1

October 4
Structure complete to 49 m, ready for reactor.

2

October 6
Reactor rolls off barge.

3

October 6
Reactor crosses bridge over River Rd.

4

October 7
Reactor set in tower.

GETTING UP AND RUNNING IN HALF THE TIME

Early this year, Nucor Corporation, one of the largest steel producers in the United States, started production at their new steel mill in Louisiana. In close collaboration with Mammoet, the most important part of the steel mill, the furnace, was built in only six months – allowing commissioning and production to start six months earlier than originally planned.

5

October 8
PTC rigged to Module 1.

6

October 9
Module 1 set.

7

October 12
Modules 4 and 5 set in tower.

8

October 13
Furnace complete.

Upon planning the construction, Nucor intended to stick-build the entire furnace. An important phase in the construction would be the installation of the reactor into the base of the furnace structure; a heavy lifting operation for which they considered using a gantry system. With this plan, Nucor consulted Mammoet. After thorough analysis Mammoet's engineers concluded there was a much better alternative for building the facility: modular construction.

Stick building the furnace would take about a year. It would mean having to work at heights, and dealing with the safety risks that come along with it. Building the furnace in five modules on the ground would be a much safer option, and it would cut the construction time in half, bringing forward the commissioning phase and production date by six months (see illustration on page 28–29).

For lifting the 1,100 ton reactor and the five large modules, Mammoet also proposed a new approach. As a tower gantry is fixed on its location, each module would have to be transported on a SPMT to the gantry before being lifted into place.

Mammoet's PTC 140 DS – one of the largest cranes in the world, in the 5,000 ton class – would be better suited for this job. The crane would be able to reach all modules from one central position and lift them into place – a much faster way than using a gantry system. The proposal was readily accepted and Mammoet was put in charge of planning and executing the lifts.

First, the base of the furnace structure was stick built to a height of 49 meters, while the five modules were constructed around the crane. Once all the modules were ready, they would be lifted into place within one week.

While construction progressed, Mammoet also handled the transport of about 50 parts for the facility, such as process and pressure vessels and the key component for the furnace: the reactor. This reactor had to be loaded onto a barge at the manufacturer site in Texas and shipped to a river port at the Mississippi, close to the construction site.

Transporting the reactor – 56 meter tall, 9.15 meter in diameter and weighing approx. 1,100 tons – proved to be the most challenging part of all transport activities: on its way from the river port to the construction site, the reactor would cross a levee and a river road that both appeared too fragile and therefore could be damaged by the heavy load. Avoiding the levee and road, however, would delay the transportation and installation schedule by several days.

Mammoet rose to that challenge by building a bridge over the levee and river road. "We had to come up with a solution to make sure we wouldn't damage the levee with the reactor", says crane manager Brett Taylor. "That

is why we built a temporary bridge over it." Michael Cook, Technical Solutions Manager at Mammoet USA, adds: "The alternative was to make a very long detour and that would have delayed the project. That was not an option".

Mammoet also built a temporary road over the swampy area between the river and the bridge. "For that we made a 250 meter long road, primarily of limestone, sand and clay", says Cook. Shortly before the reactor reached the bridge, all traffic was stopped. Taylor: "It was almost like a movie star was on its way. Everyone was watching".

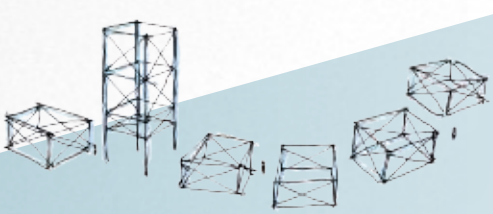
Thanks to the road and bridge, transporting the reactor from the river bank to the site took only three hours instead of several days, without any damage to the environment.

On site, the reactor was lifted 67 meters and placed carefully into the steel furnace structure.

"There were only centimeters of space for maneuvering the reactor into its structure", says Cook. "It was extremely tight. Thanks to detailed engineering and the communication between our engineers and field supervision it went smoothly. It took less than three hours to put the reactor in place."

Mammoet approach

(modular construction, six months)



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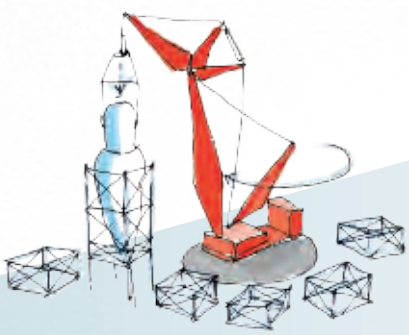

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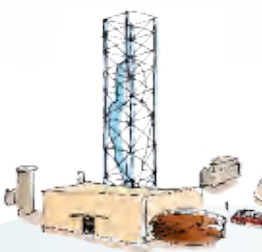
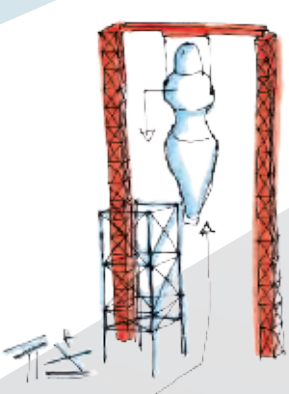


4

Original plan

(stick building, twelve months)

1



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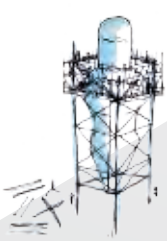
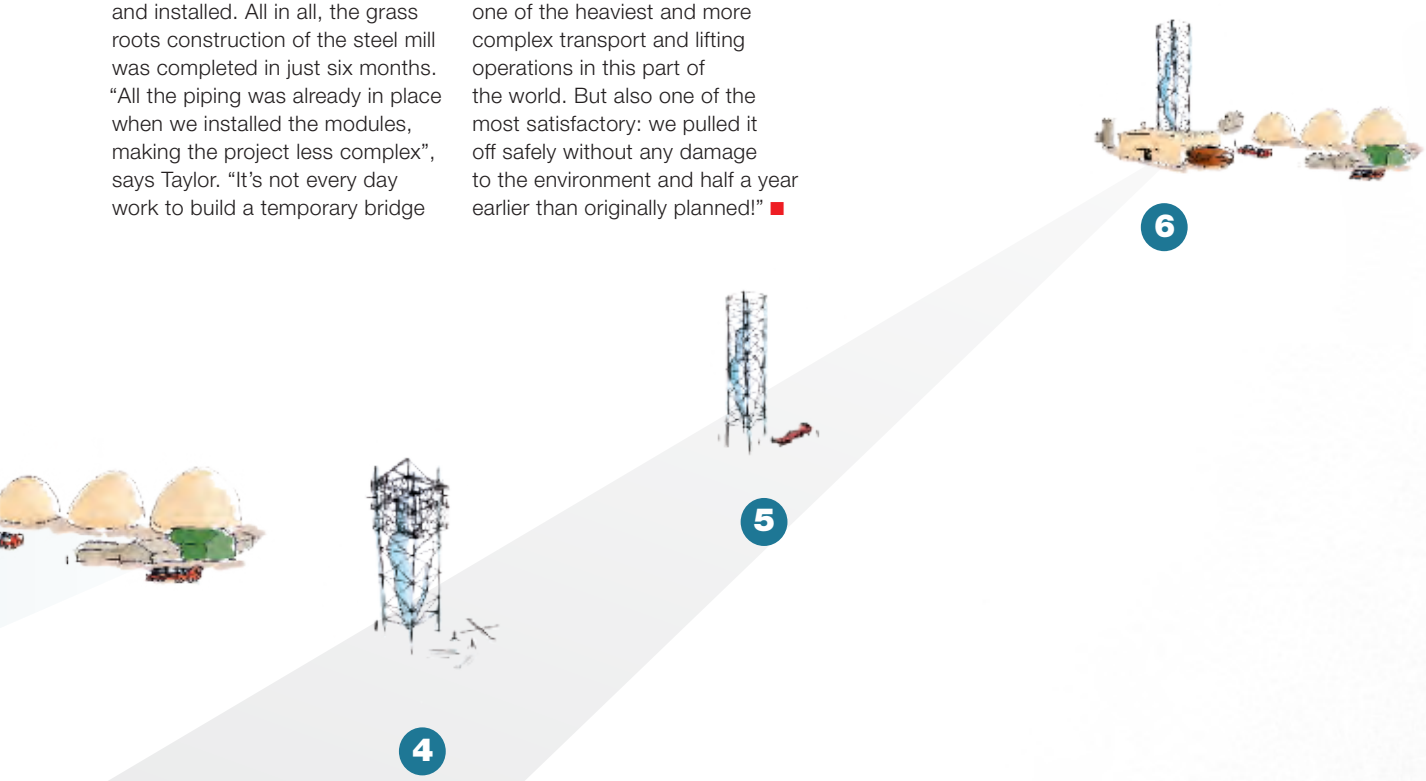


3

After this, the modules were lifted and installed. All in all, the grass roots construction of the steel mill was completed in just six months. “All the piping was already in place when we installed the modules, making the project less complex”, says Taylor. “It’s not every day work to build a temporary bridge and road”, Cook adds. “It was one of the heaviest and more complex transport and lifting operations in this part of the world. But also one of the most satisfactory: we pulled it off safely without any damage to the environment and half a year earlier than originally planned!” ■



Mammoet approach

1. The base of the furnace is stick built. In parallel and on-site the rest of the furnace is constructed in modules and the PTC 140 DS is assembled.
2. After the base is constructed, the reactor is lifted into the base and the modules are lifted onto it to complete the furnace. All within one week.
3. The furnace can now be commissioned.
4. The steel mill is in production.

Original plan

1. The base of the furnace is constructed.
2. A gantry system is assembled to lift the reactor into the base.
3. After disassembling the gantry system, construction work continues at elevation.
4. To finish the furnace, construction takes place at increasing heights.
5. The furnace can now be commissioned.
6. The steel mill is in production.

“Mammoet’s engineers concluded there was a much faster and safer alternative for building the furnace.”