

Wattway

—Next-generation solar powered pavement system—

Wattway

—Système de revêtement routier photovoltaïque
de nouvelle génération—



About Wattway

Wattway is a revolutionary photovoltaic paving system that installs photovoltaic panels to the road surface of car parking and other paved roads. The surface of Wattway solar panel is coated with a special resin, allowing cars, pedestrians and bicycles to pass through. By installing it on road surface, power generation equipment can be installed without disturbing the surrounding landscape.

Features of Wattway



Does not get damaged during typhoons or other storms



Effective use regardless of land size



Self-generated energy and can be used independently during a disaster



Easy installation without modifying existing pavement



Inconspicuously harmonizing with the surrounding architecture and landscape

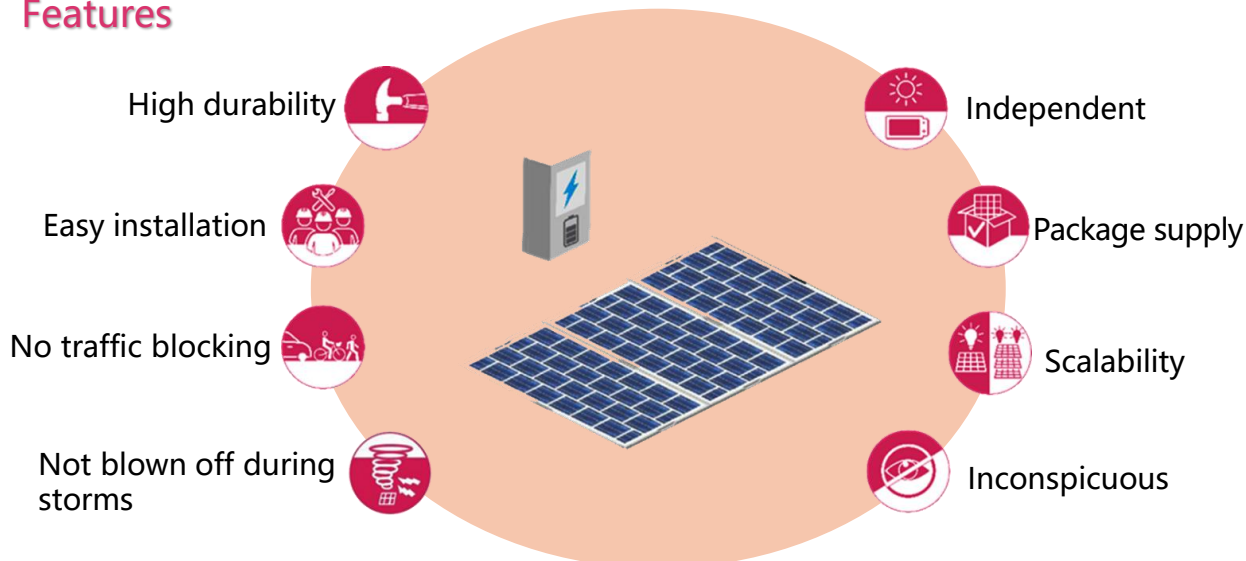


Koshu City, Yamanashi Pref., Japan
6 units of Wattway Pack are installed as a power source to charge two electric kick scooters for moving inside the premises.

Wattway Pack

Wattway Pack is a versatile, independently operated power generation system. Power supply can be provided for all kinds of electrical and IoT devices, not only in urban areas but also in rural areas. We propose this as a system for charging rechargeable batteries with renewable energy generated by Wattway. It is possible to implement a design that considers the interconnection with the grid power source, enabling effective use of surplus power. It functions as an emergency power source during a disaster. It has been connected and installed with various electrical facilities and devices (charging stands for electric bicycles and kickboards, surveillance cameras, smart bus stops, traffic information boards, lightings, etc.).

Features



Wattway

—Next-generation solar powered pavement system—

Wattway

—Système de revêtement routier photovoltaïque
de nouvelle génération—



Achievements of Wattway

Roadside Station, Fukushima, Japan

6 units of Wattway Pack are installed as a power source to charge light poles that illuminate crosswalks.



National Garden, Tokyo, Japan

Installed 48 units of Wattway Pack within the national garden to demonstrate the usefulness of renewable energy technology with reduced impact on the natural environment and landscape.



MWD plus

Vehicles designed to measure both pavement deflection and pavement characteristics

MWD plus

Véhicule conçu pour mesurer simultanément la déformation et les caractéristiques de la chaussée



MWD plus is a measurement vehicle that can simultaneously measure **pavement deflection** and **pavement characteristics** while providing a comprehensive diagnosis of pavement health without the need for restricting traffic.

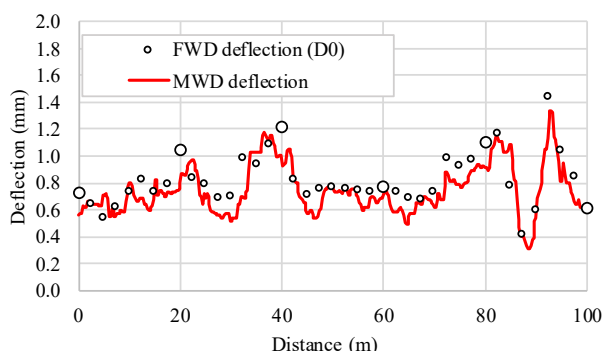
MWD plus is a minibus-sized vehicle, which means it can also be used to measure narrow roads.

Deflection

Three Laser Doppler Vibrometers mounted near the rear wheels of the vehicle measure the **deflection velocity** of the pavement caused by the weight of the vehicle as it travels on the road, which is then converted into **pavement deflection**.

Measurements can be taken without imposing traffic restrictions, and a 1-km route can be completed in just a few minutes. In addition, compared to FWD measurements, continuous data makes it possible to detect localized areas of reduced bearing capacity and other anomalies.

The deflections obtained with MWD Plus has been found to have a **high correlation with the FWD central deflection (D_0)** at the same location.



Comparison of MWD plus and FWD deflection

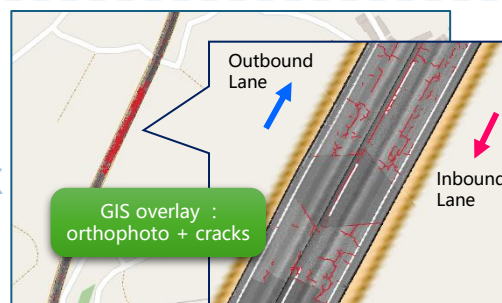


Two 3D camera units mounted at the rear of the vehicle capture continuous cross-sectional road surface profiles and luminance information.

From this information, the amount of **cracking** and **rutting** is automatically calculated.

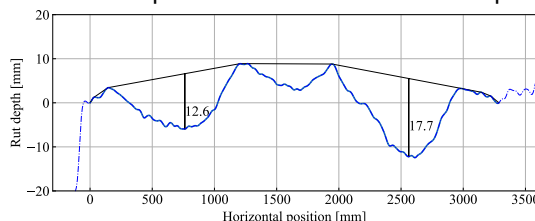
IRI is calculated using a laser displacement meter installed under the vehicle.

Crack

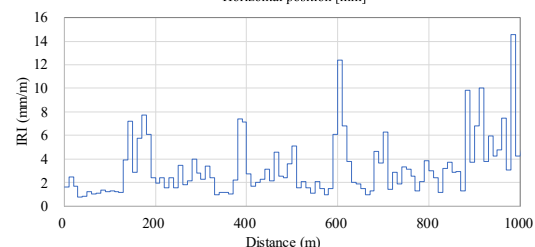


Crack shapes can be viewed on a GIS map.

Rut



IRI



Pavement Materials Utilizing Renewable Resources Deriving from Plants

Matériaux de revêtement à base de ressources renouvelables d'origine végétale

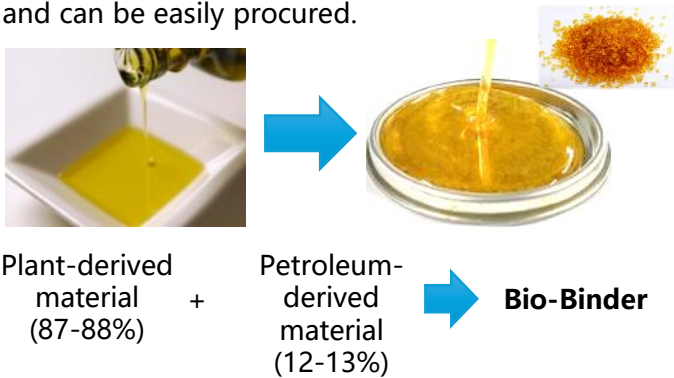


Introduction

Bio-Binder is a type of binder used in pavement, designed as a sustainable binder that replaces a portion or a significant share of petroleum-based asphalt with bio-based components. With the goals of carbon neutrality and resource circulation, its basic concept is to use plant-derived materials to ensure the viscoelasticity and durability required for paving applications.

Description for Bio-Binder

Bio-Binder is synthesized as shown in the figure. Plants as raw materials are widely available and can be easily procured.



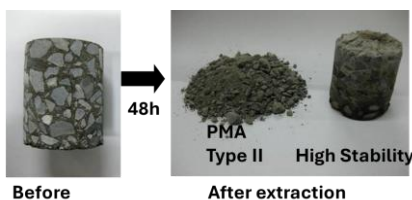
- Bio-Binder has these features:
- Has a biomass rate of 80% or higher.
 - Strongly bonds with aggregates.
 - Can be repaired and recycled.



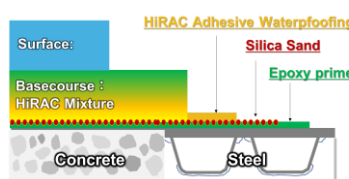
Other materials

Below are various applications that use plant-derived materials, such as modifiers for bitumen and adhesive waterproofing materials. All of these can be installed using conventional construction techniques.

| Items | HS Ascon | HiRAC Adhesive waterproofing | High Rigid Asphalt Concrete (HiRAC) | Bio-Binder |
|---------------------------|---|--|---|--|
| Application | High-stability asphalt concrete | Waterproofing material for slabs | Steel Deck reinforcement method | Biomass mixture |
| Bitumen Substitution Rate | 20% In PMB | 100% | 45% In PMB | 100% |
| Prior use | Semi rigid asphalt pavement | Water membrane | Steel fiber reinforced concrete | Asphalt pavement |
| Features | <ul style="list-style-type: none"> • High dynamic stability and oil resistance | <ul style="list-style-type: none"> • High adhesion at low and high temperatures | <ul style="list-style-type: none"> • Effective in preventing fatigue cracks in steel decks | <ul style="list-style-type: none"> • Asphalt-free mixture |



HS Ascon



HiRAC



HiRAC Adhesive waterproofing

T. Hirato, DEVELOPMENT OF HIGH STABILITY HOT MIX ASPHALT CONCRETE WITH HYBRID BINDER, ISAP, 2012

Hui Qu, Development and Evaluation of Pavement Materials Utilizing Renewable Resources Deriving from Plants, 7th E&E, 2021

N. Shitara, Development of Steel Deck Reinforcement Method Using Asphalt Utilizing Plant-Derived Materials, 8th E&E, 2024

