

DESIGNING PAVEMENT SURFACES FOR REAL-WORLD CONDITIONS



Heavy-duty infrastructure is not always failing because of poor construction. At the Port of Napier, increasing throughput, heavier equipment, and repeated loading cycles showed the importance of designing pavements for how they are actually used.

CHALLENGE

At the Port of Napier, growth placed increasingly intense stress on critical pavement infrastructure. Throughput increased significantly in the early 2000s, bringing heavier equipment and more frequent loading cycles. Front-axle loads reached over 100 tonnes, creating extreme pressure on pavement surfaces. Over time, rutting reached up to 85mm along wheel paths. These surface deformations disrupted operations, required frequent maintenance, and created instability as forklifts moved across uneven ground. The issue reflected a broader mismatch between traditional pavement design and the real operating conditions found in high-demand environments.

Partner: Higgins, Port of Napier

Market: Paving

Product(s): HiMA™

Highlights

- HiMA helped address extreme loading demands at Port of Napier.
- Trial sections showed no structural distress after heavy use.
- Higgins expanded the approach across New Zealand infrastructure projects.
- The pavement system supported long-term performance under repeated stress.

SOLUTION

Rather than continuing reactive maintenance, Higgins approached the Port of Napier challenge with a performance-first mindset. The goal was to design a pavement system capable of withstanding sustained, high-load conditions over time.

The solution incorporated highly modified asphalt; a polymer technology engineered for durability under heavy stress. Designed to last 20+ years, the pavement structure combined 10cm of HiMA™ SP28 asphalt over a cement-stabilized base, and 75cm of crushed river gravel finished with a 5cm SP12.5 asphalt wearing course using PG64E-22 SBS bitumen. Initial implementation focused on the most heavily rutted sections, with 420m² paved in 2010 and an additional 3,700m² later that year. This allowed the system to be evaluated in real-world conditions before broader use.

IMPACT

Years after implementation, the results showed what is possible when pavement design matches actual operating conditions. After handling an estimated 700,000 twenty-foot equivalent units, the trial section showed no signs of structural distress. Deformation was estimated at less than 5mm, and no cracking was observed. Following the trial, Higgins expanded the use of HiMA across New Zealand, including state highways, municipal streets, and additional port facilities, totaling over 110,000m² of paved surfaces.

CONCLUSION

The Port of Napier case demonstrates how performance-focused pavement design can support demanding infrastructure environments. By aligning materials and design strategies with real-world loading conditions, long-term pavement performance becomes achievable in applications where reliability, durability, and operational efficiency are critical.

.....

“Deformation is estimated at less than 5mm and no cracking has been observed.”

SEAN BEARSLEY

Technical Innovation and Implementation Manager, Higgins

KRATON CORPORATION

For more information, visit our website at www.kraton.com.

U.S.A. Headquarters
The Woodlands, Texas

Asia Pacific
Shanghai, China

Europe, Africa, Middle East
Almere, The Netherlands

India/ Southeast Asia
Mumbai, India



The information herein is for general information purposes only. While it is believed to be reliable, no representations, guarantees or warranties of any kind are made as to its completeness, accuracy, reliability, or suitability for applications or the results to be obtained therefrom.

*Kraton and the tagline “Sustainable Solutions. Endless Innovation.” are trademarks of Kraton Corporation or its affiliates.

©2026 Kraton Corporation

2026.08MS-Port-of-Napier