



Numerical analysis of the stress distribution in an electron beam welded worm wheel

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In this paper the finite element method was used to determine various stress states in an electron beam welded worm wheel. These are the residual stresses due to the welding process, stress redistribution after teeth milling and another stress redistribution under operation load. It turned out that the maximum principal stress takes up the tangential direction and not the radial direction as was originally assumed. Based on this, the initiation of cracks in the weld can be explained. Teeth milling and applied operation loading proved to have a limited influence on the resulting stress state. Using the time development of residual stresses, an improved welding technology to eliminate the residual stresses was proposed.

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