

Project Name: Medical Center of Aurora – Surgery Renovations

Category 2: Meeting the Challenge of a Difficult Job – Specialty Contractor

Company Name: Ludvik Electric Co.

Project Cost: \$2,584,955.00

The Medical Center of Aurora (MCOA) project was a renovation of the operating rooms and ancillary spaces in a functioning hospital that provided for some extraordinary challenges in keeping the hospital open. Critical surgeries are occurring every day – and sometimes into the early morning hours – and patients are often brought into the emergency room requiring immediate surgery. Due to the life-and-death nature of maintaining operations in a fully functional hospital while ensuring patient and staff safety, thorough planning was vital to ensure that absolutely nothing is interrupted during a medical procedure. Ludvik Electric achieved construction excellence on this project using highly ambitious, skilled, and dedicated people. Following are the details affirming the challenges, solutions, and cooperation of a truly integrated team.

MCOA was first constructed in 1974. Although it has been remodeled and added to several times, technologies and other influences continually change the medical facility needs. Because the operating rooms (ORs) were out-of-date and no longer met the required certifications, MCOA had to upgrade and reconfigure 11 ORs, pre-op and post-op areas, and other supporting spaces. The team chosen to manage the electrical work for this important project would be required to work closely with nurses and doctors to accomplish the mission. That's when Ludvik Electric was engaged to provide the knowledge and skills necessary to upgrade all 11 ORs with their associated areas in the fully operational hospital.

In addition to the work in the ORs, key electrical rooms would have to be relocated. Because the feeders to those electrical rooms – which would also have to be relocated – were underground, relocating the electrical rooms while maintaining operations would be even more difficult.

Prior to any work being performed, a phasing plan was formulated that would allow the hospital to continue to perform surgeries and other procedures during the construction. Every

phase would have to be synchronized like a clock that keeps perfect time. Each area would have to be carefully analyzed because working on one area could affect an adjacent operating room that was still in action. Once an area was completed, there was no access into the space again – making the phasing even more complicated.

There were several other obstacles that would affect the planning. The moving of the electrical rooms created quite a challenge. Each electrical panel feeder had to be identified to see what it fed before being moved. Each circuit had to be traced so it could be isolated before being de-energized. Each fire alarm detector, fire alarm speaker, nurse call station, communication device, and indicator light above every headwall or door had to be researched so that nothing was left to chance. Ludvik crews were required to carry hospital radios during any construction that involved power interruptions, so MCOA could immediately notify our team of any emergency. We were never allowed more than a 10-minute outage of any electrical circuits and even those had to be coordinated with everyone and with permission from the hospital staff. To mitigate the possibility of a major catastrophe, the team decided that no more than three electrical circuits could be worked on at the same time. In a hospital, there are hundreds of circuits so when you are limited to three at a time, you know that it is not going to be an easy process.

The new electrical rooms would have to be constructed first and new electrical equipment installed. After the room was constructed and equipped, the new electrical room would have to be energized before the next step could occur. Finally, one circuit at a time could be deactivated in the old electrical room and then re-energized from the new one. The process was tedious but necessary to accomplish the task.

There were many moving parts to this project and crucial planning was a must. In addition to the relocation of critical electrical rooms, the heart of all phasing was dictated by an area referred to as “Central Sterile”. Central Sterile was the area where the instruments for the ORs were held and sterilized for surgeries. If Central Sterile wasn’t operating properly, procedures in the ORs were not allowed. Central Sterile became a nemesis during the process. Even though a plan was agreed to prior to starting each area, there was always something that would occur in Central Sterile that would interfere. In some instances, new sterilization equipment was delivered late or manufactured wrong, making the plan obsolete. Each time,

Ludvik's team would have to re-evaluate their options and create a new plan to keep the ORs open.

When it came time to begin a phase or to perform a workaround, a Method of Procedure (MOP) that would define each step would be written and reviewed by the entire team. If the MOP was questioned or rejected by even one reviewer, the process would start over until it was approved by everyone. The MOP identified what work needed to be performed and in what amount of time. The MOP also identified each piece of material that would have to be used so the material needed would be on-site just at the right time. Material was staged in containers outside of the hospital but on-site for ready access. A mitigation plan was also part of the MOP in case something went wrong with the procedure, allowing crews to reverse their task without impacting hospital operations. In addition, other trades were working on systems that the electrical work would affect, such as mechanical systems. The impacted mechanical systems were critical to move clean air throughout the ORs, heat and cool each space, and provide medical gas where required. MOPs became the bible for the electrical construction process.

And oh, by the way, have you ever seen what's above a ceiling in a hospital? The ceilings were already packed with existing mechanical piping, plumbing, and other electrical systems. Finding space and sharing it with other trades was a challenge. But working closely with our trade partners and knowing that the end goal was for everyone's benefit, we were able to make alliances and found great cooperation. Due to the space restrictions in the ceilings and the schedules in which the work had to be performed, more workers had to be placed in a small area. Some of this could be mitigated by working multiple shifts, but much of the work had to be performed with multiple trades in a tight quarters. Again with mutual respect and coordination, Ludvik worked with the other trades as if in a well-choreographed dance performance worthy of a golden buzzer on America's Got Talent.

While working in a hospital, another issue is the possibility of contamination and infection – not just of a patient, but of construction personnel working above the ceiling. Therefore, stringent sanitary and Infection Control Risk Assessment (ICRA) policies made for difficult installation of materials in ceilings were utilized. Much of the installation had to be performed wearing protective clothing and using an ICRA cart to isolate contaminants. This

made for a slow installation process, especially in combination with the time, material, and operational constraints.

As always, safety was a top priority to Ludvik Electric. By using pre-task plans (PTPs) each morning, we were able to communicate our goals for the day's tasks and identify safety issues that could arise, specific to the tasks being performed. Lock out/Tag out procedures were vital to the safety of our craft. Many circuits remained live during construction and NFPA 70E had to be strictly adhered to while keeping three electrical systems in the hospital working (Normal, Emergency, and Critical). The systems had to be monitored extremely closely for patient and staff safety as well. Ludvik Electric is proud to have performed all throughout without a single safety incident and no lost time.

“Ludvik Electric did an outstanding job on The Medical Center of Aurora project. The electrical scope on this project was extremely difficult. The phasing proved to be a challenge as we had to keep several ORs operational during construction. This involved several critical electrical shutdowns that had to be scheduled during off-hours, with no room for error. Ludvik planned, and executed these shutdowns to perfection. One of the most difficult things was the relocation of an entire electrical room to make way for a new OR. The electrical feeds to and from this room all ran underground, which made it even more challenging. Just like the shutdowns, Ludvik came up with an excellent plan for this relocation, and even finished it one week ahead of schedule. It was a pleasure having Ludvik as our electrician. I would work with them again on any project!”

-Curtis Holbrook CHC, ASHE HCC, Superintendent, Layton Construction









