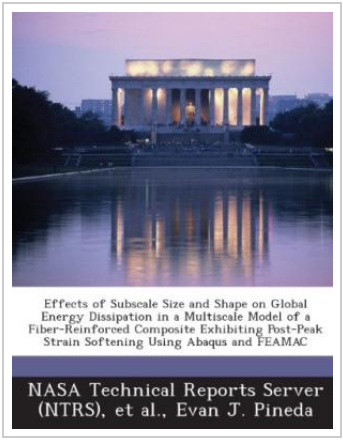

Effects of Subscale Size and Shape on Global Energy Dissipation in a Multiscale Model of a Fiber-Reinforced Composite Exhibiting Post-Peak Strain Soft

By Evan J. Pineda

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 26 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.A mesh objective crack band model is implemented in the generalized method of cells (GMC) micromechanics model to predict failure of a composite repeating unit cell (RUC). The micromechanics calculations are achieved using the MACGMC core engine within the ImMAC suite of micromechanics codes, developed at the NASA Glenn Research Center. The microscale RUC is linked to a macroscale AbaqusStandard finite element model using the FEAMAC multiscale framework (included in the ImMAC suite). The effects of the relationship between the characteristic length of the finite element and the size of the microscale RUC on the total energy dissipation of the multiscale model are investigated. A simple 2-D composite square subjected to uniaxial tension is used to demonstrate the effects of scaling the dimensions of the RUC such that the length of the sides of the RUC are equal to the characteristic length of the finite element. These results are compared to simulations where the size of the RUC is fixed, independent of the element size. Simulations are carried out for a variety of mesh densities and element shapes, including square and...

Reviews

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