

Crews Crown Shrine with 42-ft Diameter Dome

Written by: Constructor Magazine Online Exclusive

LIFT MARKS MILESTONE IN BUILDING SHRINE DEDICATED TO FUTURE SAINT

When you lift a 32-ton cathedral dome, it all comes down to trigonometry. That was the final check Marvin Rivers made before teams from The Boldt Company lifted the giant dome in place on the Blessed Stanley Rother Shrine.

“You only get one chance,” Rivers says. “No one wants problems, and it’s through good engineering that we eliminate problems.” Rivers is the director of hoisting and rigging for Boldt and he worked collaboratively with teams on-site to develop a safe and effective lift plan for the dome lift in August.

The dome is the crown on the shrine, a Spanish colonial-style church that will be the largest Catholic Church in Oklahoma. The campus calls for a future museum and pilgrim center, documenting the life, witness and martyrdom of Blessed Stanley Rother, an Oklahoma farmer who became a priest and served as a missionary in Santiago Atitlan, Guatemala. In 1981, Father Rother was murdered in his rectory during a violent civil war and his assailants have never been caught. In 2016, Pope Francis declared him a martyr for the faith – the first recognized Catholic martyr from the United States. Blessed Stanley Rother was beatified in 2017 in Oklahoma City, making him the first priest born in the United States to be beatified.

The problem-free lift was the result of teams working collaboratively in quality assurance, project management,



engineering, construction, and architecture. Early on, construction teams made the decision to build the dome on the ground on concrete piers rather than 100+ feet in the air. This increased safety on the jobsite and eliminated the need for scaffolding, lifting equipment, and extra labor hours needed to build above ground – and it was easier to lift it for final placement.

Planning the lift of the 34-ft tall, 42-ft diameter dome started with conceptual design. Project engineers compared architectural drawings and computer renderings with on-site construction to ensure detailed measurements were exact. Subcontractors specified cold-formed steel because of its durability, speed of construction, and lighter weight. As the octagon shape dome was built, crews checked and re-checked that the dome's weight, height, and dimensions were exact.

"All our subcontractor teams anticipated what the weight of steel frame, the roofing material, and other materials would be at the time of the pick, and we gave the information to Marvin for lift planning," says Gabriela Escalona, project manager for Boldt.

"It starts with getting the dimensions and details of what is being lifted," Rivers says. "We start developing where the lifting-load attachment was going to be, the lifting weight, the rigging components, and the capacity of the crane."

Planning called for a 550 Ton, Liebherr LTM1450-8.1 crane rented from Northwest Crane in Oklahoma City that towered more than 200 feet in the air. Rivers and the Boldt design team created a RISA design model, Revit drawings, and used 3DLiftPlan software to create the dome lift plan. The computer plan detailed crane placement, specifics on the concrete support footings, specified rigging points, the lift radius, lift frame, and spreader beams and slings and shackles required to lift the massive structure.

"I always go back to trigonometry and do hand calculations just as a final check on the lift plan layout," Rivers says.

On a sunny afternoon in August, after re-checking all the input weights and measurements and rehearsing the lift with the crane, the plans all came to a head as the 65,000-pound dome was lifted into place without any complications.

"It's an emotional moment to see the dome put in place. The innovative engineering and planning to build the dome on the ground made it faster, safer, and less expensive. Boldt is proud to use our skills to benefit the Blessed Stanley Rother Shrine," says Tony Yanda, senior director of construction operations at The Boldt Company.

"This was a complicated part of the project," says Tyler Bolt, project manager for Boldt Construction. "We're ensuring the quality and safety of this structure will last for 100 years."

The project is slated for completion in Summer of 2022. 🖋️





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