

WHERE IS MY MASK ?

Col Ram Athavale, PhD, discusses Prospects for CBRN Industry in India post Covid19

It's not too late at all. You just don't yet know what you are capable of.

Mahatma Gandhi

Introduction

The current Covid19 pandemic and the urgent need to conduct tests and detect cases has led to serious thought about Indian capability to deploy rapid Chemical, Biological, Radiological and Nuclear (CBRN) detection systems across the country. In addition, the vanishing of masks and Personal Protection Equipment (PPE) from the markets and rise in levels of civic awareness for protective measures has also created a need to enhance local industry for protective means. Sanitizers have brought the subject of decontamination to the household breakfast table.



Army CBRN Team practices casualty evacuation

In this heightened state of social and civic awareness, is there a concerted and focused effort to develop in house capability in terms of detection, protection, decontamination and medical management of CBRN incidents? Has 'Make in India' reached the CBRN frontiers? Defence Expo Feb 2020, saw a mere **three** Indian CBRN participants.

Background

The Indian Nuclear Biological and Chemical (NBC) defence programme began in late eighties as a core training facility at College of Military Engineering (CME) Pune in collaboration with the Defence Research and Development Organisation (DRDO). Except for overseas purchase of some sample equipment and nucleus staff trained at UK, Russia and Czech Republic, no foreign or private collaboration was permitted. The programme got a fillip after the 1998 Shakti Nuclear tests. To maintain indigenisation, the responsibility for developing NBC equipment for India was to be that of the DRDO.

The DRDO NBC Defence Technology Program

Early in the millennium, the DRDO began a NBC Defence Technology program to develop a range of equipment. The term NBC was revised to CBRN in view of the emerging Radiological threat. In 2010, the Government approved a consolidated CBRN Defence Technology Programme covering 36 key CBRN projects. Today there are ten laboratories of the DRDO engaged in developing various category of CBRN equipment. However, the process of development and production is mired with long delays and quality

control issues.

A decade ago (after the 2008 Mumbai attacks), the DRDO also started looking at Non Military clients (NDRF, SDRF, NSG and other state level Counter Terrorist units) for their CBRN equipment. Detection equipment, forensic capabilities, protective suits and masks and decontamination equipment is also needed by civil first responders, border/port control agencies and incident management agencies. Alas, they are still looking for quality equipment in adequate quantities. The Covid19 crisis has highlighted these deficiencies.

Private / External Partnership

CBRN being a sensitive matter, all R&D has remained with the DRDO. This led to lack of competition and technological growth. However, developments in the last few years (where the Services have raised quality control and obsolescence of technology issues with the DRDO products) have led to some positive outcomes. The recent opening of the defence sector to private players and the 'Make in India' push by the Prime Minister has led to positive outlooks.

The other issue is testing of CBRN equipment. Most of the CBRN equipment requires to be tested against highly lethal CBRN agents. This can only be done at designated DRDO/CSIR laboratories. DGQA, the Defence Quality Assurance Agency does not have adequate testing facilities, especially specialised laboratories for CBRN testing. So per force, they fall back to the DRDO for the tests. Foreign testing is only permitted for aspects not yet possible to test in India by the DRDO. Hence there is the duality of developer and tester being the same agency. Private CBRN R&D has therefore, not developed or matured. This lack of competition and public sector ethos has been crippling for the industry.

Existing Indian CBRN Industry

There are a few Indian firms engaged in production of high quality CBRN equipment like suits, masks and respiratory devices, collective protection shelters, radiological sensors and medical equipment. A lot of expertise (and in a few cases even sound R&D) has been instituted and a stable base is well in place. Most of these industries also have a ToT agreement with the DRDO.



CBRN UGV at DefExpo 2014

However, CBRN is a **low demand** (other than crisis situations), **low technology, very high impact** industry. Therefore, any private industry entering the CBRN market needs to have another sustainable business avenue for survival. This has been one of the major factors for lack of private CBRN industry in India. The second main issue is that there is no Government support for R&D or assurance of orders of approved and passed products. This also applies to critical hazardous material (Hazmat) equipment in the civil arena like PPE, masks, special detection and testing kits, analysers and mass sanitizers and decontamination equipment.

Notwithstanding the above, there has been a spurt of "Covid19 compliant PPE Manufacturers" since last

two months. Garment, IT and even plastic industries have begun making PPE. Most of these 'fly-by-night' operators are not sustainable in the long run and are trying their luck for a fast buck in a crisis situation.

Recent Encouraging Developments

The Government has instituted some key reforms that aid R&D and manufacture of quality CBRN equipment in India. Main ones are:

- Creation of Defence corridors promoting growth on defence related industry.
- Opening up of defence manufacturing and export possibilities in the defence sector.
- Increase in FDI in defence sector.
- Promoting SMEs in defence sector.

Some more push in the R&D sector is required to get state of the art technologies and global quality standards in place. Latent capacity building for future crisis is recommended.

Avenues for Collaboration

While the subject of CBRN Defence has largely been a closed door one, recent change of stand indicates that foreign collaboration for CBRN equipment is feasible. Focus of future R&D, especially by private industry, is required in the following areas :-

⇒ **Detection Equipment.** India has a good Radiological & Nuclear devices (detectors, sensors and survey meters) industry. Chemical detectors are still imported and we need robust Indian manufacturers. More private involvement is desired. There is an urgent need for state of the art Biological detection equipment for field use by military, paramilitary, civil defence and health services. The Covid19 crisis has shown a gross shortage of quality testing kits, analysers and temperature detectors. It is not rocket science, but there is still lack of 'Make in India' players.

⇒ **Integrated compact detectors on Drones or UGVs.** As the future lies in robotics and automation, there is a need to develop small reliable sensors which can be integrated with drones and Unmanned Ground Vehicles (UGVs).

⇒ **Automated CBRN Sentries.** These robust stand-alone fixed or robotic devices are conceptualised to have a networked CBRN sensor suite, which can transfer data automatically to an integrated Situation Awareness and Hazard Mapping system for optimal response. Deployed in a grid to give real time CBRN threat inputs, these are Ideal for civilian use (critical infrastructure, municipal or district hazard mapping) or military use in field locations.



Integrated CBRN Control System

⇒ **Protection Equipment**

- **Individual Protection Equipment (IPE).** Suit technology is changing. CBRN proof and self-decontaminating fabrics with negligible physiological stress are being developed. Masks and breathing apparatus are getting sleeker and lighter with longer operational capabilities. These technologies need to be incorporated in Indian products.
- **Collective Protection.** Fixed Underground Fallout shelters are passé. ColPro type flexible, modular, inflatable, quick deploy shelters are becoming the norm. Similarly, Containerised CBRN proof shelters with compact CBRN filtration units, integrated detection and hazard mapping systems are also favoured for mechanised operations.
- **Armoured Vehicle and Shipboard Protection.** CBRN protection for armoured vehicles and ships is normally in-built by the manufacturer. Some Indian manufacturers are already producing and integrating the detection, filtration and actuating devices on these platforms. However, latest advancements and new technologies for enhancing such protection (especially filtration) are always being sought.

⇒ **Decontamination Systems.** Very little decontamination equipment is in service. Most of it is now outdated and obsolete technology. Advancements in self-decontaminating suits and paints, lighter and more effective decontamination systems and greater efficiency decontamination agents are being sought. Sadly, as yet there are no Indian firms engaged in decontamination equipment manufacture. A major area of concern. Of late, due to the Covid19 crisis many companies are offering sanitization showers and spray equipment. None of these have been on the CBRN scene for decontamination requirements.



CBRN protection equipment planned to be procured from the US Govt

- ⇒ **Medical Management.** This is a field where India has made good progress. DRDO and other agencies have developed excellent drugs, antidotes and casualty management apparatus. Covid19 has generated a lot of awareness and interest in this field. There is still a need for better drugs, vaccines, antidotes, advanced triage kits and casualty management equipment. Casualty isolation pods and CBRN/Isolation ambulances are areas of interest.
- ⇒ **CBRN Software.** Hazard mapping, situational awareness and decision support are critical areas of CBRN incident management. Already the world is looking for use of AI and robotics based systems to aid these areas. India has great potential for developing such software systems. Already some private players are working on Integrated CBRN Control systems.
- ⇒ **Research.** There is a lot of scope for growth of private R&D. This will help in developing state of the art equipment, enhance healthy competition and garner greater synergy between DRDO/CSIR and private vendors for enhanced technological advancement.

⇒ **Training.** The Armed Forces have a very advanced training protocol for CBRN Training. Civil Defence and Private CBRN response training has yet to take off in India. Some other areas of interest are automated training aids and simulators based on in-service equipment. However, such training needs to be standardised and therefore should be delivered by a central agency, aka National CBRN Center of Excellence (*refer DefInsights May 2020*).



Mock drill by NDRF before CWG 2010

⇒ **Testing Facilities.** While testing facilities for various CBRN equipment exist with DRDO/CSIR, there is a dire need to upgrade these. Approved Private testing facilities are few. Internationally acclaimed and accredited research laboratories, in partnership with Indian companies, can engage the DGQA and DRDO for setting up state of the art testing facilities.

⇒ **The Emergency Management Market.** The Emergency Management market in India is huge and just beginning to show its head. The Indian Government has instituted a string of measures to promote these. However, execution demands adequate training and capacity building. Foreign CBRN Industry (especially Europe, USA and Israel) have a lot to offer in these areas, and there is no dearth of Indian clients (governmental, quasi-governmental and private).

⇒ **Government to Government Agreements.** Both for CBRN defence and for CBRN Emergency Management issues, Government to Government cooperation is of great value. The key areas of interest are :-

- Technology sharing by induction of reputed, tested and state of the art CBRN products.
- Expertise sharing - Joint Exercises, Seminars, Centres of Excellence and Training schools.
- Research and testing facility development - mutual utilisation.

Conclusion

The need for Indian CBRN industry has already begun to be felt by the Government agencies and Armed Forces. A great avenue of CBRN equipment usage is the civil Emergency Management apparatus. Covid 19 has shocked us all with the emergent need of testing and protective equipment in huge quantities. Rising terrorist incidents and industrial accidents are already making the authorities think of CBRN Incident Management. It is time India takes note and encourages CBRN industry growth for optimal national security.



About the Author:

Col Ram Athavale, PhD has been a Key Adviser to the Government of India (MoD and MHA) on CBRN Security. He has been a Key CBRN Expert for the EU CBRN Risk Mitigation Centres of Excellence initiative in Eastern and Central Africa. A Visiting Faculty at select Indian and overseas universities, prolific writer and a speaker in international seminars and conferences on CBRN subjects, he holds PhD in CBRN Security and Incident Management. He has recently authored a pioneering book titled "Toxic Portents" on 'CBRN Incident Management in India'. Presently he is a freelance CBRN Security and Risk Mitigation Consultant based at Pune,