Innovative pre-fabricated Pavement Systems

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In 2000 the Dutch Ministry of Transport challenged the market to develop pavement systems that meet the following general requirements:

- Overcoming the limitations of traditional pavement construction
- Adaptable for future functions
- Less traffic jams
- Low noise production
Technical requirements

• Fast to apply (and to remove!)
  - 100 m/h (= 50% faster than now)
  - independent of weather conditions

• Function specific design
  - Major reduction of noise level, more than 5 dB(A) compared to dense asphalt concrete (= reference wearing course)
  - Same permeability as porous asphalt

• Modular construction
  - Prefab production

• Adaptable for future functions
  - Sensors, energy, etc
State of the art and practice

- 2001 - development and testing of systems: 4 systems were tested on a bypass of a highway. Two systems (rollpave and modislab) now used on a highway and under observation

- 2009 Rollpave system used for PERS (special trial to reach 8-10 dB(A) noise reduction) on a bypass of a highway
Rollpave
Expected contribution to development of more sustainable pavement solutions

- Factory produced, reduce variability
- Modular system: fast removing and placement of failed section
- Strong noise reduction of 5-7 dB(A) compared to the reference
- Anticipation on change possible by adding functions
- Dedicated trailerroads
Current gaps in knowledge

- Manufacturing process
- Material development (two-layer porous concrete, PERS)
- Maintenance techniques (a.o. skid resistance toplayer)
- Models for the toplayer
Main research questions

• Smart production in the factory
• Combination of requirement for the wearing course (noise, skid resistance, rolling resistance, etc)
• Development of materials
• Adhesion of toplayer to pavement structure (PERS)
PERS: Porous Elastic Rubber surface

Principle of CT Acquisition
- X-ray Source
- Sample
- Array Detector
- Step-by-Step Rotation
- Angle: 1°
- Tube Control
- CMM object stage
- Data Acquisition

Computed Tomography / Volume Reconstruction
PERS produced in the factory
Test trial PERS
The Very Silent Sound Module
Noise reduction results so far (compared to DAC)

- Modieslab: 7 dB(A)
- The Rollable Road: 6 dB(A)
- Rollpave: 6 dB(A)
- The Very Silent Sound Module: 5 dB(A)

The assumption was 8-10 dB(A)