

Abstracts – 2006 Trinity College Dublin

2A - Accessibility

Envall (Smeed) : BARRIERS TO ACCESSIBILITY PLANNING: - A SURVEY OF LOCAL AUTHORITIES [Inst. for Transport Studies, University of Leeds]

ABSTRACT: The scope of this study is to provide new knowledge that can help to guide successful implementation of accessibility planning. A questionnaire was used to evaluate a number of hypotheses, exploring the barriers to accessibility planning. The questionnaire survey was carried out during February and March 2005. The survey received a 63% response rate among LTP authorities, which gives confidence in the generality of the conclusions. Full responses were received from a total of 103 local authorities. The results of the survey supported two of the hypothesised barriers, while three research hypotheses were at least partly rejected. • Over 1/3 of LTP authorities disagreed or strongly disagreed that the software tools needed to carry out accessibility analyses were easy to use. This supports the hypothesis that, at least for some local authorities, the tools and data needed in order to quantify accessibility were not available and therefore the intentions of accessibility planning were not achievable for them at the time for the survey (Hypothesis 1). • 56% of respondents disagreed or strongly disagreed that the core walking accessibility indicator was reliable for the purposes of accessibility planning. This indicates that, at the time for the survey, the problems of walking indicators suggested for accessibility planning have been of such magnitude that commonly employed accessibility indicators were not useful for the purposes of transport planning (Hypothesis 2). • The respondents do not give any support to the hypothesis that accessibility planning does not fit the transport planning culture (Hypothesis 3). An overwhelming majority, three-quarters of respondents, agreed that accessibility planning fits into the culture and context of transport planning. • The respondents from LTP authorities indicated that accessibility planning would facilitate public transport improvements to key services for general users. This partly rejects the hypothesis that local authorities found accessibility planning to be a useful tool for dealing with access problems in certain areas of deprivation but not as an instrument for facilitating a general improvement in accessibility by walking, cycling and public transport (Hypothesis 4). However, only a small proportion of respondents anticipated a significant change in access by walking and cycling in general, which partly supports the hypothesis. • It was expected that the outcomes of accessibility planning in terms of improved accessibility for the targeted groups would be correlated with any conflicts with local economic policies (Hypothesis 5). A statistical analysis disproved strong links between local economic policies and the outcomes in terms of improvements of walking, cycling and public transport access. Interestingly the survey results indicated that LTP authorities and non-LTP authorities expectations differ somewhat. Non-LTP authorities expected those without a car to benefit from the greatest positive change, while LTP authorities, in charge of the accessibility planning process, anticipated public transport users in general to be the ones that benefit the most. Accessibility planning was believed to have the lowest positive impact on car users followed by cyclists, children from deprived neighbourhoods and pedestrians.

Woods : Travel Choices in Scotland – the effect of local accessibility on non-work travel [University of Strathclyde]

ABSTRACT: Accessibility features prominently in the developing transport policies of both the United Kingdom Government and the devolved Scottish Executive which aim to promote social inclusion and integration of transport and land use planning. It follows that a detailed understanding of the relationship between accessibility, personal mobility and travel behaviour is critical to the successful implementation of these policies. This paper presents the results of a disaggregate, multi-level

analysis of the Scottish Household Survey (SHS) dataset and attempts to unravel the complex relationship between socio-economical circumstance, geographical access to local services and public transport and revealed non-work travel choices. The SHS is a continuous, cross-sectional survey and undertaken by face-to-face interview based on a sample of the general population in private residences in Scotland. It seeks to provide information on the composition, characteristics and behaviour of Scottish households. The survey includes a travel diary completed by a randomly selected adult member of each household. The dataset analysed in this paper was collected between 1999 and 2003 and contains over 75,000 surveyed households and over 49,000 completed travel diaries. An index representing proximity to local services at electoral ward level derived and a locational classification for each respondent which captures settlement size and wider regional accessibility were added to the dataset. The primary focus of the analysis presented in this paper is an examination of the extent to which the quality of local access to services affects travel distance for non-work purposes. Individual and household socio-economical circumstance, available transport resources (both car ownership and local access to public transport) and the wider regional geographical context are also taken into account. Given the hierarchical structure of the data used, a multi-level analytical approach is employed to develop a model of distance travelled for non-work purposes.

Hu (Smeed) : INCORPORATING TRANSPORT ACCESSIBILITY AND TRANSPORT POLICY MEASURES IN SHOPPING TRIP GENERATION MODELS [Napier University]

ABSTRACT: This paper presents an investigation to include transport accessibility and transport policy related variables (parking costs, public transport costs and petrol fees) in the models of shopping (non-food) trip generation. Perceived accessibility measures are first developed for public transport users and private car users which take into account people's opinions on public transport services and traffic levels, and then they are used in shopping trip generation models in Edinburgh area by both linear regression (LM) and Multinomial logit (MNL) techniques. The results indicate that both accessibility measures are statistically significant in the models which suggests that people's opinions on public transport services and traffic levels play an important role on people's shopping travel behaviour, not just the ACTUAL levels of public transport services and ACTUAL traffic levels. The results also indicate the relevance of transport policy related measures and the number and frequency of shopping trips. This research helps to identify means to incorporate transport accessibility in trip generation models and provide a better understanding of relationship between people's attitudes and their consequent travel behaviour. This suggests that the ways that can make people know more about transport services and/or change people's attitudes be investigated and applied in traffic demand management.

2B - Air Transport

Dennis : [University of Westminster]

ABSTRACT:

Marsden : Kiss and Fly - A study of the impacts at a UK regional airport [Institute for Transport Studies]

ABSTRACT: In the light of the forecast growth in air transport the UK Government has placed a requirement on all airports with substantial air transport movements to implement surface access strategies. The emphasis of surface access policy has been to increase the proportion of people arriving at airports by public transport by a variety of means such as managing parking supply and pricing and improving public transport. The extent to which these policies will be effective will depend on a number of factors such as the quality and availability of the alternatives, the availability

of competing off-site parking and the extent to which kiss and fly is feasible. This paper reports on two studies of passenger access to Leeds-Bradford International Airport in the summers of 2004 and 2005. The airport has an aspiration to increase public transport use to the airport from its current level of 3% to 10% by 2010. The principal means by which this is currently planned to be achieved is through the expansion of scheduled bus services to Leeds, Bradford and Harrogate. The 2004 study found that 49% of passengers were dropped off at the airport by friends and that the potential for larger quantities of people to reach the airport by conventional bus services was limited. The 2005 study investigated the extent to which these kiss and fly journeys generate extra travel on the road network. The results show that for an airport with around 2.5 million passengers the Kiss & Fly journeys are creating an extra 19.4 million kilometres, an increase of 36% over the distance that would have been travelled if people had driven and parked. The paper concludes that a charge levied on all vehicles accessing the airport, similar to a congestion charge, is likely to have the greatest impact on travel behaviour and will have a far greater impact on the environment than the current emphasis on public transport improvements and parking restrictions.

McHardy : ON THE EFFECTIVENESS OF AIRPORT PRICE REGULATION [University of Sheffield, University of Hull]

ABSTRACT: This paper explores the relative effectiveness, in terms of preserving the benefits to consumers, of alternative regimes of airport price regulation. Its approach is mainly theoretical, but it is firmly grounded in current policy debates. The paper compares a system of single till (price-cap) airport regulation, as used in the UK, with the dual till alternative under a range of competition and ownership scenarios. We construct a stylised model of an international air-passenger network which comprises five distinct sectors: domestic and foreign commercial and non-commercial (non-commercial) airport services, and an airline sector. Two important results of the paper are that, for any given price-cap, dual till regulation tends to become less effective in the domestic economy the lower the level of competition facing the domestic airport in its own (commercial and non-commercial) services and the greater the degree of complementarity between those services. The single till alternative remains robust under these conditions as long as there is no integration between the domestic airport and an airline; such integration, under a single till regime, may allow the domestic airport to undermine airline competition, leading to higher overall consumer prices. One of the principal recommendations which follow from the paper is that the choice of an appropriate regulatory regime for price regulation in airports must consider the degree of competition, integration and complementarity between the various sectors of the industry.

2C - Business Impacts

ferilli : [SBE/TRI Napier University, Edinburgh]

ABSTRACT:

Holley : TOWARDS AN UNDERSTANDING OF THE USE AND VALUE OF BUSINESS TRAVEL TIME [University of the West of England (UWE)]

ABSTRACT: Travel undertaken in the course of work, or 'business travel', is a feature of many types of employment. Currently UK government guidance for transport appraisal assumes that time spent travelling in the course of work is, at least partially, unproductive and that a reduction in this time will result in a conversion to productive time. For the assumptions to remain appropriate it must first be understood what constitutes productive travel time before assessment can be made as to whether this time will be affected by a reduction in journey time. Approaches designed to improve the productivity of manual workers (such as Taylorism) would appear to support the appraisal assumptions. However, there are an increasing number of employees in the UK engaged in

knowledge work, for which the issue of productivity is seen very differently. For this growing minority of business travellers it is questionable whether travel time savings will reduce only unproductive time. This paper examines what constitutes productive and unproductive time for these travellers, and discusses how the PhD entitled 'Time Use of the Business Traveller' is attempting to answer the questions raised throughout this paper.

Donnelly : [University of Ulster]

ABSTRACT:

3A - Travel Behaviour

Hamilton : The Impact of Work Travel on Traffic Congestion and Employee Attitudes to Alternative Modes of Transportation: A Case Study of Dublin, Ireland [University College Dublin]

ABSTRACT: The rise in private car ownership brings with it one of the most dominant transport problems – congestion, which has led to dramatic changes in journey to and from work. This paper will focus on the promotion of sustainable methods of travel and in particular on the use of work based travel plans, which utilise a variety of transport modes. The successful use of these plans to reduce congestion in the UK will be examined with a view to ascertaining to what extent this success may be emulated in Ireland. This paper will analyse travel patterns, obtained from a work based survey, of employees from two Dublin based companies - one city centre and one suburban. The purpose of this is to gain a better understanding of the difference in travel options between the two areas. This paper will conclude that even though there is a vast difference in travel patterns between urban and suburban areas of Dublin, attitudes towards modal change are similar, indicating a need for a more in-depth investigation into travel behaviour and trip-chaining.

Vega : [University College Dublin-School of Economics and Geary Institute]

ABSTRACT:

liu : [Imperial College London]

ABSTRACT:

Stanbridge (Smeed) : The residential relocation timeline of travel considerations [University of the West of England]

ABSTRACT: The paper seeks to highlight in particular the travel behaviour change occurring following a key life event of moving home. Over 50% of a survey sample of 179 recently moved households were found to have changed main travel modes since moving home, for at least one routine journey purpose, such as commute or grocery shopping. The extent of change already occurring over a home move serves to highlight that travel mode can change and therefore can be changed (Goodwin, 1997). Moving house is therefore confirmed as an ideal time to target travel behaviour change interventions, to promote further positive change. The paper discusses how understanding the processes leading to the observed behaviour change is key if further positive change is to be promoted. The paper details development and application of the Residential Relocation Timeline (RRT) from qualitative interviews, a timeline of stages during the moving process that travel might be considered. A series of questions surrounding travel mode change and the RRT timeline are explored using results from both qualitative in-depth interviews and a survey covering a greater cross-section of the population. The stage at which households are selecting the areas to search for a new home is identified as the point at which most consideration occurs, and therefore where

habits are likely to be at their weakest and most susceptible to change. Implications of this and possible interventions are discussed.

3B - Highways

Hashim (Smeed) : EXPLORING THE RELATIONSHIP BETWEEN SAFETY AND THE CONSISTENCY OF GEOMETRY AND SPEED ON RURAL SINGLE CARRIAGEWAYS [TORG, University of Newcastle]

ABSTRACT: In the UK many rural single carriageway roads with lower traffic flows remain “undesigned” and follow an alignment dictated by historic land boundaries, and fall below the current design standards. It has been shown by accident statistics that these rural single carriageways exhibit much higher rates of injury (per vehicle kilometre) than those designed to modern standards. Replacing older roads with new ones will therefore reduce accident risk. However this is not affordable across the whole network. The concept of geometric design consistency provides a technique to correlate accident risk with geometric alignment and to give guidance as to how road improvements can be targeted to make the best use of available resources. A substantial sample of undesigned roads in north-east England subject to the national speed limit was used in this study. Alignment, traffic flow, accident and other data were collected from various sources. Operating speed models that are necessary to calculate the consistency measures were developed. These speed measures and others were defined for the study. Accident frequencies were calculated for all injury accidents and related to corresponding road section and elements, then subdivided by severity and number of vehicles, creating five different accident groups. Using Generalised Linear Modelling several consistency accident prediction models for each accident group were developed. It was found that there is a strong correlation between accident frequencies and various consistency measures. Different measures fitted better to different accident subgroups.

Gunay : Statistical analysis of lateral position of vehicles negotiating bends [University of Ulster]

ABSTRACT: The paper has revealed that the lateral position of traffic exhibits a different pattern at horizontal curves and roundabout circles when compared with that of straight sections. It was observed that drivers tended to straighten their travel path as much as possible when negotiating these bends in a corner-cutting fashion. In addition to early skid resistance loss, this behaviour results in the early scuffing and removal of road markings. Preliminary data were collected at eight different sites in N Ireland. It was found that the expected geometrical location of the wheel path is not the same as the actual observed location of the wheel path at certain sections of highways. On horizontal curves, the most travelled wheel-path is shifted toward the convex side of the curve, and this shift increased with increasing radius, such as at roundabouts where it reaches a maximum displacement. This shift was about 140 cm in the outer circles of roundabouts and about 60 cm in the inner circles. For horizontal curves the figure was in the region of 30-40 cm. Therefore when skid resistance tests are carried out along the road these curvatures must be taken into account.

Rodgers : The Effects of De-icing Chemicals and Freeze-thaw Cycling on Asphalt Strength [University of Ulster]

ABSTRACT: De-icing chemicals used in the winter to combat the formation of ice on the pavement surface only suppress freezing temperatures, and do not act to alleviate the effects of low temperatures and subsequent freeze-thaw cycles. The low temperatures endured by the pavement can effect the structural integrity of the asphalt, and freezing fluids can cause frost heave that can cause pavement failure. The lack of standard testing methods led to development of one that would allow both the effect of chemical applications and temperature fluctuations on asphalt surface course materials to be quantified. The Indirect Tensile Strength (ITS) test was used to determine the indirect tensile strength of various asphalt materials, ranging from bitumen macadam to stone

mastic asphalts. Test temperatures were based on other standards; however they do focus on the upper and lower ranges that can be experienced during winter. The cycling format was based on a 24-hour period; twelve hours for the freezing stage, and twelve hours for the thawing and salt immersion stage. Analyses of data have shown how bitumen embrittlement affects strength, and how the ITS for the asphalt samples tested were five to six times greater at low temperatures than at the upper temperature limit. However, applied freeze-thaw cycles, yielded a decrease in the ITS values, but there was also a healing or recovery of the materials when left to acclimatise for a greater period of time after cycling had finished. This study showed that asphalt is subject to decreased strength as a result of winter conditions, and raised further questions such as; does asphalt regain 100 percent of initial strength, and what part does thermal contraction of materials, and thermal expansion of entrained fluids play on decreasing strength? These questions will be addressed during the final year of this PhD research project.

3C - Accidents

Evans : Interactions between rail and road safety [Imperial College London & University College London]

ABSTRACT: This paper presents and discusses the results of an investigation into ways in which the risks of travel on road and rail interact with each other, other than through physical contact such as at level crossings. The principal source of data on travel patterns is the National Travel Survey for 1999- 2001. The data on risks come from various sources: the DfT estimates of casualty rates by mode, the national road accident database, HM Railway Inspectorate and the Rail Safety and Standards Board. The average distance walked to and from stations in connection with journeys on the main line rail system is 0.9 kilometres, and such walking accounts for just under 5% of all walking nationally. Walking to and from stations is estimated to account on average for 65% of the overall door-to-door risk of being killed on rail journeys; the rail system itself accounts for 21%, and other access modes account for the remaining 14%. Increasing rail fares can be expected to cause passengers to change mode from rail to car, and thus increase overall risk for diverted passengers. Therefore if rail safety measures are funded by increases in rail fares, it is possible in principle for the safety measures to lead to an increase rather than a decrease in overall risk, as the increase in risk caused by diversions to car may outweigh the reductions in risk on the rail system itself. However, applying a rail/car modal split model developed from NTS data suggests that such counterproductive effects are likely to be small in practice. For most sensible rail safety measures, that is ones for which the safety benefits are reasonably related to the costs, the additional risk from diversions to car are negligible compared with the intended rail safety benefits.

Memon : ROAD ACCIDENT PREDICTION MODELS DEVELOPED FROM A NATIONAL DATABASE:POISSON AND NEGATIVE BINOMIAL REGRESSIONS [Centre of Transport Studies University College London]

ABSTRACT: The purpose of this paper is to develop road accident prediction model and to identify the important variables for the occurrence of accidents so that new insights can be obtained for safety intervention programs in the Great Britain. Generalized regression models with Poisson and negative binomial probability functions were fitted by using GenStat software. The daily accident data were extracted from official STATS 19 records from 1991 to 2002. Two data sets were developed, one for whole of Great Britain and other for 51 groups of counties separately. Each group represents a Police force that covers one or more counties. The variables used were Day, Month, Day.Month, Year, Holidays, Christmas, Time, New-year for the data set of whole Great Britain. The variables of Population, Length of roads, Population density and the Police force were used in addition to all other variables for the data set of 51 groups of counties. An incremental approach was used for adding variables during the modelling process. The negative binomial regression model

was selected because the data were found to be over dispersed relative to a Poisson process. The most dangerous day and month were found to be respectively Friday and November. Christmas, New-year and Holidays had fewer accidents than other days probably because of low traffic. The Day of week, Population, Population density, Length of Roads and Police force variables were found to explain most of the variation in daily accident occurrence. Keywords: Negative binomial regression, Poisson regression, STATS 19 data, standardized deviance residual.

PAI : Exploring Motorcyclist Injury Severity at T-Junction in Great Britain: an Application of the Ordered Probit and Ordered Logit Models [Transport Research Institute, Napier University, Edinburgh]

ABSTRACT: There exist several studies examining influential factors on the occurrences of different crashes between various motorised vehicles but very little has empirically investigated the relationship between various crash configurations, happening at a specific type of junction, and different motorcyclist injury levels. The complex interaction of factors, for example, different crash types, traffic control measures and the involved vehicles, which influence motorcyclist injury severity resulting from a junction-type accident, needs to be explored and understood. In order to untangle the contributions of crash configurations, traffic control measures and the involved vehicles, this study aims at investigating crash consequences conditioned on crash occurrence at T-junctions in the UK, while controlling for environment, vehicle and demographic factors. The statistical modelling techniques applied are the ordered probit (OP) and the logit (OL) models using the data extracted from the UK STATS19 accident injury database (2002), measured on three injury levels: fatal, serious and slight. In our analysis it is found that the predictability of the OP is slightly better than the OL. Factors found to be most significantly associated with the increased motorcyclist injury levels at T-junctions include: male riders; older riders; greater motorcycle engine size; riding during early morning and on weekends; street lights unlit; stop, give way signs or markings as traffic control measures; on non built-up roads; hit by bus/coach and heavy good vehicles; and while involving in approach turn collisions. The implications of this study and findings are then discussed.

4A - Modelling Travel Behaviour

Avineri : MODELLING SOCIAL INTERACTIONS IN MULTI-AGENT TRAFFIC SIMULATIONS [Centre for Transport & Society, University of the West of England, Bristol]

ABSTRACT: Traffic simulation models include the mathematical and logical abstractions of real-world systems implemented in computer software. They are designed to emulate the behaviour of travellers in a traffic network over time and space and to predict system performance. Multi-agent simulations are an emerging and promising trend in traffic simulations. Each traveller may be represented as an individual "agent" that makes independent decisions about its desired use of the transport system (travel mode, route, departure time, etc.). Multi-agent simulations can be used to aggregate the behaviour of autonomous agents. Better understanding of the psychological and social aspects of travel behaviour may improve the development of multi-agent simulations. In this paper some basic aspects of dynamic social behaviour are demonstrated using a simulation as well as a laboratory experiment, featuring the well-known Braess' Paradox. An observation of the empirical results and a comparison with the User Equilibrium and the System Optimum is demonstrating the need to include social aspects in applications of multi-agent traffic simulation.

Ma : [University of the West of England]

ABSTRACT:

4B - Public Transport

Caulfield (Smeed) : Passenger Preferences for Real-time Information [Trinity College Dublin]

ABSTRACT: Research has shown that the provision of accurate and extensive information on public transport services is seen as paramount in encouraging the use of public transport. This paper examines how passengers value real time passenger information (RTPI), what format they require this information and at what stages of a passengers journey they require time information. The paper details the results from a survey of individuals based in Dublin city centre. The methodology used to ascertain passenger preferences for RTPI was via stated preference experiments. The results from the survey will contribute to the field of research providing findings on respondents' willingness to pay for RTPI, the types of information respondents require, the methods by which individuals require this information and at what stage of a passengers' journey. The paper presents the findings on what causes passengers frustration when they are using public transport, and their opinion of the current provision of public transport information. The results on how much more often passengers would use public transport if they a system of real-time information were introduced in Dublin. The relationship between the method of information provision and the stage of a passenger's journey is already reported. The paper concludes with recommendations on the research undertaken in this project.

Schmöcker (Smeed) : An Approach to Dynamic Transit Assignment with Consideration of Capacity Constraints [CTS, Imperial College London]

ABSTRACT: This paper presents an approach to dynamic frequency-based transit assignment with strict capacity constraints. The central idea is the introduction of a "fail-to-board probability" to acknowledge that in some circumstances passengers are not able to board the first service arriving due to overcrowding. The common line problem is taken into account and the search for the shortest hyperpath is thought to be influenced by the fail-to-board-probability. The network loading assumes passenger mingling (in opposite to FIFO behaviour) and the priorities of on-board passengers to those wishing to board is strictly observed. The simulation period is divided into several time intervals and those passengers who failed to board are added to the demand in the subsequent time interval. It is further considered that some long trips have to be carried over to subsequent time intervals. The paper concludes by presenting a case study with London data. Transit capacity problems are experienced daily during the peak of the peak in London. The case study, though with some rough demand estimations, illustrates that this approach can highlight the capacity problems of the London network.

McHardy : INTEGRATED TICKETING AND REGULATION IN A SIMPLE TRANSPORT NETWORK

[University of Sheffield, University of Hull]

ABSTRACT: In this paper we explore alternative pricing and regulatory strategies within a simple transport network with Cournot duopoly and differentiated demands. We show that whilst firms always prefer to offer integrated ticketing, a social planner will not. With integrated ticketing, the firms always prefer complete collusion but there is not a uniform ranking of some of the less collusive regimes. Society generally prefers the less collusive regimes to complete collusion but prefers some collusion to independent pricing.

4C - Sustainability

Grimley : Indicators of Sustainable Development for Civil Aviation [Loughborough University]

ABSTRACT: The civil aviation system is analysed directly against the principles of the Rio Declaration and the actions of Agenda 21 to derive sustainable development issues and actions for civil aviation.

The analysis is tested based on a Delphi study of expert opinion from UK stakeholder organisations – operators, suppliers, regulators and those affected. The first round Delphi study seeks stakeholder views on targets, issues and actions for sustainable aviation; the different stakeholder groups hold widely divergent views. The second round Delphi explores experts' views on potential indicators; here there is rather more agreement between stakeholder groups. Expert views tend to strongly reflect sectional interests; in some respects these views diverge from sustainable development principles. The experts' selected indicator set is augmented to reflect sustainable development principles. Thirty indicators of sustainable development in civil aviation are proposed at airport, airline, national and international levels. The indicator set covers the social, economic, environmental and institutional dimensions of sustainable development, and includes state, driving force and response indicators. Indicators are populated with available data where possible, though at the airport level much of the required data is not published in a consistent manner. A major finding of the research is that there is a gap between current practice of the aviation industry and the principles of sustainable development. Evidence indicates that in some aspects this gap is set to widen in future.

Line : The Attitudes of young People Towards Sustainable Transport [University Of The West of England]

ABSTRACT: This paper considers that a fuller understanding of the public's attitudes towards and perceptions of transport is essential in the development of successful campaigns and policies aiming to encourage more sustainable transport behaviour. The paper seeks to clarify: the importance of understanding the attitudes and perceptions of young people (the future users and decision makers in regard to transport); what is currently understood in this area through a review of the current literature; where new research can make a contribution to knowledge; and subsequently a conceptual framework is developed to guide proposed new research. Specifically this research will seek to: identify which sources of knowledge impact on the attitudes of young people towards transport; examine how these sources of knowledge impact on their attitudes; investigate what and how subjective factors impact on young people's transport related attitudes; and determine to what extent perceived control over behaviour affects their attitudes and behaviours. Each of these factors is considered in the context of the changes in life stage that young people experience as they age. In addition, the paper justifies and outlines a methodology for successfully capturing the perceptions and attitudes of young people in their own words. The research will be using participatory methods, in particular a combination of photography and discussion groups, which has the potential to act as a highly successful way of involving young research participants (aged between 11 and 18 in terms of this research) and revealing depth insights.

Stapleton : A Framework For Promoting Sustainable School Travel Initiatives Using The Theory Of Planned Behaviour [Institute For Transport Studies, University Of Leeds. Department Of Psychology, University Of Sheffield]

ABSTRACT: The amount of children being driven to school has seen a significant increase in recent years. This increase has a number of detrimental consequences concerning the effect that travel to school by car can have on a child's mental, physical and emotional health. In addition to this there is the contribution of school run traffic to peak time congestion and negative environmental effects caused by increasing car use. This paper outlines a framework for designing an intervention aimed at increasing the incidence of parents walking their children to school using the Theory Of Planned Behaviour (Ajzen 1991). In line with previous TPB literature explaining mode choice, the direct contribution of the attitude variable to the intention to walk to school in the overall analysis was insignificant. Thus this paper outlines a process of intervention design aimed at affecting normative and control perceptions on the basis of their significant contribution to the intention to walk to school.

5A - Transport Modelling

Timms : RESEARCHING THE HISTORY OF TRANSPORT MODELLING [ITS, University of Leeds]

ABSTRACT: This paper gives an outline of a field of transport research that has not attracted much attention in the past: the history of transport modelling. The paper firstly provides a justification as to why such a topic should be studied at all, and then suggests methods by which it could be pursued. The bulk of the paper gives an overview, and suggestions for future research, for four periods/themes in transport modelling history: before (the end of) World War 2; the period from 1946 to 1965; entropy and critiques of transport modelling in the late 1960s and the 1970s; and metaphors/prediction in the period covering the 1980s to the present day. A large part of the contents of all sections is devoted to outlining key texts that will be analysed in depth in future research. Extracts from these texts are provided and discussed, and short explanations are given as to why the texts are significant.

Iryo : A THEORY OF NETWORK CONGESTION ESTIMATION WITH TRAVEL TIME DATA ON LIMITED LINKS [Kobe University and Institute for Transport Studies at Leeds University]

ABSTRACT: One approach to reduce the cost for congestion monitoring in a city is to reduce the number of surveyed links. This study proposes a theoretical method for estimating congestion levels in an urban road network with travel time data from a subset of links in the network under the assumption of Wardrop's equilibrium. The paper gives a theoretical condition for valid estimated travel times for a given set of observed link travel times which may yield non-unique solutions. Then, under an assumption that all nodes are origins and destinations and all pairs of them form OD pairs we prove the strong upper bound of the estimated link travel times. For a general problem, we propose a way to formulate the travel time estimation problem as a mathematical program with equilibrium constraints (MPEC). Two variants of this problem are explained with objectives of minimize and maximize total travel time respectively. A solution for general networks is also discussed.

Addison : Journey Time Variability on a Congested Link. [Centre for Transport Studies, UCL]

ABSTRACT: In the document "Framework for Modelling the Variability of Journey Times in a Highway Network" (<http://www.dft.gov.uk> >Economics and Appraisal> Research and Development Guidance> Journey Time Variability) the authors draw attention to the observed increase in the standard deviation of delay while the mean delay decreases as a queue starts to clear. They associate this behaviour with "flow breakdown" and the occurrence of excess demand. It seems to be difficult to model this effect in the standard theory of equilibrium queues. A complete formulation and solution of the problem will probably require the derivation of an appropriate stochastic differential equation. However the behaviour can be modelled using the diffusion approximation for equilibrium and transient queue behaviour developed by Gordon Newell. This theory is used to investigate the variation in mean delay and variance in the case where expected arrival rate increases to a value above service rate and then decreases. One of the result of the theory is that the peak in variation occurs later than the peak in mean delay, in agreement with the observed behaviour. This paper will aim to give an exposition of this theory adequate to derive the observed behaviour of journey time variability. It may be possible to present some of the essential features as a poster display.

5B - Freight

Maurer : ESTIMATING THE EFFECT OF TRANSPORT POLICIES ON EMISSIONS FROM ROAD AND RAIL FREIGHT TRANSPORT IN BRITAIN [ITS Leeds]

ABSTRACT: A methodology is proposed to estimate the amount of pollutants and carbon generators from road and rail freight transport under various policy scenarios as part of the LEeds Freight Transport Model (LEFT) series. LEFT was designed to provide a near instantaneous estimate of the effect of macroeconomically neutral scenarios on mode split (road, trainload and wagonload), average length of haul and total market size. The new functionality which led to version 2.7 was built to reflect the importance of the freight transport industry to the United Kingdom's Sustainable Development Strategy. The paper's main contribution is the calculation of the amount of pollutants and carbon generators from road and rail freight transport in the United Kingdom (UK) in 1998 which is the current base year of LEFT. The calculations were carried out using various approaches. Emissions from road and rail freight transport are calculated from a combination of total fuel consumption data and fuel properties as well as from a combination of distance related emission factors and road traffic data. The paper compares the results obtained by the applied approaches and contrasts the figures with external reference values. In a further step it was estimated how the implementation of various government transport policies currently envisaged by the UK government would impact on the amount of pollutant emission. The focus in this paper is put upon the results obtained for rail freight transport due to the preliminary status of the current LEFT dataset at time of paper submission. The applied methodology inputs into a more complex model which is aimed at enabling governmental policy-makers to predict the environmental consequences of different policies before their implementation. The idea is to allow a better definition of the level of taxes and fees according to the total costs from freight transport by including measures and a monetary evaluation of implied externalities. Therefore the results outlined in this paper are used to decide which approach for estimating emissions should be chosen in order to guarantee most valid outcomes.

Woodburn : POLICY IMPLICATIONS OF RAIL FREIGHT GROWTH TARGETS [University of Westminster]

ABSTRACT: Growth in rail freight activity features strongly in contemporary European transport policy. The European Union aims to increase rail's mode share from 8% to 15% by 2020. By contrast, the British government's Ten Year Plan set a growth target of an 80% increase in the number of tonne kilometres moved by rail by 2010, with lower (but still substantial) growth estimates being identified in late-2005. This paper assesses and challenges the appropriateness of the targets and growth estimates and argues that achieving them will not necessarily mean that policies encouraging modal shift from road to rail have been successful. Problems with targets specified as tonne kilometre increases relate mainly to the lack of a link to changes in rail's mode share and take no account of further growth in freight activity as a whole. More fundamentally, neither type of target addresses the reliance on weight-based measurement which under-represents the conveyance of the types of goods that policies are aiming to attract on to rail, nor the capabilities of the network to deal with growth in freight train movements. The ways in which activity levels can be influenced by changes in rail freight operating conditions, rather than by the volume of freight actually carried, are also revealed. The paper concludes with an assessment of additional or alternative means of monitoring the level of rail freight activity, since appropriate measuring and monitoring is essential from a policy perspective.

Zhong : The scope for shifting containers from road to intermodal services in UK – two case studies [University of Southampton]

ABSTRACT: The congested road network and the EU working time directive introduced in April 2005 are now two major obstacles faced by the Road Haulage Industry in UK, along with other exterior factors such as fuel and labour price, they have greatly affected the reliability and flexibility of road transport and added additional costs to the industry. Under such circumstances, there is greater

scope for intermodal transport options to improve the efficiency of freight movement. This paper investigates the potential for shifting containers from road to intermodal services in the UK by analysing and forecasting the main determinants on mode choice. Two case studies have been undertaken on trial routes from Felixstowe to Manchester and Felixstowe to Glasgow using a real database of container imports. A comparison is made between the road and intermodal transport alternatives in terms of the journey times and costs of delivering both in current and future scenarios. The current scenario focuses on the impact of the Working Time Directive (WTD) and the future scenario focuses on the combined effects of the WTD and increased congestion levels on the road network. From the study, the cost difference is able to activate the mode shifting on the route; nevertheless the service qualities in terms of the transit time and the service frequencies of the intermodal rail have neutralized the price advantages. By forecasting the congestion level in 2016, the transit time of the road container distribution would increase greatly and the cost of distribution would be much higher than the cost in 2005. At the mean time, the intermodal cost is forecasted less than two thirds of the road cost while the service quality has much improved and is able to challenging the flexibility and reliability of the road container distribution.

5C - Environment

Goodman : USE OF REMOTE SENSING AND AIR QUALITY MANAGEMENT DATA IN NOISE MAPPING – A CASE STUDY FOR LEICESTER [Inst. for Transport Studies, The University of Leeds]

ABSTRACT: The recent European Directive on the Assessment and Management of Environmental Noise, (OJEC, 2002) has engendered the requirement for EU member states to undertake noise mapping for major land transport routes and within agglomerations. It is intended that such mapping will support the introduction of policies or “action plans” to ameliorate noise issues in excessively loud locations, whilst also preserving existing quiet areas. One of the key obstacles to mapping is the acquisition of necessary data, such as traffic intensities, fleet characteristics, building geometries etc., with the required spatial coverage and resolution. Wherever possible, existing sources of information should be adapted. For road traffic, this means use of data collated in atmospheric emissions inventories, developed for Air Quality Management Strategies. For describing the urban form, data may be supplemented by the bulk use of remote sensing information, such as photogrammetry, RADAR (RADio Detection And Ranging) or LiDAR (LIght Detection And Ranging). This paper describes a method of creating 3-D building descriptions from LiDAR data, and demonstrates the sensitivity of the resulting maps to both the underlying assumptions in the emissions inventory, and the data used to describe urban form is explored. Reference is made to recent findings of work by both the UK Department of the Environment, Food and Rural Affairs (DEFRA) and the European Working Group on the Assessment of Environmental Noise (WG-AEN, 2003). This research has been carried out as one component of the EPSRC Sustainable Urban Environment – FUTure URban technologies (SUE-FUTURES) project, namely to develop modelling tools at the microscale level, so that the noise and pollution impacts of implementing intelligent transport systems can be quantified.

Ishaque (Smeed) : PEDESTRIAN EXPOSURE TO VEHICLE EMISSIONS: THE ROLE OF TRAFFIC SIGNAL TIMINGS [Imperial College London]

ABSTRACT: Most research on vehicle emissions in the field of transport and traffic engineering has focused on measuring or estimating average vehicle emissions with the objective of reducing total emissions from road traffic. This approach has resulted in overlooking hot spots arising from traffic management policies. These hot spots might be of insignificant importance in the gross traffic emissions in a large area but for the persons directly exposed they are a very real problem. One of these emission hot spots is a traffic signal in an urban environment. At a traffic signal, with pedestrian crossings, pedestrians are in the immediate vicinity of a large number of accelerating

vehicles. The signal timings, the geometry of the junction plan, the type of pedestrian crossings, all are policy parameters that are not designed with any consideration for traffic emissions. One reason is that the precise nature of how these different parameters affect vehicle emissions is not clearly known. This paper analyses pedestrian exposure to vehicle emissions and the role played by signal timings. A simple junction is coded in a micro-simulation model and the time series data on vehicle performance, i.e., speed and acceleration is generated for various signal time settings. This data is then used to calculate vehicle emissions through a modal emissions model. The effects of these emissions on the pedestrian paths and crossings adjacent to the traffic junction are then estimated using an air dispersion model. The suitability of various traffic signal plans in terms of pedestrian exposure to harmful vehicular emissions is discussed.

North (Smeed) : A MODEL OF PARTICULATE MATTER EMISSIONS FROM A LIGHT-DUTY DIESEL VEHICLE [Centre for Transport Studies, Imperial College London]

ABSTRACT: Emissions from motor vehicles are a major source of air pollution and studies have shown that exposure to the particulate matter (PM) in fresh diesel exhaust is a significant risk to health. Short term peak exposures are thought to have the greatest impact, making the second-by-second evaluation of real-world PM emissions from vehicles desirable. Despite the development of several vehicle power-based models to estimate the second-by-second mass emission rates of gaseous pollutant species such as carbon monoxide (CO), carbon dioxide (CO₂) and nitrogen oxides (NO_x), none of these models predicts PM emissions. To address this need, this paper presents a set of models of the second-by-second PM mass emission rate of a light duty diesel vehicle. Calibration data is taken from a standard highway drive cycle carried out at a chassis dynamometer emissions test facility. Reference particle solid fraction measures are obtained from an opacimeter, a tapered element oscillating microbalance (TEOM) and an on-board laser light-scattering device. Simultaneous second-by-second emission rates of the gaseous species are provided by laboratory measurements of exhaust concentrations and detailed engine management data. PM emission rates are modelled as a function of vehicle operating parameters (e.g. speed or acceleration) and the mass emission rates of the gaseous pollutants (CO, CO₂, and NO_x). The importance of time alignment in the calibration data is demonstrated and a technique for deriving an appropriate lag structure is devised. Four multiple linear regression models are estimated with an autoregressive error structure (AR1) to account for serial correlation in the emissions data. Inclusion of the gaseous emission rates greatly improves model fit, giving an R² of 0.718 and a Mean Absolute Percentage Error (MAPE) of 32.9% when validated against an independent set of test data. The corresponding prediction of aggregate PM mass emitted over the cycle gave an overestimate of 20%. This is a similar level of performance to that offered by existing microscopic emissions models and suggests that a two stage modelling process might allow PM estimation to be made on the basis of vehicle operating parameters alone. Keywords: PM, Particle emissions, PEMS, modelling

6A - Route Choice

Jotisankasa (Smeed) : A framework for travel time perception updating in route and departure time choice [Imperial College London]

ABSTRACT: Understanding the dynamics of individual travel choice behaviour is both a considerable research challenge and of considerable practical importance. Of particular interest are the day-to-day dynamics of commuters' route and departure time choice decisions, since these processes influence peak period conditions. Two of the key mechanisms underlying these behavioural dynamics are the process by which commuters update their perceptions of network travel times (which we shall refer to as learning) and the process by which they adjust their behaviour as a result of this learning. In this paper, we present a new theoretical framework for modelling travel time perception updating process in the context of route and departure time choice and present

estimation results based on data collected in a series of web-based experiments involving travellers making repeated decisions in hypothetical transport networks over a period of 15 simulated days. The estimation results indicate that triggering and updating are indeed distinct processes and that the proposed framework constitutes a fruitful direction for future research.

Batley : The Applicability of Prospect Theory to the Analysis of Transport Networks [Institute for Transport Studies, University of Leeds]

ABSTRACT: The convention in transport network modelling is to represent the choices of individual users by means of a Random Utility Model (RUM) and to identify the conditions under which the network reaches some sense of 'equilibrium'; such as Wardrop's equilibrium. If the network is characterised by unreliability, users will be forced to make choices under uncertainty which calls into question the paradigm of utility maximisation. Recent literature has contributed significant evidential support for this conjecture, and proposed a range of alternative approaches, in particular Kahneman & Tversky's (1979) Prospect Theory. In this paper we reconcile Prospect Theory with the extant theory of route choice; considering the overlap between Prospect Theory and a generalised presentation of RUM under uncertainty. We apply this analysis to transport network models, and seek to develop a consistent framework for representing the travel time uncertainty arising from variability in demand. Moreover, we derive an equilibrium solution (fixed-point condition) to the network problem, given our representation of Prospect Theory.

Clegg : "It'll be alright by Friday" – traffic response to capacity reduction [Dept of Mathematics, University of York]

ABSTRACT: This paper looks at traffic response to network change that reduces road capacity. Data was collected in the city of York (UK) to investigate driver response to a planned capacity reducing intervention. Licence plate surveys in York monitored the situation before and during a planned event that lowered the capacity of a road by closing one lane of a two-lane road. The event is analysed in terms of flows and travel times to consider how the closure impacted on driver behaviour. A model is fitted to the data with an initial change followed by a linear return to normal. This is an analogy to the engineering rule of thumb that an initial change to a transport system that seems disastrous on Monday will "be alright by Friday".

6B - Urban Traffic Control

Ropkins : INTRODUCTION TO THE SRIF INSTRUMENTED JUNCTION PROJECT [University of Leeds, Institute for Transport Studies]

ABSTRACT: A Higher Education Funding Council for England (HEFCE) Science Research Investment Fund (SRIF) award to University of Leeds' Leeds health, Air pollution, Noise, Traffic and Emissions Research Network (LANTERN) consortium has enabled the instrumentation of two metropolitan sites (one junction and one nearby section of road) to provide synchronous data on traffic flows, vehicle emissions, air-flows and noise and air pollution. This project is intended to make a significant contribution to current scientific understanding of the (physical and chemical) processes affecting the complex relationship between junction geometry, meteorology, traffic management and resultant local environmental impacts, i.e., noise and air pollution, pedestrian exposure, etc. The aims here are to introduce the SRIF Instrumented Junction project, characterise the junction environment through the analysis of available data, and describe the monitoring sites and instrumentation, report on the progress to date setting up these sites and expected 'start dates' for monitoring and discuss the future uses of this research tool. Particular attention is placed on future uses of the Instrumented Junction because the intention is to extend the planned research

programme through the development of collaborative research programmes involving co-locational deployment of third party equipment and/or alternative analysis of site datasets.

Nguyen : Variability of homogeneous saturation flow at traffic signals [Institute for Transport Studies, University of Leeds]

ABSTRACT: The variability of saturation flow has been the subject of a large number of studies since the 1960s. Previously, many works have reported that saturation flow at signalised intersections varies greatly between different times of day and also between different locations in a traffic network. This variability is likely to produce large effects on the output of traffic network models which typically use fixed values of saturation flow for their inputs. Besides this, some recent studies have stated that saturation flow within the traffic signal cycle is not as stable as conventionally conceived, but varies over the green time. This variability, to some extent, leads to inaccuracy in planning and designing traffic signal settings which are currently calculated based on a constant value of saturation flow and lost time. This present work firstly reviews the variability of saturation flow at both levels (within a traffic network and within the signal cycle) and then builds a model reflecting this variation for both levels simultaneously. The subject of this study is traffic which is dominated by motorcycles. In order to eliminate the effect of the variation of motorcycle unit (MCU) values when calculating saturation flow, the data used is restricted to those periods when purely motorcycle and bicycle traffic prevailed. Data were collected in Hanoi, Vietnam at 15 approaches to traffic signals. Multiple regressions have been used as the main techniques for analysing the variation of saturation flow. A final model describing the variability of saturation flow in terms of geometric, traffic, environmental and temporal factors (variation over green time) is presented.

Sirivadidurage (Smeed) : QUEUE RE-LOCATION USING PRE-SIGNALS FOR CONGESTION MANAGEMENT FOR BUSES [University of Southampton]

ABSTRACT: A pre-signal combines segregated and signal priority techniques in order to offer buses with priority access to a downstream road section. The main aim of this paper is to evaluate the performance of a pre-signal through development, application and validation of new methods of analysis. The findings from analytical modelling and controlled simulation were used to obtain a comprehensive evaluation of the Hanwell Bridge pre-signal in London, as a case study. The analytical relationships introduced to cater for possible interactions would bridge a gap in literature specially in evaluating pre-signals in pre-implementation stages. On the other hand simulation techniques were used to replicate real traffic and operational conditions at the pre-signal site. Results suggested that simulation may be a technique that can be used during final implementation stages. It is obvious that the effectiveness of a pre-signal should be judged not by vehicle throughput but by passenger throughput. In this sense a pre-signal may be an effective device to relocate queues from congested road sections to sections where there is reserved capacity and allow buses to gain priority access to downstream road section.

6C - Surveys

Mackey : Transport Disadvantage - A case study of rural Northern Ireland [University of Ulster]

ABSTRACT: Abstract Transport disadvantage and social exclusion in the rural areas of Northern Ireland is an important issue. The recent Regional Development Strategy (RDS) and Regional Transportation Strategy (RTS) have included a commitment “to create an accessible countryside with a responsive transport network that meets the needs of the rural community” (RDS for NI 2025, 2002). Transport disadvantage is a key determinant of the levels of access that are enjoyed by individuals. This has important consequences for participation in key activities such as education, employment; and also access to goods and services (Church et al, 2000; Gaffron, Hine and Mitchell,

2001; Hine and Mitchell, 2003; Social Exclusion Unit, 2003). In Northern Ireland no studies of the linkages between transport access and participation have been undertaken in rural areas, although limited studies of travel time in different rural areas has been undertaken (Fawcett, 2001; National Travel Survey, 2002). In Belfast work has been undertaken on socially necessary services public transport services and levels of access resulting from changes in service structure (Hine and Wu, 2003; Wu and Hine, 2003). Also work for the Community Relations Council has looked at the effect of segregation on transport (Smyth, 2000); while the General Consumer Council for Northern Ireland has looked at transport poverty (GCCNI, 2000) The research reported in this paper is part of the first stage of a study looking at travel patterns in different rural communities.

White : Scope for a National Travel Survey for Ireland [University of Westminster]

ABSTRACT: National travel surveys have been established in many countries, providing comprehensive data on all (or most) modes, normally based on household-level data. This paper examines possible options for such a survey in the Irish Republic, by reference to examples such as the National Travel Survey in Britain, and the Scottish Household Survey. A household-based survey was considered appropriate, but issues of sampling method and inclusion of non-standard households require attention. The Scottish Household Survey was not found to be a satisfactory method due to reliance on recall of previous day's travel. Improvements to the British NTS model could be made through inclusion of international travel on a consistent basis, and harmonising definitions used by public transport operators with any future survey - at present, there are large discrepancies between the grossed-up public transport volumes derived from the published household survey data, and those estimated by public transport operators themselves. These may be reduced by treating linked trips (those involving interchange) in a consistent manner, and improving estimates of trip rates by card holders. Developments in technology such as smartcards should help in this respect. The recent reweighting procedure developed for the British NTS also greatly reduces discrepancies between the operator-based estimates and those from the household survey, suggesting that a similar procedure could be worthwhile in similar surveys elsewhere.

McDonnell : An Analysis of the Transport Characteristics of Residents in the Catchment area of a Quality Bus Corridor (QBC): A Case Study of the N11 QBC [University College Dublin]

ABSTRACT: Policymakers have responded to the challenge of congestion in Dublin with mixed success. One of the perceived successes has been the introduction of the Quality Bus Network of priority bus corridors throughout the city. Despite widespread interest by policymakers, the media and the public in general, there has been relatively little academic focus on the topic. This study assesses the responses of 1000 residents in a GIS constructed catchment area of the N11 Quality Bus Corridor (QBC). This paper focuses on the transport characteristics of residents and their opinions of the QBC through an analysis of the descriptive statistics and the use of probit analysis techniques. Results show that the QBC is popular with users and non-users alike and, despite the fact that the area under investigation has an income and education attainment level higher than either the Dublin or the National average, the bus is a popular transport option; over 40% of the sample describes themselves primarily as bus users. The perception of residents is that the bus is the fastest mode in the peak period, but this advantage collapses in the off-peak period. Shared car users are also more likely to express views that are more similar to bus users than solo car users.

7A - Traffic Assignment

Stewart : MINIMAL REVENUE NETWORK TOLLING: STOCHASTIC SOCIAL OPTIMISATION UNDER STOCHASTIC ASSIGNMENT WITH ELASTIC DEMAND [Napier University]

ABSTRACT: Recent work has defined a Stochastic Social Optimum (SSO) (Maher et al, 2005) and has developed methodologies to examine the minimal revenue toll problem in the case of Stochastic User Equilibrium (Stewart and Maher, 2006). This work has however been based on the assumption of a fixed demand stochastic equilibrium model. It is clear that imposing tolls on a network, will directly affect demand as well as being able to influence route choice, and so it is of interest to consider the impact of tolling under elastic demand. Elastic demand may be readily included in stochastic equilibrium models (Maher et al, 1999), and so it is possible to examine flow patterns resulting from imposing tolls under SUEED. Stewart and Maher (2006) presents a heuristic to approach the 'true SO' flow pattern under stochastic assignment methods which presupposes that the desired flow pattern is fixed, and may be determined. In the case of elastic demand, further iteration is required to account for the change in the 'desired flow pattern' as each link toll is increased, and Stewart and Maher (2005) extends the previous heuristic to include this, where the 'desired flow pattern' is a deterministic SO flow pattern with the same demand matrix as in the SUEED assignment. In the case of deterministic assignment with elastic demand a Social Optimum with Elastic demand (SOED) has been formulated where economic benefit is to be maximised; under this formulation it has been shown that all toll-sets associated with the flow/demand pattern which minimises the SOED objective function generate the same revenue and that marginal social cost price tolls are such a toll set (Hearn and Yildirim, 2002; Larsson and Patriksson; 1998). This paper extends the SOED formulation to SSOED (Stochastic Social Optimum with Elastic Demand) and will discuss the extension of the fixed revenue result to tolling to achieve SSOED under SUEED. It will further examine the case where the economic benefit is not to be maximised, and tolling may be used to achieve an SSO flow pattern for a particular OD matrix where minimal revenue tolls may be desired. These results will be compared to those obtained in seeking the SO (Stewart and Maher, 2006; Stewart and Maher, 2005). Illustrative numerical results will be given for toy networks.

Balijepalli (Smeed) : A Stochastic Process Model for Doubly Dynamic Traffic Assignment [Institute for Transport Studies, University of Leeds]

ABSTRACT: This paper presents research aimed at unifying the fields of (i) dynamic network equilibrium, (ii) dynamic whole-link models and (iii) stochastic process models of day to day and within-day dynamics. An approximation result and computational procedure is derived whereby the equilibrium probability distribution of the stochastic process is estimated through knowledge of within-day dynamic stochastic user equilibrium flows and various link travel time and choice probability Jacobians. An implementation is reported with a particular form of whole-link model commonly found in the literature, where travel times at the time of entry to a link are a function of the number of vehicles on the link at that time. As the method implicitly assumes the stationarity of the stochastic process, the same is verified in the end, by analysing the autocorrelation function. Suitable numerical illustrations are presented.

Nakayama : A Maximum Likelihood Method for Estimating Parameters on Congested Networks [ITS, University of Leeds]

ABSTRACT: Estimation of parameters in network equilibrium models is essential when applying the models to real-world networks. Link flow data are convenient for estimating parameters because it is easy for us to obtain them. The least squares or generalized least squares methods have been adopted for parameter estimation in many cases. However, the least squares method is not necessarily appropriate from a statistical standpoint and the estimated parameters may be biased. In this study, we propose a maximum likelihood method of estimating parameters on network equilibrium models, that is statistically rigorous. Then, we derive first and second derivatives of the likelihood function under the equilibrium constraint. Using the likelihood function and its derivatives, t values and other statistical indices are provided to examine the confidence of estimated parameters and the model itself. Furthermore, we examine which conditions are needed

for consistency, asymptotic efficiency, and asymptotic normality for the maximum likelihood method with non-I.I.D. link flow data.

7B - Congestion Charging

Wichiensin : THE INTERDEPENDENCE OF CONGESTION CHARGING AND OPTIMAL TRANSIT FARE SETTING [Imperial College]

ABSTRACT: An interdependence of congestion charging and optimal fare setting in different transit market structures is revealed by an inter-modal equilibrium model. The model links an urban road network subject to a congestion charge to a parallel urban transit market, with a view to finding the optimum congestion charge consistent with the commercial decisions of the transit operator(s). A congestion charge is set to maximise social surplus which is maximised with respect to the congestion charge. The transit market is assumed to be either a profit maximising monopoly or a profit maximising duopoly competing non-cooperatively. The operator(s) set the fares to maximise profits and the supply of transit services are determined by the resulting demand. Travel behaviour is assumed to conform to elastic-demand user equilibrium traffic assignment. The problem has been formulated as a bi-level programme with the determination of the congestion charge on the upper level and the setting of transit fares on the lower level. In the case of non-cooperating operators, the Bertrand-Nash equilibrium fares are sought. The results of the model are analysed for a small example based loosely on Edinburgh giving insights into the problem and solution method. This reveals the importance of competition in the transit market for the trade off between the Government, the transit provider(s) and the travellers.

Gaunt : PUBLIC ACCEPTABILITY OF ROAD USER CHARGING: THE CASE OF EDINBURGH AND THE 2005 REFERENDUM [University of Edinburgh]

ABSTRACT: Road user charging (RUC) has emerged as a practical solution to the growing problem of congestion. Detailed plans were advanced for the implementation of a RUC scheme in the City of Edinburgh, Scotland. Edinburgh's urban RUC scheme (otherwise known as the congestion charging scheme) comprised two charging cordons, one on the edge of the city and the other surrounding the city centre. Edinburgh residents were given the opportunity to vote on the introduction of the scheme in a referendum held in February 2005. The public voted against the proposal by a ratio of around 3:1 and the scheme was abandoned as a consequence. This study explores a number of factors that accounted for the public's overwhelming opposition to the proposal. A postal, self-completion questionnaire was distributed to 1300 randomly-selected residents along a transect from central to south Edinburgh. The findings of this study are based on the responses of the 368 replies received. Car use was shown to be the principle determinant of voting tendencies. For instance, car owners strongly opposed the scheme while non-car owners weakly supported it. The public's understanding of the proposal was limited. Further, the public were largely unconvinced that the proposed scheme would have achieved the dual objectives of reduced congestion and improved public transport. Considering a referendum was ultimately held, the scheme should perhaps have been designed with a greater consideration for public acceptability.

Noland : The Effect of the London Congestion Charge on Road Casualties: An Intervention Analysis [Imperial College London]

ABSTRACT: The introduction of the congestion charge in central London on the 17th of February, 2003, led to a reduction in congestion. One factor that has not been fully analysed is the impact of the congestion charge on traffic casualties in London. Less car travel within the charging zone may result in fewer traffic collisions, however, as the number of pedestrians, cyclists, and motorcyclists increased after the introduction of the congestion charge, the number of traffic casualties associated

with these groups may also have increased. Reductions in congestion can also lead to faster speeds. Therefore, there could be increases in injury severity for those crashes that do occur. An intervention analysis was conducted to investigate the effect of the congestion charge on traffic casualties for motorists, pedestrians, cyclists, and motorcyclists, both within the charging zone and in areas of London outside the zone. This was done for killed and serious injuries (known as KSI in British terminology) and for slight injuries to examine whether there were any shifts in severity outcomes. Our results suggest no statistically significant effect for total casualties in London, but within the charging zone there has been a statistically significant drop in motorist casualties. There is an associated effect of an increase in casualties of motorcyclists and cyclists in areas outside the charging zone, suggesting that changes in the design of the congestion charge may be needed to achieve reductions in casualties.

7C - Data Capture

Tate : Floating Car Data –Sources and Future Applications [Institute for Transport Studies, University of Leeds, UK]

ABSTRACT: There are a growing number of ‘floating vehicles’ or probes that acquire up-to-date and reliable journey time data for congestion monitoring, incident detection, fleet management and security applications. In the UK, it has been proposed that Floating Vehicle Data (FVD) is used to enable the assessment of journey times, speeds and congestion across the strategic road network and on major roads within the ten largest urban areas. In 2005 the Department for Transport (DfT) signed a contract with iTIS Holdings plc to purchase historic and real-time FVD collected from their fleet of approximately 70,000 commercial vehicles for this purpose. Concerns have however been raised as to how well developed the urban data sets are in terms of coverage, given the commercial nature of the probe vehicles. Since 1999, in a search for new methods to improve the quality of traffic telematics services, the BMW Group have also developed an Extended Floating Car Data (XFCD) system. This at present collects journey time information from approximately 40,000 active vehicles across Germany (2003). In addition, driver behaviour is being studied using a small number of highly instrumented vehicles. These typically access data from the vast array of sensors found in modern motor-vehicles. Also capturing data from Advanced Driver Assist Systems (ADAS) such as Adaptive Cruise Control (ACC) allows the distance or headways between neighbouring vehicles to be quantified and recorded. This paper aims to review these and other data types/ sources and finally considers the potential growth and application of vehicle-generated data in all aspects of traffic monitoring, modelling, management and information provision.

Chamberlain : WORKING TOWARDS IDENTIFIABLE FEATURE EXTRACTION FROM A PEDESTRIAN’S GAIT [Napier University, School of Computing]

ABSTRACT: This paper describes our work measuring the movement of pedestrians. We describe our data collection system, processing techniques and introduce our data analysis software system. Our work aims to provide data to improve security and monitoring of pedestrians in public areas that would otherwise be unavailable. This data is important to those working in market research, behavioural psychology or safety and security.

Chen : [University of Southampton]

ABSTRACT:

8A - Modelling

Kaparias : Risk-averse Dynamic Route Guidance: Observations from the Application on a Real Network [Centre for Transport Studies, Imperial College London]

ABSTRACT: Travel time uncertainty is one of the most important factors affecting route choice in real road networks. This is particularly important in route guidance. In order to model this uncertainty, a recently developed Dynamic Route Guidance algorithm introduces the Link Reliability approach. This paper presents the application of this approach on a real road network. To carry out this task, software is developed, including a number of methods and assumptions, whose aim is to model a real network. The software is used to run a simulation on a part of London's road network and the results are presented here.

Lee : [Centre for Transport Studies]

ABSTRACT:

8B - Increasing Road Capacity

Renfrew : Corridor capacity improvements using a 'zero headway' concept [University of Manchester]

ABSTRACT: Recent initiatives have been directed towards the development of intelligence in road transport, in vehicles, on the highway, in driver information systems and in regulatory aspects such as road charging. It has also been suggested that 100% manual driving may not always be permitted in future. Research into Automated Highway Systems (AHS), at one time extensively funded in the United States, promised increased safety, better use of existing highway space and some energy savings. However, the need for substantial investment in sensors, computing power and vehicle communications have inhibited full-scale implementation and legal and liability issues also dampened the development of this mode of transport automation more than any other, forcing the technologies to be limited to driver assistance. However, incremental developments arising from Adaptive Cruise Control (ACC) and Advanced Safety Vehicles (ASV) are leading towards the concept of Co-operative Vehicle Highway Systems (CVHS) in which intelligent highways interact with vehicles. The paper considers the background to highway automation and raises the question of safety under conditions of communication or other technical failure. A 'fall-back' zero-headway concept which maximises lane use and the accompanying inter-vehicle device are introduced. The concept also decreases the communication required by a convoy of vehicles to a single 'leader' signal. However, the control system must also ensure that the vehicle passenger experiences a longitudinal ride comparable to that of a widely spaced vehicle string. Simulation results which illustrate the concept using a hybrid-electric car (based on an ADVISOR model) are shown and the potential for energy savings is identified. The work described is part of a broader research effort to evaluate the potential of automated close-headway convoy systems to increase the capacity and flexibility of corridors such as highways, guided busways, light rail or novel guided systems.

Chase : Maximising Motorway Capacity Through Hard Shoulder Running: UK Perspective [Centre for Transport & Society, University of the West of England, Bristol]

ABSTRACT: New innovative ways to increase the capacity of motorways in the UK, without the need for substantial land-take and construction, are currently being developed by the Highways Agency (HA). One of these methods is Hard Shoulder Running (HSR), which is due to be piloted on the M42 from late 2006. Based on interviews and content analysis of media reports, this paper outlines the strengths and limitations of HSR as viewed by UK stakeholders, considers the potential impact of the portrayal of HSR in the media, and discusses the informational requirements of UK drivers, paying attention to attitudes and behaviour. It is concluded that there are a number of potential limitations

to HSR, but relatively few reasons why HSR cannot potentially become successful and acceptable in the UK, as long as the correct level of information and driver education is provided.

8C - Data Mining

Hofmann : Are large unprocessed datasets of urban public transport operators an unutilised decision support resource? [Trinity College Dublin]

ABSTRACT: Urban public transport operators have the ability to collect large amounts of operational data using electronic fare collection (EFC), automatic passenger counters (APC) and automatic vehicle location (AVL) systems. Such systems often generate hundreds of millions of records annually. However, often these datasets are not fully utilised and traditional methods such as surveys are used to obtain the necessary information to improve operations and to make strategic decisions. Other industry and service sectors have used large datasets for over a decade to improve their operational and strategic planning. This paper focuses on the possible utilisation of the data and reports on several projects that developed algorithms which generate information that was previously unknown. The paper elaborates on possible analyses that can be used to support the decision-making of urban public transport operators. It further outlines the use for other stakeholders such as public transport regulators and departments of transport. Some detailed examples from a large Irish public transport operator will demonstrate the potential of EFC systems. This includes origin/destination (OD) information of public transport passengers, transfer nodes and their volumes on a network wide level, micro analysis on a passenger level and other level of service figures that are relevant to operational planning and decision-making. The paper also discusses the advantages and disadvantages of the use of large datasets in comparison to surveys and the difficulties that may arise when utilising such large datasets.

Lindveld : [Imperial College London]

ABSTRACT:

9 - Plenary

Allsop : Some reflections on forty years' evolution of transport studies [University College London]

ABSTRACT: Against the background of the evolving coverage of UTSG Annual conferences since 1969, the development of the discipline of transport studies is discussed. The discussion emphasises the increasing attention given to the socio-economic implications of developments in transport technology, engineering, operations, planning and policy alongside continuing attention to the technical issues from which the discipline originally sprang. The relevance of academic work in transport studies to the needs of the transport profession, industry and agencies in serving society is also emphasised.