Effect Of Impact Sequence And Impactor Mass On Structural Performance Of Dry Beam-column Joints

Thong Pham[1]
Tuan Ngo[2] and Hong Hao[3]
[1] Curtin University
[2] Curtin Univesity

This study aims to experimentally investigate the performances of prefabricated dry beam-column joints using GFRP bolts and reinforcements and geopolymer concrete under different impact sequences and impactor masses. Four Specimens, including three dry joints and one control monolithic joint, were tested under different impact loading conditions using the pendulum impact testing system. The effects of the impact sequences and impactor masses were examined in terms of the failure patterns, peak impact forces, and peak displacements. The experimental results indicated that the impact sequence significantly affected the failure mode, peak impact force and maximum displacement, but changing the impactor mass while maintaining the same impact energy did not affect the failure mode. Severe shear damage was observed on these specimens, from the impact point to the fixed end of the beam, when impacted by different masses. A higher impact force was observed on the specimens when the impact velocity is high and impactor mass is lower. Finally, the application of GFRP bolts and reinforcements and geopolymer concrete showed very good performances without brittle failure during the test when they were appropriately designed. It demonstrates that the proposed dry joint could be applied effectively in the precast concrete building to reduce construction time and costs. Also, the damaged components can be easily replaced and the remained undamaged components can be reused.