

Rotor Straightening

Product Sheet

On-Site or Shop Solution

Steam turbines operating in extreme conditions, at high temperatures and under heavy operation loads are often exposed to mechanical and temperature shock. The turbine rotor is the component most sensitive to these situations, and as a result of many factors, damage of the turbine rotor and result in it becoming distorted. Such damage make it impossible to operate the turbine without risking catastrophic damage to the unit. In these situations, rotor replacement requires significant downtime, resulting in a loss power production and high costs for a new rotor. As an alternative to this, EthosEnergy offers a turbine rotor straightening solution that results in the turbine shaft axis distortion returning to no more than 0.05mm.

Experience

The turbine rotor shaft straightening process has been used to successfully straighten over 100 rotors of various structures and power values. On the average, a distortion found manifests in 0.00-0.5mm distortion, however case have been seen with a distortion value reaching 7.0mm on a generator rotor distorted due to a failure and 5.4mm on a high pressure shaft of a 10 MW turbine. In one case, distortion of one shaft had occurred in several places, requiring the straightening process to be performed on each distortion separately.



Our Customer Benefits

- Faster and cost-effective alternative to a replacement rotor
- Capable of being performed on-site or in shop
- Single source for rotor straightening and rotor and component repairs
- Process does not produce stress accumulations or leave stresses in shaft material

Process

Prior to beginning turbine rotor shaft straightening, a detailed evaluation of the rotor condition and working out the entire repair scope is necessary. Additionally, prior to starting straightening is to perform defectoscopic studies to ensure there are no cracks or material discontinuity. Finally, curvature measurements and distortion reason analysis are conducted to choose the most appropriate course of action. A rotor to be straightened is set on a special straightening stand which enables technicians to take curvature measurements, to install a temperature measuring system, to produce thermal insulation and to install a heating system, as well as to induce loadings needed in straightening. This stand is made in a portable form, which allows the straightening to be performed on-site. The straightening process is completed in two stages and four cycles. The first stage is to remove stresses from the shaft material at the distortion spot, while the second stage consists of straightening of the plastic distortion. Straightening of a typical turbine shaft is completed, typically, when run out does not exceed 0.12mm (axis distortion 0.06mm). After straightening, the rotor must be balanced dynamically prior to returning to service. Typical straightening of a rotor shaft of 0.5mm distortion takes approximately 5 days when a prepared stand is used.



EthosEnergy is a leading independent service provider of rotating equipment services and solutions to the power, oil & gas and industrial markets. Globally, these services include facility operations & maintenance; design, manufacture and application of engineered components, upgrades and re-rates; repair, overhaul and optimization of gas and steam turbines, generators, pumps, compressors and transformers; delivery of gas turbines and generators, and supply of overhauled and warranted equipment on a FAST TRACK basis.