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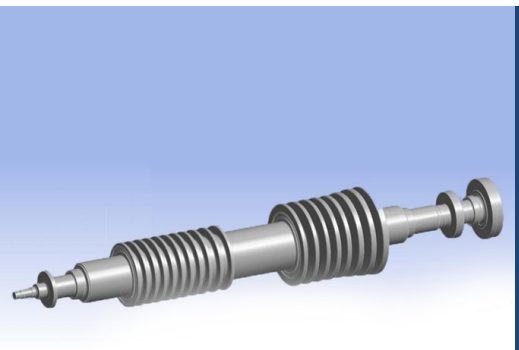
CCGT Start up times reduced

Steam Turbine Start Up Time Optimisation



Location United Kingdom

Client Little Barford CCGT Station

Expertise Steam Turbine Engineering, Stress Analysis, Thermal and Thermo-dynamic Analysis, Finite Element Modelling, Creep and Fatigue Modelling, Lifetime Estimation

Our Services

- Transient thermal and non-linear structural Finite Element Modelling
- Fatigue and Creep Damage Prediction, Lifetime Estimation
- Steam Turbine Thermodynamic Modelling
- Steam Turbine Engineering
- Lifetime Estimate

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Project description

A whole station flexibility study carried out for Little Barford Power Station identified that the steam turbine rotor stress controller equipped at Little Barford was very generic and not specific to the Little Barford rotor. It was concluded that there could be margin to improve the start-up times of the steam turbine without having a detrimental impact on the existing design life of the rotor.

To confirm this, a CAD model of the turbine rotor was generated and thermodynamic calculations were performed to provide input into a finite element model of the steam turbine rotor. Thermal and structural finite element modelling (including creep and fatigue) of the existing start-up procedure then identified a large margin between number of starts to crack initiation and the existing design life of the rotor.

The original starts results were reviewed and options identified for improvements to the start procedures. This new improved starts regime was then incorporated into the finite element model and, although the lifetime of the rotor reduced, there was still significant margin on the design life.

The new starts regime was implemented by the station and has led to an 1 hour reduction in start time for cold starts, a ½ hour reduction for warm starts and the hot start envelope being increased from 12 hours cooling or less to 18 hours cooling or less.

Europe & Central Asia