

FE model for creep buckling modelling of Al–SiC composite beam

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The paper presents the finite element beam model applied on creep buckling simulation of a functionally graded Al–SiC composite with a spatially varying volume fraction. The creep parameters of the material were taken from available experimental studies on Al–SiC composites and described using the Norton–Baley creep law. Available experimental data were interpolated to obtain continuous creep parameters corresponding to the specific Al–SiC volume fraction distribution considered in this work. An original Fortran code was developed to simulate the creep buckling behaviour. A numerical algorithm using one-dimensional spatial beam finite element is developed. The corresponding equilibrium equations are formulated in the framework of co-rotational description. Results were compared, for validation purposes, with those obtained from FEMAP (see Fig. 1). The critical creep buckling times were determined for different beam structural geometries as well as for several loading conditions.

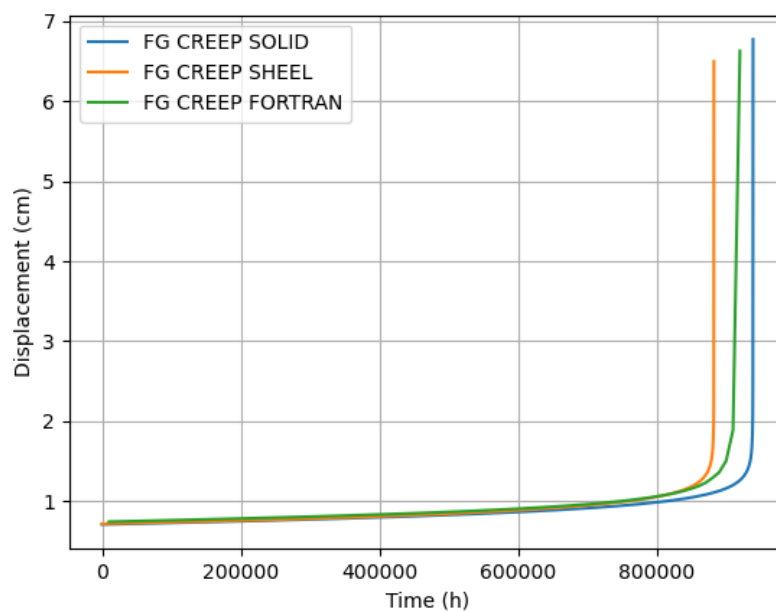


Figure 1. Critical buckling time for axially loaded cantilever.

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