COMPUTING AND SIMULATING RESIDUAL STRESSES IN AN R65 RAIL

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Abstract	Keywords

The article presents the results of analytically computing residual stresses (RS) in an R65 rail deformed by bending in two planes and torsion. We also used the ANSYS Mechanical application to simulate residual stresses for the same type of deformation. The resulting key parameter values match. We note that analytical computation is much more labour-intensive and hence not feasible when computer software is available. As compared to ANSYS Workbench software, ANSYS Mechanical has a less informative user interface. The residual stresses are non-uniformly distributed along the rail. Buckling creates minimum stresses in the head and foot, while stresses in the web reach the yield point, alternating tension and compression. Lateral bending forms both tension and compression stresses in the rail head, the concave part being compressed and the convex part subjected to tension of ±500 MPa.

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