



**I**N A BID TO QUICKLY GRAB ATTENTION, THE NEW JAPANESE OWNERS OF A FORMERLY NON-DESCRIPT SINGLE-STORY RETAIL BUILDING hired an artist to create a design for a new clothing store. The artist, Keith Greco, has a history of success with similarly challenging projects in Japan and the United States. For this project, he opted to create an avante garde design featuring a series of seemingly non-structurally supported bombs thrust through the windows of the building.

The existing 50-year-old building at 825 N. La Brea Ave. near downtown Los Angeles was a one-story unreinforced masonry retail sales building with an approximate total area (including a mezzanine) of 10,000 sq. ft. within an "L" shaped floor plan. The structure has a roof diaphragm composed of a 1" x 6" straight sheathing supported by built-up wood bowed trusses typically spanned at 20' on center. The foundation consists of continuous concrete footings and a 4"-thick concrete slab floor.

The owner's program consisted of:

## BOMBS AWAY

This radical renovation included both a seismic update and a complete cosmetic makeover

- Converting this very boring looking existing building into a more attractive and dynamic retail American clothing store;
- Upgrading it seismically;
- Keeping construction costs low; and
- Repairing a fire damaged truss at the front of the building.

Project engineer was Juan Carlos Esquivel, P.E., from Breiholz Qazi Engineering, Inc., a Lomita, CA, based firm specializing in seismic retrofit work. Fortunately, Esquivel had spent a year in Japan taking post-graduate earthquake engineering courses so was already familiar with the additional Japanese cultural requirements from the owner and artist's experience.

"Due to the unusual requirements of the owner and the bizarre design by the artist, steel was the only material that could meet the engineering demands of creating the illusion of structurally unsupported bombs throughout the building," Esquivel said.

The design began fairly simply, with a steel space frame with a steel platform on top to be used at the main door entrance of the building right underneath the damaged truss to carry it. However, among the several proposed modifications demanded by Greco was placement of bombs at the four corners of the steel space frame. After considering various solutions, it was decided that the space frame could be supported by a rectangular frame composed of tube steel members at the front and two flagpole steel pipes with a 75 degree angle of inclination at the back inside the building. These structural members were connected by a grid of steel members with diamond shaped holes in the web and a 1/4"-thick steel platform on top as a diaphragm.

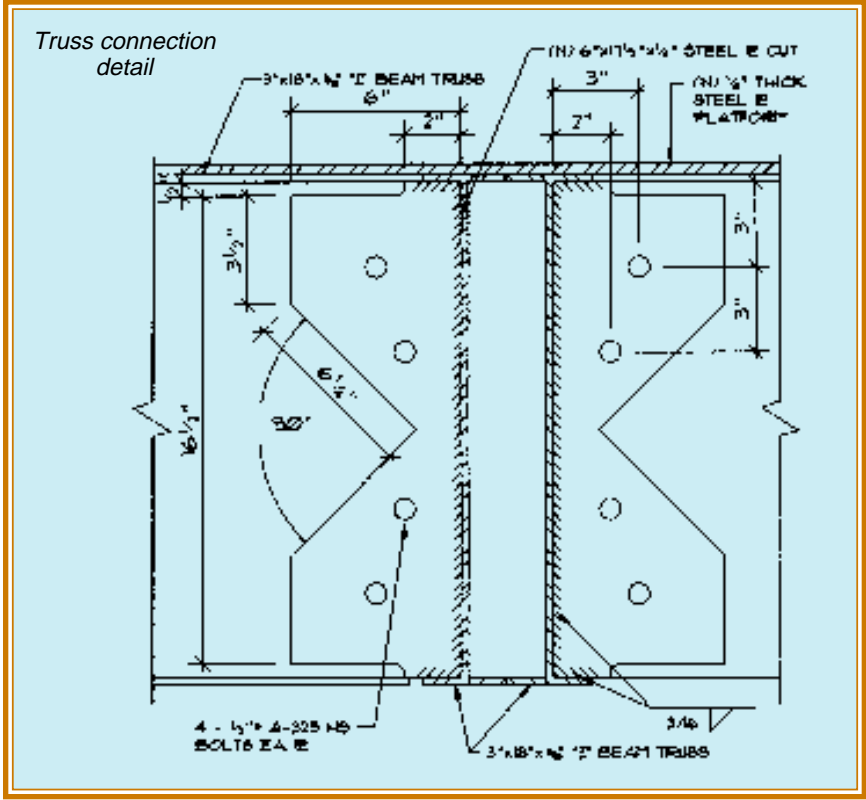
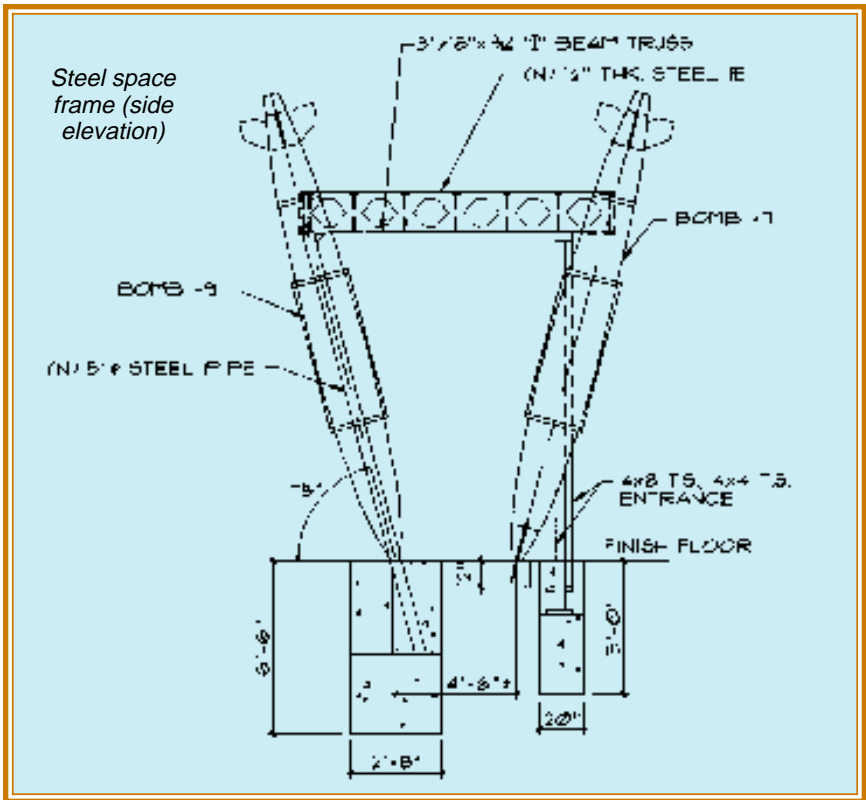
"The steel alternative was chosen among other materials for the manageability of the connections, which were purposely hidden inside the bombs, creating the illusion that the bombs



*Pictured on the opposite page is the original building and the newly renovated clothing store.*

*Shown at right top is the special steel moment resisting frame in the N-S direction.*

*Shown at right bottom is the connection between the steel members.*



are the structural elements and satisfying the artist's vision and owner's requirements," Esquivel explained. Both welding and bolting were used for the connections, depending on accessibility and aesthetics. Steel straps and steel rods were used to attach the bombs, which were real—though deactivated—World War II bombs, to the existing steel plates at the headers of the windows. "This accomplished the requirements of the artist to create a unique building which appears to have bombs penetrating the middle of each plane of glass window without any visible support."

For the seismic upgrade, in addition to the standard roof-wall ties and fiber wrapping of the walls, a special steel moment resisting frame running in the north-south direction was designed. After careful consideration, the Cover Plate Connection referenced in SAC's "Interim Guidelines: Evaluation, Repair, Modification and Design of Welded Steel Moment Frame Sections."

The total cost of the remodeling and retrofitting the building was less than \$300,000.

