

**COMPARISON BETWEEN THEORETICAL AND NUMERICAL SOLUTIONS
FOR CENTER, SINGLE EDGE AND DOUBLE EDGE CRACKEDFINITE
PLATE SUBJECTED TO TENSION STRESS**

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ABSTRACT

The stress intensity factor is one of the most important concepts in fracture mechanics because of stresses near the crack tip increase in proportion to it. Therefore, it must be calculated accurately to obtain the fracture damage. This paper deals with determination of the stress intensity factor mode I (KI) for Centre Cracked Tension (CCT), Single Edge Notch Tension (SENT) and Double Edge Notch Tension (DENT) finite plates under Linear Elastic Fracture Mechanics (LEFM) and plane strain assumptions. To investigate the differences between the theoretical and numerical solutions, a comparison is made between the stress intensity factors calculated using a large number of standard equations with the others calculated using finite element software ANSYS R14.5. Stress intensity factors are evaluated with variation of crack length to plate width ratio (a/b), tensile stresses ($\bar{\sigma}_t$) and plate length to plate width (h/b). The analysis shows that the numerical solution is more suitable than the theoretical solution due to the results that the theoretical equations are limited in a range of parameters values, some parameters such as length plate is not considered in it and also the difficulty to determine the accurate stress intensity factors for cracks in complex structures.

KEYWORDS: Stress Intensity Factor, Centre Cracked Tension (Cct), Single Edge Notch Tension (Sent), Double Edge Notch Tension (Dent), Ansys R14.5