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Analysis of stress distribution near a blunt surface notch tip in an orthotropic fiber under tension

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Abstract

The intrinsic strength of carbon fiber is determined from tensile tests of carbon fibers with a blunt surface notch using a point stress criterion. A stress distribution around the blunt surface notch tip is needed for the carbon fiber with cylindrical shape and orthotropic mechanical properties. In this study, the stress distribution around a blunt surface notch in a fiber with various orthotropy under tension were calculated using a finite element method. An effect of orthotropy on the stress distribution is investigate. To predict the stress distribution for various notch and various orthotropy, an approximate stress distribution equation was proposed.

Key words

Fiber; Finite element analysis; Point Stress Criterion; Notch; Orthotropy

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