

GE Johnson

U.S. Olympic & Paralympic Museum

Category 3 – Meeting the Challenge of a Difficult Job

Overview

Have you ever imagined what it feels like to walk into the opening ceremony of the Olympics? The thrill of cheering crowds and the hundreds of other athletes from around the world? The 60,000-square-foot U.S. Olympic & Paralympic Museum makes that immersive feeling possible. From the stunning building enclosure made up of 9,000 interlocking aluminum pieces to the memorabilia of past athletes, the museum is dedicated to U.S. Olympians and Paralympians and their compelling stories.

Enlivening the core values of Team USA's Olympic and Paralympic movements, the design of this landmark, four-floored museum is inspired from the physical motion of the athletes it celebrates.

Entering the museum, guests are transported to the top floor with views of Pikes Peak. As they make their way down the gently descending spiral slope that guides them through the exhibit halls, guests experience the history and legacy of Team USA through memorabilia and immersive displays. The complex also features a broadcast studio, a café and retail shop, an outdoor gathering place and amphitheater, and flexible spaces for special events and Olympic gatherings.

The success of the project is owed to the spirit of teamwork and collaboration of the project team members, who were personally inspired by the Olympians and Paralympians for whom the museum is built.

Solutions of Special Projects:

One of the most paramount construction challenges was the geometry of the museum and the iconic exterior enclosure.

In addition to the enthralling interior, the museum boasts an exterior unlike any other in the world. Its spectacular, art-inspired architecture is covered in more than 9,000 interlocking diamond-shaped, anodized aluminum petals. These panels form a single beveled surface of integrated drainage channels and create a beautiful texture that is unique to this building.

The unique structure and enclosure required weekly design coordination meetings for more than a year so as design details were developed, materials were selected, and system constructability was verified. More than 10,000 hours of collaborative building information modeling (BIM) with the contractor, numerous subcontractors, and design team partners, verified that all panels would fit seamlessly onto the substrate and meet the design intent.

An extensive, 10-month effort to mock-up the enclosure was coordinated and constructed. This way, the project team could validate constructability of the design, ensure compatibility of materials, practice installation means and methods, and test air and water performance.

Another challenge for the construction team was the addition of the exhibits on all levels of the museum, which needed to be coordinated with the already underway construction of the uniquely shaped core and shell. Weekly coordination meetings among all stakeholders, daily coordination of issues using BIM, and a commitment to teamwork, resulted in the successful integration of twelve galleries, a hall of fame, a cafe and a retail space, with limited re-work.

Excellence in Project Execution and Management/Team Approach:

This highly anticipated museum required exceptional collaboration and teamwork to achieve the vision for this iconic project. Early on, the project team proactively committed to solving each challenge with a focus and responsibility for delivering the design and function of the museum. Lines of communication and trust were established up front amongst all partners, including the design team, contractors, and owners.

The ingenuity of the structure demanded constant collaboration with designers, builders, fabricators, and installers. Our team approach was to challenge construction norms, question every condition, looking for the optimal solution for many never been done before details. Opportunities for ingenuity presented themselves throughout the entire project to meet safety, quality, schedule and cost expectations and goals. We used anything and everything to ensure the project was built right the first time, pushing boundaries, gaining outside expertise and asking more of oneself than others will, which is the Olympic spirit the museum was built to honor.

Whether it was the gauge thickness of the diamond metal panels, the use of prefabricated or standard framing, polished concrete or terrazzo, the team was committed to delivering value on every aspect of the project without compromising on the vision and delivery of a world class museum.

Construction Innovations/State-of-the-Art Advancement:

To achieve a successful overlay of the building's complex geometry with more than 9,000 uniquely shaped diamond panels, the team embraced innovation. There was no playbook for this component of the project, so the team developed their own.

A collaborative process was developed whereby each phase of exterior enclosure construction was as-built using laser scan and point cloud technology. Laser scanning is a fast, accurate, and non-intrusive way to collect as-built construction data and eliminates the need to return to the site for additional measurements. At each critical phase of construction surveyors, and virtual design and construction (VDC) team members developed a process to as-built the construction of each elevation within an 1/8-inch tolerance.

The team then developed a pass/fail process to verify installation was within tolerance. At the end of every day the team surveyed each piece and used the process to confirm the framing installed was within the acceptable tolerance, correcting any issues as they arose. This prevented issues from compounding and provided the team daily assurance that everything was installed correctly.

Construction quality and craftsmanship were paramount to the delivery of the museum so it can live up to the athletes it celebrates. One example of quality is exemplified in the effort put in to construct the exterior enclosure.

To achieve the designed 3/8" joint on all sides of each diamond panel, the team developed a process using the latest laser scan technology to as-built survey every component of the enclosure system within an 1/8". The as-built survey of the Drake William Steel and LPR's structural steel was provided to Spacecon / Radius Track for fabrication and installation of their prefabricated radius framing, the survey of that system was provided to MG McGrath for fabrication and installation of the diamond metal panels. Only through this process were we able to ensure that the enclosure system would fit, end-to-end and top-to-bottom on each elevation, with the proper spacing and location for roughly 2,250 diamond panels, curtain wall and ACM panels

To replace the punchlist, the architect sent observation reports with anything that needed to be addressed as the exterior metal panels were installed on the museum. This strategy allowed for real-time corrections and prevented delays to the completion of the enclosure.

Environmental/Safety:

Extensive, specific safety planning for erection of the building and the hazards created by its individual spaces resulted in no lost time incidents. Custom safety plans were created and successfully implemented to address the unique geometry of the building.

Since the steel frame of the museum is extremely unique in its geometry that mimics the flowing movement of an athlete, there was extensive work invested into a custom steel erection safety strategy. Created by LPR Steel Erectors, the safety strategy was reviewed by the project team to ensure that all area connections were laid out and exact, allowing preplanning in case the need to rescue a fallen ironworker arose.

Due to the uniqueness of the building and its construction, numerous custom fall protection measures were implemented on this project. Due to the abstract roofline, some areas would not allow for standard guardrails and warning lines to be in place. Instead, the team creatively used a combination of different types of warning lines and guards on the exterior roof area.

Inside, the building had multiple fall protection exposures as there are multiple levels and exhibit areas within the structure. Each area was preplanned based on that specific space and design. For example, multiple "diving board" platforms representing the medal winning dives throughout U.S. Olympic history look out over the atrium from the third floor of the building. These

platforms required extra preplanning with the project team and subcontractors to ensure fall protection was covered in these areas.

Excellence in Client Service and/or Contribution to Community:

Leading up to and throughout construction, there was a palpable sense of excitement and pride for the project by the community. Being the lead project for the Colorado Springs City for Champions initiative, and Olympic City USA, it was important to embrace this excitement by welcoming the community to experience this iconic build.

The construction team partnered with the museum to facilitate hundreds of tours resulting in over 4,500 visitors getting to experience the various phases of construction. Olympians, Paralympians, citizens of Colorado Springs, city representatives, etc. visited the project. Tours were also important in helping the museum raise the necessary funding to build this moon-shot project.

GE Johnson partnered with several educational institutions, including the U.S. Air Force Academy, local community college and high school vocational programs and several construction management programs to provide educational opportunities throughout construction. Whether it was learning about concrete formwork, hanging drywall or installing a complex enclosure system, students gained valuable insight of the construction industry, what it takes to be part of a successful construction project team and an iconic building like USOPM.









