Surface Condition of Airports

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Road condition survey.

**Surface condition assessment.**

**Surface Condition Assessment**

**Evenness**

**Longitudinal Evenness**
- planograph, longitudinal slope

**Transverse Evenness**
- rut depth, water depth, transversal slope
Road condition survey.

Skid resistance measurement.

Surface Condition Assessment

Grip

Skid resistance value

measuring method for routine examinations of skid resistance
Concrete surface condition.

- Longitudinal splitting
- Transversal splitting
- Split accumulations
- Breaking edges
- Corner damages
- Cavities and chips
- Mends/patches
- Partial bitumen repairs
Joints and sealing.

Services according to the water balance act

- Technical regulation of substances hazardous to water (TRwS) – fuelling of aircrafts
- Recurring assessments
- Annual assessments of fuelling stations
- Shut-down assessments
- Assessment of coating systems
- Assessment of the impermeability of concrete surfaces
Bearing capacity.

**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.

TÜV Rheinland

Further Assessments

Bearing Capacity
FWD
ARGUS Truck

Stratigraphic sequence
Impulse-Radar

Material Testing
Marking
Asphalt, Concrete,
Minerals,
Earth and Rock
FWD. Analysis.

Measuring principle

\[ F_{\text{dyn}} \]

\[ h_1, E_1 \]
\[ h_2, E_2 \]
\[ h_3, E_3 \]

2-3 m
Aviation surfaces condition survey.

Condition Survey during operation
- Layer composition
- Bearing capacity (PCN), ICAO
- Surface condition
  - Concrete surfaces
  - Joints and sealing
  - Asphalt surfaces
  - Drainages

Condition Evaluation
- Damage assessment
- Damage valuation
- Maintenance concepts
Bearing capacity.
Remaining life.
PCN-assessment.

Advantages:
- No counterbalance necessary
- Assessment of the complete superstructure
- Minimum interference with air traffic
- Short test duration: about 2 minutes → nearly no traffic obstruction
- Tests done in non-flight times and at night
- No contamination of surfaces (i.e. drilling debris)
- No excavation necessary → destruction free
- Representative due to statistical conclusion
Remaining life. Maintenance size.

The long-term performance of the surfaces is simulated considering the pressure and the measurement results. By predicting the remaining life the required maintenance work can be economically optimised.

The valuation of the bearing capacity and the remaining life of the complete system is conducted according to ICAO standards.
Remaining life according to exposure.

Essential for the assessment of the remaining life is the manner, number and size of exposure of the surface.
Remaining life divided into 4 areas.

- Asphalt superstructure notional RL > 20 years
- RL = Remaining Life
- Concrete superstructure notional RL > 20 years
- notional RL < 20 years
- notional RL < 5 years
Identification of the PCN.

- Calculation of layer modules based on the deflection measurement and the layer size
- Definition of exposure and load repetitions
- Comparison of the calculated PCN with the existent CAN (IACO)
Presentation of PCN.

The examined area shows weaknesses and inhomogenities in certain spots which can be identified and presented as follows:

- Asphalt superstructure satisfactory PCN
- Concrete superstructure satisfactory PCN
- PCN < ACN
Evaluation and presentation.
Example.

The assessed condition classes of the surfaces can be visualised with given colours in general maps or GIS systems.

Joint assessment
- **green** new or slight damage
- **yellow** significant damage
- **red** heavy damage

The collected data can be visualised in various ways.
Evaluation and presentation.

Access to stored data on all measured areas is quick and user friendly.
Evaluation and presentation.
Data examples.

Various information can be added to the documented sections.

For example:
- Condition images
- Condition sizes
- Condition level
- Condition classification
- Bearing capacity evaluation
Conclusion and summary.

Non-destructive measuring methods

- economically achieve a high density of necessary information
- support the identification of weak spots, homogenous sections and representative testing locations
- minimise the number of conventional excavations and laboratory tests cannot, however, completely substitute them.
- the results can be analysed divided into surface and subgrade
- calculation of PCN according to ICAO
Thank you for your attention!