

Task:

Due to cyclical thermodynamic operating loads, fatigue cracks have developed on a turbine casing. The shrinkage stresses and thus the remaining residual stresses had to be kept as low as possible given the amount of weld metal required for repair. Furthermore, the sustainability of the repair seam was to be increased.

Solution:

SVS once again decided to use PIT technology. By means of the so-called intermediate-layer hammering, the resulting shrinkage stress on each layer was converted into residual compressive stresses. This procedure significantly reduces the residual stresses that build up layer by layer over the entire cross-section. Finally, after the hot form-grinding and the final test, the top layer including HAZ is once again PIT treated. Due to work hardening and remaining residual compressive stresses, the formation of new cracks is counteracted.

Customer benefits:

By reducing the shrinkage stresses during the repair, possible distortion was counteracted, and the final PIT treatment of the surface significantly increased the sustainability of the repair. This method, in conjunction with the quenched and tempered layer welding technique, was qualified as a uniform repair procedure in accordance with standards. The SVS has already carried out several repairs in this way and made very good experiences.

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