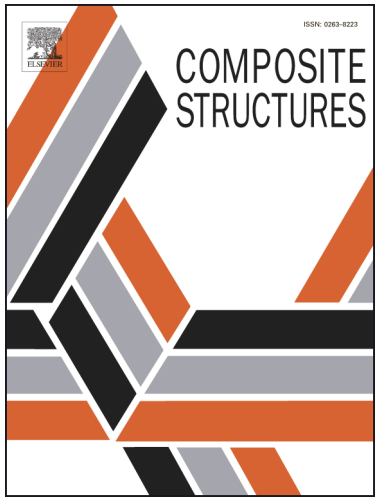


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# Application of energy dissipation approach for notched behavior in fiber metal laminates

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**Abstract**

Characterization of the complicated failure behavior in fiber metal laminate (FML) depends on well understanding of the contributions from metal and composite layers. It seems to be very cumbersome to deal with this by conventionally collecting the stress, strain and damage patterns through experiments or numerical simulations, especially when complicated load (e.g., off-axis load) or a more hybrid degree is adopted. Since all mechanical responses in nature are governed by energy principles, in the present study an energy dissipation approach was introduced in FML. Analyses were carried out with employing the available history outputs in Abaqus, where four kinds of energy variables in terms of internal or total strain energy ($E_{int}$), elastic or recoverable strain energy ($E_{elast}$), energy dissipated by plastic deformation ($E_{plast}$) and damage ($E_{dam}$) were requested for both the constituents and the laminates. Two issues were clarified by this energy approach: off-axis dependence of mechanical response and damage behavior in notched glass fiber reinforced aluminum laminate (Glare), and the reinforced effect of titanium on notched Glare (a more hybrid case). Results have shown the potentiality of energy approach in straightforwardly and effectively characterizing the failure behavior of FMLs.

**Keywords:** Fiber metal laminate (FML); Energy dissipation; Damage behavior; Notch sensitivity; Titanium reinforced.

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