Monitoring and testing needs for road asset maintenance management.

Carl Van Geem, Tim Massart
Results of a survey in Belgium in 2019.

Objective:
understand what are the (monitoring) needs for AMS purposes
and
start thinking from the start: where do we need roads for?
Approach of the survey

- BRRC-internal note about context and current use
- Checked with external experts (in “BRRC technical committee”)
- Questionnaire (announced to the road sector in Belgium)
- 2 Workshops (with topics related to outcome of questionnaire)
Warning:

- Only 30 responses on questionnaire
- Only 8 participants in the workshops

So, even with the wide variety of type of respondents, the sample is too small for definite conclusions!
Questionnaire
Finding 1: there are 3 levels

- Project level
  - Can be improved

- Optimised preservation of existing road assets
  - Needs a global appreciation of current conditions

- Asset management
  - Needs identification of current and future expectations and a long term vision
Project level: drawing up technical specifications

Choice of adequate maintenance method, causes of distress
• determine causes by inspections, measurements, lab-tests

Quality of road works: to be foreseen during preparations
• follow-up during road works
• quality control after road works
Choice of adequate maintenance method

- Water management?
- Cause of distress?

From cause to maintenance, e.g. “catalogue of damage” (http://docs.wegenenverkeer.be/Publicaties/Schadecatalogus.pdf) in Dutch.
Choice of adequate maintenance method

Bearing capacity:
- pavement structure?
- deflections?
- traffic loads?
- busses?
- rat-run traffic?
A role for monitoring and measurements!

Prepare intervention: find cables and sewer pipes

GPR

utilities in factory yard

© A. Ristić, GPR applied to detection and localization of utilities in urban areas, Road Show of COST action TU1208, Osijek, 2017
Quality of road works:

“Good practice”
- Follow-up of materials used
- Follow-up of conditions during execution of works

“Existing requirements”
- Longitudinal evenness
- Skid resistance
Optimised preservation of existing road assets

Current feeling: too little budget for all necessary road works

Finding 2: few network management in municipalities

- Many cities and municipalities only think about how to efficiently execute the few road works for which they have a budget.
- There is a “backlog”... usually the priorities are not set from a global overview of the current condition of the road network.
Optimised preservation of existing road assets: a PMS approach

Management by regional NRA’s:

- surface defects
- PMS
- bearing capacity

A role for monitoring and measurements!
City of Ghent: rich inventory, yearly condition evaluation

© I. Devreese (City of Ghent), Wegen Informatie Systeem, on the Day “Beheer van Wegen” of CEDUBO, 3 December 2015.

Map and data
(e.g. surface material)

Quality
(score A – E)

A role for monitoring and measurements!
A role for monitoring and measurements!

Optimised preservation of existing road assets: a PMS approach

BRRC method used by some cities and municipalities:

- Visual inspection
- Training courses


Example in City of Namur:

Communication: road administrator explains to the population about rational maintenance policy

- Coating: 5€/m² (2 days of road works on average)
- Replacing top layer: 20€/m² (2 weeks of road works)
- Reconstruction: 85€/m² (more than 6 months of road works)
- Maintenance at the right moment prevents early need for more important road works.

First plan based on a global appreciation of the current condition of the roads in the network.

Next step:

- regular and systematic visual inspections for pavement management
A role for monitoring and measurements!

Example elsewhere: multifunctional device

Kaiserslautern (2011, 2018):

TÜV Reinland Schniering
(measurements with “ARGUS”)

Heller Ingenieurgesellschaft
(PMS interpretation)

Asset Management

- What is the real budget needed for maintenance?
- What are the needs and expectations for the future?
- How to adapt infrastructure to future mobility needs?
  - Maybe a declassification of some roads
  - Pavement design according to new mobility needs
Expectations according to the answers to the questionnaire

1. Safety and Comfort
2. Traffic fluidity, parking, aesthetics, ...
3. Maintenance efficiency: budget assignment
4. Environmental issues

As was expected...

Not important: economic development...
Continuous monitoring (cf. questionnaire)

- Check quality of materials used
- After interventions related to sewer or cable networks
- Monitoring during road works
- Looking for surface defects
- Budget “monitoring”

Daily routine and budget control...
Monitoring every 2 years (cf. questionnaire)

- Retro-reflection of markings
- Skid resistance, longitudinal evenness
- Traffic related noise, deflections, air quality, traffic density

This is not at all done (except on main roads): probably we get this response because we asked...

- Similar results for cycle paths and sidewalks...
Workshops

Describe work flows of today and tomorrow
(at municipalities ≈ 90% of all roads in Belgium)
Processes (Workshops): TODAY

- network approach
- network owner (municipalities)
- Available budget
- complaints
- subsidies
- priorities
- project
- consultancy bureau
- builder
- Technical specifications
- budget control
- external planning
- planning
- control
- control
- planning
- planning
Processes (Workshops): TOMORROW

- Network owner (municipalities)
- Monitoring network
- Network owner (municipalities)
- Interventions planning
- Measurements analysis
- Technical specifications
- Consultancy bureau
- Traffic data
- Experience
- Simple intervention
- Maintenance method
- Control

- Contractor
- Builder
- Project
- Contractor
- Regular maintenance
- Contractor

- Expectations
- Indicators
- Some database
"some database"... going for BIM, example elsewhere:

**Essen** (2017)

Collaboration with Trimble (lidar + 3D reconstruction, GPR, huge geo-database of existing assets for asset management)

cf. [https://www.essen.de/meldungen/pressemeldung_1081249.de.html](https://www.essen.de/meldungen/pressemeldung_1081249.de.html)
(prudent) conclusions

• **Project level:**
  – need for more effort in preparations (with role for measurements)
  – difficulty: current emphasis is on "budget management"

• **Asset preservation:**
  – need for systematic approach: a role for different types of measurements

• **Managing for the future:**
  – need for global picture of expectations, then strategic choices must be made
  – regular monitoring of expectations