RECO NEWS
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The Reinforced Earth Company

TechSpan Arch Accommodates Wildlife in Calgary

When the City of Calgary and Carma Developers began looking at the extension of Nose Hill Drive to the west of Stony Trail (in north west Calgary) to improve the access to the Tuscany Community, they had an obstacle in their path. The new roadway extension would need to cross a scenic ravine carrying the "12 Mile Coulee" water course. This ravine area is popular with wildlife, which passes through the territory, and also serves as a recreational area. It also is part of the scenery that makes the adjacent residential community highly desirable.

The technical challenge that the designers from Southwell Trapp & Associates initially faced was to come up with a design that accommodated not only the stream crossing, but also allowed pedestrians and wildlife free safe passage across the roadway without greatly impacting the area's natural beauty. In addition, this location was identified as a future full roadway interchange, meaning that the initial design concept had to be scalable to meet the future requirements. This included eventually raising the road grade another 11m (36ft).

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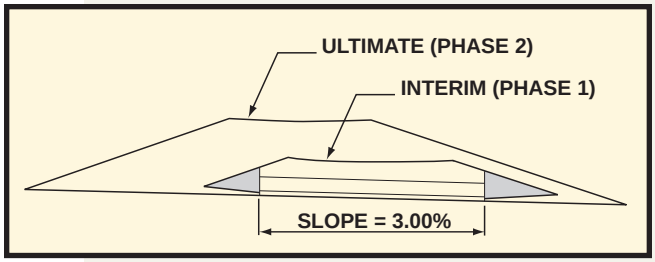

The area will eventually be upgraded to a full interchange raising the overburden above the TechSpan arch by 11m (36 ft)

The design for the initial structure included a 62 m (200 ft) long TechSpan arch measuring 4.0m (13 ft) in height and 7.0m (23 ft) in span width. Support for the arch consisted of a 3% sloping raft footing with 1.45m (4.75 ft) raised pedestals. The overburden over the arch was 4m (13 ft), with a height of cover from streambed to roadway of 9m (30 ft). When the stream crossing is eventually upgraded, the overburden above the crown would be 15m (49 ft), or 20m (66 ft) from the stream bed to the roadway.

At both ends of the TechSpan arch, TerraClass retaining walls were used as headwalls and wing walls. These retaining walls were finished with an Ashlar Stone design and a sandstone-colored pigment. This addition of colored pigment to the concrete produced a faux sandstone finish with a buff shade. Adding the architectural finish and colored concrete to the entrance walls enhanced the tunnel's appearance and blended the environmental reserve's natural scenery with the structure.

Erection of the entire TechSpan arch structure took place in two days averaging 31 lineal m (100 ft) of arch per day. Construction of the head walls and back filling followed.

Lightweight Materials as Backfill

Most of the volume of an MSE (Mechanically Stabilized Earth) wall consists of selected granular backfill that must meet standard requirements for strength, gradation, and electrochemical compatibility. In some cases, the presence of sensitive buried structures or compressible conditions of the foundation soil requires the MSE walls to exert low bearing pressure. In these situations lightweight backfill materials may be needed to reduce the overall weight of the MSE walls.

Typical lightweight materials include

- Manufactured aggregate (expanded kiln-fired shales, clays, and slates with confirmed durability)
- Bottom ash (byproduct of coal burning)
- Lightweight foam concrete fill (LFCF).

With a weight of only 20% to 50% of ordinary granular backfill, these materials may be effective in significantly reducing the weight of the MSE wall.

In the case of aggregate-like lightweight materials (manufactured aggregate or bottom ash), the MSE wall construction method is nearly the same as for standard weight granular backfill. LCLF backfill, on the other hand, is poured into place and sets up in a manner similar to concrete, with the MSE wall precast panels and reinforcing strips acting as framework and form ties, respectively, while the LCLF sets.

The large variety of lightweight materials, along with their more recent entry into the field of MSE wall construction, requires additional evaluation beyond that normally used for standard granular backfills. Along with a wide variety of options, lightweight materials are also usually more expensive than traditional backfills, depending on source and type. If alternative lightweight materials are going to be considered for your project, RECo should be consulted early in the design process so that analysis and cost-effective selection may be made to obtain owner approval.

RECo Goes to the Races

Over the years, The Reinforced Earth Company (RECo) has been involved in many fast-track projects, both large and small, simple and complex. When a representative of Smokey Mountain Amusement Park in Tennessee approached RECo to design and supply retaining walls to support a new go-kart track, we welcomed the opportunity to meet their needs. Although the Owner wanted the project finished quickly, neither he nor the Contractor liked the initially proposed system and RECo was contacted for an alternate solution.

The Owner wanted to raise his outer track to compete with a rival track that was elevated on a wood trestle. He wanted the track to be highly visible, aesthetically pleasing and challenging to the drivers. In addition, construction time needed to be kept to a minimum to reduce track closure.

With no concept plans available, RECo met with the Owner on December 10, 2003 to lay out the walls and walk the job site. The owner explained where the walls should begin and end, the elevation change desired and specified a series of "bumps" with unique dimensions. Then the Owner's surveyor supplied a series of horizontal and vertical coordinates from which an existing plan and profile was established. Using the Owner's wall height and "bump" requirements a proposed profile was engineered. Preliminary plans were submitted on December 22, just twelve days after RECo initially viewed the site.

On Monday December 29, a fax was waiting stating that wall construction was to begin that day. Off to the races went design and construction of the Reinforced Earth wall system. Plans were finalized and materials ordered. The original concept was to bring stored materials "borrowed" from nearby projects, but complications arose. The tight radii and sloping tops required special panels. In consultation with RECo, the Contractor started where he could use the stored panels and worked toward the areas where special panels were needed. RECo materials started arriving on the job site within a week.

The design/build Contractor, Charles Blalock and Sons, located in Tennessee, was selected to manage and construct this project. The walls, C.I.P. coping, infill and track pavement were completed in 6 weeks time, saving the Owner excessive lost revenue due to track closure. The Owner is very pleased with the finished product and has informed RECo that other track Owners are now coming to see his facilities.

International Corner

Reinforced Earth selected to provide Avalanche Defences in Iceland

Towns and villages along Iceland's steep mountainous coastline have long been the victim of snow avalanches. The large amount of snow on steep slopes creates the avalanche hazard. Many old fishing settlements which have grown to become small cities, are built at the bottom of these steep slopes and are subject to the dangers of powerful cascading snow.

Several dams, for the protection of settlements, have been constructed in recent years as a part of a government plan to improve the safety of people in avalanche prone areas. The dams direct the avalanches away from populated areas and splitters dissipate the avalanche energy.

The projects involved the construction of avalanche defences at Neskaupstaður, Seyoisfjorour and Isafjorour, Iceland. In Neskaupstaður the defences comprised of a 14m (46ft) high 8000 m^2 (86,100 ft^2) catching dam and 13 - 10m (33ft) high splitters in the run out zone of the snow avalanche.

Completed TerraTrel splitter walls.

In Seyoisfjorour, the 7000m^2 (75,350 ft^2) defences comprised of a 20m (66ft) high deflecting and catching dams in the run out zone, while the defences at Isafjorour comprised of splitters and a deflecting dam located directly in the avalanche path.

The catching dams, deflecting dams, and splitters were designed as Reinforced Earth TerraTrel walls. The upstream face of the dams and splitters were built at a designed angle of 76°. The steep slope face was supported by a composite of graded blast rock fill and galvanized steel reinforcing strips.

The TerraTrel system was chosen for these defences because of the speed of erection during Iceland's short summer construction season and the proven ability to withstand significant impact loading.

View from mountain slope to Neskaupstaður harbour, showing face of main dam with splitter walls in the foreground.

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