

Stickney Water Reclamation Plant CASE STUDY

Flux Drive installs SmartCOUPLING™ on KSB hot oil pump system, reduces vibration, extends life of pump bearings and seals, saves energy costs.

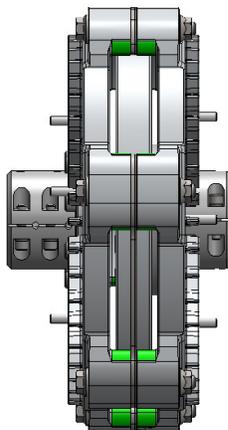


The Stickney Water Reclamation Plant, with a capacity of 1.44 billion gallons per day, is one of the largest wastewater treatment facilities in the world. Located on 570 acres in Stickney, Illinois, the plant serves over 2.4 million people in the greater Chicago area.

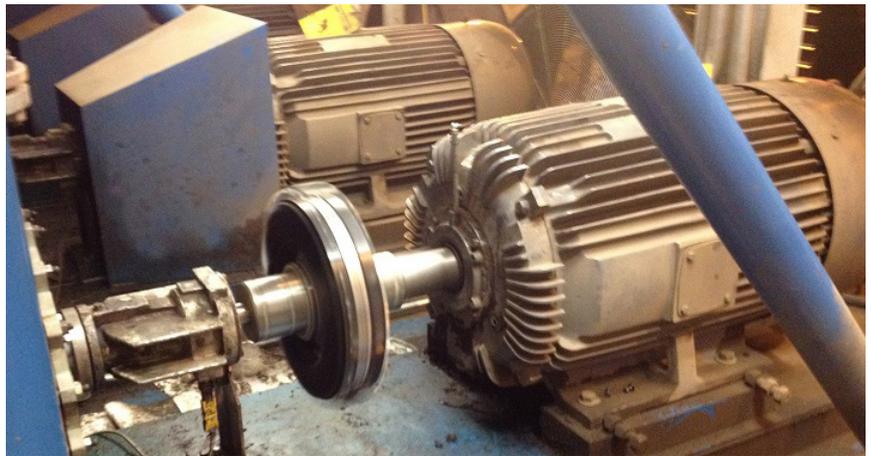
A portion of the produced sludge from the plant is dried and pelletized by a facility operated and maintained by Veolia Environnement.



Stickney Water Reclamation Plant



Flux Drive SmartCOUPLING™



Flux Drive FSC-4 SmartCOUPLING™ at Stickney Water Reclamation Plant sludge drying facility

CHALLENGE

The sludge drying facility at Stickney utilizes four 125 horsepower, 1800 rpm motors with KSB hot oil pumps in a drying system for the bio-solids waste from the treatment plant. Reliable shaft alignment (between motor and pump) has been difficult to maintain with standard elastomeric couplings due to thermal growth caused by the extreme temperature of the oil running through the pumps. The resulting severe shaft misalignment has led to excess vibration and extreme wear and tear on bearings and seals.

SOLUTION

Flux Drive replaced the existing elastomeric coupling on the most troublesome of the four motor-pump hot oil systems with a Flux Drive SmartCOUPLING™ model FSC-4. The maintenance-free SmartCOUPLING™ uses permanent magnets to transfer torque by means of magnetic induction across an air gap with no physical connection. The air gap allows for thermal shaft changes and in this particular installation, permitted some axial movement in the motor shaft due to a worn bearing housing from prior motor misalignment.

To match the axial length of the replaced coupling, the FSC-4 was installed with a 1" hub spacer. No other modifications to the system were necessary.



The SmartCOUPLING™ allows axial, parallel and angular misalignment up to .090" (or more with air gap spacers installed) with no loss of power!

SUMMARY

Following the installation of the Flux Drive SmartCOUPLING™ model FSC-4, the measured vibration levels on the motor and pump had been reduced to below 0.05 in/sec (Pk) in all directions, well within acceptable limits. In comparison, vibration on the other three identical hot oil pumps was measured in excess of 0.25 in/sec (Pk).

The air gap also served in an insulating capacity, keeping pump shaft heat from being transmitted into the motor, therefore increasing motor life.

Stickney Water Reclamation Plant Case Study

BENEFITS

The air gap effectively insulates the motor from the extreme temperatures in the pump. During testing, pump temperatures were recorded at 503 degrees F. Normal operating temperatures are approximately 580degrees F. The pump side of the SmartCOUPLING™ remained relatively cool at 119F due to air cooling, but the motor side of the SmartCOUPLING™ was at an even lower 105F – only slightly above ambient temperature. Reduced operating temperatures will extend grease life in the motor bearings, thus increasing motor bearing life.

It has been determined that the air gap also eliminates the need to perform laser alignment and will significantly reduce vibration levels due to misalignment. The motor and load shafts are isolated and the allowable misalignment tolerances are such that the pump can grow thermally without any increase in vibration or loss of torque transmission capacity. As a result, down time, maintenance and costly equipment repairs will be substantially reduced over the system's operating lifetime.

ENERGY SAVINGS

While misalignment correction and decreased maintenance were the primary factors in the purchase of the Flux Drive, the facility also benefited from reduced energy costs. During installation, a .050" air gap spacer shim was installed on the SmartCOUPLING™ to provide slightly more air gap space for thermal growth. This had the effect of slowing pump speed to approximately 96% of motor speed. There was no noticeable reduction in pump flow and the sludge drying process was unaffected. However, the 4% reduction in load speed resulted in an approximately 7% reduction in energy consumption. Compared to the previous full speed operation, the facility will save close to \$1,500 per year in energy costs.

The ability to fine tune load speed for energy savings is one of the truly unique features that sets the SmartCOUPLING™ apart from all other flexible couplings.



Air Gap Spacers for Energy Savings



Thermal images of the Flux Drive FSC-4 SmartCOUPLING™ in operation at the Stickney Water Reclamation Plant sludge drying facility.

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
- ▶ 100% mechanical SmartCOUPLING™ adjustment features
- ▶ NEVER WEARS OUT!

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.



Flux Drive Inc. • 23412 68th Ave South • Kent, Washington 98032
Phone: 253-826-9002 • Fax: 253-826-9004 • Web: www.fluxdrive.com

