



THE SOCIETY FOR EARTHQUAKE AND CIVIL ENGINEERING DYNAMICS

An Associated Society of the Institution of Civil Engineers

EVENING MEETING
at the
INSTITUTION OF CIVIL ENGINEERS
ONE GREAT GEORGE STREET, LONDON, SW1P 3AA

ON

WEDNESDAY 26TH SEPTEMBER 2007 AT 6PM

PERFORMANCE-BASED SEISMIC ASSESSMENT OF BUILDINGS

Speaker

PROFESSOR ANDREW S. WHITTAKER, S.E.

UNIVERSITY AT BUFFALO,

STATE UNIVERSITY OF NEW YORK, BUFFALO, NEW YORK

Chair

Stewart Gallocher, Halcrow Group

NON-MEMBERS OF THE SOCIETY ARE WELCOME TO ATTEND

Please note that there is no charge to attend.
Seats are allocated on a first come, first served basis.
Tea and biscuits will be served from 5.30pm - 6pm.

For further information please contact Pauline Arundel, Engineering Dept, at the ICE on
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Visit the SECED website at <http://www.seced.org.uk> .

Synopsis

The ATC-58 project is developing the second generation of tools and guidelines for performance-based assessment of buildings, with a focus on measuring performance in terms of direct and indirect economic loss and casualties. The 35% draft of the *Guidelines for Seismic Performance Assessment of Buildings* (available at www.atcouncil.org) presents procedures for intensity-, scenario- and time-based assessment and loss computations. Such assessments will be of value to prospective building owners, tenants, insurers and others who might experience adverse impacts as a result of earthquake-induced damage to buildings.

Each type of assessment requires the user to select and scale earthquake ground motions using procedures that are substantially different from those presented in current guidelines and codes of practice. Eleven, eleven and eighty-eight ground motion records must be selected and scaled for intensity-, scenario- and time-based assessments, respectively. Vectors of demand parameters from response-history analysis using these scaled ground motions are input to a Performance Assessment Calculation Tool (PACT) to generate 200 statistically consistent realizations of demand per seismic intensity. A Monte Carlo analysis is performed using the 200 realizations and default fragility and consequence data embedded in PACT for typical framing systems and common occupancies to generate a loss curve. For a time-based assessment, a simple algorithm is used in conjunction with a seismic hazard curve to translate a series of intensity based loss curves into an annualized loss curve.

Each type of performance assessment and its technical basis are described in detail. The procedures used to select and scale earthquake ground motions are presented. The algorithm in PACT to generate statistically consistent vectors of demand parameters is introduced. Sample results are presented for scenario- and time-based assessments for a three-story commercial office building constructed with special steel moment-resisting frames.