

Poster-Session

Development of a New Test Method to Evaluate Local Adhesion Properties of PVD coatings Using Vibration-Induced Cavitation

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Fatigue behavior and adhesion properties of the PVD (DLC and CrN) coated steel (100Cr6) samples were investigated using cavitation erosion tests. Locally distributed but highly defined surface defects such as nano-scratches and corrosion sites were introduced onto the samples surface before coating to intentionally distort the coating growth and weaken the coating adhesion. Cavitation erosion test parameters such as amplitude and distance were systematically varied and optimized in order to achieve the targeted coating adhesion loss at defect sites. The results of the investigation revealed adhesion loss at the defect sites and that it is possible to determine local coating adhesion properties with a cavitation erosion test. Localized adhesion loss was also detected on defect-free coated samples. Subsequent microscopic investigations revealed that segregation zones present in the microstructure led to apparently reduced coating adhesion which, might have caused the observed localized coating failure phenomenon.