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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.

Claudio De Maio
Mauro Valerio Mattavelli Solbiati

**The Role of the HazMat
and the INSARAG Certification Process
of the Italian USAR Heavy Team**





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Giacchino Onorati editore S.r.l. – unipersonale

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via Vittorio Veneto, 20
00020 Canterano (RM)
(06) 45551463

ISBN 978-88-255-3064-3

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Ist edition: April 2020

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Abstract

This thesis will focus on the INSARAG certification process that Italy has decided to undertake in order to include its USAR Heavy team in the international relief system. Special attention will be given to figure of the HazMat, namely the person in the USAR team who is responsible for the management of hazardous materials.

In the first part of the thesis the concept of USAR and USAR team in its various modulations (Light, Medium and Heavy) will be addressed and developed, then the role in the international relief of INSARAG and the process to be followed to certify a USAR team will be analyzed. Everything will be related to the figure of the HazMat and the role it plays in this process.

The next part of this thesis work is experimental, and is focused on the standard operating procedures related to the work of the HazMat that Italy had to deliver to INSARAG.

The operating procedures have been drafted for the certification of the H-USAR ITA1 Team and have been the subject of evaluation and field tests during the exercise test.

These procedures will be subsequently reviewed with a view to a future perspective of improvement and optimization, opening up future scenarios and considerations on the feedback received at international level.

Urban Search and Rescue Activity

The occurrence of important complex and serious events¹ that can cause death, have favored the development of an organizational system able to face and to solve problematic situations. It is a system in which highly qualified professionals and technical skills come together and make themselves available for the resolution of the event.

The English acronym USAR is used to indicate the Urban Search and Rescue activity, namely all the actions and operations carried out by operators specialized in search and rescue of people dispersed in the urban areas and trapped in confined spaces. This acronym is used in all countries regardless of the language spoken and it is also adopted by international standards.

The Urban Search and Rescue scenarios are events such as explosions, road accidents, structural collapses also determined by natural disasters — as in the case of earthquakes and hydrogeological instability — involving a large number of people trapped or buried under the rubble.

The word Urban (it is a word derived from Latin, *urbs/urbis*, which means precisely *city*) indicates events that affect urban contexts, determined by accidental factors or deliberate acts. In this case, the development factor of the event plays a specific role: slow but predictable, as in the case of floods or hurricanes, or abrupt, as in the case of earthquakes, tsunamis and even terrorist attacks².

Team trained to give an integrated and complete response and this is why this activity is defined as a “multi-hazard” discipline³.

1. *Progetto per la costituzione della capacità di ricerca e soccorso internazionale*, www.alessandropirrone.com.

2. The 9/11 terrorist attack on the World Trade Center represents an example of an abrupt and devastating event that required the intervention of the Urban Search and Rescue Teams.

3. In this thesis the figures that together form the USAR teams and the equipment will be presented.

The scenarios typical of this kind of interventions are complex contexts and generally with hostile environmental conditions⁴. Moreover, the victims involved in structural collapses can be blocked in voids that are formed inside the structure and can be trapped under heavy, irregular and unstable debris. This situation obviously puts rescuers in serious danger.

The USAR project was born, therefore, with the aim of improving rescue activities in contexts where there are rubble due to disastrous events, making sure that intervention of specialized operators is functional to the risk assessment, to the localization of the victims with the subsequent extrication of the same and the initial medical stabilization with the administration of first aid while waiting for the doctors and nurses.

USAR operators, to respond in an integrated and functional way to the event, must therefore be adequately trained to provide immediate basic support for vital functions — Basic Life Support (BLS)⁵.

In summary, the scenarios of USAR teams' operations are unique, unrepeatable and characterized by a high criticality for victims and rescuers.

Therefore a high specialization of the operators and the adoption of qualified operating procedures is required in order to recover and to secure the greatest number of people involved in the event.

The organization and coordination model Incident Command System allows managing actions and activities of USAR teams in order to save the largest number of victims. Many countries use this model, which thanks to its characteristics allows facing complex and extraordinary events.

These considerations highlight the fundamental classification of the complexity of the USAR activities on the basis of essential features that will be constantly kept in mind and developed in the discussion of the topic.

4. As for the Italian context, an example of USAR team intervention in particular conditions was the collapse of the Hotel Rigopiano di Farindola (Abruzzo, Italy) on January 18, 2017. The extraction of victims and deaths from the rubble has been made even more difficult due to the adverse weather conditions.

5. Assuming the collapse of a house, it is possible to imagine the involvement of a high number of victims and for this reason it is important that search and rescue operations take place as quickly as possible and that teams USAR are also composed of health personnel.

In this chapter the Italian and international legal organization will be analyzed, with the consequent agreements that regulate the juridical aspects at a global level, up to presenting the INSARAG Guidelines.

1.1. The legislative framework

The occurrence of situations of emergency, crisis, danger and calamity determine a strong social mobilization, both for the immediate effects and for the consequences that may occur in the society affected.

The speed in the management of event in the very first moments is fundamental both for the containment of loss of human lives and for the containment of damages to homes and to production and economic structures. The response in the first moments also has an impact on the subsequent phase of rehabilitation and reconstruction.

During the last few decades, urban search and rescue activities have increasingly attracted national, community and international attention and responsibility. In fact, the social importance of the event and the link between outcomes of the emergency in a country and the rest of the world are very concrete and perceived at the socio-political and institutional level.

1.1.1. The most relevant Italian legislative references

There are many directives and official acts governing intervention in case of disasters or catastrophic events.

The Circular of the Ministry of the Interior November 6, 1991, no. 28⁶, adopted under the signature of the Head of the National Fire Corps, allowed introducing the *Directives on the organization and functioning of the Colonna Mobile Regionale*⁷ (*Colonna Mobile* is the reinforcements that arrive to local firefighters from neighboring regions.). Therefore, in the event of disasters of various origins, composition and modalities of activation of the *Colonne Mobili Regionali* of the National

6. Should also be mentioned the circular EM-01/2011 signed by the Head of the National Fire Corps *Reorganization of the Colonne Mobili Regionali and the mobilization device for great calamity – Riorganizzazione delle Colonne Mobili Regionali e del dispositivo di mobilitazione per grande calamità*.

7. *Direttive sull'organizzazione e sul funzionamento delle Colonne Mobili Regionali*.

Fire Corps was regulated. The *Colonna Mobile* can intervene on the national territory, ensuring an immediate availability of forces, which is graduated according to their proximity to the place of intervention.

Regarding the organization and management of the emergencies, some Directives of the President of the Council of Ministers intervened and among these must undoubtedly be recalled the *Directive for the coordination of initiatives and measures aimed at regulating the relief and assistance to the population in the event of road, rail, air and sea accidents, explosions and collapses of structures and accidents involving the presence of dangerous substances*⁸ adopted on April 6, 2006. The directive has highlighted the need for a planned, not improvised, coordination of intervention activities to prevent delays in rescue and amplification of the critical issues⁹. The Directive also defines a unique intervention strategy to address critical issues related to the “emergencies due to accidents”.

The Directive first establishes the need to define communication between the local and central operating rooms, so that the civil protection system can be activated immediately. Identification of the Technical Relief Director (“Direttore Tecnico dei Soccorsi – DTS”) will allow coordinating interventions on the territory; defining the activities to be performed and which must be carried out by the various operating structures. During emergencies, the link and connection with the affected territory is fundamental and is considered as an activity of first assistance to population. The Mayor will play this role. Subsequently, a coordination center will be set up for management of emergency fully.

The Provincial Commander of the Fire Corps (in general and apart from cases of maritime accidents) covers the role of Technical Director of Relief. Its task is to define the interventions to be carried out in collaboration with the Director of Health Assistance (“Direttore dei Soccorsi Sanitari – DSS”), with the Head of Order Services and

8. *Direttiva per il coordinamento delle iniziative e delle misure finalizzate a disciplinare gli interventi di soccorso e di assistenza alla popolazione in occasione di incidenti stradali, ferroviari, aerei ed in mare, di esplosioni e crolli di strutture e di incidenti con presenza di sostanze pericolose.*

9. The Head of Civil Protection Department through the Directive of 2 May 2006 no. 1636, in implementation of the previously stated Directive of the President of the Council, has also provided guidance on the coordination of emergencies characterized by a large regional impact or a high involvement of people.

Public Safety (role that may be held by the Quaestor or the Carabinieri Commander) and with the Head of the Road System Services (usually the commander of the local Traffic Police). If the level of coordination and integration of relief is high, as a result the possibility of success of the search, rescue and safety of the victims will be high.

Other Directives have been produced that deal with the problem of emergency only from a health point of view, identifying the basic structures for the management of medical assistance. Specifically, it must remember the Decree of the Ministry of the Interior (delegate for the coordination of civil protection) adopted on 13 February 2001 *General criteria for the organization of health assistance in disasters*¹⁰ and the directive of the President of the Council of Ministers of 13 December 2007 *Procedures and forms of triage in catastrophes*¹¹.

The decree law of January 26, 1987, no. 8¹² in article 1, paragraph 5 defines the Italian intervention at an international level. This is a government intervention launched specifically for a national emergency aimed at activating *Urgent measures to deal with the emergency in the municipality of Senise and in other municipalities affected by land destruction and areas affected by the atmospheric adversities of January 1987, as well as measures relating to public calamities*¹³.

This context, following the occurrence of a determined calamity, was also the legislative vehicle for delineating the general principle of international collaboration. In fact, the quoted paragraph 5 of article 1, established that, in case of a disastrous or extraordinary event characterized by particular gravity in a foreign country, Italy must provide the most appropriate cooperation and availability also in terms of financial resources of the Civil Protection Fund.

The law decree 31 May 2005, no. 90, converted into law with modifications, from the article 1 of the law of 26 July 2005 no. 152¹⁴ deals

10. *Criteri di massima per l'organizzazione dei soccorsi sanitari nelle catastrofi.*

11. *Procedure e modulistica del triage nelle catastrofi.*

12. The decree was converted into law, with modification, by article 1, comma 1, of the law of 27 March 1987, no. 120.

13. *Misure urgenti per fronteggiare l'emergenza nel comune di Senise ed in altri comuni interessati da dissesto del territorio e nelle zone colpite dalle avversità atmosferiche del gennaio 1987, nonché provvedimenti relativi a pubbliche calamità.*

14. With particular reference to the combined provision of Article 4, comma 2, and Article 9 governing the relationship between the Ministry of Foreign Affairs and Civil Protection.

with Italy's intervention system in international emergencies. In accordance with this article the state of emergency may be declared even in case of natural disasters or serious events abroad with details for each international emergency of the data on the measures adopted and the resources allocated¹⁵.

1.2. The National Fire Corps and USAR teams

The National Fire Corps has experts and professionals able to carry out urban search and rescue and to help victims trapped under debris.

They operate, therefore, with specific intrusion techniques, creating passages necessary to allow the extraction of trapped persons¹⁶.

The various rescue activities in complex scenarios¹⁷ — characterized by a prolonged work activity, often with difficult climatic conditions and with limited rest periods — are carried out by the USAR Fire Corps teams, which are trained to use advanced methodologies especially for the assessment of risks, the location of victims and their extrication.

For the success of the response to the event, rescue activities must be incisive and must be carried out as quickly as possible, with the fixed objective of saving the largest number of victims trapped in debris according to times compatible with the needs of medical care. In this way it is possible to reduce the risks both for the victims and for the teams.

The competence of the USAR teams of the National Fire Corps has been demonstrated and recognized both nationally and internationally. Precisely for this reason the Circular EM 05/2013¹⁸ of the Ministry of

15. In Appendix, it is possible to consult the list of the latest international emergencies in which Italy has intervened.

16. The triangle of life (a Doug Coop's theory) is the space in which a person can find protection. The collapse of load-bearing and non-load-bearing edifice structures, together with objects, furniture and furnishings present within them, can lead to the formation of voids in which people can survive.

17. The complexity of operations comes from the fact that, when a disaster occurs, teams need to work and to find operational solutions in new and different scenarios for which a standardized action procedure can not be used (the so-called *knowledge-based on behavior*, as mentioned in Circular EM 05/2013).

18. The object of the Circular indicates: *Qualification, composition and equipment of the USAR teams of C.N.VV.F. in mobilizing for great calamity and for international relief missions*