Road Pavement
*Seminar on **the Urban Pavements***

- *Environment-friendly pavements in urban areas of JAPAN*

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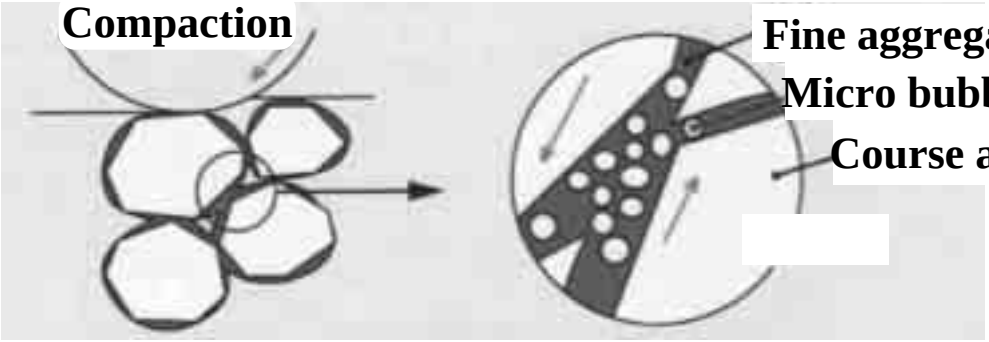
Current State and Evaluation of Technologies

- *Reducing CO_2 emission*
- *Recycling of asphalt concrete*
- *Controlling storm water by permeable pavement*
- *Heat-controlling pavement*
- *Absorbing and decomposing nitrogen*

Paving Technologies in Lower Temp.

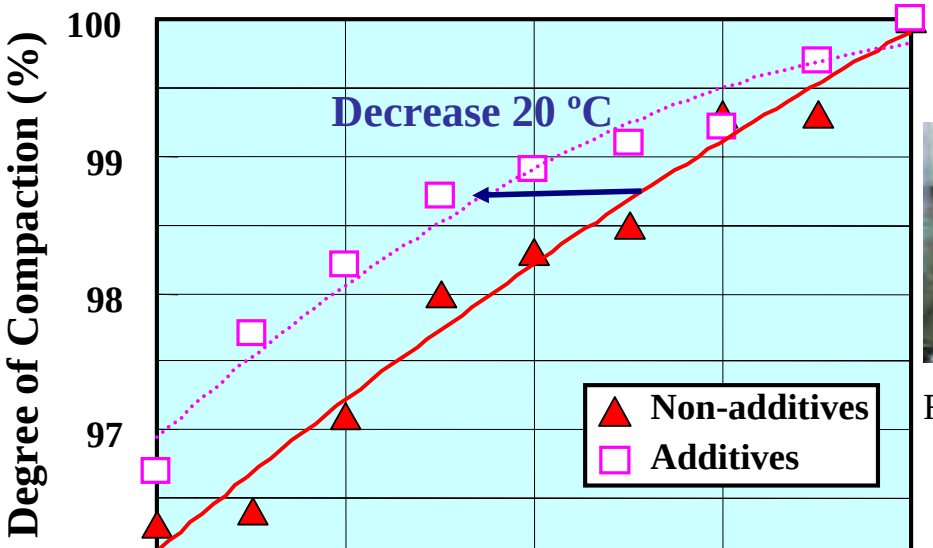
Forming micro bubbles in bituminous material or additives to reduce viscosity of bituminous material enables sufficient compaction even in lower temperature than ordinary mixtures.



An image of the bubble to reduce the viscosity

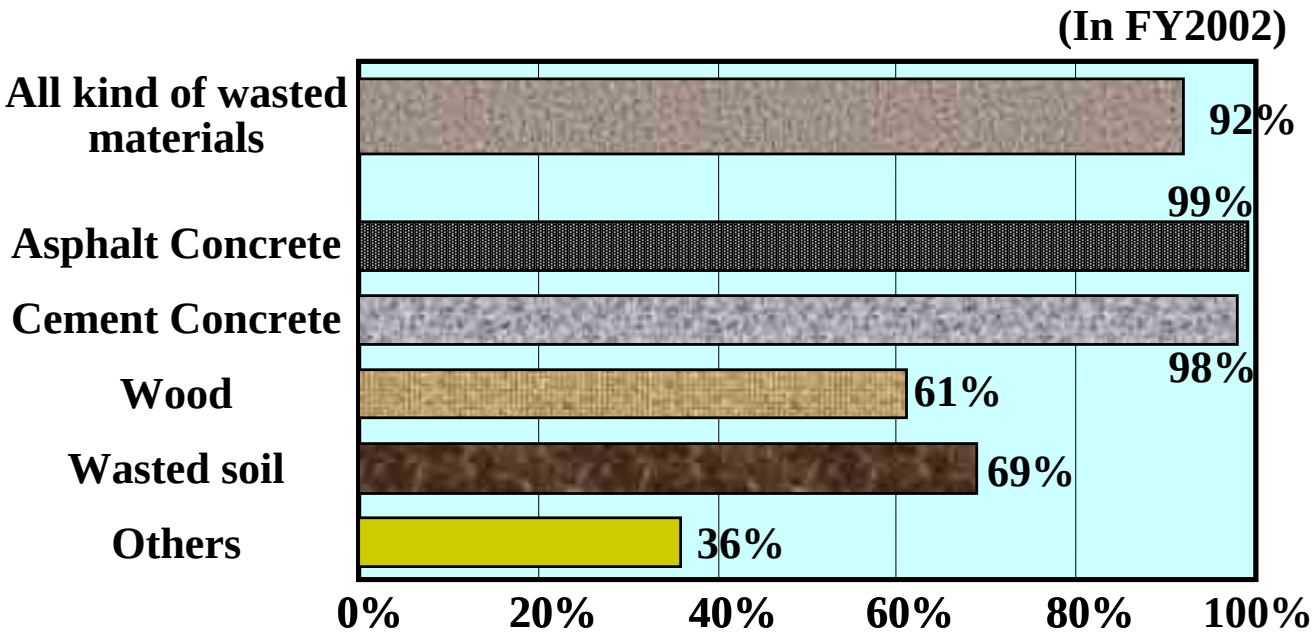
Relationship between Temp. & Degree of Compaction

We can obtain same degree of compaction in lower temp.



Foaming agent, Original

in Japan



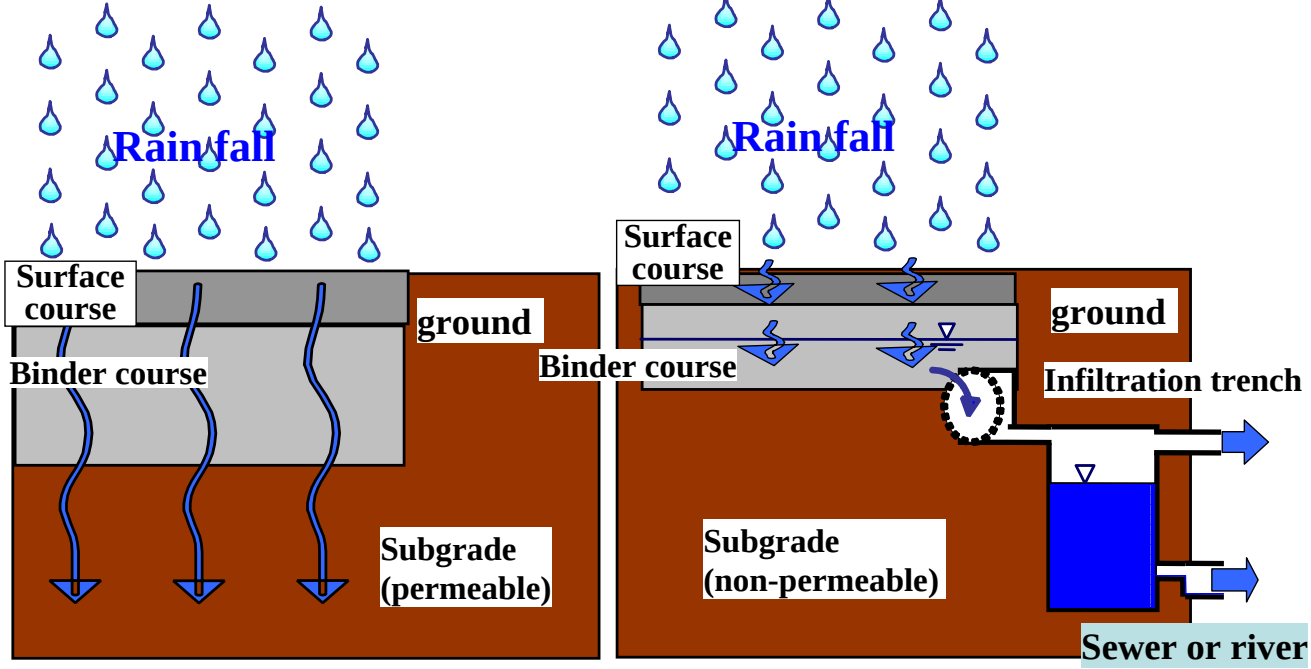
Permeable Pavement to Reduce Run-off from Its Surface

A law aiming at reducing flood hazard in Urban Area was enacted in 2003.

Minister of MLIT or Local Governor can specify a flood hazardous river in urban area.

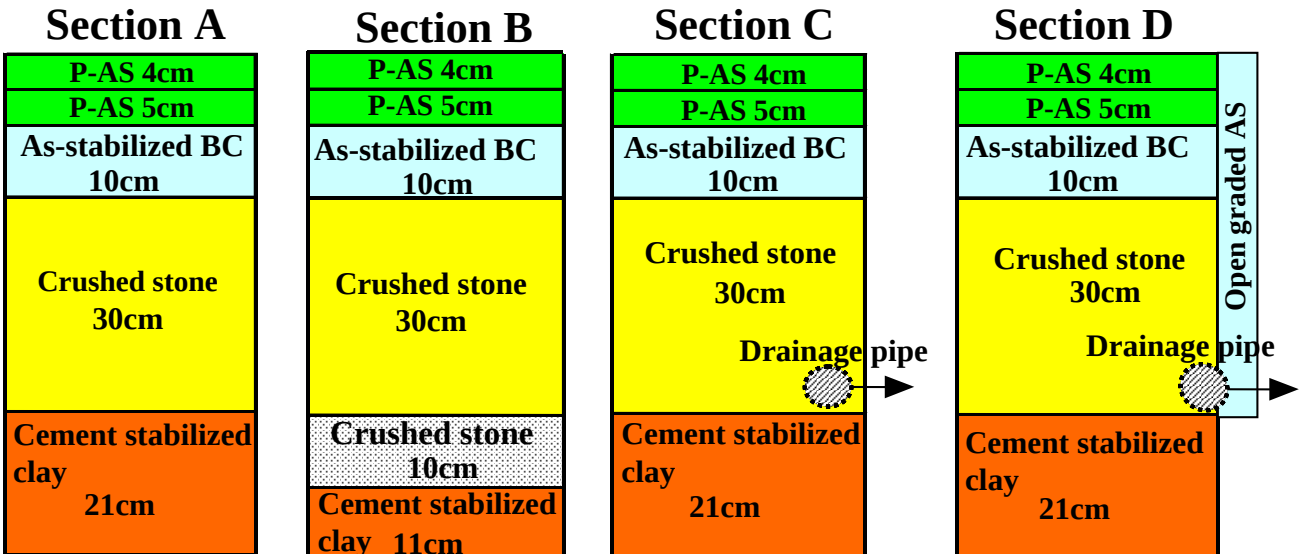
The flood alleviation must be tried by the installation on the development action over 1,000m^2 of permeable pavement or infiltration facilities.

Permeable pavement has been expected



Permeable subgrade (ex. sand) **Non-permeable subgrade (ex. clay)**

4 types of permeable pavement for the test section



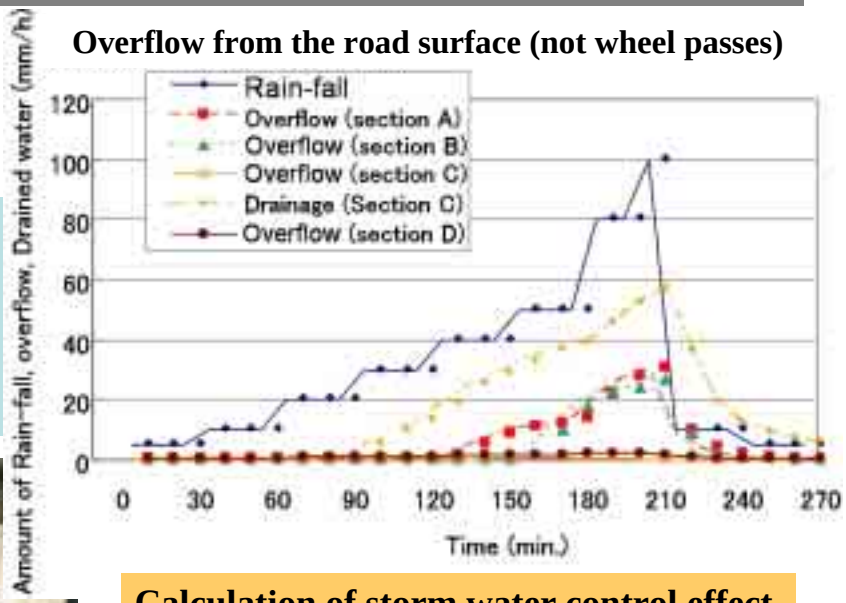
Simulated Rainfall

Rainfall Simulator
15m×5m (Section A)

Overflow from surface

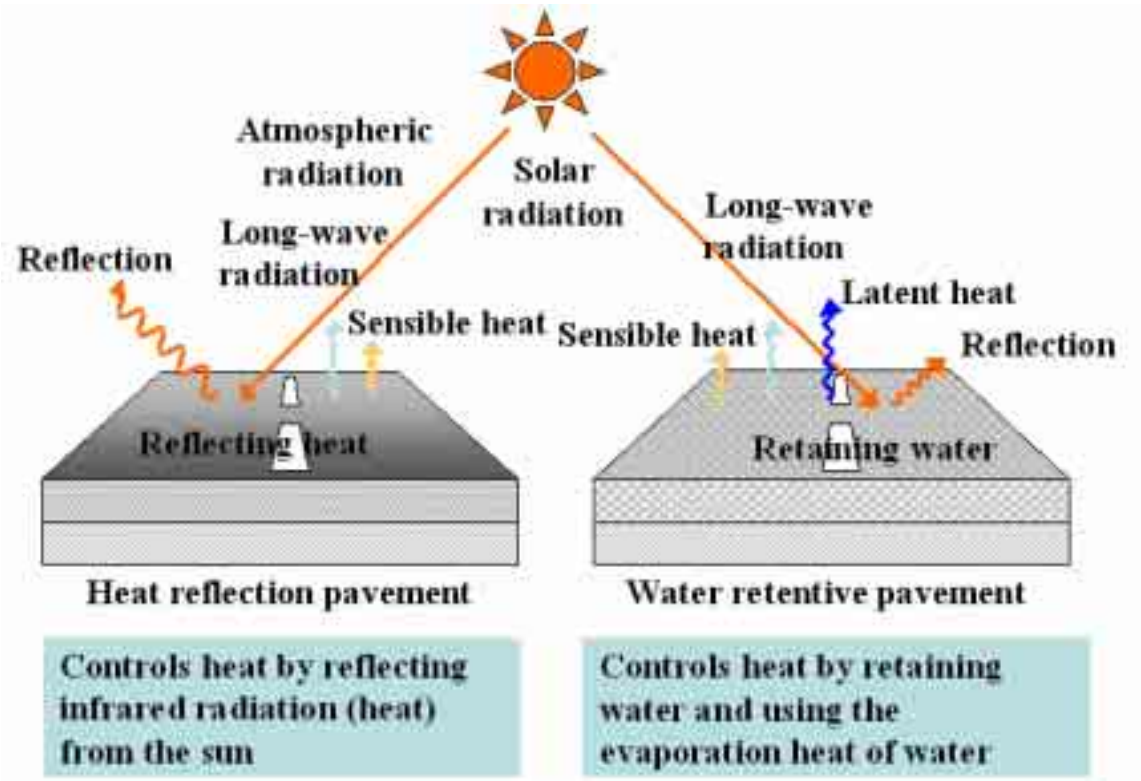
Amount of rainfall and delay of the floodflow

Overflow from the road surface (not wheel passes)

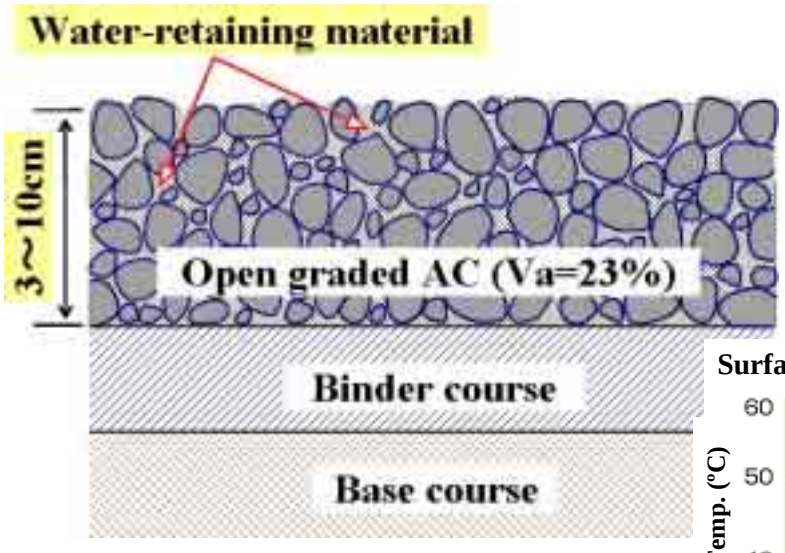


Calculation of storm water control effect

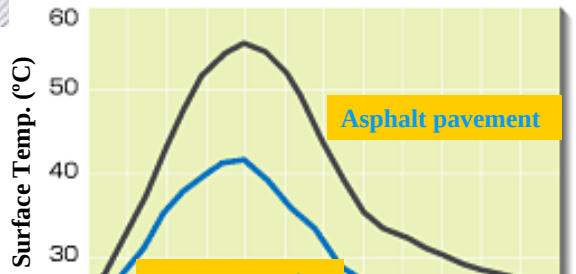
Triangular weir for the measurement of the drainage discharge from the trench



Structure of water-retentive pavement



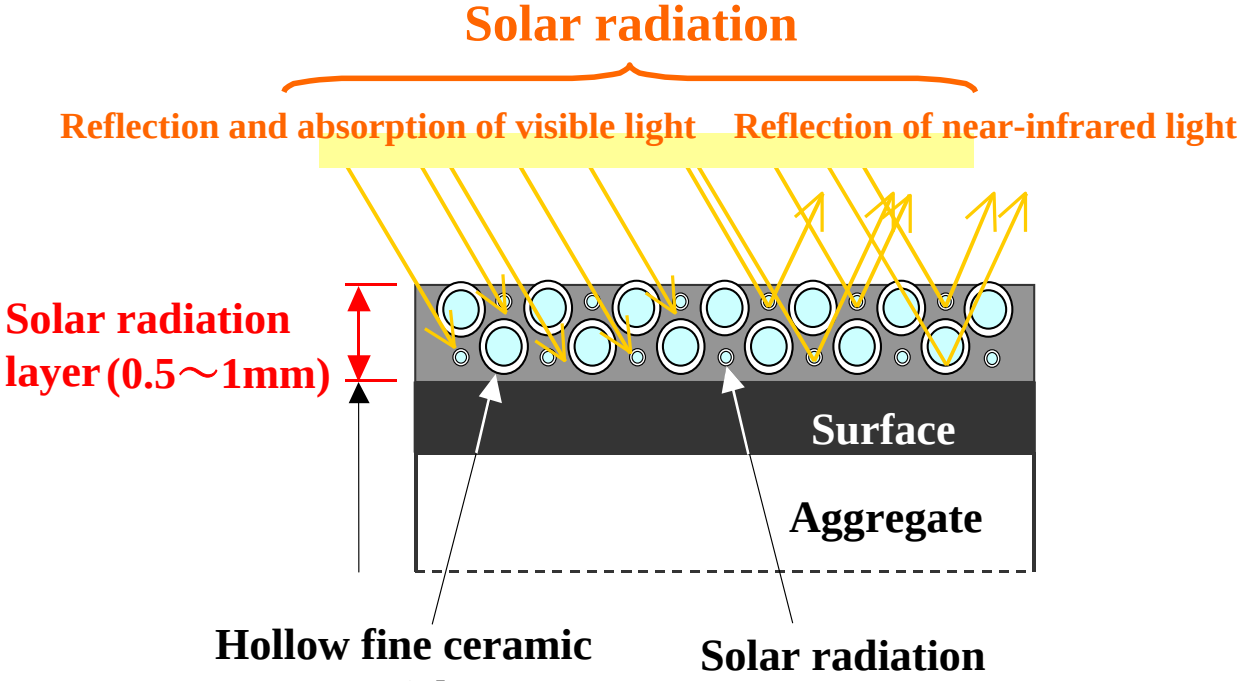
Surface Temp. of water-retentive pavement



Injection of cement milk into water-retaining material

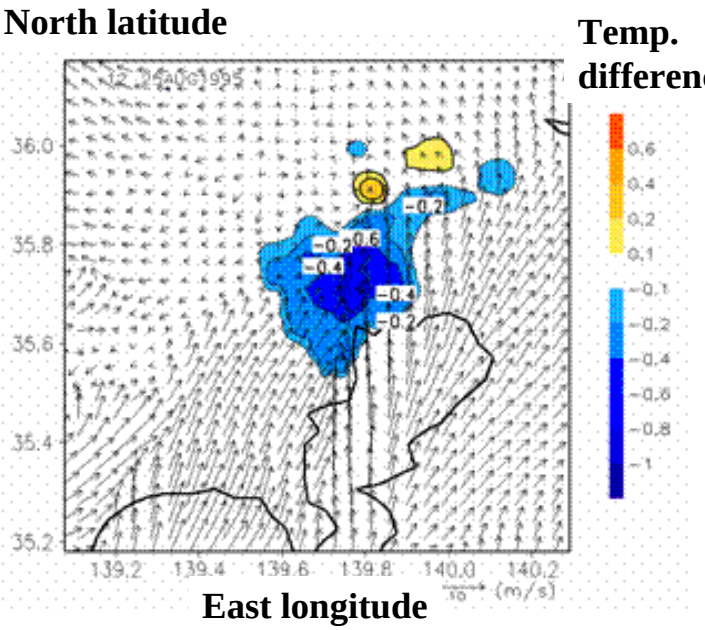
Surface of water-retentive pavement [Open graded AC (Va=23%)]

Structure of Solar Radiation Pavement

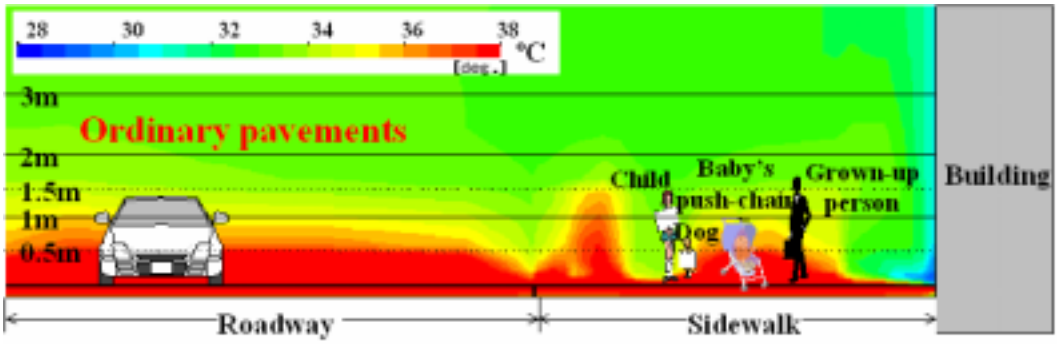


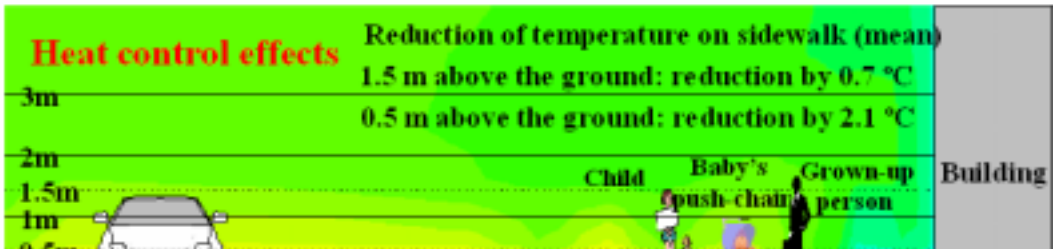
phenomenon

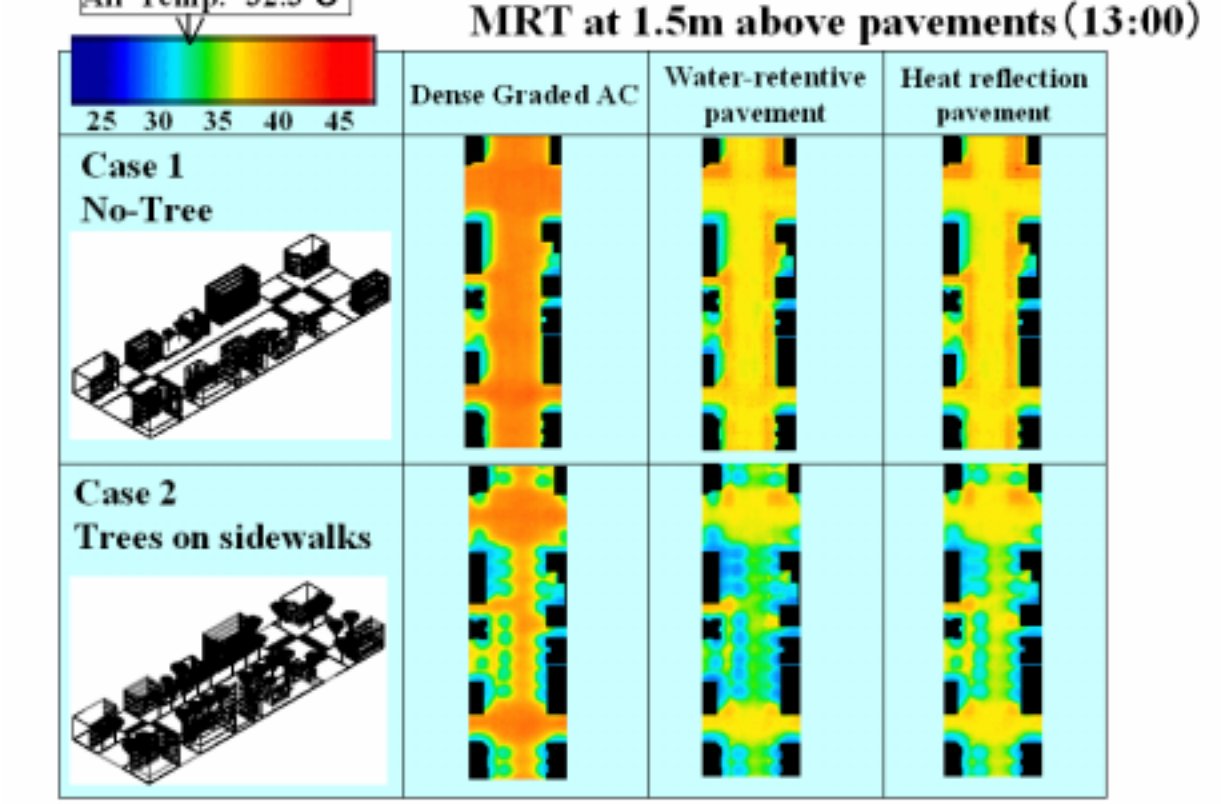
Driveway of National Highway No. 1



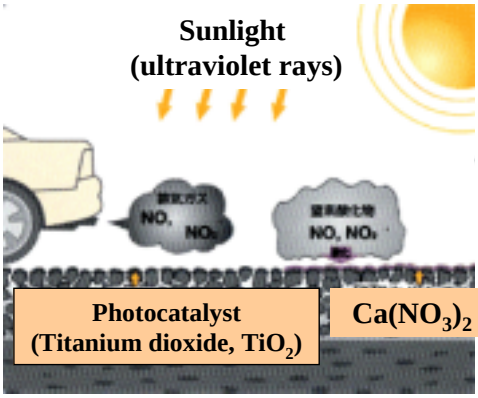
Simulation of improving the heat environment of sidewalk



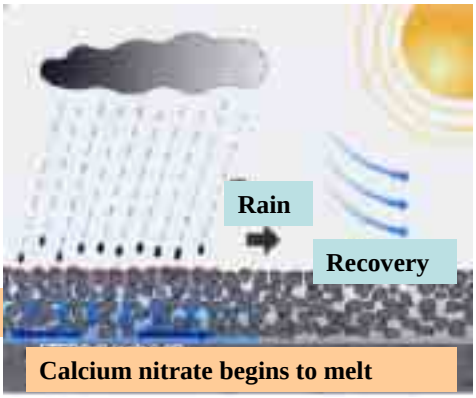




Absorbing and decomposing nitrogen oxides



It oxidizes with the photocatalyst (TiO_2) which sprinkled the nitrogen oxide (NO_x) in the exhaust gas which a car generates on the



A calcium nitrate is flushed as harmless nitric acid ion (NO_3^-) and calcium ion (Ca^{2+}) by rain, and the unclean pavement surface is

Photocatalyst (TiO_2) which decomposes pavement surface to which the nitrogen compound

1) Quantifying and organizing the roles of pavement for mitigating environmental loads,
2) Balancing the environment improvement effects with the original roles of pavement,
3) Developing technologies to improve the effects and to reduce the cost ,
4) Establishing methods for evaluating the effects of improving the environment,
5) Identifying the target effects ,
6) Introducing procurement methods that can appropriately reflect the technological levels of constructors,
7) Constructing a system for disseminating the technologies.

Future topics and summary

New pavement technologies are not yet widely used in Japan, but the importance of developing and using pavement technologies to improve the environment is increasingly recognized.

Some technologies are being tested in test pavement, and once analyzed, the results will be published.