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# MATHEMATICAL MODEL FOR FAILURE LOAD EVALUATION OF MARAGING STEEL COMPACT TENSION SPECIMENS

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**Abstract**

M250 grade maraging steel having high strength and toughness is currently being used for aerospace pressure vessels. Following the elasto-plastic fracture mechanics, a simple and reliable mathematical model is presented to predict the failure load of the compact tension (CT) specimens. The model suggests for determination of the effective crack length and the stress intensity factor from the measured load versus crack mouth opening displacement data. The crack extension versus the stress intensity factor (i.e., the crack growth resistance curve or the R-curve of the material) obeys the power-law. After evaluating the material constants in the power-law through least square curve fitting of the fracture data, the model is validated through testing and estimating failure load of several CT specimens.

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Key Words : *CT specimens, Crack growth resistance curve, Failure load, Fracture toughness, Fracture strength, Maraging steel, Rocket motor case.*