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Abstract: The present paper deals with the effect of uncertainties on the prediction of fatigue failure of aerospace and mechanical components. Typically the design of such structures has been based on costly experiments or modified versions of Paris' law which are applicable to very restricted range of conditions. The present formulation employs cohesive zone elements in order to resolve the fractured zone in combination with an extrapolation scheme that makes the analysis over hundred of thousands of cycles computationally efficient. The effect of randomness in the cohesive strength is examined with respect to the total lifetime of the specimen. (c) 2006 Elsevier Ltd. All rights reserved.

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