

BEHAVIOR BY SHAKING TABLE TEST FOR QUANTIFICATION OF COLLAPSE MARGIN OF STEEL HIGH-RISE BUILDINGS

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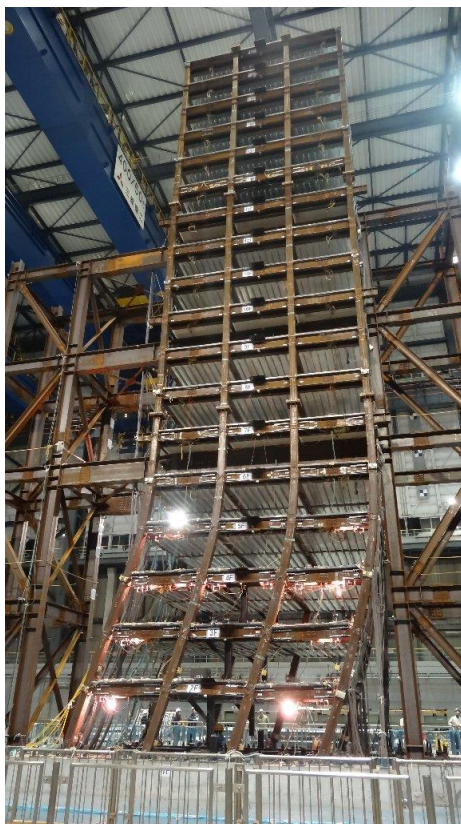
ABSTRACT :

The 2011 off the Pacific coast of Tohoku earthquake reminded us the importance of preparing unanticipated earthquakes. So we conducted a large-scale shaking table test to quantify the collapse margin of steel high rise buildings against strong ground motion beyond design level. This test is the largest one in the world that brings the test specimen to collapse. On the basis of the average level of the long-period ground motion that estimates the strong ground motion in the metropolitan area caused by the Nankai trough earthquake, the shaking level was raised gradually watching the way of damage progression, and the test specimen collapsed finally.

When the shaking level is average, the test specimen had an enough margin to the collapse. And finally, when the shaking level is 3.8 times to average, the test specimen was damaged heavily with ductile fracture of beam ends and local buckling of columns and then collapsed by the loss of the gravity load support capacity of lower story columns.

KEYWORDS:

steel high rise building, collapse margin, shaking table test, fracture of beam end, local buckling of column



(a) Collapse mechanism



(b) fracture of beam end



(c) local buckling of column

Photos of test specimen after collapse