TRL at TRAFFEX 2011 featuring SCOOT MMX, MOVA7, iMAAP, TEST (Tool to Evaluate Strategies for Traffic) and a wealth of other TRL Software and traffic technology applications to provide solutions for the transport issues of today and in the future. See pages 2-3.
iMAAP

The new generation road safety data system

In order to develop effective, evidence-based approaches to reduce the problem of road injuries, crash data sets are vital. TRL’s new generation road safety data system is iMAAP, a powerful new software solution for the management, analysis and evaluation of road traffic crash data. Designed for police forces, local authorities, international governments and highway network authorities, iMAAP helps road safety professionals reduce the number and severity of crashes and casualties in a given area.

iMAAP is the new generation MAAP – a software product TRL has been distributing in the UK and worldwide since the 1980’s, and the most widely used off-the-shelf crash data system across the world. MAAP has undergone a complete review and the result is a brand new version which provides a better fit with today’s technological environments, offering additional capabilities required by the professionals who use it. The new tool, iMAAP is a flexible, fully web-based system capable of handling a wide range of database platforms and GIS formats, as well as increasingly complex and stringent IT and security standards.

iMAAP provides the latest techniques in crash data storage, analysis and reporting. Its tools for identifying and analysing causes of crashes, and for isolating common features, are sophisticated, yet simple enough to use to provide a high level of productivity. It’s built on new generation technologies and is designed to plug quickly and efficiently into a number of existing client IT environments. Uniform, intuitive and user-friendly screens make it easy to master. A simple adaptable data entry form helps to capture crash data swiftly and effectively.

iMAAP will enable road safety professionals to:

• Identify problems based on in-depth analyses of accident data
• Establish safety goals based on identified problems, which are measurable,
• Plan programmes of counter-measures, associated costs and timelines
• Implement and monitor programmes by periodically checking progress and modifying on-going counter-measures, associated costs and timelines
• Evaluate effectiveness of all interventions implemented
• Monitor and address accident trends

MAAP is just one of a suite of crash data systems that TRL has been developing for a growing number of customers, each with a different set of requirements around the world.

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TRL supports the Decade of Action for Road Safety 2011-2020
The Traffic Management Act (TMA) 2004 places a responsibility on Local Highway Authorities to be able to predict the consequences of actions they undertake on their network, whether it is in response to an incident or simply in considering the impact of implementing a new junction onto traffic control systems such as SCOOT (Split Cycle and Offset Optimisation Technique) or MOVA (Microprocessor Optimised Vehicle Actuation).

The West Midlands region, which is formed of seven LHAs, was granted full approval for the Department for Transport funded Urban Traffic Control (UTC) Major Scheme in July 2008. The scheme aims to make more efficient use of the existing road infrastructure and reduce congestion on the network.

TRL used their years of experience in traffic modelling, development of traffic management control systems and decision support tools and their support to Regional Control Centres to develop a suite of tools for UTC operators to better plan and evaluate traffic management strategies for their road network: the result is TEST.

The objective of TEST is to consider the impacts of incidents and events on the network and to develop mitigation strategies, using traffic micro-simulation models integrated with real time signal control mechanisms such as SCOOT and MOVA to evaluate signal strategies. The simulations evaluate control strategies that are central to the implementation of modern UTMC systems. The front end user interface provided is easy to use and has been developed so that a working knowledge of micro-simulation is not required.

Development of the simulation models
TRL is working in partnership with Capita Symonds to develop micro-simulation models of selected routes / corridors within the West Midlands area. The first authority to be modelled was the Solihull Borough Council administrative area and it is this area which formed the pilot for prototype development of TEST.

The approach to developing TEST was to create a series of simulation models based on ‘urban traffic corridors’ using PTV’s VISSIM modelling package. Each simulation model includes a detailed study area and a buffer zone around it so that interdependent boundaries of adjacent models are realistically considered.

Strategy development
TEST forms an integral part of the West Midlands UTC programme and is designed to be used in tandem with real world control systems.

Users located within traffic control centres can use the service to test operational theories in a safe, simulated environment with a key focus on changes to traffic signalling control plans. Plans that produce the best results can be exported into the UTMC command and control system through the Common Database (CDB).

Users can explore the effect of different UTC control settings on the behaviour of the UTC system and the resulting traffic performance of the network. Results of making different changes can be compared and assessed using different factors eg. journey time and average speed, to decide upon which strategy is most appropriate.

Next steps
TEST can be modified to work with different micro-simulation packages and is the only tool of its type that incorporates both PC SCOOT and PCMOVA into a micro-simulation for operational users.

The system was successfully installed in the Solihull UTC in December 2010 and users are currently deploying the system, forming the Beta testing phase of the work programme. Once this phase is completed, the software will be refined and the full version released.
In the December edition of TRL News, we focussed the spotlight on our overseas business activities. As TRL continues to grow its international work, we highlight more of these successes.

**Ethiopia**

TRL provides a number of “unique” services to Low and Middle Income countries and has a long history of working in Ethiopia.

In collaboration with the Ethiopian Roads Authority, we are preparing a manual for the planning, design, construction and maintenance of low volume roads in Ethiopia, together with accompanying standard bidding documents. The purpose of this is to promote the rational and affordable implementation of projects, providing low volume roads that make appropriate use of local resources and are cost-effective and sustainable. An important additional element of the project includes training and dissemination of the manual and bidding documents to stakeholders in the Federal and regional governments, the private sector and within academic institutions.

Another TRL project is looking at ways to reduce the maintenance and life-cycle costs of roads in the Southern region of Ethiopia. This will be achieved through improving the performance of wearing courses and low-cost surfacing constructed using a local material. It was originally thought that this local material was limestone; however, during the initial phase of the project it was identified as rhyolite. Trial sections of different construction have been built and the project is now in its monitoring phase. Once performance data is collected and analysed, guidelines on the sustainable use of this locally produced material will be prepared and disseminated.

A project funded by the Global Environment Facility (GEF) is addressing the transport challenges of three major cities in East Africa – Addis Ababa, Nairobi and Kampala, and TRL is leading the Ethiopian segment of this work. The project aims to increase awareness and build support to implement sustainable transport solutions for policy makers and stakeholders in the region and around the world.

**Abu Dhabi**

Our team in the Middle East is working with the Department of Transport in the Emirate of Abu Dhabi to help them develop a road safety strategy. This is now just entering its most important phase, that of implementation. As an integral part of the strategy, a ten year casualty reduction target was set and an initial five year action plan developed. TRL will be involved in overseeing the implementation phase and will be working very closely with the Abu Dhabi Department of Transport, providing direct advice and guidance in the areas of management, engineering, vehicle standards and evaluation.

The timing of the Abu Dhabi road safety strategy implementation is particularly relevant as it coincides with the launch of the UN’s Decade of Action initiative, which will raise the profile of road safety throughout the world. In Abu Dhabi, the strategy addresses the key target areas highlighted by the UN:

- Road safety management
- Safer road users
- Safer vehicles
- Safer roads and mobility
- Post crash response

and will be delivered through working in partnership with a wide range of stakeholders.

In addition to the road safety strategy, TRL has also undertaken safety assessments of Abu Dhabi’s existing road network, introduced a methodology to review speed limits and set up safety audit procedures.
TRL is assisting Kenya in formulating a road safety programme. Crash data sets are vital to any casualty reduction exercise, so importantly, the work includes the implementation of a TRL crash database system. Currently our databases are in use in countries as diverse as Botswana, Papua New Guinea, Kosovo and Greece. In conjunction with improved reporting practices, the crash report and analysis information will enable police to target enforcement effort effectively, help engineers identify and treat hazardous locations, and educationalists to target those groups who make up both the most dangerous and most vulnerable road user groups.

In February, a team from TRL was in Nairobi at the launch of a flagship report compiled by the UN Environment Programme (UNEP) entitled “Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication”.

The report compiled in collaboration with economists and experts around the world, identifies ten key sectors where investing two per cent of global GDP can kickstart a transition towards a low carbon, resource efficient Green Economy. One of these key sectors is Transport and TRL’s Holger Dalkmann and Ko Sakamoto were coordinating authors for the chapter relating to this important topic. Supported by other TRL colleagues and leading international researchers, the chapter examines the role of transport in a green economy and makes a case for ensuring future investment in the sector is increasingly green. Visit www.unep.org/greeneconomy/

TRL is assisting Mauritius with Roughton International to establish a user-friendly Road Management System (RMS) for the Road Development Authority (RDA). The system is to be used to develop a comprehensive set of maintenance plans and programmes supporting budget bids and a range of implementation strategies. The project also includes training to ensure the sustainable implementation and operation of the RMS and the delivery of long-term benefits to the road network through the optimal use of available funds.

Our approach to this project is based on the introduction of systems, procedures and strategies that are cutting-edge in terms of technology and approach, but at the same time are fully proven in terms of the reliability of the software, fully sustainable in terms of user procedures within the RDA institutional framework, and enduring as a result of the training and long-term support strategies built into our implementation methodology.

TRL supports the Decade of Action for Road Safety 2011-2020
TRL delivers a new Impact Sled Facility in Japan

TRL has just completed the installation of an impact sled rig for Car Mate, a Japanese child seat manufacturer, at their factory based in Yuki City, Japan. The new facility is a replica of a purpose built impact sled, designed and installed by TRL at our headquarters in the UK.

The TRL designed impact sled rig is a facility for simulating vehicle impacts and the impact performance of items that are designed to be fitted to a vehicle. The rig consists of a rail guided sled, a propulsion system to accelerate the sled, an arrestor system to generate the required deceleration pulse to simulate a vehicle impact, systems to control the rig and instrumentation to record data during a test.

Car Mate approached TRL with very specific requirements, to enhance the development process of their child restraint systems. The new test rig, whilst offering a wide flexibility of testing capabilities, has been delivered to achieve ECE Reg.44 standards.

TRL worked very closely with Car Mate from the outset of the project to understand the exact requirements and to prepare a plan to deliver the whole project in just 7 months. All areas of the build were covered, including the design and preparation of the foundations and general architecture of the new test facility. TRL’s Engineering Team then applied its patented sled rig design, together with a next generation bespoke computerised control system and enhanced with new technologies, introducing Olympus cameras and Arri lighting to the overall build. The result is a stunning new facility for Car Mate.

As TRL offers a wide range of services within its Child Safety Centre, we have been able to apply our knowledge and understanding of regulation and standards to prepare the test rig for Car Mate’s specific use. The TRL test team was also heavily involved in the commissioning process to demonstrate to Car Mate the rig’s capacity to replicate the TRL sled facility.

A combined TRL team from engineering, testing and research managed the whole installation project at Car Mate’s Yuki site, including, the education, knowledge transfer and training for operational staff at the new facility.

The rig was well received by Mr Sakuma, Car Mate’s Vice President: “We are proud to announce the completion of Japan’s first ECE R44 deceleration test rig with the cooperation of TRL. In addition to thanking TRL, we are also proud of the support provided by the Car Mate team. The new test rig will help us create safe, comfortable and competitive child seats in record time and we can introduce new products to the satisfaction of our European and worldwide customers. This project has strengthened the relationship between Car Mate and TRL.”

If you would like more information about TRL’s Engineering Services and test rig opportunities, please get in touch.

Collision Data Retrieval tool

A man who killed a pensioner when he drove his Chrysler 300 into the back of her stationary car on the M40 has become the first in the country to be prosecuted using evidence recovered from his airbag by a Collision Data Retrieval (CDR) tool. The driver appeared at Oxford Crown Court where he pleaded guilty to Causing Death by Careless Driving. The data TRL gathered was vital to the success of the prosecution case. It showed that he was driving the car without concentrating on the road ahead for a significant period of time.

TRL has been investigating and trialling the use of collision data recorders for some time now, and are well aware of their tremendous potential to traffic safety researchers. When Thames Valley police asked TRL to assist with this particular case, accident investigator, Tony Read imaged the data retained in the vehicle’s airbag control module. Very simply, data required by the air bag control module (ACM) is retained after a deployment or near deployment in an Event Data Recorder (EDR). The information gathered in this case proved that the driver was travelling at 70mph and only started to brake 0.5 seconds before impact.

At present, this scientific analysis is only available for vehicles manufactured in the US, so the number of CDR compatible vehicles on the road in the UK is currently small. However, following on from the popularity of the Chrysler Voyager and Jeep the number of vehicles of US origin in use in the UK is increasing.

From September 2012 any vehicle sold in the US that has an Event Data Recorder function must comply with the specifications of the data elements to be retained, the time period of the recording and the recording resolution. It is hoped that the recent legislation in the US and the possibility of further requirements will filter into European vehicles so that we may also have access to this type of data.

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**Affordable Safeguarding - increasing the climate resilience of rail**

The rail sector has an important role to play in the development of sustainable low carbon transport networks. However, the rail industry has the difficult challenge of delivering this whilst addressing impacts from global climate change and current economic pressures. In response to this, TRL has developed the industry-facing initiative of ‘affordable safeguarding’ – the creation of a climate resilient rail network within financial constraints.

Climate change has become a ‘clear and present danger’ to operating efficient and cost effective transport networks; clearly highlighted in the Network Rail Interim Climate Change Adaptation Report published in January 2011. Adapting to the projected changes in climate has therefore become a key agenda item for operators in the rail sector. Affordable safeguarding reflects the need for:

- Effective climate resilience action constrained by limited funding
- Strong links between asset vulnerability to extreme weather events and rail infrastructure management processes
- The development of affordable and innovative solutions to reducing risk, ranging from utilising state-of-the-art technology to revising design standards and management procedures

Strategically, affordable safeguarding recognises the challenge of bridging the gap between an awareness of the need for adaptation to climate change and integrating climate resilience into operational processes. TRL considers identifying and bridging these gaps an important function of affordable safeguarding. This process includes design and engineering standard reviews, revision of management processes to mainstream consideration of climate resilience and the development of materials, designs and technologies to increase the resilience of the network.

Over the coming decades, consideration of climate risk will be an integral part of asset management, requiring forward planning to identify potential issues and the provision of prioritised cost effective solutions; this is in line with the Technical Strategy Leadership Group (TSLG) objectives supporting the national 30 year planning horizon for the rail sector.

TRL is able to support this process by applying our knowledge of climate change impacts, together with our long-standing expertise in transport infrastructure and asset management. We can help with all aspects of the process including vulnerability assessments to projected weather events, resilience modelling based on a ‘modes of failure’ approach including weather triggers to inform operational monitoring, and cost benefit analysis comparing the costs of adaptation actions to the delay and damage costs caused by projected climate change impacts.

TRL can provide new and innovative improvements to railway infrastructure through the provision of ‘intelligent infrastructure’ capable of providing near-real-time or real-time condition monitoring. This intelligent infrastructure will provide the means to ‘predict and prevent’ by intervening at the appropriate time before asset failure. We can also provide advice on actions to improve resilience, suggest revisions to standards, design and material use to improve network resilience, and identify and test new materials.

Adaptation to climate change is also an important area for consideration for rail stations and depots. Access resilience to weather events, both for passengers or rail staff, is a vital factor in an efficient network. TRL has developed the PERS (Pedestrian Environment Review System) audit tool which provides clear assessments of accessibility, quick-win maintenance recommendations and indicative costs of improvements.

Climate change adaptation should not be considered alone, but as part of an holistic approach to sustainability looking at the economic, environmental and social impacts. TRL expertise can support the rail industry, both in the UK and overseas, to address sustainable development in areas of climate change mitigation, policy and strategy development, air quality, noise and vibration, waste and resource management, behavioural change and safety.

TRL is currently disseminating affordable safeguarding to rail industry stakeholders and discussing these issues and actions, through workshops, articles and presentations. If you would like to be included in these discussions please contact us.

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TRACK FACILITIES

It’s business as usual as TRL secures a number of collaborative arrangements with track facilities around the country to ensure the smooth transition of its research and testing. Following privatisation in 1996, TRL retained a 15 year lease on its test track facility. This lease is due to expire this month, and arrangements are now in place for longer term research and testing programmes to take place at a number of sites around the country. We have, however, obtained a short term extension to our track lease which will allow us to carry out small projects and track hire.

**Calibration Trials**
Calibration trials of road survey vehicles on behalf of the Highways Agency and Department for Transport will still be managed by TRL, but will take place at a new purpose built calibration trial site on MIRA’s premises in Nuneaton.

**Noise Research**
For a number of years, TRL has enjoyed a collaborative agreement with Millbrook Proving Ground in Bedford for its noise related research, and this partnership will continue. Millbrook has a range of noise related test facilities, including a drive-by external asphalt noise circuit which is ISO Accredited to 10844.

**Phased Trials**
TRL’s comprehensive crash testing programme for security barriers, blockers and vehicle restraint systems will continue at Dunsfold Park in Surrey. A brand new winch, capable of testing vehicles up to 30 tonnes is being installed in a secure area of the Dunsfold track and testing will commence as soon as the TRL track is closed, thus providing a seamless service for our security barrier and vehicle restraint system clients.

**ITS Projects**
The new innovITS ADVANCE city circuit in Nuneaton, a collaborative initiative between TRL, MIRA and innovITS will provide the venue for all ITS related work. innovITS ADVANCE is the world’s first purpose-built facility for the development, testing and validation of Intelligent Transport Systems (ITS) and telematics technology, products and services. Its comprehensive network of roads and open architecture of multi-zoned Wi-Fi and GSM mobile telecoms systems can be configured according to the precise needs of testing and can replicate any urban scenario world-wide in a highly controlled manner.

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