

## **INQUIRY INTO: EFFECTIVE ROAD AND TRAFFIC MANAGEMENT**

### **EXECUTIVE SUMMARY**

#### **The Institute**

The Institute of Highway Engineers IHE (formerly the Institute of Highway Incorporated Engineers IHIE) was founded in 1965 and is run by and for practical engineers and allied professionals.

IHE registers Chartered and Incorporated Engineers and Engineering Technicians with the Engineering Council and currently has almost 3,000 members who work in Central and Local Government, Consulting Engineers and supplying contractors. IHE members work in a wide variety of highway related disciplines including:

- Traffic Management
- Highway Maintenance
- Bridge Maintenance
- Infrastructure Design
- Traffic Signals
- Intelligent Transport Systems
- Development Management

The Institute is well known for its training courses, and specialist qualifications in development management, traffic signing, highway maintenance, road safety and signal control. We also accredit academic courses through the Joint Board of Moderators (JBM) with the ICE, IStructE and CIHT and maintain a public register of road safety auditors.

We are also developing specialist 'competence' based qualifications e.g. in road safety engineering, traffic signing, highway maintenance and signal control, several of which have DfT etc. backing.

The IHE is a full member of the Construction Industry Council, a member of the Adept training group and a member of the Parliamentary Advisory Committee for Transportation Safety (PACTS).

The IHE publishes good practice guidelines and was awarded the Prince Michael Road Safety Award in 2005 for its "Guidelines for Motorcycling" which is a compendium of good practice for road engineers in how to consider that particular group of 'vulnerable' road users.

#### **Summary of Proposals and comments in the IHE submission**

- (i) Road congestion presents a significant cost to the UK economy. At a local level relatively inexpensive interventions can bring about significant reductions in journey time and defer the cumulative effect of delay (paragraph 1.1)**

- (ii) Interventions at junctions, particularly at bottlenecks, often have important consequences for congestion but there is no agreed method of evaluating the congestion consequences (paragraph 1.3)**
- (iii) Congestion is not currently a priority compared with the other local objectives. Managing road networks to reduce congestion could require a reversal of attitudes, and call into question many of the sorts of schemes currently prioritised by local authorities. (paragraph 1.4)**
- (iv) Alleviation of congestion requires measures at junctions to increase vehicle capacity. Even removing signals requires expenditure. Managing the road network involves reviewing bottlenecks and a national initiative would probably be needed to bring about this level of activity. (paragraph 1.5)**
- (v) Technology can play an important role in addressing congestion but systems require significant on-going maintenance which is rarely adequately allowed for in recurrent expenditure. (paragraphs 1.9 & 1.10)**
- (vi) Key to managing the network are skilled, trained, motivated, recognised and rewarded staff dedicated to improving our performance and management. It is imperative that local authorities and consultants address the growing skills gap and the demographic problem caused by experienced engineers leaving the industry. Authorities and consultants should be encouraged and rewarded for directing staff to improving the design and management of the road network and to recruit, retain and develop staff by re instating training and recognition of professional registration. (paragraphs 1.11, 1.12 & 1.13, 3.2)**
- (vii) Driving standards need to be improved. Most road users after they have passed their driving (or riding) test do not make any effort to keep up-to-date with current road signs, the law and the Highway Code. The Highway Code is thus largely ineffective as a means of engaging with the vast majority of road users. (paragraph 2.2)**
- (viii) Driver distraction has become a topic of great concern in recent years. However, there has been little research into the cultural change required to address this issue. Cultural and behavioural issues must be addressed to effect real change; much of our current activity is treating the symptoms of road user problems rather than curing them at source. (paragraph 2.4)**
- (ix) Good initiatives, such as 'Bike Safe', do exist but more needs to be done to encourage drivers and riders to adopt a life-long skills attitude and to regard a licence to drive or ride as a privilege. Financial incentives such as lower insurance premiums do exist but are rare and more could be done, possibly through the vehicle licensing mechanism. (paragraph 2.5)**

## WRITTEN EVIDENCE

In view of the short time scale this IHE response has been coordinated by the Presidential team and represents edited commentary and evidence from a small invited group of IHE members and friends thus it concentrates only on the areas of interest selected by the contributors.

### **1. The extent to which the Government and local authorities should intervene to alleviate congestion and the best means of doing so.**

- 1.1 Prior submissions to the Select Committee on Transport have shown that the cost of congestion to the UK economy is significant. The Transport Select Committee Seventh Report (2005) referred to the CBI's estimate that road congestion costs the UK economy £20 billion per year. Eddington in 2006<sup>(1)</sup> hypothesised that a 5 per cent reduction in travel time for all business travel on the roads could generate around £2.5 billion of cost savings. Whilst the "Predict & Provide" culture of road building has fallen from favour, none the less significant benefits should accrue from making better use of our existing infrastructure. Experience from IHE members suggest that relatively inexpensive interventions at local level can bring significant reductions in journey time and delay the cumulative economic effect of congestion.
- 1.2 Congestion arises wherever vehicle demand exceeds road capacity, the all important supply side of the equation. During the last 20 years or so, there has been minimal road building in urban areas, and managing the existing road network has been, and continues to be, the only way of controlling or managing vehicle capacity. Most everyday urban congestion occurs at signalised road junctions - the bottlenecks in the road network - and we are aware that there are calls for signals to be removed. However, junction design needs to address accident problems, provide safer crossing opportunities for pedestrians (particularly impaired pedestrians) and cyclists and to redistribute traffic queues and, although IHE supports shared space concepts (see our UK resource site: [www.homezones.org.uk](http://www.homezones.org.uk)), it must be recognised that each site needs to be studied to identify the best solution and this costs money and takes expertise.
- 1.3 Modifications to improve safety, or conditions for buses, cyclists or pedestrians, may be implemented at relatively low cost but often results in reduced capacity for vehicles and increased congestion and there is no agreed way of evaluating these congestion consequences.
- 1.4 Far from alleviating congestion, much traffic management can have the opposite effect. Congestion is often not seen by local authorities as being a priority compared with other objectives, particularly now money is short, and it has recently been deleted as a Target by Government. Managing road networks to reduce congestion would require a reversal of this approach, and could call into question many of the sorts of schemes currently prioritised. Achieving a change of direction might require a national initiative making clear the importance of congestion on local roads.

- 1.5 Alleviation of congestion on local roads normally requires measures to increase vehicle capacity. Managing the road network would increasingly involve the review of bottleneck junctions and devising ways of getting more vehicles through. Again a national initiative would probably be needed to bring about this sort of activity start to make any sort of impact.
- 1.6 The design of schemes for junctions whether controlled or shared space, requires very specific skills and expertise in areas where the IHE is pre-eminent vis:
- Improving safety and conditions for buses, cyclists and pedestrians in ways which limit the effect on congestion
  - Enhancing public space
  - Identifying geometric layout improvements, and better methods of signal control to increase vehicle capacity.
- 1.7 Technology has always played an important role in congestion management in the UK and UK engineers are at the cutting edge in the development and deployment of this technology. As far back as 1969 the Transport Road Research Laboratory (now TRL) developed the TRAFFIC Network Study Tool (TRANSYT)<sup>[2]</sup> a computer based tool for determining traffic signal timings for networks of junctions to minimise stops and delays. The development of TRANSYT led directly to the invention of Split Cycle Offset Optimisation Technique (SCOOT)<sup>[3]</sup> which is a dynamic traffic feedback and control system for networks of signalled junctions deployed by many local authorities throughout the UK and abroad. SCOOT systems require investment but benefits can be significant. Hunt et al (1982)<sup>[4]</sup> found that SCOOT could reduce average delays by up to 12% when compared with fixed time traffic signal plans. UK engineers continue to innovate in the traffic control and modelling arena and are credited with the creation of other significant tools such as Microprocessor Optimised Vehicle Actuation (MOVA)<sup>[5]</sup> which, at isolated junctions, can deliver reductions in delay similar and occasionally better than SCOOT, and LinSig<sup>[6]</sup>, an important modelling and design tool used in the UK. DfT estimated in 1997 that, if MOVA was applied to all the isolated traffic signals in the UK, the savings in delay would be in excess of £220 Million.
- 1.8 The sophistication and deployment of technology varies amongst Authorities but many will have reasonable CCTV coverage and a means of collecting data on traffic patterns. Authorities should have a good understanding of local congestion hot spots and key events which trigger congestion. To variable degrees Authorities have communications links and equipment which allow the remote control of traffic signals, car park guidance signs (eg in Nottingham), bus priority (eg in Reading), tidal flow systems etc. The most advanced have invested in Urban Traffic Management & Control (UTMC)<sup>[7]</sup> systems which allow the integration of control and information systems and control via computer algorithms (including SCOOT).

- 1.9 Investment in technology is, unfortunately, often seen as a panacea for traffic problems, involving up-front investment with the promise of an automated solution. In reality systems are never fully automatic and investment needs to be carefully planned with adequate resources made available for their management and maintenance. The need to provide for running costs is unfortunately often at best under estimated and at worst completely overlooked in an attempt to drive down revenue costs.

The majority of UK road junctions are probably not running at optimum capacity and this is almost entirely due to a lack of both staff and money (and political will) to model, adjust (and re design if necessary) existing junctions. In financially austere times it is particularly attractive to make better use of the investments we have already made. The key to getting more from our existing infrastructure is dedicated, trained and motivated personnel with a remit and the freedom to improve efficiency.

- 1.10 Local authority departments often seem to be in a permanent state of transition with restructures every three to four years. Restructuring usually involves staff rationalisation and requires those remaining to take on multiple roles. Their focus is thus diluted and, whilst they may receive some transitional training, they are given little or no support for professional development. Consultancies & Local Authorities are also facing severe financial difficulties and one of the first casualties is staff training. Around half the respondents to the IHE members' survey 2010 indicated that their employer was unlikely to fund any training in 2011. If the investment that has already been (and continues to be) made in smart technology is to be maximised, engineering skills must be sustained and developed.
- 1.11 IHE believes that whilst investment in new technology is important, we are none the less often failing to make the best of what we already have. To reap the benefits of the investment already made in smart infrastructure we must recognise, train and support engineers and technicians to manage and maintain these systems. The demographics are such that experienced personnel are retiring (or being made redundant) and we have a skill gap emerging as a result of failure of local authorities and consultants to recruit, train and retain staff dedicated to the management and maintenance of our smart systems. A summary of sources of information on supply and demand is here:  
<http://www.theihe.org/training/training-for-ieng-and-engtech/demand-and-supply/>
- 1.12 A positive step in getting the best out of our current infrastructure would be to encourage (and reward) local authorities who free up engineers to concentrate on core activities and commit time and resources to re visit existing junction design and operation. One way to encourage recruitment, retention and development of specialist engineers would be to restore the link between salary grades and professional registration and support engineering personnel by funding training (including a return to day and block release courses).

## **2. The extent to which road user culture and behaviour undermines effective traffic management, including the relevance to today's road users of the Highway Code.**

- 2.1 Road users are not passive entities, blindly obeying signs and driving rules - indeed, in many cases they understand neither the true meaning of the signs and road markings provided to assist them, nor the rules and guidelines intended to ensure a trouble-free journey<sup>[10]</sup>. Current engineering, education and enforcement interventions assume that road users will react in a generally predictable, consistent way to external stimuli or controls. However, road user behaviour is determined by a large number of factors (including many completely unrelated to the journey being undertaken) which reduce the predictability of responses to interventions and may result in different behaviours in identical situations because of unrelated external circumstances.
- 2.2 Whilst drivers are quick to recognise common errors in others' road use, they seem incapable of identifying shortcomings in their own behaviour. A number of studies have demonstrated that the majority of drivers consider themselves to be 'above average' in their driving skills<sup>[8]</sup>; the corollary to this appears to be that those least in need of additional training are often paradoxically those most likely to seek it out. Whilst there is a general recognition that driving standards need to be improved, few make any effort to even keep up-to-date on evolving road signs and law. The Highway Code, it seems, has little value to road users after they have passed their driving (or riding) test and is thus largely ineffective as a means of engaging with them.
- 2.3 Road users are clearly conscious of some 'adaptive behaviour', recognising, for example, that driving behaviour will depend on the social situation and who the driver is with at the time<sup>[9]</sup>. However, there are elements of adaptive behaviour which are not so clearly recognised, particularly with respect to frequent journeys where familiarity breeds contempt. Many road users journey on auto-pilot and are unconscious of particular circumstances or adaptations. Changes to the road environment are rapidly assimilated and become part of the routine. Additional signs and road markings become part of the scenery over time - not a problem if driving behaviour has adapted appropriately, but counter-productive where a long-term change has not been effected. Peer pressure has a clear impact here, particularly with respect to vehicle speed - whilst excessive speed is generally recognised as a problem, 'moderate' speeding is tolerated and enforcement interventions which address this issue are not well-received.
- 2.4 Cultural change happens slowly. Driver distraction has become a topic of great concern in recent years, as cars assist the driver more and more, reducing the need to concentrate solely on driving, and the range of in-car non-driving distractions has increased. However, driver inattention is possibly a greater, unaddressed concern, linked to some of the adaptive behaviour concepts above. There is a widespread recognition of 'inattentional blindness' when focussing on some activities detracts from our ability to recognise abnormal situations<sup>[10]</sup> and this has even formed the basis of a TfL campaign to improve recognition of cyclists<sup>[11]</sup>. However, little research has looked at the cultural change required to address this issue; nor is it clear by what means change can be effected. These

cultural and behavioural issues must be addressed to effect real change; much of our current activity is treating the symptoms of road user problems rather than curing them at source.

- 2.5 What is needed is a cultural change in drivers' attitudes. Drivers (and riders) must be encouraged to regard the possession of a license to drive on UK roads as a privilege and encouraged to make a life-long commitment to maintaining their skills. We must foster an attitude of pride in driving skills and a commitment to maintain and supplement knowledge of important safety related changes to legislation and enforcement. Previously a minor incentive was reduced insurance premiums for "Advanced Drivers" but this has largely been eroded by the increasingly competitive insurance industry. Initiatives do exist such as 'BikeSafe'<sup>(12)</sup> - a nationwide police-led motorcyclist casualty reduction initiative that is run by the majority of forces throughout England, Wales, Scotland and Ireland. It engages with post-test riders in a conflict free environment to consider and analyse why motorcycle crashes are happening and it encourages them to foster a continual development attitude to riding including, for some, encouragement to share their skills by entering 'The Register of Post-Test Motorcycle Trainers' (RPMT)<sup>(13)</sup> which carries a financial incentive with respect to insurance premiums. The Institute of Advanced Motorists have also recognised the importance of continual development of riding skills with their 'Skills for Life Programme'<sup>(14)</sup>. Initiatives such as these should be encouraged and promoted and mechanisms explored to reward participants both through the insurance industry and possibly through the Vehicle Licensing charges.

### **3. Intelligent traffic management schemes, such as the scheme which has operated on the M42 and their impact on congestion and journey times.**

- 3.1 By introducing hard shoulder running, the M42 Active Traffic Management (ATM) scheme<sup>(15)</sup> has more or less widened the motorway to 4 lanes in each direction. Not surprisingly, the equivalent of an extra lane in each direction has dramatically reduced congestion. This lower cost for of motorway widening is now the preferred way of tackling the most congested section of motorway throughout the country, and substantial schemes are under construction on the M1 and elsewhere.
- 3.2 Whilst M42 type schemes can tackle congestion on lengths of road between junctions, there are many junctions on the national road network where everyday congestion is a problem at peak times. Whilst the ATM schemes are extremely beneficial, IHE believes that if a small proportion of the funding allocated to ATM (currently valued at £5.6 Million per kilometer of motorway converted) was applied to existing junctions then significant improvements could be made. Again the traffic engineering skills of IHE members could be put to good use in tackling congested junctions using the best engineering and communication techniques.

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- [6] LinSig: <http://www.jctconsultancy.co.uk/Software/LinSigV3/linsigv3.php>
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- [8] e.g. RURAL ROAD SAFETY: DRIVERS AND DRIVING, SCOTTISH GOVERNMENT SOCIAL RESEARCH (2008):  
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- [11] 'MAYOR AND TFL ANNOUNCE AMBITIOUS PLANS FOR IMPROVING CYCLE SAFETY':  
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- [12] BIKESAFE: <http://www.bikesafe.co.uk/>
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- [14] INSTITUTE FOR ADVANCED MOTORISTS 'Do you want to be a better rider?':  
[http://www.iam.org.uk/do\\_you\\_want\\_to\\_be\\_a\\_better\\_rider\\_/doyouwanttobeabetterrider.html](http://www.iam.org.uk/do_you_want_to_be_a_better_rider_/doyouwanttobeabetterrider.html)
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