

Finite Element study of Hydrogen-Induced Cracking: Determination of the Stress Intensity Factors for small elliptical cracks under high internal pressure.

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Currently, Hydrogen-Induced Cracking in pipelines is avoided using an empirical designed test. Saudi Aramco wants to assess and improve this empirical criterion by financing experimental and numerical studies of the physical problem. The post-doctoral fellow will participate to this project by performing three-dimensional Finite Element estimations of the conditions of crack propagation. HIC will be modelled by elliptical cracks loaded by high internal pressures. Among the framework of Linear Elastic Fracture Mechanics, the Stress Intensity Factor (SIF) will be determined in function of the geometry of the crack, their position in the pipeline and the external loadings (pressures, weight, free or restrained ends). In order to predict their evolution, the SIF will be compared with the local, eventually anisotropic, toughnesses determined experimentally in collaboration with the Ecole des Mines de St Etienne and the Ecole Nationale Supérieure De Mécanique et d'Aérotechnique of Poitiers.

We are seeking a highly motivated postdoctoral candidate with experience and interest in linear fracture mechanics and fully independent in three-dimensional finite element calculations. The position offers a good opportunity for a PhD graduate to be confronted with the problems of the industrial world while staying in a high level fundamental research environment.

The position will be for 18 months with a possibility of permanent job placement subject to satisfactory performance and availability of funds. Entrance upon september 2009.

To submit an application for this job, please contact Véronique Lazarus at veronique.lazarus@upmc.fr.

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