

2008 Southampton – Annual Conference

1 Plenary

Watling : 40 years of UTSG & network modelling: a retrospective on a selected paper and its impact [University of Leeds]

ABSTRACT: This paper relates to one of a number of special plenary sessions commissioned to celebrate 40 years of UTSG conferences, based around a number of topics that has had a significant representation at UTSG. For each topic, an invited speaker was asked to select one paper from all those delivered over this 40 year period, and to give a presentation explaining the content of the paper and its significance in the current context. I was pleased to accept the invitation to be the speaker on Network Modelling. The paper I have selected is one by M.J.Smith from the 12th annual conference in Newcastle in 1980. This paper, combined with several of Mike's other UTSG presentations, contained and built on the core ideas of what is widely recognised to be a landmark paper in the field, a 1979 paper he published in Transportation Research B. Of course, there is also a personal dimension to this selection too, in marking Mike's enthusiastic, insightful and always distinctive contribution to UTSG over many years. Conscious that the material in the papers uses technical arguments that are not entirely conducive to a plenary session for an audience such as UTSG with a wide range of backgrounds, mathematical concepts will be introduced minimising recourse to equations, referring interested readers to papers suitable for learning more detail.

10A Travel Psychology

Dickinson : Travelling slowly: an exploration of the discourse of holiday travel [Bournemouth University]

ABSTRACT: Transport research focusing on people's behaviour tends to arise from the spatial geography and logistics tradition which focuses on quantifying trips and travel characteristics but pays less attention to the social conceptions of transport and the social reality that shapes travel behaviour. Meanwhile, within tourism, while studies explore the tourist behaviour and its antecedents in some depth, this largely focuses on destinations rather than the travel component. Travel to and from destinations is rarely analysed in the same way as other holiday experiences. Thus, there are few studies in either the transport or tourism literature that address the social assumptions that underlie holiday travel behaviour. The paper focuses on the practice of slow travel where air transport is rejected in favour of more environmentally benign forms of overland transport which generally take much longer and become incorporated as part of the holiday experience. Data are drawn from interviews with 'slow travellers' and newspaper and on-line reports of 'slow travel'. The analysis reported in this paper employs a constructionist perspective to explore the travel component of holidays. A discourse analysis approach is used to show how people draw on shared discourses and theories of the world in order to explain their travel practices. Discourse analysis focuses on the function and context of talk and/or text. Some discourses are more prevalent than others and analysis shows how people use these discourses to justify their travel behaviour patterns. People frame their travel practices positively and use rhetoric to undermine alternatives to create a positive self-image, a process of self-affirmation. This in turn creates a particular travel identity. Discussion focuses on the context contingent framing of arguments and the dilemmas of stake and interest.

Campbell : Wayfinding in the urban environment [University of the West of England, Bristol]

ABSTRACT: Having difficulty finding a destination can be costly to individuals and organisations. Individuals have to endure feelings of frustration, confusion and even fear, while time is wasted and appointments are missed. This paper examines, based upon a series of in-depth interviews, how well a selection of technology-mediated wayfinding services are meeting travellers' requirements. Firstly a sample of PDF documents providing directions (found using Google) is compared in terms of information format and content to the requirements of individuals in assisting their comprehension of directions. The use of and attitudes towards a further five forms of technology-mediated wayfinding assistance are considered. What happens when travellers experience a problem finding an unfamiliar destination is explored, discovering distinct behaviours towards finding destinations: 'always find it'; 'persevere'; and 'occasionally abandon'. Following this, occasions when the traveller abandons the unfamiliar journey are examined, with the emergence of three categories of wayfinding problems: complex layouts; simultaneous travelling and wayfinding; and comprehension of directions. Only by understanding these issues, together with the needs and desires of people wayfinding in the urban environment, will it be possible to ensure that current and future information provided for wayfinding is both useful, i.e. the information is what is needed by the traveller, and usable, i.e. the traveller is easily able to make use of the information.

10B Spatial Models

Quddus : Modelling area-wide count outcomes with spatial correlation and heterogeneity: an analysis of London crash data [Loughborough University]

ABSTRACT: Count models such as negative binomial (NB) regression models are normally employed to establish a relationship between area-wide traffic crashes and the contributing factors. Since crash data are collected with reference to location measured as points in space, spatial dependence exists among the area-level crash observations. Although NB models can take account of the effect of unobserved heterogeneity (due to omitted variables in the model) among neighbourhoods, such models may not account for spatial correlation among neighbourhood areas. It is then essential to adopt an econometric model that takes account of both spatial dependence and uncorrelated heterogeneity simultaneously among neighbouring units. In studying the spatial pattern of traffic crashes, two types of spatial models may be employed: (i) classical spatial models for higher levels of spatial aggregation such as states, counties etc. and (ii) Bayesian hierarchical models for all spatial units, especially for smaller scale area-aggregations. Therefore, the primary objectives of this paper is to develop a series of relationships between area-wide different traffic casualties and the contributing factors associated with ward characteristics using both non-spatial models (such as NB models) and spatial models and to identify the similarities and differences among these relationships. The spatial units of the analysis are the 633 census wards from the Greater London metropolitan area. Ward-level casualty data are disaggregated by severity of the casualty (such as fatalities, serious injuries, and slight injuries) and by severity of the casualty related to various road users. Our analysis implies that different ward-level factors affect traffic casualties differently. The results also suggest that Bayesian hierarchical models are more appropriate in developing a relationship between area-wide traffic crashes and the contributing factors associated with the road infrastructure, socioeconomic and traffic conditions of the area. This is due to the fact that Bayesian models accurately take account of both spatial dependence and uncorrelated heterogeneity. Households with no cars (%) and total employment always have a positive impact on ward-level traffic casualties. Average traffic speed of a ward in London does not have any effect on traffic fatalities and serious injuries. Percent of population from the ethnic minority also has some positive impact on traffic casualties. Interestingly, average road curvature of a ward and counts of the number of roundabouts within the ward are always found to be statistically insignificant in all models estimated in this study.

Liu : Spatial statistical modelling of traffic accidents on a road network [Transport Management Research Group, Middlesex University]

ABSTRACT: Conditional autoregressive (CAR) models have been successfully used to develop spatial models for accidents at the local authority level (see Liu & Jarrett, 2007). The main use of the CAR model is to account for explanatory variables that are not available, unknown or not measured perfectly, but are believed to be spatially correlated. This paper aims to show how the CAR models can be applied to road accidents on a road network. Models have been developed for link accidents on the M1 and junction accidents in Coventry. After including spatial effects in the M1 models, model performance is greatly improved and the significant spatial correlation in the residuals from conventional models is removed. However, for the junction models, the inclusion of spatial effects does not improve the models. In addition, this paper proposes a new approach for site ranking. The spatial random effects included in the CAR models developed in this paper can be estimated and used to rank the sites. The sites selected by such a criterion are those with high risks caused by some unknown or unmeasured factors (for instance, road geometry) which are spatially correlated.

10C Roadspace Allocation

Paskins : Winners and losers in streetspace reallocation [Centre for Transport Studies, UCL]

ABSTRACT: Government policies encourage the reallocation of urban streetspace from private cars to other transport modes, and from Movement to Place-related street activities. However, given that total highway space/capacity is generally fixed, then gains for some street users will generally be offset by losses to others. This paper presents a systematic approach to assessing the distributional and net impacts of different scheme options, which has been implemented in the form of an Excel spreadsheet. The research has been carried out as part of the EPSRC funded DISTILLATE project. The first step is to identify the main categories of street users to be found on that type of street, and the kinds of activities they carry out there. This gives rise to a set of infrastructure requirements that can be translated into the provision of specific street design elements. The latter is encoded in a 'benefits matrix', showing the groups that benefit (or disbenefit) from the each design element. It is possible to weight the importance to be given to each street user group (based on their numbers, policy priority, etc.), and to register the degree to which a design element meets a specific need. Step two involves determining desirable minimum and maximum levels of provision of each street design element, taking into account numbers of users and existing nearby provision, and establishing a relationship between levels of provision and size of benefit. The default relationship is linear, though the user can specify a wide range of relationships. By summing across groups and design elements, and applying weights as appropriate, the spreadsheet shows weighted benefits for each street user group, and the overall net benefit of a scheme proposal. The paper illustrates the operation of the tool with an application to a high street in the West Midlands, where different design options are assessed.

Anderson : No car lanes or bus lanes: which gives public transport the better priority? An evaluation of priority lanes in Tyne and Wear [JMP, Newcastle University, Aberdeen University]

ABSTRACT: The implementation of No-Car Lanes as a method of allocating space on the highway is a relatively new concept which differs from bus priority measures in that No-Car Lanes give priority not just to buses but to other types of vehicles, facilitating the movement of goods as well as people in congested urban areas. Within the study area reported in this paper, covering the five Districts that comprise Tyne and Wear, Newcastle City Council has already implemented No-Car Lanes in the city centre and has proposed others, with the same approach being trialled in Sunderland. This paper reports the outcome of a study which looked to quantify the benefits of No-Car Lanes in Tyne and Wear, together with disadvantages to give an improved understanding of their contribution within the more general context of bus priority measures. The motivation for the study was that a

better understanding of the different measures would give a sound basis to the development of a rational, conurbation-wide, policy. The paper examines the available evidence on journey times for goods vehicles, buses, cars and taxis; and the road safety aspects, particularly for cyclists and pedestrians of different forms of priority and levels of contravention. Existing data are supplemented by a simple micro-simulation model to look at the effects of changes in traffic composition and importantly to evaluate the environmental impacts of the different types of priority measure. This 'hard data' evaluation is enhanced by views elicited by a stakeholder consultation and the results of an on-line questionnaire that sought the general public's perceptions of priority schemes in the conurbation.

10D Traffic Flow

Addison : Modelling traffic with variable speed limits [Centre for Transport Studies]

ABSTRACT: The purpose of this paper is to report on recent work on the modelling of traffic on motorways where variable speed limits are in force. The work reported here is based on analysis of the MIDAS traffic data collected on sections of the M25 motorway for the Highways Agency. The focus of this is on estimation of the speed-occupancy relationship, and interpretation of this for traffic flow in various circumstances. Modelling of the data leads to the adoption of a class of traffic models that has two important properties: First, the fundamental (flow-density) diagram has a concave region in congested conditions. A relationship of this form allows for the formation of stable start waves, which is a phenomenon that is observed in practice. Second, the model has a non-zero speed at jam density. Thus stationary traffic, where it arises, does so because of a blockage on the road that imposes zero speed rather than because of high density. The empirical justification for adoption of these models is presented in terms of statistical criteria in modelling the MIDAS traffic data. This leads to adoption of traffic models under speed controlled operation in which occupancy is taken to depend on speed. The effects on the estimated capacity of the road under different speed limits are explored. The paper concludes with a discussion of the nature and implications of these findings. Amongst these is a shift in point of view under which traffic modelling of this kind is approached, with differences being required according to the control status of the traffic conditions together with an appreciation of the mechanisms by which speed control affects capacity.

Krishnan (Smeed) : A deductive travel time estimation method for signalised corridors using single loop detector data [Imperial College London]

ABSTRACT: Travel time is an important input for Intelligent Transport Systems (ITS) applications such as Advanced Traveller Information Systems (ATIS) and Dynamic Route Guidance (DRG) and Network Performance Monitoring. Travel time needs to be estimated for links without sensors such as Automatic Number Plate Recognition (ANPR) cameras that measure the travel time of vehicles. Inductive Loop Detectors (ILD) are installed on a large number of urban links for providing input for traffic control. A calibration-free model to estimate travel times from such ILDs is proposed in this paper. The method has the advantage that reference travel time data are not required for training. The proposed method is based on the cumulative counts method, which is a classical calibration free travel time estimation method. While theoretically attractive, the method requires that error-free vehicle counts are available from upstream and downstream points of a link. The method also requires that the number of turning vehicles is accurately measured. The presence of errors in vehicle counts will introduce a drift error in cumulative counts resulting in unrealistically low or high travel times. No measurement device is generally error-free, and ILDs are known to have errors. In addition, many of the ILDs installed for traffic control span two lanes, and reports biased vehicle counts. Lastly, vehicles entering or leaving the link from minor streets are not measured for some of the links. These factors mean that the cumulative counts method cannot be directly applied to urban links. A number of measures are proposed in this paper to overcome these issues. To solve the

problem of biased flow counts from ILDs that span two lanes, a probabilistic model for estimating flows from such cross-lane ILDs is proposed assuming similar traffic characteristics for the two lanes monitored by a common ILD. Errors in vehicle counts remain after removing the bias using the above model, resulting in drift errors in the cumulative counts method. A method to adjust vehicle labels of the cumulative curves based on estimated link cruise times is proposed to correct for the drift error. The adjustment is carried out for each signal cycle, where vehicles corresponding to a signal cycle are identified using a platoon identification algorithm. The resultant method provides an estimate of the link travel time distribution, where the link is a section of road between two ILDs spanning a junction. The estimated travel time distribution is used to further estimate the travel time and its variability on a route that is made up of multiple links. The dynamics of platoons getting split at junctions due to the signals is deduced from the link travel time distribution, and the information is used to estimate route travel time variability. The combined model was used to estimate travel times for a corridor in Central London for a oneweek period. The results show that the calibration-free model developed in this study is capable of reliably estimating travel times on urban routes despite only making use of limited and biased data available from the ILDs. The accuracy of the model is comparable to a state-of-the-art urban travel time estimation model that requires calibration. The proposed model is a candidate for ITS systems that require estimation of network wide travel times where existing sensor instrumentation does not provide travel time measurements but has flow sensors installed across the network for traffic control.

11A Vehicle Evolution

berridge : Exploring options for a hydrogen fuel infrastructure system [Open University]

ABSTRACT: Hydrogen is widely advocated as the long term solution to transport's environmental challenge. However, current production and delivery methods make hydrogen no more environmentally friendly than many other transport fuels. Transporting hydrogen is both difficult and energy intensive. Given the right production and delivery system, a future Hydrogen economy may help to address environmental issues and other major areas of concern for policy makers such as energy security and shortage. This paper focuses on the viable pathways to a hydrogen infrastructure. Much of this research draws upon on the recent Clean Urban Transport for Europe (CUTE) demonstration projects and the research models a set of pathway options comparing:-

- Economics – the cost of running vehicles on hydrogen
- Environmental issues - CO2 equivalent emissions for each of the pathways.

Hydrogen has several advantages compared to the current system used for petrol/diesel vehicles. It can be produced in a variety of ways and has the potential of a short supply chain, as it can be produced at the point of use. It is this flexibility which may support any drivers towards a future hydrogen economy and help to overcome some of the current technical difficulties with a hydrogen infrastructure.

Dudley : From 'Two Jags' to the Prius: shifting policy agendas and the government car service [University of the West of England]

ABSTRACT: As the British government's flagship transport organization, the Government Car Service (GCS) has carried Ministers and officials since 1946. In doing so, it provides a unique indicator of shifting policy priorities and preoccupations. A particular feature here is the change in the vehicle purchasing policy from criteria governed for many years by the priority of 'Buy British,' to objectives dominated by the environmental agenda. Intriguingly, the environmental criteria themselves have shifted significantly in recent years, reflecting fresh perceptions of the principal problems to be addressed. For several decades, the mainstays of the GCS fleet were cars manufactured by British Leyland (later Rover). The decline of Rover, leading to its demise in 2005, combined with the phenomenon of the globalisation of vehicle manufacture, progressively weakened the GCS 'Buy British' policy, to be replaced by the environmental agenda. The shift is perhaps best symbolized

politically by criticism aimed at former Deputy Prime Minister John Prescott, who acquired the nickname 'Two Jags' for his official and private use of large UK manufactured Jaguar cars, despite advocating greater public transport use as part of an integrated transport policy. In the 1990s, GCS vehicle purchasing policy reflected government priorities for improving air quality, and the emphasis was on using alternative technologies such as Liquefied Petroleum Gas. Over time, however, it was discovered that these vehicles were not easy to supply and service. More recently, the GCS emphasis has switched to climate change objectives that reflect a government preoccupation with reducing greenhouse gases such as carbon dioxide. This shift is illustrated particularly by the rapid growth in the GCS fleet of the hybrid electric-petrol Toyota Prius, manufactured in Japan.

11B Motorcycling

Law : Factors associated with the relationship between motorcycle deaths and economic growth [Center for Transport Studies, Imperial College]

ABSTRACT: This paper examines the Kuznets curve relationship for motorcycle deaths. The Kuznets curve describes the inverted-U shape relationship between economic development and, in this case, motorcycle deaths. In early stages of development we expect deaths to increase with increasing motorization. Eventually deaths decrease as technical, policy and political institutions respond to demands for increased safety. We examine this effect as well as some of the factors which might explain the Kuznets relationship: in particular motorcycle helmet laws, medical care and technology improvements, and variables representing the quality of political institutions. We apply a fixed effects negative binomial regression analysis on a panel of 25 countries covering the period 1970-1997. Our results broadly suggest that implementation of road safety regulation, improvement in the quality of political institutions, and medical care and technology developments have contributed to reduced motorcycle deaths.

Pai : Modelling motorcyclist injury severity in angle collisions at T-junctions considering the effects of right of way infringement, junction control measures, and manoeuvres [Napier University Edinburgh]

ABSTRACT: There is evidence in literature suggesting that motorcycle's right-of-way violated by driver is the main contributory factor to motorcycle-vehicle accidents. This paper attempts to identify whether driver's failure to give way, and whether a certain junction control measure, is more severe to motorcyclists in angle collisions at T-junctions in the UK, while controlling for other factors (demographic, vehicle and environmental factors). The ordered probit models of motorcyclist injury severity were estimated using the data extracted from the STATS19 accident injury database (1991~2004). Angle collisions are further categorised into several sub-crashes based on the manoeuvres motorcycles and vehicles were making prior to the collisions. The modelling results uncover several important determinants of injury severity. For example, injuries appeared to be greatest when a travelling-straight motorcycle on the main road collided with a right-turning vehicle from the slip road, and such effect was found to exacerbate injury-severity levels at stop, give-way signs and markings. Such driver's failure to yield also appears to severely injure motorcyclists. This study provides some important preliminary evidence for the development of countermeasures that may help prevent the hazards from occurring, or at least may assist in elucidating a future research direction.

11C Mode Choice 2

Najam : [Institute for Transport Studies, University of Leeds]

ABSTRACT:

Yahya : The relationship between satisfaction and quality: an exploration of the impact of Quality Bus Partnerships [University of Newcastle]

ABSTRACT: This research looks at an important aspect of bus service improvement through a detailed investigation of current bus operations and service quality factors in the context of an informal Quality Bus Partnership (QBP). This research will address two main questions: First, what effect does bus service improvement have on the passengers' satisfaction? Second, what are the most important quality factors to the bus users that can influence their satisfaction? This research uses a qualitative approach to assess passengers' views of quality of bus service improvement by comparing routes which have experienced significant improvements in quality with those which have not and using Tyne and Wear, United Kingdom as a case study. User satisfaction is an intuitively important outcome measure previously linked to general increase in patronage. The aim is to assess the importance of quality attributes such as reliability, punctuality, cleanliness, etc. and how satisfied passengers are with these attributes. To fill the gap, this research looks at the performance of a bus service from the passengers' perspective in an attempt to quantify their response to significant changes in service quality introduced by the QBP.

11D Methodologies

Connors : Aggregation of traffic networks using sensitivity analysis [Institute for Transport Studies, University of Leeds]

ABSTRACT: Transport modelling encompasses many scales of analysis, from junction design and signal timing to urban planning and infrastructure provision for predicted land use and population changes across whole regions. The transport network is modelled using different levels of detail at each scale of analysis, and yet it is not well understood what effect the level of aggregation (with respect to data and/or model structure) has on the predictions of the network model, and hence on the overall analysis. These two issues, the level of aggregation used in the network model and the fidelity of data used in calibration, can be considered separately though of course their combined impact is ultimately of interest. While network aggregation is a well recognised problem in transport analysis, no systematic aggregation methodology exists, with only empirical evidence reported in the literature. In this paper we consider the particular problem of network aggregation: specifically the question of how a detailed network model can be aggregated. We propose a systematic method of network aggregation based on sensitivity analysis. The aim of this method is to represent the aggregate dependence of origin-destination travel times on network-wide demands. We illustrate this technique with an example motivated by real-life problems in which it is desired to represent the impacts of a smaller urban area within a larger-scale regional network.

Polak : [Imperial College]

ABSTRACT:

12 Plenary

McDonald : [University of Southampton]

ABSTRACT:

2A Emissions

Susilo : Individual CO₂ profiles from passenger transport in the Netherlands and the United Kingdom [University of the West of England / Delft University of Technology]

ABSTRACT: Transport currently accounts for a fifth of all greenhouse gas (GHG) emissions in Europe (excluding international aviation and maritime transport). Whilst GHG emissions of most other sectors are either stable or decreasing, GHG emissions from transport (both passenger and freight) are still growing. Between 1990 and 2004, GHG emissions from transport increased by more than 30% across Europe. GHG emissions from transport in the UK increased by more than 10% during this period whilst emissions in the Netherlands increased by 34%. What is not known however is how these emissions are divided across society and how similar this distribution is across different countries. This paper focuses on passenger transport and looks at daily travel distance, energy consumption and CO₂ emissions of individuals in the United Kingdom and the Netherlands. It uses national travel data for both countries from a number of different years since 1990s to examine individual travel distance, energy consumption and CO₂ emissions over time. It then constructs a classification of individuals based on their travel patterns and CO₂ emission profiles with the aim of identifying the key socio-economic characteristics of individuals with high and low CO₂ emission profiles. By looking across a series of data since 1990, the paper examines the extent to which the socio-economic characteristics of the main contributors of GHG emissions are the similar in both countries.

Felstead : Extremes in driving style and their potential effect on vehicle emissions [University of Southampton]

ABSTRACT: A small, petrol engine, EURO IV compliant vehicle was driven along a real-world route in Southampton, UK to measure the potential effects of differing driving styles upon fuel consumption and tailpipe emissions,. The test route in Southampton was selected to included a wide range of traffic conditions that could be expected on urban roads. Two drivers were asked to follow a simple set of behavioural rules intended to replicate what have been termed as 'aggressive' and 'passive' driving styles. The resulting driving profiles were compared to a number of legislative driving profiles. The aggressive driving profile exceeded the properties exhibited by the UK Department for Transport Warren Springs Laboratory (WSL) combined drive cycle, whilst the passive driving style exhibited properties similar to the European Union legislative New European Diving Cycle (NEDC). The drive profiles were replicated on a chassis dynamometer to quantify the difference in emissions of the two driving styles. The aggressive profile produced CO, NO_x and CO₂ emission rates of 2.68, 0.853 and 183.6 gkm⁻¹ respectively, whilst the passive profile produced only 0.064, 0.011 and 124.4 gkm⁻¹ respectively.

Bell : The use of the speed-flow curve to demonstrate the effect of new technologies [University of Newcastle upon Tyne]

ABSTRACT: This paper develops the concept of road capacity, from the traffic, emissions and climate change perspective. It demonstrates how traffic management and control technologies manage to move more traffic, more smoothly as they have become more sophisticated. However, our motorways and urban networks continue to experience recurrent congestion. As a consequence, increase in pollutant emissions, including climate change gases, are respectively increasing health risk and threatening the planet. Results of research are presented to demonstrate the role of driver behaviour and vehicle technologies in reducing emissions by smoothing flows and reducing source emissions. However, results of real-world tailpipe emissions are used to demonstrate why there need for radical changes in people's attitudes to the use of public and private transport as well as the design and operation of transport infrastructure. There is a need to move away from the traditional approach of optimising networks as traffic systems but instead to minimise performance measures associated with effective movement of people and goods. Also, in the near future, due consideration needs to be given to controlling the demand for travel by car in order to meet air

quality and noise targets set by the European Commission. However, if climate change issues are to be addressed, a dramatic reduction in personal travel and freight miles, along with investment in and use of sustainable transport systems is essential. The purpose of this presentation is to provoke discussion with regard to the use of the speed flow curve as an aid to the understanding and design of possible 'futures'.

2B Public Transport Simulation

Davenport (Smeed) : Personal rapid transit performance modelling using discrete-time queues
[University of Bristol]

ABSTRACT: This paper describes research carried out for Advanced Transport Systems (ATS) as part of an EPSRC-sponsored Engineering Doctorate in Systems. The research project has combined elements from Operations Research to support the development of a Personal Rapid Transit (PRT) system known as ULTra. ULTra's passenger arrival, destination selection and journey booking processes give rise to a number of queuing situations. By applying time-continuous M/M/1 queuing theory to these we find theoretical mean and 90th percentile queuing times, which are the key performance measures for the ULTra system. However, PRT queues are more accurately modelled in discrete-time, since this places lower bounds on inter-arrival times that model minimum vehicle separation times, manoeuvring times, and minimum delays in the journey booking system. Here the fundamentals of discrete-time queuing theory are developed and two simple applications are considered: 1. Passenger wait times and station sizing, and 2. Journey booking delays.

Hounsell : Investigating issues of differential bus priority for high frequency services [Transportation Research Group, University of Southampton]

ABSTRACT: The need for sustainable transport operations in cities is focusing more attention on the needs of buses to provide fast, frequent and reliable services. One favoured measure is bus priority at traffic signals, particularly where roadspace is limited and traffic signal density is high. As bus fleets are increasingly equipped with satellite-based Automatic Vehicle Location (AVL) systems, it is now possible to provide 'differential' priority, where different levels of priority can be awarded to buses at traffic signals according to chosen criteria. For high frequency bus services, improving regularity and reducing 'excess' waiting times for passengers at stops are key criteria often used. Various priority strategies can be implemented within differential priority to improve regularity. A strategy defines the targeted category of buses (in terms of the 'lateness') and the level of priority allowed, which greatly influences the effectiveness of bus priority. A common and simple way of categorising buses for priority is based on the headway of each individual bus, by comparing its headway to the bus in front, on the same service, with the scheduled headway. However, recent research for Transport for London has shown that greater regularity benefits could be achieved through more advanced strategies. These include strategies where priority for a bus is based not only on its own headway, but also the headway of adjacent buses. There can also be benefits in using the average headway being achieved as the reference headway, rather than the scheduled headway, where this cannot be achieved for operational reasons. This paper discusses these options and results of analyses, to illustrate the relative effects of these different headway-based priority strategies, both on regularity and passenger waiting time.

Polyviou : Evaluation of new bus fleet management options using intelligent transport systems
[University of Southampton]

ABSTRACT: Fleet management is the most significant function for any bus based public transport organisation. In order to detect the fundamental role of dynamic fleet management in bus based public transport, a microscopic simulation model capable of modelling bus fleet management

control strategies in case of slight and moderate incidents is being developed to apply to a variety of scenarios. Dynamic bus fleet management is one of the main elements of dynamic bus scheduling. Therefore, it has been recently encouraged and supported with the use of Intelligent Transport Systems (ITS). Based on an existing simulation model called SIMBOL, which was developed for modelling differential bus priority in detail, the new model is exploring the performance of different bus fleet management strategies. The new simulation model is currently under development, although the specifications, requirements and characteristics have been identified. The model is going to be calibrated and validated with the field data from a bus route in the city of Southampton. The performance of the fleet management strategies is then going to be evaluated using the output results from the simulation model. The bus delays resulting from various incidents will be calculated, graphs depicting the impact of each incident will be presented and bus fleet management strategies to address each problem will be proposed accordingly. Eventually, the overall benefit for buses, due to the bus fleet management strategies provided, will be calculated, in terms of relative cost effectiveness. The research is expected to demonstrate the usefulness of the simulation model as a valuable tool for modelling bus fleet management under various incidents and verify the convenience that such a tool would offer to bus operators, who should always be regarded as the ultimate and indispensable decision makers in any bus based public transport issues.

2C Local Authorities

Jordan : Public representation in transport consultations: exploring the age bias [University of the West of England]

ABSTRACT: This research is primarily concerned with the appropriateness of methods of consultation and participation used to consult with members of the public on transport initiatives and the effect that these methods have on the level and type of participation achieved. The overarching aim of this research is to establish whether an age bias exists in consultation exercises undertaken by local authorities in relation to transport initiatives. Attitudes to this potential bias of people of the age range 20- 35 and local decision makers are investigated. It attempts to determine whether younger people want to be involved in their communities and whether they feel that transport professionals engage them effectively. Finally, this research aims to provide some idea of the type of consultation that would be beneficial in including people of the age range 20 – 35, thereby providing preliminary recommendations to assist in the development of inclusive consultation strategies.

Marsden : The likely impacts of target setting and performance rewards in local transport [Institute for Transport Studies]

ABSTRACT: All local transport authorities in England have, since 2000, been obliged to submit five year plans for local transport. The plans set out the overall strategy, key policies that will be implemented and how the strategy will be resourced. The central government now adjusts the funding allocations up or down by up to 25% based on the quality of the plans and, on an on-going basis, achievement against the targets proposed in these plans. This paper presents a theoretical and practical assessment of the impacts of these incentives on local authority performance. The research has employed a mixed methods approach with interviews, questionnaires, the development of a game theoretic representation of the process and a laboratory experiment. The findings have been discussed with practitioners. The research suggests that the presence of performance rewards, in a scheme where authorities believe they have a reasonable chance of being rewarded, leads to authorities setting more ambitious targets. Whilst it is not certain that these targets will be met it appears that the absolute outcomes achieved are likely to be better than they otherwise would have been. Generic conclusions are drawn about the conditions under which target-based performance reward schemes will work best.

Edwards : A strategic approach to reducing the transport impacts of purpose-built football stadia [Transport Operations Research Group, University of Newcastle Upon Tyne; Vehicle Safety Research Centre, Loughborough University]

ABSTRACT: Since the late 1980s a number of football clubs have moved to new purpose-built stadia, the largest of which have a capacity of 50, 000 people. Many incorporate a wide range of leisure and business facilities such as hotels, conference facilities and shops, leading to a more consistent flow of traffic than that generated by the seasonal fortnightly home games at the old grounds. One such ground is the Ricoh Arena in Coventry, which is used as a case study in this research. The Ricoh has a capacity in excess of 40,000 when used as a concert venue, and the transport infrastructure, despite being fairly new, struggles to cope. This paper will investigate the accessibility implications of purpose-built stadia, whilst also examining wider environmental impacts such as land take and trip generation. It will address the priority given to transport, not only in the initial planning process, but also in the planning and licensing of events that are held there after completion. Of most significance is the overwhelming dependence by those travelling to events on road transport, and in particular the private car. A range of problems arise, including severe road congestion, difficulty enforcing road safety practice, legislation connected with parking, taxi licensing, and pedestrian behaviour. A more coordinated approach is required, but can be difficult to implement due to the diverse nature of the events themselves, and hence of the people attending. Using the Ricoh Arena as a case-study, and gathering evidence from other UK stadia, along with examples of best practice from the USA, this paper will provide recommendations for the alleviation of problems at existing stadia, and a set of guidelines to be implemented at the planning stage in order to help similar developments in the future to achieve the desired balance between sustainability and accessibility.

2D Rail

Blainey : Some issues in modelling new local rail services [University of Southampton]

ABSTRACT: Modelling the absolute level of demand for new rail services has received much less attention than modelling relative changes in demand for existing rail services. The majority of the recent work which has been undertaken on absolute demand modelling has focused on inter-urban travel, meaning that local and suburban travel has been somewhat neglected. In an attempt to remedy this, work has been undertaken on developing and updating the local rail demand models developed by Preston (1987, 1991). Trip rate, trip end and hierarchical logit models have been formulated, and calibrated for a case study area based around South Hampshire using a range of electronic datasets. GIS have been extensively used for integrating and analysing the large volumes of data required for model calibration, and also for improving the presentation of model results. The inclusion of a variety of variables in the models has been investigated, with the best models explaining almost 90% of the variation in demand, raising the question of whether the extra time and effort involved in developing more complex models is justified. The issue of catchment area definition has also been investigated, with population units allocated to stations by several different methods and the respective model fits compared. Data on exact trip origins and destinations from the Greater Manchester Travel Survey has been used to investigate how well estimated catchments match actual travel behaviour. A site search procedure for potential new stations has also been developed and applied to the Hampshire area, with the best trip end model used to predict demand at the sites identified.

Singh (Smeed) : Estimating the marginal costs of infrastructure and operations for Indian railways [Institute for Transport Studies]

ABSTRACT: This paper estimates the marginal costs of infrastructure and operations of Indian Railways. The categories of costs which were analyzed included the track maintenance and renewal costs; repairs and maintenance costs of locomotives, wagons and plants and equipment; operating

expenses including wages and fuel. All these elements contribute to the track access and haulage charges levied by the Indian Railways. The methodology used is a synthesis of practical cost analysis like the Uniform Railroad Costing System (URCS) followed by US railroads and the European approach for analysis of marginal cost estimation of infrastructure from micro level data. It was possible to get an estimate for marginal cost of intermodal trains on per Twenty Equivalent Unit (TEU)-Km basis. This is compared with the prices actually charged by Indian Railways. With this analysis it is now possible to understand the Indian Railway approach to pricing for access and haulage for the operators in the newly deregulated intermodal sector and to design more efficient charges.

Price : Assessment of the high-speed railways interconnectivity in Southwest Europe through accessibility measure [Transport Studies Unit, Oxford University]

ABSTRACT: This paper proposes an approach to the assessment of the level of interconnectivity of the highspeed railways in south-west Europe using accessibility measures. It seeks to explain the way the interconnectivity of the examined network justifies the accessibility of the region which the network crosses. First the paper defines accessibility as a measure of interconnectivity. It then offers an overview of existing accessibility studies, followed by a proposed accessibility model of network interconnectivity. The proposed model considers variables such as tourism, employment, travel time, and travel costs before and after the introduction of the high-speed rail network in the region. In the paper accessibility will be defined as the ability for a destination to be reached by using a transport mode at different scales (local, regional, national, international).

3A Safety

Muir : Pedestrian casualties and deprivation: modelling the influence of local factors [Institute for Transport Studies, University of Leeds]

ABSTRACT: Adult pedestrians in the most deprived areas of Leeds are seven times more likely to be involved in road traffic accidents than pedestrians in the least deprived areas, and this link exists across areas nationwide. Previous studies have shown that although factors associated with deprived areas do, in part, contribute towards explaining increased pedestrian casualties in these areas, there are further elements of deprivation, yet to be accounted for, that remain influential, and cannot therefore be addressed. This paper builds on the previous studies by using accident prediction models to assess whether the 'deprivation effect' remains when previously unconsidered variables are tested in the models. The models within this paper can be further distinguished from those used in previous studies in three main ways. Firstly, earlier models have been constructed at a national level whereas these models cover the smaller area of Leeds, thus facilitating the inclusion of more detailed local variables (such as traffic and pedestrian flow) that are less feasible to obtain on a larger scale. Secondly, previous models have been aggregated at ward level, where population size varies from 800 to 30,000 people. The models here use Lower Layer Super Output Areas (LSOAs) which have smaller populations of 1000 to 3000 people, and therefore greater social homogeneity. Finally, these models use the latest Index of Deprivation (IMD 2004), rather than IMD 2000 used in previous studies. These improvements allow more accurate and representative modelling of areas and their populations, thus improving the validity of any associations with pedestrian accidents.

Evans : Fatal accidents at level crossings in Great Britain 1946-2005 [Imperial College London]

ABSTRACT: This paper presents an analysis of fatal accidents and fatalities at railway level crossings in Great Britain over the 60 years 1946-2005 using HM Railway Inspectorate data. Level crossings are classified by whether they are controlled by railway staff, protected by lights and/or barriers operated automatically by trains, or are reliant on the road or footpath user to check that it is safe to

cross – so-called ‘user-worked’ crossings. Accidents are classified by whether the fatalities are to pedestrians only or whether they include road vehicle or train occupants. The number of crossings fell from about 26,050 in 1946 to 7,670 in 2005, including footpath crossings. In 2005 there were about 860 railway-controlled crossings, 760 automatic crossings, and 6,050 user worked crossings. Automatic crossings were introduced to Britain in the mid-1960s; before then, all were then either railway-controlled or user worked. The number of fatal accidents – including pedestrian accidents – fell from about 36 per year in the late 1940s to 11 per year in the late 1970s, since when it has remained approximately constant. This is in a period when other types of railway accident fell sharply, so that fatalities at level crossings are an increasing proportion of the railway total. The safety performance of each type of crossing has been different: the number of fatal accidents per 1000 crossings per year, including those to pedestrians, is estimated to be: · low and falling at railway-controlled crossings; · low but constant at user-worked crossings; · much higher and rising at automatic crossings. It is interesting that the number of fatal accidents and fatalities per crossing per year at signalised road junctions and automatic railway crossings are about the same.

Wang : The effects of area-wide road speed and curvature on traffic casualties in England
[Loughborough University]

ABSTRACT: Transport provides a range of benefits to society in terms of mobility, access and economic growth. There are however negative impacts of transport, not least in terms of environmental degradation, damage to property, traffic accidents and loss of life. This paper focuses on road traffic accidents, the reduction of which is an important aim of transport policy world wide. The approach the paper takes is to develop a series of relationships between different traffic casualties and the contributing factors using area-based accident models. In particular the paper investigates the impact of area-wide road speed and road curvature on traffic casualties by the use of a Negative Binomial (NB) regression model, utilising spatially disaggregated cross-sectional data. The spatial units of this analysis are the 8,019 census wards of England based on the UK 2001 Census data and GIS data of such units obtained from the EDINA UKBORDERS datasets and the STAT19 UK national road accident database obtained from the UK Data Archive. The results suggest that increased average speed within a ward is positively associated with total fatalities and serious injuries. In addition, the research finds that road curvature is a protective factor with regards to traffic casualties, with traffic volume being positively related with casualties but negatively associated with non-motorized slight injuries. The results associated with the controlling factors such as road infrastructure, namely length of road, junctions and roundabouts, and socioeconomic variables, namely population and employment, were all found to be coherent in all models.

3B Route Choice

Qadir : The effect of travel time variability in the route choice decision in traffic network equilibrium
[Institute for Transport Studies, University of Leeds]

ABSTRACT: The daily experience of travel time variability (TTV) irritates drivers to think about other alternatives available in traffic network during their route-choice decision. In other words, drivers are not only perceiving the generalised cost but also the variability in travel time (showing their risk-taking behaviour) which adds a new attribute in the utility function and, more importantly, brings in the concept of travel time reliability. One of the aims of this paper is to investigate the impact of TTV in the drivers’ route choice behaviour. For this purpose, a new model is developed which incorporates the effect of TTV and schedule delay to multiple drivers’ classes, and is named the late arrival penalised stochastic (L/S/M) equilibrium model. A path-based solution algorithm, which minimises the gap function, is employed to solve a small transport network using the logit-based L/S/1 model with an unconstrained optimisation technique, the quasi-Newton method. The model works as expected by revealing the drivers’ behavioural perception against TTV which inspire them

to deviate from a path which actually has the least mean travel time but the greatest variance in travel time; showing their risk-taking behaviour. It is also observed that drivers update their route choice decision more aggressively for the penalised equilibrium models than the other equilibrium models.

Park (Smeed) : A fuzzy decision tree learning algorithm for modelling route choice behaviour [Imperial College London]

ABSTRACT: This study introduces a way to overcome the sensitivity of decision trees used for route choice behaviour studies by utilizing fuzzy logic while preserving the advantages of decision trees and the C4.5 algorithm, namely comprehensibility and ease of application. Soft discretisation of continuous values in fuzzy decision trees is able to provide a more robust classification. Also, the use of fuzzy logic enables us to accommodate qualitative attributes describing route characteristics. Apart from these features, fuzzy decision tree learning algorithms are also capable of assigning numeric values on decisions regarding the degree of certainty of each recommendation emanating from the fuzzy reasoning. This feature makes it possible to solve the multiple suggestion problem whereby the classical decision tree may suggest that more than one route is optimal. In order to investigate improvements resulting from the application of fuzzy decision tree learning algorithms, a software for an adaptive route choice model using a fuzzy decision tree learning algorithm, fuzzy ID3, is developed and simulation experiments with the model are carried out. The comparison of results with the non-fuzzy adaptive route choice model indicates better predictive accuracy and more effective applicability for the fuzzy model in practice.

Lindveld : [Imperial College]

ABSTRACT:

3C Demand Models 1

Kirby : Pivot point prediction problems [Napier University]

ABSTRACT: The "pivot point" method of forecasting trips from origin zone to destination zone takes as its starting point the (grossed-up) observed value for each O-D movement in some base year, and adjusts it by a ratio of two function values. The function is a function of generalised cost of the movement, the values are the values of generalised cost in the future and base years. One problem with this approach is the conceptual one, that it implies an assumption that the "true mean" is best represented by the observed value instead of the more usual assumption made in modelling that the true mean is best represented by the modelled value. But that has given a problem for practitioners, in that there has not hitherto been a basis under which a modeller can consistently estimate the parameters of this function from the base year data. Instead, current practice (and advice on "Variable Demand Modelling" from the Department for Transport) is to use functions and parameters taken from elsewhere. Hence, base year data has been ignored. This paper derives and demonstrates a method that enables the parameters of the function to be estimated in a manner that is consistent both with the base year data and the pivot point approach. It is shown that the optimum value (for example of the parameter of an exponential deterrence function) depends upon whether or not the results of pivoting are constrained to yield the same tripend totals as in the base year. Another problem with the method is that cells in the O-D matrix that are empty in the base year remain at zero. This again raises the question of what is the best estimate of the true mean, for which the paper suggests that Bayesian methods of estimation might provide a way forward.

Chatterjee : Towards the dynamic modelling of travel demand [UWE, Bristol]

ABSTRACT: Solving for a static equilibrium is a central feature of travel demand modelling practice. In contrast with static models, dynamic models can recognise inter-temporal dependencies in travel behaviour and enable the evolution of travel demand to be predicted. Despite some past interest and recognition of their theoretical and practical advantages there has been little progress with developing dynamic models. The lack of suitable data is a contributing factor to this and a panel survey has been conducted obtaining longitudinal data on the travel behaviour of residents of Crawley, West Sussex, before and after the introduction of a new guided bus service in September 2005. The paper explains how this data has been used to construct dynamic models of the evolving response of a population to the change in the travel environment and what has been learnt from this. The paper starts by introducing the concept of dynamic modelling and the motivations to employ it. Examples of models developed from the panel data are presented and discussed. Duration models enable the time taken after a new transport service is introduced until a mode change takes place to be analysed. It is shown how a 'split population' duration model should be used which permits the assumption that some people will never change modes. Models for the transition in bus usage at specific time points are then presented and it is explained how different specifications can be used depending on the assumptions made about behavioural dynamics. Model parameters and forecasts are compared for different model specifications and this highlights the advantage of dynamic over static specifications. Significant data and specification issues faced when developing dynamic models are identified before the paper concludes with recommendations for future research in this area.

Smith : Convergence of transport models: a pictorial study [University of York]

ABSTRACT: Decision-makers make decisions worth thousands or millions of pounds on the basis of runs of transport models. These are increasingly complicated as many behaviours are modelled; usually decision-making loops interact with one another. These days, despite tremendous advances in computer technology, the National Transport Model and even just some demand sub-models of transport models take days to run to a reasonable level of convergence. Convergence can also be slow within the new DIADDEM integrated demand / assignment procedures. Moreover, to ensure accurate economic benefit results convergence tolerances need to be tight; so it is not feasible to accelerate convergence by slackening criteria. Despite the central importance of accurate fast convergence there has been apparently little study of the ways in which convergence of complicated interacting models may be improved. These complicated models often comprise several essentially distinct models joined together in some way. This paper gives a short introduction to the problem and then summarises, in sections 2-8, work that has been undertaken (over several MSc dissertations) in a simple case, with just two interacting models; a cost or supply model and a demand model. In these sections the paper builds on Lv et al (2007); suggesting methods which when suitably developed and tested may improve the convergence of complicated transport models. The paper also, in section 9 below, suggests a natural amendment of the usual excess demand formulation of variable demand transport models.

3D Freight and Logistics

Woodburn : An investigation of container train service provision and load factors in Great Britain [University of Westminster]

ABSTRACT: The continued growth in the volume of international trade poses considerable economic and sustainability challenges, particularly as transport routes become more congested and concern grows about the role of transport movements in accelerating climate change. Rail freight plays a major role in the inland transport of containers passing through the main British container ports, and potentially could play a more significant role in the future. However, there is little detailed understanding of the nature of this particular rail market, especially in terms its current operating

efficiency. This paper examines container train service provision to/from the four main ports, based on analysis of a representative survey of more than 500 container trains between February and August 2007. The extent to which the existing capacity is utilised is presented, and scenarios by which the number of containers carried could be increased without requiring additional train service provision are modelled, to identify the theoretical potential for greater rail volumes. Finally, the paper identifies the challenges involved in achieving higher load factors, emphasising the importance both of wider supply chain considerations and government policy decision-making.

Maynard : Analysis of mean bin weight data to monitor best practice at HWRCs [Transportation Research Group]

ABSTRACT: This paper describes a modelling approach used to investigate the significance of key factors (vehicle type, compaction type, site design, temporal effects) in influencing the variability in observed nett amenity bin weights produced by Household Waste Recycling Centres (HWRC). Understanding such variability is a prerequisite to achieving best operational practices, to minimise the number of vehicle movements between each HWRC and disposal sites, and achieve consequential environmental and traffic benefits. The method described can help to quickly identify sites that are producing significantly lighter bins, enabling detailed back-end analyses to be efficiently targeted and best practice in HWRC operation identified. Tested on weigh ticket data obtained from nine HWRCs across West Sussex, the model suggested that compaction technique, vehicle type, month and site design explained 76% of the variability in the observed nett amenity weights. For each factor, a weighting coefficient was calculated to generate a predicted nett weight for each bin transaction and Bognor Regis, Crawley and East Grinstead were identified as having similar characteristics but returning significantly different mean nett bin weights. Waste and site audits were then conducted at the three sites to try and determine the possible sources of the remaining variability. Significant differences were identified in the proportions of contained waste (bagged), wood, and dry recyclables entering the amenity waste stream with significantly less contained waste and dry recyclables observed in the amenity waste bins at Bognor Regis.

Zanni : Freight transport in London: climate change challenges and issues [Loughborough University - Department of Civil and Building Engineering - Transport Studies Group]

ABSTRACT: The aim of this paper, based on research implemented in the framework of the Tyndall Centre for Climate Change Research 'Cities' Programme, is to analyse and project freight transport related CO₂ emissions in London. This research firstly profiles the historical and current situation in terms of freight traffic and carbon emissions. Preliminary projections for both variables (up to 2025) are then presented. These projections represent the baseline situation and they will be elaborated in order to take into account the impact of a set of freight and logistic related transport policy initiatives on the operational behaviour of freight operators within London, as well as the impact of economic and demographic change, in order to identify the likely changes in the amount of CO₂ emitted by the freight sector. In order to do so, a review of the available studies analysing freight movements and policy in an urban setting has been carried out. The considered policy variables include infrastructure intervention (loading bays and the use of preferential lanes), regulation (time and weight restrictions, congestion and road users charging), technology and operators efficiency incentives. Opportunities to reduce carbon emissions were especially identified in the provision of collection/delivery and consolidation infrastructure and measures to increase fuel efficiency at both the drivers and vehicles levels. Findings from this review will be further developed with the feedback from a network of experts through a Delphi type of questionnaire.

4A Travel Behaviour

Riley : A segmentation analysis of air travel attitudes and behaviour in the East Midlands
[Loughborough University]

ABSTRACT: The EPSRC-funded 'Propensity to fly' project examines individual responses to low cost air travel in the East Midlands region. The project aims to deliver a stated choice modelling capability and a greater understanding of air travel market segments. This paper focuses on the development of air travel market segments, based on a major postal household survey across five sampled local authorities within the East Midlands: Hinckley & Bosworth, Newark & Sherwood, Northampton, North East Derbyshire, and Nottingham. Cluster analysis is an exploratory statistical technique, used for market segmentation purposes to develop meaningful subgroups of individuals. Distinct population segments are generated from a range of socio-economic variables (age, gender, current status, income, residential location, presence of children in the household) within the East Midlands household survey, using cluster analysis. Further cluster analysis runs incorporate air travel variables (flown the previous year, split of business & leisure travel). The air travel attitudes and behaviour of the generated population segments are then analysed. Air travel attitudes and behaviour variables within the survey relate to airport usage, flight booking habits, holiday preferences, opinion towards environmental issues, and price sensitivity towards air fare changes. The relationships developed provide an insight into air travel attitudes and behaviour amongst different population segments. This can be linked to contemporary aviation policy and the context that, although the increasing demand for air travel has provided greater opportunities for individuals, there are environmental challenges to ensure that the development of aviation is more sustainable.

Richards : The role of lift sharing in future mobility [University of Southampton]

ABSTRACT: The ability of the private car to provide flexible, attractive and cost-effective personal travel is gradually being eroded, particularly in urban areas. Contributing factors are the increasing levels of congestion and enforcement, limited and increasingly expensive parking, and controls / charging on road use. Also, local authority targets such as those relating to the environment and road traffic reduction are constraining the use of cars in urban areas. In this context, the role of the car in future mobility may change and lift sharing offers the prospect of enabling more efficient usage by reducing single occupant car trips. This paper discusses research undertaken through the FUTURES project (Future Urban Technologies: Undertaking Research to Enhance Sustainability) to enhance understanding of the current practice and future potential of lift sharing in the UK. Current evidence relating to the benefits and impacts of lift sharing is limited. However, the presence of the UK's principal lift sharing service provider, Liftshare.com Ltd, amongst the project's stakeholders has enabled the research team to access previously unavailable data on the practice of lift sharing in the UK. In 2006, some 37,000 new subscribers joined Liftshare.com and this paper reports on the analysis of this 2006 membership database to identify common characteristics amongst lift sharers. The main variables analysed were journey purpose, type, distance and frequency, as well as age and gender of the subscriber. The paper then summarises key findings to emerge from this analysis before identifying some future research options.

Sunitiyoso (Smeed) : Influence of social interaction and social learning on travellers' behaviour
[Centre for Transport and Society, University of the West of England]

ABSTRACT: Social interaction and social learning are likely to be influential factors in the travel choices made by individuals and the dynamics of these choices. The study aims to understand the influence these social aspects have on travellers' decision making and behaviour, and furthermore, to find out the possibility of utilizing them to enhance policies on behavioural change. Social interactions, which may due to an interdependent situation between travellers, social information about other travellers' behaviour and communication between travellers, enable social learning and social influence processes between travellers. The study utilizes an innovative methodology involving a laboratory experiment to capture the role of social interactions and social learning in the

dynamics of travellers' decision making over time. The laboratory experiment found that effects of social interaction and social learning are more visible and significantly observed at individual and group level than at aggregate level. They produce different effects between different individuals or groups of individuals. Providing more social information makes people less cooperative and less decisive in making choices. It also influences more people to make contrarian than direct responses. Analyses of group and individual behaviour reveal that people learn individually from their previous experience and socially from other people. It is revealed that confirmation (keeping previous behaviour when the observed individuals also previously chose the same choice) and conformity (following the choice of the majority) are likely to exist whenever individuals have access to social information. These findings elicit some behavioural, policy and methodological implications.

4B Urban Design

Potter : The challenge of sustainable suburbia [Open University]

ABSTRACT: Not only is UTSG currently celebrating its 40th birthday, but so is Milton Keynes, perhaps Britain's most transport-oriented urban design. This discussion paper explores issues raised with the expansion of Milton Keynes and the dilemmas in seeking to plan for sustainable travel behaviour. Following its designation as a new town in 1967, the 1970 design of Milton Keynes was for a car-oriented low density land use pattern served by a one-kilometre grid of dual carriageway roads. Bus services in Milton Keynes are the poorest for any town of its size and the low density design makes most trips too long to walk and cycle. Hence Milton Keynes has a level of car use more characteristic of a rural shire than an aspiring city. Furthermore traffic is even starting to overwhelm the grid roads in a casebook SACTRA manner. Today the 1970 Plan for Milton Keynes would be viewed as environmentally irresponsible, economically extravagant and socially divisive, so proposals for the town's expansion involve medium-density developments in new areas that are served not by 70 mph grid roads, but 20-30mph 'city streets' with bus priority measures and maximising facilities within walking and cycling distance. These proposals have sparked a big local debate. A widespread view is that such a change in the principles of the town's design will throw away what has made Milton Keynes good and economically successful. Many advocate retaining the ethos of a 'city built for the car'. A counter expansion plan, backed by an e-petition, proposes a continuation of the 1970s high car dependency design with, low density development served by large grid roads. This raises questions that have a generic application in the transport debate. Firstly, the failings of 'predict and provide' transport planning that has emerged in the last 20 years have utterly failed to get beyond the transport professional elite. The UK's most socially divisive and unsustainable transport design is still popularly perceived as successful. There is no perception that any problem exists. Secondly, even were there an acceptance of the unsustainability of extremely car dependent urban designs, is there only one way for places like Milton Keynes to move towards transport sustainability? There seems to be a single model for transport sustainability based around high density living and traditional forms of public transport. For the majority of suburban and semi-urban Britain perhaps different and more innovative approaches are needed, with the emphasis being on institutional changes in transport provision rather than highly compact urban forms.

hickman : Transport and reduced energy consumption: the role of urban planning [bartlett school of planning, ucl]

ABSTRACT: Traffic volumes and energy consumption from the transport sector continue to rise, yet the potential role of urban planning in contributing to reduced transport energy consumption continues to be largely underplayed. The growth of suburban areas tends to increase traffic volumes by dispersing activities and hence facilitates private car travel. Public transport orientated development as an evolving practice tends to be focused very much on urban areas. This paper draws on research in suburban Surrey to suggest that urban planning can be applied more fully, at

the strategic and local levels, to reduce energy consumption in car use in the commute to work. The future locations of housing growth are critical to our future travel behaviour – the lessons from Surrey can be applied to a certain extent to the Growth Areas and Housing Pathfinder Areas and elsewhere – however it is only through a careful integration of transport and urban planning that the potential for reduced travel can be realised. Regression analysis shows that urban form variables contribute up to 10% of the variation in transport energy consumption in the commute to work. The conclusion reached is that integration requires action across a wide range of fields and from a wide range of actors. New households, for example, should be located in a coordinated manner in relation to [not only] the density of development, [but also] settlement size, distance from urban centres and transport networks, jobs and housing balance, local streetscape layout, public transport accessibility and green belt designation. Ad-hoc “pepperpotting” of new housing development no longer remains an option. Appropriate urban structure, at the macro and micro scales, can therefore help reduce transport energy consumption in the commute to work, with greater transport sustainability being achieved through clearer direction on the location and form of major new development.

Carty : Modelling the link between urban transport and urban form [University College Dublin]

ABSTRACT: This paper discusses the relationship that exists between transport and land use. In particular, the paper seeks to question the conventionally accepted wisdom regarding the relationship between urban land use and transport. Rapid economic growth in Ireland has led to car ownership levels increasing very quickly. In Dublin, increased car ownership combined with a lack of investment in public transport infrastructure has resulted in congestion, high levels of car use and urban sprawl. Recent plans from the government in Ireland seek to counter this urban sprawl and produce a more sustainable city by constructing a light rail system and a metro. However, this paper questions whether providing radial routes to distant suburbs will actually have a beneficial impact on Dublin’s development. One of the main problems associated with the link between transport and urban form/Land use is that of causality. It is very difficult to state for sure what would have happened to an urban area if no investment had occurred. But in this project, it is intended to use Moland and an integrated transport model to examine the feedback relationship between transport and land use. The model will be developed and applied to the Greater Dublin Area. This model will provide planners and policy makers with a Decision Support System which can provide guidelines for the types, intensities and characteristics of land uses that they ought to encourage and to support them in their analysis of the impact of alternative spatial planning and policy scenarios.

4C Microsimulation

Maher : Optimisation using a Monte Carlo traffic simulation model [University of Leeds]

ABSTRACT: Microscopic traffic simulation models such as Paramics and Vissim have become immensely popular in recent years. They offer the capability to model traffic flow in a far more detailed, and potentially accurate and realistic, manner than macroscopic models. However, whereas the outputs from macroscopic models are replicable and the performance index (PI) is generally continuous with respect to any control variables or parameters, the Monte Carlo nature of microscopic models means that their outputs are subject to random error or “noise”. This makes the problem of optimisation using a microscopic model a far more challenging one. Using as an example the optimisation of signals in a network using a Monte Carlo traffic simulation model, it is shown how this “noisy optimisation” problem can be tackled using the cross entropy method - a new approach for complex combinatorial problems. The basic method is extended to incorporate a Bayesian updating procedure. The algorithm is then applied under a number of different scenarios, designed to assess the performance of the method and how it depends on the amount of random error in the simulation runs.

Liu : STABILITIES OF A CAR-FOLLOWING MODEL: AN ENGINEERING ANALYSIS [University of Leeds]

ABSTRACT: This paper presents an experimental stability analysis of a multi-phase car-following model under mild to severe disturbances. The results show that local stability was always conformed. An asymptotically unstable region was found for traffic in congested states. One of the boundary conditions proposed by Brackstone et al (2002) for close-following situations was found to be in conflict with the stable condition required by the car-following model, which had attributed to speed oscillations seen in the model during transition of the traffic from non-congested to congested states. Suggestions were made to the choice of model parameter values to meet the stability conditions and ways to improve the model

Liu : Stabilities of a car-following model: an engineering analysis [University of Leeds]

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4D Older Travellers

Schmöcker : An analysis of trip chaining among older London residents [Imperial College London]

ABSTRACT: This paper examines the trip chaining complexity of individuals in London. We adopt two definitions of trip chaining. One based on a 30 minute dwell time rule and a second based on home-to-home tours. Our focus is on the complexity of the trip chains as measured by the number of stops on a given tour. The analysis uses the London Area Travel Survey and examines the factors associated with trip chaining for people aged over 60. A comparison with those aged under 60 reveals that older people on average make more complex tours. Through descriptive analysis and ordered probit regression models we examine how reported levels of disability effect their trip chaining and we examine household demographic characteristics as well as proxies for accessibility, such as local population density. The analysis shows that disabilities do not necessarily lead to reduced tour complexity except when disabilities become so severe that independent travel is not possible. Our use of different tour definitions reveals that in particular home-to-home tours are more complex than tours with other starting points or destinations.

Musselwhite : A grounded theory exploration into the driving and travel needs of older people [Centre for Transport & Society, University of the West of England, Bristol.]

ABSTRACT: The population of older people in the UK and 'western world' is increasing in number and as a percentage of the total population. This trend is continuing into the foreseeable future. In addition, changes in lifestyle as a result of increased longevity and better health and social care mean that older people are being mobile later on in their life than ever before. This research uses grounded theory and adopts an iterative approach to eliciting and generating the travel needs of older drivers through in-depth qualitative research with 26 older car drivers and 31 ex-drivers. Analyses of the findings suggest three levels of travel need (practical, psychological and aesthetic). At a primary level, practical needs encompass day-to-day, functional and utilitarian mobility needs. Participants were most aware of such needs and as such these tend to be met when they give-up driving. The secondary level, psychological needs, include a sense of control and independence, enhancing status and defining roles. The tertiary level aesthetic needs, involve travel for pleasure

and for enjoyment. Psychological and aesthetic needs are less obvious to the participants themselves, but arguably are of equal importance as practical needs. However, less provision is made by older people in meeting these needs when they give-up driving. This has implications for design of travel services for older people to place emphasis not only on practical aspects of travel, but also on meeting social, psychological and aesthetic needs.

Rackliff : Deriving and validating road safety performance indicators for vulnerable road users in urban areas [Vehicle Safety Research Centre, Loughborough University]

ABSTRACT: Road Safety Performance Indicators (RSPIs) are indicators which are causally related to crashes or injuries, and can be used to describe the level of safety offered by the transport system. It has been common practice in the UK to use a count of crashes in conjunction with some measure of risk exposure to assess safety, with targets framed in terms of reductions in casualty numbers for different categories of road user. RSPIs have a number of advantages over this approach; for example, they can smooth out random fluctuations in accident data and give a picture of long term trends, they allow disaggregation of the effects of different policies. Interest in this approach has grown recently, with the European Transport Safety Council's promotion of the idea through its Performance Indicator Network, which ranks European countries' performance on measures such as seat-belt wearing rates, number of breath tests and effectiveness of speed management measures. In the case of vulnerable road users RSPIs can be particularly useful in separating out the effects of changes in risk exposure to measure purely the safety implications of policy. This research which is being undertaken as part of a PhD programme describes a pilot study to construct such indicators for one specific class of vulnerable road user, namely older drivers. Using data from questionnaires, local authorities and national travel surveys a number of RSPIs have been constructed to measure the impact of urban road infrastructure design on this specific group. Ultimately the methodology will be extended to derive additional RSPIs for pedestrians and cyclists. The outputs of this research include: a validation of the RSPI approach to quantifying road safety; a re-evaluation of the past history of road safety in Britain within a performance indicator framework; and recommendations regarding appropriate directions for road safety policy in the future.

5 Plenary

Preston : The challenge we face - and how transport economics might help [University of Southampton]

ABSTRACT: This paper reviews a presentation by John Wootton to the 31st UTSG Annual Conference (1999) through the lenses of an occasional transport economist. Wootton outlines a number of transport challenges and solutions from a largely engineering perspective - which has been the dominant disciplinary viewpoint at UTSG. In this paper, it is argued that although the influence of economists on UTSG can be characterised as a steady trickle, in other respects we are all economists now. However, as we have attempted to rise to the challenges of congestion, pollution and accidents, we have neglected some important economic truths. With rising incomes, rising car ownership and (largely) falling generalised costs, demand growth has been strong. Cars generate traffic. This growth has been tempered by technological transformations and globalised displacement, but will only be effectively dealt with if we price correctly at the margins and if modal investments reflect scale economies. Paradoxically, rising oil prices might provide an opportunity to get prices right. By contrast, engineering driven targets may have unintended consequences and lead to perverse incentives.

6A Choice Models

Avineri : The challenges in setting parameter values in prospect theoretic models of travel choice [University of the West of England]

ABSTRACT: Travellers' responses to risk and uncertainty involved in their travel choices have been argued to be a research area that can be better addressed by a descriptive approach rather than a normative one. Prospect theory, a descriptive model of decision making under risk and uncertainty, has been recently incorporated to travel behaviour modelling. This paper describes some of the major challenges modellers are faced with when applying prospect theory to risky travel behaviour contexts. In particular we discuss options in determining the values of crucial parameters of prospect theoretical travel choice models such as the reference point and the loss aversion factor. Prospect theory has been originally proposed in order to capture observed choices between alternatives framed as lotteries and gambles, and has been applied fruitfully to some settings in economics. However, due to some unique characteristics of travel journeys and the environment of decision making, application of prospect theory to a travel choice context is not trivial. Modelling challenges due to lack of in-consensus reference point value and other difficulties in setting values to other parameters are described in this paper, and several methodological approaches to set the parameter values of prospect theory are suggested and illustrated.

Ibáñez : A re-assessment of the theoretical requirements on travel choice models to ensure validity for economic appraisal [University of Leeds]

ABSTRACT: A key issue in establishing the validity of travel choice models for economic appraisal is whether or not they adhere to the so-called 'integrability' conditions. These conditions ensure that, for any system of demand functions involving a symmetric negative semidefinite substitution matrix, there necessarily exists an underlying utility function from which the demand functions can be derived. In short, the integrability conditions ensure that a given observed pattern of demand is consistent with economic theory. Conventionally, these integrability conditions exploit 'continuous' demand theory, wherein preferences are defined on a continuous commodity space. Indeed the integrability conditions are based on the partial derivatives of Hicksian demand functions with respect to price and income, and thus appeal to smooth and continuous demand functions. Travel choice models may be seen as special case of continuous demand theory, such that choice is restricted to a finite and exhaustive subset of the commodity space, and this provokes some challenges in translating the conventional integrability conditions. The definitive contribution in this regard is McFadden (1981), although Bates' (2003) scoping paper on the theory and practice of transport appraisal described McFadden's analysis as '...path-breaking though relatively inaccessible ...' (p19). Our own paper seeks to promote deeper understanding of McFadden's analysis by repeating his derivation from first principles, and annotating this derivation with commentary throughout. In performing this derivation we reveal a number of important, and possibly restrictive, properties of McFadden's analysis. We also discover that a number of common practical specifications of travel choice model fail to comply with McFadden's integrability conditions; the validity of these specifications for economic appraisal is thus questionable.

6B Cycling

Sherwin : Travel planning at railway stations; an examination of the potential for bike-rail integration [CTS University of the West of England]

ABSTRACT: In the past, rail companies have focussed on improving the journey on the rail network both in time and experience rather than the journey to and from the rail station and the ease of interchange. The government in the recent white paper "Delivering a Sustainable Railway" recognises the importance of the whole journey for the passenger and intends to encourage rail operators to produce train station travel plans. The aim is to provide the best possible package of environmentally friendly access options. Promoting cycle access will be an important element in any

station travel but it starts from a low base with 2% of passengers accessing rail in this way. This paper looks at what bike rail integration has to offer and explores some of the theories of behaviour change and how these might apply to cycling. It looks at the context of travel planning and the different forms of bike rail integration that could be promoted. The provision of cycle parking will be a part of any station travel plan and this paper reports on data collected at Bristol Temple Meads station, the first phase of research designed to obtain a better understanding of existing bike rail integrator behaviour to inform a social marketing exercise to promote more. Surveys and interviews with bike rail integrators are ongoing.

Brown (Smeed) : Independent assessment of cycling attractiveness models [University of Southampton]

ABSTRACT: Encouraging cycling is high on the Government's agenda, specifically to quadruple cycling levels by 2010 (DfT, 1998). Current cycling levels are falling in most areas outside London and without a full understanding of how to invest effectively to bring the maximum benefit, they are set to continue to do so. Cycling attractiveness models help to prioritise investment by analysing existing facilities and provide a score for each link in terms of its attractiveness for cycling. Three models, considered to be the most advanced and most applicable to the UK, are compared within this study. Their results are compared with the opinions of UK residents to ensure their robustness and appropriateness for use in the UK. The Bicycle Compatibility Index (BCI) model (Harkey et al., 1998) was found to be the most appropriate model for use within the UK and subsequent applications of the model are discussed. Adaptations are suggested to ensure its transferability to all roads in the UK in an attempt to improve the attractiveness of UK roads to cycling, providing potential to create a healthier, more sustainable population.

6C Fuel Consumption

Tolouei : ANALYSIS OF SECONDARY SAFETY PERFORMANCE AND AGGRESSIVITY PERFORMANCE OF MAKES AND MODELS IN BRITISH VEHICLE FLEET [University College London]

ABSTRACT: There are two distinct safety aspects for a vehicle involved in a two-car crash: secondary safety which is the injury risk to the occupants of that vehicle, and aggressivity which is the injury risk that the vehicle imposes to the occupants of the other vehicle. In a vehicle fleet, different makes and models have different levels of secondary safety and aggressivity performance depending on their design. Amongst various design elements, vehicle mass is a key variable contributing to both secondary safety performance and aggressivity performance of a vehicle. This study introduces a new methodology based on generalised linear modelling techniques to estimate secondary safety and aggressivity performance of popular makes and models in Great Britain based on driver injury risk using 2000-2004 two-car crash data. Two indices are defined for each make and model. Secondary Safety Index (SSI) that is the proportional difference in absolute driver injury risk of the make and model compared to the mean driver injury risk of all makes and models when involved in similar accidents with the same vehicles, and Aggressivity Index (ASI) that is the proportional difference in the imposed absolute driver injury risk by the make and model to the other vehicles compared to the mean imposed driver injury risk by all makes and models to the other vehicles in collision. Unlike the previous methodologies, the estimated indices for a car model are independent of driver injury risk in the other car in collisions. For each make and model, SSI and ASI were estimated before and after controlling for the effect of mass of the colliding vehicles. Cross-comparison of estimates of SSI and ASI indices for each model before controlling for the effect mass shows a general trade-off between the two; however, controlling for the effect of mass confirms that this trade-off is imposed by vehicle mass. It is shown that even when the effect of mass is controlled, there are a few makes and models that are designed successfully in favour of both

secondary safety performance and aggressivity performance or in favour of one aspect without a detrimental effect on the other.

bonilla : Vehicle sales and fuel economy: evidence from Japan [Oxford University transport studies unit,]

ABSTRACT: As of 2004 more than 50 giga-liters of oil are consumed in Japan by private vehicles. To mitigate oil consumption improvements in new car fuel economy (km/l) are needed. Drawing on data for 1980 to 2002, we estimate (1) gasoline demand for three vehicle sizes, (2) new car fuel economy changes (the 'real' technical change), (3) vehicle sales, and vehicle stock. Forecasts for gasoline demand to 2020 rely on three econometric and six numerical equations (by vehicle class) for: vehicles sales, surviving vehicle stock, survival rates, vehicles utilization. An econometric approach to model consumer demand for fuel efficient and inefficient vehicles is used and combined with a vehicle stock and gasoline demand model. Vehicle stock is estimated using predicted levels of car sales. Estimation of the model, using 16 sets of time series data, shows that increases in capital costs, improvements in new car fuel economy, together with a shift in the mix of vehicles, and household income, influence gasoline demand considerably but that vehicle price effects have the largest impact on reductions in gasoline demand. Gasoline demand could fall considerably if vehicle prices increase. We fill a gap in the modelling literature of gasoline demand by linking the car sales model to new car fuel economy effects over time.

6D Demand Models 2

Duran-Fernandez (Smeed) : Gravity, distance, and traffic flows in Mexico [Oxford University, Transport Studies Unit]

ABSTRACT: This paper presents an econometric analysis that compares the performance of different measurements of distance in a gravity model using state data in Mexico. The estimation shows that at this geographical scale, the definition of distance does not affect significantly the explanatory power of the model. However, time-based definitions of distance have a marginal improvement on the model fit in comparison to length-based measures. When geographic specific fix effects are unknown, the model shows that distance measured through the transport network is a better predictor. The results conclude that time-based definitions of distance present several advantages in comparison to traditional length-based definitions. Another implication is that at large geographic scale, where relative distances between every geographic unit are large, the use of length-based distance instead of time to approximate travel costs generates similar results.

Khorgami : Trip-chaining behaviour of different types of workers: A comparison between households structure [University College London]

ABSTRACT: The trip chain, as the result of a decision to chain out-of-home activities that is made by individuals, receives attention by planners in modelling, analyzing, and understanding travel patterns of different social groups (Strathman et al., 1994; Schmöcker et al., 2007). The relationship between the patterns of activities pursued in trip chains and the characteristics of the individuals making the chains has long been recognized elsewhere (e.g. Alder & Ben-Akiva 1979; Golob 1986; Goulias & Kitamura, 1989; Golob & Hensher, 2007) but to date little progress has been made in the UK in understanding and quantifying the trip chaining of workers particularly at the national level with consideration of the effect of household structure. This study, defining a tour as a chain of trips which starts from home and ends at home, developed a model to examine relationships between taking complex tours, as a dependent variable, and household and individual characteristics, a location factor, and travel attributes using the National Travel Survey 2002-4. The results show that household structure has significant effect on the complexity of work tours, particularly, being a

single parent has a great influence on making a complex work tour. This study also examines the effect of some other socio-economic characteristics such as income, work status, social class, and access to a car in choosing complex work tours of single parent workers. Results of this study may help policy makers to recognize and understand the trip chaining behaviour of single parents who are potentially at the risk of social exclusion (SEU, 2003) and may have policy implications in getting single parents back to work as part of a welfare to work strategy, adopted by the UK Government to encourage and increase lone parents' participation in the labour market (DWP, 2005).

7 Plenary

Rye : 40 years of UTSG: transport and environment. A commentary on a 1978 paper, and progress since then [Napier University]

ABSTRACT: This paper reviews a 1978 UTSG paper on transport and energy consumption as part of a number of invited plenary sessions at the 2008 conference, to mark 40 years of UTSG and to consider how transport research at UK universities has progressed during that time.

8A Families

Thoreau : Impacts of differing commuting times in the London region on family life [Centre for Transport Studies, UCL]

ABSTRACT: Travel surveys have shown a wide variation in the door-to-door travel times of commuters in the London Region, ranging from a few minutes, up to two hours. Using both quantitative and qualitative methods, the study compares the behaviour patterns of households with full-time working commuters making short (under 30 minutes) and long (over 60 minutes) one-way trips. The objective is to establish how these differences affect the non-work travel and activity patterns of these commuters, while controlling for socio-economic group and other factors. It also examines any knock-on effects on the behaviour of others in the household. The quantitative aspect of the study involves analysis of the National Travel Survey seven-day diary data for residents from the Home Counties and Greater London, and this is being augmented by an analysis of National Time Use (NTU) survey data. The distribution of commuting travel time is examined and linked to factors including residential location, place of work and mode choice. The comparison between different commute lengths of the population will focus on the number and nature of the other trips and activities engaged in outside of work and travel. The qualitative component is based on in-depth interviews with 20 households in which one full-time employed person makes either a 'short' or a 'long' commuting trip, as defined above. The purpose of these interviews is to explore in greater depth the impacts of commuting journeys on family life, both in terms of behaviour, perceived stress and quality of life. The study is being carried out in parallel with a study of Paris and its surrounding commuter region using the same methodology. This paper presents the English results in detail, and provides a preliminary comparison with the results from Paris.

Murray : Visualizing the journey to school [University of Brighton]

ABSTRACT: Visual methods are considered to empower research participants to represent themselves in the research process. In addition, visual methods can enhance contextualization of the research subject in both space and time, whilst facilitating researcher reflexivity. This is particularly important when exploring the complex interrelationships that determine mobilities around the journey to school. This paper explores the use of visual methods in analyzing the construction and playing out of these mobilities, which are inextricably linked with decision-making and emotionalities around risk. The study used a mixed method approach which included indepth interviews with mothers; and videos of school journeys followed by film elicitation interviews with their children.

The forty participants in this study were sampled from two contrasting areas in Brighton, south east England. One area was an east Brighton edge of town 'suburban' estate; and the other area a relatively affluent part of inner Brighton. The use of these methods allowed the development of the concept of mobility histories, which explores issues of risk experience, personal biographies of childhood and motherhood, freedoms, space and emotions. This disentangles the complex interactions between risk, mobilities and cultures of motherhood and childhood that both facilitate and constrain children's independent travel.

8B Mode Choice 1

Melia : Carfree development and the paradox of intensification [University of the West of England]
ABSTRACT: From the complex, contested evidence, it would seem that urban intensification can, and usually does, reduce per capita car travel. The relationship is not proportional however, so a doubling of population density is unlikely to halve per capita car travel, for example. It follows that a policy which may be necessary to promote overall sustainability may simultaneously worsen local environments, by increasing concentrations of cars and traffic. To resolve this paradox of intensification would require more radical measures to restrain car use: measures which climate change may force up the policy agenda. Carfree development is one such measure. Larger carfree developments are becoming more common in some European countries, although examples in the UK are limited in size and concept at present. Scepticism amongst developers over potential demand is one factor in this. This study aims to research the potential demand for living in carfree neighbourhoods in the UK, initially through three questionnaire surveys: i) amongst national cycling and environmental organisations ii) in an area (in Camden) of low car ownership iii) a recent development (in Poole) with sustainable transport objectives. The initial findings suggest that potential demand does exist amongst identifiable groups in the UK.

Yao : To drive or not to drive: work trip mode choice among Shanghai's car owners [Centre for Transport Studies University College London]

ABSTRACT: This paper examines the mode choice behaviour of car owning households for their journeys to work, using survey data obtained from 1,200 Shanghai residents through a web-based survey in 2007. In addition to collecting socio-demographic data, it also asked about existing mode choice and, for those driving to work, how this might change if public transport services were substantially improved. The paper briefly introduces the survey and analyses the commuting trip mode among central, inner city, and suburban residents of Shanghai. It examines the hypothesis that long distances to stations and limited access to underground rail services are the underlying motivations for car owners choosing to drive to work. Geographic Information System (GIS) visualizations and underground network analysis are used to identify representative commuters, in order to illustrate the factors affecting mode choice in the different areas. Discrete choice models were estimated, using a nested logit structure, for three potential commuting modes. It was found that the choice probability of "driving to work" increases with the decrease in underground network coverage in the three areas, and that reliance on the automobile also increases with length of journey to work. In addition, the direct and cross elasticities are presented, with respect to adjusted travel cost, in vehicle and out of vehicle time. The cross elasticities indicate that increasing the access to train services has considerable potential for reducing car use for the journey to work. These results may be helpful to decision makers in developing strategies to reduce traffic congestion in Shanghai.

8C Road Construction

Bain : PPP construction risk: International evidence from the roads sector [Institute for Transport Studies, University of Leeds]

ABSTRACT: The decision to use public-private partnerships (PPPs) to procure public-sector infrastructure assets is often substantiated by claims about on-time and within-budget construction delivery. This paper presents the results from an international survey of banks and other lending institutions about PPP construction performance – with particular emphasis on the roads sector.

Huang (Smeed) : Development of a life cycle assessment tool for construction and maintenance of asphalt pavements [University of Newcastle]

ABSTRACT: The increasing use of recycled materials in asphalt pavements calls for environmental assessment of such key impacts as the energy and CO₂ footprint. Life cycle assessment (LCA) is being accepted by the road industry for such purpose. This paper reviews relevant LCA resources worldwide; identifies the knowledge gap for the road industry; and describes the development of a LCA model for pavement construction and maintenance that accommodates recycling and up-to-date research findings. Details are provided of both the methodology and data acquisition. This is followed by a discussion of the challenges of applying LCA to the pavement construction practice, and recommendations for further work. The LCA model, during its development, has been applied to 3 real case studies of asphalt paving projects in the UK, which in turn build up the scope and adaptability of the model. The LCA model can be further tested and calibrated as a decision support tool for sustainable construction in the road industry.

8D Fuel Demand

Broadstock : Testing for simultaneity between the markets for gasoline and diesel in the UK, and complementarity between asymmetric prices and the UEDT [University of Portsmouth, University of Surrey]

ABSTRACT: Some studies treat the demand for energy in transport as a single commodity i.e. aggregate road transport fuel, whereas others, assume that the separate components of gasoline and diesel should be treated completely independently. Following simple micro-economic logic, it is equally likely that these fuels are complements, and hence it is possible that (i) gasoline and diesel should not only be disaggregated from each other, but also (ii) that they should then be modelled simultaneously to allow for some contemporaneous relationship between the two. This study therefore seeks to formally test the hypothesis that the demand for road transport fuel, including both gasoline or diesel, should really be modelled as a system, or independently of each other. A system stochastic trend model is advocated, namely the Seemingly Unrelated Structural Time Series Model (SUSTSM), thus allowing for the estimation of key income and price elasticities and the underlying energy demand trends (UEDT's) for both gasoline and diesel. This will be achieved by using the 'general to specific' framework and testing down from an initial fourth order autoregressive distributed lag model (ARDL(4)). As a further extension, the prices for each fuel will be decomposed to allow for asymmetric demand response to increasing and decreasing fuel prices respectively, as well as the cumulative sum of sub-maximum price increases. By formally testing whether or not asymmetric prices and the UEDT are complements or substitutes, this will provide evidence to help either support or disclaim the conjecture that asymmetric prices encapsulate technical progress effects.

Crotte (Smeed) : Elasticity estimates of the demand for fuel in Mexico City [Imperial College London]

ABSTRACT: Short and long run price and income elasticities of the demand for fuel are estimated for Mexico with a time series cointegration model for the period 1980-2006 and a panel GMM model with data from 30 Mexican states over the period 1993-2004. The time series estimates for price

elasticities are smaller than the values reported in fuel demand surveys whilst the short run income elasticities are above the surveys results, a pattern found in developing countries. The results from the panel data show that the instruments available for the system GMM model are weak, while the difference GMM results are biased since they do not fall between the OLS levels and Within Groups estimates. Estimates for the Mexico City Metropolitan Area are derived from national estimates and mode shares at the national and local level, as suggested by Graham and Glaister (2006). The short run price elasticity is -0.08 while the long run estimate falls between -0.25 and -0.36. Income short run values are between 0.48 and 0.53 while the long run income elasticity is in the range 0.68 to 0.75.

9 Plenary

Lucas : Review of T.K. Wilson's 1980 paper 'The perception of time': the contribution of social research to transport studies [University of Westminster]

ABSTRACT: This paper is written in response to an invitation by the UTSG conference Committee to select and review a past UTSG paper, which offers a significant contribution to our understanding of the social factors associated with transport and travel in celebration of UTSG's 40th Anniversary. I considered the papers that were included in the UTSG conference published proceedings from 1971 to 2007 and decided on a PhD student paper from the 1980 conference. The paper would perhaps not be considered so remarkable in the context of a present day UTSG conference, but it stood out as quite unusual among papers of the time in that it was one of the first to offer a 'social' perspective on transport. The paper identifies the importance of understanding people's perceptions of time in making travel decisions and discusses how this might affect transport models, travel planning and policy decisions. It is an issue which is still highly relevant for understanding people's travel choice today.