



VULNERABILITY

Urban Areas

Landscape & Ecosystems

Infrastructures & Lifelines

amra

■ analysis and monitoring of environmental risk



AMRA ACTIVITIES

AMRA's approach combines parameters describing vulnerability of physical environment with those related to vulnerability of territory – ensemble of people, infrastructures, economical and social activities – usually indicated as systemic vulnerability. Besides direct damages, this approach allows to identify also indirect damages, which are sometimes induced in far areas.

Vulnerability's evaluation is performed with a multidisciplinary methodology combining different kinds of information: geophysical, geological, hydraulic, structural and urban. These information participate together to the definition of expected damage scenarios (in figure below an image of Sarno, small town in Naples area, devastated in 1998 by a series of landslides with 180 houses destroyed and 161 people died).

The activities are focused on three specific sub areas: **Urban Areas, Landscape & Ecosystems, Infrastructures & Lifelines.**

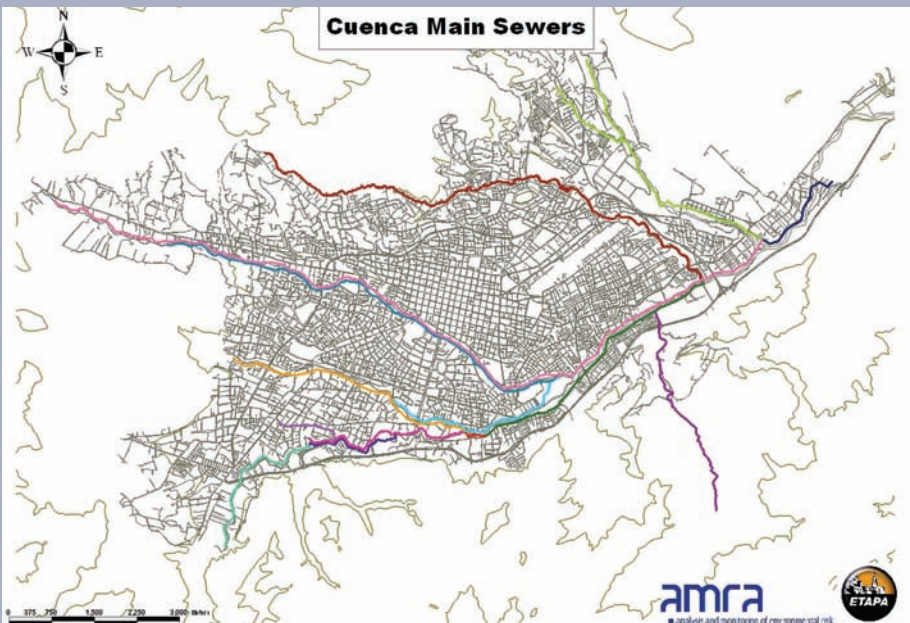




MAIN OBJECTIVES

Main objectives of these area are:

- to develop new methodologies for vulnerability evaluation using quantitative methods;
- to support management and mitigation of risks through damage scenarios definition, advanced planning policies and recovery of building heritage (in figure an example of GIS map of main sewers of city of Cuenca – Ecuador);
- to enhance collaborations with centres, institutes, national and international agencies in order to develop synergies that will take full advantage of available resources and bring to more successful conclusions.



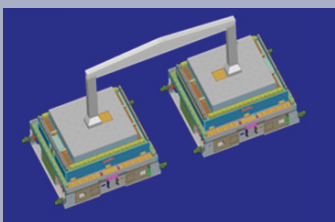


EQUIPMENT

BIAXIAL SHAKING TABLE SYSTEM

It is a facility with maximum flexibility and modularity, relocatable and reconfigurable. It can be set to produce a single biaxial table shaking in the two horizontal directions or to reproduce asynchronous seismic inputs controlling each table separately.

The tables system can work in a independent way or can be combined to form one big table (3 m x 7 m).



DOF	2 for tables
Dimension	3.0 m x 3.0 m
Max payload	20 t
Acceleration peak	1.0 g
Weight for one table	63 t
Displacement peak	± 250 mm for axis
Bandwidth	0÷50 Hz

CLOSED SYSTEM = ACTUATORS AND SERVOVALVES INSIDE → POSSIBILITY OF MOTION



COMMERCIAL SOFTWARES

Bentley SewerGEMS: Software used by engineers to solve sewer system design and operation problems, especially those in systems with direct inflows such as combined sewer systems where hydrologic calculations are important and overflows are a key consideration. It is available in four compatible and interoperable interfaces: Stand-alone, Microstation, ArcGIS and AutoCAD.

Bentley WaterGEMS: An easy-to-use hydraulic and water quality modeling solution for water distribution systems. It features advanced interoperability, model building, optimization, and asset management tools. WaterGEMS runs on four different platforms (stand alone, Microstation, AutoCAD, or ArcGIS).

PROPRIETARY SOFTWARES

SCADA Campania: Software for gathering and validating data collected by a rain gauge and/or hydrometric network and for managing flood risk alarms based on rainfall thresholds.

PLUVIO Campania: Software for a real time forecast of rainfall fields and for an estimation of area-averaged rainfall at basin scale.

SISIDENT AND REALPREV: Software for forecasting hydraulic depth at instrumented river cross sections.

MODIDRO: Hydraulic models for flooding forecast.

GEOTECHNICAL INSTRUMENTATION

MINIVIB II is an advanced seismic source production system designed for high resolution and geophysical prospecting. Minivib generates high frequency P and SH wave. Its high power compared to the traditional equipments and the control capability on the produced signal allow high performances compared with common seismic instrumentation and technique available on the market. The signals acquisition is performed by a 240-channels digital recorder.



MAIN PROJECTS

INTER-AMERICAN DEVELOPMENT BANK THROUGH ETAPA, ECUADOR

Risk Management Plan for Water Supply and Sewer Systems of Cuenca City, Ecuador.

The general objective of the project is the creation of a Risks Management Plan for water supply and sewer systems, within the area of “Planes Maestros de Agua Potable y Saneamiento” – 2nd phase of Cuenca Municipality (Ecuador).

EUROPEAN COMMISSION FP7

SYNER-G, Systemic Seismic Vulnerability and Risk Analysis for Buildings, Lifeline Networks and Infrastructures Safety Gain.

The main objective of the project is to develop a unified methodology, and tools, for systemic vulnerability assessment accounting for all components (structural and socio-economic) exposed to seismic hazard, considering interdependencies within a system unit and among systems.

EUROPEAN COMMISSION FP7

CLUVA, Climate Change and Urban Vulnerability in Africa.

This project is aimed to develop methodologies and knowledge to manage risks and to reduce vulnerabilities in African cities in the context of climate change, and to develop adaptation strategies.

REGIONE CAMPANIA

IC3, a project to estimate the impact of Climate Change on Regione Campania. Its objectives are the Study of the Climate Change and Related impact through the development and optimization of numerical simulation and the developing of a Decision Support System for planning, mitigation and adaption strategies.



MAIN SCIENTIFIC PAPERS

D. Asprone, A. Nanni, H. Salem, H. Tagel-Din

Applied element method analysis of porous GFRP barrier subjected to blast
Advances in Structural Engineering, 2010, accepted for publication

D. Asprone, F. Jalayer, A. Prota, G. Manfredi

Probabilistic assessment of blastinduced progressive collapse in a seismic retrofitted RC structure

14th World Conference on Earthquake Engineering, Beijing 12-17 October, 2008

I. Iervolino, G. Manfredi, M. Polese, G.M. Verderame, G. Fabbrocino

Seismic risk of r.c. building classes

Engineering Structures, 29, 813-820, May 2007

M. Polese, G.M. Verderame, C. Mariniello, I. Iervolino, G. Manfredi

Vulnerability curves for gravity load designed RC buildings in Naples – Italy

Proc. of the International Symposium on Earthquake Loss Estimation for Turkey (HAZTURK), Istanbul, Turkey, 2007

G. Greco jr, M.L. Colarieti, G. Toscano, G. Iamarino, M.A. Rao, L. Gianfreda

Mitigation of olive mill wastewaters toxicity

J. Agr. Food Chem., 54, 6776-6782, 2006

M.L. Colarieti, G. Toscano, G. Greco jr

Toxicity attenuation of olive mill wastewater in soil slurries

Environ. Chem. Lett. 4, 115-118, 2006

M.L. Colarieti, G. Toscano, M.R. Ardi, G. Greco jr

Abiotic oxidation of catechol by soil metal oxides

J. Haz. Mat., B134, 161-168, 2006

M.L. Colarieti, G. Toscano, M.R. Ardi, G. Greco jr

Olive mill wastewater degradation in soil

Proceedings of 9th International FZK/TNO Conference on Contaminated Soil (ConSoil 2005), pp. 2162-2167, ISBN 3 923704 50 X, 3-7 October 2005, Bordeaux, France, 2005

F. Russo, G. Nocerino, M.A. Rao, L. Gianfreda

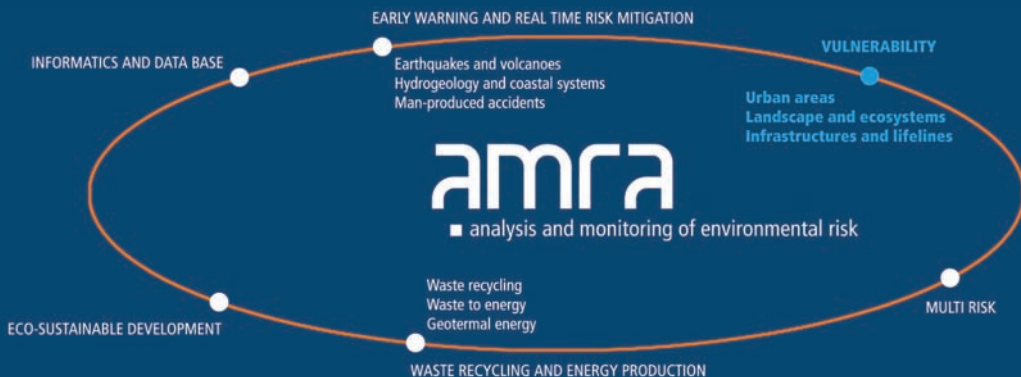
Interactions catechol-birnessite-phenanthrene and their effects on phenanthrene biodegradation

Applied Microbiology and Biotechnology 68, 131-139, 2005

G. Zuccaro

Inventory and vulnerability of the residential building stock at a national level

Seismic risk and Social/economic Loss Maps CD-ROM, Naples, Italy (in Italian), 2004



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