



SECED NEWSLETTER

THE SOCIETY FOR
EARTHQUAKE AND
CIVIL ENGINEERING
DYNAMICS

January 1993, Volume 7, Number 1

MEMBERSHIP NOTES

JOINT SECED/BNES SEMINAR

One day Seminar 28 April 1993

Uncertainty and Conservatism in Seismic Design for Nuclear Power Plants

*AEA Conference Centre, Risley,
Warrington*

This meeting has been jointly sponsored by the British Nuclear Energy Society and the Society for Earthquake and Civil Engineering Dynamics, representing the Institution of Civil Engineers. The objectives of the seminar are to highlight in the specialist areas where there is uncertainty and where conservatism has entered into the design process and how these effects can be minimised. The speakers have been chosen from the nuclear companies, Nuclear Electric plc, NNC and British Nuclear Fuels plc, and the major consultants working in the field. Topics to be covered are the Uniform Risk Spectra, Soil-Structure Interaction, Damage Assessment, and Design and Management of Projects. In addition there will be contributions from the research field and the licensing authorities - the Nuclear Installations Inspectorate.

Speakers will include:

Seismic Hazard Assessment

- Seismic Source Modelling
 - D Mallard, Nuclear Electric plc
- Ground Motion
 - G Woo, BEQE

The Sensitivity and Use of Uniform Risk Response Spectra - a generic study of the UK

- J Pappin & T Paul, Ove Arup & Partners

Soil-Structure Interaction Analysis

- J Llambias, NNC

Lessons to Avoid Conservatism in the Design Process and the Way Forward

- P A Merriman, BNF

The Role of Design Management in Reducing Seismic Conservatism

- J Mills, Allott & Lomax

Wylfa Nuclear Power Station Seismic Assessment of Reactor Buildings and Dry Stores 4 & 5

- A Buchanan, W S Atkins, & M Healey, Nuclear Electric plc

Sources of Uncertainty and Future Research Requirements

- B Izzudin & A Elnashai, Imperial College

Generation of Secondary URS and Use of Structural Reliability Techniques for Removal of Conservatism

- R L Bruce, ABB Impell Ltd

Regulatory View

- J Incester & C Patchett, NII

The format for the day will be to limit the invited speakers to a fifteen minute presentation to ensure that there is ample time for the audience to

participate in the proceedings. The meeting will be of benefit to all project managers and engineers involved in the seismic field who wish to ensure that they produce a cost effective design - both in relation to design fees and construction costs.

For registration information contact

Peter Bacos
Institution of Civil Engineers
Great George Street
Westminster
London SW1P 3AA

Attendees who wish to formally take part in the discussion with slides/overheads should inform Peter Bacos of their requirements.

SECED AGM

The SECED AGM will be held at 5:30pm, in the AEA Conference Centre, Risley, Warrington immediately following the joint BNES/SECED Seminar. SECED members wishing to attend the AGM but unable to go to the seminar will be free to join the closing discussions subject to the availability of space in the seminar lecture theatre. For further information contact the SECED Secretary at the Institution of Civil Engineers (071 222 7722).

SECED Meeting Report

Hazard Assessment - Seismological and Wind Comparisons

*Institution of Civil Engineers, Great
George Street, 5 November 1992*

This evening meeting at the ICE in Great George Street was held jointly by SECED and the Wind Engineering Society (WES). It was an occasion for the wind engineers to describe advances in the prediction of extreme wind speeds and also the assessment of wind hazard using techniques borrowed from seismic engineering.

The first of the speakers was Professor Cook of the Building Research Establishment. Professor Cook has been centrally involved in the drafting of the forthcoming British Standard for wind loading, BS 6399, Part 2. Here, he introduced the method used to construct the latest wind map of the UK, as contained in the new code. This draft code has been criticised by some for its apparent conservatism in predicting wind loads on buildings by comparison with the existing code, CP3 : Chapter V. Although this issue was not addressed here, the meeting gave Professor Cook the opportunity to demonstrate why the new wind map is an improvement on the current one.

The existing wind map of the UK given in CP3 : Chapter V was constructed on the basis of a small set of parent wind speed data. With records from wind stations around the country the measured maximum annual gust speed data were fitted to an extreme value distribution (Gumbel

Type 1 distribution) in order to calculate a wind speed with an annual probability of exceedance of 0.02. However, because only the annual maxima data were considered, the resulting small data set used in the statistical analysis meant that the extrapolated values of the extreme wind speeds were sometimes inaccurate.

In arriving at the new wind load map, Professor Cook re-analysed the available wind data in a new way. Instead of using only the annual maximum wind speed, the maximum hourly mean wind speed associated with each windstorm passing over the UK was noted. These storm maxima were then the subject of an extreme value analysis, on the basis of the annual average of 150 windstorms in the UK. This large set of data meant that the probabilities associated with extreme wind speeds could be determined with improved accuracy.

Dr Muir-Wood continued the talk with a presentation of the work done at BEQE on the assessment of windstorm hazards. BEQE have developed a wind-intensity damage scale (WINDS) in order to characterise the wind speed in a region by the damage that it causes. The scale has six divisions, each corresponding with a wind speed in a 5 m/s range. Information on the damage to objects such as houses, churches, mobile homes or vehicles can be used to assess the probable maximum wind speed. Maps of probable maximum wind speed due to individual storms can then be plotted. The technique has obvious parallels in the way that earthquake intensity maps are constructed after the assessment of earthquake damage.

Dr Melville of Cambridge University

was the third and final speaker of the evening. Dr Melville continued the topic of wind hazard assessment with a consideration of the historical information available on wind damage. Objects such as trees, churches or chimney stacks on domestic houses are useful indicators when estimating the intensity of past storms, assuming that these items have not changed significantly with time. There are over 800 years of historical documentation available on the damage due to windstorms in the UK. The wind intensity damage scale, can be applied to the historical data to indicate the 'footprint' caused by the more notable storms down through the centuries. Dr Melville showed colour contour maps of the wind intensities associated with the October 1987 and January 1990 storms, along with plots for even more intense storms such as one in 1835 (newspaper reports of the time also described some unscrupulous practices in the building industry following the storm, demonstrating that whatever improvement of understanding on the pattern of wind storms, human nature has remained quite constant).

The wind intensity damage scale would appear to be of interest to the insurance industry and disaster planning/lifeline services. The electricity distribution services are the current beneficiaries of the work. Their interest is apparent given the damage caused by the 1987 storm in the south of England and the subsequent delays in recovering electricity supplies. Its impact on engineering design would appear to be limited in view of Dr Cooks work on the improvements in the prediction of extreme wind speeds.

Paul Murphy, Ove Arup & Partners

SYMPOSIUM ON PRACTICAL LESSONS FROM THE LOMA PRIETA EARTHQUAKE

*National Research Council
Geotechnical Board
Board on Natural Disasters
and
Earthquake Engineering Research
Institute*

March 22-23, 1993

Nikko Hotel
San Francisco
California

The symposium is offered for engineers, planners, geoscientists, architects, policy makers, building and transportation officials and all others interested in implementing lessons from the 1989 Loma Prieta earthquake.

The program will consist of keynote papers, panel discussions and technical sessions that focus on the

application of lessons from research and practice to reduce seismic risk in communities throughout the United States.

For further information contact

*Earthquake Engineering Research
Institute
499 14th Street, Suite 320
Oakland
California USA
Tel: (510) 451-0905
Fax: (510) 451-5411*

INTERNATIONAL POST-SMIRT CONFERENCE SEMINAR ON ISOLATION, ENERGY DISSIPATION AND CONTROL OF VIBRATIONS OF STRUCTURES

August 23 to 25, 1993
Capri, Italy

Organised by:

Associazione Nazionale Italiana di Ingegneria Sismica, Gruppo di Lavoro Isolamento Sismico (GLIS)

in cooperation with:

Argonne National Laboratory (ANL)
Argonne, Illinois (USA)
Commissariat à l'Energie Atomique (CEA), DDMT, Saclay (France)
Institute of Industrial Science, University of Tokyo (Japan)
Shimizu Corporation, Tokyo (Japan)
University of California at Berkeley, California (USA)
Universidad de Chile, Santiago (Chile)

with support and sponsorship of:

ACEDIS, CREA, ENEA, ENEL S.p.A., ISMES S.p.A., Università di Napoli

INTRODUCTION

According to current codes adopted in several countries, structures may suffer even severe damage under strong external dynamic loadings such as earthquakes, provided that collapse is prevented. Thus, the structure shall be capable of undergoing significant inelastic deformations, i.e. it shall be ductile.

However, the reduction or even absence of damage may be of primary importance for some types of structures, such as:

- important public buildings, especially those critical for emergency and disaster planning (hospitals, emergency control centres, energy and communication facilities, distribution centres, etc.);
- structures which house high risk components (nuclear facilities, some chemical plants, etc.);
- structures which house costly components and electronic equipment;

- important bridges and viaducts.

The development and application in past years of new seismic design approaches and technologies, *such as those using seismic isolation and energy dissipation systems*, allows for the reduction of the seismic vulnerability of structures, for both the structural and non-structural members. Based on experience there is an international consensus that these concepts are already reliable enough for wide-ranging application in both new constructions and retrofitting of existing structures.

In addition, isolation techniques have been developed for the abatement of non-seismic vibrations, and presently great efforts are being devoted in some countries to the development of methodologies for the control of vibrations.

SCOPE

This Seminar is the third to be organised, on the above-mentioned topics, in the framework of specialist meetings connected to the International Conference on Structural Mechanics in Reactor Technology (SMIRT). The first two seminars - held at San Francisco, USA, in 1989, and at Nara, Japan, in 1991 - focused on seismic isolation only. This seminar is intended to provide an opportunity for the exchange of updated and complete information concerning the state-of-the-art on the development and application of all the innovative techniques that have been or are being developed for the abatement of seismic and non-seismic vibrations of structures. In addition to base isolation - which is already an accepted technique for civil constructions in some countries - topics covered by the seminar will be floor isolation, energy dissipation and passive and active control of vibrations.

PROGRAMME

The seminar will consist of sessions addressing the following topics:

- Isolation of civil engineering structures and bridges from seismic and non-seismic ground-borne vibrations;
- Seismic isolation of nuclear facilities;
- Seismic isolation of non-nuclear industrial facilities;
- Energy dissipation and control of vibrations of structures.

Presentations will consist of invited lectures given by experts of the countries that are the most involved in the development and applications of the new techniques. Presentations will be followed by panel discussions on the various topics and future prospects.

REGISTRATION

The individual registration fee is 500 German Marks for participants registered through the SMIRT Secretariat and 350 U.S. Dollars (or the equivalent amount in Lira, for Italians) for participants registered through the Seminar Secretariat. Registration through the Seminar Secretariat is strongly advised to those who will not participate in the main SMIRT Conference also.

CONTACT INFORMATION

Technical Secretariat:

M Forni, GLIS Secretary, c/o ENEA-NUC-RIN, VIA MARTIRI DI MONTE OLE, 4, I-40129 Bologna, Italy.

Tel: +39-51-498554;

Fax: +39-51-498639/498629;

Telex: 510487 ENEAVR I

Administrative Secretariat:

L Bellani, ACEDIS, c/o ALGA SpA, Via Olona 12, I-20123 Milano, Italy

Tel: +39-2-4897946;

Fax: +39-2-28102111

UK Contact:

Dr K Fuller

Tun Abdul Razak Laboratory
Brickendonbury

Hertford SG13 8NL England

**APPLICATION FOR MEMBERSHIP
OF
THE SOCIETY FOR EARTHQUAKE AND CIVIL ENGINEERING DYNAMICS**

INDIVIDUAL MEMBERSHIP

Name: _____

Address: _____

Academic Qualifications: _____ Telephone: _____

Membership of Professional Bodies: _____

Present Employer: _____

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Address: _____

Nominated Representatives (3 only) Telephone: _____

1. Name: _____
Home Address _____

2. Name: _____
Home Address _____ Telephone: _____

3. Name: _____
Home Address _____ Telephone: _____

Home Address _____ Telephone: _____

STUDENT MEMBER

Name: _____

Address: _____

Telephone: _____

Confirmation of Student status: (To be signed by tutor or supervisor)

I confirm that this applicant is a full-time student

Date: _____ Signature _____

Institution and position _____

Annual Subscription : Ordinary Member - £20
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 Retired Member - £10
 Student Member - FREE

Please return to: The Secretary, SECED
 Institution of Civil Engineers
 1 - 7 Great George Street London SW1P 3AA