Fatigue Crack Cheat Sheet

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Summary

The potential for fatigue cracks to occur in pipeline structures due to cycling loads inherent of offshore oil production, makes necessary have an inspection tool to carry out periodic non destructive inspection in the inner pipe surface. The most critical point of pipeline structures is the circumferential weld and demands special attention during inspection. The results achieved demonstrate the feasibility to apply eddy current technology to detect fatigue cracks in welded joints of clad pipes.

Literature Review

Yusa et. al. [28]	**Purpose**	Application of the eddy current technique for detection of fatigue cracks
	Material	Nickel 600 (Incoloy Alloy) plate
	Artificial Defects	The cracks were fabricated on a three-point support fatigue machine.
	Image	Crack image
Huang et.al. [30]	**Purpose**	In addition to detection, the sizing of cracks of fatigue
	Material	316 Stainless Steel plate
	Artificial Defects	The cracks were fabricated on a four-point support fatigue machine.
	Image	Crack image
Nakagawa et.al. [31]	**Purpose**	In addition to the detection reliability of the eddy current technique, the effects of using EDM notches to represent fatigue cracks.
	Material	Titanium Alloy (Ti-6246) e Nickel (IN-100)
	Artificial Defects	Electrical Erosion notches
	Image	Electrical Erosion crack
	Image	Extrapolation of results
	Final results	From the results achieved with the fabricated notches, a linear function was fitted to the data, extrapolating them to opening values that the authors named “zero” opening.
Larson et.al. [32]	**Purpose**	Similar Nakagawa et.al. [31]
	Material	Titanium Alloy and aluminium
	Artificial Defects	The notches studied in the work were superficial and shallow, with depth ranging between 25.4 μm and 0.4 mm, and openings ranging from 30 μm and 0.12 mm, and the interaction between the opening and the depth of the defects was mainly analyzed.
	Image	Extrapolation of results

Literature Review (cont)

Final results	The results achieved by the author indicated that the amplitude attenuation factor, so that signals from EDM notches are representative for fatigue cracks, is between 10 and 30%.

Difficulties to be considered in Crack detection

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