

Thoughtful planning and scheduling were the first critical steps on this manufacturer's fast-track project.



Construction began in the finishing area where the process equipment would be housed. Completing this area first enabled the construction team to begin installing the process equipment while steel was being erected in the other areas of the structure.

Express Steel Construction

BY THOMAS R. BROAD

NATIONAL ALABAMA CORPORATION is the newly created Alabama-based sister company of National Steel Car Limited, based in Hamilton, Ontario, Canada. Since its founding in 1912, National Steel Car has designed and manufactured freight cars to meet the ever-changing requirements and standards of the railroad industry. And this innovator in the steel rail car business recently drove innovation in the structural steel construction industry as well.

Once the site was selected for its first U.S.-based facility, National Alabama Corporation was racing to meet surging demand for rail cars, which was being driven by high energy prices and a renewed interest in rail car transportation. The company needed a very capable team to fabricate and erect the base building, which incorporated 21,000 tons of structural steel in a new 2.5-million sq.-ft facility. The remarkable installation schedule was only 17 weeks long for the ini-

tial 19,000 tons. The construction team had to come together fast to meet the project's exceptional goals and logistical requirements.

Located in Barton Riverfront Industrial Park near Cherokee in northwest Alabama's Colbert County, the completed building required a total of 21,000 tons of steel, 200,000 bolts, nine miles of crane rail, and three miles of hand rail. The mile-long, linear facility includes three main sections for rail car construction: fabrication, construction, and finishing. The finishing area was the most complex of the areas to construct because it houses the process equipment, so construction of this area drove construction of the whole building. Finishing this area first enabled the construction team to begin installing the process equipment while steel was being erected in the other areas of the structure.

The 17-week installation schedule was based on six-day weeks and amounted to 102 working days to erect 27,000 pieces of steel,

or an average of 1,580 pieces per week. This created significant challenges, considering that a typical project involves installation of about 500 pieces per week. As soon as Midwest Steel was selected by Walbridge/Yates, the company's senior project manager began to plan, schedule, and develop the sequencing prior to detailing.

Well-coordinated logistics was a critical element in accommodating the schedule. At peak, 100 truckloads of steel per week were required to maintain pace. Cives Steel used multiple plants to complete the necessary 210,000 fabrication hours. One of the initial keys to streamlining the fabrication schedule was to make

pieces as repetitive as possible; some single piece marks exceeded 2,000 in quantity.

Cives' project managers were assigned specific responsibilities for distinct portions of the project. One handled all requests for information (RFIs), changes and shop drawings; another handled fabrication and shipping coordination; the third handled all sublet

purchases such as deck, joists, and miscellaneous metals. Midwest Steel dedicated a crew to receiving, inventorying and distributing incoming steel to cranes for installation.

The site conditions also were a key to the success of the project. Before site work began, Walbridge/Yates consulted Midwest Steel to understand requirements needed for staging materials during installation. Lay down areas were outlined to handle the massive quantities of materials coming to the site. Walbridge/Yates provided an exceptional lay down area that was later to become the half-mile-long, 100-yard-wide rail yard. The entire building footprint was finished with the stone that became the subgrade for the finished concrete slab.

The pace of the project required that most materials be delivered two to four days prior to erection. Trusses, for example, were delivered two days prior to installation and were unloaded and assembled within the footprint of each sequence. Joists, however, were delivered much farther in advance to allow Midwest Steel the opportunity to ground assemble them in

full bay panels, complete with the bridging. Each day, quantity surveys were taken by the field team and the Primavera schedule was updated to maintain the critical smooth flow of materials to the erection cranes.

Four erection crews with four crawler cranes worked concurrently. Located in the rural community of Muscle Shoals, Ala., the project quickly outstripped the capacity of the local union hall. Midwest Steel called upon its national labor pool to support manpower needs, which reached 140 craftspeople on this project.

Because the structure's final bracing system relied on the installation of the metal roof deck, Midwest Steel developed a temporary bracing

design that included tensioned cables in the top and bottom chord framing as well as temporary cable sway frames. Additional cables provided vertical bracing for the structure until installation of the permanent vertical braced frames was complete.

Field installation began on February 22, 2008, while the building was still being designed. As a result, 26 changes were released in the first 16 weeks of the schedule. Construction of the exterior envelope was completed before July. Steel installation was the key element on the project schedule's critical path. The intense coordination efforts of the entire project team brought all the pieces together safely and delivered the project on time by topping out on May 29, 2008. MSC

Safety First

The risk for injury on a project of this magnitude is increased and required focus on worker safety. Fatigue was a concern, given the 6-day work weeks and 10- to 14-hour work days. Extra precautions were implemented, and a full-time safety manager monitored the work to protect the ironworkers, project team, and owner. Midwest Steel assigned three site safety people to work with the crews. In addition, the site superintendent was in the field 100% of the time overseeing the work. This extensive project, which required 210,000 man-hours, was completed with a zero lost time incident rating.



Installation of the initial 19,000 tons of structural steel for this mile-long facility was completed in 17 weeks, a pace that required exceptional planning, coordination and execution. The facility required a total of 21,000 tons of steel, 200,000 bolts, nine miles of crane rail, and three miles of handrail. All photos courtesy of Midwest Steel, Inc.

Owner

National Alabama Corporation, Cherokee, Ala.

Owner's Representative

The Staubach Company, Austin, Texas

General Contractor

Walbridge/Yates, Detroit

Engineer of Record

Albert Kahn, Detroit

Fabricator

Cives Steel, Roswell, Ga. (AISC Member)

Steel Installation

Midwest Steel Inc., Detroit (AISC Member)



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