

One-Day Seminar on “Precast Concrete Structures: Connections, Stability, Wall Panel Systems, Lifting and Handling Solutions”



by Ir. Dr Eow John Son

IEM SOUTHERN BRANCH

THE IEM Southern Branch recently invited Assoc. Prof. Dr Ahmad Baharuddin Abd. Rahman from the Faculty of Civil Engineering, Universiti Teknologi Malaysia, Skudai, Johor, and Mr. John Zhang, Managing Director of J&P Building Systems Pte Ltd, Singapore, to present a one-day seminar on precast concrete structures and Industrialised Building Systems (IBS) on 23 April 2011 at The Puteri Pacific Hotel, Johor Bahru. Chaired by Ir. Dr John Eow, the talk was attended by more than 50 participants.

In the first session, Assoc. Prof. Dr Ahmad Baharuddin provided informative descriptions of the analysis and design of structural systems utilising precast concrete structure elements. Precast concrete structures have advantages over the construction of conventional reinforced concrete frames, as the latter requires more formwork, cast in-situ concrete and involves higher labour costs.

In Malaysia, precast concrete structures have gained increasing popularity ever since the Government introduced component-based construction known as IBS. Precast concrete structures have been used in many projects in Malaysia such as Sekolah Kebangsaan Brickfields 2, Jusco Tebrau City Shopping Complex, CIQ Building Johor Bahru and Persada Johor Convention Centre.

Assoc. Prof. Dr Ahmad Baharuddin also addressed the issues and methods for designing precast concrete structures by highlighting the structural systems, connection systems and ties for structural integrity to ensure that the designed frames are stable and robust when subjected to external forces and loads. Since precast concrete components are prefabricated, there are many possible methods of joining the loose components together. Therefore, issues of pinned, semi-rigid or rigid connections, stability, and integrity of frames would always need to be examined.

In the afternoon session, Mr. Zhang deliberated on the cast-in, lifting and connecting systems for precast components and elements. These include reliable lifting anchor systems and smart connection systems for precast components. Mr. Zhang also explained the design guidelines and the German Safety Regulations for lifting anchors and lifting anchor systems for precast concrete units (ZH 1/17). Figure 1 shows some of the good lifting anchor systems available in the market.



Figure 1: Examples of good lifting anchor systems

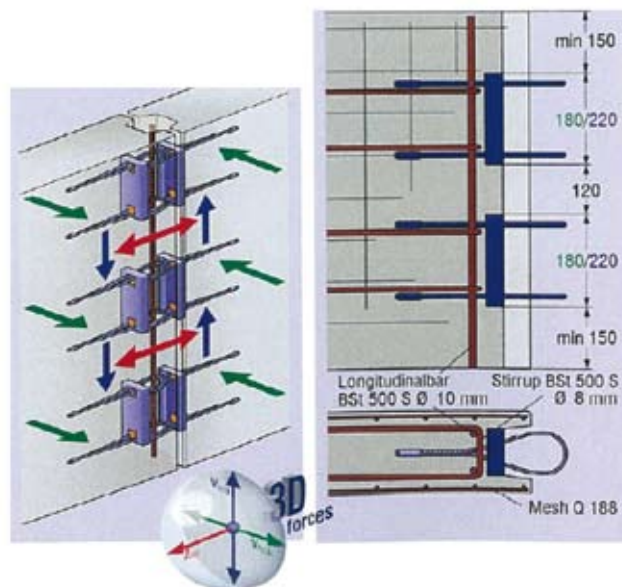


Figure 2: Transverse force and tensile force in a wire loop connection system

In a Wire Loop Connection System, the transverse force, parallel and vertical to the joint and tensile force are as shown in Figure 2, which is helpful information for designers, contractors and precasters.


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Figure 3: Steel bearing connection for precast beam or slab

Figure 3 shows the steel bearing connection for a precast beam or slab. The fixing system is used for the connection between the precast beam and the main beam. This method comes with lower costs and is time saving as there is no requirement for concrete curing time and assembly support once the connection is ready.

The seminar allowed the participants to gain a better understanding of the entire range of precast lifting and connecting systems available in the market. Lifting and handling are of the utmost importance in planning the design and use of precast concrete. It is, therefore, vital that all aspects of these operations are carefully considered and detailed at all times so that subsequent activities may be performed by others in the safest possible manner without the risk of failure or accident.

The IEM Southern Branch extends its gratitude to Assoc. Prof. Dr Ahmad Baharuddin and Mr. Zhang for their invaluable contribution to the knowledge of local practising engineers in the field of Industrial Building Systems (IBS). As a token of appreciation, the speakers were thanked and presented with IEM souvenirs by Ir. Mohd. Khir bin Muhammad, the Chairman of IEM Southern Branch. For more technical information and applications of precast concrete structures, Assoc. Prof. Dr Ahmad Baharuddin and Mr. Zhang can be contacted at baharfka@utm.my and john_zhang@jnp.com.sg respectively. ■

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