

2015 AGC ACE Awards

Category 2: Meeting the Challenge of a Difficult Job – Specialty Contractor

Specialty Contractor: Sturgeon Electric Company, Inc.

Project Name: Saint Anthony Hospital North Health Campus

Sometimes it takes a natural disaster to reveal the character of a team; a disaster can substantiate the true beauty and spirited resilience a community requires to mend the seams nature has ripped open.

When Sturgeon was awarded the Saint Anthony North Health Campus, we knew we were facing a major challenge; completing a 350,000SF design-build hospital within a schedule as aggressive as our 103-year-old company has ever seen. Planning and coordination would be critical to project success. A close-to-home pride in delivering a landmark facility for our local community created an ambition and excitement to commence construction. No one could have anticipated the historic flooding that would soon ravage Colorado during a crucial phase of project construction.

The storm referred to as the “thousand-year-flood” swept across Colorado in mid-September 2013; regions of Colorado accumulated 18” of rainfall over five days, doubling the anticipated *yearly* rainfall. As rushing waters carved through roughly 2,000 square miles of Colorado, over 2,000 homes were damaged or destroyed, hundreds of miles of roads were obliterated, and several mountain towns were rendered completely inaccessible. More than 14 counties declared federal emergencies. The end result was nearly \$2 billion of damage. By the time the storm finally faded, the Saint Anthony North Health Campus needed its own form of resuscitation.

The water runoff swept away huge portions of the aggregate base beneath the 10” thick concrete slab, which was ultimately compromised and sinking. Upon further inspection with Ground Penetrating Radar, the full extent of destruction was revealed; over 17,000 square feet of the concrete slab and underground installations would need to be excavated and reinstalled. This threatened to deny the owner and local community of their new hospital for four to six weeks. However, Sturgeon Electric and project partners would stand unified in a determined effort to fight back and reconcile the schedule.

Solutions of Special Projects:

The destroyed Level-1 slab forced the collective team to discover a new path to completion. The electrical Switchgear was in-route and the steel structure was well underway. Leaning on strong relationships we developed with GE Johnson and other trades, we began looking at options to optimize the schedule and mitigate the impacts. Determined to find a solution to Mother Nature's destruction, the project teams unified in a common mission and goal. Our mission: provide our community a new hospital, on time. Our goal: mitigate the flood. To achieve the mission and goal, we scrapped the old plan of tackling the largest portions of work in the traditional "ground-up" approach. Instead, we reallocated labor and material resources to the upper floors with a "mass-attack" approach:

- Construction efforts on Levels 2-4 required aggressive & concurrent focus during Level-1 repair.
- Immediately upon completion of Level-1 slab repair, a labor swarm would attack Level-1 without hindering progress of upper floors.
- Allocate a separate Foreman to each level of the building.

Results: The concurrent floor activities created a healthy competition between floor crews, and facilitated communication between trades in respect to production and safety.

Excellence in project execution and management/team approach:

Long before the flooding, we needed solutions for compressing our work to meet the aggressive 18-month construction schedule. We targeted the underground installation at the Central Utility Plant. Our goal: assemble large sections of underground conduits off-site in a controlled location, to be delivered and placed underground at exactly the right time. This concept of just-in-time delivery of the massive conduit assemblies required a triad of in-house collaboration between our field leadership, prefab department, and BIM teams; the results were unprecedented. The effort was a massive success, as Sturgeon was able to install all of the underground feeders in just 10 working days. The time savings were colossal, providing a one-month gain over traditional methods of lay-in trench assembly.

Fast-forward to mid-September 2013: a saturated, mangled concrete slab sits atop the same conduits that we had so proudly installed. Until the damage could be assessed, we feared that the success of our innovative process would be nullified by Mother Nature's hand.

As removal of the concrete slab and damaged utilities commenced, it was discovered that Sturgeon's underground installations stood unfazed, firmly intact despite the eroding floodwaters. This was credited to Sturgeon's best-practice approach; we opted to use flow-fill, a slightly more expensive type of conduit encasement, in lieu of the traditional squeegee method. As a result, 90% of our underground installations withstood the beating of the raging flood.

Sturgeon saw the benefits prefabrication provided, and began dissecting other items for prefabrication:

- Panels and Transformers were sent directly to our prefab shop, where they were pre-mounted on metal channel support systems, fitted with conduits, junction boxes, and terminal lugs. The result:
 - Nearly a week of labor carved out of electrical rooms on every floor.
- Installation for typical Patient headwalls containing up to 20 electrical devices was simplified with the use of installation templates. The result:
 - Rapid installation/minimal re-work.
- Precision pipe bending was delegated from the field to our prefab department. The result:
 - Time spent on-site for large conduit bends was nearly zero. Custom sections of conduit were delivered exactly as needed.

Construction innovations/state-of-the-art advancement:

Project success required eliminating waste, specifically in the form of unnecessary equipment, waiting for materials or information, and miscommunication causing re-work. Understanding job trends in order to identify solutions as soon as possible would mean success.

With the flood forcing greater manpower and coordination for the upper floors, state-of-the-art construction tools would need to be employed.

We sharpened our pencils implementing production tracking tools, Bluebeam document control, Bim360 QA/QC, 3D modeling software, and tablet PC's in the field.

The results:

- Elimination of paper drawings
- Deterring re-work
- Real-time job status and tracking
- Speeding information exchange between the office and field.

The technology package drastically improved communication between trades, harvesting efficient field planning and production.

Value Engineering and means and methods adjustments were necessary to achieve the project completion and offset repair costs.

- The project used aluminum feeder wire to reduce commodity costs
 - Provided a savings of nearly \$230,000.
- Creative means and methods drastically cut labor costs.
 - Utilized plug-tail devices
 - Provided a 2/3 labor reduction for receptacles/switches
 - Wire Pull-packs were used for all branch wire pulling
 - Eliminating 1/3 of task manpower

Environmental/Safety:

The mitigation plan moved forward successfully. The team – well aware of the compressed time frame – understood that any accident would be detrimental to the hard-earned schedule gains.

Delayed construction schedules typically equate to surging manpower. This results in overcrowding, which often compromises safe conditions and increases the likelihood of injuries or incidents. As a counter-measure, Sturgeon held preparatory control meetings prior to starting any major feature of work. By utilizing a Task Hazard Analysis (THA), crews identified risks inherent to the specific task, and developed detailed risk mitigation plans which would entail communication by affected parties; project trades, the general contractor, or the client.

A daily job briefing would precede all activities. The entire crew would discuss their specific tasks and production goals, then acknowledge the associated safety hazards and provide opportunities for improvement. In addition, our Safety Observation Report (SOR) program facilitated safety-conscious action while reducing complacency; the program rewards employees who identify and correct hazards in the field. The reports are seen by virtually all Sturgeon site employees and are distributed company-wide to raise awareness on other sites.

The safety culture Sturgeon exhibited on the Saint Anthony project was observed first-hand by OSHA representatives in June 2014. As a condition of membership in OSHA's Voluntary Protection Program (VPP), the safety conditions of Sturgeon Electric's jobsites, pre-fabrication shop, and even corporate headquarters are subjected to the scrutiny of OSHA VPP officials every three years as part of the renewal process. VPP participation is the highest level of partnership offered by OSHA, and Sturgeon Electric is the only certified mobile workforce in Colorado with this status, which was renewed after OSHA's visit to this project.

A motivated team and strong corporate safety culture ensured that a compressed schedule would not compromise safety; we worked the entire project duration - over 160,000 hours - with zero lost-time injuries.

Excellence in client service/contribution to community:

The owner wanted to add a special contribution for their patients and community. The goal was to raise money for a 7,000 square-foot healing garden, to which Sturgeon responded by donating \$25,000. The tranquil healing garden provides patients a venue for a relaxing escape.

While nearly every modern project is challenging, a whole new dynamic is added when a natural disaster enters the picture. Teams come together, sacrifices are made, and one has the opportunity to see the true character and greatness of this industry. We are fortunate to have been part of the team who delivered such a challenging yet rewarding project.



Aggregate base undermined by flood waters

Photo Credit: Sturgeon Electric



Excavation of destroyed slab begins.

Photo Credit: Sturgeon Electric



A project first - massive sections of underground conduit were pre-fabricated off site and installed just in time, significantly reducing installation time.

Photo Credit: Sturgeon Electric



Photo Credit: Time Frame Images



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