Contributing to the improvement of the quality assurance in the determination of skid resistance (SCRIM) in Spain

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SKID RESISTANCE IS A COMPLEX PARAMETER...

IT IS DIFFICULT TO ASSESS DUE TO A MULTICIPLICITY OF FACTORS PLAYING DIFFERENT ROLES...

NEVERTHELESS IT IS HIGHLY INTERESTING TO DETERMINE ITS VALUES...

• Road safety
• Rehabilitation needs
• Others
WHAT CAN BE DONE BY ROAD ADMINISTRATIONS?

DEMAND THE HIGHEST QUALITY

CEDEX IS DEEPLY INVOLVED IN THIS PROCESS TO PROVIDE THE HIGHEST POSSIBLE QUALITY IN ROAD MEASUREMENTS
QUALITY IS A PROCESS...

INCREASING QUALITY (level 1 to 4)

Level 1
Provider Services/Products
Product/service standard
ISO/UNE/EN
Product according to standard

Level 2
Internal Quality
ISO/UNE/EN
Quality management systems

Level 3
Conformity assessment
ISO/IEC 17000
Declaration - requirements are met

Level 4
Provider 3rd party audits
Provider Conformity Assessment
Verification

RESULT FOR THE CLIENT
Verified product

AGENT
Provider Services/Products

STANDARDS
ISO/UNE/EN

INCREASING QUALITY (level 1 to 4)
LEVEL 1: PRODUCT STANDARDS

✓ Standardization of measurement methods:
  – In Spain: UNE 41201 IN for SCRIM measurements.
  – Also calibration and verification of every component.
  – Together with operators training.

This has proven not to be enough in the case of skid resistance.
LEVEL 2: INTERNAL QUALITY PROCEDURES

☑ Every company should consider its own internal quality procedures.
☑ These can be required by the client (usually a road administration). Which is the case of CRT measurement in Spanish high level road network.

☑ However this has also proven not to be enough in the case of skid resistance.
LEVEL 3: CONFORMITY EVALUATION (ISO IEC 17000)

- It implies to prove that specific requirements are met.
- Steps:

  Selection
  - Information
  - Survey

  Determination
  - Test
  - Inspection
  - Auditory

  Review
  - Declaration
  - Certification
  - Accreditation

- This is what CEDEX does in order to check the devices...
SOME PARTICULARITIES WHEN WE TRY TO APPLY ISO 17000 SPECIFICATIONS TO SKID RESISTANCE MEASUREMENTS...

1. NO PREVIOUS CRITERIA – SO WE HAVE TO TAKE INTO ACCOUNT EXPERIENCE!
2. IT´S NOT POSSIBLE TO TEST THE SAME ITEM SO SAMPLING BECOMES ESSENTIAL
When performing interlaboratory tests it is usually feasible to provide every laboratory with the same sample...

The sampling is irrelevant and the differences among the different laboratories can only depend on the procedure used to calculate the concentration.
BUT when measuring skid resistance it’s not possible that every device measures the same “ítem”, so the sampling becomes essential...

The 95% confidence interval of the mean $\mu$ of a set of $n$ elements is:

$$\bar{x} - 2 \cdot \sigma / \sqrt{n} \leq \mu \leq \bar{x} + 2 \cdot \sigma / \sqrt{n}$$

The sampling is relevant and the differences among the laboratories can’t be related exclusively to the procedure followed in them:
SO, the way to **minimise the influence** of the sampling is measuring over **long enough sections** that are considered as homogenous from a statistical point of view.
MORE THINGS TO TAKE INTO ACCOUNT: RESULTS ANALYSIS


2. UNE 82009-2:2009 “Accuracy (trueness and precision) of measurement methods and results. Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method”

3. Plus statistical models to simulate the interlaboratory comparison tests (by CEDEX).
CEDEX METHODOLOGY TO PERFORM INTERLABORATORY COMPARISON TESTS

Design of the test
- Study the Surface characteristic that is being assessed
- Product standards to be taken into account

Perform Interlaboratory test
- Find test sections
- Plan
- Previous checks
- Road measurements
- Analysis of data

Results
- Assess the results of each device
- Reproducibility and uncertainty
- Harmonization of results
SCRIM INTERLABORATORY TESTS

✓ Previous checks
SCRIM INTERLABORATORY TESTS

✓ Road measurements
SCRIM INTERLABORATORY TESTS: ANALYSIS OF RESULTS

✓ Lots of calculations according to the above mentioned standards and methods


2. UNE 82009-2:2009 “Accuracy (trueness and precision) of measurement methods and results. Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method”

3. Plus CEDEX statistical models
## SCRIM INTERLABORATORY TEST

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SUMMARY AND CONCLUSIONS

- Conformity assessment
- ISO/IEC 17000
- "Third party" quality controls
- Quality assurance
- ISO 9000
- Product standards
- ISO/UNE/EN

QUALITY
Thank you so much for your kind attention!

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