



PATIENCE PAYS OFF

The Nebraska State Capitol in Lincoln, an Indiana limestone-clad building with a 400-foot-tall domed tower rising from its base, succeeds two territorial capitols and two state capitols.

The Nebraska Territory was created in 1854, and controversy regarding the Omaha location of the territorial capitol was not resolved until 1867 when Nebraska became a state. The Nebraska Legislature voted to construct the first state capitol at the western edge of settlement in the state in the village of Lancaster. The village, which was to include the Nebraska State Capitol and the state's university, penitentiary and state hospital, was renamed Lincoln, and construction of the first state capitol commenced in 1867.

Built from 1867-68, the first state capitol was a two-story native limestone building with a central cupola. Because of poor construction and inferior building materials, the building soon began to crumble.

Construction of a second state capitol building at the same site was completed in 1888; however, the building experienced the same problems. In 1919, the state legislature passed a bill to provide for construction of a third state capitol building, as well as provisions for a capitol commission to oversee its construction.

The third Nebraska State Capitol building, erected on the same site and still standing, was designed by New York architect Bertram Grosvenor Goodhue and constructed in four phases between 1922 and 1932.

The U.S.' first statehouse to radically depart from the typical design of the U.S. Capitol and to use an office tower, the building has a low, wide base laid out like a cross within a square, creating four interior courtyards. From the center of the three-story base rises the domed tower topped with a 19-foot-tall bronze statue of The Sower by Lee Lawrie, who designed

the building's sculptural elements to pay homage to people of past civilizations, such as the American Indians, Egyptians (which The Sower is modeled after) and European settlers.

The building also features exterior stone carvings representing historic events from the evolution of democracy, and the interior features marble-columned chambers with vaulted polychrome tile ceilings, marble mosaic floors and murals depicting Nebraska's history. The Nebraska State Capitol was added to the National Register of Historic Places in 1976 and is a registered National Historic Landmark.

In 1995, an extensive inspection of the Nebraska State Capitol determined temperature extremes and freeze-thaw cycles had caused shifting and cracks in the building's facade and roof system, which would require major reconstruction. The Office of the Capitol Commission hired Wiss, Janney, Elstner Associates Inc.,

Midland Engineering replaces the copper roofs on the Nebraska State Capitol

by **Ashley St. John**

Chicago, and Bahr, Vermeer & Haecker Architects, Lincoln, as the project's architects and Mark 1 Restoration Co., Dolton, Ill., as the general contractor and masonry restoration contractor.

One aspect of the project was the restoration of the capitol's copper roof systems. The roof restoration was added to Mark 1 Restoration's scope as a change to its restoration package, and the company invited Midland Engineering Co., South Bend, Ind., to bid on the project.

"The project was a multi-tiered, invitation-only project collaboration with the building owners, architects and general contractor from a multi-state search," says Tom Swizek, Midland Engineering's contract operations manager. "We were invited to provide pre-qualification documentation with financials, manpower, equipment, bonding capabilities, etc., for review; provide a presentation to the group; and then bid the project.

"We were awarded the contract and asked to remove the existing copper batten-seam and soldered flat-seam roofs and replace them with 20-ounce copper batten-seam and soldered flat-seam roofs with all associated intricate flashings, gutters and downspouts during a three- to four-year time frame," Swizek continues.

COPPER TEAR-OFF

In September 2007, a Midland Engineering crew of about 26 began removing the Nebraska State Capitol's existing roof systems.

"The building design is composed of

four quadrants making up one big square," Swizek says. "Each quadrant has four to five roof areas at varying levels."

The numerous roof heights necessitated various types of fall protection.

"There are limestone parapets at most roof areas that meet OSHA requirements to prevent the need for 100-percent tie-off," Swizek says. "However, at the eaves of the upper courtyards, we put up guardrails and workers were tied-off. On the lower courtyard, we also installed a guardrail system."

The crew began work on the northwest quadrant and proceeded counterclockwise around the building.

"The existing roof systems totaled 111,000 square feet—39,000 square feet of soldered flat-seam panels and 72,000 square feet of 2-inch batten-seam panels," Swizek says. "The original roof areas were a combination of different roof designs with some combination of gypsum deck, wood sleepers, tongue-and-groove lumber or plywood, and copper roofing."

Midland Engineering crew members used handheld power tools to slice the existing copper roofing into manageable portions. The copper then was lowered from the roof with a crane and placed in bins on the ground and secured to avoid theft. When the bins were full of salvaged copper—35 20-cubic yard bins in all—they were removed and brought to a local recycling center for reimbursement to the state of Nebraska.

"Salvaging the copper was a combined effort between Midland Engineering and

Project name: Nebraska State

Capitol

Project location: Lincoln, Neb.

Project duration: September
2007-December 2010

Roof system type: Copper

Roofing contractor: Midland
Engineering Co., South Bend,
Ind.

Roofing materials manufacturer:
Hussey Copper Ltd., Leetsdale,
Pa.

Mark 1 Restoration," Swizek says. "The reimbursement was a contributing factor in making the project possible."

After the copper was removed, there were three different conditions existing on the roof areas.

"A majority of the roof had the copper directly on the gypsum deck, but about 15 percent of the roof had tongue-and-groove dimensional lumber and 2x4 sleepers that also had to be removed," Swizek says. "In one area, plywood sheathing was anchored directly to the gypsum deck."

Crew members removed all the materials down to the gypsum deck.

"The debris was placed in a trash hopper and lifted by a crane into a bin below," Swizek says.

A FRESH INSTALLATION

After removing the existing roof systems on each building quadrant, Midland Engineering crew members installed new roof systems on those areas before moving to the next quadrant.

"The existing gypsum deck was only removed in areas where we installed new drains," Swizek says. "Crew members also



Photos courtesy of Premier Aerial Imaging, Lincoln, Neb.

Midland Engineering fabricated and installed 20-ounce batten-seam and soldered flat-seam copper panels on the building's four quadrants, each of which has four to five roof areas at varying levels.

reworked the existing gypsum saddles to provide new saddles constructed of dimensional lumber covered by plywood sheathing and fabricated and installed new drain boxes.”

Workers then installed 2x4 sleepers anchored through the gypsum deck and 5/8-inch-thick plywood decking, followed by high-temperature underlayment and red rosin paper slip sheets. The slip sheets were tacked in place with staples and covered with 20-ounce batten-seam and soldered flat-seam copper the same day to avoid moisture damage to the red rosin.

“We purchased the copper in coils through Hussey Copper, and we fabricated the panels internally,” Swizek says. “We ordered the coils at the correct width so we could run them through the standing-seam machine in our shop.

“Ordering the copper at the right time was critical because of the copper market’s instability,” he continues. “We communicated hourly with the general contractor and the state to ensure we purchased the copper at the best rate.”

Midland Engineering also fabricated and installed new flashings, downspouts and gutters.

TIMING IS EVERYTHING

Roofing work on the Nebraska State Capitol was made especially complicated

because of the number of people involved and the nature of the building’s use.

“We had a roof consultant, owner’s representative, engineers and many more people trying to ensure everything was being done to meet the customer’s standards and expectations,” Swizek says. “We managed to address each party’s concerns.”

Midland Engineering also had to consider those working in the building. Business is conducted in each of the building’s quadrants, and noise had to be kept to a minimum.

“In 2007, we were performing work over an area where state legislation was being conducted, and when it was in session, we were prevented from working on that area because the noise transferred to the rooms below,” Swizek says. “We had to adapt. Sometimes, we didn’t know whether they would be in session until the morning. They did their best to inform us and did a great job of keeping us updated, but sometimes, meetings would be called only a day in advance.”

When Nebraska Supreme Court proceedings were under way, Midland Engineering faced the same issues. And the governor occupied the last quadrant where work was being performed in 2010, so work couldn’t be done whenever he called a session.

“There was a lot of pre-planning, planning, re-planning and re-sequencing to accommodate the client’s requirements

and finish the job on schedule,” Swizek says.

Midland Engineering also faced some challenges with material storage. There was limited storage space at the building, and coordinating the movement of materials around the building was difficult.

“When crew members were finishing the copper installation on one quadrant, some workers began work on the next quadrant, and the crane would have to move with them,” Swizek says. “It was complex trying to make sure we had all the materials and equipment that were needed. Movement of the crane from one quadrant to the next had to be scheduled about four weeks in advance, so it was a huge issue trying to make sure everything was ready.”

GREAT ACCOMPLISHMENT

Work on the Nebraska State Capitol was slated to be finished in 2010, and Midland Engineering worked hard to make that deadline.

“It was a known fact the project had to be finished by 2010,” Swizek says. “With all the challenges, we were still able to accomplish that. Lyle Bandurski, Steve Kurtz and Jim Sexton, Midland Engineering’s on-site supervisor, lead sales representative and sheet metal superintendent (shop fabrication), respectively, were integral to the project’s timely completion.”



For additional photos of the project and more information about the companies highlighted, log on to www.professionalroofing.net.

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