

RC Wide Beam-Column Joints with Continuous and Discontinuous Column under Seismic Loads

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Abstract

Because of complicated behavior of concrete, hysteresis response of reinforced concrete structures can not be achieved simply by most of the softwares. Since VecTor2 is a 2 dimensional software for analyzing reinforced concrete structures, wide beam-column joints with transverse beams tested by the authors and their colleagues were modeled in this software to evaluate accurate capturing the nonlinear cyclic response of them. Default constitutive models were used in most of the cases to evaluate VecTor2 program for simple modeling. Results showed that seismic behavior of exterior and interior wide beam-column joints with continuous or discontinuous column can be achieved from VecTor2 program accurately.

Key words: Wide beam-column joint, finite element analysis, VecTor2 program, smeared rotating crack, hysteresis response.

1. Introduction

Using wide beam-column joints as flooring system has many advantages such as cost minimization, reducing the amount of formwork, providing simplicity for repetition, lower story height and faster construction at a reduced cost. Therefore, various investigations have been conducted on this type of joints. At the University of Michigan, interior and exterior wide beam-column joints were tested. Adequate strength and deformation capacity were observed [1]-[2]. Moreover, a new detailing strategy was proposed for interior wide beam-column joints. In this detailing strategy, a portion of longitudinal reinforcement of wide beam passed outside the column core should be debonded. By using this strategy, good behavior of the wide beam-column joint could be achieved [3]-[4]. In 2009 and 2010, Li and Kulkarni tested interior and exterior wide beam-column joints. Good performance was achieved. Then, tested joints were modeled numerically and parametric study was conducted on this type of joints [5]-[6]. Moreover, Benavent *et al.* tested wide beam-column joints designed in accordance with past codes [7]-[11].

Since beam-column joints with discontinuous column is defined as the area needing