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# MEASUREMENT OF INTERFACIAL ADHESION IN A THERMAL BARRIER COATING SYSTEM ON NI-BASED SUPERALLOYS: EFFECT OF TEST CONFIGURATION

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## Abstract

Measuring parameters of the resistance to interfacial deboning (adhesion) is one of the key factors to predict the durability of thermal barrier coatings system (TBCs) during operation under severe conditions. This work aims to develop a new experimental technique to quantify the interfacial adhesion in TBC system on Ni-based superalloys. Based on the analysis of existing methods and approaches to measurer the adhesion parameters for multi-layered structurally heterogeneous TBC systems, a new design of samples and test fixtures are proposed [1].

The obtained test results are discussed in a strong correlation with microstructural analysis, which is employed to study TBC thickness, its uniformity and geometry of the interfaces in pristine samples as well as to control the occurrence and spread of spallation during testing.

It has been previously shown that the residual stresses developed during thermal cycling are of primary importance, as their magnitude and distribution govern the durability of TBC systems. Numerical study is carried out using a finite element model based on representation of the contact between TBC components as a cohesive interaction.

**Keywords** Ni-based superalloy; TBCs; interfacial adhesion; microstructural analysis; FEM

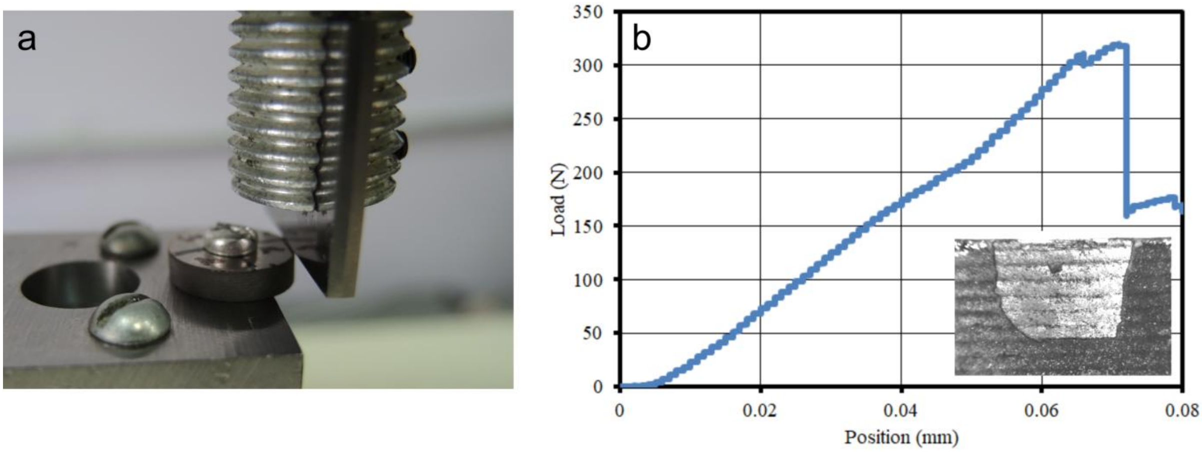


*Figure 1. Loading fixture for Tinius Olsen H25KT testing machine (a); experimental curve and spallation area of TBC on Ni-based superalloy (b).*

[1] E. Fedorova et al. Fracture modeling and experimental study on interfacial adhesion in a thermal barrier coating system on Ni-based superalloys. Procedia Structural Integrity (68) 2025, 908-914