

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

Contractor: GE Johnson

Project Name: Pikes Peak Summit Visitor Center

Replacing the 1960's Summit House, the new 38,400-square-foot Pikes Peak Summit Visitor Center sits at the summit of Pikes Peak, 14,115 feet above sea level. The new building takes advantage of inspiring views, blending in with the colors and textures of the granite of the mountain and the surrounding landscape of the summit.

Each year, more than 600,000 people visit the summit of Pikes Peak, and this new facility is designed and constructed so that visitors can focus on the beauty, richness, and scenery of America's Mountain, with multi-media exhibits to tell the story and history of the mountain and enhance the visitor experience.

The interior includes a two-story grand stair entry with views looking south over Mt. Rosa, an interactive exhibit area that provides information on geology, geography, flora and fauna, and Native American and the mountain's history. There are ample public restrooms, a full kitchen, servery and dining areas, as well as retail and gift shops. The lower level is the central utility plant.

Construction consisted of extensive site work, demolition of the existing central utility plant, installation of a temporary water tank, sanitary sewer tank, and an emergency generator to allow the existing summit house to remain open during construction. The crews performed extensive rock blasting and excavation of 35,000 cubic yards of rock.

The foundations are shallow spread footings placed directly on bedrock. The main structure consists of 428 precast wall panels and floor tees. All slab on deck and slab on grade incorporated hydronic radiant in floor heat. The second story of the building is the only location where structural steel was used; this large lobby is 80% curtain wall system.

A tremendous amount of planning and thought went into the safety and logistics of this job. Weather was factored into scheduling delays and unforeseen job conditions. The mountain sees snow and ice almost year-round and daily coordination with Pikes Peak - America's Mountain personnel was necessary to determine if the teams could work on the summit of Pikes Peak each day. Snow and intense wind made the Pikes Peak Highway inaccessible half of the year during the winter and spring months. During the summer months, computer applications were used to monitor lightning strike distances know when to shelter crews working on the project. With wind speeds over 80-miles-per-hour, all materials were required to be tied down and secured.

Due to the extreme grades and switchbacks on the road leading to the summit of Pikes Peak where the project is located, building components like precast were designed to maximum widths, lengths, and weights to be trucked. Additionally, all regular material deliveries were taken to GE Johnson's Logistics Facility and scheduled for delivery to the summit by GE Johnson trucks to assure the owner the project team was in control of the traffic on the access road that interfaces with the Pikes Peak summit visitors.

All foundations had to be installed in bedrock with micro piles due to permafrost on Pikes Peak, requiring extensive rock blasting and rock hammering. When drilling began, the team was expecting the ice from the permafrost to be three to six feet deep. The team found out the ice was actually 10 to 20 feet deep, requiring an adjustment to the blasting.

An extraordinary amount of teamwork and collaboration was used throughout the construction process for the Pikes Peak Summit Visitor Center. From the start of preconstruction, the owner (Pikes Peak – America’s Mountain), GE Johnson, the City of Colorado Springs, RTA Architects, the U.S. Forest Service, Colorado Springs Utilities, and our subcontractors worked together seamlessly to ensure a safe, efficient, and state-of-the art project. The mountain sees more than 600,000 visitors a year, so the construction team needed to consistently communicate with the owner and the City when there might be extra hazards for tourists to be aware of when they reached the summit. An effective solution the teams developed was a brochure with a map of the mountain showing areas where pedestrians were safe and areas they needed to avoid. The brochure was handed to the driver of each car that entered the Pikes Peak Highway park entrance, giving everyone clear direction on how to remain safe while visiting during construction on Pikes Peak’s summit.

GE Johnson’s Logistics Facility personnel managed all subcontractor material deliveries and equipment; this was the only entity to transport deliveries to the top of the mountain. Due to the extreme nature of the highway, with its sharp switchback turns and steep drop-offs, the Logistics team took full responsibility to safely make these trips. GE Johnson Logistics successfully made over 1,060 accident-free trips up and down the mountain.

Early in the project, the team recognized the need to implement a system to handle the extreme logistical complexities. The project team utilized Trello, an online project management site that allows members to create tasks and post in real-time, to communicate and schedule deliveries. This allowed the project to organize deliveries and communicate with several people and entities without in-person meetings or coordination calls. It also minimized the amount of trips team members had to take up and down the mountain, which could take anywhere from 45 minutes to two hours. This communication was also critical in maintaining the safety of workers and guests.

Tracking technology was used during the prefabrication of the concrete formwork and precast, giving each piece a unique QR code and tracking them from fabrication to delivery. This added to the efficiency of the delivery and decreased construction time.

Building on top of a 14er (a peak 14,000+ feet from sea level) presents its own special safety challenges, but even with these extra challenges, the GE Johnson team achieved zero recordable injuries. All crew members were required to undergo an extensive physical examination, including a flexibility test and a Harvard Step fitness assessment. Crew members engaged in a two-hour, site-specific orientation and briefing on the special safety measures necessary for working at high altitude. The biggest challenge was the fatigue and stress the altitude put on workers. About 10% of the workforce was unable to perform at the altitude.

A buddy system was crucial to sensing if someone was experiencing altitude sickness. High altitudes affect everyone differently and can affect someone more one day than another. Having

a buddy nearby provided an extra layer of support in case symptoms hit quickly. During work hours an emergency medical technician (EMT) was present, a satellite emergency phone was available due to poor cell service, and mock emergency drills were performed so everyone was prepared in case of an accident.

In addition to these unique measures, crews performed daily stretch and flex, created hazard recognition reports, and identified their top five hazards specific to their work each day.

The Pikes Peak Visitor Center was constructed to meet The Living Building Challenge (LBC) – the world’s most rigorous environmental and health performance standard for buildings and will be the first building in Colorado to achieve this recognition. Considerations for the LBC include restoring the building’s interrelationship with nature; creating environments that optimize physical and psychological health and wellbeing; and using materials that are safe for all species through time.

LBC requires over 90% diversion of construction and demolition waste, transplanting existing native vegetation, sourcing materials close to the site, vetting every product for over 900 red list chemicals that are harmful to human and environmental health, meeting stringent material certifications, and minimizing negative indoor air quality impacts. The red list vetting process took an extraordinary collaborative effort between GE Johnson, the architect, engineers, and 32 subcontractors over the span of three years.

A reclaimed water treatment system was installed, making it the second one in all of Colorado. This system processes black sewage water and utilizes graywater in vacuum-assist toilets, reducing the amount of water and sewage transported up and down the mountain by over 60%.

Tourists visit Pikes Peak year-round, if the summit is accessible. The GE Johnson and Pikes Peak – America’s Mountain teams believed keeping the mountain open throughout construction was important. Through collaboration, systems were developed to manage any visitor crowds, especially during the summer months. Extensive J rails, fencing, and signage were erected to keep the public away from construction activities and safe.

Pikes Peak is not only a popular 14er for tourists to visit but is a special place for locals as well. The GE Johnson team recognized the significance the mountain had to the cities of Colorado Springs, Manitou Springs, and Woodland Park and took extra steps to preserve the surrounding environment. Employees volunteered and worked with the U.S. Forest Service on cleaning up trash and old abandoned piping around the Glen Cove area on Pikes Peak. They also partnered with the owners to reclaim and seed areas that had been used as trails at the Crystal Reservoir, a popular area located along the Pikes Peak Highway. Finally, the crews held trail clean-ups to gather debris that blew down the mountain during intense wind events.









