

1 Cracks in an original turbine casing after many years of service. The casing was replaced by a new casing, reverse-engineered and manufactured by Sulzer Elbar.



opportunity to increase the life-time of turbine housings.

Replacement of Four Casings

A Sulzer Elbar customer was relocating his Pratt-and-Whitney-powered peak-load power plant from New Zealand to Australia. The power turbines were manufactured by Curtiss and Wright. Target for Sulzer Elbar was to refurbish the rotor, as well as to reverse engineer and manufacture four new and more durable power turbine casings. All this was to take place within the limited time-frame of the relocation. In addition

to that, Sulzer Elbar was to come up with a number of design improvements to overcome problems encountered during the many years of service of these turbines.

Welding Instead of Casting

The original cast casings showed numerous cracks and were heavily deformed (Fig. 1). The casings were in no condition to start a second life that was destined for them on their new site, so they had to be replaced. It was decided to manufacture new casings out of Inconel 625 material, which would result in more durable casings.

Because of the time-frame in which the replacement was to take place, casting was not an option. Also, casting of Inconel 625 was not taken into consideration since it would not produce homogeneous and reproducible properties in this alloy. Therefore, the casings were manufactured out of a number of forgings that were joined by welding.

Reverse-Engineering of the Original Casings

To reverse-engineer the right dimensions out of the deformed casings was not an easy task. The stator vanes were tilted downstream as a result of creep deformation of the carrier teeth, caused by the continuous downstream gas force on these vanes. Based on the measurements on the deformed casings, the internals, and the rotors and by analyzing the clearance data provided by the customer, the Sulzer Elbar engineers reconstructed the original dimensions of the casings.

2 Final quality check of a repaired turbine casing.



