



2-day workshop on Earthquake resistant design of RC Building based on the EC8 Malaysia NA: From Loading characterisation to RC detailing

by Ir. Jimmy Wan

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The Civil and Structural Engineering Technical Division (CSETD) organized a 2-day workshop on 'Earthquake resistant design of RC Building based on the EC8 Malaysia NA: From Loading characterisation to RC detailing'. The 2-day workshop was held on 18th and 19th December 2018 at Crystal Crown Hotel. The speakers were Professor Nelson Lam, Dr Hing-Ho Tsang, Dr Daniel Looi Ting Wee, Ir Lim Ek Peng, Ir Dr. Ng Soon Ching.

This 2-day workshop was officiated by IEM president Ir. David Lai, was chaired by Ir. Low Kai Wah and Ir Ng Beng Hooi. The total 107 participants included engineers from engineering consultants, contracting firms, government agencies and local authorities as well as faculty members from local institutions of higher learning.

Day 1

Welcoming remarks by Chairman of IEM Civil & Structural Engineering Technical Division, Ir. Chong Chee Meng, then followed by the devote time for remembering the late Adjunct Prof. Ir. MC Hee chaired by Ir. Prof. Dr. Jeffrey Chiang.

The first speaker for that day was Prof Nelson Lam, his topic was design seismic actions stipulated by Malaysia NA. in the 1-hour presentation, he shared the overall seismic environment of region surrounding Malaysia, the recorded magnitude and active local earthquakes in Malaysia. He ended his presentation by sharing the design seismic actions stipulated by Malaysia NA.



Prof. Nelson Lam delivering the talk

He ended his presentation by a simplified seismic analysis workflow for practising engineer in design office.

Day 2

Professor Nelson Lam started with his topic on Tools to check dynamics results generate from computer packages: The generalised force method (GFM).

In method, he illustrated the simplified method to check the computer generated result. The GFM is basically a method to analyse the building structure when subject to a set of pre-determined static lateral forces. Thus, the method is essentially a static analysis method which can be checked easily by hand calculations.

An example of GFM has been demonstrated, the analysis result is very consistent with linear elastic dynamic analysis of the structure.

After the morning coffee break, the workshop continued with Dr Daniel Looi on his topic on EC8 RC Design and detailing: with A Deemed to comply DCM solution.

He highlighted the code (EC8) requirements:

- Width of primary beam
- Allowable eccentricity
- Critical plastic hinge length
- Minimum and maximum longitudinal tension reinforcement ratio
- Hoop distance

Dr Daniel advised designer to review the limitation stipulated in code before using the graphs. After the technical and theoretical workshop, Ir. EP Lim and Ir. Dr. SC Ng presented a design example applying EC8 and the Malaysia NA - Modelling and Design of a RC Frame Building under DCL and DCM

In the design example, it illustrated a modal response spectrum analysis and design of a 8-storey residential RC building under very low seismicity, low seismicity and low to moderate seismicity scenario in Malaysia based on EC8 and Malaysian MS EN 1998-1 NA using commercial structure analysis software.

In general, seismic zone with higher PGA will result in greater seismic force, thus, require more reinforcement, higher concrete strength or greater section and longer drift.

Theoretically, using higher ductility class DCM will result lower seismic demand and saving in the reinforcement. This advantage may not be capitalised in 'border line regions' where design PGA marginally exceeds the threshold of low seismicity definition. This is due to the stringent requirement of detailing in DCM and also minimum reinforcement requirements. It is suggested that for cases where the design acceleration marginally exceeds the threshold limit of low seismicity definition, DCL to be considered for the analysis & design. Further studies to be carried out by local practising engineers and academicians.



Presentation of memento to Prof Dr Nelson Lam

A short closing remarks was given by Professor Nelson Lam and Dr Hing-Ho Tsang. They expressed that Malaysia NA has gone toward to a right direction, Malaysia has done more works than other neighbouring countries. They appreciated all effort from local agency, engineers and experts to pursue new design standard of EC8, Malaysia NA.



Presentation of memento to Dr Daniel Looi

With persistent effort, they believe that Malaysia will be the leading position in South East Asia.



Ir. Dr SC Ng delivering the talk



Presentation of memento to Dr Hing-Ho Tsang



Presentation of memento to Ir. Dr SC Ng



Presentation of memento to Ir. Lim Ek Peng