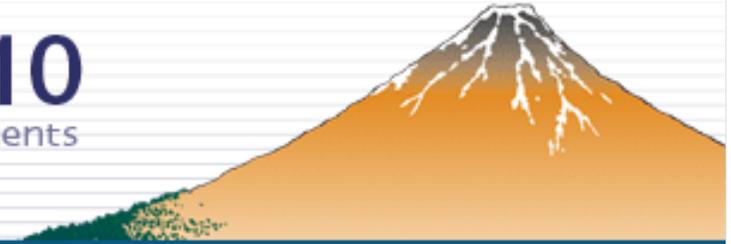




ISAP NAGOYA 2010

The 11th International Conference on Asphalt Pavements

August 1 to 6, 2010



Feedback on the 11th International Conference on Asphalt Pavements

RPF

09-10 Nov 2010

CSIR
our future through science

Venue: NAGOYA CONGRESS CENTER



Hosted by:



International Society for
Asphalt Pavements (ISAP)

AND



Japan Road Association
(JRA)

Summary (Day 1)

- Day 1 - Roads and pavements in Asian Countries
 - Session 1: State-of-the-Art
 - Session 2: Innovation and challenges

Summary (Day 2 – Day 5)

- 12 Plenary presentations
- 224 oral presentations
 - ▣ 187 papers from international participants
 - 5 Papers from South Africa
 - ▣ 102 papers from Japan
- 53 poster presentations

Summary (Day 2 – Day 5)

- Plenary sessions

- Session 1: Environment

- Session 2: Road safety

- Session 3: Low-cost Road Constructions

Summary (Day 2 – Day 5)

- Parallel sessions (A – F)
 - ▣ Session 1: Environment and Safety
 - ▣ Session 2: Structural and Surface Design for Pavements
 - ▣ Session 3: Pavement Materials
 - ▣ Session 4: Construction Technologies
 - ▣ Session 5: Management
 - ▣ Session 6: Low-Cost Road Construction
 - ▣ Session 7: Advanced Application

KEYNOTE SPEECH

Keynote speech



Dr Earl Arp – Director (Health, Safety and Environmental Division), *Asphalt Institute*

Keynote speech

- Bitumen “Fume” Research in the 21st Century – A Decade of Discovery
 - A body of knowledge relating to health effects of bitumen emissions has been greatly enhanced.
 - Findings from Germany studies have shown that bitumen fumes have irritant effects but not causing reproductive problems and not tumorigenic either.
 - Findings from US studies showed paving fumes not carcinogenic.

TECHNICAL SESSION 1B

TS1B: Use of 100% Reclaimed Asphalt Pavement (RAP) Material in Asphalt Pavement Construction

- With the specter of long term deficits restricting public spending what can be done to facilitate recycling more RAP?
- In the post SHRP-Superpave era, the large majority of funded research has been in support of low RAP percentages, <40%.
- Is it possible to recycle 80 to 100% using existing plants?

TS1B: Use of 100% Reclaimed Asphalt Pavement (RAP) Material in Asphalt Pavement Construction

- Strategy: Use industrial process oils, rejuvenators, to soften age hardened RAP binders. Liquid asphalt remains equivalent binder used for a virgin mix.
- Most existing drum plants are already capable of recycling 80% of mix binder requirements with a combination of fractionated RAP and recycled asphalt shingles.
- Data from seven-year old 100% recycled NYCDOT plant mix material produced from reheated millings and rejuvenator.

During Construction



7 years later



TS1B: Use of 100% Reclaimed Asphalt Pavement (RAP) Material in Asphalt Pavement Construction

- 1. Regrade RAP samples to meet a specified gradation;
- 2. Determine bulk specific gravity of regraded samples;
- 3. Add rejuvenator (Reclamite) to samples using vendor guidelines based on optimum binder content;
- 4. Compact 150 mm diameter specimens with the gyratory compactor;
- 5. Determine dynamic modulus of prepared specimens;

TS1B: Use of 100% Reclaimed Asphalt Pavement (RAP) Material in Asphalt Pavement Construction

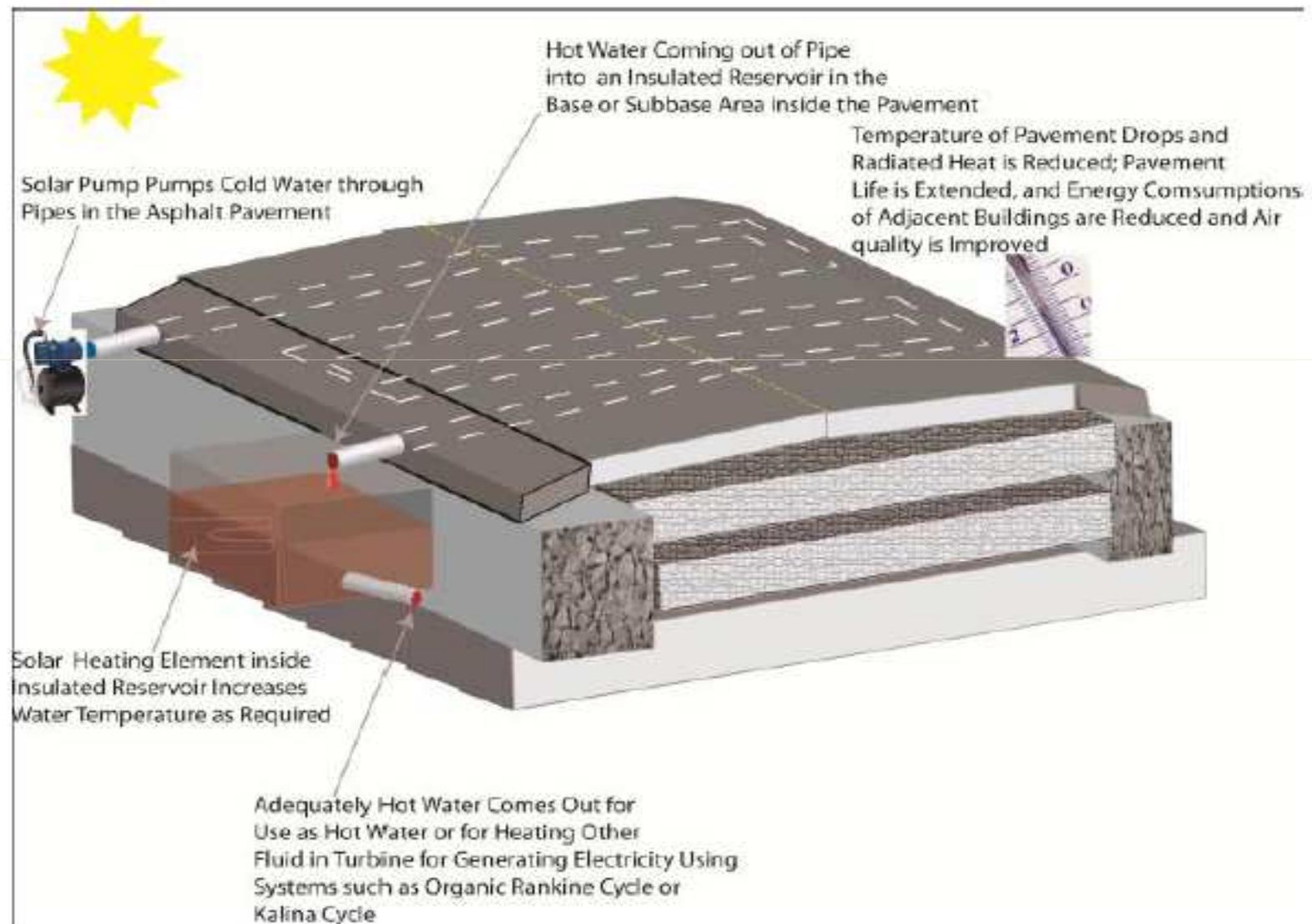
- The addition of rejuvenating agent is effective in lowering the stiffness of RAP, and providing mixes with dynamic modulus values that are similar to mixes that are regularly used in the US.
- 100% recycled mixes with good performance can be produced with existing quality control procedures in a suitable plant.
- Studies should be conducted to develop a step by step procedure for assisting mix designers to utilize rejuvenators for high RAP content recycling.

TECHNICAL SESSION 2A

TS2A: A Multiphysics Approach to Optimize Systems for Harvesting Heat Energy and Reduce the Urban Heat Island Effect of Asphalt Pavements

- Asphalt pavements absorb a large amount of solar radiation because of their thermal properties – low conductivity ($1-1.8 \text{ W/m}^*\text{K}$) and relatively high heat capacity ($1,200-1,800 \text{ J/kgK}$)
- This energy can be supplied for providing heated water for household or commercial use, and other applications such as in absorptive chillers.

TS2A: A Multiphysics Approach to Optimize Systems for Harvesting Heat Energy and Reduce the Urban Heat Island Effect of Asphalt Pavements



TS2A: A Multiphysics Approach to Optimize Systems for Harvesting Heat Energy and Reduce the Urban Heat Island Effect of Asphalt Pavements

- There are concerns around traffic and thermal stresses, and their combined effects on the pavement and pipe structures.
- Other factors include piping material, depth of location, and the type of flowing fluid, its incoming temperature and rate of flow, and environmental conditions such as solar radiation and air temperature.

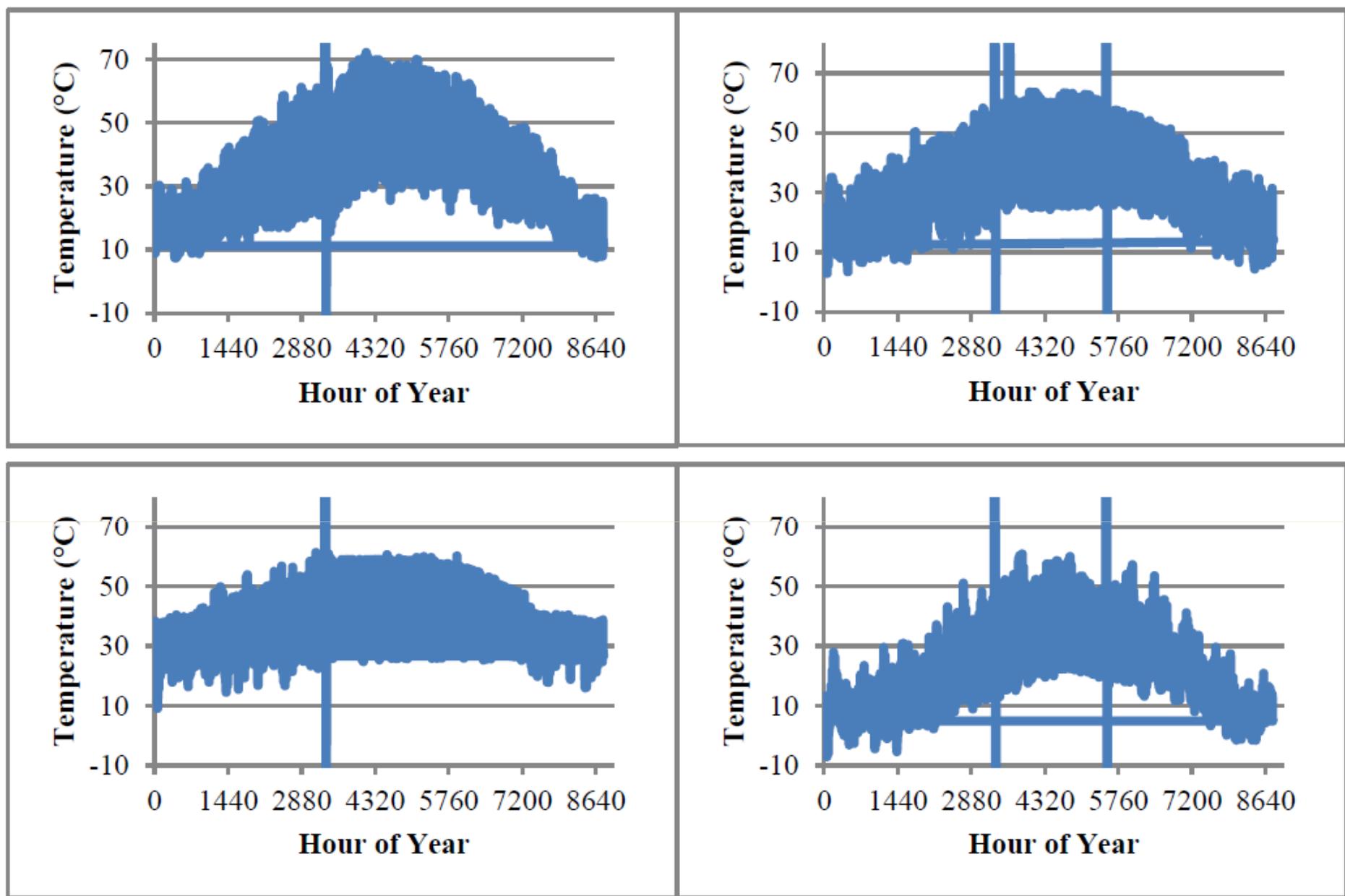


Figure 3: Continuous surface temperature profile: (upper left) Phoenix, AZ (upper right) Houston, TX (lower left) Miami, FL (lower right) Boston, MA

TS2A: A Multiphysics Approach to Optimize Systems for Harvesting Heat Energy and Reduce the Urban Heat Island Effect of Asphalt Pavements

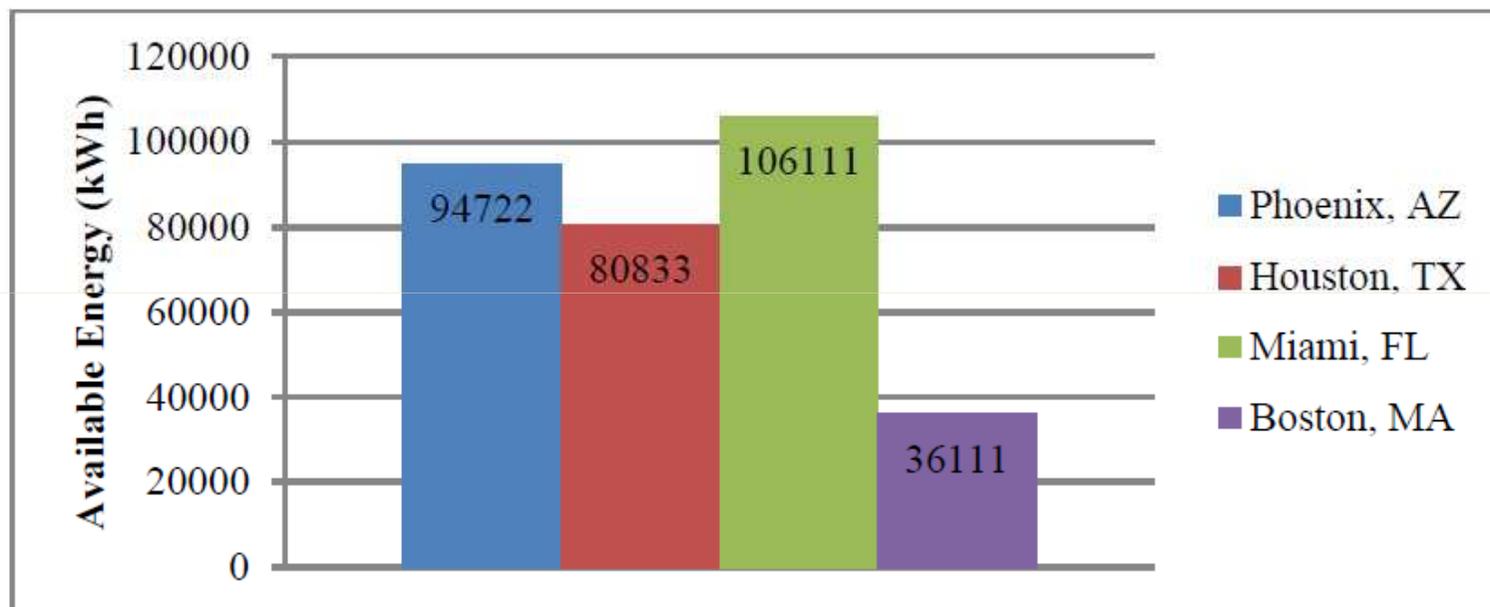


Figure 5: Available energy for harvesting for four case studies (50 mm pipe depth, 13 L/min flow rate)



TECHNICAL SESSION 5A

TS5A: Application of 3D-MC for Road Construction Machine

- On most construction sites work is controlled by coordinate location information based on the combination of a site survey and the engineering design
- Practical automation of construction site work is often compared to automation in industrial manufacturing.
- The common method of providing construction equipment operators with location information is to use manually placed stakes and/or string lines, both of which are subject to installations errors, deformation and reckless disregard.

TS5A: Application of 3D-MC for Road Construction Machine



Photo 1: Manual operation with grade stakes

TS5A: Application of 3D-MC for Road Construction Machine

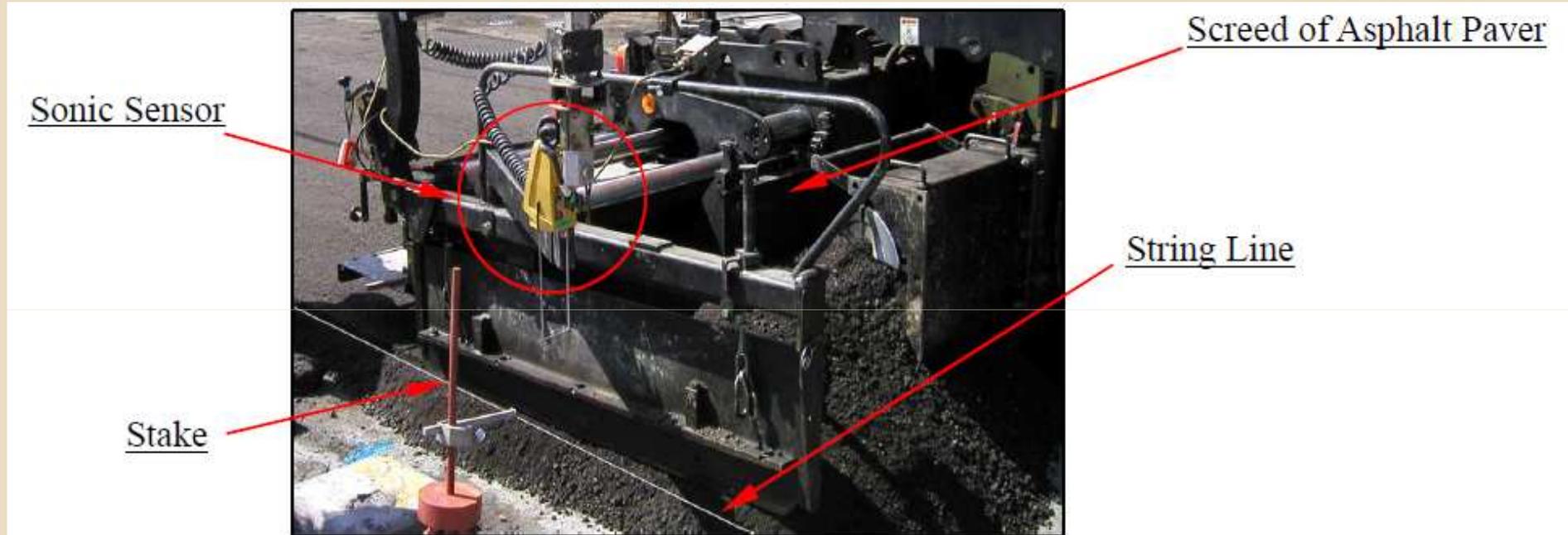


Photo 2: Sonic sensor refers string line on stakes

Automation of conventional machine

TS5A: Application of 3D-MC for Road Construction Machine

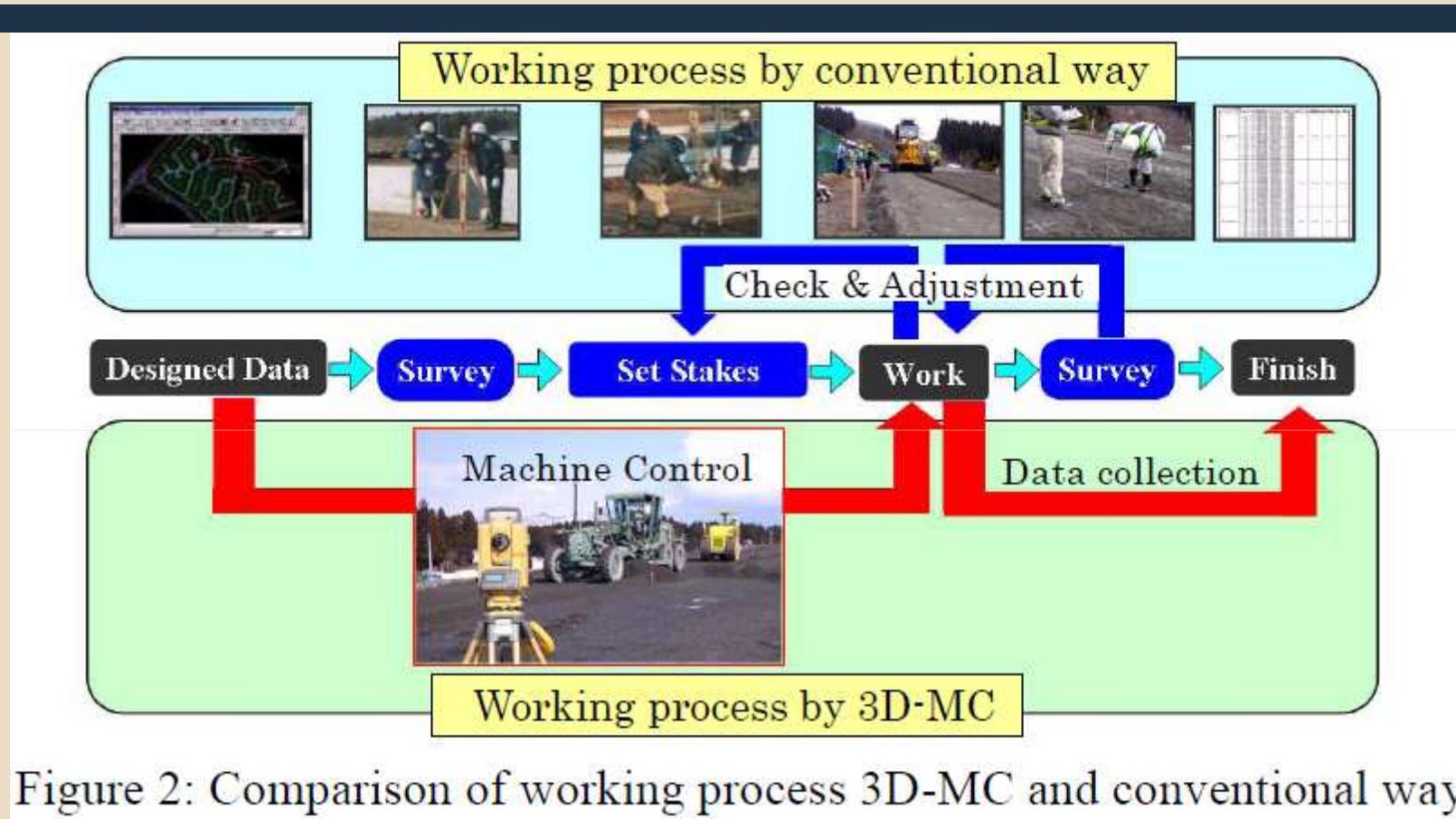


Figure 2: Comparison of working process 3D-MC and conventional way

3D-MC controls construction machine directly with the design data, without the need for stakes or string lines.

TS5A: Application of 3D-MC for Road Construction Machine

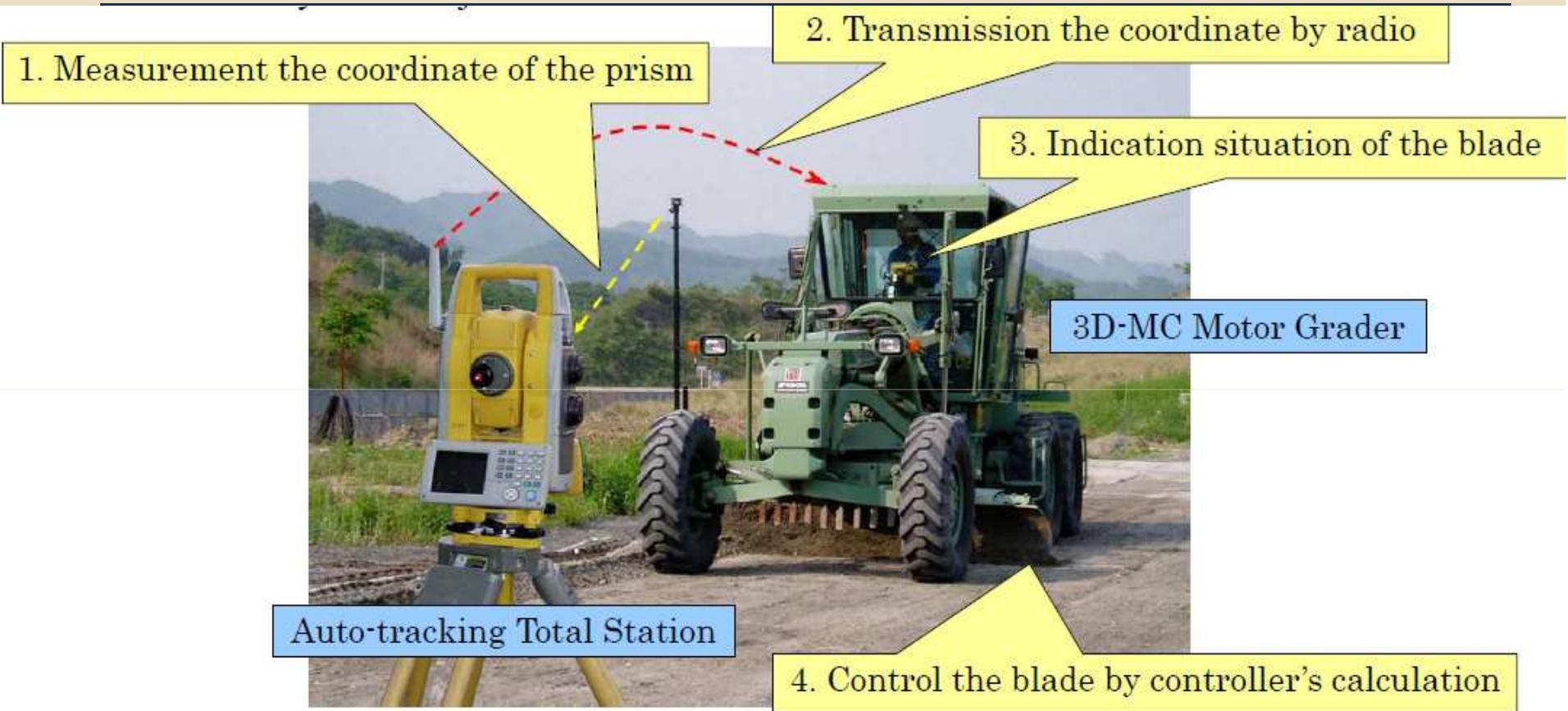


Photo 3: Auto tracking total station and 3D-MC Motor Grader

3D-MC Based on Survey Instrument Function.

TS5A: Application of 3D-MC for Road Construction Machine

Table 1: Accuracy of height level

	Cross slope	Average	Maximum	Minimum
Case 1	+2.5%	0	11	-9
	0.0%	0	8	-11
	-2.5%	5	15	-3
	Total	2	15	-11
Case 2	0.0%	-7	6	-14
	Amphi-gradient	0	13	-8
	Total	-2	13	-14

(Unit : mm)

Results equal to or better than human control. Possible to achieve even better results with proper setting of dead-band.

TS5A: Application of 3D-MC for Road Construction Machine

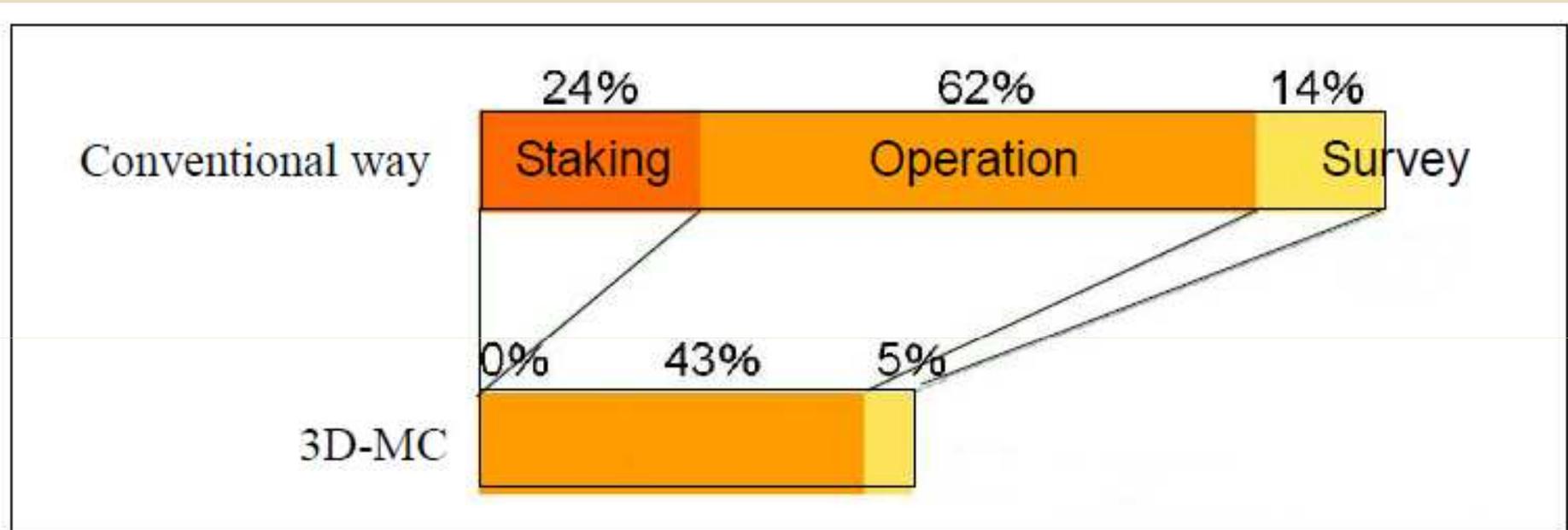


Figure 6: Comparison of time efficiency

TS5A: Application of 3D-MC for Road Construction Machine

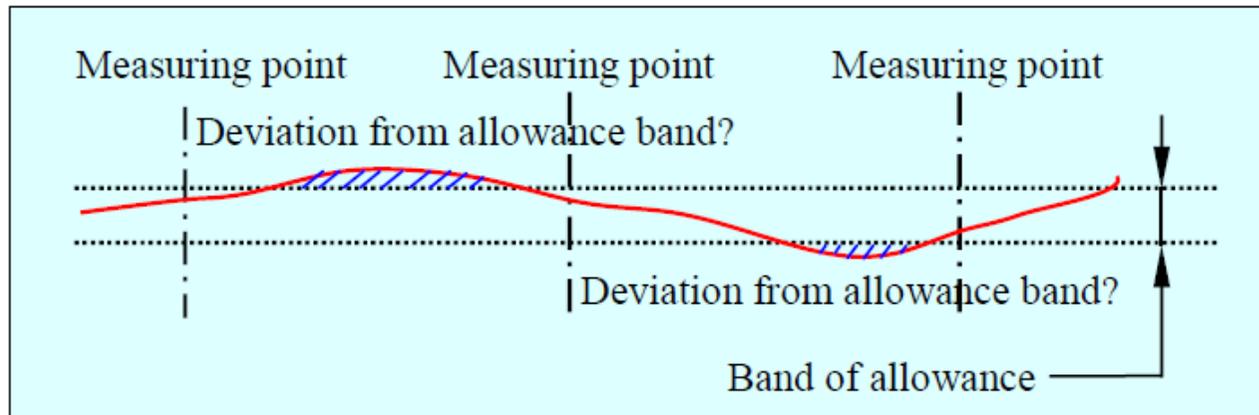


Figure 8: Relation between finished elevation and allowed tolerance using manual control

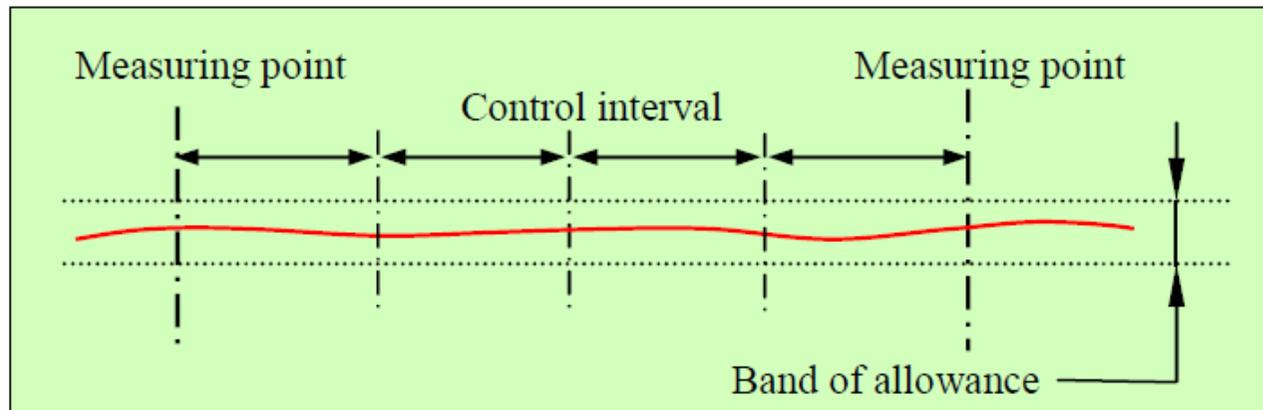


Figure 9: Relation between height level and allowed tolerance using 3D-MC



Photo 6: Paving work of 3D-MC asphalt paver at expressway overlay



Photo 7: Trial work of 3D-MC slip form paver for concrete paving

TS5A: Application of 3D-MC for Road Construction Machine

- Expert operator statement that he had never seen a finished grade that was superior to that achieved by the 3D-MC motor grader is a testimony to the 3D-MC quality.
- 3D-MC will provide a means to overcome the lack of veteran equipment operators.

PLENARY SESSION 1

PS1: Rollpave, a prefabricated asphalt wearing course

- Increasing traffic puts higher demands on construction and maintenance of pavements.
- The Dutch Ministry of Transport, Public Works and Water Management is working on smart and efficient Modular Road Surface aimed at a prefabricated road with a high noise reduction that could be constructed and replaced quickly.
- Hence Rollpave concept consisting of a prefabricated thin asphalt layer that can be unrolled like a carpet.

PS1: Rollpave, a prefabricated asphalt wearing course



Figure 3: After production the asphaltmat is rolled on the reel.

PS1: Rollpave, a prefabricated asphalt wearing course

- This layer can be bonded very quickly by an innovative bonding system based on electromagnetic waves.
- Typical dimension of one asphaltmat is 50 metres by 3.75 metres.
- The concept is independent of the weather conditions
- The noise reduction of Rollpave is better than single-layer porous asphalt and approaches the performance of two-layer porous asphalt.

PS1: Rollpave, a prefabricated asphalt wearing course



Figure 4: The asphaltmats ready for transport.

PS1: Rollpave, a prefabricated asphalt wearing course



Figure 5: The operator controls the movement of the asphaltmat and places it very precisely.

PS1: Rollpave, a prefabricated asphalt wearing course

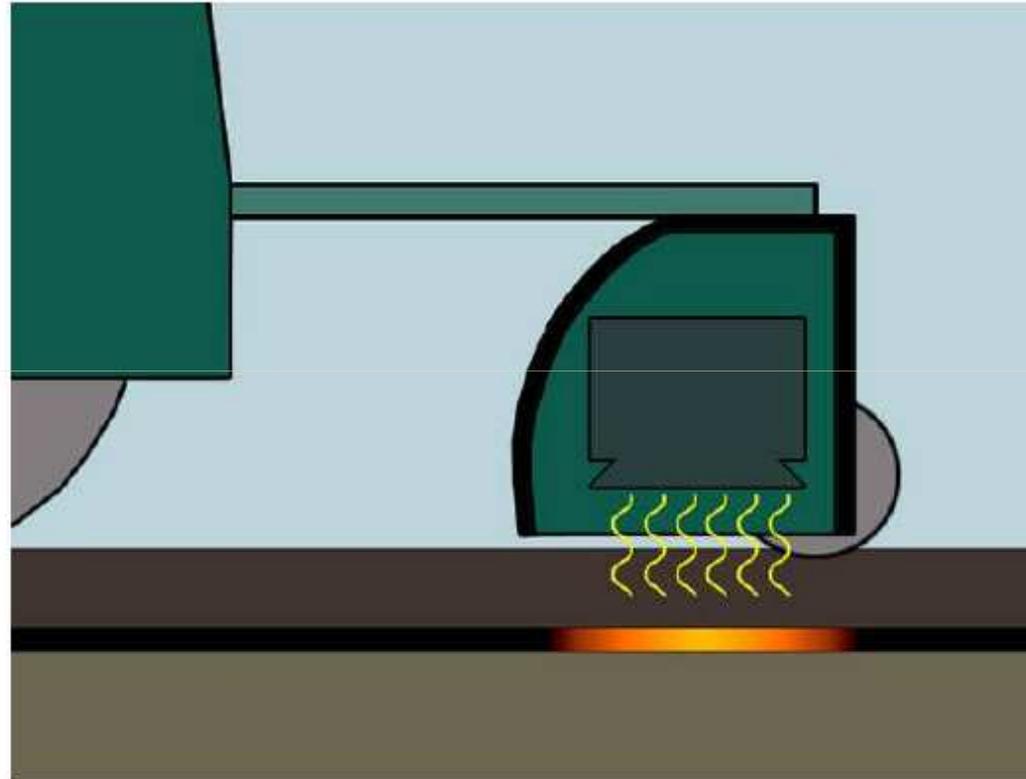


Figure 2: Principle of selective heating of only the bond-layer by means of induction.

PS1: Rollpave, a prefabricated asphalt wearing course

- Issues that need to be addressed:
 - Longer construction time;
 - Skid resistance;
 - longitudinal evenness;
 - water draining capacity;
 - Possible debonding;

TECHNICAL TOUR - 2

TT: Urban environment protection technologies for urban expressway

- A photovoltaic generation system set on the toll gate rooftop (*Japan*)



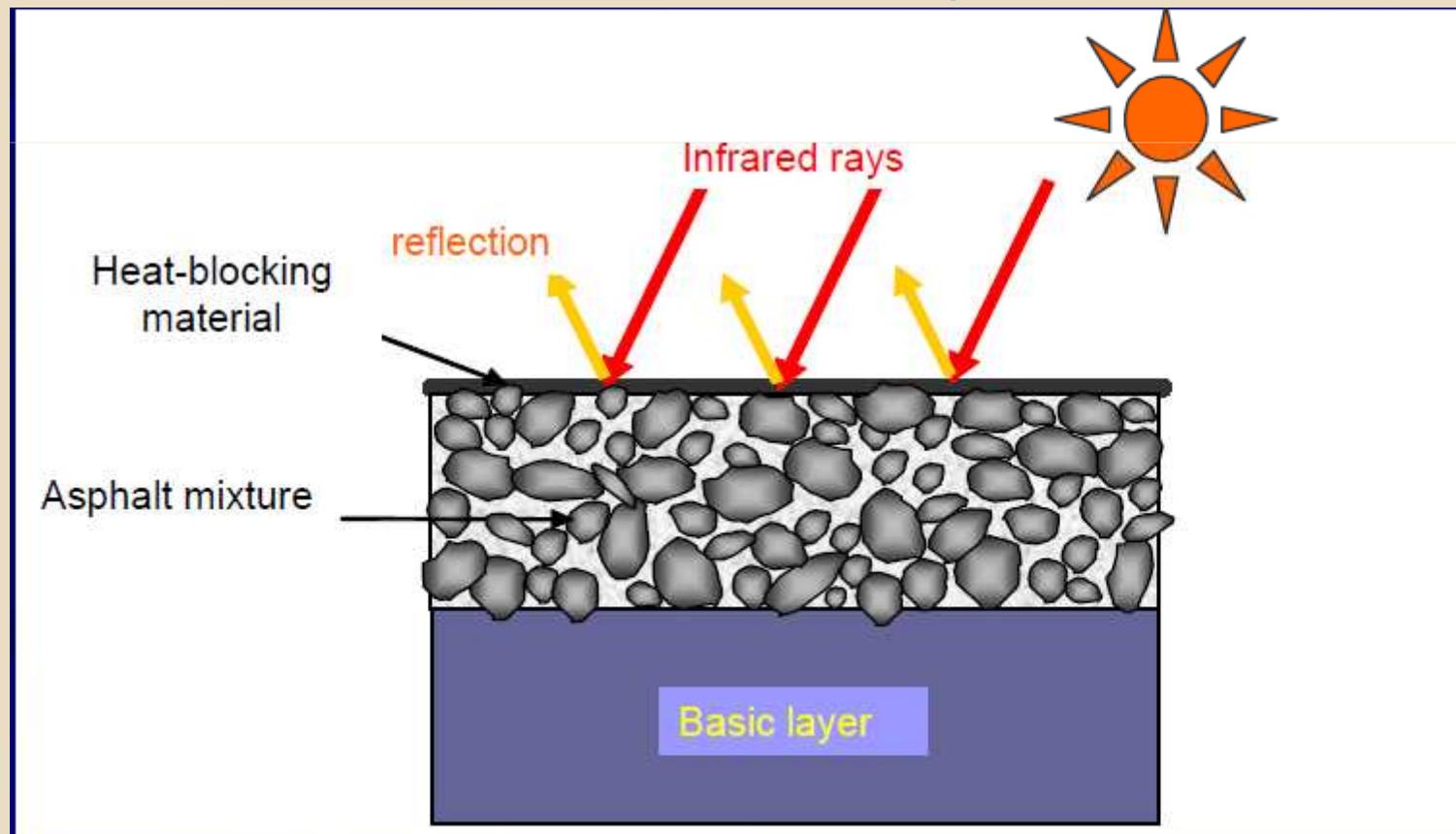
TT: Urban environment protection technologies for urban expressway

- Photovoltaic generation systems set on the median and side of the road (*Japan*).



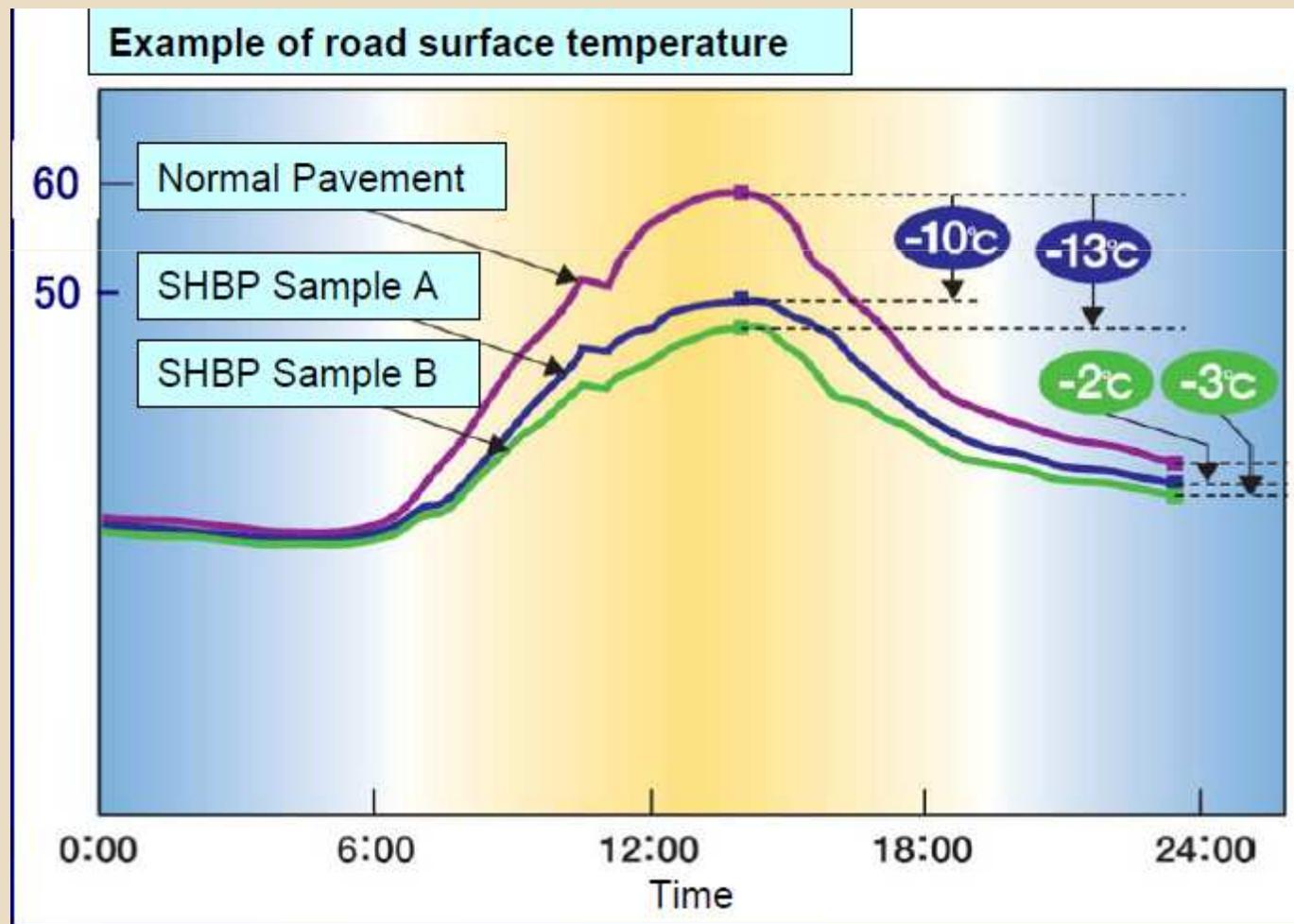
TT: Urban environment protection technologies for urban expressway

- Reduce road surface temperature by coating the pavement with heat-blocking material that reflects infrared rays from the sun (*Japan*)



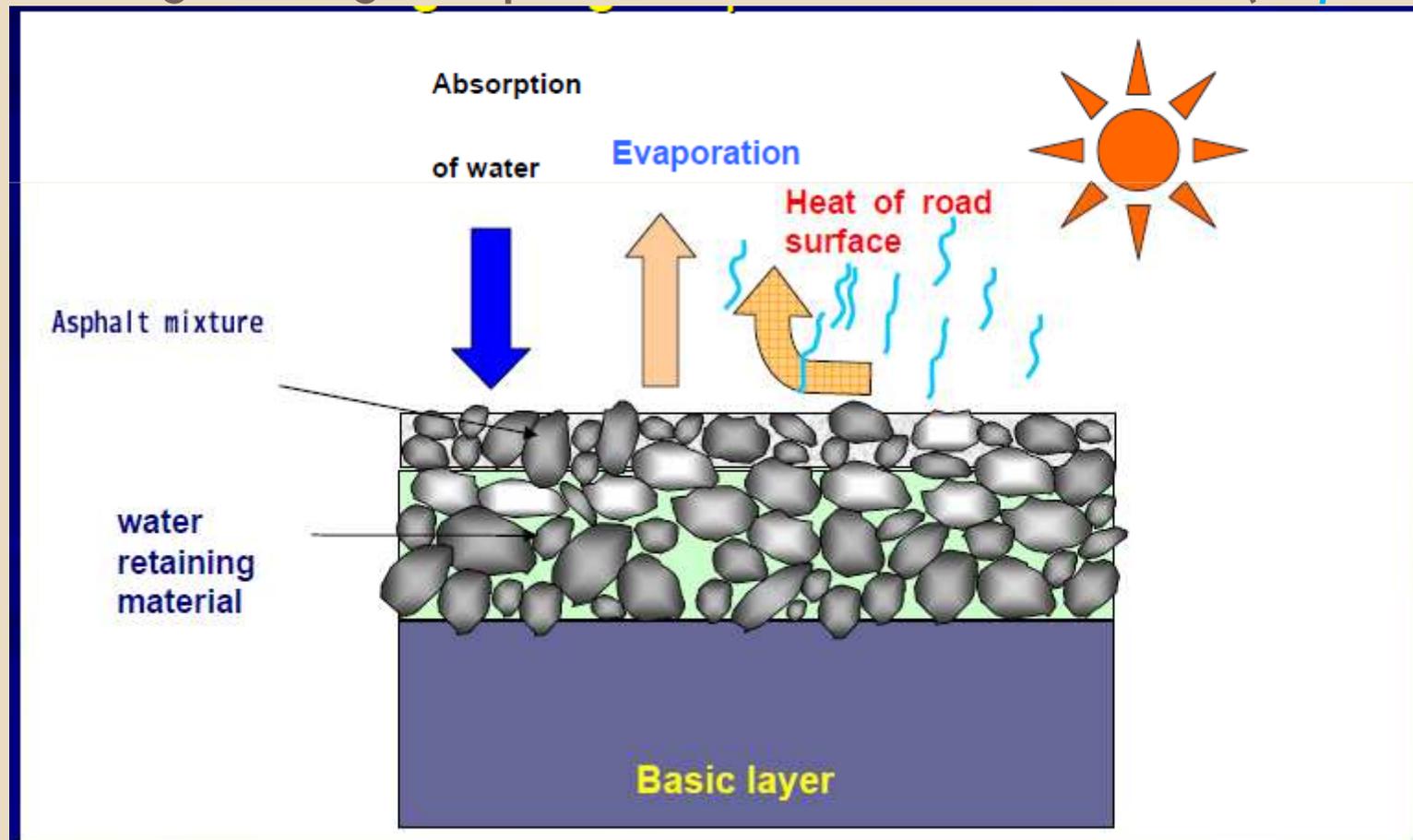
TT: Urban environment protection technologies for urban expressway

- Effect of solar heat-blocking pavement (*Japan*)



TT: Urban environment protection technologies for urban expressway

- Reduce the rise of road surface temperature by filling the pavement surface with water retaining material for cooling through vaporization of stored water (*Japan*)



TT: Urban environment protection technologies for urban expressway

- Linimo is a magnetic levitation train line near the city of Nagoya. ([Japan](#))

Linimo and JAMA
wonder wheel
pavilion – Expo
2005 site



TT: Urban environment protection technologies for urban expressway

- Linimo is a magnetic levitation train line near the city of Nagoya. ([Japan](#))



Linimo Cabin

TT: Urban environment protection technologies for urban expressway

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THANK YOU!