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Solid but compact gearbox replacement

Planetary gear manufacturer Wikov reports on a recent case-study...

Wikov recently delivered a planetary gearbox for the central drive of a ball mill at a cement plant in Alicante, Spain. The project was a drop-in replacement for an original gearbox. The goal was to keep all connecting dimensions while delivering a much more compact gearbox and to keep its original power output.

The original weight of the central gear unit, including the base frame, was 104.5t, whereas the Orbi-fleX® planetary gearbox installed by Wikov weighs 67t, a 36% reduction in mass. Such compactness positively influences the capital cost.

The high power density of Wikov's planetary gear units is enabled through a multi-satellite arrangement and utilisation of a flexible pin in an open carrier structure. This design solution gives the gearbox higher power density but it is also critical in terms of operational safety. Wherever shockloads occur or higher safety factors are required, satellites mounted on a flexible pin in the open carrier structure flex, bringing benefits to the end-user.

Flexibility with Orbi-fleX® gearboxes means that the planetary gears are able to adjust position to compensate for any misalignments and deformations caused by shock loads from the driven machine through the output shaft and the carrier to the meshing points. This occurs via flexible pins that bring controlled flexibility into the system and help to reduce peak torque during shock load events. This consequently reduces load to gears and bearings. As a result gears and bearings do not suffer from damage and gearbox lifetime is enhanced. End-users benefit from a compact solutions that enables significantly reduced weight without compromising on power and safety.

Right: Comparison of behaviour of the conventional rigid pin solution and the shock load-eliminating flexible pin system from Wikov.

Below: Cross-section shows satellites with the flexible pin on two stages of the ball mill central drive.

Below right: The drive awaiting dispatch at the Wikov workshop.

