



KAYTECH CASE STUDY

APPLICATION OF A CONCRETE-FILLED CELLULAR CONFINEMENT SYSTEM IN URBAN ROAD CONSTRUCTION

GEOSYNTHETICS USED

Multi-Cell® PP: a honeycombed structure that is manufactured from strips of a coated slit film woven polypropylene tape that are stitched alternatively together to form a three dimensional diamond shaped cells.



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PROJECT DESCRIPTION

As part of the Special Maintenance of National Route R56 (Section 5: Dordrecht to Indwe), concrete-filled cellular confinement was used for the construction of municipal roads and sidewalks within the town of Indwe. Block paving was originally specified. However, following a technical and commercial review, the consulting engineer and contractor approved the use of Multi-Cell® PP as a more practical alternative for the remote project conditions.

A total of approximately 22,590m² was installed, comprising 19,680m² of 100mm depth panels for roadways, and 2,910m² of 75mm depth panels for sidewalks. The system was installed in 2024 and is performing as intended.

A BETTER SOLUTION

Concrete-filled Multi-Cell® PP provided both constructability and structural advantages over conventional block paving. Some of the advantages included:

- Eliminating the need for long-distance transport of precast pavers
- Reducing the risk of material theft on site
- Replacing the 100mm G5 base with a 150mm G7 base

The 100mm deep Multi-Cell® PP system forms a continuous cellular concrete surface within approximately 200mm×200mm stitched polypropylene cells. The cell walls act as in-situ shuttering, confining the concrete infill, localising shrinkage-related cracking and promoting load sharing through the interconnected cellular matrix. Unlike conventional block paving, performance is not dependent on block-to-block interlock, but on cellular confinement and restraint of the concrete infill. The reduced number of open joints also limits preferential surface water ingress, supporting base-layer stability and long-term pavement performance when combined with suitable falls, drainage, curing and edge restraint.

Roads were constructed in 3m half-widths to maintain traffic during curing, with a centre-line kerb providing edge control and camber definition. Concrete was placed flush with the cell walls and finished with a broom texture to improve traction.

The installation of over 22,000m² confirms the system's suitability for large-scale municipal road and sidewalk applications, achieving the required quality standards and providing a durable, maintainable alternative to the original paving specification.



Did you know?



Durable Design

The cellular design of Multi-Cell® PP confines the concrete infill, localises shrinkage-related cracking and limits surface water ingress, supporting base-layer protection and long-term pavement performance.



Community Impact

Over 30% of the project work was completed by local SMMEs, creating direct employment opportunities in the community.



Faster Construction

Using Multi-Cell® PP reduced construction time compared to traditional block paving, allowing SMMEs to complete road sections faster.