

## Project Description

### Reptile Complex (Scaly Slimy), Zoo Atlanta, Atlanta, Georgia

It's not often in a structural engineer's career that the design of a signature building comes along. By "signature," we mean a building that is one-of-a kind or an organization's flagship building. This building is both and already a winner of the *Engineering News Record* Southeast 2015 Best Projects in the Cultural/Worship Category.

What makes this building special is not its size, but the complex blending of materials to create a walking-learning experience for Atlanta Zoo-goers. Reinforced concrete, reinforced masonry, structural steel, structural wood, structural shotcrete, and glazing all come together to showcase this building's stars, the reptiles and amphibians.

Zoo patrons experience a winding, "scaly slimy" landscape beneath the building's distinctive "glass hat." This glazed roof shape was chosen, not only for its drama, but also to let outside light spill into the inner, cathedral-like space below the roof. Unfettered wall-glazing, while letting in light, made for greenhouse-like heat-gains and a flight hazard for birds outside of the building. The architect, Torre Design Consortium, solved both of these problems by fritting the glazing to shade the heat-gain, while letting in light for the tropical plants below, and at the same time, allowing the outdoor birds in flight to see the glass walls.

Structural shotcrete on rebar and wire mesh cages was used to cast free-form landscaping shapes; these elements were blended into and onto reinforced concrete animal exhibits with structural, public-side glazing, allowing onlookers to see and encounter the animals from above or, in many exhibits, below exhibit water levels.

Given the landscaped, freely-shaped features inside of the building, the structural drawings for the project also developed in ways that challenged the normal grid method of construction location. The design drawings acknowledged this free form, but were specific about the need for the location control of certain critical points, both horizontally and vertically. Winter Construction, the general contractor, built a 3-D Building Information Model that dictated the project layout surveying and the coordination of the building's subcontractors. Thankfully, everything mostly lined up as planned during construction, much to the credit of the architects and the construction team, with input from the structural engineer as needed.

The architectural design focused on the public attraction experience and on state-of-the-art animal management and care for the reptile and amphibian species housed in the building. Structural design challenges included not only the normal coordination between the architects and structural engineers, but also intensive mechanical, electrical, and plumbing coordination prompted by MEP systems that are more specialized and complex than most medical buildings. Special structural detailing and uncommon drawings stretched structural design efficiency.

However, the greatest structural design challenge lay in working out complex vertical and lateral loadpaths from the thrusting roof hat steel legs onto the masonry and steel supports below. The lower roofs act as diaphragms to shed the thrusts from gravity, wind and earthquakes to masonry bearing/shearwalls below. Built into a hillside, there are numerous retaining walls, both inside and outside of the building. Along with this main building, there is a small theater and a zoo restroom building in the complex.

The project design got underway in the late 2008, and construction began in the late summer of 2013; the building opened in March/April of 2015. This lengthy project life resulted from ongoing scope and budget challenges within this project and a sister project, the Animal Hospital, which was under design at the same time, but is not yet built. Project management stretched out over almost seven years, and it took ongoing professional strength and energy to work through the design and construction services.

This building was designed as a Zoo and Atlanta landmark, providing new attention for Zoo Atlanta, attracting new visitors, and increasing attendance and revenues.