

# *Workshop on Safety Significance of Near Field Earthquakes*

*8-12 March 2004  
(Miramare - Trieste, Italy)*

The Abdus Salam International Centre for Theoretical Physics, in collaboration with the International Atomic Energy Agency (IAEA), will organize a Workshop on Safety Significance of Near Field Earthquakes, from 8 to 12 March 2004. The Workshop is co-ordinated with an IAEA research programme of the same title, in which 22 teams from 18 countries are involved. It will be directed by Mr. Pierre Labbé, (IAEA, Vienna), Prof. G.F. Panza (Dept. of Earth Sciences/ICTP, Trieste) will be the Local Organizer.

It is a well-known technical finding that the usual earthquake engineering practices, as applied in the design of Nuclear Facilities, result in a poor estimate of safety implications of near field earthquakes. The Workshop is dedicated to the resolution of this nuclear safety issue. In order to investigate the case on a scientific basis, experiments were carried out on a shaking table: a civil engineering structure, representative of a 6-level building, was subjected to different seismic input motions representative of near field as well as of far field ground motions. The purpose of the above-mentioned IAEA Co-ordinated Research Programme is to benchmark the interpretation of the experimental results by research teams and, on this basis, to make proposals for an evolution of the engineering practices. The Workshop will be focused on the comparison of outputs provided by the research teams. The modelling of the structures and of the response to seismic input motions by a) classical engineering approach, b) new approaches such as, the displacement-based approach, c) time history simulations, will be discussed. The outlines of an updated engineering approach will also be discussed.

The programme will cover the following topics:

## **A) Modelling of the specimen and of the seismic input motions**

- Several types of modelling of the specimen will be discussed (flexure and shear models, multi-layers models, finite elements),
- Two types of input motions were used on the shaking table: one representative of a far field motion at 2 input levels (0.24 g and 0.41 g) and one representative of a near field motion, also at 2 levels (0.13 g and 1.11 g),
- Two near field input motions recently recorded in Japan are also used for numerical simulations of their effect on the specimen.

## **B) Output Benchmarking**

Benchmarking of outputs will be carried out on the following items:

- Static linear and non-linear analyses,
- Modal spectral analysis, (transfer functions, estimates of maximum values reached by control parameters during a seismic transient),
- Displacement based approach and associated pushover technics,
- Time history analysis.

## **C) Proposal for an evolution of the engineering practice**

- Evolutions already made out of the field of nuclear engineering,
- Difficulties encountered when addressing nuclear facilities,
- Possible evolutions of nuclear engineering practices.

## **D) Keynote lectures**

Keynote lectures will be delivered on:

- Seismic ground motion modeling and earthquake prediction research at ICTP, by Giuliano Panza (ICTP)
- Seismologic features of the near field input motions, by Pierre-Yves Bard (Laboratoire Central des Ponts et Chaussées, France)
- Displacement-based approach and evolution of the Eurocode, by Michael Fardis (Patras University, Greece).

Scientists and students from all countries that are members of the UN, UNESCO, or IAEA may attend the Workshop. The main purpose of the Centre is to help researchers from developing countries through a programme of training activities within a framework of international co-operation. However, students and post-doctoral scientists from developed countries are also welcome to attend. As the Workshop will be conducted in English, participants should have an adequate working knowledge of that language. A degree in Civil engineering, Mechanical engineering, Computer Science and/or similar disciplines is required.

As a rule, travel and subsistence expenses of the participants should be covered by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half fare). However, limited funds are available for some participants who are nationals of, and working in, a developing country, and who are not more than 45 years old. Such support is available only for those who attend the entire activity. There is no registration fee for attending the Workshop. For logistic reasons, connected with the number of Personal Computers available, the total number of participants in the Workshop is limited.

The **Application Form** is obtainable from the ICTP WWW server:

<http://agenda.ictp.trieste.it/smr.php?1593> which will be constantly up-dated, or from the activity Secretariat. It should be completed and returned before **6 February 2004** to the following address:

**Workshop on Safety Significance of Near Field Earthquakes**  
**Smr1593 c/o Ms. G. De Meo**  
**the Abdus Salam International Centre for Theoretical Physics**  
**Strada Costiera 11, I-34014 Trieste, Italy**