**Integrated JC-ZA constitutive model for Flow Stress prediction of Inconel 625 Alloy**

**C. Anand Badrish**

BITS Pilani, Hyderabad Campus, Hyderabad, India

*nitink@hyderabad.bits-pilani.ac.in*

**Ayush Morchhale1, Nitin Kotkunde1\*, Swadesh Kumar Singh2**

1BITS Pilani, Hyderabad Campus, Hyderabad, India

2GRIET, Hyderabad, India

**ABSTRACT**

An accurate constitutive model is necessary for investigating deformation characteristics of materials and reliable numerical simulations in metal forming processes. In this study, hot tensile deformation nature of Inconel 625 alloy has been examined with slow strain rates (0.0001 *s-1*, 0.001 *s-1*, 0.01 *s-1*, 0.1 *s-1*) and temperature ranging from Room Temperature *(RT)* to 700ºC at an increment of 100ºC. The flow stress behavior was found to be considerably affected by variation in strain-rates and temperatures. Various material properties viz., yield strength, ultimate tensile strength, % elongation and strain hardening exponent have been determined at various temperatures. Furthermore, phonological based Integrated Johnson Cook and Zerilli-Armstrong (JC-ZA) constitutive model was applied based on experimental flow stress data. Various statistical parameter were used to prove its effective applicability. The experimental flow stress data showed good in agreement with predicted values.

*Keywords: Inconel625,Tensile Testing, Flow Stress, Constitutive Modeling*