

Failure Forewarning in Complex Structures Under Arbitrary Loading

Disclosure Number

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Technology Summary

This invention is a novel predictive paradigm to determine the in-service health of structures or equipment by real-time, condition-based detection of impending failure, thus allowing repairs only when necessary with substantial time and cost savings over other methods. ORNL has demonstrated failure forewarning in simple structures by continuous, time-serial acquisition of load and deflection in laboratory-scale samples for low-temperature creep crack growth, stress corrosion cracking, and fatigue cracking in various materials (aluminum, steel, and glass-fiber/polymer matrix composite); (un)corroded states; single and multiple-site or wide-spread fatigue damage; and constant amplitude loading, as well as periodic over-loads. This invention teaches a novel extension of this forewarning approach. The invention further provides an automated, objective means of event forewarning.

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