

Development and Principles of Malaysia National Annex to Eurocode 7

by Ms. Suvarna Ooi

THE two British Standards traditionally used for the design of foundations (BS8004) and retaining structures (BS8002) have been withdrawn. Taking their place are the Eurocodes, the primary basis for designing buildings and civil engineering structures in Europe.

As such, Malaysian engineers, if they are to remain competitive globally, must move forward and begin to make the switch to the Eurocodes. To learn more, JURUTERA met up with Prof. Brian Simpson, Ir. Dr Ting Wen Hui and Ir. Yee Yew Weng for a glimpse into their experience with the Eurocodes, particularly Eurocode 7 (EC7) which is related to geotechnical engineering.

Prof. Simpson has been involved in the development of the Eurocodes since the early 1980s. The latter was finally published in 2004 and adopted for use in the United Kingdom ever since. He pointed out that, during the time of its development, there were numerous debates about the Eurocodes; some engineers were in favour of its introduction, while others were very much against it.

However, in the past few years since it has come into use, he has heard very little complaints about it. He said, "In fact, the response has been quite good since the Eurocodes was fully implemented, particularly for major projects by the larger engineering firms. Overall, the engineers are quite enthusiastic and have provided positive feedback about it."

According to Prof. Simpson, one of the very first projects that adopted the Eurocodes, particularly the EC7, was the Oresund Link project, a bridge-tunnel link between Denmark and Sweden. Since then, it has been adopted by many other major international projects including Crossrail, the underground railway system in the UK, which is currently in the design stage.

He said, "I have actually spoken to the Crossrail design team on the implications of the use of the EC7. One of the major issues that they had to deal with was designing for the water pressure beneath the underground station boxes. Not surprisingly, they found the EC7 quite helpful in tackling such a tricky situation."



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Chairman of the BSI committee on geotechnical codes, B/526, which is responsible for the National Annex of Eurocode 7*



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THE MALAYSIA NATIONAL ANNEX TO EC7

Prof. Simpson was also pleased to note that there are many similarities between the Malaysia National Annex and the UK National Annex, particularly in the way the piles are designed. At the same time, he also noted the immediate differences between the two, namely, the increase in the factor of safety for pile design and slope stability for Malaysia.

On the Malaysia National Annex, Ir. Dr Ting Wen Hui, explained that it enables the



Ir. Dr Ting Wen Hui: Practicality of engineering skill and expertise are required both for the present method and in applying the Eurocode7

country to set Nationally Determined Parameters, which have been left open in the main code (Eurocode 1997 Part 1 or EC7-1) for determination by national bodies. The parameters include certain design rules such as design approach, partial factors and model factors. It also allows each country to include non-conflicting complementary information (NCCI) as references to assist users in applying the code.

He said, "For example, to establish the values of partial factors and model factors in the Malaysia National Annex, calibration exercises were carried out by the drafting committee and reviewed. The values of these factors are set in such a way that a design applying EC7 essentially matches the values obtained in the present design procedure using the working stress method."

Ir. Dr Ting also pointed out that the Malaysia National Annex is continually open for public feedback. He said, "Improvements are always to be expected for any code or standard, thus IEM will be setting up the necessary mechanism to monitor the progress of the application of the Eurocodes and make appropriate amendments from time to time."

According to Ir. Yee, during the preparation of the Malaysia National Annex, it was found that hoards of data were available from different consultants and contractors. Unfortunately, most of these data had not been collated with suffi-

cient substantiated records, hence could not be directly cited in the Malaysia National Annex.

He also pointed out that Malaysia has unique geotechnical concerns with slopes, peat, ex-mining land, etc. As such, he stated that research grants should be made available by the Government and directed to the right channels to further enhance understanding in these important areas.

He added that the current Malaysia National Annex, which only covers Part 1 of BS EN 1997, will be published in early 2012 with the completion of the final draft by the Technical Committee on Geotechnical Works, TC 17 (SIRIM) under the Chairmanship of Ir. Dr Mohd. Nor Omar. In addition, the publication of Part 2 of BS EN 1997 will only be determined next year.

Ir. Yee also pointed out that IEM is currently involved in drafting amendments to the Uniform Building By-Laws (UBBL), which include the usage of the Malaysia National Annex. Although the grace period for its adoption would depend on the lawmakers, from a practical point of view, the period should not be less than two years.

POTENTIAL CHALLENGES IN APPLYING THE EC7

Prof. Simpson pointed out that, in the UK, the majority of the engineers discovered that applying the EC7 in their work was

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not as challenging as some had made it out to be. He noted that young engineers in particular, adapted to the use of the code more easily compared to those who have been much longer associated with the practice of the code.

Ir. Dr Ting added, "Even in a design situation using the present working stress method, engineers need to evaluate and understand the design problem, and deal with the issues that arise, such as the relevant ground conditions, performance of the super and sub structure, and the foundation, risks assessment and mitigation of risks. As such, appropriate levels of engineering skill and expertise are required both for the present method and in applying the EC7."

At this point, Ir. Yee related his personal experience on the use of the code. He said, "I first used the EC7 when I was working in the UK more than 10 years ago. It took me some time to get used to the nomenclature. However, after the initial struggle, I found that the document actually guides the engineer to carry out their design in a clear and systematic way."

He added, "For example, graduate engineers tend to dive straight into running computer software and deriving solutions to problems from there. The EC7, on the other hand, reminds the practitioner to dedicate time to gather sufficient data from the site, study historical records, understand functionality requirements, derive the engineering parameters, etc. The document is practical in its application and is relevant to the industry."

To date, IEM has conducted several workshops for local engineers on the Malaysia National Annex to EC7 in major cities throughout the country. Prof. Simpson observed that, although the engineers were keen to learn, many of those who attended were not geotechnical engineers and hence, were not very advanced in their knowledge of soil mechanics and geotechnics.

He said, "We do not, strictly speaking, require the local engineers to have very advanced knowledge in these areas. However, it would certainly help in their understanding of the Eurocodes. It is important for them to realise that those who are going to design the ground needs to understand the ground."

TEACHING OF THE EUROCODES

According to Ir. Dr Ting, the Eurocodes have not only become globally accepted, a number of countries outside Europe are also currently adopting the Eurocodes (with appropriate adaptations) as their national standards. As such, if Malaysia wants to penetrate the global market, its engineers need to be knowledgeable and competent in using the Eurocodes.

Prof. Simpson stated that there is currently an ongoing debate on the teaching of the codes of practice as some universities believe that they should focus solely on teaching soil mechanics and ensure a proper understanding of the ground, instead of providing training on the design procedures of the codes of practice.

He said, "Although I sympathise with both views, I feel that the most important thing is for engineers to understand the basic mechanics, particularly soil mechanics and the behaviour



Ir. Dr Ting Wen Hui: Competency in using Eurocodes, enables our engineer to embrace global market

of soil materials. The latter is clearly much more important than knowing the details of a particular code of practice."

Ir. Yee, on the other hand, felt that it is essential for local universities to teach design using the EC7. He said, "The educationists should become an expert with its usage. The EC7 encompasses more than just the systematic and proper design approaches. It was also written to help enhance trade between different nations in Europe, and to allow them to speak the same technical language."

Either way, Prof. Simpson advised local engineers to attend trainings on the Eurocodes and to read up on the subject to smoothen the adoption process of the codes of practice in their work. During the workshops that were mentioned earlier, he also recommended several publications, including two new publications, namely, "Concise Eurocodes: Geotechnical Design" and "Decoding Eurocode 7".

He said, "The most important thing, however, is for Malaysian engineers to move forward and start applying the codes of practice in their work. Although they may take a bit of time to get used to it, they should not become easily discouraged. In fact, I have noticed that once people understand it properly and use it regularly, they generally become quite enthusiastic about it."

Personally, he was very pleased to note that Malaysian engineers have put in a lot of work in the Malaysia National Annex to EC7. He said, "Overall, I believe Malaysian engineers will find the EC7 very helpful, particularly in allowing them to design the structures in a coordinated and consistent manner."

Finally, he would like to welcome comments and criticisms from Malaysian engineers who have used the Eurocodes. He said, "The Eurocodes will be a developing document, as such, we will take note of the comments we receive from around the world." ■

Note: IEM wishes to thank Prof. Brian Simpson, Ir. Dr Ting Wen Hui and Ir. Yee Yew Weng for sharing their views and highlighting the issues involved in the switch to Eurocode 7.