

Ministerie van Verkeer en Waterstaat  Rijkswaterstaat

Evaluation of crack detection systems

The Dutch and Flanders experience

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Dutch pavement management system main roads

- Two yearly monitoring friction and evenness, estimation of intervention year by models
- Ravelling, cracks etc. by VCS, estimation of intervention year by expert judgement
- 70% porous asphalt, normative deterioration: ravelling
- Cracking hardly ever normative deterioration, but of importance for treatment

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Experiences with automated crack monitoring (WiseCrax, 1998)

- Comparison with VCS
- Detection of cracks till 3 mm is poor on DAC and Porous Asphalt
- Good detection on DAC of cracks over 3mm, poor on Porous Asphalt

Recommendations:

- Increase pixel resolution, early detection of cracking is of importance to monitor progression
- Acquisition speed should be increased to at least 80 km/h to reduce traffic hindrance (was limited to 70 km/h)
- Forget automated monitoring of cracks on Porous Asphalt, concentrate on Ravelling

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Ravelling on Porous Asphalt



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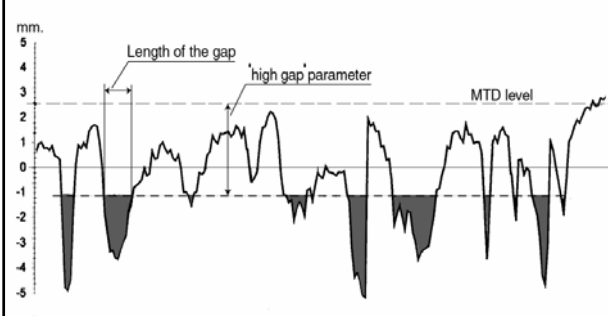
Detection of ravelling on Porous Asphalt

- Visual analyses of pavement images of Porous Asphalt showed that ravelling cannot be detected from them
- Trials with texture analyses have been successful
- DWW developed an algorithm (Stoneway) based on "gaps" in the texture profile representing missing stones validated with VCS on the network level in 2003.

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Stoneway principle



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Future developments

- Automated detection of ravelling and cracks and other surface deficits to make VCS obsolete
- Possibly additional video inspection to detect the other surface deficits and to inspect the parallel lanes

2007: Start trials with new ARAN

- HDTV ROW video images
- 1mm resolution pavement images from line scan camera
- Software: Surveyor and WiseCrax

Flanders experiences with automated crack detection

- Year 2000: Tuning of Video-rating to VCS results on the network level
- Year 2001 and 2002: No more VCS but video rating from pavement images
- From 2001 start experiments with WiseCrax
- From 2003 full operational use of WiseCrax, after modification to real time digital image acquisition to reduce time consuming analog to digital conversion

Hard situations

- Cracks with great width are not detected. The width exceeds expected width/length ratio
- On element surfaces the program detects rims as cracks
- Sometimes the rims of pavement markings are detected as cracks
- Other visual surface deficits than cracks (e.g. ravelling, bleeding, rim deterioration) are not detected. From 2005 these are acquired from ROW-images by manually operating the program Surveyor in parallel