

FCLU Public Seminar

Design Against Progressive Collapse: Understanding the Mechanics and Developing a Procedure



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Abstract

Collapse of the World Trade Centre placed progressive collapse on the TV screens of the world. Questions were asked about why this happened, could it have been prevented, was our understanding sufficient and, most importantly, what might be learnt and used to ensure a better future. In structural engineering terms, whilst this was the most spectacular illustration of progressive collapse, it was by no means the first, Oklahoma City and Ronan Point had previously

shown what might happen to structures subject to locally severe effects. But comparatively little of the underlying physics of the problem, nor how it should best be tackled in structural design, was known. Available treatments tended to be prescriptive i.e. "Doing this should lead to better performance than not doing it", and quantitative approaches permitting objective comparisons of alternative solutions were lacking.

Work at Imperial College London during the past 5 years has seen the development of a method for assessing susceptibility to progressive collapse. Essentially, it tests the ability of the damaged structure to attain a new equilibrium position in its grossly deformed state without triggering a progressive collapse. The method recognises the dynamic nature of the event, allows for inelastic material behaviour and gross changes of geometry, incorporates analysis to varying degrees of sophistication and can be applied to substructures ranging from a single beam to a complete 3 dimensional frame. Its basis will be explained, its implementation in a variety of forms illustrated and some results presented to show how it is now possible to assess the contribution of different components in resisting progressive collapse and thus in developing effective structural arrangements that eliminate potentially weak elements but do not require wholesale upgrading.

All Interested Are Welcome

Please register online at http://www.polyu.edu.hk/fclu/seminar/Seminar_29May09/

For enquires, please contact Ms Becky Chang at

Tel : 2766-5039

Email : clbecky@inet.polyu.edu.hk

Fee : Free of charge

- An attendance certificate will be issued to each registered participant.
- Applicants with confirmed registration who fail to turn up will be put on lower priority in the registration for the next Faculty distinguished lecture or seminar.

About the Speaker

Prof. David Nethercot OBE, FREng, is the Head of the Department of Civil and Environmental Engineering at Imperial College London. He has some 40 years experience of research, specialised advisory work and committee activity in the area of steel, aluminium and composite construction. Previously, he was on the staff at Cardiff, Sheffield and Nottingham Universities, including five years as Head of Department at Nottingham.

Ten of his papers have won Institution prizes. He was awarded a DSc degree in 1993 and elected to the Royal Academy of Engineering in that same year. He is a past President of the Institution of Structural Engineers and a former Council Member of the Royal Academy of Engineering. In 2006 he was awarded an OBE for services to Structural Engineering; in 2008 the Charles Massonet Prize from ECCS and in 2009 the IStructE Gold Medal.

For 10 years he was chairman of the BSI Committee responsible for the design aspects of BS5950 as well as for UK input into the preparation of EC3. He currently chairs the IStructE Committee overseeing activity designed to ease the introduction of the suite of Eurocodes into UK practice, having previously chaired the group that prepared the initial statement of need requested by the UK Government. His involvement with Structural Codes extends beyond the UK and has included speaking and writing on technical content, practical usage and general principles.

His research has included work in the areas of buckling, connections, semi-continuous construction, stainless steel and composite frames. He has supervised over 40 PhD students to completion, been responsible for a similar number of externally funded projects and spoken, often as a keynote speaker, in more than 50 countries.



Date:

29 May 2009

(Friday)

Time:

11:00a.m. to 12:00p.m.

(Refreshments will be served at 10:30a.m.)

Venue:

M1603, Senate Room, Li Ka Shing
Tower, The Hong Kong Polytechnic
University

