Session 41 Homework – Experimental Creep Crack Growth

Mentor Guide Knowledge & Skills Questions

[1.28] Describe the basic experimental arrangement used in creep crack growth tests and the raw data measured.

[1.29] State how the creep fracture parameter C* is estimated from the raw data measured in a crack growth test. Discuss the errors to which this estimate is subject.

[1.30] Describe how the crack tip opening displacement (COD) is measured at any time during a creep crack growth test, and hence how the critical COD for crack incubation is defined.

[1.31] State the validity requirements on specimen dimensions. Hence describe how an upper limit to the valid creep crack growth could be obtained.

[1.32] Explain what side-grooving is, how side-grooved specimen tests are interpreted, and why side-grooving may be desirable. Describe the variation in creep crack growth rates for progressively thicker or more deeply side-grooved specimens (at the same C*).

[1.33] Describe how the results of a creep crack growth test are presented graphically. Discuss how these results are used to derive a crack growth rate law. Describe the 'tails' in the graph, and explain how they arise with reference to the creep deformation behaviour of the material.

[1.34] Indicate typical plant C* or C(t) values on a typical experimental graph of da/dt versus C*. Discuss the reliability of the implied extrapolation with reference to longer term creep crack growth tests, contrasting ferritic and austenitic material behaviour.

Practical Activity

Visit Barnwood 100 to view a ccg test in action. See what instrumentation is used and how the data is gathered. (Liaise with Louise).