Composite Steel-Concrete Structures for Civil Engineering

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Abstract

Steel-concrete composite structures have been used in a design manner for well over 50 years in Civil Engineering in Australia. Standards and codes of practice in Australia have existed in this area for well over 40 years, however innovative builders and engineers have often worked well ahead of the curve in applying composite steel-concrete composite techniques using innovative systems and materials. This paper provides a summary of Australian practical experiences in the application of steel-concrete composite structures focusing on bridges, buildings, transport infrastructure and other civil engineering projects. The paper then highlights important advances in the development of the main materials of concrete and steel and focusses on high performance concrete and steel and the associated issues in applying these new materials for steel-concrete composite forms. A brief summary of advances in composite systems, namely in beams, columns, joints, walls and frames is then provided. A focus on reliability and demount ability is then provided which focus on existing and future structures with particular application for the civil engineering sector. Codes of practice are also summarized in particular the newly released Australian-New Zealand bridge and building standards, ASNZ55100 Part 6 and ASNZS2327 both released in 2017 and under current amendment. The paper then concludes with a brief summary of future and further research in the Australian context for civil engineering.