



KAYTECH CASE STUDY

SINKHOLE REMEDIATION USING COMPOSITE GEOGRID-REINFORCED SUBGRADE ON THE R50

GEOSYNTHETICS USED

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

RockGrid® PC 100/100 & 200/200: Installed in multiple layers within the subgrade to span potential sinkholes and distribute traffic loads across the void-prone foundation.



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PROJECT DESCRIPTION

A sinkhole developed beneath the R50 road surface near Bapsfontein, compromising the structural integrity of the pavement and posing a risk of collapse. Lubocon Civils was responsible for the remediation works, which required immediate intervention to restore stability and prevent further subsidence.

The project required a solution capable of stabilising the subgrade over voids, safely distributing traffic loads, and allowing reconstruction of the road layers. Site conditions included underlying dolomitic cavities, necessitating a geotechnical approach capable of spanning potential future sinkholes while supporting standard pavement construction.

A BETTER SOLUTION

The engineering principle applied was reinforced subgrade stabilisation using composite geogrids, which distribute loads across weak or voided ground to reduce differential settlement. RockGrid® PC layers were integrated within the subgrade to span potential sinkholes, providing tensile reinforcement and improved bearing capacity.

Following excavation to a depth of 2m and dynamic compaction to collapse underlying cavities, the first RockGrid® PC 100/100 layer was placed directly on the prepared roadbed. Controlled fill layers were then placed and compacted, with additional RockGrid® PC layers interspersed to reinforce each lift. The final geogrid layer incorporated RockGrid® PC 200/200 to form a stable geotechnical platform.

Standard pavement layers, including C4, C3, and C2 subbases, a G1 base, and asphalt surfacing, were constructed on top of this reinforced foundation. The multi-layer geogrid system ensures that the pavement can tolerate residual subsidence while maintaining structural integrity over dolomitic voids.

The reinforced subgrade prevented collapse over the sinkhole area and restored the structural stability of the R50. Load distribution through the RockGrid® PC layers reduced stress concentrations within the subgrade and limited differential settlement.

The method allowed reconstruction of standard road layers without additional deep foundation work. The geotechnical solution was installed efficiently and is expected to deliver long-term performance under dolomitic conditions, providing a durable and reliable roadway with reduced risk of recurrence.



RockGrid® PC layer prepared for placement of the overlying fill material.



RockGrid® PC unrolled and positioned on the prepared subgrade.



RockGrid® PC deployed during installation of the reinforced subgrade.

Did you know?



Dolomite Risk

Dolomitic formations can dissolve over time, creating underground cavities that may collapse suddenly and form sinkholes beneath infrastructure.



Load Distribution

Reinforced subgrades utilise geogrid layers to distribute loads over a wider area, reducing stress concentrations that could trigger localised collapse in weak ground conditions.



Progressive Support

Layered reinforcement within compacted fill allows the pavement structure to accommodate limited ground movement while maintaining overall structural stability.