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Brian Uy

The University Of Sydney, Australia

Future trends in high strength steel and composite steel-concrete structures in construction

This paper will address the future trends in the use of high strength steel and composite steel-concrete structures in construction. Future infrastructure is faced with the challenge of ever-increasing spans of bridges and heights of building structures. One of the most efficient methods to address this challenge is in the implementation of higher strength steels and higher strength concretes. This paper will trace the developments of both steel and steel-concrete composite structures over the last century and the material developments that have been made in steel and concrete strengths over that time. These developments have influenced the development of steel and steel-concrete composite systems and further contributed to the innovative bridge and building solutions over that period. The paper will highlight issues associated with serviceability, strength, stability, and ductility of high strength steel and composite structures. The applications and research in these areas will be addressed and the developments in the area of codification in international standards will also be presented with particular attention to American, Australasian and European steel and steel-concrete composite construction bridge and building standards. The paper will conclude by forecasting what the challenges for future infrastructure will be and how the implementation of both high strength steel and steel-concrete composite structures will be aligned to this future. Existing and future research in the area of high strength and very high strength steel will be summarised and typical applications from the construction industry illustrating the advantages will be highlighted.

Biography

Brian Uy is Professor of Structural Engineering and Head of the School of Civil Engineering at The University of Sydney, Australia. He has co-authored over 600 publications including over 150 journal articles and has delivered over 75 keynote/invited papers in 15 countries. He has been involved in research in steel and composite structures for over 25 years. He is the Chairman of the Standards Australia Committee BD32 on composite Structures; which prepared the new Australian/ New Zealand Standard AS/NZS2327 composite structures for buildings released in 2017. He has been the Chairman of the Australia Regional Group of the Institution of Structural Engineers since 2012 and the Chairman of the Australia Group of the International Association for Bridge and Structural Engineering (IABSE) since 2015. He is the Chief Editor(Asia-Pacific) for Steel and Composite Structures and serves on the Editorial Board of Journal of Constructional Steel Research and Advanced Steel Construction. He also currently serves on the American Institute of Steel Construction (AISC) Task Committee 5 on Composite Construction and the IABSE Working Commission 2 on Steel, Timber and Composite Structures.

brian.uy@sydney.edu.au

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