

Category: 3 – Meeting the Challenge of a Difficult Job - GC

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Project Name: The Broadmoor West Tower Renovation

Project Overview

GE Johnson completed the original Broadmoor West in 1976, and has facilitated occasional upgrades to the facility over the years. The Broadmoor is a Colorado gem and boasts the highest ratings in the hospitality industry – 5-Star and 5-Diamond status by AAA, Forbes and others. The resort includes more than 700 rooms, 18 restaurants and cafes, and a world-class spa. In 2011, The Broadmoor won 110 awards for the hotel, sports facilities, spa and restaurants.

While the original Broadmoor West served the hotel well over the years, it was a clear departure from the architecture of the landmark resort, and suites were inadequate in size, amenities and comfort as compared to the rest of the resort campus. In 2013, GE Johnson was selected to perform a major transformation of the 180,000 square foot facility in less than half the time of a typical construction project.

GE Johnson added three levels to the existing roof structure which feature opulent and spacious suites. The perimeters of the hotel were expanded by nearly 8 feet – increasing the size of existing suites dramatically and creating accessible balconies and patios. In all, the project added 188 new hotel suites, two amazing restaurants, an extensive plaza, fountain, and a reconstructed porte-cochere.

Extensive renovations were made to existing guest rooms, including the installation of custom-built, pre-fabricated, 5-piece bathrooms. These units were finished 100% off-site and transported to the project. Their prefabrication was crucial to maintaining the rigorous project schedule.

A vertical and horizontal expansion of this enormous scale typically requires 60-80 weeks of construction. **Incredibly, the \$47 million renovation and addition was completed in just 26 weeks.** Work began in October 2013, and maintained course in the face of inclement weather and an expanded scope. Field and staff members worked 103,246 man-hours, overcoming many heavy snow and wind events, to complete **two full days ahead of schedule.**

In addition to the ambitious schedule, the expansion required 226 tons of structural supports, 10,111 square feet of ornate stained wood paneling, stained glass replicas, and imported Italian marble throughout the lobby and public spaces. GE Johnson, using non-traditional processes, pre-planning, extensive assembly prefabrication and unique labor strategies, met every challenge and delivered this one-of-a-kind project ahead of the busy tourism season.

Solutions of Special Problems

Concrete Reinforcement

The addition of three levels and the horizontal expansion put enormous additional weight on the existing structure's foundation. To accommodate this weight, GE Johnson had to expose all footings, foundations and existing concrete columns and then enhance the lower level within the areas of expansion; this required drilling and dowelling, forming and placing of each enhancement. Interior concrete slabs had to be removed to expose the footings, and existing systems had to be re-routed to provide access for the forming of the enlarged columns, which were approximately 2 feet larger. Total, GE Johnson installed more than 7,200 dowels in existing concrete columns. Each location was x-rayed and laid out appropriately to avoid all existing reinforcement. The reinforcement from floor to floor had to be continuous, requiring countless core drills in the existing slabs, which also had to X-rayed for existing reinforcement.

Prefabrication

Typically, suite bathrooms require nearly 40% of the construction labor in a hotel. Broadmoor West's bathrooms feature separate walk-in marble showers, large soaking tubs, two piece vanities, separate water closet, and vanity mirrors with integrated television screens. GE Johnson worked with a prefabricated bathroom manufacturer to develop a system whereby the bathrooms could be prefabricated in a single component then transported to the project site. This eliminated an enormous amount of field labor required, and produced a cost savings given the ornate finish and lighting materials installed in a factory controlled environment as opposed to the multi-shift installation strategy required for traditional field installation.

The team also panelized almost the entire façade of the seven-level hotel. The exterior walls, thermal and moisture barrier assemblies were constructed off-site and erected as single units. This method decreased the installation duration by 70% as compared to the traditional "in-place" erection of structural stud framing, insulation, sheathing and moisture barriers.

Excellence in project execution and management/team approach

As the hotel was completely booked for the 2014 International Space Symposium immediately upon turnover, schedule extensions due to weather or other unforeseen factors were not an option.

The project endured one of the coldest winters in Colorado Springs history. More than 2 feet of frost was measured prior to Thanksgiving, coinciding with excavation and foundation activities. With no weather days in the schedule, work progressed in extreme conditions. Each concrete column being enhanced had to be wrapped and individually heated as rebar temperatures were reading -19 deg. F.

Initially, the project was established with a 60-hour baseline work week; soon, crews adopted a 7-day/week jobsite. This required exceptional manpower resource management by GE Johnson and the Subcontractors. A significant portion of work was completed well into the night hours and on weekends with minimal disruptions to surrounding guests and residents.

At the onset of asbestos abatement and demolition, it was discovered that substantially more abatement was required which resulted in a nearly 4 week impact to the original schedule. The team quickly reevaluated the original day-by-day sequence plan; using LEAN Last Planner methodologies alongside each of our key subcontractor managers, a new sequencing and overtime approach was developed.

Despite the rigorous work schedule, the project was able to enjoy Thanksgiving and Christmas days off.

Construction innovations/state-of-the-art advancement

Building Information Technology

GE Johnson's Systems Integration Group (SIG) proved invaluable in achieving Broadmoor West's 26-week construction schedule. The SIG team primarily concentrated on Mechanical, Electrical, Plumbing, and Fire Protection (MEPF) coordination, but also provided a virtual mockup, 4D schedule planning, building enclosure review, drawing QA/QC review, roof truss coordination, prefabricated bathroom pod coordination and concrete lift drawings.

One notable challenge was verifying existing conditions for all MEPF systems, which were not fully verified until demolition began in November 2013. All new systems were laid out virtually on existing floors, requiring additional rework in certain areas once existing conditions were verified. A number of precast panels had to be cored to allow mechanical and fire protection routing to pass through. With a model locating all reinforcing and plates for the panels, SIG located all locations where coring was required.

SIG also provided as-built survey integration to assure all 180+ prefabricated bathroom pods would “fit” into their assigned spaces. The 37-year-old facility brought several unforeseen conditions including structural dimensions that were undocumented, requiring real time coordination in the virtual environment and with the prefabricated bathroom manufacturer, Eggrock.

Specialty Materials

Throughout the project, materials installation and specialty products had to be coordinated creatively to avoid schedule impact. An example of this is the high-quality millwork found throughout the project. Genesis Innovations LLC provided the architectural millwork; typically millwork is sized, cut and installed on-site to ensure proper fit and look. However, as there simply was not enough time for a traditional process, wood and ceiling paneling, running trim and standing trim was fully cut and pre-assembled in the factory so workers could quickly install it on-site with hidden fasteners. This process took an enormous level of collaboration between Genesis Innovations, GE Johnson and the design team, but the effort resulted in a custom feel that has earned rave reviews.

The project also utilizes reclaimed 200+ year old Italian stone which is utilized in the new Ristorante Del Lago along with custom hardwood flooring which was laid in ornate patterns. Tile work required highly skilled setters as nearly all the tile was custom laid marble and patterned work, along with custom hand blown glass features throughout the restaurant areas.

Environmental/Safety

In regard to environmental, health and safety concerns, the project leadership implemented the three building blocks of safety: demonstrated management commitment, accountability and employee engagement. To initiate this commitment, GE Johnson focused on the following safety components:

- Site-specific safety data compilation
- Enhanced orientation for all new and returning employees
- Employee craft assessments
- Continuous incident reporting and Investigations
- Pre-task planning for each scope of work
- Team-based safety committee
- Additional Safety training programs regarding safety and environmental concerns.

GE Johnson completed more than 82,000 man-hours of self-performed activities without a lost time incident.

Reception

The opening of Broadmoor West was a highly publicized event, attended by the Anschutz family, the Mayor of Colorado Springs, the Board of County Commissioners, local business figures and community leaders. The hotel is a cherished local landmark, so the importance of maintaining the look and feel of the campus was paramount. The new hotel opened in May 2014 to high praise and stellar reviews from local press and visitors. Broadmoor West's two new eateries – Ristorante Del Lago and Natural Epicurean – were profiled in the New York Times, while the project itself was featured heavily in the Colorado Springs Gazette, Colorado Springs Business Journal, Colorado Springs Independent, Denver Post, and other local media. The effort that went into overcoming the challenges faced at Broadmoor West was immense. This was one of the most daunting projects GE Johnson has ever faced, but the results speak for themselves!











