

## **2017 AGC ACE Awards**

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

**Specialty Contractor:** ISEC, Inc.

**Project Name:** Colorado State University Health and Medical Center - Handrail

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### **Overview Statement – *Meeting the Owner’s Need for Integral Architectural Feature***

As a specialty contractor brought on in the middle of construction, tasked with installing an integral architectural feature that was almost eliminated from the project due to an already compressed schedule, ISEC’s work on the four-story spiral center staircase at the CSU Health and Medical Center embodies the definition of “Meeting the Challenge of a Difficult Job.” ISEC had to overcome several unforeseen conditions to meet the non-negotiable opening date for the upcoming semester.

Despite having to create new drawings and deliver innovative solutions to existing design parameters, both which caused an initial loss of three weeks in schedule that was later made up, ISEC managed multiple submittals to save time, and utilized an innovative 3-D scanner technology for accurate templates to deliver the architectural feature of complex curved glass the owner wanted most, on time.

“The staircase is my favorite feature in this new building... We asked in the name of health for all people coming into the building to feel invited to take the stairs instead of the elevators... It is beautifully representative of our mission for increased well-being on the campus,” stated Anne Hudgens, Executive Director of the CSU Health Network.

### **Solutions of Special Projects – *Overcoming Unforeseen Job Conditions***

As a team member that was given this scope midway through the project, ISEC did not have the luxury of brainstorming possible solutions during the early design phases. To meet the owner’s needs for this essential feature, ISEC had to assess the work already performed, offer work-around solutions during construction, and maximize the collaborative efforts between the owner,

CSU, general contractor, Adolfson and Peterson, the architect, Bennett Wagner and Grody Architects and many subcontractors.

### ***Unforeseen Condition – New Drawings Needed***

From the outset, project schedule served as the accelerating factor for completion of the spiral staircase with no room for errors. One of the first challenges to overcome included the need to submit new drawings.

With the stair structure installed and the concrete decks poured months before ISEC joined the team, installation of the landing posts presented a challenge. Upon investigation, it was discovered that the floor plate design would not be sufficient, as the steel structure and rebar were based on another rail design that had the posts mounted with a base plate bolted to the floor.

When the team concluded that the only way to stay on schedule and reduce the risk of installation errors was to core drill for the landing posts, new drawings had to be created to reflect the new core design and changes to the radius for the center line location for the stairwell.

### ***Solution – Multiple Submittals***

This unforeseen condition forced ISEC to consider alternative solutions. As a result, ISEC submitted separate bracket and post design, baffle node design, stair rail drawings, landing rail drawings and smoke baffle drawings to release many different components as originally scheduled.

**Result:** This allowed the team to perform necessary work, such as installation of weld plates and stair post brackets while the handrail and glass panels were being fabricated, saving critical time originally lost on the project.

### ***Excellence in Project Execution and Management/Team Approach - Smoke Baffle Design***

ISEC offered their expertise in project execution by overcoming the challenge of the smoke baffle design. Smoke baffle glass panels are an essential component for fire safety to limit the spread of smoke and meet fire codes. The nodes for the smoke baffle applications had to be custom made due to the atypical design, which had them mounted on the side of the wall, instead of under the ceiling. To function properly, the team had to install the smoke baffles as close to

the wall as possible, all while having the customized nodes needed to mount the stairs and landing panels to the walls, machined down to the baffle.

### ***Solution – Subcontractor Coordination and Design Templates***

The team determined that the ¾” space needed for proper execution was too wide for caulking and a needed a fire rated neoprene seal. This element was outside ISEC’s scope of work, but the team coordinated with the glazer to keep the project moving forward and still maintain the scaffold decking needed for safety.

In addition, the atypical design caused the team to have templates made for the smoke baffle node locations. There were 54 baffle panels with three nodes each. If the team even deviated slightly with the installation of one of those nodes, work would need to cease until the wall and backing were repaired.

To keep the project on schedule and not cause delays waiting for glass to arrive, precise hardboard templates were made with a CNC machine using the data from the 3D modeling. Each template needed to have the exact starting points, correct radius for node locations, and the correct spacing between panels.

### **Results:**

- This allowed the team to hang the baffle panels in the stairwell in two days with no errors in node locations.
  - With a three-week lead time before the glass panels even arrived onsite, ISEC’s installers used the accurate templates to drill and tap for 162 nodes. When the glass arrived, the team hung the baffle panels on the nodes with not one node in the wrong location.
- With final adjustments, the baffle installation was completed in four days, compared to the originally scheduled three weeks. ISEC made up all the time that was lost during the initial phases of the project.

### **Construction Innovations/State-of-the-Art Advancement - 3D Scanner technology**

ISEC applied the latest in construction technology with a 3D modeling process called the Faro Focus 3D Scanner technology. This modeling process was critical in handling the design issues and completing the stairwell project on-time without errors.

This process included completing the scans at night so no one in the building could interfere with the lengthy scanning process. Each scan had over a million laser points of data and were taken at multiple points on each floor, with 360-degree photos for modeling reference. The modeling process took three weeks to complete before the CAD drawings could be made, but saved the project team several weeks of labor.

**Results:**

- Modeling created accurate templates that allowed the team to effectively manage the smoke baffle coordination and move on with drilling and tapping, without having the glass onsite, saving many man-hours.
  - Had the team used a standard templating process, the level of accuracy achieved would have been very minimal compared to using the innovative modeling process.
- Modeling created near perfect drawings specifically for the post layout in the core drilling process with the exact chord and inset dimensions. Not one single core hole was inaccurately placed, saving the team much needed time on the project.

**Environmental/Safety – *Importance of Scaffolding and Decking Process***

Installing curved glass panels on multiple levels certainly presented added safety concerns. To provide the utmost safety for everyone, ISEC’s team determined that a complete deck on the second and third floors was essential for the project. The deck on each floor provided the safest and most efficient means to protect the workforce from the possibility of items falling from above.

**Results:**

- There were no lost time hours due to injury, with the team working approximately 1600 hours on the project.

- ISEC could increase the crew size and work on multiple floors at the same time, in the safest conditions.

Fall protection safety also influenced the installation of the glass panels while the workers were tied off. The original tie off places were eliminated after the fourth floor was drilled, and new tie-offs that met the fall standards had to be identified and executed to maintain safety.

During one of the early team meetings it was discussed how CSU could safely start moving into the building while the stairs were being worked on. Since there were other stairs available, CSU could obtain the Certificate of Occupancy, but with an open stairway, this would not have been feasible. This resulted in a walled in stairwell for safety, and to maintain schedule.

### ***Excellence in Client Service and/or Contribution to Community – Promoting Wellness through Stairwells***

The design of the project was intended to create a relaxed atmosphere, encouraging people to use the spiral staircase instead of the elevators. As a central focus of the building dedicated to promoting wellness, the stairway provided one of the greatest owner benefits that was delivered on-time by ISEC's team in collaboration with the owner, general contractor and architect.

Matthew Curtis, Senior Project Manager at Adolfson & Peterson, commented, "ISEC...stepped in during a tough time in the project and allowed us to meet a schedule and finish what we had promised the owner."

ISEC provided a contribution to the community because this project unites all of CSU's student health services in one building that were previously spread out in three separate locations. The spiral staircase provides a critical pathway to the second and third floors which house the CSU Health Network, that more than half of all CSU students rely on for their on-campus healthcare needs.





