A STUDY ON THE BENEFITS OF IMPROVING LOCAL BUS SERVICE PUNCTUALITY

Kazushi SANO, Yumiko SUGA, Wisinee WISETJINDAWAT, Pairoj RAOTHAANACHONKUN

Abstract: In local cities, it is important to improve bus service level in order to keep the number of passengers and to maintain bus routes since there is no other public transportation system operated except bus. Our research focuses on the punctuality, which is one of the most important factors to determine the level of bus service. Improvement of the punctuality of bus service does not provide benefits only to bus users but also to bus operators. For example, improving of the bus service level will increases number of passengers and, in the meantime, decreases the expense to bus operator because of reducing the bus waiting time at terminals. Our survey was conducted in Nagaoka city, Niigata to study the behavior of passengers coming to bus stops and to analyze the operation costs of bus operator. In addition, we estimate the benefits on both bus passengers and bus operator when the punctuality of bus service has been improved.

Key Words: Bus Service, Modal Choice, and Punctuality

FUNDAMENTAL CHARACTERIZATION OF ASPHALT BINDERS FOR PAVEMENT PERFORMANCE

Jian-Shiuh CHEN, Poyen CHU, Chien-Chung HUNAG, Kuei-Yi LIN

Abstract: Eight different asphalt binders representing a wide range of applications for flexible pavements were tested in uniaxial tension-, bending- and shear-mode facilities. Theoretical development was made in this study to convert these three engineering properties to stiffness for predicting pavement performance. At low temperatures high asphalt stiffness may induce pavement thermal cracking; thus, the allowable maximum stiffness was found to be 1,000 MPa. At high temperatures low asphalt stiffness may lead to pavement rutting; master curves were constructed to rank the rutting potential for asphalts. All three viscoelastic functions were shown to be interchangeable within the linear viscoelastic region. When subjected to large deformation in the direct tension test, asphalt binders behaved nonlinear viscoelastic in which the stiffness was not comparable with one obtained from the bending and shear tests. The asphalts were, however, found to exhibit linear viscoelasticity up to the failure point in the steady-state strain region.

Key Words: asphalt binders, rheological behavior, pavement performance

ANALYSIS OF BICYCLE BEHAVIOR IN SIGNALIZED INTERSECTION BY STATISTICS
**Abstract**: An Statistics analysis on the cyclist behavior in signalized interactions was conducted to determine the behavioral characteristics representative. We use SAS software to build all the process and models except some tests. Our purpose is to create a model to describe the overall process of the cyclist behavior and a regression model to estimate the average velocity in the conflict zone according to prevail parameters. The describing model includes arrival time and static density's distribution, the correlation coefficient between cyclists' "snake track" and the overall average velocity. The forecast model includes clustering, fast-clustering and regression.

**Key words**: Forecast Model, Correlation Coefficient, Pseudo F; Fast-cluster

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**PLANNING OF VEHICLE ROUTES FOR HANDLING MIXED PICKUP AND DELIVERY OPERATIONS WITH SIMULATED ANNEALING ALGORITHM**

Shwu-Ping GUO, Xin-Ying HUANG

**Abstract**: This study investigates the vehicle routes for a firm with its own delivery fleets and a single depot. A mathematical programming approach is employed to construct a vehicle routing model for handling mixed pickup and delivery operations by referring to the Vehicle Routing Problem with Pickup and Delivery (VRPPD). Furthermore, this study utilizes a heuristic algorithm to develop a problem-solving procedure. A revised Nearest Neighbor (NN) method is developed to obtain an initial solution. The 2-Opt exchange and Simulated Annealing (SA) method are adopted to develop the solution-improving procedure. Analytical results of this study are the optimal sequence of vehicle routes and the customer sets served by each vehicle. A sensitivity analysis among vehicle capacity, travel distance and number of routes is also proposed.

**Key Words**: Pickup and delivery, Vehicle routing, Simulated annealing

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**RISK OF ENERGY CONSTRAINED ACTIVITY-TRANSPORT SYSTEMS (RECATS)**

Dr. André DANTAS, Dr. Susan KRUMDIECK, Dr. Shannon PAGE

**Abstract**: A long-term strategic planning tool called RECATS© is introduced. It explores the link between urban form and susceptibility to fuel shortages in order to quantify a risk factor at a queried year in the future for a given urban form and travel demand configuration. RECATS includes interactive models for global peak in oil production, development scenarios for alternative or bio-fuels, and fuel rationing or supply management. On the transport side, RECATS allows the user to specify the distance, mode, and frequency matrix
which has been determined for a given urban form using standard transport modelling. 
RECATS was applied to a case study in which four different urban development forms for Christchurch, New Zealand were simulated. Results show that all urban forms would lose and/or change trips according to the land use-transport system configuration options, but the risk to activities would be very different for different future cities.

**Key Words:** Transport Planning, Urban Planning, Energy.

**PCE OF U-TURN TRAFFIC AND LANE UTILIZATION AT U-TURN SECTION WITHOUT AUXILIARY LANE**

Terdsak RONGVIRIYAPANICH, Teerapon LADALALITSAKUL

**Abstract:** Urban sprawl along arterial road is a common phenomenon in Bangkok. This pattern of urban growth has resulted in uncontrolled access to the arterial road. The most common way to handle the traffic changing to the opposite direction of the road is to provide median openings, which adversely affects road capacity. This study is aimed to investigate the effects of u-turn traffic on road capacity and lane utilization. Video cameras were used to record the traffic data of a median opening on a major arterial in Bangkok. Regression analysis indicated that at the median opening, capacity of the middle lane is approximately equivalent to 1,680 pcu/h. while the observed capacity is 1,896 pcu/h. It is found that share of traffic in the middle lane remains almost unchanged at above 50 percent throughout the study road section. Passenger car equivalents (PCEs) for motorcycle, passenger car and truck making u-turn movement are also estimated.

**Key Words:** U-turn, PCE, Lane Utilization

**CAPACITY EFFICIENCY OF DOMESTIC AIRPORTS IN TYAIWAN USING THREE-STAGE DEA APPROACH**

Ming-Miin Yu

**Abstract:** This paper modifies the Stage 1 DEA of the three-stage DEA approach developed in Fried et al. (2002) to allow for the fact that undesirable outputs like aircraft noise may not be freely disposable, and the efficiency measure of airport capacity use is modified to allow for an asymmetric treatment of desirable and undesirable outputs. A directional distance function introduced by Chung et al. (1997) was used to construct an output orientated DEA model with CRS assumption. Stage 3 DEA is a repetition of Stage 1 DEA with observed outputs adjusting to account for the effects of variation in the operating environment, variation in statistical noise, and variation in technical change obtained from Stage 2 SFA regression analysis. Results from the empirical analysis for the case of Taiwan’s domestic airports strongly demonstrate that airport capacity efficiency performance turned out to be very sensitive to whether or not environmental impacts, stochastic noises, technical-change factor, and undesirable outputs were
included. This document contains detailed guidelines for preparation of full papers of the EASTS 2007. To submit a paper for the proceedings of EASTS must follow the instructions in this document. Authors should review all information in this document before submitting papers. Papers that do not follow the guidelines may not be considered for presentation or publication. You are also requested to revise your paper in accordance with the comments and suggestions from reviewers.

**Key Words:** capacity efficiency, three-stage DEA, undesirable outputs

**EFFECT OF RETRO-REFLECTING PERFORMANCE FOR TRAFFIC SIGNS BY DRIVING VISIBILITY EVALUATION UNDER FOGGY CONDITIONS**

Kazunori MUNEHIRO, P.E., Roberto A. TOKUNAGA, Ph.D. Motoki ASANO, Ph.D., P.E., Toru HAGIWARA, Ph.D.

**Abstract:** For safe driving in foggy condition it is important that driver recognize warning signs. The authors tested effects of retro-reflecting performance for signs by driving under foggy condition. The tests were conducted on a road in service under four visibility conditions: daytime clear, daytime dense fog, nighttime clear, and nighttime dense fog. Two types, incorporating wide-angle prism retro-reflective and encapsulated-lens retro-reflective materials are used for testing visibility targets. Drivers drove a test car under free-flow condition and cued an experimenter in the back seat upon recognizing the warning sign and again upon determining its meaning. Visibility and legibility distances in daytime dense fog and nighttime dense fog tended to be greater for the signs incorporating wide-angle prism retro-reflective material than for signs incorporating encapsulated-lens retro-reflective material. The findings demonstrate that installing traffic signs with high retroreflectivity can contribute to driving safety by improving visibility and legibility under fog.

**Key words:** traffic sign, visibility, fog

**FORECASTING AUTOMOBILE DEMAND TOWARD SUSTAINABILITY: A SIMULTANEOUS-EQUATIONS MODEL FOR TAIWAN**

Chi-Chung WANG, Kevin P. HWANG, Ya-Yun CHENG

**Abstract:** This paper aims to forecast automobile demand in Taiwan. A dynamic automobile demand simulation model is developed utilizing a simultaneous-equations system from the 1981 to 2005 data. A three-stage least squares technique is applied to generate coefficient estimates. Relevant tests are applied to evaluate performance of the prediction model. Finally, experiments with various economic growth and oil prices
scenarios are demonstrated. Research results show that most of the automobile demand growth is driven by economic growth in Taiwan and there is observable sensitivity of the increase in automobile demand with respect to various oil prices scenarios.

**Key Words:** automobile demand, simultaneous-equations system, oil price

**RELATIONSHIPS BETWEEN OIL PRICE AND AUTOMOBILE DEMAND: TESTING COINTEGRATION AND GRANGER CAUSALITY**

Chi-Chung WANG, Kevin P. HWANG, Ya-Yun CHENG

**Abstract:** This study aims to analyze the relationships between oil prices and automobile demands. World crude oil price, Taiwan’s fuel price, new-car demand and car-ownership registrations series were used in the analysis to explore leading relations between oil price variables and automobile demand variables. Cointegration analysis and Granger causality tests were made for demand models. Statistically, the results show that there is evidence for cointegration and Granger-causality from world crude oil price to new-car demand. However, there is not leading relations from oil prices to car-ownership demand.

**Key Words:** oil price, cointegration, Granger causality

**PRELIMINARY STUDY ON FLEXIBLE PAVEMENT PERFORMANCE A CASE STUDY JAGORAWI TOLL ROAD WEST JAWA, INDONESIA**

Aloysius TJAN

**Abstract:** Jagorawi Toll Road as Indonesia’s first freeway has in service for more than 40 years. It performs very well, although pavement is maintained in a traditional maintenance procedure. If PMS (pavement management system) is applied, optimum maintenance alternatives can be selected based on life cycle cost analysis. Currently, Indonesia has no pavement performance model. Development of such model is a first step to do before developing an appropriate PMS. Based on ten years of 1122 roughness data at Jagorawi, annual rates of roughness change is 0.163 m/km. This value is comparable to Australia’s national highway. However, the rates of roughness change cannot be developed as a function of cumulative equivalent standard axle load. In order to be able to develop such model, it is recommended that annual pavement roughness monitoring, accurate NAASRA roughness meter calibration, in addition to automatic traffic data acquisition as priority program of PT Jasa Marga.

**Keywords:** pavement management system, pavement performance, pavement roughness
THAILAND SAFE-FOLLOWING DISTANCES BASED ON SPEED-DENSITY RELATIONSHIP

Pichit JAMNONGPIpatkul, Ponlathep LERTWORAWANICH, Mongkol Tawechaitsapap

Abstract: Nowadays transportation forms an integral part of social activities. Unfortunately, one of the by-products of modern transportation is the price that society pays for injury and loss of life. Even though there is no specific statistic, it is thought that rear-end collision is the most common type of road accidents in Thailand. Therefore, the aim of this research is to reduce the severity and the number of accidents due to rear-end collisions by introducing a safe-following distance. This research develops a methodology to estimate the safe car-following distance for a speed range from 80 to 120 km/h within which speeds are commonly observed on the highways in Thailand. The methodology is based on the maximum likelihood estimation to derive the safe following distance. To bring the findings of this research into practice, the “dot” pavement marking is developed as a countermeasure for assisting drivers in establishing the recommended following distance.

Key Words: car-following, rear-end collisions, maximum likelihood

NEW STABILITY INDEX INDICATING RUTTING RESISTANCE OF ASPHALT MIXTURE

Iman Haryanto, Osamu Takahashi

Abstract: Stability reflects a resistance of asphalt mixture to rutting. Asphalt mixture with low stability is prone to rutting. This study aimed to develop a new stability index (SI) standing on cohesion (C), internal friction angle (φ) and porosity of mineral aggregates (n). The properties of C and φ could be obtained from unconfined compression test and indirect tensile test. The property of n could be analyzed from the volumetric analysis of asphalt mixture. Seven asphalt mixtures were investigated. Wheel tracking test was conducted to verify validity of SI as a rutting potential index. It has been found that SI is well correlated with dynamic stability (DS). The relationship suggests that SI more than 54 kPa is equivalent to a minimum DS of 800 cycles/mm, within the scope of materials sources and the test methods used in this study. SI can be a rutting potential indicator of asphalt mixture.

Key Words: asphalt mixture, rutting, stability index

A PROPOSAL TO IMPROVE THE DESIGN PROCEDURES OF
WEARING COURSE MIXTURE IN INDONESIA

Iman HARYANTO, Osamu TAKAHASHI

Abstract: The objective of this study was to improve design procedures of wearing course mixture in Indonesia. This study discussed the followings; use of unconfined compression test (UCT) to evaluate the rutting resistance, use of semi circular bending test (SCBT) to evaluate the cracking resistance, and adoption of analytical method to design the aggregate gradation. The UCT and SCBT were carried out to obtain secant shear modulus ($G_s$) and $J$ integral ($J_c$), respectively. Wheel tracking test was conducted to obtain dynamic stability (DS) of which employed to verify validity $G_s$ as a rutting potential index. There were strong correlations between $G_s$ and DS, and between coarse aggregate ratio and $J_c$. A flow of new design procedures of Indonesian wearing course mixture was proposed standing on the findings of this study.

Key Words: mixture design procedures, shear modulus, $J$ integral

USE OF SPHERICAL AGGREGATES ASSEMBLY MODELS FOR THE ASSESSMENT OF DILATANCY AND RUTTING OF ASPHALT MIXTURE

Iman HARYANTO, Osamu TAKAHASHI

Abstract: Asphalt mixture is an assembly of bitumen bound aggregates. Application of stress and high temperature on asphalt mixture simultaneously may enforce aggregates motions in the mixture. The motions of aggregates induce shape deformation or shear distortion of asphalt mixture. Dilatancy is increase of volume during shear distortion. Shape distortion is one of rutting appearance. The objective of this study is to develop spherical aggregates assembly models as an aid to understand both dilatancy and rutting performance of asphalt mixture. The models were developed standing on criteria of the Bailey ratios and porosity of backbone aggregates. Dilatancy tendencies of the models statistically agreed with those of asphalt mixtures measured by compression test. Deformation tendencies of the models were comparable with those of asphalt mixtures evaluated by wheel-tracking test. The models indicated that small contact angle and high mixture cohesion positively increased the rutting resistance.

Key Words: spherical aggregates, dilatancy, rutting

DATA FUSION AND FEATURE COMPOSITION APPROACH TO SEQUENTIAL ACCIDENT DURATION FORECASTING

Ying LEE, Chien-Hung WEI
**Abstract:** This study creates an adaptive data fusion procedure to represent the sequential forecast of accident duration. This procedure includes two Artificial Neural Network-based models. Model A is used to forecast the duration time at the instant of accident notification while Model B provides multi-period updates of duration time after the moment of accident notification. These two models together provide a sequential forecast of accident duration from the accident notification to the accident site clearance. With these two models, the estimated duration time can be provided by plugging in relevant traffic data as soon as an accident is being notified. Through the feature composition approach, the number of inputs can be decreased while the relevant traffic characteristics are preserved. This study shows very promising practical applicability of the proposed models in the Intelligent Transportation Systems context.

**Key Words:** Sequential forecast, Freeway accident duration analysis, Data fusion techniques

**TEMPERATURE ISSUES IN FINE WINE TRANSPORTATION**

Ying XIE, Chris KISSLING

**Abstract:** Wine is a temperature-sensitive product. On the shipping route from New Zealand to major export markets in the northern hemisphere, wine shipments face high equatorial temperatures and large temperature fluctuations that might degrade/damage the wine’s quality. This article focuses on the possible temperature fluctuations on major shipping routes under various conditions. Information from data recorders have been collected in sample containers sent from New Zealand to destination ports. The sample containers included general containers and containers with an insulated temperature protection liner. This article has reinforced that quality control is very important during the entire length of the wine supply chain. Some further suggestions have been given for future studies. Some possible ways to eliminate or mitigate the temperature fluctuation, which threaten the quality of wine during the transport phase, are also discussed.

**Key words:** wine quality control, temperature fluctuation, transportation

**OPTIMIZATION OF NEW AIRPORT LOCATION AND AIRLINE RATE IN TERMS OF BENEFITS FOR SUPPLY AND DEMAND SIDES**

Lu WANG, Zhongzhen YANG

**Abstract:** A model for locating new airports is built aiming to minimize the total expenses of regional air transport. Two factors in the model namely airport choice probability and airlines average rate are analyzed in detail. For the former, a sub-model to simulate the users’ behavior for choosing airports is built, and for the later a sub-model to
analyze the market scale of regional air transport is developed based on the model calculating the market scale of single airline. The study integrates the airline average rate setting, airport choice behavior and new airport location closely and considers the benefits of both passengers and the new airports simultaneously. Due to the interaction, an iterative calculation algorithm is designed to solve the model, in which a GAs is used to simulate the relationship between the two factors and the equilibrium solution is obtained. Finally, a numerical test is done to validate the method.

**Key Words:** Airport Location, Airline Average Rate, Airport Choice Behavior

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**MODELING DRIVER PREFERENCE FOR IN-VEHICLE TRANSPONDER FEATURES: A CASE STUDY OF TAIWAN**

Chien-Hung WEI, Kitty WU, Ying LEE

**Abstract:** This paper models consumer preference for potential product features to be incorporated into electronic toll collection transponders equipped in private passenger cars. Both conjoint and artificial neural network (ANN) models were used to analyze data collected from a driver survey conducted in Taiwan. The conjoint preference model identifies that rescue service is the most important product feature if the transponder is designed to add a new single feature. The model however is not able to conclude the most preferred combination of feature options under segmentation evaluations. The ANN model results show that a combination comprising rescue service, traffic information, individual route guidance, and automatic vehicle location is perceived by most respondents to be a potential combination of product features for transponders. Although the modeling results reflect only the driver preferences in Taiwan, the results can be used to identify peer regions in Asia for further comparison and analysis.

**Key words:** ETC transponder, Conjoint analysis, Neural network

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**EFFECT OF SPEED REDUCTION DEVICES ON THROUGH TRAFFIC: AN ANALYTICAL MODEL AND SCENARIO ANALYSIS**

Kuan-Zu CHEN, Juey-Fu CHENG, Kevin P. HWANG

**Abstract:** To protect pedestrians, bicyclists, and the quality of living environment, vertical and horizontal speed reduction devices (SRD) are often utilized to reduce the vehicle speed. SRDs not only contribute to reducing vehicle speed, but also redistribute the traffic flow due to the change of travel time which implies the residents have also to endure the inconvenience of SRD. To help evaluate the SRD installation, this study uses the traffic flow-speed-density relationship setting the minimum travel time as the objective function to establish a steady state traffic assignment model. Different traffic settings and SRD installation schemes are tested and evaluated which shows that the
introduction of SRD is most significant when traffic outside the traffic calming zone is at high volume peak period. By proper choice of SRD type and installation scheme, through traffic outside the community cutting into the local streets can be significantly reduced.

Key Words : Through Traffic, Speed Reduction, Traffic Assignment

EVALUATION OF BUS LANE BENEFITS AND IMPACTS

ShuGuang Li, HongKe Xu

Abstracts: We present a multi-mode dynamic traffic assignment model to evaluate the benefits and impacts of bus lane. Firstly, a multi-mode point queue model is proposed to model the interactions of cars and buses under two conditions: with and without bus lanes. Then, we present an integrated variational inequality formulation to capture the travelers’ mode choices, path and departure time choices. Then, a heuristic algorithm is presented to solve the variational inequality problem. Finally, the benefits and impacts of bus lane are analyzed by numerical examples.

Keywords: Multimode point queue model, Bus lane, Variational inequality.

DYNAMIC TRAFFIC NETWORK MODEL WITH COMBINED MODE IN CONGESTED NETWORKS

ShuGuang Li, HongKe Xu

Abstract: We propose a conceptual dynamic traffic network model with combined mode. We assume that travelers are classified into two classes, one class is pure mode travelers that complete a trip by single transportation mode, and the other is combined-mode travelers that complete a trip by multiple transportation modes. The multi-mode point queue model is used to model the interaction of cars and buses on the network. We present an integrated variational inequality formulation to capture the complex traveler choice behaviors such as mode choices, departure time choices, transfer point and path choices and so on. Finally a numerical example is given to illustrate the effectiveness of the proposed heuristic algorithm and model.

Keywords: dynamic traffic network model, combined mode, Variational inequality.

RESEARCH ON THE COORDINATION BETWEEN THE AIRPORT LAYOUT AND REGIONAL ECONOMY OF CHINA

Xiuyuan ZHANG, Zhijian CHEN
Abstract: With the developing of global economic and extensive trade cooperation, the transport demand volume increases quickly both passenger and freight traffic in China. it is much higher frequently that china connect with other country in trade and people commuting, which makes much more the need of transport. The civil aviation is played important role in the integration of multi modal traffic and transportation network. Here we discuss the function, topology of airport planning and it’s coordination with diversified region solid economic pattern in order to make fast and convenient multi-layer traffic network to fit our economic development. And we study china civil aviation three relationship of (1) airport and flight course network topology, which is a free-scale complex network, from the point of systematic theory view; (2) the airport network with the region attract and origin activity, and (3) the airport group layout. and regional economy forming an traffic economic belt space effect. Sum up the study content and give some suggest for china airport planning.

Key words: airport network, free-scale network, airport group

HOW DOES THE VALUE OF TRAVEL TIME SAVING VARY OVER THE INDIVIDUAL'S INCOME?

Hironori KATO, Makoto FUJIU

Abstract: This paper analyzes how the value of travel time savings (VTTSs) varies over individual’s income. First, we formulate a time allocation model and examine the variation of VTTS over income with the comparative static analysis. The results show that the variation of VTTS over income depends on whether the marginal utility is increasing or decreasing with respect to the work time. As a shape of utility function cannot be fixed a priori, we cannot know clearly the variation of VTTS over income. Then, we analyze the VTTS over income empirically with the travel data of urban rail in Tokyo. We estimate the multinomial logit model and the mixed logit model for six different income groups. The empirical analysis shows that the VTTS increases as the income increases.

Key Words: value of travel time savings, income, discrete choice model, comparative static analysis

ADVANCED TRAFFIC CONTROL SYSTEM IMPACTS ON ENVIRONMENTAL QUALITY IN A LARGE CITY IN A DEVELOPING COUNTRY

A. Caroline SUTANDI

Abstract: Advanced Traffic Control Systems (ATCS) have been used in large cities in developing countries to ease traffic congestion problems. Congestion causing poor traffic
performance has negative impacts on economic productivity, environmental quality and safety. The aim of this paper is to evaluate the impact of ATCS on fuel consumptions and pollution emissions in a large city in a developing country with specific geometric and traffic behaviour. A large road network area in Bandung, Indonesia was used as a case study. Fuel consumptions and pollution emissions (CO, NOx, HC) data was obtained from combustion and emissions laboratory. The results found that the impact of ATCS on reducing fuel consumption and pollution emission is not good especially during peak periods that usually have more traffic congestion. In conclusion, the application of ATCS in the large city in a developing country is not effective to reduce traffic congestion and enhancing environmental quality.

**Key words:** Advanced Traffic Control Systems, Environmental Quality, Developing Country.

**TRANSPORT MODE CHOICE MODELS FOR METRO MANILA AND URBAN TRANSPORT POLICY APPLICATIONS**

Alexis M. FILLONE ,Cresencio M. MONTALBO Jr. ,Noriel Christopher C. TIGLAO

**Abstract:** Multinomial and nested logit models were developed for urban transport mode choice of urban travelers during the morning home-to-work trips in Metro Manila. In the multinomial logit model, seven mode choices were available including the private car, regular taxi, light rail transit, air-conditioned bus, non-air-conditioned bus, jeepney, and fx megataxi. Two-level nested logit models were further developed which divided the available modes into private and public, and the public modes were further divided into air-conditioned and non-air-conditioned modes in the three-level nested logit models. Important deterministic variables included in the utility equations include in-vehicle time, out-of-vehicle time, individual monthly income divided by out-of-pocket cost, among others. The developed models were then used to determine the utility ranking of transport modes in Metro Manila and to test the effect of proposed urban transport-related developments in Metro Manila on mode choice probabilities of urban travelers.

**Key Words:** logit models, utility, work trips

**SENSITIVITY ANALYSIS OF STRAINS AND STRESSES FOR LONG-LIFE ASPHALT PAVEMENT**

Hongyan SUN ,Chuanchao ZHENG

**Abstract:** The objective of this study is to provide foundations for selecting pavement structure by sensitivity analysis of pavement structure factors including thickness and modulus of each layer. In this paper, sensitivity analysis is based on orthogonal experiment method. Tensile strain at the bottom of asphalt concrete $\varepsilon_t$, compressive strain on top of the subgrade $\varepsilon_c$, and tensile stress $\sigma_t$ at the bottom of semi-rigid cement stabilized
gravel were evaluated using Bisar 3.0 program. Results demonstrate that when conspicuous level $\alpha$ is equal to 5\%, only asphalt concrete thickness $h_1$, graded crushed stone modulus $E_2$ and asphalt concrete modulus $E_1$ have obvious effect on tensile strain at the bottom of asphalt concrete $\varepsilon_t$. $h_1$ has the most efficient on all pavement responses. Two types of long-life pavement have been recommended.

**Key Words:** Long-life pavement; Pavement structure factors; Sensitivity analysis; Orthogonal experiment;

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**SUPPORTING APPRAISAL FOR INNOVATIVE TRAFFIC CONTROL DEVICES: AN APPLICATION OF FAHP**

Kevin P. HWANG, Chi-Chung WANG

**Abstract:** Questions of location, method, or effectiveness are the prime focuses of academic research about traffic improvement project. However, economic, political, administrative, and product concerns are often other aspects of importance when new or innovative traffic control devices (ITCD) are planned for installation to relieve safety problem or provide traffic information to road users. This research develops a procedure of three-staged fuzzy analytical hierarchical process (FAHP) to support the appraisal of where and when to install those devices besides the warrants of MUTCD. This research reveals that the factors concerned follows the order of 1. effectiveness, 2. cost and financial resource, 3. location and environment, 4. product capability, 5. possible political concerns, and lastly, 6. administrative endeavor. After completion of the criteria evaluation, 5 kinds of ITCD were used to test the model.

**Key Words:** Innovative Traffic Control Device, Fuzzy Analytical Hierarchical Process

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**INVESTIGATING THE TEMPORAL TRANSFERABILITY OF TRANSPORT MODAL CHOICE MODELS: AN APPROACH BASED ON GIS DATA BASE**

Katia ANDRADE, Seiichi KAGAYA, Kenetsu UCHIDA, Andre DANTAS, Alan NICHOLSON

**Abstract:** Developing precise travel behavior models and testing its forecasting capability are essential when planning transportation systems. However, emphasis is observed in estimating while forecasting still needs to be better understood. This study examines the temporal transferability of a Multinomial Logit Model and a hybrid Neuro-Fuzzy Multinomial Logit model, which differ primarily by including linear and non-linear utilities. Geographic Information System is successfully used during the forecasting process. Overall, the hybrid model presents better performance, even though both models do not show satisfactory behavior when directly transferred to the application context. Small sample
model results show good behavior of the hybrid model. Accordingly, a sensitivity analysis suggests this model is able to capture travelers’ sensitivity to parking cost variations, which is not well described by the classical model. Travelers’ behavior could be better explained by the hybrid model rather than by the classical Multinomial Logit structure.

Key Words: Geographic Information System, Neuro-Fuzzy Systems, Temporal Transferability.

A STUDY OF AIRLINE TICKET PRICING IN CHINA

Zhongzhen YANG, Lu WANG

Abstract: This paper first theoretically analyzes the current problem of air ticket pricing in China, and investigates the consciousness of the travelers on the price level with the Price Sensitivity Measurement. Secondly, from the perspective of air transports suppliers, optimal air ticket model is built for suppliers benefit increment; and from the perspective of travelers, rational air ticket price model is built for market scale enlargement. With the consideration of different price sensitivity of business consumers and private consumers, this paper distinguishes them. Finally, by taking the flight from Dalian to Beijing as an example, data are collected from the questionnaire analysis and optimal air ticket price point and the rational price point are estimated with the models, respectively. The results of the example show that the current ticket price is higher both for business consumers and for private one, which matches the theoretical analysis. And the numerical test verifies the feasibility and availability of the method.

Key Words: air ticket price, price sensitivity measurement, air transport market scale, profit level for the producer

OPTIMIZATION OF THE DISTRIBUTION OF SHOPPING CENTER TO MANAGE THE SHOPPING TRIPS IN A CHINA’S CITY

Qin FANG, Zhongzhen YANG

Abstract: In order to manage the transportation demand through land use planning, we developed a model to optimize the distribution of shopping centers in a China’s city. In the model the location behavior of shopping centers and the destination selection behavior of the shoppers are considered. It is a p-median style model, in which we considered the modal split model. Models respectively based on road network and super transportation network are structured. The objective of both of them is to decrease the distance of shopping trip. With survey data of Dalian city we calibrated the two models and verified their validity. After that in order to solve this nonlinear programming problem, genetic algorithm with dynamic parameters is designed and numerical test is
done with the data of Dalian city in China.

**Key Words:** Shopping Center, Transportation Demand Management, p-median model, Modal Split Model, Genetic Algorithm

INCIDENT DETECTION MODELS TO DETECT BOTH LANE-BLOCKING AND SHOULDER INCIDENTS

Kittichai THANASUPSIN, Sarosh I. KHAN

**Abstract:** This paper presents nonparametric generalized additive models to detect both lane-blocking and shoulder incidents for two freeways in Colorado and California, USA. The parametric generalized additive models were developed based on the examination of the partial prediction of the variables of the nonparametric generalized additive model. This paper also highlights the importance of developing incident detection models to detect both lane-blocking and shoulder incidents. The performance of the nonparametric generalized additive models were also compared to multilayer feedforward neural network based models. The model proposed outperformed the neural network based model.

**Key Words:** Incident Detection Model, Lane-blocking and Shoulder Incidents, Intelligent Transportation Systems

RURAL ROAD SURFACING RESEARCH FOR SUSTAINABLE ACCESS AND POVERTY REDUCTION IN SOUTH EAST ASIA

Ta Van GIANG, Nguyen Huu DUC, Robert PETT

**Abstract:** The paper describes recent DFID and World Bank funded research on alternatives to gravel roads in Vietnam and Cambodia. A substantial range of proven, low-cost, rural road paving options is available and many of these have been tested in over 150 road sections constructed in South East Asia. These paving options are suitable for construction and maintenance by Small and Medium Enterprises (SMEs). The paper also reviews the alternative surfacing options. Most of these paving options require little capital investment in equipment, use labour-based techniques and can optimise the use of local materials resources. They can utilize locally made or available simple equipment, thus promoting local manufacturing and appropriate equipment ownership. For many of these techniques overhead costs could be reduced and a higher proportion of the costs could be recycled in the local community. The maintenance burden of these alternatives is usually lower than for gravel roads, and whole life costs can be cheaper than the provision of a gravel surface. Poverty reduction would be facilitated both through the involvement of the local community in the works, and improved, more sustainable access.
**Key Words:** gravel road, rural road paving, low-cost

**ANALYSIS OF EQUIVALENT ELASTIC MODULUS FOR TWO-LAYER ELASTIC SYSTEM UNDER RIGID BEARING PLATE**

Xucan YU, Chuanchao ZHENG

**Abstract:** Based on the theory of two-layer elastic system, this paper introduces the formula of equivalent elastic modulus of two-layer elastic system under rigid bearing-plate, and presents the normal figure of equivalent elastic modulus by a numerical method employed in the paper, which can be used expediently in highway engineering. The influences of bearing plate form and other parameters on the equivalent elastic modulus are analyzed; the results show the form and radius of bearing plate as well as Poisson’s ratios have a great effect on the equivalent elastic modulus.

**Key Words:** Two-layer elastic system, Equivalent elastic modulus, Bearing plate, Parameters analysis

**IMPACT ASSESSMENT OF BUSWAY IMPLEMENTATION IN JAKARTA: A CASE OF CORRIDOR ONE (SUDIRMAN-THAMRIN)**

Sutanto SOEHODHO, Alvinsyah

**Abstract:** There have been some debates on the effectiveness and efficiency of busway or bus priority implementation since its undertakings in 2004. Questions have been raised regarding its traffic and related environmental impacts, especially to corridor one or Sudirman-Thamrin passage through which this corridor has a strictly determined green corridor. Inherently implementation of busway has occupied one dedicated lane for each direction out of the existing three higher speed lanes and two slower speed lanes. This occupation has, of course, worsened the traffic performance during peak hours, and as can be expected that the impact would cause traffic congestions to some road segments in the periphery at network level as well. Quite recently local government has intention to gain back the existing road capacity at the corridor through the cutting of some road separator between the slower and higher speed lanes, and replace one additional lane upon at the higher speed lanes to alleviate tremendous traffic congestion. This additional lane may reduce width of two other existing lanes from 3.00 m to 2.75 m which is still accepted by the Indonesian Highway Capacity Manual (IHCM) for road segments with limited speed. To justify such capacity gains study is made to consider merits and demerits regarding the traffic impact and its environmental consequences such as fuel consumption, and CO or NO emissions. Although it is a corridor level implementation,
study uses a network level assignment to estimate the changes of traffic flows, and it relates the changes with some emission issues for environmental aspects. Results have shown that some improvements of traffic measures could be achieved with its emission reduction. It is also noticed that little achievement is hard to gain when corridors are at saturated level.

**Key Words:** busway, dedicated lane, traffic performance, fuel consumption and emissions.

**STUDY OF FACTORS INFLUENCING VEHICLE HYDROPLANING SPEED**

Ghim Ping ONG, Tien Fang FWA

**Abstract:** Hydroplaning of vehicles is of particular concern to pavement engineers as it compromises the safety of automobiles during wet-weather highway operations. This paper describes the use of a finite-element model to simulate hydroplaning of a locked wheel sliding on a flooded pavement surface. The main components of the model are described and the model is validated against the various experimentally-derived relationships. The effects of tire inflation pressure, wheel load and water-film thickness on hydroplaning speed are studied using the numerical model. It is found that hydroplaning speed increases with increasing tire pressure, increasing load and decreasing water-film thickness. It is observed that tire inflation pressure is a dominant factor affecting hydroplaning speed while wheel load and water-film thickness are secondary factors. For easy practical application a regression relationship of hydroplaning speed as a function of tire inflation pressure, wheel load and water-film thickness is developed using the results of the numerical simulations.

**Keywords:** Hydroplaning, Finite-element method, Fluid-structure interaction

**PASSENGERS’ BEHAVIORAL INTENTIONS FOR INTERCITY BUS SERVICE IN TAIWAN: APPLICATION AND COMPARISON OF THE LISREL AND NEURAL NETWORKS**

Kai Chieh Hu, William Jen

**Abstract:** LISREL and neural networks have recently become popular methodology for causal models. However, few researches have applied either of these two methods in behavioral research of passengers. To investigate the differences between LISREL and neural networks in research of passengers’ behavioral intentions, this study applied these two methods to a case of intercity bus transport in Taiwan. First, we applied LISREL to test the goodness of fit of the research model. Second, two competitive models of the NN model were tested, in which one was the full connected network and the other was the
non-full connection network. The results indicated that LISREL can be a convenient and effective analysis tool if the causal relationships are known. At the same time, no matter if the causality has been derived in advance or not, NN provided a suitable prediction after the proper training procedure.

**Key Words:** LISREL, Neural Networks, Behavioral Intentions, Intercity Bus

**RESISTANCE TO OVERCOMPACTION OF SINGLE LAYER AND DOUBLE LAYER POROUS ASPHALTS**

Meor Othman HAMZAH, Hardiman M. YATIM

**Abstract:** This paper described a simulative laboratory test to simulate traffic overcompaction using the gyratory compactor. During overcompaction, specimen heights were monitored to determine mix porosity. Mix permeability was measured before and after overcompaction. Resistance to overcompaction was assessed from changes in porosity, height and discharge time. The porosities of all mixes reduced continually until overcompaction ceased. The magnitude of porosity reduction of SLPA mix was highest when overcompacted at higher pressure and on smaller NMAS conventional mix. From the terminal percentage height reduction values, DLPA mixes were subjected to a higher degree of overcompaction compared to the corresponding SLPA mixes. In general, SBS modified mixes were more resistant to overcompaction compared to conventional mixes. The modified mixes also exhibit the lowest percentage change in drainage time.

**Key Words:** Porous Asphalt, Porosity Reduction, Height Reduction, Drainage Time

**CO2 EMISSION: STATUS, REDUCTION POLICY AND MANAGEMENT STRATEGY OF TAIWAN’S TRANSPORTATION SECTOR**

Kevin P. HWANG, Po-Shine TSENG

**Abstract:** Greenhouse gas emission (GHG) is a very important issue in today’s international agenda. Among GHG, CO2 emission related to energy use results from fossil fuel combustion; and CO2 emissions due to transport play a major role in the worrying problem of the greenhouse effect. Thus transportation sector (especially in highway system) could play a critical role to help Taiwan meet the requirements of Kyoto Protocol. The objective of this study is to investigate CO2 emission status, reduction policy and management strategy of Taiwan’s transportation sector. It is concluded that the lower price of fuel is important reason that contributed to fuel inefficiency and CO2 emission increase. The government must restrain the use and possession of private vehicle effectively to reduce fossil fuel consumption. Finally, levy of fuel tax method must be reviewed and reformed to improve CO2 emission.
INCORPORATING DIFFERENCES IN MARGINAL UTILITIES OF TIME ACROSS ACTIVITIES IN A TIME ALLOCATION MODEL

Kali Prasad NEPAL, Daisuke FUKUDA, Testuo YAI

Abstract: Most existing activity time allocation models assume that individuals allocate their time to different activities over a period in such a way that the marginal utilities of time across activities are equal. Their argument is that, if not equal, an individual is free to allocate more time to those activities whose marginal utilities of time are higher and, finally, allocates the optimal time to each activity with equal marginal utility. However, such an ideal situation may not always prevail in reality, especially when an individual is under income constraint and/or under intense time pressure. In order to incorporate such differences in marginal utilities of time across activities, we enrich the traditional activity time allocation model by explicitly including income constraint and by adding marginal extension activity choice model. As an application, the developed integrated model is used to estimate the value of activity time during weekends in Tokyo. The results are encouraging in that they forecast the individual time allocation more accurately and estimate realistically the value of activity time for each activity in a set of different activities than do by existing traditional models.

Key Words: activity time allocation, marginal utility of time, value of activity time

A HYBRID FLOW SHOP SCHEDULING MODEL FOR LOADING OUTBOUND CONTAINERS IN CONTAINER TERMINALS

Qingcheng ZENG, Zhongzhen YANG

Abstract: This paper discusses the scheduling problem for loading outbound containers in container terminals. The problem is to determine a schedule that minimizes the makespan or time being taken to load a given set of outbound containers. An integrated model based on hybrid flow shop scheduling problem is developed. Two Metaheuristic algorithms are designed to solve the proposed model, the procedures are: initializing container sequence first; then allocating containers according to certain partitioning rule; and then improving the sequence by simulated annealing. Numerical experiments are conducted to test the performance of the proposed model and algorithms.

Keywords: Container terminal; Simulated annealing; Hybrid flow shop problem

ANALYSING THE POTENTIAL OF TELECOMMUTING AS A
SUBSTITUTE FOR COMMUTE TRAVEL

Abdul Azeez KADAR HAMSA, Wan Nurul Mardiah WAN MOHD RANI

Abstract: Earlier research had identified association between telecommuting and commute travel. Telecommuting is considered as a travel demand management measure in mitigating travel especially work trip to the central business district. However, whether it acts as an effective travel demand management measure is still remain to be seen. This paper investigates potential of telecommuting as a travel substitute especially for work related trips. The analysis of travel substitution as a result of practicing telecommuting was made based on stated preference of the employees in the selected business organizations by questionnaire survey. The survey was administered in two major cities namely Kuala Lumpur and Johor Bahru in Malaysia. Work trip components include commute trip and vehicle-km. Telecommuting frequency between 1 and 3 days per week was considered for this study. The analysis revealed that the commute trip reduction from stated preferred telecommuters was not more than 10% of the total commute trips.

Key Words: telecommuting, commute trips, vehicle-km

A TRAIN SERVICE PLANNING MODEL WITH DYNAMIC DEMAND FOR INTERCITY RAILWAY SYSTEMS

Jyh-Cherng JONG, Chian-Shan SUEN, Taiwan High Speed Rail Corporation

Abstract: The journey time of intercity trains is usually more than hours. The train dispatched at its departure station may not be able to serve the passengers during the same hour at downstream stations. In addition, intercity trains usually consist of various stopping patterns. Consequently, typical method for determining train service plans based on maximum passenger load and train capacity is inapplicable for such systems. For these reasons, this paper develops a mathematical model for generating optimal train service plans for intercity railways, taking into account the dynamics of train movements and the transfer of unserved passengers. This model combines operator’s revenue, operating cost, and users’ travel-time cost as its objective. The operational requirements are formulated as the constraints. The Taiwan High Speed Rail is taken as an example to test the model. The case study shows that the model is very efficient and is very flexible for different operation strategies.

Key Words: Intercity Railway System, Train Service Plan, Optimization

REQUIRED LUMINOUS INTENSITY OF LED ROADWAY DELINEATORS UNDER FOGGY CONDITIONS

Kazunori MUNEHIRO, P.E., Roberto A. Tokunaga, Ph.D., Motoki ASANO, Ph.D., Toru HAGIWARA, Ph.D.
**ABSTRACT:** This study involved the subjective visibility evaluation of LED roadway delineators under different visibility conditions both at daytime and nighttime. The experiment was conducted using a road in Hokkaido, Japan under natural foggy conditions. The authors employed three types of LED delineators to examine how their visibility differed across various levels of luminous intensity. Twenty women participated as subjects. They were asked to evaluate the visibility, glare, and safety of each test accessory. In heavy fog, LED delineators earned a high rating of subjective visibility at daytime and nighttime. It was also recognized that the luminous intensity of the light-emitting elements in the delineators required adjustment depending on the degree of visibility reduction due to fog: To make the delineator "visible" from the observation distance of 200-m under foggy conditions with a visibility distance of 100-m, luminous intensities of 1,000-cd and 70-cd are desirable for daytime and nighttime, respectively.

*Key words:* luminous intensity, visibility, roadway delineator, fog

**DYNAMIC RESPONSE OF PAVEMENT WITH ABSORBING ELEMENT**

Ming-Lou LIU, Zhi-Qiang LIN, ui-Chang CHUANG

**Abstract:** A vehicle traveling on the road exerts a dynamic load on the pavement. A realistic prediction of pavement response can be achieved by using a dynamic finite element analysis. However, the computational model of the finite element method is restricted to a finite domain. It is necessary to use a special boundary technique to consider the radiation condition of the unbounded domain into the finite element model. In this paper, absorbing elements are installed inside the finite element domain to simulate half-space conditions; these can absorb a propagating wave and prevent wave reflection from the bottom boundary. The efficiency of the absorbing elements is verified first, then the elastic structural responses of pavement under three different vehicle speeds are studied. Finally, the developed program is incorporated with the Drucker-Prager plasticity model to predict the permanent deformation of pavement under repeated traffic loading.

*Key Words:* Absorbing element, dynamic response of pavement, finite element

**Dynamic Time Domain Backcalculation of LTPP Test Sites**

Ming-Lou LIU, Hsiao-Yuan LIAO, Jui-Chang CHUANG

**Abstract:** A time domain backcalculation program is developed, and it is used to predict the response of the FWD test from LTPP test sections for three-layer and four-layer
pavements. The Newmark scheme is used for the time integration, and the pattern search approach of optimization is adopted to perform the backcalculation analysis. First, the backcalculations based on the synthetic data generated by the finite element program show a good agreement between the backcalculated and given material properties. Then, the backcalculation is performed to analyze the FWD data of three-layer and four-layer pavements from the LTPP database; the predicted and measured history responses deflection are close. Finally, the backcalculated properties are used to predict the dynamic response of the FWD test in which the deflection data was not used for backcalculation analysis; the results show that the predictions and the test results agree very well.

**Keywords:** FWD, dynamic backcalculation, LTPP

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**PLASTIC DEFORMATION CHARACTERISTICS AND STIFFNESS MODULUS OF HOT ROLLED SHEET (HRS) CONTAINING BUTON ASPHALT (ASBUTON)**

Bambang S.Subagio, Harmein Rahman, Harry Fitriadi, Lusyana

**Abstract:** Rock asphalt exists in large quantities in Buton Island, Indonesia, and until late 1990s was used extensively in its natural state as a surfacing layer for existing road pavements. On the other hand, extensive maintenance of the Indonesian road network involves the use of very large quantities of bitumen-bound materials. This paper describes some laboratory performances of Hot Rolled Sheet (HRS) mixes, according to the New Indonesian Specification, using an ASBUTON (Indonesian Rock Asphalt) as fine aggregates and filler. The main laboratory works, conducted at Center for Research & Development, Department of Public Works, Bandung were: Wheel Tracking Test and UMATTA Resilient Modulus Test. The results of Wheel tracking test at temperature 45°C, showed that the Dynamic Stability (DS), as well as the Rate of deformation, were higher for HRS-5 and HRS-10 than those for HRS-0. But the lowest value of Total Deformation (Do) obtained for HRS-5. Hence, it can be concluded that the HRS mixture with 5% Asbuton (HRS-5) gave the best resistance to Plastic deformation at 45°C. The results of Resilient Modulus test showed that the Resilient Modulus decreases rapidly i.e. 30%, as temperature increases from 25°C to 35°C and 45°C. In fact, the “abnormality” was obtained for the value of Resilient Modulus in function of Asbuton content i.e. decrease-increase at temperature 35°C, and increase-increase at temperature 45°C, as Asbuton content increases. The results of Marshall Test showed that the Optimum Asphalt Content and VMA increase as the Asbuton content increases. The results of Immersion Test showed no regularity in function of Asbuton content i.e. increase – decrease. This parameter therefore, can be used to be one criteria in obtaining the Optimum Asbuton content. In General, almost all laboratory results showed that the use of Asbuton, as fine aggregates and filler in HRS mix, gives the better performance, compared to the HRS mix using “standard” filler, e.g. “stone dust” filler.
**Key Words:** Hot Rolled Sheet, Asbuton filler, Marshall Test, Resilient Modulus

**NEUTRAL PLANE ANALYSIS OF TWO-LAYER BONDED CONCRETE SLAB ON WINKLER FOUNDATION**

Chuanchao ZHENG , Xucan YU

**Abstract:** Determination of neutral plane position is the key point in the analysis of two layer bonded concrete slab on Winkler foundation, however, there are no solutions for it when the Poisson’s ratios of two slabs are different. Based on the Kirchhoff hypotheses, the equation of neutral plane was formulated in this paper and numerical method was employed to solve the equation. The position of the neutral plane for the two-layer bonded slab is found out. In addition, the effects of the modulus of foundation, the ratio of Poisson's ratios, elastic moduli and thicknesses of bonded slab on the positions of neutral plane were discussed, and the results show that the position of the neutral plane for bonded slab with different Poisson ratios is totally different from that for bonded slab with the same Poisson ratio.

**Key words:** Winkler foundation, two-layer bonded slab, neutral plane, numerical method

**LOW TEMPERATURE CRACKING BEHAVIOR OF ASPHALT PAVEMENT WITH CRACKED BASE COURSE**

Chuanchao ZHENG , Yu CHEN

**Abstract:** This paper describes the cracking behavior of the asphalt pavement surface course when the underlying base course is fully cracked. Finite element pavement model is created using regular finite element. Pavement material properties are obtained from experiments conducted by MTS. Stress intensity factors at the cracking tips are calculated and compared with fracture toughness to describe how cracks propagate from the bottom of the pavement surface to the top. Results show that the cracking growth in asphalt pavement surface course can be divided into stable propagation and unstable propagation.

**Key Words:** asphalt pavement, fracture toughness, cracking growth

**EXPERIMENTAL STUDY ON FATIGUE CRACK GROWTH IN BOTH PLAIN AND REINFORCED ASPHALT CONCRETES**
Chuanchao ZHENG , Aysar NAJD

Abstract: Theory of fracture mechanics FM has been employed to determine crack growth rates of the suggested anti-cracking overlay systems. Two different reinforcing methodologies are applied; 1: addition of chopped glass fibers to the HMA; 2: reinforcing asphalt overlay by glass grids. Asphalt mixture designing tests, three points bending tests and fatigue crack propagation tests were carried out. Fracture toughness \( K_{IC} \) is determined for plain and reinforced asphalt concretes. The crack growth rate is determined for each type of anti-cracking systems, the cracking process is analyzed. One of the significant points in this study is the attempt to give better understanding of the crack propagation for multilayer asphalt overlay. The results indicate that the reinforcing materials improve anti-cracking characteristics of the asphalt concrete and composite structure anti cracking overlay gives a good solution for reflective cracking phenomenon over old cracked pavements.

Key words: HMA; Crack propagation; Fracture mechanics; Fracture toughness \( K \)

A NEW FORM OF GENERAL SOLUTION FOR ASPHALT PAVEMENT STRESS ANALYSIS

Chuanchao ZHENG, Ya WANG

Abstract: Generally speaking, there are two methods for the solution of axially symmetrical elastic space problems in asphalt pavement stress analysis. Integrating the two methods, the authors found out a new form of the general solution of axially symmetrical elastic space problems. Meanwhile, the relationships among the three general solutions of axially symmetrical elastic space problems are obtained, and characteristics of the general solutions are analyzed and compared in the study.

Key Words: pavement structural analysis; axially symmetrical elastic space problems; general solutions

PRODUCTIVITY IMPROVEMENT OF AIR TRANSPORT AND ECONOMIC EFFECT OF CAPACITY EXPANSION OF HANEDA AIRPORT

Tomoki ISHIKURA, Kazuyuki Tsuchiya

Abstract: In Japan, Haneda Airport is the core of domestic air network and its capacity can be an important factor of productivity of air transport service. Improvement of air transport industry will bring economic impacts to other industrial sectors. This paper constructed a model for the estimation of nation-wide economic effect of expansion of Haneda Airport. The model is a hybrid system which consists of the combination of a
simple Solow residual estimation approach and Computable General Equilibrium model. This paper furthermore estimated actual economic effect by past capacity expansion of Haneda Airport and found the broad inter-industrial economic effect.

Key Words: Computable General Equilibrium Model, Capacity Expansion, Productivity, Haneda Airport

MEASURING LEVEL-OF-SERVICE FOR CYCLING OF URBAN STREETS USING “PROBE BICYCLE SYSTEM”

Hideo Yamanaka, Susumu Namerikawa

Abstract: Promotion of bicycle use is one of the important policies for environment friendly urban transport. Improvement of cycling Level-Of-Service (LOS) on streets is considered to be an important part of this policy. The aim of this study is to develop a measuring system for the evaluation of level-of-service for bicycles by monitoring cycling behavior using Probe Bicycle System. The Probe Bicycle developed in this study can automatically measure and record position, 3-axis acceleration, speed, and pedaling power by electric sensor and GPS. By employing experiments of measuring perception of cyclists behaviors and their perception towards the conditions on various streets, the relationship between perception and behavior is analyzed. As a result, the author developed the level-of-service index using level of vertical vibration, average speed, variance of speed and average of pedaling power.

Key Words: bicycle, street environment, users' perception, level-of-service, probe system

LOGIT DEMAND SUPPLY CHAIN NETWORK EQUILIBRIUM PROBLEM

Huey-Kuo CHEN, Huey-Wen CHOU

Abstract: Supply chain networks represent economic entities in tiers such as manufacturers, distributors and demand markets. To study how the market share among the commodities is determined under the assumption of profit maximization, we formulate the supply chain network equilibrium problem with logit demand functions using the variational inequality approach. A nested diagonalization method, along with the specially designed supernetwork representation, is then proposed for the solution. The test example shows that the obtained results comply with the generalized Wardrop second principle in that: the market share of the two commodities is determined according to the binary logit formula and for each origin-destination pair, the same commodity at the destination is charged with the same price no matter which transport route is used. In addition, a sensitivity analysis shows that the larger of price difference of the two commodities, the more deviation of their market share, which is consistent with our
A STUDY ON THE MOTORCYCLE OWNERSHIP: A CASE STUDY IN PENANG STATE, MALAYSIA

Lee Vien LEONG, Ahmad Farhan MOHD. SADULLAH

Abstract: The fast growing rate of motorcycle ownership in Malaysia in recent years has become a serious problem in safety issues and management of traffic system in urban areas throughout Malaysia. To date, there are approximately 5.8 million motorcycles on the roads in Malaysia and accidents rate involving motorcycles is very high, almost half of the total road fatalities recorded. However, regardless of the high accident rate involving motorcycles, motorcycle ownership in Malaysia has increased rapidly from 0.13 in year 1990 to 0.26 motorcycles per person in year 2004. Therefore, in this research, issues concerning motorcycle ownership were investigated. A stated preference survey was conducted in Penang state, Malaysia to determine the trend of motorcycle ownership. An attempt to develop a disaggregate choice model based on the data collected was also conducted. Development of this model will give an indication on the future trend of motorcycle ownership in Malaysia which is important in future travel demand forecasting model.

Key Words: Motorcycle ownership, stated preference survey, disaggregate choice model

PERFORMANCE EVALUATION OF ADVANCED TRAFFIC CONTROL SYSTEMS IN DIFFERENT ROAD NETWORK TYPOLOGIES

A. Caroline SUTANDI, Wimpy SANTOSA

Abstract: Advanced Traffic Control Systems (ATCS) have been used to ease transportation problems in large cities around the world. The application of ATCS in developing countries is noteworthy, because these cities face more severe transportation problems and characterised by typologies. The aim of this study is to evaluate the performance of ATCS in different type of typologies. A large road network in Bandung, Indonesia was used as a case study. Hierarchical Cluster analysis was used to classify the Bandung road network into typologies. AIMSUN micro-simulator was used to evaluate the performance of ATCS at each typology. The results showed that based on typologies, the application of ATCS in the large city in a developing country was ineffective to increase traffic performance measures especially during morning peak period and in typology consists of intersections with medium to large size, lied in CBD area, and have high level of side friction.

Key words: Advanced Traffic Control Systems, Road Network Typologies, Developing Country
MODELING DRIVERS’ STATED ENROUTE SWITCHING BEHAVIOR UNDER VARIOUS INFORMATION SCENARIOS

Cheng-Min FENG, Yi-Wen KUO

Abstract: Advanced Driver Information Systems can benefit drivers by switching routes while encountering traffic congestion to alleviate congestion. Therefore, it is important to realize the latent variables of real-time traffic information that affect drivers’ enroute switching behavior. This paper identified the latent variables that will positively or negatively affect drivers’ enroute switching behavior and explored the causal effect by applying structural equation modeling. Then binary logit model was used to confirm whether latent variables and information scenarios will affect drivers’ enroute switching behavior. Empirical findings indicate that the latent variables of perceived value, usage attitude and compliance rate toward traffic information would positively enhance freeway drivers’ enroute switching rates, but switching barrier and congestion tolerability would largely impede them in the case of Taiwan. However, providing more detailed information on alternative routes can motivate drivers’ enroute switching behavior during traffic congestion.

Key Words: enroute switching behavior, structural equation model, binary logit model

TRAFFIC SIGNAL EVALUATION USING A MODIFIED PASSENGER CAR EQUIVALENT UNIT

Xuan Ha NGUYEN, Wen Long YUE

Abstract: Mixed road traffic with a high proportion of motorcycles is a typical vehicle composition in Hochiminh City, Vietnam. Due to the nature of such a traffic stream, the method commonly used in evaluating the efficiency of traffic signals cannot be adopted here. Motorcycles are performing differently to traffic signals compared with passenger cars; in particular, their advanced mobility and flexibility resulted in a failure of the application of traditional traffic signal evaluation tools. This paper attempts to report a new approach for the issue; using a modified Passenger Car Equivalent unit (PCE) to convert motorcycles into standard car unit. Then aaSIDRA is applied to conduct a standard evaluation process on the performance of traffic signal designs; a range of output from aaSIDRA can be used to compare the differences with different signal settings. Finally, using the developed PCE factor, queuing and delay measured from aaSIDRA can be converted back into motorcycle delays.

Key Words: Mixed traffic, Passenger car equivalent unit, Traffic signal
THE NONLINEAR BACKCALCULATION FOR LTPP TEST SECTION AND REVISION REPORT

Ming-Lou LIU, Hsiao-Yuan LIAO, Jui-Chang CHUANG

Abstract: Most backcalculation programs are based on the linear-elasticity assumption, and the material properties obtained are rarely used for pavement analysis. Laboratory results have shown that pavement materials possess a nonlinear stress-strain relationship. The purpose of this study is to develop a nonlinear backcalculation program which will be used to analyze the properties of the test pavement sections in the Long-Term Pavement Performance (LTPP) database in the United States. The selection criterion for the test pavement sections is that there are strong nonlinear behavior for the drop weight and peak deflection relationship for the test pavement section. The Falling Weight Deflectometer (FWD) test results from these test sections will be compared with the predicted results from linear and nonlinear backcalculation analysis. The backcalculated material properties will also be used to predict the deflections of the FWD test data for different drop weights. Finally, the backcalculation results will be used for the structural analysis, and the results from the linear and nonlinear analysis are different.

Key Words: Nondestructive test, Backcalculation, FWD

CHARACTERISTICS OF PRIVATE CAR AND MOTORCYCLE OWNERSHIP IN INDONESIA

Leksmono Suryo PUTRANTO, Susan GRANT-MULLER, Frank MONTGOMERY

Abstract: The main objective of this research was to develop Indonesian car and motorcycle ownership rate models at municipality and regency levels. The research was conducted using yearly aggregate data (1990-2000) from 21 municipalities and 28 regencies throughout Indonesia. In addition, 105 households from 4 municipalities and 3 regencies were interviewed. The car and motorcycle ownership rate model form was the quasi-logistic function and values of the saturation level were selected based on both previous research and the function boundary condition function. Both in the cross-sectional and longitudinal aggregate models, the wealth level was the most important factor in explaining the vehicle ownership rates variation. The higher the wealth level, the more sensitive car and motorcycle ownership was to the wealth level. In household level a proxy of wealth level (household monthly expenditure) was positively correlated with the number owned cars. As the wealth level increased, motorcycle ownership in a household decreased.

Key Words: car ownership, motorcycle ownership, Indonesia

RED LIGHT VIOLATION BY MOTORCYCLISTS AT A SIGNALIZED INTERSECTION IN JAKARTA
Leksmono Suryo PUTRANTO, Robby SUCIPTO

**Abstract:** Red light violation by motorcyclists is common in Indonesia. Therefore a study on this behaviour is essential. Observations were made on an intersection approach in Jakarta on 4 hourly observations at 5.00, 8.00, 12.00 and 15.00. Two types of violation were found, (1) at the beginning of red and (2) at the end of red. The type 1 was dominant during the early morning observation, whilst type 2 was dominant during the other three observations. The analysis shows that the higher the degree of saturations (Q/C) the higher the rate of type 1 violation and the lower the Q/C the higher the rate of the type 2 violation. Higher Q/C encourages motorcyclists to wait their turn in front of stop line and using gaps during the inter-greens. Lower Q/C allows a higher speed thus enables the use of the amber time or even all red time to cross the intersection.

**Key Words:** red light violation, motorcyclists, degree of saturation

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THE OPERATIONAL CHARACTERISTICS OF THE JAKARTA BUS RAPID TRANSIT SERVICES

Leksmono Suryo PUTRANTO

**Abstract:** In order to understand the operational characteristics of the Jakarta bus rapid transit (BRT) services, an observation was made on line 1 between Blok M and Kota. Three observation points were selected on Blok M terminal, Bank Indonesia stop and Kota terminal. Sufficient surveyors were assigned at each point to record the time of arrival/departure of the bus and the number of passengers boarding and alighting. Headways, boarding/alighting rates and travel speeds were calculated from the obtained data. The results confirm that no control on planned headways and boarding/alighting times has been made due to lack of fixed time table of the bus service.

**Key Words:** bus rapid transit, headway, boarding/alighting time

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THE ADVANCED INTELLIGENT ENFORCEMENT SYSTEM

Cheng-Min Feng, Pei-Ju Wu

**Abstract:** The activities of detection, classification, and surveillance of traffic are critical to the efficient operation of streets and highways. Well development of vehicle detection and vehicle classification can not only supplement police efforts but also provide uniform enforcement to enforce against noncompliance with traffic law. In order to reduce manpower for the traffic police, this paper aims at developing an advanced intelligent enforcement system which incorporates laser range imaging system, image tracking system, enforcement expert system, and license plate reading system. The core logics of the proposed enforcement expert system was analyzed, including which vehicle detection
and vehicle classification techniques can be used to perform which traffic rules, e.g. abnormal turning. We expected that the advanced intelligent enforcement system will be performed in the role of the traffic police cracking down on traffic violators.

*Key Words:* advanced intelligent enforcement system, vehicle detection, vehicle classification

**INDONESIAN DOMESTIC SEA FREIGHT MOVEMENT MODELLING BASED ON STRAMINDO DATA (2003)**

Ofyar Z TAMIN ,Rusmadi SUYUTI

**Abstract:** The objective is to obtain the most appropriate transport demand models which can likely represent the behavior of port-to-port sea freight movements in terms of OD matrices. The model is developed for the purpose of forecasting the Indonesian sea freight movements using the current OD pattern and the forecasted loading and unloading volumes. The paper will report on a family of aggregate models containing a flexible Gravity-Opportunity model for modeling the trip making behavior in which standard forms of the Gravity and Intervening- Opportunity model can be obtained as special cases. Non-Linear-Least-Squares and Maximum- Likelihood estimation methods were then used to calibrate the parameter of the model. The models have been tested using the total domestic sea freight movements in 2003 (Stramindo 2003 Data) for 25 major ports in Indonesia. The models were found to provide a reasonably good fit and the calibrated parameters can then be used for forecasting purposes.

*Keywords:* Freight Movement, Freight Demand Modelling, Gravity-Opportunity Model

**Modelling Traffic Accident Occurrence on Indonesian Toll Roads**

Tri TJAHJONO

**Abstract:** This paper presents traffic accident models of toll roads in the Greater Jakarta Area. The Negative Binomial modelling technique was used to model the frequency of accidents. Single vehicle multiple vehicle accidents were modelled separately and the results summed to provide an overall model. These models showed that the relationship between accidents and traffic flow can be described by U-shaped curves which were created using data from sets of dual-2, dual-3 and dual-4 toll roads. The dual-2 and dual-3 models were skewed to the right and the dual-4 model was skewed to the left indicating that high traffic flow conditions were associated with high numbers of accidents on dual-2 and dual-3 toll roads and low number of accidents on dual-4 toll roads. The modelling reveals that the dual-3 toll roads are the safest type in terms of accidents per kilometre.

*Key Words:* accident frequency, negative binomial models, Indonesian toll roads
The Effect of Geometric Variables to the Risk of Accidents on Indonesian Toll Roads

Tri TJAHJONO

Abstract: This paper describes the effect of geometric features on the risk of accidents on the Indonesian toll roads. Variables that were evaluated are: lane width, interior and exterior shoulder widths, median width, bendiness in terms of degrees per kilometre, presence of safety fences and street light, horizontal curve and terrain. The accident prediction models were constructed through homogenous one kilometre length using the negative binomial error structure. Accident risks were derived through the elasticities of each significant variable. It was found that lane width of 3.75 m, interior shoulder width of 0.70 m and exterior shoulder width of 3.00 m are associated with low accident risk for dual-2 toll roads. Lane width of 3.60 m, interior shoulder of 1.50 m and exterior shoulder width of 3.00 m are the best traffic performance for dual-3 toll roads. Safety fences should be provided regardless the median width.

Key words: accidents models, road geometric features, Indonesian toll roads.

SHORT - TERM TRAVEL TIME PREDICTION USING LINEAR MODEL

Chong WEI ,Takamasa IRYO ,Yasuo ASAKURA

Abstract: Prediction of travel times is a vital part of many advanced traveler information systems. Linear model is used in this research as it is effective, computationally efficient and reliable to the available freeway detector data. In this paper an explicit analysis of the linear model is shown and a method to predict freeway travel times using a linear model is proposed. The proposed method is applied to a data set of Hanshin Expressway, Japan.

Key words: travel time prediction, linear model, weighted least squares

COLLISION RISK ANALYSIS IN AIR TRAFFIC CONTROL

Dongbin LI ,Xiaohao XU ,Xiong LI ,Jinjin GUO

Abstract: A model is developed for collision risk estimation in air traffic control system, which resolves the problem of the collision risk assessment of the recent air traffic management system. It is a systemic model, in contrast to the old models, in which the defensive barrier and human factors are modeled and the focus is on systemic analysis. The collision event tree is used to calculate the collision risk. This model makes it straightforward to see what leads to collision, and easy to understand the roles of the main parameters. It is a good starting point for the incorporation of defensive barrier and
the human factors.

**Key Words:** Air Traffic Control, Collision Risk, Separation Minima

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THE GRAY-MARKOV MODEL FOR FORECASTING AIR TRAFFIC FLOW BASED ON RESIDUAL CORRECTION

Shuang GUO , Zhaoning ZHANG , Lili WANG , Yan GUO

**Abstract:** The flight flow forecast has an important significance for the studies of strategic development of civil aviation. The Gray forecast method and the Markov forecast method are taken together, and the Gray-Markov model is established. The Gray model reveals the general trend of long-term development of the air traffic flow. The transition of states is determined by the Markov model. Through the practical application of forecasting air traffic flow, we can see that this model can obtain a high accuracy.

**Key words:** air traffic flow, Medium-term and long-term forecasting model, Gray-Markov model

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PRODUCTIVITY ANALYSIS OF CONTAINER PORTS IN MALAYSIA: A DEA APPROACH

Ada Suk Fung NG , Chee Xui LEE

**Abstract:** Recent trends in containerized trade have led to the importance of measuring the performance of container ports. In Malaysia, container ports are mostly situated along the Straits of Malacca, one of the most important shipping lanes in the world. Two of its ports, Port Klang and Port of Tanjung Pelepas (PTP) are ranked amongst the top 20 container ports in the world. In particular, PTP is ranked 16th in 2004, even though it is just a young port which started its operations in October 1999. This paper aims to quantitatively measure the productivity of Malaysian container ports. A cross-sectional performance measurement is carried out, using a data envelopment analysis (DEA) approach. To further assess the productivity of the ports over time, a set of panel data is analyzed. In order to compare the productivity of the Malaysian ports with world standards, Port of Singapore is added as a reference.

**Key words:** Productivity, Malaysian ports, Data Envelopment Analysis

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APPLICATION PROCESS OF HYDRATED LIME TO RESIST MOISTURE DAMAGE AND RUTTING IN ASPHALT MIXTURE AND REVISION REPORT
Abstract: Moisture damage can manifest in the hot mix asphalt pavements in forms of stripping and (or) softening of asphalt. It results in loss of stability and bearing capacity failure, and rutting of asphalt pavement. One of the common anti-stripping additives, hydrated lime, is considered to improve the properties of asphalt mixture in resistance of the moisture damage. The lime application process can be introduced to the asphalt mixture by either adding dry hydrated lime to wet aggregates or adding lime slurry to dry aggregates. This study aims to evaluate the laboratory performance-based properties of asphalt mixtures using two different lime application processes as well as to compare between hydrated lime-modified and polymer-modified asphalt mixture. Results indicated that the performance of hydrated lime modified asphalt mixture in moisture damage and rutting resistance is related to the lime application processes. Adding the hydrated lime directly to the asphalt binder is an effective and economical method to improve the performance of asphalt mixture in moisture damage and rutting resistance.

Key Words: moisture damage, hydrated lime, anti-stripping

USING AUTOMATIC VEHICLE IDENTIFICATION AND GLOBAL POSITIONING SYSTEM DATA FOR TRAVEL TIME ESTIMATION IN HONG KONG

Mei Lam TAM , William H.K. LAM

Abstract: This paper presents a Real-time Traveler Information System (RTIS) for Hong Kong, in which a novel solution algorithm is proposed for estimating current travel times using automatic vehicle identification (AVI) and global positioning system (GPS) data. The proposed algorithm can deduce the travel times on road links either with or without real-time traffic data by integration of real-time and off-line traffic database together. The travel time estimates are displayed on a GIS-based RTIS website portal and updated once every five-minute interval. Observation surveys are carried out during different time periods at a selected path in Hong Kong urban area to validate the RTIS travel time estimates. The estimations of travel times on the road segments of the selected path have been conducted in the case of with and without real-time data available. The validation results show that the performance of RTIS is satisfactory and acceptable.

Key Words: real-time traveler information system, automatic vehicle identification, global positioning system

TERMINAL AREA TRAFFIC MANAGEMENT SYSTEM BASED ON FOLLOWING THEORY
Xinhua LI ,Zhaoning ZHANG

Abstract: The terminal area has become the bottleneck of air traffic, so its stability plays a vital role in the steady operation of air traffic flow management system. In this paper, the following theory and stability theory on road traffic are used for reference to build the traffic following model of terminal area. Stability analysis and parametric analysis are then applied to the terminal area traffic management system. Finally, two terminal area traffic management system stability indices are presented.

Key words: Air traffic flow management, Terminal area, Stability, Following theory

THE COMPUTATION OF SEPARATION STANDARD IN A GIVEN SAFETY LEVEL ON THE PARALLEL ROUTE

Zhaoning ZHANG ,Xiuhui ZHANG ,Lili WANG ,Jinjin GUO

Abstract: This paper initially studies inverse problems of collision risk models, which computes the safe space through establishing a model under the condition of a given safe target level. First we improve models of collision risk models existed on the parallel route, and get cross-track, along-track and vertical safe separation computing the improved models. Then we establish the iterative arithmetic of models and simulate them on three directions, and get the safe separation on each direction.

Key words: Separation Standard, Parallel Route, Iterative Arithmetic

THE EFFECT OF FILLER AS MODIFIER IN BINDER ON ASPHALT CONCRETE PROPERTIES

Imam ASCHURI ,David WOODWARD ,Alan WOODSIDE

Abstract: The behavior of the asphalt concrete mix containing fly ash and hydrated lime in binder was studied. The fillers as modifier were prepared with 3%, 6% and 9% by weight of bitumen respectively. The bitumen filler binder properties have been evaluated in terms of penetration test at various temperatures (25°C, 30°C, 35°C and 40°C) and softening point test. The laboratory test revealed that the penetration values of modified bitumen were found lower than unmodified bitumen but the softening values showed higher than unmodified bitumen. Marshall tests were carried at optimum bitumen content to evaluate the effect fly ash and hydrated lime on the properties of asphalt concrete in terms of rutting resistance (stability), unit weight, air void in mix, void in mineral aggregate and stripping resistance. Test results showed that the performance of bitumen mixes prepared using fly ash and hydrated lime as modifier were better than origin bitumen mixes.

Key Words: Fly ash, Hydrated Lime, Modified Bitumen, Asphalt Concrete
STOCHASTIC MODEL FOR MULTY-PATH TRAFFIC ASSIGNMENT WITH CONSIDERING DIVERGE PERCEIVED TRAVEL COST

R Didin Kusdian, Prof. Ir. Ofyar Z. Tamin, MSc., PhD., Prof. Dr. Ir. Agus Salim Ridwan, MSc., Ir. Ade Syafruddin, MSc., PhD.

Abstract: New idea added in this research and have been considered inside perceived cost diverge modelling, that was perceived cost also influenced with the distance of journey. More long the distance more wide the uncertainty distribution of travel perceived cost. To model this phenomenon the travel perceived cost generated not only by using single distribution function as an approach effort, this research use three distribution with gradual dispersion parameter. This idea derived and aplicated in hypothetical road network assignment analysis. Experiment result showed that with assumed that there are four segment of travel cost perception for all origin-destination pair in the network will appear diverge chosen route which could be different with one best route as the result of the assumption that there is no diverge perception among the traveller about the travel cost of all pair of origin-destination inside the network.

Keywords: diverge travel perceived cost, normal distribution, distance base distribution, route choice pattern.

TIME-DEPENDENT DISCRETE NETWORK DESIGN PROBLEM

Liam O’BRIEN, W.Y. SZETO, Margaret O’MAHONY

Abstract: Over time there will be inevitable changes in the travel demand patterns in a transport network. To capture these changing demands and design a gradually upgraded network it is necessary to introduce the time dimension into the transport Network Design Problem (NDP). Previous efforts have extended the continuous network design problem to cater for such considerations. However the continuous problem does not always indicate improvements that are practical. Therefore in this paper we develop a model of the time-dependent discrete network design problem. The importance of the model is illustrated by two numerical studies, which demonstrate the importance of introducing the time dimension to the NDP and the importance of introducing discrete decision variables to the NDP over time. An example on NDP under two cost-recovery principles is also provided to illustrate the application of the model.

Key Words: Discrete network design problem, Cost-recovery, Time-dependent traffic assignment
MODELLING MODE CHOICES DURING RAIL INCIDENT DETECTION

Syahriah BACHOK, Wen Long YUE

Abstract: Modelling of demand for bus feeder services among users, following rail incident detection is the central core of this paper. Mode choices have been identified to be significantly influenced by information provisions. The need for integrated traveller’s information was necessitated in public transport trips, where users were to transfer between at least two transport modes. This paper documents the preliminary results of the impacts of public transport information provision on travellers’ decision making processes. Utilising a case study of suburban commuter rail services in Kuala Lumpur, Malaysia; a Logit model is being developed and validated. It attempts at explaining the nature and extent of the influences of information provided on-board vehicles on users’ travel behaviours, during rail services disruptions. It aims at facilitating the planning and implementation of feeder services which can be applied to public transport operations in developing nations.

Keywords: multi-modal, on-board information, feeder services, mode choice.

STUDY OF TRAVEL FACTORS THROUGH STRUCTURAL EQUATION MODELING APPROACH IN BANGKOK

Pradeep Kumar SHRESTHA, Yordphol TANABORIBOON, Shinya HANAOKA

Abstract: The travel behavior is a result of complex decision making process affected by individual's socioeconomic, mode and trip characteristic as well as unobserved variables. The focus of this research was to identify the unobserved factors influencing travel behavior. Six latent variables named as travel factors were identified through factor analysis. Structural equation modeling (SEM) was used to identify casual relationship between observed variables and travel factors. It was noted that SEM cannot predict the travel demand but it has ability to express relationships between unobserved and observed variables. Then, travel factors were employed in discrete choice model to consider individual preferences on unobserved variables. It was found that the model with travel factors perform superior than model without travel factors. Conclusively, the further application of these factors in its different forms can effectively measure their effect in the travel demand model.

Key words: Travel factors, Structural Equation Modeling, Discrete Choice Model

AIR-RAIL INTER-MODEL NETWORK DESIGN UNDER HUB CAPACITY CONSTRAINT
Makoto OKUMURA, Makoto TSUKAI

Abstract: Recently, while building or expanding of a large hub airport becomes controversial in economic, social and environmental facets, the idea of inter-modal substitution of shorthaul air spokes by high-speed trains (HST) becomes a realistic option. This paper aims to analyze what shape of inter-modal network is efficient, and how beneficial it would be on passengers. Genetic Algorithm is applied to find the best mixture of Haneda Airport’s operation capacity allocation to domestic destinations and the spatial configuration of HST network, which maximizes the total consumer surplus of Japanese domestic inter-city passengers. The result of our analysis shows that HST service of 2,400km actually provided in year of 2000 is essential for keep mobility, and that operation capacity shortage problem at Haneda is solved by additional HST service. The shape of optimal HST network becomes different according to the different level of the operation capacity of Haneda.

Key Words: Network Design, Inter-modality, Genetic Algorithm, Hub and Spoke

MAXIMAL RESERVE TRIP GENERATION FOR TRANSIT NETWORKS

Qiang MENG, Der-Horng LEE, Lan WU

Abstract: This paper addresses a maximal transit reserve trip generation which quantitatively reflects interaction between land-use and public transit system. It firstly proposes a variational inequality and a diagonalization method for the combined transit trip distribution/logit-based stochastic user equilibrium transit assignment with elastic frequencies of transit lines. Secondly, this paper develops a generalized bilevel programming model for the maximal transit trip generation, which consists of two level problems – upper and lower level problems. The upper level problem aims to maximize the reserve transit trip for each origin subject to the transit equity constraints, which is formulated as a multi-objective maximization problem. The lower level problem is the proposed variational inequality for the combined trip distribution/logit-based stochastic user equilibrium transit assignment. A genetic algorithm embedded with the diagonalization method is designed for solving the generalized bilevel programming model. Finally, a numerical example is carried out.

Key Words: public transit network, stochastic user equilibrium, reserve trip generation

EFFECT OF BUILT ENVIRONMENT ON ACTIVE TRANSPORTATION: ATAIPEI STUDY

Jen-Jia LIN, Tsui-Ti HSIA

Abstract: This paper addresses a maximal transit reserve trip generation which quantitatively reflects interaction between land-use and public transit system. It firstly proposes a variational inequality and a diagonalization method for the combined transit trip distribution/logit-based stochastic user equilibrium transit assignment with elastic frequencies of transit lines. Secondly, this paper develops a generalized bilevel programming model for the maximal transit trip generation, which consists of two level problems – upper and lower level problems. The upper level problem aims to maximize the reserve transit trip for each origin subject to the transit equity constraints, which is formulated as a multi-objective maximization problem. The lower level problem is the proposed variational inequality for the combined trip distribution/logit-based stochastic user equilibrium transit assignment. A genetic algorithm embedded with the diagonalization method is designed for solving the generalized bilevel programming model. Finally, a numerical example is carried out.

Key Words: public transit network, stochastic user equilibrium, reserve trip generation
Abstract: This study empirically analyzed the effects of built environment on active transportation. Twelve latent variables and twenty-seven observed variables were considered in a structural equation modeling (SEM) approach. One hundred and forty-seven adults residing in the Xinyi District of Taipei City were enrolled in the study. Calibration results revealed that mixed-use urban areas associated positively with daily life activity but associated negatively with commuting activity. Transit accessibility negatively affected commuting activity, which is contrary to the relationship between accessibility and usage of transit systems observed in previous studies. Further, the neighborhood environmental quality and footways associated positively with daily life activity. The empirical evidence indicates that physical activity in urban areas can be encouraged by land use patterns, transportation services and landscape design.

Key Words: built environment, active transportation, structural equation modeling

APPLICATION OF A VEHICLE TRACKING SYSTEM TO RIGHT TURNING BEHAVIOR FOR INTERSECTION COLLISION ANALYSIS

Masanori MATSUDA, Shoji MATSUMOTO

Abstract: A traffic tracking software system, TrackerM, was developed by our group to detect vehicles and track their movement using video camera recordings. The study focuses on a practical analysis by using reliable data from TrackerM to propose countermeasures for avoiding a collision at a signalized intersection in the center of Niigata, Japan. Three items investigated are: short-cut behavior of subject vehicle (SV) drivers trying to turn right quickly, right-turning timing of SVs to cross the path of oncoming traffic, and countermeasures to avoid a collision between SVs and bicycles. A gap acceptance curve reveals that short-cut behaviors are liable to cause a collision particularly when a time gap is less than 4 seconds. The paper concludes with several issues for developing and improving the software system.

Key Words: vehicle tracking, accident analysis, gap acceptance, intersection

THE EXPLORATION OF THE SUSTAINABILITY OF URBAN TRANSPORT IN MEDAN, INDONESIA

Tri Basuki JOEWONO, Wimpy SANTOSA, Hisashi KUBOTA

Abstract: It is widely agreed that sustainable public transport is important for developing cities. However, there is a wide variation in definition of sustainable public transport. Thus, this article has an aim to explore the sustainability of urban public transport in the city of Medan, as one of the main cities in Indonesia. Based on rigorous literature, it can be deduced the red line of the definition of sustainable urban transport. Based on the data
of urban transport and its social demographic of the city of Medan, it can be concluded that the urban transport in Medan is not sustainable in many facets. In addition, the comprehensive urban transport planning to reach and to shape the public transport in Medan has been proposed.

**Key Words:** sustainability, urban public transport, sustainable transport planning.

### URBAN PLANNING FOR LOCATION OF PEDESTRIAN BRIDGES IN HOCHIMINH CITY, VIETNAM

Phung Manh TIEN, Tran Cuong BA DIEN

**Abstract:** Some pedestrian bridges have been built in Hochiminh city in recent years for solving many problems such as decreasing accidents number, making better conditions for pedestrians, … But, the situation is not improved as so much as the city’s government want. At the base of researching and analyzing of the transportation network situation, the real state of the stream of people, the development of the transportation traffic as bus and metro system, the land using, the urban planning, the terrain conditions, the historical and social-cultural characteristics, the master plan for transportation of Hochiminh city to the year 2020 … the research group want to propose some ideas about urban planning of the pedestrian bridges in the city. Therefore, the aim of this article is to analyze the strong and weak points relating to the built pedestrian bridges. Beside that, the proposal locations for some pedestrian bridges will be introduced in this paper.

**Key Words:** pedestrian transportation, pedestrian bridge, urban planning

### MAINTENANCE SELECTION FOR HIGHWAY NETWORKS IN VIETNAM

Dinh Tuan HAI, Nguyen Xuan DAO

**Abstract:** Highway authority currently face ever-increasing tasks to maintain normal functionality of a huge inventory of deteriorated roads. Allocated budget is usually small and covers 30-70% actual needs, thus the necessary maintenance is compulsorily postponed or cancelled. This fact gives us a difficult problem to be solved, whether we should aim for ensuring performance of all highways, or for generating maximum values of maintenance resources. This article therefore presents a computational procedure to prioritize maintenance in accordance with available resources. The priority indices are calculated for highway segments to determine the prioritized works and to select scope of maintenance. The priority index is calculated by considering several indicators of road specialty, health condition or maintenance benefit. The method have been applied to a specific highway network of Vietnam to examine whether it is useful to prioritize most necessary maintenance, such as deteriorated roads whose performance is crucial to the
Keywords: Highway Network, Maintenance Priority, Vietnam

ANALYZE OF BUS SERVICE PERFORMANCE AND PASSENGER CHARACTERISTIC (A CASE STUDY ON CITY BUS IN BANDAR LAMPUNG INDONESIA)

Rahayu SULISTYORINI

Abstract: The existence of the public transport is very important but if it doesn’t handling correctly, it will raise such problems. The objectives of research are: to review and analyze the bus system performance according to indicator parameter from “world bank standard” and others, and to improve understanding of the passenger characteristic. The method of the research was observed and interview to a passenger in three routes for three days. The result shows that the significant bus passenger mostly 16-25 years old, student, for working, income range Rp. 250,000 – Rp. 500,000, their reason using bus because of cheap, and they expected for increasing the number of bus. In peak hour there are much passenger in bus and cause inconvenient. Performance indicator of bus which is crucial are reduced waiting time, more bus, increased the frequency of operating, increased the hours of operation, improved ride comfort, and improved the reliability of timetables.

Key Words: Indicator Performance, Reliability, Passenger’s Characteristic

COMPETITION IN AIR TRANSPORT MARKET AND AIRFARE STRUCTURE: CASE OF US DOMESTIC MARKET

Mikio TAKEBAYASHI, Katsuhiko KURODA, Makoto EKAWA

Abstract: The aim of this work is to understand the market structure of the US domestic markets, where legacy carriers vs. low cost carriers competition appears, to confirm the existence of “bi-level” competition between legacy carriers vs. low cost carriers, and to find the factors affecting the shift of market structure from the bi-level competition to the horizontal competition. We assume the Cournot type competition among airlines and discuss the market structure—the horizontal competition or the bi-level competition and market share of low cost carriers. The results suggest that the market is classified when introducing a 10% share for low cost carriers as a threshold.

Key Words: air transport market, oligopoly, low cost carrier

COMBINING THE GRAAND THE TWO-STAGE DEAMETHODS FOR ASSESSING THE PERFORMANCE OF AIR CARGO
TERMINALS

Jui-Chang CHENG ,Rong-TsuWANG ,Meng-Fen HSIEH

Abstract  As an air cargo terminal is the key point in the airfreight market, its business development is directly correlated with the volume of the goods that are transported by air. The large airfreight market also stimulates a beneficial operation niche for air cargo terminals. This paper will focus on studying 3 major air cargo terminal firms through Grey Relation Analysis (GRA) and two-stage Data Envelopment Analysis (DEA) in order to measure each company's relative strength. A total of 31 initial indicators were considered, with nine being selected—two indicators of production efficiency, three indicators of marketing effectiveness, and four indicators of execution efficiency. In performance evaluation parts, Taiwan Air Cargo Terminal(TACT) is found to be relatively efficient in both efficiency and effectiveness stage in 2000 and 2001. Everterminal (ET) and Far Glory Free Trade Zone (FTZ) are found to be efficient in effectiveness stage only during 2001-2002. In other years they were inefficient.

Key Words: Air Cargo Terminal, Performance Evaluation, Grey Relation Analysis, Two-Stage Data Envelopment Analysis

MEASURING THE SERVICE QUALITY OF AIR CARGO SECTOR: CASE OF CHINAAIRLINE

Rong-TsuWANG ,Ta-Hui YANG

Abstract: As recent skyrocketing prices for crude oil have impacted the development of airfreight industry, operating environment becomes increasingly harsh, while increasing service quality and competitiveness are pressing issues for management. This paper will employ quality function deployment (QFD) to integrate inside quality technology and outside consumer voice and through the use of the house of quality illustrate the company’s performance in terms of service and offer suggestions for improvement. As the conclusion shows, in terms of outside consumer voice, the three main factors demanding improvement and three most factors in greatest need of improvement with regard to quality technology.

Key Words: Air Cargo, Airline, Service Quality, Quality Function Deployment

SAFETY DESIGN CONSIDERATION OF VEHICLE TO AVOID ACCIDENT

Swapan Kumar BAGUI ,Ambarish GHOSH ,Dr Sujit Bose

Abstract: Various researches, studies have been carried out in India and abroad for
safety design consideration for road and various road safety manuals are prepared. All these are related to improvement of road geometric works only. Some of the improvement measures for safety aspects are (i) improvement of sharp curves, (ii) realignment of the road and (iii) provision of traffic sign, road marking, safety provisions.

But safety design aspects have not received much attention during vehicle design stage since; it is not part of road design aspects. In this study vehicle design aspect has been considered. If this aspect is considered during manufacture of vehicle, vehicle passengers, vehicle and driver may be in safe after accident. A Model (spring system) has been proposed which will absorb energy during striking vehicles each other or striking stationary object.

**Key Words:** accident, road safety, vehicle design

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**A STUDY ON THE RHEOLOGICAL PROPERTIES OF POLYMER MODIFIED BITUMINOUS BINDER**

Dr. Md. Shamsul HOQUE, Md. Abdullah Al HOSSAIN

**Abstract:** The qualitative improvement of polymer modified binder and mixes is studied by comparing their properties with that of conventional bituminous binder and mixes through the tests of rheological properties. Different modified binders and mixes are prepared with low density polyethylene (LDPE) contents and tyre polymer. The rheological properties of the binders are evaluated by comparing penetration, ductility, elastic recovery, softening point etc. A non-standard film thickness test is also conducted to compare the binder film thickness on aggregate coated with fresh and modified bitumen. Results indicate that penetration, ductility, and specific gravity of the LDPE and tyre modified bitumen decrease with the increase of polymer while elastic recovery, softening point and viscosity increase with the increase of polymer in bitumen. Tyre polymer also improves the binder's temperature susceptibility and consistency significantly. The binder coating thickness increases significantly with the increase of the tyre content in bitumen.

**Keywords:** Low Density Polyethylene, Modified binder and mixes, Rheological properties

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**TRAFFIC SIGNAL DESIGN FOR NON-LANE BASED HETEROGENEOUS ROAD TRAFFIC CONDITION**

Md. Asif IMRAN, Dr. Md. Shamsul HOQUE

**Abstract:** The principles of signal timing developed in the western world cannot achieve proper optimisation in Bangladesh conditions because of heterogeneous traffic with the absence of strict lane discipline. Consequently, to design traffic signals as per Bangladesh situation a software incorporating local parameters has been developed. The software has
been demonstrated by designing signals of two very busy intersections of Dhaka city namely Bangla Motor and Bijoy Sarani intersection on a demand responsive and multi plan basis. It has been observed that four-phase controller at Bijoy Sarani results in oversaturated conditions at all the approaches almost throughout the day. While, at Bangla Motor, two phase controller makes the intersection approaches oversaturated for only a small proportion of time. Based on this observation, it is suggested that the phasing pattern of the Bijoy Sarani intersection should be changed to two or three phase controller with or without imposing ban on right turning.

**Key Word:** Heterogeneous Traffic, Saturation Flow, Signal Timing Plans.

**RELATIONSHIP BETWEEN TOURIST SHOPPING INVOLVEMENT AND TRAVEL BEHAVIOR: A CASE STUDY OF TAIWANESE OUTBOUND TOURISTS**

Kevin P. HWANG, James NGUYEN, Yung Jai DAI, Janet V. HWANG

**Abstract:** Despite the popular and important role of shopping as a major tourist activity, feature of destination attraction, motive for travel, and the subject of an individual’s shopping involvement in relation with his/her travel behavior has not been fully researched, especially in Taiwan. This study examines the nature of the relationship between a Taiwanese individual's tourist shopping involvement and his/her travel behavior with travel motivations, information searches, destination perceptions, and travel intentions. To research on the idea, a set of hypotheses are developed. A questionnaire survey along with multivariate analysis is employed to verify the conceptual model and to calibrate the relative importance for those interrelated factors. This research finds that there are significant relationships between an individual’s tourist shopping involvement and travel motivations, information searches, destination perceptions, and travel intentions.

**Key Words:** Tourist Shopping Involvement, Travel Motivation, Travel Behavior

**TRANSPORTATION NEED OF EMERGENCY MEDICAL SERVICE: AN OCCURRENCE RATE ANALYSIS**

Kevin P. HWANG, Ching-Han WU

**Abstract:** International Standard requires emergency medical service (EMS) response time to be less than 8 minutes. To reduce the response time for improving the survival rate needs to know the phenomena of EMS call for better management. This article focuses on analyzing the factors of such a problem. A total of 13,871 records from in 2004 were employed to identify the probability distribution of EMS calls and to establish several occurrence probability models. The population data were found to be day dependent; the weekday pattern is different from the weekend pattern. In addition,
data are also time-dependent. Results of Chi-square tests show that the occurrence intervals follow the exponential distribution which means the pattern of EMS calls follows a nonhomogeneous Poisson process.

**Key Words:** Probability distribution of arrival rate, Exponential distribution, Poisson process.

**PREDICTING AGGREGATE TRAVEL DEMANDS OF JAPAN UNDER THE IMPACT OF TELECOMMUNICATIONS**

Ming-Hsiung HSIAO

**Abstract:** This study aims to gather data on aggregate travel demands and socioeconomic developments of Japan from multiple sources, and then to apply regression modeling technique to predict the aggregate travel demands and to explore the impacts of socioeconomic developments, those from the telecommunications in particular. The results show that most transportation modes in Japan are normal goods and are price inelastic. The overall income elasticity further indicates that transportation is more like necessity goods. The results also show that telecommunications causes complementarity effects on the demands of most modes in Japan. This implies that the widespread applications of telecommunications are going to boost the demands for transportation, a result that transportation planners would least like to see.

**Keywords:** aggregate travel demand, telecommunications, socioeconomic development.

**System Simulation of Capacity for Container Terminal Based on Stochastic Petri Net**

Xiangqun SONG, Chen TANG, Zijian GUO

**Abstract:** Container terminal is a typical discrete event dynamic system. The paper uses Stochastic Petri Net to establish hierarchy model of capacity for container terminal and dynamic model of subsystems. Depending on the simulating language WITNESS realize dynamic simulation of capacity, obtain the capacities of subsystems and decide the bottleneck of capacity system, then adopt useful scheme to improve the bottleneck and promote the total capacity finally.

**Key Words:** Capacity, Discrete Event Dynamic System, Stochastic Petri Net, System Simulation

**FINANCIAL OPTIONS: MANAGEMENT OF GPS-BASED**
DISPATCHING TAXI, A CVO DEPLOYMENT OF ITS

Kevin P. HWANG , Jen-Tsung LIEN

Abstract: ITS is not free of cost. It often requires initial capital investment plus further maintenance and operation cost. From the aspect of business sustainability, this paper reviews the financial feasibility and revenue from investing a taxi fleet with GPS-based dispatching service which is an ITS deployment for CVO. Financial and operation data from current practicing operators are collected and a consumer survey is conducted to unveil both the supply and demand condition. After different scenarios of financial options analyzed, it reveals that a subsidy from government to share the initial capital investment will provide a better chance to sustain such a kind of ITS deployment. In addition, a fleet with at least 400 taxis also renders a better opportunity to have an early break even time and help both operator and taxi drivers to sooner recover their investment.

Key Words: CVO, Financial Feasibility, GPS-based Dispatching Taxi

EXPLORING THE FACTORS AFFECTING THE SUPPLY CHAIN OPERATIONAL MODEL FOR NOTEBOOK-COMPUTER COMPANIES

Cheng-Min FENG , Chi-Hwa CHERN

Abstract: This paper mainly discussed the operation models of supply chain for notebook-computer manufacturers in Taiwan. To Explore and analyze the key factors emphasized by different operation model. The operation models of supply chain mainly included the business model (OEM/ODM) and the process model (BTF/BTO/CTO). For understanding the particular characteristics within different operation models, 12 notebook-computer companies located in Taiwan were investigated by means of the questionnaire and depth-interview. Grey Relational Analysis method was used to find the key factors among different operation models (six models combined with different type of business model and process model). According to the result, different operation models emphasized the different factors with relation to the company’s characteristics and operation targets.

Key Words: Supply Chain, Operational Model, Grey Relational Analysis (GRA).

THE MULTIGROUP ANALYSIS REGARDING USER PERCEPTION OF PARATRANSIT SERVICE

Tri Basuki JOEWONO, Hisashi KUBOTA
Abstract: Paratransit is used extensively in almost all cities in Indonesia, as well as in many developing cities. The aim of this research is to explore user perceptions of paratransit operation, regarding quality of service, frequency of negative experience, and loyalty using multigroup analysis in SEM (structural equation modeling). As the previous studies by the authors found that the user of paratransit is dominated by the student, then this article intends to elaborate whether the student and non-student group have the same regression weights in the path analysis. The findings illustrate that the regression weights do not differ significantly between student and non-student, which eliminates the doubt of the bias resulted by the domination of one group among other groups. However, the other important finding from this model is the positive relationship between overall satisfaction and loyalty to use this mode in the future.

Key Words: structural equation modeling, multi group analysis, user perception.

THE CHARACTERISTICS OF TEMPORAL TRAFFIC FLOW DYNAMICS

Lawrence W. LAN, Jiuh-Biing SHEU ,Yi-San HUANG

Abstract. This paper proposes a novel filtering approach to scrutinize the characteristics of traffic flow dynamics measured in various time intervals during different times of day at different spatial locations. The proposed approach executes stepwise procedures to filter out periodic/quasi-periodic time series by Fourier power spectrum, equilibrium fixed points by the largest Lyapunov exponent, randomness by iterated function system (IFS) clumpiness maps, and followed by distinguishing chaoticity and stochasticity by correlation dimension. The dataset used in the numerical study is collected from the detector stations of Taiwan Freeway No. 1. The numerical study mainly analyzes the properties of dynamic traffic flows of four detection stations, sampled, respectively, in 20-second, one-minute, three-minute and nine-minute intervals, measured during midnight, morning, afternoon and evening periods. The results indicate that different nonlinear patterns, including fixed points, randomness, and chaotic-like phenomena may exist irregularly, contingent on the measured time intervals and observed times of day.

Key Words: filtering approach, nonlinear time series, temporal flow dynamics.

DRIVING ENVIRONMENT COMPLEXITY OF MIXED TRAFFIC FLOW: ITS MEASUREMENT AND CHARACTERISTICS

Sheng-Hsiung CHANG ,Dong-Yang LEE

Abstract: By applying the concept of information entropy in the information theory, this study aims to create a complexity index to measure the driver-perceived driving
environment and to give remedy for the past indexes’ incapability of showing drivers’ perceived comfort and safety. The complexity index is calculated by the drivers’ driving behaviors of speed, acceleration and deceleration, and horizontal shift area. We show that the complexity index is a proper qualitative index to truly reflect the drivers’ perception of driving environment and to measure the level of service. It can be a supplement index for the traditional traffic measures.

_key words:_ level of service, complexity, driving behavior

HOW DO THE TRAFFIC POLICE PERCEIVE THEIR ABILITY FOR RED LIGHT RUNNING ENFORCEMENT? - AN APPLICATION OF THE RASCH MEASURE

Hsin-Li CHANG , Chang-Ku SHIH

Abstract: Police enforcement is a common and economical method to reduce red light running, since the automated traffic enforcement instrument such as photo enforcement camera is costly. In this study, we applied the Rasch model to analyze a Traffic Police Enforcement Ability Questionnaire (TPEAQ), and then used it to assess the perceived enforcement ability of red light running. Four main results were obtained: First, the perceived enforcement ability of female polices is slightly higher than male polices’. Second, the prior abilities needed to enhance for female polices are mental and psychosocial demands, whereas the psychosocial and physical demands are the priority for males. Third, heads can deal with the violator’s complain well to prevent his objection. Finally, the future training for traffic police should focus on safety driving discipline, strengthen physical loading, and increase the ability of accommodating extreme weathers.

_key words:_ red light running, enforcement ability, Rasch model

Calibration and Estimation of Dynamic Traffic Assignment Procedures

Ta-Yin Hu , Da-Tung Li

Abstract: Under Intelligent Transportation Systems (ITS), real-time or daily operations of traffic management measures depend on long-term planning results, such as origin-destination (OD) trip distribution; however, results from current planning procedure are unable to provide fundamental data for dynamic analysis. In order to capture dynamic traffic characteristics, transportation planning models should play an important role to integrate basic data with real-time traffic management and control. In this research, an estimation framework for dynamic traffic assignment is proposed and field data is applied in estimation and calibration processes. In this framework, results from transportation planning projects in terms of Origin-Destination (OD) trips, are
considered and extended to the dynamic models. DYNASMART, a simulation-assignment model, is applied to generate time-dependent flows. The results show high agreement between actual flows from vehicle detectors and simulate flows from DYNAMSART.

**Keywords:** Dynamic Traffic Assignment, Time-Dependent Origin-Destination (OD), DYNASMART

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**PEDESTRIANS ACCIDENT RATES: ALARMING ON MIRPUR ARTERIAL IN DHAKA CITY, BANGLADESH**

Md. Mizanur RAHMAN, SABREENA Anowar

**Abstract:** Traffic accidents not only causes damage to property and to vehicles but also kills human and brings about untold sufferings and misery to the members of the victim’s family. In Bangladesh, road accidents are increasing at an alarming rate and this rate is reached at red signal incase of pedestrians as the direct consequences of rapid growth in population, motorization and urbanization. This in turn is causing a rapid deterioration of road safety and the problem is turning out to be very severe by international standards. This paper aims to provide a broad overview of some characteristic features of pedestrian traffic accidents and related safety problems on Mirpur arterial for the last eight years that might help in identifying the major causes, factors and types of pedestrian accidents for suggesting appropriate intervention procedures or counter-measures in order to reduce such accidents. Attempts were also made to evaluate the current condition of the existing pedestrian facilities by field inspection.

**Key Words:** Pedestrian accident rate, Urban arterial, Fatality rate.

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**ASSESSMENT OF RUNWAY CAPACITY FOR SHANGHAI PUDONG INTERNATIONAL AIRPORT**

Pinghui GU, Zhaoning ZHANG, Fei HONG

**Abstract:** This paper gives a basically theoretically analytical model of the ultimate capacity of two parallel runways. The capacity model is about two operation modes of runways, one is absolutely independent operation mode, and another is dependent approach and independent departure mode. Apply the capacity mode to estimating the ultimate capacity of Shanghai Pudong International Airport two runways system. Also compare the runways capacity curve of two operation mode. The result of this analysis shows that the capacity model works effectively with the degree of accuracy in the assessment of airport runway capacity.

**Keywords:** parallel runways, capacity model, independent operation, dependent
AN APPROXIMATION ALGORITHM FOR QUAY CRANE SCHEDULING WITH NON-CROSSING AND SAFETY DISTANCE CONSTRAINTS IN PORT CONTAINER TERMINALS

Der-Horng LEE, Hui Qiu WANG, Lixin MIAO

Abstract: The quay crane scheduling problem studied in this paper is to determine a handling sequence of ship bays for quay cranes assigned to a container ship in order to minimize the completion time of the container ship considering non-crossing and safety distance constraints. This paper provides a mixed integer programming model for the considered quay crane scheduling problem that is NP-complete in nature. An approximation algorithm is proposed to obtain near optimal solution and worst-case analysis for the approximation algorithm is performed. Computational experiments are conducted to examine the proposed model and solution algorithm. The computational results show that the proposed approximation algorithm is effective and efficient in solving the considered quay crane scheduling problem.

Key Words: quay crane scheduling, approximation algorithm, worst-case analysis

RESEARCH ON MODEL AND ALGORITHM ON DECISION TREE OF COMPLICATED RAILWAY SIGNALS MALFUNCTIONS DIAGNOSIS

ZHANG Xi CHEN Yu, YIN Yaping

Abstract: According to the classification decision questions of the Complicated railway signals malfunctions diagnosis, the paper gives the practical application way of knowledge representation and knowledge base development based on ID5R algorithm. Through an instance, the paper proves the algorithm is useful to form the knowledge base of malfunctions diagnosis expert system.

Key words: ID5R algorithm, decision tree learning, malfunctions diagnosis

AN ANALYSIS ON CHOICE BEHAVIOR ON THE PICK-UP POINT FOR THE E-COMMERCE RETAILING DELIVERY USING A CUSP CATASTROPHE MODEL
Yu-Kai HUANG, Cheng-Min FENG

Abstract: Convenience stores in Taiwan have made remarkable successes with retail delivery services by integrating E-commerce and logistics systems to form a new retail delivery model: “On-line shopping with pick-ups at convenience stores.” The main purpose of this study is to explore what kind of factors can influence the pick-up point choice behavior by using a catastrophe model. In this paper, the catastrophe characteristic of the choice behavior has been discussed and used by cusp catastrophe model that is based on the empirical data. The outcome has shown that these characteristics include bimodality, hysteresis, and catastrophe are present in the research data. When increasing the value of the retail delivery services through some marketing strategies, the loyalty relationship between customer and convenient stores will be enhanced.

Key Words: choice behavior, catastrophe theory, GEMCAT

MICRO NATURAL ROCK ASPHALT FROM BUTON ISLAND (MICROASBUTON) AS STABILIZING AGENT FOR EXPANSIVE SOILS

Bambang Ismanto SISWOSOEBROTHO, Noertjahjo WIDODO

Abstract: This paper describes a laboratory investigation of soil stabilization using Micro Asbuton (MA) and Fluxing Agent (FA). Soil samples were obtained from Purwodadi and classified as CH (USCS) or A-7-5 (AASHTO). Swelling measured after 4 days soaking prior to CBR test was 9.41% and the soaked CBR was 2.08%. The soil therefore exhibits very poor characteristics as a subgrade material. Nine combinations (A-F) of soil, MA and FA were investigated. The results of the investigation show that combination F (soil plus 10% MA and 10% FA) was the best combinations investigated. The soaked CBR values for combination F at 0 days curing time was 10.67%; when curing time was extended to 7 days the CBR value increased to 11.11% and when extended to 14 days, the CBR values reduced to 9.0%. Combination F yielded the lowest swelling value, 1.96% after 7 days curing followed by by 4 days soaking.

Key Words: Stabilization, Micro Asbuton, Fluxing Agent.

AN OPTIMAL CONTRAFLOW LANE CONFIGURATION SCHEME WITH STOCHASTIC USER EQUILIBRIUM CONSTRAINTS

Hooi Ling KHOO, Qiang MENG

Abstract: This paper proposes a bi-level programming model to determine the optimal
lane configuration for contraflow operations. For the bi-level programming model, the upper level problem aims to minimize the total travel time of a study area by choosing the appropriate number of lanes of candidate links to reserve their travel directions, which is formulated as an integer programming; the lower level is a logit-based stochastic user equilibrium (SUE) traffic assignment model that is able to predict the network flow pattern with respect to the change of network topological structure made by the upper level problem. Furthermore, this paper also proposes a hybrid genetic algorithm embedded with a SUE traffic assignment method for solving the proposed bi-level programming model. The proposed model and solution algorithm are tested using the Sioux Falls network. Results show that the methodology proposed can produce promising results.

Key Words: Contraflow, Stochastic User Equilibrium, Genetic Algorithm

MULTI-AGENT MODELLING FOR EVALUATING DYNAMIC VEHICLE ROUTING AND SCHEDULING SYSTEMS

Eiichi TANIGUCHI, Tadashi YAMADA, Masayuki OKAMOTO

Abstract: This paper presents multi-agent models for evaluating the behaviour and interaction among stakeholders who are involved in urban freight transport systems as well as effects of city logistics measures. Multi-agent simulation on a small test road network demonstrated that the VRPTW-D model which dynamically adjusted vehicle routing planning to the current travel times generated good performance in terms of increasing profits for freight carriers and decreasing costs for shippers. After applying multi-agent models on a large test road network, it was observed that introducing the VRPTW-D model generated a win-win situation by increasing profits for freight carriers and decreasing the costs for shippers. The results also show that the implementation of road pricing can reduce NOx emissions but may increase the costs for shippers. To avoid such effects, introducing cooperative freight transport systems helps shippers to reduce their costs.

Key Words: City logistics, multi-agent model, vehicle routing and scheduling

ANALYSIS ON THE CONSCIOUSNESS ABOUT DEPARTURE BEHAVIOR AND TRAFFIC MEASURES BY USING DRIVER’S EXPERIENCE DATA UNDER DOWNPOUR

Motohiro FUJITA, Jun SAKAMOTO, Koji SUZUKI

Abstract: The downpour which had occurred in Nagoya city area from September 11 to 12, 2000 had caused severe damage to the city’s traffic network, and highlighted the
problem about the method of giving information, traffic management, and driver’s behavior under the downpour. Therefore, in this paper, we focus on automobile traffic, and aim to consider the traffic information and traffic management for promoting driver’s appropriate behavior under a heavy rainfall disaster. Especially, we analyze driver’s consciousness and activity under downpour by using driver’s experience data, and develop departure behavioral models of drivers under downpour in order to analyze the relationship between the driver’s departure behavior and the traffic network and rainfall situation.

**Key Words:** Traffic measures, Downpour disaster, Departure behavioral model

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**A SYSTEMATIC APPROACH FOR QUESTIONNAIRE DESIGN ON NEW TRANSIT SYSTEM IMPLEMENTATION IN DEVELOPING COUNTRIES**

Thillaiampalam SIVAKUMAR , Toshiyuki OKAMURA , Fumihiko NAKAMURA

**Abstract:** Developing countries are nowadays considering exclusive or semi-exclusive transit system implementation. Such systems need to be planned well; attractive to car-owners and affordable to the transit captive users. Therefore, survey becomes essential to grasp preference from all segments of potential users. However, in developing countries, their response for questionnaire survey using hypothetical questions is less reliable because of users’ lack of knowledge about such transit systems and trading-off in hypothetical questions. This study aims to propose a systematic approach for questionnaire design in the contest of developing countries. Two different surveys with hypothesis system (BRT for Sri Lanka) were conducted for comparing: (1) System explanation ways of with and without pictures in questionnaire; and, (2) Level of complexity of the hypothetical questions. This study concludes that, in developing countries, questionnaires need to be attentive in questionnaires design. Even if questionnaires are conceptually same, few structural changes affect users’ response considerably.

**Key Words:** Public transportation, Questionnaire design, Developing countries, BRT

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**MULTINOMIAL LOGIT MODEL OF MOTORCYCLE OWNERSHIP AND CAR OWNERSHIP IN TAIWAN**

Hsu Tien-Pen , LinYu-Jui

**Abstract:** Motorcycle has its advantage of price and mobility to become the main transportation mode in Asia countries where there are high density of population and the economic development falls behind the developed countries. When people have enough
economic capability to buy a motor vehicle, the car and the motorcycle have a relation of substitution. It is also a major work to develop a Multinomial Logit Model of motor vehicle chosen. The variables of cost in Multinomial Logit Model are insignificant to the models, and car owners and motorcycle owners usually underestimated the expected cost of another type of vehicle. In sensitive analysis, we can find that three utility factors, such as travel time reliability, convenience and safety are the major reasons influenced the ownership of motor vehicle. In Taiwan, due to a lot of strategies for improving motorcycle traffic safety, such as helmet wearing duty, motorcycle exclusive lane, two stage left turn regulation, and head start waiting zone, the ownership of motorcycle didn’t decrease rapidly following the increasing income, and it is now still in a situation of high motorcycle ownership.

Key word: motorcycle ownership, motorcycle utilization, Multinomial Logit Model

AN OPTIMAL SLOT ALLOCATION IN INTRA ASIA SERVICE FOR LINER SHIPPING

Cheng-Min FENG ,I-Chang CHOW ,Chia-Hui CHANG

Abstract: In practice, liner shipping company pursues to fully load cargo on vessel. It has brought about argument for slot allocation between shipping agencies in booming market and ignored the revenue management to maximize profit for liner shipping company. Especially in Asia service, the service route is designed to call more ports, it is an important issue to make a slot allocation which determined the slot to different port-pairs to increase profit and provide shipping agencies a rule to follow. This paper presents an optimal slot allocation in intra Asia service for liner shipping. The slot allocation model is formulated through mathematical programming to maximize operational profit (freight revenue minus variable cost) with the consideration of revenue management. We illustrate this slot allocation model with a case study of Taiwan liner shipping company and the results show the applicability and better performances than the previous allocation used in practice.

Key Words: liner shipping, slot allocation, revenue management

IMPROVING DOMESTIC SHIPPING IN THE PHILIPPINES

Ricardo G. SIGUA

Abstract: The Philippines is made up of more than 7,100 islands. Given the archipelagic nature of the country, water transport plays an important role in its economic development. Ports serve as nodes in the maritime transport chain and contribute to the efficient transport of passengers and goods. The paper will discuss the RORO (Roll-On
Roll-Off) system which has been expanded and strengthened with the opening of the Strong Republic Nautical Highway in 2003. The system, aimed at providing better linkage among the regions thereby improving the services all over the entire country, is expected to improve tourism, transportation and commerce. Furthermore, the paper may provide perspective on a remote market for those in the shipping industry who are generally focused on the North American and/or European ferry operations.

**Key Words:** water transportation, inter-island passenger and freight movements

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**IS IT A TIMELY APPROACH FOR BUS ACCIDENT INVESTIGATION IN THAILAND?**

Mouyid Bin ISLAM, Sattrawut PONBOON, Nuttapon BOONTOB, Dr. Kunnawee KANITPONG

**Abstract:** Worldwide it is estimated that 1.2 million people lose their lives and as many as 50 million injuries and disabilities from road accidents every year. It is more inflicting burden for developing countries like Thailand when Thai statistics indicate over 12,000 people became fatal with accident costs comprising about 3.4 percent of GNP. Among all types of vehicles involved, bus accident is considered a major public concern as transportation of many innocent people is involved. The gravity of the situation is getting more public concern as annually 4,000 bus accidents occurred in Thailand. Single vehicle-bus accident with running off road accounts a major portion of bus accidents. This research attempts to investigate such single vehicle bus accidents to collect detailed information of crash scene, vehicle and occupants. The findings of this research indicate the possible factors leading to collision with a particular demonstration of the case studies.

**Key Words:** accident investigation, bus accidents, roadside hazard

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**EXAMINING TRAVEL TIME RELIABILITY ON HAN-SHIN EXPRESSWAY NETWORK**

Ravi Sekhar CHALUMURI, Toshihiko KITAZAWA, Jun TANABE, Yoshiki SUGA, Yasuo ASAKURA

**Abstract:** Increased economic activities and improvements in quality of life have resulted in a corresponding increase in human and material traffic across existing transport networks. Hence, there is a need for examining the reliability of these networks. The main objective of this study is to examine travel time reliability of various sections in the Han-Shin expressway network Osaka and Kobe area. Performed travel time reliability evaluation of each route considered in this study. To do this, various existing travel time reliability indices are considered and are examined. The advantage of travel time reliability is that, it can be used in policy assessment as a new evaluation technique and
also may be used as travel time related information to the system users. Further in this study, conventional congestion measures presently using a measuring performance of Han-shin expressway network are compared with travel time reliability measures. Results reveal that reliability measures are more capable of measuring the variability in congestion level.

**Key Words:** Travel Time Reliability, Urban Expressway, Traffic Detector, Travel Time Distribution

**DEVELOPMENT OF DECISION SUPPORT SYSTEM FOR AN UNSCHEDULED EVENT**

Seongkwan Mark LEE, Jong-Sung LEE, Tschangho John KIM

**Abstract:** The impacts from damage to production facilities and lifelines may spread across boundaries of several regions via import-export relationships and can bring serious economic impact to other regions. The economic impacts from unscheduled events stem not only from the damage and losses, but also from the recovery and reconstruction activities. To recover and reconstruct the facilities and lifelines damaged by unexpected events through investment or government financial aid, both the direct and the indirect economic impacts from the events need to be measured in regional and interregional contexts. Direct economic impact is the direct change of production and demand due to the disruption of production facilities and lifelines from an unexpected event, and indirect economic impact is the change in other sectors due to inter-industry relationships. Interdisciplinary approaches combining engineering techniques with economic analysis tools to analyze the impact of an earthquake may be useful. Total number of recorded earthquakes in Korea is a little more than 2,000 of which 48 were catastrophic. The purpose of the present research is to analyze various economic impacts of an earthquake, especially impacts on transportation networks in Korea. We collected spatial and economic data from Korea, and analyzed and estimated final demand loss and commodity flows from the unscheduled event.

**Key Words:** decision support system, earthquake, socio-economic loss

**The obstacles of cycling to school – an empirical study of Taiwanese students**

Hsin-li CHANG, Hsin-wen CHANG, Mei-chen CHIU

**Abstract:** This is an original study investigating the obstacles of cycling to school among
students in Taiwan, as well as the students’ ability to overcome them. A questionnaire survey was conducted to collect the students’ information, a descriptive analysis was applied to examine the students’ characteristics, and the Rasch model was applied to analyze the findings. This research discovers that uneven paving, raining day, and impolite drivers are the most difficult items for students cycling to school. This research also realizes that boys, first grade junior high school students, and those who own bicycles in the family and live in a rural area have greater cycling abilities than the others. The overall goal of this research is to suggest a reasonable policy for improving the cycling safety. This research results provide a set of valuable information for the government to look at the issues and to expand the usage of bicycles.

Key words: cycling difficulty, cycling ability, Rasch model

PSYCHOLOGICAL FACTORS INFLUENCING BEHAVIORAL INTENTION OF PRIVATE CAR USE IN FUTURE WORK TRIPS

Kasem CHOOCHARUKUL, Satoshi FUJII

Abstract: This study proposes an extension of the theory of planned behavior (TPB) to investigate whether psychological factors can be predictors for the behavioral intention of private car use in future work trips. The study sample comprised 156 undergraduate students who were in their senior year and were expected to graduate in the next few months. A questionnaire survey was conducted to measure several psychological variables related to private car use for future work trips after graduation. Core constructs included subjective norm, attitude, and perceived behavioral control, with an addition of moral obligation. Based on structural equation modeling, we found subjective norm, attitude and moral obligation to be significant determinants for the behavioral intention. Contrary to the TPB, the perceived behavioral control was not found to be a statistically significant factor influencing the intention of private car use in future work trips. Practical implementations of the results are discussed.

Key Words: Psychological Factors, Future Car Use, Theory of Planned Behavior

ROUTE PERFORMANCE EVALUATION OF TAIWANESE DOMESTIC AIRLINES

Shy-Chang TSAI, Yen-Heng CHEN

Abstract: This study employs data envelopment analysis (DEA) approach to evaluate the performance of domestic air routes from the perspectives of cost efficiency, cost effectiveness and service effectiveness. A total of 15 routes operated by a Taiwanese domestic airline are examined. Three input variables, two production variables and two
service variables are selected from the regression analysis. The routes evaluated as relative efficiency are presented, and the improvements for all inefficient routes are thereupon proposed. This study also performs agglomerative hierarchical clustering analysis to categorize the routes into four clusters according to their efficiency and effectiveness scores of three perspectives. Moreover, four routes featured in each cluster are respectively selected to have further evaluation of the routes’ monthly performance.

*Keywords*: Data envelopment analysis, Air routes, Performance evaluation

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**A STUDY ON THE VALUE OF TRAVEL TIME FOR USERS OF TOLL ROADS USING MARKET SEGMENTATION IN KOREA**

YoungTae LIM , HunKi LEE, YongSeok KO

**Abstract:** In Korea, even though various factors have influence on the value of travel time, the guideline for road project appraisal doesn't take into account those factors and could bring distorted results especially for road project implemented by private financial initiative. In this context, this paper aims to identify influencing factors on the value of travel time and to propose efficient and adequate standards for the value of travel time on road project appraisal especially initiated by private financing. In order to identify influencing factors on the value of travel time, interview surveys were carried out on the Cheonan-Nonsan expressway, which was the second road project initiated by private financing in Korea, as well as for the metropolitan area. RP(Revealed Preference) and SP(Stated Preference) data obtained through these interview surveys enabled an estimate of discrete choice models according to market segmentation, which made it possible to identify influencing factors on the value of travel time, and proposed the value of travel time on road projects initiated by private financing. The results reveal that the value of travel time for roads initiated by private financing is relatively higher than those of existing government-operated expressways and national highways. In this study, it was analyzed that trip purpose, income level, length of travel time and road congestion were key factors with impact on the value of travel time. In other words, the roads initiated by private financing shows higher value of travel time due to more trips with business purpose and long distance by high-income travelers. It may be recommendable that the discriminated value of travel time reflecting travelers' behavior and location characteristics should be fully exploited for road projects initiated by private financing.

*Key Words*: VOT(Value of travel time), SP(Stated Preference), Market Segmentation

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**BEHAVIOR AND CONSCIOUSNESS ANALYSES ON EFFECT OF TRAFFIC SIGNALS INCLUDING COUNTDOWN DEVICE FOR VEHICLES**
Abstract: It is expected to control traffic light safely, especially at inter-green periods because the drivers’ judgments whether pass or not at that time affect the occurrence of severe traffic conflicts. Recently, countdown-type traffic signals for vehicles that are contributory to make appropriate judgments have been installed positively in Asian countries. In this study, we conducted a questionnaire survey and observed surveys via video cameras at signalized intersections with those types of traffic signals installation in Turkey. Analyzing the effect of the traffic signal from the viewpoint of users’ consciousness, it was shown that users’ satisfaction is improved and driving rage is dropped by the countdown display. Furthermore, it was also found that start-up delay is reduced and risky behaviors at inter-green periods are decreased by the signal, but at the same time the inadequate signal parameter settings may induce risky behaviors in spite of the countdown-type traffic signal installation.

Key Words: traffic signals for vehicles, countdown device, risky behavior model, users’ consciousness

A STUDY ON THE INTEREST OF CHILDREN IN THE SIDEWALK AREA

HIDEKATSU HAMAOKA, KOSHIRO SHIMIZU

Abstract: It these years, the number of children in Japan is decreasing year by year. Therefore, it is important to make a better environment for children. In this paper, interests of children to the sidewalk are analyzed by the photo data taken by the children. It is found that children have favorable impression to the objects that related to their daily life. And also, separating the roadway and pedestrian road, such as restriction of vehicles, planting along the pedestrian road and wider pedestrian road width, is favorable to the children.

Key Words: children, interest, sidewalk area

A VISUALIZATION OF THE IMPACT OF DISASTERS TO INTERNATIONAL TOURISM USING TOURIST DESTINATION BRANDING INDEX

Vasantha WICKRAMASINGHE, Shin-ei TAKANO

Abstract: Tourism is one of the most dynamic and fastest growing global industries. Brand image of a tourist destination is important to attract tourists. Sudden calamities highly affect the brand image of tourist destinations; recently several destinations were
found with declined brand images following massive calamities. Maintaining a positive brand image is challenging due to external fluctuations and because decision making depends on individual motives. Travelers’ destination decisions are attained after trading-off personal and destination attributes. It is complex and could be unreliable depending on available information sources. A Tourist Destination Branding Index (TDBI) which incorporates a weighted combination of destination attributes is therefore worthwhile. This paper explains TDBI, based on the Total Utility Value (TUV) of a destination. A visual representation of brand image fluctuation with disasters is meaningful for tourists as well as tourism planners for decision making and destination management.

**Key Words:** International Tourism, Disaster Risk, Conjoint Analysis

**MULTI-CRITERIA DECISION MAKING FOR PUBLIC TRANSPORTATION DEVELOPMENT PROJECTS USING ANALYTIC NETWORK PROCESS (ANP)**

MINTESTNOT Gebeylehu, Shin-ei TAKANO

**Abstract:** In Asian and African developing cities, decisions on transportation projects are made with capital cost constraints and administrative influences, thus, providing a well-designed public transport is not a simple task. Therefore, multi-criteria decision-making methods that can incorporate the conflicting considerations are essential. This case study introduced the application of ANP for public transportation development programs. Even though ANP is the generalization of AHP, the results of the two models were compared to see the effects of the feedback, outer and inner dependences of the elements. According to the result, ANP model give a relative importance for environmental and socio-economic benefits as a criteria of public transport development, however, the AHP model turned out to give importance for the capital cost and capacity. Providing Bus Rapid Transit and Light Rail are the chosen alternatives in the case of ANP, where as AHP model choose expanding the existing bus services.

**Key words:** Analytic Hierarchy Process (AHP), Analytic Network Process (ANP), Public transportation projects

**INCORPORATING NETWORK IMPACT ANALYSIS INTO ROAD ALIGNMENT OPTIMIZATION**

Peng JIA, Zhuo SUN, Hirokazu KATO, Yoshitsugu HAYASHI

**Abstract:** In existing literature on road alignment optimization, only some cost factors related to the road itself are considered. But actually a new road is not only an isolated
transportation facility, but also obviously a component part of a road network. The impact of the new road on the original network is valuable and could not be ignored. In this paper network impact analysis is incorporated into the road alignment optimization model. Each road alternative can change the topology structure of the original network. As for each alternative, flow characteristics of OD traffic on the links are obtained through traffic assignment, and thus changed travel time and environmental load of OD traffic on the network can be estimated. They are converted into monetary equivalents and are regarded as the benefit incurred by the alternative. The ratio of benefit to cost is used as the objective function to evaluate each alternative. Genetic Algorithm is employed to solve this model.

**Key Words:** Road Alignment Optimization, Genetic Algorithm, Traffic Assignment, Environmental load

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**EVALUATING THE OPERATING EFFICIENCY OF INTERNATIONAL PORTS IN ASIA: THE DEA/TOPSIS APPROACH**

Chen-Huei YEH, Kuang LIN, Kee-Kuo CHEN, Ta-Shun CHO, Hsuan-Shih LEE, Ming-Tao CHOU

**Abstract:** This paper aims to recommend a promising alternative approach for evaluating the operation efficiency of the top 20 international container ports in Asia for the year 2004. Evaluation of efficiency for the target DMU (Decision Making Unit) with conventional DEA (Data Envelopment Analysis) is to determine the most beneficial multipliers of input and output and derive the best efficiency that the target DMU can achieve with these multipliers. However, the available studies have not yet provided a satisfactory answer to the problem of making international comparisons of port efficiency. For performance enhancement, TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) can be employed to aggregate efficiencies in different aspects, which leads to an innovative two-stage relative efficiency estimation technique, called DEA/TOPSIS. Superior to the traditional DEA approach, determination of the overall ranks of the container ports with better precision is accessible based on the DEA/TOPSIS approach.

**Key Words:** DEA/TOPSIS, decision making unit (DMU), operation efficiency, Asian container ports

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**THE INVESTIGATION OF FREEWAY TOLL PLAZA TRAFFIC DELAY AFTER ETC IMPLEMENTATION WITH DRIVER OPTIMISTIC TRAFFIC SIMULATION MODEL**
Che-Hung KUNG, Kuo-Liang TING, Ta-Yin HU

Abstract: The operation of freeway electronic toll collection (ETC) system in Taiwan has started since February 2006 and the congestion around toll plazas becomes a serious problem. This paper proposes a simulation study framework to evaluate the traffic pattern around the most congested toll plaza in Taiwan before and after the implementation of ETC as well as to conduct traffic management strategies to improve traffic congestions under ETC/manual tolling environments. Here applied the mesoscopic simulation model DYNASMART-P that provides the feature of vehicle route selection (ETC lane or manual toll lane) mode - user equilibrium - that is useful in simulating driver behavioral characteristic around toll plaza movements. Analyses on different traffic parameters are performed through numerical and graphical representations. In addition to evaluate the traffic pattern and the effectiveness of manual and Electronic tolling, the threshold to adjust the toll lane distributions between ETC and manual tolling is also obtained.

Key Words: ETC, toll plaza, traffic model, simulation, DYNASMART

The study of the urban track transportation noise prevention at Taipei

Sy Chang, K.Y. Chang, Pei Yi Chang, B.C. Yen, Yu Ying Lee

Abstract: Population concentration and resulting traffic jam are common phenomena in modern society. Such problems are getting worse when time go on. Although highway area increases every year, traffic jam still can’t be solved effectively. So the trend of Inland transportation is turning to track transportation system. They are many advantages for the track transportation system, but it still has the problems of the noise and vibration induced from the wheel/rail contact that is sensitive to the neighbouring residents along the track route.

Their have many complain about noise and vibration by the residents along the Taipei MRT (TRTS) line where some of the TRTS tunnel was underneath the building, TRTS have try lots way to solve the noise issue, it still can not satisfy the require form the residents along the line.

This paper was study the cause of noise issues of the TRTS, we try to analyze and evaluate overall cases that use the different solution of different case, and some of case that we have set out a long term monitoring, and this paper was analyze measuring data and compare the practice outcomes and theory, that can feed back to the practice design.

We hope this paper can share our practical experience and the results of the study, for the noise prevention in track at the urban transportation for environmental pollution prevention, to other railway systems or the academia in the environment field and railway field in the world.

Key Words: Noise, localize, Monitor, Noise prevention
DESIGN OF FREQUENCY OF BUS LINE WITH A BI-LEVEL MODEL

Bin YU, Zhongzhen YANG, Lu WANG

Abstract: In this paper, a bi-level programming model for the bus frequency design in a given network is presented, which is aiming to determine the optimal bus frequencies in order to minimize the total cost of the bus company and the passengers by accounting for the route choice behaviors of the users. In the model, the upper-level optimizes the bus frequencies with the outputs of passenger assignment. The objective of the lower-level is to assign transit trips to the network based on optimal strategy and the optimized frequencies. An iterative approach, which consists of a label-marking method and a new heuristic algorithm-shuffled complex evolution method (SCE-UA), is adopted to solve the lower model and the upper model, respectively. Finally the model and the algorithms are illustrated with the bus network in the city of Dalian in China and some conclusions are drawn.

Key Words: bus frequency design, bi-level model, bus traveler assignment, SCE-UA

VR ANALYSIS OF MULTI-VEHICLE ACCIDENTS IN UNDERGROUND URBAN EXPRESSWAY

Terumitsu HIRATA, Kunihiro YAMAGUCHI, Tetsuo YAI

Abstract: Underground urban expressways which have great potential to settle many existing transportation-related problems may pose unknown risks regarding traffic safety. Vehicle accident in tunnel can more seriously damage road infrastructure and human life than outside roads because of its closed space especially in deep underground road. Therefore, it is important to consider the safety countermeasure for preventing not only a single-vehicle accident but also multi-vehicle accidents which are more damaging. We conducted a unique driving experiment with virtual reality (VR) where the multiple subjects can drive simultaneously in the same roadway space. With this experiment, we collected the microscopic driving data of multi-vehicle accidents that originated in a single-vehicle accident. The results of data analysis reveal some important factors causing the occurrence of multi-vehicle accidents.

Key Words: Multi-vehicle accident, driving simulator, underground urban expressway

APPLICATION OF TIME-DEPENDENT STOCHASTIC EQUILIBRIUM ASSIGNMENT MODEL CONSIDERING ACTIVITY
CHOICES TO THE NAGOYA METROPOLITAN AREA

Ryo KANAMORI, Tomio MIWA, Takayuki MORIKAWA

Abstract: This paper examines an applicability of the traffic assignment model overcoming some drawbacks of conventional models. The developed model has the following characteristics: 1) integration of trip generation (i.e. activity choice), destination choice, mode choice and route choice; 2) expression of traveler's choice behavior as a nested logit structure; 3) consideration of hourly traffic condition variations including queue evolution; and 4) approximate reproduction of trip chain along the time axis. The reproducibility of developed model is shown under application to the Nagoya Metropolitan Area, Japan. Furthermore, as case study, we evaluate road pricing and railway's fare discount. These results suggest that the model allows us to compare various TDM policies effectively and evaluate in detail.

Key Words: combined stochastic user equilibrium model, induced travel, road pricing

ROAD NETWORK ACCESSIBILITY ISSUES AND IMPACTS ON REGIONAL AUSTRALIA

Sekhar V. C. SOMENAHALLI, Michael A. P. TAYLOR

Abstract: Concepts and methods for analysing accessibility are essential for understanding many significant social, economic, and political issues. All accessibility measures seek to define the level of opportunity and choice taking account of both the existence of opportunities, and the transport options available to reach them. To study these issues this research has focused on the Australian road network as the primary database with the interest in accessibility directed at those who live in rural and remote areas, rather than urban dwellers. At first stage, this research focuses on spatial approaches to the conceptualisation, measurement, and analysis of accessibility at the regional level. At next level, this research attempts to analyse socio-economic indicator (Income) in regional Australia and relate it to road network accessibility. In the final stage attempt has been made to identify the weak spots in the regional road network based on the extent of accessibility changes.

Keywords: Network accessibility, Geographic Information System and Gini Coefficient

STUDY ON THE MODEL STRUCTURE OF THE INTEGRATED TRANSPORT NETWORK

Zhongzhen YANG, Guoqiang MIAO, Zhi ZUO, Lu WANG
Abstract: This paper presented a method to construct an integrated transport network model after analyzing the characteristic and structure of the network and the path choice behavior between the origin and destination. First, the conception of integrated transport network is given and meanings of dummy links in the network and its constructing method are discussed. Three kinds of dummy links for building the integrated network model, namely the attributes based dummy link, urban road sub-network based dummy link and the multi-scale based one, are developed. And then three kinds of network models are constructed with different dummy links for Chinese Northeast region, and the performances of them are evaluated and compared.

Keywords: Integrated transport network model, ordinary link, dummy link, multi-scale

ESTIMATION OF DAILY TRAFFIC FROM SHORT COUNTS USING ARTIFICIAL NEURAL NETWORK

Dr. Md. Saiful Alam SIDDIQUEE, Dr. Md. Shamsul HOQUE, Hamid-Uz-ZAMAN

Abstract: This paper gives the detail description of a systematic survey of hourly traffic volume data over a time of four years along the North Bengal corridor of Bangladesh (at Jamuna toll collection point) and its equivalent numerical model by using a Artificial Neural Network. The Neural Network is trained with the intermittent data of 13 weeks over four years and with this ANN model missing data is interpreted with quite reasonable accuracy. The ANN model could capture the variety of trends of the traffic data very accurately as has been depicted in the paper.

Key Words: Artificial Neural Network, Traffic data prediction, Estimation

A STUDY OF TIME VARYING TRANSIT SERVICE AREA AND ITS INFLUENCE ON MODAL CHOICE

Hajime Daimon, Hirotaka Koike, Akinori Morimoto

Abstract: Recently, excessive automobile dependence in local cities in Japan exemplifies the importance to compare the convenience between automobile and public transit. The purpose of this study is to develop a model that takes time of day into consideration in such a way to express bus travel time as a function of departure time. By using this concept, the regions where bus transit is equally competitive with automobile transportation were found based on the travel time standpoint. Moreover, comparing poorly-served area identified using the above model and public transport modal split, we would like to visualize the fluctuation of bus transit service area using GIS, and examine the relationship between bus transit service area and modal choice. In addition, the adaptability of this concept and model is discussed.
**Key Words:** bus transit service area, modal choice, level of service

FINANCIAL SUSTAINABILITY OF RAIL TRANSIT SERVICES — CASE STUDY IN HONG KONG

Z. W. WANG , Hong K. LO

**Abstract:** In many modern cities, rail transit services are not financially sustainable without subsidy. However, the situation in Hong Kong is different. It is believed that the high population density provides a suitable environment for the rail transit system to be financially sustainable. In this study, a preliminary analysis on the demand and supply of the rail transit service was undertaken to shed light on the threshold density below which the rail service cannot be sustainable without subsidy, considering its operations vis-à-vis the competing modes’ fares and services. We investigated to the Mass Transit Rail (MTR) line in the new town Tseung Kwan O (TKO) in Hong Kong as a case study.

**Key Words:** rail transit service, urban density, financial sustainability

A STUDY ON TRAFFIC BEHAVIOR OF HIGH INCOME PEOPLE IN ASIAN DEVELOPING COUNTRIES

Xiao LUO , Akinori MORIMOTO , Hajime DAIMON , Hirotaka KOIKE

**ABSTRACT:** Disorderly urban sprawl in developed countries was aggravated by the progress of motorization. City planners in developing countries can avoid similar mistakes to be repeated. Since personal income level and car ownership seems to have a positive relationship, the objective of this study is to clarify the influence of rising income level on traffic behavior in developing countries. It was found that the car usage rate will rise with increasing income levels for cities with income levels above a certain value. One of the reasons is the relocation of high income people to the peripheral area of a city and this has been proven. Solutions to this imminent problem include development of a pleasant living environment in the city center so as to attract more people from high income level groups to reside in the city center area, and the compound use of city land in order to reduce trip length.

**Key Words:** developing countries, income, transport mode

INTEGRATED TOLLING AND CAPACITY EXPANSION
SCHEDULE FOR TRANSPORTATION NETWORK MANAGEMENT

Barbara W.Y. SIU, Hong K. LO

**Abstract:** Including both transportation supply and demand management (TS-DM) measures underpins the development of an effective transportation management strategy. One may consider transportation infrastructure provision as the supply; whereas the traveling public as the demand, subject to demand management measures which are often introduced as a separate policy tool, distinct from supply management. Nevertheless, synergy can be achieved in solving congestion problems when TS-DM strategies are developed jointly in an integrated manner. This paper develops a bi-level formulation in determining the time-dependent TS-DM strategy. The interactions between TS-DM strategy and residential/employment location choices are studied and comparisons between the mixed TS-DM strategy and traditional pure demand management are made. With a small network example, we demonstrate that the integrated TS-DM strategy is a promising way of designing and managing transportation network over time, creating a win-win situation between network operator and road users.

**Keywords:** network design, road pricing, combined model

TRAFFIC DYNAMICS IN PURSUIT OF EQUILIBRIUM

Jing BIE, Hong K. LO

**Abstract:** This paper studies how equilibrium is achieved in day-to-day traffic dynamics. Trip-makers update their perceived cost on a daily basis and adjust their route choice accordingly. The limiting behavior of day-to-day dynamics is characterized by the notion of equilibrium, which forms a stationary state. The attractiveness of an equilibrium state is examined by stability and can be quantified by its attraction basin. This paper illustrates how instability, as well as the problem of non-convergence from states outside the attraction basin, can be removed by modifying network configuration. This paper further investigates other attractors including cycles and chaos that are associated with the dynamic process in the pursuit of traffic equilibrium.

**Key Words:** day-to-day traffic dynamics, equilibrium stability, attraction basin

A MULTI-CLASS CONGESTION-PRICING PROBLEM IN A CONTINUUM TRANSPORTATION SYSTEM

H.W. HO, S.C. WONG, Timothy D. HAU
Abstract: Consider a city of an arbitrary shape where difference classes of users are distributed continuously over the city region. Within this region, the road network is dense and can be represented as a continuum and users patronize a two-dimensional continuum transportation system to the central business district. In this paper, two different congestion pricing models for this continuum transportation system with multiple user classes are studied. The first model is concerned about the social welfare maximization, which determines the optimal toll rates that maximize the total benefit of the whole system, and the second model is cordon-based congestion-pricing, which offers a sub-optimal but more practical tolling strategy. Both of these models are solved by the finite element method and a promising Newtonian-based solution algorithm. Finally, a numerical example is adopted for giving an idea on the impact of cordon toll charges on the resultant social welfare.

Key Words: Multiple user classes, congestion pricing, continuum model, anonymous toll

A FUZZY-MCDM EVALUATION FRAMEWORK BASED ON HUMANITY-ORIENTED TRANSPORT FOR TRANSFORMING SCHEME OF MAJOR ARTERIAL SPACE IN TAIPEI METROPOLITAN

Jen Te Pai

Abstract: Since the 1990s, sustainable development, humanity-oriented transport, new urbanism, transit-oriented development and green transport have been the notice in the field of spatial planning. Based on the concept of designing humanity-oriented major arterial roads in the Taipei metropolitan area, this paper selected Zong-Xiao East Road and Roosevelt Road as the survey area and established an evaluation framework, including four dimensions: traffic smoothness, pedestrian friendliness, comfort of landscape, and space complexity, to assess transforming schemes and facilitate decision-making process. By conducting fuzzy-MCDM (Multiple Criteria Decision Making) approach and fuzzy-AHP (Analytical Hierarchical Process) method, this paper was able to integrate opinions of experts with different expertise into the evaluation framework and further determine the optimal transforming scheme. The evaluation result showed that the two optimal schemes both assign the maximum of adjusted roads to pedestrian space, transform the vehicle-oriented arterial roads into a pedestrian-friendly place, focus on greening the streetscape, and encourage mixed land use. The evaluation framework and the research methods applied in this paper are practical for the related municipal departments to utilize in reviewing transforming plans, thus creating a sustainable city.

Key words: fuzzy-MCDM, humanity-oriented transport, arterial road
STUDY ON THE CHARACTERISTICS OF CONGESTION PRICING

Zaw Naing WIN, Hisashi KUBOTA, Kunihiro SAKAMOTO

Abstract: Congestion pricing is one of the most popular strategies to tackle the congestion problem in recent TDM practices. Because of its special inherent performance to combat the congestion problem at specific time and period, transport professionals are become interested to introduce to their cities. For the fact that, study on the characteristics of congestion pricing is ever more demanding and playing an important role in entire process. Taking this into consideration, this paper analyzes and explores the characteristics of time based, distance based and area wide congestion pricing schemes by tiss-NET microscopic simulator. The hypothesis based algorithms were developed to conduct the simulation, and the function value of time from the developed algorithms has been estimated from route choice behavior model. State preference data has achieved to estimate the value of time for motorists. The simulation results show the effectiveness, impacts, and their characteristics on the congested imaginary road network.

Key Words: congestion pricing, modeling route choice behavior, simulation

ARTERIAL ROAD TRAVEL TIME PREDICTION

Hong-En LIN, Rocco ZITO, Michael A P TAYLOR

Abstract: Travel time is important information for network measurement and ITS applications. Recently number of arterial road travel time research raised has symbolised the importance of the research field. The shortage of travel time data and uncertain of signal settings are the two major challenges of arterial road travel time research. This research adopts SCATS data and micro-simulation techniques to overcome the problems of data shortage. In terms of traffic data, SCATS provides detailed traffic signal setting data and volume data meanwhile micro-simulation produces various detailed traffic outputs for the need of developing the travel time prediction model. The result demonstrates that the developed mathematical travel time prediction model has the ability to provide reliable travel time results on arterial roads. The following research will focus on the extension of the model to deal with the prediction of travel time under over-saturation condition.

Key Words: Travel Time Prediction, Arterial Road, Micro-simulation, SCATS

AN INTEGRATED MODEL OF RURAL INFRASTRUCTURE DESIGN IN DEVELOPING COUNTRIES
Salpiseth HENG, Yasuhiro HIROBATA, Hitomi NAKANISHI

Abstract: In developing countries, poor geographical accessibility due to poor quality of roads and ineffective public facility locations has made a negative impact on rural residents’ welfare. The lack of proper planning of these public infrastructures is also a major problem. The objective of this study is to investigate an integrated model to design an optimal rural road network considering financial and spatial constraints. The rural road network and new multi public facility locations are to be optimally designed simultaneously to achieve least total cost spent by government and residents. Having defined a specific objective and a set of constraints, an optimal rural road network configuration is determined endogenously by searching for an optimal combination value of the decision variables. The model is going to provide the decision makers with useful information of the rural infrastructure investment to explore the validity and effectiveness of capital allocation through the sensitivity analyses.

Key Words: integrated model, rural infrastructure design, developing countries

BUS ACCIDENT– A PROBLEM IN PUBLIC TRANSPORT IN HANOI TODAY

Trinh Tu ANH, Trinh Thuy ANH

Abstract: In all developing countries over the world, encouraging people are using bus service is considered as a method to decrease traffic accidents and solve traffic congestion to make a better life. However, a negative effect was found while operating bus system in Hanoi due to a certain existing situation. This study mentioned a different approach: the bus system was one reason making more traffic accident in Hanoi. The paper applied the systematic method to find the main causes of bus accident through analysis of existing bus operations. They were found that the current governor policy, bus driver behavior, poor infrastructure and facilities, and management system of the bus companies contributed to more accident and poor traffic so the public transport could not be their own real function. In order to minimize these deficiencies, this paper aimed to propose measures to improve the bus safety and to create higher quality of life for people in Hanoi.

Key Words: Bus Accident, Urban Transportation Problem, Safety analysis

THE EFFECTS OF OFFSETTING AND WEDGING CELL LATTICES IN THE ON-RAMP SYSTEM

Wei HUA, Peng SHEN, Research Assistant, FengYan ZHOU
**Abstract:** On-ramp is generally regarded as one key bottleneck along highway. Three different merging relationships between on-ramp and main lane are presented. The first case parallels each cellular position of accelerating lane to that of main lane. In the second case, every cell of accelerating lane keeps half lattice ahead. The third case wedges each cell of accelerating lane into cells of main lane from 1/4 overlap to all. Based on cellular automaton model, the simulations have been done to observe how vehicles from on-ramp affect the traffic flow moving on main road under above three different cases. The results find that driver behavior under the third case is more similar to Chinese real traffic, where an on-ramp car finds it hard to merge into main lane with same velocity. All three phase diagrams show the complex phase transitions, but this reflects the degree of the stochastic nature of traffic flow in reality.

**Key Words:** Cellular automaton model, on-ramp, accelerating lane, virtual vehicle

**An analysis using the AIDA model to compare the service level of the bus transportation system and travel behavior**

Kousuke MIYAZAKI, Keishi TANIMOTO, Jun-ichi TAKAYAMA, Takehiro KIKUCHI

**Abstract:** This study focuses on the reaction of the residents during the social experiment of bus transportation service. According to AIDA model proposed in marketing, the reaction consists of several stages. We assume that the reaction in each stage is different from the person who lives where the service level was low and high before the experiment. Specifically, the person who lives where the service level was low does not react well because the service level has been too low to have concern for the bus service. We verify this assumption using the data from the social experiment conducted in Hiraka Town. As a result, this assumption is verified. Thus the disparity of the responsiveness in the service level before the experiment exists. We discussed that it is not fair to use the observed responsiveness for the information basis of the bus transportation service after the experiment because of the disparity.

**Key Words:** Social experiment, Public transportation system, AIDA model

**PROJECT RISK MANAGEMENT IN TRANSPORT PROJECTS IN VIETNAM**

Trinh Thuy ANH, Trinh Tu ANH
**Abstract:** Urbanization and economic development today has cause many serious risks in transport projects. This paper aims to study risk in transport projects in Vietnam by phase of project on the view of the project manager. The list of 91 risks in transport project with its magnitude are built based on the interview survey. The relationship between those 91 risks are identified and analysed to understand clearly about the causes and effects of the risks. The paper analyses and evaluates the current circumstance of risk management in transport projects nowadays. Based on that, measures for risk management are proposed to deal with the existing situation of complexity and uncontrollability of transport project management in Vietnam today. The paper has significant contribution in study and management of project risk for developing countries like Vietnam.

*Key words:* transport project, project management, risk management, project risk

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**A Study on the Influence of Network Attributes on the Route Choice Behavior**

Sideney Schreiner, Tetsuro Hyodo, Yoji Takahashi

**ABSTRACT:** Residents of urban areas must endure daily movements in order to acquire goods and perform activities necessary to life. Goods also must be transported within the urban areas as a result of the market activities. The route choice models are widely used for the prediction of these movements by city and transportation planners. This paper presents the application of a methodology introduced initially for the prediction of route choice of bicycles, now adapted to motorcycles and trucks. The adaptation of the methodology allowed the improvement of the original analysis algorithm increasing the number of considered network attributes and adding a user related attribute: Value of Time. The case studies of Ho Chi Minh City and Tokyo produced satisfactory results relating the route choice behavior and the network attributes. As a result, the value of time for trucks in Tokyo and the parameters relating route choice and network attributes were obtained.

*Keywords:* Route choice model, Route overlapping, Network attributes, Value of time

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**THE INFLUENCE OF SAFETY CLIMATE ON VESSEL ACCIDENTS IN CONTAINER SHIPPING**

Chin-Shan LU, Chaur-Luh TSAI

**ABSTRACT:** This study empirically evaluates the crucial dimensions of safety climate and vessel accidents from a seafarer’s perspective, specifically in the context of container shipping. According to the factor analysis six safety climate dimensions are identified: safety management, supervisory safety, safety attitude, safety training, job safety and
co-workers’ safety. A logistic regression was used to evaluate the effects of safety climate dimensions on vessel accidents such as crew fatalities and machinery failures. The findings of this study indicate that the safety management, safety training and job safety dimensions significantly affect crew fatalities, whereas job safety dimension has a significant effect on machinery failure. The results suggest that job safety dimension is the most important factor affect vessel accidents, followed by safety management and safety training dimensions. The theoretical and practical implications of the findings on the vessel accident prevention in container shipping are discussed.

*Keywords*: Safety climate; Vessel accidents; Container shipping.

**DEVELOPMENT OF SEISMIC RISK ASSESSMENT METHODOLOGY FOR HIGH SPEED RAILWAYS**

Makoto SHIMAMURA, Yayoi MISU

**Abstract**: Methodologies for assessing the seismic risk of a high speed railway system were limited to analysis of fragilities of structures and vibration dynamics of vehicles in the past. A deterministic or scenario based approach assuming a particular devastating earthquake was also used in some methodologies. A seismic risk assessment methodology that can estimate the risk of derailment caused by earthquake is proposed in this study. Among constituent factors, the effectiveness of the seismic early warning system that detects the occurrence of earthquakes before the strong ground motion reaches the line is concerned. This study addresses a formulated method to quantify cost-benefit tradeoffs between gain in safety and false alarms. In addition, an assessment model of consequences in terms of injuries and fatalities in derailment disaster, an approach method for network of Shinkansen, and a graphical user interface are considered as perspective studies.

*Key Words*: seismic risk assessment, high speed railway, seismic early warning system

**A STUDY ON JOURNEY-TIME RELIABILITY CONTRIBUTING TO THE SUSTAINABLE DEVELOPMENT OF RURAL AREAS**

Masaru FUJII, Hironobu HASEGAWA, Mikiharu ARIMURA, Tohru TAMURA

**Abstract**: Rural areas play important roles in national land planning. However, with rapid changes related to the ever-declining birthrate and graying of society as well as financial reforms due to financial constraints, “village collapse” has become increasingly obvious, and the survival of rural areas is now at risk. In light of this situation, journey-time reliability of road transportation could become an important key in supporting the sustainable development of production and living-related activities in rural,
mature communities in the future. In this study, the importance of journey-time reliability of road transportation for the activities of rural residents is examined by referring to the concept of a time-space path and the population movement theory. In addition, the value of journey time reliability is quantified using the stated preference survey.

Key Words: journey time reliability, activity-based approach, stated preference, population movement theory

A NEW PARTICLE SWARM ALGORITHM BASED COMPREHENSIVE LEARNING SYSTEM IN TRAFFIC SIGNAL COORDINATION

Huixian HUANG, Wen Long YUE

Abstract: A New Particle Swarm Optimization algorithm (NPSO) based on comprehensive learning system is proposed for solving nonlinear function optimization problems. The method to learn comprehensive experience from the best particle and from the worst particle is used to adjust the searching direction. The adaptive mutation operator is used to change the velocity inertia factor according to the size of fitness and the iteration process so as to avoid the stagnancy of population and increase the convergence speed. Simulation experiment processes are developed to compare NPSO algorithm with an Improved Particle Swarm Optimization algorithm (IPSO) algorithm. The simulated results demonstrated that the NPSO algorithm is effective and efficient in dealing with the nonlinear function optimization problem. At end of the paper, an application of NPSO in optimizing an isolated traffic signal setting was considered to demonstrate its efficiency.

Key words: Adaptive mutation, Comprehensive learning, Inertia factor, Signal coordination

Privatization vs. Efficiency Evaluation and Productivity Change: A Study on C.K.S Air Cargo Terminal

Yung-Hsiang CHENG , Huei-Wen Chen

Abstract: Faced with severe competition pressure from rival, numerous countries have already adopted privatization in order to stimulate productivity and improve operation efficiency of air cargo terminals. In Taiwan, the privatization of C.K.S. air cargo terminal has been launched in 2000. This study applies the DEA (Data Envelope Analysis) methodology and Malmquist production index to analyze efficiency and productivity change of C.K.S. air cargo termination before and after privatization. Empirical results
indicate privatization improves efficiency of terminals and that the productivity change relies on technology innovation. It is worth mentioning that terminal privatization experienced initial decline followed by latter increase trend. The reason could be the economic declines and terrorist attacks in 2002 caused decline in efficiency and stabilized in 2004. In addition, privatization on organization management and technology transfer requiring transition time to show effects could also be possible reason.

**Key Words:** Privatization, DEA, Malmquist productivity index, TFP-CH

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**EXTENDED DIAMOND INTERCHANGES WITH ROUNDABOUTS INCLUDING LOCAL ROADS FOR RURAL CROSSINGS**

Hyoungsoo KIM , Taehyung KIM , David J. LOVELL

**Abstract:** The purpose of this study was to assess some operational and safety issues related to rural crossing mechanisms: a “traditional” diamond interchange design with roundabout intersections at the ramp termini, and a less conventional design incorporating local roads, called an extended diamond interchange. Various levels of traffic demand were considered through computer simulation. The primary safety metrics were the speed differences between an approaching link and a circulating link (SDAC), and the speed differences between consecutive time windows (SDCW) on an approaching link. In both light and heavy traffic conditions, the extended diamond interchange with roundabouts including local roads seems to be safer, by these metrics, than the typical design because the longer ramp to roundabouts makes traffic flow more stable. For the operational performance, total delay time was surveyed. In heavy traffic conditions, the extended design is stronger than the typical design thanks to more space for vehicle queues.

**Key Words:** roundabout, rural crossing, safety

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**THE EFFICIENCY EVALUATION OF THE TRANSPORTATION-REGIONAL ECONOMY COMPOSITE SYSTEM BASED ON DEA**

Weixiong ZHA , Fenjie QIU , Lin LIU

**Abstract:** Based on the analysis to the transportation-regional economy composite system, and by time-series DEA analysis method, an evaluation system on efficiency toward the input and output of transportation-regional economy composite system are established in this paper. According to the model and analysis method, we carry out an appraisal analysis to dynamic integrated efficiency of transportation-regional economy
composite system in Jiangxi province.

*Key Words:* transportation, regional economy, composite system, efficiency evaluation

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**EVALUATION METHOD OF THE PAVEMENT RUTTING BASED ON THE VEHICLE DYNAMICS**

Kazuya TOMIYAMA, Akira KAWAMURA, Alimujiang YIMING, Tateki ISHIDA, Shigenori NAKAJIMA, Takashi NAKATSUJI

**Abstract:** The rutting is a major distress mode of the paved road surface. The condition of the rutting is a special concern to road administrators as well as road users because it affects driving safety and ride quality. Nowadays, the maintenance criteria of the road surface are obliged to change from detailed specification to performance specification in response to the road user’s demand. However, today in Japan, the rut depth which has been used as an index for the maintenance of the rutting although it has some disadvantages. To establish the index in term of vehicle/road interaction, first, driving experiment at the proving ground is conducted. Then, the new evaluation method of the rutting is proposed based on the vehicle dynamics by use of the Half-Car simulation. As the result, the model indicates the high reproducibility of the rutting effects with a small computational effort.

*Key Words:* pavement rutting, rutting evaluation, Half-Car model

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**ACCIDENT RISK AT A RAILWAY LEVEL CROSSING**

Chi-Kang LEE, Shou-Ren HU

**Abstract:** The purpose of this research is to estimate risk models, which can assess the safety at a railway level crossing. The accident risk, in terms of equivalent fatalities in a period of time, is decomposed into two parts: the accident likelihood, in terms of number of accidents per period, and the accident impact, in terms of equivalent fatalities per accident. Each of the risk dimensions is investigated, using nonlinear regression, Poisson regression, and negative binomial regression, and considering the effect of exposure variables, highway characteristics, railway characteristics, and the control devices, at railway level crossings. Empirical results indicate that Poisson regression is good for the estimation of accident likelihood; and negative binomial regression is good for the estimation of accident risk and accident impact.

Key Words: railway level crossings, accident risk, Poisson regression, negative binomial regression.
THE ALGORITHM FINDING OPTIMAL ROAD SECTIONS FOR THE INVESTMENT AGAINST DISASTERS UNDER THE BUDGET CONSTRAINT: A CASE OF ULSAN CITY IN SOUTH KOREA

SONG, Ki Han, BAEK, Joo Hyun, CHUNG, Sung Bong, RHEE, Sung Mo

Abstract: There has been growing interest in minimizing damages by disasters, but the countermeasure in traffic engineering has been limited to the passive researches such as evaluating transportation network. The algorithm suggested by this paper was the active countermeasure to find directly the optimal road sections for investment against catastrophes using the optimization process and the simulation. This was composed of three modules such as scenarios, model, and aggregation. First, scenarios were made by the assumption of unusual behaviors under ‘life or death’ situation. Second, the object function using the number of dead people and the budget constraint were included into the optimization equation. Then, the results of iterated scenarios were aggregated to the best alternative, using the possibility of disaster occurrence. Lastly, it is applied using the network and production of Ulsan City in South Korea. The result of case study supported the usefulness and availability of this algorithm.

Key Words: countermeasure of disaster, optimal algorithm, network design

METHODOLOGY FOR ESTIMATING TRIP PRODUCTION OF SUBDIVIDED ZONES USING SOCIO-ECONOMIC INDEXES: A CASE OF KOREA

KWAK, Ho Chan, SONG, Ki Han, RHEE, Sung Mo, CHUNG, Sung Bong

Abstract: In traffic demand forecasting process, subdividing zones is needed to know trip pattern among smaller zones than existing O-D zone system. Trips among subdivided zones are generally estimated because it is difficult to obtain the real data. Generally, Production of subdivided zones is estimated by population ratio of subdivided zones with respect to existing zone. But it has a weakness which it can not explain properly characteristics of each linked trip (Especially in case of non home-based trip). Therefore new methodology to estimate production of subdivided zones for each linked trip is proposed in this paper. The methodology uses more socio-economic indexes and equations of regression for production. To evaluate the methodology, real data of Haenam County in Korea is applied. The error of estimated production by the methodology will be smaller than that by existing methodology. After all, more accurate traffic demand forecasting will be possible by the methodology.

Key Words: subdividing zone, linked trip, trip production estimation
SIMULATION ANALYSIS OF OPERATION CAPACITY AT COLD CHAIN HOME DELIVERY TERMINAL

Ying-Wei WANG，Tzeu-Chen HAN，Huan-Chen KANG

Abstract: This study establishes a discrete process-interaction simulation model to solve cold chain home delivery peak-demand problem at operation center. We simulate its ceiling capacity and use it to evaluate alternatives to over-capacity. A Penghu case study shows that current capacity is 360±20 packages under five members/vehicle assignments. However, capacity can be increased to 435 once staff’s operation efficiency was increased by 20% (i.e., decreased by 20% operation time for each job-item). In case of over-capacity or trucking delay, dropping out unnecessary job-items such as cargo number and weight recording is a workable option to save operation time. In addition, depending on package amount, truck’s arrival delay at operation center is acceptable for fleet control. For example, a late arrival truck with 30% (of 361 units) packages carried, a delay of thirty minutes is allowable. At 79%, only five minutes is allowable.

Keywords: cold chain home delivery, operation capacity, discrete simulation

CITIZENS’ EVALUATION OF ROAD PLANNING PROCESS: CASE STUDY OF YOKOHAMA NORTH-WEST CORRIDOR

Chunyan SHAN, Tetsuo YAI, Takanori SAKAI

Abstract: Public involvement (PI) has recently been introduced into the road planning process at the conceptual stage in Japan. However, there is a lack of agreed-upon evaluation methods for individual processes. It is very difficult for citizens to distinguish between the planning process evaluation and planning decision evaluation. This study developed a method for citizens’ evaluation withdrawing items assessing procedure from other outcome items for road planning. A body of questions for citizens’ evaluation was constructed and the residential questionnaire survey was conducted in Yokohama North-West Corridor (YNWC), of which the public was involved in the development of the “rough plan”. The feasibility of citizens’ evaluation for planning process was discussed while examining the question items; the effects of respondent’s attributes on perception were analyzed; the determinants of citizens’ attitude to government and the participatory planning process were studied by performing regression analysis.

Key Words: public involvement, citizens’ evaluation, road planning, Yokohama
DEVELOPMENT OF PHILIPPINE TRIP GENERATION RATES

Jose Regin F. REGIDOR, Dr. Eng.

Abstract: The practice of transportation engineering and planning has employed trip rates to determine the number of trips generated by developments. Trip generation serves as an input to modeling transportation requirements and traffic flows influenced by the development. For example, a condominium may directly impact traffic within a 10 km radius. Meanwhile, a shopping mall can impact an area of over 50 km in radius. These trips generated and attracted are represented by standard rates for trip generation like those published by the Institute of Transportation Engineers. This paper discusses the trip rates used in transportation research and practice in the Philippines. The paper also describes the current efforts in the development of trip rates for various land use types. An assessment of issues and concerns pertaining to local trip and rates are examined, and recommendations for future research directions are also presented.

Keywords: trip generation, traffic analysis

PSYCHOLOGICAL DETERMINANTS OF BEHAVIORAL INTENTION TO USE TRAVEL MODES IN HO CHI MINH CITY

Hong Tan VAN , Satoshi FUJI

Abstract: This study investigated attitudinal aspects of six travel modes currently used in Ho Chi Minh (HCM) City, and examined the relationship among psychological constructs following Theory of Planned Behavior (TPB). Participants (N=208) completed measures on attitudes toward travel modes using Osgood ’s semantic differential technique in junction with Likert-scale measures of perceived behavioral control (PBC), subjective norm, moral obligation and intention for travel mode choices. Principle component analysis yielded three attitudinal factors, i.e. Symbolic affective, Instrumental and Social Orderliness, repeating the result in the previous study by Van and Fujii (2006). The structural equation model analysis of TPB structure provided strong support for the hypothesized relationships, i.e. all the constructs (attitude, subjective norm, PBC, and moral obligation) explained high significant proportions of the intentions’ variances. This implies that TPB is potential for predicting the behavioral intention of mode choice in HCM City.

Key Words: attitudes toward travel modes, travel mode choice, theory of planned behavior
A HYBRID LAGRANGIAN HEURISTIC/SIMULATED ANNEALING ALGORITHM FOR THE MULTI-DEPOT LOCATION ROUTING PROBLEM

Chia-Ho CHEN , Ching-Jung TING

Abstract: The design of a logistics system can be defined as a Location Routing Problem (LRP), which is to find the optimal number and locations of the distribution centers, simultaneously with the vehicle routing to minimize the total system cost. In this research, a three-phase hybrid heuristic approach (LH-SA), combining the Lagrangian heuristic (LH) and simulated annealing (SA), is developed to solve the multi-depot location routing problem (MDLRP). Firstly, the LH is applied to determine the facility location set and the allocation of customers. Then an independent vehicle routing problem (VRP) for each selected facility location is solved by SA. Finally, the SA is used to perform a global search for all routing moves. The performance of the proposed algorithm is tested on two different groups of benchmark instances and compared with other algorithms in the literature. The results show that the LH-SA is competitive and updates 20 best-known solutions.

Key Words: multi-depot location routing problem, Lagrangian heuristic, simulated annealing

URBAN GOVERNANCE OF PACKAGING ENVIRONMENTALLY SUSTAINABLE TRANSPORT POLICIES: INDICATOR DEVELOPMENT AND APPLICATION

Junyi Zhang , Akimasa Fujiwara

Abstract: To realize environmentally sustainable transport (EST), some barriers have been identified, including institutional, financial, legal and regulatory barriers, acceptability of policy instruments by the public, appraisal, monitoring and evaluation, and robust urban travel data. Most of these barriers are related to the governance, which is carried out by government, firms and civil society. This paper attempts to measure urban governance level of packaging various EST policies, in both developed and developing cities. Millennium Cities Database is used to measure environmental sustainability in transport sector, and Environmental Sustainability Index to measure governance level. A structural equation model with latent variables is used to evaluate the influence of governance level on packaging EST policies. It is found that enhancing governance level of government could contribute to reduce environmental emissions, but improving those of civil society and firms is not the case.

Key Words: environmentally sustainable transport, governance, indicator, developing cities
A METHOD FOR URBAN ROAD MAINTENANCE MANAGEMENT

Indra Alfitri MAIZIR

Abstract. Road network is an important aspect for general economic development. This study aims to develop a methodology for road maintenance management for urban roads by reviewing road maintenance management, exploring methods in managing road attributes database and determining road maintenance activities to maximize the use of maintenance budget. This study also proposed some criteria for road maintenance in Bandung by considering the existing condition, the national standard and relevant literatures. Considering some limitations of the existing road maintenance management, this study has developed a methodology for identifying the most economical maintenance activities and selecting the optimal segment locations.

The proposed methodology not only analyzes and prioritizes maintenance needs but also they can even create project cost estimates and analyze various funding scenarios. A Geographic Information System can add tremendous functionality to a road maintenance management program not only in graphical output but also in analysis, planning, reporting and other areas.

Keywords: road maintenance, geographic information system, pavement management

MODELING GROUP DECISION-MAKING MECHANISMS IN HOUSEHOLD TRAVEL BEHAVIOR: THEORIES AND AN APPLICATION

Junyi ZHAN, Akimasa FUJIWARA, Masashi KUWANO

Abstract: Choice models with individual decision-making mechanisms have been dominating in transportation, even though it has been long recognized that in many cases, an individual makes his/her choice together with other people. This paper establishes an additional household choice model with group decision-making mechanisms based on a multi-linear household utility function, which can theoretically and endogenously deal with intrahousehold interaction and members’ relative influences in joint decision-making process. The model is applied to represent households’ vehicle type choices, using a data collected in two Japanese cities in 2004. The effectiveness of the model is empirically confirmed from both model performance and applicability to analysis of household car ownership behavior.

Key Words: group decision-making, intra-household interaction, multi-linear utility, car Ownership
EFFICIENT ESTIMATION OF SIGNALIZED LINK TRAVEL TIME USING SMALL SIZE PROBE REPORTS

Qiang LI, Tomio MIWA, Toshiyuki YAMAMOTO, Taka MORIKAWA

Abstract: The cost and capacity of the communication between probe vehicles and the operation center impose restrictions on the number of probe vehicles and thus it is expected that reliability of probe reports can be obtained by relatively small number of probe vehicles. Travel time on a signalized link is a multi-peak distribution because there are several subgroups divided by turning movements and intersection delay at downstream. When sample size is small, sampling error arises and it is difficult to estimate population mean using sample mean directly. In this paper, the sources of sampling errors are discussed and an estimation method that minimizes the effect of the sampling errors is proposed. The result shows that performance level of a signalized link can be estimated reliably using the proposed method and small size sample.

Key Words: signalized link, estimation, probe vehicle, small size

THE IMPLICATION OF TRANSPORT DIVERSITY FOR SUSTAINABLE URBAN TRANSPORTATION AND REVISION REPORT

Cheng-Min FENG, Cheng-Hsien HSIEH

Abstract: The different transport stakeholders with diverse demands have different needs for transport infrastructures and services in an urban transportation system. To meet the objectives of sustainable transportation implies the trade-off consideration of benefits among different stakeholders and creates the issues of transport diversity. However, few researches have focused on these issues. The aim of this study was to provide a framework to evaluate the transport diversity in the Taipei Metropolitan Area. The transport diversity is defined as the satisfied level among the needs of stakeholders in this study and measured as the gap between the goal and present values of stakeholders’ needs in the form of Shannon-Weaver Index. The result revealed that the higher diversity means the more equitably stakeholders’ needs satisfied. It is hoped that the findings of spatiotemporal analysis would help transport planners to understand what infrastructures or services at where have to be improved.

Key Words: diversity, sustainable transportation, stakeholders
INVESTIGATING THE EFFECTS OF TRANSIT INFORMATION SYSTEMS ON DIFFERENT USER GROUPS

Yalcin ALVER, Shoshi MIZOKAMI

Abstract: This study investigates the effects of Transit Information Systems (TIS). TIS are wide range of systems that provide travelers information about travel options such as; travel times, delays and/or incidents. In this study, the important transit information types and their service levels are investigated in Izmir City, Turkey. The study focused on the transit users; considered information types for different transit mode segments were identified. In addition, accepted information types for non-transit users to consider transit as an alternative commute mode was investigated. For these purposes, a stated preference scenario was prepared which included the considered important information types of respondents and a function of their actual travel time. In this study, static pre-transit information systems were considered. Results indicated that considered TIS between transit and non-transit users are not much different from each other. However, considered TIS among different transit mode segments is significantly different.

Key Words: public transit, transit information systems, stated preference scenario.

SIMULTANEOUS ESTIMATION OF THE PEDESTRIAN ORIGIN-DESTINATION MATRIX AND PARAMETER OF THE ACTIVITY/DESTINATION CHOICE MODEL


Abstract: This paper deals with the problems of pedestrian origin-destination (O-D) matrix estimation and activity/destination choice model calibration from pedestrian counts. This paper proposes a bi-level programming model that integrates the two steps of pedestrian O-D demand matrix updating and pedestrian activity/destination choice model calibration. The lower-level problem is the activity-based user equilibrium assignment model for pedestrian networks with bi-directional flow effects, while the upper-level problem is to estimate the OD demands together with the calibration of the activity and destination choice model from pedestrian counts. Solution algorithm is adapted for solving the proposed bi-level programming problem. A numerical example is provided to illustrate the applications of the proposed model and solution algorithm.

Key Words: pedestrian activity and destination choice, activity-based user equilibrium

EVALUATION OF SAFETY AND EFFICIENCY OF CARGO DELIVERIES BY TRUCK BASED ON PROBE DATA
Michiyasu ODANI , Yasuhito TANAKA , Kenichiro NAKAMURA , Naoya AKITA

Abstract: Recently, a set of probe equipment comprising the GPS and an information terminal is increasingly mounted on goods vehicles to gather data on their operations. This study aims to better understand cargo deliveries over a middle/long-distance and within a city, using the probe data of trucks linked with the drivers’ operation status. It is learned that truck drivers are constantly under psychological pressure to make the designated delivery time, which is getting more demanding in recent years. In this study, we estimate safety margin against the designated arrival time based on the probability of being late calculated from the truck’s travel data. This is because the probability gives us an objective way to evaluate the risk of getting late. As this safety margin lessens the driver’s psychological pressure for sticking to the delivery schedule, it is expected to greatly contribute to safety drive while improving the efficiency of deliveries.

Key Words: cargo deliveries by truck, probe data, probability of being late, safety margin

AN ANALYSIS ON CITY FREIGHT COOPERATIVE TRANSPORTATION SYSTEM USING GAME THEORY

Dong YANG , Michiyasu ODANI

Abstract: City cooperative freight transportation system is considered as an effective way to solve traffic problems. However, cooperation problems remain on the stage. With this in mind, this paper applies some important concepts in a cooperative game theory with focuses on core and ε-core to analyze cooperation among members of an alliance of truck-focused logistics companies, which will involve 1) Providing a detailed and systematic standards of essence to judge the rationality of alliance formation by core; 2) Seeking rational payoff for partner companies and optimal subsidies given by public sector as to formation of an urban cooperative alliance by ε-core; 3) Illustrating the crucial factors for promoting alliance formation and 4) Suggesting practical measures on how to make practical measures in order to boost cooperative alliance easily. This paper aims to enhance the understanding of interagency cooperation and decision-making behaviors facing truck logistics companies and local public sectors.

Key Words: freight cooperative transportation system, game theory, core, ε-core

ROAD SAFETY IN VIETNAM: THE CAUSES AND SOLUTIONS

Nguyen Huu HA
Abstract: Traffic accident has been one of the hardest troubles and caused to a great deal of strong argument for many years in Vietnam. Regardless of the effort of State and functional offices, traffic accidents have been not only reduced but also increased rapidly. The article analyses causes for traffic accidents and recommendations concrete solutions dealing with the problem.

Within early 10 months of 2006, there were 12,000 traffic accidents happening in Vietnam in which 10,422 people died and 9,237 people were injured from those ones, average 30 people dying of traffic accidents daily. There has been a drastic increase in the grievous numbers, which makes scientists concerned and worried. There have been a lot of explanations for the problem; however, road safety has not got the expected outcomes. The below parts will describe the causes of traffic accidents and suggestion of solutions.

Keywords: Road Safety, Road Accident, Sustainable Transport, Public Transport System

AN EMPIRICAL STUDY OF LAND USE/TRANSPORT INTERACTION IN BANGKOK WITH OPERATIONAL MODEL APPLICATION

Varameth VICHIENSAN, Kazuaki MIYAMOTO, Wiroj RUJOPAKARN

Abstract: This paper presents a study of land use transportation interaction in the developing countries context. Several issues regarding the development of land use model in developing metropolis are discussed. A case study of Bangkok is presented. The present situation of urban and transport development is described, showing that land use interaction is not explicitly considered in the transportation analysis. Empirical evidence from the railway projects shows that interaction of land use and transportation interaction is quite strong and must not be ignored. To analyze land use and transportation interaction, an effective tool is required. Among the existing urban models, TRANUS is selected as a pilot system for Bangkok for several reasons. The design and calibration of Bangkok model are described. Scenario analyses provide insight how land use is incorporated in the comprehensive urban transportation analysis scheme. Policies such as road pricing or TOD are effective countermeasures to compact the city and relieve traffic congestion. Lessons learned from the present system gave an idea of to develop an integrated land-use transport and the environment for Bangkok.

Keywords: Land Use/Transportation Interaction, Railway Development, TRANUS, Bangkok

DEVELOPMENT OF PREDICTING MODELS OF THE OPERATING SPEED CONSIDERING ON TRAFFIC Flow CHARACTERISTIC AND ROAD ALIGNMENT FACTORS
SooBeam LEE, Tetsuo SHIMIZU

Abstract: The road should be designed in the consistency alignment which helps the driver can the safe driving. In order to offer proper environment from the design stage, it is essential to respect the operating speed for the different highway environments. So, it is necessary to develop the operating speed estimation model. Through model, the status of road safety can evaluate which is possible to provide safer environment to road users. Factors to affect on operating speeds were classified into three groups; horizontal & vertical alignments and traffic operation characteristic factors. Factors have chosen to affect on operating speeds as classifications of horizontal tangent, curve and vertical curve sections. In order to develop operating speed estimation models, Multi-regression analysis was used to this study using the selected factors. This study has meaning that the developed estimation models for operational speeds and evaluation of safety degree to horizontal and vertical alignments simultaneous.

Key Words: Estimating of the operating speed, Traffic operating characteristics, Road alignment characteristics

EVALUATING KEY WEB SITE SERVICES IN CONTAINER SHIPPING

Chin-Shan LU, Chun-Shan YANG

Abstract: This paper empirically evaluates web site services from container shipping companies’ perspective. The results suggest that carriers perceive vessel schedules and tracking to be the most important web site service attribute, followed by customs response, service routes, and electronic document service. Furthermore, a cluster analysis were employed to classify carriers into three groups, namely, schedule and tracking services oriented firms, support services oriented firms, and market and company information services oriented firms. Theoretical and practical implications of the research findings are discussed.

Keywords: web site services, container shipping, cluster analysis

BINARY CHOICES MODEL TO VALUE MOTORCYCLIST’S SLIGHT INJURY COST IN SURABAYA

Hera WIDYASTUTI, Corinne MULLEY, DR., Dilum DISSANAYAKE, DR.

Abstract: The purpose of this study is to value the subjective cost of slight and serious motorcyclist accident using the stated preference method which is applied into the willingness to pay (WTP) approach. Willingness to pay is one way to assess the cost and
impact of road traffic casualties. The purpose of this study is to investigate a relationship between age, income and number of children of the respondent and their willingness to pay for reducing slight injury as a result of motorcyclist accident. Two binary discrete choice models have been determined to obtain the figure of the subjective cost. All the independent variables on both models have the expected signs and are significant at 5% level. The goodness of fit of the model to the data is expressed by $\rho^2$ and this too falls within the expected range of 0 - 1.

**Key Words:** motorcycle, stated preference, willingness to pay and discrete choice

THE IMPACT OF PUBLIC TRANSPORT ARRIVAL RATE AND STOP TIME IN MODELLING AND ANALYZING A SIGNALIZED INTERSECTION BY USING MICRO SUMULATION AND ANALYTICAL SOFTWARE

Gusri YALDI , Wen Long YUE , Elvi Roza SYOFYAN

**Abstract:** The application of micro simulation traffic modeling and analyzing software has been widely spread in many countries, including the developing countries. Before that, many developing countries have been used micro analytical software, for example aaSIDRA. It seems it is more difficult to use micro simulation software in developing countries due to there are more complex problems compared to developed countries, as the models were developed based on the travel behavior of the country. A study to model and analyze a signalized intersection has been undertaken in Padang, West Sumatra, Indonesia. It used CUBE Dynasim, a relatively new micro simulation software, and aaSIDRA. Throught the application of the two models, it has been found that CUBE Dynasim tends to generate lower approach flows compared to the real data while aaSIDRA generates higher lane capacity than the demand. Public transport arrival rate and stop time were reduced with by 10 percent incrementally in order to investigate this case. However, CUBE Dynasim still generates traffic flow which is below the real data.

**Key Words:** Traffic flow, Public transport arrival rate, Public transport stop time

MODELING TRANSIT PASSENGER TRAVEL BEHAVIORS IN CONGESTED NETWORK WITH EN-ROUTE TRANSIT INFORMATION SYSTEMS

Hualing REN , William H. K. LAM

**Abstract:** This paper proposes a multi-class schedule-based dynamic transit assignment model to investigate the impacts of En-route Transit Information Systems (ETIS). The
The proposed model considers simultaneously the departure time and route choices of passengers in congested transit network with ETIS. There are two classes of passengers: those equipped and those unequipped with ETIS. These passengers would make their travel choices to follow the stochastic dynamic user optimal principles, with the equipped passengers having a lower perception variation of the travel cost due to the availability of better information. The numerical example indicates some important insights on passenger travel behaviors and the performance of the transit network with ETIS. The effects of the service cost and service quality of ETIS on the market penetration of ETIS and the total passenger travel cost are assessed under different conditions with various levels of transit passenger demand.

**Key Words:** en-route transit information systems, schedule-based dynamic transit assignment, market penetration

**Development of National Highway ITS Facility Management System Utilizing RFID Technology in Ubiquitous Environments**

Park, Hyun Suk, Kim, Young Chan, Moon, Hak Yong

**Abstract:** For more efficient management and supervision of the ITS(Intelligent Transport Systems) for National Highway in Metropolitan area, we have applied RFID (Radio Frequency Identification) in ubiquitous environments to road traffic ITS for the first time. RFID is widely used for the operation and maintenance of logistics, security, transportation cards and electronic libraries. As a demonstration model, the facility management system was tested on 394 pieces of local equipment out of a total of 655 including unmanned area centers. With the National highway ITS facility management system established, it is now possible to save manpower and time needed for maintenance, and management and supervision has become easier because maintenance technicians can no longer manipulate arrival times or the content of inspections.

**Key Words:** ITS, RFID, facility management

**INVESTIGATING THE IMPACT OF LOCAL CONDITIONS IN MODELLING AND ANALYZING A SIGNALIZED INTERSECTION BY USING CUBE Dynasim AND aaSIDRA**

Gusri YALDI, Wen Long YUE, Elvi Roza SYOFYAN

**Abstract:** The application of micro simulation and analytical software has contributed significantly to the development of new and existing transport systems. However, it seems that the successfulness of the software could be different when used in different countries, particularly when the software is newly developed. It is due to the different of
local conditions. A study has been undertaken in investigating this issue. Two signalized intersection located in different countries, in this case, Adelaide in South Australia and Padang in West Sumatra-Indonesia, have been used as cases in modeling and analysing by using CUBE Dynasim and aaSIDRA. It resulted in some interested findings. For instance, CUBE Dynasim tends to generate the same output as aaSIDRA and match with the real data for intersection located in Adelaide. However, it is different for another intersection in Indonesia. The possible causes are related to the local infrastructure and travel behavior conditions and the simulation factors used by CUBE Dynasim.

**Key Words:** Traffic flow, Travel speed, Queue

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**AVerage Freeway Link Travel Time Predictions Using Data From Fixed Sensors**

Kittichai THANASUPSIN , Viroat SRISURAPANON

**Abstract:** This paper presents models to predict freeway link travel time in multiple periods. The relationships between traffic measures and average link travel time from simulation were explored using the Generalized Additive Model (GAM), a nonparametric regression technique. Parametric models to predict freeway link speed were then developed based on the relationships discovered by the nonparametric model. The models were developed on a set of simulation data and tested on another set of simulation data. The root mean square errors (RMSE) of the model developed to predict link travel time at current time-step were 88.63, 6.88, 2.38 seconds for morning peak hours, off-peak hours, and afternoon hours, respectively. The RMSE of the model to predict link travel time at 5, 10, 15 minutes forwards were 91.20, 101.86, 122.08 seconds, respectively.

**Key Words:** Average Link Travel Time, Intelligent Transportation Systems, Travel Time Prediction

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**The Development of Evaluation Criteria for Driver Service Quality in Urban Roadways**

Soobeom LEE , Sooil LEE , Jangwook KIM , Juntae PARK

**Abstract:** This study aims to establish new assessment index to comprehensively assess the service level of the road by areas considering current qualitative method and quantitative method together using a structural equation model. The results of the study are as follows. In case of Gangnam-gu, traffic flow, utilization behavior, signal control, maintenance and management, road design and information and others were found in order as the indexes, and for Seongdong-gu, maintenance, information and other, traffic flow, signal control, road design and utilization behavior were found in order as the
indexes. Based on the results of this study, there were differences in the recognition of the users for the service provided regarding the operation of the road and the facilities according to the areas. In the respect of the execution of traffic policies, it is necessary to establish appropriate measures to reflect the recognitions of the service users by areas about the quality of the services.

*Key Words:* Evaluation Criteria, Structural Equation Model, Level of Service

**VALUING PASSSENGER VAN SERVICE IN BANGKOK BASED ON STATED PREFERENCE SURVEYING TECHNIQUES**

Prapatpong Upala, Sorawit Narupiti, Richard Batley

**Abstract:** In the recent years, passenger van is a new form of the small-medium transit service in Bangkok. In comparison to bus, passenger van offers shorter journey time, increased headway, improved reliability, higher levels of comfort, less frequent stopping, guaranteed seating and air conditioning. The objectives of this paper are to investigate the preferences of public transit users in general, and passenger van users in particular, towards several service quality attributes, and to exploit such insights in the planning of future services. The main Stated Preference (SP) surveying techniques were based on 1200 passenger van users which were drawn from three strata pertaining to different spatial locations, specifically inner-city, urban-fringe and suburban. The analysis was exploited the merger of the various SP experiments and the phenomenon of repeated observations.

*Key Words:* Passenger Van, Stated Preference Techniques, Transit Service Quality

**CCFI FORECASTING BASED ON RBF NEURAL NETWORKS**

Xiangqun SONG, Na LIU, Zijian GUO

**Abstract:** China Container Freight Index has been regarded by international maritime trade realm. Research on the fluctuation rule of China Container Freight Index and forecasting of the trend of international container shipping market are very meaningful. At present, researches on China Container Freight Index forecasting are limited. Utilizing the nonlinear mapping function of RBF neural networks and their a good many advantages compared to BP neural networks, such as density, only interpolation, convergence and so on, this paper creates a model to forecast China Container Freight Index. The model forecasts the future China Container Freight Index, and the short-term model is validated by practical data. The result indicates the high precision of this model.

*Key Words:* RBF neural networks, China Container Freight Index, forecasting
SEARCH FOR SUITABLE URBAN FREIGHT DISTRIBUTION MEASURES: THE CASE OF HORIZONTAL AND VERTICAL COOPERATIVE DELIVERY SYSTEM

Nashreen G. Sinarimbo, Yoji Takahashi, Tetsuro Hyodo

Abstract: Insufficient numbers of parking space and lack of (off) loading areas are some of common problems that driver of delivery trucks have to deal with. One way to address this problem is by increasing the utilization rate of the limited parking spaces by ensuring short parking time of trucks. Attaining this brief parking time, however, requires a shift from a traditional way of delivering goods to a policy-driven method. Traditional way presents a situation where the driver has to leave his truck and make his way to the floor of the building to make delivery. Although this method remains to be popular due to its simplicity, there exist methods that when carefully enforce would present sizeable benefits. One of these policies is by assigning workers inside the building to facilitate the (un)loading activities to free the driver immediately. This paper discusses implementation of cooperative delivery system and tries to produce a guideline regarding what CDS design is suitable depending on the characteristics of the CBD.

Key Words: urban freight distribution, cooperative delivery system, urban goods movement

MEASURING THE PRODUCTION AND COST EFFICIENCY IN TELECOMMUNICATIONS INDUSTRY: THE TAIWAIN CASE

Chao-Chung KANG

Abstract: This article empirically analyzes production and cost efficiency changes in the Chunghwa Telecom Company (CHT Co.), before and after privatization. The input-orientation Data Envelopment Analysis (DEA) and Cost-DEA were the research tools used in this study, and the findings showed that the efficiency performance has significantly improved after partial privatization. However: under this condition, the CHT is still restricted by some government policies and regulations that have resulted in its failure to achieve any significant improvement in its cost management. The government needs to eliminate its control and regulations in order to solve this problem. This will provide CHT with a completely privatized environment that will allow it to face a very competitive telecommunications industry.

Key Words: DEA, production efficiency, cost Efficiency, telecommunication, privatization.
ANALYSIS OF INTERACTION BETWEEN REGIONS FOR PURPOSE OF SIGHTSEEING IN JAPAN

Yoshihiko MANNAMI, Akio KONDO, Akiko KONDO, Kanako OTSUCA, Ken-ichi OHASHI

Abstract: Interaction between regions is commonly focused on regional policies from the viewpoint of local revitalization. An interaction whose main purpose is sightseeing is analyzed in this study. An interaction index is proposed which can evaluate influence on the region of destination quantitatively in consideration of economic consumption. Economic consumption varies along with the sojourn time at the region of destination. An interaction model is formulated by constructing a consumer behavior model which is based on the Utility Maximization Theory. In order to develop a method to measure the degree of influence due to interaction, parameters of this model are estimated. As a result, it is clarified that interaction is influenced by travel cost, attraction of destination region and relationship between regions. In addition, degree of influence on prefectures in Japan by interaction is calculated and revitalization is discussed.

Key Words: Interaction, Utility Maximization Theory, Sightseeing, National Land Planning

CO2 REDUCTION EFFECT AND ECONOMIC EVALUATION OF ROAD TRANSPORT POLICY CONTRIBUTING TO PREVENTION OF GLOBAL WARMING

Hideaki SHIMADA, Akio KONDO, Akiko KONDO, Qi CHENG

Abstract: CO2 emission has increased in Japan in recent years. The transportation sector is one of the sectors which contributes to increased emission of CO2. Amount of CO2 emission by automobile traffic occupies a very large percentage of emission in this sector, and we have to make policies in order to reduce the amount of emission. In this study, Tokushima urban area is selected as a study area. After understanding characteristics of road traffic in this area by simulation analysis, road transport policies are proposed in consideration of characteristics that contribute to prevention of global warming. Reduction of CO2 emission and economic value of this policy are calculated quantitatively. As a result, it is proved that implementation of the policy which is packaged and reflected the characteristic of traffic is effective in reduction of CO2 emission.

Key Words: prevention of global warming, road transport policy, effect of reduction in CO2, economic evaluation
STATED PREFERENCE ANALYSIS OF AIR TRAVELERS’ MULTIPLE-AIRPORT CHOICE BEHAVIOR IN TOKYO METROPOLITAN AREA

Pradtha UDAYASEN, Daisuke FUKUDA, Tetsuo YAI

Abstract: The objective of this research is to investigate the main factors underlining air travelers’ choice behavior in Tokyo Metropolitan area’s multiple-airport system and apply these findings as the backup information for further policy implementations in order that both existing airports, Haneda and Narita, are effectively utilized. Stated preference experiments were conducted using internet-based questionnaire survey. Experimentally control combinations included three attributes: airfare; access time; and flight frequency. Respondents were asked to choose their most preferable air tickets from choice sets as they made their decisions between two airports. We conducted a cluster analysis in order to segment the respondents by their attitudes and estimated a discrete choice model for the respondents representing the population living in the Tokyo Metropolitan region. The results indicate that: (a) airfare and access time are significant factors in overall airport choices, especially for domestic experiments; and (b) frequency of service is a less significant factor.

Key Words: Stated Preference Analysis, Multiple-Airport Choice Behavior, Cluster Analysis, Internet-Based Survey

OD PAIR SAMPLING METHODOLOGY FOR PROBE VEHICLE SYSTEM AND EFFECT OF PROBE INFORMATION

Tetsuhiro ISHIZAKA, Atsushi FUKUDA

Abstract: Probe vehicle system to provide the reliable average travel time must collect huge travel time data from many number of probe vehicles, including passenger cars. In order to have passenger car’s driver send their travel time data, it is necessary to verify whether these drivers can gain the effect of travel time reduction based on provided travel time. These problems are very critical for practically applying probe vehicle system in a city. Therefore, this study proposes new methodology to estimate the number of probe vehicles required to ensure the reliability of travel time estimation. This study aims to verify a feasibility of reducing the number of probe vehicles in comparison with it estimated by conventional methodology and evaluate the effect of travel time reduction. This study concluded that new methodology can reduce it and the usage of probe vehicle information provides the effect of travel time reduction.

Key Words: Probe vehicle system, Number of probe vehicles, Travel time reduction
An Optimization Model for Container Marine Transport Network with IA Approach

Xiangqun SONG , Jun HUANG , Zijian GUO

Abstract: In recent years the trend of utilization of mega containerships in international marine transport is more and more obvious. Mega containerships benefit the carriers and port operators more than small ones, which is due to the less unit cost of the former. Thereby the general goal is to figure for the economies of scale. In order to achieve this benefit, the optimization schedule for container transportation network based on Immune Algorithm (IA) will be performed firstly, so as to reforge a reasonable transport system. The conclusion indicates that IA can resolve this complicated combinational optimization problem fleetly and efficiently. So a reliable theoretic method is provided for the management of the container harbors.

Key Words: Port and Harbor; Container Transportation Network; Immune Algorithm

DEA-based MPI Measure of Operating Efficiencies: New Insights with an Application to Container Ports

Boxin FU , Xiangqun SON , Zijian GUO

Abstract: To investigate the long-term operating efficiencies of container ports, we extend the work of previous researches to find a new systemic and improved method of DEA-based MPI in this paper. An approach based on both panel data and multi-inputs/outputs are considered comprehensively, and aim to measure the operating efficiencies of 10 leading container ports in China from 2001 to 2005 by applying this new systematic calculation method. The results illustrate that the MPIs are mainly attributed by scale efficiency change. Generally, The MPIs of ports sort by area in China from highest to lowest is the Delta of Pearl River area, the Delta of Yangtze River area and the Circum-Bohai-Sea Region.

Key Words: port operating efficiency, malmquist productivity index (MPI), data envelopment analysis (DEA)

PREDICTION OF SHORT-INTERVAL TRAFFIC DYNAMICS IN MULTIDIMENSIONAL SPACES

Lawrence W. LAN , Jiuh-Biing SHEU , Yi-San HUANG
**Abstract.** A radial basis function neural network (RBFNN) model is employed to predict the short-interval (within 15-minute) traffic series, including flow, speed and occupancy, which are measured in different time intervals, time lags, dimensions of state spaces, and times of day. Aside from describing entirely the methodology of RBFNN, the paper also uses two deterministic functions to test prediction power of the model. A field study with flow, time-mean-speed and percent occupancy time series directly extracted from two dual-loop detectors on a freeway of Taiwan is conducted. The results reveal that the predictive accuracies for different short-interval traffic dynamics by RBFNN model are quite satisfactory. It is also found that the predictive accuracies can be affected by the means of representing traffic series in terms of various time intervals, time lags, dimensions of state spaces, and times of day.

Key words: multidimensional state spaces, radial basis function, traffic prediction

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**RESIDENTIAL LOCATION CHOICE BEHAVIOR FOR DIFFERENT HOUSEHOLDS: METHODOLOGY AND CASE STUDY**

Pengpeng JIAO  Noboru HARATA

**Abstract:** This paper presents a mixed logit framework to identify residential location choice behavior in households. The model integrates a “direct parametric representation” approach to capture the correlation between spatial units, as well as a comprehensive structure of zonal accessibility to reflect the effects of employment, school, shopping and recreational opportunities. Households are clustered based on demographic and daily trip data to extract their different residential choice characteristics. The model is applied to the central city of Dalian, China. The empirical results reveal that 11675 households are clustered into 5 groups, with distinct characteristics in each group. Results also show the significant differences in sensitivity to female, male and children commuting behavior while households make residential choices, as well as their preferences to zonal accessibility to different activity opportunities.

**Key Words:** residential location choice, mixed logit model, spatial correlation

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**MULTIMODAL FREIGHT TRANSPORT NETWORK DESIGN FOR DEVELOPING COUNTRIES**

Jun T. Castro  Tadashi Yamada  Bona Frazila Russ  Makoto Iida

**Abstract:** This paper focuses on strategic planning in developing countries, particularly in freight transport network design and terminal development. Optimal set of transport
projects is determined using a transport network design model with some objective function, which can be a single objective function or a multi-objective function. The model involves a bi-level modelling approach, where multimodal multi-user assignment is incorporated in the lower level problem and the combination of transport interventions or projects is optimized in the upper level problem. Application of the model is undertaken using data from the two archipelagic countries of Indonesia and the Philippines - both countries that surely would benefit from a multimodal transport design.

Key Words: Multimodal transport, network design, traffic assignment, genetic algorithm

MOTORCYCLE OWNERSHIP MODELLING: GENERAL APPROACH AND APPLICATION TO THAILAND

Pattarathep SILLAPARCHARN

Abstract: As motorcycle is often ignored in many transport models, this paper aims to address some important issues of how income growth would affect motorcycle ownership. In this paper, a motorcycle ownership model is developed with a case study of Thailand using the limited aggregate data by province. Different functional forms were tested and it is found that a non-log linear function fits the observed data best. The final model has good statistical properties i.e. all statistically significant coefficients, correct signs and a high adjusted R squared value. In addition, the weighted least squares modification is applied to the proposed models in order to correct the heteroscedasticity problem and the final model gives sensible forecasts as when income increases to a certain level, the motorcycle ownership starts to decline as there might be a switch from motorcycles to cars which is expected from higher income countries’ experience.

Key Words: Motorcycle Ownership Model, Aggregate data, Thailand motorcycle ownership

ANALYSIS OF THE CORRELATION BETWEEN WATERFRONT DEVELOPMENT MODEL AND URBAN DEVELOPMENT STRATEGY-A CASE STUDY OF KEELUNG CITY

Wen-Chih HUANG  Chien-Hua CHEN  Sung-Ken KAO  Kuang-Yu CHEN

Abstract: The text stresses that the waterfront development model does not simply take into account its own growth factors but is usually required to comply with urban development strategy. The waterfront development model then must go with urban development strategy, along with which the model itself is changing as well. Besides, this text further attempts to establish the three-stage-six-type evolutionary model of the waterfront development, illustrates the development function activity content of different
types of waterfront development and hopes by this idea to explain how the waterfront development model combines with urban development strategy. In conclusion this text will take Keelung City as an example, and expound how to handle aforesaid concept, making the waterfront development model comply with urban development strategy to construct development layout.

**Key Words:** development model, development strategy, waterfront development.

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**A REFLECTION OF MOTORIZATION AND PUBLIC TRANSPORT IN JAKARTA METROPOLITAN AREA: LESSONS LEARNED AND FUTURE IMPLICATIONS TOWARDS BETTER TRANSPORTATION DEVELOPMENT IN DEVELOPING COUNTRIES**

Yusak O. SUSILO  Tri Basuki JOEWONO  Wimpy SANTOSA  Danang PARIKESIT

**Abstract:** This article provides a description of the influences of motorization trends on the urban residents’ travel patterns in the Jakarta Metropolitan Area (JMA) in the last decade. The performance of the first year of the Bus Rapid Transit (BRT) system implementation, as a way to suppress the motorization in JMA, is also described. A comprehensive discussion of the existing problems and the possible future implications that can be applied in Indonesia and also in other developing countries are presented.

**Key Words:** motorization, urban transport, developing countries, sustainable urban-transport policy

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**MOTORCYCLE ACCIDENTS, ALCOHOL INTOXICATION AND FUTILE HELMET LEGISLATION IN THAILAND: HOW LONG MUST WE TOLERATE?**

Pawinee IAMTRAKUL  Moinul HOSSAIN

**Abstract:** This research study estimates the risk factor involved in alcohol impaired driving and the disregard of helmet legislation from hospital data of 28 public hospitals in Thailand (from year 1999 to 2003) and thereby calculates the economic loss in motorcycle accidents influenced by alcohol consumption. It also unveils the alleged association between the marketing and advertising strategies of the alcohol and motorcycle manufacturers and motorcycle accidents. The outcome of the study estimates the economic loss due to motorcycle accidents involving alcohol to be US$ 1,444 million per year. The study also reveals from a questionnaire survey that the campaigns against drunk and un-helmeted motorcycle riding is failing against lucrative thrill seeking
marketing strategies adopted by the alcohol and motorcycle industries to attract the young generation.

**Key Words**: motorcycle accidents, risk factors, industry involvement

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**AN OPTIMAL TRANSIT SCHEDULING FOR PASSENGER TRANSFER VIA ANT ALGORITHM**

Tang Hsien CHANG   Li Kai YANG

**Abstract**: This paper aims at building up an optimal transit scheduling method for the passenger transfer between different transit systems. To optimize the performance of transfer in total travel time, the ant algorithm to develop a scheduling model is applied. In order to increase service area and improve accessibility of a certain transit system, arranging a suitable transfer timing with other transportation system is important. Indeed, transfer scheduling is the core issue of transit integration. In order to reduce total travel time, minimizing the waiting time during transfer is the objective in the functional target. It is to minimize the time offset of the arrivals of different transits. In this paper, the ant colony optimization (ACO) algorithm is utilized to find the optimal timed-transfer schedule between two transits.

**Key words**: Timed-transfer, Ant algorithm, Ant colony optimization, Transit scheduling.

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**DESIGN OF OPTIMAL MARSHALLING YARD LOCATION MODEL CONSIDERING RAIL FREIGHT HUB NETWORK PROPERTIES.**

LEE Jin su   KIM Dong kyu   CHON Kyung soo

**Abstract**: Marshalling yards serve as switching and transshipment points in rail networks. The selection of optimal marshalling yard location influences not only total costs and delays but also economies of scale due to the consolidation of flows. The purpose of this paper is to develop an optimal marshalling yard location model considering economies of scale due to the consolidation of flows. This model also includes several cost components and capacity constraints related to rail networks. Test results are presented for rail freight transportation problems with 25 origins/destinations. Computational results are compared with recently published studies. The proposed model can be used in the several decisions on the improvement of the efficiency in rail networks.

**Key Words**: marshalling yard, rail freight, hub-and-spoke networks, economies of scale, consolidation of flows
APPLICATION OF IN-DEPTH CRASH ANALYSIS TO IMPROVE SAFETY CONDITION AROUND A COMMUNITY: A CASE STUDY IN HAT YAI, THAILAND

Paramet LUATHEP   Pichai TANEERANANON   Pipat THONGCHIM

Abstract: An in-depth crash analysis is a systematic approach to identify the contributing factors and to discover the causes of a crash. The important starting point for this concept is to map-out the series of events which result in a crash. This is an alternative approach which leads to efficiently remedy and prevent future crashes. This paper adopts the in-depth crash analysis concept to indentify the contributing causes of a fatal crash in a case study of Srisab Gate, one of the main entrances of the Prince of Songkla University, Hat Yai, Thailand. Crash information including at scene and related information were collected. Data analysis, evaluation of potential causes, and recommendation of countermeasures of the case study are presented. The research team wishes to spark up the concerned authorities’ interest in the in-depth crash analysis and hopes to promote this concept as an effective tool to tackle the road crash problem in Thailand. 

Key Words: Traffic accident, In-depth crash analysis, Accident countermeasure

A STUDY ON THE EFFECTS OF AGGRESSIVE DRIVING BEHAVIORS- Using Driving Simulator -

Lee Young Ihn   Park Chul Hyun

Abstract: In this study, driving behaviors in accordance with driver's inclination was analyzed based on the Driving Simulator. After classification of drivers into unaggressive drivers and aggressive drivers with driving behaviors by the questionnaire, simulation was conducted supposing ordinary situation with the Driving Simulator. As a result of the analysis, driving speed of car and the speed deviation of drivers with aggressive driving behaviors showed higher value than drivers with unaggressive driving behaviors, and acceleration was also higher. There was no significant difference statistically in the deceleration and perception distribution. Overall, psychological state of aggressive drivers make them overspeed, and make the speed deviation bigger considerably so it makes the safeness of the whole road lower.

Key Words: Driving Simulator, Driving Behavior, Aggressive Driver

DEVELOPMENT OF ROAD SAFETY ESTIMATION METHOD
BASED ON HUMAN ENGINEERING

Soobeom LEE  Sooil Lee  Jangwook KIM  Wonkeun Kim

Abstract: In this study, the roads currently being designed through driving simulator and 3D graphics in virtual reality are reproduced. The study found out the driver's characteristics in regards to the road geometric characteristics based on data collected through the driving simulator. Furthermore, visual angle data through Eye Camera (Face Lab) test have been obtained and are examined closely on its characteristics. Lastly, it is possible to measure image factors that drivers can feel while driving in road designing level. Therefore, this study set up a road safety model based on geometric characteristics' image data collected through the driving simulator. It closely examined factors affecting the safety of drivers according to the changes in road geometric characteristics. The study presented the method to evaluate the safety of road in the designing level.

Key Words: Road Safety Estimation, Driving Simulator, Eye Camera, Virtual Reality

VERTICAL RELATIONSHIP, EFFICIENCY AND PRODUCTIVITY IN THE KOREAN AND JAPANESE RAILWAY INDUSTRIES: A STOCHASTIC FRONTIER APPROACH

Jinkyung PARK  Sungsoo KIM

Abstract: This paper investigates the vertical relationship between infrastructure provision and railway operations and evaluates the effects of privatization and deregulation on the firm-specific efficiency and total factor productivity (TFP) growth in the Korean and Japanese railways. Using a stochastic frontier approach and a generalized translog functional form, the paper specifies the equation system consisting of a multiproduct variable cost function and input share equations which is estimated with the Zellner”s iterative seemingly unrelated regression and the corrected least squares method. The empirical results indicate that there are cost complementarities between infrastructure provision and overall railway operations and cost anticomplementarities between incumbent passenger and freight outputs in the Korean railways, and between Shinkansen and incumbent passenger outputs in the Japanese railways. They also indicate that the firm-specific efficiencies and TFP growth rates of the privately-owned JRs are higher than those of the government-owned KNR and JNR.

Key Words: railways, vertical separation/integration, efficiency, productivity

ANALYZING INTER-REGIONAL TRAVEL MODE CHOICE BEHAVIOR WITH MULTI NESTED GENERALIZED EXTREME VALUE MODEL
ANALYZING INTER-REGIONAL TRAVEL MODE CHOICE BEHAVIOR WITH MULTI NESTED GENERALIZED EXTREME VALUE MODEL

XiaoYun ZHUANG  Daisuke FUKUDA  Tetsuo YAI

Abstract: Travelers inevitably make multi-modal route choices – a combination of modes making a trip. It is particularly important in the analysis of inter-regional travels, including access modes, trunk modes, egress modes etc. The paper focuses on the mode choice behavior in the entire trip covering each part of the trip. This paper also aims to give contributions to the evaluation of the policies aiming to more efficient and smooth transfer between travel modes. An advanced discrete choice model called “Multi-Nested GEV (MN-GEV) Model” is formulated to capture the correlations among the elements of the inter-modal travel behaviors. The stability of MN-GEV model parameters is also examined to show the capability of the model. It is applied for the inter-regional travel survey data of Japan and the estimation results are compared with other types of discrete choice models.

Key Words: multi-modal travel, inter-regional trips, multi-nested GEV model

EXPLORING THE RELATED FACTORS THAT INFLUENCE THE COMPREHENSION AND RESPONSE WHILE READING DIRECTIONAL SIGN ON FREEWAY

Chia-Ming AI  Chin-Zin YANG
Abstract: Due to any possible reason, drivers happen to near miss outgoing ramp. These occasions reduce freeway efficiency and safety. This study aims at exploring the factors those influence the mentioned dangerous situation by driving behavior observations, which consist of testing in several intervals. There are three designed route scenarios on Taiwan's freeway, and the response of action for each relevant sign from every participated driver is recorded, there are about 50 to 70 times for a driver to response. Totally, the number of observation is 526. By applying ordinary least square linear regression method, the model results indicate that after adjusted by multiple factors regression models, big car, driving experience, attention degree, horse power, weather condition, sunlight and place of installing become real important factors.

Key Words: directional sign, driving behavior observation, reading comprehension, lane-changing

PARKING DURATION OF FRINGE PARK-AND-RIDE USERS AND DELINEATION OF STATIONS CATCHMENT AREA: CASE OF THE KUALA LUMPUR CONURBATION

NORLIDA, Abdul Hamid  JAMILAH, Mohamad  MOHAMED REHAN, Karim

Abstract: This study aims to identify the significant attributes that influence the utilization of the park-and-ride scheme in three fringe areas of the Kuala Lumpur conurbation, namely, Shah Alam, Rawang and Seremban. In understanding the characteristics of the park-and-ride users, three main areas of concern of the study are the socioeconomic characteristics, trip characteristics and the parking-related characteristics of the users at the stations. Geographical Information Systems (GIS) is applied in order to delineate the catchment area of the respective stations. Information was retrieved by means of personally-administered questionnaire at the park-and-ride site via random sampling and car park utilization survey to determine the hours of parking. By applying standard multiple linear regression, the attributes that were found to significantly influence the duration of the utilization of the facility are total travel time by rail (via the park-and-ride), income, trip purpose, egress mode and types of rail ticket used.

Keywords: Park-and-ride, utilization, conurbation, regression

APPLICATION OF RELIABILITY -BASED SAFETY FACTORS TO MECHANISTIC-EMPIRICAL FLEXIBLE PAVEMENT DESIGN

Hyung Bae KIM  Nam Ho KIM

Abstract: Implementing mechanistic-empirical (M-E) pavement design approaches in
practice, the need that the pavement performance level related to the limit state function such as fatigue cracking or rutting can be controlled considering inherent variabilities associated with design input parameters and systematic bias of the design procedure is being more considerably presented. This paper presents the practical applications of principal reliability concepts to the M-E pavement design and a reliability-based design approach for the M-E flexible pavement design using overall and partial safety factors to design a pavement cross-section satisfying performance threshold with a target reliability during its intended design life. This paper shows that the pavement sections designed with a reliability level using AASHTO 93 design guide don’t have uniform structural reliability in terms of the mechanistic distress of fatigue cracking and the uniform reliability can be achieved by the a reliability-based design approach using overall and partial safety factors.

*Key Words:* Reliability, Pavement Design, Flexible Pavement

**MODELLING THE EFFECTS OF MULTI-MODAL TRAVELER INFORMATION SYSTEMS**

Zhijia TAN  William H.K. LAM  Zhichun LI  Agachai SUMALEE

**Abstract:** This paper proposes a multi-class probit-based stochastic user equilibrium model for assessing the effects of multi-modal traveler information systems (MTIS) on a multimodal transport network. It can be formulated as a fixed-point problem and solved by a simulation-based heuristic solution algorithm. It is assumed in this paper that the travelers equipped and unequipped with MTIS would make their travel choices following a probit-based stochastic manner when considering alternative paths or modes according to their perceived utilities. The proposed model and solution algorithm can be used to evaluate explicitly the impacts of MTIS services. Numerical results show that the introduction of MTIS would improve the network performance and promote the utilization of public transit under certain market penetration and congestion levels.

*Key Words:* multi-modal traveler information systems, fixed-point problem, stochastic user equilibrium, multi-modal transport network

**THE PERFORMANCE INDICES FOR SHIPPINGALLIANCE**

Ming-Tao Chou  Hsuan-Shih Lee

**Abstract:** This article presents a performance index to the evaluation of shipping alliance competitiveness. The estimation program and solved by our performance index. Based on the output/input table for shipping alliances are derived, the input/output can be aggregated into the performance index for shipping alliance, by which each shipping
alliance can classify his own competitiveness. The performance index can be further integrated into an overall performance indices, by which shipping alliances can classify their competitiveness ranking.

Key Words: The performance index, shipping alliance, competitiveness ranking

INCORPORATING PSYCHOMETRIC ATTRIBUTES AND INERTIA EFFECT INTO STATED PREFERENCE MODEL

Chih-Wen YANG

Abstract: This paper is aimed to propose a new framework and methodology to incorporate service quality and inertia effect into stated preference model. We use structure equation model and stated preference method to conduct with psychological and quantitative attributes. The logistics regression is used to generalize inertia effect and to explore causal influences of important factors on inertia effect. The empirical data is focus on the choice behavior of intercity bus transport. The computer questionnaire is based on the each traveler’s experiences in RP choice to design the corresponding SP scenario in avoiding to the response bias. The results of logistics regression show that there are significant casual influences between inertia index and number of alternative, traveling frequency, and personal income. The estimating results of MNL model prove that the specification of generalizing inertia index has the better model fitness than the traditional 0-1 inertia index.

Key Words: service quality, generalizing inertia index, stated preference, MNL model

THE PROSPECT OF A WINTER SNOW CHARGING SYSTEM

Arshad BAHARUDIN  Seiichi KAGAYA

Abstract: Sapporo, a major city in northern Japan, has an annual snowfall of over 5 metres and snow removal is a major civic concern. In this study, we analysed and compared various examples of road pricing projects around the world to ascertain their various characteristics. From these findings, we then imposed a hypothetical road pricing system in Sapporo, on the basis of providing revenue to help cover the city’s winter road maintenance costs. We designed two different winter-time road pricing systems; a bounded cordon toll and a mileage charge. To get an indication of the acceptability of road pricing for the citizens, a survey was conducted. Findings indicate that residents would be willing to pay a minimal amount in support of road pricing and the bounded cordon toll as the preferable design. Residents residing within and around the cordon were also found to be more sensitive to road pricing changes
CHARACTERISTICS OF TRANSPORT BY HOUSEHOLD AND INDIVIDUAL ATTRIBUTES IN JAPANESE CITIES

Atsushi NAKANO  Yuichi MOHRI  Mamoru TANIGUCHI

Abstract: In this research, we first categorized transport surveys of passenger flow in Japan and found out their situations. Large-scale transport statistic surveys have been conducted and they provide information for planning or just for statistics purposes. Next, we analyze current situations of urban transport using the results from Nationwide PT Survey, and found the following. a) The number of trips has declined in Japanese cities as the society ages. The vehicle ownership and driver’s license holders increased further. Thus, automobile use has increased overall. This could exacerbate environmental burdens in the future. b) Compared to younger age groups, the elderly use car less often and makes fewer trips. As aging progresses, the number of elderly without mobility is anticipated to increase. c) In Japanese cities, modal split varies by the size of urban area and population density. Lately, with the declining trend of population density, it may contribute significant increase in car use.

Key Words: person trip survey, transportation statistical surveys, travel behavior analysis

SHARPENING PASSENGER SERVICE STRATEGY PLANNING BY APPLYING KANO’S QUALITY ELEMENT CLASSIFICATION: A CASE STUDY IN THE AIRLINE INDUSTRY

Yueh-Ling HSU  Chao-Che HSU  Pei-Chi BING

Abstract: For sustainable competitive advantage in the air transport industry, an airline must be able to create and retain customers. One of the necessary conditions for this is that an airlines’ product/service must be able to meet the passengers’ needs and wants. This paper presents how airline passenger service requirements can be analyzed by using Kano’s model of quality element classification as well as discusses the potential benefits that can be achieved by applying this approach to make marketing strategy planning. According to Kano’s model, quality elements can be classified into three categories, namely Must-be, Onedimensional and Attractive needs, depending on their ability to create customer satisfaction or dissatisfaction. Results of this study suggest that airline passenger service elements could be classified analogously with Kano’s model to identify the most important passenger service elements, and to effectively distinguish the differences between passenger groups by statistic analysis.
METRICS OF CHANGES TO MAJOR EMPLOYMENT CENTRES: 
ANALYSES OF SPATIAL PLANS FOR SYDNEY 1948 - 2031

John BLACK  Charles CHEUNG  Ken DOUST  Ofra SHABTAY

Abstract: A case study of metropolitan Sydney is given on the dynamics of polycentric employment location and land-use and transport policies that encourage such a spatial formation of jobs. Spatial plans from 1948 to 2005 are reviewed. Employment decentralisation into major centres has been a consistent objective. Changes in the location of metropolitan employment and journey to work using Census data from 1961 to 2001 and the current metropolitan strategy to 2031 are analysed to help assess whether policy objectives have been met. An historical study of Parramatta, one of the major sub-centres, illustrates the problems of implementation. Current initiatives to create the “two harbour and three river cities” are described.

Key Words: polycentric employment, spatial planning, land-use transport strategy

COMBINED SIGNAL CONTROL AND BOUNDEDLY RATIONAL 
TRAFFIC ASSIGNMENT BASED ON CA AND HGA

Lu Shoufeng  Liu Ximin

Abstract: Signal control and route guidance jointly influence traffic flow in time and space. Firstly, the conceptual structure of combined signal control and route choice (CSCRC) was analyzed. Then, the mathematical models of CSCRC were summarized. Link travel time function and signal control policy have significant influence on solution uniqueness and convergence of CSCRC model. Simulation-based method can allow more complex interactions, therefore win real value than travel time formula. Modified iterative simulation and assignment procedure is built, in which road is discretized by Cellular Automata, traffic flow dynamics is represented by Cell Transmission Model, signal setting is optimized by Hybrid Genetic Algorithm. For toy network, the algorithm converges to stable solution.

Key Words: Combined Signal Control and Route Choice, Cellular Automata, Genetic Algorithm

MAXIMUM TRIPS UNDER ENVIRONMENT CONSTRAINT

Otkur GOJASH  Atsushi FUKUDA  Yuichiro KANEKO  Tomonobu INOKUCHI
Abstract: This paper aims to clarify urban development potentiality in terms of the total number of work trips generated, which can be taken as a control indicator for the authorities to plan urban transport and environment development. Under an environment policy on which CO₂ emission should not exceed a given cap for a transportation network, namely road transportation environmental capacity. In order to examine the maximum possible increase in the total trips generated in association with urban economic activities subjecting to urban road transportation CO₂ emission capacity constrain, a bilevel optimization model is proposed. And the model is verified on a real urban network of Chengdu, China.

Key Words: Maximum Trips, Bilevel Programming, Environmental Capacity

A STUDY OF CONSTRUCTION OF THE TRAFFIC ACCIDENT AUTHENTICATION MODELS FOR TWO-VEHICLE COLLISION

Ming Shan YEH  Hsin-Hsien LIU

Abstract: The aim of this study is to construct the traffic accidents authentication models for the Local Traffic Accident Authentication Committees (LTAAC) as reference. In present, due to the committee members will change every two or four years and different LTAACs will authenticate the similar case with different results. This study will build a database which includes 5,268 client data, and the collision types include car/car, car/motorcycle, and motorcycle/motorcycle. This study utilizes the artificial neural network method (ANN), and the classification tree method (CT) to construct the models. This study shows that both of authentication models all have over 70 percent accuracy in the accident responsibilities.

Key Words: traffic accident, artificial neural network, classification tree

INCORPORATING LAND USE, TRANSPORT AND ENVIRONMENTAL CONSIDERATIONS INTO TIME-DEPENDENT TOLLING STRATEGIES

Xiaoqing LI  Wai Yuen SZETO  Margaret O'MAHONY

Abstract: This paper develops a single-level optimization model to determine time-dependent optimal tolls while considering the dynamic relationships between land use, transport, and environment. To illustrate the importance of incorporating land use, transport, and environment considerations in determining time-dependent tolls, and the effect of tightening vehicular emission standards on link tolls, numerical studies are set up. The results show that the tighter the vehicular emission standards, the higher the toll
charges are required, and that the vehicular emission standards have direct impacts on the overall vehicular emissions, the operational strategies and profit of public transit, the mode and route choices of travelers, the residential and employment distributions, the profits of land owners, and rents. The government should consider these impacts when determining the vehicular emission standard of each road.

**Keywords:** Road pricing, vehicular emissions, land use, transport and environment, timedependent toll design problem

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**INTEGRATED LOGISTICS NETWORKS MODELING AND GENETIC ALGORITHM DEVELOPING**

Yong PENG

**Abstract:** This paper discusses how to integrate forward and reverse logistics to decrease the total cost of third party logistics service providers. A mathematic model is provided without the assumption of straight-line distance. Demand for product and return amount of product can vary randomly in this model. We also allow that the demand of customers can exceed the capacity of their suppliers. Then we develop a Genetic Algorithm to solve this NP-hard problem and discuss its convergence. At last a numerical example is available.

**Keywords:** integrated networks, forward and reverse logistics, genetic algorithm

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**A HEURISTIC BASED ON MODIFIED LAGRANGIAN RALAXATION FOR THE VEHICLE ROUTING PROBLEM**

Kuancheng HUANG  Tai-Yi WU

**Abstract:** Given the high level of complexity and wide application of the vehicle routing problem (VRP), numerous solution algorithms have been developed for the past several decades, including many recent meta-heuristic algorithms with great success and popularity. In order to balance computational load and solution quality and to address the issue of flexibility and simplicity, this study developed a heuristic algorithm based on several classical mathematical programming techniques. The VRP is first formulated in the form of the set covering problem (SCP), and the Lagrangian relaxation is used as the backbone in designing the iterative algorithm. In addition, a concept similar to column generation is used to maintain a partial set of potential routes to reduce computational load. Based on the numerical experiment, the solution quality of the heuristic algorithm is stable. The result suggests that the solution algorithm should be able to deal with the operational problems arising from a highly dynamic environment.
An Analysis of Key Influence Factors for Containership Registration in Taiwan

Cheng-Chi CHUNG  Cherng-Chwan HWANG  Yu-Lin WONG

Abstract: In the highly competitive shipping industry, flagging out has become one of the important operation strategies for shipowners. Although some literature have discussed the practice of and reasons for vessel flagging out, there is a lack of systematic and quantified analysis, nor any differentiation between different shipping sub-markets. The total fleet of Taiwan’s containerships plays a significant role in the global shipping industry. In order to understand the degree of influence of the related factors upon the vessel registration of Taiwan container shipping companies, this study adopts the Analytic Hierarchy Process (AHP) and develops a hierarchical analysis framework with four different objectives, and thirteen relevant criteria to evaluate the issue. Study results indicated that ‘Reducing operating costs’ is the most important among the four objectives, and ‘Restriction of the operation region’ is the most important evaluation criterion. It is expected that the findings of this work will be helpful for shipping companies and government agencies in making relevant decisions.

Key Words: Flagging out, Containerships, Vessel registrations, Analytic Hierarchy Process

A MULTI-USER CLASSES EMERGENCY EVACUATION NETWORK RECONSTRUCTION MODEL FOR LARGE-SCALE NATURAL DISASTERS

Chung-Yung WANG  Shou-Ren HU

Abstract: The present study is a follow-up study of Wang and Hu (2005). We extend the study of the previous study by decomposing the emergency network reconstruction problem into an emergency evacuation network reconstruction and an emergency rescue network reconstruction problem. In this study, the emergency evacuation network reconstruction problems are the main focus. We formulate the emergency evacuation network reconstruction for natural disasters as a bi-level programming model. In the model, the victims’ evacuation route choice behaviors and evacuation destinations choice behaviors are both considered at the same time. This concern is the most different point from Wang and Hu (2005). Moreover, the multi-class users’ evacuation route choice behaviors are also considered in the model. Finally, the optimal network reconstruction planning, multi-class users’ emergency evacuation routes and destinations planning can be obtained.
**Key Words:** emergency evacuation, network reconstruction, multi-class users

### MODELING LEVEL OF SERVICE ON PEDESTRIAN ENVIRONMENT

T. H. HUANG  Chen-Jr CHIUN

**Abstract:** The study provides an efficient procedure for the evaluation of level of service (LOS) on pedestrian environment. Since LOS measuring for pedestrian facilities are not well considered until now. Moreover, the safety and comfortable factors of pedestrian facilities are important for the original pedestrian facilities designing, but fewer researches had concerned about facilities of pedestrian walking environment. We used the general variables on pedestrian walking environment and step-wise to set up the model. First of all, we collect the reliable data about pedestrian walking environment, included lateral clearance, traffic characteristic and pedestrian characteristic of 263 streets in Taipei city. Secondly, we provided an efficient method to understand how a particular street accommodates pedestrian travel well, a fuzzy procedure of combining comfortable index and safety index were processed on pedestrian walking environment. Finally, we demonstrated the model of pedestrian LOS based on identified attributes.

**Key Words:** Level of service, Pedestrian walking environment, Fuzzy procedure

### COMPUTATION OF ADDITIONAL ACTIVITY AREA WITH REVEALED PATH CONSTRAINTS

Takahiko KUSAKABE  Takamasa IRYO  Kayo TAKAKURA  Yasuo ASAKURA

**Abstract:** This study proposes a methodology for estimating places where people may perform additional activities with utilizing the concept of space-time prism. Decision about travel behaviour can be affected by time constraints of their life and spatial structure where they live. Considering such constraints is important to estimate which place is likely to be chosen for the additional activities. This study develops a method to estimating the place which people may choose as an additional destination. This method proposes the concept of path constrained potential path area (P-PPA) by incorporating the concept of space-time prism with information of revealed trip trajectories which can be taken by position detection tools such as GPS and so on. An efficient calculation algorithm with considering actual network structure is proposed. An empirical test has been carried out in the real network to check the proposed methodology.

**Key Words:** Space-time prism, GIS, Probe person surveys
ASSESSMENT OF AIRCRAFT NOISE IN THE VICINITY OF THE NINOY AQUINO INTERNATIONAL AIRPORT

Ernesto ABAYA  Ricardo SIGUA  Karl VERGEL

Abstract: This study investigates the effects of noise emitted by operating aircrafts using runway 06/24 of the Ninoy Aquino International Airport (NAIA) on communities namely Barangay San Dionisio and Barangay Rizal, which lie under the flight paths of the aircrafts. Noise contours in the vicinity of the airport were generated using Integrated Noise Model along with data on aircraft operations such as frequency of flights of different types of aircrafts, flight paths and weather conditions at NAIA. It also presents the perceptions of respondents from the two communities mentioned on how they are affected by aircraft noise. These were analyzed along with other factors that might influence an individual’s perception such as years of residence, occupation, sex, age and household income. Analysis showed that individuals experienced the effects of noise in varying degrees but there is a general tendency to foreground their view that they have “gotten used” to aircraft noise.

Key Words: aircraft noise, noise exposure level, community reactions

A PARAMETER CALIBRATION TECHNIQUE FOR TRAVEL COST FUNCTION IN TRAFFIC ASSIGNMENT

Yongtaek LIM  Mingu KANG  Doohoe NAM  Changho CHOI

Abstract: A travel cost function is critical in traffic assignment in that the route choice behaviors of users could be described by the function. Parameter calibration of the function is to adjust parameters in a model so as to represent local traffic conditions. In order to describe correctly the real travel patterns in the model, we should calibrate the parameters by observed information. This paper presents a calibration method for travel cost function, which widely used in traffic assignment. It is based on bi-level programming such that the upper level is to minimize the difference between observed link flows and estimated ones computed from traffic assignment, while the lower is to describe the route choice behaviors of users on the transportation network. A solution algorithm will be given and through a numerical example it is also shown that multiple solutions is existed in such problem.

Key Words: parameter calibration, travel cost function, bi-level programming

DYNAMIC FLEET MANAGEMENT UNDER REAL-TIME
INFORMATION

Tsai-Yun LIAO  Ta-YinHU  Hsin-Hwa KUO

Abstract: Logistics management has been one of the most important parts in the supply chain management. More and more distribution centers (DC) have been established to provide the flexibility of sales and supply. Major daily operation issues in distribution centers are routes and schedules of trucks. The dynamic vehicle routing problems (DVRP) is an extension of vehicle routing problems (VRP) in order to consider possible variations of travel times in the network. In this research, a two-stage framework for solving dynamic vehicle routing problem is proposed. In the first stage, a well known approach, the sweep method, is conducted in vehicle assignment. In the second stage, a Tabu search algorithm is implemented to improve routes under real-time information. The heuristic approach is then applied in an evaluation framework is which assigning and routing operations could be simulated in a realistic traffic environment. The simulation-assignment model, DynaTAIWAN is applied to evaluate assigning and routing strategies in a traffic network. Numerical experiments are conducted in a Taichung City.

Key words: Dynamic Vehicle Routing Problems, Real-Time Information, DynaTAIWAN

ANALYSIS OF CHANGES ON THE INTERSECTION EFFICIENCY ON INTRODUCING A NEAR-SIDE TRAFFIC SIGNAL

Song Su SON  Kyung Soo CHON

Abstract: Many countries try to improve a traffic design on the intersection to make it safer as a traffic safety is more concerned on the traffic system. A near-side traffic signal has been recently introduced to many countries for the traffic safety. However, the efficiency of an intersection seriously goes down according to the location of a near-side signal on existing far-side traffic system, which is caused by wrong visibility of driver and extended distance to cross intersection. Both efficiency and safety should be considered on the improvement of intersections. On this study a control delay is used as the efficiency of intersections and it is researched what kinds of factors and how much they are influenced by the location of a signal device. Various analyses estimate the changes of traffic conditions on installation of near-die signal on this study.

Key Words: Near-side signal, Control delay, Intersection LOS, Yellow time, Startup lost time

RESEARCH ON THE DEVELOPMENT OF MALAYSIAN ROAD TRAFFIC INJURY SURVEILLANCE SYSTEM
Abstract: Road traffic accident (RTA) is one of the major social and public health problems in Malaysia. In year 2006 alone, the total road traffic crashes in Malaysia were 341,252 cases whereby 35,425 people sustained injuries due to road traffic accidents. This figure is 0.15% of the total population (26.4 million) in Malaysia. In order to analyze the road traffic injuries, a Malaysian Road Traffic Injury Surveillance System was developed. The system is a database program written in Visual Basic 6.0 (VB6) with MySQL 4.0.21-nt as the database management system (DBMS). It is useful to store RTI data, printing hospitalization report, perform simple cross tabulations and data analysis. The system contributes in adopting the Abbreviated Injury Scale 1990 update 1998 injury codes for describing motor-vehicle injuries.

Keywords: road traffic accident, road traffic injury, injury surveillance

INJURY SEVERITY SUSTAINED IN ROAD CRASH:KHON KAEN, THAILAND CASE STUDY

Wichuda KOWTANAPANICH Yordphol TANABORIBOON Thaned SATIENNAM

Abstract: This study aims to provide an overview of road crash injuries occurred in Khon Kaen city, Thailand. A three year data set from the health sector is analyzed. There are an average 1.6 injuries per victim. 70% are male. Male-female ratios are increased when severity levels increased. The most frequently effected area is Head/face (33%) followed by Lower-extremity (32%) and Upper-extremity (28%). In every ten injuries, nine of them are motorcyclist. More than 80% of them riding while unhelmeted and one-third are drink riders. Most of the drink riders are riding unhelmeted. This rider group has higher risk of Head/face injuries than others. Among the moderate to serious injuries group of pick-up truck user, twothird of injuries sustained to the passenger. Injuries to head/face is relatively high when compare with those of motorcyclist for the same injuries levels. The seatbelt usage of the pickup truck user are merit more studies.

Key Words: Road crash injury, risk taking behavior, injury body region

DIFFERENT MODELS OF SATURATION FLOW IN TRAFFIC DOMINATED BY MOTORCYCLES

Hien NGUYEN , Frank MONTGOMERY

Abstract: Motorcycle traffic has attracted little interest in the past, despite the reported increase in motorcycle ownership in many countries. Saturation flow and vehicle equivalence factors such as PCU values are two of the most important parameters
characterising the traffic flow at signalised junctions. The investigation of these parameters facilitates a better understanding of traffic dominated by motorcycles. This paper introduces a new method to study the variation of saturation flow and vehicle equivalence factors. MCU values have been applied instead of the conventional PCU values. Five regression models were derived to describe the variation of saturation flow in three traffic compositions, including (1) motorcycles and straight-on cars, (2) motorcycles and cars making three movements (right, left and straight-on) and (3) all vehicle types making three movements. The paper also assesses the difference between two approaches of counting vehicles: one based on 4s periods during green time; the other based on the signal cycle. MCU values were estimated for different vehicle types making different turning movements.

**Keywords**: Signalised Intersection, Motorcycle, Saturation Flow, MCU value, PCU value.

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**IMPACT OF REAL-TIME INFORMATION ON DYNAMIC VEHICULAR FLOWS UNDER MIXED TRAFFIC CONDITIONS**

Ta-Yin Hu  Li-Wen Chen

**Abstract**: This research aims at developing an integrated dynamic simulation-assignment model, DynaTAIWAN under mixed traffic flow conditions, for Advanced Traffic Management Systems as well as Advanced Traveler Information Systems. The model is composed of two layers, namely simulation-layer and real-time control layer. The simulation layer is designed to simulate traffic flow patterns according to assumed tripmaker characteristics and/or under a set of given conditions; the real-time control layer receives real-time vehicle information and forecast short-term traffic flow patterns. In this paper, the simulation layer is discussed in detail and numerical experiments are conducted to illustrate functional capabilities of the proposed model. In the simulation process, each vehicle is moved and tracked individually. Four different vehicle types are explicitly considered in DynaTAIWAN, including car, bus, motorcycle, and truck. Vehicles are moving along the link through macroscopic flow relationships, speeds of each type of vehicle are adjusted. Numerical experiments are conducted in a 50-node test network and a Taichung City Network.

**Key Words**: Simulation-Assignment Model, DynaTAIWAN, Mixed Traffic Flow

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**A PROTOTYPE OF THE GIS-BASED TRAFFIC ACCIDENT DATABASE SYSTEM: THAILAND CASE STUDY**

Wichuda KOWTANAPANICH, Yordphol TANABORIBOON, Thai CHARNKOL
Abstract: This study aims to develop the comprehensive GIS-based traffic accident database system through the integration of hospital-based data, police data and the road inventory data. To determine how to integrate the data from three data sources, data taxonomy is utilized. Available data are hierarchically classified based on their share characteristic. Grouping data in this way is useful for understanding, designing, and building integrated data system. Data warehouse, a common data storage approach to integration, is utilized for the data integration. GIS is an enabling technology for the integration as well. The scope of data integration is established by identifying the model of target data (or integrated data) and identifying the disparate data that would be mapped to the target data. During the physical data integration process, data from the three data sources are extracted, transformed, cleaned and finally loaded into an integrated data source, a data mart or data warehouse.

Key Words: accident database, data taxonomy, GIS

ACCELERATION AND DECELERATION MODELS OF MOTORCYCLE AT SIGNALIZED INTERSECTIONS

Chu Cong MINH  Kazushi SANO  Shoji MATSUMOTO  Nguyen Cao Y

Abstract: The knowledge of traffic operation of motorcycles is too little compared to the development of motorcycles in Southeast Asia. This study addresses a model framework of motorcycles’ acceleration/deceleration at signalized intersections. Different from previous researches, which are associated with the static strip-based approach for referring motorcycle positions, a new technique, so-called dynamic motorcycle lane, is developed. Then, motorcycles’ deceleration and acceleration are treated similarly to cars’ by applying deceleration and acceleration models with some modifications. Two regimes in the deceleration and acceleration models are proposed: free-regime and following-regime. At every observed interval, the particular regime is specified by the longitudinal threshold distance. A case study is introduced to estimate the parameters of proposed models using microscopic traffic data collected at some intersections in Vietnam. The finding here can be applied to develop a motorcycle simulation model, which is very necessary for Asian countries.

Key Words: Motorcycle traffic, Motorcyclist behavior, Traffic operation

DEVELOPMENT OF SYSTEM FOR THE VISIBILITY RISK AT RAILROAD GRADE CROSSINGS

Yong-Gwan LEE, Hye-Ran KIM, Chang-Ho PARK, Seung-Young KHO

Abstract: The goal of this paper is a development of system for appraising and comparing visibility risk factors of railroad grade crossings. Because accidents at
crossings are related to diversity of driver behaviors, car approach speed and driver perception-reaction time, main factors of car braking distance evaluation, are assumed to be stochastically distributed. In this base, a concept of visibility risk at railroad grade crossings is established. Algorithm developed for evaluating visibility risk combines and includes these factors. Like this, visibility risk assessment system, based on database of properties of grade crossings and approach roads without accident records, is developed. With this system, improvement methods of the grade crossings with geometric risk factors can be presented.

**Key Words:** railroad grade crossing safety, visibility risk, driver behavior

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**IMPACT OF CHINESE PORT POLICY USING THE MODEL FOR INTERNATIONAL CONTAINER CARGO SIMULATION**

Ryuichi SHIBASAKI, Yauso KANNAMI, Hitoshi ONODERA, Jiaqi LI, Lixin MIAO, Tomihiro WATANABE

**Abstract:** Until now, the authors have been developing a model for international container cargo simulation (MICCS) which can produce the movement of the cargo with the volume of OD container cargo as a given input, focused in East Asian region, in order to simulate and evaluate international freight transport policy. This paper aims to evaluate the effects of the policies on port investment in China, using the model with two cross-sectional data in different years. The outputs of the model, incorporating with initial condition of transport environment in 1998 and OD container volume in 2003, are compared between cases with and without port investments during these five years in China. By this, it will become clear how degree these policies contribute to the change of container cargo flow on maritime and land transport network.

**Key Words:** international container cargo, port investment, model simulation, Chinese trade

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**PERFORMANCE EVALUATION OF SHIPPING COMPANIES WITH FINANCIAL RATIO AND INTELLECTUAL CAPITAL AND REVISION REPORT**

Chao-Hung CHIANG, Cherng-Chwan HWANG

**Abstract:** Today's international container shipping is a highly competitive industry operated under dynamic changing environment. It is important for shipping companies to continuously improve their performance in order to maintain their current and future competitiveness. The purpose of this paper is to evaluate the performance of the top-3 container shipping companies in Taiwan by using financial ratio and intellectual capital,
based on the data collected during year 2003-2005. Grey relation analysis is used to select the representative indicators and then TOPSIS is used to rank the performance. Suggestions to enhance performance of each company are then proposed following the results of analysis.

Key Words: Financial Ratio, Intellectual Capital, Performance Evaluation

ESTIMATING CRITICAL GAP ACCEPTANCE FOR UNSIGNALISED TINTERSECTION UNDER MIXED TRAFFIC FLOW CONDITION

Wan Hashim WAN IBRAHIM, Mohd Erwan SANIK

Abstract: Critical Gap Acceptance procedure is still widely used for estimating capacity of unsignalised intersection. In Malaysia, the critical gap acceptance is still being used as in the existing guideline for unsignalised intersection (Arahan Teknik (Jalan) 11/1987). However, the use of the gap acceptance procedure does not take into consideration the mixed traffic flow condition prevalent on Malaysian road. In this study, critical gap acceptances under normal saturation flow condition were estimated for unsignalised T-intersection in Malaysia using the Maximum Likelihood Method. The results indicate that there are significant differences between the critical gap of passenger cars and motorcycles. In this study, the composite critical gap that takes into consideration the differences in traffic compositions were proposed. The composite critical gap enables the use of single representative gap acceptance value for estimating capacity of unsignalised T-intersection based on Malaysian traffic condition.

Keywords: Composite Critical Gap, Maximum Likelihood Method, Unsignalised TIntersection, Mixed Traffic Flow Condition

THE BEHAVIOR OF PEDESTRIANS AT CROSSWALKS IN NANJING

Jianmei LI, Haruo ISHIDA, Naohisa OKAMOTO, Morito TSUTSUMI

Abstract: Traffic behavior of pedestrians’ signal disregard gave rise to the increase of traffic accident and the decrease of the capacity of intersection in Nanjing, China. The traffic behavior at three kinds of typical crosswalks: signalized intersection crosswalk, single road intersection crosswalk and single road intersection button crosswalk was collected by using video camera and analyzed under different traffic conditions in the term of the proposed factors: vehicle traffic, headway, saturation degree, length of red light, ratio of red light and crosswalk length. The results showed that there were stronger positive correlation of signal disregard with headway; and stronger negative correlation
with vehicle traffic volume, saturation degree, length of red light, the ratio of red light and crosswalk length. The ratio of signal disregard was higher at signaled intersection crosswalks across major highway while that at minor highway were lower.

**Key Words:** PEDESTRIAN, CROSSWALKS, SIGNAL DISREGARD

PERFORMANCE EVALUATION OF ROUNDABOUTS CONSIDERING TRAFFIC CONFLICTS

Hideki NAKAMURA, Taiki MABUCHI

**Abstract:** A roundabout is an alternative type of junction control that reduces delay under low traffic demand. Conditions under which they are advantageous in terms of capacity and delay have been already shown in existing researches. However, the implementation of roundabouts is likely to be negatively evaluated, particularly in Japan; due to safety reasons since traffic conflicts are inevitable when merging. In this paper, a methodology for the performance evaluation of at-grade junctions considering a trading-off relationship between delay and vehicular conflicts is proposed. The performance of signalized intersections and roundabouts are also compared by applying this methodology. As a result, it was found that roundabouts are still more advantageous than signalized intersections when approaching traffic volume is less than 500 vph, even though not only delay but also conflicts were taken into account as evaluation indices.

**Key Words:** Roundabout, Conflict, Delay

EVALUATING ENVIRONMENTALLY SUSTAINABLE URBAN AND TRANSPORT POLICIES FOR A DEVELOPING CITY BASED ON A TRAVEL DEMAND MODEL WITH FEEDBACK MECHANISMS

Xuesong FENG, Junyi ZHANG, Akimasa FUJIWARA, Metin SENBIL

**Abstract:** Confronted with rapid urban growth in developing cities, it is expected that configurations of transportation network, as well as their operation conditions, could have significant impacts on various aspects of trip-making behavior. Meanwhile, trip-making behavior is one of the most important determinants during the design and management process of transportation network. To properly reflect such interdependency mechanism, this paper first attempts to establish a travel demand prediction model with feedback for the Jabodetabek metropolitan area, Indonesia. Compared to the traditional four-step model without feedback, it is empirically confirmed that introduction of feedback mechanisms could improve the model accuracy a lot. Based on the estimation results of the feedback model, some urban and transport development policies are evaluated from
Identifying Transport Infrastructure Investment with Maximum Impact: A SAM-Based SCGE Approach

Cristela Goce-Dakila, Shoshi Mizokami

Abstract: The paper identifies the most appropriate transport infrastructure investment among three alternative transport modes—land, air, water—across five delineated regions in the Philippines. The analytical tool used is a spatial computable general equilibrium (SCGE) model with a five-region social accounting matrix (SAM) as database. An exogenous shock in the form of technological improvement in transport infrastructure is introduced for each transport mode in each region. This results to higher output elasticity with respect to transport input. The transport infrastructure with greatest impact on gross output is then isolated using a SAM-based SCGE model. The impact on relative welfare of households via equivalent variation concept and interregional flows among production sectors via changes in spatial impedance ratio is then presented. The completion of Skyway project connecting Northern Luzon to Southern Luzon via National Capital Region is a concrete example of infrastructure project which meets aforementioned criteria.

Key Words: transport infrastructure, SCGE, gross output

Patterns of Discharge Flow at Traffic Signals and Implications in Motorcycle Traffic

Hien Nguyen, Frank Montgomery

Abstract: Recent research has suggested that the discharge rate of traffic across the stop-line of signalised intersections is not constant (a conventional assumption when deriving saturation flow), but varies over the green time. Different studies have shown very different patterns of variation, but the reasons for these differences have not been fully explained. This study firstly compares previous results studying this variability and then attempts to explain why different patterns were produced by different situations. Then, another study is undertaken in traffic dominated by motorcycles also presented. It appears that the pattern of the discharge rate at signalised intersections depends on degree of saturation, traffic composition and types of signal control. Furthermore, it also seems that built-up time of discharge rate depends much on the proportion and manoeuvrability of the predominant type of vehicles at the head of the queue. Finally, the impacts of these unconventional patterns on the optimisation of signal timings are discussed through a
practical example.

*Keywords: Discharge Rate, Traffic Signals, Signal Timings*

**TRAFFIC ACCIDENT ANALYSIS ON HIGHWAYS USING RISK INDICES**

Seunglim KANG, Seongkwan Mark LEE

**Abstract:** A traffic accident analysis method based on the accident risk index according to the combination of alignment elements is developed and tested applying geographic information systems (GIS). This study is based on crash experience on curves of 4-lane expressways in Korea from 1996 - 2000, and that finding relation only to curves. Impacts of alignment elements on traffic accidents have been identified by examining accidents that occurred under different alignment conditions and by investigating traffic accident risk indices (TARI). Evaluative criteria are suggested using geometric design elements as an independent variable. Traffic accident rates are estimated more reasonably by considering the interaction between alignment factors and the design consistency. Traffic accident risk indices and risk grades are suggested in the traffic accident data-based approach. Finally, estimating traffic accident rates, evaluating the level of risk and then visualizing information graphically are combined into one system called the risk rating system by means of GIS. This risk rating system is expected to play a major role in designing expressways and developing countermeasures for expressway sections susceptible to traffic accidents.

*Key Words: traffic accident analysis, traffic accident risk indices, alignment, GIS*

**EFFICIENCY EVALUATION OF CHINESE TRANSPORTATION SYSTEM’S RESOURCE ALLOCATION BASED ON DATA ENVELOPMENT ANALYSIS**

WANG Dan, YANG Zan

**Abstract:** This paper discusses the issue of Chinese transportation system’s resource allocation in the background of integrative transportation system. Firstly, the definition of “resource allocation” in this paper is given, then a brief introduction about data envelopment analysis is presented. After that, the data envelopment analysis is used to evaluate resource allocation of Chinese transportation system, different periods’ resource allocation efficiency, scale income, ideal input/output are calculated as well. In the end, some suggestions about Chinese transportation system’s resource allocation are put forward.
MODELING THE COMFORT OF PASSENGERS IN URBAN PUBLIC TRANSPORT SYSTEM

Chao-Fu YEH

Abstract: Passengers choose the mode of public transportation and the path for their trip according to different individual demand. The typical factors are like the fare condition and the trip time etc. The comfort of passenger becomes an important factor now. At present, the modeling softwares have taken account into aspect of comfort; however it still stays the beginning now. Effectively, passengers can choose the mode of public transportation according to their different comfort. The goal of studying aims to create a new algorithm of comfort in order to reinforce the missing aspects in the actual software. The first part of the report consists in presentation a longitude aspect of comfort. In the second part has to establish mathematical algorithm model according to the aspects of comfort and codify the calculating program by Scilab. Finally, this studying will give a numerical case to display the relation between trip cost and other parameters.

Key Words: Modeling of comfort, Number of seating and standing, Trip cost, Public transportation system

ESTIMATION OF TRUCK ORIGIN-DESTINATION BASED ON COMMODITY FLOWS

Paioj RAOTHANACHONKUN, Kazushi SANO, Shoji MATSUMOTO

Abstract: This study estimates light and heavy truck origin-destination (OD) matrices based on the commodity flows in the Tokyo metropolitan area. There are three major concepts in this study. First, the truck OD is estimated using the commodity approach because it can reveal the important characteristics of the shipments. Second, the ability to estimate both loaded and empty trips is the main contribution of the model. Finally, loaded trips are mainly concentrated and modeled with trip chains behavior and shipment characteristics such as average payload, adjacent zones, and others that provide the most attractive zones traveled by trucks. The performance of the model is demonstrated using the relative mean absolute error between the estimated and observed truck OD matrices. The numerical analysis based on the light product of the food industry demonstrates that the proposed concept with trip chain behavior always outperforms the model without trip chain behavior.

Key Words: Origin-Destination estimation, Commodity flows, Trip chain behavior
DYNAMIC CGE MODEL CONSIDERING DISEQUILIBRIUM ACCUMULATION PROCESS OF PRODUCTION FACTORS FOR EVALUATION OF TRANSPORT DEVELOPMENTS

Tetsuji SATO, Takayuki UEDA

Abstract: Existing computable general equilibrium (CGE) model in a static framework has weakness that it cannot simulate impacts on employment. As for neoclassical type dynamic CGE model, reproducibility of macro economic variables such as gross product and private capital investment is very bad. This paper proposes a dynamic CGE model considering disequilibrium accumulation process of labor and capital which can evaluate impacts of transport developments on employment and whose reproducibility is better than existing models. The model consists of a static CGE model for describing the economy in each year and macro economic functions that express changes in number of employees, private capital investment and private capital stock. As results of empirical analysis for an expressway development project in the Tokyo metropolitan area with the model and a neoclassical type model, it is found that project evaluation by existing CGE model or dynamic CGE model has possibility of underestimation.

Key Words: CGE model, dynamic model, evaluation of transport developments

PERFORMANCE EVALUATION OF HIGHWAY SEGMENTS USING TRAVEL TIME BASED PERFORMANCE MEASURES

Babak MEHRAN, Hideki NAKAMURA

Abstract: This paper introduces some applications of travel time based performance measures and mainly the travel time reliability as a measure of performance. In this research, operational conditions of two different segments of an intercity expressway are evaluated and compared by using travel time based performance measures. While Buffer Time Index and Travel Time Index are used to evaluate travel time reliability and congestion, it is observed that travel times are more reliable during off-peak periods, whereas unreliability dramatically increases during the peak periods. Additionally, travel time reliability varies from time to time according to demand fluctuations and traffic influencing events. Finally, highway segments are found to be more susceptible to disruptions caused by traffic influencing events once congestion starts to build up.

Key Words: congestion, performance measures, travel time reliability

EXPLORING ISSUES AND STRATEGIES OF DEVELOPING
SKYWAY SYSTEMS: A CASE STUDY OF THE TAIPEI SHIN-YI DISTRICT

Jen Te Pai

Abstract: In an urban setting, the development of a skyway system has been seen as an important facility to improve local environment, create the urban image, and enhance the prosperity of the area. Furthermore, skyways can offer vantage points for pedestrians to observe the city and enjoy the unique view of the urban streetscape. This paper therefore argues that skyway systems are capable of forming a vibrant element in an urban context. As the development of skyway systems has recently become a notice in Taiwan, this paper selects the skyway system in the Shin-Yi Planning District, Taipei City as the subject of the research and conducts on-site observations and the questionnaire survey. The survey result shows that the majority of the respondents are content with the skyway system as a whole. However, several issues such as the lack of directional signage, deficient protection from the elements, and incomplete connection with public transit require more discussions in the subsequent skyway development. To build a sustainable skyway system, planners should pay much attention to the three critical strategies—integrating with the public transit system, providing a pedestrian-friendly environment, and enhancing the urban image and landscapes—in their skyway plans.

Keywords: Skyway, Pedestrian, Shin-Yi District

POSSIBILITY AND PROBLEMS OF A COMMUNITY BASED MUSEUM BUS TO SUPPORT LOCAL CULTURE IN THE HANSHINKAN AREA

Yasuo TOMITA, Tsutomu DOI

Abstract: In the Hanshinkan area, which is located between Osaka and Kobe in Japan, various cultural heritage sites remain and many museums also exist. However, these museums confront financial problems and have poor accessibility by public transport. In this paper, we propose a community-based museum bus service to link museums in order to heighten the accessibility to each museum and support local culture, and to conduct a bus experiment for one day only. We did questionnaire surveys of bus passengers, visitors to museums and neighborhood residents. Following the results, the characteristics of bus demand, the induced demand to museums, optimal bus fares and revenues, and remaining problems to provide regular bus service were examined.

Key Words: Community bus, Museum, Local culture, Hanshinkan area
DYNAMIC MOTORCYCLE UNIT AND MEAN STREAM SPEED UNDER MIXED TRAFFIC CONDITIONS ON URBAN ROADS

Nguyen Cao Y, Kazushi SANO, Chu Cong MINH, Shoji MATSUMOTO

Abstract: This study analyzes the impacts of the effective space on speed of various vehicles categories, dynamic motorcycle unit and mean stream speed under mixed traffic conditions on urban roads. Data was collected at three link roads of streets, namely Cau Giay, Hang Bot and Nguyen Luong Bang street in Hanoi. This study estimated the relationship between speed and effective space associated with various categories of vehicles. Dynamic motorcycle unit (DMCU) values were calculated and suggested that the impacts of space occupancy of vehicles on mean stream speed should be given special consideration. Different from projected rectangular area on ground, the factor for estimating area of vehicle occupying on ground as the required space, the boundary around vehicle including intersection area from other vehicles, is introduced to reflect DMCU more dynamically and accurately.

Key words: Dynamic motorcycle unit, Mean stream speed, Mixed traffic.

METHODOLOGICAL FRAMEWORK FOR DEVELOPING AN INTELLIGENT DECISION SUPPORT SYSTEM FOR URBAN TRAFFIC CONGESTION MANAGEMENT

Xiaojie TAN, Jing ZHOU

Abstract: This paper proposes a methodological framework for developing a real-time intelligent decision support system for urban traffic congestion emergency response. To support real-time decision making, the system is required to have the capability to provide an efficient organization of input data and inferred knowledge from all kinds of data sources so as to guarantee the adaptability to changes and the reusability for different congestion situations. For this requirement, we attempt to combine data warehouse with data mining methods in building the framework. Data warehouse provides a well-organized information source for traffic congestion dispersion by means of data collection, analysis, disposal and storage. Furthermore, data mining techniques deal with the set of mixed numeric and nonnumeric congestion data and information. In this way, knowledge that represents cause-and-effect dependencies among the congestion attributes is extracted.

Key Words: Intelligent decision support system (IDSS), traffic congestion, data warehouse, knowledge acquisition

ANALYSIS OF TRAVEL DEMAND FOR MEDAN COMMUTER
RAIL TRANSPORT

Henry ARMJAYA, Bambang Budi PRASETYO, Ari Sarif MUNANDAR

Abstract: The paper reports the result from the study of the potential demand for commuter rail transport system serving commuter trip in Medan-Binjai-Deli Serdang (Mebidang) area. The logit model is used for analysis of stated preference data. Individuals are requested to select a mode between rail and existing mode when confronted with a combination of different attribute levels. The development of this commuter rail consist of 3 (three) sections Medan – Binjai, Medan – Belawan and Medan – Deli Serdang. The elasticity analysis (direct and indirect) show for car users, attribute of travel time found as the most influence attribute to the change of train choice utility. Whereas, bus and motor cycle users, tariff is found as the most influence attribute. The result of mode choice analysis show that the commuter rail is able to attract 52.83%, 46.58% and 46.52% of car, bus and motor cycle user, respectively.

Key Words: mode choice, stated preference, commuter

MEDICAL INVESTIGATION OF MOTORCYCLE ACCIDENTS IN THAILAND

Moinul HOSSAIN, Pawinee IAMTRAKUL

Abstract: The research study intersects the knowledge of medical science with transportation engineering to discover injury patterns and its mechanism and employ it to improve road safety. For this, the study uses the injury data of a total of 199,570 motorcycle accident victims collected from 28 Public Hospitals of Thailand for the period of 1999 to 2003. The injury pattern analysis identifies head (39.18%) and lower extremities (28.12%) to be the two most vulnerable body regions. Moreover, the accident victims most frequently sustain injury level of AIS2 (moderate). It is also found that head injury is the main cause of death in motorcycle accident. The study suggests a 6.18% improvement in life saving due to use of helmet. Lastly, the study demonstrates the use of injury phenomena to amass ample support for the instigation of an in-depth study on separate motorcycle lane for Thailand.

Key Words: injury mechanism, motorcycle accident, accident analysis

A STUDY ON THE PERFORMANCE EVALUATION AND ADEQUATE USAGE OF DEICING MATERIALS

Dukgeun YUN, unhwa JEONG
Abstract: The deicing work is usually considered as a main part of the highway maintenance activity in during the winter season. The deicing includes the physical method which removes snow with tools and the chemical method which removes the snow with deicing material. When removing snow using deicing material, excessive deicing material will cause the environmental and budget problems. If the deicing materials are used less than the required amount, the snow will remain on the road surface. For these reasons, the adequate usage of deicing materials is important. In this research, the performance of deicing material has been evaluated and the amount of deicing material has been determined according to the amount of snow through the laboratory and the field experiments. Also the adequate usage of deicing material has been determined by 130kg/km-lane on two lane road.

Key Words: Deicing material, Winter maintenance, Calcium chloride, Sodium chloride

COMPARATIVE STUDY OF TRAFFIC CALMING DESIGN PROCESS

Farzana RAHMAN, Hisashi KUBOTA, Kunihiro SAKAMOTO

Abstract: Residents sometimes feel general decline in life due to speedy traffic on neighborhood streets and high traffic volume. Traffic calming is a way to reduce traffic speeds and volume into local residential streets and thereby increase safety for all road users. Japan has introduced some traffic calming devices but there is no design guideline as well as documented methodology for the process. The objective of this research is to perform a comparative study of traffic calming design process, which is expected to facilitate for future implementation in Japan. An internet based questionnaire survey of North America and some European countries was conducted to have knowledge of the traffic calming design process and types of devices currently in use. Interview survey was done to Sacramento (California) and Largo (Maryland) USA. From the research it was found that speed hump is most widely used (53%) device having speed reduction effect of about 8mph.

Key words: Traffic calming, guideline, design process

TASK COMPLEXITY IN MULTI-ATTRIBUTE STATED CHOICE ENVIRONMENTAL VALUATION

Michelle PARUMOG, Shoshi MIZOKAMI, Ryuji KAKIMOTO

Abstract: This study aims to investigate task complexity problems in attribute-based stated choice valuation of non-monetary costs of automobile use. Two factors leading to
task complexity problems were considered: (1) non-linearity in the utility function indicating uncertainty in preferences, and (2) parameterization of the scale of the stochastic error of the utility indicating decision complexity. Empirical investigations on the complexity of non-market attributes valuation were made based on a web-based stated route choice survey of work trips in Metro Manila. The results show strong suggestions that degree of complexity of the choice problem is affected by not only the number of alternatives but also by the range and the description of attributes.

**Key Words:** state choice methods, preference uncertainty, decision complexity, environmental valuation

**IDENTIFICATION OF A SUITABLE CELLULAR AUTOMATA MODEL FOR MIXED TRAFFIC**

CH. MALLIKARJUNA K. RAMACHANDRA RAO

**Abstract:** In this paper an attempt is made to study the suitability of different available cellular automata (CA) based models for mixed traffic. CA model structure is modified to incorporate typical mixed traffic characteristics. Different CA updating procedures have been used with the modified CA structure to know their suitability for modelling mixed traffic. Detailed parametric studies are carried out to understand the ramifications of modified CA structure. From the parametric studies carried out, Knospe’s brake light model (Knospe 2000) along with the modified CA structure, found to be useful in modelling mixed traffic. Using this new model, influence of slow vehicles such as trucks on the traffic stream is studied.

**Key Words:** CA model, Mixed Traffic, Updating Procedure, Brake Light Model

**THE NEED FOR TRAFFIC SIGNALIZATION FROM THE PERSPECTIVE OF LOCAL GOVERNMENT UNITS OUTSIDE METRO MANILA: AN ASSESSMENT**

Franklyn T. AMISTAD, Jose Regin F. REGIDOR

**Abstract:** This study assessed the need for traffic signalization from the perspective of local government units by considering the issues, concerns and experiences revealed by the 23 LGUs outside Metro Manila, Philippines. Most of the cities are thickly populated. Majority of them are first class cities wherein there is a continuous increase in the number of registered motor vehicles every year. The levels of necessity and attainment of objectives for traffic signalization are very high and high, respectively. They tapped the expertise of the Traffic Engineering Center, Traffic Engineering and Management, and the academe for the conduct of traffic engineering studies. Correlative analysis was used
in this study. There is a significant relationship between the consultation which was administered by LGUs and the level of attainment of objectives for signalization. The researchers recommend policy formulation of the guidelines in the implementation of traffic signalization among the local government units and agencies concerned.

**Key Words:** Traffic Signalization, Traffic Management, Local Government Units

**DEMAND RESPONSIVE TRANSPORT AND ITS CAPABILITY IN ADDRESSING THE EMPLOYMENT NEEDS OF RURAL AREAS**

Michele EASTMOND, Dilum DISSANAYAKE

**Abstract:** The technological advancements made within the Demand Responsive Transport (DRT) field have further propelled it forward to become a practical and viable solution to rural transport needs, reducing social exclusion and providing vital links to major public transport provisions. This paper investigates the specific link between DRT and its ability and appropriateness in catering to the employment needs of those living in rural areas; in an effort to determine whether or not the needs, issues and improved accessibility surrounding employment access are met through DRT or if special attention is needed to this particular topic of social exclusion. Results from this study shown that DRT can offer substantial benefits; however, sufficient sustainable demand and financing of ventures are key requirements to maintain its longevity. Without such, projects are at risk of failure and as a result eroding the benefits obtained by the community it serves.

**Key Words:** Demand responsive transport, Rural transport, Employment

**EVALUATION OF SPEED LIMIT ON HOKKAIDO ROADS**

Suthipun THANESUEN, Seiichi KAGAYA, Ken-etsu UCHIDA, Toru HAGIWARA

**Abstract:** Speed limit is currently one of the most controversial topics in Japan as the Japanese National Police Agency has planned to revise the speed limit regulation. Traffic accident analysis and questionnaire survey will be included in their 3-year study plan. However, this study focuses only on the questionnaire survey on Hokkaido roads. The purpose of this study is to evaluate the speed limits on Hokkaido roads by applying trade-off analysis. Trade-off questions between accessibility (speed limit) and safety were applied to show the reflection of publicity. The comparison between speed limits from direct questions and trade-off questions were made. In conclusion, the study found that speed limits during summer period are not appropriate while winter speed limits should be raised. In order to enhance road safety in Hokkaido, the study recommends that the stringent speed enforcement and management should be incorporated with the new speed limit.
THE FUNCTION OF CONTAINER PORTS –ANALYZED FROM THE CARRIER’S VIEWPOINT

Tao CHEN

Abstract: The ports of Hong Kong and Singapore have been the top two container ports for years. Twenty million TEUs of container throughput have made them the best-known mega “hubs.” The mega carriers manage hundreds of vessels with a capacity of over half a million TEUs; these also have the capacity to support a hub. Thus the following questions arise: “What’s the relationship between mega carriers and mega ports? Do mega carriers utilize mega ports as their hub?” To answer the above questions, this study collected three items of operational information of thirty-four ports of one mega carrier to examine the role container ports play in the shipping network. The result show there are at least six types of hubs. The use of a dedicated-terminal strategy has been found to be the most significant factor influencing a shipping line’s selection of a port as a hub.

Key Words: Container Port, Hub and Spoke Network, Mega Carrier;

LAND USE FACTORS AND THE RISK FOR CHILD PEDESTRIANS

James ARYAIJA, Dilum DISSANAYAKE, D. M. Priyantha WEDAGAMA, Roger BIRD

Abstract: This study investigates the use of land use variables in predicting the number of child pedestrian accident casualties taking Newcastle upon Tyne (UK) as a case study. GIS techniques are used to create spatial models, from which generalised linear models (GLM) are developed over all child accidents and KSI (Killed or Seriously Injured) considering the child pedestrian casualty numbers, land use trip attractors and generators as variables. The results show that secondary retail and high density residential were the main land use types associated with child pedestrian casualties, in such a way that the former was positively associated while the latter had a negative association. It also found that educational sites were also positively associated with child pedestrian casualties, especially for the KSI.

Key Words: Child accidents, Land use, Generalised linear models

COMPARISON OF ATTITUDES TOWARD WALKING IN JAPANESE CITIES
Hiroshi TSUKAGUCHI, Upali VANDEBONA, Shinji SUGIHARA, Kuang-Yih YEH

**Abstract:** Walking is a basic transport mode that has thus been important throughout human evolution. In recent time, the emphasis on development of sustainable societies has regenerate interest in pedestrian facilities and creation of seamless transport systems, to decrease negative environmental impacts. This paper focuses on the importance of cultural significance in development of pedestrian infrastructure. Pedestrian traffic behavior, awareness and attitudes toward walking affect lifestyle and the philosophical outlook of the people in the area. Conversely, this way of thinking also has an effect on pedestrian behavior. Thus, the research team set out to examine pedestrian behavior from a cultural perspective. This study investigates the awareness and attitudes toward walking in major Japanese cities. A brief comparison is attempted with a supplementary survey conducted in Taiwanese cities. Preliminary findings suggest that comparative studies are meaningful in the context of Asian cities, to gain insights on ‘pedestrian travel culture’.

**Key Words:** pedestrian travel culture, image of walking, Asian cities

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**THE INFLUENCE OF URBAN LAND USE ON PEDESTRIANS ACCIDENTS DURING CONGESTED AND UNCONGESTED PERIODS**

D. M. Priyantha WEDAGAMA, Roger BIRD, Dilum DISSANAYAKE

**Abstract:** During congested periods in urban areas, traffic flows are higher and traffic speeds are lower than during uncongested periods. In such conditions there are likely to be more accidents but fewer, or less severe, casualties than in uncongested periods. The study focused on child, adult and elderly pedestrian accidents in relation to the existing spatial patterns of urban land use in the city centre during congested periods (7.00am – 8.00pm) and uncongested periods (9.00pm – 06.00am). Generalised Linear Models (GLMs) were constructed using the number of pedestrian accidents including these three age groups as response variables with census and land use data as explanatory variables. The analysis shows that retail land use may have the same influence on adult pedestrians during both congested and uncongested periods on weekdays. On average, an increase of retail land use by 1% in urban area will increase adult pedestrians by 30% during weekdays.

**Key Words:** Pedestrian accidents, Urban Land Use, Spatial Analysis

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**ACCIDENT ANALYSIS AND PREVENTION FROM THE CHAIN PERSPECTIVE AND REVISION REPORT**

Jinn-Tsai WONG, Yi-Shih CHUNG
**Abstract:** One of the most effective approaches interpreting accident causality is from the chain perspective. However, this approach has been applied only to measuring safety improvement for specific countermeasures. This paper emphasizes that the chain concept, which reflects the generating process of an accident, should be borne in mind when analyzing accidents and preventions. A safety framework of the driving behavior is constructed from the chain perspective in support of this argument. Also, a two-stage approach is proposed to adopt the idea in analyzing accident data. The approach includes applying classification techniques at the first stage and causal inference models at the second stage. The relevant methodologies are introduced and possible issues are discussed. It is believed that the proposed framework and approach would help further studies to analyze and interpret accident data in a more thorough perspective.

**Key Words:** accident analysis, accident prevention, causal chain

**MULTI-DIMENSIONAL INTERGRATED TRANSPORT POLICIES OPTIMIZATION BASED ON GENETIC ALGORITHM**
Ya-Wen CHEN  Jin-Fa CHEN  Yu-Sheng JIANG  Chien-Hung, WEI

**Abstract:** Empirical experiences showed that improving the urban transport problems should rely on integrated multi-dimensional transport policies which can also soften the demand of infrastructure investment. However, to fully consider the multi-dimensional transport policies in transportation planning framework would be very difficult due to the factor that there would be too many possible policy combinations to be evaluated. Therefore, this study attempts to develop an analytic framework for evaluating urban integrated transport policies comprehensively, including strategies of investment, pricing, management and regulation. In particular, to deal with the difficulty of too many policy combinations, genetic algorithms will be employed to search for the optimal strategy combination for integrated transport policy. Finally, the relationships between quantified objectives, policy combinations, and assessment performances would be analyzed using the proposed model in this study. The results can also provide a reference to decision makers when drafting urban integrated transport policies.

**Key Words:** Public Transport, Performance Assessment, Genetic Algorithms.

**STRENGTH EVALUATION FOR SUBGRADE AND SUBBASE USING HISTORICAL TIME DATA OF PORTABLE FWD**
Yoshio TATSUMI   Osamu TAKAHASHI

**Abstract:** Portable falling weight deflectometer has been used to evaluate stiffness of subgrade and/or subbase. The stiffness is estimated using a pair of peak values of load
and displacement. However, test data are dependent on specification of measurement apparatus. Instead of peak values of load and displacement, this study have used historical time data of load and displacement to estimate layer stiffness. The estimated stiffness was comparable to the one obtained from plate bearing tests. The objectives of the study are to improve accuracy on estimated stiffness and to decrease influence of individual apparatus specification.

**Key Words:** Portable FWD, $K_{30}$ value, historical time data

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**Development of Emergency Response Procedures Based on Scenarios of Urban Railroad Incidents - Focused on Fire Accidents**

Sigon KIM, Hwangbae KIM

**Abstract:** Urban Railroad has been constantly exposed to the risk of accidents because of uncertain system of railroad safety in Korea. The Korea government enacted a law, railroad safety Act, for each railroad operating company to make the Standard Operation Procedures (SOP) to reduce the magnitude of fatality and injury in the case of emergency, including responsibility and obligation. This study, in the beginning, has established emergency response scenarios to build the effective SOP through the analysis of railroad accident's distinguishable remarks. Then, emergency response procedures are developed based on the emergency response scenario. Activity-action diagrams are suggested to make a consecutive procedure for the emergency response. Each activity consists of a bundle of actions by emergency response personnel. 14 activity-action diagrams are developed on the basis of the critical cases described in the emergency scenarios. They are also used to define the role of each emergency response personnel. Finally, a case study has been performed for a fire accident in tunnel of urban rail transit.

**Key Words:** Standard Operation Procedure, Emergency Response

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**EVALUATION OF OPERATION PERFORMANCE FOR CONTAINER TERMINAL FROM MICRO POINT VIEW**

Wen-Chih HUANG, Tu-Cheng KUO, Ching-Tsyr WU, Li Guoquan

**Abstract:** The method of evaluating a container terminal performance, from a management perspective, is becoming more and more complicated. This paper intends to evaluate the performance of container terminal from a micro perspective. The queuing theory could only solve problems about changes of berth numbers in the operational performance of container terminals and seldom simultaneously deal with equipment variation. In this study, we have used many evaluation indexes, including cost functions,
to analysis four different operation scenarios via a simulation model. According to our research results the equipment deployment is discussed to propose an operational method in order to promote port performance. The equipment deployment of a container terminal plays a vital role in port planning and profoundly influences ship berthing and the smooth operation of container loading/discharging. Performances of three different berth configurations are also compared, and the reasonable capacity of container terminal is also deduced.

*Key Words: Simulation, Container terminal, Performance*

**DEVELOPMENT PLANNING FOR METRO SYSTEM IN HOCHIMINH CITY**

Trinh Van CHINH, Trinh Tu ANH

**Abstract**: The biggest city of Vietnam is Hochiminh city. Estimated population for the 2020 years will be 10 millions in Hochiminh City. Nowadays, problems in urban transportation are congestion in the peak hours, smoke and air pollutants, traffic accident... In the next years, the public transport is expected to play a bigger role in meeting intra-city travel of the people. It is targeted to ensure urban environment and to build a civilized and modern city. The estimated development of bus system can meet only one part of the future travel demands. It is necessary to develop Metro lines in Hochiminh city. There some studies in this field.

*Keywords: passenger public transport, bus planning, metro planning*

**Comparative Analysis of Household Car and Motorcycle Ownership Characteristics**

Hsu, Tien-Pen, Tsai, Chia-Chia, Lin, Yu-Jui

**Abstract**: This paper adopted Poisson regression model to investigate motorcycle ownership and car ownership characteristics using the household survey data in three typical cities in Taiwan. The different ownership characteristics of motorcycle in the cities are significantly illustrated by the research results. According to the results, the car ownership will reduce when motorcycle ownership increases. High public transportation usage will reduce the motorcycle ownership in the city which has better public transportation system. The income has significant negative influence on motorcycle ownership. The different motorcycle ownership in the cities with different transportation development features in Taiwan can provide a valuable experience in expecting future development tendency of motorcycle ownership for other Asian countries.

*Key word: Household motorcycle ownership, Poisson model, Household car ownership*
POPULATION DENSITY - AUTOMOBILE USE RELATIONSHIP: RE-EXAMINATION IN ASIAN AND AMERICAN MEGA-CITIES

Takamasa SUZUKI, Yasunori MUROMACHI

Abstract: This study first re-examined the relationship between urban density and per capita car use which most of previous studies supported. We showed that the relationship was also interpreted as one between total urban area and total car kilometers. Next, with person trip surveys conducted in Asian and American mega-cities, the factors affecting both total urban area and total car kilometers were analyzed. We studied total urban area and total car kilometers, and their relationship with average travel speed and modal split, which were found to significantly affect these elements. Finally, we revealed that increase in average travel speed and car share contributed to the expansion of both total urban area and total car kilometers. Also, to supply efficient public transportation, in terms of travel speed, could have the effect of constraining urban area and car use.

Key Words: Mega-cities, Population Density, Automobile Use

BIVARIATE PROBIT MODEL OF ON-ROAD EMISSION MEASUREMENT OF PASSENGER CARS IN JAKARTA CITY

SUDARMANTO Budi Nugroho, Akimasa FUJIWARA, Junyi ZHANG, Metin SENBIL

Abstract: The Jakarta’s 2005 bylaw on air pollution control, stipulates that all private car owners must get their vehicles’ emission tested twice a year. The vehicle owners will be given a certificate, as a requirement to extend the vehicle’s registration. This paper describes an initial analysis of vehicle characteristics which influence emission testing results. Analysis was done by using on-road emission measurements at nine major roads in Jakarta city and its surrounding cities. We apply a bivariate probit model for the likelihood of CO and HC emission test failure given a set of vehicle characteristics. The vehicle age, non-sedan, fuel type, carburetor and lambda all play a significant role in determining the probability of emission test failure. However, we didn’t find a significant effect of engine size on HC emission test failure. The findings can be used as a preliminary review of the implementation of new regulation in Jakarta city.

Key Words: Bivariate Probit Model, Emission Test, Major Roads, Jabodetabek

THE BUDGET ALLOCATION OF TRANSPORTATION CONSTRUCTION PROJECTS BY FUZZY MULTICRITERIA
GRADE CLASSIFICATION MODEL

Junn-yuan TENG, Ron-Chuen YEH, Maw-cherng LIN, Wen-chih HUANG

Abstract: For a government, one important subject as regards public infrastructure program is how to effectively allocate budget, especially when it is in financial difficulty, in order to put the budget to the best use and maximize the function of the budget. Otherwise, it may generate the problem that some units are faced with excessive budget and hurry to absorb the budget while other units are left in the dilemma of insufficient budget. Therefore, the question of how to allocate budget according to the priority, constitutes an important subject for government. In the budget allocation of transportation construction projects, the first issue is to determine the priority. In this paper, the authors used the Fuzzy Multi-Criteria Grade Classification Model to deal with the grade of prioritized execution of transportation construction projects. In this way, the budget will first go to prioritized projects which enjoy the right to the prioritized performance.

Keywords: transportation construction project, budget allocation, grade classification, Fuzzy MCDM

DEVELOPMENT OF CROSS SECTION DATA COLLECTION AND ANALYSIS METHOD

Dukgeun YUN, Junggon SUNG

Abstract: The highway cross section slope is an important element in cross section design to drain water and to avoid driver’s discomfort. Despite of the importance of the cross slope design, it is not easy to acquire the cross slope geometric information in the field without highway drawings because of the traffic. In many cases, however highway drawings are not always available. Even if we acquire highway drawings, sometimes the drawings are differ from the real-world highway cross section slope because of the frequent pavement overlays. For these reasons, a cross section slope analysis algorithm has been developed which can acquire and analyze the cross slope information using the GPS(Global Positioning System), INS(Inertial Navigation System), and three dimensional laser scanner. The algorithm has been tested to check the possibilities of cross section data collection and analysis quickly along the highway.

Key Words: Cross slope, Safety, Highway alignment

COMPETITIVE MARKETS BASED ON DYNAMIC INDIVIDUAL CHOICES AMONG HIGH-SPEED RAIL, AIR TRANSPORT, AND AUTOMOBILE ALONG A TRANSPORTATION CORRIDOR
Chaug-Ing HSU, Yu-Chiang CHEN, Yu-Hua CHEN

Abstract: This paper formulates a model to explore market shares of intercity modes including automobile highway (AH), high-speed rail (HSR) and air transport (AT). The relationship among demand-supply attributes such as fare, speed, terminal locations, travelers’ trip length, the value of time, departure time and origin and destination locations is explored to identify market boundaries by comparing different routing strategies for each type of passenger. Passengers’ optimal choices are assumed by minimizing their generalized travel time and then are aggregated by accumulating a probability density function of value of time and time zones with the same waiting time differences. A case study on current HSR, AH and AT is used to illustrate the application of the model. The results show that passengers with higher value of time tend to choose the mode with less travel time but higher cost. And how demand-supply attributes such as the number of persons in one car, access time to HSR station, and HSR fare impact market share distribution among three modes.

Key Words: intercity transportation, market share, mode choice

FORMULATION OF THE ROAD SUPPLY INDEX BASED ON THE LAND USE PATTERNS AND STREET FUNCTIONS FOR MAJOR RESIDENTIAL AREAS

Jaisung CHOI, Sangyoup KIM, Youngsoo JANG, Kyungsung HWANG

Abstract: South Korea recently has made many housing market efforts including the development of new towns and major residential areas. Much of the developed land was allocated for new road networks. However, since the road ratio which is the primary indicator for determining the necessary land size is based on the ratio of total road area to total land area, it may lead to wrong decisions. This study formulated a road supply index for a major residential area by comparing the relationships between land use patterns and vehicle speeds. This can account for the effects of the land use patterns, population size, and the road function. Also, to prevent an unbalanced amount of road supply, practical ranges for each road function was established. Finally, a case study was done for validation. The new index should be useful in determining an appropriate level of road supply in a major residential area.

Key Words: major residential area, appropriate road supply index, the land use patterns, vehicle travel speeds

REPRODUCING THE HOURLY TRAFFIC DEMAND FLUCTUATION THROUGHOUT A YEAR FOR THE EVALUATION
OF HIGHWAY CROSS-SECTION DESIGN

Hideki NAKAMURA, Taisuke UTSUMI, Masamitsu WATANABE

Abstract: The authors have advocated a new planning and design methodology in for highways in Japan, which includes operational performance check in consideration of the traffic demand fluctuation. For this method, it is necessary to reproduce the hourly traffic demand fluctuation on a planned and designed highway section throughout a year. This study proposes a method to reproduce it with two phases; reproducing the daily traffic demand phase and setting the hourly traffic demand coefficient phase, in consideration of potential hourly traffic demand on a day with congestion. The reproduced hourly traffic demand fluctuation using this method was validated on two expressway sections in Japan. As a result, it could verify that the reproduction precision was satisfactory except that it could not consider some special local characteristics. Estimating hourly traffic demand fluctuation by the proposed methodology enables us to check performance of any planned and designed highway sections throughout a year by inputting traffic demand into the respective design performance curve.

Key Words: Traffic demand fluctuation, Highway planning and design, Performance-oriented highway design

DEMAND MODELING OF INTERNATIONAL AIR CARGO MARKET USING TRADE DATA AND COMMODITY FLOW DATA IN JAPAN

Jim Joel C. MADRIGAL, Tetsuro HYODO, Yoji TAKAHASHI

Abstract: This paper examines Japan’s growing international air cargo. It aims to analyze the trend by making use of two sets of Air Cargo Data made available by the Japanese Government – one from the Bureau of Customs Ministry of Finance and another from the Department of Aviation Ministry of Transportation. This paper applies traditional four-step modeling process combined with commodity based demand analysis for the process of forecasting Japan’s international air cargo demand. A regression model was generated from the first set of data to be used as the generation and attraction model for the demand forecasting. Then an airport choice model was estimated to distribute the future cargoes to the chosen four airports of Japan in preparation for the case scenario study. Lastly a sensitivity analysis of the model was performed and a scenario to account future development in Haneda Airport.

Key Words: International Air Cargo, Airport Choice Model, Demand Forecasting

TRANSIT STATION ACCESS TRIPS AND FACTORS AFFECTING
PROPENSITY TO WALK TO TRANSIT STATIONS IN BANGKOK, THAILAND

Saksith CHALERMPONG, Sony S. WIBOWO

Abstract: An important strategy to improve rail transit ridership is to improve station accessibility conditions. The objectives of this research are twofold: to understand patterns of access trips to transit stations and to determine the factors affecting propensity to walk to stations in Bangkok. The results show that most popular access modes are bus, motorcycle taxi, and walking. Within transit catchment area, Bangkok’s share of walking is less than those in other major cities, due to competition from motorcycle taxis. Estimation results of choice model show that distance to station is the most critical factor affecting propensity to walk, and that station-specific characteristics have significant impacts.
AN ANALYSIS OF TRAFFIC CONFLICT PHENOMENON OF BICYCLES USING SPACE OCCUPANCY INDEX

Keiichi OGAWA

Abstract: since bicycle traffic is not sufficiently considered in road planning processes, at present, the road space for bicycle traffic is not serviced sufficiently on many roads, it is necessary to develop evaluation indices of the dangers of bicycle traffic, in order to determine the appropriate road space required for bicycle traffic responding to road and traffic conditions. In the present study, the traffic conflict phenomenon of bicycle traffic is analyzed. Space occupancy indices are applied to the analysis. Throughout the analysis, the applicability of the traffic conflict indices to the phenomenon of bicycle traffic is examined.

Key Words: bicycle traffic, traffic conflict phenomenon, space occupancy

THE OPTIMAL SIZES AND LOCATIONS OF AIRPORT PARKING FACILITIES CONSIDERING DEMAND-SUPPLY INTERACTION

Chaug-Ing HSU, Fu-Shan LIN, Hui-Chieh LI

Abstract: This study attempts to optimize the sizes and locations of the airport parking facilities by considering demand-supply interaction and travelers’ socioeconomic characteristics. This study formulates traveler’s parking and operators’ supply costs functions, where the former incorporates parking fee, access cost to the terminal building and searching cost for an available stall, while the latter includes land acquiring, construction and operating costs for the parking facilities and the operating costs of shuttle buses. This study further develops a mathematical programming model to determine the optimum sizes and locations of the airport remote and terminal parking facilities. Results show the demand on terminal parking increases with an increase in travelers’ values of time. Results imply that when the airport locates in a region with higher average income residences, the remote parking facility should locate at a closer distance with higher parking fee while the terminal parking supplies a considerable amount of stalls. As the land acquiring cost is less related to terminal access distance, a closer remote parking facility will not result in a higher operating cost. Remote parkers will benefit from both a relatively low parking fee and a short access time, thereby resulting in an increased demand.

Key Words: terminal parking, remote parking, airport
EFFECTS OF ROAD GEOMETRY AND SEASON ON HEAD-ON AND SINGLE-VEHICLE COLLISIONS ON RURAL TWO LANE ROADS IN HOKKAIDO, JAPAN

Terrance M. RENGARASU, Toru HAGIWARA, Masayuki HIRASAWA

Abstract: This study investigates the road geometry factors and the seasonal factors associated with head-on collisions and single vehicle collisions occurred in Hokkaido, Japan. Head-on collisions represent about 20% of all traffic collisions on the rural two lane national roads however; head-on collisions were responsible for about 40% of the fatal collisions. We developed a segmented accident database based on Traffic Accident Analysis System (TAAS) produced by Civil Engineering Research Institute for Cold Region Hokkaido. Analysis using Poisson-regression models showed that road geometry factors and seasonal factors were important factors correlated with head-on collisions. The model proposed in this study is potentially capable of identifying the causal factors of head-on and single vehicle collisions. In addition, the model might be used as the safety evaluation function in the development of the before-after study.

Key Words: Head-on collision, Single vehicle collision, Road geometry, Rural two lane roads

ANALYSES OF DAY-TO-DAY ROUTE CHOICE BEHAVIOUR USING AUTOMATIC VEHICLE IDENTIFICATION DATA

Nan LIU, William H.K. LAM, Mei Lam TAM

Abstract: Unreliable transport systems cause variability of route travel time and lead to different route choice behaviours among three harbour crossings in Hong Kong. This paper conducts a comprehensive investigation of route choice behaviours over a series of consecutive days. Data analyses of route choice behaviours are based on one-month Automatic Vehicle Identification data which are collected from Autotoll transponders at toll plazas of three harbour-crossing tunnels. The results of the analyses show that the route choice behaviours vary significantly between commercial vehicles and private cars as well as spatial-temporal contexts. It was also found that the split of traffic flows among the three harbour crossings is not well balanced by time of day and day of week. Thus there is a need to consider differential tolling (i.e. tolling by time of day) by revamping the tolling arrangements of the three harbour-crossing tunnels traversing the Victoria Harbour in Hong Kong.

Key Words: day-to-day route choice behaviour, automatic vehicle identification data
STUDY ON REGULATION OF MOTORCYCLE TAXI SERVICE IN BANGKOK

Ryosuke OSHIMA, Atsushi FUKUDA, Tuenjai FUKUDA, Thaned SATIENNAM

Abstract: Motorcycle taxi plays an important role as one of public transportation modes in Bangkok. However, in the past, the motorcycle taxi service has been operated under unregulated condition that causes various problems to motorcycle taxi drivers and users. In 2005, the Thai government has imposed the regulations upon motorcycle taxi service that included motorcycle taxi drivers’ registration and fare rate. This makes Thailand becoming the first country in the world that regulates motorcycle taxi service. This study examines the motorcycle taxi drivers and service conditions before and after having imposed the regulations. The results reveal that the motorcycle taxi drivers’ behavior and its service system have been changed obviously after the imposition. Also, this study proposes the equation that could represent the system of motorcycle taxi service which could be applied for future planning condition perspective.

Key Words: Motorcycle Taxi, Regulation of Motorcycle Taxi, Bangkok

REPRESENTING HOUSEHOLD VEHICLE HOLDING DURATION WITH HETEROGENEOUS DISTRIBUTIONS ASED ON LATENT CLASS APPROACH

Masashi KUWANO, Junyi ZHANG, Akimasa FUJIWARA

Abstract: It is expected that vehicle holding durations differ substantially across households. Some households may keep their vehicles as long as possible, while others may replace some of their vehicles after holding several years. Even though existing studies have incorporated such heterogeneity using duration models, one-peak distribution is usually assumed. In reality, this assumption can be easily violated. In this sense, the heterogeneity of duration distributions has not been satisfactorily represented in existing literature. To represent the heterogeneity in the household vehicle holding duration, the paper proposes to apply a latent class modeling approach to simultaneously incorporate different duration distributions. Such modeling approach could deal with multi-peak distribution of vehicle holding duration. Using a data collected in several Japanese cities in 2006, this paper confirms the model effectiveness from both model performance and applicability. It is found that household characteristics are important factors to explain the latent classes.

Key Words: Vehicle holding duration, Heterogeneity, Multi-peak distribution
PRESENTATION OF NEW DIAGRAM FOR INCIDENT DETECTION ONSIDERING SPEED VARIABLE

SangGu Kim, YoungChun Kim

Abstract: Most Algorithms for detecting incidents have been developed under the premise that the congestion must happen whenever an incident occurs. For the reason, the performance of algorithm could be not guaranteed in case the congestion does not happen due to the traffic operations of low flows despite the occurrence of an incident. This paper is to propose a new diagram that can reliably detect the incident under the various conditions of traffic operations including a low volume state. Compared to the McMaster Algorithm, the newly proposed diagram is tested with three different cases that the incident occurs in the traffic operations with the low volume state, the relatively high volume state, and the recurrent congestion section. Evidently, the new diagram shows a capability to identify the flow characteristics of incident for all the three cases.

Keywords: Incident Algorithm, McMaster Algorithm, Diagram, Congestion

RELIABILITY OF MOUNTAIN ROAD NETWORK AND A GIS BASED LOPE RISK MANAGEMENT APPROACH: A CASE STUDY OF EPALESE NATIONAL HIGHWAY

Bhoj Raj PANTHA, Kiyoharu HIROTA, Netra Prakash BHANDARY, Ryuichi YATABE

Abstract: Reliability of transport infrastructure has attracted a lot of attention in recent days. Reliability analysis is an integral part of planning, design and operation of the transport network. Geology, geomorphology and hydrology are the key factors in the design, construction and maintenance of roads in mountainous region. In this paper, we mainly discuss network reliability and slope risk management practice in Nepalese highways, and importance of geological and geomorphological analyses in mountain roads. Reliability of Nepalese highway was found very low. Geological and geomorphological analyses were performed by using geological and topographical maps. Slopes with relief energy more than 251 m are dominant and landslides have mostly occurred in these area. From the analyses, 25%, 72% and 3% of the study area are in high, moderate and low risk of road slope failure respectively. Thus, proper and adequate attention needs to be paid for enhancing the reliability of Nepalese road network.

Key Words: transport network reliability, mountainous terrain, slope risk management

STUDY ON SITUATIONAL ANALYSIS OF ENVIRONMENT ONSERVATION PROJECTS AROUND ROADSIDE IN JAPAN
**Abstract:** This paper aimed to assess the actual situation of environmental conservation projects for protecting roadside’s natural environment and the ecosystem all over Japan. Creating habitat for specific creatures and biotope for various species is being carried-out as the part of environmental conservation projects for restoring the affected environment of past developments. Recently, these projects have been actively implemented. However, the actual state of how these projects were conducted has never been fully reviewed. Therefore, field surveys and consultations to the developers who were in-charge of environmental conservation projects were conducted for analyzing the actual situation and clarifying the problems. As a result, it was concluded that it is necessary to establish the manual for developing habitat and biotope because most of these projects have not established any conservation goals and few have made plans not considering the harmony with the environment.

**Key Words:** Biotope, Habitat, Environmental Conservation Project

**AN EMPIRICAL STUDY ON THE JOB SATISFACTION OF CHINESE FISHERY SEAFARERS IN THE PENGHU ISLANDS**

Taih-Cherng LIRN

**Abstract:** The Penghu Islands are part of Taiwan's territory with varied international fishery cargo boat seafarers including Chinese seafarers. Empirical surveys on Chinese fishery seafarers and local fish cargo boats’ owners are implemented and an Importance-Performance Grid model is employed to explore both parties’ perceptions differences on the importance and performance of fourteen job satisfaction attributes for these Chinese seafarers. Looking into the “possible overkill attribute”, Chinese seafarers consider “Ease of Hiring Chinese seafarers procedure in Taiwan” as less important attributes with higher degree of performance. In contrast with the Chinese seafarers, local ship owners perceive “Coast Guard Agency’s(CGA’s) Reschedule roster time”, “Job Security”, and “Discrimination between Chinese and foreign fishermen” as the three “possible overkill attributes”. Thus it could be concluded, when “critical attribute” and “possible overkill attribute” influencing seafarers’ job satisfaction are concerned, there are broad perception gaps between Penghu’s fish cargo boat owners and the Chinese seafarers.

**Key Words:** Job Satisfaction, Importance-Performance Grid, Fishery Seafarers

**FORECASTING THE INTERNATIONAL TOURISM DEMAND**
FROM EAST ASIA TO JAPAN

Naohisa OKAMOTO, Takeshi KURIHARA, Haruo ISHIDA

Abstract: This paper suggests a method in forecasting international tourism demand. The forecasting model has two stages of estimation. First stage is the “International Trip Generation”. We explained this by using a logistic curve. Second, we proceed to find out the travel destination by using the aggregate logit model. Results for the forecast of tourists coming to Japan led to two main conclusions. 1) The number of tourists from every Asian country shows a growing tendency until 2030. 2) Moreover, the rate of tourist visiting Japan will decrease gradually compared to other regions such as North America where the rate is steadily increasing.

Key Words: international tourism, international trip generation, travel destination

INDIVIDUAL CHOICE BEHAVIOR TOWARDS TELECOMMUTING

Chaug-Ing HSU, Min-Ling CHIANG, Fa-Chu CHANG

Abstract: Commuting travel is the main source of the traffic congestion in the peak period, and telecommuting is considered as one of alternative strategies to reduce commuting travel. This study develops a logit model to analyze individuals’ choices between telecommuting and commuting. We use stated preference survey data collected from 349 households of Taipei city to calibrate the model. Individuals’ socioeconomic characteristics, time saved and trip chain behaviors are found to be significant factors. Compared with the activity use pattern for saved time before and after adopting telecommuting demonstrates that some activities would be shifted to off-peak period, while some would be conducted at other places, some would be accomplished by other people, and some would not change. The results show that telecommuting may result in the various spatial patterns of activities, changes in family roles, more discretionary time for individuals, and the reduced traffic in the peak period.

Key Words: Telecommuting, trip chain, commuting

A DISCRETE CHOICE MODEL OF OCEAN CARRIER CHOICE

Chieh-Hua WEN, Jun-Yuan HUANG

Abstract: This paper investigates freight forwarders’ perceived satisfaction on service attributes of ocean carriers and their choice behaviors. The mail surveys were conducted to freight forwarders, providing services between the United States and Taiwan. This
research employs factor analysis to combine a large number of service attributes into few latent factors and the multinomial logit model to examine ocean carrier choice by freight forwarders. The result of factor analysis obtained three factors, namely speed/reliability, safety/empathy and convenience. The estimation results of the multinomial logit model reveal that transit time, frequency of sailing, record of cargo delay, freight rate and latent service quality factors are the significant variables influencing the choice of ocean carriers. Freight forwarders are sensitive to the changes in service frequency and transit time, indicated by the values of direct elasticities. The findings provide useful insights into ocean carrier choice behaviors by forwarders.

Key Words: ocean carrier, freight forwarder, logit

A BEHAVIORAL ANALYSIS OF PASSENGERS’ RAILWAY STATION FACILITIES VISITING CHARACTERISTICS

Yoshihisa YAMASHITA, Naohiko HIBINO, Hisao UCHIYAMA

Abstract: Recently, various retail shops are installed in the railway stations in the Tokyo Metropolitan Area (TMA). Many passengers enjoy shopping and window-shopping while transferring trains, and waiting in the station. Such passenger behavior causes issues such as crossing of the passengers’ flow and the decline in walking speed. Therefore, it is important to consider such behavioral patterns in the planning and management of facilities in the railway station. Pedestrian simulation model is a powerful analytical tool for determining optimal layout of facilities. So far, many pedestrian simulation models have been developed. These models can reproduce the average walking speed, and sectional pedestrian volume. However, these models do not consider behavioral patterns in visiting the facilities into consideration. For developing the pedestrian simulation model applicable also to the facilities arrangement planning, the study conducts a basis analysis aimed to grasp passengers’ visitation patterns of facilities in the railway station.

Key Words: railway station, behavioral patterns, market basket analysis

TOKYO METROPOLITAN AREA EMPLOYMENT CLUSTER FORMATION IN LINE WITH ITS EXTENSIVE RAIL NETWORK

Pelin ALPKOKIN, Naohisa KOMIYAMA, Hiroyuki TAKESHITA, Hirokazu KATO

Abstract: Market forces and/or planned intervention in many metropolitan areas are transferring urban form from mono-centric to more dispersed or, poly-centric structure where firms cluster outside city center and where location and trip patterns tend to vary amongst cities. As study area, distribution of employment, and related commuting and residential location preferences in Tokyo metropolitan area have been investigated by
grouping zones into four tiers and analyzing associated trip lengths, mode shares employment destination zonal preference functions. Tokyo contributes to poly-centric city work (with huge literature on North America) by its extensive railways that mainly characterize urban dynamics. Results confirm that despite relatively higher decentralization between 1960s and mid of 1980s, Tokyo central area or highest ranked zones are accommodating half of total employment stock but jobs agglomerations have evidently evolved nearby major rail stations generating stable trip times over time and uniform mode shares over metropolitan area.

**Keywords:** Poly-centric employment; Accessibility; Decentralized concentration

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**A DATA MODEL FOR THE INTEGRATED TRANSPORTATION SYSTEM**

NGUYEN Thanh Hung, Hideto IKEDA, ZIN Lin, Nikolaos VOGIATZIS

**Abstract:** Transportation systems are indispensable for all the countries around the world. The main concerns of transportation systems are safety, efficiency and reliability. To fulfill those concerns, it is necessary to integrate into one overarching transportation information system. Integrated Transportation System (ITS) was proposed as a future transportation information system and proposed the three layers object model (3LOM) as an architecture of ITS. In 3LOM, the middle layer consists of a data management system. In order to implement the data management system of the middle layer, it is crucial to design an integrated database structure. This paper proposes a four-layer database model of ITS and discusses how to integrate different types of transportation system. The four-layer model includes a general map database, a general transportation system database, a schedule based and non-schedule based transportation system database, and a specific transportation system database.

**Key Words:** database design, layer model, integrated transportation system.

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**REFORMING CONVENTIONAL RAIL SERVICES TO COMPETE AGAINST HIGH SPEED RAIL**

Chieh-Hua WEN, Chih-Huai LIN, Sheng-Jun PENG

**Abstract:** The Taiwan high speed rail (HSR) system is anticipated to begin operation in 2007. As expected, when the HSR joins the intercity transport market, the conventional rail (CR) in Taiwan will receive severe competition from HSR, particularly for medium- and long-distance trips. The objective of this paper is to develop an intercity mode choice model that can be used to evaluate the impact of changes in CR services in response to the new HSR. Stated preference techniques and discrete choice models were employed to identify important variables influencing intercity passenger choice of the HSR, CR and
other intercity modes. The empirical results indicate that travelers are more sensitive to the changes in travel cost than in travel time. The potential market for CR in the medium- and long-distance ranges is non-business travel. A declining distance-based fare structure is particularly useful to attract non-business travelers.

**Key Words:** rail, logit, stated preference

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**A BASIC STUDY ON TRAFFIC ACCIDENT DATA ANALYSIS USING SUPPORT VECTOR MACHINE**

Hironobu HASEGAWA, Masaru FUJII, Mikiharu ARIMURA, Tohru TAMURA

**Abstract:** In Japan, fatalities from traffic accidents are decreasing, but sacrifices of the traffic accidents are not negligible. So, traffic safety measures are still important. When considering the traffic safety measures, it is effective to extract dangerous locations with high fatality and injury accident rates and then analyze the details of the factors involved in such accidents. Due to numerous factors, however, it is difficult to effectively and efficiently process large quantities of traffic accident data. For this reason, previous traffic analyses are reviewed, and a Support Vector Machine (hereinafter referred to as "SVM"), which has become the focus of attention as a data mining method, is chosen. The SVM is applied to the traffic accident data analysis. The effectiveness of and problems surrounding a SVM are examined in this study. The classification rate of the SVM toward non-learning data was approximately 70%.

**Key Words:** support vector machine, traffic accident, data mining

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**AN ANALYSIS ABOUT THE EFFECTS OF RAILWAY STATION ON REGIONAL ECONOMY: RELATED TO STANDARD OF LOCATION**

Ho Jin CHOI, Sun Yon HWANG, Hyo Seung KIM, Chang Ho PARK

**Abstract:** As a railway station is main traffic facility, it affects regional economy and urban activity variously. This fact tends to change more synthetically and then it needs to be reflected in construction and movement of railway station. This study proposes to select the inside and outside of the Korean representative railway station and analyze railway station’s influences in regional economy quantitatively and qualitatively on user side in order to make a decision about construction and movement of future railway station. For these reasons, it is considered that development of railway station impact area, complex railway station, and synthetic transferring center is examined for deriving desirable use way. It derived the factors influencing railway station on regional economic impacts from the classification by the types of the railway station. It presented the application model on the construction of railway station whether to satisfy the selective
conditions.

**Key Words:** railway station, regional economy, railway station impact area, transfer center

### POLICIES FOR EMPLOYMENT CENTERS IN METROPOLITAN REGIONS

Stefan KLUG, Pelin ALPKOKIN, John BLACK, Yoshitsugu HAYASHI

Abstract: The paper describes the methodology that underpins an EASTS International Collaborative Research Activity (ICRA) on the dynamics of poly-centric employment formation and associated land-use and transport policies. The selection of metropolitan case studies is explained. The general forces that have lead to the decentralization of employment from predominantly mono-centric city structures to poly-centric nodal structures or to dispersed employment patterns are outlined. Planning represents a market intervention and the methodology of the comparison of urban policy is presented. Indicative results are presented for ten cities from Asia and Australia. A critical commentary is made on the barriers to implementing major employment centres embedded in spatial plans. The conclusions deal with first evaluation and discuss further research into policy analysis on this EASTS IRCA.

**Key Words:** Polycentric Development, Asian Metropolitan Regions, Employment Policy

### WHERE IS THE STATE? The case of the BOT project for Taiwan’s High-Speed Railroad

Chien-hung TUNG

Abstract: While Taiwanese people and government celebrate for initiating service of the first high-speed railroad, there are certain possible financial and management crises within Taiwan High-Speed Railroad Co (THSR). As the first and most significant BOT project in Taiwan, THSR Co. faces certain financial problems which would affects the successful of this BOT project. The author argues the ambiguity of property right transfer during the BOT process and the formation of new power bloc in Taiwan are the causes of such financial problems.

**Key Word:** Taiwan High-Speed Railroad, Property Right, Privatization

### TRANSIT TRAVEL TIME FORECASTS FOR LOCATION-BASED QUERIES: IMPLEMENTATION AND EVALUATION
Shin Hyoung PARK, Yeon J. JEONG, Tschangho John KIM

Abstract: Recently, the market for location-based services (LBS) has been rapidly expanding. As an LBS value-added service, a concierge service provides users with a minimum total cost route using multiple modes. One of the core features in a concierge service is a travel time forecast which undoubtedly affects decisions by users as to the selection of modes, routes and time of travel. Multimodal travel time forecasts thus become an essential part of providing LBS. Many researchers have endeavored to develop reliable travel time forecasting models. Most of these studies, however, have shown general forecasting performances without carefully evaluating performances of models with actual time data. The purpose of this paper is to implement a transit travel time forecasting model and evaluate the performance. The nonparametric regression model, developed in an earlier study has been implemented and evaluated using real-time transit data.

Key Words: LBS, concierge service, travel time forecast, nonparametric regression

DEVELOPMENT OF HIGHWAY VERTICAL ALIGNMENT ANALYSIS ALGORITHM USING THE ROAD SAFETY SURVEY AND ANALYSIS VEHICLE

Dukgeun YUN, Junggon SUNG

Abstract: In this research, the vertical alignment analysis algorithms was developed which could recognize the highway sections whether they were vertical tangent sections or vertical curve sections using the real-world coordinate data. The developed algorithm for vertical analysis includes the identification of the beginning and ending points of vertical curve sections, the reduction of data noise which are included from the real world coordinates using the Road Safety Survey and Analysis Vehicle(RoSSAV) and the analysis of vertical tangent and curve formula. In order to verify the algorithm, a field test was conducted using the RoSSAV which were installed multiple sensors. The result of field test showed similar output from the analysis algorithm using the acquired coordinates from the RoSSAV comparing with the highway CAD drawing. The analysis algorithm of vertical alignment can be used to substitute highway drawings where highway drawings were not available and can be used to analyze highway safety.

Key Words: Vertical Alignment, Highway Safety, GPS

MODELING REPEATED CHOICE BEHAVIORS OF PHYSICALDAMAGE COVERAGE FOR NEW CAR OWNERS

Chieh-Hua WEN, Ming-Jyh WANG, Lawrence W. LAN
Abstract: This paper presents a discrete choice modeling framework for analysis of repeated choices associated with expensive automobile insurance policy (AIP) – the bundled physical damage coverage and the number of consecutive years the insured has purchased the same type of AIP. A four-year panel data with 9,949 voluntary automobile insurance records, randomly drawn from a non-life insurance company in Taiwan, are used to test the empirical case. The estimation results of the preferred multinomial logit model show that engine capacity and vehicle made are significant factors influencing one’s selection of AIP bundles. Older adults and owners of newer vehicles, of larger engine capacities, and of imported vehicles tend to repeat purchasing the expensive AIP bundles for consecutive three or four years. The preferred nested logit model further confirms that the inertia of the same individuals tend to repeat buying the same physical damage coverage policies for consecutive few years.

Key Words: automobile insurance policies, discrete choice models, repeated choice behaviors.

TRAFFIC MANAGEMENT OF A MAJOR ARTERIAL WITH THE LANE USE CONTROL IN A LARGE URBAN AREA

Jaisung CHOI, Heungsoon CHOI, Sangyoup KIM, Seungyong LEE

Abstract: Major Arterials have high traffic volumes and are susceptible to traffic congestion. Many countries use traffic management strategies to avoid traffic congestion, and express lanes installed inside existing R-O-W(Right Of Way) width is one of them. Basic concept of the express lane is to separate through traffic from locals and provide a preferential treatment. The through traffic in the express lane can avoid traffic signals. In this research the Nambu Beltway was used for a case study and the cost effectiveness for having the express lane was analyzed. A traffic simulation program VISSIM was used and with the express lane introduction to the Nambu Beltway it was analyzed for the express lanes to have a 20 km/h speed improvement in spite of a slight speed reduction of 3 km/h on general purpose lanes. The express lane was found to be an effective traffic management strategy for the Nambu Beltway.

Key Words: Major Arterial, Traffic Management, the Express Lane

ROLE ESTABLISHMENT OF EACH AUTHORITY IN TRANSPORT LOGISTICS ACCORDING TO THE GROWTH OF INFORMATION AND TECHNOLOGY

KangDae LEE, Hoon JANG, KangWon LIM

Abstract: This study wants to find the direction of development of national policy on
transport logistics according to the development of information and technology. For this, we defined the index of logistics information at each region and deducted the index to the 16 administrative districts (Si and Do) above all. After that we found out that these index and the freight outflows of each region are closely related with each. Especially, the role establishment among the planning subjects in the transport logistics and the introduction of organic linkage system among them can suggest efficient functions and roles according to the participant which correspond to their role and situation. Also, we can establish effective transport logistics policy to meet the development of the information technology through role establishment and organic cooperation.

**Key Words:** Index of Regional Logistics Information, Standard System of Transportation Logistics Information, Transport Logistics

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**A Study on Pilot Service Behaviour in Kaohsiung Harbor – An Application of Principle Component Analysis**

Ming-Tao Chou, Hsuan-Shih Lee, Chien-Chang Chou, His-Ching Chen

**Abstract:** The Kaohsiung harbor is the most important harbor in Taiwan. Two thirds of Taiwan’s international commerce goods are handled in this harbor. The future development of the harbor is influenced by many factors, namely port operational efficiency, port safety, weather condition, national, economic growth rate, and political stability. Although operational efficiency is important; however safety is even more important than operational efficiency. From this point of view, Kaohsiung harbor will soon launch its vessel traffic management system (VTS). Piloting service is one of the crucial elements in the development of a port’s VTS. This article analyzes pilot’s service behaviour in the Kaohsiung harbor and proposes appropriate pilots management regulations in the future VTS mechanism. In the paper, we applying principle component analysis and three key factors effects pilot's service behaviour under VTS regulations are found, namely, weather condition, sea condition and pilot experience. Three principle components accounted for over 62.247 percent of the data set. This result justified our efforts to represent the tongue shapes with the three basis factors the weather condition, pilot experience condition and sea condition. Therefore future VTS’s pilot regulations should take the abovementioned three factors into consideration.

**Key worlds:** Pilot, Kaohsiung harbor, Principle component analysis

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**WHAT IF THE SUPPRESSED TRAVEL DEMANDS OF THE TRANSPORTDISADVANTAGED WERE RELEASED: RESULTS OF A SIMULATION APPROACH**

Yavuz DUVARCI, Shoshi MIZOKAMI
Abstract: Modeling for the transport disadvantaged (TD) is relatively new subject since the 2000’s. The study aimed to discuss the simulation results of what the required transportation needs would be when also presumed suppressed demand of the TD are added. The underlying assumption is that the travel conditions of those TD groups must be equated to the “normal” demand, called full release. Based on the modeling approach for the TD, this task of equity could be realized elaborating special case of the elderly and disabled groups with some interesting results such as slightly increased costs, traffic and congestion, knowing also their locations. As of early virtual results, it is concluded that, for full release of suppressed trips (about 5%), local governments must be ready for extra financial burdens, which require a coordination effort both to standardize the TD and to reduce incurring costs on the operators.

Key Words: Suppressed Travel Demand, Transportation Disadvantaged, Disabled (Handicapped) and Elderly

THE INTERACTION BETWEEN PEDESTRIANS AND FACILITIES IN CENTRAL BUSINESS DISTRICTS: AN EXPLORATIVE CASE STUDY

Dick SAARLOOS, Akimasa FUJIWARA, Junyi ZHANG

Abstract: A conceptual multi-agent model is presented that aims at supporting planners in their decision-making regarding the regeneration of Central Business Districts (CBD). The model focuses on the interaction between the environment consisting of facilities and the decisions of pedestrians regarding their activities and movements within that environment. As a preparatory step for the implementation of the model, the paper includes an explorative case study to reveal particular aspects of the interaction between pedestrians and facilities. Besides an analysis of the stops that people make at facilities during their trips, also the functional linkages occurring between stops are investigated, both in relation to whether or not they are planned and whether or not goods or services are purchased. Finally, these results are discussed in relation to the requirements of the multi-agent model.

Key Words: pedestrian movement, urban facilities, central business districts

COST-EFFECTIVENESS IN PROBE VEHICLE SYSTEMS

Kai LIU, Toshiyuki YAMAMOTO, Qiang LI, Taka MORIKAWA

Abstract: The development of traffic data collection is promoted by IT technology. Probe vehicles are playing an increasingly important role in the field of ITS, and showing high ability for various ITS applications in the last decade. The overwhelming superiority of probe technology relies on a good coverage and a high penetration rate of probe
vehicles. Although conceivable, the expectation of ubiquitous coverage of the entire road network is still far away from actual implementation nowadays. Through the review of current studies on the probe systems in ITS projects around the world, recent advances in probe technology are explored, following by an analysis of the impending obstacles or trade-offs that were faced by the extension of probe implementation. It is recognized that a cost-efficiency probe deployment scheme is of certainty to be the impetus of probe system evolution.

**Key Words:** probe vehicle, cost-effectiveness, review

**POLY-CENTRIC EMPLOYMENT FORMATION IN MEGA-CITIES: ANALYSIS FROM APEC-TR COLLABORATIVE RESEARCH**

Pelin ALPKOKIN, John BLACK, Hirokazu KATO, Varameth VICHIENSAN

**Abstract:** Factors influencing poly-centric employment formation in metropolitan regions are identified and explained. Less is known about the dynamics of change in cities of the developing world so a comparative study was proposed that was successfully funded by EASTS International Collaborative Research Activity (ICRA). A common analytical framework is outlined. This paper presents preliminary empirical findings for rank-size distributions of employment and for employment specific preference functions for the journey from work to home. Comparative findings are presented and interpreted for Bangkok, Canberra, Dalian, Delhi, Istanbul, Sapporo, Sydney, and Tokyo. Directions for on-going research are outlined.

**Keywords:** Employment Clusters; Poly-centrism in Mega-cities, Commuting trips

**THE OLDER DRIVER’S TRAFFIC ACCIDENTS IN KOREA**

Kyungwoo KANG, Jungtae KWON, Wookag KOOK, Jongheun KIM

**Abstract:** The purpose of this paper is to reconsider the relationship between the aging society and the traffic accidents by older drivers, so it is possible to establish suitable policies for the society. We estimated the changes of the traffic accident rate considering the number of drivers. Also, we analyzed the effect of traffic accidents classified by age. It showed that the accident rate of the older drivers decreased over time, and also that the older drivers have the effect of decreasing the number of traffic accident and the number of deaths in traffic accidents. Due to the analysis on simple accident data and the older drivers' physical frailty, it was generally thought that older drivers increased the accident rate. Therefore, policies should be devised to limit the older drivers' driving. However, our study concludes that traffic policies must be established considering the behavior of the older drivers.

**Key Words:** The ageing society, Older driver, Poisson regression
MODELING PUBLIC TRANSPORT CHAINS IN DEVELOPING CITIES

Caesar P. RUBITE, Yasunori MUROMACHI

Abstract: Public transportation (PT) plays a major role in order to meet the ever-increasing travel demand in developing cities. With urbanization trend at the fringes of the region, away from the city core, travelers must take different modes or to chain trips to reach their final destination. This study investigates the travelers’ decisions on choice of mode and modal combination patterns through modeling tools. Specifically, it looks into the travelers’ preferences for different modes in performing PT chains. Empirical analysis using logitbased extreme value models such as multinomial logit (MNL), and nested logit (NL) was performed. It introduces the applicability of cross-nested logit (CNL) model structure in analyzing PT mode choice behavior. Utilizing variables such as total travel time and cost, with some socioeconomic variables, for all model formulations, estimation results point to the flexibility of more advanced models in dealing with the choice situations involving PT chains.

Key Words: Public transportation chains, Developing cities, Logit models

THE PRACTICAL WAYS OF THE SPACE UNDER OVER-PASSRAILWAY

Mi-Jeong JO, Dong-Kyu OH, Yong-Gwan LEE, Sung-Mo RHEE

ABSTRACT : Korea opened express rail in 2004. It calls KTX(Korea Train Express). Ever since the average speed of train has been improved and bridges occupied in roadbed thereby have been increased. As the number of railroad bridge increases, the undeveloped space under railway increases. However, a standard regarding to developing the space under railway is not prepared yet in Korea. This paper investigates current used or undeveloped space under railway in Korea. The utilizing methods are classified into 2; structural types of bridges and location types. It suggests some cases to develop the space under railway properly.

Key Words : Space under railway, Overpass railway, Urban areas

A COMPARATIVE STUDY ON TRAFFIC CHARACTERISTICS AND DRIVER BEHAVIOR AT SIGNALIZED INTERSECTIONS IN GERMANY AND JAPAN
Abstract: The authors are currently investigating the applicability of the operation policy, commonly applied at signalized intersections in Germany, for Japanese signalized intersections. As an initial step, this study analyzed traffic characteristics and driver behavior at several typical German and Japanese intersections to understand the impacts of such policy on them. The results showed that German intersections had significantly lower starting response time (SRT) and start-up lost time (SULT), which was due to the sequence of signal indications. However, no apparent variations existed in saturation flow rate (SFR) and lost time in amber (LTA). Left turners at German intersections tended to be more aggressive in choosing suitable gaps, indicated by critical gap and 1/PET values. Moreover, longer all-red clearance interval and gap adaptive control seemed to encourage aggressive pass. Lower stop-line crossing during amber (SCA) and red light violation (RLV) rates at German intersections were attributed to multiple factors.

Key Words: traffic characteristics, driver behavior, signalized intersections

TRANSFERABILITY OF THE EUROPEAN SUSTAINABLE TRANSPORT PLANNING PROCESS TO TRANSPORT MASTER PLAN IN THAILAND

Sittha JAENSIRISAK, Pongrid KLUNBOONKRONG, Sutthipong MEEYAI

Abstract: This paper briefly presents European decision making process, and mainly the transferability of the European process into practice in Thailand, in a case study of the Si Sa Ket Transport Master Plan. The case study shows that it is not easy to develop a transport master plan, which perfectly fit to the “ideal” process. A main obstruction is a political barrier. This is because there is no knowledge-based public participation process. Therefore, residents should be continuously educated, in order to be able to participate in setting objectives and strategies. Moreover, more research is needed on participation toolsets (in addition to tools for decision makers), in order to facilitate public participation in urban transport planning, and to provide information that would not normally be available to the public.

Key Words: European transport planning process, transport master plan, Thailand

A COMPUTABLE MODEL FOR OPTIMIZING RESIDENTIAL RELOCATION BASED ON QUALITY OF LIFE AND SOCIAL COST IN BUILT-UP AREAS

Noriyasu KACHI, Hirokazu KATO, Yoshitsugu HAYASHI

Abstract: Population aging and population decline, coupled with a saturation of the
Japanese economy and declining fiscal revenue to maintain the existing infrastructure, pose particular problems in suburban areas. A new planning philosophy based on planned-retreat and planned re-concentration is described. To evaluate and identify suitable land areas, a tool for planning decision is provided. In this paper, the previously proposed framework (Kachi et al., 2005) is applied in order to identify the planned retreat and re-concentration areas with the index for social cost effectiveness of Quality of Life (QOL) derived from the given maximization problem. The case study of a rural small-sized city in Japan shows that the clustered urban spatial configuration is appropriate in terms of social cost effectiveness of QOL, although QOL in the suburban areas is higher than that of in the city center.

**Key Words:** Quality of Life (QOL), Urban sprawl, Population aging and decline

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**INFLUENCE OF SUPERPLASTICIZER ON THE PROPERTIES OF CEMENTITIOUS GROUTS FOR SEMI-RIGID PAVEMENT**

Roshni FATIMAH, Mohamed Rehan KARIM, Hilmi Bin MAHMUD

**Abstract:** Semi-rigid pavement (grouted macadam) is composed of open-graded asphalt skeleton filled with various cementitious grouts. In this study, influence of superplasticizer (SP) on the characteristics of cementitious grouts for semi-rigid pavement has been explored through laboratory experiments. Several cementitious grouts with varying compositions of SP are produced with favorable flow property so that they can rapidly penetrate the porous asphalt skeleton aiming at improving the strength and resilient properties of the resultant composite. Poly-carboxylic ether based SPs used in this study are: SP-A, SP-B and SP-C (ASTM C494, type F). The prepared grouts are tested for the properties such as flow time (Flow Cone test), compressive strength and density. It is observed that flow times and strengths are significantly affected by the type and percentage of SP. The grouted semi-rigid specimens are also tested for compressive strength, resilient modulus, porosity and density. The results are analyzed and compared with Malaysian field practices for selecting suitable grout composition for the open graded asphalt mix under study.

**Key Words:** cementitious grouts, superplasticizer and semi-rigid pavement.

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**ENVIRONMENTAL EFFICIENCY ANALYSIS OF TRANSPORTATION SYSTEM: A STOCHASTIC FRONTIER APPROACH WITH FLEXIBLE CAUSE-EFFECT STRUCTURE**

Tao FENG, Junyi ZHANG, Akimasa FUJIWARA

**Abstract:** This paper aims to evaluate environmental efficiency of transportation systems by integrating a multiple-output stochastic frontier analysis (SFA) model with a structural
equation model (SEM) to flexibly incorporate cause-effect relationships among various factors influencing traffic emissions. The SEM is firstly specified to illustrate such complex interrelations and the calculated latent variables are taken as the inputs to SFA model. A SFA model, named the distance function approach which can accommodate multiple inputs and multiple outputs, is adopted to calculate efficiency scores in transport sectors at different cities. To examine the model performance, an empirical study is carried out considering three types of emissions, i.e., CO, VHC and NO\textsubscript{x}, based on the Millennium Cities Database. The effectiveness of the proposed model is confirmed. Efficiencies in transport sectors are compared and it is found that cities in developed countries do not consistently show higher efficiency than other developing cities.

**Keywords:** Multi-output stochastic frontier analysis (SFA); Structural equation model (SEM); Environmental efficiency

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**ANT COLONY SYSTEM BASED APPROACHES TO THE AIREXPRESS COURIER’S ROUTING PROBLEM**

Wilson W. LAN, Ching-Jung TING, Kun-Chih WU

**Abstract:** This paper proposes two ant colony system (ACS) based approaches, called stepwise-ACS (SACS) and cheapest-insertion-stepwise-ACS (CISACS), to solve the airexpress courier’s routing problem. The courier visits \( N \) predetermined delivery points and \( M \) pickup requests during the en route delivery. The SACS performs an ACS to obtain the initial tour for the \( N \) delivery points and then to find the shortest Hamiltonian path, in a stepwise manner, when the \( M \) requests arrive. The CISACS, following the SACS, incorporates the cheapest insertion into the SACS as new requests become known. Experiments with various pickup emergence patterns that characterize the real-world circumstances are tested for the proposed algorithms. The computational results, in terms of total traveled distance, are compared with the baseline results by a cheapest insertion (CI) heuristic. The results show that both SACS and CISACS perform better than the CI heuristic and that CISACS yields the lowest traveled distance.

**Key Words:** air-express courier, pickup and delivery, ant colony system, cheapest insertion

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**Forecasting Transportation Demand by Binary Logit Model, Light Rail System**

Jaesung ChOI, Yongeun SHIN, Jaehoon OH

**Abstract:** In case of Car ↔ LRT, in-vehicle travel time was found to be the main cause of shifting in modal choice from car to LRT while other modes are not as much impacted by the same, so if in-vehicle travel time were reduced through enhanced punctuality in
the future, potential transport demand for LRT brought about by conversion from the demand for cars would exist. In cases of Bus↔LRT and Taxi↔LRT, out-of-vehicle travel time was responded to be the major cause of shifting in modal choice, so should waiting and transfer times be made long on account of bad punctuality, the competitiveness of the new transport system is deemed to be very little. For the trip case(2), where transfer should be made and with cars, variation of in-vehicle travel time appears to be in important play where improvement of punctuality and intermodal connection measures are deemed required.

**Key Words**: Binary Logit model, Stated Preference, Modal split by trip type, Modal split by trip zone

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**THE VALUE OF RAIL FREIGHT TIME OF KOREA**

Kyungwoo KANG, Wookag KOOK, Jongheun KIM, Kyounghun HAN

**Abstract**: South Korea is preparing takeoff as the distribution central country in Northeast Asia. So in this paper, we estimated the value of rail freight time by using the Stated Preference data of rail freight cargo. We also estimated the value of rail freight's characteristics (reliability, transportation time and shipping frequency). The value of time of container was 8,670 won/40Ft-hour, bulk was 375 won/Ton-hour, the value of reliability of container was 2,306 won/hour, bulk was 201 won/hour, and the value of frequency of container was 2,142 won/time and bulk was 86 won/time.

**Key Words**: The value of rail freight time, Stated preference, Willingness to pay

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**DEVELOPMENT OF MECHANISTIC DESIGN PROCEDURE OF FLEXIBLE PAVEMENT FOR TROPICAL CONDITION**

Bambang Sugeng SUBAGIO, Bambang Ismanto SISWOSOEBOETHO, Aris WIBOWO

**Abstract**: Based on the analysis of several asphalt mixtures in Indonesia, generally, asphalt mixture has stiffness modulus (E1) varies from 2000 MPa to 5000 MPa. At the subgrade layer, soil has CBR value at 3% to 6% which is equivalent to modulus (E3) at 30 MPa to 60 MPa. The second layer would be a base layer with thickness considered to be a constant value at 200 mm and stiffness modulus (E2) at 100 MPa. The other characteristic is Poisson’s Ratio (ν). Poisson’s Ratio for surface (ν1), base (ν2) and subgrade (ν3) was taken as 0.35; 0.40; and 0.45 respectively. Considering the material characteristic above then design nomograph were developed. The nomographs were inspired by Nothingham and there are then 4 types of nomographs related to a subgrade modulus. Pavement thickness result designed using mechanistic procedure was thicker than empirical method.
**Key Words:** empirical, mechanistic, nomograph

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**A STUDY ON THE TRIP GENERATION CHARACTERISTICS OF BUSINESS PROCESS OUTSOURCING (BPO) COMPANIES IN THE PHILIPPINES**

Jose Regin F. REGIDOR, Dr. Eng.

**Abstract:** This study focuses on the trip generation characteristics of business process outsourcing (BPO) companies in the Philippines. Business process outsourcing is a rapidly growing industry and as such, has spawned land use that has significant differences in trip generation characteristics from traditional offices. Travel demand characteristics for BPOs, for example, are quite different because of the unusual nature of operation of such companies due to the varying times in countries served by employees. Many BPOs were initially located in central business districts in Philippine cities. However, as the demand for BPOs continue to increase, offices have been established away from the urban areas at business and industrial parks. The paper examines the characteristics of BPO trip generation. It presents the formulation of strategies to address problems pertaining to transport demand as well as the provision of facilities to accommodate the continued growth of the industry.

**Key Words:** trip generation, business process outsourcing

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**INTEGRATED DATA ENVELOPMENT ANALYSIS MODELS FOR MEASURING TRANSPORT EFFICIENCY AND EFFECTIVENESS**

Yu-Chiun CHIOU, Lawrence W. LAN, Tzu-Hui YEN

**Abstract:** This paper proposes integrated data envelopment analysis (DEA) models to jointly evaluate the transport efficiency and effectiveness by measuring the efficiency scores under three aspects of technical efficiency, service effectiveness, and technical effectiveness simultaneously. The underlying reason for requiring joint evaluation is that when the transport services are produced and a portion of which are not consumed, the technical effectiveness would be less than the technical efficiency. A case study on 15 bus companies in Taipei is conducted. Results show that the number of efficient companies determined by the proposed models is fewer than that determined by conventional two-stage DEA models. It indicates a superior benchmarking power of the proposed models.

**Key Words:** integrated DEA model, technical efficiency, service effectiveness
MODELING THE LEVEL OF ENVIRONMENTALLY EFFICIENT CAR OWNERSHIP

Tao FENG, Junyi ZHANG, Akimasa FUJIWARA

Abstract: This study attempts to develop a macro-level car ownership model using a bi-level optimization modeling approach. The upper level of the bi-level model deals with a maximum problem of zonal car ownership. Objective function is the total zonal car ownership and the constraints are the legalized standard of air quality and the frontier emissions estimated using a stochastic frontier analysis approach. The lower level is a user equilibrium assignment model. Pollutant concentrations are estimated using an artificial neural network model. The interdependencies of car ownership, traffic flow, and the emissions and pollutant concentrations are logically represented based on an iterated optimization process. The final optimized car ownership can be used as a benchmark of realizing environmentally sustainable transportation systems. Based on the data collected in Dalian, China and the Millennium Cities Database, the effectiveness of the proposed car ownership model was empirically confirmed.

Keywords: Zonal Car Ownership, Bi-level Optimization, Stochastic Frontier Analysis, and Artificial Neutral Network

DEVELOPMENT OF TRANSPORT PLANNING MODEL USING GEOGRAPHIC INFORMATION SYSTEM (Trip Assignment Model Using Dynamic Segmentation Model)

Nindyo CAHYO KRESNANTO, Ofyar Z. TAMIN

Abstract: To analyze performance of a transportation network in transportation system, trip assignment model has been widely used. Using this model, every travel's route selection behavior from origin to destination can be predicted. This study apply trip assignment model using Geographic Information System (GIS) model. The selected GIS model applied in this research is Dynamic Segmentation Model. Dynamic segmentation builds upon arc-node topological model to provide a method for modeling and analyzing linear features. The results are graphic information (map) and attribute of: (1). Optimum route between centroid zone, and (2). travel volume along every selected link.

Key word: trip assignment model, dynamic segmentation, route-system

THE ESTIMATION OF COMBINED TRIP DISTRIBUTION MODE CHOICE MODEL ESTIMATED FROM TRAFFIC COUNT UNDER EQUILIBRIUM CONDITION

Rahayu SULISTYORINI, Ofyar Z. TAMIN
Abstract: The development of techniques for calibrating the trip distribution models from traffic volumes to obtain the O-D matrices is well advanced (see Tamin, 1988; Tamin and Willumsen, 1988; Tamin, 1992). Therefore, positive results on this development will be further developed by combining trip distribution and mode choice model (TDMC) and calibrating it using low cost traffic (passenger) volumes information (see Tamin 1997; Tamin and Purwanti, O 2002). As usual, the traffic (passenger) counts are expressed as a function of model form and relevant parameters. In this case, the TDMC model is represented by a function of a model form and relevant parameters. The previous research still in a burden condition of “All or Nothing” which is not realistic for some road network in urban area. So, the main objective of this research is the application of a combined trip distribution-mode choice model estimated from traffic count under equilibrium condition.

Key Words: Combined Trip Distribution-Mode Choice Model, Traffic Count, Equilibrium Assignment

AN ESTIMATION OF THE APPLICABLE LONG-RUN ROAD PRICING CONSIDERED CAPITAL INVESTMENT AND THE DEGREE OF CONGESTIONS

Kyungwoo KANG, Dongyong CHOI, Wookag KOOK, Jongheun KIM

Abstract: In this paper, we estimated changeable road pricing while considering the capital and congestion degree, that could be applicable in the long term (Gangbyeon Expressway). We investigated traffic volume and speed(unit per 15 minutes, 2005. Jan. 10 - 2005. Jan. 14.). Then we determined congestion areas as when the average pass speed of vehicle is under 30km/h on Expressway occurred over 3 times a day. The 13 sections were investigated out of the total of 43 sections. These sections are between Nanji I.C. and the northern end of Sungssoo Bridge. As a result, there were some differences among each section(13 sections, average length : 1.38km), but we were able to estimate the range of road pricing which is 900 ~ 2,300won, that is in accordance with the degree of congestion.

Key Words: Road pricing, Degree of congestion, Rental price

RECENT DEVELOPMENT OF INDONESIA RAILWAY INSTITUTION

Harun Al-Rasyid S. LUBIS, Pamungkas NURULLAH

Abstract: Indonesia railway policy reform has been initiated since 1991, where several stages of improvement took place. However train services decline, length of track in operation decline too, the sector does not function as expected by the Law number 13 / 1992 on Railway. There has been a slowdown in the policy implementations especially
since the Asian financial crisis in 1997 hit the country. Some key elements of the government policy reform halted and and PT Kereta Api (Persero) as the sole state-owned railway corporation failed in implementing the corporate restructuring agenda. Under the new Law Number 23 / 2007 on Railway it is expected that this matter will be resolved. The new law also underlines the importance of inviting private sector participation in developing railway industry in the country. This paper reports the recent institutional development of Indonesia railway. Brief history of railway restructuring together with the underlying problems are reported. As the practice of multi-operators is envisaged in the future, the necessary changes in the institutional setting of Indonesia railway are also discussed.

Key Words: railway restructuring, institutional development, corporation

A CASE STUDY ON THE ELECTRONIC TOLL COLLECTION (ETC) SYSTEM IN THE KLANG VALLEY

Mohd Rasdan IBRAHIM, Mohamed Rehan KARIM, Nadiah HUSAIN, Herda Yati KATMAN

Abstract: Congestion at toll plazas has been the common scenario in Malaysian expressways. In view of the delay, toll operators have introduced two ways of transaction in Electronic Toll Collection (ETC) system which is the contact-less smart card toll lane and the non-stop with barrier lane. Despite having the system introduced, traffic congestion at toll plazas still occurs. 800 questionnaires had been randomly distributed to road users and commuters to evaluate their views on the system based on their experience. As a conclusion, we can say that the road user’s level income has a slight impact on the number of users using the ETC system. However, there a significant number of non-ETC users that actually earned a high income and still would prefer to use the manual payment system due to some dissatisfactions to the system. Problems aroused related to ETC system includes the pricing and the reload system.

Key Words: expressways, electronic toll collection system, congestion

THE FARE COMPETITIVENESS ANALYSIS OF MAJOR HUB AIRPORTS IN ASIA

Hyoungku YEO, Kyungwoo KANG, Hyejin JANG

Abstract: Main airlines dominate the Incheon international airport naturally and the government executes various protective policies for protection of main airlines. In this paper we will analyze the distances between hub airport in Asia and the spoke of long distance, and the relationship with other main variables and fare. The purpose is to recognize the position of the Incheon international airport through the analysis of fare differences between the Incheon international airport and other hub airports by market
PUBLIC TRANSPORT POLICIES AND THE ROAD-BASED PUBLIC TRANSPORT SERVICE IN DEVELOPING COUNTRIES: THE CASE OF INDIGENOUS PUBLIC TRANSPORT MODES IN DAVAO CITY, PHILIPPINES

Marie Danielle GUILLEN, Haruo ISHIDA, Naohisa OKAMOTO, Morito TSUTSUMI

Abstract: Different types of road-based public transportation vehicles can be observed in many developing nations of Southeast Asia. For example, Thailand has its “tuktuks”, Indonesia has its “bajajs” and “mosos” or motorcycle taxis are familiar sight in Vietnam. In the Philippines, public utility jeepsneys and tricycles are very popular. This study uses the concept of indigenous public transport modes. That is, low-occupancy, road-based motor vehicles and with unique design identifiable to its place of origin and sometimes have informal nature of operation. Thus, this paper aims to understand the different types of motor vehicles used as public transport service and in particular describe the indigenous modes by studying the public transportation system of Davao City, Philippines. A holistic planning and policy perspective is provided by understanding the history and role of different public transport modes thru its key stakeholders: government units, supply and demand using in-depth interviews and small-scale survey.

Key Words: road-based public transportation vehicles, indigenous modes, developing country

REDEVELOPING PORT CITY WATERFRONTS: A QUALITATIVE FRAMEWORK

Wen-Chih HUANG, Kuang Yu CHEN, Song-Ken KAO, Takeshi CHISHAKI

Abstract: Redevelopment of the port city waterfront has created high-profile cases around the world. Authorities are facing challenges of linking port and urban functions, maximizing utilities of available port city resources, and creating a built environment best for all relevant stakeholders. It is argued that for all parties to truly benefit from the redevelopment, the government should approach the planning systematically in a top-down and comprehensive manner. By dividing into functional developmental parcels on the waterfront, the development is held responsible by various participants. This paper investigates waterfront redevelopment from the perspective of socioeconomic trend. From the concept of Alvin Toffler’s waves, three value-added stages and their six sub-categories of waterfront development are identified. Comparing waterfronts in various economic regions, incentives and contents of the redevelopment are discussed.
Waterfront functions and organizations are finally examined in relevance of planning issues.

**Key Words:** waterfront redevelopment, port city, socioeconomic trend.

**DISTRIBUTIVE CONTINUOUS FRACTAL ANALYSIS FOR URBAN TRANSPORTATION NETWORK**

Zhuo SUN, Peng JIA, Hirokazu KATO, Yoshitsugu HAYASHI

**Abstract:** A city has a very complex transportation network. It is very hard for city planners to evaluate it in both micro scale and macro scale and so far most of these works have been done empirically. In this study a new method named Distributive Continuous Fractal Analysis will be introduced to evaluate the road networks. Previous researches treat a city as a whole and did fractal analyses between cities. This study tries to treat a city as distributive continuous space and deploys the fractal analysis on every piece of space. With the power of high end computer and GIS platform this analysis can be done in few hours and shows the results to the planners visually. Comparing with the other subsystems will make the policy maker or planner see the detailed situations of a city more clearly and intuitively and they can easily make some decisions or predictions.

**Key Words:** Fractal Analysis, Road Network, City Planning

**SOCIAL AND PUBLIC COSTS OF RESIDENTIAL URBAN SPRAWL**

Stefan KLUG, Yoshitsugu HAYASHI

**Abstract:** The long-run costs of different forms of urban development are one of the major problems in the field of land use and transport. This paper summarises and evaluates the most important international literature, dealing with “Costs of Sprawl”: comprehensive studies including many social aspects, studies on public costs and those simulating the local fiscal impact of various development scenarios. Taking these examples, the paper derives criteria and requirements for a calculation framework to estimate Social Residential Urban Sprawl Costs, which includes the aspect of cost-by-cause principle and sponsorship under the viewpoint that economic and fiscal problems basically occur, if costs are not paid by those who are causing them. Both fiscal instruments and land use development methods, which are described for Japan and Germany as an example, need to be taken into account in respect to its impact and its application aiming in socially efficient urban structures.

**Key Words:** Urban Sprawl, Infrastructure Costs, Fiscal Impact
A USER PREFERABLE K-SHORTEST PATH ALGORITHM FOR INTERMODAL NETWORK

Zhuo SUN, Qionghua WU, Hirokazu KATO, Yoshitsugu HAYASHI

Abstract: This study discusses seamlessly integrating multiple modes of transportation networks and calculating the User Preferable K-Shortest paths in the network between origin and destination with a new algorithm based on improved Link Penalty. A projection method has been used to connect different networks. Three aspects of users’ preferences have been evaluated to set the rate of link penalties in each step that k-shortest paths will be generated. Link similarities are considered respectively in different mode and Partial Overlap has been introduced to be a criterion for iteration. Users can set their constraints and will get very precise and efficient travel information through GIS. Due to the simplification of the topological structure and flexibility of the k-shortest path algorithm, it’s very easy for developers to update their existing traveler information system.

Key Words: K-Shortest Path, Intermodal Network, Link Penalty, Partial Overlap

BENEFIT EVALUATION OF ROAD REHABILITATION AT NINE PROVINCES IN INDONESIA

Judiantono TONNY, Tamin OFYAR Z

Abstract: Direct benefit of road rehabilitation can be measured by transportation and roadway change, meanwhile indirect benefit measured by physical, social, economic, environmental and spatial change. This research takes road projects between 1990-1998 in Bengkulu, South Sumatera, Lampung and West Java Provinces. Through direct observation on sample data and comparative analysis between before and after project, the evaluation has result IRI changes up to 140%, ADT increase 140%, even for West Java and Lampung increase 360%-470%. This evaluation also resulting the relation between Speed and IRI such as: \( \text{Speed} = -0.13443 \times \text{IRI} + 49.71993 \ (R=0.98) \). After rehabilitation, vehicle composition changes especially on car and utility, meanwhile truck and bus tend to decline. VOC decrease 21-46%, and BCR 4.38 for 1990-2010 period. Beside of benefit, the road rehabilitation raise also negative impact as like level of traffic accident, productive land food shift to industrial, residential or other non-agriculture uses.

Key Words: Rehabilitation, Evaluation, Benefit

A TIRE MARK LOCALIZATION METHOD FOR FORENSIC IMAGE ANALYSIS
Ying-Wei WANG

**Abstract:** An automated tire mark identification system includes functions of the mark localization, segmentation, feature extraction, tire-tread matching and identification. The tire mark localization is the first and most important step for the system development. The study proposed a new algorithm called rotation-projection method to solve the problem of the seed selection by using region growing algorithm for skid mark localization and expand the processing scope of the types of tire marks. This new algorithm has six steps including gradient direction angle detection, image rotation, image projection, calculating the coefficient of the variant, and detecting the tire mark area. This method combined with the gradient operator can effectively detect the area of the new or old tire marks. Its accuracy is similar to the original region growing algorithm in new tire mark localization. Nevertheless, the algorithm also can localize the old tire mark while the region growing method can not cope with.

**Keywords:** tire mark, localization, region growing

**IMPACT OF GARMENT INDUSTRIES ON ROAD SAFETY IN METROPOLITAN DHAKA**

Dr. Md. Shamsul HOQUE, Ashim Kumar DEBNATH, S.M. Sohel MAHMUD

**Abstract:** There are 4,000 garment industries in Bangladesh, most of them are clustered in and around the capital city. Together they account for 75 percent of the country's export earnings and employ around 1.8 million people which is almost half of the total industrial workforce of the country. Though it is the most important economy sector of Bangladesh, unplanned and haphazardly built garment factories are also inducing many social, housing and most importantly urban transportation problems which are a great cause of concern. This study investigates the impact of garment industries on transportation, in particular road safety of garment workers. Data is collected to identify the locational problems of garment factories, spatial distribution of worker residences, and their travel pattern as well as to assess their walking and road crossing problems. Finally, recommendations are put forward to tackle transport problems arising from these unplanned establishments of garments industries in Dhaka City.

**Keywords:** Garment Industries, Pedestrians, Road Safety

**MODELING AIRCRAFT NOISE IN THE VICINITY OF AIRPORTS**

Ricardo G. SIGUA

**Abstract:** The paper focuses on the impact of noise due to aircraft movements in the vicinity of the two major airports in the Philippines, namely: the Ninoy Aquino International Airport (NAIA) in Metro Manila and the Diosdado Macapagal International
Airport (DMIA) in Pampanga. The Federal Aviation Administration’s Integrated Noise Model software was used to aid in assessing the noise levels.

**Key Words:** aircraft noise, noise model

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**Cellular Automata Model of Pedestrian’s Group Behaviour**

Shohei SHIMOHARA, Tsukasa WATANABE, Toshikazu SHIMAZAKI

**Abstract:** It is necessary to expect the behavior of pedestrians, to provide the comfortable walking environment. The pedestrian behavior is difficult to describe with a numerical formula, because psychological influence is large. The paper constructs the simulation model of the pedestrian by Using Cellular Automata. Although such a simulation model exists, the aim of this paper is to construct pedestrian behavior of group composed of three or more pedestrians.

**Key Words:** Pedestrian Behavior, Cellular Automata

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**TRAFFIC CONTROL ON TWO WAY TWO LANE ROADS WORK ZONES: A CASE STUDY IN INDONESIA**

Endang WIDJAJANTI, Tri TJAHJONO, Sutanto SUHODHO

**Abstract:** The work zone related congestion on streets has grown to critical discussion in Indonesia, Construction and maintenance on two way two lanes roads require the closure of one of the two lanes. This paper develop a practical guidelines to choose the appropriate traffic control method by simulating the work zone dimensions and traffic condition of the work zone. The results of the study are the mathematical equations to determine maximum traffic flow can be accommodate based on work zone width, work zone length and work zone traffic flow condition.

**Key Words:** work zone, traffic control, two way two lane road

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**DEVELOPMENT OF POLICY INSTRUMENTS FOR EMISSION STANDARDS COMPLIANCE OF MOTORIZED THREE-WHEELERS**

Manuel Jose D. CAMAGAY, Dr. Karl N. VERGEL

**Abstract:** Upon the implementation of the Philippine Clean Air Act, many informal transport modes like three-wheelers were confronted with compliance problems. Factors resulting to failure of 2-and 4-stroke motorcycles have been identified. Correlations were also observed between
compliance and variables like education, income, behavior, land use, infrastructure and preference. The tricycle sector is an important segment of the whole transportation system. Policy intervention is necessary to bridge the law and the target sector. A menu of policy instruments is prescribed in this study using the Local Government Unit (LGU) as the lead agency in implementation with emphasis on the maintenance and education, petroleum product quality, emissions monitoring and policy review body. A clean air program is recommended to integrate the policy actions into a formal plan.

Key Words: policy instruments, emissions, tricycle

ROLLING GREY FORECASTING MODELS FOR SHORT-TERM TRAFFICS

Yu-Chiun CHIOU, Yen-Ching CHIOU, Chia-Ming AI

Abstract: This paper aims to develop rolling grey forecasting models (RGM) to predict short-term traffics. Two types of RGM models are developed and compared: RGM(1,1) and RGM(1,N). To investigate and validate the accuracy and applicability of proposed models, two time horizons of short-term traffics of 1-minute and 5-minute are applied, respectively. For comparison, two commonly used short-term traffic prediction models: statistical time-series model (ARIMA) and artificial neural network (ANN), are also developed. The accuracies in term of mean absolute percentage error (MAPE) of various rolling intervals (4-8 intervals) and prediction periods (1-5 periods) of the proposed model are also compared. The results show that both of RGM(1,1) and RGM(1,N) perform better at fewer rolling interval and prediction period. Besides, RGM(1,6) remarkably outperforms in predicting three traffics, followed by RGM(1,1). Obviously, the performances and applicability of proposed RGM models are validated.

Key Words: short-term traffics, grey forecasting model, artificial neural network

POLICIES, COMMUTING PATTERNS AND ACCESSIBILITY IN A NON-MONOCENTRIC CITY: CASE STUDY OF DELHI

Kirti BHANDARI, Jia PENG, Pelin ALPKOKIN, D MUKHOPADHYAYA, S GANGOPADHYAY

Abstract: With an estimated 13.8 million people in Delhi in 2001, an overwhelming 93% was urban. Given the highly urbanized character of Delhi, industry, trade and manufacturing offer the maximum employment opportunities for people. In order to study the dynamics of employment distribution over NCT Delhi and to assess the policies outlined for Delhi, certain specific metrics are employed. These include the rank-size distribution and the employment specific preference functions. Results indicate towards the formation of employment centers within Delhi, other than the CBD. Accessibility is an important component of Quality of Life (QoL), which may influence the choice of
residential areas. Accessibility indices for different types of land-use activities, i.e. work, education, health and commercial centers are estimated. Accessibility to work has been perceived as the most important by the respondents in Delhi, underpinning the need to investigate job agglomerations in a city where city limits are expanding to accommodate more job opportunities. Transport policies aim to integrate the NCT and the NCR with special focus on the satellite cities, which show high concentration of work centers.

**Key Words:** non-monocentric development, employment specific-preference functions, accessibility, Quality of Life, Delhi

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**EXPLORING TRAFFIC FEATURES WITH STATIONARY AND MOVING BOTTLENECKS USING REFINED CELLULAR AUTOMATA**

Chih-Cheng HSU, Zih-Shin LIN, Yu-Chiun CHIOU, Lawrence W. LAN

**Abstract:** This paper proposes refined cellular automata (CA) rules, including anticipation effect, slow-to-start, lane change, and interaction among vehicles to explore the fundamental traffic features. Generalized definitions of traffic variables, in spatiotemporal sense, and a new concept of common unit (CU) for gauging non-identical vehicle sizes and various lane widths are presented. The simulation experiments are tested on a two-lane highway context. The effects of both stationary and slow-moving bottlenecks on global traffic are also examined. Vehicular trajectories, flow-occupancy, and spatiotemporal traffic patterns under deterministic and stochastic conditions are displayed. The results reveal noticeable traffic patterns with free flow, wide moving jam and synchronized flow phases. This study has demonstrated that the proposed refined CA models are capable of capturing the essential features of traffic flows.

**Key Words:** cellular automata (CA), moving bottleneck, stationary bottleneck

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**DETERMINATION OF TARGET BINDER CONTENT FOR RUBBERISED POROUS ASPHALT**

Mohd. Rasdan IBRAHIM, Mohamed Rehan KARIM, Herda Yati KATMAN

**Abstract:** Obtaining adequate or optimum binder content is a major requirement in the designing of hot mix asphalt (HMA) pavements. Besides of correct choice of aggregate type, aggregate grading, and bitumen grade, the determination of optimum bitumen content is also important to optimize the engineering properties in relation to the desired behavior in service. This study is conducted to determine the target bitumen content for rubberized porous asphalt prepared by wet and dry mixing process. The target binder content for each sample was determined using binder drainage test adopted from Transport and Road Research Laboratory (TRRL). For both processes, this study found that rubber content was the significant factor affecting the target binder content, which as rubber contents increase, the target binder
content increases. The most significant finding is that target binder content for dry process mixes is lower than wet process mixes.

*Key Words*: porous asphalt, rubberized asphalt, optimum binder content

**RESEARCH OF THE PERFORMANCE IMPROVEMENT IN TRAFFIC ACCIDENT DETECTING SYSTEM WITHIN THE CROSS ROAD**

Sung-jun YOO, Young-chan KIM, Dong-young LEE, Won-ho KIM

**Abstract**: The purpose of this paper is to develop accident detection algorithm for improving performance of the automated traffic accident recorder in operation in Korea from 2004. The current automated traffic accident recorder has problems in increase of detection rate (DR) and correct detection rate (CDR) that are sensitive to environmental influences as time elapsed. In order to solve these problems, we developed the improved algorithms by utilizing of the object recognition, grant of weight and fluid approximation algorithm, the result of field test for 2 weeks amounted to 28 detections of the movie files, total numbers of real traffic accidents was 6 cases in the detection area during the evaluation period. As the test was 100% of detection rate (DR), 21.4% of correct detection rate (CDR), we learned the system is improving the performance than existing system (DR 66.7%, CDR 2.03%).

*Keyword*: Automated recording system of traffic accident, Detection rate (DR), Correct Detection Rate (CDR)

**A STUDY ABOUT PSYCHOLOGICAL CAUSE OF SPEED REDUCTION ON HIGHWAY TUNNEL SECTION**

Ki-jung Kum, Seung-neo Son, Yun-mi Lee, Yi-wan Wang, Jae-woong Joo

**Abstract**: In this study we surveyed the speed difference between road sections and tunnel sections on the highways under the given conditions, selected the variables which are expected to cause the speed difference, verified the significance of the data via statistical analysis, and examined the cause of speed difference between road sections and tunnel sections on the highways. We selected 20 tunnels for analysis, and collected the vehicle speed data from FTMS and ITMS. Based on this data, we selected 9 variables which were considered to cause the speed difference; Lateral clearance, Height, Portal shape, etc.. We further deduced the factors of speed difference between the road sections and the tunnel sections on the highways via principal component analysis between the 9 variables and regression analysis.

*Key Word*: tunnel speed, cause of speed difference, principal component analysis
TRAFFIC ACCIDENT COSTING FOR THAILAND

Pipat THONGCHIM, Pichai TANEERANANON, Paramet LUATHEP, Phayada PRAPONGSENA

Abstract: This paper presents the results of Thailand study of traffic accident costing. Five provinces are selected as representatives for north-eastern, northern, middle, southern region and the capital city. They are Khon Kaen, Lampang, Nakhonsawan, Songkhla, and Bangkok. The Human Capital Method (HCM) is adopted for the 2004 study in which 13,766 people were killed. The cost components are grouped into three categories thus: human category comprising loss of productivity, medical treatment, long term care, quality of life and emergency service; property damage category comprising vehicle and non-vehicle damages; and general traffic accident category comprising insurance, police administration, judicial, emergency rescue services and travel delay. Further, all estimated costs are computed for four levels of casualty and accident severities. The total costs of traffic accident in Thailand for the year 2004 are estimated at 153,755 million baht (approximately US$ 3,460 million).

Key Words: Traffic accident costing, Human capital method, Thailand

A STUDY OF THE VALUE OF TIME USING STATED PREFERENCE DATA

Rahayu SULISTYORINI

Abstract: Using stated preference techniques surveys were undertaken in Jakarta and West Java. Four separate surveys were undertaken, one for bus passenger at bus terminal, and three surveys for the occupants of cars and light vehicles were carried out at petrol station in central Jakarta, at service station on a toll road and via road side interview on the main road between Jakarta and Bandung. Distribution of the value of time were derived from the data and, using a logit analysys, mean values were estimated and the effects of different characteristic were observed. Mean and median bus passenger values of time were estimated to be 2453 and 2756 Rs per hour respectively. Median estimates of the car survey passengers were found to lie in the range 4000 to 4469 Rs per hour while mean estimates were higher, lying in the range 5056 to 6541 Rs per hour.

CHAOS ANALYSIS OF MIXED TRAFFIC FLOW WITH MOTORCYCLE

Hsu, Tien-Pen, Li, Pei-Jung

Abstract: Chaos represents a condition that seems disorderly but regular in nonlinear and
dynamic system. The application of chaos analysis is widespread on various fields, either in the traffic flow of the road. The motorcycle traffic flow at mixed traffic might also have chaotic characteristic, especially when the relationship between different traffic parameters is disproportioned and disorderly. The motorcycle traffic at mixed traffic could be inferred and seen as a chaotic and dynamic system. Therefore, in this paper, chaos theory was employed to analyze the mixed traffic characteristic with motorcycle. The results demonstrate that the variables of motorcycle flow exists chaotic phenomenon. Finally, the comparison of pure and mixed motorcycle flow on attractor dimension can infer the complicacy exist in pure internal motorcycle traffic flow.

Key Words: Chaos analysis, mixed traffic, motorcycle traffic

Requirements for the Substantive Public Involvement in Transportation Infrastructure Development: Analysis of Causes of Public Disputes

Hiromitsu YAJIMA, Atsushi SUZUKI, Sonoko ENDO

Abstract: Public involvement (PI) has recently been adopted in planning process of transportation infrastructure development in Japan, which increased communication with the public. However, PI communication still remains one-way and limited, whose process does not effectively prevent public disputes. This study defines such PI as conventional PI, and proposes more effective PI, defined as substantive PI. It points out that conventional PI has problems of procedural justice and creates causes of disputes due to concerns about plans’ potential adverse impact. It also discusses importance of process-control to improve procedural justice and effectiveness of creative problem-solving methods to provide a winwin settlement through interest-based communication in negotiation theory. It further analyzes policies to alleviate the impact in welfare economic perspective, and indicates possibility of mitigation policies to relieve external cost and increase social surplus. Finally, it proposes requirements for substantive PI, which effectively prevents public disputes based on prior analyses.

Key Words: Public Involvement, Procedural Justice, Dispute Resolution

Influence of Superplasticizer Type and Dosage on The Workability and Strength of Cementitious Grout for Semi-Flexible Pavement Application

Suhana KOTING, Hilmi MAHMUD, Mohamed Rehan KARIM

Abstract: Semi-flexible pavement is a composite pavement that utilizes the porous pavement structure of the flexible bituminous pavement which is subsequently grouted with an appropriate cementitious material. The main purpose of this research is to
investigate the influence of superplasticizer type and dosage on the flowability of cementitious grouts. The grout mixtures were designed to attain high compressive strength while maintaining flowable properties to ensure that the cement slurries infiltrate easily through the ungrouted samples and to fill up the voids under the influence of gravitational action. In order to attain the workability required, three types of superplasticizer were used. Two were of polycarboxylic ether polymer and the other was of sulphonated naphthalene formaldehyde origin. Results showed that type and dosage of superplasticizer influence the workability of the cementitious grouts.

**Key Words: Superplasticizer, Cementitious grout, Semi-flexible pavement**

THE PROPERTIES OF BITUMINOUS MIXTURES FOR SEMI-FLEXIBLE PAVEMENT

Suhana KOTING, Mohamed Rehan KARIM, Hilmi MAHMUD

**Abstract:** Semi-flexible pavement is the combination between the cementitious grouts rigidity and bituminous material flexibility and it was produced from the best qualities of bituminous and concrete component. The main purpose of this study is to concentrate on the design and properties of bituminous mixture to be utilized in the semi-flexible pavement application. The open graded bituminous skeleton was prepared to achieve a compacted porosity between 25% and 30% of the total volume and at the same time maintaining adequate bitumen coating on the aggregates particles. In order to investigate the properties of open graded skeleton, a range of performance and deformation tests were conducted. The tests are porosity, indirect tensile stiffness modulus, compressive strength and cantabro test. The results obtained were compared with porous asphalt skeleton by Zoorob et al. (2002).

**Key Words:** Bituminous mixture, Open graded asphalt skeleton, Semi-flexible pavement

INTEGRATING ENVIRONMENTALLY SUSTAINABLE TRANSPORT AND METROPOLITAN DEVELOPMENT UNDER A DECENTRALIZED FRAMEWORK

Norial Christopher C. TIGLAO, Karl N. VERGEL

**Abstract:** In the Philippines, the Local Government Code (LGC) of 1991 defines local development as the main responsibility of local government units and provides for increased local autonomy. However, there is still a great lack of awareness among local governments in pursuing Environmentally Sustainable Transport (EST) as integral part of the local development process. At the metropolitan level, disjointed policies and uncoordinated mechanisms diminish local efforts in addressing urban issues that have
metro-wide impacts, including road traffic congestion and air pollution due to vehicular emission. This paper examines critical sustainable transport and governance issues in Metro Manila and presents possible approaches for effectively pursuing EST in the context of effective metropolitan development.

**Key Words:** environmentally sustainable transport, local development, metropolitan

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**EMERGENCY TRIP DESTINATION OF EVACUATION AS SHELTER ANALYSIS FOR TSUNAMI DISASTER: A CASE STUDY IN PHUKET, THAILAND**

Thai CHARNKOL, Shinya HANAOKA, Yordphol TANABORIBOON

**Abstract:** This paper aims to develop alternative forms of emergency trip destination (emergency shelter) and investigate the evacuee behaviors affecting the shelter choices for future tsunamis and other disasters. The shelter allocation forms are developed using the logistic regression model and neural network model in estimating the probability of evacuee choice of selecting evacuation destinations between public and private shelters. Not only the socio-economic factors that affect the selection decisions are presented, but this paper also intends to analyze the shelter attributes based on evacuee’s perceptions. These perceptions are expected to influence evacuee’s preferences among different alternatives. Data are collected in one of the most recent tsunami affected areas, Phuket, Thailand. Results of this study revealed that the emergency trip destination demand estimation does not provide only information for shelter requirement and shelter space but it can also be used to plan for emergency materials needed.

**Keywords:** Emergency shelter, binary logistic regression model, neural network model

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**APPLICATION OF PROSPECT THEORY TO DISCRETE CHOICE MODELLING FOR UNCERTAIN TRAFFIC INFORMATION**

Hye-Jin CHO, Kang-Soo KIM

**Abstract:** This paper explores the way and the extent to which drivers’ route choice was influenced by uncertain information. The SP survey was conducted and route choice logit models were estimated. The main findings show that drivers tend to prefer a route with information to those without information and a route with a certain and precise information to one with uncertain and imprecise information. Application of Prospect Theory to the results explains the way drivers may be interpreting the choice situation and how they make a route choice in response to uncertain information. The results of this paper implicate that drivers’ decision making under uncertainty seem to be very complicated and flexible, depending on the way drivers interpret the choice situation. Therefore, it is recommended to apply wider related theories to the analysis of the
drivers’ behaviour

**Key Words:** Traffic Information, Uncertainty, Prospect Theory

**TRAFFIC SAFETY AS A PRE-REQUISITE FOR SUSTAINABLE URBAN TRANSPORT: AN INTERNATIONAL ANALYSIS**

Dinesh MOHAN

**Abstract:** Nearly sixty percent of the world’s population lives in low and middle income countries (LMIC) and these countries include 62 of the largest 100 cities in the world. The urban growth rates in Asia, Africa and Latin America are higher than those in Europe and North America and so are the vehicle growth rates (World Health Organization, 1998). Data were collected for road traffic fatality rates for 56 cities to understand issues concerning road safety and sustainable transport issues. The results show that pedestrian fatality risk in LMIC is generally much higher than high-income countries. If risk for pedestrians is high, it will discourage walking and consequently use of public transport as the access trips are as pedestrians. This in turn will make it difficult to have cleaner air. Therefore, pedestrian safety becomes a pre condition for planning sustainable transport systems.

**Key Words:** Traffic safety, sustainable transport, urban area

**STREET SPACE SUSTAINABILITY IN ASIA: THE ROLE OF THE ASIAN PEDESTRIAN AND STREET CULTURE**

Iderlina MATEOBABIANO, Hitoshi IEDA, D. Eng.

**Abstract:** Discussion initiates from the present practice of street space design and management in the Asian context to establish that the current thrust of standards and mandates is geared towards promoting vehicle use and lacks consideration of other street users such as the pedestrian. The objective is to conduct a sociocultural analysis of the Asian street user focusing on behavior, street sociology and culture. It aims to understand the Asian psyche and how this knowledge may contribute to enhancing street space sustainability. Four aspects of the Asian street user are considered: its physiological attribute and the needhierarchy, the Asian psyche compared with its Western counterpart, sociology of street use, and potential of reviving pedestrian culture. An interpretative, culturebound approach is utilized to define the parameters to sustain people’s use of the street environment. It aims to review historical precedents on street space and use as well as utilize various anthropological methods.

**Key Words:** Asian Pedestrian, Sidewalk Space Design, Sociocultural Approach
DEVELOPMENT OF TRAFFIC DATA QUALITY EVALUATION METHOD AND COMPUTER PROGRAM

Seungjin SHIN, Dongjoo PARK, Hansoo KIM, Seungkirl BAEK, Seong NAMKOONG

**Abstract:** The objective of this study is to develop a data quality evaluation method for managing the quality of traffic data from detectors. For this purpose, we proposed a methodology for quantifying the accuracy, completeness, validity, timeliness, accessibility and coverage of vehicle detection data suggested by Battelle in the U.S. In addition, we developed a computer program that implemented vehicle detection data processing and evaluation. The developed computer program is composed of data processing module, data evaluation module and data service module. The developed computer program was applied to the traffic data collected from the expressways of Korea Highway Corporation in Korea. The developed data quality evaluation program was found to quantify data quality adequately in general. In addition, the overall quality of vehicle detection data was analyzed to be satisfactory.

**Keywords:** data quality, data quality evaluation, data quality evaluation program

PERFORMANCE EVALUATION OF DELINEATION SYSTEM USING DETECTION DISTANCE AND LATERAL PLACEMENT

Woo Hoon JEON, Hye-Jin CHO

**Abstract:** This study investigated the effects of delineation systems on drivers' maneuver. The experiments were conducted to collect lateral placement data and detection distance data using GPS equipped vehicles. The main results are summarized as follows. Firstly, installing the delineation facilities on the roads helps drivers to recognize road alignment. Secondly, the detection distance is longer for delineators than for raised pavement marker in tangent section, while there is no difference in curve section. The chevron show the longest detection distance in the curve section, while the raised pavement markers showed no distinctive performance in terms of detection distance and lateral placement. Therefore, we can recommend install delineators in the tangent sections and chevrons in curve sections, based on the analysis results of effects of delineation facilities.

**Key Words:** delineation system, detection distance, lateral placement

QUALITY OF TRAVEL TIME ESTIMATION FROM PROBE VEHICLES: A SIMULATION STUDY

Sorawit NARUPITI, Masria Binti MUSTAFA
Abstract: The purposes of this study were to investigate accuracy and reliability of travel time information and to assess the effectiveness of probe vehicle in providing travel time information under various traffic conditions. Paramics V5 was used to generate travel time data on a hypothetical network. Average travel time on links and routes were analyzed for various percentages of probe vehicles and compared to the ‘true’ average travel time using ‘bootstrapping’ technique. Results indicate that the plots of probe vehicle average travel time versus ‘true’ average travel time for link and route case agreed well. However, travel time from probe vehicles is less accurate when traffic is congested. A case study was carried out to consider travel time between Origin-Destination. The quality of travel time not only depends on the percentage of probes but also the traffic conditions.

Key Words: Probe Vehicle, Paramics V5, Bootstrapping

MODELING THE WORKING MODE CHOICE, OWNERSHIP AND USAGE OF CAR AND MOTORCYCLE IN TAIWAN

Wen-Tai LAI, Jin-Long LU

Abstract: In Asia, many developing countries are facing the issue whether to develop the motorcycle market as a transitional phase or to jump to the automobile market directly. In order to examine the issue, this study attempts to develop a mixed discrete/continuous demand model to analyze the characteristics of household’s decision behavior associated with the mode to work, ownership and usage of cars, and ownership and usage of motorcycles. Empirical analyses indicate that it is not easy to suppress the ownership levels of motorized vehicles by adopting price mechanism or by improving the quality of public transportation. Thus, in order to prevent a great deal of problems resulting from mixing car and motorcycle flows, we suggest that it is better for developing countries not to approve the development of motorcycles as a transitional phase.

Key Words: Ownership and usage, discrete/continuous choice model, decision behavior of household

MOBILITY IN NEW ZEALAND – BACKGROUND KNOWLEDGE FOR DECISION-MAKERS

Jean-Paul H. M. THULL

Abstract: The aim of this paper is to open the debate on the future mobility of New Zealanders based on oil depletion and Green House Gas discussions, the environmental and social impacts of private motor vehicles, the latest technological highlights and some of the outstanding policy statements made by the New Zealand (NZ) government. The
main part compares the NZ situation with relevant technical improvements in Europe as a consequence of the first oil crisis and how it has developed since. New Zealand has taken a different approach over the last 10-15 years by providing affordable individual accessibility to its population without a strong focus on the environment, something the current government is seeking to fix through energy and emission control measures. This review needs to be seen as an opinion piece that provides information from the past and outlines current developments to provide basic understanding to decision-makers in New Zealand.

**Key Words:** motor vehicle history in New Zealand, engine technology, emissions

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**A STUDY ON THE CONSTRUCTION OF PAST TRAVEL TIME PATTERN FOR FREEWAY TRAVEL TIME FORECASTING - FOCUSED ON LOOP DETECTORS –**

Dong-ho KIM, Dongjoo PARK, Jeong-hyun RHO, Seungkirl BAEK, Seong NAMKOONG, Pattanamekar Parichart

**Abstract:** The objective of this study is to propose methods for determining optimal representative value and the optimal size of historical data for reliable travel time forecasting. We selected values with the smallest mean of forecasting errors as the optimal representative value of travel time pattern data. The optimal size of historical data used was determined using the CVMSE (Cross Validated Mean Square Error) method. According to the results of applying the methods to point vehicle detection data of Korea Highway Corporation, the optimal representative value were analyzed to be median. Because mean used in previous researchers are influenced by each historical profile of travel time patterns, the distribution is easily skewed if there are very large or very small values in the travel time pattern data. Second, it was analyzed that 60 days’ data is the optimal size of historical data used for travel time forecasting.

**Key Words:** travel time pattern data, optimal representative value, optimal size of historical data, travel time forecasting

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**OPTIMAL UPDATE INTERVAL OF ON-LINE DEPARTURE TIMEBASED LINK TRAVEL TIME INFORMATION – FOCUSED ON UNINTERRUPTED FLOW –**

Jaejin KIM, Dongjoo PARK, Jeonghyun RHO, Seong NAMKOONG, Hansoo KIM

**Abstract:** The objectives of this study are to develop an on-line departure time-based travel time estimation method and to determine an optimal update interval for on-line link travel time information. As an on-line departure time-based travel time estimation method, this study developed a link-based rolling horizon logic. In order to determine an
optimal update interval, the information error of the travel time provision from the user’s perspective was defined and employed as an criterion. When the travel time aggregation size was set as five minutes, it was found that the update interval of four minutes gave the most accurate result.

**Key Words:** departure time-based, link travel time, spatial detection system, update interval size

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**LONG-TERM AGGREGATE TRAVEL DEMAND ANALYSIS: A COMPARISON BETWEEN JAPAN AND TAIWAN**

Ming-Hsiung HSIAO

**Abstract:** This study aims to find the comparability between Japan and Taiwan by examining their long-term growth patterns of aggregate travel demands from 1967 to 2004. It is found that travelers both in Japan and in Taiwan see bus as inferior goods, and passenger car ownership and domestic air as more luxurious than rail and bus. Nevertheless, a number of differences between Japan and Taiwan are even more noticeable. First, travelers in Taiwan see public transportation as inferior goods, and rely more on private transportation, while travelers in Japan rely on both private and public transportation. Second, to travelers in Taiwan, passenger car is luxurious goods, while to those in Japan, it is necessity goods. Third, in Japan the private mode (car and motorcycle) ownership demand demonstrates overall substitutive effect, instead of complementary one, with public transportation, while in Taiwan no such evidence is found.

**Keywords:** aggregate travel demand, price elasticity, income elasticity.

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**AN INTEGRATED MICROSCOPIC SIMULATION MODEL FOR ESTIMATING POTENTIAL EMISSIONS IMPACTS OF TRUCK-INVOLVED TRANSPORTATION POLICIES**

Minyoung PARK, Younshik CHUNG, Yong Jin KIM

**Abstract:** This paper presents an integrated microscopic simulation model that would be applicable for examining potential emissions impacts of truck-involved transportation policies in urban freeway system. Basic idea of the model is to integrate an emission model into existing microscopic traffic simulation framework. Considering truck-only lane policies, the effectiveness and applicability of the integrated model was evaluated with an application to the Long Beach freeway (I-710), a main corridor for freight transportation that provides regional access to the Ports of Long Beach and Los Angeles in the United States. The case study shows that the proposed model is useful in that when considering alternative policies of truck-only lane, it enables transportation planners to evaluate potential emissions impacts and traffic conditions simultaneously without real
implementation of each alternative.

Key Words: freight transportation, truck-only lane, microscopic simulation

RUTTING CHARACTERISTICS OF BITUMINOUS MIXES REINFORCED WITH GLASS FIBER

Abdelaziz MAHREZ, Mohamed Rehan KARIM

Abstract: The deterioration of pavement due to rutting is a major problem on heavily travelled flexible pavement specifically on climbing lanes. It is caused by permanent deformation due to traffic loading in one or more pavement layers. Reinforcement of Bituminous mix might be one of the possible remedies that can be considered to improve the performance of a pavement in terms of rutting resistance. It is thought that the addition of glass fibers to asphalt mixtures enhances material strength and fatigue resistance while adding ductility. Because of their excellent mechanical properties, glass fibers combined with SMA mix might offer an excellent potential for asphalt modification. This paper investigates some fundamental properties and rutting characteristics of glass fiber reinforced Stone Mastic Asphalt, which may have the benefit of improving the performance of road pavement. To evaluate the effect of the fiber content on the bituminous mixes, laboratory investigations were conducted on the samples with and without fibers. The tests undertaken in this research comprise the indirect tensile test, creep test and resistance to rutting by using wheel tracking test. The test results on the reinforced mixes provide information in terms stiffness properties, of accumulated permanent strain (deformations) and also rutting caused by the addition of glass fiber. Overall the inclusion glass fiber resulted in higher resilient modulus, higher resistance to permanent strain and higher resistance to rutting. It was noticed that mix with 0.3% fiber content showed the highest performance. Good correlation between the laboratory tests parameters (stiffness and permanent strain) and rutting performance of glass fiber reinforced bituminous mix was obtained. The dynamic creep test was found to be more reliable test in evaluating the rutting performance of asphalt mixtures as compared to the IDT test, in addition the contribution of aggregates internal friction to the rut resistance was found to be more significant than mix cohesion.

Key Words: Asphalt Reinforcement, Glass Fiber, Stiffness and Creep, Rutting.

PLANNING THROUGH ASSISTED NEGOTIATION: CONSENSUS BUILDING FOR TRAFFIC SAFETY

Masahiro MATSUURA, Hideo YAMANAKA

Abstract: This paper examines the prospect of using interest-based negotiation for public participation in designing traffic safety improvement plans. Through participatory observation of experimental deliberative processes for improving safety at the Kita-Josanjima Intersection in Tokushima, Japan, we examined its effectiveness in
satisfying differing interests of its neighbors and users. Even though the experiment demonstrated the effectiveness of using consensus building techniques in such dialogues, it also revealed challenges in identifying and involving appropriate stakeholders, as well as in managing their relationship. It also suggests the need for adaptations in using “imported” planning tools due to cultural and institutional differences.

Key Words: Consensus Building, Dispute Resolution, Public Participation

REduced VISIBILITY AND SPEEDS Variation IN NATIONAL HIGHWAYS

Hye-Jin CHO, Eunmi PARK

Abstract: This study investigates the extent to which reduced visibility due to thick fog affect speed selection, approached not only by the stated responses about drivers behaviours but also revealed speed selection behaviours. To do this, a questionnaire survey and field experiments were conducted. The results show that as the visibility reduces, drivers are likely to reduce their speed. The visibility reduction leads to reduce the mean speed of the traffic flow but to increase the variance of the speed distribution, indicating that visibility reduction causes unstable traffic flow.

Key Words: Visibility, Speeds, Fog, Behaviour

POLY-CENTRIC EMPLOYMENT LOCATION IN CANBERRA: PLANNING A HOME-WORK BALANCE AND THE JOURNEY-TO-WORK

Charles CHEUNG, John BLACK

Abstract: Canberra is a planned new town where there have been spatial plans and policies to implement a hierarchy of centres, including major employment nodes in the central area, and the free standing towns of Woden, Belconnen, Tuggeranong, and Queanbeyan (in adjacent New South Wales). The planning aim has been to balance homes and workplaces spatially and thereby contain journey-to-work trip lengths. The outcomes of this policy are examined using journey-to-work data from the 2001 Census of Population and Housing and by constructing a mathematical model of both residential-based journey to work preference functions and employment-based journey to home preference functions. Explanations as to why the planned location of employment has not met the transport planning objectives are given.

Key Words: poly-centric employment, journey to work travel preference functions, policy appraisal
THE PERSPECTIVE OF CHINA’S LOGISTICS UNDER THE WTO FRAMEWORK

Yingfeng YU, Wen Long YUE

Abstract: Based on the discussions on the positive relations between the economy and trade through a number of evidences, this paper attempts to demonstrate that, as an important determinant of the volume of trade, the role of logistics occupies a unique position in China’s fast economic development. Therefore, this research work summaries some constructive recommendations, in order to facilitate the economic development and obtain and keep competitive advantages, in particular, for the perspective of logistics in responding to the challenge of an integrated global economic development under the World Trade Organization (WTO). For governments and business enterprises, they should actively engage in sustained innovations, and reformations in some cases, to pursue a smooth movement of goods and services. In particular, among the efficacious measures, it is a more fundamental step to formulate programs, construct and maintain an efficient, flexible and energetic modern logistics system or supply-chain systems, though it’s an arduous task.

Key Words: WTO, Trade, Logistics, Policy

ANALYZING THE IMPACT OF IMPROVING PORT FACILITIES AT TUMINDAO PORT ON THE SEAWEED INDUSTRY AND LOCAL ECONOMIC DEVELOPMENT

Crispin Emmanuel D. DIAZ

Abstract: The Philippines is composed of a large number of populated yet remote islands. These populations are among the poorest in the country. Sitangkai municipality is located at the southernmost part of Tawi-Tawi province and thus has poor access to the rest of the Philippines. However, it has a relative advantage in the production of seaweed, having ideal agro-climatic endowment. One concern related to this industry is how to transport the harvested and dried seaweed to market cities. The paper examines the case of proposed improvements to the Tumindao Pier of Sitangkai. The impacts that these improvements may have on transport and cargo handling costs are discussed, in terms of the impact to the local economy, including the effect of transport costs on market price competitiveness of Sitangkai’s dried seaweed.

Keywords: Sea ports, dried seaweeds, economic development, intermodal transport

INFLUENCE OF HEAVY VEHICLES ON JAPAN TWO-LANE
HIGHWAY SPEED AND FOLLOWER FLOW CHARACTERISTICS

Jerome CATBAGAN, Hideki NAKAMURA

Abstract: The effects of heavy vehicles become more pronounced in two-lane highway facilities with passing restrictions since vehicles in a platoon do not have any other choice but to follow the leaders’ choice of speed, which is usually below their desired speed levels. Furthermore, platoon lengths are expected to be longer than usual, affecting level of service indicators such as follower density and average travel speed. This study aims to make a preliminary analysis of the influence of heavy vehicle on such facility types in Japan. Detector data were analyzed for two different time periods – peak and weekday. The speed of heavy vehicles has a direct effect on follower speed and follower density was found to become more sensitive to heavy vehicle percentage as flow rate increases. Average speed was also found to be more sensitive to heavy vehicle presence on upgrades, especially during the evening period.

Key Words: Two-lane highway, Heavy vehicles, Follower flow

THE EFFECT OF FARE POLICY ON PUBLIC TRANSPORT RIDERSHIP AND PASSENGER AVERAGE TRAVELLED DISTANCE (CASE: JAKARTA BRT SYSTEM)

ALVINSYAH, Sutanto SOEHODHO

Abstract: At current situation, BRT system in Jakarta utilizes a flat fare system. The objective of this study is to observe and analyze the effect of distance-based fare system on ridership and passenger average travelled-distance through a model. A model, based on four step planning, from previous studies has been adopted for simulation. An analysis is conducted to predict the total ridership and travelled distance, which then converted to average travelled distance based on different fare setting and BRT network. Analysis shows that the application of distance-based fare increase ridership and shift the domination of passenger average travelled distance from relatively long trip to short trip. From the analysis has been found that different fare setting and number of corridor affect the ridership significantly, but in contrary does not affect the average travelled distance.

Keyword: BRT, fare, travelled distance, ridership

IMPROVING QUALITY OF PASSENGER SERVICE IN VIETNAM AIRLINES

Trinh Tu ANH, Trinh Thuy ANH, Bui Quang HUNG
**Abstract:** Based on a survey of 1000 passengers who travel by Vietnam Airlines and the operation results of Vietnam aviation, the paper reveals differences between Vietnamese and foreigner passengers on the arriving and departure flights from Noibai airport with respect to their characteristics and their satisfaction level of airline services in airport and on board. The paper presents systematic method to examine and improve quality of passenger service through the performance analysis.

*Key Words:* Air service, Air passenger service

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**TECHNOLOGY ACCEPTANCE FOR FIELD WORKERS WITH PORTABLE DEVICES AND THE EFFECT OF PERCEIVED BEHAVIORAL CONTROL**

Shih-Hung Hsu, William Jen

**Abstract:** With the rapid growth of population and technology, more and more traditional industries are migrating to hi-tech systems. Since technology acceptance influence the productivity increment greatly, Technology Acceptance Model was used most frequently to explain and predict user’s acceptance of a newly adopted technology. However, the model had few reports on field worker environment, and also, whether perceived behavioral control should be added to the model, are issues worthy of discussion. To clarify the doubts, this paper conducted a survey to 160 road side ticket issuers of Taipei city parking administration, who recently changed their issuing system from paper-and–pen to PDA. The 15-item questionnaire is adopted form literature and the results of focus group meetings and a small scale pre-test. The data collected were analyzed with SEM method, discussion and future research directions are also provided.

*Key Words:* Technology acceptance, Field worker, Perceived behavioral control

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**A BI-LEVEL PROGRAMMING MODEL FOR PLANNING SCHEDULE FLIGHTS ON EXISTING OR NEW ROUTES**

Sui-Ling, LI

**Abstract:** This study proposes the bi-level model between the airline and market competitors to develop strategies for decision-making problem of planning scheduled flight on route. At the same time, this problem should consider the measurement of decision-making aspects, which involves the profits of airline management, the competition of market share, the current capacity of airline routes and travel demand. In the TNA study case, one outcome shows that if the airline profits as the upper level and airline market share as the lower level, the strategies will allocate new scheduled flights on new routes for the highest passenger load factor of air routes. Another outcome shows
that if market share of the airline as the upper level and airline profits as the lower level, the strategies will still allocate adding scheduled flights on existing routes for the highest market share rate of air routes.

**Key Words:** Bi-level programming, Schedule flight, Route planning

**DYNAMICS OF URBAN STRUCTURE IN BANGKOK BASED ON EMPLOYMENT CLUSTER AND COMMUTING PATTERN**

Varameth VICHINSAN

**Abstract:** Many large cities in the world including Bangkok are now moving toward multi-centric structure in order to tackle with urban problems such as car dependency, traffic congestion, suburbanization, environmental degradation, etc. However, they have achieved at different stage at different pace. Exploring the city structure and its dynamics provides insight on how to go from now. The present paper presents an analysis of urban structure dynamics of Bangkok Metropolitan by considering employment clustering and commuting pattern in the city based on an analytical framework. It is found that Bangkok is in the early stage of polycentric development. However, some locations have high potential to form employment centers, either urban or suburban sub-centers. In addition, classical transportation indicators show that area with good public transport service will be stimulated in forming sub-center by shorter travel time and distance.

**Keywords:** Employment, Sub-Center, Cluster Analysis, Bangkok

**STUDY ON TRAVEL MODE CHOICE OF CITIZENS BASED ON MULTI-OBJECTIVE DECISION MAKING**

Shu-guang Cui, Sheng-rui Zhang, Lei Mei XI’AN

**Abstract:** Based on the travel psychology of citizens, this article considered about the six indices of being safe, comfortable, swift, convenient, in-time and economic comprehensively, analyzed the relationship between these indices and then built up an evaluation index system. Then using fuzzy evaluation model and multi-objective decision making method, it researched on citizens' traveling behavior, built a mathematic model and thus located comparatively scientifically the traveling modes citizens adopt. With live examples of citizens of a district, this article proved that the model is simple and practical, could be applied to practice basically.

**Key Words:** citizen, travel mode choice, multi-objective decision making

**TREATING MOTORCYCLES TO INCREASE THE CAPACITY OF**
A SIGNALIZED INTERSECTION

Sigit PRIYANTO

Abstract: The high increase of motorcycles in developing countries makes motorcycles traffic needs a special treatment; otherwise capacity at an intersection are sacrificed. This is because most accident involved motorcycles, and intersection capacity decreased due to improper behavior of motorcyclists. Therefore, the intention of this study is to investigate the behavior of motorcyclists and to find out a better solution that may increase intersection capacity. A field study was carried out at an intersection to perform a proposed measure when motorcycles exist at the approach of an intersection. Results of the experiment showed that the behavior of motorcyclists can be influenced by a measure that increases intersection capacity. This solution may be useful to be adopted in some similar countries in treating motorcycles.

Key Words: high increase of motorcycles, motorcycles’ position, signal capacity

Properties of Cementitious Grouts using Pozzolanic Materials

Roshni FATIMAH, Mohamed Rehan KARIM, Hilmi Bin MAHMUD

Abstract: In high performance cementitious grout as required for semi-rigid pavement, pozzolanic materials such as fly ash, slag and silica fume are used as supplementary cementitious materials to improve its properties. Pozzolanic material affects strength and other properties of grout such as flow, strength and density. This study is aimed at exploring the effects of silica fume and fly ash on the characteristics of cementitious grout through laboratory experiments. The cementitious grout used in this study is composed of ordinary Portland cement (OPC in a range of 90% to 100%), Silica flume (SF in the range of 3% to 10%) or Fly ash (FA in the range of 5% to 30%) mixed with water (relatively low w/c ratio in the range of 0.26-0.30) and chemical admixture of superplasticizer (SP in the range of 0.5% to 2.5%). The prepared grouts are tested for the properties such as flow time (Flow Cone test), compressive strength and density. The effects of combined addition of SF and SP or fly ash and SP combinations on grout strength, flow and density are explored. It is found that flow times and strengths are significantly affected for addition or replacement of fly ash and silica fume in the OPC mix. The results from the experiments are useful in determining a suitable grout composition for use in semi-rigid pavement.

Key Words: cementitious grouts, pozzolanic material, fly ash and silica fume

SUGGESTING URBAN MASS TRANSIT TECHNOLOGY FOR PAKISTAN “A COMPARATIVE ANALYSIS OF RAIL BASED RAPID TRANSIT AND BUS RAPID TRANSIT”
Intikhab Ahmed QURESHI, Lu HUAPU

**Abstract:** As elsewhere, in Pakistan too, the rapid urbanization, motorization and spatial expansion led to a sharp increase in demand for urban transport facilities and services. Cities in Pakistan are still without mass rapid transit. The existing informal urban public transport system is unable to meet the increasing travel demand. Absence of urban mass rapid transit system has caused acute increase of cars and motorcycles in Pakistan. To meet increasing travel demand and to fight against severe traffic congestion, large cities like Karachi and Lahore have come up with modern rail based rapid transit options in their cities, while other major cities have not yet considered about it. This paper intends to evaluate existing rail based rapid transit projects of Karachi and Lahore with Bus Rapid Transit (BRT) technology to suggest an urban mass rapid transit technology that is financially feasible and affordable for low income developing countries like Pakistan.

**Keywords:** Urbanization, Mass rapid transit, Developing countries.

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M. A. KAMAL, Engr. Imran HAFEEZ

**Abstract:** Transportation system consists of three major components; driver, vehicle and road. Each component interacts with the other and depends on the performance of the road system as a whole in terms of safety, convenience and operational efficiency. The failure of one or more of these components or a mishmash of one component with another might lead to a system failure, with an “accident” being the end result. This study identifies/highlights the relationship among the defined variables i.e. driver, vehicle and road by studying and analyzing the available facts and figures of road accidents in Pakistan. Brief introduction of human psychology, road and vehicular system and correlation among these parameters has been reviewed. Analysis of Statistical data of road accidents in Pakistan has been presented based on which suggestions have been proposed for the implementation by the Govt. authorities for a safer, convenient and smoother traffic flow.

**Key Words:** Human Psychology, Roads, Vehicles, accidents

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Eiichi TANIGUCHI, Naoki ANDO, Masayuki OKAMOTO

**Abstract:** This paper presented the VRPTW-D (Vehicle Routing and scheduling Problems with Time Windows-Dynamic) model with real time information on travel times. After applying the model to a test road network, results indicated that the
VRPTW-D model presented more efficient routing and scheduling in reducing the delivery costs than those of the VRPTW-F (Vehicle Routing and scheduling Problems with Time Windows-Forecasted) model. This reduction of delivery costs was mainly attributed to the reduction of delay penalty. If the depot costs of construction and maintenance were taken into account, the case with two depots was chosen as the optimal solution with traffic impediments even in urban areas where the land price was very high. It can be noted that efficient vehicle routing and scheduling using the VRPTW-D model can also provide environmentally friendly systems in terms of reducing CO2, NOx and SPM emissions.

**Key Words:** ITS, Vehicle routing, Urban freight transport

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**APPLYING FUZZY REGRESSION FORECASTING MODEL TO PREDICT TAIWAN INTERNATIONAL AIR CARGO VOLUME**

Chou, Tsung-Yu, Liang, Gin-Shuh

**Abstract:** Forecasting demand by taking into considerations the present international air cargo market and its possible changes in the future trend will assist in the construction for civil aviation policy and the planning of international airports. When forecasting air cargo volumes, due to the fact that uncertainty factors often cause deviation in estimations derived from traditional linear regression analysis, fuzzy regression analysis has been adopted to amalgamate with linear regression analysis, for reducing the residual resulted from uncertain factors. In this study, relative researches were presented to indicate the factors influencing export air cargo volume. Stepwise regression was implemented to find out key variable factors that had major impacts on Taiwan air cargo export and import volume. In addition, fuzzy regression analysis and volatility concept were applied to accurately forecast the demand for Taiwan air cargo volumes under present scenario.

**Key Words:** Air cargo, Freight Forecasting, Fuzzy Linear Regression

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**LOCATION EXTERNALITY AND IT’S IMPACT ON TRANSPORTATION COST**

KAYITHA Ravinder, TATSUHITO Kono

**Abstract:** In this paper we have defined location externality with a simple model and shown that transportation cost in Nash equilibrium differs from that of social optimum. Further the impacts of location externalities on transportation cost have been explained using the above model. From this analysis every possible Nash equilibrium locations transportation cost is not equal to social optimum transportation cost. Further more it is explored that how the equilibrium locations can bring to social optimum locations patterns by imposing the toll tax or by giving subsidies.
TRANSPORTATION MODE CHOICE: ARE LATENT FACTORS IMPORTANT?

Md. Nor NOR GHANI, Mohd Zin AHMAD, Seng-Huat TAN

Abstract: Many past researches have invoked time, cost and specific mode attributes to explain transportation mode choice. Alternatively, this paper attempts to study an additional dimension by incorporating latent factors. The general structure comprises two models, namely a latent variable model and a discrete choice model. The estimation is performed by first determining the significance of specific latent variables—safety, comfort, convenience and flexibility. In the second stage, the discrete choice model is estimated by integrating the choice and the latent variable in the choice process. The discrete choice model is estimated via logit and probit regressions. The main findings are that the latent factors are statistically significant and thus enrich the discrete choice model. Hence, latent factors must not be ignored in describing individual preferences towards travel mode. By providing better explanation to mode choice behaviour, the enriched discrete choice model could prove useful to policy makers in managing transportation infrastructure and services to maximize welfare.

Key Words: mode choice, latent factors, choice models

ON STRATEGIES OF HARBOR’S SUSTAINABLE DEVELOPMENT

Yong HUANG, Baohua MAO

Abstract: In the development of many cities history, their ports play a very important role in urban economy. The paper analyses inner and outside environmental factors of urban ports and indicates the necessity for a modern port to implement sustainable strategy. By using sustainable strategy, we conclude ten aspects both in port and city development, which may lead to a sustainable strategy.

Key words: Ports development, sustainable strategy, port planning

FINANCIAL ANALYSIS FOR PROVIDING ANTI GLARE SCREEN

Swapan Kumar BAGUI, Ambarish GHOSH

Abstract: Anti glare screen is used to shield the driver’s eye from the head light of oncoming vehicle. Financial analysis has been carried out to judge the viability of
providing glare screen for a Build, Operate and Transfer (BOT) Project to encourage private sector participation. Various types of anti glare screens are available in the market with varying cost. Project cost will be more for providing anti glare screen. The major benefits of anti glare screen are (i) reduction of glare, (ii) increase of night speed, and (iii) reduction of night accidents. This paper presents a part of a research work to determine/identify most economical anti glare screen. The BOT operator may provide such anti glare screen for the benefit of road users. The financial analysis along with project Financial Internal Rate of Return (FIRR) and Net Present Value (NPV) of a four lanning project has been presented herein as a case study. It is revealed from the present study that small trees and bushes with or without large trees may be planted to protect glare and it also acts as median barrier.

Key Words: anti glare screen, BOT project, financial analysis, FIRR

FINANCIAL ANALYSIS FOR SELECTION OF FUTURE WIDENING SCHEME TO AVOID GLARE

Swapan Kumar BAGUI, Ambarish GHOSH

Abstract: The government of India is presently encouraging private sector participation in road projects. Generally concession period varies from 20 to 30 years. Major projects are widening and strengthening from two lanes to four lanes road. With present rapid economic development of India, average traffic growth rate is in the range of 7 % or more. After 15 to 20 years, major of these roads will be widened to six or eight lanes. Proper future planning is required for the successes of Build, Operate and Transfer (BOT) projects. During six lanning, one lane will be added on each carriageway and it will be added on median side or road side. A case study has been taken up and financial analysis has been carried out considering six lanes will be constructed from toll revenue of the project. From analysis, it has been found that median side widening is more profitable and hence recommended for construction. Median side widening needs wide median in the range of 12-15 m or more. Wide median with small bushes works as good anti glare screen barrier.

Key Words: BOT, financial analysis, glare Screen, IRR, widening scheme

SELECTION OF PANEL SIZE OF RIGID PAVEMENT FOR RURAL ROAD PROJECT

Swapan Kumar BAGUI

Abstract: Selection of panel size of rigid pavement is one of the most important parameters for rigid pavement design. Temperature stress depends on the size of panel.
Indian Roads Congress (IRC):58-1988 recommended the maximum size of panel as 4.5 m. For rural road and Pradhan Mantri Gram Sadak Yojana (PMGSY) Project, rigid pavement has been recommended on urban area. Carriageway width varies from 3.5 m to 7.0 m or more. Normally panel size 3.50 to 3.75 m width and 4.5 m length is used for concrete pavement. It increases pavement thicknesses, since temperature stress increases with the increase of size of panel. It has been found that panel size 3.5 m $\times$ 3.5 m requires minimum pavement thickness i.e., the panel size is square. Based on consideration of panel size, a manual has been developed considering six values of subgrade reaction, K (6, 8, 10, 15 and 30) with panel size of width 3.5 m and length varying 3.5, 3.6, 3.7, 3.8, 3.9, 4.0, 4.1, and 4.2 and 4.5 m. Temperature stress, edge stress, and factor of safety are calculated and presented graphically. This will be very useful for designer to decide proper size of panel and minimum thickness of rigid pavement.

**Key Words:** factor of safety, panel size, rigid pavement, temperature stress, thickness of panel

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**SIMPLE PERFORMANCE TEST AND PERFORMANCE INDICES AS A STEP TOWARD PERFORMANCE BASED SPECIFICATION OF ASPHALT PAVEMENT IN INDONESIA**

Iman HARYANTO

**Abstract:** The pyramid of (asphalt) road specification recognizes different levels of demands to obtain a functional road, including materials demands. Building asphalt roads in Indonesia use performance-related specification combining the volumetric properties and the Marshall properties, to evaluate performance of asphalt mixtures. Performance-based specification, which includes evaluation of the fundamental properties of asphalt mixtures, is an ideal type of asphalt road specification. However, this type of road specification needs some sophisticated test apparatus, which probably have been commonly applied in the industrial countries, but it obviously cannot be realized in Indonesia soon. This paper emphasized benefits of simple performance tests and simple performance indices to improve the current asphalt road specification in Indonesia.

**Key Words:** road specification, simple performance test, performance indices

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**THE EFFECTS OF CHINESE AIRLINES’ JOINING THE GLOBAL STRATEGIC ALLIANCE ON ASIAN AIR MARKETS**

Gui-hong ZHAO, Yongliang WANG, Bo WEI
**Abstract:** As more and more Chinese airlines join the global strategic alliance, the structure of world air market will be changed. The paper first introduced the two famous global airline alliance, skyteam and star alliance, and analyzed their market characteristics. That means their members will cover the major continents. Next, it showed us the power of the new Chinese airlines that just announced to join the global alliance. Lastly, it analyzed the benefits that the two Chinese airlines will lead to after they join the global alliances.

**Key Words:** airline alliance, network, customer welfare

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**ALLIANCE’S INFLUENCE ON THE FOUNDATION OF INTERNATIONAL HUB AIRPORTS IN CHINA**

Gui-hong ZHAO, Yongliang WANG, Bo WEI

**Abstract:** This paper looks at the relationship between airline alliance and building of hub airport and analyzes the strategic effects of airline alliances when alliance members want to build their base airport to a hub. In this paper we introduce the basic concepts and characteristics of airline alliance and some indispensable features of the hub airport, and discuss the key factors for building hub airport. Finally we present a model of air china entry into star alliance, and try to explain the effects of alliance to Beijing capital's international airport. We can conclude that the alliance is of positive factor to the construction of an airport hub. Several major airlines in China will join the international airline alliance, so their bases airports should seize the opportunity to develop.

**Keywords:** hub airport, airline alliance, hub and spoke networks

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**DOUBLE LAYER POROUS ASPHALT IN THE NETHERLANDS AND FIELD MONITORING IN BELGIUM**

Meor Othman HAMZAH

**Abstract:** The use of double layer porous asphalt (DLPA) to reduce highway noise was the focus of a scanning tour to the Netherlands. A visit was also conducted to the Belgian Road Research Centre. The Dutch Innovatie programma Geluid program has strategised policies that set noise level thresholds and seek noise reductions from both vehicles and tyres. The DLPA, regarded as a potential noise reducing pavement material, comprised of a thin finer porous asphalt underlying a coarser but thicker bottom layer can potentially reduce traffic noise by up to 6 dB(A). Construction wise, DLPA has to be placed hot-on-hot to avoid rapid cooling of the thin top layer. The results of a CT scan on DLPA revealed that the transition zone crucially dictated mix porosity hence permeability. Experience with DLPA in Belgium was rather recent with one trial site at Bambois.
Key Words: Double Layer Porous Asphalt, Noise Reduction, CT Scanner, Hot-On-Hot

RESEARCH ON TOLL RATE EXCELLENT MODEL OF HIGHWAY

SHI ShiYing

Abstract: Providing relationship between tariff of tolling way and its influencing factors, esp.the interior ones, as clue, this paper makes a systematic exposition of forming of tariff and its quantitative model using relevant theories, such as economics theory, traffic behavior theory and optimizing theory.

Key words: toll rate, model, highway

DETERMINING THE PRIORITY OF TRANSPORT POLICIES:
WITH A SPECIAL FOCUS ON THE DATA ENVELOPMENT ANALYSIS USING RANKED VOTING DATA

Seock-Jin HONG, Jaehak OH

Abstract: To date, transport policies in Korea have been planned and implemented as part of a larger policy based on the achievement of economic growth. As a result, previous transport policies have been focused mostly on the supply of transport infrastructure. The average annual economic growth of six percent and the twelve percent annual growth in motor vehicles until the late 90s led to an acceleration of the imbalance between the demand and supply of infrastructure. As such, there is a need to establish an innovative transportation policy that can increase national competitiveness and provide momentum for national growth in the 21st century. This research has developed strategies and policies based on interviews that were carried out with specialists in the transport field. The results are as follows. The most urgent issues identified were, in descending order, the development of an inter-modal transport system, followed by the need for an integrated service system for public transport, the need to increase the competitiveness of the transport and logistics industries, and the furthering of transport safety.

Key words: transport policy, Data Envelopment Analysis (DEA), preference voting, Determining the Transport policy priorities, Intermodality System

REVERSE LOGISTICS CHAIN
Ruhe XIE, Zhuqiang QIU, Baoxing CHEN, Yanping ZHANG

Abstract: Firstly, a simple description of the concept of the reverse logistics as well as the differences between it and forward logistics are given in this paper. Secondly, based on the analysis on the driving factors of reverse logistics, four basic developing stages are summarized for the first time. Thirdly, a detailed discussion on the necessity of the integration of supply chain and reverse logistics is carried out. Fourthly, the idea of reverse logistics chain is put forward for the first time both at home and abroad in this paper, in the meantime, on the basis of the analysis on the structure of reverse logistics chain and principal characteristics, some critical factors affecting the operation of reverse logistics chain are listed. At last, conclusions are presented.

Key Words: Reverse logistics; Supply chain; Forward logistics

STRATEGY ON SUSTAINABLE PUBLIC PASSENGER TRANSPORT DEVELOPMENT IN LARGE CITIES in Vietnam

ANALYSIS ON THE CHARACTERISTICS OF TRANSPORTATION SYSTEM BETWEEN CHINA AND AMERICA BASED ON THE INPUT-OUTPUT THEORY

ZHAO Xu, XU Ye-er, WANG Jing, YANG Zan

Abstract: In order to analysis the position and role of transportation industry on the national economy rationally, the paper use the input-output theory to compare and analyze the characteristics of industry relevancy and industry spread in transportation industry and five transportation mode between China and America. Comparatively, the status of the Chinese transportation industry plays important role than before in the national economy. But currently due to the lower level of the Chinese industrial structure, the degree of transportation requirement by other industries is lower than America. The transportation industry in China belongs to the industries that the ratio of intermediate demand is high, and its drawing power for the relevant industries is larger than America. The impact coefficient of the Chinese transportation industry is obviously larger than its response coefficient, the inducing ability of export to transportation industry is higher than other ultimately demands. Finally, the proposals in developing Chinese transportation industry are put forward.

Key Words: transportation industry, five transportation mode, input-output analysis, industry relevancy, industry spread

RESEARCH ON SHIPPERS’ CHOICE OF CONTAINER PORT
BASED ON DISAGGREGATE THEORY

ZHAO Xu, LIU Jin-ping, YANG Zan

Abstract: The competition of container ports rests with routes, voyage frequency, port service, location and so on. All of these factors will influence shippers’ behavior on choice of port, and also influence the freight distribution and the competition result among the container ports in this area. In this paper we study the characteristics of shipper’s choice of container ports based on disaggregate theory by choosing four main container ports in the northeast of China. Firstly, it analyzes factors influencing container port choice of shippers. Overall transport time and overall transport cost are chosen for characteristics variables according to results of questionnaire. Secondly, it establishes disaggregate model and calculate the aggregate probability and elasticity. In the end we test and analyze the results. The result accords with the characteristics of shippers’ choice of port. This model has good applicability in choice of container port and reference to container port planning.

Key Words: Choice of port, Disaggregate theory, Shippers

KEELUNG PORT’S STRATEGIES IN COPING WITH TAIPEI PORT’S COMPETITION IN CONTAINER TERMINAL OPERATION

Chih-Ching CHANG, Ding-Hsun HSIAO, Kuang LIN, Yuh-Mei HWANG

Abstract: Keelung Port will face keen competition from Taipei Port, of which 7 container wharves will be completed and commence operation as from 2008. This article estimates that about 150,000 TEU containers will be shifted from Keelung Port to Taipei Port in 2008, and gradually increase to 600,000 TEU in 2014 when the 7 container wharves are wholly completed. Based on the interviews with the top executives of three main Taiwan shipping lines and two major freight forwarders, this article provides suggestions to Keelung Port, including development of free trade zones, marketing measures, improvement of infrastructures, reform of organization and operation systems, and reduction of costs. These measures aim to upgrade Keelung Port competitiveness and meet its customers’ demand of providing value-added services

Key Words: Keelung Port, Taipei Port, Port management, Container transport

DEPLOYMENT OF THE ROAD MARKING SYSTEM SYNCHRONIZING WITH IT
Makoto KITAYAMA, Tadashi YOSHIDA, Yasuhiro NAKAMURA

Abstract: Traffic demands are sharply influenced by the time and day of the week regarding roads and station plazas. If it is possible to change the number of traffic lanes or the usage of road flexibly according to traffic demands, the limited road space can be used effectively and an efficient road operation can be managed. Furthermore, it can be thought to contribute to the improvement of user convenience and safety.

The authors have developed a traffic marking system with high brightness light emitting diode named "Lane-Lighting-System". This system realizes the use of the above-mentioned road efficiency by changing traffic markings in accordance with traffic demands synchronizing with IT. In this paper, an outline of "Lane-Lighting-System" is introduced and its applications for roads, tunnels, station plazas and parking areas are proposed.

Key Words: Lane-Lighting-System, ITS, Light Emitting Diode

SCM IN ECOTOURISM PLANNING AND MANAGEMENT: A CASE OF CHIKU LAGOON

Kevin P. HWANG, Yeong-Jia DAY

Abstract: The tourism industry needs much support from related industries such as manufacturing, agriculture, fishery, and transport to keep its role of recreation and attraction and to form a supply chain relationship. A proper and healthy partnership continues the attraction for future enjoyment. This paper discusses the partnerships between ecotourism and other related products or services from a supply chain perspective. A cooperative condition and structure operation model with different parties is properly described. The inbound and outbound logistics of ecotourism through a whole dimension of perspectives to set up a suitable supply chain management model of ecotourism is also investigated with a case study on ecotourism in Chiku lagoon.

Key Words: Ecotourism supply chain, Partnerships, Collaboration

RISK SEGMENTATION OF TOURISTS - AN APPLICATION OF SOM

Kevin P. HWANG, Yeong-Jia DAY

Abstract: In terms of tourists’ attention levels on their travel risk, this research uses the skill of self-organization map (SOM) of artificial neural network to classify tourists and explain their behaviors. Besides discussing the difference of risk items that tourists care when they fell into different attention levels, this study also attempted to explore the
relationship between personal characteristics and perceived risk levels. The result revealed that the tourists’ perceived risk levels can be recognized with a few of demographic representatives of personal characteristics and showed that the relationship between personal characteristics and perceived risk levels works as a beneficial index of offering customized information service.

**Key Words:** Segmentation, Self-Organized Map, travel risk

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**THE SUBCONTRACTOR SELECTION OF THE INTERNATIONAL MULTI-MODAL TRANSPORT OPERATOR**

Jiaqing SUN, Zhihong JIN, Pinghua REN, Xin ZHAO

**Abstract:** Because of the complexity of multi-modal transport process, multi-modal transport operator cannot only depend on its own resource to finish all its business, part of the business should be assigned to the subcontractor by business outsourcing. Through the research in the basic theory of multi-modal transport, along with the characters of multi-modal transport, the multi-modal transport subcontractor evaluation system is established, and the AHP is the method to be used to select the international multi-modal transport operator’s subcontractor.

**Key Words:** International multi-modal transport, Subcontractor selection, AHP

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**AN APPROACH BASED ON FUZZY OPTIMIZATION TO EVALUATE CREW HARMONY IN AIRCREW ROSTERING PROBLEM**

Yannan QI, Hong WANG, Xinglong WANG

**Abstract:** Crew rostering is an important project in development of information system for airlines and a significant aspect of optimal use of human resources. The quality of scheduling is chiefly concerned with the safety and qualification of the flight. Most of early optimization attempts focused the research on lowest cost and equilibrium of crews’ workload, while crews’ harmony that is a very critical aspect is neglected. Based on the study of crew rostering in practical operations, with the help of analyzing factors about crews’ ability, workload and character, a method is provided to generate crews, then a system is set up to evaluate the harmony of crews. Fuzzy Optimum Dynamic Programming that translating multistage problem into simplex is applied to rostering problem to analyze and evaluate the harmony. A formalized method is introduced to solve crew-generating problem.
DESIGN AND IMPLEMENTATION OF A REAL-TIME GOODS TRACING SYSTEM

Xinying WANG, Xiangwen LI

Abstract: Rapid development of modern information technology and wide use of logistics technology such as EDI, RFID, GIS, GPS and GSM make real-time goods tracing possible. According to the characteristics of the third party logistics in our country, this paper introduces the design and implementation of a GPS real-time goods tracing system based on the technology of GPS, GIS and GSM short message service system. Topo-structure and the software architecture analyzes the key technique of the implementation of various subsystem with the system that customers could inquire the location, the status and the appropriate arrival time of goods on the web. The moving target can be monitored, scheduled, navigated and altered on real time.

Key words: Third party logistics (TPL), SMSC, Real-time tracing system

COMPARATIVE RESEARCH AND REVELATION ON DOMESTIC AIR FARE BETWEEN CHINA AND FOREIGN COUNTRIES

Li Xiao-Jin, Li Jing-Hong, Wang Bin, Zhai Yan-Juan

Abstract: The domestic air fare are compared between China and foreign countries on the basis of air transport economics in this paper, including publishing air fare, actual air fare and comparing between air fare and railway fare. Hereon, several existing problems on domestic air fare system of China and trends of its development are put forward.

Key Words: civil aviation, domestic air fare, air fare system

A STUDY ON CONTACT PROBLEM OF WHEEL/RAIL USING FINITE ELEMENT METHOD DURING PASSING THROUGH CURVED TRACK
Li Ping SUN, Jian ZHANG, Jun ZHANG, Chang Hua WU

Abstract: Wear is one of the main damage mechanisms for the rail, especially in the sharp radius curve. The three-dimensional elastic frictional finite element model of contact between the wheel and rail is established. Variations of the contact stress and contact force of the rail with different curve radiiuses and superelevations are investigated by using the parametric variational principle, the corresponding finite element parametric quadratic programming method and multi-substructure technique to offer theory basis for finding the method which can slow down rail wear. This method can avoid half-space assumption of the Hertz method and the CONTACT program based on the Kalker complete contact theory and accurately simulate the real geometry and the boundary condition of the wheel/rail.

Key Words: wheel/rail, contact, finite element method, parametric quadratic programming method, curve

A STUDY ON HIGHWAY PROJECT PROCUREMENT THROUGH EVALUATION OF ALTERNATIVE PUBLIC-PRIVATE PARTNERSHIP APPROACHES

Aye Aye MAW, Dr. Fumihiko NAKAMURA, Dr. Toshiyuki OKAMURA

Abstract: Conventionally, highways are formulated by public departments through annual government budgets. However, due to budget deficits, limited investment in feasibility studies and technical innovations, most highway projects encounter overruns. On the other hand, privatization of highway assets faces renegotiation, revenue short falls or profit maximization and unbearable risks. This paper aims to facilitate procurement of highway projects successfully through public-private partnership (PPP) approaches; cooperation and effective risk share under government intervention. The objective is to evaluate the applicability of PPPs for highway projects in developing countries, particularly Myanmar. Analysis focuses on key criteria and comparison of other countries’ PPP experiences, in order to find alternatives. Finally, PPP options appropriate for Myanmar are highlighted as being procurements with autonomous public agency, government and private investment on public work force/ public-private joint venture (JV) under PPP regulations.

Key Words: Highway Projects, Autonomous Public Agency, PPP, Applicability

DEVELOPMENT OF THE TRAFFIC CONGESTION INDEX FOR FREEWAY CORRIDORS IN SOUTH KOREA

Jaisung CHOI, Chungwon LEE, Seungjun LEE, Juseong YU
Abstract: Traffic congestion on freeways is burgeoning worldwide, and incurred costs are remarkable. In South Korea, the KHC (Korea Highway Corporation) is responsible for collecting and analyzing traffic data on freeways and providing driver information. However, the information is only meaningful in the KHC’s standpoint, leaving general public who seek detailed information on traffic congestion unattended. Therefore, it is necessary to develop a traffic congestion index that is able to indicate quantitatively the level of freeway traffic congestion and suggest solutions for congestion related problems in a more responsive manner. In this research, numerous worldwide traffic congestion indices were reviewed, and TTI (Travel Time Index) was selected. TTI shows the level of traffic congestion by comparing actual travel time to free flow travel time. A case study to verify the model showed that the index could describe traffic congestion in both time and space, and that data collection effort was minimal.

Key Words: Traffic congestion, Freeways, Travel Time Index

Transportation Research Links between EU and Asia for Sustainable Development (TRANSLINK)

Tri TJAHJONO, Karl L-Bång, Nicholas W. MARLER, Sabariah MOHAMAD

Abstract: The quality of the transport system is a main factor in economic development. Transportation research provides the knowledge, skill and tools to implement efficient transport policies, systems and services. The three-year Translink project is a partnership between two European and two South-East Asian universities with the overall aim to promote sustainable urban development in this region through development of their human resources for transportation research. Institutional assistance is also be provided aiming at creation of full PhD programme in their own departments. The need for research is studied through identification of “Critical Issues in Transportation”. Furthermore guidelines for carrying out PhD research training, supervision and assessment are developed as well as advice for institutional development of Transport research Schools.

FORECASTING THE EFFECT OF A MARKET “SHOCK” ON TRANSPORT DEMAND: CASE STUDY OF THE TONGA AIR TRAVEL MARKET

Glen D’ESTE

Abstract: Market “shocks” are especially problematic for demand forecasting. Conventional approaches assume that the future will be like the past and that the market will continue to develop and evolve in a smooth and continuous way. But this approach
breaks down if the market is hit by an external “shock”. This paper explores the process of forecasting the short and longer term impact of a negative market shock on demand for travel. The suggested method is a bottom-up approach based on market segmentation and a simple response-recovery model that represents the profile of the response over time using a small number of parameters, each with a clear practical interpretation. The paper uses the Tonga air travel market as a case study, but the approach is transferable and could equally be applied to a range of other markets, transport modes and types of market shocks.

**Key Words:** Demand Forecasting, Market Shock, Air Transport

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**DEVELOPMENT AND PRACTICAL VERIFICATION OF PEDESTRIAN INFORMATION SYSTEM IN THE INTERMEDIATE AND MOUNTAINOUS AREA**

Shuichi MATSUMOTO, Keizo TSUTSUI, Yasuhiro MIYATAKE, Hiromichi KUBO, Yasuhiro KUMAGAI

**Abstract:** Kochi prefecture advocates “ITS for local pedestrians,” which is developed at low costs taking into account full deployment of the system. Kochi prefecture developed “pedestrian information system in the intermediate and mountainous area,” designed to ensure a safe traveling environment by reminding drivers that a pedestrian is around. As part of safety measures, our team deployed the system on the road in the intermediate and mountainous area within the prefecture where a sidewalk is not available since depopulation is accelerating merger and closure of elementary school and junior high school. Then, we conducted a survey to see how the perception of users changed. This paper presents “pedestrian information system in the intermediate and mountainous area” as a case of ITS for local pedestrians.

**Key Words:** pedestrians, intermediate and mountainous area, reminding

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**EMPIRICAL ANALYSIS ON THE IMPACT OF ECONOMIC DEVELOPMENT IN NORTHEAST CHINA ON THROUGHPUT OF DCT**

LI Jing, LU Jing

**Abstract:** This paper tries to study the dynamic relationship between throughput of DCT and economic development of Northeast China with time-varying parameter state space model. The following three indicators are selected to be the explanatory variables: 1) actual GDP; 2) total value of export & import; 3) proportion of second industry output
value to GDP, which represent the overall economic level, degree of economic opening and industry structure respectively. The conclusions are that the first and second indicators always have positive impact on the throughput of DCT, and the second indicator’s influence has become more obvious than the first one since 2002. But the third indicator has a negative impact on it, and furthermore this influence has become stronger since 2000. Government should fully consider the impact of industry structure on the long-term development of DCT in order to avoid waste of resources.

**Key word:** DCT, Hinterland, Time-varying parameter state space model

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**A STUDY ON THE EFFECTIVENESS AND CHARACTERISTICS OF THE INTERNET-BASED RESPONSE METHOD EMPLOYED FOR A PERSON TRIP SURVEY**

Hiroshi TATSUMI, Toshihiro ENDO, Hironori TABATA, Riki KITAZONO, Yoshitaka KAJITA

**Abstract:** This paper studied the results of employing the Internet-based response method for a person trip survey of the Northern Kyushu area. First, the survey system was put in order and described. Next, with regard to the survey results, the Internet-based response rate, the structure of respondents' attributes, and the respondents' trip characteristics were analyzed to understand the effect of employing the Internet-based survey method. Furthermore an analysis was performed on the use of the Internet-based response method. As the results, we were able to confirm the effectiveness of the Internet-based response method employed for person trip survey.

**Key Words:** Person Trip Survey, Internet-based Response Method, Northern Kyushu Area

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**IMPROVING THE ROUTE BUS BUSINESS MODEL USING OPERATION DATA AND MARKETING**

Masaru YAJIMA, Kunihiro SAKAMOTO, Hisashi KUBOTA

**Abstract:** This report presents a history of the bus business in Japan and summarizes the current status and issues facing the route bus industry in Japan, which is poised at a major turning point due to deregulation, and attempts a scientific approach as a method to solve these issues. Diagram (timetable) rationalization is discussed utilizing the tools of marketing and quality control as well as operation data. A novel approach for collecting operational data using GPS and onboard sensors is introduced. Two route bus case studies, Kawagoe City and Hida ka City, are presented whereby the effectiveness of our
method of diagram rationalization is verified. With this method, income and expenditure can be improved while simultaneously improving the level of service and safety in existing bus businesses, with the ultimate goal of realizing a new bus business model to meet the needs of today and tomorrow.

**Key Words:** route bus, marketing, quantitative date, quality control

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**DECISION SUPPORT SYSTEM OF AIR TRAFFIC FLOW MANAGEMENT BASED ON COORDINATION THEORY**

Zhaoning ZHANG, Xinhua LI, Jiansheng HE

Mastering modern decision technology and improving the decision-making ability and efficiency are essential to the ATFM. In this paper, relevant concepts about decision support system (DSS) are expounded; the environmental characteristics of the ATFM system are discussed. And then we analyze the decision-making and coordination issues existing in the process of ATFM; study the applications of DSS and coordination theory in ATFM. Finally, theory on the basis of coordination of ATFM integrated DSS is constructed.

**Key words:** air traffic management; flow management system; DSS; coordination theory

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**AN ANALYSIS OF MOBILITY FOR ELDERLY PEOPLE LIVING IN AN ISLAND-CASE STUDY OF THE OSAKI-KAMIJIMA ISLAND IN JAPAN**

Masato OKAYAMA

**Abstract:** Many of the small islands in Japan have suffered from depopulation and population aging. When elderly people will age more, it will be very difficult for many of them to drive a car. Because of this, the people who can't drive a car will increase and it will be very important to prepare the mobility in the islands for them. In this study, the questionnaire survey was carried out to the elderly people who live in the Osaki-Kamijima Island. Through the analyses of this survey, the elderly people’s attitudes toward the facilities and the public services, including the mobility, in this island to support their lives are made clear. It is shown what kind of facilities or services should be connected with the mobility to raise the degree of the quality of the life of the elderly people.

**Key Words:** Mobility, Population Ageing
BLACK SPOT ANALYSIS – A COMPARISON BETWEEN TWO EUROPEAN COUNTRIES AND THAILAND

Andreas VESPER, Ulrich BRANNOLTE, Pichai TANEERANANON, Csaba KOREN

Abstract: The identification of accident black spots in the road network is a transboundary task around the world. Different appropriate methods are used in European and Asian countries. This paper gives a descriptive overview and makes a comparison of methods used in Thailand, Hungary and Germany. It shows similarities and differences of the used methods. On this basis the reader of the paper can share experiences made by experts in the three countries. The paper is prepared in the framework of the EU-Asia project “NICE on RoadS – Network In Competence Enhancement on Road Safety” with financial support from the European Union.

Key Words: black spot analysis, accident, road safety

ORGANIC TRANSPORTATION: iOT, GLOBAL STRATEGY–LOCAL TACTICS

Nikolaos Vogiatzis, Kun Zhang, Michael A P Taylor

Abstract: This paper provides the blueprint for the development of a new type of Urban Traffic Management and Control system which is event responsive at the individual intersection level whilst influencing (and controlling when needed) community intersections (intersections grouped by means of having a shared strategy, key performance indicators (KPI), etc) using real-time strategy and policy monitoring. This provides the ability to control traffic at the individual level using more traditional KPIs whilst allowing new types of strategic KPIs (such as speed reduction, improving ‘black spot’ conditions, etc) at the higher level to be implemented. To do this, some emerging research questions are posited with relation to enhancing the capability of individual intersection performance for dynamically changing travel demand by well-informed travellers, and by taking into account the broader questions of economical, environmental and social objectives rather than only transport specific ones.

Key Words: Organic Transportation, Event Responsive, Urban Traffic Management and Control

TRAFFIC STUDY IN AN URBAN AREA: THE CASE OF UNSIGNALIZED INTERSECTION ALONG NATIONAL HIGHWAY IN URDANETA CITY, PANGASINAN, PHILIPPINES
Franklyn T. AMISTAD, Jose Regin F. REGIDOR

unsignalized intersection along the national highway in Urdaneta City, Pangasinan, Philippines. There are 27,654 vehicles that traverse the unsignalized intersection during the fourteen hour period or with a flow of 1976 vehicles per hour. The peak hour was observed to be at 11-12 in the morning and 5-6 in the afternoon/night time. Majority of the transport modes that traverse during the mentioned peak hours are cars (e.g. automobiles, tricycles). Uncoordinated movements of the pedestrians along the national highway create conflicts between vehicles and pedestrians. There were ten accidents experienced in the year 2003. Most of them were experienced during nighttime. The information gathered is a significant input in the transportation planning process between LGU and Planners if the existence of traffic study in urban areas is to be considered.

Key Words: urban area, unsignalized intersection, traffic congestion

A STUDY OF TRANSPORTATION SYSTEM FOR EUCALYPTUS BARS USED IN CONSTRUCTION INDUSTRY

Rittee HONGSAKORN

Abstract: This article presents the study of the cost in transporting and transferring the Eucalyptus bars used in construction industry. The analysis of the suitable transportation pattern for Eucalyptus businesses in Bangkok is also performed. A Geographic Information System (GIS) program is used for secondary data collection and analysis. The modes of transportation include roads and trains. The results show that the Eucalyptus bars for construction are 1-3 inches in diameter and 3 meters long. The specific gravity of Eucalyptus is 0.7-0.8. The weight of Eucalyptus will lose by 20%-30% in the ordinary atmosphere. The average transportation costs of the ten wheeled truck and trains are 0.045 and 0.019 U.S.$/ton/kilometer respectively. The labor efficiency of transferring is 4.7 kilograms/minute/person, which is equivalent to the transfer cost of 2.533 U.S.$/ton. Finally, the ten wheeled trucks will cost less than trains as the transportation distance is shorter than 190 kilometers.

Key Words: Transportation System, Eucalyptus, Labor Transfer Efficiency, Geographic Information System (GIS)

DEVELOPMENT OF METHODOLOGY FOR CALCULATING ECONOMIC BENEFITS OF HIGHWAY PROJECT IN CHINA

Jiaxin LI, Linggang CHENG

Abstract: This study first gives an overview of the development of highway transport and the history of applied economic benefits calculating methodology in China.
Following is the comparison between the current used methodology (Link-Cost Based Method) and the ODCost Based Method, the strengths and weaknesses of both methodologies are explained under different road networks. Finally, it probes into the application of OD-Cost Based Method with a case study, and foresees the development of this practical methodology in a scientific way. This report is useful for potential researchers who are interested in economic benefit calculation with the fast development of China highways.

**Key word:** Economic Benefits, OD-Cost Based Method, Highway

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**DESIGN THERMAL GRADIENTS FOR STRADDLING TRACK GIRDERS**

Tao ZHANG

**Abstract:** The response of the straddle track girder exposed to thermal environment conditions is studied. In present paper, a comparison of current design-code provisions is referred to. The estimation of temperature distributions considers a numerical technique for the solution of the Fouier heat-transfer equation and its boundary conditions. This technique is based on the finite-element method and takes into account the geometry of the cross section of the track girder, the thermal properties of concrete, and the climatic conditions. A field test is conducted on a track girder to verify the analytical models. The results of a temperature gradient study developed to evaluate design thermal vertical differences for the straddle type track girder are presented. The numerical technique is also applied to the analysis of special cases in which an accurate estimation of the thermal effects is necessary. This study will help engineers better understand thermal effects developed in track girders.

**Key Words:** temperature, girder, thermal effect, finite element method

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**ENVIRONMENTAL MANAGEMENT PRACTICES AT TAIWANESE AIRPORTS**

Cherie LU, John BLACK

**Abstract:** Internationally, it is recognized that the costs of environmental and social externalities of air transport must be internalized and paid for by the aviation industry and its users. The current policies and regulations on aircraft noise at airports in Taiwan are described. A wider scope of environmental issues at Taiwanese airports is identified and a research framework is proposed for providing strategic guidance to the future environmental management of airports in Taiwan. This generic framework could also be applied to other airports in Asia or in the rest of the world.
Key Words: Aircraft noise, Policy and regulation, Environmental management, Taiwanese airports

AN IMPROVED ANT COLONY OPTIMIZATION FOR VEHICLE ROUTING PROBLEM

YAO, Jinbao, YAO, Baozhen

Abstract: The objective of this paper is to examine the feasibility and applicability of ant colony optimization in vehicle routing problem area. Due to different vehicle capacities, a mathematical formulation, which considers the variable costs and the vehicles' fixed costs simultaneously, is given. Since the inherent complexity of the vehicle routing problem (VRP), an improved ant colony optimization with a new strategy to update the increased pheromone (Ant-Weight strategy) and the 2-opt exchange is developed. Finally, the proposed algorithm is examined with the data of Wuhu in China. The results indicate that this method performs well in terms of the solution quality and run time consumed.

Key Words: vehicle routing problem, improved ant colony optimization

NEW PERSPECTIVES ON URBAN TRANSPORT POLICIES FOR EAST ASIAN MEGACITIES

Shigeru MORICHI, Surya Raj ACHARYA

Abstract: This paper attempts to examine the special characteristics of and their implications for overall urban transport policy in East Asian Megacities. These characteristics create more challenges than opportunities when it comes to dealing with the urban transport problems. A broad framework of long-term vision and strategic approaches is recommended to face such challenges. The core element of the framework is transit dominated multimodal urban transport system and strategic timing of different policy options. Finally, the paper discusses some of the special policy issues and measures that are relevant to the case of East Asian Megacities.

Keywords: Urban Transport, Asia, Megacities,

CHARACTERIZING LOAD LIMIT OFFENCES IN INDONESIA; A STATISTICAL APPROACH ON OVERLOADING CASES AT WBSS

IGW Samsi GUNARTA, Idwan SANTOSO, Bambang ISMANTO, Pradono
Abstract: Overloading has caused headache to Indonesian Road Authority due to its occurrences and severity. The Directorate General of Land Communication (DGLC) suspected the mismanagement of Weigh Bridge Station (WBS) significantly contributes to the failure of WBS in deterring overloading offences from the road network. A new concept, by involving private sector in WBS management, was set up. Four WBSs in Sumatra were included in the pilot project. This paper utilized the data provided by the project to characterize overloading offences captured by the WBSs. Three hundred sixty (360) cases were randomly selected from over 10,000 cases of 4 WBSs. Descriptive and crosstabs analyses were conducted indicating that overloading has not been simply related to trucking cost coverage but rather related to the utilization of resources in freight transport. Deeper understanding by conducting insight look towards the motivation of overloading is strongly recommended in solving the problem of overloading.

Keywords: Overloading Offences, Weigh Control, Freight Transport, overload countermeasure

TRANSPORT MODELLING – THE NEW ZEALAND EXPERIENCE

Grant SMITH

Abstract: New Zealand has a long and continuous history of transportation planning, with the first study using a model undertaken in Christchurch in 1959. Over the years since then, every city in New Zealand has had at least one study, and many have had regular reviews. The technology used in the models has also developed without pause, with the result that the techniques now being used are equivalent, or ahead of those in the rest of the world. The paper describes the development of models in New Zealand, touching on inputs, data sources, technology and outputs. It concludes with a brief comment on the new generation of models which are now emerging.

Key Words: Transport, Planning, Models

DEVELOPMENT OF THE ACTIVITY BASED TRAVEL DEMAND MODEL IN BANGKOK: A REVIEW OF AVAILABLE DATA AND PROPOSED MODELING FRAMEWORK

Natachai WONGCHAVALIDKUL, Mongkut PIANTANAKULCHAI

Abstract: This paper investigates the modeling framework and the existing available data which could be used to develop the activity based travel demand model in Bangkok. The paper focuses on two main issues including “the population synthesizer” and “the activity generator”. It is found that there are possibilities to create the activity based model by using the existing available data from several sources. However, the
modifications of the existing modeling framework from previous activity based modeling researches are needed in order to match the existing available data.

**Key Words:** Travel Demand Modeling, Activity Based Modeling, Synthetic Population

### Establishing Technological Basis for Realizing the next-GenerationRoad Services

Setsuo HIRAI, Hideto HATAKENAKA, Yasuyuki MANABE

**Abstract** Japan has been working to create the next-generation road system called SMARTWAY that will utilize advanced ITS technologies to provide diverse road transportation services. The National Institute for Land and Infrastructure Management of the Ministry of Land, Infrastructure and Transport has conducted a joint research with 23 private companies on the next-generation road service provision system based on advanced ITS technologies. The institute has then presented the achievements of the research to the public by carrying out an event “SMARTWAY Demo 2006” in February 2006. Furthermore, from the fall of 2007, the Next-generation road services will be launched and this report introduces the efforts towards ITS realization.

**Key Words:** SMARTWAY, Next-Generation Road Services, Joint Research

### FUZZY EXTENSION OF THE ANALYTIC NETWORK PROCESS FOR TRAVEL MODE-CHOICE MODELING

R.P. Niranga U. AMARASINGHA, Mongkut PANTANAKULCHAI

**Abstract:** Mode choice methods model the traveler’s choice among a set of alternative mode of travels. This study proposed the Fuzzy extension of the Analytic Network Process (FANP) to model the travel mode choice. Fuzzy set theory could be incorporated in the Analytic Network Process (ANP), which is a widely acceptable decision making tool in order to capture vagueness of the human decision. Triangular fuzzy numbers and their degree of fuzziness are used to express human judgment that is articulated in natural language. The method presented in this paper utilized the alpha cut and optimism index to transform the fuzzy comparative judgment matrix into sets of crisp matrices. The proposed method can be an alternative to conventional mode choice modeling techniques that are used to model travel mode choice problems.

**Key Words:** Fuzzy Analytic Network Process, Travel mode-choice, Individual decision making
NEW MASTER PLAN OF JABODETABEK RAILWAY

Akira NEHASHI, Tohir KARTABRATA

Abstract: Indonesian government and the railway sector have long been striving for the development of railways. Since 1960s Japan has long been cooperating and engaged in planning, engineering, advising and training of Indonesian Railways. Jakarta has a population of nearly 8.7 million inhabitants in an area of 661 km². Jabodetabek area has a total population approaching 21.0 million in an area of 6,580 km². The former railway master plan of Jabotabek area was established in 1981 aiming railway should take a big role in urban traffic. However, the motorization overwhelmed the poor urban rail and the railway transportation share stayed only 3% of all motorized traffic in the area. The New Railway Master Plan was proposed for the first time after twenty five years. The target year is 2020 and the railway share will be beyond 10% with all the efforts including the total promotion of public transportation use not only with the railway improvement itself.

Key Words: Urban Railway, Master Plan, Public Transportation

ANALYSIS AND DEVELOPMENT FORECAST OF CHINA, JAPAN, SOUTH KOREA LOGISTICS COOPERATION

XING FANHUI, SUN JUN,YANG ZAN, CHANG GUOSONG

Abstract: There is a good foundation in logistics cooperation among China, Japan and South Korea. It is necessary to explore the static and dynamic effect of the logistics cooperation to confirm the economic rationality of three countries, at the same time to establish a model of the trade quantity to predict potential of the logistics cooperation. Empirical study indicates that there is huge potential in logistics cooperation among the three countries and it can achieve a win-win situation.

Key words: China, Japan and South-Korea; Logistics cooperation; static effect; dynamic effect;

RESEARCH AND EXPLOITATION ON RAILWAY STATION SIGNAL CONTROL EQUIPMENT FAULT DIAGNOSIS EXPERT SYSTEM IN CHINA

ZHANG Xi, LU Cheng, CHEN Yu, WANG Ying-nan

Abstract: The thesis mainly introduce unitary structure design, exploitative technology model and realization method of railway station signal control equipment fault diagnosis
expert system in detail and base on research production of science and technology development program in Chinese railway ministry.

**Keyword:** Chinese railway, control equipment, fault diagnosis, expert system

**DYNAMICS OF EMPLOYMENT LOCATION-SPECIFIC PREFERENCE FUNCTIONS IN SAPPORO FROM 1972 TO 1994**

Yuzo MASUYA, Tohru TAMURA, Kazuo SAITO, John BLACK

**Abstract:** The paper examines commuting behavior to employment sub-centers in metropolitan region. Traffic analysis zones are arranged in order of employment density to identify discrete clusters of similar characteristics. For each employment zone an employment location specific preference function for the journey to work is considered. This allows comparison of the spatial extent of each employment center labor market. The mean trip length for the commute to each employment center is explained by the parameters of the quadratic function that describes the preference function. Results are presented for the city of Sapporo, Japan, where the models were calibrated on data for 1972, 1983 and 1994. Growth in population and employment with a polycentric employment formation in the suburbs has led to an increase in the region’s mean trip length.

**Key Words:** Employment Location-specific Preference Function, Rank Size Rule, Sapporo

**THE RETROREFLECTIVE PERFORMANCE OF THE ROAD MARKINGS IN KOREA**

Jewon KIM, Soohyung LEE, Inkyoon YOO

**Abstract:** In Korea, the condition of road markings is not systematically recorded or evaluated, and thus, it is hard to manage or make decisions regarding the matter. This study undertakes a field research and analyzes retroreflective performance of road markings installed along the national highways in Korea. The study evaluates suitability of standards for road markings, identifies related problems, and seeks solutions.
**Key Words:** Road Marking, Retroreflective Performance

**ANALYSIS OF THE EFFECTS OF ACCELERATION LANE LENGTH AT MERGING SECTIONS BY USING MICRO-SIMULATIONS**

Xingju WANG, Toshihiko MIYAGI, Akiyoshi TAKAGI, Jiangqian YING

**Abstract:** In this paper, the quantitative analysis of the congestion easing measures of acceleration lane length at merging sections was done by using our micro-simulation model for describing the traffic flow behavior in the merging sections in highways is proposed. By numerical simulation experiments, it was proven that when the main lane traffic volume was less, the effectiveness of acceleration lane length was good, and vice versa.

**Key Words:** Lane change, Micro-simulation, Acceleration lane

**EXPLORATION OF THE COMMUNITY DESIRES IN THE PROVISION OF ADAPTIVE BUS SERVICE IN JAPANESE RURAL AREA**

Tri Basuki JOEWONO, Masaru YAJIMA, Kenichi SUZUKI, Kunihiro SAKAMOTO, Hisashi KUBOTA

**Abstract:** At present, in the city of Hidaka, Saitama Prefecture, Japan, there is a plan to provide a new scheme of bus service. Thus, this article has an aim to explore the community desires regarding the bus service in the city of Hidaka. This study employed questionnaire survey, which was distributed to commuter and non-commuter group of resident in three different residence areas. This survey collected community’s desires and perceptions regarding bus service, while this article reports only the findings from commuter. It is found that there is a potential for the provision of bus service in this area, whilst the main problem is the unsynchronized time table between bus and rail service, including the length of bus operation time. Moreover, the binary logistic model explains the potential demand of the new bus service. It can be concluded that this study provides potential notion for bus service improvement.

**Key Words:** bus service, rural area, desire.

**PARAMETER CALIBRATION AND VALIDATION OF PARAMICS**
FOR FREEWAY

Zhe LI, Ming CAI, Zhaocheng HE, Ningning CHEN

Abstract: PARAMICS is a microscopic traffic simulation model for evaluating both urban and freeway traffic operations. Before simulation, the models must be calibrated and validated to ensure the results derived from it to be reasonable. This paper presents a procedure for the calibration and validation of PARAMICS, focusing on freeway traffic conditions using the detailed vehicle-by-vehicle toll data at each toll plaza from Guangzhou – Shenzhen freeway in Guangdong Province, China. The simulation results after calibration and validation show that the calibrated simulation models are able to adequately represent freeway traffic conditions.

Key words: Microscopic traffic simulation, Calibration and validation, PARAMICS

IATA OPERATION SAFETY AUDIT (IOSA)-A PRACTICAL TOOL FOR THE AIR TRANSPORT INDUSTRY

Jyh-shyan CHOU, Yueh-Ling HSU, Chao-Che HSU

Abstract: This research presents the philosophy and development of IOSA model in current airline industry. It starts with the introduction of safety challenge in the aviation industry, followed by the discussion of human error and organizational accident, indicating that accident’s contributing factors has been affected by “Organizational and Management factors”. In an attempt to effectively deal with the organizational issues, IOSA program is designed to provide a common airline audit standard, which help the airline not only to deliver operational safety but also to operate more efficiently. After exploring how IOSA model can actually reduce airlines cost and share audit can increase its credit as well as business opportunity, conclusions will be made that the IOSA model can also be applied in different fields like airport operations, cargo operations as well as other transportation mode to achieve continuous safety improvement and cost efficiency.

Key Words: IOSA, airline, organizational factors, system safety

NEW APPROACH TO PAVEMENT MANAGEMENT SYSTEM IN THAILAND

Nara KHOMNAMOOL, Ph.D. Pichai TANEERANANON, Ph.D. Surachai SRILENAWAT, Pipat THONGCHIM, Ph.D.

Abstract: Thailand has a total highway network of about 200,000 kilometres, 51,662 of which are main highways under the responsibility of Department of Highways (DOH). In its recent new approach to road asset management, DOH has engaged transportation engineering
resources from four leading Thai universities to upgrade existing Thailand Pavement Management System (TPMS) and to introduce Highway Design and Maintenance Model (HDM-4) for use in the Department’s pavement management programme. The new approach involves the utilization of automated data collection of highway conditions for the whole country. Data collected include wheel rutting, pavement roughness and surface distresses with pavement and asset views. This paper describes the application of the survey vehicle equipped with laser profilers, digital video cameras, distance measuring instrument, GIS database, and GPS in field data collection of highway conditions, asset views, and pavement views. Successful implementation of new approach to the pavement management system (PMS) requires the understanding of the model capabilities with local parameters; quality input parameters; customization of treatment selection process and intervention levels, and consideration of the environment and local maintenance practices in predicting future pavement conditions. Use of HDM-4 is discussed with respect to the strategic assessment of funding needs and optimum resource allocation for the future pavement maintenance and rehabilitation at the project and network levels.

**Keywords:** Pavement management system, Electronic data collection of highway conditions, GIS database, HDM-4

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**MID-TERM JAPAN PORT POLICY FOR STRENGTHENING COMPETITIVE EDGE OF INDUSTRY IN JAPAN**

Norio SASAKI, Koji TAKAHASHI

**Abstract:** The new mid-term Japan port policy is being discussed in the Japanese government. Since 2002, the Japanese government has implemented the Super-hub Port Initiative, a new policy package for strengthening competitiveness of the container terminal business. However, it has recognized that it also needs to take some measures for hinterland of terminals in order to follow the rapid change in logistics and manufacturing systems. Then, the Japanese government proposed forming logistics centers which are unified with terminals in order to accommodate increasing import cargoes from Asian countries and highly utilizing hinterlands of ports and developing port facilities in order to encourage return of industry to coast areas. The next mid-term Japan port policy will be authorized by the end of this fiscal year.

**Key Words:** Trend in Japanese industry, Super-hub Port Initiative, Logistics center

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**DETERMINE A NEW O-D MATRIX AS AN IMPACT OF ADDITIONAL ZONES**

Muhammad ISYA, Rizal Z. TAMIN, Ofyar Z. TAMIN, Heru PURBOYO H.P.

**Abstract:** Origin-Destination (OD) matrix is a distribution of trip from origin zone i to
destination zone \( d \) in a period of time. OD matrix is very important to be determined. By determining an OD Matrix we can identify the potential of trip inter zone for the base and prediction year. If an OD matrix is assigned to the road network, we will determine the traffic volume at the road network and any measure program can be taken in order to gain a better condition. Many methods have done in order to determine OD Matrix. In Indonesia, National OD matrix is the trip of passenger and commodity by mode of transport which travel inter zone in a year. The zones to assume are regency and municipality. National OD matrix in Indonesia is updated in about every five years. The main reason of this is likely because of high cost to do the national OD survey. However, its very common that OD matrix has to be updated because of additional zone. Additional zone is usually needed because of new regency or municipality, detailing of study area, etc. For that reason it is needed to find a practical method in order to determine an updated OD matrix. Methods to be used in this paper is proportional methods. OD trip matrix is proportioned to the total number of population in the pair of origin and destination zone.

*Keywords*: OD Matrix, trip distribution

**REVIEW OF THE 6TH TERM HOKKAIDO DEVELOPMENT PLAN AND PRINCIPLES OF A NEW PLAN**

Yasushi TAKAMATSU, Kiyoshi TAKAHASHI

**Abstract**: Approved by the Japan’s Cabinet in April 1998, the 6th term Hokkaido Comprehensive Development Plan is now facing its target year, FY2007. The Hokkaido Development Committee of the National Land Council reviewed the 6th term plan and discussed principles of a new plan, and compiled in February 2007 the final report: “Review of the 6th Term Plan and Principles of a New Plan.” This article presents the essence of the final report, focusing on desired transportation policies for the future Hokkaido, which would be also helpful for Asian countries.

*Key Words*: comprehensive development plan, development policy, improvement of traffic network and mobility

**THE PERFORMANCE OF ASPHALT MIX CONTAINING SLAG AGGREGATES FOR HEAVY TRAFFICKED ROADS**

Eri Susanto HARIYADI, Leksmi NINGSIH, Bambang Ismanto SISWOSOEBROTHO

**Abstract**: This study evaluates the performance of asphalt mixes containing slag aggregates for road pavement which consist of laboratory and field study. The field trial in Cileunyi Road has a traffic density more than one million ESA. The trial test consists of two types of asphalt mixes. Mix 1 consist of coarse and medium slag aggregate mixing to fine standard aggregate and Mix 2 consist of coarse, medium and fine slag aggregate mix.
mixing to sand. Mix 1 was placing on slow lane that expected to be able to resists rutting. Mix 2 was placing on fast lane that expect be loaded by heavy vehicle within a short time. FWD test is conducted after six months, the result indicates that modulus of the Mix 1 was harder than Mix 2, and both mixes have the same rutting results. The skid resistance of this pavement was higher than the existing pavement.

**Key Words**: Slag, Asphalt Mix, Cileunyi Road

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**MORE EFFICIENT WINTER ROAD MANAGEMENT WITH ITS TECHNOLOGY**

Setsuo HIRAI, Hideto HATAKENAKA, Isao YAMAZAKI

**Abstract**: The National Institute for Land and Infrastructure Management has studied the possibility of applying visible image type road surface sensors to winter road surface management to ensure the safety of road users and achieve more efficient road management. The results have confirmed that using visible image type road surface sensors will permit rational winter road surface management in response to direct change of the road surface by clarifying changing road surface conditions over wide areas in real time and by displaying it linked to fluctuation history and weather data.

**Key Words**: sensor, road surface management, freezing

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**IMPROVING INVESTMENT EFFICIENCY BASED ON OBJECTIVE DATA MIERUKA PROJECT: IDENTIFYING AND VISUALIZING PROBLEMS**

Tadashi HAMADA, Takayuki KAWAJI, Tomoyuki KOSAWA

**Abstract**: We have scientifically identified road sections which have the most frequent accidents by compiling data on traffic accident occurrence in each road section. Countermeasures are being focused on very worst sections, which we call the "red zone." The red zone consists of only about 7% of the total number of road sections under our management, but about 65% of the budget for measures to prevent traffic accidents will be devoted to the improvement of these sections. We anticipate that this kind of rational management, in which problematic locations are scientifically identified and made a budget priority, will lead to more effective use of invested funds for the reduction of traffic accidents.

**Key words**: traffic accident, focused investment, scientific analysis
TRIP GENERATION MODEL FROM SHOPPING CENTER IN BANDUNG, WEST JAVA, INDONESIA

Judiantono TONNY, Tamin OFYAR Z

Abstract: Trip generation from a shopping center now becomes a new transportation planning problem for a city. Common approach to predict trip generation of a shopping center is based on total floor wide of the building. This approach is too rugged, because practically either facilities itself and also in combination traps gives bigger impact to traffic generated. The elements of a shopping center is Service Trade Area (STA), Net Selling Floor Area for Convenience Goods (CON), Net Selling Floor Area for Comparison Goods (COM), Complement Activity Area (CAA) and Accomodating Area (ACC). Through this research and uses regression method approach can be formulated trip generation model estimation from shopping center in Bandung as like: \( Y = 613.55 + 2.22 \times STA + 1.49 \times CON + 0.56 \times COM + 1.12 \times CAA + 0.26 \times ACC \) Knowledge to this model estimation, would hardly assists to predict level of trip generation from shopping center.

Key words: Trip Generation, Shopping center elements

HOW DO STREET TREES DEEPLY AFFECT ON-STREET ACTIVITIES OF PEOPLE? AN EVIDENCE FROM HANOI

Hitoshi IEDA, Phyo Thet Thet HTUN,

Abstract: Site survey was conducted in Hanoi’s six streets to examine how people live today in Hanoi, how they use public spaces in their neighborhoods and how many and what type of street trees are currently planted on the streets. The results of surveys were documenting on how much and where people walk, sit, stand, and carry out various peoples’ activities in the Hanoi’s street and number and type of planted tree species in the Hanoi’s street. Interestingly two facts coming out from this survey results are, peoples’ activities under trees are significantly higher than not under tree activities and certain species have maximum amount of peoples’ activities underneath.

Key Words: Hanoi streets, street trees, on street peoples’ activities

A GUIDELINE FOR SIGNALIZED INTERSECTION DESIGN CONSIDERING PEDESTRIANS’ PSYCHOLOGY

Kiichiro HATOYAMA, Masao KENZAKI

Abstract: In Japan, large signalized intersections often have quite long cycle times that
may affect the environment and users’ psychology. For cycle-time reduction, it is necessary to develop a new methodology to design intersections. One practical method can be considered as two-step crossing system with pedestrian refuges. By using a comprehensive simulation model that can deal with both pedestrians and vehicles, we checked the effect of two-step crossing system and short cycle times. As a result of the simulation, we found that cycle-time reduction is effective for both pedestrians and vehicles unless the vehicular traffic flow is heavy. Finally, we proposed a guideline for signalized intersection designing to design intersections that are safer and more efficient in traffic for both pedestrians and vehicles.

**Key Words:** Intersection Design, Signal Control, Pedestrian Psychology, Traffic Simulation

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**CONCEPTS OF THE COLLABORATIVE INFRASTRUCTURE MANAGEMENT METHOD AND ITS APPLICATION IN HOKKAIDO**

Akihiro IZUMI, Daisuke SUNAGA, Tatsurou HAYASHI, Hiroyuki SENOU, Taira ENDOU, Hitoshi IEDA

**Abstract:** The “collaborative infrastructure management method” is a part of new infrastructure administrative management. This paper aims to examine its significance, role, conceptual development and related issues, and summarizes the results of the study on its institutional design for implementation in Hokkaido. The collaborative infrastructure management method is an organization control and operation procedure for managing cooperative projects between an infrastructure administrative body and relevant public and private organs as well as users and interested people in general to successively improve the quality, utilization and maintenance of facilities, and to systematically, continuously and collaboratively promote concrete management methods, future planning and improvement projects and educational activities of social facilities as a whole.

**Key Words:** collaboration, management system, evaluation

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**IMPLEMENTATION OF COLLABORATIVE INFRASTRUCTURE MANAGEMENT-THE CASE OF THE WORKSHOPS IN SHIRETOKO, HOKKAIDO**

Kiyoshi TAKAHASHI, Kouji SANJHOU, Mitsutaka SAWA, Kiminori NAKAMURA, Mikiharu ARIMURA, Hitoshi IEDA

**Abstract:** Four workshops were held for formulating road improvement and utilization
methods in the Shiretoko World Natural Heritage area (including the national highway between Shari and Utoro). Participants in these workshops consisted of local residents, scholars and road administrators, and employed a method called “collaborative infrastructure management.” Through the workshops, a "basic plan" was framed which summarized how future road improvements should be carried out, and how roads themselves should be utilized. The method of collaborative infrastructure management identifies and arouses discussion of specific needs and problems, and allows the creation of long-range solutions. Opinion map/Resource map used in the workshops were useful for the Externalization and Combination process of the SECI model which is model concept for knowledge management, and video clips of driving conditions were effective in the Socialization process.

**Key Words:** collaborative infrastructure management, workshop

DEVELOPMENT OF SCHEDULED BUS SERVICES IN ASEAN COUNTRIES-CASE STUDIES OF CHIANG MAI, BATAM, AND SIEM REAP

Takeshi SHIMOMURA, Satoshi OGITA, April COLETTE, Yoshiya NAKAGAWA, Chiaki KURANAMI, Hironori KATO

**Abstract:** As part of the Urban Public Transport Policy Framework (UPTPF), the Japanese Ministry of Land, Infrastructure and Transport (MLIT) has conducted studies in several major regional ASEAN cities to recommend practical solutions and frameworks for moving forward to create sustainable and comprehensive public transport policies. In 2003, Chiang Mai, Thailand was chosen as the first target city of this framework and the second city was Batam, Indonesia in 2004. MLIT also undertook a study in Siem Reap, Cambodia in 2006. The studies aimed to develop well-organized and sustainable urban public bus services in the cities where 1) a majority of public transport was operated as paratransit, 2) formal public transport was relatively poor, or 3) urban public transport did not exist. This paper briefly summarizes the studies conducted over the past few years in the selected cities and, from the study results, outlines a number of lessons learned.

**Key Words:** Urban Public Transport, Bus, and Paratransit

COMBINED OPTIMIZATION OF SHIP ROUTING AND ASSIGNMENT PROBLEMS IN CONTAINER FEEDER LINER

Na LI, Xiaona SUN, Zhihong JIN

**Abstract:** Based on the Vehicle Routing Problem, this paper presents a combined optimization IP model of ship routing and assignment in feeder liner container shipping problem (FLCSP). Existing formulations of ship routing or ship assignment are
independent LP or IP, which can not satisfy the optimization of the whole system. While compared to VRP or its variations, feeder liner container shipping problem is quite different, for that FLCSP has to design a periodic service pattern in order to maintain the minimum service frequency and satisfy the container transportation demand in the planning horizon, and need considering simultaneously both the assignment of different types of ships and the determination of routes. A combined Genetic Algorithm is proposed as FLCSP belongs to NP hard problems. The results of the practical experiments indicate that the formulation and algorithm are efficient and effective in reducing the total shipping cost.

Key Words: Feeder Liner Container Shipping Problem, IP, combined GA

PERFORMANCE INDICATOR FOR TRANSPORTATION SECTOR
A CASE STUDY ON INDONESIA TRANSPORTATION SYSTEM

Dail Umamil ASRI

Abstract: Nowadays, draft for guideline in formulating performance indicator and evaluation of transport sector have been compiled, where the compilation of budget based on the performance of planning and the performance indicator achieved by a budget entity. For that reason, in 2004, Bappenas have compiled and developed the transportation performance indicators as a stepping base for the budget arrangement. This article aims to report the results of study on performance indicators and its method of assessment for the performance of transportation facilities and infrastructure, and also to carry out testing assessment to performance indicator of transportation sector for a selected city or regency in Indonesia as a case study. Some strategic issues in transportation sector related to emulation modal, market structure and compartment, inter mode and multimode, and also the need of further development to the assessment of transportation sector performance are also presented in this article.

Keywords: indicator, performance, transportation sector

REVIEW OF URBAN TRANSPORT POLICY AND ITS IMPACT IN BANGKOK

Shinya HANAOKA

Abstract: This paper reviews transport policy, implementation and its impact in Bangkok. Bangkok has not done any special measures in its transportation system. Many ambitious policies have been planned like the exclusive bus lane and the automatic location system for buses. However, they have only reached the experimental level and have not reached full implementation because of financial constraints and political conflicts. Only the ring
road, expressway, overpass, underpass, truck ban, BTS and MRT have been successfully implemented.

**Key Words:** Transport Policy, Bangkok, Historical Review

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**DEVELOPMENT OF COMBINED TRIP GENERATION, TRIP DISTRIBUTION, MODE CHOICE AND ROUTE CHOICE AS SIMULTANEOUS MODEL RESEARCH REVIEW**

Rahayu SULISTYORINI, Ofyar Z. TAMIN

**Abstract:** The development of combined trip generation, trip distribution, mode choice and route choice to obtain the O-D matrices is well advanced. Therefore, positive results on this development will be further developed by combining each part of four step models. The previous research represents combination from sub-models series in which each series must be done separately and successively as well. With this combination model, modeling process become shorter and faster thus the result is comply with each phase of expectation. Besides, consistency between the model phases which were combined can be more guaranteed, due to the definition and input were utilized the same materials in the models.

**Key Words:** Simultaneous Model, Four Step Model, efficiency and effective

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**URBAN TRANSPORT IN INDIA: POLICY GUIDELINES**

Geetam TIWARI

**Abstract:** Indian cities are characterized by diversity and heterogeneity in socio economic conditions. Often 10%-50% of the population live in slums. The slum population seems to grow as the city size increases. The growth of the formal sector is accompanied by the growth of the informal sector. The travel demand of people who have limited choices because of their socio-economic characteristics presents another dimension of complexity in the system. In a hostile physical environment people continue to walk and use bicycles in most Indian cities. Rickshaws and other forms of paratransit exist in many cities defying all regulatory measures. An understanding of the individual demand versus the system characteristics is necessary for achieving a socially optimal modal mix for a city.

**Key Words:** Urban Transport, Indian Cities, Nonmotorised Transport

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**THE ECONOMIC FEASIBILITY STUDY FOR INTRODUCTION OF**
URBAN TRANSIT MAGLEV TRAIN

BAEK, Joo Hyun, SUL, You Jin, LIM, Tae Hoon, RHEE, Sung Mo

Abstract: It is generally acknowledged that economic feasibility study should be preceded when introducing and developing new transit system such as urban transit maglev train. Urban transit maglev train recently known for technology is recognized for potential superiority of environment friendship and maintenance and is selected for one of national projects. Although maglev train is commercially operated at Nagoya Tobu-kyuro line in Japan, it is expected that there are some technical problem for maglev train to alternate the existing LRT market. However, it is expected that economic ripple effect would be great when some problems is settled. Since it is required enormous budget to promote practical-use plan of urban transit maglev train, it is necessary to precede economic feasibility study to attain the reasonability of the project. In this study, the scales of domestic & international market of maglev train are analyzed and the methodology of economic analysis is classified.

Key Words: urban transit maglev train, inter industry analysis, economic feasibility, economic ripple-effect

A STUDY OF EARTHQUAKE AFFECTED ROADS IN PAKISTAN AND SOLUTION TO THE PROBLEMS

Kamran MUZAFFAR KHAN, Mumtaz AHMED KAMAL, Naveed AKHTER

Abstract: Natural disaster like Earthquake is the worst of all calamities which claims heavy toll of both life and property. In hilly areas, it causes major destruction because steep and mostly unstable slopes along mountain sides slide down more quickly. Road network, which is also located along mountain side, thus experiences more distresses and failures/collapse. The Earthquake of October 08, 2005 in Pakistan affected the roads in different ways. This paper aims at explaining different types of road failures/distresses of two affected regions. Pavements experienced settlement, severe cracking (both longitudinal & transverse), edge failure, slides, flow of mountain debris, pavement layers flow; retaining wall, bridge and culvert collapse etc. In this research, solutions to all above problems have been proposed using a systematic and concentrated engineering approach.

Key Words: Earthquake, Roads, Cracks

DEVELOPMENT OF PAVEMENT DISTRESS IDENTIFICATION MANUAL FOR MOTORWAY (M-2) PAKISTAN

Kamran MUZAFFAR KHAN
**Abstract:** In the last couple of years the volume of vehicles in terms of number as well as axle load has increased rapidly. This increase in number of vehicles has reduced the carrying capacity of roads, while the uncontrolled axle loads have adversely affected the quality of riding surface and pavement structure very badly. Same is the case with M-2 Lahore to Islamabad Motorway. (M-2). The Distress Identification Manual for flexible Pavement Performance Studies enables agencies to assess the type and severity of pavement distress accurately and uniformly. This manual provides a method for obtaining consistent, repeatable, and quantifiable information. Also it is a basic tool that highway agencies can adopt easily for use with state-of-art pavement management systems. The Manual covers the analysis and evaluation of survey conducted during 2006 which shows the trend of deterioration of Lahore–Islamabad Motorway Pakistan. The manual also provides quantifiable information regarding extent of repairs.

**Key Words:** pavement, distress, manual

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**VISUALIZATION OF HIERARCHICAL SYSTEM OF CITIES IN EAST JAPAN CONSIDERING SUPPLY AND CONSUMPTION BEHAVIOR**

Md. Kamrul ISLAM, Hitoshi IEDA, Kerati KIJMANAWAT, Liqiang MA

**Abstract:** The most of countries’ city system has relatively small number of large cities and large number of small cities. Economy of scale can be enjoyed through cost reduction resulting form high demand within large cities. However, people of small cities would have to travel large cities to buy necessary goods and services paying travel cost. Thus, there exist a hierarchical dilemma between demand and supply within system of cities. The objective of this paper is to provide a survey on hierarchical system of cities in East Japan to understand how the consumption of urban goods/services affects the system of cities. A survey on household shopping behavior was conducted to estimate consumption rate. Limited simulations were performed and four levels of hierarchy were found. Another simulation was performed by changing consumption rate to observe the network change of system of cities. Finally, implications and directions of future research are discussed.

**Key words:** Hierarchical system of cities, consumption rate, goods and services

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**A STUDY REGARDING HOW EXPERIMENTAL SCENARIOS AFFECT READING COMPREHENSION OF DIRECTIONAL SIGNS ON FREEWAY**

Chia-Ming AI, Chin-Zin YANG

**Abstract:** For better understanding how directional signs obtain their guiding objective
towards drivers' intended destinations, this research aims at testing the effects of relevant factors on percentage of correct answers after seeing signs and reading necessary questions. Logistic regression models are developed to depict the mentioned problem. The results show that seeing time has positive effect on reading comprehension, while signs with less degree of complexity are easier to verify, signs on the route involving simplified driving environment make persons have better reading performance as well, seeing at a relative short distance, i.e., seeing larger signs, helps correctly answer regarding content of signs, furthermore, looking towards signs located at lane above distracts one's eyes less than roadside signs. Suggestions about size and display frequency of a sign are provided at the end of this paper with respect to better demonstration for function of directional signs.

Key Words: directional sign, reading comprehension, logistic regression

MAKING PUBLIC INVOLVEMENT PART OF THE HIGHWAY PLANNING PROCESS IN KOREA

Erik CEMPEL, P.E. Young-in KWON, Ph.D. Taewan KIM, Ph.D. Ji-Hong PARK

Abstract: Social conflict related to highway construction in Korea is continuously increasing. As a result, interest, research, and policy-making related to public involvement (PI) have also been increasing. The government has created committees and regulations to find ways to effectively manage conflict. In the highway planning process, opportunities for public debate are extremely limited and come only at the end of the planning process. A successful, ongoing demonstration PI project for the planning of the Chuncheon-Yangyang Expressway has expanded the capability and tools of Korea's highway agencies for involving the public. A PI manual is being developed simultaneously. However, the PI demonstration project also illustrated that PI still started too late in the planning process and that the process still fell short of processes used in Japan and the US. Further, carefully considered legislation will be necessary in order to implement truly effective PI.

Key Words: public involvement, conflict, highways, policy

EXPLORING THE EFFECTS OF EXPERIMENTAL READING SCENARIOS ON COMPREHENSION OF DIRECTIONAL SIGNS ON FREEWAYS BY MARKET SEGMENTATION

Chia-Ming AI, Chin-Zin YANG

Abstract: For better understanding how directional signs obtain their guiding objective towards drivers' intended destinations, this research aims at testing the effects of relevant
factors on percentage of correct answers after seeing signs and reading necessary questions. Logistic regression models are developed to depict the mentioned problem. Persons with traffic academic background perform better in reading and answering questions while compared to persons without such background, however, when this effect is adjusted for other factors, it becomes insignificant. The models with or without traffic expertise really demonstrate different stories in terms of only 5 common factors among 9 kept factors respectively for these two models, so do the models with or without old testing experience, only 4 common factors among 4 and 11 kept factors respectively for these two models, hence market segmentation results can better reflect the real stories.

**Key Words:** directional sign, reading comprehension, logistic regression

SUPPLY CHAIN RISK MANAGEMENT IN THE INTERNATIONAL LOGISTICS ENVIRONMENT

WANG Dan, YANG Zan

**Abstract:** This paper discusses the matter of how to manage supply chain risks in the international logistics environment. It is divided into four parts: first, classification of supply chain risks in the international logistics environment is given, including external risks and internal risks; second, a new method of risk assessment based on fuzzy entropy is put forward, which is validated by a following case study; then some measures about how to manage the supply chain risk in the international environment are summarized; in the end, main conclusions are summed up and several directions of future research are provided.

**Key Words:** Supply Chain, International Logistics, Risk Assessment, Fuzzy Entropy

CREATING ROAD IMAGE ON DRIVING SIMULATOR

Yiming ALIMUJIANG, Akira KAWAMURA, Kazuya TOMIYAMA

**Abstract:** In this paper, we presented a method of building the view image for driving simulator by applying the photographic measurement, based on various road distresses such as cracks, rutting and roughness of the road surface. The method is using a digital camera to obtain the photograph on the road, and then convert the image data into the profile data of three-dimensions. As a result, running environment in an actual road can be created by inputting the three-dimensional profile data to driving simulator, and by reproducing the road image corresponding to this at the same time. The main property of this method is can obtain the data profile from several photographs of the road. Therefore, it is flexible and efficient, especially when the measurements of the road properties have the difficulty due to heavy traffic conditions. Another advantage of this method is
economical and easy to implement.

**Key Words:** Cracking ratio, Roundness, Driving simulator, Road profile

**THE DEVELOPMENT OF MULTIMODAL TRANSPORT AND LOGISTICS IN THAILAND: PLAN AND ACTIONS**

Malee UABHARADORN

**Abstract:** This paper has reviewed the development on multimodal transport and logistics services in Thailand with a view to understand as the key factors for supporting production and distribution system, inventory and distribution management, efficient logistics services, and enhance the competitiveness of Thai products thereby enabling Thailand to be a major player in the world trade by positioning it at the transport gateway and economic centre in the region. This paper has discussed key areas of multimodal transport and logistics services such as demand of freight transport, logistics costs, modal shift, effect of transport costs on trade, and the government policy and action plans towards the development of multimodal transport and logistics services, and the areas of improvement. Finally, the study has outlined as task ahead the national policy framework and action plans for a competitive, efficient and economic functioning of multimodal transport and logistics services.

**Key Words:** Thailand, multimodal, transport, logistics

**TOWARDS MULTIMODAL TRANSPORT AND LOGISTICS SERVICES FOR RISING ASIA: PREPAREDNESS AND ACTION**

Indra P. TIWARI

**Abstract:** This study has analyzed and discussed the state of affairs related to the Asian preparedness and actions, and addressed the multimodal transport and logistics services required for the rising Asia. Motivated to achieve very high economic growth, international trade and tourism, and dedicated to achieve competitiveness, efficiency and economy, the countries are vigorously working to improve their transport network along with the international linkages, liberal operational legislation, simplified and streamlined communications and documents and other services to remove both physical and non-physical barriers for seamless movement of goods and enhance domestic and international trade. Despite daunting tasks, construction, maintenance and management of physical and nonphysical infrastructure and interfacing them with production and distribution delivery systems, are required to be completed to achieve the conditions conducive of the rising Asia.
Key Words: transport, multimodal, logistics, Asia

ASSESSING THE COSTS OF THE PEDESTRIANIZATION OF AVENIDA IN THE CITY OF MANILA

Konstantine KOH, Crispin Emmanuel DIAZ, Hussein LIDASAN

Abstract: In 2003, as part of the City of Manila’s urban renewal program, a section of Rizal Avenue, which is a major national arterial road, was pedestrianized, thereby closing the road to vehicular traffic. Because of this, vehicles that were originally traveling along this road section were diverted to the adjacent local streets which do not have enough capacity to handle heavy traffic volumes. Coupled with heavy volumes of pedestrians and high roadside friction in the downtown area, this resulted in massive congestion and travel delays. Commuters have also suffered with the increase in in-vehicle and out-of-vehicle travel time. On the part of the jeepney drivers, the re-routing meant longer travel distances, hence additional fuel consumption, but without a corresponding increase in fares. This paper attempts to estimate these costs brought about by the project to gain an understanding of its impact on society.

Key Words: pedestrianization, economic costs, Manila streets.

CASE STUDY OF SUSTAINABLE TRANSPORT FOR EAST ASIAN MEGACITIES (STREAM) - URBAN TRANSPORT IN TAIPEI

Cheng-Min FENG, Yi John SUN, Shiaw-shyan LUO

Abstract: This paper presents the preliminary findings of the STREAM case study on Taipei. The focus is on urban features, transport policies, and lessons learned in Taipei, which could be relevant references for other cities. Both quantitative data and qualitative reviews are presented to backup the points of the paper. The urban context and urban transport structure of Taipei City as well as the metropolitan area are first presented. The urban transport strategies and measures adopted in recent years are presented next. Urban transport policy issues and lessons learned are also discussed. Lastly, as a conclusion, key success factors for urban transport summarized from the experiences and lessons learned in Taipei are highlighted.

Key Words: Urban transport, Transport policy, Taipei

STRENGTHENING COORDINATION AND COOPERATION ON SUSTAINABLE URBAN TRANSPORTATION ACTIVITIES IN ASIA
FOR CLEANER AIR AND CLIMATE CHANGE MITIGATION

Cornie HUIZENGA, Herbert FABIAN, Aurora ABLES

Abstract: Asian cities are faced with environmental problems arising from sustained economic development and increasing demand for mobility. In the past years, several institutions have taken on the challenge of promoting sustainable urban transportation (SUT) in Asia. These institutions can be roughly categorized by the focus of their activities, which are (i) policy-oriented initiatives; (ii) research, knowledge management and capacity building initiatives, (iii) policy development and support. However, a disconnect among these groups and their activities still exist, and as such their individual efforts are not able to systematically and promptly push the SUT agenda forward in Asia. The paper provides an overview and assessment of existing regional and national sustainable urban transport (SUT) programs and initiatives and presents a scenario for enhanced coordination and cooperation among these programs and initiatives which can help Asian cities to develop their urban transport systems in a more sustainable manner.

Key Words: international development community, urban transport policies, regional body

EVALUATION OF ROADS NETWORK IN JAPAN FROM VIEWPOINT OF DRIVABILITY

Yukihiro TSUKADA, Tadashi OKUTANI, Shinji ITSUBO, Jun TANABE

Abstract: Drivability is one of important factor for evaluation of level of services on roads network. So that “Drivability Map” was produced by Ministry of Land, Infrastructure and Transportation Government of Japan in 2006. This paper aims to investigate drivers’ evaluation of “Drivability Map” based on results of questionnaire survey conducted in 2006. Validity of drivability ranks which is used in “Drivability Map” is also confirmed through driving experiment. Furthermore present roads network in Japan is evaluated from viewpoint of drivability, and several problems are indicated. Differences of density of roads network between Japan and the United Kingdom are investigated from perspective of drivability.

Key Words: Drivability Map, Level of Service, Evaluation of Road Networks

THE ESTABLISHMENT OF A NEW SCHEME FOR DEVELOPMENT OF URBAN RAILWAY AND OUTLINE OF ITS FIRST IMPROVEMENT PROJECT

Satoru KAJITA
Abstract: A new legal scheme was established in 2005 for development of urban railways that aims to enhance passengers’ convenience by improving existing railway facilities. The scheme adopts separation of infrastructure and operations. The first project under the new scheme to reduce travel time, development of a short connection line between two existing lines, has just been started. It is hoped that the connection line will bring reduction in the travel time, alleviation of the congestion of the existing railway lines and improvement in access to the Shinkansen.

Key Words: Urban Railway, Separation of infrastructure and operations, Improvement of Urban Railway Convenience

BICYCLE FACILITIES INITIATIVE IN JAKARTA

Andi RAHMAH

Abstract: This paper described a first step of transportation sector policy research and advocacy efforts by PELANGI on UNEP-GEF Project with title Bus Rapid Transit and Pedestrian Improvement in Jakarta. The objective of this study is to foster a more sustainable transportation sector by increasingly utilizes non motorized transportation modes as an integrate part of the transportation system. This initiative aims to decrease air pollution, pays careful attention to the affected communities, and to create locally transportation option especially for the urban poor. Therefore, data was collected through in depth interview and focus group discussion to member of Bike to Work community in Jakarta. Result of the analysis shows that by utilized bicycle it can save their transportation cost, in term of money and travel time, respectively 90%, 60% and 50% reduction compare with private car, motorbike and combination of private vehicle and bus/BRT.

Key Words: Bicycle, Facilities, Accessibility, Jakarta

WHAT DID WE HAVE EXPERIENCED AND LEARNED FROM THE HOUSEHOLD TRAVEL DAIRY SURVEY IN SEOUL, KOREA?

Ju-Yeon LEE, Jin-Hyuk CHUNG, Hyung-Jin KIM, Il-Sub PARK

Abstract: The Household Travel Survey in City of Seoul has been conducted every five years since 1996. The third survey was performed in the year 2006, which collected travel and demographic information of households residing in City of Seoul, Korea. The project consists of Weekday Survey, Weekend Survey, and Supplementary Telephone Survey for Correcting the Under-Reporting problems. Sample size of weekday survey should be more than 3% of households (about 102,000 households) in City of Seoul and final sample size after eliminating erroneous samples should be at least 2% of households.
For preliminary and main examination of returned questionnaires, many investigators were hired for about a month. Using survey data, we analyzed weekday and weekend travel characteristics in terms of travel purposes and modes. In this paper, we would like to introduce our survey, and share experience of survey process.

**Key Words:** household survey, travel survey, diary survey

**MANAGING MOTORIZATION AND TIMING OF MASS RAPID TRANSIT IN EAST ASIAN MEGACITIES**

Surya Raj ACHARYA, Shigeru MORICHI

**Abstract:** This paper attempts to explore factors influencing car ownership and car use rates. Through regression analysis, the effects of common urban transport policy measures on car ownership and car use rates are estimated. In addition, dynamics of urban transport system through feedback loops diagram is examined. Our analysis suggests that common policy measures intended to control motorization are effective through their effects more on car use rate than on car ownership rate. Likewise, Mass Rapid Transit (MRT) can play significant role in improving overall condition of urban transport. However, the impact of MRT would be insignificant if the investment is committed too late. A simple index for MRT timing has been proposed that could help policy makers from cities without MRT system to make judgment about the appropriate timing of MRT investment. Regression results, feedback loops diagram and proposed index for MRT timing offer new insights for policy makers.

**Keywords:** Motorization, East Asia, Megacities, Mass Rapid Transit

**ROAD TRANSPORT TAXATION AND CHARGING TRENDS AND STRATEGIES IN EAST ASIA**

Michelle PARUMOG, Surya Raj ACHARYA

**Abstract:** Strategic transport pricing instruments used to internalize social costs of motorization in East Asia remain to be uncoordinated regardless of pressing regional economic integration policies and plans. This article contributes to the limited literature discussing the current situation and policy issues in pricing instruments used in the road transport sector in East Asia. To understand pricing regime in the region we present in this paper: (1) review and comparison of road transport pricing administration in different institutions; (2) issues on the current taxation and charging regime in the region; and (3) panel analysis of the politico-economic variables influencing institutions’ strategic pricing policies. Finally, we discuss implications and recommendations on tax and pricing competition and cooperation in the sector.
Key Words: automobile tax, fuel tax, East Asia, pricing instruments, sustainable transport

CHANGING FEATURES AND CHALLENGING ISSUES ON URBAN DEVELOPMENT AND TRANSPORTATION IN THE SEOUL METROPOLITAN AREA

Hyun-gun SUNG, Ph.D. Hye-Ja KIM, Master.

Abstract: This study introduces challenging issues on urban development and transportation in the Seoul metropolitan area since land use and transportation policies must be more closely coordinated in the 21st century. During the 1990s, Korea has experienced rapid changes in dealing with urban transportation problems such as worsening traffic congestion and increasing travel costs. Although the challenging problems of urban transportation are almost identical between before and after the 1990s, fundamental characters in the new century differ from those of the 20th century, in terms of population migration, suburbanization and travel demand patterns. They are more specifically introduced in the study. The study then investigates challenging issues newly rising in the Seoul metropolitan area with regard to urban development and transportation. The study derives three major challenging issues: growth vs. balance in the global competition era, new development vs. redevelopment in supplying housing, and BRT vs. LRT in mass transit investment.

Key Words: urban transport, urban development, the land use and transportation coordination

SOCIAL EXPERIMENT ON DISTANCE-BASED TOLLING SYSTEM FOR METROPOLITAN EXPRESSWAY

Kouichi SAKAI, Masahiro SHIMAZAKI

Abstract: Tokyo Metropolitan Expressway (MEX) advances the examination for the introduction of a new toll system of use charge corresponding to the distance from a flat rate system that continued for 45 years aiming at fiscal year 2008. Therefore, user's behavior change when a part of charge social experiment was executed in the section in December, 2006, and the traffic charge was changed trying it depending on the use distance and the change in a traffic situation were measured. The use traffic in the experiment section increased by about 20 percent along the route, and the congestion easing and the running speed improvement of the public road that goes side by side were seen. The examination of the toll system according to the distance in which effective use on the network in the metropolitan area is based will be advanced in the future.
**Key Words:** social experiment, distance-based tolling system, increase in expressway usage

**AN ANALYSIS ON THE INTER-INDUSTRIAL DIFFUSION STRUCTURE OF FOSSIL RESOURCE CONSUMPTION**

Kazuaki OKUBO, Hajime INAMURA, Tetsuya GOMI, Shigemi KAGAWA

**Abstract:** The inter-industrial diffusion structure of fossil resource consumption in Japan between 1975 and 2000 is discussed dealing with 315 industrial classifications using a structural modeling. The inter-industrial connection is divided into direct and indirect relations and the energy sources such as primary energy and electric are analyzed. As a result, the energy intensive connections are specified and it is revealed that the diffusion structure of energy consumption is different by the energy class. The changes in the production technology of non-energy sector also have a significant effect into an energy saving. By focusing on the factors that contributed to energy saving, the industry that technology transfer is effective for overseas energy saving was specified

**Key Words:** production structure, fossil resource consumption, inter-industrial energy flow

**CASE STUDY OF SUSTAINABLE TRANSPORT FOR EAST ASIAN MEGACITIES-SHANGHAI URBAN TRANSPORT**

Haixiao PAN, Weiwei LIU,

**Abstract:** This paper discusses on the main Survey results of the STREAM case study on Shanghai. The key content is on urban features, transport structure, transport policies in Shanghai. First, Shanghai’s context, transport infrastructure, travel characteristics has been described. Then Shanghai urban transport objectives, strategies and measures planned for next decade are highlighted in succession. At last, urban transport issue and policy have been analyzed.

**Key Words:** Urban transport, Transport policy, Shanghai

**EVALUATION OF BONDING CONDITION BETWEEN ASPHALT PAVEMENT LAYERS**

Eri Susanto HARIYADI, Bambang Ismanto SISWOSOEBROTHO, Bambang Sugeng SUBAGIO, Djunaedi KOSASIH
Abstract: Bonding condition between asphalt pavement layer has significance influence on the stress distribution across pavement layer under traffic loads. Should the bond at interface be inadequate, the strain throughout the pavement under traffic load may increase and its life consequently be reduced. This paper described the laboratory assessment of bonding condition between asphalt pavement layer using the modified Direct Shear Test which previously applied in soil test. Bonding properties are characterized by Bond Stiffness and Bond Strength and both are investigated using modified Direct Shear Test. The test are applied to fabricated samples and resulting various factors such as tackcoat rate, tackcoat type, mix type and temperature are implemented. The results show that temperature are the most influenced factor to the bonding condition between pavement layer.

Key Words: Pavement Bonding, Direct Shear Test, Bond Stiffness, Bond Strength

EFFECTS OF SURFACE NANOCRYSTALLIZATION METHODS AND SURFACE STATES ON FATIGUE STRENGTH OF TA2

WEN Ailing, WANG Shengwu, REN Ruiming, YANG Junyong

Abstract: The enhancement of the fatigue strength is significant for the engineering applications of commercial pure titanium and its alloys. The paper investigated improvement of fatigue strength for commercial pure titanium by combined high-energy shot peening. Firstly, nano-crystallization in surface layer of pure titanium was carried out by high-energy shot peening, and then the shot peening with small diameter shots was introduced to degrade the surface roughness, enhancing the quality of the nano-grained surface. The fatigue limit of pure titanium by high-energy shot peening turns out to be increased by 34%, and the fatigue limit of pure titanium by compound high-energy shot peening turns out to be increased by 52.3%, according to the results. Effective factors such as surface states etc. to fatigue life, the fatigue crack initiation and propagation behaviors were also discussed in this paper.

Keywords: combined high-energy shot peening, nanocrystallization, fatigue limit, titanium

THE RESEARCH OF PROCESSING TECHNIC FOR DIE-PRESSING BASED ON FEA

WANG Shengwu, ZHAO Huairui, WEN Ailing

Abstract: Based on MSC.MARC software, mechanical model for die-pressing (DP) was established, with which large deformation analysis was conducted. The agreement of finite element method and experimental outcomes is good enough. Through solving the model, the relationships between die-pressing depth, friction factor, the modular angle
of the die and residual stress are obtained, under different contact conditions of workpiece and the die, which will lay a foundation in theory to design die-pressing tools, to arrange the pass in front of forming progress and eventually enhance the efficiency of DP working. The efficiency for enhancing the load-carrying capacity of structural elements with cylindrical holes subjected to bending load has been proved by means of FE simulation.

**Keywords:** die-pressing, residual stress, numerical simulation

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**A STUDY ON COMPETITIVENESS OF INCHEON INTERNATIONAL AIRPORT FOCUSING ON MEASURING THE SERVICE QUALITY OF PASSENGER**

Seock-Jin HONG, Tae-Kyu KIM

**Abstract:** This paper identifies eight dimensions underlying the overall service quality in passenger terminals. These eight elements were found from research through relevant documents. Out of these eight elements, four broad dimensions of service quality (reliability, responsiveness, assurance, empathy) were identified in Parasuraman, Zeithaml, and Berry's research. The research explains the linkage between the overall satisfaction of Incheon International Airport and five services that influence those satisfactions. The five services would be as the following: service quality of passenger terminals, commercial facilities services, easy access by transportation, service quality of the airlines, and contributions to the community by IIAC. This paper has four significant values. First, it tried to research passenger terminal oriented service quality. Second, it tried to research service quality focusing on a three-cornered relation among passengers, and the employees of the airline and IIAC. Third, it tried to research service quality focusing on IIAC's employees.

**Key Words:** Airport Service, DEA CK, Incheon International Airport

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**EXAMINING EFFECTS OF TDM WITH TOLL DISCOUNT ON MITIGATION OF EXPRESSWAY TRAFFIC CONGESTION**

Hideki TAKAHASHI, Hiroyuki KAMEOKA, Kazumi MABUCHI, Hisanaga SATO, Jian XING

**Abstract:** This paper describes the results of TDM implementation with toll discount for ETC vehicles, which is intended to mitigate congestion for an uninterrupted flow section of the Tomei Expressway. As an initial trial for mitigation of congestion on Japanese intercity expressways, the TDM was implemented during the New Year period of 2007. Though traffic congestion still occurred partly because of increased daily traffic volume
and insufficient shift of traffic demand from peak hours to off-peak hours, it is estimated that total delay is reduced by 35\% as compared to the one predicted in case of no TDM implementation. It seems difficult to expect the shift traffic if the amount of discount is less than 1000 yen or so. Moreover, it is found from a questionnaire survey that about 50\% of targeted drivers were aware of the New Year early morning discount and the induced demand was about 2\%. Finally some issues are also addressed.

*Key Words:* TDM, measure against expressway traffic congestion, toll discount for ETC vehicles

**CHALLENGES FOR SUSTAINABLE MOBILITY IN MEGACITIES:A CASE OF GREATER JAKARTA**

Danang PARIKESIT, Bambang SUSANTONO

**Abstract:** This article investigates the development of Jakarta urban transport, its challenges and options for catering future demand for mobility. The paper utilizes data from various studies and projects between 1978 until 2006. It portrays the change of policies and its impacts to transport and environmental indicators using time-series and descriptive analysis. The paper suggests that Jakarta and Greater Jakarta have grown into Megacities with a lack of planning control. The urbanized area has grown into enormous geographical scale which makes it difficult to manage and has created serious problems in air quality. However, success story with Jakarta BRT / Busway system has given the city a self confidence to promote further sustainable transport while the challenge is to maintain the development momentum for further implementation.

*Key Words:* Urban transport, Megacities, Jakarta, Policy development

**IMPROVEMENT OF ROADWORK SCHEDULING USING THE CALENDAR SYSTEM TO RESTRICT PEAK TRAFFIC DAY WORK**

Shuntaro KAWAHARA, Masahiro OOE, Yutaka SUZUKI, Hidenori YODA

**Abstract:** Since unexpected delays caused by roadwork are a typical cause of motorists’ dissatisfaction, practical roadwork management is the present focus. To minimize roadwork’s adverse effect on highway traffic, construction is to be scheduled for off-peak traffic periods. This report outlines the development and use of a roadwork scheduling tool called the “Calendar System” prepared by the Akita National Highway Office. The Calendar is used to restrict construction on “no-work days” corresponding to annual peak traffic periods and marked preliminarily according to previous years’ traffic profiles collected by permanent traffic counters. Although the system is a static management method that cannot reflect influence of construction on highway traffic, it is easy to prepare and to use, brings highway administrators no additional work costs, and
effectively reduces drivers’ time loss due to roadwork in cases where annual traffic fluctuation is large enough and has a stable traffic pattern.

**Key Words:** roadwork, off-peak scheduling, Calendar

**ISSUES AND DIRECTIONS ON INTEGRATED PUBLIC TRANSPORT IN METROPOLITAN MANILA**

Noriel Christopher C. TIGLAO, Ildefonso T. PATDU, J

**Abstract:** The urban population of Metro Manila continues to expand along with high rates of suburbanization at adjoining municipalities. This greater metropolitan region is now referred to as 'Mega Manila'. The resulting urban pattern is one where an increasing number of people live at the fringes of the metropolitan area but still need to travel to the city centers to work or study. In order to sustain economic growth and development and to protect the environment in the region, there is a need to increase mobility through the provision of an integrated public transport system. This paper reviews the various sustainable development and management issues and policies impinging on the public transport system of Metro Manila. The paper also reviews and evaluates existing policy directions in relation to the development of an integrated public transport system for the metropolis.

**Key Words:** integrated public transport, sustainable development, mega-city

**EAST ASIA INTERNATIONAL COMPETITIVENESS INDEX FROM THE VIEWPOINT OF INDUSTRY ~ JAPIC INTERNATIONAL COMPETITIVENESS INDEX ~**

Masayuki TAKASHIMA, Toru AMANO, Atsushi HASEGAWA, Yasushi TSUTSUMI, Masanao FURUTA

**Abstract:** "International competitiveness" is fundamental to government policy and economic planning and activities, and is a very important keyword in national strategy. However, at present there is not a single definition of "international competitiveness," and although this word is shared by each industry, the perception of international competitiveness is by no means shared. This is said to be because to measure competitiveness, various indices are used, and the ranking of the results is given more attention than the objectives or the structure of the indices. The public frequently hears of the IMD index; however, when viewed from the standpoint of industry, the ranking results frequently seem inconsistent. Therefore, Japan Project-Industry Council (JAPIC) has proposed a new "JAPIC International Competitiveness Index," focused on the East Asia region as the continuing "growth center of the world," from the point of view of how to cooperate with each country to strengthen, maintain, and develop
competitiveness.

**Key Words:** International Competitiveness, East Asia, Industry