

DEN Concourse B West Expansion

Category 7 - Best Building Project - Specialty Contractor (Over \$10 Million)

Ludvik Electric Co.

The challenge of working on an active, security X rated airport is not something every contractor is willing to take on. Dealing with the everchanging needs of the airlines and the Owner, installing and working with specialized systems, and working over the sprawling distances such a site requires are just a few of the reasons that many contractors shy away from airport projects. Ludvik is not just any contractor. Ludvik not only tackled these challenges and more, but did so while providing exceptional client service, exceeding minority and women owned business participation goals, and delivering an on-time project. For these reasons and more, Ludvik's work on Concourse B West of the Denver International Airport deserves to fly away with the ACE award.

Over thirty years ago, Ludvik was proud to be selected as one of the electrical contractors to work on the initial construction of the new Denver International Airport (DEN). During this initial construction, Ludvik worked on several areas of the airport including the Airport Office Building, FAA Tower, Concourse B, Runway Lighting Vaults, and the Airport Ground Transportation Systems Tunnel. Now, more than thirty years later, Denver and its surrounding community continues to grow, and the airport must expand to meet the ever-increasing needs of the city. Ludvik is again proud to have been selected as one of the electrical contractors to assist with this expansion and provide the primary electrical and low voltage work for the expansion of Concourse B West.

The expansion of Concourse B West includes four new gates, the relocation of two existing gates, and an innovative de-icing location directly next to the concourse. The project was unique not only in its a new de-icing area and gates, but the technical coordination required to tie-in the new construction and systems to the existing facility without any interruption to ongoing operations. To accomplish this, Ludvik relocated a portion of the taxiway and provided temporary power solutions for the then-in-use de-icing systems. Both were critical to airport operations while construction on the new expansion was being performed.

As stated previously, the expansion of Concourse B West presented many challenges. The design underwent a large amount of refinement including more than fifty bulletins and hundreds of formal clarifications through RFIs. Meeting the challenge of frequent changes to the design required rigorous document control and swift information exchange with Ludvik's subcontractors and field crews. This was accomplished by adhering to well-developed internal processes, procedures, and technology.

Additionally, Ludvik developed several project-specific matrices for testing and commissioning, mechanical equipment coordination, and the low voltage systems. Each of these matrices was custom designed to meet the unique project requirements. The general contractor decided these matrices were so useful they requested Ludvik to allow the matrices to be used by other subcontractors.

DEN also had multiple general contractors performing work on other major projects at the airport which made the project more complicated due to different owner-driven requirements. Documentation, meetings, and processes were required that were far more stringent than typical construction projects. Ludvik Electric navigated this by obtaining keen knowledge of, and close adherence to, all requirements for the Airport; not just those for this particular project.

In the interests of the public good, the project required a minimum participation percentage of minority-owned and women-owned business enterprises (M/WBE). Ludvik took this to heart and exceeded the published requirement by obtaining 57% M/WBE participation using a variety of scopes of work. This success was due to Ludvik's decades-long relationships with six M/WBE firms. This allowed Ludvik to hold scope evaluation meetings with each M/WBE subcontractor partner during the on-boarding process. Thus, each such subcontractor was fully versed with their scope of work. Ludvik also held weekly coordination team meetings and provided its partners with support and guidance creating a successful team. These efforts allowed Ludvik to closely coordinate multiple scopes of work and then share the success of successfully completing the project.

Among the resources Ludvik provided was its internal CAD/BIM department. The project Building Information Modeling (BIM) and Virtual Design Construction coordination had stringent requirements for all trades at a level of LOD 200 and as-built's were to be at a level of LOD 500 – the highest requirement possible. With the significant number of design changes, meeting this requirement was a

challenge. Months of spatial coordination with other trades was needed and this massive coordination effort could easily have prevented a successful as-built delivery. However, having the work done internally allowed the BIM team to easily synchronize with the management and project teams to meet the project schedule. Ludvik eliminated installation conflicts and delivered an on-time and accurate set of as-built drawings.

Ludvik's BIM department developed shared rack systems for use by it and its subcontractors to minimize material waste and reduce installation time. These BIM efforts lent themselves perfectly to internal prefabrication of the racks, conduit bends and other assemblies.

The logistics of working in an operational "all systems running" airport, working airside, managing and moving material from off-site to on-site, security/access constraints, and bringing in craft labor were never-ending challenges. These obstacles called upon Ludvik's expertise in pre-planning, advance procurement solutions, and long-standing processes and procedures. 100% buyouts of engineered items and 90% up-front buyouts of commodities were used to facilitate consistent, pre-scheduled delivery days and times for materials. Using Ludvik's warehousing and prefabrication facilities to stage and store materials and assemblies proved to be invaluable as site laydown space was minimal. In addition, because the project sequences and schedule changed numerous times, having material stored locally allowed Ludvik to be adaptive in planning and material movements.

The project schedule was tight for the enormous amount of coordination and work required. The work was scheduled to take place over thirteen months, but due to circumstances beyond our control, Ludvik could not start work until five months after the scheduled start date. This greatly reduced the amount of time available to complete the electrical work. To combat this, Ludvik personnel were always well-informed and prepared for pull planning sessions and assisted in creating the weekly work plans utilized for each area of work. Getting these done prior to work starting in an area further streamlined the work and helped maintain the abbreviated schedule. As an extra measure, Ludvik took the general contractor's schedule and developed its own internal P6 schedule to more effectively manage work and closely monitor progress and productivity. This allowed Ludvik to quickly identify any constraints or disruptions and communicate these with the general contractor in a timely and ongoing manner. Unfortunately, delays or extended durations by other subcontractors in the early days of the project--foundations, steel

erection, deck pours, wall construction, and fireproofing, to name a few, caused the schedule to slip and become less sequenced over time. The large number of changes and project disruptions, the amount of time to receive returned submittals and answers to RFI's and other communications, and the increased difficulty to fully follow the pull plans or the project schedule pushed Ludvik to rely on its decades of experience and take steps to mitigate additional impacts to the overall schedule. Ludvik implemented staggered and second shifts for crews to reduce congestion, maintain productivity, and stay on target with the schedule deadlines. Ludvik also assisted the project by supplementing its subcontractors' resources with our own. In short, Ludvik proved that it is the partner that will do everything possible to ensure an on-time and successful project completion.

Finally, recognizing each challenge as an opportunity, Ludvik pursued and utilized effective solutions and practices to provide quality electrical, life safety, and low-voltage installations based on pro-active approaches and a high-level commitment to safety. A testament to this commitment is the fact that Ludvik and its subcontractors spent nearly 40,000 manhours on the project with no lost time incidents. Success was achieved on this project, its uniquely situated site is something Ludvik is extremely proud of and indicative of the company's overall approach and commitment to safety, quality, schedule, and customer service. Ludvik consistently strives to remain the preferred electrical contractor in Denver's diverse and expansive community. The Ludvik management and field teams insist on and rely on Ludvik's proven ability to work positively, effectively, and successfully with the general contractors, owners, designers and multiple other trades. Ludvik is proud to have worked with and contributed to the growth of Denver's M/WBE workforce with whom Ludvik has shared so many past achievements. The Concourse B West Expansion is a shining example of excellence in work and Ludvik is delighted to submit it for your consideration for an ACE award.









