

Prevention and Protection from Chemical Terrorism in the Prague Metro in Czech Republic

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Received: January 19, 2023; **Published:** February 28, 2023

Abstract

Subway is a main transportation system in populated city in many countries. Because of its closed system and also involving a large number of people, it is an easy target of chemical and biological terrorism. Actually we witnessed sarin attack at Tokyo subway on March 20, 1995.

Due to its serious damage, Czech Republic considers the safety of Prague subway system as an eargent problem. In this report the safety measure of Prague subway system is described.

Keywords: *Prevention and Protection; Chemical Terrorism; Prague Metro in Czech Republic*

Introduction

Today's complex and contradictory world faces a number of serious problems. Huge population migration, organized crime, plunder of natural resources, the dangers of nuclear weapons, climate change and much more. At the beginning of 2020, the "new contagious disease" of coronavirus COVID-19 spread very rapidly from China, which gradually engulfed the whole world.

As of today, we are facing evolving threats both state and non-state actors that includes range of complex challenges, including hybrid warfare, terrorism, cyber-attacks, migration, highly contagious diseases and wide range of events involving weapons of mass destruction (WMD), chemical, biological, radiological and nuclear (CBRN) threats.

Effective responses to CBRN crises events often require the initiation of a response before the origin or full extent of the events is understood which requires familiarity with various aspect of diverse scenarios that can only achieved through advanced consideration.

The Czech Government and authorities consider security problems to be crucial issues of interior policy. The concern is well justified because Metro system is in closed environment and is an easy target for terrorist. In 1995, Aum Shinrikyo of Japan attacked Tokyo subway with sarin caused 12 death and nearly 4460 injuries according to the Japanese police report.

Citation: Otakar J Mika and Anthony T Tu. "Prevention and Protection from Chemical Terrorism in the Prague Metro in Czech Republic". *EC Pharmacology and Toxicology* 11.3 (2023): 101-108.

However, in 2014 Japanese Government made a new law compensating to the victims of Tokyo subway terrorism. Because of the new law, more people claimed to be victim and the number reached to 7,000. After the terrorism another victim died later so the total death was 13 in total..

Many victims were treated at hospital. After Aum Shinrikyo struck Tokyo subway on March 20,1995. Every space was used for the treatment of victims at Saint Luke International Hospital (Figure 1).



Figure 1: Tokyo subway sarin terrorism victims were treated at the St. Luke International Hospital. Because of large number of victims every space at the hospital was used including hall way. Courtesy of St Luke International Hospital.

CBRN terrorism and protection against it have been thoroughly focused on by the Czech Government and authorities very frequently. Means of public transport, especially the Prague tube, represent sites potentially threatened by a terrorist attack. Many Czech Republic organization such as The Ministry of the Interior, the Ministry of Transport, the Ministry of Health, the Ministry of Defence, the State Office for Nuclear Safety are active participants for the safety and defence of the Praha subway system. There is just only one tube in the Czech Republic which is located in Prague (the capital). The Prague tube serves three lines, green, red and yellow ones (Figure 2).

Chemical terrorism in the Prague tube

The Chemical Weapons Convention, an international agreement (Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction) was being prepared by the United Nations bodies for more than 25 years. In January 1993, the treaty was signed in Paris and it was entered into force as late as April 29, 1997, four years later. And that time, Hungary, the 65th signatory, sent their instruments of ratification to Paris. In 1997, the Czech Republic had already prepared its own National Act No. 19/1997 Coll. on chemical weapons prohibition (Figure 3).

The list of easy to misuse chemical substances comprises compounds such as phosgene, phosphine, chlorine, hydrogen chloride, hydrogen sulphite, and carbon disulphide. Huge amounts of toxic industrial compounds are stored in plants and transported throughout the Czech Republic, mainly by road and rail. They can be stolen and easily used by terrorists to implement chemical attacks. The best example is the use of chlorine as a poisonous gas by Syrian rebels; chlorine is readily available compound for sterilization of water in pool and in water purification.



Figure 2: Subway system in Praha, Czech Republic (Mika and Fiserova; Schlluerva., et al. 2014).



Figure 3: Subway train at Prague, Czech Republic.

Possible scenarios of a chemical terrorism in the Prague tube have been elaborated to install preventive, repressive, protective, liquidation, rescue and recovery measures. Nevertheless, modelling propagation of hazardous chemical toxic substances in the tube with its specific air flow is very difficult. In the Czech Republic, tests and experimental measurements of contaminant proliferation were imple-

mented by using safe simulation substances. The use of air conditioning system supports the propagation of a distributed toxic substance. The results of the experiments have not been made public.

Emergency response plan to a chemical attack in the Prague tube

In July 2013, a completely new type of the emergency response plan to a chemical terrorism act was put into operation in the Czech Republic. This 108-page emergency management plan of response to an attack in the tube has not been published since it is subject to concealment. The directive was compiled after implementation of many simulation experiments with proliferation of contaminants in the tube. Implementation of the above model tests is regarded as unique within Europe. Strong air flow shows special effects, like the so called piston effect, which is pushing air by train movement in the tunnel. Use of ventilation systems and shafts are considered the crucial factors in proliferation of contaminants in the tube.

The above new directive in response to a chemical attack in the tube provides detailed information on a possible act of chemical terrorism in the Prague tube and on recovery of its operation. It specifies response activities of individual components of Integrated Emergency System (IES) such as the Fire Rescue Service, the Medical Rescue Service, the Czech State Police and other state rescue bodies. The emergency plan also gives details on their mutual collaboration in rescue operations and other instructions for a successful intervention after chemical attack including delivery of information to tube passengers and to people outside the tube. The emergency response plan can save hundreds to thousands of lives and protect the health of possible victims of a terrorist attack in the tube.

It is imperative to set up an on site detection system so that the Metro authority knows the critical situation and can take appropriate action. After detecting the subway is attacked by terrorism it is important to decontaminate the subway system (Figure 4).



Figure 4: Decontamination of at Prague subway station in Czech Republic.

As mentioned before the Prague’s subway has a device to blow out air from subway to outside and this is illustrated in figure 5.

Many authorities and bodies such as Ministries of Interior, Health, Defence, The State Office for Nuclear Safety and other institutions participated in preparation of the emergency response directive. Firstly, a basic concept of passenger rescue, decontamination and first



Figure 5: Blowaway the contaminated air from subway.

aid was elaborated by the Fire Rescue and First/Aid Services and then it was completed based on discussions with experts from the Czech State Police, the Czech Army, and the Prague Municipal Government and with forensic medicine specialists. Results of experiments and tests with simulated propagation of suitable chemical substances in the Prague tube were also considered. Naturally, the emergency directive is built on theoretical background, thorough safety study and literature search.

An important step in the verification of the entire emergency response plan was extensive exercises in the premises of the Anděl metro station. They participated in all the main components of the Integrated Emergency System. The total number of participants was more than 800 persons, and 130 pieces of special equipment. A total of five major hospitals in Prague were included in the rescue of the affected persons (Table 1).

Main Participants	Members	Vehicles	Main responsibility
Fire Rescue Brigades in Prague	81	18	Rescue Operations
Transport Company in Prague	22	5	Transport of Citizens
Medical Rescue Service in Prague	14	10	Medical Rescue Operation (START)
State Police and many more	57	23	Secure Order
Total participants and equipment	808	130	

Table 1: Participation of different units for the security of subway safety at Prague.

A large verification exercise took place in October 2014, and another major professional verification exercise is currently under preparation. It is important to set up facility to make immediate response for terrorist action. One should set up a storage place for drugs, medical tools, and miscellaneous rescue equipment such as gas masks, gloves, and tents for decontamination of victims. It is also important to identify the toxic agent as soon as possible so that proper treatment can be made.

On 11 October 2019, Dekonta, a company specializing in decontamination, demonstrated prototypes of several facilities that are capable of clean, fast and reliable cleaning of Prague Metro stations and tunnels. In addition to the Fire Rescue Brigade of the Prague Public Transit Co., the Ministry of the Interior and the State Material Reserves Administration also met here because of this novelty. The screening exercise on 11 October 2019 was also a rigorous test of new powerful and reliable devices that are likely to be partially modified after evaluating the current exercise.

Case report of subway terrorism

So far only one case of terrorism occurred in the subway was sarin attack in the Tokyo subway on March 20, 1995 in Japan. Therefore, it is valuable lesson that one can obtain from this case.

Aum Shinrikyo attacked Tokyo subway with sarin on the day of March 20,1995. Since all victims were underground, Tokyo Metropolitan Fire Department personels went to underground to bring victims to surface of emergency treatment.

For against subway terrorism, one has to consider many measures. For instance, the detection of terrorism tools is important for chemical terrorism CAM, chemical agent monitor is useful (Figure 6).



Figure 6: British soldier used CAM (Chemical Agent Monitor) for military exercise. The figure obtained from NATO document.

For precise identity of the substances used in terrorism various laboratory equipment is used. However, this takes time and therefore on-site detection is used in recently.

The detection of biological type weapon is totally different from chemical one. CAM is portable and convenient to carry so it is widely used. However, the number of the Substance is limited. Therefore, many countries developed on site detection vehicle that can move anywhere and analyze the substance on the spot. In this article only the US and Japan's reconnaissance vehicles are mentioned (Figure 7A and 7B).



Figure 7A: US reconnaissance vehicle.



Figure 7B: Japan Self ground force reconnaissance vehicle.

Decontamination is very important and the targets of decontamination have several varieties such as military weapons, buildings, fields, subway systems, affected human beings.

Decontamination is also very important and there are several variety such as decontamination of military weapons, building, field, subway, affected human being.

Among the protection to save human is the most important. The standard protection is to use gas mask. Even for the gas mask there are many varieties. Because this topics has been extensively discussed by many articles no further explanation is planned in this article.

Chemical terrorism is a serious security threat not only in the Czech Republic, but all over the world. Its imminence and danger are given by many different facts such as the previous experience of actual chemical attacks (Japan 1994 and 1995). The appearance of new terrorist groups, use of different agents, different objectives of terrorism is facing the Czech Republic. It is not easy to cope with unknown forms of terrorism may occurred in Czech Republic. However, we have to cope with future terrorism may occurred in Czech Republic.

Conclusion

Travelling comfort and a high level of security of the tube passengers will be enhanced by their awareness of the new thorough emergency response plan that organizes all the essential activities after a possible attack and also by their consciousness of outstanding preparedness of rescue bodies. atrocities to be very brutal to shock the entire public to draw attention to their requirements [1-9].

Declaration of Interest

The authors declare that there is no conflict of interests that can be perceived as prejudging the impartiality of the research reported.

Funding Support

The research did not receive any specific grant from any funding agency in the public, commercial or non-profit sector.

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Volume 11 Issue 3 March 2023

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