RAIL ACCIDENTS HIGHLIGHT THE NEED FOR EFFECTIVE RISK MANAGEMENT STRATEGIES
BRINGING YOU UP TO SPEED

Railways are an inherently safe form of transport, and safety is always the primary consideration for any well-run railway system. Over the past 200 years the world’s railways have been able to demonstrate a continual improvement in safety, applying the lessons learnt from accidents to develop better technology and improved ways of working.

The International Union of Railways’ (UIC) monitors railway safety with the support of its members, and defines a ‘significant accident’ as any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to rolling stock, infrastructure or other installations (workshop and depot accidents are not included). According to the 2016 Railways Accidents in Europe report, which collates data from 22 European railways, the number of significant accidents dropped from 2,370 in 2006 to 1,624 in 2015, a 31% reduction.

The report notes that 79.9% of accidents are the result of external factors, chiefly trespassing (47%) and vehicle or pedestrian level crossing accidents (24.3%). Human factors (railway staff and subcontractors) were responsible for 8% of significant accidents, with other prominent internal causes including railway users (4.7%) and infrastructure (3.9%). The number of fatalities fell from 1,283 in 2006 to 857 in 2015, and there were 22 passenger fatalities in 2015.

Against this backdrop of more-or-less continual improvement, a spike in passenger fatalities in 2013 stands as a stark reminder that these numbers can go up as well as down. That year 95 passengers died on Europe’s railways – more than double the total for any other year between 2006 and 2015 – and the spate of serious accidents that occurred in the space of just a few weeks in mid-2013 came as a genuine shock to many in the industry.

Seven passengers were killed when an intercity service from Paris to Limoges derailed at Bretigny-sur-Orge, south of Paris on 12 July. Less than two weeks later on 24 July the derailment of a Renfe high-speed train at Santiago de Compostela in northwest Spain claimed 79 lives. Then on 7 August a train carrying crude oil derailed and exploded in the town of Lac Megantic, Canada, killing 47.

These were three very different incidents with differing implications for safety, but they all involved human error, and risk management was a factor in all three cases. Effective risk management strategies are vital to the operation of any railway, but they vary massively in their application and comprehensiveness.
SHIFTING THE FOCUS

Steve Medhurst, RSA Global Rail Leader says, “There needs to be an acknowledgement of the changing face of the industry and the emerging risks this presents – with faster trains, increased passenger numbers and more hazardous materials being transported than ever before. Simply reacting to the directives of regulators and governments may no longer be enough. It’s important that operators and insurers work in partnership to implement effective risk management strategies for the long-term, addressing more than just the traditional elements of risk prevention.”

The preliminary report into the Bretigny-sur-Orge accident noted that the derailment occurred as a result of a dislodged fishplate in pointwork, which had become detached after the head of one of the bolts holding it in place sheared off. This has led to changes in the technical specification for bolted track devices and revised inspection procedures, as well as a four-year programme to replace turnouts and improve maintenance staff training.

The derailment of a Renfe high-speed service from Madrid to Ferrol on the approach to Santiago de Compostela was Spain’s worst railway accident for nearly 40 years. The onboard data recorder showed that the train was travelling at nearly twice the linespeed of 80km/h when it derailed on a curve at the end of the Orense-Santiago high-speed line, which was attributed to driver error.

In the aftermath of the accident, the Spanish government ordered a national review of train driver route knowledge. It was also decided that the national automatic train protection (ATP) system, which was designed in the 1970s to protect trains from passing signals in danger, would also be used to enforce permanent speed restrictions at specific locations, such as the Santiago curve. In addition, infrastructure manager Adif carried out a comprehensive review of safety at other locations where additional speed-restricting measures may be required.

While there is no debating the severity of these two incidents, the measures required to address the causes are both identifiable and achievable. From a risk management perspective, the situation is less clear-cut following the accident at Lac Megantic.
RE-EVALUATING RISK FOR NORTH AMERICA

The Lac-Mégantic accident occurred when an unattended crude oil train ran away and derailed, with several wagons catching fire and exploding. A report published by Canada’s audit general concluded that the country’s rail safety authority, Transport Canada, failed to systematically collect and use important railway safety performance and risk data to ensure that it was targeting the higher-risk railways and the most significant safety risks.

Although it has been a requirement for Canada’s railways to implement safety management systems for more than a decade, the auditor general says Transport Canada has yet to establish an audit approach that provides a minimum level of assurance that they have done so. At the current rate, it would take many years to audit all the key safety management components on all of Canada’s railways. Transport Canada has accepted the findings of the report and is implementing changes to its monitoring procedures.

In the aftermath of the incident, the operator of the train, the Montreal Maine & Atlantic Railway (MM&A) filed for bankruptcy protection. As a relatively small regional railway, the MM&A had liability insurance of just US$25m, which while clearly inadequate for an incident of this magnitude was the statutory minimum and typical of the liability of many North American railways of comparable size at the time of the accident.
RSA believes there is a strong argument that current capacity is not proportionate to the risks North American railways are being exposed to. The North American shale gas boom has resulted in an extremely rapid increase in the volume of crude oil being moved by rail. Transforming the fortunes of many smaller railways and bringing welcome new business for the major Class 1’s, which are seeking to offset the decline in traditional coal traffic.

While the decline in global oil prices has reduced traffic over the last two years, volumes remain high. According to Canada’s National Energy Board, the country’s railways were moving an estimated 54,000 barrels of export crude oil per day at the time of the Lac Megantic disaster. In November 2016 the figure increased to more than 120,000 barrels per day.

In May 2015 the US Department of Transportation and Transport Canada unveiled new standards for the transport of flammable liquids by rail. This included enhanced standards for tank wagons (DOT-117 and TC117), new braking standards for certain types of train, and the phasing out or rebuilding of all DOT-111 tank wagons. There are also operational protocols for trains transporting large volumes of flammable liquids, such as routing requirements, speed restrictions, and information for local government agencies, as well as new sampling and testing requirements to improve the classification of energy products prior to transportation.

While new safety procedures can be implemented relatively quickly, replacing or upgrading rolling stock will be a major challenge for operators and asset owners. At the time of the Lac Megantic derailment, DOT-111 wagons accounted for around 80% of the Canadian oil wagon fleet and 69% of the US fleet with some 78,000 vehicles in circulation. USDOT and Transport Canada have set a deadline of May 2025 for the elimination of the DOT-111 fleet, but even with this aggressive schedule for replacement, these wagons still be a key component of crude-by-rail operations a decade after the catastrophe at Lac Megantic.

While doubts have been expressed over requirements for the use of electronically-controlled pneumatic braking (ECP), the Association of American Railroads has been a driving force behind the development of the DOT-117 standards, helping to ensure the regulatory outcome is workable for the industry.

This a positive development as it shows the industry is willing to tackle key safety issues and could also reduce the risk of a major incident, thereby cutting the railways’ exposure to the kind of losses that brought down the MM&A.

Until the regulatory and technical response to Lac Megantic can be fully implemented, railways will live in fear of another major incident. In addition to the regulatory, institutional and technical response, North American railways are looking at how they can limit their exposure through robust risk management strategies.

“We are seeing attitudes to risk management changing in North America”, says Steve. “For example, some major railways have asked for an increase in cover for third party suppliers since Lac Megantic. It’s important for railways to know where their key exposures are, and the likely impact of disruption on their operations.”
TECHNICAL SOLUTIONS TO TARGET RISK

Major accidents often lead to the adoption of new technical solutions that can help to drive down risk. Following the death of 25 people in a head-on collision between a freight train and a commuter train near Los Angeles in September 2008, the US federal government mandated the installation of Positive Train Control (PTC) on all main lines carrying passenger trains and hazardous chemical traffic by the end of 2015.

This was a formidable proposition – 97,000 route-km and thousands of locomotives would need to be equipped to operate using technology, within little over seven years, which at this point had not been fully developed and tested. A timetable which ultimately proved unworkable.

By the middle of 2015 the railways had invested US$5.7bn, but it was clear that the federally-mandated deadline would not be met.

However, with Congress showing little willingness to give the industry more time, the railways began to warn their customers that they would no longer be able to carry poisonous by inhalation (PIH) cargoes or passenger traffic after 31 December, 2015. As it dawned on legislators that the transport system would be cast into imminent chaos without urgent corrective action, the House of Representatives passed a bill extending the deadline until December 2018.

With the railways spending around US$100m a month on PTC progress is being made. According to the Association of American Railroads, by the end of 2016 PTC had been rolled out on 38% of the network and 63% of its members’ fleet of 18,500 freight locomotives had been equipped. More than half of 125,000 staff requiring PTC training were qualified and 87% of 32,654 trackside signalling systems were PTC-ready.

With nearly US$8bn invested in development and deployment, the industry should begin to see a positive impact on insurance premiums because PTC will decrease collision risk.

In Belgium, infrastructure manager Infrabel is rolling out TBL1+, which automatically applies the train brakes if a signal is passed at danger (SPAD). The programme was implemented following the Buizingen collision in 2010, which killed 18 people, and it has cut the number of SPADs on the Belgian network from 104 in 2010 to 75 in 2012.

By the middle of 2016 around 7,500 of Belgium’s 10,700 signals had been equipped with TBL1+. Infrabel considers this to be the first step towards the nationwide rollout of the European Rail Traffic Management System (ERTMS), which will improve safety standards further still. In mid-2016 a total of 1,228km of main lines – 19% of the network – had already been equipped with European Train Control System (ETCS), which will be rolled out across the remainder of the network by 2022.

‘The SPAD count tells an insurer a great deal about how safe your railway really is, because it tells us about driver behaviour and the quality of your signalling system, and that can be reflected in the insurance premium,’ says Steve. ‘With more modern systems the risk is generally much lower. We use ATP as our baseline, so railways using the latest systems such as ERTMS get a discount, but we also consider other systems, such as Automatic Warning System, and we consider them on their own merits. The level of investigation we carry out is proportionate to the safety system that is in use. Operators may find that they can make a business case for upgrading their safety system because it reduces their premium.’

Other key risk management factors include crash worthiness and fire resistance standards for rolling stock, as well as the ease of repair and availability of spare capacity in the fleet to cope with the loss of a train. Compliance with industry standards is also a key consideration in establishing a baseline for rolling stock insurance, and underwriters will also consider the signalling system and maintenance standards in their assessment of an operator.

Steve stresses that risk management isn’t the same as delegating risk, and those operators that are able to retain and manage their own risk often benefit from lower premiums. ‘A key question for operators is how much risk are you willing to retain yourself? If you are willing to keep a lot of risk it shows that you are confident you have a robust risk management strategy, you understand what you are exposed to, and you are prepared to back that up. As an insurer we look for correlation between external risk and what the customer is prepared to retain.’
TAKING A VIEW

The tragic events of 2013 are a stark reminder that every railway needs a robust strategy to drive out risk, wherever possible, and effectively manage what remains, ensuring that they have appropriate measures in place to respond appropriately to a major incident and restore their operations in the aftermath.

The legacy of the accidents outlined above will undoubtedly lead to better safety, as the lessons learnt are applied through legislation, improved operating procedures, and technological advancements, as well as enhanced business processes. While we cannot reasonably expect to eliminate human error, we can be better prepared to deal with the risks and the consequences of accidents.
ABOUT THE AUTHORS

Keith Barrow was speaking to Steve Medhurst, RSA Global Rail Leader. Keith has over 10 years' experience as a Rail industry journalist, writing on a broad range of topics from around the globe.

Steve Medhurst, RSA Global Rail Leader, has been underwriting Rail property risks for more than 15 years and combines this experience with a lifelong passion for the industry, having worked as a volunteer for Heritage Rail in the UK for three decades.

RSA AND RAIL

RSA works with Rail customers in over 20 countries worldwide and can provide Property, Casualty, Transport of Cargo, Breakdown and Construction of Infrastructure cover for a wide range of rail industry operations, from national rail networks to light rail and metro systems. By working together, we ensure that the best of our underwriting, claims and risk management expertise is available to our brokers and customers, wherever they are in the UK for three decades.

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