



Toward Optimal Updating Time Inspection Based on Reliability Approach of Fatigue Crack Propagation

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Auteur	Eltaeif, Maher [1], Hassine, Tarek [2], Bouraoui, Chokri [3], Riahi, Hassen [4], Chateaufneuf, Alaa [5], Bressolette, Philippe [6]
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Mots-clés	Fatigue Crack Growth (FCG) [7], Reliability Updating Method [8], Response Surface Method (RSM) [9], Updating Time Inspection [10]
Résumé en anglais	<p>It is well-established that fatigue crack growth process is one of the main process which can produce failure of structures and mechanical components. The aim of this work is to develop a model predicting an updating inspection time model for structural fatigue crack growth life based on updating reliability analysis taking into account the additional information generated by the previous inspection results. First order reliability method (FORM) and Surface response method are used to evaluate the reliability. The uncertainties such as material parameters and geometrical parameters which affect the lifespan of the structure were regarded as random variables. Updating reliability assessment based on Bayesian approach was introduced to determine the updating inspection time for target reliability. The method was illustrated through an application to a plate with an emergent rectilinear crack loaded with a constant amplitude cyclic stress. The results of the application are in a good agreement with the physical results and show that the proposed method is proved to be feasible and applicable in the general complex fatigue loading and able to give accurate updating framework for scheduling inspections. Furthermore the proposed approach leads to determine the optimal Inspection time strategy based upon cost-minimization by considering a single type or multiple types of inspections.</p>
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Liens

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