Impact & Crashworthiness Laboratory

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Shear generated fracture in predicting oil leak in accidents involving sinking platforms

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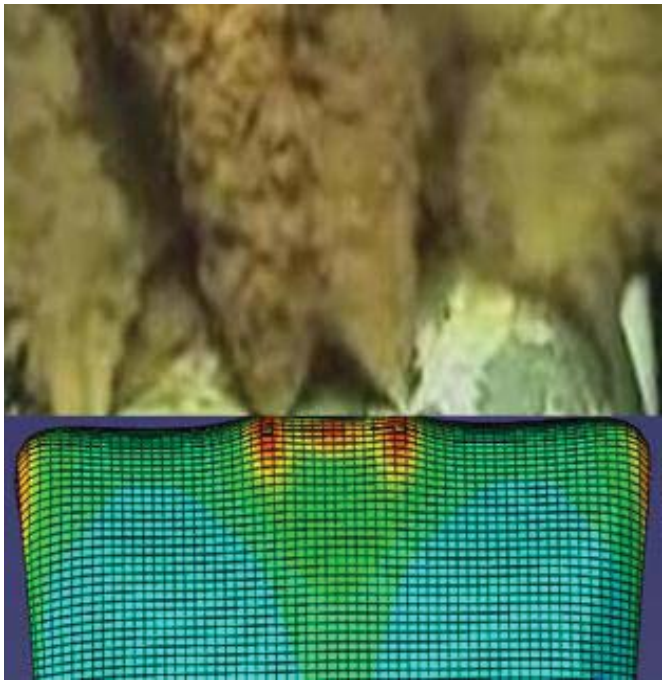

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Abstract

Extensive research in the area of plasticity and fracture modeling of high strength steels is been pursued in the Impact and Crashworthiness Lab (ICL) at MIT. This project is supported by the international fracture consortium on Advanced High Strength Steel (AHSS) funded by the automotive and steel industry. The MIT fracture model stems from the Modified Mohr-Coulomb (MMC) criterion combined with a suitable biaxial testing program and a calibration procedure. The objective of this paper is to present the main components of this technology and show its capabilities in predicting onset and propagation of cracks in O&G offshore heavy wall pipes. Results are shown for the cases of extreme bending of two concentric pipes and of the shear ram induced cutting process which is a critical part of the blowout preventer function.

Keywords: Multi-axial loading; shear ductile fracture; heavy-wall pipes; shear-ram; casing, riser; drill pipe; Mohr-Coulomb.
