Emergency Activation Procedures

Mauro Dolce
Italian Department of Civil Protection
Risk management: roles and responsibilities in the decision-making process

Civil Protection vs. Science

Contributions of Science to Civil Protection

i. Permanent activities for CP
ii. Finalised research funded by CP
iii. Permanent commissions of CP
iv. Commissions on specific subjects
v. Research funded by other subjects
vi. Spontaneous research works
Scientists and Decision Makers in the risk management

Within the Risk Cycle, (Political/Technical) Decision Makers and Scientists provide different contributions to the risk management, with frequent and intricate interactions that can cause distortions of their roles, and thus of their responsibilities.

(Other subjects play important roles, and thus indirectly condition decisions:

• Mass media
• Citizens
• Judiciary
• ... )
Steps of an ideal civil protection decision-making process:

1) **definition of the acceptable level of risk** according to established policy;

2) **quantitative evaluation of risk** ($H \times V \times E$);

3) **identification of specific actions** capable of reducing the risk to the acceptable level;

4) **cost-benefit evaluation** of possible risk-mitigating actions;

5) **adoption of the most suitable technical solution**;

6) **implementation** of risk-mitigating actions.

- Scientists should deal with steps 2 and 4;
- Political Decision Makers should deal with step 1;
- Technical Decision Makers typically manage steps 3, 5 and 6.
Distortions of the roles imply some confusion and undue responsibilities in the decision.

This occurs especially if some of the participants in the decisional process:

- Do not / cannot accomplish their tasks
- go beyond their role
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Contributions of Science to Civil Protection

The National CP system

i. Permanent activities for CP
   - Centres of Competence
     - INGV
     - EUCENTRE
     - ReLUIS

ii. Finalised research funded by CP

iii. Permanent commissions of CP

iv. Consultancies on specific subjects

v. Research funded by other subjects

vi. Spontaneous research works
From the CP point of view, two aspects are relevant in the relationship between Science and Civil Protection:

- **Scientific advances** can allow for **more effective CP decisions and actions** concerning the entire risk cycle.

- **CP** has to **suitably shape its activities and operational procedures** to take into account these advances, **without delay**.
Civil Protection vs. Science
Scientific products for CP

Science can contribute to CP in the following two ways:

1. **Scientific products made available spontaneously:**
   a. multitude of information on the same subject, inconsistent or conflicting
   b. totally new information "standing out from the crowd", proposed as innovative/revolutionary/fundamental, often conveyed to the public through media
   c. totally new (valuable) information, which needs adaptation for CP operability

Scientific correctness, reliability and consensus are needed to select the best or the right product among the many available.

2. **Scientific products specifically requested by CP**

Products, however, can be not suitably shaped for a direct translation into CP actions (if not provided at all).
Contributions of Science to CP - Classification

i. scientific activities permanently made by scientific institutions (e.g. monitoring) on behalf of CP

ii. finalised research funded by CP

iii. permanent commissions or consultants of CP

iv. commissions for CP on specific subjects

v. research activities funded by other subjects to produce results of interest for CP (e.g. EU projects)

vi. spontaneous research works producing results of potential interest for CP, without any involvement of CP
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INGV EUCENTRE ReLUIS

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The National CP system
The national warning system is provided by DPC and the Regions by means of:

- **“Functional Centres”** (Centres for Forecasting and Surveillance of Effects - CFSE), which collect, elaborate and exchange every kind of data to provide a **multiple support system for decisions**.

- **“Competence Centres”** (Centres for Technological and Scientific services, development and transfer - CTS), scientific institutions which provide **services, information, data, elaborations, technical and scientific contributions** for specific topics, to **share the best practices in risk assessment and management**.
An example: the DPC-INGV 2012-21 Agreement

Three types of activities are envisaged:

a) Operational service activities
   - Seismic (and volcanic) **monitoring** and 24/7 surveillance *(CNT-National Earthquake Centre)*
   - Implementation/maintenance of **data banks** of CP use
   - Scientific **support in emergency**

b) Pre-operational service activities
   Validated research products derived from c-activities or other INGV research are translated into products for a CP pre-operational experimental phase

c) Finalized research activities
   Seismological-volcanological **research programmes** are funded, involving all the scientific community
"a-type" activities
Seismic monitoring and surveillance

The velocimetric National Seismic Network (~400 stations) is managed 7/24 by INGV–CNT (National Earthquake Centre).

Mag. Detection 2014-06-30 7.30

Working Stations
2014-06-30 7.30

Multisensor Station:
BB Seismometer + Accelerometer + GPS

quasi-real-time information on location and magnitude of Italian earthquakes.
"a-type" activities
Implementation/Maintenance of Data Banks
DISS – Database of Individual Seismogenic Sources
"b-type" activities
CPS - Centre of Seismic Hazard

Long-term seismic hazard ➔
Time-window: typically fifty years
Time-independent process
Used for building code and seismic classification

Mid-term seismic hazard ➔
Time-window: years to tens of years
Time-dependent process
Possibly used to set up risk mitigation strategies

Short-term seismic hazard ➔
Time-window: days to months
Time-dependent process
Possibly used to improve decision-making during swarms or aftershock sequences (and maybe improve people awareness)
"b-type" activities
CAT - Tsunami Alert Centre

Italian National Tsunami Warning Centre

NTWC

Seismic Data

ISPRA
RMN

DPC
SSI

CAT@INGV
TWFP

Data & Messages

Seismic Data

Sea level data

Messages

Alert dissemination

National & local authorities

TWPs

TWFPs
In 2012-2014, DPC funded two seismological and volcanological research programmes. Each of them was organized in three main projects, involving some tens of research units.

The total funding was 2 M € for each programme, 60% of which for the participation of universities and other scientific institutions.
Technical-scientific support and divulgation

EUCENTRE (European Centre for Training and Research on Earthquake Engineering) supports DPC in:

• Training and divulgation
• Experimental Laboratory
• Implementation/Management of a seismic risk platform
• Planning, preparing and managing technical-scientific activities in emergency
Seismic Risk Platform

WebGIS for the computation of seismic risk maps and real time damage scenarios

- 50,000 schools
- 32 harbors
- 238 dams
- Residential buildings (ISTAT 2001)
- Road way network (17,000 bridges, 38 airports)
Finalized research programs on earthquake engineering and seismic risk mitigation

i. **General Themes**, relevant to **design, safety and vulnerability assessment** of buildings and engineering manufacts (e.g., R/C and masonry buildings, bridges, tanks, geotechnical works, dams, etc.)

ii. **Territorial Themes**, aimed at **improving the knowledge of the actual territorial distributions of types of buildings**, to define their vulnerability, in order to **set up tools for the vulnerability and risk assessment** at national/local scale

iii. **Special Projects** on themes different from the general ones, or transverse themes
DPC-ReLUIS CARTIS Project

DPC is developing, along with ReLUIS, CARTIS a data collection for improving building taxonomies and their territorial distribution at national level.
RINTC Project, to assess the (implicit) seismic risk of code-conforming buildings in Italy.

From: I. Jervolino, A. Spillatura, and P. Bazzurro, RINTC Project: assessing the (implicit) seismic risk of code-conforming structures in Italy, COMPDYN 2017
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Permanent commissions of CP: “Commissione Grandi Rischi”

- The **National commission for forecasting and prevention of major risks** is the **highest level** connecting structure between the CP and the Scientific Community.

- It provides **advice on technical-scientific matters** required by the **Head of the Department of Civil Protection** and may provide directions on how to improve capabilities for evaluation, prediction and prevention of the various risks.

The Commission was established with law no. 225 of 1992. Organization and functions have been **re-defined on 2011** (DPCM 7 October 2011).
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Centres of Competence

INGV
EUCENTRE
ReL UIS
ICEF - International Commission on Earthquake Forecasting

• Charged by DPC on 20 May 2009 to:

1. Report on the current state of knowledge of short-term prediction and forecasting of tectonic earthquakes

2. Indicate guidelines for utilization of possible forerunners of large earthquakes to drive CP actions

• ICEF report: “Operational Earthquake Forecasting: State of Knowledge and Guidelines for Utilization”

  – Findings & recommendations released on 2 Oct 2009

Members (9 countries):
T. H. Jordan, Chair, USA
Y.-T. Chen, China
P. Gasparini, Secretary, Italy
R. Madariaga, France
I. Main, United Kingdom
W. Marzocchi, Italy
G. Papadopoulos, Greece
G. Sobolev, Russia
K. Yamaoka, Japan
J. Zschau, Germany
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Contributions of Science to Civil Protection

- The participation of CP organizations to research projects is now **strongly encouraged** by the research funding policy of EU.
- While until some years ago only a generic endorsement was looked for by the research consortia, now an **active participation of CP organisations**, or more generally **stakeholders**, is required, as **partners, end-users** or **advisors**.
Example of EU-Projects oriented to CP problems – REAKT

REAKT – Strategies and tools for Real time Earthquake risk reduction

Among the objectives:

• a detailed methodology for optimal decision making associated with earthquake early warning system (EEWS), with operational earthquake forecasting (OEF) and with real time vulnerability and loss assessment in order to facilitate the selection of risk reduction measures by end users

• the study of the content and way of delivering public communication, recognizing the value of a degree of self organization in community decision making
SHARE's (Seismic Hazard Harmonization in Europe) main objective is to provide a community-based seismic hazard model for the Euro-Mediterranean region with update mechanisms. The project aims to establish new standards in Probabilistic Seismic Hazard Assessment (PSHA) practice by a close cooperation of leading European geologists, seismologists and engineers.
GEM – Global Earthquake Model

DPC represents Italy in this partnership

A TRUE PUBLIC-PRIVATE PARTNERSHIP

More than 25 public & private organisations and 16+ countries fund and govern the GEM Foundation

VISION

EXPAND the knowledge and understanding of earthquakes

SHARE data, models, and science through the OpenQuake platform

INTEGRATE information and build collaboration from local to national to global scale

FACILITATE tools and resources to be applied for risk reduction and management
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Centres of Competence

INGV EUCENTRE ReLUIS
"Spontaneous" research can determine **critical CP issues** when it concerns **sensitive aspects of risk mitigation**.

E.g., in case of earthquakes:

- Drafting new **hazard maps**
- Making **earthquake predictions** (short and medium term)
- Conceiving new **structural devices or building techniques**
- Inventing **antiseismic cellules, antiseismic beds** …
- …

No matter if these new findings are the outcome of valuable research or not, very often **"Civil Protection" is**, even inappropriately, **urged to promptly acknowledge or adopt** the new findings and **take any useful action to mitigate risks, based on them**.
Relationships between Science and CP are very complex, but both can take advantage from it.

- Scientific advances can allow for more effective civil protection decisions/actions, although critical issues can arise for the CP system, that has to suitably shape its activities and operational procedures according to these advances.

- The scientific community can benefit from the enlargement of the investigation perspectives, the clear finalisation of the research activities and their positive social implications.

A stable and continuous relationship between Science and Civil Protection is needed and has to be pursued, making every effort to overcome misunderstandings and reciprocal suspicion.
This presentation is mainly based on the content of the following papers:

