

NUS Public Seminar by Professor SL Chan

**“ADVANTAGES OF DIRECT SECOND ORDER ANALYSIS FOR
DESIGNING COMPLEX STRUCTURES”**

Jointly organised by:



CCMT
Department of Civil
& Environmental
Engineering



Supported by:



CONTINENTAL STEEL PTE LTD



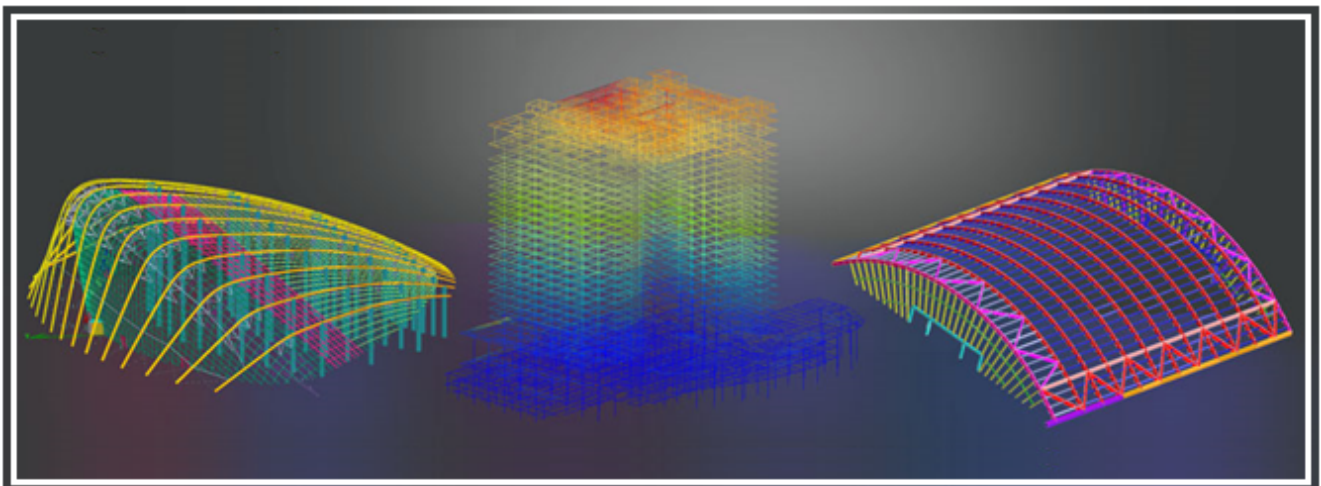
YONGNAM HOLDINGS LTD

Venue: LT6, Faculty of Engineering, NUS

Date: 27 November 2015 (Friday)

Time: 1900 - 2100

Admission: Free



Bifurcation and finite-deflection stability analyses represent two general stability theories and they lead to the first-order linear and direct analysis methods of design for checking of structural stability and capacity. In the bifurcation approach, design is based on an assumed buckling mode at undeformed structural geometry for a specific load case and all columns have their own effective lengths and buckle simultaneously. The effective length method of design has limited accuracy since no practical structures could have elastic buckling at undeformed state without deflections and the error of assuming an incorrect effective length by manual inspection could be catastrophic. In contrast,

the direct analysis approach uses an analysis to predict the loss in stiffness of a deforming structure which is loaded to the various limit states. The direct analysis method of design has been well received by the design profession as a superior and preferred alternative to the effective length method since its introduction in the design codes LRFD in U.S., European and Hong Kong codes some fifteen years ago. The obvious advantage of the direct analysis includes redundant members not over-designed and critical members not under-designed and it could deal with design of structures rationally under different scenarios like fire and seismic engineering, progressive analysis, load sequence studies etc. This seminar presents the theoretical background with practical considerations of the direct analysis method of design with examples given on its concept and practical application to complex structures beyond the applicability of the effective length method when the buckling load factor is less than 10 or 5. Experience in using the method for practical design of structures will also be shared.

Programme

1730	Registration
1800	Dinner reception
1900	“Latest update on Advanced structural Steel design using Eurocodes 3 and 4” by Professor Richard Liew, National University of Singapore
1915	“Advantages of Direct Second Order Analysis for Designing Complex Structures” by Professor SL Chan, Hong Kong Polytechnic University
2030	Q&A
2100	Closing

Curriculum Vitae of Speaker



Professor SL Chan

Chair Professor in Computational Structural Engineering,
 Department of Civil and Environmental Engineering,
 The Hong Kong Polytechnic University.
 Fax : 852-23346389 Office Tel: 852-27666047
 Mobile Tel : 852-90256814
 Email: ceslchan@polyu.edu.hk

Dr. SL Chan has published more than 300 papers in journals, books and conferences. His book, “Non-linear static and cyclic analysis of steel frames with semi-rigid connections, Elsevier, 2000, pp.336”, summarizes his work on “analysis for design of steel structures” before this century. Dr. Chan also serves as chief editor and a member of editorial boards of a number of international journals, of ad-hoc committees in drafting guides for design of steel and glass structures in Hong Kong and the U.K., the incumbent President of the Hong Kong Institute of Steel Construction (HKISC), which publishes a SCI-indexed International Journal “Advanced Steel Construction”, and adjunct professor at several leading universities in Mainland China. In conjunction with a research team of the Tongji University, Professor Chan was given the first class award for research in steel structures by the Education Ministry in the Mainland China in 2008. Professor Chan also received numerous research and consultancy awards from his university and served as the Chairman of the Structural Division (2013-2014) and in several other advisory committees in the The Hong Kong Institution of Engineers.