

Stress-Based Analyses of Random Multiaxial Loading on a Specimen with a Hole

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The paper reports on two different ways of deterministic fatigue life prediction employed on a solution of a very complex problem. It concerns a set of experiments with multiaxial broad-band random loadings applied on torsion and push-pull load channels. The tubular specimen used for the experiments has a small hole drilled to one of its sides. In addition to the specific notch, which for various mutual relations between both load channels results in different hot-spots, the load history block, at which the load is randomized, is quite long - up to 600.000 time instants. The load histories at each load channels are constructed in such a way, that their power spectral density curves have specific forms: ascending, descending, pyramidal or white noise PSDs.

The applicability of stress-based solution method is discussed and prediction results of two specific solutions " one using the common load history decomposition to cycles, while the other integrating the load path differential by differential for obtaining damage " are provided and commented.