

Innovative steel framing system unites strength, flexibility and cost-effectiveness for landmark hospital expansion.



It's Not Just for Earthquakes Anymore

BY MARSH SPENCER

TWO YEARS AGO, Carolinas Healthcare System launched plans to significantly expand its Carolinas Medical Center (CMC) in Pineville, N.C. The medical center was widely acclaimed for excellence in in-patient, emergency and maternity services, and several expansion projects were introduced to ensure that the facility could continue to meet the medical needs of families in this growing community.

A focal point of these expansion plans was a 201,415 sq. ft, six-story addition to the existing hospital that would grow the total number of beds to 206 from 109. The addition would also more than double the overall size of the hospital, expanding the facility to 515,000 sq. ft in total.

When it came time to design this landmark project, the original concrete frame design proved to be too costly for the budget assigned to this superstructure. That is when the Charlotte, N.C.-based BE&K Building Group, a commercial construction services company, turned to SteelFab, Inc. for alternative framing options.

We had several options to offer for consideration. The first was a rigid steel frame for the structure. While this option cost less than concrete, it was still cost prohibitive for the client. The second option was a braced frame steel structure. While this approach brought the project within budget constraints, it also introduced brace frames to the building footprint, which interrupted the flow of the building and hospital design requirements.

The third option was actually the first thing that had come to mind: using SidePlate Systems. But another word was also front and center when I thought of SidePlate: earthquakes. The company's steel frame systems are known for protecting buildings against natural and manmade disasters, including seismic activity and blast attacks. How would their technologies apply to a medical center in the sleepy, non-seismic, moderate-climate suburb of Charlotte?

Now based in Laguna Hills, Calif., SidePlate introduced its patented steel framing technologies following the devastating Northridge earthquake in 1994. SidePlate FRAME (Fast, Reliable



▲ The new six-story addition to the Carolinas Medical Center in Pineville, N.C., may never need the added seismic performance capabilities of its steel framing system, but it still can take advantage of the \$500,000 savings it provided.

◀ Using the SidePlate FRAME system facilitated erecting the estimated 1,397 tons of steel framing for the Carolinas Medical Center—Pineville in just 12 weeks.

▲ Viewed from a similar vantage point, it's clear to see how using moment connections in the steel framing avoided having to accommodate diagonal braces.

and Master Engineered/Erected), a new and improved version of the company's legacy high-performance steel frame technologies, had recently been introduced and seemed like a viable option for this project. This system has undergone thorough testing for blast and progressive collapse, and has been implemented in a number of high-profile construction projects nationwide. But for our purposes, what mattered most to us and the client was that the system uses less steel and expedites construction schedules—both of which save considerable time and money.

So despite the lack of earthquakes and extreme weather conditions, SteelFab moved forward with exploring SidePlate FRAME as a viable alternative to concrete framing. The result was an innovative steel frame system that gave the hospital even greater flexibility in terms of space planning without sacrificing structural integrity. And then there were the savings: after running the numbers yet again, we determined that by using the SidePlate steel framing system, we could guarantee a savings of \$500,000 over the costs based on the original concrete frame design.

The challenge, of course, was that since North Carolina is not in a seismic area, no other builder, engineer or fabricator in the Southeast had fully explored SidePlate as a viable option. That meant the SteelFab team and SidePlate had to thoroughly educate and win over every stakeholder involved in the project.

The cost savings alone was significant. But just as importantly, every stakeholder realized direct benefits from the SidePlate system throughout the entire planning and construction process. The owners knew they were creating a stronger, safer building that met all of their needs for less money. SidePlate engineers worked along-



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◀ Each SidePlate FRAME connection consists of several relatively simple individual components that all are welded to the steel shapes in the shop so only bolting is required to make the connection in the field.



side the general contractor to share their knowledge and provide technical support. And engineers appreciated the chance to create a stronger building that uses a steel framing system fully backed by full-scale laboratory testing for earthquakes, blast and progressive collapse—all while offering maximum design versatility.

As fabricators, SteelFab found the new SidePlate FRAME system very easy to fabricate and erect. The fabrication process consists of 100% shop fillet welding in either the flat or horizontal positions connecting steel plates to both steel columns and beams—with no UT required in the shop. This means up to 50% less shop hours compared to the old SidePlate systems, ¼-in. to ⅝-in. shop fillet welds, the elimination of beam stub welding, match marking and handling, no prepping beams for CJP field welding and the elimination of wide trucking loads.

In the fall of 2010, SteelFab successfully erected the frame of this new addition, using an estimated 1,397 tons of structural steel and completing the task in an impressive 12 weeks. Most importantly, this phase of the project fully realized the promised \$500,000 in savings by using the SidePlate FRAME system over the proposed concrete frame design. Thanks to the versatility SidePlate offered, the original vision for the facility was able to be fully realized, and is slated to debut in 2012.

Following the success of this project and others, SidePlate is emerging as an increasingly desirable steel framing option throughout the East Coast. As fabricators, we took a considerable yet calculated risk by supporting the use of SidePlate from very early on in the project stages. This is a risk that has clearly paid off, and we are proud to have been the first to bring SidePlate to the Southeast region. **MSC**

Owner

Carolinas Healthcare System

Architect

Wright McGraw Beyer, Charlotte, N.C.

Structural Engineer

Walter P Moore, Atlanta

Steel Fabricator and Detailer

SteelFab, Inc., Charlotte, N.C. (AISC Member)

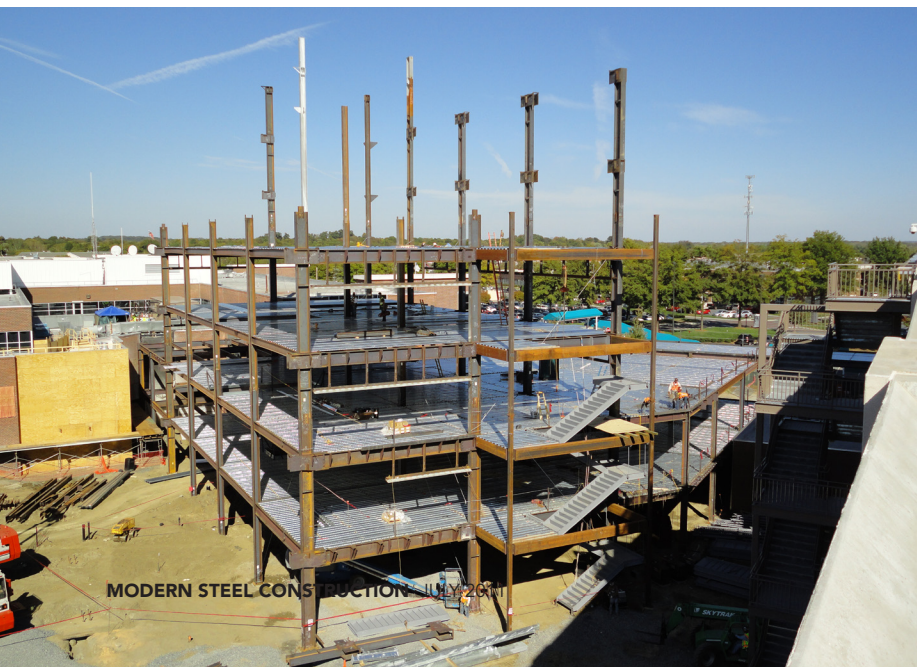
Steel Erector

Carolina Steel & Stone, Inc., Hunterville, N.C. (AISC Member)

Construction Manager

BE&K Construction Group, Charlotte, N.C.

▲ Preparing a column in the SteelFab shop. In addition to keeping all the welding in the shop, attaching the plates requires only fillet welds, which simplifies both welding and inspection.



◀ The first few columns in place for the fifth and sixth levels of the Carolinas Medical Center's Pineville facility display the distinctive, clean look of the SidePlate FRAME system connections.