

Towards Integrated Railway Protection

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Abstract Since their inception, railways have been built upon the need for transport to be as safe as possible. Although incidents remain a fact of life in railway field due to the volumes carried, the density of traffic and the extent of services offered by railways, rail transport remains one of the safest mode of transport. However, another threat is jeopardizing the railway sector: crime and terrorist. Over the past 10–20 years, security issues have increasingly come to the fore, requiring strong sector action. This chapter presents a briefly overview about the present challenges for security in railway system. It provides a clear picture of the current scenario illustrating the most relevant threats, experiences, best practices and possible counter measurements all matured by the experience of UIC, in about one century of activity in the railway sector.

1 Railway: Constantly Striving for Safety

Since their inception, railways have been built upon the need for transport to be as safe as possible. As technical performance has improved and the significance of railways as a mode of transport has grown, rail managers have constantly striven to improve overall safety standards as the bedrock of the rail system’s reliability and efficiency, their only limits being technology and funding. Their achievements are impressive, and, although the volumes carried, the density of traffic, and the extent of services offered by the railways mean that safety incidents and accidents remain a fact of life—coincidental multiple occurrences in a short space of time indeed sometimes prompting us to believe that “troubles always come in threes”—rail transport remains one of the safest, if not the safest, mode of transport. Railways’ organizational structures, trained staff and, more broadly speaking, human factors approach, and its deployment of ever-better technologies enable more efficient use

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of networks and their potential, all contributing towards maximum transport safety. Rules and regulations are already in place and continue to develop, becoming ever more precise and applying to all sector stakeholders, whether infrastructure managers, railway operators or even service-providers and contractors working in the railways.

2 The Emergence of Security

Over the past 10–20 years, security issues—meaning the impact of negative or anti-social behaviour, crime and terrorism on the railways’ existence and business—have increasingly come to the fore, requiring strong sector action. Unlike in the field of safety, this action cannot and must not be autonomous, but rather must be in support of and in partnership with the national authorities, which remain in overall charge of the security of people and goods on their territory. It is not a question of the rail sector deputizing for the state in fulfilling the latter’s sovereign responsibilities, but rather of the railways integrating a number of constraints, rules, and commitments (in the shape of staff and financial resources) into the way they do business in order to allow an effective partnership to flourish under the state’s leadership, ensuring a sufficient standard of security *vis-à-vis* customer expectations and rights.

The first difficulty arises from the fact that the world of transport is by its nature a world in motion—that is its primary vocation—and that the administration of a state (whatever form it takes: centralised, decentralised, regionally-devolved, etc.) remains the administration of a territory, of geographic areas, of places: the security of these places must thus combine with the security of transport which allows travel from one place to another. Rail transport can only play its vital role forging bonds in the economic, social (urban and regional transport especially) and regional-development (regional, long-distance and high speed transport) spheres if all internal stakeholders fulfil their security roles, in partnership with public authorities and as an extension of the action taken by the latter under the laws and regulations in force. Naturally, this role involves intervention in the event of security problems, but it can also—indeed may most of all—involve the implementation of a policy of prevention, protection and deterrence intended to minimise the number of acts or situations requiring immediate intervention on the ground. These latter points are vital for the rail sector’s image amongst the general public, customers, the media, etc.

3 The Transport Environment

From the rail sector’s perspective, infrastructure managers and operators agree that the two preceding aspects are vital since they fall under their sphere of responsibility—wholly as concerns safety, and partly as concerns security.

From the customer's perspective, the issue is more complex, since it is not so much a matter of legal liability for the execution of a contract as the idea that once one entrusts or delegates one's transport to a company or organisation, this latter must fulfil its task faultlessly. To this extent, the rail sector also needs to take on board other customer expectations, such as allowing for and managing random external events for which there may be no malicious intent or culprit, e.g. extreme weather conditions or meteorological hazards impacting on infrastructure or operations.

The sector must adopt an "all hazards" vision since that is what customers demand, even though the sector can and may only act in response to certain aspects. In this regard, it is vital to communicate prior to, during, and after operating incidents with a bearing on safety, security or other factors.

Crisis management and resilience

All the efforts deployed by the sector are intended to reduce as far as possible the number of incidents and accidents, whether intentional or random. Since it is self-evident that no blanket guarantee can be given that nothing will happen, the sector must nonetheless make preparations to manage situations disrupted by these incidents or accidents and ensure the resilience of the rail system in order that services may resume as soon as possible, even if they temporarily run at a reduced or downgraded level pending a definitive return to the normal situation.

Even if it is conceptually difficult both to organise things such that adverse events do not happen and simultaneously make provision for how to respond when they do, this two-pronged strategy is nonetheless vital.

Regularly conducting drills with the emergency and first-response services is essential for various reasons. The first is to teach different organisations, each with their specific rules and mindsets, to communicate effectively and act without delay in joint or at least joined-up fashion when responding to an emergency. The second is that the rail environment presents hazards for the uninitiated and those untrained in its constraints and particularities.

What is railway infrastructure security?

The definition of security as the rail sector's response, in partnership with the public authorities, to malicious intentions or acts, is a very broad one and covers extremely disparate realities and constraints, between which a choice must be made or which must be combined in an overall strategy to offer customers and staff the responses they expect.

4 Everyday Security in the Railway Scenario

When we think of security, we mostly think of terrorist attacks targeting transport—whether everyday commuter services or high speed trains—as a way of destabilising governments. However, we must not neglect everyday offences such as graffiti, vandalism and antisocial behaviour, which create delays and disruptions and which harm the image of public transport, preventing those who most rely on it from using it to remain connected to the rest of society.

Security is very often to the forefront of people's minds when choosing a mode of public transport for a journey, and this concern needs to be taken on board, since for many people the fundamental freedom to come and go as they please is underpinned by the ability (whether subjective or objective) to use public transport. Alongside long-distance transport and the high speed systems developed in various countries, everyday transport represents a social and economic challenge of the first order.

The matter becomes complicated when we start trying to distinguish between objective security and feelings of security. A UIC study conducted some years ago into major stations (in London, Paris, and Brussels) highlighted some remarkable aspects. When asked to define what they considered a particularly secure place, a place where nothing could happen, most travelers cited military bases, embassies, etc., that is places where the coordinated deployment of technical and human resources to protect and monitor on a massive scale (with all the associated constraints) rendered any security breach or attack impossible or so unlikely that it was unworthy of consideration. However, when the same travelers were asked to name a place in which they felt particularly secure, they mentioned their home, where they went on holiday—places where there were no specific external constraints in place but where they did not imagine anything could happen to them.

Railway companies' security policies must distinguish between what is more a matter of objective security (video protection, specialist uniformed staff, technical monitoring systems, etc.) and what is more a feeling of security (cleanliness and agreeableness of facilities, customer service staff in company colours, etc.). Of course they have to involve themselves in both, level of security and feeling of security, and remain in touch with the clients in order to define the priorities accordingly to their requests.

In addition, all the measures taken—particularly when they result in constraints on customers—must be understood and accepted by customers: no security policy can survive if the measures it provides for are not accepted by customers. Beyond this, the effectiveness of security policies will be boosted if the travelling public backs them and plays an active part in ensuring its own security: remaining vigilant, reporting unusual situations, unattended objects, etc.

5 Personal Freedom and Collective Security

Introducing security restrictions for passengers, particularly in publicly-operated urban or other everyday transport systems, also raises a problem of principle, one which is variable according to the political and institutional make-up of each country, that is, the balance between personal freedom and the need for better collective security.

Whereas a demonstrable terrorist threat may necessitate the taking of strict emergency protective measures, which may be coercive in their application, everyday security must for its part be underpinned by clear principles where each party's rights and obligations are defined.

This issue has arisen in particular with regard to video protection systems, specifically the permitted retention period for recorded material, the authorised viewers of this material, and under what circumstances and with what controls it may be viewed.

It also arises in the legal and technical division of labour between the public authorities in charge of security and their various partners such as railway companies' in-house security services and private contractors allowed to work on or monitor railway property.

6 The Terrorist Threat

Their extent, complexity, and impact on everyday life mean the railways are a target for domestic or international terrorism, and we do not need to recall the attacks in Madrid Atocha, London, the Russian Federation, India, and elsewhere. Constant allowance must be made for this threat, and only close collaboration between the services of the state, particularly intelligence services (which are tasked with gauging the threat to the country) and railway companies (which are aware of their own vulnerabilities) can allow any headway to be made.

A probability-based analysis such as may be used in safety management cannot apply in the same way when the task is to counter the acts of individuals or groups with significant intellectual and financial wherewithal, whose singular determination is deployed in support of a strategy which evolves in tandem with the policies developed to protect against it.

Though anti-terrorist strategy feeds off past experience, it must constantly take account of new threats and adapt to them.

The particularity of the railways, given their extensive infrastructure and the significant traffic flows they carry, requires them to develop their own strategy, since the examples of other transport modes (airlines, for instance) can only be followed to a limited degree and in very specific circumstances, otherwise the efficiency and capacity of rail transport would be compromised. The question arising is whether significant flows can be securely monitored without jeopardising the atmosphere, duration or cost of carriage by rail.

7 The Cost of Security

Since security does not obey probability-based reasoning, it is difficult to assess the efficiency of security measures, impossible to establish a direct mathematical link between the money spent and the outcome in terms of the number of offences committed, culprits arrested, etc. It is difficult enough even to gauge the real cost of security, beyond the cost of the staff and infrastructure directly allocated to this task.

It is particularly difficult to gauge the effect of prevention policies, the goal of which is to avoid malicious acts being committed.

It would perhaps be useful to reason in terms of a feeling of security. That would involve, as some railways do, regularly questioning both customers and those reluctant to travel by train to assess how important feelings of security or insecurity are in their decision and in the image they have or will retain of their journey and the rail-sector stakeholders which executed it.

In any case, it remains to be clarified what is the carrier's responsibility and thus included in the cost of carriage as paid by the user, and what is the public authority's responsibility and paid for by the taxpayer. Here again, the challenge is also the terms of competition between transport modes.

8 Security of Stations: The Challenge of Joined-Up Thinking

Stations are set to play an increasingly complex role. Initially solely transport-focused, over time they have become places where people live their lives, and form part of the urban environment. Their long opening hours mean that at some times of day they are the only building open to the public when all others are shut, and are thus frequented by various groups and categories of people, whose goals in using or occupying them are not necessarily the same. The development within stations of bigger and bigger retail areas, of which high-street shops are a particular feature, creates other everyday security issues, and suggests we need to clearly define the roles of the various security players for each area of the station affected. It is logical that a security guard working for a railway's in-house security service should come to the aid of passengers on a platform, though the police of course retain jurisdiction, but what about being called to assist with a security incident in the retail area of a station—perhaps between people who are not even there to catch a train?

Moreover, major termini are also multi-modal transport hubs served by various transport companies at any one time—these may not share the same view or analysis of their security commitments in terms of policy or financial outlay, which may again raise issues of consistency.

Lastly, within the European Union, the ongoing development of community law and the adoption of the Fourth Railway Package mean that 1 day, even within “the railways” in the narrowest sense, stations could 1 day simultaneously host trains from different companies, of different nationalities, incumbents or newcomers. There are already an increasing number of such players operating in the same place at the same time, a number set to increase further under the Fourth Railway Package given its emphasis on boosting competition between rail-sector players. The challenge will be to ensure consistency between their operations and security policies, and to avoid security becoming or causing a distortion of competition between them.

Consistency in managing the security of a space comprising various locations, each of which obeys its own logic, and playing host to stakeholders who alternate between being collaborators and competitors, is becoming a major challenge, since stations, as well as being multi-modal, are also increasingly multi-stakeholder.

9 Consistency at European and International Level

The issue of consistency already raised with regard to stations also extends to international traffic, which is certain to prove a source of traffic and railway business growth, particularly due to the development of high speed systems.

Guaranteeing a “sufficient” level of security throughout the journey in international traffic may convince people to travel by train rather than another mode.

Alongside this “commercial” argument, within the European Union there are the provisions of Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers’ rights and obligations, published on 3 December 2007, article 26 of which makes the following provision: Personal security of passengers: “In agreement with public authorities, railway undertakings, infrastructure managers and station managers shall take adequate measures in their respective fields of responsibility and adapt them to the level of security defined by the public authorities to ensure passengers’ personal security in railway stations and on trains and to manage risks. They shall cooperate and exchange information on best practices concerning the prevention of acts, which are likely to deteriorate the level of security.”

Here again, then, consistency needs to be sought, in a shape which remains to be defined, in order to guarantee the involvement of domestic and international players throughout the journey; this consistency cannot merely be limited to an array or succession of bilateral agreements such as those developed for specific infrastructure (e.g. the Channel Tunnel, etc.).

10 Specific Aspects of High Speed Systems: Risks and Opportunities

What has been said for major stations and international traffic is naturally also true of high speed systems, with some specific aspects and limitations.

As regards terrorism, though the most notorious recent acts have tended to strike at urban networks, high speed rail definitely offers an attractive target, given what it represents.

Firstly, it is an important symbol of technological development in industrialised countries, attacking which guarantees immense political attention and media coverage of the acts perpetrated and the culprits thereof (or those claiming responsibility).

Beyond that, any safety-critical consequences of such acts risk being magnified by the speed of the train (obstacle on the track, potential derailment, etc.).

Travellers on high speed services have a legitimate demand for high-quality service due to the highest price.

If a local train is graffitied or looks the worse for wear, the least-worst solution for the operator may be to continue running it nonetheless, as long as it does not present a safety risk, since cancelling such services would create chaos in terms of service punctuality. At the same time, travellers will use such trains because they do not really have a choice, even if they feel uncomfortable doing so, that is, they feel the opposite of a feeling of security.

What passengers will tolerate for local services they will not tolerate for high speed.

Set against this, the high speed rail system also offers helpful opportunities: the speed with which it is developing means there is always new-build or upgrading going on, allowing security of operation to be integrated upstream as one factor in quality of service, rather than adding-on measures or operating restrictions post-fact.

A complex balance must therefore be struck. Railway security, preventive action and anti-terrorism form a whole: passengers have a right to travel in security both in daily travel and on high speed services. However, the high speed sector presents specific risks calling for a specific and tailored response. High speed rail represents a very significant investment by society and thus requires protection. At the same time, the rapid roll-out of high speed services in many countries means that security issues can be integrated upstream in the design and management of such systems, bringing maximum effectiveness at an optimum cost: security is one part of service quality, not an additional constraint imposed post-fact.

11 UIC Involvement

UIC was founded in 1922 by governments seeking to “create a permanent conference of railway administrations to harmonise and improve the conditions governing the establishment and operation of railways with regard to international traffic”.

UIC currently has almost 240 members on 5 continents, including integrated railways, infrastructure managers, rail and intermodal operators, and service companies.

UIC’s chief task is thus to:

- promote rail transport at world level,
- promote interoperability between rail systems,
- develop and facilitate all forms of international cooperation between its members,

- support its members in their efforts to develop new markets and new areas of business,
- propose improvement pathways for the technical and environmental performance of railways to improve their competitiveness.

Since 2009, UIC has been structured on the basis of four technical departments: passenger, freight, rail system (infrastructure and associated aspects), and fundamental values. The latter department brings together railway protection and promotion of its social and environmental credentials: security thus sits alongside safety, environment and sustainability, training, and research.

Alongside the action taken by UIC member railways, UIC itself has addressed the subject of security, developing activities in various shapes and forms since the late 1990s and focusing particularly on the development of the terrorist threat following the 11 September 2001 attacks in the USA.

The idea is to share experience and best practice and to define shared ways and means of action so that members can learn from and successfully apply lessons from elsewhere when developing their own strategies, in partnership with their national authorities and, potentially, in accordance with a general international framework.

11.1 UIC Fundamental Values

Alongside its three “technical” departments—Passenger, Freight and Rail System—corresponding to the business units conventionally used in the rail sector, UIC has also created a “Fundamental Values” department bringing together various subjects which cut across the traditional lines but which also serve to protect the rail sector or spotlight its economic and societal benefits.

Security and safety are thus part of this department, alongside sustainable development, international training, expertise development, and research. As regards security, this serves as a reminder to the rail sector that its security policy must be designed in the service of its various businesses, alongside and complementary to the vital role played by the public authorities, not as a substitute for them. The security priorities of the sector and those of the authorities may thus differ, but must remain consistent and a source of synergy.

11.2 UIC Security Platform

Both in its working groups and at its annual congress, the Security Platform brings together UIC members from across the world wishing to make headway on the subjects they consider vital priorities.

The Steering Committee is attended by representatives of the various rail business units (passenger, freight, rail system), representatives of the UIC regions

(Europe, Asia, Middle East, Africa), representatives of the major industry, technical and institutional partners, and by the chairs of the working groups, guaranteeing that the needs of each party and of the rail sector in all its complexity are optimally attended to.

Overseen by the Security Division, which also acts as a centre of expertise and think-tank, the platform acts both as a standing venue for exchange between members and as an arena for partnership with the various European and international institutions and bodies with responsibility for railway security.

Chaired by a European and a non-European on a rotating basis, it has a global dimension, which goes beyond regional particularities.

The platform holds an annual world security congress on a mutually-agreed subject which is defined based on members' needs; the 9th such congress is set to be held in Paris on 13 and 14 November 2013, and will be organized jointly with SNCF on the overarching theme of: "Security policy: which strategies, regulations and partnerships for railway companies?"

Meanwhile, the working groups continue to address: three "constants", developed by UIC, which form the core planks of security policy: human factors, technologies, strategy and regulations. The idea is to develop these three aspects in parallel: an effective security policy starts by supplying frontline staff (human factor) with the information and decision-making support they need (technology), all within a legal or regulatory framework in partnership with the public authorities (strategy and regulations). Two priority subjects, requested by UIC members in the light of current events and the problems encountered on the ground: metal theft, and border crossings and security of international transport corridors. Metal theft represents an intolerable burden for railway companies both in terms of the direct costs caused by theft (replacement, repair, etc.) and in terms of the indirect costs (compensation for delay, damage to company image, etc.). In terms of the second subject, developing international traffic is assumed to bring time savings and ensure the end-to-end integrity of convoys: in this context it has been deemed a priority to conduct a pragmatic examination of security conditions on international routes (predominantly Eurasian freight corridors) and of border crossings en route (customs, compatibility between systems, etc.), in order later to define a shared method of analysis and a joined-up response, where necessary, along the whole route.

In addition, the Security Division provides various services, either at the request of the technical departments (e.g. the aforementioned work under way on a handbook on security in high speed systems, in collaboration with the Passenger Department), or at the request of UIC members (participating in studies, organizing working seminars, disseminating results and documentation, etc.).

11.3 UIC Research Focuses

In the areas of security, prevention, and combating crime and terrorism, perhaps even more than in other fields, tomorrow's challenges will not be met with today's

solutions. The threat is ever-evolving, and the response must develop at the same pace, at least.

UIC is thus involved in various research projects, including those funded by the European Commission, focusing on the general protection of the rail system (stations, infrastructure, rolling stock), and on the reduction of suicides and trespass, protection of the most vulnerable infrastructure against threats of all kinds, etc.

One output of the PROTECTRAIL project was a general demonstration of the project proposals in Zmigrod (Poland) in October 2013; the project will conclude at a final conference to be held at UIC in Paris in June 2014. The goal is to coordinate the various useable security technologies within a consistent architecture, providing railway undertakings with solutions and standards for the security issues they encounter, whether these are objects blocking the tracks, unattended items in stations, identifying those responsible for risky behaviour, etc. The project takes a modular approach to the various aspects, and developments in problem-solving technologies can be included and integrated within the whole without adverse effects on the rest.

The RESTRAIL project (Reduction of Suicides and Trespass on Railway property) for its part aims to produce a toolbox for decision-makers in order both to reduce the number of suicides and trespass incidents and to mitigate the consequences of these acts. Some of the various measures identified and examined come under education and communications policy; others draw on early-warning or infrastructure-protection technologies. The most promising solutions are being field-tested during the second half of 2013, and the final toolbox should be available by the end of 2014.

The other projects underway include, in particular, those touching on cybercrime, which is undoubtedly a future threat.

Beyond the inherent value of these projects, they offer opportunities for partnership and joint thinking between disparate communities: railway companies, research centers, universities, specialist consultants, technical service-providers, etc., and allow us to broaden the scope of our enquiry, compare and contrast our analyses, and obtain a broader view of the roles, capabilities, and rights and obligations of the various potential players.

12 Conclusions

The rail sector has had to learn to live with a number of external constraints, which affect its environment, beyond the internal safety constraints, which are a constant of its business. This is the challenge to be met by the security policies to be developed. The challenge is complex since it involves taking on-board external systems of thought, which need to be joined up or synergized with those within the railways. Nevertheless, the challenge is also to meet the expectations of customers who wish to be able to travel undisturbed and of staff who wish to work without

undue risk: this is the legitimizing basis for railways' actions, whether they are infrastructure managers or operators.

The task is simultaneously to construct a set of principles, which may require updating or strengthening by legal texts defining the rights and obligations of each party and its role in the process, and to develop constant awareness of security amongst the various players—including customers.

Customers expect their transport to be secure, but also that transport operators allow for all their various concerns, and for the random events which may disrupt their journey. Their vision is one of integrated protection for rail transport, to achieve which each component part must be integrated. This is no easy task, but to quote the philosopher Seneca: *It is not because things are difficult that we do not dare, it is because we do not dare that things are difficult.*



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