

Retrofit of Concrete Columns with Seismic Isolators

The NOVA Award was presented to the Retrofit of Concrete Columns with Seismic Isolators for innovation in supporting and cutting columns in a fully operational building.



Rockwell International Corporation's Headquarters and Information Systems Center operates 24 hours a day. The eight-story building, located near California's Newport Inglewood fault, must survive earthquakes without downtime. The contract required the building continue to operate during the project.

Morley Construction Company retrofit the building by inserting seismic base isolators into 54 concrete columns. The isolators are alternating rubber and steel plates that minimize the transfer of earthquake forces from the ground to a building's upper floors. Installation of the isolators required cutting a segment out of each concrete column between the first and second floors.



The system was devised to carry column loads while concrete segments were removed and isolators inserted, was developed by engineers at Adams & Smith. Friction yokes gripped each column, above and below the segment to be removed. Four 500-ton hydraulic jacks carried the column load, enabling full column support without bulky shoring.

Cutting the columns presented another challenge. Sawing access was severely limited, the cut surface had to be extremely smooth, and lubricating water had to be tightly controlled.

Craftsman Concrete Cutting Company and Longyear Construction suggested using a plunge saw, a recent German innovation. They also designed a special bracket for horizontal cutting. Sequential cutting passes with blades of increasing diameter were then made to sever the columns, of which the largest was 84" x 36".

After a segment was removed, the isolator was inserted along with a flatjack. The flatjack was expanded, using liquid epoxy, the hydraulic jacks and friction yokes were removed, and the columns again carried their own loads. Throughout this process, the building remained operational and occupants conducted their activities without interruption.

An innovative friction jacking system for temporary support, and a specially-designed saw for making exceptionally flat, level cuts, enabled column cross sections to be removed and replaced with seismic isolators - without disrupting building operations.

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