

COSMOPOLITAN CHRONICLE

True tales from the annals of history, archaeology, construction, and restoration of the Casa de Bandini and Cosmopolitan Hotel.
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Seismic Retrofit

Part 1

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In 1869, when Parsons Brothers were building the Cosmopolitan hotel, they were not too concerned about earthquakes. "The Great 1906 San Francisco Earthquake" was still decades in the future. The wood framed second floor of the Cosmopolitan was built without any connections to the first floor adobe walls. Today, with 4" or 6" thick walls, that seems almost preposterous, but the Casa de Bandini has walls that measure 24" thick in 2 rooms, and nearly 38" thick elsewhere. Simply setting the wood floor framing on top of the adobe walls was no great feat, and surely seemed extremely stable.

Today however, seismic retrofit, i.e., accommodation for earth movement, in California is a major concern. Several major earthquakes have shown the vulnerability of non-reinforced cement block, brick, and of course, adobe buildings. When an earthquake affects a building it does not all move at the same time (natural frequency) or the same amount (displacement). In a 2 story building such as the Cosmopolitan, the adobe walls (first floor), the wood framed walls (second floor), and the roof level move differently. As the adobe

walls move back, the roof and second floors will still move in the original direction if not connected to the adobe walls below. This means that the building would actually be moving in two directions at the same time. An unacceptable degree of damage to both the adobe walls and wood framing could result unless adequate attachments between the two floors are made.



To connect the second story of the Cosmopolitan to the first, we are inserting 5/8" threaded stainless steel rods that are 60" long down the middle of the adobe walls. This is done by first coring holes in the upstairs wood floor to access the top of the adobe walls below. The wood plugs are numbered so they can be replaced in the original position when the job is complete. Two inch holes are then bored into the adobe, the rods are inserted and the holes are filled with a special adobe epoxy. The epoxy is slow cure to minimize

heat generation. It contains sand and has a degree of flexibility to improve its compatibility with the adobe. The top of the rods are then attached with brackets and wood blocking to the 2nd floor joists and top plates effectively connecting the first and second floors together.



The roof connections also have to be improved. Traditionally in wood frame construction, the rafters are toenailed, i.e., fastened with angled nails, to the top of the wall. To strengthen the interface of walls and roof, brackets called "A35s", are installed at each rafter to wall.

