Metalock Engineering UK

Press Information

METALOCK ENGINEERING ACHIEVES A FIRST BY IN-SITU MACHINING THREE LP TURBINES FOR RETROFIT UPGRADES

To raise the efficiency of three 500MW low-pressure steam turbines for electricity generation, Metalock Engineering UK has carried out what it believes to be a first – the in-situ machining of three turbines casings to accept new retrofit upgrade components.

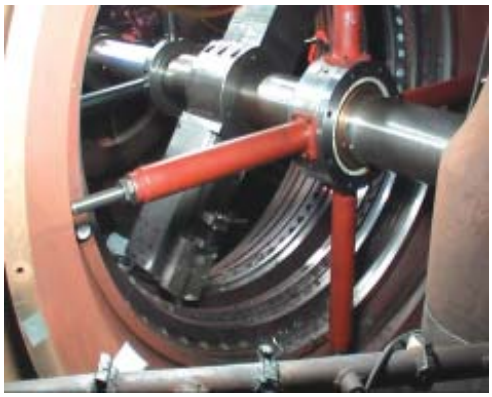
A traditional way of retrofit upgrading is to replace the existing inner module for one with extra rows of blades. However, due to the design, these turbine casings had to be modified to accept the larger blade carriers. It was decided that in-situ machining would be the most cost effective means of achieving the casing modifications required. The alternative would have been to dismantle the turbines completely but the time and cost, as well as asbestos health and safety requirements precluded this. Metalock Engineering had the type of equipment and expertise needed to carry out the complex machining work.

The company was called in for discussions on how best to approach the task of machining the casing to accept larger blade sets. Various faces and diameters had to be machined out to accept new blade carriers. The blade carriers are made up from 3 sections per half, mirrored about the centre. So in each turbine there are 12 separate blade carriers.

To save time Metalock devised a programme to machine two casings at one time using two of its own design and manufactured 6-metre long, 250mm diameter boring bars. These were roughly set into position inside the lower casings. The upper casings were then temporarily bolted down and the boring bars set to datum diameters at each end of the LP casing and locked into position. Each boring bar had separate drive gearboxes set independently of each other. The machining requirements were to achieve ±0.5mm on diameters between 1900mm to 3.5 metres and axial limits of ±0.2mm to ±0.3mm. The profile of the new static blade carriers required a circular slot with accurately cut faces, shoulders and chamfers. On completion of the two initial casings, one of the boring bars was moved to the third machine and set up to repeat the exercise.

Using Metalock's purpose-designed bridge drilling rig, holes were drilled, tapped and counterbored at the bottom dead centre positions of all the carrier blade slots to accept radial location keys and prevent the fixed carriers from spinning.

The technique employed was a first and a substantial learning curve but Metalock was able to achieve what was required to the satisfaction of the other parties.



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