

The biblically themed Ark Encounter in Williamstown, Ky., is a one-of-a-kind exhibit centered on Noah's ark as recorded in the Bible. The full-size wooden ark sits on 800 acres and is 510 feet long (more than the length of 1½ football fields), 85 feet wide (the width of two school buses) and 91½ feet high (three giraffes stacked) with enough volume to hold 483 semitrailers.

The Ark Encounter is a sister attraction to the Creation Museum. Both are Christian evangelistic outreaches intended to bring the Bible, including the account of the ark of Noah's day, to life. Through interactive exhibits, the Ark Encounter immerses visitors in Noah's world and the events recorded in the Book of Genesis. The ark was designed and built to be family-oriented, environmentally friendly and true to the Bible's description.

The Ark Encounter opened July 7, 2016, and is the largest timber-frame structure in the world. Along with the ark, the attraction includes Ararat Ridge Zoo, a 1,500-seat restaurant, a lake and a gift store under the ark.

Additional phases will be added during the next few years.

Construction of phase one began in June 2015. TruCraft Roofing LLC, Milford, Ohio, was invited by the project's architect and general contractor, Troyer Group, Mishawaka, Ind., to submit a bid for the installation of the ark's roof systems.

"One afternoon we received a call from the Troyer Group, a contractor we were not familiar with, and they asked whether we would be

interested in submitting a bid for a replica of Noah's ark," says Evan Zepf, project manager and estimator for TruCraft Roofing. "We agreed to view the drawings, not grasping the idea this was a life-size replica. But when they sent the drawings and we viewed the dimensions, we realized the size of the project and focused on bidding for the unique opportunity."

TruCraft Roofing subsequently was awarded the project and joined the team of ark tradesmen in November 2015.

A solid foundation

More than 500,000 cubic yards of dirt were moved to prepare the ark site for construction. Four feet under the site is solid rock. To meet building code regulations, the ark's first floor was made of concrete, and the ark was built around it. More than 3,500 yards of poured concrete and about 6,000 yards of concrete in precast slabs were used during construction.



Photo courtesy of Answers in Genesis, Petersburg, Ky.



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The big logs used for the ark came from trees that were killed by a beetle infestation; most of the other timber came from renewable forests. Each piece of wood was prepared off-site for a specific location within the ark. Each plank and beam then was assigned a number, so when it arrived at the site the builders knew the exact location for placement. More than 612 miles of timber were used in the ark's construction—enough timber to go from Williamstown to Philadelphia.

The ark is built on 102 piers, each 15 feet high. The ribs of the ark are made of glulam (laminated timber). The ribs, beams and logs were made into a structure called a bent. Thirty-two bents were constructed and bolted onto a concrete platform attached to the piers. The keel of the ark is 12½ feet off the ground and hidden under the platform. This design allows guests to walk under the ark.

Three seven-story towers were constructed behind the ark to which the ark anchors. Each tower extends into the ark about 14 feet. The two end towers contain elevators and stairs. The large middle tower contains stairs and restrooms. These tower supports were designed to withstand 120-mph winds, and one contains a 50,000-gallon underground water tank for fire protection.

The ark contains 132 bays of which 74 contain exhibits, dining spaces and offices for mechanical, housekeeping and security personnel. Eighty feet above ground are the ark's roof systems.

The ark's roof

TruCraft Roofing worked closely with the project's architect and designers to merge the vision for a grand life-size ark with present-day standards and codes.

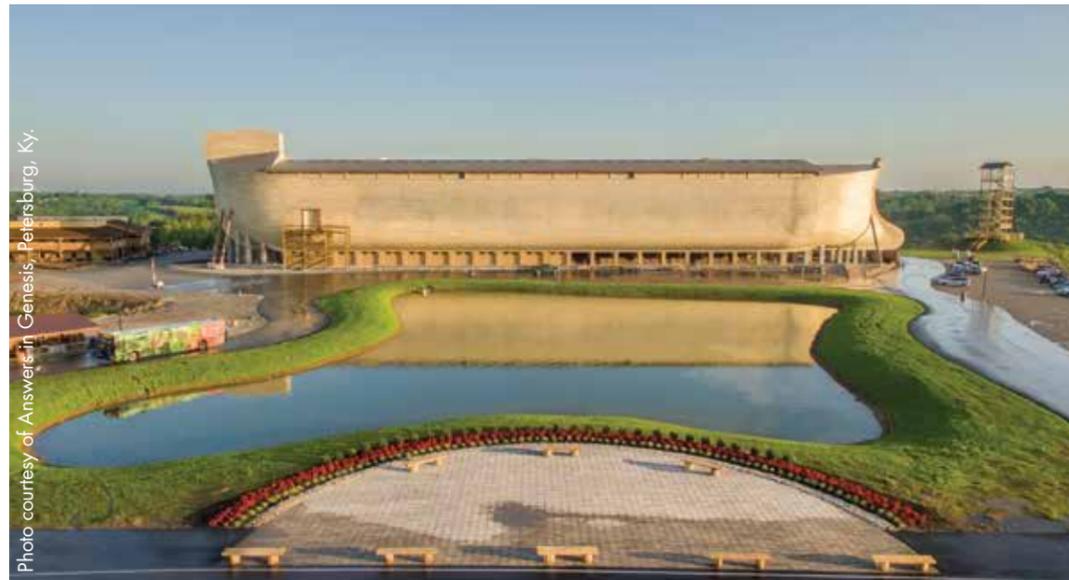


Photo courtesy of Answers in Genesis, Petersburg, Ky.

Building Noah's Ark

TruCraft Roofing helps construct the largest timber-frame building in the world

by Chrystine Elle Hanus



Photo courtesy of TruCraft Roofing LLC, Milford, Ohio.

Clockwise from upper left: The ark is built on 102 piers, each 15 feet high; more than 612 miles of timber were used to construct the ark; the completed ark and lake; three seven-story towers were built behind the ark to anchor the structure



From left to right: TruCraft Roofing workers install the ark's gutters and edge metal; workers adhered TPO membrane in slate gray

On the low-slope areas, TruCraft Roofing workers adhered or fastened (depending on the roof deck type) a base layer of 4½-inch-thick base polyisocyanurate insulation, fully tapered (¼ of an inch per foot) polyisocyanurate insulation (up to 17 inches thick in some areas) and fully adhered 60-mil-thick EverGuard® TPO membranes in slate gray and white.

On the steeper-slope roof area, the TruCraft Roofing crew installed ¼-inch-thick DensDeck® Roof Boards, fastened 4½-inch-thick polyisocyanurate insulation and fully adhered 60-mil-thick EverGuard TPO membranes in slate gray.

TruCraft Roofing crews were 100 percent tied off while working on the ark. Depending on the construction phase, various fall-protection measures, such as building rails around the ark's perimeter, were implemented to ensure safety.

"As you can imagine, working on the ark presented unique safety conditions, so we had to come up with unique safety methods depending on where we were working," says Rod Sparks, owner of TruCraft Roofing. "This wasn't just any project we were working on. For us, this project had meaning, and 'what we do, we would work with all our hearts.'"

Getting materials to the different roof areas was challenging because of logistics and availability of crane use at each building section. Performing work during winter months and working side by side with other tradesmen added to the challenge but was rewarding.

"Working alongside timber craftsmen, instead of the usual steel or concrete contractors of today's modern construction, was quite inspirational," says Ralph Wissing, TruCraft Roofing's superintendent for the project.

A BioPCM™ material also was incorporated into the steeper-sloped roof section. BioPCM is designed for thermal-energy storage and release and presents high potential in energy conservation.

"The BioPCM material consists of a blanket with pockets essential to its performance," Zepf says. "Our worry was penetrating those pockets while fastening the roof system, leaving them futile. To overcome this issue, we designed a grid system for the blankets to fit into to

Project name: Ark Encounter
Project location: Williamstown, Ky.
Project duration: November 2015-June 2016
Roof system type: TPO membrane
Roofing contractor: TruCraft Roofing LLC, Milford, Ohio
Roofing manufacturers: Architectural Products Co., Hebron, Ky.; GAF, Parsippany, N.J.; Georgia-Pacific Gypsum LLC, Atlanta; Phase Change Energy Solutions, Asheboro, N.C.; Metal Panel Systems Inc., Cincinnati



avoid penetrating the material while still keeping our insulation fastening pattern."

Workers finished off the roof systems with associated gutters and edge metal work. Because of the intricacies involved working with heavy timber and woodwork, only small portions of the roof deck became available at one time for roofing work. This meant work took a bit longer than expected, but TruCraft Roofing workers stayed the course and worked diligently to complete their work in time for the Ark Encounter's opening date.

All aboard

Since opening three months ago, more than 300,000 people have visited the Ark Encounter. Plans for additional construction phases of the attraction include a pre-flood walled city, the Tower of Babel, a first-century Middle Eastern village, a walk-through aviary, an expanded petting zoo and other attractions, including a 600-seat restaurant on the ark's roof deck.

"TruCraft Roofing is honored to be part of the team that helped construct a life-size replica of Noah's Ark," Zepf says. "There is the infamous drive down to the main site, and as you come down the road, the sight of the ark puts butterflies in your stomach at the realization of the capability and creativity of man's construction ability. Although we had technology and machinery of today's age, the ark's site submerges you in an antediluvian feel." 🌐🔧

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ON the WEB

To view a time-lapse video of the Ark Encounter's construction, go to www.professionalroofing.net.