

Full Function Pave (FFP)

Longitudinal Groove Rough Surface Hybrid Pavement

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Revêtement hybride à surface rugueuse
et à rainures longitudinales

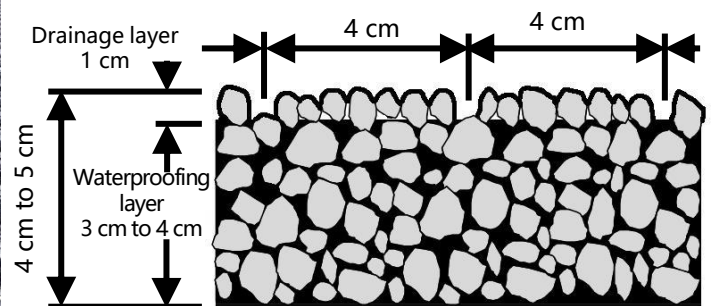


Overview of the construction method

Full Function Pave (FFP) is a longitudinally grooved rough-surface hybrid pavement. Its hybrid structure, consisting of a drainage layer and a waterproofing layer, is formed within a single asphalt paving mixture during a single construction process. The pavement surface is finished into a longitudinally grooved rough surface by using an asphalt finisher equipped with a compaction device modified specifically for this application. Longitudinally grooved rough-surface finish enhances vehicle stability under wet weather and other difficult-to-drive conditions and contributes to other improvements, such as freezing prevention, noise reduction, and visibility improvement. FFP has also proved to be effective in reducing traffic accidents.



Example of longitudinally grooved rough-surface finish



FFP layer structure

FFP mixture test criteria

Item	In-house criteria
Cantabro loss (-20° C) ^{*1}	(%) 12 or less
Permeability coefficient ^{*2}	(cm/sec) 1.0 x 10 ⁻⁷ or less
Dynamic stability (DS)	(cycles/mm) 6,000 or more

*1: When used in a cold region; 20°C in other regions

*2: Based on pressurized permeability test

FFP surface properties criteria

Item	In-house criteria
Mean profile depth (MPD) of pavement surface	(mm) 1.2 or more
Seepage rate	(ml/15 sec) 800 or more ^{*1}
Skid resistance (BPN)	(BPN ₂₀) ^{*2} 60 or more
Skid resistance (DF tester)	(μ) 0.25 or more

*1: Equivalent to the seepage rate in drainage pavement with a porosity of 17%

*2: Value corresponding to BPN at a surface temperature of 20°C



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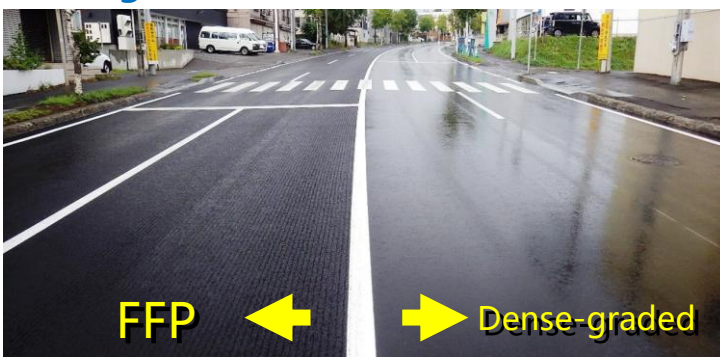
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Features

- ❑ The structure of FFP consists of two layers — a drainage layer and a waterproofing layer — formed in a single construction process.
- ❑ FFP contributes to driving safety by preventing hazards such as hydroplaning.
- ❑ Longitudinally grooved rough surface improves visibility and reduces road noise.
- ❑ Longitudinally grooved rough surface ensures long-lasting performance of the anti-freezing function.
- ❑ Longer service life is achieved with higher aggregate fretting resistance.
- ❑ Traffic safety is enhanced by preventing skidding accidents.

Drainage function



The drainage function of the upper layer helps prevent the surface from flooding in wet weather. Driving safety, therefore, is enhanced by preventing hydroplaning and smoking. In winter, FFP also prevents the formation of black ice.

Anti-freezing function

The longitudinally grooved rough surface excels in retaining deicing agent. Since the chloride retention rate is high, the effective duration of the anti-freezing function can be extended significantly. This chloride retention function is more effective than conventional dense-graded pavement in exposing the road surface. Another advantage is that the number of deicing-agent applications in winter road maintenance can be reduced.



Accident reduction function



The measurement results of the acceleration and angular velocity of a hard-braking vehicle revealed that the vehicle came to a stop with a smaller amount of turn in the yaw direction than on the dense-graded pavement. This result indicates that longitudinal grooving helps stabilize braking vehicles, thereby preventing skidding accidents.



Precast Concrete Pavement Slabs

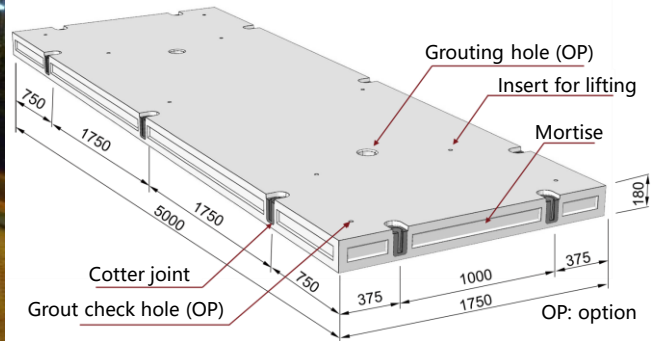
Dalles de chaussée préfabriquées en béton



High-strength PRC slabs

Precast reinforced concrete pavement slabs

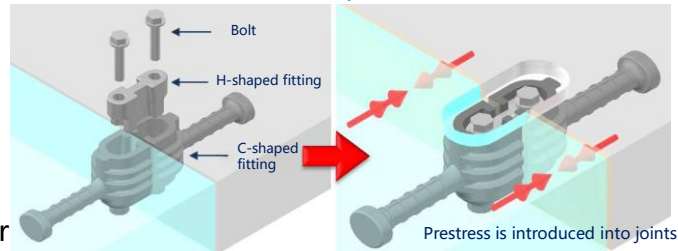
A high-strength PRC slab is a long-life, high-quality, high-durability precast (prefabricated concrete member) pavement slab. High-strength PRC slabs are suitable for use in high-traffic areas, such as airports, container yards, and heavy-traffic roads, and on soft ground. High-strength PRC slabs greatly contribute to reducing the construction period and life-cycle costs.



General view of a high-strength PRC slab (for road pavement)

Features

- Use of high-strength concrete (design strength: 60 N/mm²)
- Lattice truss reinforcement improves deformability while reducing slab thickness and weight.
- A slab connection method using cotter joints produces an integrated flat surface. Partial replacement can be easily carried out.



Slab connection method with cotter joints

Precast snow-melting slabs

Snow-melting PRC slabs

Field test at Shiraito Highland Way



Electric heating OFF



Electric heating ON

Features

- A precast pavement slab system with embedded heating cables enables rapid construction.
- Use of concrete with high thermal conductivity significantly reduces electric power consumption.
- Partial control and replacement are possible.



High-Performance Pavement Repair Materials

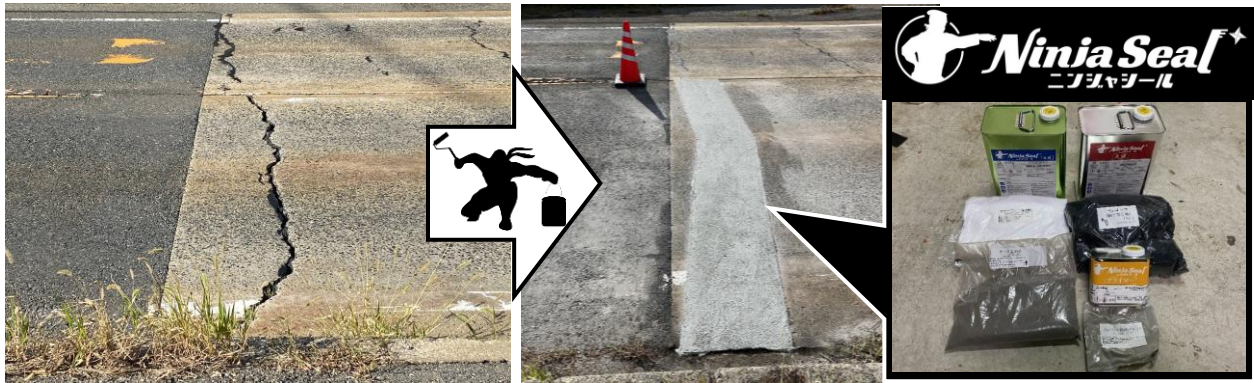
- Cold-Mix Pavement Repair Materials -
Matériaux haute performance pour la
réhabilitation des chaussées
- Matériaux de réhabilitation des chaussées à froid -



Ninja Seal

Cold-mix concrete repair material

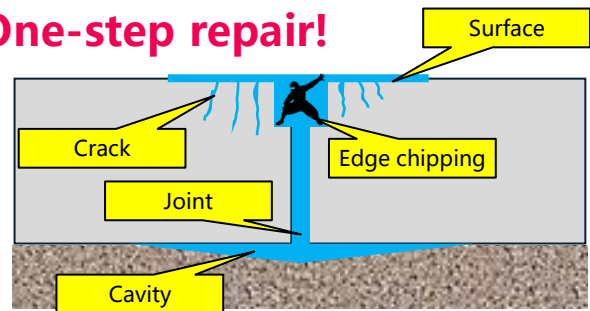
Ninja Seal is a resin-based, cold-mix repair material developed as a solution to concrete pavement repair problems, such as joint edge chipping, cracking, steps, and water intrusion.



Features

- Use of soft and flexible material with an elongation of 300% or more
- The strength measured by load testing is at least 80% of the concrete strength on the upper surface and at least 105% on the lower surface.
- High flow resistance and wear resistance

One-step repair!



Forest Patch

All-weather asphalt repair material

An all-weather, water-activated cold-mix asphalt repair material!

Features

- Simple procedure: Spread the material at the repair location, sprinkle water, and compact.
- Repair can be made at ambient temperature. No specialized skills or equipment required.
- The repaired surface can be opened to traffic immediately after application. No need to worry about damage such as fretting and spalling.
- Repair can be made even in wet conditions, such as rain and water puddles.

