SM9L_11626

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Failure Model of Protective Coatings

Asher A. Rubinstein, Yaliang Tang

Dept. of Mechanical Engineering, Tulane University, New Orleans, USA

The integrity of protective coatings is a continuous subject of concern for a variety of industrial applications. The determination of active failure development parameters during a series of thermal cycles is the key step for life prediction of thermal barrier coatings. Selective results of a rigorous analytical-computational model are presented. The emphasis is on relating thermal cyclic loading and mechanical loading to the developing system of periodically distributed cracks through the protective coating and the branching cracks along the interface. The developed model gives insight into the processes taking place during failure development and the effect of the details of the applied thermal loading. The model will serve as a guiding tool for service life estimation of components subjected to the described conditions. The analysis separates the coatings into two groups: thin and final thickness coatings. Both cases were analyzed and are presented.

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