Transport Certification Australia Ltd

Submission to

Parliament of Victoria

Road Safety Committee – Inquiry into Improving Safety at Level Crossings

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1. RECOMMENDATION

Transport Certification Australia Limited (TCA) believes that an IAP-type solution could be developed to provide improved safety at level crossings, and offers itself to the Committee for that purpose.

IAP monitors vehicle location and, in combination with in-locomotive and at-crossing devices, could generate an alert/warning for the vehicle driver, and the locomotive, when train, vehicle and crossing are in close proximity to each other. The nature of the alert/warning, and timing and distance thresholds, and the type of vehicles which would be required to participate, would have to be determined in a trial process.

2. ABOUT TCA

TCA was established in August 2005 by the Commonwealth and State and Territory Governments to manage the implementation of Australia's Intelligent Access Program (IAP), including, relevantly, the certification and auditing of private sector service providers providing telematics services under the IAP. The IAP is described in detail below.

In addition to administering the IAP, TCA is also required to promote awareness and understanding of other intelligent transport technologies, and facilitate the integration of these technologies with the IAP to provide improved road safety and transport productivity.

TCA has experience and resources relevant to the development, implementation and management of technology-based public-purpose road transport reforms. TCA has assembled a team of experts with unique regulatory, telematics and transport skills.

3. WHAT IS THE IAP?

3.1 Background

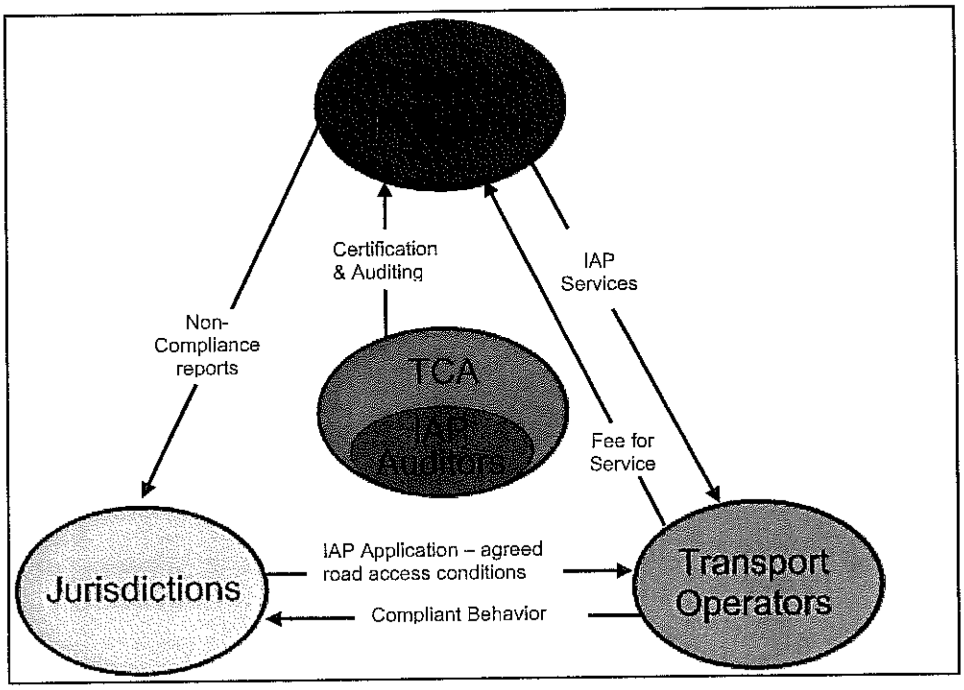
The IAP is a national road transport reform. It represents a new and innovative way for managing heavy vehicle access to the Australian road network, offering to transport operators improved access arrangements, and providing road authorities and local governments with assurance that operators are adhering to these arrangements. The program has been developed in response to Australia's growing freight task and the need to make better use of our existing road network.

The IAP provides a unique national framework comprising regulatory, contractual and operational elements for monitoring heavy vehicle activity, and generating "evidentiary level" reports in relation to non-compliant activity.

3.2 IAP operating model

In the IAP operating model, independent private-sector service providers certified by TCA as fit-for-purpose, provide evidentiary-level telematics services to transport operators. Vehicle non-compliance with agreed road-access conditions is reported by the service providers to the road authorities and forms the basis of appropriate response by the authorities. The model is summarised Figure 1 below.

Figure 1 – IAP operating model



The participants involved in the IAP are:

Road authorities (jurisdictions), which:

- grant transport operators enhanced access to the road network, and
- receive, and take appropriate action in response to, non-compliance reports received by them from IAP Service Providers.

Transport operators, which:

- receive enhanced access to the road network for their participating IAP vehicles, and
- engage an IAP Service Provider to monitor their IAP vehicles for compliance with the conditions attached to their enhanced access.

IAP Service Providers, which:

- using the global positioning system (GPS), an in-vehicle unit and a back office monitoring and reporting system, monitor participating IAP vehicles' compliance with the conditions of the enhanced access, and
- issue Non-compliance Reports to the relevant road authority in the event of non-compliant activity (for example, a vehicle leaves a permitted route, travels over a prohibited bridge or travels on a permitted route but at a prohibited time).

TCA, which:

- Manages the overall program, including specifically the certification and audit of IAP Service Providers.

3.3 Administration, probity and governance

TCA's role is to certify and audit IAP Service Providers.

Certification is the process by which TCA determines whether a company seeking to be IAP-certified meets the probity, financial, functional and, particularly, the technical standards, of the program. Only when certified can a company offer IAP services to transport operators or other customers.

There is no limit to the number of IAP Service Providers which can be certified. This will ensure a competitive market for transport operators.

Certification and the underlining statutory framework ensure that vehicle data generated by the Global Positioning System (GPS), and the IAP-certified in-vehicle unit (IVU) is accepted at an evidentiary standard in court. Certification is given to the IAP Service Provider's in-vehicle unit and back office processing and reporting system.

TCA uses IAP auditors who have specialist expertise in due diligence, business systems, information technology and GNSS to assist in determining the initial (and ongoing) suitability of a company to be certified as meeting the standards of the program. The standards or the specifications of the program have been set and/or approved by all of the government road authorities.

3.4 Key Features of the IAP Framework and Operating Model

Importantly, the IAP has been designed as a flexible tool, capable of being adapted to meet future regulatory and compliance needs with regard to transport reforms.

National program

The IAP is a national program. Once certified, an IAP Service Provider is recognised by, and can provide vehicle monitoring services in, all States and Territories. As a result, participating vehicles can be monitored Australia-wide by a single IAP Service Provider.

The IAP is governed by a national legal and policy framework, set out in the Model IAP Legislation, and implemented by State and Territory governments through local legislation.

Technical requirements are 'performance based'

The technical requirements for participation in the IAP as a service provider are, to the maximum extent possible, 'performance based'. That is, the IAP defines required outputs and it is up to each company wishing to be certified as an IAP Service Provider to establish, to the satisfaction of TCA, that its equipment and related back-office systems deliver the required outputs. The IAP does not specify the particular equipment and systems required. Thus, competing companies whose equipment and systems differ significantly may be certified, as long as they deliver the required outputs.

This gives IAP Service Providers the flexibility to take full advantage of innovative, cutting edge telematics technologies when designing and developing their equipment and systems. Coupled with market competition between IAP Service Providers, this flexibility will ensure that 'IAP technology' keeps pace with world-wide advances in broader telematics technologies.

It was felt that the alternative 'prescriptive approach', in which the ability of the Service Provider to bring the full benefit of its own creative technical and systems development to the IAP would have been significantly restricted, was less appropriate for the development of the IAP.

Quality Assurance

Through its certification and audit processes, TCA provides expert, nationally consistent, and cost effective quality assurance in relation to the standard of monitoring provided by IAP Service Providers. This avoids the need for road authorities to establish and manage their own, potentially different, processes, and means that IAP Services Providers are not required to undergo separate audits for each of the eight road authorities.

To perform its certification, audit and review function, TCA has developed a series of complex test and audit systems.

4. POSSIBLE TECHNOLOGIES TO IMPROVE SAFETY AT LEVEL CROSSINGS

4.1 General background

Advances in information and communication technology in recent years have resulted in significant new technology being introduced for the transport sector, from the management of transport networks to the provision of real-time information for transport managers and users. In combination with global positioning systems (GPS), transport assets can be tracked in real-time for a range of safety and security applications. Many of these technologies are being used in Australia, ranging from commercial fleet management systems, safety and security systems for private vehicles, real-time traveller and traffic information and dynamic traffic management systems seeking to address increasing congestion on transport networks.

Every intelligent transport system (or ITS system) is based on three fundamental building blocks; data, content and delivery. Data has to be collected, then processed into information and then delivered to the end- user (which may be the network manager, the transport user or the transport vehicle).

The challenges for an ITS application to improve safety at rail crossings therefore needs to address three issues: what data can be collected (historically or in real-time such as the imminent approach of a train or vehicle); what information needs to be provided, and how to deliver that information to the recipient.

4.2 Technological approaches to safety at level crossings

Modern technology is capable of providing significantly enhanced safety at level crossings.

The challenge for technology is to detect the impending risk of a collision between vehicle and train; transmit that information in instantaneous real-time alert/warning to the driver of the vehicle, and finally to get the driver to respond to the alert/warning. Additionally, the intervention would ideally be automatic, with the use of electronic systems to deploy brakes – electronic braking systems (EBS) and stability programs (ESP) available on many current generation vehicles rely on a range of sensors to automatically deploy brakes, even if the driver neglects to do so and in a reaction time far quicker than humanly possible.

4.3 Communication technology/systems

A key element in collision avoidance is accurate detection and risk assessment in real-time followed by immediate transmission to the vehicle and driver. Various communication media are available for this purpose. These are based on the public wireless communication networks such as GSM/GPRS, mobile wireless broadband, radio data service and satellite. Dedicated short range communication (DSRC) is also available and is now well established in, for example, electronic toll collection systems. DSRC offers the shortest time-lag in communication and is the preferred communication medium for road safety applications which require data or messages to be immediately sent to the driver or to an automatic system within the vehicle to initiate a response to the imminent danger.

5. PRINCIPAL REQUIREMENTS FOR TECHNOLOGY-BASED SOLUTIONS TO IMPROVE SAFETY AT LEVEL CROSSINGS

5.1 Requirement for uniformity of application

TCA considers that it is important that the solution selected be applied to **all** level crossings to recognise the fact that the introduction of a system will impact upon driver behaviour. That is, once the solution is generally introduced, drivers may then assume that it is in place at all crossings, with potentially disastrous outcomes at crossings where it is not applied.

5.2 Reliability/quality assurance

The solution selected must be absolutely secure, technically. That is, technically fool-proof and also tamper-evident, if not tamper-proof.

Reliability of systems can be assured and verified in three ways:

(a) assessment and certification of equipment and systems

(b) ongoing performance audits (including random checks of equipment)

(c) remote monitoring via telematics of operation of equipment and systems

The regulatory framework for the IAP, and the prescribed standards and processes for equipment and systems, incorporate all three of these criteria.

5.3 Inter-jurisdictional issues

It is acknowledged that the Committee will report to the Parliament of Victoria, only.

However, a significant percentage of heavy vehicles on Victorian roads commence their journeys from within other States or Territories, and TCA therefore recommends that consideration be given to:

(a) at least, mandating that no heavy vehicles be permitted to travel on Victorian roads without being compliant with the selected solution, and,

(b) if possible, the development of a national solution in-conjunction with the other States and Territories.

It is worth pointing out that research conducted with the transport industry during the early stages of the development of the IAP indicated clearly that a single system operating nationally, rather than multiple systems for each State and Territory, was strongly preferred by the industry.

5.4 Stakeholder consultation

In developing the IAP, TCA was acutely aware that road transport stakeholders, and particularly the road transport industry itself, tend to have strong views regarding issues which have the potential to impact on them.

Extensive consultation was therefore undertaken with the industry during the development process, and we can now see the benefit of that in the form of growing industry support for the program.

For example, consultation with the industry resulted in the inclusion into the IAP of a 'self-declaration' function. This enables the transport operator/driver to enter directly into the system helpful information such as the mass being carried by the vehicle and general comments such as "detoured off permitted route at direction of police because of accident".

6. IAP-TYPE SOLUTION FOR RAIL CROSSING SAFETY

6.1 Potential for an IAP-type solution

Other IAP-type projects which TCA is presently developing include:

(a) use of intelligent speed adaptation (ISA) devices. These provide for the transmission to the vehicle of an alarm/warning when it is exceeding the permitted speed limit, and may be extended to the point of external control of the speed of the vehicle. They are also currently being trialed for application at road construction and school zones, and it is quite conceivable that the level crossing could be treated as a 'zone' within this technology.

(b) Extension of IAP to provide for:

   (i) monitoring of individual trailers within prime-mover/trailer combinations, and,

   (ii) continuous weight (mass) monitoring.

6.2 Emerging technologies

Currently, intersection collision-avoidance technologies are being developed, which rely on the use of dedicated short range communication (DSRC) for vehicle-to-vehicle and vehicle-to-roadside communications. TCA is strongly committed to bringing this technology to Australian road transport reform.

6.3 Which vehicles should be equipped?

A major issue to be considered is – which vehicles should be required to participate in the solution ultimately identified? Ideally, all vehicles would be required to participate, but depending on the selected technology solution, cost issues may make it necessary to restrict participation to part of the fleet.

A study is required to balance the most cost-effective participation regime across the highest risk classes of vehicles.

7. RECOMMENDATION

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End of submission