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Creating
the future of
transport

TRL launches its Child Safety Centre, providing industry with a comprehensive service covering all aspects relating to the safety of children travelling in vehicles. At the Head of the Centre is Marianne Hynd, who leads an experienced team with knowledge in product development, Type Approval testing, child safety research and legislation. See page 3.

Lorry Road User Charging

TRL has been at the forefront of research into road pricing, including Lorry Road User Charging (LRUC) since 1995. This experience has made us one of the leading providers of research and advice on road pricing issues, with an involvement in all aspects of the road pricing delivery chain of services. This has been developed through work in both research projects that deliver advances in the capability and understanding of road pricing for government clients and the EC, along with service delivery projects for government clients and sponsors facilitating the introduction of schemes.

Lorry road user charging schemes have already been successfully implemented in Austria, Switzerland, Germany, Slovakia and the Czech Republic, and others are being actively progressed elsewhere in Europe such as France and Poland. LRUC is also back on the UK agenda.

The introduction of LRUC to the UK was first considered in 2004. Under a procurement programme managed by HM Revenue & Customs (HMRC), would-be vendors submitted possible solutions to HMRC for Time, Distance and Place (TDP) based charging. At this time, TRL was asked to evaluate a range of technical solutions to include options for implementing both the charging and compliance sub-systems.



TRL went on to successfully plan and execute the trials programme for each system, evaluating their performance and taking responsibility for the operational management of the trials on its test track and on the public road.

But why charge? In most countries, paying for the building and maintenance of roads comes principally from general taxation. In order to maintain a "user pays" element,

taxes are normally collected from vehicle owners and users, most commonly in the form of road and fuel taxes. In some countries it is also common practice for all vehicles on selected roads to be subject to tolls which are used to maintain those roads.

While this model works well for private vehicles, it is less true for commercial lorries, particularly larger ones. The freight transport industry is international, and lorries can be fitted with very large fuel tanks. Registering vehicles in one country and filling up before each trip across country borders allows hauliers to exploit variations in fuel prices and road-tax rates to minimise their running costs. This leads to a disparity between the use of the road and the revenue collected for maintenance and renewal, and is particularly problematic for countries with large numbers of transiting vehicles.

A solution to this is to charge vehicles directly for the use of the roads, through the use of Lorry Road User Charging. LRUC can provide additional benefits, including



managing congestion (through varying prices according to time and place), emissions (through varying pricing by vehicle emissions class) and infrastructure damage (by ensuring that charges are more closely aligned with infrastructure wear and tear).

There are various ways to achieve open road pricing; the simplest being a paper-based road charge, also called a vignette. This is in effect a form of road tax, normally levied at border controls and based on vehicles' characteristics. The system allows differential charging for all roads and vehicle classes. Although quite difficult to enforce, vignettes are widely used in Europe and a harmonised system called Euro-vignette is used in the Benelux countries, Denmark and Sweden.

The limitations of this system have led to the development of electronic free-flow solutions to road pricing. These electronic systems mostly employ one of two technologies; Tag and Beacon (nearly always based on Dedicated Short Range Communications - DSRC) or Global Navigation Satellite Systems (GNSS).

TRL is actively running projects that deliver key advice to government bodies in the UK and abroad and more information on these will be reported on in future editions of TRL News.

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TRL launches Child Safety Centre

TRL has been an authoritative source of independent and impartial expertise on the safety of children in vehicles for more than 30 years. With our well established history in vehicle safety, we provide child seat manufacturers, retailers, road safety professionals and the automotive industry with a comprehensive service covering all aspects relating to the safety of children travelling in vehicles.

TRL has now brought all that expertise together to provide a single point of contact for its child safety activities. The 'TRL Child Safety Centre' was launched at the Kind & Jugend Show held in Cologne in September. The show, which attracts leading child seat manufacturers from across the world and a large number of well known retailers, provided an excellent platform for TRL to showcase its expertise in the child seat safety arena.

Working with TRL enables instant access to internationally recognised experts, like Marianne Hynd, who heads up the new Child Safety Centre. Marianne is a technical advisor to the European Commission and various national governments, a BSI committee member and a UK representative on ISO working groups for child seat safety. Marianne leads an experienced team with knowledge in product development, Type Approval testing, child safety research and legislation.

TRL operates a UKAS (ILAC) Approved Laboratory to ISO 17025. We are also an appointed Technical Service to VCA, UK (E11) and RDW, NL (E4), for the provision of UNECE Regulation 44 Approvals. As a Technical Service, we provide a full Type Approval service, and as a Company accredited by an ILAC member, TRL's test reports are accepted internationally (including Brazil).

An important new addition to TRL's child seat activities is our recently launched 5 star rating scheme, which provides an objective and independent rating of a child seat's capabilities. It is of considerable value to consumers, manufacturers and retailers alike, and enables consumers to make comparisons and informed decisions on which product best meets their requirements. The rating scheme presents an overall star rating of each product, which is based on a suite of tests to assess the front and side impact performance and the usability of the product. Several major retailers support the scheme, which also has the backing of the AA (the UK's Automobile Association.)



Graco, Silver Cross and Car Mate Ailebebe are among the first manufacturers to make their results public, all achieving 4 star ratings on their seats. As soon as a manufacturer is ready to publish, the results are freely available from

the TRL web site. They can also be found on the product and in-store. All three child restraint systems were on display at the Baby Show for Trade held recently in London - and there are more to come. Manufacturers are actively improving their products, ready to demonstrate performance under this scheme.

With our unique insight into the development of child seat legislation, TRL can also help industry navigate the minefield of interpretations and how they relate to the development of new products. For manufacturers, we offer guidance on legislation and general consumer information as well as the application of UNECE Regulations and Performance Ratings to product development. For retailers, we offer guidance on legislation and test procedures, interpretation of child restraint performance information and product range performance analysis, as well as staff training.

To complete the Child Safety Centre package, TRL provides bespoke seminars and workshops. These can either be held at TRL's premises in Berkshire, or a specialist will visit a venue of your choice. The types of topics covered include the dissemination of research activities, child restraint selection and child restraint fitting – and typical delegates are retailers, road safety officers, education providers, emergency services and accident investigators.

TRL's Child Safety Centre is essentially a "one-stop shop" for anyone involved in the safety of children in vehicles.

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The TRL World

For TRL, continued growth in our international business is a key objective and we are aiming for around 25% of our income to come from the **Middle East, India, Africa** and **Europe** regions, augmented by specific initiatives across the rest of the world.

▶ Canada

Using TRL's CERS (Cycling Environment Review System) methodology, we have worked in partnership with Canadian transportation and engineering consultancy McCormick Rankin Corporation (part of the MMM group) on two cycling related projects in Canada. In St. John's, Newfoundland we undertook "fit for purpose" assessments on roadways proposed for cycle lanes. In Ottawa, we assessed key sites in terms of cycling safety and comfort. In reporting the results of both projects, TRL has played a key role in the development of safe, coherent and successful cycling networks.



▶ Europe

TRL is working with the European Commission to provide legislative advice and consultancy for vehicle safety and emissions. A key focus is the development of Type Approval for hydrogen and electric vehicles. We are also leading a European Consortium looking at heavier vehicle weights and dimensions.

In addition, TRL has won a major role in a new European Research Programme called ERA-NET ROAD: Effective Asset Management meeting Future Challenges. The overall aim of ERA-NET ROAD is to strengthen the European Research Area in road research by co-ordinating national and regional road research programmes and policies.



▶ Africa

Kenya – TRL is working on a major project funded through the Northern Corridor Improvement Programme, to improve road safety significantly across all sectors. The initial review phase identified 67 critical actions and from these, projects targeting enforcement, medical, education and engineering issues have been developed for implementation over the next 3 years.

Botswana – TRL is assisting the Traffic Police and the Department of Roads and Transportation Safety to upgrade the newest version of TRL's accident analysis package, MAAP. The project is already resulting in major benefits since it has significantly improved the ability of staff to give accurate coordinates for crash locations country-wide.

Mozambique – TRL is instrumental in developing initiatives to provide reliable access for isolated communities across sub-saharan Africa via AFCAP (the African Community Access Programme). TRL's expertise contributes to the regional roads investment programme by providing detailed and tailored road construction solutions and determining priorities and "best-fit" options.

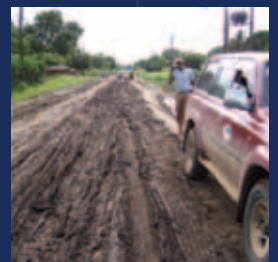
Ethiopia – TRL is developing pavement design standards for low volume roads to ensure that appropriate and

affordable guidelines are in place across the country to construct suitable roads from local resources that are cost-effective and sustainable. We are also working with the National Government and the World Bank to explore the options of setting up an Institute of Transport Safety that will provide a Centre of Excellence for the entire continent.

Malawi – TRL is delivering planning and investment development expertise for an appropriate planning and investment prioritisation system for the country's roads. This will provide the means to prioritise and develop capacity for construction and maintenance of rural roads across the country.

Gambia – TRL is developing its existing pavement management system, RDM (originally developed in Malawi) to manage and plan the Gambia road network. The system allows prioritisation and planning of the road network using HDM-IV.

Uganda – TRL is assisting in the training of sealing for low volume roads. Staff at Mbale Technical College are being trained in the application of various types of low volume seals including Oto, Penetration Macadam and Sandy seals.





Mike Head – Commercial Director is tasked with building our business internationally, he comments “we will focus on those products/services where we excel and have an established track record – whilst recognising the need to tailor products and services to local needs and situations. Localisation will be a key part of our approach – we have learnt that having a strong base of staff permanently in-country is good for TRL and matches our business

aspirations. We also recognise that to deliver the very best services, partnering forms an essential part of our approach to growing a sustainable international presence.”

International business successes will be a particular focus in future issues of TRL News. To introduce this theme, here are just a few examples of the work that TRL is currently involved with around the world...



Middle East

Abu Dhabi – TRL has undertaken a comprehensive, multi-sector road safety strategy review and has developed an accompanying action plan through stakeholder involvement. The programme of work has identified current strengths and weaknesses for road safety and assessed performance against international best practice. The action plan is now being moved forward into the implementation phase. As part of the same project, TRL also developed criteria for setting speed limits, developed safety audit procedures and undertook safety assessments of 3,000km of the road network.

Dubai – Work is nearing conclusion in the development of new traffic modelling tools for the Dubai Road Traffic Authority. TRL has also recently completed a project to review possible remedies to reduce the effect of long distance commuter traffic in the City and developed a speed management strategy that included the development of policies to set and enforce speed limits.

Qatar – We are completing the final stages of work for Ashghal, the Ministry of Public Works, providing expert advice and best practice guidelines for asphalt, and are developing partnerships with local universities and consultancies to help transfer best practice for safety and transport technologies.



India

TRL is collaborating with IBS Software, India’s leading travel, transportation IT solutions provider, and other consultancies in developing transport solutions and information management systems to increase road safety through a tool based consulting approach.

Road tolling and appropriate road tolling technologies are also being developed so that the lessons that TRL has learnt from its work in this area in the UK and Europe can be adapted and extended for use within other national contexts such as India.

TRL is also exploring the possibility of establishing a Centre of Excellence for Road Safety in Karnataka State – this will provide expertise, advice, training and tools to help strengthen a national approach to the reduction of road death and injury, as well as strengthening in-country skills and capacity to improve transport safety more generally.



Software Solutions

TRL Software connects many of these countries. In recent times, our reseller network has experienced significant growth with some of the most recent signings including Ethiopia, India, Russia, Slovakia, and Chile. They join existing partners in Brazil, China, Italy, Ghana, Australia and New Zealand.

Whether it’s signalised intersections, coordinated networks, priority roundabouts, traffic control solutions or complete streetscape auditing, TRL has proven, flexible tools that are used to solve traffic problems the world over. In the last couple of months TRL and its partners have conducted training courses in our software in Africa, Malta, Australia, Singapore, Canada, and of course the UK.



Survey and consultancy in GPR

Ground Penetrating Radar (GPR) offers a more practical and efficient alternative to destructive investigation techniques. TRL has been involved in the development of GPR from early experimental research. This has led to the introduction of quality management strategies to ensure the integrity of all traffic speed GPR data collected on the English strategic road network.



Now, TRL is making use of the very latest in GPR data collection and processing techniques to produce highly accurate surveys. Whether a survey involves collecting data from pavements at traffic speed or on foot, from bridges or other high level structures either vertically or horizontally (including the underside

of bridge spans), TRL is able to offer innovative survey solutions that achieve the best possible accuracy.

TRL has recently acquired the very latest in shallow GPR systems allowing us unprecedented resolution of shallow targets (up to 400mm). Coupled with this, recent updates to our GPR processing and interpretation software enable us to visualise the data in 3D, providing a better understanding of the context of the GPR targets. This enables us to undertake a range of work that includes:

- Construction surveys of roads and rail
- Surveys for buried utilities
- Condition surveys of bridges
- Consultancy in planning and commissioning commercial GPR surveys
- Professional analysis services of GPR data
- Data "fusion" – bringing together data to improve analyses, such as video, FWD and deflectograph data

Using GPR surveys brings a range of benefits to the user, enabling confident detection and identification of many features and defects. The high data rate means data collection is swift, thus reducing disruption and in the case of traffic speed surveys, no traffic management is required. Where intrusive site investigations are required, GPR can provide improved and accurate targeting. This precision and ability to detect a wide range of materials makes GPR much more effective than other buried object location methods. Importantly, the cost of GPR services is relatively small, compared to the overall value of the project.

TRL can undertake a range of surveys that help to bridge the gap between the engineer and the geophysicist by offering independent advice for identifying and developing the best survey solution and/or specification.

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Devon bends

The A377 is an historic route (i.e. it has evolved over time, rather than being 'designed'), which makes it very challenging in terms of traditional approaches to safety. Previous survey work had shown that one problem perceived by motorists using the road is the lack of a consistent approach to signing bends; the severity of bends is not necessarily matched by the signing and marking present. Devon County Council made a decision to apply a

consistent hierarchy of signing and marking treatments to bends on the route and asked TRL to assist them with a bend treatment plan.

Using existing data (curvature and cross-fall) from the SCANNER road maintenance survey vehicles, and collision data from the route, each bend was assigned a 'risk score'. Tighter bends, and those with more collisions, were assigned higher risk scores.



31 local drivers drove a section of the A377 in an instrumented vehicle. The In-Vehicle Data Recorder (IVDR) equipment fitted to the car enabled the measurement of speed data directly from the vehicle. GPS data made it possible to plot speed points over the entire route driven, for each driver. A camera was also used to film the drives. Speed data were gathered continuously (at 1Hz) and the average speed driven through each bend was calculated.

It was shown that these speed data correlated well with the risk ratings assigned to the bends; generally speaking as risk scores went up, speeds went down, and this was true in the daytime and at night. This suggests that overall drivers were sensitive to the risk present on the bends; when risk is high (i.e. on tight, difficult bends) drivers tended to slow down to compensate.

It was also possible to identify some bends on which this relationship

broke down (i.e. bends on which drivers did not appear to be sensitive to the risk present). Furthermore, by examining the video of the route, it was possible to show that the correlation with speed for each bend was even stronger when the total number of warning signs and markings present was included in the 'risk score'. This suggests that drivers, as well as being sensitive to bend geometry when assessing the difficulty of driving on a given bend, are also sensitive to warnings from signing and markings.

In light of this, Devon County Council's intentions to use a consistent signing and marking hierarchy to treat the bends on the route seems likely to lead to a desirable behavioural change in drivers.

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Saving carbon, saving lives

How do we ensure the rush to lower carbon vehicles is also a rush to safer vehicles?

In the recent Comprehensive Spending Review, the government focussed financial support on key transport priorities designed to reduce emissions and support the growth of a low carbon economy. As consumer incentives for electric and other low emission cars and investment in electric vehicle recharging infrastructure demonstrates, the push for low carbon vehicles continues apace.

While most will probably welcome such support, what's not often talked about is the growing tensions between the environmental impacts of road transport and one of its major societal impacts; deaths and injuries from road accidents.

As the figure shows, road fatalities and casualties in the UK have fallen dramatically over recent decades, by about two-thirds and one-third respectively since 1970, despite rising vehicle numbers and vehicle use. Per kilometre vehicle fuel efficiency has also been steadily improving, but not enough to avoid a doubling of overall energy consumption. As almost all of this energy is derived from fossil fuels, greenhouse gas emissions have similarly risen.

Whilst the welcome downward trend in casualties is due to a complex mix of factors, with many of them such



as changing attitudes to seat belts and drink driving, better junction designs and enforcement of lower speed limits being developed and championed by TRL, the role of vehicle design and engineering cannot be overstated. Our understanding of accident scenarios and impact mechanics has improved markedly and the crashworthiness of vehicle structures, accident avoidance technologies and occupant protection systems have all improved to match.

But these safety improvements have tended to add weight; cars are now wider, longer and heavier than their predecessors. Despite this extra weight, engine, powertrain and aerodynamic improvements have combined to provide the per kilometre fuel efficiency gains mentioned above. But will the push to decarbonise road transport put environmental priorities above safety ones, and will the smaller, lighter,

lower carbon alternatives now being promoted inevitably mean that casualty rates will start to rise again?

Many of the latest low carbon vehicles are based on conventional internal combustion engine platforms. The vehicles are essentially modified to accept the new technologies. These changes might affect both the primary and the secondary safety performance, and changes to the traffic mix may have broader effects on accident and casualty statistics. Looking further ahead, the next generation of low carbon vehicles may look and feel very different. Advanced concepts could free designers from the traditional layout and its constraints. In addition, potential changes in the road infrastructure may radically change how consumers interact with, and use, low carbon vehicles.

To help the low carbon vehicle industry and policy makers address such challenges and opportunities, TRL has recently launched a partnership initiative with MIRA Ltd (formerly the Motor Industry Research Association) on the safety of low carbon vehicles. Through this partnership, the market for



low carbon vehicles can expand more profitably and at less risk to manufacturers because TRL and MIRA together can help ensure new technologies are not just cost, weight and functionally optimised, but are implementable within an appropriate, supportive policy and regulatory framework. Furthermore, road transport's contribution to carbon and energy policy objectives can be enhanced because we can identify appropriate emerging technologies, assess their potential and help bring them to market in a cost effective and safe way.

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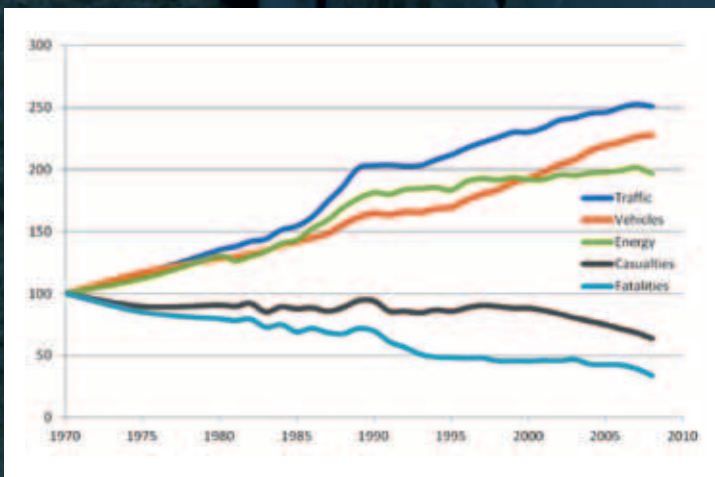


Figure1 UK road transport trends, 1970-2008, 1970=100 (sources: DfT and DECC)



Certification

Certification has become an integral part of TRL's services to its customers and we have had particular success writing bespoke certification schemes for clients such as WRAP, Thames Water, the Department for Transport and the Tyre Baling Association. Where there is no conflict with our impartiality as a certifying body, we offer consultancy and training to help companies achieve and operate certifications to various standards, such as ISO9001 (QMS), ISO14001 (EMS), ISO18001 (OHSAS) and ISO17025 for Laboratory Accreditation.

There has been a demand for certification schemes in the

sustainability and recycling industries to assure the quality of recycled products, such as tyres, both shredded and baled, and recycled aggregates for the infrastructure and utilities reinstatement industries.

For example, Thames Water recently adopted our Quality Assurance Scheme for recycled aggregates producers and all its supply chain companies need to become TRL Certified. Quality Recycling Services (QRS) is already certified and a number of other major recycling companies are following closely now that the scheme has the support of the South East Highway Authorities and Utilities Committee (SEHAUC).

The TRL scheme for Tyre Derived Rubber Materials (TDRM) is complete and we expect this to be launched by WRAP shortly; it enables the tyre shred and crumb industry to re-categorise its output from waste to product, eliminating the need for costly waste permits and licences. Our scheme to certify producers of tyre bales for use in civil engineering applications to the specification PAS108 has also been approved by the Tyre Baling Association and is ready to accept applications.

Our 5 Star Child Seat Rating Scheme, supported by the AA, has been successfully launched and the first four product ratings have been

issued to Graco, Silver Cross and Car Mate Ailebebe. For more information on the scheme please refer to the article on TRL's Child Safety Centre on page 3.

If you think your industry would benefit from an independently delivered certification scheme to differentiate compliant companies from the crowd, please contact us at certification@trl.co.uk and we will get in touch to discuss your particular needs.



Olympus helps Product Testing deliver the Vision

Providing world class testing services is the vision of TRL's Product Testing Division. Delivering technical performance and ensuring best practice in every test is the benchmark used by Product Testing to deliver customer satisfaction and the embodiment of that vision. However, world class

testing services requires continual investment in cutting edge technology. When the time came to replace the High Speed Cameras in the impact sled facility, TRL turned to Olympus.

Olympus has been involved in promoting road safety

for over 20 years and is now a principal member of the European Transport Safety Council (ETSC), a pan-European organisation funded by the European Commission and six leading industrial companies - Shell International, Toyota, Volvo Group, 3M, Diageo and UK subsidiary Olympus KeyMed.

TRL has worked closely with Olympus on a number of projects to provide testing and consultancy services to the ETSC and is pleased to announce an extension to this relationship in the form of a technical partnership.

Working with Olympus to define the correct

specification for the cameras, TRL purchased two i-SPEED TR cameras in high 'g' configuration. Capable of filming at 2000 frames per second at full resolution (1280x1024) with greatly increased light sensitivity,

TRL's new cameras represent a significant technological step in the capturing of sled test footage. In turn, this not only provides TRL customers with improved quality video footage of their test but also further increases confidence in motion analysis techniques. High 'g' capabilities also provides the scope for sled mounted video footage; a new option for customers at TRL.

Olympus, at the request of TRL, is also developing additional features to include in their standard viewer software. This development, carried out under the technical partnership, comes as a direct request from a TRL customer to synchronise video and data for immediate playback. TRL is delighted that it is able to respond to feedback from its customers and continues, with the support of Olympus, to deliver world class testing services.

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