Fabio Germagnoli
EUCENTRE Foundation

Our mission is to create value for our founders, partners and stakeholders in the field of safety

Founders

PROTEZIONE CIVILE
Presidenza del Consiglio dei Ministri
Dipartimento della Protezione Civile

Dipartimento per la Protezione Civile (DPC)

IUSS
Scuola Universitaria Superiore Pavia

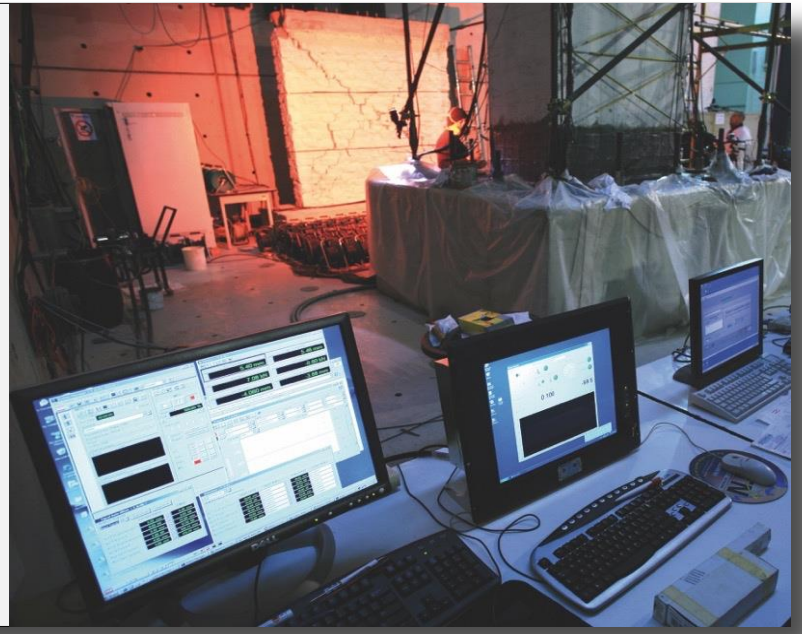
Scuola Universitaria Superiore IUSS (IUSS)

UNIVERSITA' DI PAVIA

Università degli Studi di Pavia (UniPV)

INGV

Istituto Nazionale di Geofisica e Vulcanologia (INGV)



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DGS-UNMIG

CLYPEA INNOVATION NETWORK FOR FUTURE ENERGY

OMC 2019 27-29 March 2019 RAVENNA ITALY

www.omc2019.it

OFFSHORE MEDITERRANEAN CONFERENCE & EXHIBITION

EUCENTRE
FOR YOUR SAFETY.

Eucentre was founded in **2003** and become a Foundation in **2005**.
Eucentre Foundation is a non-profit organisation that
promotes, supports and sustains training and research in the field of seismic risk mitigation.

- **6** thematic departments
- **4** laboratories
- **2** univ. colleges in Pavia
- **1** auditorium

- ≃**110** employees/collaborators
- ≃ **50** researchers
- ≃ **30** PhD students

activities in the last 5 years:

- ≃ **200** national research projects (16.8 M€)
- ≃ **50** international research projects (5.6 M€)
- ≃ **260** projects for public and private bodies (22.5 M€)
- ≃ **300** commercial tests (4.6 M€)
- **131** courses for PhD and Masters
- **51** courses for practitioners
- **12** thematic books
- **11** volumes of Ingegneria Sismica journal
- activities in favour of the DPC (8.8 M€)
- emergency support for the DPC after the earthquakes in Emilia Romagna (2012) and Central Italy (2016/17)

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SHAKELAB
EUCENTRE

Making and testing buildings

- **earthquake simulator** able to reproduce any real event recorded to date, on large prototypes up to life size
- **system to test** support and isolation devices with five degrees of freedom
- **contrast structure** composed of a base plate and two orthogonal walls allowing pseudo-static and pseudo-dynamic bi-directional tests

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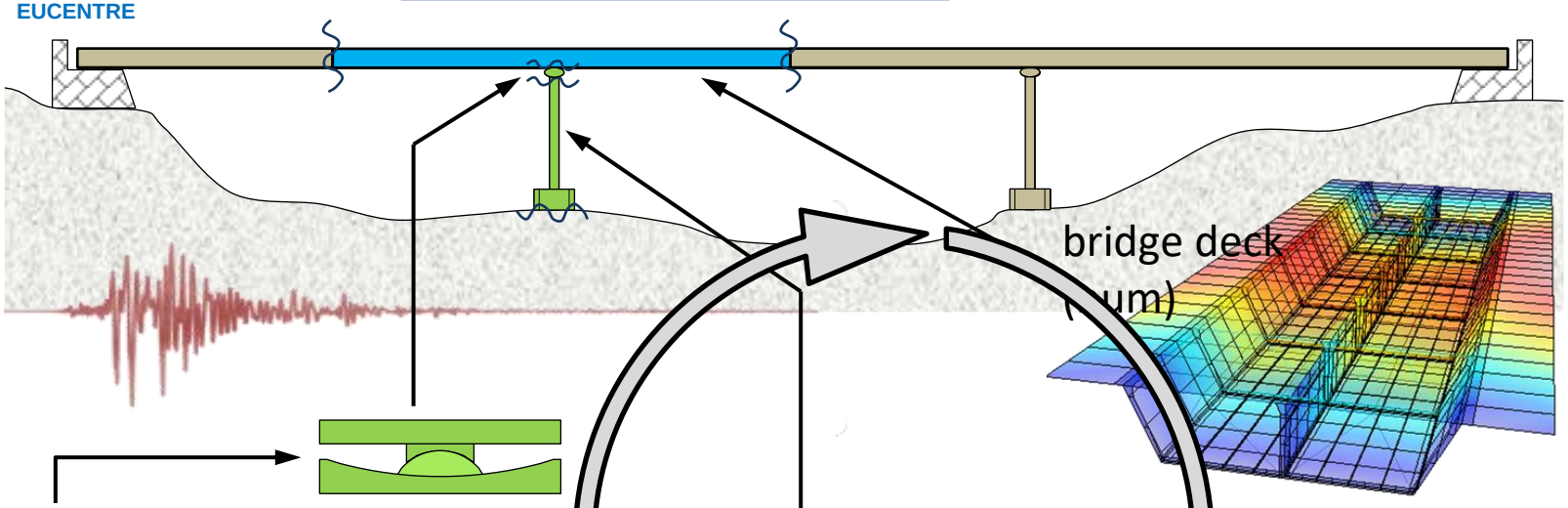
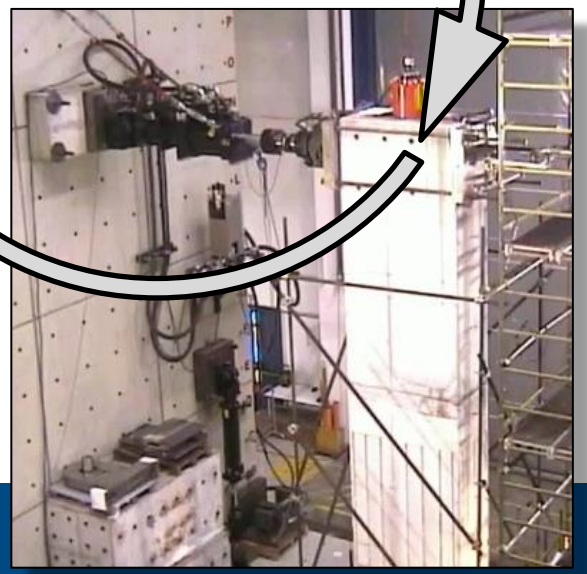
Real-Time Dynamic Hybrid Testing





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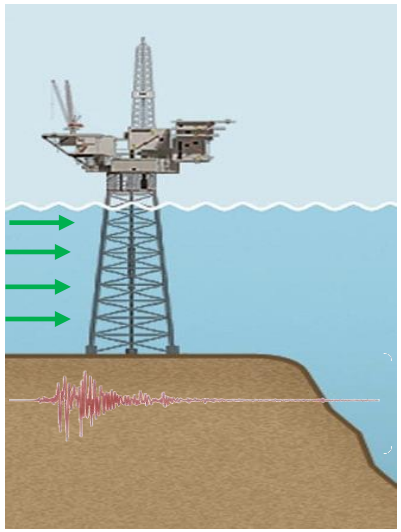
Real-Time Dynamic Hybrid Testing with Sub-structuring (RTDHTS)

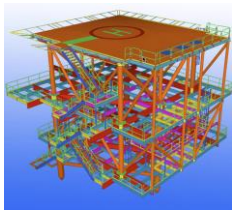
Developed from PsD method:

-Test on large structure

-Rate-dependent effects;

- Sub-structuring

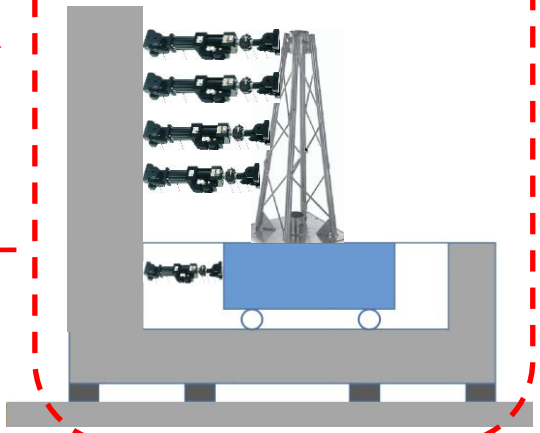




NUMERICAL

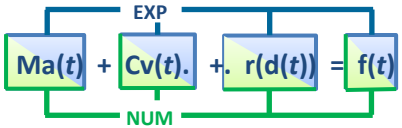
Sub-structure

Num. SIMULATION



PHYSICAL

Sub-structure



Dynamic equilibrium equation

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6DLAB
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Testing non structural components

table 4.80 x 4.80 m

Phase 1: 4 DoF

- 2 horizontal actuators, 2 vertical hold-downs, 4 bearings,
- Stroke: X +/- 250 mm, Z 140 mm
- Payload: 30 ton, Force: 2.000 kN
- Peak vel.: 0.45 m/s

Fase 2: 6 DoF

- + 2 horizontal actuators
- Stroke: X +/- 500 mm, Y +/- 500 mm, Z 140 mm
- Payload: 30 ton, Force: X,Y 1400 kN
- Peak vel.: 2 m/s

Fase 3: a new 3 DoF upper table

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Seismic risk and damage scenario maps

DATALAB
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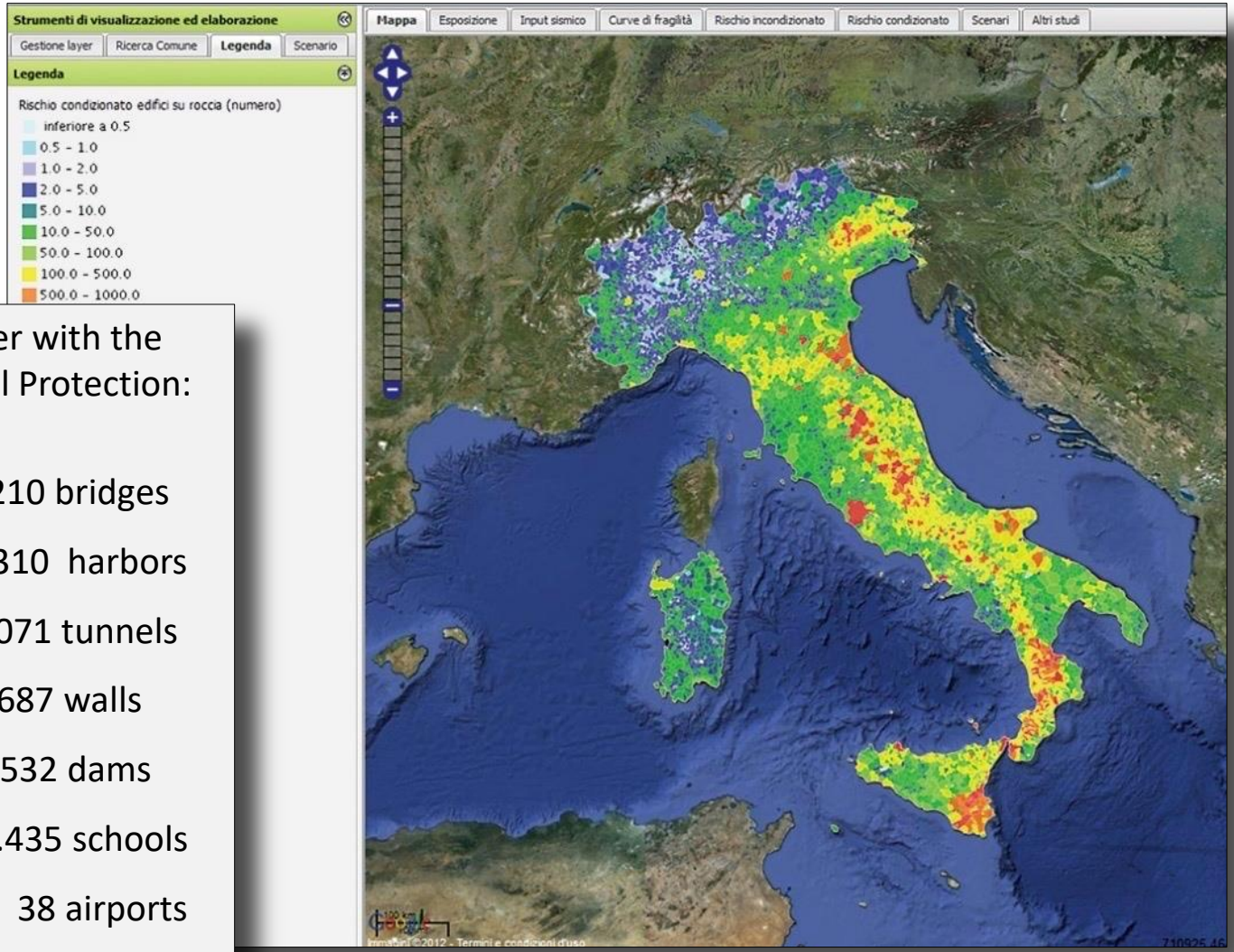

WEB GIS platform together with the Italian Department of Civil Protection:

18.210 bridges

310 harbors

1.071 tunnels

30.687 walls

532 dams

52.435 schools

38 airports

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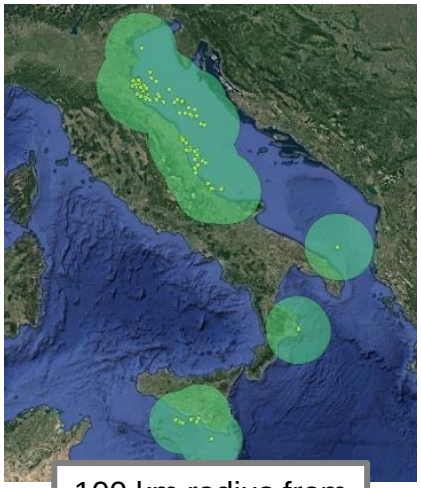
Eucentre in SPOT Project

Definition of damage scenarios to coastal structures and infrastructures deriving from earthquakes in the extraction areas

Study area



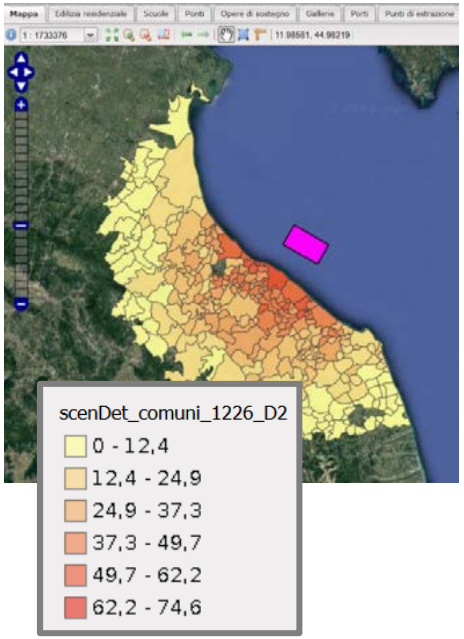
100 km radius from the extraction points

Structures/ infrastructures

- Residential buildings
- School buildings
- Bridges
- Retaining walls
- Harbours
- Tunnels

11 faults by INGV

Damage scenarios



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