Are We Ready for Eurocodes?

by Ir. Tu Yong Eng

1.0 INTRODUCTION

Malaysia is currently working very hard to update the Malaysian Standards based on the latest Eurocodes. In 2004, The Institution of Engineers, Malaysia published a position paper on the concrete codes of practice in Malaysia after 2010 and recommended that the Eurocodes be adopted after the withdrawal of the structural British Standards.

Traditionally, Structural Malaysian Standards follow the British Standards. However, due to the publication of the Structural Eurocodes, a total of 57 documents or parts of the Structural British Standards were withdrawn on 31 March 2010. In fact, prior to the withdrawal of the Structural British Standards, many other British Standards were withdrawn either in totality or partly after the publication of the relevant Eurocodes.

These include BS 5328 part I to part IV on the specification of concrete (replaced by EN 206-1, BS 8100-1 and BS 8100-2), BS4360 on the specification for weldable structural steels (updated and replaced partly by BS EN 10025, BS EN 10113, BS EN 10210, etc), BS 6089:1981 Guide to the assessment of concrete strength in existing structures (replaced by BS EN 13791 and BS 6089:2010), *etc*.

2.0 THE STRUCTURE OF EUROCODES

The Structural Eurocodes is undoubtedly a state-of-the-art design code for structural engineering. Hence, we have little choice except to adopt the current Eurocodes. The National Standards implementing Eurocodes will comprise the full text of the Eurocodes including annexes, as published by CEN and followed by a National Annex. The National Annex shall cover the following aspects:

i) Decisions for the Nationally Determined parameters specified by the Eurocodes – Normally, Structural Eurocodes allows the participating nation to decide on the values of some parameters. These parameters shall be changed according to the local practices.
ii) Decisions for the status of informative Annexes.
iii) References to non-contradictory complementary information.

The Structural Eurocodes will be implemented together with other relevant codes in material specification (EN 206-1, Concrete – part 1: Specification, performance, production and conformity; EN 10025 part 1 to part 6, Hot rolled product of structural steel), execution (EN 1090-1, EN 1090-2, EN 1090-3, Execution of steel structures and aluminium structures) as well as testing, interpretation and repair (EN 12350: Testing fresh concrete; EN 12390: Testing hardened concrete; EN 13791, Assessment of in-situ compressive strength in structures and precast concrete components).

3.0 CHALLENGES

In order to successfully implement Eurocodes in Malaysia, great efforts have to be undertaken by all industry players including law makers, researchers, developers, consulting engineers, contractors and laboratory testers. Following are the challenges of adopting Eurocodes as Malaysian Standards:

i) To update all 58 documents of the Structural Eurocodes – To date, we have completed only four documents, *i.e.* MS EN 1990, MS EN 1991-1-1, MS EN 1992-1-1 and MS EN 1993-1-1. Great effort will be needed to complete all the remaining 54 documents. Various technical committees have been set up to carry out the drafting of the Malaysian Standards, *i.e.* MS EN 1991-1-4 (Wind loads), MS EN 1993-1-4 (Design of steel structures – Part 1-8: General – Design of joints); MS EN 1997 (Geotechnical), and MS EN 1998 (Seismic Action).
ii) To update other related Eurocodes in specification of materials, testing and execution. Various technical committees have been set up to carry out the drafting of the Malaysian Standards. These include MS EN 10025, MS 523 (basing on EN 206-1, BS 8500-1 and BS 8500-2), MS 28 (Part 1:1985, Methods of Test For Water for Making Concrete), MS 29 Specification of Aggregates From Natural Sources for Concrete and EN 1504-Concrete Repair (pending ISC D approval), *etc*.
iii) To harmonise the numbering system. Apparently, Standards Malaysia has obtained the permission to use the prefix of MS EN. However, some of the codes are still using running serial numbers, *e.g.* MS 522 and MS 523.
iv) Currently, Structural Malaysian Standards refer to the British Standards, JIS, Australian Standards, ASTM and ISO. Hence, we may face a situation where a design is based on the British

Standards (or equivalent MS) while the material supply is based on JIS or ASTM. This situation is not encouraged due to the fact that the material may fail to comply with the defining environment of the design codes. Singapore has published BC1:2008, Design Guide on the use of alternative materials to BS 5950, and BC2:2008, Design Guide of high strength concrete to Singapore Standard CP 65, to resolve their problem.

v) New concepts and terminologies were introduced by Eurocodes. Reliability was introduced in Eurocodes. It is the first time that limit state design and characteristic strength concept were introduced to the Geotechnical Codes of Practice (EN 1997). In EN 1992-1-1, the Strut and Tie model was included, whereas in EN 1993-1-1, a more extensive requirement on lateral torsional buckling was introduced. In wind loading, a 10-minute mean wind speed was specified compared to 3 seconds of gust speed in MS 1553 and an hourly mean speed in BS 6399 part 2. EN 1990 has also included the provision of design assisted by testing.

vi) Extensive training and education are also needed to ensure the smooth implementation of the Malaysian Standards based on the Eurocodes. Furthermore, researches are needed to ensure the suitability of the Eurocodes in Malaysia. Currently, TC on EN1992-1-1 has written two NCCI, *i.e.* behaviour study of band beam and also thin size element (pending publication). The environment in Malaysia is different from the presumption in the Eurocodes (however, this will be overcome by specifying the National Determined Parameters). These include the exposure parameters, rate of concrete attack, hot climate concreting, level of workmanship and others. A huge funding is required for engineers to be trained in the implementation of the Eurocodes. The Malaysian construction industry is also not yet ready. Furthermore, a lack of funding has also impeded the progress of the research and training.

vii) Our legal framework has not been changed to adopt the application of the Eurocodes by the Malaysian construction industry. Currently, we rely on the Uniform Building By Law (UBBL) to determine the requirement of the building condition. Hence, the UBBL has to be amended to provide a legal status of the Eurocodes. In addition, many other aspects also has to be specified, for example, the reliability of the building industry (in Eurocodes, specified target of the reliability was specified and will affect the specification for workmanship, material supply, wind load and seismic load), accidental load, and the responsibility of all professionals and industry players involved in the construction industry (Eurocodes allowed for third party supervision, product certification, *etc*).

4.0 CONCLUSION

Judging from the discussion above, it maybe concluded that our industry is not ready to adopt the Structural Eurocodes now. More efforts have to be put in to enjoy the benefits of the Eurocodes. To further facilitate the industry players, the existing Malaysian Standards should remain even though it will not be updated. The co-existence period should be sufficiently long to cover the codes drafting and training period.

As usual, IEM, as the leading organisation in promoting the Eurocodes, devoted huge resources in drafting the relevant Malaysian Standards and training of fellow engineers. IEM has also organised many road shows and short courses for the Structural Eurocodes. Furthermore, IEM has specifically a fixed column in the IEM Bulletin to provide a platform for learned discussion (note 1). ■

Note 1: The section, paper series on structural Eurocodes, a section devoted to the discussion of the structural Eurocodes, is open to members to air their opinion on the Eurocodes related to the local construction industry. The paper can cover any topic on any structural Eurocodes, whether it is already published as the Malaysian Standards, still in the drafting stage or no TC has been set up. The guidelines for the publication is similar to the papers submitted for the Bulletin.

CONGRATULATIONS

The President and Council of IEM wish to extend our heartiest congratulations to the following members on their conferment of ASEAN Federation Engineering Organisation (AFEO) Honorary Fellowship:

Ir. Tan Yean Chin
Ir. Yim Hon Wa
Y. Bhg. Datuk Ir. Rosaline Ganendra
Y. Bhg. Prof Dato' Ir. Dr Zaini bin Ujang

The President and Council of IEM also wish to congratulate **Y. Bhg. Dato' Hafsah binti Hashim** for being conferred the AFEO Honorary Member at the Farewell Dinner for CAFEO 28 held on **2 December 2010** at **Melia Hotel, Hanoi, Vietnam**.