



2018 AGC Colorado ACE Awards

Category: 07 – Best Building Project – Specialty Contractor (Over \$10 Million)

Contractor: Murphy Company

Project Name: United Airlines Flight Training Center

It is a beautiful, sunny day. The pilot goes through the first of many checklists as he prepares for his four-hour trip. “Prepare for takeoff,” he says, and begins taxiing down the runway. No other planes are ahead of his Boeing 787 Dreamliner. He increases speed, and slowly rises into the air, meeting the fantastic Denver skyline. As he soars, he prepares for any scenario in today’s session at United Airlines Flight Training Center.

Just as the pilots, mechanics, and flight attendants train for their 4,600 daily departures, Murphy Company works hard to deliver a quality product creating a one-of-a-kind renovation and consolidation project to support one of the largest airlines in the world. Although much of the existing Denver location was built over 50 years ago, the campus would evolve over the course of two years, ensuring United would have a sleek, modern facility with utilities ready to meet their needs for the next 50 years.

A New Project Takes Flight

The United Airlines Flight Training Center (UALFTC) Renovation Project was created to consolidate United’s three locations into one master global training facility. After careful consideration of the three existing locations – Chicago, Denver, and Houston – upgrading and expanding the Denver campus presented the best opportunity. This campus was built as part of the former Stapleton International Airport, which served as Denver’s hub from 1929 to 1995. The existing infrastructure was adequate to start the process, minimizing disruption and producing savings, allowing the facility to be fully operational sooner than expected. The 23-acre campus

currently features six buildings consisting of over 500,000 square feet of space with more room to grow with the airline.

With United being the number one nonretail employer in Denver, this project was named the Economic Development Deal of the Year by Metro Denver Economic Development Corporation, strengthening United's ties to Denver International Airport. This move would maintain the 400 jobs currently at the facility and is anticipated to add approximately 200 more jobs. United also currently staffs approximately 12,000 pilots, all of whom will train at this remodeled facility alongside pilots from smaller airlines who rent space through United. The pilot training program operates both fixed and full motion flight simulators built to the specifications of each aircraft in United's fleet. This facility also trains flight attendants who will learn their day-to-day duties along with procedures utilizing a smoke evacuation fuselage, door training fuselages, or raft/slide training devices. Ultimately, there will be a total of 36 flight simulators and 24 classrooms, creating a new, efficient learning space for United employees.

First Class Project Team

Murphy Company had the privilege of working hand-in-hand with Mortenson Construction, United Airlines (UAL), and Page Southerland Page (Page). We were brought onboard based on the team's ability to adhere to an abbreviated and aggressive schedule while maintaining full facilities operations. Our design-assist capabilities coupled with our success in completing complicated projects with Mortenson also posed as deciding factors. Our scope consisted of a complete remodel of the heating, cooling, hydraulics, compressed air, breathing air, and plumbing systems in the six existing buildings. These systems included (5ea) 6,000 MBH high efficiency boilers, (5ea) 550 ton condensing magnetic bearing chillers, rework of existing under slab snowmelt piping, (20ea) various sized semi-custom air handling units (AHUs), (12ea) dedicated flight simulator AHUs, (42ea) computer room AHUs, and a 61 SCFM breathing air compressor.

The project began quickly after the Denver site was chosen. Murphy Company's preconstruction team immediately began looking at the plans, developing solutions to ensure the facility could stand the test of time. The existing buildings were constructed in various phases dating back to the

1960's, and the as-built drawings were incomplete or inaccurate. This newfound discovery created concern for design engineer, Page, who realized they would need some assistance as their engineer of record was based in Texas. With in-house design-assist capabilities, Murphy became a paramount asset to Page, and the team became the eyes and ears in the field, reviewing site conditions and heavily supporting the completion of the design. Through these early stages, Murphy, Page, and Mortenson worked closely together to develop a constructible design that met the owner's needs and budget. Ultimately, Murphy Company was able to help manage the design to meet UAL's financial goals and perform on project excellence and customer satisfaction.

United also challenged the construction team with a goal of 25% project participation of diverse business categories including small-, women-, and minority-owned business enterprises (SWMBE). UAL is a strong contributor to the community, and Murphy Company shares this value. We took great care when selecting trade partners and suppliers ensuring we were not simply "checking a box" on a proposal, but allowing these companies a chance to enhance the United experience.

Creativity Goes Sky High

With our experienced project managers and foremen, Murphy's performance on the first 50% of the project set the tempo for execution while leading by example in both quality and safety. While maintaining a difficult schedule, Murphy kept onsite crews to a minimum through utilization of Building Information Modeling (BIM), prefabrication, and preassembly solutions from our shops. Our BIM team also worked with the field team to develop shop drawings to fabricate and assemble modularized skids cutting down the overall installation in the field, improving quality and performing the work in a safe environment.

Murphy Company also got creative with the limited laydown and storage space on-site due to ongoing operations. The impact of this condition was managed with prefabrication, preassembly, along with just-in-time material and equipment deliveries, which were leveraged through strong vendor relationships. Our team provided valuable solutions throughout the project with extensive BIM coordination and intricate assembly of broken-down equipment. In a few cases, this limited

spacing required air handling equipment to be built around existing structural steel members without impacting the unit's performance.

To maintain facility operations at an uninterrupted load, all of the equipment replacement (boilers, chillers, air handlers, and pumps) were phased in conjunction with the use of temporary equipment implemented over limited night shutdown windows and careful offseason planning. UAL personnel utilized temporary trailers to conduct portions of their business during each phase. This required an extensive overhaul of trailers to accommodate their needs. Murphy's in-house mechanical engineers were called on to provide the design to meet United's needs for those spaces. Ultimately, we were able to keep the airline running with great efficiency, quality, and Murphy Company safely worked over 700 consecutive calendar days on this project injury free.

Earning Our Wings

Murphy Company enjoyed success from onset, but the project did not go without challenge. From initial demolition and abatement, all the way to startup and commissioning, Murphy was able to meet challenges head-on and provide effective solutions. In preparation for demolition of the domestic water plant, we installed a temporary plant that would provide hot water to all occupied buildings from phase one. With the temporary plant running, the boiler plant was shut down in May for containment and abatement causing the entire campus to no longer have the ability to heat its spaces. Our team made a commitment to have the new heating plant, along with the new domestic hot water plant, online no later than September 15th. For United's cafeteria and lobby, issues arose with the asbestos abatement in the old boiler room due to permanent power issues, prolonging the demolition. Murphy only had 10 weeks to install and startup a new boiler and domestic hot water plant, including a new boiler flue installed within the existing 65-foot masonry chimney. We also had a 14-week timeline to install, startup, and commission all equipment associated with a commercial kitchen, including air handling equipment, grease exhaust fans, grease hoods, and supplementary plumbing hookups to food service equipment for the cafeteria grand opening on December 1st, 2017.

Along with the help of Mortenson's BIM team, the entire project was detailed, fabricated, and installed per a cohesive model, providing the contractors ample ability to preplan, fabricate, and resolve "clashes" in the field with minimal dispute. Beyond the benefits this model provided the construction team, it also provided UAL with a quality tool to maintain and track their buildings well into the future, which was severely lacking prior to this project.

Apart from the aforementioned successes, the shining star for Murphy Company was undoubtedly our use of prefabrication. Murphy was awarded Mortenson's 2017 Overall Excellence / Overall Subcontractor for the jobs well done at UALFTC. This award recognized our safe work environment, high quality installations, and schedule commitment all of which were driven by our extensive use of fabrication.

The Sky Is the Limit

In closing, UALFTC is a project Murphy Company will take pride in for years. This project was a big commitment to Denver, Colorado and will positively impact the community for the foreseeable future. The opportunity to be a part of the team with United, Mortenson, and Page was truly special, yielding significant relationships and producing more chances to work together in the future.









