



KAYTECH CASE STUDY

BASAL REINFORCEMENT SOLUTION FOR STEEL TANK FOUNDATIONS ON SOFT CLAY

GEOSYNTHETICS USED

RockGrid® PC: A composite geogrid bonded to a nonwoven geotextile.

RockGrid® PC 100/100: Used as basal reinforcement within the engineered fill platform to improve load distribution and reduce settlement risk beneath the steel tank foundations.



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PROJECT DESCRIPTION

Toyota South Africa Manufacturing Plant in Prospecton, Durban, undertook infrastructure expansion associated with firewater storage upgrades, including the construction of a new steel tank foundation. The proposed tank location was underlain by very soft, compressible clay deposits with low bearing capacity and a high risk of differential settlement. Conventional shallow foundation solutions were not suitable without significant ground improvement due to the weak founding conditions and variability within the upper soil profile.

A BETTER SOLUTION

Weak subgrade conditions can be improved by incorporating composite geogrid reinforcement within engineered fill layers to create a stable load-bearing platform. RockGrid® PC functions as a combined reinforcement and separation layer, providing high tensile stiffness to improve load distribution while maintaining separation between the fill material and underlying subgrade.

This composite action forms a reinforced soil platform that redistributes applied structural loads, reduces stress concentration at the formation level, and limits deformation within the underlying clay (Giroud & Han, 2004; FHWA, 2006).

Following geotechnical assessment and design verification, RockGrid® PC 100/100 was selected as the primary basal reinforcement element. Reinforcement spacing was evaluated to optimise constructability and performance under steel tank loading conditions. A 500mm vertical spacing configuration was adopted to ensure effective load transfer through the reinforced platform while maintaining constructible layer thicknesses and consistent compaction of fill.

Kaytech provided technical input during design and installation to support correct reinforcement handling and alignment in accordance with design intent.

The reinforced foundation platform provided a stable and uniform support system for the steel tank structure. The composite geogrid layers enabled efficient load redistribution across the weak subgrade, reducing the likelihood of differential settlement and improving overall platform stiffness. The solution also facilitated the use of readily available fill materials, reducing the extent of deeper ground improvement works and supporting a more efficient construction sequence. The system is expected to deliver reliable long-term performance under sustained operational loading.



Did you know?



Composite Reinforcement

RockGrid® PC combines tensile reinforcement with separation and confinement functions, improving overall fill behaviour under load.



Load Dispersion Mechanism

Basal reinforcement spreads concentrated structural loads laterally, reducing peak stress transmitted to soft clay layers.



Platform Stiffness Increase

Layered geosynthetics increase the modulus of the foundation platform, limiting deformation under service loading.