St. Kitts Rockfall Protection Tunnel

OWNER	Public Works Department of St. Kitts and Nevis
DESIGNER	ADeB Consultants Ltd.
CONTRACTOR	National Association of Heavy Equipment Operators Ltd.
LOCATION	St. Kitts and Nevis

The South-East Peninsula Road is the main highway on the island of St. Kitts joining the capital city of Basseterre to the beaches of the south and the ferry dock to neighbouring Nevis. Sections of the road were built through the steep hills on the Peninsula. Along the Timothy Hill Road cut, just outside Basseterre, the hills were highly unstable and losing their rock faces to the salt and weathering of the Caribbean winds. Mudslides, large boulders and rock-fall threatened the safety of motorists and pedestrians travelling this route.

Application:
The Public Works Department of St. Kitts and Nevis commissioned the design and construction of a tunnel to protect vehicular traffic and pedestrians from dangerous rock-fall. Armtec proposed a 150m long Bridge-Plate arch structure following the natural curvature of the road.

TECHNICAL DETAILS

Bridge-Plate Arch

- Span: 11.3m
- Rise: 6.76m
- Length: 150.1m

The Challenge:

The project faced several design challenges. The new structure needed to withstand both the corrosive effects of salt in the atmosphere as well as the impact of falling rock and debris.

The topography of the road section requiring protection also posed a challenge. The new structure had to follow the curved and sloping route whilst maximizing the area for traffic flow. The presence of both vertical and horizontal direction changes added a new element of difficulty to the design.

The Solution:

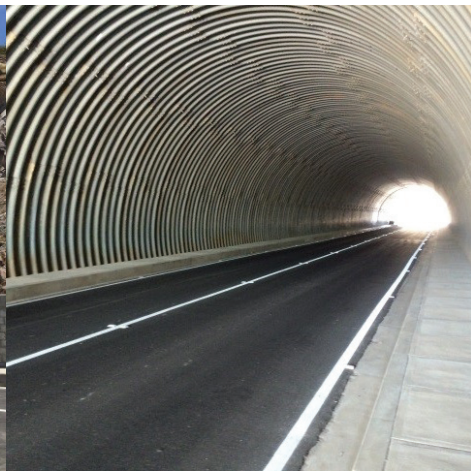
Armtec collaborated with the consulting team to design a solution that met and exceeded the design service life requirements despite the challenging site conditions.

The winding route was accommodated with a unique double direction elbow including a horizontal and vertical component. The elbow provided a smooth curve guiding traffic through the bends from the upslope entrance of the tunnel to the exit some 140m away.

In early 2014 construction began on the approximately 12m wide by 7m high tunnel. Bridge-Plate's Deep Corrugated Structural Plate (DCSP) sections were easily transported to this island location. Quality checks in the plant ensured construction would proceed seamlessly in the field.

By mid-year the plates were assembled on-site and the tunnel was ready for final backfill. Once completed, the tunnel was buried under 2m of fill guarding the road from falling rocks and debris.

The project was completed in the spring of 2015. The main road crisscrossing St. Kitts was once again open, providing safe transport for the burgeoning tourist trade and enhancing day-to-day transport for island travelers.



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