J Appl Mech Eng 2018, Volume 7
DOI: 10.4172/2168-9873-C2-021

# Formulation of galerkins-integral based model for predicting abrasive wear in hot forging dies

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This paper presents a mathematical model for predicting abrasive wear in hot forging dies. The main objective of the study is to solve the developed model using the galerkin's finite element method. The governing differential equation of the developed mathematical model was put in a weaker form in order to obtain the stiffness matrix, mass matrix and source vector that is generated for each element to get the depth of wear at nodal points. The wear stiffness matrix, mass matrix and source vector were assembled by enforcing continuity for the nodal degree of freedom to obtain the global system equations. A time approximation was developed using α -family of interpolation and to achieve this, we apply the Crank-Nicholson finite difference scheme taking (α-0.5) and a time step Δt=0.005 was used to compute the depth of wear. From the validation of this work model with experimental data and exact results we had a correlation coefficient of 0.9999, it can be concluded that the model has strong tendency for higher degree of accuracy and efficiency.

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