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Thermomechanical Damage Modeling of F114 Carbon Steel

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Abstract : The numerical simulation based on the Finite Element Method (FEM) is widely used in academic institutes and in the industry. It is a useful tool to predict many phenomena present in the classical manufacturing forming processes such as fracture. But, the results of such numerical model depend strongly on the parameters of the constitutive behavior model. The influences of thermal and mechanical loads cause damage. The temperature and strain rate dependent materials’ properties and their modelling are discussed. A Johnson-Cook Model of damage has been selected for the numerical simulations. Virtual software called the ABAQUS 6.11 is used for finite element analysis. This model was introduced in order to give information concerning crack initiation during thermal and mechanical loads.

Keywords : thermo-mechanical fatigue, failure, numerical simulation, fracture, damage
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