General information

SEMINAR AND SYMPOSIUM ON EARTHQUAKE ENGINEERING

A four day seminar on Geotechnical Aspects of Earthquake Engineerings will be held at the University of Auckland on Wednesday May 20 to Saturday May 23, 1970. It is intended to bring together civil engineers and scientists to discuss topics of mutual interest in the field of earthquake engineering, with particular emphasis on engineering seismology, together with aspects of foundation design, soil dynamics and slope stability. It is an attempt to bridge the gap between results of recent research and current practice on the one hand, and between scientists and engineers on the other.

TECHNICAL PROGRAMME

Wednesday, 20 May

OPENING ADDRESS, Professor N.A. Mowbray
SEISMICITY OF NEW ZEALAND, Mr G.A. Eiby
ELASTIC AND NON-ELASTIC EARTH DEFORMATIONS IN NEW ZEALAND, Mr G.J. Lensen
DYNAMIC PROPERTIES OF SOILS, Mr P.W. Taylor

Thursday, 21 May

LIQUEFACTION OF SOILS, Mr P.W. Taylor
FOUNDATION DESIGN AND SOIL-STRUCTURE INTERACTION, Mr P.W. Taylor & Dr. G.R. Martin
ORIGIN OF EARTHQUAKES, Professor F.F. Evison
SURFACE LAYER MODIFICATION OF EARTHQUAKE WAVES, Mr P.W. Taylor
EARTHQUAKE MOTIONS FOR DESIGN PURPOSES, Professor Paul C. Jennings

Friday, 22 May

A NEW VERSION OF THE CARACAS STORY, Mr P.W. Taylor
SURFACE LAYER RESPONSE PREDICTION, Mr R. Sheperd
SOME ASPECTS OF MICROZONING, Mr L.E. Oborn
PANEL DISCUSSION ON MICROZONING

Saturday, 23 May

RESPONSE OF EARTH STRUCTURES, Dr. G.R. Martin
SLOPE STABILITY IN EARTHQUAKES, Dr. G.R. Martin
THE VIEWPOINT OF THE PRACTISING ENGINEER, Messrs, R.J.P. Garden, J.P. Hollings, R.M. Tonkin

A brochure containing further details and an enrolment form is to be mailed to all members of the Society. Closing date for enrolment is 20 April.

Enquiries should be directed to -

The Director,
Department of University Extension,
University of Auckland,
Private Bag,
AUCKLAND.

THE NEED FOR STRUCTURAL REGISTRATION

G. H. F. McKenzie

More and More information is being published about earthquake engineering, and design codes are constantly being updated. However, the effective application of these advances in knowledge to the design of seismic structures requires engineers who have covered extensive fields of study in earthquake engineering. It is necessary to prevent engineers who are not equipped with the necessary study in these fields from being in responsible charge of the design of major building structures, because of the magnitude of the responsibility for safety of life which is involved in this particular work. Consequently, there is an urgent need for a criterion to determine whether an engineer has the necessary education and training to take responsibility for design of an earthquake resistant building structure.

The present N.Z. Registration as an Engineer falls far short of being a satisfactory qualification, for the following reasons.

(1) It does not define the field in which a man is registered. His registration may, for example, be based on electrical engineering academic qualifications and experience.

(2) Even if a special qualification of "N.Z. Registration as an Engineer, based on Civil Engineering qualifications and experience" were adopted, this would still not be acceptable for modern structural requirements. N.Z. Registration can at present be awarded to civil engineers on the academic basis of qualifications such as A.M.I.C.E. and A.M.I.Struct.E., for which the examinations are set in countries where no aspects of earthquake engineering are taught, and which have consequently no earthquake engineering content.

(3) To anybody who has engaged in earthquake resistant design of major structures, it is fairly obvious that a satisfactory criterion of ability requires a much higher academic training than the minimum which is accepted for registration. It also requires a more selective specification for the details of the academic qualifications. (e.g. the qualifications must include adequate studies in seismology, earthquake engineering, structural response, advanced theory of structures, earthquake resistant design and foundation engineering).

*Assistant Chief Structural Engineer,
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There is no doubt that the present New Zealand B.E. degree is a more satisfactory qualification for design of seismic structures than the examinations set by the British Institutions and the Registration Board, provided that the degree course is chosen to include the optimum combination of structural and related subjects. However, for the final year of the N.Z. Civil B.E. degree, the course of study can now be chosen from a number of options, and it is possible to select a final year course which omits all the advanced structural options. Hence it is obvious that even the label "B.E. degree" does not necessarily indicate that an engineer has had training for seismic design of structures. Again it is apparent that even the most suitable combinations of final year B.E. subjects do not go far enough or cover all the necessary fields of study for design of major structures.

One can sum up by saying that there is no qualification criterion at present in existence in New Zealand which indicates that an engineer has had suitable training for seismic design of major building structures.

One might ask at this stage why structural building design should be considered to require a special qualification. It could be pointed out that other specialised fields of engineering have been developed to a very advanced and sophisticated stage, and are not adequately covered by any established qualification. The first answer to this is that a single engineering failure in the field of building structures can cause loss of life on a very large scale. A large building can house up to 1,600 people, and the lives of all these people would be jeopardised if the building collapsed in an earthquake. Hence it is essential to be able to recognise whether an engineer is adequately equipped for such work. The only other field of work where the consequence of a single failure approaches this level is the design of large dams. However, the latter type of work is carried out in New Zealand by only one large organisation, which has, over a long period of years, built up a team of highly trained specialists. The design of building structures, on the other hand, is carried out by a large number of firms, some of which have only a small staff. Some of these firms have been formed very recently. These firms are, for the most part, engaged by clients who are not engineers and who have no way of assessing the real level of ability in the firms.

The other main reason for advocating a special qualification to cover building structures is the very large annual expenditure on this work. More than 200 million dollars per year are spent in New Zealand on the construction of buildings. This is a large portion of the total expenditure on the whole field of civil engineering, and, in itself, should be adequate justification for a special qualification.

It is fairly evident then, that an adequate structural qualification is needed now. It is not desirable that an engineer who is qualified to design major structures should be not qualified to do general civil work also. Hence, the structural qualification should be regarded as an advanced addition to normal civil registration. In other words, following Californian practice, an engineer should become registered first as a general civil engineer and should then sit an advanced examination in suitable specialised fields of study in order to qualify for registration as a structural engineer.

The Californian system appears particularly suitable to New Zealand requirements (which is to be expected, in view of the fact that California has earthquake problems similar to that of New Zealand and has developed earthquake engineering to a similar very high level.) Hence it is briefly outlined below.

An applicant for authority to use the title, "Structural Engineer" must:

(a) hold a valid registration as a Civil Engineer in California,

(b) submit evidence satisfactory to the Board that he has been in responsible charge of structural engineering work for at least three years subsequent to the effective date of registration as a Civil Engineer, and prior to the filing date of his application. ("Responsible Charge" is defined on the application form as the technical control and direction of the design and construction of structures, requiring initiative, engineering ability, and independent judgement.)

The regular written examination is a two-day (16-hour) examination consisting of four parts of 4 hours each. There are no provisions for "reciprocity or comity". All applicants who are accepted must take the regular written examination.

For application in New Zealand, it is possible that some of the optional sections in the final year B.E. could be considered as exemptions for part of the final written examination. However it would still be necessary to take additional work to a more advanced stage and to sit parts of the examination covering fields which are not included in the B.E. syllabus.

When an engineer has registered as a general civil engineer, he could be permitted to take charge of moderate sized structures. When he has taken the more advanced registration as a structural engineer, he could be permitted to take responsible charge of major structures.

The proposed system of Structural Registration could easily be superimposed on our present system of general registration, since it is simply a more advanced addition. It is necessary now, and it would have to be advocated and possibly administered by a body such as the Earthquake Engineering Society. It would be understandable if the general body of N.Z. civil engineers were reluctant to recognise the need for a special qualification for design of building structures.

Engineers already designing major structures before a certain date would probably have to be given special registration, but any engineers subsequently coming into this field of work would have to obtain structural registration.

It is proposed to bring these proposals up at the Annual General Meeting of the N.Z. Society for Earthquake Engineering.