



EMBANKMENT ON SOFT SOIL

Project : Soreze interchange embankment
 Client : Mauritius Road Authority
 Consultant : ARQ Mauritius
 Contractor : TGVB, Mauritius
 Location : Mauritius Island
 Date : 2020
 Product : TenCate Rock[®] PEC

The new A1-M1 Link Road crosses soft soil areas. Under the future access ramps to the bridge closed to Soreze, several geotechnical investigations have demonstrated that the bearing capacity was extremely low. To ensure the stability of the embankment, a basal reinforcement using a geosynthetic had to be realized.

In order to provide an effective and efficient road network to support the socio-economic development of Mauritius, the Government, through the Road Development Authority, has initiated the construction of A1-M1 Link Road".

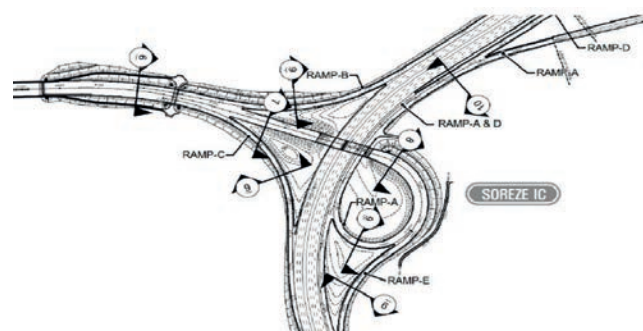
The main objectives of the project are to improve fluidity of traffic in order to reduce congestion time and associated costs, to decrease accidents by providing state-of-the-art road safety equipment; and to enhance the level of service to road users through the provision of high quality infrastructure.

The A1-M1 Link Road will be an approximately 1 km long dual carriageway linking Port Louis-St Jean

Road (A1) at Chebel with a separated interchange at Soreze.

As a part of the project, various ramps shall be constructed to enable road users to enter or exit the A1-M1 Bridge. The embankments height vary between 0 m to almost 9 m.

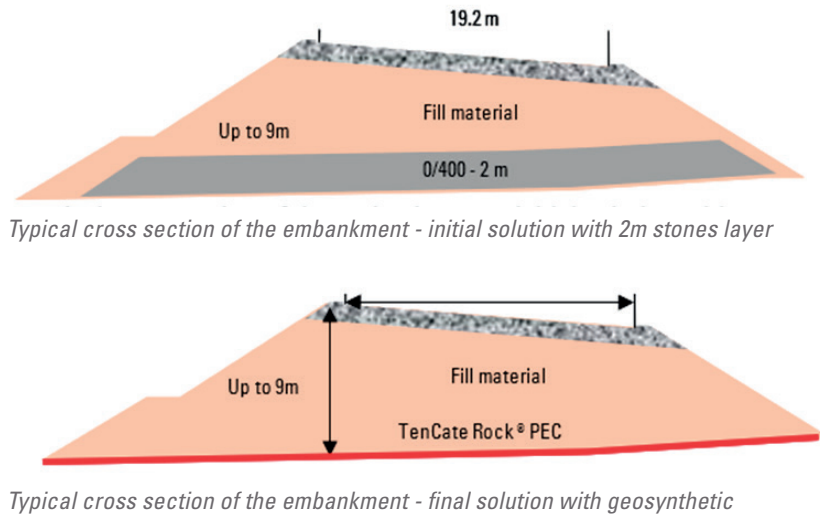
Geotechnical report has shown that the profile consists of a mix of inter alia fill, gravel, boulders, completely weathered basalt (residual soil), and highly weathered basalt. Below, moderately weathered to slightly weathered basalt was encountered between depths of 3,0 to 5,2m depth.



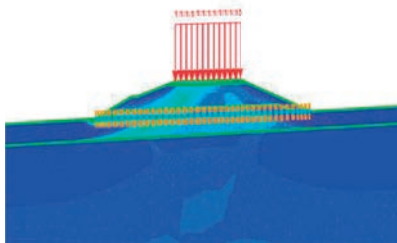
Soreze interchange: Location of the earth fill embankments

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CASE STUDY



To ensure the overall stability, a 2m stone layer was needed at the base of the embankment. An alternative was proposed using bi-axial geosynthetics.



Overall stability analysis via Finite Element method

The stability analysis showed that a tensile strength of 95kN/m at low elongation was required to provide adequate strength to 9m high embankments. The solution cost can be optimised by reducing the required tensile strength with the height of the embankment. It was determined that a bi-axial reinforcement layer with a tensile strength of 50kN/m would be required for fill heights < 4,5m.

The geosynthetic should have filter geotextile attached to assist in providing separation, but most

importantly, facilitates drainages to promote faster consolidation times. It will also separate the more granular overlying fill from the underlying fine-grained soils. The installation of reinforcement at the base of the embankment have the added benefit of controlling differential settlements and spanning over voided areas.

This solution was more cost effective and reduced the construction time compared to the initial solution with the 2m stone layer.

To stabilize the soft subsoil, TenCate proposed TenCate Rock® PEC 55/55 and TenCate Rock® PEC 95/95, multifunctional geosynthetics that combine the filtration, separation and reinforcement functions. Separation prevents intermixing from fill material and soft subgrade, filtration prevents migration of fines into the base course and allow dissipation of pore water pressure and the capillarity break due to the flow capacity in the plane. At the base of the embankment, reinforcement with TenCate Rock® PEC enhances the stability.



Installation of TenCate Rock® PEC