

Growing Optimism Spurs Innovation for Seismic Companies

By Larry Kahaner

Growing optimism in the construction industry is bringing with it new products and services, as companies offer more value and advanced features to keep up with customer demand and their own competitors.

At West Jordan, Utah-based CoreBrace, LLC (www.corebrace.com), Chief Engineer Brandt Saxey says that growth in the steel industry is increasing his sales. “We have continued to see strong growth in the steel industry and in particular the use of buckling restrained braces (BRBs) within that industry. The use of BRB systems can bring the overall construction cost for a building down, often helping to make the project more feasible and funding more available. Projects incorporating BRBs often use less steel; offering not only significant cost savings, but also contributing to true sustainability.”

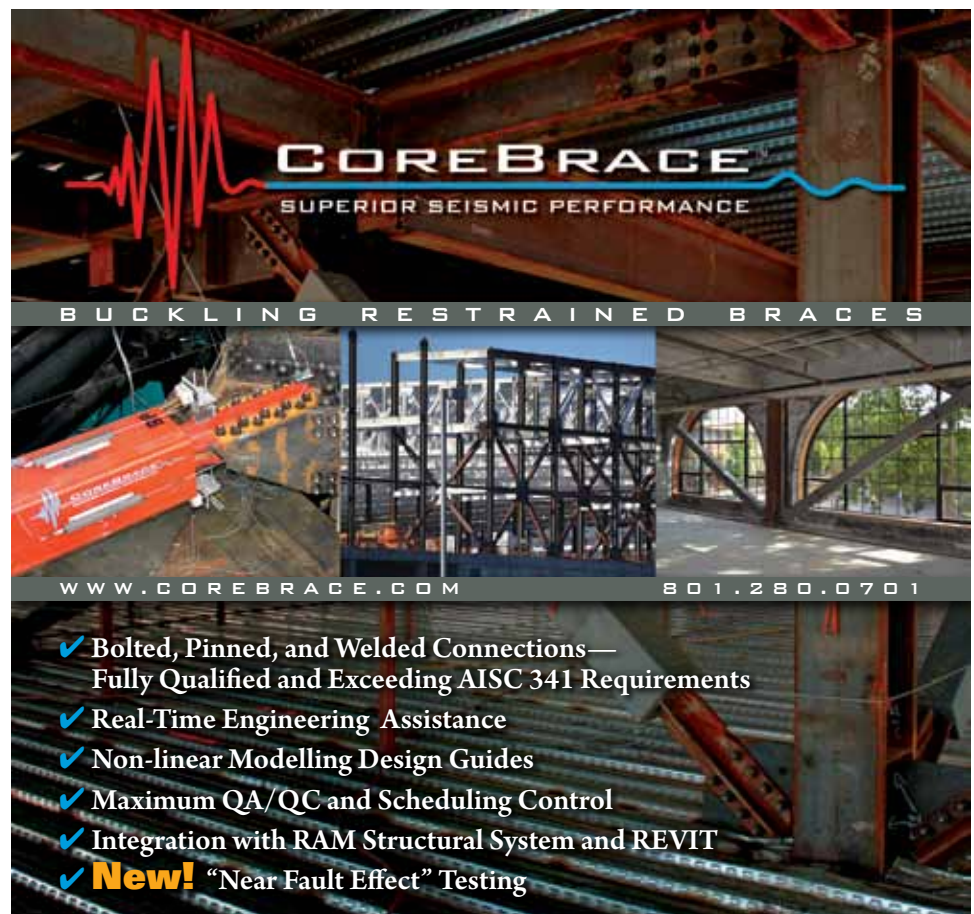
The company supplies a large number of braces for typical buildings such as schools, office buildings, and hospitals, but also provides braces for large industrial facilities, existing building retrofits, warehouses, bridges, and essentially any structure that an engineer might be designing, Saxey notes. “As the engineering community continues to become more familiar with the behavior and advantages that BRBs provide, we see designers continually finding novel uses and new applications for them. This sometimes means that new kinds of performance requirements must be met from engineering and fabrication perspectives, which we work constantly to achieve.”

Corebrace recently tested braces specifically designed for bridge applications as well as near-fault earthquake effects such as occurred in Christchurch, New Zealand. This testing included braces fabricated out of standard steel, galvanized steel, and stainless steel, and included both pseudo-static and dynamic rates of loading. Adds Saxey: “Each of these different material types produced a unique set of brace performance data, but each can be fit for any project type. We’ve also recently tested braces designed specifically for retrofit use. These braces are installed in two separate pieces and spliced in the middle, allowing them to be brought in and fit-up in tight spaces where the use of a traditional brace would not be possible. These recently tested braces underwent some of the most rigorous testing we have ever performed – far exceeding the AISC-341 code requirements. Our ongoing R&D program allows us to continually

provide the most state-of-the-art performance levels and keep our fabrication processes as economical as possible.”

Other companies see better times, too. “The construction environment is becoming more optimistic. It appears that, as the economy continues to recover, construction jobs are returning,” notes Aura Joyce, Marketing Communications Manager for Aegion Corporation (www.aegion.com), headquartered in St. Louis, Missouri and the parent company of Fibrwrap Construction Services and Fyfe Co.

“One new and innovative application for the Tyfo Fibrwrap Systems on light-frame construction is the Tyfo G Wrap System,” says Joyce. “The Tyfo G Wrap System utilizes advanced composite materials to strengthen existing gypsum walls, and makes them behave like properly detailed plywood shearwalls. This is critical in strengthening existing apartment buildings that suffer from what is called soft story or weak story deficiencies.” She adds: “The Tyfo G Wrap systems allows for the strengthening of these buildings by applying advanced composite materials over existing painted gypsum wall boards without having to tear into the wall. This allows for faster construction schedules and



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limits the potential exposure of asbestos or other airborne particles that could be hidden within the walls of these buildings.”

Also seeing an improvement is Lyle Simonton, Director of Business Development at Subsurface Constructors in St. Louis, Missouri (www.subsurfaceconstructors.com). “We are seeing a big increase in the use of ground improvement methods in the transportation and commercial sectors. We have performed the design-build of ground improvement solutions for MSE (mechanically stabilized

earth) walls for several large DOT projects in several states,” says Simonton. “Additionally, we are seeing several of the big-name retail companies who are building new stores across the country require the use of ground improvement in lieu of remove and replace to speed up construction of these new stores.”

At Subsurface, innovation is key, Simonton says. “As a specialty contractor, we must continue to innovate with our equipment and services so marginal sites can be improved economically, while trying to

maintain a technological advantage over our competitors.” He adds: “Engineering consultants and the owners they’re working for seem to be spending more time than ever on trying to bring value to their projects. They’re asking design-build speciality contractors like us to work closely with them to develop value-added foundation solutions, which often times means using vibro stone columns/ aggregate piers in lieu of deep foundations or substantial over-excavation.” (See ad on page 20.)

Mo Ehsani, President of QuakeWrap Inc. (www.quakewrap.com) in Tucson, Arizona, says that a major concern in seismic retrofit of structures is the strengthening and confinement of concrete columns. The company in the early 1990s introduced Fiber Reinforced Polymer (FRP) products which had been successfully used worldwide, he says. However, these repairs use the FRP in what is known as a wet layup procedure, where the fabrics of carbon or glass are saturated in the field with epoxy resins and wrapped around the column. The method requires the column surface to be smooth, and in some post-earthquake repairs this may take additional time so masons can repair the damaged concrete before wrapping. The technique also requires trained contractors who have prior experience with these products.

Now, Ehsani says that QuakeWrap has come up with a new generation of products called PileMedic that make these repairs much faster and easier. “We can now apply heat and pressure to saturated fabrics in our plant to produce a very thin FRP laminate sheet. These sheets are four feet wide by hundreds of feet long and are sold in rolls. The challenge in this technique has been to make these sheets with thicknesses as little as 0.01 inch; the typical sheet is 0.025 inch and has a tensile strength in excess of 150,000 psi. The relatively flexible sheets can be

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formed to virtually any shape in the field. In a typical installation, the sheet is wrapped twice around the column and glued to itself to create a very strong “sonotube”-like shell that leaves a small annular space. This annular space between the shell and the column is filled with grout. The entire operation takes about 1-2 hours.” Videos of these applications are available at www.pilemedic.com.

“Like most engineers, we like to solve problems. So we’re continually researching and developing new ideas and asking ‘what can we do better?’” says Henry Gallart, President of SidePlate (www.sideplate.com), Laguna Hills, California. “CJP welding is expensive and time-consuming, so SidePlate FRAME was developed as an easier way to realize the SidePlate design benefits without having to do any CJP welds. It’s been a huge success by any measure, but many areas of the US still prefer field-bolting. The SidePlate bolted connection was the logical follow-up to that.”

Adds Gallart: “In April, we unveiled a new low-seismic, R=3 system that is field-bolted. The industry response has been tremendous. For higher-seismic areas, just a few years ago we developed a new, more economical system called SidePlate FRAME, that uses only fillet welds in the shop and field. The field-bolted connection is tailored to low-seismic applications and delivers the same SidePlate cost-saving benefits to the overall design, but also solves many of the fit-up issues inherent with other bolted moment connections. For higher-seismic applications, the fillet-welded SidePlate FRAME configuration meets all of the AISC criteria for Special Moment Frames, saves cost on the overall design, and saves a significant amount of construction cost by eliminating CJP welding.” (See ad on page 23.)

Jim Hussin, Director, Hayward Baker, Inc., (www.haywardbaker.com) headquartered in Odenton, Maryland, says that his company is involved in all industries and sectors since nearly all are confronted with geotechnical challenges. “Since its inception over 60 years ago, HBI has established itself in the forefront of geotechnical specialty contracting, evolving and expanding to meet the increasingly complex needs of the construction community. HBI is recognized by the industry to be reliable and innovative experts, and offers full Design-Build services for virtually any geotechnical construction application.”

Hussin adds: “Soil mixing is a relatively new technology that is growing in use to solve issues related to soft soils and seismic applications. HBI has used this technology to improve ground for a wide variety of structures, especially those subjected to seismic and wind loading.” As for business conditions in general, he notes: “Although not close to the peak levels seen several years ago, Hayward Baker has seen a steady, healthy growth in the construction market over the past couple of years. Hayward Baker has a strong engineering staff and is available to assist SEs with evaluating geotechnical challenges and provide Design-Build services.”

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