An Evening Talk Session on "Design and Construction of Cable Stayed Bridges – Sg. Prai Bridge"

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The IEM Civil and Structural Engineering Technical Division, in association with The Institution of Structural Engineers, IStructE, Malaysian Division, organised an evening talk session on "Design and Construction of Cable Stayed Bridges – Sg. Prai Bridge". The talk session was held on 28 March 2007 at IEM HQ Conference Room, Petaling Jaya, Selangor. It was presented by Mr. Seshadri Srinivasan who is a director of Dar Al Handasah Consultant (UK) Ltd.

Mr. Seshadri graduated with a BE in civil engineering in 1956 and a MSc in structural engineering in 1958, both degrees obtained from the University of Madras in India. He is a Chartered Engineer (CEng) and is a Fellow of the following Engineering Academy and Institutions which are the Royal Academy of Engineering (FREng), the Indian National Academy, the Institution of Structural Engineers (FIStructE), and the Institution of Civil Engineers. Due to his outstanding talent in bridge engineering, he was awarded the MILNE Gold Medal in 2004 for Bridge Design by the International Association of Bridge and Structural Engineering(IABSE).

The seminar was chaired by the recently elected Chairman of IStructE, Malaysian Division, Engr. David Lau, and was well attended by over 190 participants. A brief description of the talk is as follows.

Mr. Seshadri commenced his presentation by introducing the key aspect of the project, the Sungai Prai Bridge, which is part of the 12.1 km Butterworth Outer Ring Road. It links the busy port of Butterworth to the primary arterial North-South Highway and to the Penang Bridge. The structure, 1.85 km long, comprises 57 approach spans of 50m each and a 185 m long cable-stayed main span. A total of 1400 segments was erected in a span-by-span method with a launching girder for the approach, a lifting frame for the main span and a scaffold system for the ramps. A trumpet interchange, 2 sets of bifucations on structure, 3 ramps as well as a cable-stayed span, which represented a considerable variety and challenge to the project team. The bridge over the River Prai has towers of 71m high and a 28m navigation clearance to retain access to a shipyard upstream of the bridge location.

The structure is a winning alternative design, replacing a twin box girder bridge over a 85m river span, with a single wide deck and a cable supported river span of 185m. The 28m wide deck is dual 3 lane consisting of precast segments, made up of a central spine and side cantilevers. The spine is constructed first and the side cantilevers erected as a second stage using the constructed spine. The concept is geared to repetition and minimising different elements. The key features of the concept which combine the Designer's signature motifs and project specific solutions and the construction of the main span was presented. The Bridge has won the Supreme Award of The Institution of Structural Award 2006.

In summary, the various topics as addressed by Mr. Seshadri are as highlighted below:

- Innovative alternative bridge design and construction: a single wide deck and a cable supported river span of 185m, replacing conventional twin box girder bridge.
- Innovative access features: A trumpet interchange, 2 sets of bifucations on structure, with 3 access ramps.
- Innovative aesthetic concept: A slim and graceful structure layout, enhances capability of design engineers to emulate architectural skills to infrastructures.
- Contribution to environment and people's benefit: Blending perfectly into the surrounding.

The talk ended at 7.30 pm, followed by a short session of questions and answers, in which some interesting questions were raised, such as the use of spun piles and steel piles in concrete pilecaps, the chlorination resistance specified, and also the cost of the bridge project per square metre. Mr. Seshadri answered all the challenging questions posed by the audience with much enthusiasm, and added further advice on the technical problems faced by local engineers in other bridge projects.

Finally, Mr. Seshadri was thanked and presented with a token of appreciation by the organisers of the event, for his invaluable contributions to the knowledge and benefits of local practicing engineers in the field of bridge engineering, in particular, a unique cable-stayed bridge design and construction in this part of the world. ■