

# Development of Detection and Protection Technologies of Rail Security System against Terrorism

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**Abstract.** In the light of enlarged threats of terrorism, and with an intention to protect European culture of living by increasing the security of rail passengers and personnel, rail security systems shall establish a new organization and apply new detection and protection technologies. The work presents potential areas of application of detection and protection technologies appropriate to public rail transport, as well as operational and technical requirements that place new challenges to the development of detection and protection technologies.

## Present-day Terrorism

The history of mankind is primarily the history of conflicts and wars, together with efforts to settle problems between states in a peaceful way. The culture of using violence in the family and in international relationships for the purpose of imposing one's own interests has a long history and various manifestations. War and terrorism are the most common among them. Traumas resulting from the use of force in interpersonal relations are experienced by individuals, communities, and by states. The development of civilisation has evidenced that damage from performing such politics is enormous.

Technological development has stimulated the existence and easy use of weapons for mass destruction, stronger destructive effects and unrecoverable consequences. Mankind has become aware of a real hazard from total destruction if the use of force does not stop primarily at settling political relations in the society and among states; as a result we are approaching the period when refraining from the use of force in international relations has been pervasive. War becomes an unacceptable social phenomenon if not being defensive. Inappropriate use of force is codified as a war crime and infringement of human rights.

## What about Terrorism?

For the purpose of easier understanding, the problem of terrorism and interdependence of relevant factors are shown in the following block diagram in Figure 1.

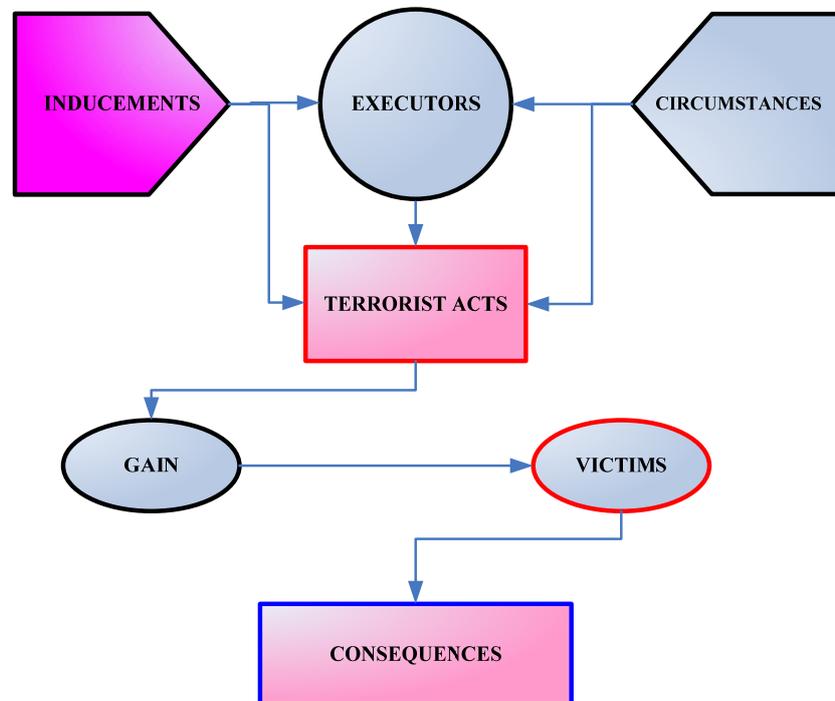


Figure 1

## Characteristics of Present-day Terrorism

- In reaching its goals, present-day terrorism chooses citizens as its victims, infringes their basic human rights by establishing the state of general uncertainty and fear;
- Sabotages and misuse of modern technological systems can pose a mass threat to human lives and jeopardise the achieved level of civilisation;
- Misuse of technological achievements has enabled the creation of terrorism as a global phenomenon;
- Individual protection against terrorism is not possible;
- The existing level of cooperation is not efficient enough;
- Present-day terrorism is not only an unacceptable social phenomenon any more, but a means of achieving political goals in international relations under the conditions of accepting non-use of force in international relations (RATA);
- On the basis of tragic experience the fact on non-existence of a state or society that cannot be threatened by terrorism has been conceived;
- Awareness of the need for coordination of international activities related to the protection against and elimination of terrorism has been established.

## **Organisational Aspects of International Anti-terrorist Campaign**

- There is no generally accepted definition of terrorism that can serve as a framework for organising efficient international cooperation in anti-terrorist campaign;
- The police which, by its constitution and principles of work, is the only suitable force in protection and anti-terrorism campaign, has no strength for it on the global level;
- Organisation of military force and principles of use of the existing military organisations, both national and international, are inappropriate either for anti-terrorist campaign (since terrorism is not an adversary) or terrorists;
- The main concern should be how to prevent jeopardising of basic human and civilisation rights under the mask of anti-terrorist campaign, which will basically turn terrorism into the global winner;
- Various definitions of terrorism which exist in politics and science are determined by the needs for problem clarifications or political limitations of real life, and therefore are not suitable for codification and organisation of forces in anti-terrorist campaign.

## **Definition of Terrorism**

In the antiterrorist struggle the most appropriate and acceptable suggestion of the definition of terrorism is the one given by Boaz Ganor in his work “Defining Terrorism: Is One Man's Terrorist another Man's Freedom Fighter?”:

“Terrorism is the intentional use of, or threat to, use violence against civilians or against civilian targets, in order to attain political aims.”<sup>1</sup> [1]

But for better understanding of its consequences and impact on the public, the next definition is more appropriate:

**“Terrorism is use of violence with the intention of bringing to political changes and creating a general feeling of anxiety and fear.”** [2]

## **Terrorist Attacks on Railways**

Terrorist attacks on railways worldwide [3]:

- 206 attacks worldwide on trains and rails from 1979 to 31/12/2005;
- 1980: Bomb kills 75 at Bologna station;
- July 1995: Eight killed on Paris train;
- March 2004: 191 killed on Madrid trains;
- Feb 2004: Two blasts in or near Moscow's subway killed 51;
- The 7 July 2005 London bombings were a series of coordinated suicide bombings that struck London's public transport system during the morning rush hour, 56 people were killed in the attacks, including the four suspected bombers, with 700 injured.

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<sup>1</sup> The question is whether it is at all possible to arrive at an exhaustive and objective definition of terrorism, which could constitute an accepted and agreed foundation for academic research, as well as facilitating operations on an international scale against the perpetrators of terrorist activities.

The definition of terrorism will be the basis and the operational tool for expanding the international community's ability to combat terrorism.

According to an estimate based on a database of terrorist incidents maintained by the RAND Corporation and the Oklahoma City Memorial Institute to Prevent Terrorism, there were a total of 181 terrorist attacks on trains and rail-related targets such as stations *worldwide from 1998 to 2003*, i.e. an average of 30 per year.

After the 9/11, airports introduced tighter security checks and armed air marshal-boarded flights. But railway transport is much harder to protect. The purpose of public (railway) transportation is to convey a huge number of people every day; because of that the design of public transport is a triumph of convenience, so passengers hop on and off buses, tubes, suburban trains and intercity trains without the check-in desk or long queues familiar to air travellers. The idea for construction of the stations is to ease the passage to a huge number of people every day, with open spaces and multiple entries. In addition to that, lines between stations are easily accessible and vulnerable (particularly tunnels and bridges), and the railway network is "essentially an open system". Passenger rail systems are inherently vulnerable.

All forms of railway transport: surface and underground, intercity and city rails, with more passengers and less freight, share certain characteristics that make them vulnerable to attacks: they make scheduled stops along fixed routes; their operations depend on people having quick and easy access to stations and trains; and the number of access points and volume of travellers make it impractical to subject all rail passengers to the type of screening that airline passengers undergo. Due to these circumstances, it is inappropriate to use the airport security approach to reduce a risk of terrorist attacks on railway transport. Regardless of the fact that security of public transport (railways) is under constant review, an answer to the question: "Are there practicable ways to reduce risk of terrorist attacks" is needed<sup>2</sup>.

The Madrid and London attacks showed how vulnerable public transport is to attacks. Following the Madrid rail attacks in March 2004, the UK government introduced measures such as enhanced CCTV and increased staff training in spotting explosives, but after the London bombings, other options could be ruled in or out. It is important to stress out that the use of explosive devices is not needed for a terrorist attack on railways in order to cause a huge disaster. Instead of them, mechanical devices are sometimes used to direct a train out of rails, as shown in Picture 1.



## **The Terrorist Threat to the Turin Olympic Games**

Why Turin is a Likely Target for a Terrorist Attack [4]

In the light of previous modus operandi, it is unlikely that a terrorist strike in Turin would be directed at symbolic targets such as churches or historical monuments. If—as many

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<sup>2</sup> As the 9/11 Commission noted in its final report, "Surface transportation systems such as railroads and mass transit remain hard to protect because they are so accessible and extensive." facilities are lower than might be expected.

expect—attackers follow the operational patterns of Madrid and London by targeting the public transportation system, Turin would be an ideal target. The town has an extensive local railway system used daily by vast numbers of workers employed in the region's industries. If a regional train or important railway hub was attacked during the morning rush-hour, the terrorist strike would inflict extensive casualties, and also give rise to a severe blow to the economy of the surrounding region—one of Italy's core industrial areas. The time required for post-attack reactivation of the rail routes would be sufficient to cause significant economic damage, especially if coupled with subsequent commuter tardiness in reverting to train use as a "safe" alternative to private cars. Despite ongoing efforts of the police, it is extremely difficult to secure Turin's railway stations and heavy flows of commuters from the smaller towns in the Piedmont region (La Repubblica, July 24, 2005).

Terrorists would probably opt to use suicide bombers to strike the public transportation system; therefore, the most effective counter-terrorist tactic would involve the interception of suicide bombers before they set foot on Italian soil<sup>3</sup> in the following ways:

- a) Monitor groups and individuals already known to the police for their subversive attitudes and surveillance of potentially dangerous groups and individuals.
- b) Obstruct the capability of terrorist cells to obtain the necessary information needed to carry out suicide attacks;
- c) Closely monitor outlets that sell chemicals, fertilizers and other equipment and materials needed by terrorists to construct explosive devices.

### **Operational Requirements on the New Equipment and/or Security Technologies**

Operational requirements on the new equipment and/or security technologies for protection against terrorist attacks depend on various factors.

- The first group of factors depends on railway characteristics:
  - Type of service: passenger or freight transport, line (intercity) services or city public service;
  - Accessibility of: railway stations, tracks, workshops, depots and other facilities.

*To determine these factors, research on a real system is needed.*

- The second group of factors depends on terrorist tactics and weapons.

*To determine these factors, a risk evaluation of terrorist attacks on the real system is needed. Risk evaluations are classified, on a "need-to-know" basis, only for restricted use of professionals involved in railway system security, which means that it is not for public use.*

- The third group of factors depends on public consent to acceptable limitations of human rights.

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<sup>3</sup> This text was written before the Olympic Games started. After the end of the Games, we knew that there was no reason for the worry. This points out that the "curse of predictions" is real.

*To determine these factors, public understanding of problems and consequences of a solution is needed. However, with risk evaluations being classified (not for public use), determining of this factor may be a problem.*

With limited options for preventing attacks and without public consensus on an acceptable ratio **security – freedom**, transit agencies have focused on minimizing the harm from attacks (this is referred to as “consequence management”). On May 20, 2004, the Department of Homeland Security issued security directives for passenger rail systems; many rail systems have already undertaken appropriate actions. These include removing or hardening trash containers on boarding platforms that could be used to hide bombs, increasing the presence of security officers, using video surveillance in and around stations, using bomb-sniffing dogs for random inspections of passengers and baggage, and encouraging riders to spot any suspicious activity.

Consequence management efforts include vulnerability assessments, emergency planning, emergency response training and transit personnel drills, ideally in coordination with first responders, as well as purchase of communication and safety equipment. These actions also help agencies prepare for natural disasters, criminal activity, and other potential disruptions to their operations. Since terrorism is a real menace and may obstruct public transport, some railway authorities have launched projects to develop better surveillance and access control, mostly at railway stations.

Figure 2 presents the future of railway security planned for the London public transport system [5]. This is certainly not a solution for assuring security of above-ground railway lines and it will have a high impact on everyday life of passengers and citizens.

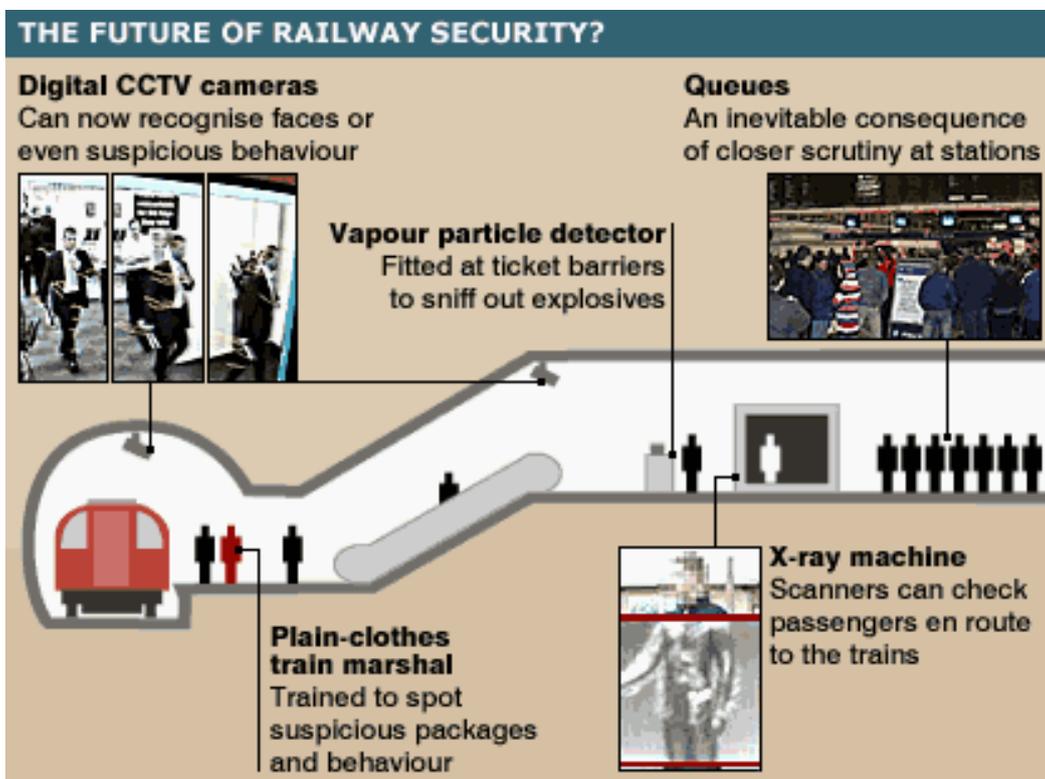


Figure 2

## Conclusion

Existing railway techniques and technologies, together with terrorist tactics, definitely have influence on the research and development of new security technologies for protecting railway systems against terrorist attacks. Influence of railways on everyday life in Europe and vice versa is well-known and is at present part of European style of living (culture). An instrument in achieving terrorist goals is creating a general feeling of anxiety and fear which implies the change of everyday lifestyle. The development and use of new equipment and technologies has a big impact on everyday life, either positive or negative. If we want to preserve and develop our way of life, and European culture, we must be careful with a request for total control of everyday life, because total surveillance over passengers does not mean better security for public and railway systems. This means that our culture, which we want to preserve, must have influence on determining the operational requirements on new equipment and security technologies.

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