Title: Behaviour of HVOF, WFS and AS coatings during the tensile test

Tomas Gregor, Ph.D.

Pavel Podany, Ph.D.

COMTES FHT a.s., Dobrany, Czech Republic

Abstract:

The coating is a common way to improve the properties of any product surface. The added material can have higher toughness, lower friction or even higher corrosion resistance compared to the substrate. The additive technology is also used where the original surface is worn out and the new part is much more expensive to manufacture compared to material addition and machining back to the original size. This contribution deals with a comparison of three different coating technologies: high-velocity oxygen fuel (HVOF), wire flame spray (WFS) and arc spray (AS). Literature offers comparisons of the above-mentioned methods based on the surface properties and wear/shear load resistance. However usually, there occurs also some stress/strain induced by temperature or mechanical interaction. The coating hardness is higher compared to the substrate and the delamination is accompanied with acoustic emissions. Authors used this information to detect the first signal of the de-adhesion of coating from substrate or coating rupture during the tensile test. The acoustic signal from the coating comes before any rupture is visible which can be used for failure identification way ahead any failure. The acoustic emission method was proved to be eligible for the detection of the behaviour of all tested coatings.

Image:



Figure 1: HVOF layer defects after tensile test.



Biography:

Tomas Gregor finished his Ph.D. in Experimental investigation of polymeric materials where he focused on computer tomography of polymers which is very challenging due to extremely low absorption in Xray wavelengths. After the research career he moved his focus to automotive industry as a leader of his own laboratory. Since 2018 he returns to material research with specialization to material enhancement with surface layer that can improve the key properties of each application.

Email: Tomas.Gregor@comtesfht.cz