

## Emerging CBRNE Threat from Industrial and Medical Fields to the National Security of Sri Lanka

ADR Wickramarathne

*Defence Services Command and Staff College, Sri Lanka*

daham.wickramarathne@yahoo.com

**Abstract**— Number of manufacturing industries and medical institutions in Sri Lanka are using variety of CBRNE agents that could cause severe damage if those agents are released to the environment due to behavioural patterns such as negligence, unawareness and lack of supervision. Inadequate care on CBRNE agents will cost lives and if the same agents are fallen in to wrong hands those could be used as Weapons of Mass Destruction. On the other hand, whether the government has adequately laid down the rules and regulations to protect the national security from the emerging threat is another area to be investigated. Therefore, a research gap has been identified in the area of CBRNE agents and their industrial usage as to whether the parties involved in CBRNE related production are caring about the national security aspect along with the revenue aspect to conduct a research.

**Keywords:** *CBRNE, WMD, National Security*

### Introduction

The rapid development in science and technology during 20th century resulted numbers of inventions followed by the induction of various industries. Therefore, the massive use of CBRNE agents in the manufacturing industries and the medical field were significant and closely tied with the modern economic development. On the other hand, having analysed the modern modus of operendi of transnational terrorist organizations it is clearly evident that they have a tendency to cause severe damage to the nation states by using various methods in which security forces are marginally ready to counter. As such Chemical, Biological, Radiological, Nuclear and High yield Explosive (CBRNE) generally known as the Weapons of Mass Destruction (WMD) can be expected at any time with massive numbers of casualties. Apart from that, the same devastating impact could happen due to accidental or deliberate releasing of CBRNE agents from

economic centred entities such as industries and medical firms due to negligence.

Several nations have adopted various measures to nullify the emerging CBRNE threats, some of them are monitoring the illicit transporting of nuclear and radioactive materials, toxic industrial chemicals, movements of infected personnel for the pandemics through the sea and airports, Systematic disposal of radioactive and medical waste and activation of an integrated national response plan for CBRNE emergencies.

However, disparate from other countries in the world it is a question that Sri Lanka has paid adequate courtesy for the emerging CBRNE threat due to inadequate knowledge on massive consequences followed by CBRNE emergency or attack. Apart from that awareness among the general public about the CBRNE emergencies are also seems to be limited thus making the issue further aggravating.

Further to above, CBRNE agents are used for peaceful purposes such as food processing, agriculture and medical industry by several stakeholders in Sri Lanka, most frequently, Pesticides, Toxic Industrial Chemicals, and high radioactive materials with potential radiation hazard. Hence, this research is to expect that to study the issues emerging from the said context.

Potential dangers with relevant to Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) appear to be argued in security agendas of non-nuclear states. It is obvious that numbers of industries have been using numbers of toxic industrial chemicals such as Pottasium Nitrate, Calcium Nitrate, Methanol, Caustic Soda and Ammonia in their production line while medical institutions have been using several radioactive materials such as Cobolt 60, Caesium 137, Iodine 131 for their treatment process accordingly. As

per the rules and regulations particular organizations are obliged to adhere to numerous standards when using CBRNE agents.

Though the accepted procedure as such, numbers of incidents were recorded due to negligence and mishandling of CBRNE agents which resulted loss of numbers of lives around the world. Chernobyl nuclear disaster in 1981, Bhopal gas disaster in 1984, Goiania incident in 1987 and Fukushima Daiichi nuclear disaster in 2011 are some of the classic examples in this context. Further, leakage of chemical into the environment through a detergent manufacturer in 2013, a Thinner pipeline explosion in a paint manufacturing factory in 2015, Outflows of H<sub>2</sub>S gas from a septic tank in a rubber manufacturing factory in 2018, are some of the significant incidents happened recently in Sri Lanka (NBRO, 2019).

In addition to that, if those CBRNE agents are fallen into wrong hands such as extremist and terrorist groups they can create massive damage by using those as WMD. Sarin gas attack in Matsumoto in June 1994 as well as in Tokyo in March 1995, Anthrax attack in 2001, killing of North Korean leader Kim Jong Un's half-brother, Kim Jong Nam by using nerve agent VX) at the Kuala Lumpur International Airport in Malaysia in 2017, Novichok agent attack in Salisbury, the United Kingdom in 2018 and Ester Sunday attack in April 2019 are some of the examples for such events.

## Objectives

The study contains main and specific objectives, the main objective of the research is to study, the emerging CBRNE threats to the National Security from Medical Institutions and Industries in Sri Lanka. Further, specific objectives are,

A. To identify the types of CBRNE agents used in Sri Lanka for medical institutions and industries.

B. To identify the possible ways of local CBRNE proliferation.

C. To recommend a suitable framework in order to halt possible proliferation.

## Methodology

### A. Study area

The study was mainly focused on the chemical related manufacturing industries at Free Trade Zone at Katunayake, Sri Lanka Gamma Centre at Free Trade Zone Biyagama, dangerous Cargo section at BIA Katunayake and Apeksha Hospital at Maharagama.

### B. Methodology

The information required for the study was obtained through published reports of regulatory commissions, media archives, interviewing key characters in the field. The statistical data required for analysis of the information were obtained from the statistical reports issued by the government institutions of Sri Lanka. Further, to conduct the study with more generalisability couple of international CBRNE experts were also interviewed representing continents of Africa, America, Europe, and Asia.

### C. Definitions used in the analysis

CBRNE Hazard- a potential source of harm or adverse health effect on something or someone which has direct or indirect involvement of CBRNE agents.

Risk- the likelihood that a person may be harmed or suffers adverse health effects if posed to a hazard.

CBRNE accident- the unintentional release of one or more hazardous CBRNE substances that could harm human health or the environment.

CBRNE Disaster- the result of one or more consecutive CBRNE accidents which causes severe damage to something or someone.

For ethical and legal considerations much of the details regarding the CBRNE events were not recorded intentionally, maximum effort was made to present information within the ethical and legal framework to emphasize the aspects of the existing CBRNE disaster management framework which is under the consideration.

## Results and Discussion

The study reveals that threats connected to use of CBRNE agents evolving rapidly together with deviations in the political environment as well as the developments in technology. The never-ending use of CBRNE agents in several magnitudes throughout worldwide armed

conflict has, in particular, highlighted that the insubstantial nature of existing world's arm control treaties.

#### A. *Varieties of CBRNE agents*

Sri Lanka is one the country use range of CBRNE agents in the medical and industrial field.

i. Toxic industrial Chemicals- Toxic industrial chemicals are listed as scheduled chemicals in the Chemical Weapons Convention (CWC). Due to the dual use of chemicals, there is a possibility of using readily available materials such as pesticides, toxin as chemical weapons (OPCW,2020).

ii. Biological Warfare Agents (BWA) – Those are complex systems that disseminate disease-causing organisms or toxins to harm or kill humans, animals or plants. Those weapons comprise weaponized living disease causing agents such as bacteria and viruses or non-living agents such as toxins which are derived from bacterial pathogens

iii. Radiological Weapons - Radiological weapons that disperse radioactive agents to inflict injury or cause contamination or damage. A dirty bomb using a conventional explosion to disperse radioactive contaminants is one such type of weapon. Cesium-137, Iridium-192 and Cobalt-60 are common radioactive agents. The exposure to alpha and beta particles and gamma rays leads to incapacitating and lethal effects. This could also encompass other ways to disperse nuclear contaminates, such as through a food or water source.

iv. Nuclear weapon - a device designed to release energy in an explosive manner as a result of nuclear fission, nuclear fusion, or a combination of the two processes. Highly enriched Uranium-235 and Plutonium-239 are commonly used in nuclear war heads.

#### A. *Trends and Threats of CBRNE use*

CBRNE terrorism poses a clear threat to public health and safety, national security and economic and political stability on a global level. Accordingly, the prevention of such incidents is of the highest priority.

Bioterrorism refers to the intentional release of biological agents or toxins for the purpose of

harming or killing humans, animals or plants with the intent to intimidate or coerce a government or civilian population to further political or social objectives The threat from bioterrorism is real, with current reports indicating that individuals, terrorist groups and criminals have both the capability and intention to use biological agents to cause harm to society.

Chemical and explosive threat, the use of explosive materials by criminals and terrorist groups poses a significant threat in every country. Attacks using explosives and chemicals endanger public safety on a large-scale and can severely impact the economic and political stability of countries. Threats in the future Chemical attacks are becoming increasingly easier to carry out because the knowledge barrier is low and equipment and materials are readily accessible. There is also a fear that dual-use chemicals, such as pesticides could also be used as weapons. Increasing evidence suggests that terrorists can access chemical weapons stockpiles in unstable states such as Syria. Mustard gas and chlorine are considered to pose the biggest threat because of their free availability and ease of use. Novichok attack in Salisbury (UK) on 4 March 2018 known to be part of a Russian chemical weapons programme, poses a new threat given that these are supposedly highly controlled substances.

Radiological and nuclear threat, Nuclear and other radiological materials have benefited society in areas of medicine, agriculture, industry and the provision of energy. There is a risk, however, that nuclear or other radiological materials could be used in terrorism or other criminal acts. The detonation of an improvised nuclear device (IND), radiological dispersal device (RDD), or the placing of a radiological exposure device (RED) would lead to serious consequences. Such incidents would damage human health and the environment, create panic, and affect economic and political stability.

CBRNE Accidents and Emergencies, since under wrong environmental conditions and poor handling, CBRNE agents can trigger deadly emergencies crossing over the spatial boundaries of an industry. The most significant chemical accident in recorded history was the 1984 Bhopal disaster in India, in which more than 3,000 people were killed after a highly toxic vapour was released at a Union Carbide pesticides factory.

This tragedy was happening mainly due to human error. The Chernobyl nuclear power plant explosion on 26 April 1986 resulted in an unprecedented release of radioactive material from a nuclear reactor and adverse consequences for the public and the environment. The resulting contamination of the environment with radioactive material caused the evacuation of more than 100 000 people from the affected region.

Industrial accidents over past decades in Sri Lanka reveals that there is increasing trend of chemical disaster events. While many industrial accidents which occur inside an industry or a facility reportedly managed within the factory safety frame work, it appears that several chemical accidents have propagated beyond the factory safety management protocols leading to chemical disasters associated with release of one or more hazardous chemical substances to the environment triggered by fire.

Review of the chemical disaster events in Sri Lanka suggested that most of these chemical disasters event have occurred mainly due to lack of knowledge, poor maintenance and supervision, and bad industrial practices despite that actual case is undisclosed most of the time. Further, when disaster strike, often the situation has gone out of control of the industrial management as well as the local incident management capability resulting delayed emergency operations while exposing community at an uncertain vulnerability. In addition to that lack of sound Chemical Disaster Management Frame Work as a major concern and that has propagated many industrial accidents to a state of chemical disaster incident.

Import of clinical waste form the European countries possess high hazard in the biological perspective. Some of the leading companies in Sri Lanka importing these clinical wastes as highly lucrative business by covering in to weak rules and regulations in the country. It was evident that 111 containers filled with chemical waste including human remains were imported by the end of 2019.

## Conclusion

It was revealed that the industries and medical institutes that uses CBRNE agents in production

line by giving special emphasis to the previous incidents which has direct bearing to the national security concern. The survey revealed that there are number of possible security threats that can emerge in those entities. Due to the high hazardous level of CBRNE agents, these threats are to be promptly dealt and needed to be immediately addressed by the relevant authorities before serious consequences occur in the society.

Threats related to CBRNE use are evolving rapidly alongside changes in the political environment and developments in technology. The endless use of chemical weapons (CW) throughout global armed conflict has, in particular, highlighted that the fragile nature of existing world's arm control treaties. Further, recent CBRNE attacks took place in Europe and Asian region using nerve agents and radioactive materials suggest that a new concern on state sponsored assassination or attempted assassination must now be incorporated into national security perspective. Such confirmed use of CBRNE materials by both state and non-state actors in these contexts highlights substantial challenges that the world is facing. As such, it is imperative to identify the threats posed by the use of CBRNE and to understand the obstacles that impede cooperation at both the regional and international levels.

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## Author Biographies



Squadron Leader Daham Wickramaratne is a serving Air Force Officer, Holding Masters Degree in Defence and Strategic Studies and BSc (Mgt), Pg Dip (Def Mgt) from KDU. One of the pioneer member of Sri Lanka Air Force CBRNE Squadron. He is a chemical weapon instructor and qualified in basic, advance and instructor levels of chemical warfare under the OPCW.