Introduction of Measuring Technologies, Vehicles, Devices and Systems

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Infrastructure and Engineered Structures
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Measuring technology.
Areas of application.

- Pavement monitoring of all road types (i.e.: city streets, county roads, motorways, highways)
- Inspection of construction and repair works
- Securing of evidence of road surface properties (i.e.: before and after the employment of heavy load vehicles)
- Settlement of facts on road sections with frequent accidents
- Section related evaluation of longitudinal and transversal evenness, skid resistance and surface distress
- Inspection of bearing capacity (size and homogeneity of pavement layers)
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## Road Condition Survey

**Surface condition assessment.**

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Road Condition Survey.

**Surface condition assessment.**

Surface Condition Assessment

**Evenness**

**Longitudinal**
- Evenness planograph, longitudinal slope

**Transversal**
- Evenness rut depth, water depth, transversal slope
Evenness.

Measuring principle: multiple scanning

Driving Direction

in meters

1.00  0.90  0.10

2.00
Evenness.
Longitudinal evenness: altitudinal profile

![Graph showing longitudinal evenness profile with measurements and chainage km.]

Test 1
Test 2
Evenness.
Planograph-simulation.

Based on the altitudinal profile
The calculation of the planograph-profile is conducted every 10cm below the centre of the 4m bar.
Evenness.
**System component: transversal evenness (front view).**

- Frequent alignment of measuring points
- Distance between lasers: 10cm
- Distance of transverse profile measurements: 1m

3.00 to 3.80 in meters

0.10
Evenness.
Transversal profile analysis.

Rut depth according to the “2 meter-crossbar principle“ and the theoretical water depth.

Transversal slope: 0.7%
Surface Condition Assessment

Angle: 20°

Sideward leading force $F_y$: $\mu_y = \frac{F_y}{F_z}$

Grip

Skid resistance value

measuring method for routine examinations of skid resistance
Road condition survey.

Surface condition assessment.

Surface Condition Assessment

Substance Characteristics

Asphalt
- net cracks
- mends/patches
- single cracks
- quarrying

Concrete
- longitudinal and transversal cracks
- edge damages
- corner derogation

Road condition survey.
Surface condition assessment.
Surface condition assessment.
**Evaluation of video material.**

Digital front camera: panoramic view

3 Macro detail cameras: straight down
Video evaluation.  
**Panorama - section image.**

Consisting of 3 synchronized front camera images
Video evaluation.
**ARGUS Macro Video – Surface distress assessment**

- Accurate localisation of results by
  - precise satellite navigation
  - exact reckoning system in combination with the recording of reference points by the operator during the measurement
- Computer controlled synchronised playback of the video recordings in different evaluation speeds ranging from single step to real time - depending on evaluation requirements
- Documentation of all observed damages with specially trained personnel depending on clients needs on up to 10 analysing desks.
- Detection of cracks of 0.5mm width
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Further Assessments

Bearing Capacity
FWD

Stratigraphic
sequence
Impulse-Radar

Material Testing
Marking
Asphalt, Concrete, Minerals,
Earth and Rock

Evaluation of traffic surfaces.
Evaluation of traffic surfaces.
Falling Weight Deflectometer (FWD).

Testload up to 240kN (on roads 50kN)

Plate applying pressure
Geophones

Simulation of heavy vehicle traffic exposure
Evaluation of traffic surfaces.
FWD – Analysis.

Measuring principle
Evaluation of traffic surfaces.
**Ground Penetration Radar.**

A destruction free measuring system for the detailed evaluation of:

- Subgrade
- Traffic surfaces
- Buildings
Evaluation of traffic surfaces.

**Ground Penetration Radar.**

**Radargram:**

- Evaluation of the layer constitution and localisation of possible damages on traffic areas
- Assessment of inhomogenities in the subgrade (i.e. hollow spots)
- Pre-assessment of the hydrological ratio
- Identification of pipelines, cable lines and other substances
Evaluation of traffic surfaces.  
**Material testing.**

Destructive and non-destructive tests

- At the laboratory
- Afield

of

- Earth and rock
- Concrete
- Asphalt
- Coating
- Marking material
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Data evaluation and presentation.

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Data Evaluation and Presentation

STRADIVARI

ARGVideo

GIS Incorporation
Data evaluation and presentation.

Positioning via GPS.

- Measurement run calculated by GPS
- City map with net point system
- Image of urban area
Data evaluation and presentation.
Road condition map.
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Hardware development.

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Hardware Development

ARGUS

Skid resistance (SKM )

ARGUS - PROFI

ARGUS - AGIL

Customer specific
Your advantage: Our attention to detail.
Thank you for your attention.