

Fracture Mechanics Assessment of Full-scale Railway Axle under Constant Stress Amplitude

Masataka YAMAMOTO Kazunari MAKINO Hiromichi ISHIDUKA

The assessment of railway axles based on fracture mechanics is very important for railway-vehicle safety. In particular, there is an increasing demand for damage tolerance analysis in order to determine appropriate axle inspection intervals. However, few studies have focused on the correspondence between the theoretical crack growth behavior and the observed results for railway axles subjected to cyclic rotary bending loading. This paper presents the results of crack propagation tests conducted using full-scale axles. The findings provide important information on the geometry of the cracks that are likely to be initiated and to propagate in railway axles. Moreover, the crack growth behavior of full-scale axles is evaluated and compared to that exhibited by compact tension specimens.