Erosion

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Erosion tests by solid particle impingement

Testing & Analysis Lab Scale
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- These tests are performed in TECNALIA typically to evaluate if a material/component can be stored and operated under blowing sand conditions without degradation of its performance, effectiveness, reliability and maintainability due to abrasion/erosion.

- This test method is routinely used in the laboratory to measure the degradation due to solid particle erosion of different materials (paints, composites, metallic alloys, coatings, etc.), e.g. as a screening test for ranking materials in simulated service environments; component life estimation; etc.

- Tests are typically performed under procedures based on the working conditions as defined by the clients and/or indications of the following standards:
  - **ASTM G40** Terminology relating to wear and Erosion.
  - **MIL-STD-3033** Particle / Sand erosion testing of rotor blade protective materials
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- Tests are carried out with *jet nozzle type erosion equipment*.
- This equipment can be operated under different conditions:
  - Different *nozzles*, which allows the use of a variety of abrasives efficiently.
  - Working pressure *from 0.1 bar to 7 bar*.
  - Remote control.
  - *Calibration and precise control* for the flow of incident abrasive particles.
  - No decompression of the tank containing the abrasive material, i.e. regular and continuous particle flow.
  - Different *angles* of incidence.
  - Different *particles*. 
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Methodology

Test procedures are typically tailored to the working conditions / specifications.

- **Particle selection**: They can be client specific or defined based on on-site particle sample analyses: composition, size, morphology, etc.

- **Test conditions**: They can be client specific or defined based on experience, literature, etc.

- **After-test sample evaluation**: It is performed following clients` indications or otherwise defined based on the material characteristics, application and an ample set of analysis techniques, e.g. weight loss, profile analysis, spectrophotometric analysis, etc.
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Examples
Particle erosion test are relevant and have been performed for a number of sectors:

- Electrical transmission OH lines.
- Wind mills: blades...
- Solar power stations.
- High speed trains.
- Aircraft components.
- …
Testing & Analysis
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Labs equipped with testing facilities allowing a large number of corrosion tests in atmosphere, immersion or under mechanical solicitation to be performed according to standardized or specific demands.

Materials Testing & Failure Analysis

- Material testing and characterization (i.e., chemical composition determination, microstructure, mechanical properties: tensile test, fatigue, ...).
- Surface properties, i.e.: surface roughness, coating adherence, wettability, hardness, ...).
- Failure analysis
- Corrosion analysis, forecasting, assessment, control and monitoring.
- Wear and friction characterization.
- Paints and paints characterization.

Standards and Accreditations
Materials testing under NADCAP, ASTM, NACE, DIN, UNE, ...)
ENAC Accreditation
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- Accelerated atmospheric corrosion testing
- $\text{H}_2\text{S}$ Corrosion testing
- Corrosion/degradation under stress & corrosion fatigue
- In immersion (aggressive media) with or without mechanical load.
Thank you for your attention

For more information, please contact:

Iñigo Braceras / inigo.braceras@tecnalia.com