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### Abstract:

The influence of elevated temperature, typical for operating fuel injection systems of Diesel engines, on the fatigue strength of such systems is the subject of the current paper. The investigation covered components, whose original durability had been increased by the mechanical procedure of autofrettage (unique mechanical overload). The method introduces favorable, fatigue strength increasing compressive residual stresses. No validated information was available concerning the influence of temperature on the fatigue strength of such components with residual stresses for the temperature up to 180 °C. The transient cyclic material behavior of the steel 42CrMo4 (used for autofrettaged components) was investigated as a function of the test temperature. The influence of elevated operating temperature on the fatigue strength of autofrettaged and non-autofrettaged components was simulated for intersecting hole specimens applying fracture mechanics based approaches of various complexity. The results were compared with results of an experimental investigation. The accuracy of all simulation models has been very satisfying.

Keywords: Autofrettage, fatigue crack growth, crack arrest, crack closure, cyclic plasticity

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