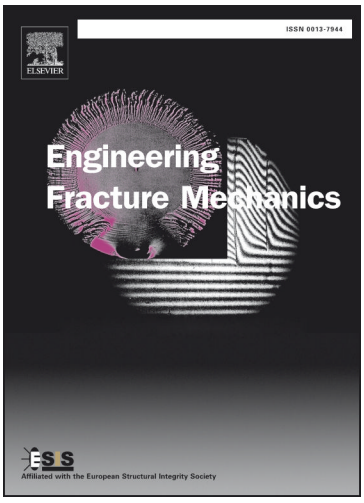


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# Fracture Toughness Testing Using Non-Standard Bend Specimens - Part II: Experiments and Evaluation of $T_0$ Reference Temperature for a Low Alloy Structural Steel

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**Abstract**

The present study addresses an experimental investigation of the effects of geometry and loading mode on the cleavage fracture behavior of a high strength, low alloy structural steel using standard and non-standard SE(B) specimens, including a non-standard PCVN configuration. Fracture toughness testing conducted on various bend specimen geometries extracted from an A572 Grade 50 steel plate provides the cleavage fracture resistance data in terms of the $J$-integral at cleavage instability, $J_c$. The experimental results show a potential effect of specimen geometry and loading mode on $J_c$-values which can help mitigating the effects of constraint loss often observed in smaller fracture specimens. An exploratory application to determine the reference temperature, $T_0$, derived from the Master Curve methodology (which defines the dependence of fracture toughness with temperature for the tested material) also provides additional support for using non-standard bend specimens in routine fracture applications.

**Keywords:** fracture toughness test, $J$-integral, specimen geometry effect, loading mode effect, subsize specimen, reference temperature

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