A Condition-Based Deterioration Model for the Stochastic Dependency of Corrosion Rate and Crack Propagation in Corroded Concrete Structures

Titre	A Condition-Based Deterioration Model for the Stochastic Dependency of Corrosion Rate and Crack Propagation in Corroded Concrete Structures
Type de publication	Article de revue
Auteur	El Hajj, Boutros [1], Schoefs, Franck [2], Castanier, Bruno [3], Yeung, Thomas [4]
Editeur	Wiley
Type	Article scientifique dans une revue à comité de lecture
Année	2017
Langue	Anglais
Date	Janvier 2017
Numéro	1
Pagination	18-33
Volume	32
Titre de la revue	Computer-Aided Civil and Infrastructure Engineering
ISSN	1093-9687
Résumé en anglais	Physics-based models are intensively studied in mechanical and civil engineering but their constant increase in complexity makes them harder to use in a maintenance context, especially when degradation model can/should be updated from new inspection data. On the other hand, Markovian cumulative damage approaches such as Gamma processes seem promising; however, they suffer from lack of acceptability by the civil engineering community due to poor physics considerations. In this article, we want to promote an approach for modeling the degradation of structures and infrastructures for maintenance purposes which can be seen as an intermediate approach between physical models and probabilistic models. A new statistical, data-driven state-dependent model is proposed. The construction of the degradation model will be discussed within an application to the cracking of concrete due to chloride-induced corrosion. Numerical experiments will later be conducted to identify preliminary properties of the model in terms of statistical inferences. An estimation algorithm is proposed to estimate the parameters of the model in cases where databases suffer from irregularities.
URL de la notice	http://okina.univ-angers.fr/publications/ua15907 [5]
DOI	10.1111/mice.12208 [6]
Lien vers le document	http://onlinelibrary.wiley.com/doi/10.1111/mice.12208/abstract [7]

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