Numerical tool for the analysis of CTOD curves obtained by DIC or FEM

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Abstract

Typically, the Crack Tip Opening Displacement (CTOD) is used only to quantify the crack closure phenomenon. However, more information about crack tip phenomena can be extracted from the CTOD curves, which can be used for a better understanding of fatigue crack growth. The main objective here is the development of a numerical tool for the automatic analysis of CTOD plots, which can be obtained either numerically using the Finite Element Method (FEM) or experimentally using Digital Image Correlation (DIC). The parameters extracted are the elastic and plastic CTOD in loading and unloading regimes, the corresponding load ranges, the crack opening and closure levels and the dissipated energy. This tool is expected to promote a fast and efficient analysis of DIC and FEM results, facilitating the implementation of CTOD analysis in the fatigue community.

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`CTOD_tool.docx` available at https://authorea.com/users/344818/articles/471201-numerical-tool-for-the-analysis-of-ctod-curves-obtained-by-dic-or-fem

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