Performance of IBS Precast Concrete Beam-Column Connections Under Earthquake Effects: A Literature Review

Abstract

Problem statement: Despite demonstrating rather much benefits comparing to the conventional cast-in-place construction, the acceptance level of precast concrete building is still reportedly low in Malaysia. The implication imposed by stricter seismic design provisions would only worsen the matter. Approach: The main objective of this study was to identify the most appropriate type of beam-column connections to be introduced to precast concrete industry, particularly for regions of low to moderate seismicity. Hence, this study presented a comprehensive literature overview of the findings from studies conducted to analyze and investigate the behavior of precast concrete systems assembled with typical connections or joints under simulated earthquake loading. Results: The seismic performance of precast concrete structure very much depended on the ductility capacity of the connectors jointing each precast components, especially at critical joints such as the beam-to-column connections. It was learnt from the review that (1) hybrid post-tensioned beam-column connection and (2) Dywidag Ductile Connector® were among the most widely used connectors for precast construction in seismic prone regions. Conclusion: Future refinement and research could be carried out in order to optimize these connections to be used in low seismicity regions. Proposed connection type should be practical and well-accepted to avoid further impediment of the precast system.