Session 25 (Reference Stress Solutions) – Homework

Last Update: 23/10/14

Mentor Guide Questions

Provide written answers to questions 2.3, 2.4, 2.5, 2.6 and 4.5

Numerical Questions

1) A flush branch in a pipe made of a creep ductile material has dimensions:-

Main: $D_o = 230mm$, $D_i = 180mm$;

Branch: $d_o = 130mm$, $d_i = 100mm$

without reinforcement. It is subject to an internal pressure of 160 Barg and the following moments,

Across the section through the main: $M_x = 40$ kNm; $M_y = 35$ kNm; $M_z = 35$ kNm

Across the section through the branch: $m_x = 10$ kNm; $m_y = 5$ kNm; $m_z = 5$ kNm,

where $_x$, $_y$ represent the transverse moments and $_z$ the torque.

Find the rupture reference stress using the inverse code method.

2) In (1) what would the rupture reference stress be if the feature were a trunnion with the same dimensions and loads?

3) Optional extra question: Is the branch in (1) code compliant (say to BS1113), assuming a time-dependent (i.e., creep limited) design stress of $f = 90MPa$?