(6)

8/17/06

71 FR 47548

Comments on Draft Regulatory Guide DG-1144

I will send you my comments regarding draft regulatory guide DG-1144.

C. Regulatory Position

1. Fatigue Design Curve in Air

(Common to carbon steel, low alloy steel and stainless steel)

Introduction of environmental effects can improve the accuracy of fatigue evaluation. Given the introduction of environmental effects, safety margins of fatigue design curve should be reviewed in a more reasonable way. The proposed safety margins of 2 on strain amplitude and 12 on cycle seem to be too high. I consider that lower safety margins can be allowed through the evaluation of the scatter in the data obtained from the tests both in the air and under the water.

For example, I propose that safety margins of 1.5 on strain amplitude alone should be adopted when we introduce environmental effect. The technical basis of this safety margin is presented in PVP-2003-1775. This paper addresses the scatter in the test data only. The difference between test conditions and actual conditions needs to be also considered. However the current fatigue curve is based on the initiating point of a 3mm crack in smooth specimen. We have determined that such difference can be offset by the conservativeness of these assumptions applied in the codes.

2. Environmental Correction Factor

I have two comments based on the difference between the proposed factor and Fen factor adopted in JSME codes.

(1)Environmental fatigue correction factors of carbon steels, low-alloy steels and austenitic stainless steels have the following values in the case of no environmental effect.

Fen,nom = exp(0.632) = 1.88 (for carbon steels)

Fen,nom = exp(0.702) = 2.02 (for low-alloy steels)

Fen,nom = exp(0.734) = 2.08 (for austenitic stainless steels)

Fen should be 1.0 in the case of no environmental effect.

(2)The Japanese study (EFT Program) indicates that fatigue lives of austenitic stainless steels shows clear difference in PWR and BWR environment. The NUREG report developed the environmental fatigue correction factors by using conservatively low-DO environmental data which cause lower fatigue life. However the PWR and BWR environmental fatigue correction factors of austenitic stainless steels should be separated based on the test data. Otherwise the equation for austenitic stainless should be expressed by DO such as carbon steels and low-alloy steels

(3)The Japanese study (EFT Program) also indicates that Fen of nickel-chromium-iron alloy (Inconel) is smaller than Fen of austenitic stainless steel (SS). DG-1144 doesn't mention Fen of Inconel and I assume that you use that of SS. It is too conservative to apply Fen of SS to the evaluation of Inconel. You should add Fen of Inconel in Reg. Guide.
Ref: PVP2006-93194

D. Implementation

1. I agree that the regulatory guide will apply only to new construction plants. However, the applicability of this regulatory guide to actual plants needs to be investigated carefully since it entails drastic review of the current fatigue evaluation. In particular, the design transient conditions should be entirely revised applying this RG. Therefore, it is necessary to assure a sufficient period of leading time for investigation before applying the regulatory guide to an actual construction plant.

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