

ANALYSIS OF THE EFFECT OF CRACK WIDTH, CRACK LOCATION AND LOADING ON A METALLIC ELEMENT USING FINITE ELEMENT ANALYSIS AND ITS APPLICATION IN CIVIL ENGINEERING

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ABSTRACT

Metallic material (steel) is one of the reliable and promising construction material encompassing tremendous performance characteristics compared to other materials. The profound understanding and study of such material aid a lot in concluding various engineering properties. Crack in any element is one of the major problems in construction as it can propagate and can cause ample stress causing any element to deform so precise and tactful study of those material is must in advance. There are various factors which cause the deformation such as material property and behavior of material in accordance with location of crack, size of crack and the pressure applied in element. In this paper, mechanisms of crack propagation along a weak interface under shear and flexural dominated loading are studied by static methods using ANSYS 11.0. Our main objective is to test if continuum critical zone can accurately predict the critical crack and location scales relative to loading observed in static simulations model. This paper also explains how crack propagation would occur in different loading with variation in location and crack size. Analysis is done considering same thickness plat with rectangular model under compression and tension states, the parameters of stress under certain pressure and comparative graphs are drawn for stress and applied pressure. Conclusions are drawn based on the obtained graphs and figures.

KEY WORDS: ANSYS, Crack Propagation, Stresses, Continuum, size and location of crack