

Saving time, money and lives

Marian Regional Medical Center, Santa Maria, California



Following the 1994 Northridge earthquake during which 11 hospitals were damaged, California passed a law requiring higher seismic standards established by the Office of Statewide Health Planning & Development (OSHPD) and the California Building Code. Meeting the most stringent of these criteria, Marian Regional Medical Center built a new \$210 million, four-story acute care facility.

Products in use

- Chicago Metallic[®] 1200 Seismic
- Chicago Metallic[®] 1496 Seismic Perimeter Clip



Doubling the size of the previous hospital, the new 191-bed, California Mission-style building spans nearly 240,000 square feet. Throughout the facility, Martin Integrated installed Rockfon's Chicago Metallic 1200 Seismic Suspension System and innovative 1496 Seismic Perimeter Clip. This approved alternative construction method was approved for this building. It is estimated to save three times the cost and four times the labor of the code-prescribed method for seismic ceiling perimeter treatment.

As pioneers of this efficient, cost-effective product, Rockfon's team supported the project with the necessary documentation through the OSHPD approval process. "Although our contribution to the project is largely invisible, it serves a critical function," says Tom Prukop, Rockfon's district manager. "We are doing our part to mitigate the risk by maintaining the integrity of the ceiling perimeter during an earthquake."

Building for growth

Marian Regional Medical Center, a Dignity Health member, has served the people of Santa Maria and the Central Coast since its founding in 1940 by the Sisters of St. Francis of Penance and Christian Charity. The primary service area includes seven communities in Santa Barbara and San Luis Obispo Counties.

The communities' most current hospital, opened in 1967, included 167 beds. In the early 1980s, the emergency room was redesigned to accommodate 24,000 visits per year. In 2011, approximately 54,000 patients entered Marian Regional Medical Center's emergency room. An additional 177,000 outpatient visits occurred in 2011 and 3,000 babies were born in the hospital that year. Patients often had to wait for extended periods of time until a patient room became available.

In response to the rapidly growing population and ongoing advances in medical technology, Marian Regional Medical Center built a new hospital, which opened in May 2012. Its 191 all-private rooms include 62 medical surgical beds, 46 telemetry beds, 42 labor/delivery/post partum/recovery beds, 21 neonatal intensive care unit beds and 20 critical care beds.

"The private rooms are a big step in improving patient care and creating a bigger hospital," Craig Miller, Marian Regional Medical Center's vice president of construction and real estate, told the *Lompoc Record*. The new hospital's emergency department doubles the size of the previous department. It offers dedicated imaging services for emergency patients with the capacity to serve 80,000 people each year.

Critical design

Designed by Moon Mayoras Architects, Inc. and constructed by Kitchell, Marian Regional Medical Center's exterior matches the California Mission-style of the neighborhood. "The appearance was very important to the local community," emphasizes Tim Simons, project manager with Moon Mayoras. "The building is located within a residential community and was essential that it blended with the surrounding architecture."

The interior, designed Brandt Design Group Inc., also takes its cues from the area's agricultural landscape. The finishes, furnishings and artwork highlight cinnamon, pinot noir and sage green colors. Throughout the building, the new hospital focuses on cultivating patient care and creating comfort within a healing environment.

"As a design element, the ceiling system is rather minimalist in appearance, but it's complex in its performance," observes Prukop. He elaborates, "Our Chicago Metallic 15/16-inch 1200 Seismic ceiling suspension systems are the industry standard for suspended ceilings. For Marian, this Heavy-Duty grid system is used throughout the building. Everywhere you look, you'll see our ceiling suspension system. What you won't see is the 1496 Seismic Perimeter Clip. This essential component works behind the scenes to meet the International Code Council seismic performance requirements and to provide a clean, sleek look."

"Under the 2007 California Building Code, the hospital was classified... to meet the most stringent seismic requirements," remarks Simons. "The perimeter clip proved very useful."

"During a seismic event, the structural integrity of the ceiling's perimeter may be compromised. Under certain vibration conditions experienced in an earthquake, ceiling motion can increase and lead to near total failure of the acoustical ceiling," cautions Tony Ingratta, an engineer with Rockfon who worked extensively on the Marian Regional Medical Center.

Facts

- The Chicago Metallic 1496 Seismic Perimeter Clip and 1200 Seismic suspension system presented extreme cost savings
- The 1496 Seismic Perimeter Clip received OSHPD approval, which will help mitigate the risk of damage during potential earthquakes in the future

Functional, fast, flexible

Ingratta explains that the code-prescribed method for seismic ceiling perimeter treatment requires a 2-inch wall angle, suspended with perimeter support wire, within 8 inches of the wall. Furthermore, the perimeter components must be tied together to prevent spreading. When the suspension members spread apart the perimeter, the ceiling panels may then become dislodged from the suspension system and fall out. A typical solution to meet the code requirement is to install spacer bars between tees to stabilize the ceiling and to keep the runners from spreading apart.

As an approved alternative construction method for all Seismic Design Categories (SDCs), the 1496 Seismic Perimeter Clip attaches to a wall angle, main runner and cross-tees that support ceiling tiles. For the SDC D associated with Marian Regional Medical Center, the use of the International Code Council Evaluation Service (ICC_ES) recognized, seismic perimeter clip may replace the 2-inch wall angle with a 15/16-inch wall angle and eliminate the need for spacer bars.

“Chicago Metallic 1496 Clip and 15/16-inch [1200] suspension system presented an extreme cost savings to both the owner and to us as the installing contractor,” says Tyler Hovivian, project manager with Martin Integrated. “It’s a methodical, simple system that offers an opportunity for highly efficient labor and meets the criteria required by OSHPD. I estimate it’s three times more expensive to use the system prescribed by OSHPD and that [this] approved alternate system is three to four times more efficient labor-wise. It’s so much faster and cost effective.”

He continues, “Installing 2-inch wall angles is a nightmare, not just from the time and materials, but also from an aesthetic point-of-view. When an architect or designer looks at it, they see a large obtrusive angle [and] unevenness in the drywall. The drywall has a stringent tolerance of no more than 1/8-inch variance. With the 2-inch wall angles, the drywall looks like it undulates. This system is much more flexible and you don’t have to rework the drywall. They’ve cut out several steps for us.”



Supporting documentation

“To assure OSHPD that our system met the highest seismic design categories’ criteria, our engineering team provided supporting documentation and technical information,” says Paul Ihn, Rockfon’s director of engineering and new product development.

The ICC develops and publishes the International Building Code (IBC), which is used at a local or statewide level across the nation. “Previously, building teams relying on the IBC could examine a map and determine their seismic requirements based on geography. Today, seismic requirements are not generalized by geography; they can vary between projects in the same city,” summarizes Ingratta.

According to the IBC, every construction project must be designed to a very specific SDC depending upon:

- One of three occupancy groups,
- Site soil properties ranging from hard rock to soft soil or special soil conditions, and
- Locations based on earthquake ground-motion maps.

IBC outlines six SDCs, A through F, ranging from the least to the most vulnerable. SDC A has very small seismic vulnerability. SDC E and F have very high seismic vulnerability and are near a major fault with very poor and liquefiable soil. For each construction project, a professional engineer or a registered architect must specify the SDC on the project drawings.

Moon Mayoras Architects specified SDC D on Marian Regional Medical Center for high seismic vulnerability. As a hospital, it clearly fits within Occupancy Group III as an essential facility. Third-party evaluation reports, such as those generated by ICC-ES, often are provided to ensure building products meet code requirements.

Passing inspection

The authority having jurisdiction or onsite inspector is responsible for the interpretation and enforcement of the building code at a local level. For Marian Regional Medical Center, inspections were stringent and thorough. Aiding in this effort, Rockfon manufactures its Chicago Metallic 1496 Seismic Perimeter Clip in an electro-deposited, gold-color finish to make them easily visible to the inspectors.

To gain OSHPD’s approval, Rockfon’s team provided detailed documentation including engineering analysis by Miyamoto International, Inc., (<http://www.miyamotointernational.com/>) an independent, internationally renowned structural and earthquake engineering firm; an ICC-ES Evaluation Report verifying compliance with 2006 and 2009 International Building Code; and the 2007 and 2010 California Building Code requirements applicable to the project. In particular, it referenced ASCE 7 sections specific to SDCs D-F. “More importantly, the report documents compliance with the applicable DSA [Division of the State Architect] and OSHPD provisions that apply to suspended ceiling systems,” notes Ihn.

In Spring 2011, Marian Regional Medical Center’s building team received OSHPD approval for the Chicago Metallic 1496 Seismic Perimeter Clip. Martin Integrated started installing immediately after having the signed papers in hand.

During the 18-month installation, Simons of Moon Mayoras Architects remembers, “There were some areas with so much overhead congestion that additional perimeter clips were allowed to be used at the wall in lieu of compression posts. Of course, the calculations needed to be reviewed and approved by the state, but it was allowed and was very useful.”

To mitigate other conflicts, Martin Integrated worked closely with Kitchell to develop 2-D drawings and 3-D Building Information Modeling (BIM) tools. “BIM is considered standard for large hospital work like this, but very few installing contractors have the in-house capabilities or even the knowledge to do it well,” says Prukop. “Martin Integrated is experienced with high-end hospitals and is at the forefront of BIM technologies.”

The 3-D imaging allows a virtual 360-degree view revealing complicated seismic bracing and grid systems within the ceilings and walls. In addition, the BIM views provide intricate details of ducts, conduits, pipes, sprinkler lines, electrical panels, and other integrated systems. BIM’s benefits endure long after construction, supporting ongoing maintenance and future renovations.

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Seamless transition

On Tuesday, May 22, 2012, the patient move began promptly at 8 a.m. and all patients were moved to their new private patient rooms by 12:30 p.m. The patient move process was a seamless transition conducted by more than 200 medical and support staff, hospital volunteers and Allan Hancock College Emergency Services Academy students who working together carefully and systematically moved 209 patients to the new facility.

“Knowing that we’re moving patients into a hospital that’s not just current, but a hospital that’s going to survive us for the next couple of generations because of the way it’s designed, it’s pretty special,” remarked Chuck Cova, president and CEO of Marian Regional Medical Center. “It’s really exciting. It’s satisfying for our community because our community has waited a really long time for a new hospital.”

As part of Santa Barbara County’s healthy future, Simons at Moon Mayors Architects also reports that the local area residents already have welcomed the building as a landmark representing their community.

Today, Marian Regional Medical Center is recognized as one of the top hospitals in the state and nation for low infection rates and patient safety. Contributing to ongoing safety, the facility and its site have been fitted with seismic instrumentation that sends real-time data to the California Geological Survey with the goals of providing early warning earthquake detection and optimizing buildings for the next generation.



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