

Colorado Convention Center Alternative Care Facility

Category 2 — Meeting the Challenge of a Difficult Job — Specialty Contractor

U.S. Engineering Construction, LLC

By any measure, transforming the empty Colorado Convention Center, a space the size of six football fields, into an ad hoc hospital with 1,242 beds would be a noteworthy achievement.

Doing it in less than three weeks, from the first site walk to finish, and in the looming shadow of a global pandemic that had builders across the country scrambling for everything from face masks to shower fixtures? How could this be done? After all, constructing a 200-bed hospital typically takes two years. So, 1,242 beds in a little more than two weeks? Practically unthinkable.

But not impossible.

In partnership with Hensel Phelps Construction Co. and the U.S. Army Corps of Engineers (USACE), U.S. Engineering converted the Colorado Convention Center into a field hospital for COVID-19 patients. Across 18 days in April, they filled the empty convention center with functional hospital rooms built out with 1,242 beds and the oxygen system infrastructure to complete another 766 beds.

Besides the hospital beds, the convention center required cleaning facilities to support patients and the staff. For this, crafts people at Metalworks, U.S. Engineering's manufacturing facility in Johnstown, fabricated four seven-stall modular showers for patients; two 11-stall showers for staff (six shower units with seven Americans with Disabilities Act [ADA]-compliant showers, four shower units with 10 standard showers, and one water closet unit with 11 stalls); and 72 dual-sink stations that were placed strategically throughout the center. For the staff, locker areas were created at the loading dock and a 20,000-cfm temporary heating and cooling system was installed for comfort.

The challenges the team faced were daunting. Among them: the need to mobilize a mechanical crew of 100-plus, procure materials and equipment in high demand across the country, and protect the crews from the coronavirus.

This is how they did it.

Preparing for the Worst

On Friday, April 3, eight days after the state's first stay-at-home order began in response to the COVID-19 pandemic, Denver Mayor Michael Hancock announced that the state and federal governments would turn the convention center into a 2,000-bed field hospital to relieve pressure on the region's medical system.

Though Colorado's coronavirus death toll was still relatively low, public health officials warned that the number of cases could climb dramatically, cresting in early May. To accommodate a potential surge without taxing existing healthcare resources, the Colorado Department of Personnel & Administration sent Mayor Hancock a letter of intent to lease the 2.2 million-square-foot convention facility through at least June 30.

At the same time, USACE launched its search for a construction team to convert the convention center into a Tier-3 hospital that would house "subacute patients" – people who needed once-daily monitoring by a doctor, twice-daily monitoring by a registered nurse and, in some cases, respiratory therapists.

On April 6, the entire construction team walked the site for the first time. By week's end, the work was under way. Two weeks later, a liquid oxygen plant and related piping had been installed and certified for 591 beds; on April 24, the last day of the project, another 651 beds were confirmed. (USACE lowered the bed count when updated modeling indicated the expected patient load would not be as high as originally forecast.)

Assembling Crews, Working Around the Clock

Manpower was an immediate concern for the convention center hospital project leaders. They needed enough crafts people with the appropriate qualifications in piping, plumbing, and sheet metal to complete the job in a matter of weeks, a job that was triple the size of U.S. Engineering's typical large healthcare project. In total, 137 different people worked on the convention center transformation.

The general superintendents on site and at Metalworks scrambled to assemble crews, reallocating resources from existing projects, scheduling crews around the clock, and adopting an all-hands-on-deck mentality. At the convention center, between 30 to 45 people worked the day shift while another 30 people covered the night shift for a week and a half. At Metalworks, crews worked

20-hour days seven days a week to fabricate the pipes, ducts, and other critical components.

At the project's peak – Easter weekend – 108 project team members worked at the job site and Metalworks, during which time they ran more than half of the facility's six miles of oxygen piping. By comparison, at the height of the Memorial Hospital North in Colorado Springs, U.S. Engineering fielded a crew of 55 for all three trades

The project's urgency inspired crew members to dig deep. Superintendents and foremen worked on their pre-pandemic projects during the day, and then reported to the convention center to work through the night performing tasks they had not done since they joined management.

Procuring Materials and Equipment Through Imagination and Collaboration

U.S. Engineering's procurement team worked overtime during the first week to source materials and equipment – fixtures, trims, bathroom groups, metal studs, sheet rock, copper, and the like – that builders throughout the United States wanted for similar projects under way in their areas. Team members carried letters from USACE that provided access to retailers like Home Depot, hold delivery trucks on standby, and compel competing vendors to cooperate with each other. As a result, materials often arrived on site within two hours of submitting an order, including weekends and Easter Sunday.

On the job just a week, the company's purchasing manager cast a wide net – the fold-up seats and grab bars for the showers came from e-commerce company Wayfair – and drew upon the relationships nurtured during a 23-year career as an industry wholesaler to streamline purchasing. As teams designed packages and revised drawings every few hours, she shared them directly with key factories for quotes. Bypassing sales departments shaved critical hours and days off the time it would typically take to order and receive products. For instance, fixtures for the first 60 showers and 90 double-nurse hand wash stations were designed, quoted, ordered, and received from factories all within 10 days.

Team members from other departments also jumped in to help source material. U.S. Engineering's healthcare operations director, for example, worked the phones and his contacts to find 45,000 feet of copper in Chicago, which was delivered to Metalworks within three days. However, once the copper moved through the fabrication shop, Mother Nature threw a wrench into the works. As Easter weekend approached, so did a major snowstorm, bringing cold

temperatures that could wreak havoc on the Metalworks crews' efforts. The reason? Much of the piping and plumbing finishes required at least 70 degrees for adhesives to cure. To stay on the schedule, the team rented heating equipment to warm the shop, which allowed the glues to set properly. The material was then shipped to the job site via the trucks that were on standby, arriving 24 hours before the snow.

Keeping the Crews Safe from the Coronavirus

With the pandemic building in Colorado, field crews were apprehensive, understandably. The state was locked down, cities and towns silenced, and citizens warned to stay six feet apart, all in the hopes of slowing the coronavirus' spread long enough to prepare the area's healthcare infrastructure. Despite fears for themselves, their families, coworkers, and friends, the men and women on the field crews persevered.

To help ensure their well-being, U.S. Engineering's safety specialists enacted Centers for Disease Control (CDC) protocols at the office, job site, and Metalworks. This included conducting mandatory temperature checks and use of masks and hand sanitizer – 65 gallons of which were provided by a local distillery. Because of the volume of work under way in the main building at Metalworks, a make-shift area for manufacturing the pods and modules was created to allow proper social distancing.

By project's end, a comprehensive COVID-19 exposure risk and safety plan was in place, drawing heavily from the project team's experiences as well as CDC guidelines. More importantly, no one on the U.S. Engineering team tested positive COVID-19 and the convention center, better known for business conferences, home and garden shows, winter expos, comic-con, and the Big Blue Bear, was now the largest hospital in Colorado per bed count.











