

200hp Induced Draft Boiler Fan CASE STUDY

Flux Drive solves belt slippage problem, reduces power costs by \$30,000 USD per year with project payback of 6 months.



**SIERRA PACIFIC
INDUSTRIES**
Growing Forests For Our Future

The Sierra Pacific Industries mill in Centralia, Washington has a cogeneration system to generate steam for its own use. A 200hp Flux Drive Belt/Pulley ASD was installed to improve process control and provide energy savings.



Sawmill in Centralia, WA



Flux Drive Adjustable Speed Drive installation on the 200hp ID Boiler Fan

CHALLENGE

The 200hp induced draft fan on the cogenerating steam boiler at Sierra Pacific Industries' Centralia lumber mill experienced significant belt slippage during start up. To eliminate the slippage, operators were forced to over-tighten the drive belts. The added belt tension then led to premature bearing failure. In addition, the fan provided more flow than was actually required by the process at certain times of the day.

SOLUTION

PumpTech, Inc., an authorized reseller for Flux Drive, installed a Flux Drive Adjustable Speed Drive configured for a belt-pulley system (ASD-BP).

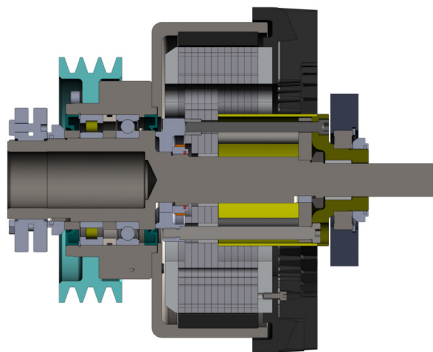
The Flux Drive ASD-BP consists of an outer magnet can assembly that is lined with permanent magnets and an inner induction rotor. These two elements are separated by a small air gap. The motor drives the induction rotor which in turn drives the magnet can and belt-pulley assembly. When the motor starts, a magnetic field builds between the rotor and can, causing the can to turn in the same direction as the rotor. When running at full speed, the relative motion between the magnet and induction rotor can be maintained at 98.5% efficiency.

The Flux Drive ASD-BP also provides a cushioned soft-start. During start-up, the motor immediately accelerates to full speed in an unloaded condition, drastically reducing locked rotor current (amps). The driven machine reaches full speed more slowly as the magnetic coupling effect builds within the ASD. At the Centralia mill, this cushioned start eliminated the belt slippage and extra belt tensioning thus preserving bearing life.

ENERGY SAVINGS

A significant bonus of the Flux Drive ASD-BP installation at the Centralia mill was a reduction in energy consumption by 550,000 kWh per year. This allowed the project to receive a utility incentive rebate totaling 70% of the project costs.

With energy savings of about \$30,000 USD per year, the payback period for this entire project is about six months.



*Cutaway of a Flux Drive Adjustable Speed Drive
(configured for belt-pulley system)*

FLUXDRIVE
ENERGY EFFICIENCY MADE EASY

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HOW THE ENERGY SAVINGS WORK

Balanced draft boiler designs utilize two types of fans. A forced draft (FD) fan delivers combustion air to the furnace. An induced draft (ID) fan reduces the atmospheric pressure in the boiler and provides a pressure differential that forces flue gases into and out of the stack.

The 200hp ID fan at Centralia is designed to provide maximum air flow when the boiler is under full load. At certain times of the day, however, the boiler is not operating at full capacity and flow from the ID fan could be reduced. During these periods, outlet dampers were used to restrict flow. Because the fan was still running at full speed, however, electrical power was wasted.

A unique feature of the Flux Drive ASD-BP is that the overlap of the magnetic can and induction rotor can be varied. While the motor-connected side of the Flux Drive remains at full speed, the Belt-Pulley side slows down to meet system demand. The amount of overlap between the magnets and rotor is controlled by a linear actuator. The actuator responds to a 4-20ma signal from the boilers control system and either speeds up or slows down the fan as required. The photo in the upper right shows the automatic actuator being installed on the Flux Drive ASD-BP.

With the ID fan running at slower speed, the power required for system operation was reduced substantially. Power readings show that the ID fan draws 98kW at full fan speed and only 35kW (a 64% savings) at the lowest fan speed during normal boiler operations. This results in an impressive savings of 552,000kWh and approximately \$30,000 USD per year. After the utility incentive, SPI's payback for the entire cost of the Flux Drive ASD-BP and installation is less than six months.



Flux Drive Adjustable Speed Drive (ASD-BP) and Automatic Actuator during installation.



A Flux Drive Technician uses instrumentation to confirm overall alignment and vibration levels.

The Flux Drive patented induction type rotor design has several distinct advantages over other coupling and drive technologies:

- ▶ Up to 98.5% efficient power transfer
- ▶ Reduces vibration
- ▶ Reduces system noise
- ▶ Reduces life cycle costs
- ▶ Lower power requirements
- ▶ Motor can be sized for the load
- ▶ Inherent Soft-Start capability – Belt Saving Feature
- ▶ 100% mechanical Adjustable Speed Drive

Flux Drive Inc. designs and manufactures the permanent magnet SmartCOUPLING™ and Adjustable Speed Drives that increase the life and performance of rotating equipment.

The company's patented technology greatly lowers power requirements and extends the life of motor driven systems by allowing motors to run at constant speed while the Flux Drive provides soft starting and adjustable speed.

Flux Drive products have been proven to reduce system maintenance cost and offer substantial energy savings.



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