

# ENR

Engineering News-Record

**Outlook**  
Construction markets poised to drop even more

**Suspicion**  
Fight escalates over cause of Florida garage collapse

**Safer**  
Industry injury rate shows slight improvement

## PROJECT SPOTLIGHT

### Precast Tunnel Speeds Opening of New Mountain Community

Developers of the new 17-acre Pine Glades luxury townhome development tucked into Snow King Mountain at Jackson Hole, WY, envisioned a place where residents would have full ski-in, ski-out access. However, in order to gain approval for construction of Pine Glades from the Town of Jackson, the developer had to create access to the property.

Unfortunately, the only roadway access to this community was through the mountain.

Working with the developer, Oldcastle Precast engineers designed a 600-ft, two-lane vehicular tunnel that sits 45 ft below the surface of the ski run. The tunnel climbs along a 15% slope as it twice crosses the face of Snow King Ski Resort, making three 90° turns before emerging half-way up the mountain.

Under a tight deadline, Oldcastle recommended the use of standard precast three-sided split box culverts that measured 26-ft by 15-ft high coupled with innovative, customized post-tension beams that incorporate lightweight geofoam fill for the first 12-ft above the beams to reduce the dead load. The beams rest on a cast-in-place concrete cap supported by



micro-piles, soil nails and shotcrete.

Cache Elzinga, project manager with Oldcastle Precast, says, "Construction crews dug a trench along the entire 600-ft length, set the culvert sections and specialized beams inside and then put the mountain back on top."

When complete the tunnel incorporated 88 3-sided bridge sections, 225 box culverts, 76 post-tensioned beams, 820,000 lb of reinforcing steel, 4,404 cu yds of concrete and 20 large utility vaults.

The tunnel was completed in six weeks just ahead of the first snowfall in mid-October. ■

### Creating a Ripple Effect

A city's skyline is one of its most memorable and defining characteristics. The towering presence of skyscrapers throughout the world has inspired the imaginations of modern architects seeking to offer the world a fresh perspective on traditional architecture. Chicago's skyline is about to be redefined with the addition of an innovatively designed high-rise building. Aqua is said to be one of the top nine unique structures soon-to-be-built worldwide. Beyond its distinctive rippling design, it will stand among the tallest buildings in downtown Chicago, rising 80 stories (822 ft) and boasting 1.9 million sq ft of retail, office, hotel and residential rental and owned floor space. James McHugh Construction Company, began construction in early 2007 with completion scheduled for 2009.

Aqua's design called for innovative approaches that reach beyond conventional construction methods. The technology behind Aqua's unique exterior design is Aluma's Hi-Flyer system. The Hi-Flyer column-hung shoring system capitalizes on the advantages of traditional column-hung systems, while introducing new features that deliver significantly greater efficiencies. Used in combination with specialty Castelite beams, the Hi-Flyer has enabled engineers



to cantilever up to 14 ft without transmitting any load onto the balcony below. This is a critical component in creating the dramatic balconies that are perhaps the building's most distinguishing characteristic.

As the building's floor plans have to define all of retail, hotel and residential levels, design changes have created new complicated formwork requirements. The Hi-Flyer is flexible enough to accommodate the transitional mechanical changes while fulfilling demanding time schedules. Aluma Systems is also involved with a project to help maximize the Hi-Flyer's performance. Aluma's engineering and R&D teams have created Hi-Flyer accessories specifically for Aqua. Aluma specialists assembled the units onsite and provided operators with training on the system. With versatility and performance the Hi-Flyer is delivering many critical time and labor-saving efficiencies. "Through using Aluma's Hi-Flyer Shoring System, we have achieved an outstanding three-day pour cycle. Its efficient design completely eliminates the need for re-shoring and our overall production time has improved by 30%," said Paul Treacy, concrete superintendent for the Aqua Project. ■