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Ryoichi Kanno

Nippon Steel and Sumitomo Metal Corporation, Japan

Recent advancement of steel materials for construction and their future trends

It is common knowledge that the first structure made of steel-based materials is the Iron Bridge built in the UK in 1779. The material is cast iron that contains a relatively large amount of carbon; therefore, it behaves in a brittle manner. With a gradual improvement of the material properties through various process innovations, steel structures have currently become one of the most widely used structural systems for bridges and buildings. Among the various countries in the world, Japan has become one of the most advanced countries in the construction of steel structures. Diverse innovative steel structures were constructed in the past such as the world's longest suspension bridge, the Akashi Kaikyo Bridge. These advances of steel structures are, in fact, attributed to a significant extent to the development of high-performance steels. Such materials developed in Japan were characterized by three types of versatilities: strength, functional, and sectional. Some examples of such materials include fairly high and low strength steels, high-bridge performance steel, seismic-resistant steel, fire-resistant steel, corrosion-resistant steels, and size-flexible H-shaped beams. In Japan, these steel material innovations enabled the progress in steel structures to leap forward and in turn challenging new structures gave birth to further advancements in steel materials. In this presentation, the advancements of steel structures and materials are reviewed, focusing on the steel materials and their contributions to the construction of steel structures. In addition, in light of recently developed innovative steels and their strength-increasing potential, the further advancements of steel materials are suggested and discussed for the future innovations of steel structures.

Biography

Ryoichi Kanno is currently a Fellow of Research & Development, Nippon Steel and Sumitomo Metal Corporation in Japan. His research interests include a wide variety of topics related to steel structures such as structural steels, composite structures, cold-formed steel structures, bolted connections, buckling behavior of steel members, etc. He has served several technical committees in the Architectural Institute of Japan (AIJ) and the Japanese Society of Steel Construction (JSSC). His major awards obtained recently include the Shiraishi Award from the Iron and Steel Institute of Japan (ISIJ) and Paper Award from the the JSSC. He has also contributed to university education and research as a part-time Lecturer at Waseda University and a visiting Professor at Kanazawa University. He completed his PhD at Cornell University in 1993.

kanno.kx4.ryoichi@jp.nssmc.com

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