

From Resilient Recovery to Sustainable Development:

L'Aquila Earthquake of 2009



**International Recovery Forum
Kobe – Japan, January 16th 2010**

April 6th 2009, 3.32 a.m.: a strong earthquake strikes L'Aquila



The earthquake in Abruzzo: the very first hours

6th April 2009 h. 3.32 am

- At 3.32 a.m. L'Aquila earthquake
- At 4.15 a.m. Crisis Unit – Civil Protection Department
- At 4.30 a.m. Departure of DPC first team for macroseismic evaluation
- At 4.40 a.m. Meeting of the Civil Protection Operational Committee
- At 4.40 a.m. Departure of the first two DPC operational teams
- At 9.00 a.m. Start-up of the Direction for Command and Control - Di.Coma.C. - in the premises of the School of the Italian "Guardia di Finanza"



First legal initiatives

DPCM of April 6th, 2009

“Declaration of a state of emergency due to the extraordinary seismic events which affected the L'Aquila province and other municipalities in the Abruzzo region on April 6th, 2009” (ex L. 225/92).

OPCM 3753 of April 6th, 2009

“First initiatives following the seismic events which affected the L'Aquila province and other municipalities in the Abruzzo region on April 6th, 2009”

D.L. n. 39 of April 28th, 2009 (converted to Law n. 77 of June 24th 2009)

“Urgent interventions in favour of the population affected by the seismic events occurred in the Abruzzo region during April 2009 and further urgent measures in the field of civil protection ”

The reaction of the Italian Civil Protection System: the forces deployed

Confronted by this big emergency, every single component of the Italian Civil Protection system reacted immediately, giving its own precious contribution to the recovery activities

	First 48 h	Maximum value	Today (15/01/2010)
Fire Brigades	2.400	2.471	422
Army	1.825	1.825	345
Police forces	1.586	3.487	683
International Red Cross	816	835	66
Volunteers	4.300	9.000	23
TOTAL	10.927	17.618	1.539



The work carried out by the Fire Fighters



Search and rescue operations



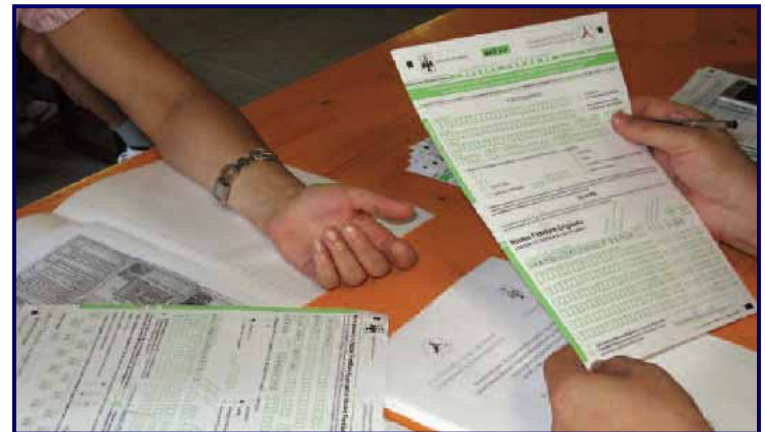
Securing damaged buildings



Assistance to the population and goods recovery

The earthquake in Abruzzo: the numbers of the emergency

	The first 48 hours	Maximum level reached	January 15 th 2010
Assisted Population	27.772	67.459	10.513
Displaced People Camps	30	170	-
Tents	2.962	5.957	-
Field Kitchens	10	107	-
AMP – Health Care	13	47	-



The protection of the cultural heritage

Starting from April 6th, there have been **1.715** inspections on cultural heritage goods.
917 where carried out on churches.



45 buildings belonging to L'Aquila's cultural heritage have been inserted into the Project **"Saving art in Abruzzo"**

The intervention on the church "Santa Maria del Suffragio"



Collemaggio's Basilica: what it used to look like...

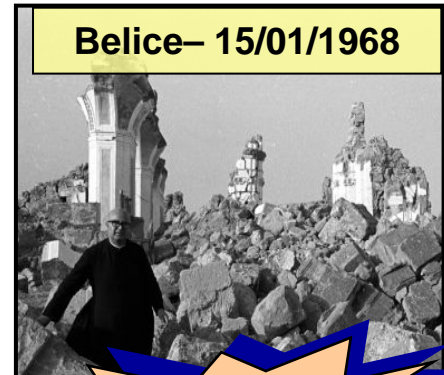


Collemaggio's Basilica reopened for Christmas



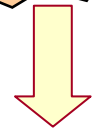
The previous earthquake emergencies...

The examples below demonstrate damage from earthquakes of at least **9+ degrees** on the Mercalli Intensity Scale



Belice – 15/01/1968

Magnitude: 6.1
296 victims



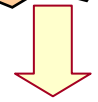
Municipalities damaged: 15

Largest town: Salemi → 11.145 inhabitants



Friuli – 06/05/1976

Magnitude: 6.4
965 victims



Municipalities damaged: 119

Largest town: Gemona → 11.190 inhabitants



Irpinia – 23/11/1980

Magnitude: 6.9
2735 victims



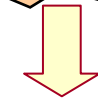
Municipalities damaged: 506

Largest town: Lioni → 6.410 inhabitants



Umbria-Marche, 26/09/1997

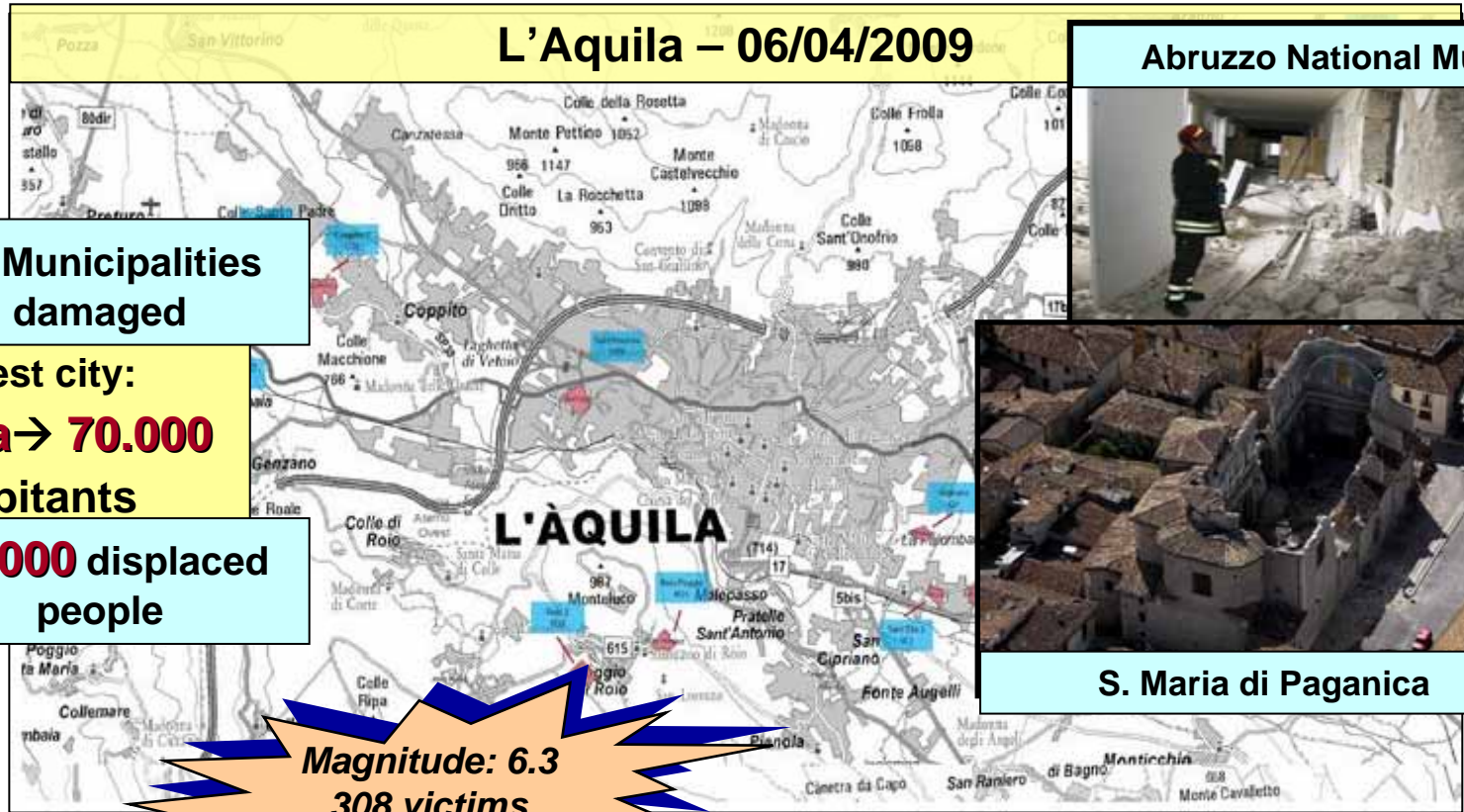
Magnitude: 6.1
11 victims



Municipalities damaged: 46

Largest town: Nocera Umbra → 6.084 inhabitants

... compared to L'Aquila earthquake



57 Municipalities damaged

Biggest city:
L'Aquila → **70.000** inhabitants

67.000 displaced people

Magnitude: 6.3
308 victims

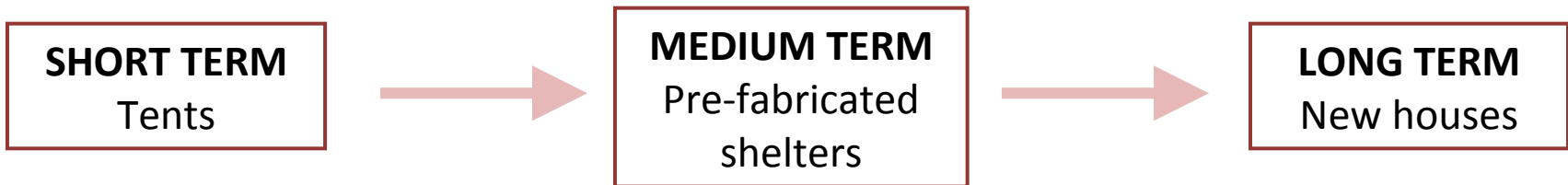


For the first time since 1908, when more than 86.000 people died during the earthquake that struck **Messina and Reggio Calabria**, a strong seismic event has had its **epicentre in a large Italian city**, rich in cultural heritage to be preserved and with a densely populated city centre.

The reconstruction strategy: avoiding containers to avoid new slums

The use of **containers** during previous emergencies in Italy has often showed that, although conceived as temporary solutions, these shelters **ended up becoming permanent**, sometimes creating new “slums”

TRADITIONAL STRATEGY



The Italian Civil Protection Department has thus decided to use a **completely new strategy**, passing directly from tents to **high quality houses** built with new technologies

ALTERNATIVE STRATEGY



Respecting different identities in the reconstruction process. C.A.S.E. and MAPs

A)



City of L'Aquila → CASE Project

Building new neighborhoods in 19 different areas in order to avoid creating a “new town” and to maintain the identity of the city

Total cost: € 819.320.194

B)



Other villages or former municipalities of the L'Aquila Province → MAP Project

Opting for small groups of houses in numerous areas in order to let people remain in the areas where they used to live and to which they feel they belong to

Total cost: € 85.096.000

A) The “C.A.S.E.” Project – Building earthquake proof and eco-friendly complexes of houses



The **C.A.S.E. Project** aims at building **4 500 new apartments**, organized in **183 buildings**, in order to host **18 000 people** having lost their own flats.

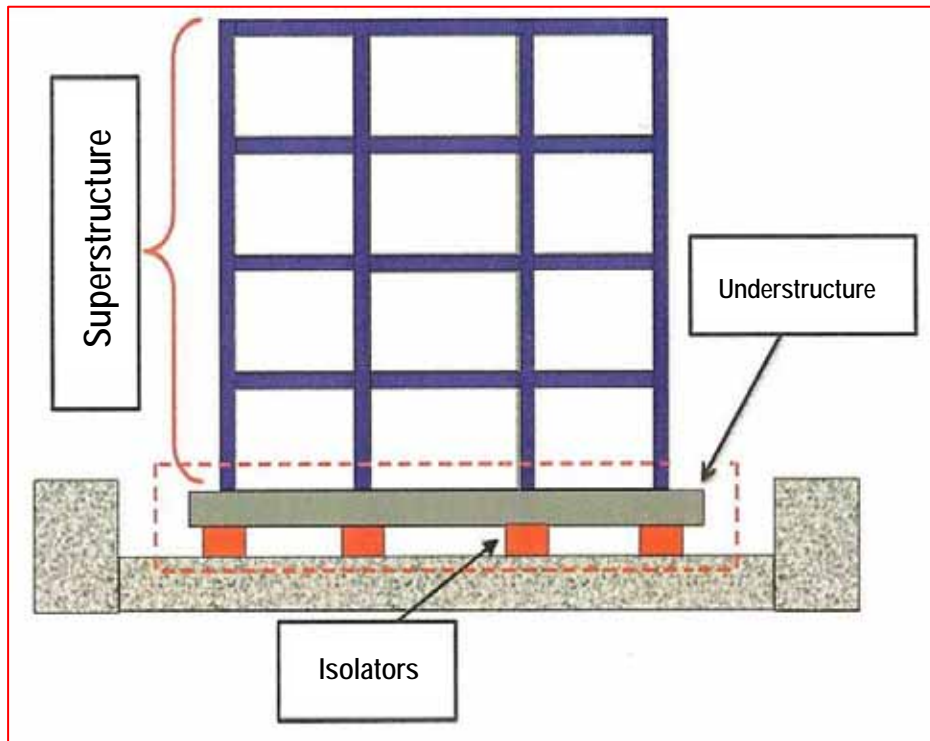
The first houses have been consigned to people on September 29th 2009.

By now, 3.700 apartments have been completed and **11.666 people are already living in the houses** of the CASE Project.

Although being called temporary, the qualitative features of the houses are as high as the ones of permanent buildings, and they are **earth-quake proof and environmentally friendly**.

As for the location, **19 areas** have been identified in cooperation with the city planners of the municipality of L’Aquila and taking into account their proximity to damaged areas, the risk of hydro-geological and environmental disasters.

C.A.S.E: the technology behind the project



The superstructure is seismically isolated moving horizontally in every direction

In case of seismic events, even if very strong, the structure does not suffer from any damage

The cost of repairing buildings after an earthquake is almost eliminated

Building CASE in 80 days: the area of Bazzano

1.

Beginning of June 2009



2.

June, 26th 2009



September 29th 2009 → 400 apartments delivered

3.



B) The so-called MAPs – Temporary Wooden Houses

The so-called MAPs are **temporary houses** that will host more than 6 000 displaced people, whose houses have been seriously damaged by the earthquake.

In particular, over **2.000 modules** are being placed **in the 57 villages** other than L'Aquila that have suffered from the seism, while **1.113 houses** are being built **in some neighborhoods of the city of L'Aquila** that used to be independent municipalities in the past.

The modules are very resistant and safe; their size can vary on the basis of the needs of the family hosted and of the characteristics of their geographical area, as well as the techniques chosen and the materials used to build them.

MAPs in Goriano Sicoli



MAPs in Castelnuovo



Comparing costs... and quality

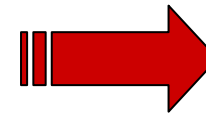
CONTAINERS

Average cost per square metre: **€ 360**

The price includes air conditioning and basic furniture but not the costs for thermic isolation and for electricity, sewerage system and street facilities. The container has standard measures (12 m x 3 m).

Since life in a container can be acceptable only for some months, it needs to be replaced by higher standards accommodation, whose cost has to be added to the one of the container (such as wooden houses, worth € 700 m²).

TOTAL COST



€ 360 +

€ 700 =

€1070





Wooden Houses - MAPs

€ 760 : cost per square metre

€ 70: average cost of the basement per square metre

€ 170: average cost of street facilities, electricity, heating system, ...

€ 210: cost of the furniture

TOTAL COST → € 1.210





CASE Project

€ 1.283: Average Cost of the apartments per square metre

+

€456: seismic isolation technologies including also the pillars and the covered parking space

+

€38: cost of the seismic isolator itself

+

€ 650: parks and gardens, measures to make the flats accessible to disabled persons

TOTAL COST → €2.428

including seismic isolation, electricity, heating, parking places, gardens and green areas, ...

Reopening the schools: the so-called MUSPs

“G. Carducci” Primary School



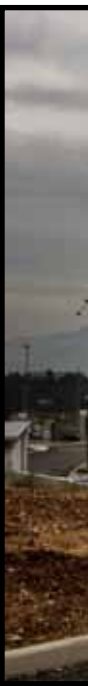
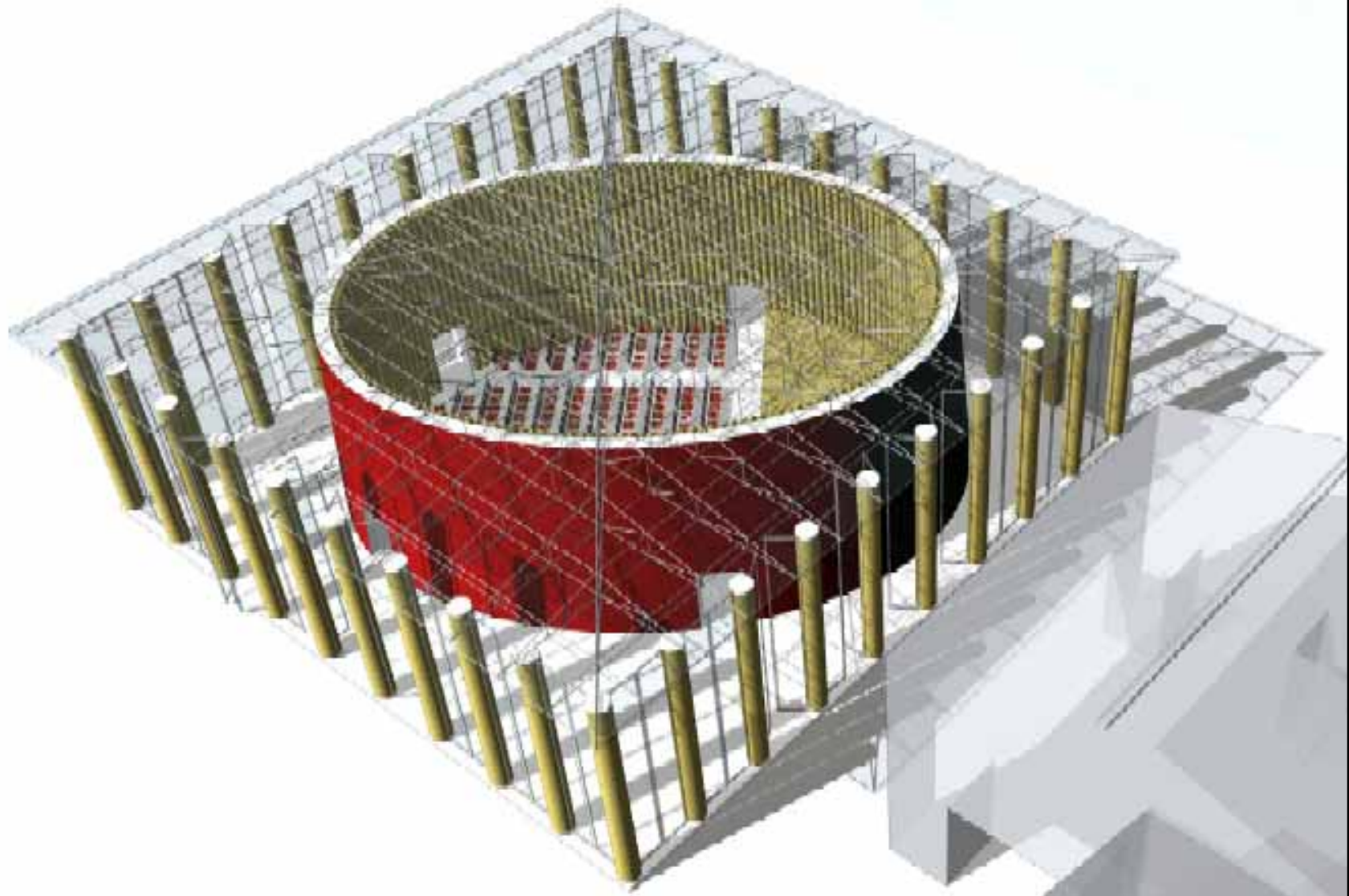
The so-called MUSPs are **temporary buildings** substituting the schools that have been damaged or destroyed by the earthquake.

They are **prefabricated structures** able to resist to difficult weather conditions (1.500 meters of altitude).

Nursery School “Ex Viale Duca degli Abruzzi”



Starting from September 21st, all the **17.567** students living in the area damaged by the earthquake have been able to go back to school.



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The contribution of a recovery process to sustainable development and reduction of risks: some lessons learnt

- 1) A natural disaster provokes a strong economic shock. However, the recovery process can be used for **fostering territorial development** and stimulate the economy, while developing new technologies and solutions
- 2) The experience acquired can be used to avoid repeating the mistakes made in the past and to build a **resilient and informed community**, involving the population and local authorities in the decision making process
- 3) What is built in the post-emergency phases needs to be different from the past and be a good example of **eco-friendly and disaster-safe architecture**



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