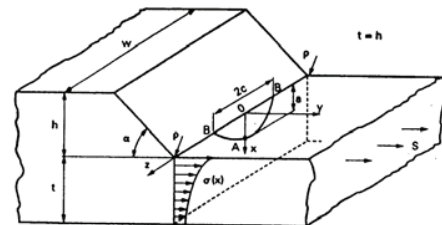
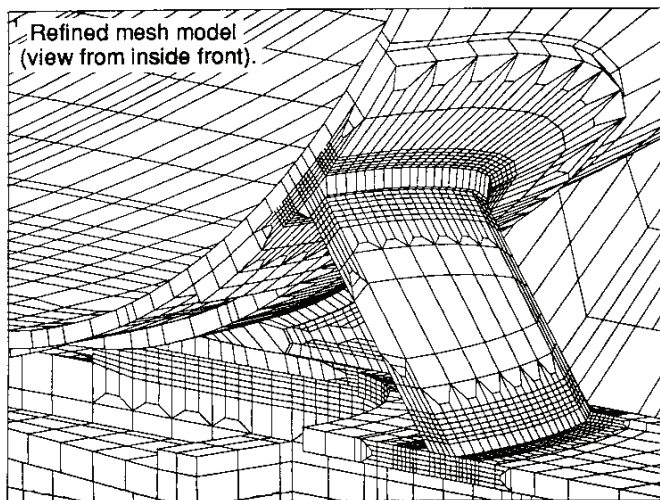


DAMAGE TOLERANCE ANALYSIS OF A RAILROAD TANK CAR

PURPOSE: Estimate the crack growth behavior and setup inspection intervals for a railroad tank car

A railroad tank car was analyzed for structural stresses per standard AAR (American Association of Railroads) specifications using FEA, with analysis guidelines established by Southwest Research Institute (SWRI). A detailed FEA model of the tank car was created with mesh refinements at the identified Fatigue Critical Locations (FCL). For each FCL, stress gradients were extracted ahead of the weld toe. Using this gradient, crack growth analysis was performed using NASA/FLAGRO (NASGRO) software. Starting at an initial detectable crack size 1/8", the crack was allowed to grow to a final critical crack size. Using the crack growth curve, inspection intervals were established. The analysis satisfactorily quantified and described the fatigue crack growth behavior of the tank car.



An assumed small pre-existing crack at the toe of the weld.

