TRB0075 - NUMERICAL SIMULATION OF FRACTURE TOUGHNESS INDENTATION IN THERMAL SPRAYED COATING.

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Abstract: Indentation testing has been used to evaluate the fracture toughness of ceramics materials and, more recently, of ceramics coatings. This is a fairly simple technique and its results may be used to analyse the effect of residual stress, adhesion and cohesion on toughness and coating performance. The advantages of the technique are, however, offset by a number of difficulties:(a) all indentation fracture models given in the literature assume that either one or other of two idealised crack system is valid during Vickers indentation test; (b) the diversity of indentation fracture toughness equations reported in the literature; and (c) the often reported discrepancy between the indentation fracture toughness of material and its fracture toughness as measured by conventional methods. The work will use the Finite Element Method to simulate the hardness indentation test. This method is usually used to solve different types of engineering problems related to stress and strain. The final aim of this work will be simulate the indentation fracture in thermal sprayed coating to identified the mechanism of crack nucleation and the best equations to calculate the fracture toughness of this coating.

Keywords: finite element, fracture toughness.

TRB0225 - THE USE OF NUMERICAL RESPONSE APPROXIMATIONS TO MODEL LINEAR AND NON LINEAR SYSTEMS, WITH APPLICATIONS IN RELIABILITY AND STRUCTURAL ANALYSIS

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Abstract: Nowadays, the analysis of large structural systems requires the use of numerical models with a high number of degrees of freedom. This demand hidden the analysis results and deviates the analyst focus from physical problem aspects. This work proposes the development of objective functions defined numerically by finite elements models. The objective function is determined at some points in the design space for each one of the relevant parameters, determined in a preliminary analysis. The response of different analytical fits that objective functions can present is analyzed through points in the design space. The functions proposed were studied starting from simple cases which analytical solutions are known. It was considered linear and non-linear functions with multiple load cases. Some solutions are presented and an application in stress analysis and reliability is developed.

Keywords: objective function, stress analysis.

TRB0237 - COMPUTATIONAL METHODS FOR THE DETERMINATION OF STRESS INTENSITY FACTORS

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Abstract: Methods for obtaining stress intensity factors (SIF) for the mode I and mixed mode of fracture using numerical methods were presented and compared. Three different approaches for the computational determination of SIF were used: displacement correlation technique, J integral and modified crack-closure integral. These techniques are set in only one analysis step and were implemented in the