Coupling Corporation of America

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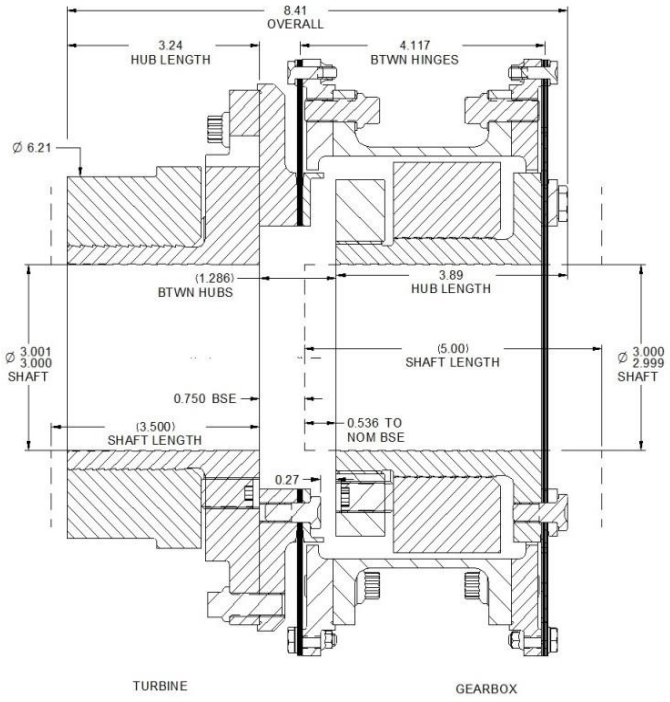
Paper Mill Reduces Equipment Vibration, Maintenance, and Downtime with a Coupling Upgrade fromCCA

For many years a paper mill in the Southeast US was struggling with maintenance and reliability on their paper machine drive steam turbine. The current coupling in the system was a gear style which required routine maintenance, and, to make matters worse, required disassembly of the turbine gearbox in order to perform the maintenance. The turbine had a capacity of 2500 HP and ran at a speed of 4827 RPM.



In 2010 the plant began looking at the idea of upgrading the current gear coupling to a maintenance-free design. The current coupling was only lasting 12 months before replacement, so there was a large incentive to make an improvement. As the plant looked for alternatives they realized that some potential options would be ruled out because of an oil pipe close to the turbine shaft. Making matters more difficult was a short distance between shaft ends of about half an inch. This short space created more geometry problems for any potential coupling. With their current setup, the coupling changeover time was about 24 hours – much of which resulted from having to heat the hubs for removal and installation.

The plant looked at the few coupling options that could meet the difficult specifications, and they wanted to select something that would help reduce vibration in the system. This meant looking for a coupling with low spring rates and one that would make the installation and removal process easier. Luckily they found the perfect combination in Coupling Corporation's Close-Coupled FLEXXOR model.

In order to fit the restrictions created by the oil pipe along with the tight shaft spacing, CCA used a bit of a hybrid design which has some elements of a spacer coupling and some of a close-coupled coupling. The turbine side had a more standard hub with the flexible element mounted at the end of the shaft, but the gearbox side had a reversed hub with the flexible element mounted on the back of the hub. See the drawing for more detail. Between the two flexible elements was a sleeve that was split sleeve that allowed it to be installed and removed very easily without moving either machine. This allows the turbine to be run independently if an overspeed check needs to be done.

The other major advantage of the CCA design was the keyless Anderson Clamp Hubs used to connect to the shafts. The Clamp Hub is designed to mechanically shrink on to the shaft without any heat or hydraulics. This makes the installation and removal process very safe, easy, and fast. Another benefit is the ability to change the axial position of the hubs very easily to adapt to small or even large changes in the shaft-to-shaft spacing. During hub removal, the risk of damaging the shaft is virtually eliminated compared with normal hub removal methods.

After installing the first coupling, the plant quickly realized that they made the right choice. The vibrations in the system dropped by 33% due to the low spring rates of the FLEXXOR coupling. They had eliminated all periodic maintenance associated with the coupling. And their downtime caused by the coupling during maintenance dropped from 1 day down to 2 hours because of the Anderson Clamp Hub. Because of the success, the plant upgraded other similar as well.

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