

The Transport Economist

The Journal of the
Transport Economists'
Group

Volume 33 Number 2
Autumn 2006



TRANSPORT ECONOMISTS' GROUP MEETINGS 2006/07

Meetings of the Transport Economists' Group are open to members and guests.

Meetings are held at 5.30 for 6 p.m. and finish around 7.30 p.m. They are to be held at Arup's head office in London, 13 Fitzroy Street, W1, which is near Euston Station.

Wednesday 27 September	The impact of new technology on rail costs <i>Phil Smith, InterFleet Technology Ltd</i>
Wednesday 25 October	Too many cars? – ownership, use and alternatives <i>John Bates, Independent Consultant & mathematical economist</i>
Wednesday 22 November	The impact of new technology on insurance products – “Pay as you drive” and other innovations <i>Douglas Vallgren, Norwich Union</i>
Wednesday 24 January 2007	Financing public infrastructure (Speaker to be confirmed)
Wednesday 28 February	Department for Transport Speaker – a topical transport policy issue <i>Details of topic and speaker to be confirmed</i>
Wednesday 28 March	Transport appraisal in a devolved Scotland <i>Iain Docherty, University of Glasgow</i>
Wednesday 25 April	European rail freight policy – liberalisation or dirigisme? <i>Alan Bennett, Steer Davies Gleave</i>
Wednesday 23 May	The costs and benefits of urban agglomerations (Speaker to be confirmed)
Wednesday 20 June	The impact of new technology on rail pricing and ticketing <i>Alec McTavish, ATOC</i>

Latest information on the programme can be found at:

www.transecongroup.org.uk

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Editor
Peter Gordon

CONTENTS

Pages

Reports of Meetings

Towards a Better Understanding of the Economics of Level Crossings 1 - 15
Michael Woods, Rail Standards & Safety Board
November 2005

Express Coach Services 16 – 20
Peter White, University of Westminster
February 2006

Transport, Transport Policy and the Environment 21 – 26
Sir Christopher Foster
April 2006

Review

The Validity of Food Miles as an Indicator of Sustainable Development,
AEA Technology for DEFRA

Reviewer: Dick Dunmore 27 – 29

TEG News

TEG Committee 2006/07 30

Towards a Better Understanding of the Economics of Level Crossings

Michael Woods
Head of Operations Research
Rail Safety & Standards Board

Arup Head Office, Fitzroy Street
23rd November 2005

Introduction

Michael Woods began his talk by mentioning some caveats concerning this subject. Firstly, the current structure of the rail industry in Britain makes a great deal of information 'commercially confidential'. Consequently, this had led to some difficulties in extrapolating and reconciling financial information from the various published sources. In addition, because some key research into cost issues had been completed for RSSB but had not yet been published, he was not able to discuss the results in this talk.

Another difficulty was that much of the information about level crossing assets is currently buried in cost information categorised as 'signalling', 'civil engineering' or 'major projects', partly because there is inevitably a close inter-relationship between works at level crossings and various other infrastructure changes. Michael noted that hardly any research or investigation had been carried out into the benefits side of the equation for changing or eliminating level crossings. In this context the following comments from a report by Lt. Col. Townsend-Rose of the Railway Inspectorate in 1978 were very prescient :-

'Consideration [should] be given to capitalising the savings in road delays at very busy crossings (and) that the attention of highway authorities be drawn to the potential savings in road delays so that the full benefits of these may be considered in bridging schemes'

For these reasons Michael had decided, whilst writing the paper behind this presentation (which he hoped would be given to the World Level Crossing Congress in Montreal in September 2006), to move in the direction of a treatment entitled *Towards a Better Understanding of the Economics of Level Crossings*. He was particularly seeking views on

how to assess the benefits of changing or eliminating level crossings and to create a wider holistic model on which future decisions can be based. Such an approach would build on one of the RSSB research projects currently in progress. In this talk he wanted to encourage people to think about the issues, rather than to present answers.

Background

Michael felt it useful to begin with some definitions.

Level Crossings represent an interface between road and rail networks, providing a link between and within towns and villages, farms and settlements. They are a historical anachronism based in nineteenth century society, having been built in an era of horse-drawn road vehicles and much slower-moving steam-hauled trains as a way of breaking down barriers created by the then 'new-fangled' railway, and creating (or re-creating) opportunities for what today we would term social inclusion.

Provision of level crossings was (and remains) an alternative to building expensive bridges or subways, to possible long diversions for their users, or even to the complete severance of some parcels of land. Without them some farms, leisure objectives, communities or towns might not be linked. Think of Lincoln, Gloucester before 1975, Paignton, or the river bank near Marlow (with its four crossings within the space of a mile) to understand the importance of level crossings to local communities.

Today level crossings represent a source of delays to road users, and of unreliability and cost to railway operators and their customers. They also can be a source of individual risk for road users and, indeed, of potential catastrophic risk for rail passengers. However, it is important to remember that closing a crossing to improve one person's safety and economics can lead to the introduction of a long diversion for others.

Important as *User-Worked Crossings* are for both the railways and those to whom they provide access, for the purposes of this paper Michael intended to concentrate on the issues surrounding Public Road Crossings.

Level Crossings in Great Britain

A frequently asked question is; “How many Level Crossings are there in Britain?” As so often, the answer depends on one’s definition; whether the crossings are:

- Vehicle or pedestrian?
- Public or private?
- Active or passive protection?
- At stations or not?

Excluding Northern Ireland, metros and heritage railways there are some:

- 5,300 road crossings and 2,500 footpath (and bridleway) crossings
- 4,000 public crossings and 3,800 private or user-worked crossings
- 1,700 protected and 6,100 passive / unprotected crossings

In addition there are currently about 180 station and barrow crossings not included in the above figures.

Within these numbers are about 1,600 level crossings on public roads in Great Britain, all but about three (which are on Highways Agency Trunk Roads) are on local authority roads. This total includes :

- 494 manned gates or barriers
- 364 manned barriers with CCTV
- 457 automatic half barriers (AHB)
- 40 automatic half barriers locally controlled (AHB-LC)
- 133 automatic open crossings (AOC)
- 62 open crossings (OC)

The numbers of public road crossings reduced significantly between 1960 and the mid 1970s (see Annex 1) largely as a result of the ‘Beeching era’ closure of branch lines, but has been largely static since the 1980s. Although many private and footpath crossings have been closed over the past 25 years, it has proved very difficult to gain agreement to close public road crossings. Those that have been eliminated are mainly as a result of major investment schemes.

CCTV controlled crossings are arranged so that the rail signals protecting the crossing can only be released once the barriers are down.

Conversion of manned gates or barriers to CCTV controlled crossings typically costs around £1 - £1½ million (mainly due to cabling costs). There is also a limit of 4 crossings which can be supervised by any one signaller or operator. Such crossings tend to be enormously inefficient in terms of the delays caused to road traffic.

By contrast AHB crossings do not have any protecting rail signals. They were introduced in order to:

- reduce traffic congestion (the barriers are down for shorter periods than on manned crossings);
- eliminate staff costs; and
- be a cheaper alternative to a CCTV installation.

The Safety Issue

Based on the RSSB risk model, 94% of the risk is caused by motorist and pedestrian failure, indiscipline and/or risk-taking (this is analogous to the risks caused by trespass, vandalism or suicide). Level crossings now represent the single greatest source of *catastrophic* risk on the mainline rail network in Great Britain. However, major rail accidents have occurred at only three locations over the past 30 years, namely Hixon (1968), Lockington (1986) and Ufton Nervet (2004). The chart in Annex 2 shows the number of fatalities each year since 1996. These figures need to be compared with the total of around 3,000 deaths annually on Britain's public roads.

However, when assessed against the reducing levels of other risks on the GB national rail network (e.g. Signals Passed at Danger or SPADs) the continued significant levels of risk associated with level crossings invite attention. (See Annex 3 and the RSSB website.)

Making international comparisons on levels of risk poses many difficulties owing to the lack of standardisation of data. Nevertheless, the following table from a UIC report appears to show that Britain is one of the safest networks in Europe with regard to level crossings. Hopefully the European Rail Safety Agency will one day enable us to standardise such data.

<i>Country</i>	<i>Fatalities per 1000 Crossings (1996-2000)</i>
Netherlands	10.3
Portugal	8.1
Luxemburg	6.1
Germany	3.4
France	2.6
Finland	2.0
Great Britain	1.1
Sweden	1.0
Republic of Ireland	0.2

Unfortunately because (as a proportion of the total) so few road deaths occur at level crossings, there is little shared ownership or joined-up thinking of the issues. The basis for decision-making on safety or other investment is significantly different between rail and road infrastructure providers. In general highway authorities find it difficult to justify even thinking about the issue and can be unaware of the distances required for trains to stop.

In order to create buy-in amongst the various interested parties, the work of the National Level Crossing Safety Group (NLCSG), involving both road and rail undertakings, is currently being strengthened. There have been some successes in terms of improvements to the Highway Code and to publicity and training schedules by the Driver Standards Agency. However, there has been only limited progress with national and local government planning authorities to improve the understanding of both the risk and cost related implications on level crossings of their decisions. For example the decision to allow development of Robin Hood Airport took little account of the increased road traffic over a level crossing leading to the site.

An extract from a recent newspaper article illustrates current attitudes towards level crossings.

**“Warning on rail crossings as toll soars” by Juliette Jowit,
Transport Editor, The Observer, 20 November 2005**

Forty people have been killed on level crossings since Britain's last major fatal train accident at Ufton Nervet a year ago.

The revelation comes as ministers are accused of opposing a campaign of safety improvements at the crossings, which the Health and Safety Executive says have 'the greatest potential for catastrophic risk on the railways'.

Network Rail, the national infrastructure company, wants powers to close dozens of crossings and force local councils to put in safety measures to protect hundreds more, as well as increasing penalties for drivers who flout the rules.

But the government will oppose four amendments to the road safety bill - to be put to the House of Lords this week - that would give Network Rail these powers.

If given new powers, Network Rail said it would seek to close dozens of the country's 8,000 level crossings. ...

Network Rail also wants the power to make local authorities improve road safety around dozens more crossings in the short term, and 'hundreds' in the longer term. Measures would include installing cameras and raising central strips to stop cars dodging around barriers. ...

Among other measures in the amendments would be increasing the maximum penalty for ignoring red lights and barriers from three to six points plus a £1,000 fine

Michael Woods emphasised that only through more research could we begin to understand how the costs and benefits from possible changes to level crossing arrangements might impact on both road and rail providers and users. Surprisingly, no one had done this before. Currently there is a considerable programme of Government-funded research being undertaken into enforcement, engineering, education and economics in relation to level crossings. As part of this programme of research, there is a particular project to create a shared model by which decisions on whether a bridge or an upgraded level crossing represents the best value for society as a whole in the long term *ceteris paribus*. More details of this research are on the RSSB website at www.rssb.co.uk.

The research brief for the current project being undertaken for RSSB and Network Rail by Halcrow, with advice from the Transport Research Laboratory, covers:

- Understanding the roadside and railway economics of crossings, including developing an economic model for making business cases for crossing closures or conversions to bridges over (or exceptionally, under) the railway; and
- Establishing a comprehensive model to aggregate the various whole-life costs of a public road crossing to allow interested parties to decide, using cost benefit analysis, whether it is economic in the long term to replace the crossing by a bridge or by diverting traffic to other routes. (Previous reports have concluded that in certain circumstances, there may be a case for replacing the crossing with a bridge over or under the railway)

Other research is being undertaken or is planned into :

- User-worked and footpath level crossings
- Development of a universal level crossing risk tool
- Trials of median strips and/or lane separators at level crossings
- Wayside horns at level crossings
- Improving level crossing information systems
- Human factors risk at user-worked crossings
- Understanding the risks at station and barrow crossings
- Evaluating best practice deterrence and enforcement mechanisms at level crossings (e.g. GATSO-style cameras)
- Reducing the risk to motorists traversing user-worked crossings on foot
- Improving road user and pedestrian behaviour at level crossings
- Investigating level crossing upgrade costs in Britain and abroad
- Developing enhanced consequence algorithms for level crossing risk models
- Evaluating the safety benefits of installing new miniature warning lights at user-worked crossings
- Obstacle detection at level crossings

Economic Costs

Michael wishes to highlight some basic figures, together with his interpretations.

Network Rail's total costs (excluding WCML) are some £6bn a year, of which around £1.3bn relate to infrastructure maintenance and £1.6bn to renewals. However it is difficult to separate out the level crossings element within these figures. In performance terms it is estimated that 2% of delay minutes (value = £6.7m) can be attributed to level crossing

issues, such as delays caused before and after calling out staff to man crossings after barriers have been struck by road vehicles. This compares with a much higher figure of 5% of overall delay minutes attributed to bridge strikes.

In accident terms (based on the rail industry Safety Risk Model in terms of equivalent fatalities), as many as 8% of the £200m annual costs (£17m) are in the level crossing categories. Accident costs involving level crossings are high since road users tend to be killed rather than injured when involved in collisions with trains. For example, although not a level crossing accident, the collision at Great Heck has cost the various parties involved £18m in settlements.

Based on figures collected from various sources, it is possible to estimate that, broadly, all 7,833 level crossings cost per annum :

- £14m in inspections
- £24m for maintenance
- £56m for renewal (on a like-for like basis over a 25 year cycle)
- £26m for the cost of repairs and other accident costs
- £17m for fatalities
- £7m for delays
- £75m for staffing 500 manned crossings and 360 CCTV crossings

Looked at from a bottom-up perspective :

- Inspection costs are in the range £1000- £4000 pa per crossing
- Maintenance costs are up to £10,000 pa per crossing
- Renewals are about £500,000 for an AHB and up to £1m for a CCTV crossing depending on the amount of cabling required (there is a major study under way on ways of reducing these costs and how Britain compares with elsewhere)
- The accident costs include rolling stock repairs as well as repairs or replacement of barriers and other crossing equipment
- The employment costs, i.e. wages & on-costs, of a crossing keeper are typically £33k pa (multiply this by 5 for 24/7 coverage)

As bottom-up figures the above exclude headquarters and administration costs so could be understated by a figure of two or even π (if Roger Ford is to be believed)

Whichever way one looks at the costs, in total these level crossings represent expenditure of perhaps £220m a year. Not all these costs are Network Rail's and some of the money is recycled within the industry – but at least looked at in this way it enables people to get an idea of the scale of the 'addressable problem'. This is something like 2-3% of Network Rail's total outlays.

Direct costs falling on the road sector mostly relate to signage, though there are some minor costs associated with providing anti-slip road surfacing, inspection and dealing with accidents. Michael pointed out that in the UK **all** costs between the stop lines at level crossings are borne by the railways. Thus the railways have to carry in full costs of some £8m per annum in capital and maintenance charges for the 1600 public level crossings. This is not the case in many other countries where costs are shared more equitably between road and rail authorities. However, even in the UK, the road sector does suffer indirect costs at level crossings relating to accidents and delays, and everyone bears the costs of pollution from queuing vehicles.

Economic benefit/cost approach

Taking a lead from Lt. Col. Townsend-Rose, as quoted in the introduction, Michael felt that it should be possible to create an econometric model for net delays at level crossings based on journey origins and destinations and perceived value of time. A CCTV crossing with two trains passing can create eight minutes delay for each road user; an AHB on a single track maybe causes only one minute delay. Such a model could be used to test various options for each crossing, e.g. keep open; close; replace by an alternative; do not replace, etc. A total network model using generalised journey times could then be constructed covering all the public road level crossings to assess their direct value. Assessments of severance costs, pollution and all the other factors would need to be included.

In order to estimate the benefits (using the CfIT model) one would need to assess the current and potential net benefits from a range of scenarios for each level crossing that is currently open. To take an example – if Ufton Nervet AHB were closed but all the parallel crossings over the 'Berks and Hants' Line stayed open, what would be the overall impact on the sum of all the existing road users in terms of the following issues?

- *Convenience*: if some diversions were too lengthy or complicated, the journeys might not be practicable at all, or would be regarded as very inconvenient;
- *Price*: the net cost of the longer / shorter journeys could be assessed in network terms probably on a marginal cost basis (fuel etc);
- *Journey time*: the incremental in-vehicle time, graded by business / commuting / leisure users (maybe with an increment for queuing suffered / avoided)
- *Interchange, comfort and space*: probably not relevant

Wider factors could also be estimated, including :

- effect of vehicle emissions and benefits (reduction in noise etc) to the residents on the routes not used (netted against those suffering additional traffic);
- change in risk = potential safety costs / benefits
- value of severance avoided, in terms of the value to communities of longer but potentially delay-free links compared to queuing at the local level crossing

Such an approach could be undertaken for a wide range of scenarios by rail route or local authority, or at regional level. Maybe one could use the North Carolina model, which reviewed all the grade crossings in a particular area and worked out a strategy for reducing their total number.

Working on the assumption that the public interest can best be served by minimising the generalised cost of transport, taking into account the safety benefits of a given scenario, Michael suggested it should be possible to use such a model to get a better understanding of what level crossings provide, and what alternatives should be considered. However, this approach represents a lot of potential work, and it is unclear whether the analysis would create sufficient pay-off.

Conclusion

In looking at the way forward, Michael's fundamental conclusion was that the economic issues associated with level crossings are not as simple as might appear at first glance. He invited comments on his suggested approach and asked his audience to identify any issues he had left out and any flaws in his arguments. Finally, he reminded his audience that, as ever, free consultancy advice was always appreciated and could be written off as marketing activity!

Questions and Discussion

Peter Gordon (AEAT Rail) asked whether cow-catchers on trains might reduce the risk of fatalities involved in level crossing accidents.

Michael Woods explained that there had been research in this area. The indications were that such projections from the front of trains might actually increase the risk of fatalities or at least contribute to more serious injury.

Nigel Harris (The Railway Consultancy) had once worked as a crossing keeper. Trains on many branch lines had to slow to, say, 10mph at some crossings. Surely it would be possible to calculate the journey time benefits from raising these speed limits?

Michael noted that in many of these instances the number of rail passengers on the trains and hence the benefits were very low. A greater saving might come from improved rolling stock and/or crew utilisation. Standards for the approach speeds to crossings were set out in the “Blue Book” and current pressure was for trains to be able to stop on sight at more crossings.

One member felt there was something to be said for trying to make road users more aware of the presence of trains. Improving barriers and fencing to keep people at a greater distance from railways might not have the desired effect in terms of public perceptions. Tramways were not fenced.

Michael recalled the media and public outcry for the street running section of West Midlands Metro to be closed down following a fatality in Wolverhampton. Railways had always been perceived as “at fault” when it came to interfaces with pedestrians or road users. Increases in train speeds and frequencies over the years suggested that such an attitude was likely to be more prevalent now than ever.

Tom Worsley (DfT) wanted to know how one might prioritise where to take action at level crossings. Were there any indicative values for severance of access by closing crossings? Could the railways, perhaps, provide compensation in kind, such as by funding additional community facilities?

Michael noted that closure of user-worked crossings had been achieved by “buying out” the users concerned. Sometimes this was in cash and

sometimes in kind, or a mix of both. Users of public crossings could not be “bought out” since they were impossible to identify in totality.

One member wished to know whether the values assigned to fatalities were different depending on whether the railway or the crossing user had occasioned the mishap.

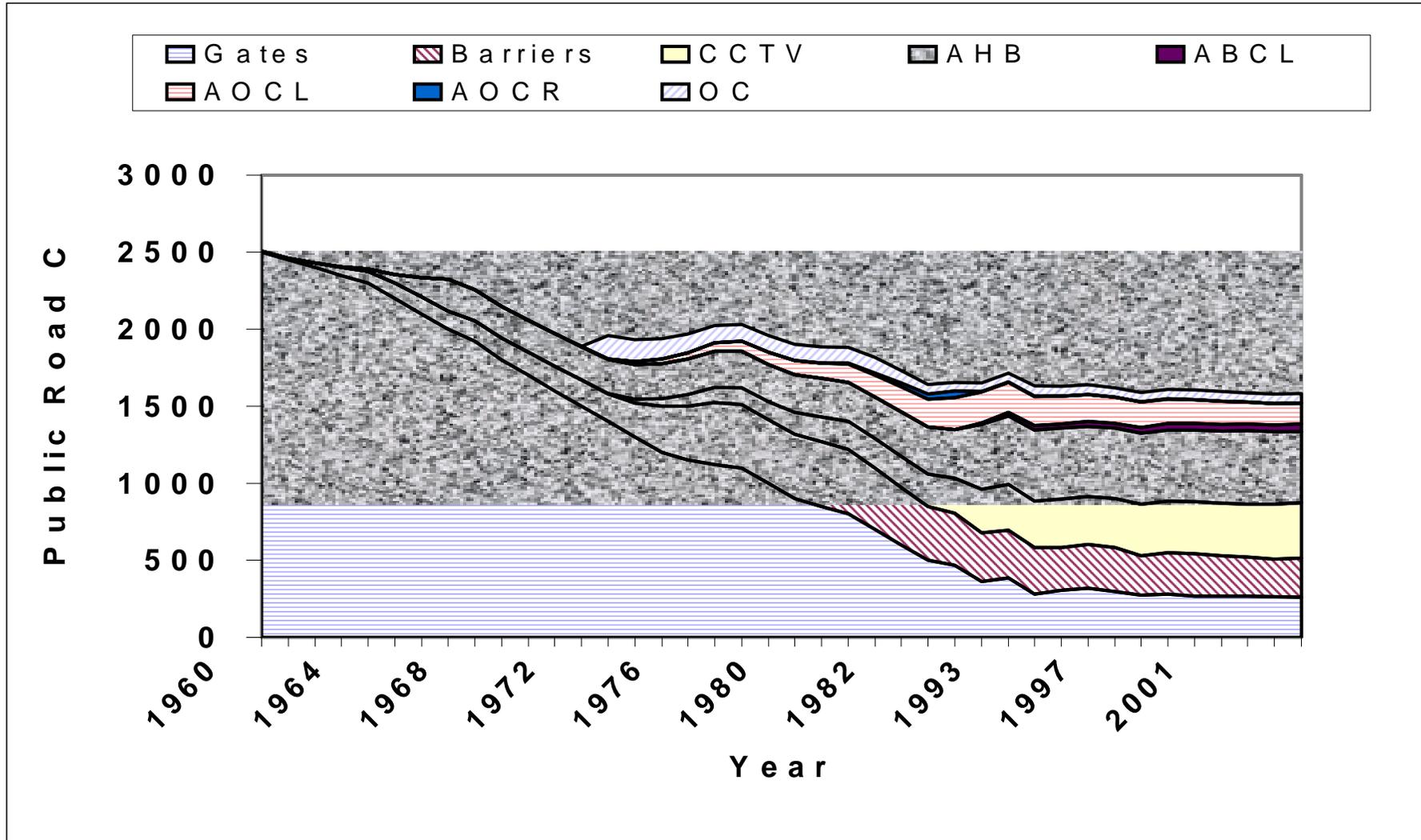
Michael explained that railways used the UK generally accepted figure of £1.3m per equivalent fatality. Traditionally this had been multiplied by a factor to 3 to represent the greater impact of railway accidents on people’s perception of risk. RSSB were now using the base figure without the multiplier. He also pointed out that highway engineers were able to spend up to £100,000 to improve safety at a location provided that at least one person has actually been killed in a road accident at that location. However, they were not authorised to spend this money on a preventative basis. Fatalities at level crossings were extremely small in relation to the number of suicides on the national network (200 pa) and London Underground (100 pa).

One member involved in planning issues questioned whether it was worth more strenuously pressing local authorities on the potential benefits from closing public level crossings.

Michael suggested he discuss such ideas with the questioner after the meeting. There was a need to engage more closely with planning authorities at all levels on these issues. The overall approach of government was to avoid any transfer of costs onto local authorities.

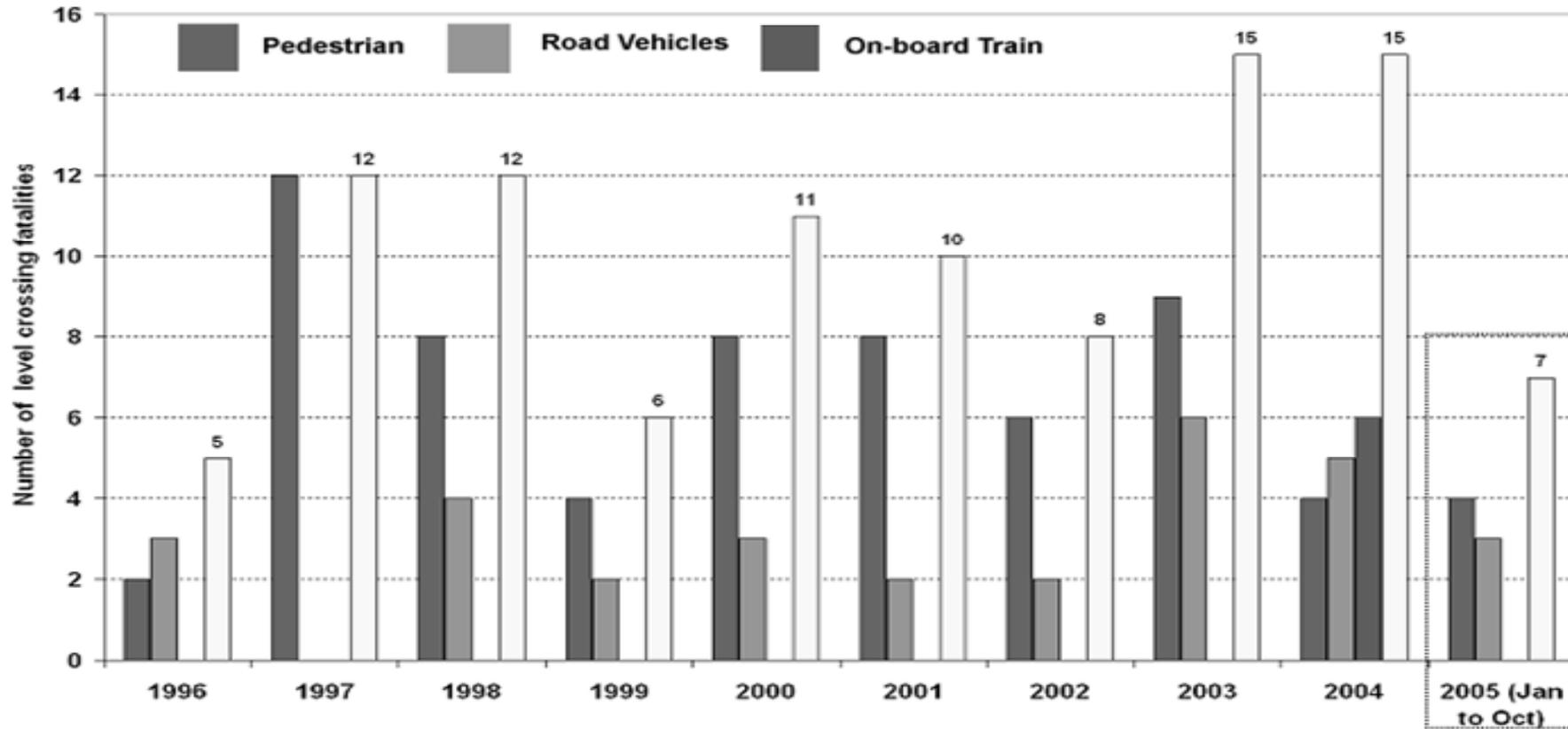
Report by Gregory Marchant

Annex 1 - Level Crossing Modernisation in Great Britain since 1960



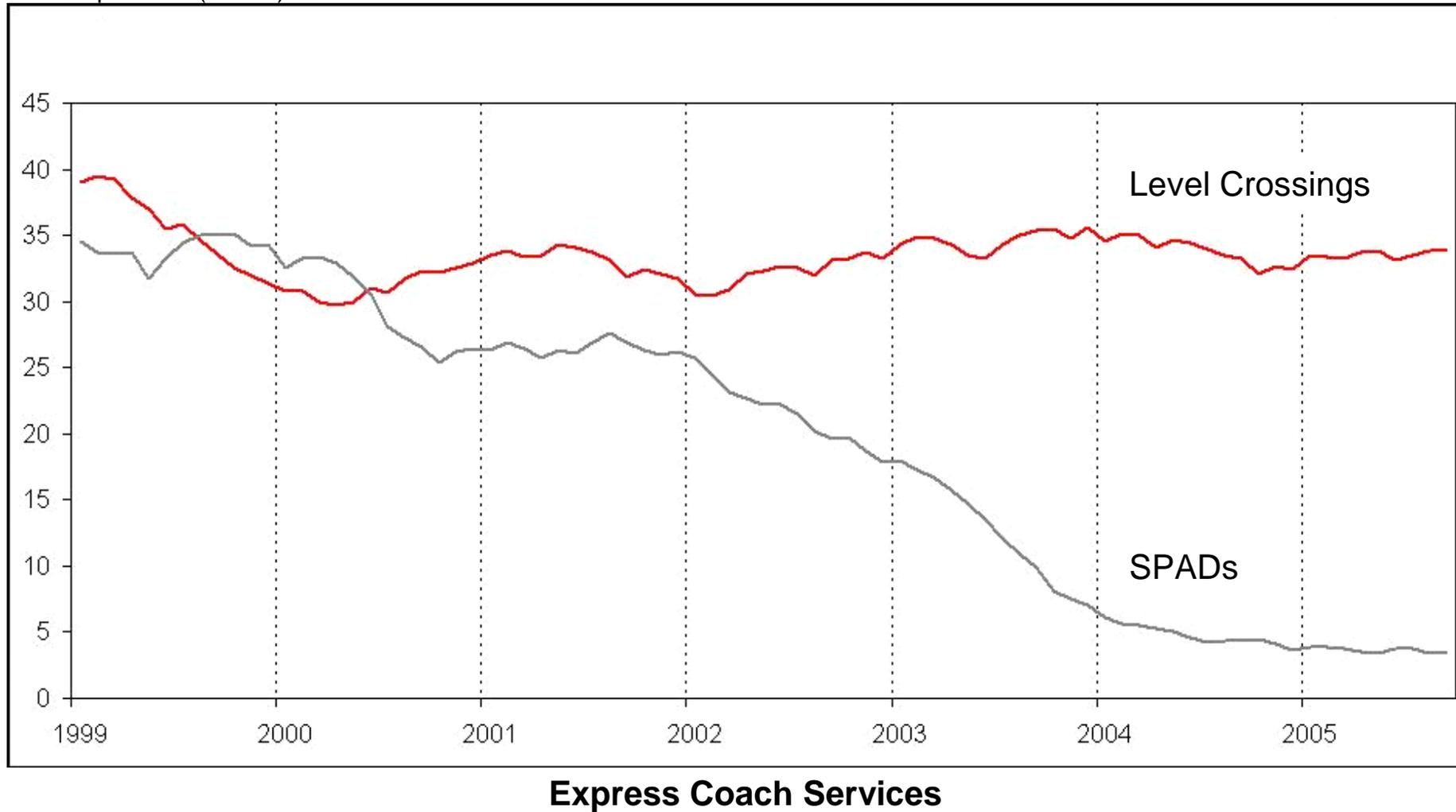
Annex 2 - Risk at Level Crossings in terms of Fatalities

□ Total Fatalities



Annex 3 - Risk at level crossings compared to SPADs

(Extract from RSSB's Precursor Indicator Model showing the contribution over time of Level Crossings and SPADs to overall catastrophic risk (n=100))



Peter White
Professor of Public Transport
the University of Westminster.

Arup Head Office, Fitzroy Street
22 February 2006

In the absence of the planned speaker, Nigel Eggleton, Commercial Director of the Oxford Bus Company (part of the Go-Ahead Group), Peter White spoke on the theme of express coach service development, drawing on research at the University of Westminster and a previous presentation on the London – Oxford services by Matthew Bradley, Marketing Manager of Go-Ahead Group.

Prior to deregulation in 1980 virtually the entire all-year round long distance coach market in England and Wales was operated by National Express, part of the National Bus Company which generally contracted the operation of services from fellow NBC subsidiaries . Trunk routes to Scotland were operated by Citylink, a subsidiary of the Scottish Bus Group, but few express services wholly within that region were provided.

Following deregulation there was a short period of intensive inter-operator competition, with higher quality coaches provided and increased motorway running leading to higher average speeds. Unfortunately the statistics available about usage are very poor and this makes measuring the effect of this competition very difficult. There appears to have been a growth in National Express passengers of about 50% from 1980 to 1985, which can be taken as an indication for the coach market as a whole There were definitely some user benefits, including those to rail passengers who saw a wider range of lower fares as British Rail attempted to compete. Price competition appeared to function much more effectively in long-distance markets than in local passenger services.

Most of the new competitors were not very successful and dropped out of the market. There was then some drop in passenger numbers on the National Express network in the late 1980s and early 1990s associated with large real fare increases. The price elasticity of coach demand is around -1 so that overall revenue is roughly constant regardless of the real price level . Perhaps surprisingly, there was little new entry into the market associated with these rises.

National Express owned and used Victoria Coach Station, which may have given it some advantages over competitors. However, it was transferred to Transport for London when National Express was privatised in 1988. It was well sited when built in the 1920s as much of the traffic was day trips to places such as Brighton. It is now not so well sited as the majority of services come in from the North and West, but it is still useful having a single point as it allows easy transfers between services – around 20% of passengers transfer between services at Victoria. The speaker quoted the viewpoint of Dave Wetzel (vice-chair of TfL) that there was a paradox with coach travellers who were generally the poorer off, indirectly paying fees to the Duke of Westminster who owned the site and was one of the country's wealthiest individuals.

In the early days of deregulation operators tended to use makeshift facilities, or on-street sites. The speaker showed a slide of some portakabins used by the new entrant British Coachways at St Pancras, on the site which is now occupied by the British Library. They did not offer a high standard of amenity. Other operators such as Berry's from the West Country terminated at places such as Hammersmith avoiding the worse of the central London traffic.

National Express tended to move upmarket over a period of time with new coaches. A significant innovation came from Harry Blundred who set up the 'Oxford Tube', competing with the incumbent ex-NBC Oxford Bus Company on the London – Oxford corridor, which has remained the major example of intensive competition within the coach market. Over longer distances, significant competition for National Express came in 2003 when Stagecoach introduced 'Megabus' using 70 seat double deck buses. This advertised fares as low as £1 with a 50p booking fee although the average revenue per trip was higher, at around £3. Peter White calculated that this should be enough to cover costs at reasonable load factors owing to the high capacity of the bus. There has been a general shift to internet booking and yield management pricing. The first Megabus service, that between Oxford and London, has now been discontinued and folded into the 'Oxford Tube' main service (now also operated by Stagecoach). This was partly because pre-booking was a problem for a short distance high frequency service with many people preferred the slightly more expensive turn up and go service, although some cheaper pre-booked seats are still available. However, Megabus has established a wide range of longer-distance services competing with many National Express trunk routes.

The 'easy' group also entered the market in 2003, with its easyBus service, based on Mercedes minibuses vans for similar appearance to 'Evening Standard' delivery vans. There were two routes, but there is now just one operating to Luton Airport where easyJet operates many of its services. The speaker had reservations about the economics of operating a low-price, book-ahead service with such low capacity vehicles.

Many services operate from public bus stops in the street. Transport for London was becoming much more pro-coach, being aware that they are efficient users of road space and was happy to facilitate this, for example with better-marked stops and passenger information. Elsewhere a number of new coach stations have been built, for example in Newcastle. These are sometimes on the periphery of town centres and poorly sited for onward public transport use, perhaps assuming a high proportion of "kiss and ride" users.

GoAhead is Britain's fourth largest bus operator, mainly by acquiring local management buyout operators formerly part of NBC. Unlike most other large operators it uses local rather than a national identity and allows a high degree of local autonomy, although it employs a national Marketing Manager, Matthew Bradley whose talk to a meeting on coach services organised by TfL in December 2005 Peter White used as the basis of the next part of his presentation, with the speaker's permission.

The group operates the Oxford Express (which is spelt like that) service every 20 minutes between Oxford and London, also with an all night service. This is the successor to the long-established service run by Oxford Bus Company in NBC days. The service is slower than the rival train service but is better for city centre access, especially at the Oxford end. Most of the market is users on personal leisure trips. Until its transfer to First Group last year Go- Ahead also operated the parallel Thames Train franchise. There is a separate service between Oxford and Heathrow service also operating about every 20 minutes. This has higher fares and a lower load factor and faces much less rail competition.

There is competition from the Oxford Tube service, which has similar frequencies and there is evidence that patronage is also increasing on this service so the total market is growing, as is the rail market. Both operators offer travelcard tickets, which include their respective local networks in the Oxford area. Distinctive branding is adopted by both operators It is interesting to compare the high level of service to Oxford

with that from London to Cambridge where there is one National Express service per hour.

Local services in the Oxford area also feature distinctive branding. Park and ride services are branded separately, possibly to differentiate them from the car users' perceptions of ordinary local bus services. Both operators provided a high frequency service between Abingdon, which has effectively become an Oxford suburb, and the city centre. The Oxford Bus X13 service uses strikingly-liveried, higher specification Mercedes vehicles. Glynn Barton, a member of the MSc Transport Planning and Management course at Westminster, did some research in 2005 looking to see if there was any brand loyalty with users on the route. The majority of the market was taken by Oxford Bus. Brand loyalty as such appeared to be greatest amongst men and commuters, probably because they largely used season tickets and hence had to use one operator's services (Since the talk was given, the rival operator Stagecoach has pulled off the direct Abingdon - Oxford route).

There are other examples in the bus industry of branded routes with high-quality vehicles such as that between Leeds and Harrogate where the local Harrogate & District company (now owned by Transdev of France) upgraded its no. 36 service with higher specification buses and created significant additional usage.

There are parallels in express coach development with other European countries. There is a growth in competition in the Irish Republic, particularly with services to and from Dublin Airport. There has also been deregulation in Norway and Sweden with some liberalisation elsewhere, but other countries retain strict regulation favouring rail, especially France and Germany.

The speaker believed that there are a number of factors influencing the usage of coaches. These included price, branding and car ownership. In addition to long-distance trunk services, branding also been adopted for regional express services such as Stagecoach Express, First Excel and Traws-Cambria. On many of these services, there is a high level of on-vehicle payments, such as Citylink within Scotland. There are very high frequencies on the London to Oxford route but no parallels elsewhere.

Questions and Discussion

Robert Cochrane asked why the coach share was so much higher to Oxford than Cambridge which appeared to be very similar markets.

Peter White said that the road access into London was worse from the Cambridge area, and the train service was better with a half hourly service taking forty minutes. However the location of the rail station in Cambridge was actually worse than in Oxford with respect to the city centre . It was interesting that the operators for both modes between London and Cambridge were owned by National Express although this was about to change (WAGN services became part of 'First Capital Connect in April).

Stephen Bennett (ex SRA) asked if there were any lessons from Scotland. The speaker said that there were a lot of good coach services. There were also good rail services between Edinburgh and Glasgow, but that coach was as quick as if not quicker than rail for services to the north of the country where the rail infrastructure was poor. There was evidence of car feeder traffic development, and significant use was made of park and ride facilities as pick up points by Megabus, notably the Perth site at Broxden.

Wynne Jones (TfL) said that the Oxford – London had a good two way traffic base, strong demand throughout the year and a lot of off peak traffic. This was not the case for many other routes. He also commented that the night services were well used and that many other coach services were far less usable because of the lack of late night trips should the user, for example, be spending a late night in London.

John Cartledge (London TravelWatch) noted that National Express owns relatively few coaches and that as they are mostly operated from the country end, hence day trips from London were often difficult to achieve. He also commented on the Office of Fair Trading's interest in bus groups operating rail franchises. Peter White agreed that most of the demand for coach services to London was from the country end. National Express was a powerful brand and few local operators have completed successfully although a few have tried. Some do both – First operates from Norwich both in its own right and as a National Express contractor! He agreed that competition issues were often irrelevant. In some cases such as National Express operating the Midland Main Line franchise the matter had gone to the Monopolies & Merger Commission and certain conditions regarding continued coach competition had been put applied.

Report by Peter Gordon

Transport, Transport Policy and the Environment

Professor Sir Christopher Foster
Arup Head Office, Fitzroy Street, London
26 April 2006

INTRODUCTION

Sir Christopher started by describing his talk as being a matter of “unfinished business”. The thesis he set out to demonstrate to the audience was that “the environment [was being] mistakenly used to justify serious under-investment in roads and over-attention to rail with disastrous consequences for the national economy, public expenditure, transport and, to some extent, the environment.” He subsequently softened the “disastrous” to “severe”.

BACKGROUND

Sir Christopher provided a potted history of his work on transport scheme development and appraisal, noting that the environmental impacts were for a long time not considered (though they could have been incorporated into tools such as COBA). He lamented the decline of the professional in transport decision-making, citing a comparison of scheme locations with marginal constituencies as the grounds for ministerial decisions at one particular nadir. The drop in the quality of white papers and legislation also exercised him. In essence, there were no longer any “convincing arguments” (based coherently on proper problem statement and examination of evidence) in government. Whilst he felt that the mistakes of the Thatcher years had not been remedied under New Labour, he noted that there had, since 1997, been a more explicit concentration on the environment and on public transport, despite the facts that privatisation had not rationalised rail as desired and that bus was almost everywhere in decline.

THE RAC FOUNDATION’S 2001 REPORT – “MOTORING TOWARDS 2050”

Sir Christopher recounted the work of the committee convened to create its own “white paper” on transport. Amongst its salient conclusions, he emphasised:

- Congestion was a failed remedy for the imbalance between supply and demand;
- The role of public transport in serving the needs of poorer people was misunderstood since car ownership was increasingly penetrating the poorer groups;
- That the rail network could accommodate only a fraction of projected growth in traffic and a large proportion of drivers were not open to switching mode; and
- The rail network was becoming much costlier to expand and the environmental case for it was weakening.

He used these points as his basis for arguing that the curtailment of road-building was wrong-headed and would be counter-productive. The prospect of affordable zero-emission cars by 2050 justified proceeding with expansions to the country's highway capacity (though some "manageable" environmental problems associated with car-based travel would remain).

The arguments in favour of substantial road-building were its high economic returns (and, Sir Christopher argued, environmental benefits), the availability of land in most areas enabling widening in particular, the scope for tunnelling and the prospect of ever-increasing congestion if expansion did not take place. The call for road-building was combined with the clear acceptance that road pricing, in some form, would need to be included.

Sir Christopher cited the Prime Minister's forward to the Foundation's report as evidence of its success in marshalling important arguments.

IMPLICATIONS OF THE REPORT

Sir Christopher argued that a greening of rail (equivalent to the anticipated environmentally friendly car) was needed and that it would continue to have a role in facilitating long-distance travel, London commuting and off-peak travel, but that it was almost at its limit. He noted that bus would continue to be essential in cities but that it, like walking and cycling, were making "scant progress". Land-use planning was continuing to defy sustainable policy aspirations so the realistic assumption was that things would continue in roughly the same way. Meanwhile, key emissions (SO₂, NO_x) resulting from transport were falling steadily. CO₂ was not falling, but the UK was still on course to achieve the Kyoto targets. And environmentally friendly cars were still likely to be available according to the original timetable. The increasing

proportions of less polluting vehicles in the fleet suggested these would be taken up. So the Foundation's conclusions stand. But road-building had become rather more expensive.

THE ENVIRONMENTAL CASE

Sir Christopher referred to two recent pieces of work by Nash and Sansom which had found that the value of externalities showed carbon dioxide to be a very small factor compared with congestion. The latter accounted for between 60% and 80% of the total whilst CO₂ constituted only 1-3.5%. This proportionate relationship was constant across locations, time periods and vehicle types. The general view was that congestion was growing at a faster rate, with the result that the contrast would become greater. The preoccupation with emissions was leading to a refusal to build which in turn increased congestion, thereby actually worsening the emissions position. This argument was supported by evidence that, in congested conditions, CO₂ is emitted at a higher rate per km.

THE ROLE OF ROAD PRICING

Sir Christopher reflected on the history of road pricing to date in the UK - its promising start in London and subsequent distancing of government. A significant point was that increasing congestion meant that the efficient price of road travel was going up by perhaps 6% per annum (making road pricing commensurately unpalatable). Meanwhile, increasing road capacity, through building, would enable a smaller charge to be levied.

CONCLUSIONS

Sir Christopher said that economic growth was the highest priority and that it should not be subordinate to environmental concerns. Technology was the key, not quotas. In closing, he presented his suggestions of a "sound transport policy":

- Improvements in vehicle and fuel technology are promising and probably economically positive
- Need to accelerate road pricing
- Strong case for accelerating road building in most areas on economic and environmental grounds and if road prices are to be acceptable
- Environmental problems in transport can be overcome without sacrificing economic growth

DISCUSSION

Peter Gordon (AEAT) argued that urban sprawl was a principal outcome of road-building and that this was undesirable; that social exclusion needed to be understood as more than a matter of income – many people cannot travel by car and are not poor; and that it is commonly found that cities with high quality public transport enjoy a high quality of life. Sir Christopher answered that decent land-use planning policies could deter sprawl and conceded that bus deregulation had made it very difficult to deliver good public transport in cities and towns.

Paul W (Transport Watch) asked whether it would make sense to pave over the railways in London. Sir Christopher responded that London needed its railways. Elsewhere, lightly trafficked railway lines would probably be of limited value as roads. More generally, there was a relationship between increasing population density and appropriate modes: car first, then bus, then light rail. It was noted that a busway had a much larger capacity than an equivalent rail corridor.

Robin Pratt (Deloitte) asked whether Sir Christopher's position on road pricing was affected by the current price of oil; whether he rejected the concept of a social value of carbon; and why, since there already existed a "target and cap" trade relating to emissions producing a price of carbon, Sir Christopher chose to ignore this. Sir Christopher responded that one should not follow the crowd (referring to existing practices). He acknowledged that high fuel prices would deter traffic and hence ease congestion but that the long-term effect was to place more emphasis on the search for technical solutions. On the price of carbon, he said that evaluations frequently depended on a shadow price of carbon that was simply not its true value.

Graham Z (formerly of the rail industry) claimed that Sir Christopher's assertion concerning the doubling or trebling of rail costs was unfounded. He also suggested that it was inconsistent to claim, on the one hand, that the rail network was at capacity and, on the other, that there were empty trains running around. He further queried the nature of traffic growth: most of projected increase would take the form of short trips which were surely likely to be urban. Why did this make them ill suited to rail? In response, Sir Christopher argued that Prescott's original vision had been for the railway to accommodate the vast majority of projected traffic growth but that, since so much of it would be short-distance journeys, the railway could not accommodate this. He added

that empty trains are not interesting (nor are they expensive) but that the points on the network where trains are full present a real problem.

Peter Burgess (Arup) asked whether we shouldn't be devoting more effort to the correct valuation of externalities, given their importance. He wondered, too, whether one problem was that there aren't any votes in the environment. Sir Christopher answered that externalities *had* been properly valued and so the question had been answered (though it was pointed out that this was less the case with freight than passenger travel). One problem was that European rules forced us to apply values to externalities despite their being suspect. Sir Christopher conceded that the environment may not be the highest political priority.

Stephen Bennett (ex SRA) wondered why there had been no mention of aviation and asked as well whether a renewed road-building programme would not mean more ministerial meddling, not less. Sir Christopher called for "first rate analysis" to understand the aviation picture better. As for meddling, he suggested that politicians would continue to do that which is most immediately attractive but even they are now seeing that they have been "conned" by what they've been told in recent times.

Gradimir Stefanovic asked how we would survive between now and 2050, particularly given the difficulty experienced to date with advanced technology in buses. Sir Christopher said that a good number of intermediate technologies were making speedy progress. Meanwhile, CO₂ continued to have a low relative value. Whilst this might change in the future, it meant that we did not need to worry overly for the time being.

Gregory Marchant (ex BR, ex SRA) asked whether Sir Christopher acknowledged the possibility of a "tipping point" from which it would not be possible to recover things and what, therefore, the cost might be of the economists "getting it wrong". Sir Christopher conceded that the economic analysis does not assume such a tipping point and that it is important to know if such a condition would apply since it would change things profoundly. In such a circumstance, a good deal of "statesmanship" would be necessary in order to convince the populus of the need for sacrifices. Mr Marchant responded by asking whether a precautionary principle was not the sound way forward, which Sir Christopher discounted as "negativism", which would hurt the poorest.

Report by Tom Cohen

¹ :Foreword from the Prime Minister

This report cannot and does not represent Government policy. But it is a well-argued and interesting contribution to the debate, and particularly so as it is from an independent inquiry by a respected motoring organisation.

Meeting the needs of modern motorists whilst fulfilling our responsibility to protect the environment is one of the biggest challenges faced by any Government. The RAC Foundation first suggested an independent inquiry into motoring issues in October 2000. In replying, I said that we would welcome a report bringing greater clarity and understanding of the issues and choices.

Eighteen months on, this Report more than meets that challenge. It argues that there are no easy answers to fulfilling our desire to travel and that we cannot solve the problem just by building new roads, or by hoping everyone will choose to use public transport for all journeys. It is essential that we make the very best use of the infrastructure we have. Technology can help with that and – through low carbon, hybrid and fuel cell vehicles – reduce environmental impacts. I want UK companies to lead the global shift to low carbon transport. We have fiscal policies and other programmes designed to bring this about, and will shortly publish a comprehensive strategy.

But the report also argues that technology on its own cannot solve all our transport problems. It highlights particularly the challenge of reducing congestion, suggesting a number of possible long-term solutions. I look forward to hearing the debate.

Review - The Validity of Food Miles as an Indicator of Sustainable Development: Final Report by AEA Technology for DEFRA, July 2005

Downloadable from

<http://statistics.defra.gov.uk/esg/reports/foodmiles/default.asp>

A new front has opened up in the battle to save the planet: food. On one side, seasonal food grown by happy local farmers with traditional organic methods is driven in small vehicles direct to the high street farmers' market and sold fresh and full of flavour. On the other, out-of-season food grown by exploited workers in the developing world is flown round the world in fuel-guzzling jets, driven around the country in massive but half-empty trucks, first to the depot of one of the giant supermarket chains, then back to a high-street-destroying out-of-town supermarket, and sold stale and flavourless. Into the breach steps Food Miles, "invented" by the SAFE Alliance, now SUSTAIN, in 1994. Multiply "food" by "miles" and the lower the number the less you are hurting the high street, the farmers, the developing world and the planet. Simple, isn't it?

In fact, like many simplifications of complex problems, Food Miles have entered our vocabulary with little public understanding of what they mean or whether they are a useful measure. This is a shame, as AEA's report for DEFRA, packed with facts, insights and over 100 references, explains how food transport works, what effects it has, why it is all rather complicated, and hints at all the other questions it raises.

AEA drew on an broad team including Alan McKinnon of Heriot Watt University, Chris Nash of ITS Leeds, Mike Browne of University of Westminster and Alistair Hunt of University of Bath. The resulting report covers logistics, distribution, the costs and economics of different modes and even, briefly, how to cook a chicken.

Given that Britain is not self-sufficient in food, and so at least some of us must eat imports, what's the problem?

Is it inefficient and unnecessary air freight? Possibly, as it produces 10% of the total CO₂ used to transport our food, and releases it high in the atmosphere, although while 80% travels as "belly cargo" in passenger planes, it may do little damage at the margin.

Is it exploitation of developing countries? Apparently not: only 3.1% of food miles relate to transport from them, and much of what they supply could not be grown here: tea, coffee, cocoa, fruit and rice. Is your latte really necessary?

Is it wasteful intercontinental travel? Apparently not: 75% of our imports come from our neighbours in western Europe.

Is it importing food we could grow here? Apparently not: while a fifth of production is exported, and twice as much imported, this partly reflects the need to grow food with minimal energy inputs. We could grow more tomatoes here, but a case study shows that the energy saved in growing them in Spain exceeds that used in transporting them here.

Is it pointless detours in wastefully empty trucks? Those big bad HGVs emit 64% of the CO₂ produced transporting food in the UK. But the supermarkets who provide 85% of our food have every incentive to design efficient supply chains. For each tonne-km, trucks create barely one quarter of the CO₂ produced by vans and barely one hundredth of that produced by cars.

So what is the problem? 48% of the vehicle-kilometres associated with transporting food are by cars carrying, AEA estimate, on average only 11 kg of food. This compares with 440 kg in a van, 8,200 kg in a truck and 11,000 tonnes in an ocean-going ship, a million times more than a car. Look at AEA's numbers another way: the food delivered to a supermarket in one truck is taken away by 750 cars. Or another: the same amount of CO₂ is produced carrying food 5000 kilometres in a ship, 500 kilometres in a truck, 150 kilometres in a van, 50 kilometres in a plane or only 5 kilometres, the length of a typical food shopping trip, in a car.

AEA don't only consider CO₂. They also examine the wider social costs including air quality, noise, congestion, accidents and infrastructure costs. Of the social costs they can identify, less than 10% are due to emissions and 80% are due to congestion and accidents, with 2000 serious injuries and 300 deaths a year, almost half due to cars.

Mode, not miles, appears to be the problem, and specifically too many cars doing over-frequent, under-loaded trips. Sound familiar?

The report has its faults. As it discusses not only social costs but also supply chains, animal welfare, farm employment and freshness, it sometimes seems more like a sequence of technical papers rather than a flowing document. It would also be useful to have more illustrative numbers: many of those above had to be calculated by the reviewer.

In fairness, AEA must address the remit set by their client. DEFRA promotes British agriculture and “local” (to be defined) food sourcing, without any evidence of the cost-benefit analysis that one would expect from DfT. AEA do not, for example, explicitly compare the environmental and social costs of feeding shop-free villages and convenience store-filled towns. Would they have found that rural communities are less sustainable than urban ones, or that farmers’ markets damage the environment more than supermarkets? Yet in their defence, merely skimming the report hints at all the wider questions which they could have answered, if only they had been asked.

How would we feed Britain at minimal environmental and social cost? Should car-accessed supermarkets be replaced by truck-based home deliveries? Should they close in favour of local shops within walking distance? Should people cook small quantities at home or reap the scale benefits of takeaways, cafés and restaurants? Should foods be cooked which can safely be eaten raw? Should drinkable water be boiled merely to flavour it with leaves from India or China, or beans from Kenya or Colombia? Should the production and transport of zero- or negative-nutrition foods – mineral water, Diet Coke and celery – be banned?

More obviously, to the economist, should Government be regulating in pursuit of outcomes, or pricing transport and other activities to reflect externalities and then letting the market decide?

AEA’s report doesn’t answer these questions but does at least show that they need to be asked. Read it!

Reviewed by Dick Dunmore

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TRANSPORT ECONOMISTS' GROUP

The Transport Economists' Group, formed in 1973, provides a forum for people involved in transport economics to meet regularly and discuss matters of mutual interest. Membership is open to economists working in transport and others whose work is connected with transport economics.

The aim of the Group is to improve the quality of transport management, planning and decision making by promoting lectures, discussions and publications related to the economics of transport and of the environment within which the industry functions.

Meetings are held every month from September to June (except December) at Arup's Central London HQ at 13 Fitzroy Street. The meetings consist of short papers presented by speakers, drawn from both within the Group's membership and elsewhere, followed by discussion.

The Group's Journal, 'The Transport Economist', is published three times a year reporting on meetings and other activities of the Group. It reviews recent publications of interest and contains papers or short articles from members. The editor welcomes contributions for inclusion in the journal, and can be contacted at peter.gordon@aeat.co.uk

The current membership of over 150 covers a wide range of transport modes and types of organisation. Members are drawn from transport operators, consultants, universities, local and central government and manufacturing industry. All members are provided with a full membership list, updated annually, which serves as a useful source of contacts within the profession. Applications from people in all sectors are welcome.

Applications for membership should be made on a form obtainable from the Membership Secretary at gregorymarchant.teg@btinternet.com.

Alternatively, an application form can be downloaded from the Group's website: www.transecongroup.org.uk.

THE TRANSPORT ECONOMIST

Volume 33, Number 2

Autumn 2006

Contents	Pages
----------	-------

Reports of Meetings

Towards a Better Understanding of the Economics of Level Crossings <i>Michael Woods, Rail Standards & Safety Board</i> November 2005	1 - 15
--	--------

Express Coach Services <i>Peter White, University of Westminster</i> February 2006	16 – 20
--	---------

Transport, Transport Policy and the Environment <i>Sir Christopher Foster</i> April 2006	21 – 26
--	---------

Review

The Validity of Food Miles as an Indicator of Sustainable Development,
AEA Technology for DEFRA

Reviewer: Dick Dunmore	27 – 29
------------------------	---------

TEG News

TEG Committee 2006/07	30
-----------------------	----

MEETINGS September 2006 – June 2007

inside front cover

