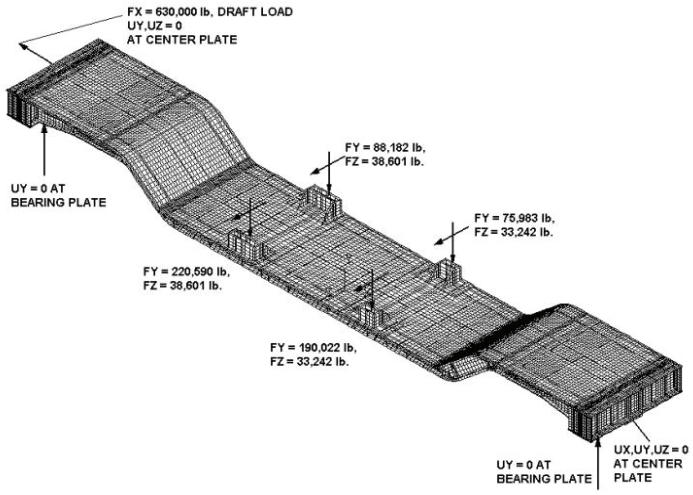
HLAENGINEERS, INC.

STRESS, WELD AND FATIGUE ANALYSIS OF A SPENT NUCLEAR FUEL CAR

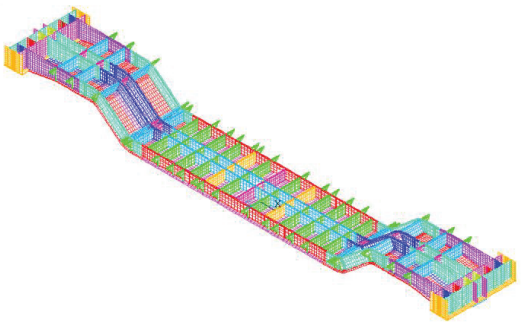
PURPOSE: Structural stress and fatigue analysis of a spent nuclear fuel flat car

A structural analysis of the first free interchange 230 ton Spent Nuclear Fuel (SNF) car was performed, per AAR (American Association of Railroads) specifications using FEA. Seven load cases (draftpull, buff, end compression empty and loaded car, single ended impact, jacking and twist) were analyzed, as recommended by TTCI in Spent Nuclear Fuel railcar specifications. Results of the stress analysis for each of the load cases were tabulated and presented in graphical form. Subsequent to the structural stress analysis and weld analysis, a strain-life fatigue analysis was conducted for the SNF car. The longitudinal, vertical and side bearing spectrums for both loaded and empty cars were included in the analysis.

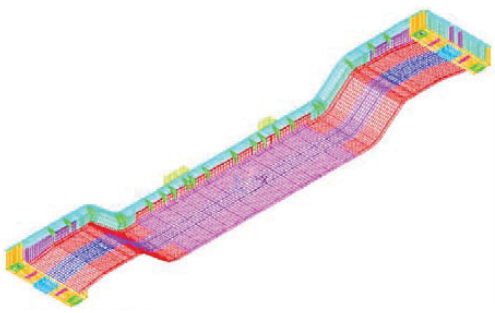
NUCLEAR CAR — DRAFT LOAD



NUCLEAR CAR — TOP PLATE AND LUGS REMOVED



NUCLEAR CAR — BOTTOM VIEW



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