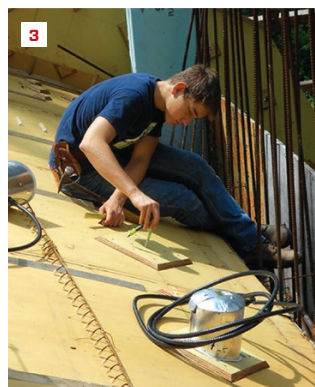


BY TIM HEALEY



The hobbit home's front facade (1). Georgia and Jude Costigan build one of the home's four skylight-well forms (2). Terence Costigan installs can lighting wired with poly-coated BX cable, both rated to be set in the concrete roof (3). Note the patterns on the finished ceiling in bedroom (4) and skylight well (5).

Forming a Hobbit House

For the past six years, when Jim Costigan wasn't working on high-rise construction and battling long commutes in and out of New York City, he was building his dream—a "Hobbit" house. This civil engineer, self-proclaimed "Lord of the Rings" nerd, and father of four teenagers spent his weekend "down-time" building an earth-sheltered home in Pawling, N.Y., some 70 miles north of NYC.

Along with sons Ethan, Jude, and Terence, daughter Georgia, and wife Jo, Jim built what can best be described as a heavily-insulated arched highway overpass built to Passivhaus standards. One of the home's most impressive features is its cast-in-place concrete roof.

Help from an engineering wizard. To achieve his vision of creating a large vaulted room with no intermediate supports, Jim had to revise his initial plans of building a uniformly thick concrete arch clear spanning 32 feet supported by two long parallel walls—the load calculations weren't working out. Jim sought out help from "concrete genius" Nat Tocci, P.E. Nat called for a tapered arch, ranging from 9 inches thick at its center to 16 inches over the walls. He also beefed up the concrete walls to 16 inches from 10 inches and thickened the slab to 6 inches from 4 inches, adding continuous rebar run through the slab to tie the walls together (the slab acts as a collar tie).

The Hobbit Hollow crew. Jim assembled a crew made up of his wife, kids, and a rotating cast of their school friends in need of part-time jobs. The kids worked hard; assembling the formwork was no easy task (the wall forms alone weigh 90 lb. per panel; 160 in all were used). To form the roof, the crew cut a series of arch-shaped "ribs" out of plywood and laid them out upright on a temporary flat deck (the deck was built at wall height using OSHA planking supported by 4x4 stringers on 150 metal post shores). Run perpendicular to the ribs, 2x4 purlins were inserted into slots cut into the plywood on roughly 12-inch centers. HDO plywood was then laid down over the framing to form the roof's interior face.

Mystical patterns. The Hobbit Hollow crew made the four skylight-well forms with 2x4s and HDO plywood and created the decorative patterns by screwing beveled shapes of scrap HDO plywood to the forms. In total, the crew installed tons of rebar joining the footings to the walls and the walls to the arched roof. Eighty-five yards (342,000 lb.) of concrete was needed to complete the roof—and the forms held without a blowout.

For more information, visit Jim's blog at myhobbitshed.com.

Photos: 1, 4, and 5, Tim Healey; 2 and 3, Jim Costigan