

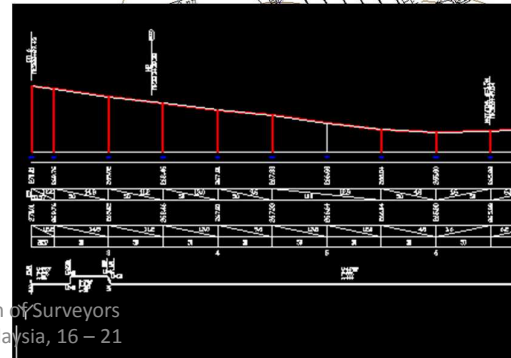
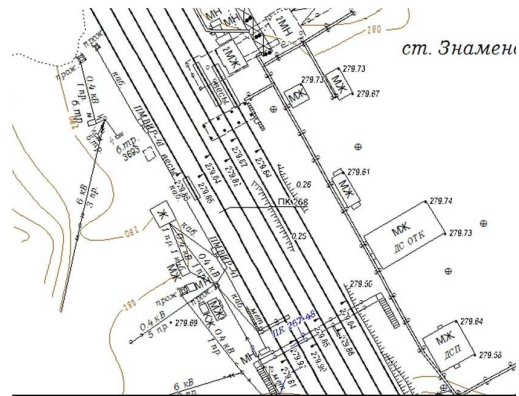
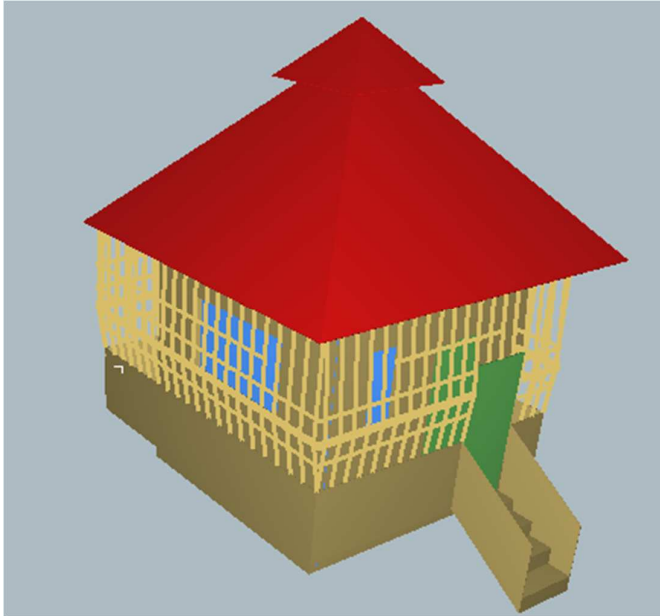
The Feasibility Study of Automatic Extraction of Cracks in the Roadbed from Mobile Laser Scanning Data

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Vladimir A. Seredovich
SSGA*

Content

1. Application of mobile laser scanning data;
2. The task of roadbed defect recognition;
3. Initial data for investigations;
4. Recognition of roadbed defects based on image classification;
5. Recognition of roadbed defects based on generation of digital surface models;
6. Conclusions.

Application of mobile laser scanning data



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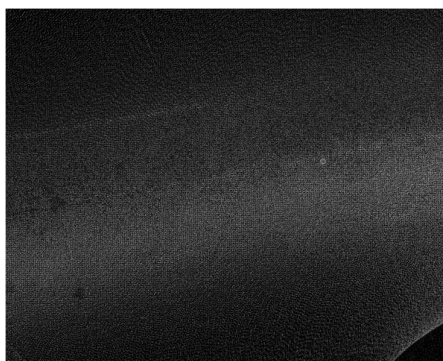
Lynx Mobile Mapper M1



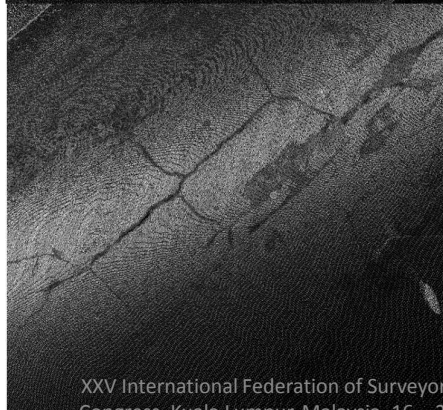
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Recognition of roadbed defects

Bad recognized on
the basis of intensity
values

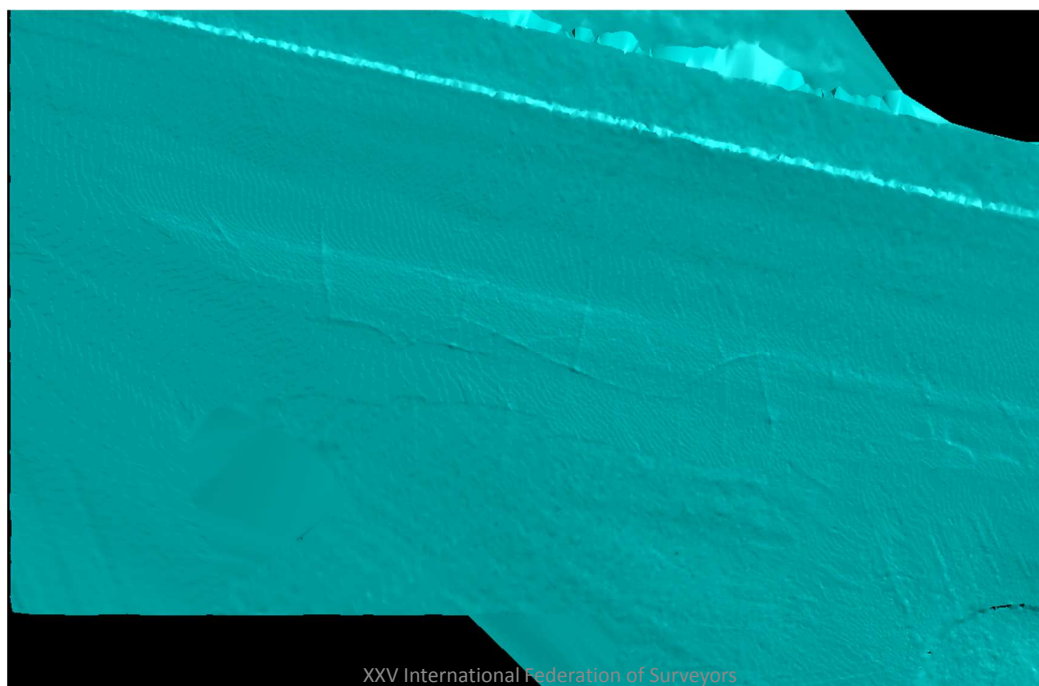


Well recognized on
the basis of intensity
values



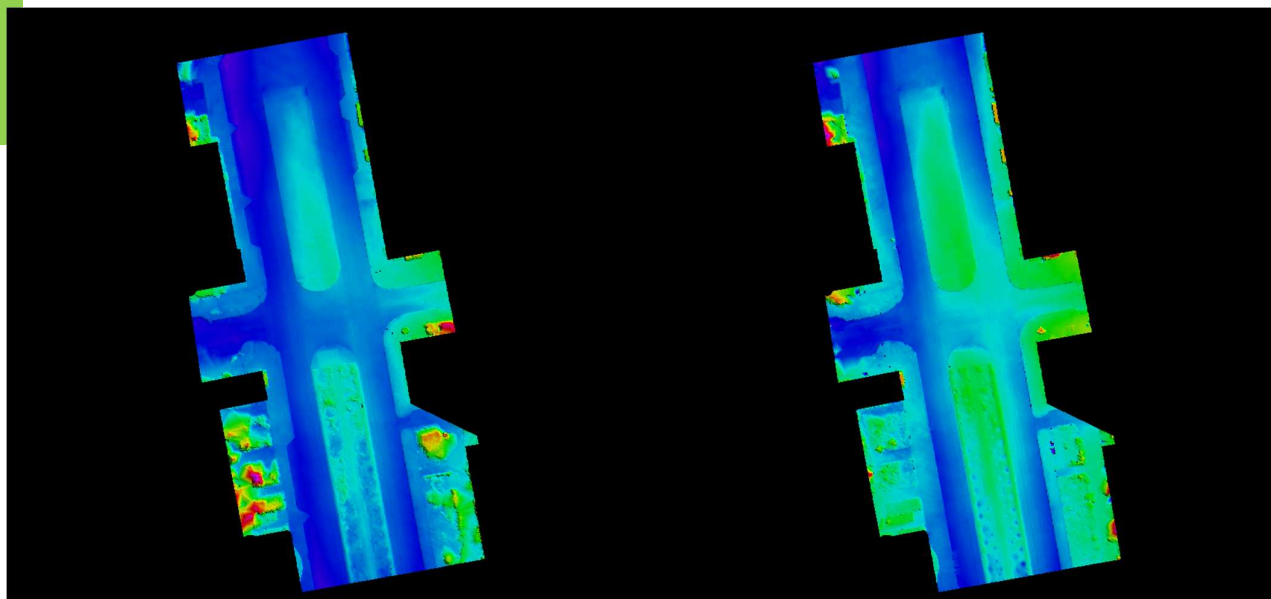
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Generation of digital surface model



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Generation of digital surface models

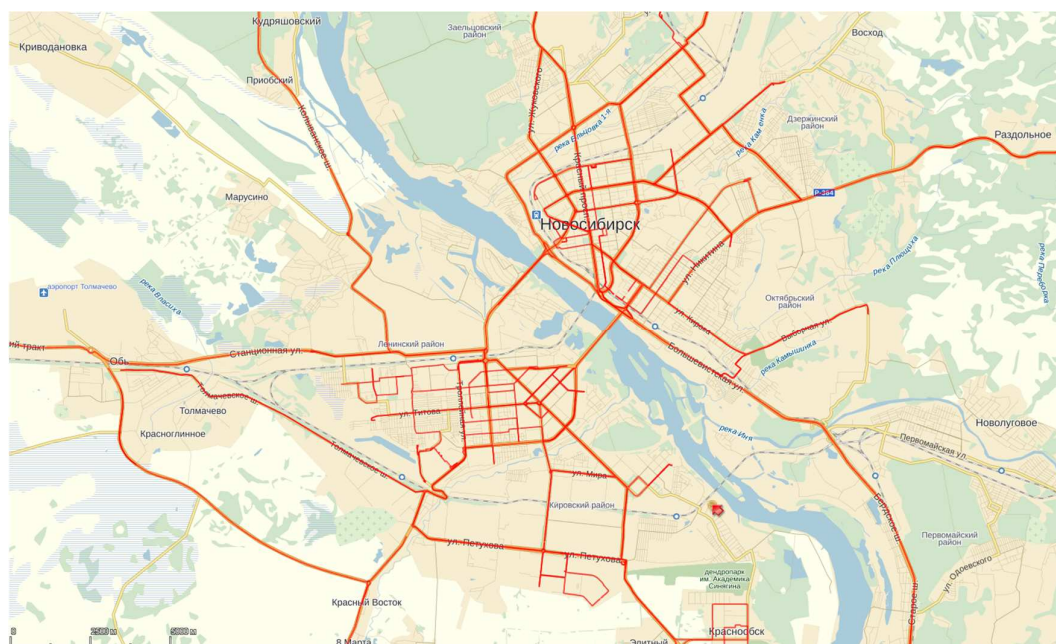


April 2013

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September 2013

Trajectories



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Consistent structures in IDIMA

- ✓ Horizontal gradient;
- ✓ Angle of gradient;
- ✓ X local;
- ✓ S signal;
- ✓ D signal;
- ✓ H signal;
- ✓ Extremum;
- ✓ Gauss-curvature;
- ✓ Laplacian;
- ✓ Transformation;
- ✓ Morphology;
- ✓ Energy;
- ✓ Dispersion;
- ✓ Arithmetic mean;
- ✓ Extremum transformation.

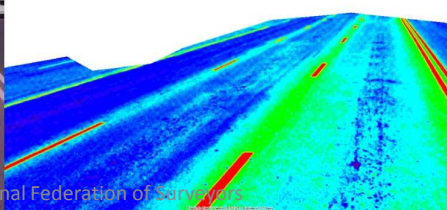
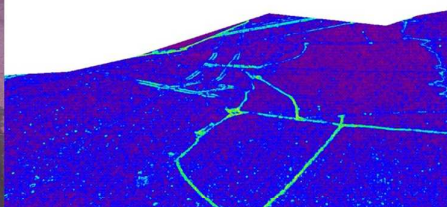
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Masking



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Images of consistent structures



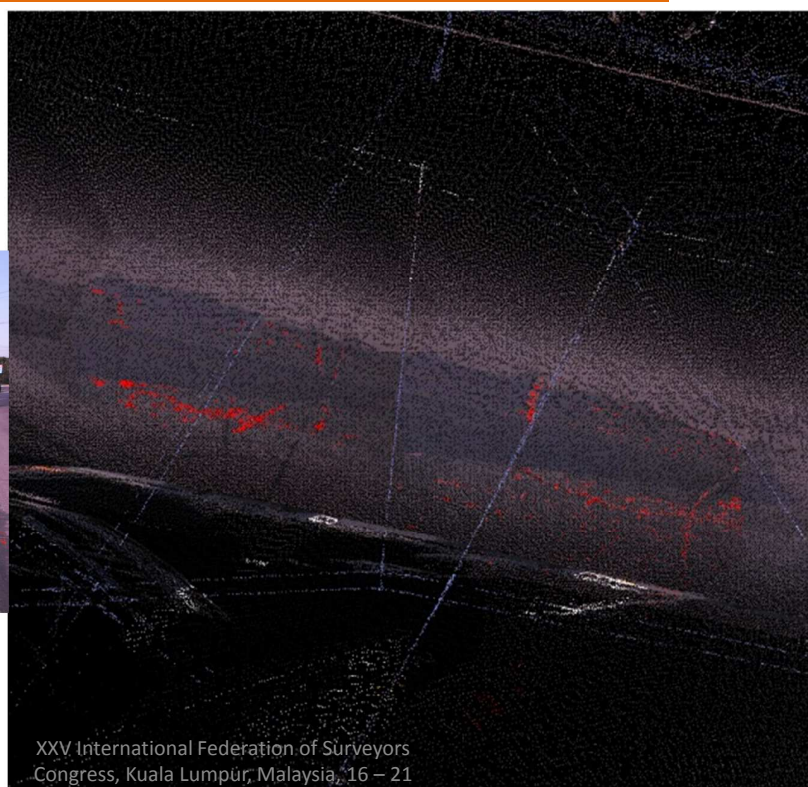
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Result of classification



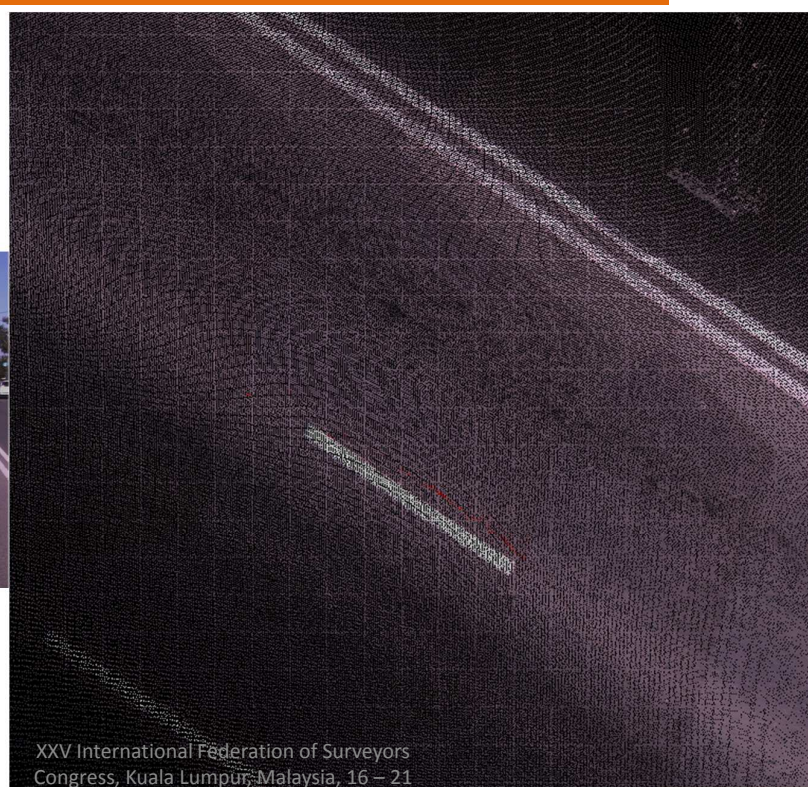
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Assign colors to the measured LiDAR points



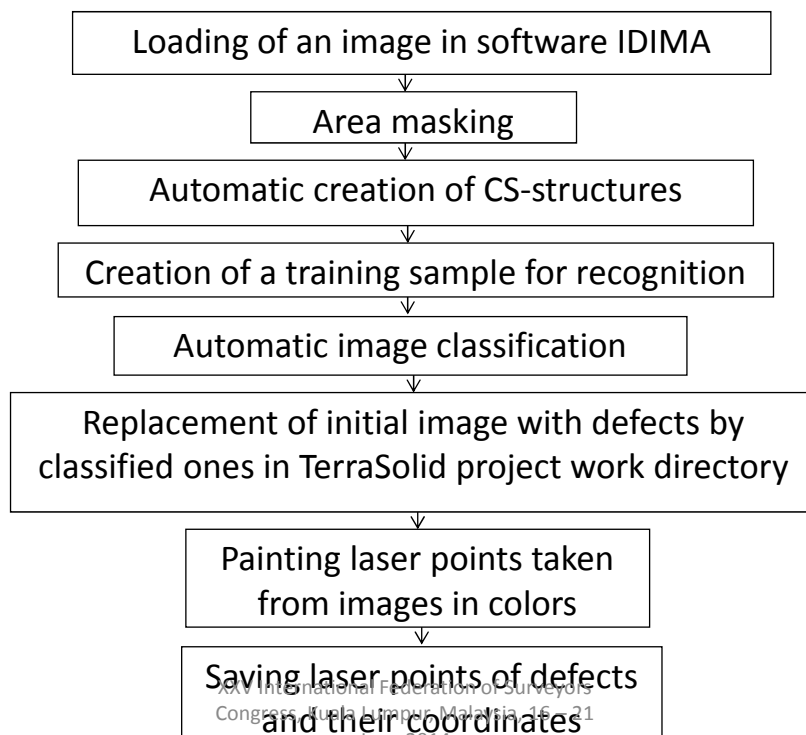
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Assign colors to the measured LiDAR points

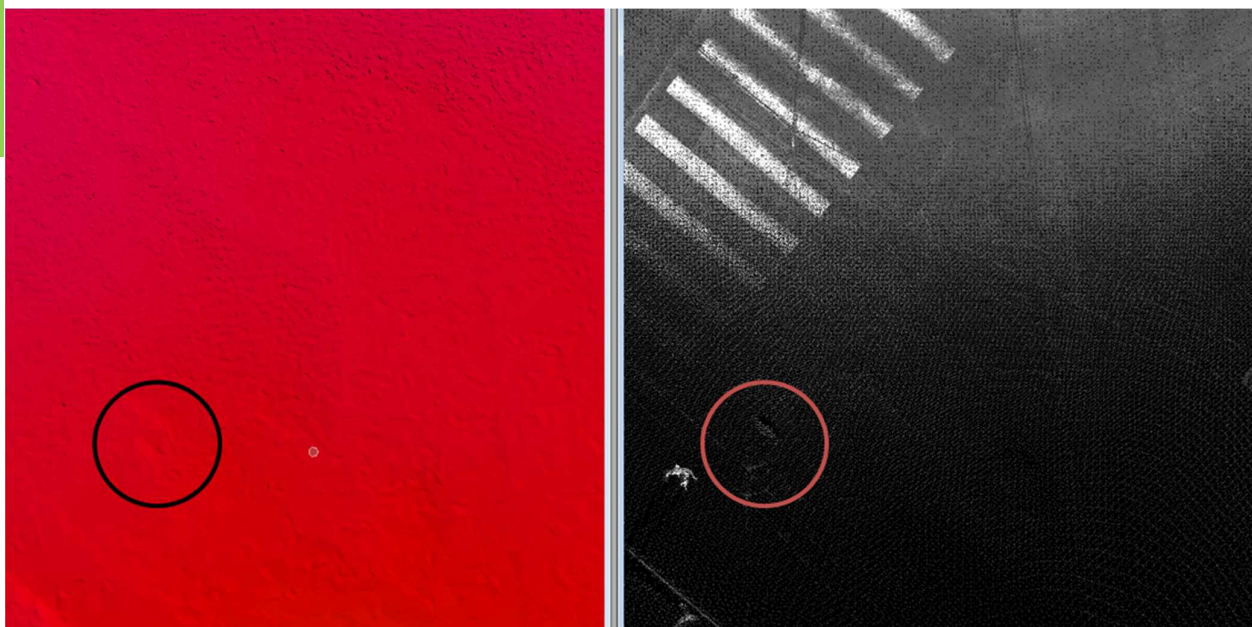


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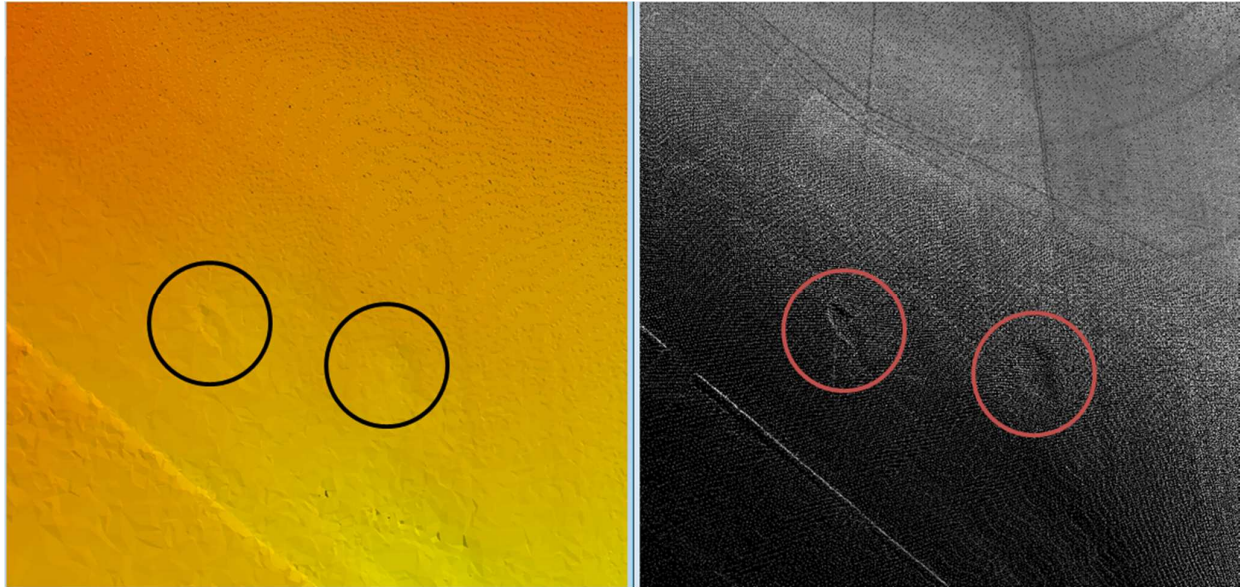
The technique for automated recognition of roadbed defects using laser scanning data



Identified chuck-hole

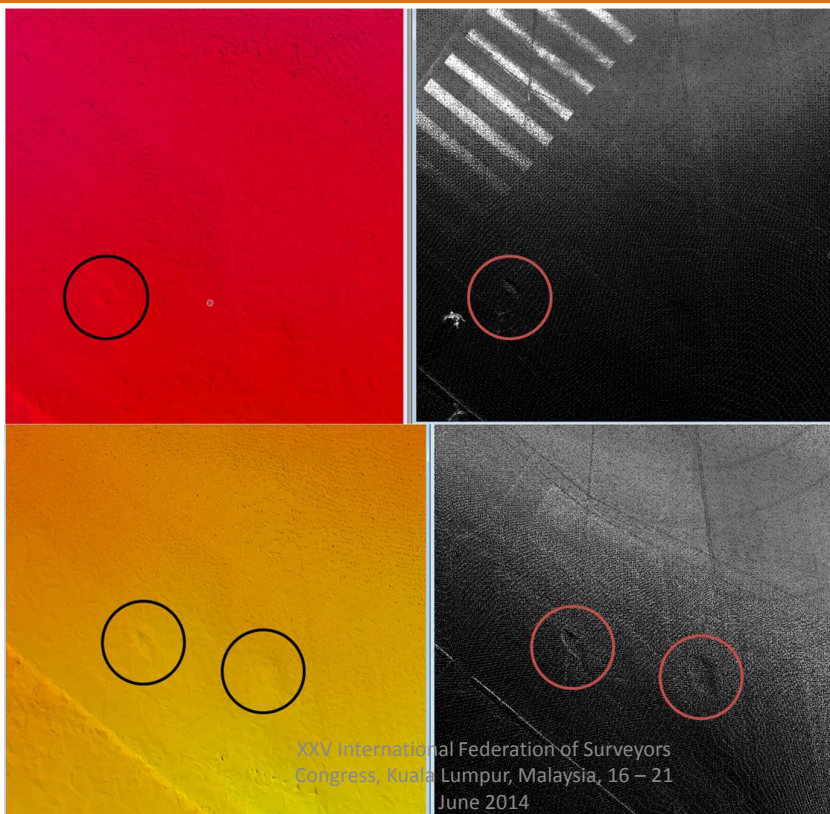


Identified chuck-holes a year later



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Comparison of digital surface models



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Conclusions

- ✓ The technique of automated recognition of cracks and chuck-holes was carried out.
- ✓ The technique requires to process each image individually, online mask, a training sample creation and to analyze digital surface models
- ✓ It is necessary to determine the impact of various external factors on pixel brightness in CS-structures obtained from images with cracks.
- ✓ Multitemporal digital surface models of roads can be used for detection of new cracks and chuck-holes.
- ✓ Multitemporal laser scanning data with high density adjusted with high accuracy should be used for generation of digital surface models

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Thank you for attention!