Replace or recondition?

Sometimes it makes a lot more sense than some realise to recondition large roller bearings, rather than replace them. Brian Tinham explains

Technical pointers

- It's worth noting that repaired roller bearings not only provide the same performance as new, but that they can attract a full 24-month warranty, as per a new bearing
- That also applies to reconditioning of bearings from third-party bearing manufacturers
- Reconditioning is normally performed to various stages of repair
- Stage 2 (basic) means repair by polishing
- Stage 3 is grinding and replacement of components
- Stage 4 includes new inner or outer rings

Reconditioning large roller bearings can save a great deal of time and money – and result in at least as good a job as installing new. And that applies even on critical machinery that could seriously impact plant availability. Sounds contentious?

On most plants, large roller bearings are still dismounted and replaced as a matter of routine for preventive maintenance. It's a time-honoured and safe practice. But there are now services from specialist companies able to restore these bearings to good working condition – and at approximately half the price.

One such is FAG Industrial Services (FIS), which has worked with steel and aluminium rolling mills, papermaking machinery, mining and quarrying machinery, mineral processing equipment, wind energy and shipping.

Its repair centre, in Wuppertal, Germany, has considerable experience and estimates that maintenance of an existing bearing can cost from 15% to 70% of the cost of a replacement, dependent on requirement – assessed by a damage diagnosis survey.

The company cites one client, in Italy, for which it recently completed a reconditioning contract involving overhaul of two large double-row tapered roller bearings from a tunnel-driving machine. Each had an outside diameter of 3.4 metres and a mass of 4.5 tonnes. Total maintenance cost in this case was approximately half that of buying new.

And it's not just about cost; often, time saving is even more significant. Large bearings can be reconditioned within three months, sometimes faster, compared to the 12–18 months' lead time on very large units. In one contract for Siemens Automation & Drives in Nuremberg, Germany, a bearing with an outside diameter of 1.12m on a vertical boring and turning mill (for machining cast housings for electric motors) was reconditioned and installed within days.

In fact, that bearing was delivered to FIS at 6.00pm on the Thursday evening and, just 19 hours later, had been inspected, the raceways reground, new balls fitted and the bearing packed. At about 1.00pm on the Friday, Siemens was able to ship the reconditioned bearing back to site and, following a weekend shift by the Nuremberg maintenance crew at Siemens, production restarted on the Monday.

Placing a newly refurbished inner ring in a prepacked outer ring of a large bearing at FIS' repair centre in Wuppertal, Germany

Massive savings

In another recent contract for a major roller bearing on a tunnel-boring machine for a US-based user, turnaround time was six weeks. Despite having a mass of 11 tonnes and an outside diameter of 3.275m, the raceways, which were damaged at several points, were reground down 0.3mm and larger balls (0.6mm up) were fitted. In this example, beyond the massive time saving, the work cost just 60% of the price of buying new.

So what's involved? Repair work ranges from polishing, through grinding and replacement of components, to substitution of inner or outer rings, so that all the effects of wear and plastic deformation are removed, as well as machining out to larger internal clearance and introducing lubrication grooves or holes.

Corus Northern Engineering Services (CNES) can vouch for FIS' service. Corus' steelmaking plant in Scunthorpe recently underwent major bearing replacement work involving 1.75m diameter FAG spherical roller bearings that were supporting the tilting Basic Oxygen Steelmaking (BOS) plant vessels.

Says Ian Taylor, business development engineer, plant condition monitoring at CNES: "By working with engineers from FIS, we removed the existing bearings and fitted the new bearings. This took just four days of the three-week planned outage, before the panels and screens were refitted, the supporting frame removed and the plant re-commissioned." PE