Towards the Implementation of Structural Eurocodes in Malaysia

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THE CURRENT SITUATION

As a former British colony, Malaysia had been using British Standard in the construction industry in the past. However, the United Kingdom has announced that it would no longer update the British Standard as it would be using a new standard known as Eurocode.

Ir. Prof. Dr Jeffrey Chiang, who is part of the IEM technical committee charged with developing the Eurocode, explains why Malaysia needs to adopt the Eurocode.

"Since the British Standard has been withdrawn, there would no longer be further updates or improvements. If we continue to use British Standard, we would be stuck in terms of advancement," he said.

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Through its Civil and Structural Engineering Technical Division, IEM has to set up a Position Paper Committee in 2002.

"We invited all the various stakeholders from the industry, academia and government, private sector and so on, to come in together to discuss the options available once the British Standard is withdrawn in 2010. The standards are important because the practising engineers need to design according to certain standards so that the documents can be submitted for approval by the authorities."

The authorities involved are local councils such as Dewan Bandaraya Kuala Lumpur (DBKL) and Majlis Perbandaran Petaling Jaya (MPPJ).

"The British Standard was accepted because it had been stated or provided for in the Uniform Building By-Laws (UBBL) in Malaysia as outlined by the Ministry of Housing and Local Government, which is the custodian of the building by-laws," said Ir. Dr Chiang.

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Currently these laws state that the British Standard is the accepted standard for use in Malaysia. If there are any changes in the standard used, then it will conflict with the by-laws.

Ir. Dr Chiang said IEM had studied the issue and came to the conclusion that the Eurocode was the way to go.

He said: "We have come to the conclusion that it is logical and reasonable to follow the steps taken by UK. In other words, we will adopt the Eurocode, in line with the withdrawal of the BS in Malaysia. So now, the problem is this: When is the deadline to do this?"

In the UK, the BS was officially withdrawn and the Eurocode fully adopted in March 2010.

"Prior to that, there was a two-year transition period during which engineers could choose to use either the BS or Eurocode in their work," he said. That transition period allowed local engineers to familiarise themselves with and learn to use the Eurocode. After the two-year transition period, they would drop the BS totally. Currently, they are fully compliant with Eurocode.

"Similarly, Singapore, a Commonwealth country, faced the same dilemma but they were quicker in making a decision. In April 2013, they decided to start the two-year transition period. By May next year, Singapore will fully comply with the Eurocode standards and BS will be withdrawn," said Ir. Dr Chiang. "In Malaysia, we are facing a situation where we haven't come to a decision yet. The Ministry of Housing and Local Government has yet to make a decision. We were told in late 2012 that the UBBL was being revised after receiving input from all the professional bodies including IEM. We haven't seen the actual revision yet but we are told that the Eurocode is now included or has replaced the BS in the revised UBBL 2012 version.

"But there is a snag. The Ministry cannot enforce the adoption of Eurocode in line with UBBL because it has to be enforced by the local authorities. They are the ones which gazette, implement and enforce and they haven't done this yet. We were informed that the Selangor State Secretariat had already accepted or gazetted the UBBL revised version. However, it has to be accepted by all the other local authorities and not just the Selangor State Secretariat," he said.

"A dilemma has surfaced. When we approached MPPJ, it said it was not aware of the changes. It had yet to come to a decision. In other words, it cannot be enforced for now. Our own professional members here have also come to a seek advice from the Institution."

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MATTER OF NAME

Ir. Dr Chiang said IEM had been working with Standards Malaysia ever since the presentation of the IEM Position Paper in early 2004.

"Up to now, we have already worked together with Standards Malaysia to produce the MS standards in line with Eurocode. They named it as MS EN. It's a Malaysian Standard but adopts Eurocode as the basis. It's the same as Singapore, which also uses the same sort of name – SS EN. In the UK it is BS EN. That's how they name it. Different names are used in different countries, but essentially it is the same Eurocode," he said.

Ir. Tu Yong Eng, another member of the committee, said the key difference was whether it was mandatory or not.

"Rightfully, in Malaysia, we can use it. In the current practice, we can also use the American standard and the Australian standard and so on," he said.

Ir. Tu said that for a country to adopt the Eurocode, they must first publish a National Annexe.

"Eurocode usually consists of three parts. The main text will be the same for all countries adopting Eurocode. This means that for Germany, Denmark, UK, Malaysia and Singapore, the first part will be the same document. The second part varies from country to country. It is called the National Annexe. Then, the other third document is called the Non-contradictory, Complementary Information or NCCI document," he said.

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Ir. Tu added that every country could publish the NCCI documents, on condition that it is not in conflict with the main text. It only serves as a complementary document to the main text.

"When we adopted the British Standard, we adopted it in full in most cases. But for the Eurocode, we have to publish our own National Annexe. This is the main difference compared to the previous BS. We have set up a lot of technical committees, not only to adopt draft the Eurocode, but also to serve as the training ground for trainers. This means we should get a group of experts who are well versed in the document. In a way, we do not want to adopt a standard where Malaysia may not have the supporting technical documents and experts.

LOCAL CONTENT THROUGH THE USE OF NATIONAL ANNEXES

A key improvement in the new standard is that Eurocode allows for a National Annexe which is, essentially, another document to supplement the main code or main standard.

"The National Annexe allows local parameters to be included. For example, variables like local weather condition, local practices and materials which are indigenous to a country. All these are local conditions or parameters which we can put into the National Annexe to go with the Eurocode. In practice, countries can adopt the Eurocode, but they can still adopt local conditions as well," said Ir. Dr Chiang.

In that sense, he added, IEM has already drafted and produced the MS EN documents with Standards Malaysia, which comprise a total of 10 documents encompassing concrete design, steel design and geotechnical design.

"It is still not completed. We have just finished the first parts of five Eurocodes. However, each one Eurocode has multiple chapters. To be frank, it will take many years to complete. The first parts are already available through Standards Malaysia. It is the owner of this standard. IEM is working on its behalf. It is the one that will sell or distribute to the users," he said.

While many of the documents are already available, Ir. Dr Chiang said there is still a lot of work to be done.

"It's still ongoing... the work of producing the necessary MS EN

documents. The work has never stopped. Standards Malaysia is also asking us to promote it. This is why IEM is holding a lot of seminars and courses as well as awareness talks and so on, to publicise it to our members and other stakeholders in the industry. This is what we are doing now with Standard Malaysia in a partnership arrangement," he said.

PROGRESS ACHIEVED BY IEM TECHNICAL COMMITTEES

According to Ir. Dr Chiang, there are currently a total of 58 documents.

"There are a total of 10 parts. Each topic has sub parts. If you count all sub parts together, then you have a total of 58 documents. It takes time to publish the National Annexe. Of course you may not publish all, as some parts may not be relevant or important, for example, structural aluminum which not many people actually use," he said.

The codes that have currently been documented are as follows:

- MS EN 1990 - Basis of Structural Design - the key code
- MS EN 1991-1-1 - Actions (Loading)
- MS EN 1992-1-1 Concrete Structures Design
- MS EN 1993-1-1 Steel Structures Design
- MS EN 1997-1-1 Geotechnical Engineering

These are the five codes already published as MS EN. Each has an accompanying National Annex.

The IEM technical committee is also working on the Eurocode 8 or MS EN 1998-1-1 for earthquake design and MS EN 1991-1-4 on wind loading. This process is still ongoing. IEM will form technical committees to address other parts of the concrete and steel design which have not yet been completed.

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THREE-YEAR TRANSITION PERIOD

In April 2014, the three main engineering bodies in Malaysia – IEM, the Board of Engineers Malaysia (BEM) and the Association of Consulting Engineers Malaysia (ACEM) – met and drafted a letter which was addressed to the Ministry of Housing and Local Government, seeking its agreement to commence a transition period, like what was done in the UK and Singapore.

"In that letter, we stated that the transition period should start from 1st June this year. Instead of two years, we wanted a three-year period starting 1st June, 2014 and ending in May, 2017, to give us more time," said Ir. Dr Chiang.

He felt that three years should be long enough for the local authorities to push enforcement, for local engineers to learn up on the code and for universities to teach undergraduate students using the Eurocode as the basis for standards.

It would also allow IT software companies to upgrade software to include Eurocode and for the local authorities to be prepared.

"After all, local authorities are ones which have to approve all submissions by practising engineers for the approval of building design and so on. So they should be well versed in Eurocode," stressed Ir. Dr Chiang who added that the three-year period should be long enough for the authorities to familiarise themselves with this knowledge.

IEM is currently working closely with Standards Malaysia to contact and coordinate with government agencies such as the Public Works Department, the Construction Industry Development Board (CIDB), DBKL and various other engineering bodies as well as interested parties.

It also is keen to organise seminar courses, awareness talks and dialogues as part of the partnership programme with Standards Malaysia, which is keen to promote the use of the Malaysian standard. That is their objective. IEM wants to get local engineers to upgrade themselves, said Ir. Dr Chiang.

"The Eurocode is a state of the art international standard which many countries in the region, in particular Commonwealth countries, will adopt. Countries like Singapore, South Africa, India and Hong Kong will be using this code because the British Standard will no longer exist. So there is no point in sticking to the old standard," he said.

THE MAIN CHALLENGES

The biggest challenge is changing the mindset, said Ir. Dr Chiang. "The people here are slow to adapt to change. The word 'change' itself gives them the impression that they would need to do a lot more work to adopt a new code or a new standard. The Eurocode is not easy. The document itself is thick, and there are many provisions in it which require a lot of changes, in terms of philosophy," he said.

"It is very different from the British Standard although the fundamentals are basically still the same. People, especially those in the middle management levels and higher, may not want to learn up the code because, as you know, they may be a bit rusty. In any case, they don't do the actual design work anymore. They have already moved on to management. It's the upcoming generation of engineers who will soon take over the industry.

"This is why we will allow them more time to catch up. Perhaps by next year, if the universities take up this issue of Eurocode, they will churn out graduates who are fully trained in Eurocode. Then slowly, the majority of engineers in Malaysia will be Eurocode trained," he said.

Ir. Dr Chiang added that even if senior engineers are reluctant to learn the Eurocode, they should encourage the younger generation do so. "Just accept the change. Don't deny it, obstruct or insist that young engineers must still use the British Standard. There is no point in that," he said. In order to be competitive in the region and globally, the Eurocode must be adopted.

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"We are not just competing with Singapore but also with up-and-coming countries like Vietnam, Cambodia and Thailand. All these countries are becoming more competitive in terms of cross-border engineering projects. Once our doors are open, there will be an influx of engineers from the region coming in. They will take over if we are not capable enough in terms of technology, knowledge and expertise," said Ir. Dr Chiang.

"We are also exporting our services overseas. We have engineers working in Dubai, Arab and Africa. If they don't use Eurocode, how can they compete against other countries? Will British or UK companies employ them? These are the challenges we have to face because the world is moving fast."

Ir. Tu pointed out that another big challenge lies in the cost or budget for retraining. A lot of money would be required to do this and there would be other costs as well.

"For the industry to adopt the changes, the regulatory industry has to be upgraded in terms of the laboratory and testing methods. There will be some changes to the manufacturing process as well. These challenges are not easy to overcome." ■

Ir. Prof. Dr Jeffrey Chiang Choong Luin is currently the Dean of the Faculty of Engineering & Built Environment at SEGi University. His research interests are in structural behaviour of concrete structures in shear, wind loadings and earthquake design for structures.

He is an alumni of the Wollongong University NSW Australia. He graduated with a BEng (Hons) Civil, in 1991 and obtained his PhD in 1995. Before pursuing a career in the academia, he worked as a structural engineer with Arup Jururunding Sdn Bhd KL. He played a key role in drafting the Malaysian Standards on design of concrete structures (as TC Secretary). He is now serving as Chairman of IEM Technical Committee on Earthquake, and formerly chaired the IEM Technical Committees on Wind Loading
Previously, he was Chairman of the IEM Civil & Structural Engineering Technical Division, and served as the IEM Honorary Secretary and Treasurer. Recently he was elected again as Honorary Treasurer of IEM. He was also the former WG coordinator on design of the International Committee on Concrete Model Code for Asia.

Ir. Tu Yong Eng is a professional engineer and amateur mathematician. He has extensive experience in civil and structural, design and construction. He has been continually involved in education and research, participating and organising various courses, seminars and conference.
He was a member of various technical committees which drafted several Malaysian Standards. He was also an advisor to several local colleges and universities.

Ir. Tu held several key positions in The Institution of Engineers Malaysia. He is a Council member of the IEM (2008-2011, 2012-2015), Advisor for Civil and Structure Engineering Technical Division (2009-2011), Committee member, 9th (2006) 10th (2009) and 11th (2012) International Conference on Concrete Engineering And Technology, Secretary, IEM Position paper on the Prevention of Collapse of Scaffolding and Temporary Works. He has published more than 10 papers in both local and international bulletins and conferences.