

# **FATIGUE ASSESSMENT OF OFFSHORE STRUCTURES (APRIL 2003) JANUARY 2004**

## **NOTICE NO. 1 – February 2013**

The following changes become **EFFECTIVE AS OF 1 FEBRUARY 2013**.

*(See <http://www.eagle.org> for the consolidated version of the Commentary on the Guide for Fatigue Assessment of Offshore Structures (April 2003), 2004, with all Notices and Corrigenda incorporated.)*

*Notes - The date in the parentheses means the date that the Rule becomes effective for new construction based on the contract date for construction. (See 1-1-4/3.3 of the ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1).)*

## **SECTION 3 S-N CURVES**

### **4 Tubular Intersection Connections**

*(Revise Paragraph 3/4.2, as follows.)*

#### **4.2 With Weld Improvement (1 February 2013)**

A summary of the API and HSE/DEN S-N curves for joints of tubular members having weld improvement is presented in the following.

API RP 2A(2000) uses the X curve for the following three corrosion cases with various endurance limits:

- In-air, endurance limit =  $10^7$  cycles
- Cathodic protection, endurance limit =  $2 \times 10^8$  cycles
- Free corrosion in seawater, no endurance limit.

The crediting of weld profile control (i.e., concave weld profile) and other fatigue strength enhancements are not mentioned in the Guide for use with the ABS S-N curves. The main reason for this is to discourage (however, not ban) the use of such a credit in design. In this way, the credit will be available if needed in the future [say, if design changes occur after structural fabrication begins and even later in the structure's life should reconditioning or reuse be considered]. Out of necessity and in a limited, particular circumstance, the Guide (in its Appendix 3) allows the use of the API X curve, which requires weld profile control and NDE.

Grinding is preferably to be carried out by rotary burr and to extend below the plate surface in order to remove toe defects and the ground area is to have effective corrosion protection. The treatment is to produce a smooth concave profile at the weld toe with the depth of the depression penetrating into the plate surface to at least 0.5 mm below the bottom of any visible undercut. The depth of groove produced is to be kept to a minimum, and, in general, kept to a maximum of 1 mm. In no circumstances is the grinding depth to exceed 2 mm or 7% of the plate gross thickness, whichever is smaller. Grinding has to extend to areas well outside the highest stress region.

The finished shape of a weld surface treated by ultrasonic/hammer peening is to be smooth and all traces of the weld toe are to be removed. Peening depth below the original surface is to be maintained at least 0.2 mm. Maximum depth is generally not to exceed 0.5 mm.

Provided these recommendations are followed, when using the ABS S-N curves, a credit of 2 on fatigue life may be permitted when suitable toe grinding or ultrasonic/hammer peening are provided. Credit for an alternative life enhancement measure may be granted based on the submission of a well-documented, project-specific investigation that substantiates the claimed benefit of the technique to be used.