LEVEL CROSSING SAFETY

Collisions at level crossings between trains and road vehicles is a global issue and industry safety statistics are showing that more needs to be done to reduce risk. Cooperation is important; the railway industry, human behaviour specialists and road infrastructure/safety authorities must work together to raise awareness of the dangers of level crossings.

The battle to increase safety has not yet been won

Accidents at level crossings are a global issue. Here, *Isabelle Fonverne*, Senior Advisor for Safety and Interoperability at the UIC, highlights that collisions between trains and heavy road vehicles result in a great number of fatalities and severe injuries. Isabelle underlines that the railway industry and other sectors must work more closely together to reduce these statistics.

ALL COLLISIONS at level crossings between trains and road vehicles should be prevented. Collisions with heavy and long vehicles, particularly those transporting dangerous goods or many passengers, represent the highest risks for the railways.

Collisions can cause a huge amount of damage to railway infrastructure and rolling stock. Furthermore, collisions can result in derailed trains creating a high risk of passengers or railway staff being hurt by debris.

Severe collisions with long and heavy vehicles result in a great number of fatalities and severe injuries. Such collisions occur too often around the world and show how it is not an isolated issue but a global one. It reminds us that the battle to increase safety has not yet been won, and that many efforts are still to be made.

ISABELLE FONVERNE joined the International Union of Railways (UIC) in 1992 and has worked in an international environment for activities including environment, high-speed, economics, technology and research and safety. From early 2010, Isabelle started working on level crossing safety, taking over the Secretariat of the European Level Crossing Forum (ELCF) and two UIC Safety Groups: SSMG (Systems Safety Management Group: ERA/CER/UIC) and IRSN (International Railway Safety Network). Isabelle is a Member of the UNECE Working Party 1 on Road Safety, this is how the UIC initiated active discussions with the UNECE to create a group of experts on level crossing safety hosted by UNECE in Geneva. Isabelle has been the UIC Coordinator of ILCAD (the International Level Crossing Awareness Day) which has been growing year after year.

Collisions involving dangerous goods

Port-Sainte-Foy, France, 8 September 1997

Thirteen people were killed and 43 injured (10 of them severely burnt) when a passenger train ploughed into a fuel truck at a level crossing, sparking a huge explosion and fire[1].

Indonesia, 9 December 2013

Seven people were killed in Jakarta including a train engineer and a technician after a commuter train burst into flames after crashing into a truck carrying gas[2].

Collisions involving school buses

Buttskop, Cape Town, 25 August 2010

A school minibus driver overtook cars waiting at a level crossing and attempted to cross the railway line even though the safety barriers were down. Ten children died and four were seriously injured[3]. The minibus driver was convicted of 10 counts of culpable homicide and was released after eight years in prison. A CCTV camera has now been installed at that level crossing.

Marhanets, Ukraine, 12 October 2010

Forty-three people were killed in a collision between a train and a bus. The collision was the worst single road accident regarding the number of victims in Ukraine's history[4].

Manfalut, Egypt, 17 November 2012

A school bus transporting 60 pre-school children was hit by a train near Cairo. Fifty children and the bus driver died.

Collisions with buses transporting workers

Hectorspruit, South Africa, 13 July 2012

A goods train hauling coal smashed into a truck carrying 44 farm workers at a controlled level crossing killing 26 people[5].

Bratoszewice, Poland, 30 July 2012

Nine people (mostly Ukrainian seasonal workers) were killed after a train collided with a minibus at an unprotected crossing[6].

Vladimir, Russia, 6 October 2017

Sixteen people were killed (migrants from Uzbekistan) when a train hit a bus on a crossing. The bus engine may have stalled after the driver

> *"Collisions with heavy and long vehicles, particularly those transporting dangerous goods or many passengers, represent the highest risks for the railways"*

Level crossings must be carefully risk-assessed, not only by the railways but together with road infrastructure managers and local authorities

ignored a red warning signal[7].

Collisions with school buses are particularly sensitive because they involve children, and collisions with trucks are often sensationalised in the media. This is perhaps less the case with accidents that occur on roads every day.

Causes

The causes of collisions at level crossings can be very different, but it is recognised that human behaviour is often the main factor. The vast majority of level crossing collisions are caused by drivers not observing the highway code, whether deliberately or unintentionally. Drivers' errors can result from tiredness, stress, consumption of pharmaceutical products or other substances or simply from speeding – but they can also be the result of inappropriately using electronic devices.

The Illinois Commerce Commission conducted a report on *'truck-related collisions in 2008-2012 in the State of Illinois, USA'*. Level crossing (or in America they are known as grade crossings) collisions had decreased but truck-related collisions stablised: Over 20 per cent of all collisions, 29 per cent were at private crossings (98 per cent with passive warning), representing 36 per cent of all injuries, 15 per cent in November, with a peak before and after lunch time, the majority (57 per cent) of truck-related collisions occurred simply because truck drivers failed to stop at level crossings. According to the Association of American Railroads[8] (AAR), on a national basis, collisions with trucks and truck-trailers in 2018 amounted to almost 23 per cent of all collisions at level crossings with an increase in 2018 compared to 2017; 7.7 per cent of all fatalities and 19.8 per cent of injured persons. Furthermore, there were seven collisions with buses resulting in no fatalities, but 10 people were injured.

In Belgium, 38 collisions with professional vehicles are estimated to be 31 per cent of all collisions in the country.

Some truck and bus drivers end up going over a level crossing with a high vertical profile by mistake; simply because they were following a diversion due to road works, or their GPS delivered the wrong route information.

To better address risks at level crossings, soft or harder measures must be taken by the railway industry, the road sector and major authorities. To find the best solutions, there is the need to:

- Better evaluate the risks at each level crossing
- Better engage with stakeholders from different sectors, local authorities, communities and users' associations
- Take engineering measures and find innovative solutions
- Take educational and awareness measures and collaborate with the rail and road sectors via Education and Transport Ministries
- Take enforcement measures by working with the police and legal authorities.

Each level crossing should be carefully risk-assessed, not only by the railways but together with the road infrastructure managers and the local authorities to make it more visible and easier to cross particularly for long, heavy and oversized vehicles.

All stakeholders should better cooperate to design the best level crossing environment, to divert the route for long vehicles to find the best and safest way, particularly when it comes to school buses.

Working together to deliver results

Sometimes some severe accidents serve as a catalyst for decision makers, the railway industry and other sectors to work more closely together. The best example of a joined-up approach is Operation Lifesaver, Inc.[9] in the U.S., a non-profit organisation financed by the railway industry which was established in 1972 when the annual average number of collisions at U.S. level crossings had risen above 12,000. The organisation's initial teams spoke to civic groups, school groups, school bus drivers and truck drivers. As a result, Idaho experienced a 43 per cent reduction in fatalities that first year.

Operation Lifesaver is represented in all states with volunteers who promote the organisation and concentrate their working programme on three Es: Engineering, Education and Enforcement.

Furthermore, to raise awareness of level crossing safety, the International Level Crossing Awareness Day[10] was launched in 2009. The International Union of Railways (UIC), together with railway industry stakeholders, road authorities, academics and international institutions will celebrate the 11th edition of ILCAD on 6 June 2019.

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11TH ILCAD
INTERNATIONAL LEVEL CROSSING AWARENESS DAY

The most important stop of the day

6 JUNE 2019

AMERSFOORT, THE NETHERLANDS

The International Union of Railways (UIC), together with railway industry stakeholders, road authorities, academics and international institutions, will celebrate the 11th edition of ILCAD on 6 June 2019. Targeting professional drivers (bus, coach, truck, farming vehicles, emergency service vehicles), the motto of the event is *'The most important stop of the day!'*.

IN 2017, collisions at level crossings represented approximately 25 per cent of all significant railway accidents in the EU, with 75 per cent of those involving road vehicles, and casualties accounted for 30 per cent of all railway casualties[1].

In the USA[2], collisions with trucks and truck-trailers in 2018 amounted to almost 23 per cent of all collisions at level crossings with 7.7 per cent of all fatalities and 19.8 per cent of injured persons. There were seven collisions with buses and, although no fatalities, 10 people were injured.

In Belgium[3] there were 38 collisions with buses and trucks which accounted for 31 per cent of all collisions. Unfortunately, this is not an isolated example.

The number of collisions with professional vehicles, the damages they cause, and the potential number of casualties resulting from collisions, is a concerning issue for railways and for road users – particularly when it comes to passenger transportation.

Therefore, ILCAD 2019 aims to raise even more awareness to the public about the risks at level crossings. This year, over 40 countries will be involved in the campaign.

The launch conference hosted by ProRail on 6 June 2019 in Amersfoort, the Netherlands, will bring together various speakers from different sectors of activities who will present risk assessment, insurance issues and human behaviour challenges. Other speakers will present the various solutions available to help improve safety at level crossings, including traditional engineering solutions. However, in an era of automation and digitalisation, railways must also look at innovative solutions.

Alongside the ILCAD 2019 conference, a technical visit will be organised on 7 June 2019

The UIC is coordinating a European Commission project called 'Safer LC' which aims to develop a toolbox that provides recommendations and solutions to the rail industry in how to make level crossings safer for everyone.

Alongside the ILCAD 2019 conference, which will attract 200 participants, there will be an exhibition of level crossing safety products and a technical visit to be organised on 7 June 2019. ■

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Eliminating risk and creating a safer railway in **Great Britain**

Level crossing safety in Great Britain continues to be one of Network Rail's key priorities. Since 2009 the infrastructure manager has invested more than £200 million in improving the safety of level crossings and this investment to date has generated over 1,100 level crossing closures and countless safety enhancements across the network. *Robert Wainwright*, Head of Level Crossings at Network Rail, explains more.

> *"Network Rail has approximately 100 dedicated level crossing managers, spread across the country, who continue to lead improvements in level crossing safety"*

GREAT BRITAIN has one of the best level crossing safety records in Europe. This is a commendable position given that the rail network in Britain is one of the most intensively used in the world. With track covering 20,000 miles across the country, interfacing with around 6,000 roads and footpath or bridleway systems throughout, the challenge to manage public and passenger safety is immense.

Reducing risk

The ring-fenced fund identified in the CP5 final determination has enabled level crossing risk reduction to go beyond legal requirements through closures and deployment of technology. Developing the next generation of technology remains a primary objective for Network Rail as we progress into CP6 in April 2019.

Network Rail continues to make improvements in level crossing safety, from coordinating the cross-industry level crossing strategy group, where all members work towards the *Leading Health and Safety on Britain's Railway* strategy. Though working with partners from both inside and outside the industry, Network Rail continues to reduce risk at level crossings and inspire other countries'

railway networks to use us as an exemplar to follow. With improved collaboration within the industry, we will continue to see level crossing risk reduction in Britain for the foreseeable future.

The safety strategy

Centred on effective collaboration, *Enhancing Level Crossing Safety 2018-2028*, is our safety strategy for how level crossing safety will be further improved over the next 10 years and will help prioritise route investment to target the best risk reduction.

Network Rail has approximately 100 dedicated level crossing managers, spread across the country, who continue to lead improvements in level crossing safety. Their expertise, local knowledge and focus on stakeholder engagement, which includes building relationships with authorised users and wider local communities, helps improve everyone's understanding and reduce risks.

Here are some of the key safety initiatives Network Rail are involved with:

Level crossing closures

Since April 2014, we have achieved 367 level crossing closures. In all, this means a total of 1,171 level crossings have closed since the start of April 2009. A further 28 crossings have also been reduced in status to improve safety.

Understanding user numbers

Improved census data continues to deliver better intelligence about the numbers of people and vehicles that use level crossings, whether on foot, in a vehicle or on a bike.

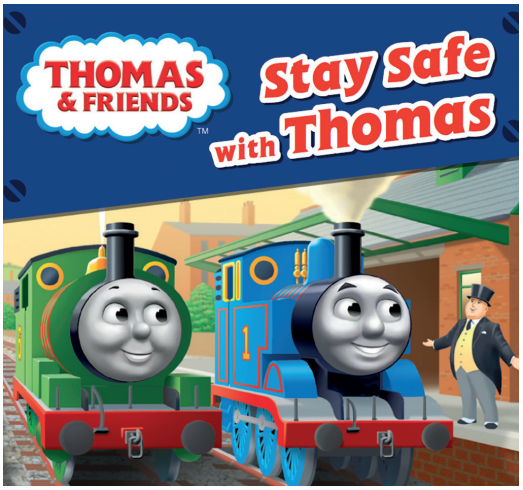
Narrative Risk Assessments (NRAs)

NRAs are enabling better targeting of risk reduction measures; blending quantitative modelled risk with structured observation and judgement from the level crossing manager. Work has begun to review this process with a plan to enhance the NRAs to encompass the whole level crossing asset system and assess wider aspects of level crossing risk.

Audible warning devices

Further progress has been made in the deployment of supplementary audible warning devices at footpath level crossings, protected by whistle boards. The technology uses radar equipment to detect approaching trains and

> *"Safety awareness campaigns remain an important tool in cascading safety communication messages to the public"*



RIGHT: Thomas the Tank Engine is being used as a platform to educate young children on how to safely use the railway

wayside horns to provide a localised audible warning at the crossing. There are now 82 level crossings equipped with this technology with more looking to be installed across the country.

Overlay miniature stop light systems

Deployment of overlay miniature stop light (MSL) systems has continued over the last five years, helping to improve safety at footpath and user worked level crossings. These MSL systems are an affordable alternative to expensive integrated systems and are primarily targeted at locations with insufficient sighting. MSLs warn of approaching trains by providing a red light and audible warning to users. There are now over 50 overlay systems in operation across the network with more programmed for delivery before the end of March 2019.

New types of level crossing

Network Rail successfully developed and commissioned a new type of level crossing to reduce risk to pedestrians at partially barriered automatic crossings. The first Automatic Full Barrier Crossing Locally Monitored system was installed at Princes Street in Ardrossan in January 2018, with two further sites in Dingwall commissioned late in 2018.

Red light safety equipment (RLSE)

RLSE has been installed at 31 public road level crossings to improve user behaviour, deterring deliberate misuse. Trials have demonstrated that these Home Office Type Approved (HOTA) cameras have reduced deliberate misuse by approximately 90 per cent at some locations. Plans are in place to install RLSE at another 50 sites over the coming year.

Mobile safety vehicles

Our fleet of 15 mobile safety vehicles, operated in partnership by the British Transport Police (BTP), continue to target locations of poor user behaviour. Furthermore, the driver education programme remains an effective tool in reducing re-offending rates.

Signs at passive level crossings

Following on from the RSSB's Project T983, which looks at the signs used at private road level crossings, Network Rail has been working collaboratively with the Department for Transport (DfT) and the Office of Rail and Road (ORR) to completely refresh signs for users at passive level crossings. A range of signs has been proposed and will be going into trial shortly. The findings will then be analysed and documented in a report which will make recommendations for deployment across the network.

Safety communication

Safety awareness campaigns remain an important tool in cascading safety communication messages to the public. Network Rail continues to work collaboratively with partners such as the National Farmers Union (NFU), trade groups, Drinkaware, the BTP and more broadly with rail industry colleagues through the International Level Crossing Awareness Day (ILCAD) community. Campaigns target at-risk groups such as those most prone to errors, lapses or deliberate misuse. Each campaign delivers key safety messages to coincide with risk and seasonal trends, keeping information fresh and engaging.

Educating children

In 2018, Network Rail and BTP teamed up with toy giant Mattel to use Thomas the Tank Engine as a platform to educate young children on how to safely use the railway. The *Stay Safe with Thomas* storybook follows Thomas as he plays on the railway, putting himself and his friends in harm's way. The story tells the dangers of failing to stop at a level crossing, leaving gates open to allow animals onto the tracks and standing too close to the platform edge. The book was created following statistics that the number of young people taking risks on the railway has increased by almost 80 per cent in the last five years. Copies of the book were distributed to local libraries, nurseries and doctors' surgeries across the country as well asbeing downloadable for schools.

Innovative solutions from suppliers

Network Rail is working to secure innovative solutions from suppliers to provide affordable, user-based warning systems which meet recognised safety integrity levels such as the 'Meerkat' system for passive footpath crossings. The 'Meerkat' system will be available from 2019.

Overlay solution for AHBs

In the light of recent examples of deliberate misuse at Automatic Half Barriers (AHB) crossings, Network Rail is developing an overlay solution to provide additional barriers and obstacle detection for targeted deployment at higher risk AHBs.

ROBERT WAINWRIGHT currently works for Network Rail as Head of Level Crossings. His role is to lead the strategic direction for level crossing risk reduction for the business. Until his appointment in December 2017, Robert's career had seen him work within Timetabling, Operations and since 2014 within the Quality, Health, Safety and Environment team as the National Train Accident Risk Reduction Specialist. Robert has been responsible for the movement to leading indicators to measure performance for train accident risk reduction and the creation of the prioritisation methodology for Network Rail's national safety improvement projects.

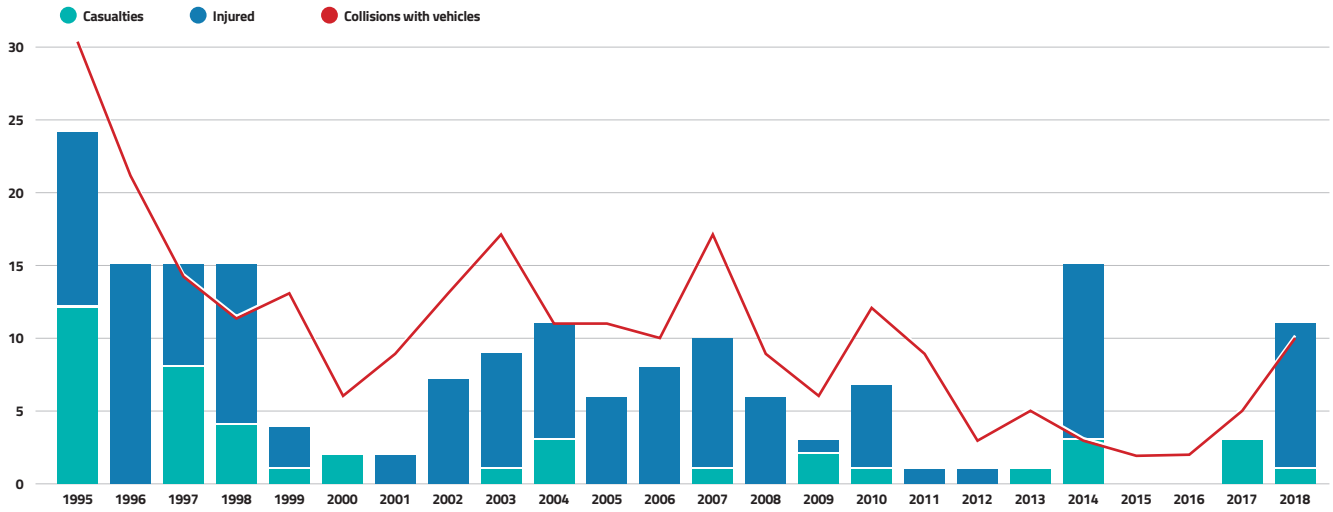
Soon to celebrate its 150th anniversary, Estonia's railway network has played, and will continue to play, a central role in the country's transportation and logistics offering. However, fatal and serious accidents at level crossings continue to occur. *Tarvi Viisalu*, Head of the Safety Department of Estonia's national railway company, Eesti Raudtee (EVR), explains how continual investment in safety measures and publicising the dangers of level crossings will hopefully lead to fewer accidents.

THERE are 152 level crossings located along EVR-owned infrastructure, with 76 per cent of these having already been equipped with safety devices. However, the majority are only equipped with automated traffic signals. According to EVR's strategy, one of the most important safety measures will be to increase the number of level crossings equipped with barriers. At present, 36 of the 152 crossings are equipped with safety barriers but it is expected that this number will increase to a maximum of 106 by the end of 2023. This goal exceeds the requirement set by current national regulations, but we want to remain a step ahead of the regulations when it comes to safety.

Reducing risk

Since accidents resulting in serious consequences have happened as a result of collisions between trains and road vehicles at level crossings, these rail-road junctions unquestionably represent one of the greatest sources of risk. In addition to the loss

FIGURE 1



ABOVE: Collisions between trains and road vehicles at level crossings

of life, a collision at a level crossing can result in often millions of euros worth of material damage to the infrastructure, with EVR and the railway transport service undertaking as well as third parties bearing the brunt of the costs of repair. ***Figure 1*** shows the number of accidents involving collisions between trains and road vehicles at level crossings on EVR-owned infrastructure between 1995 and 2018, and highlights the number of people who were injured.

Safety investigations

EVR conducts an investigation for every collision that occurs at a level crossing. During each investigation, the circumstances surrounding the incident are determined, the risk factors brought about by the realisation of the risk are reassessed and proposals are made for the implementation of additional measures (such as the installation of automated traffic signals or level crossing barriers). Results of investigations have identified that the carelessness of vehicle drivers are the main cause of level crossing accidents with many drivers ignoring safety requirements or failing to notice approaching trains.

Increased train frequency brings increased risks

In previous years, improving safety included creating grade-separated crossings, renovating the level crossing surfaces, cleaning visibility triangles and the installation of automated traffic signals or barriers. Investments in technology have helped to improve the technical condition of level crossings and reduce safety risks. However, with increased train frequency, faster trains, increased highway traffic, distractive activities and the increased use of smart devices and headphones have unfortunately caused an increase in the number of recent serious accidents at level crossings. On 16 April 2014 in Raasiku, two people were killed and 12 were injured, plus on 20 February 2018 in Kulna, nine people suffered minor injuries – both accidents were caused by semi-trailer trucks driving in front of oncoming passenger trains.

The 'zero vision' strategy

EVR's main activity is to ensure maximum railway safety. Within our company's strategy and our safety management system, in 2018 we set a 'zero vision' strategy. While we acknowledge that road users may make mistakes at level crossings due to the 'human factor', we are continuing to design safer railway infrastructure to ensure that when mistakes are made, people are not being killed or seriously injured.

Safety equipment

Based on our own experience and learning from other railway networks around the world, level crossings equipped with safety devices are, unsurprisingly, far safer than unregulated level crossings. Research indicates that installing barriers at level crossings that are already equipped with automated traffic signals reduces the number of accidents by approximately 50 per cent.

The aforementioned accident in Kulna has resulted in EVR making plans to install even more safety equipment. Between 2019 and 2023, we will be modernising or building a total of 107 automated level crossing systems (see ***Table 1***) which will help us

TARVI VIISALU is a graduate of the Tallinn University of Applied Sciences, with a higher technical education in the field of Transport and Logistics. Tarvi has earnt a diploma as a railway engineer and holds a Level 7 vocation with a specialisation in railway traffic and safety, railway transport technology and management, consultation and advising. He has worked at Eesti Raudtee (EVR) since 2000.

achieve our goal of not having a single unregulated level crossing, or crossings without barriers, on high-density passenger traffic sections.

Road users, the infrastructure owner, contractors and authorities are all involved in ensuring safety at level crossings, and only with continuous, systematic and coordinated activity from all parties over an extended period can improvements be made. The desired goals can only be reached if public railway safety principles, general bases and activities have been agreed upon unanimously and successfully implemented.

Campaigns and initiatives

Raising the awareness and actively promoting the dangers of level crossings is key in helping reduce the number of accidents.

Since 2004, EVR has been involved in running public railway safety information campaigns, and to get other railway undertakings involved EVR established the non-profit organisation Operation Lifesaver Estonia (OLE[1]). Its mission is to significantly increase the dangers of level crossings and to promote safe and lawful behaviour with the ultimate goal of reducing the number of accidents and the number of people killed and seriously injured. Each year, railway safety presentations are carried out in educational institutions, reaching approximately 5,000 people, and 'safety days' and other events are also organised. Between 2015 and 2018, EVR participated in approximately 160 different events. Furthermore, more than 100 volunteers have successfully completed training to become railway safety presenters.

In 2018 and in cooperation with the state railway safety authority, EVR participated in developing a safety workbook for schools which was distributed to 700 children during various safety campaigns. In cooperation with the Estonian Police and our contractual security company, we organised live demonstrations across Estonia to focus on level crossing safety from the point of view of road vehicles and pedestrians.

To implement additional road safety measures to increase driver awareness when reaching a level crossing, the Estonian national authorities have applied the following measures:

- Road user speed restrictions on level crossing sections where it is currently possible to cross a railway without reducing speed
- The continued placement of relief road surface markings (rattling markings) and the implementation of other attention-raising measures
- Updating the safety assessments for existing level crossings and, as necessary, raising the level of safety equipment.

It is also EVR's goal to explain and implement the following measures:

- Automated traffic surveillance at level crossings to catch drivers that ignore traffic signals and/or lowered level crossing barriers
- In cooperation with state safety agencies and local governments, to reduce the number of level crossings by closing existing ones when there are reasonable alternatives available
- Placing smart notification systems into operation to improve safety.

Conclusion

The most important goal for EVR is to ensure safe and efficient railway infrastructure operation and with its strategy and safety management system, EVR is actively working towards its 'zero vision'. But to achieve this, continual investment in level crossing safety is required and installing automated traffic signals and barriers, plus continuing to raise public awareness about the dangers of level crossings, are all valuable solutions. By cooperating with all the various parties associated with ensuring railway safety to implement measures and activities to reduce risks at level crossings, EVR is taking important steps to improve level crossing safety in the long-term.

> *"Raising the awareness and actively promoting the dangers of level crossings is key in helping reduce the number of accidents"*

TABLE 1 Modernisation of EVR's level crossings

	2017	2018	2019	2020	2021	2022	2023
The number of public level crossings	152	152	150	150	150	150	150
AFS (automatic traffic signal system) + barrier	34	36	55	73	91	96	106
AFS (automatic traffic signal system)	82	80	65	61	43	42	34
Unregulated	36	36	30	16	16	12	10

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EXPERT PANEL

As part of our Level Crossing Safety In-Depth Focus, *Global Railway Review* asked our Expert Panel:

Motorists who misuse level crossings are often the main cause of accidents, but how can the railway industry manage motorist behaviour to significantly reduce the risks at level crossings?

PARTICIPANTS

ISABELLE FONVERNE

Senior Advisor – Safety and Interoperability, UIC

CLARE POVEY

HM Inspector of Railways, ORR

ANDREW KNIGHT

Export Manager, Rosehill Rail

FONVERNE: According to the UIC safety database[1], safety at level crossings showed a huge improvement between 2012 and 2015 in Europe: The number of collisions with a road vehicle dropped by 26 per cent. Nevertheless, there is no significant improvement observed after 2015 and it seems difficult to further reduce the statistics.

In the EU, 98 per cent of train-road vehicle collisions are attributed to driver behaviour. In Great Britain, 62 per cent of crossings are passive but 79 per cent of accidents happen at active crossings. Switzerland has 95 per cent of active crossings accounting for 33 per cent of all accidents, and 67 per cent of accidents at passive crossings. These numbers show how challenging it is to have one solution for all types of crossings in all countries.

Nevertheless, as it seems that collisions at level crossings are linked to human factors, we need to better educate level crossing users (ILCAD[2]), enforce them to respect the highway code and help the sector find innovative solutions to ensure users use level crossings in a safe manner.

The railway industry, human behaviour specialists and road infrastructure/safety authorities must work together to make level crossings more self-explanatory.

The 'SAFER-LC'[3] European Commission project coordinated by the UIC aims at improving safety and minimising risk by developing a fully-integrated cross-modal set of innovative solutions and tools for the proactive management and design of level crossing infrastructure. Innovative solutions to benefit motorists could include smart detection and advanced infrastructure-to-vehicle communication systems or the deployment of GPS warning devices on all crossings.

POVEY: In December 2018, UK's Network Rail was fined £200,000, plus costs, after a signaller suffered life-changing injuries when he was hit by a car as he tried to close the gate at East Farleigh Station in Kent.

The driver had swerved around the first gate to avoid waiting for a couple of minutes and hit the second that, in turn, knocked the signaller to the ground causing his injuries.

Our investigation revealed that Network Rail's risk assessment was inadequate, and we prosecuted them for that reason, but that does not mask the fact that it was the driver's actions which caused the accident.

Level crossings can be alarming, especially as most drivers do not encounter them often, but following simple rules can make sure that everyone stays safe.

Our role is to continue working with Network Rail to reduce the risks at Britain's 5,939 level crossings, but there will always be some danger when drivers need to use them – so follow the rules and get home safely.

KNIGHT: While the UK is home to the safest rail network in Europe, safety at level crossings remains an issue with approximately 45 vehicle-related incidents a week.

A recent Network Rail study indicated that a lack of knowledge among motorists on how to use a level crossing correctly might be the primary cause behind many of the approximately 10,000 incidents recorded in the UK since 2012 – contesting any perceptions of ineffective level crossing design and infrastructure.

With almost half of these incidents considered avoidable – where drivers ignored or disregarded barriers and warning lights – imposing lower speed limits on adjoining roads would offer motorists more time in which to not only assess the situation at a level crossing, but to hopefully use those additional moments on approach to decide against the rash actions that can cause a fatality.

Network Rail's '*Drivers level crossing safety campaign*', launched in October 2018, is firm in its stance that all vehicles – including emergency services – must stop at level crossings when barriers and warnings indicate to do so. However, until we see a decline in the regularity of motor-based incidents at level crossings, perhaps the operator should eliminate all doubt by implementing mandatory, around-the-clock stop points at all level crossings. Surely an increase in road congestion and inconvenience is preferable to lives being lost?

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