Roadway Natural Stone Paving Method

Inject Method

Procédé de construction de chaussées en pierres naturelles

Méthode par injection

Resilience

Stone pavement capable of withstanding heavy vehicle loading

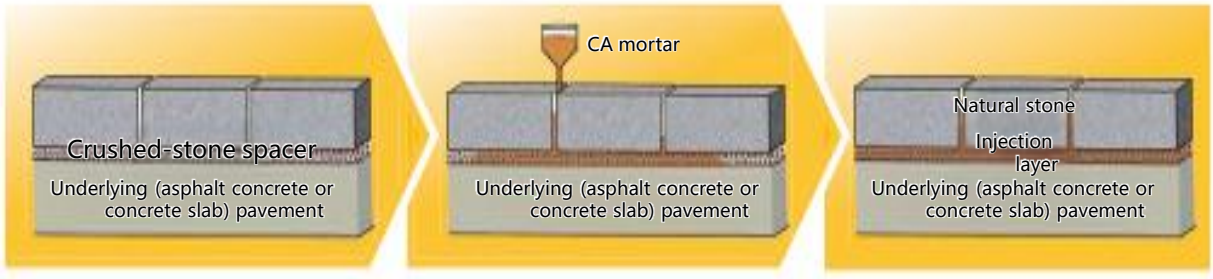
Cement asphalt mortar (CA mortar), which has excellent flowability and post-hardening impact absorption, is injected into paving block joints to fill both the crushed-stone spacer layer under the paving blocks and the joints along the four sides of each block.
This method effectively restrains the five faces of each block, resulting in block pavements with excellent flexibility and impact absorption under impact loads induced by passing vehicles.

Features

- Long-term durability to withstand heavy vehicle loading
- A wide range of applications, ranging from large-scale new pavement to repairs of existing roadways
- Asphalt pavement suffices as the underlying pavement.

Construction procedure

(1) CA mortar is injected into the joints of blocks temporarily placed on the crushed-stone spacer layer.
(2) The voids in the crushed-stone spacer layer are filled, and the joints are filled to at least half of the block thickness.
(3) Face joint material is injected until the joints are filled close to the surface level for finishing.



- The thickness of the injection layer is 3 cm, which is required to ensure the accuracy of the stone installation.
- Since the CA mortar injected into the joints is extensible, extension joints are not provided.
- Depending on construction conditions, injection into face joints may be carried out after opening the road to traffic.

Examples of construction

- Area near a bus stop (Oita Prefecture)
- Area near an LRT track (Toyama Prefecture)
- Tourist area (Kyoto Prefecture)
- Shopping mall (Kanagawa Prefecture)

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All-Weather High-Durability Cold Asphalt Mixture

TR Mix Aqua

Enrobé bitumineux à froid haute durabilité, utilisable par tous les temps

TR Mix Aqua

TR Mix Aqua is a high-early-strength, high-durability cold asphalt mixture, available in bags, that can be placed in wet weather and in areas with small amounts of standing water. TR Mix Aqua has many applications, including heavy-traffic road repair, emergency paving following disasters, pothole and general road repairs, and road surface restoration after construction work, such as gas or water pipe installation.

Features

- The spread mix begins to harden as soon as it is sprinkled with water. This quick response makes it possible to open the road to traffic in a short period of time.
- Its high durability makes TR Mix Aqua suitable for the repair of heavy traffic roads.
- Its high storage stability ensures a shelf life of up to six months.

Simple three-step finishing

Performance

* Measured values obtained in in-house tests

Performance	Test item and conditions	Measured value	Quality standard (Metropolitan Expressway Company Limited)
Aggregate fretting resistance	Cold mix Cantabro test (20°C, 30-minute curing)	1.8%	Loss: 20% or less

Performance	Test item and conditions	Measured value	Quality standard (Metropolitan Expressway Company Limited)
Plastic flow resistance	Room-temperature low-speed wheel tracking test (20°C, 30-minute curing)	6,000 cycles or more	Room-temperature low-speed DS 3,000 cycles/mm or more

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Bioasphalt Mixture Relaxphalt HT Pavement

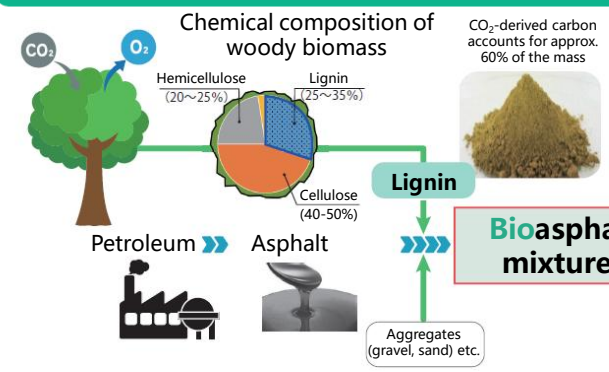
Enrobé Bioasphalte Revêtement HT en Relaxphalt

Bioasphalt mixtures

Bioasphalt mixtures are a carbon-neutral asphalt paving material that utilizes lignin, a component of woody biomass. Accounting for approx. 30% of woody biomass, lignin contains an abundance of CO_2-derived carbon (C). By using lignin as a raw material for asphalt mixtures, carbon can be fixed in asphalt pavements to indirectly reduce carbon dioxide in the atmosphere.

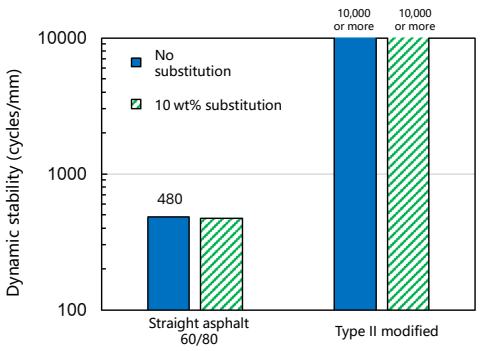
Features

- In response to the growing calls to transition to carbon-neutral and petroleum-free pavements, lignin is utilized as a partial substitute for petroleum asphalt, which is used as a paving material, in order to reduce CO_2 emissions and make efficient use of resources.
- In the process of photosynthesis, 1 ton of lignin can fix 2.2 tons of CO_2-derived carbon. By replacing 20 wt% of the mass of asphalt with lignin, CO_2 can be reduced by approx. 40%.

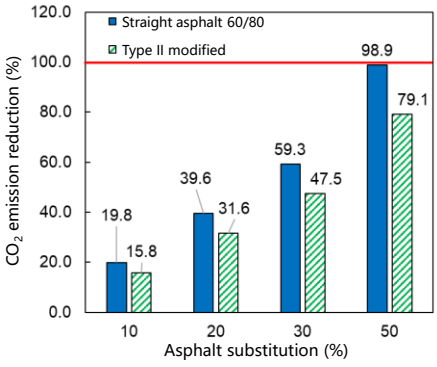


Durability evaluation
(10 wt%/20 wt% of asphalt replaced with lignin)

Example of laboratory test results



CO_2 emission reduced at the manufacturing stage



* CO_2 emission intensity of lignin
Extracted: 330 kg-CO_2 Fixed: −2,298 kg-CO_2

Relaxphalt HT pavement

Relaxphalt HT pavement is a long-life pavement that can reduce cracking and rutting significantly over a long period of time by using Relaxphalt HT as an asphalt mixture component.

Features

- Reflection cracking from the underlying pavement during overlay paving work can be reduced significantly.
- Low-temperature cracking is reduced in winter, and flow rutting is reduced at high temperatures in summer.
- During pavement maintenance and repair, crack control sheeting is not needed over existing pavements.

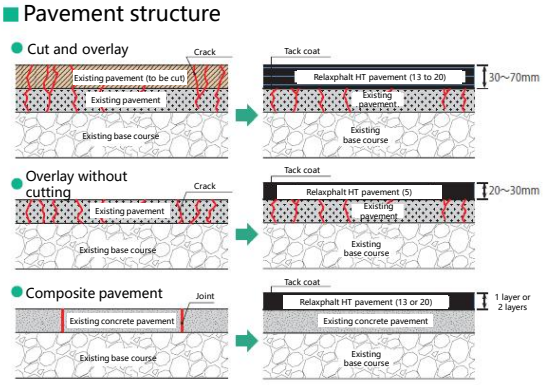
Application examples (cut and overlay, prefectural road in Kumamoto)

Relaxphalt HT pavement reduces life-cycle costs because their service life is 1.5 to 3 times longer than that of conventional asphalt pavements.

Suitable for the following applications:

- Cut-and-overlay work of concrete pavement slabs and asphalt pavement slabs that have joints or cracks
- Asphalt pavement (new/existing) in snowy and cold regions where thermal cracking is likely to occur
- Paved roads (new/existing) requiring a longer repair cycle or longer service life, such as heavy-traffic roads

Pavement structure



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TAISEI Group Future Technology Field / TAMURA Pavement Test Course

Future Technology Field du groupe TAISEI / Piste d'essais accélérés de chaussées de TAMURA

Taisei Group Next-Generation Technology Demonstration Center in TAMURA

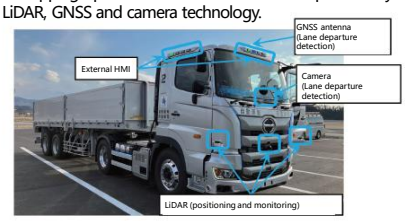
At this large-scale pavement test course, the first of its kind in Japan as a facility constructed by a private company, five unattended self-driving heavy load vehicles run the course year-round, significantly shortening the evaluation period for heavy-traffic road durability. By reducing the time required for the social implementation of new technologies, this facility contributes to the early adoption of newly developed technologies.

Pavement test course

- The number of wheel passes causing fatigue failure (35,000,000 wheel passes), an indicator necessary as part of the technical standards for pavement structure, can be evaluated in about three years* for pavements subject to the heaviest traffic.
  - Pavement durability evaluation for early adoption of newly developed technologies
  - Clarification of the definition of pavement failure
  - Validation of theoretical design methods
  - Applicability experiments for inspection and maintenance techniques

Automatic driving system

- Five large self-driving vehicles, each with a weight of 44 tons, run the test course around-the-clock at 40 km/h.
- Maintaining inter-vehicle distance through accurate positioning and automatic stopping upon obstacle detection is made possible by utilizing LiDAR, GNSS and camera technology.



Nature-friendly administration building

- Demonstration to create a zero-water building that does not depend on municipal water infrastructure
- Adoption of large-span structures using commercially available materials

Truck yard and refueling facilities

- Garages for five self-driving load vehicles
- Load vehicle maintenance dock
- Private refueling facilities

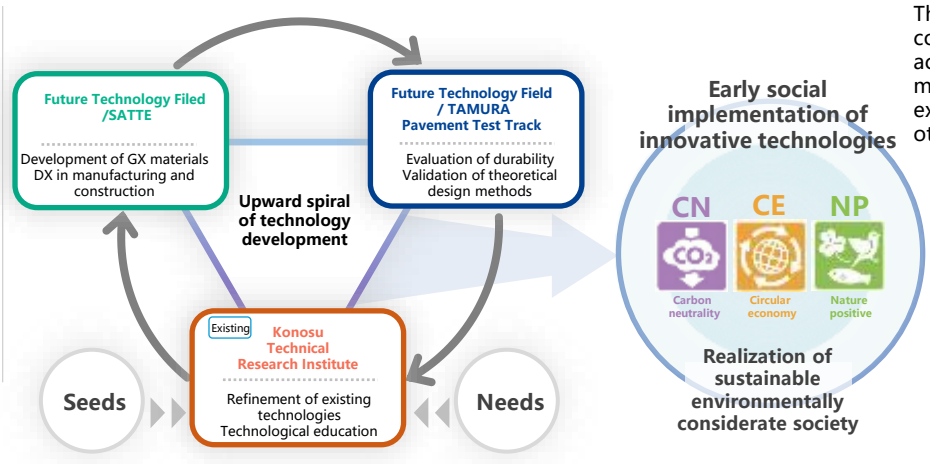

Refueling facilities


Truck yard and maintenance dock

Nature-positive demonstration field

- Establishment of technology to create rare semi-natural grassland and wetland ecosystems
- Implementation of biodiversity credit
- Development of new technology to utilize thatch

Collaboration of research facilities



The three research institutes collaborate by dividing research activities into fundamental research, manufacturing and construction experiments, and durability and other performance evaluation.

The goal is to establish three types of society (**carbon-neutral society, recycling-oriented society, and nature-friendly society**), which are the long-term environmental goals of Taisei Group, by **adopting innovative technologies early** through efficient technology development.

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