

INTERNATIONAL CBRNE MASTER COURSES SERIES

COLLANA DI SICUREZZA CHIMICA, BIOLOGICA, RADIOLOGICA E NUCLEARE

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Peace cannot be kept by force; it can only be achieved by understanding.

Albert EINSTEIN

The CBRNe Book Series was born as an initiative of the Directive Board and of the Scientific Committee of “International Master Courses in Protection Against CBRNe events” (www.mastercbrn.com) at the University of Rome Tor Vergata. The evolution and increase in Security and Safety threats at an international level place remarkable focus on the improvement of the emergency systems to deal with crisis, including those connected to ordinary and non-conventional events (Chemical, Biological, Radiological, Nuclear, and explosives). In every industrial Country there are multiple entities with specialized teams in very specific fields, but the complexity of the events requires professionals that not only have specific know-how, but also expertise in the entire relevant areas. Given the global interest in these issues, the Department of Industrial Engineering and the Faculty of Medicine and Surgery of the Tor Vergata University organize the international Master Courses in “Protection against CBRNe events”: I Level Master Course in “Protection against CBRNe events” (120 ECTS) and II Level Master Course in “Protection against CBRNe events” (60 ECTS). These courses aim at providing attendees with comprehensive competences in the field of CBRNe Safety and Security, through teaching and training specifically focused on real needs. Both Master Courses are designed according to the spirit of the Bologna Process for Higher Education, the Italian law and educational system. The Master Courses are organized also in cooperation with the following Italian Public Entities:

- Presidenza del Consiglio dei Ministri (Prime Minister’s Office);
- Ministero della Difesa (Ministry of Defence);
- Ministero dell’Interno (Ministry of The Interior);
- Istituto Superiore di Sanità (National Health Institute);
- Istituto Nazionale di Geofisica e Vulcanologia (National Institute for Geophysics and Vulcanology);
- ENEA (Italian National Agency for New Technology, Energy and Sustainable Economic Development);

- University Consortia CRATI, MARIS and SCIRE;
- Comitato Parlamentare per l’Innovazione Tecnologica (Parliamentary Committee for Technological Innovation).

And together with the following International Entities:

- OPCW (Organization for the Prohibition of Chemical Weapons)
- NATO Joint Centre Of Excellence (Czech Republic);
- NATO SCHOOL of Oberammergau (Germany);
- HotZone Solutions Group (The Netherlands);
- VVU-026 Sternberk (Czech Republic);
- Seibersdorf Laboratories GmbH (Austria);
- Chernobyl Centre (Ukraine).

All the above-mentioned organizations have signed official cooperation agreements with the University of Rome Tor Vergata in the aim of Master course activities. The Master have also cooperation with OSCE, IAEA, ECDC, KEMEA in the aim of the didactical activities and we are working to formalize this collaboration with a formal cooperation agreement.

Both Master Courses have been officially granted the “NATO selected” status and have been included in the NATO Education and Training Opportunities Catalogue (ETOC) and also they are supported by OPCW.

The purpose of the CBRNe book series is to give a new perspective of the safety and security risks from both a civil and military point of view, touching all the aspects of the risks from the technological to the medical ones, talking about agents and effects, protection, decontamination, training, emergency management, didactic, investigation, communication and policy.

The authors will be experts of the sector coming from civil, military, academic/research and private realities. A special thanks for the realization of this series goes to Prof. Carlo Bellecci for his initial encouragement, continuous support and help.

Nel mese di Agosto 2016 il Ministero dell’Istruzione, dell’Università e della Ricerca (MIUR) ha inserito la collana nella lista di quelle ufficialmente riconosciute con i seguenti riferimenti:

- codice di classificazione: E237557;
- titolo: CBRNE BOOK SERIES.

During the month of August, 2016, the Italian Minister for Instruction, University and Research (MIUR) has officially added this book series in the list of the official publications recognized by the Minister itself with the following references:

- classification code: E237557;
- title: CBRNE BOOK SERIES.

ADOLPH EID

**MASS DECONTAMINATION
OF SPECIAL AND
DISABLED GROUPS
FOLLOWING AN URBAN
CBRN INCIDENT**



aracne



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ADOLPH EID

**MASS DECONTAMINATION OF SPECIAL AND DISABLED GROUPS
FOLLOWING AN URBAN CBRN INCIDENT**

Abstract

Since it is a matter of time before terrorists get hold of a Weapon of Mass Destruction (WMD) (security experts predictions), competent authorities are requested to be well prepared for such an event by taking several proactive measures to prepare the public's appetite for such a likelihood. However, this time there should be no exceptions especially for special and disabled groups of people, in order to prepare them to overcome and recover from a potential unconventional attack should it occur. Unfortunately, after being involved in the CBRN realm, we have realized that governments and organizations who have put in place methods, protocols, and procedures to follow during mass casualty incidents are rare. This would involve emergency mass decontamination for a special category of people including: children, pregnant women, people with physical, sensory, and cognitive impairments such as individuals with Down syndrome, autism, the elderly, homeless, foreigners, refugees, pets, animals etc. These groups of people have different needs in emergencies such as logistics (e.g., plastic chairs, guidance, dry erase boards, animation movies for children portraying decontamination, medicine for chronic illness, space blankets etc.), experts (e.g., in English and other foreigner languages, in body language, social workers, psychologists especially for children with mental illness etc.), and since existing response plans have been tested on them by few organizations (especially in the United States), it is unclear whether they meet their needs or not.

Despite the lack of references regarding decontamination methods, Standard Operating Procedures (SOPs), and proactive measures disguised as entertainment activities (preferably during the summer time since individuals would be showered with water and soap), especially for children and people with mental illness or cognitive impairments, that must be drilled prior to a CBRN incident, we will focus in our thesis on trying to bridge the existing gaps in procedures with the aid of experts and Non-Governmental Organizations (NGOs) (many of them asked to remain anonymous as references as although their input was quite informative no real study/research has been conducted so far). We will also focus on the special methods and measures that must be introduced to those groups before a CBRN incident occurs, then followed and executed during their decontamination process in case of a Dirty Bomb/Radiological Dispersal Device (RDD) attack (a dirty bomb contains conventional explosives combined with a radioactive isotope(s) where the main purpose of building an RDD is contaminating people, buildings, area, etc.), or other WMD attacks (e.g., chemical or biological) in order to mitigate their consequences and reduce the impact (by neutralizing, removing or detoxifying the agents) of such an event on their lives.

In other words, since there is widespread agreement that the needs of special and disabled groups must be incorporated into emergency response plans for mass casualty incidents, particularly incidents involving WMD contamination, (we also believe that CBRN decontamination process and medical treatment should be included as a standard part of the course in Universities for medical students), stakeholders are invited to work side by side to update as soon as possible their contingency plans, by creating new techniques, and SOPs that include decontamination, mental and logistical support, plus other needs that would enhance the preparedness of these groups of people to accept, face, and recover from a potential unconventional attack.

Keywords: CBRN, Contamination, Cross contamination, Decontamination, First Responders, Vulnerable and Minority Groups, Disabled People, cognitive impairments, CBRN Operators, Special and Disabled groups, Weapons of Mass Destruction, Cognitive Impairments, physical impairments, homeless, pregnant women, children, refugees.

Index

1 Introduction 11

2 Contamination 13

 2.1 *Definition* 13

 2.2 *Chemical warfare agents overview* 13

 2.3 *Biological warfare agents overview* 13

 2.4 *Radiological/Nuclear overview* 14

 2.5 *The causes of contamination* 14

 2.6 *CWAs characteristics* 15

 2.7 *BWAs characteristics and categories* 17

 2.7.1 *BWAs characteristic* 17

 2.7.2 *BWAs categorization* 18

 2.8 *Nuclear vs Radioactive Material* 19

 2.9 *The categorization of nuclear and other radioactive material* 19

 2.9.1 *Categorization of nuclear material* 19

 2.9.2 *Categorization of radioactive sources* 20

 2.9.3 *Types of Radiological/Nuclear (R/N) contamination* 21

3 Cross contamination 22

 3.1 *Definition* 22

 3.2 *Goiania, Brazil, 1987* 22

 3.3 *Tokyo subway attack in 1995* 23

 3.4 *Alexander Litvinenko’s case in 2006* 23

 3.5 *Sergei and Julia Skripal assassination attempt in 2018* 23

4 CBRN decontamination 24

 4.1 *Decontamination purpose* 24

 4.2 *Decontamination vs Detoxification* 25

 4.3 *What do we need for decontamination?* 25

 4.4 *Basic principles for successful decontamination* 25

 4.5 *Decontamination categories* 26

 4.5.1 *Emergency decontamination* 26

 4.5.2 *Mass decontamination* 26

 4.5.3 *First Responder’s decontamination* 27

 4.5.4 *VIPs decontamination* 27

 4.6 *Basic classification, principles, and methods of chemical decontamination* 28

 4.6.1 *Decontamination of chemical agents can be natural and technical* 28

 4.6.2 *Preparedness* 28

 4.6.3 *Decontamination specifics and possibilities* 28

 4.7 *Decontamination methods* 30

 4.7.1 *Chemical decontamination* 30

4.7.2	<i>Physical decontamination</i>	31
4.7.3	<i>Mechanical decontamination</i>	31
4.8	<i>BWAs decontamination</i>	31
4.8.1	<i>Decontamination level</i>	31
4.8.2	<i>Physical B-decontamination methods</i>	32
4.8.3	<i>Chemical B-decontamination methods</i>	32
4.8.4	<i>Radiological/Nuclear decontamination</i>	32
4.8.5	<i>Types and properties of R/N contamination</i>	33
4.8.6	<i>Sensitive equipment decontamination</i>	33
5	<i>Decontaminants</i>	35
5.1	<i>CWAs and BWAs decontaminants advantages and disadvantages</i>	35
5.1.1	<i>Advantages</i>	35
5.1.2	<i>Disadvantages</i>	35
5.2	<i>Characteristics that must be fulfilled by CWAs and BWAs decontaminants</i>	35
5.3	<i>Classification of chemical decontaminants in accordance to their chemical and physical characteristics</i>	35
5.4	<i>R/N internal contamination's decontaminants</i>	36
5.4.1	<i>Potassium iodide (KI)</i>	36
5.4.2	<i>Radiogardase (Prussian blue)</i>	36
5.4.3	<i>Sodium alginate and barium sulphate</i>	37
5.4.4	<i>Sodium bicarbonate</i>	37
5.4.5	<i>Liquids</i>	37
5.4.6	<i>Dimercaprol (BAL)</i>	37
5.4.7	<i>Defferoxamine (DFOA)</i>	37
5.4.8	<i>Penicillamine (PCA)</i>	37
6	<i>CBRN decontamination of special and disabled groups</i>	38
6.1	<i>Special and disabled groups definition</i>	38
6.2	<i>CBRN targets</i>	38
6.3	<i>Children and infant decontamination</i>	39
6.3.1	<i>Psychological effects on children</i>	40
6.3.2	<i>Children categories</i>	40
6.3.3	<i>Children triage difficulties</i>	41
6.3.4	<i>Disrobing difficulties</i>	41
6.3.5	<i>Infants vulnerability under the shower</i>	41
6.4	<i>Recommendations for better children mass decontamination</i>	41
6.5	<i>The decontamination of children with cognitive impairments</i>	44
6.5.1	<i>Communication challenges</i>	45
6.5.2	<i>Recommendations for ensuring effective Communication</i>	45
6.6	<i>The decontamination of pregnant women</i>	46
6.6.1	<i>Pregnant women treatment</i>	47
6.6.2	<i>Why pregnant are vulnerable?</i>	47
6.6.3	<i>Psychological and behavioural vulnerabilities of pregnant women</i>	48
6.6.4	<i>Recommendations for the showering process of pregnant women following a CBRN attack</i>	49

6.6.5	<i>Reducing the stress experienced by pregnant women</i>	49
6.7	<i>The decontamination of people with physical impairments</i>	50
6.7.1	<i>Why people with physical impairments are vulnerable?</i>	50
6.7.2	<i>Vulnerabilities during movement and transfers</i>	51
6.7.3	<i>Recommendations on how to decontaminate people with physical disabilities</i> .	51
6.8	<i>Mobility equipment decontamination</i>	52
6.9	<i>Assisting the move and transfer of people with physical disabilities, and recommendations for mass casualty decontamination exercises and drills</i>	53
6.10	<i>The decontamination of people with sensory impairments</i>	54
6.11	<i>Challenges during communications and steps that should be taken to improve the showering of people with sensory impairments</i>	54
6.12	<i>The decontamination of pets (service animals), and assistive devices</i>	56
6.13	<i>Livestock decontamination</i>	57
6.14	<i>Effective communication with individuals with sensory impairments</i>	57
6.14.1	<i>Decontamination of individuals with sensory impairments</i>	58
6.14.2	<i>Recommendation on how to deal with individuals with visual impairments during a CBRN incident</i>	58
6.15	<i>The involvement of special and disabled groups in mass casualty decontamination exercises/drills</i>	59
6.16	<i>The decontamination of elderly people</i>	59
6.16.1	<i>Physiological vulnerabilities of elderly people</i>	59
6.16.2	<i>Elderly’s sensory vulnerabilities</i>	60
6.16.3	<i>Elderly’s visual impairments</i>	61
6.16.4	<i>Elderly’s psychological and socio-economic vulnerabilities</i>	61
6.16.5	<i>Recommendations for improving the decontamination of elderly people</i>	61
6.17	<i>Recommendations for CBRN operators</i>	62
6.18	<i>People with chronic illness</i>	62
6.18.1	<i>Chronic illness and psychological vulnerabilities</i>	63
6.18.2	<i>Recommendations on how to improve people with chronic illness mass decontamination process</i>	63
6.19	<i>Tourist’s special consideration</i>	64
6.19.1	<i>Tourists psychological, behavioural and socio-economic vulnerabilities</i>	64
6.19.2	<i>Physiological vulnerabilities</i>	65
6.19.3	<i>Recommendations on how to improve tourists’ decontamination process</i>	65
6.19.4	<i>Enhanced Communication</i>	65
6.20	<i>The homeless decontamination process</i>	66
6.20.1	<i>Why homeless people are vulnerable?</i>	66
6.20.2	<i>Physiological vulnerabilities of homeless people</i>	67
6.20.3	<i>Recommendations for First Responders</i>	67
6.20.4	<i>Efficient communication with homeless people</i>	67
6.20.5	<i>The homeless decontamination showering</i>	67
6.21	<i>The refugees’ decontamination</i>	68
6.21.1	<i>The refugees in Lebanon</i>	68
6.21.2	<i>Refugees mental health</i>	68
6.21.3	<i>Refugees psychological vulnerabilities</i>	68

6.21.4 Disability and mobility impairment amongst refugees	69
6.21.5 General recommendations	69
6.21.6 Communication	69
7 Conclusion	71

Abbreviations

ABBREVIATION	DESCRIPTION
ADL	Activity of daily Living
ARS	Acute radiation Syndrome
ASL	American Sign Language
BAL	British anti-Lewisite
BWA	Biological Warfare Agents
CBRN	Chemical, Biological, Radiological, and Nuclear
CPPNM	Convention on the Physical Protection of Nuclear Material
CWA	Chemical Warfare Agents
DECT	Deaf Emergency Communicator Theory
DNA	Deoxyribonucleic Acid
EU	European Union
FR	First Responders
GA	Tabun
GB	Sarin
GD	Soman
GF	Cyclosarin
HAZMAT	Hazardous Material
HD	Sulphur Mustard
HN	Nitrogen Mustard
IAEA	International Atomic Energy Agency
IND	Improvised Nuclear Device

INFCIRC	Information Circular
INTERPOL	The International Criminal Police Organization
L	Lewisite
MD	Mass Decontamination
NGOs	Non-Governmental Organizations
NPP	Nuclear Power Plant
NSS	Nuclear Security Series
PET	Positron Emission Tomography
PPE	Personal Protective Equipment
PSTD	Post Traumatic Difficulties
PSPFTP	Pre-Selection Physical Fitness Training Program
PWR	Pressurised Water Reactor
RDD	Radiological Dispersal Device
RED	Radiological Exposure Device
RSDL	Reactive Skin Decontamination Lotion
RSSM	Radioactive Sources Security Management
RTG	Radioisotope Thermoelectric Generator
RZ	Red Zone
SDK	Skin Decontamination Kit
SOP	Standard Operating Procedure
STB	Super Tropical Bleach
TICs	Toxic Industrial Chemicals
TBq	Terrabecquerel

UNHR	United Nations High Commissioner for Refugees
UV	Ultra Violet
VX	O-Ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate
WINS	World Institute for Nuclear Security
WMD	Weapon of Mass Destruction
WHO	World Health Organization
WWI	World War One

1 Introduction

When addressing CBRN incidents, the first thing we must consider are casualties, contamination, cross contamination and most importantly after such an unconventional attack/incident **Decontamination**. Contaminants may be chemicals such as Toxic Industrial Chemicals (TICs) like ammonia, chlorine, oxidizers etc., Chemical Warfare Agents (CWAs) such as nerve agents, blister agents, blood agents, choking agents, and incapacitating agents; Biological Warfare Agents (BWAs) such as viruses, bacteria, spores, fungi, prions, toxins, etc., Radiological Isotopes (radioactive sources and radioactive materials) such as caesium-137 (Cs-137), cobalt-60 (Co-60), barium-133 (Ba-133), strontium-90 (Sr-90), iodine-131 (I-131), Americium/Beryllium (Am-241/Be), etc. and finally Nuclear Materials (fissile materials) such as uranium-235 (U-235), plutonium-239 (Pu-239), and uranium-233 (U-233).

Regarding contaminants/agents mentioned above each has its own signature in harming humans, animals, and the environment. Therefore, CBRN agents' contamination must be avoided whenever possible. However, when it is impossible, personnel, equipment, terrains, facilities, food (depending on the level and type of contamination) must be decontaminated as soon as possible in order to reduce or eliminate the risk to personnel, make equipment serviceable, render terrains accessible, and food consumable. Consequently, after a CBRN attack First Responders/CBRN Operators take into account the priority of decontamination, where humans are always priority one. Moreover, in priority-1 there are also priorities called special groups (e.g., children, pregnant women) who must be decontaminated and evacuated from the Red Zone (contaminated area) before other victims (if other victims do not require limb or lifesaving) due to their fragile situation. There is also another category of people called disabled people (e.g., people with mobility impairments, blind, deaf, the elderly, etc.) who have the same priority as ordinary victims, however, more equipment, methods, protocols, measures, and procedures must be used and adopted to facilitate their decontamination and prevent further damage or misunderstanding due to their limited movement, sensations, and interactions. For example, deaf people rely on signs and lights in their ordinary life, therefore, they can't hear First Responders (FRs) verbal instructions nor sirens during emergencies. Unlike deaf people, blind individuals rely on oral instructions and guides such as people or guiding dogs. Here starts what is called triage that prioritizes the decontamination and evacuation from the Red Zone (RZ) according to the fragility of the victim (e.g., age, mental, and physical state), and the severity of its wounds. Hence, in order to accomplish this mission more resources, studies, procedures, efforts, and proactive measures are required from governments, associations, and CBRN Operators, for their readiness in case of a CBRN incident, since during such incidents stakeholders cannot improvise methods as time is precious and stress levels are very high. Moreover, special and disabled groups cannot be ignored by competent authorities anymore as they are part of the society and they contribute to it each according to his capability (e.g., could anyone of us ignore Steven Hawking's theories?).

Proactive measures that must be taken, include training for both FRs/CBRN Operators and vulnerable people alike. However, this kind of training must be introduced to children and mentally ill individuals as entertainment activities at schools, during summer camps, or in special associations for children with special needs such as children with autism, individuals with Down syndrome, and people with cognitive impairment. For example, CBRN operators must learn essential physical signs and other techniques such as eye contact in order to deal with deaf people. In addition to those signs they have to know the essential needs of every disabled person (e.g., hearing aids, spectacles, white canes, wheel chairs...) that might be present on the scene and may

prevent further damage or even save lives. Furthermore, FRs teams must include psychological experts to support those people following evacuation and decontamination as they will be in shock (especially children with mental illness).

In addition to techniques, logistics, and knowledge, Carlson et al. (2016), highlighted that CBRN Operators must undergo a Pre-Selection Physical Fitness Training Program (PSPFTP) that incorporates physical fitness and psychological challenges training model. All CBRN Operator candidates must complete rigorous training in order to be considered for the CBRN occupation. There is a CBRN Operator training module which is designed to measure the performance of applicants while they are under physical and mental stress in order to determine a candidate's competency to undertake the CBRN training course and accordingly be employed as a CBRN Operator.