

Coating Adhesion Test

Rapid evaluation of coatings subjected to friction and cyclic loads

Industrial coatings serve to protect and enhance the functionality of the underlying substrates and prolong the service life of materials and equipment. The quality of the coating plays a crucial role in many applications involving repetitive mechanical loads and frictional stresses. However, the existing test methods are often unable to accurately reflect the real-life conditions to which the coatings are exposed. Researchers at TU Wien have therefore developed a novel device and accelerated test method for determining real life mechanical bending fatigue and effects of friction in coated materials.

BACKGROUND

The durability of coated materials strongly depends on the interfacial adhesion between the coating and the substrate. The failure of the coated materials, which can be adhesive, cohesive or substrate-related, plays a crucial role in the application and must therefore be assessed quantitatively.

Many qualitative and quantitative testing procedures based on international standards exist to evaluate and assess coating failures. For metals, scratch and abrasion tests are typically used to obtain qualitative information on coating adhesion, whereas static or quasi-static testing techniques are used for quantitative measurements. However, none of the existing methods reflect the typical cyclic loading conditions that occur in many industrial applications.

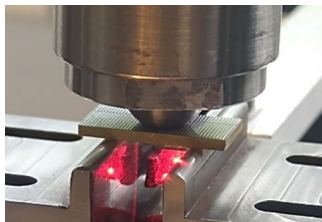


Image 1: Detail of test setup with sample © TU Wien

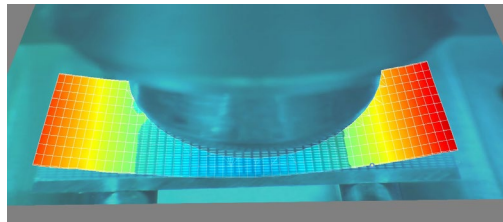


Image 2: Cyclic bending mode of the sample as measured with a scanning laser vibrometer © TU Wien



Image 3: Schematic of possible types of failure in coated samples © TU Wien

TECHNOLOGY

The high frequency test method and apparatus developed at TU Wien allow for a simultaneous application of static and dynamic forces as well as pressure and friction on coated surfaces. The method is suitable for various coating thicknesses ranging from nanometers to 100 micrometers. The tested coatings can be continuous, structured, flat, or profiled.

ADVANTAGES

- Quick
- Accurately reflects operational conditions
- Suitable for various coating materials, constructions, and thicknesses

REFERENCE:

M015/2022

DEVELOPMENT STATUS:

TRL 5

APPLICATIONS:

Any application, in which coated surfaces are subjected to cyclic loads, for example:
Machine industry e.g. power tools
Manufacturing industry
Automotive and aerospace industry

OPTIONS:

License agreement
R&D cooperation
Development partnership

IPR:

Patent applications pending

KEYWORDS:

Coatings, industrial coatings, coating failure, failure analysis

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