

Schaeffler Global Technology Solutions

Steel and non-ferrous metals

Welded Tube of Canada, Canada

Reliable Brass Worm Gear Monitoring

Welded Tube of Canada is a privately owned leader in steel pipe and tube manufacturing with annual production capacity of 700 000 tons. Founded in 1970, Welded Tube has three divisions – Tubulars (OCTG), ERW Mechanical and HSS. With more than 700 employees and headquarters in Concord, Ontario, Canada, Welded Tube owns and operates five manufacturing and finishing facilities located in Canada and the US to serve the North American marketplace.

Challenge for Schaeffler

Welded Tube's metal tube forming line consists of four sections: forming, finishing, sizing and squaring. In the first three sections, only one electric motor drives 3 to 4 gearboxes. In its Concord plant, Welded Tube wanted to introduce predictive maintenance in order to increase gearbox availability and realize extended lead time for spare parts. The main requirement of the system was to get a well-priced solution with reduced cabling effort that could also be used on standard double output drives.

Schaeffler Solution

Schaeffler recommended that the customer should monitor all gearboxes' shaft and gear bearings as well as brass worm gears using FAG SmartCheck. The solution comprises of 13 FAG SmartCheck devices which continuously monitor the vibration of the gearbox. An FAG SmartController acts as a bi-directional gateway between the customer's control system and the sensors. The use of wireless routers and Power over Ethernet allowed the cabling outlay to be kept to a minimum – the entire system can be supplied with power and communication ensured with just one cable.



Technical Information about the Plant

Plant location:

Concord, Ontario, Canada

Annual capacity:

700 000 tons/year

Application:

Tube forming gearbox

Gearboxes:

- 13 gearboxes with 2 output shafts
- Electric motor speed with variable speed from 0 to 2 200 rpm



Monitored specialized gearbox



Damaged brass gear



FAG SmartCheck

Customer Benefit

Shortly after being put into service, the FAG SmartCheck devices proved their reliability by identifying high vibrations on various gearboxes. Within a period of only six months, Welded Tube's maintenance team detected three brass gear failures at an early stage. This information is especially important for gearbox spare parts with long lead times.

| Cost savings within 6 months | |
|--|--------------------------|
| Production loss and labor cost for one unplanned shutdown due to a brass gear failure [3 days (72 hr) x 700 €/hr]: | approx. € 50 000 |
| Cost savings resulting from 3 avoided shutdowns: | approx. € 150 000 |
| One-time cost for 13 FAG SmartCheck devices and 1 FAG SmartController: | approx. € 24 000 |
| Realized cost savings: | approx. € 126 000 |

Welded Tube is so satisfied with the Schaeffler service that meanwhile they have also switched to sourcing their bearings from Schaeffler. Moreover, additional FAG SmartCheck devices are in the process of being installed at two further Welded Tube plants in Welland (Canada) and Buffalo (USA).

What's special

Worm gear monitoring is very challenging due to the complex gear ratio. The FAG SmartCheck includes a special template called "track frequency band" that enables monitoring jobs such as this to be carried out. So the FAG SmartCheck is suitable both for specialized gearboxes and standard gearboxes.

Technical Information about the Solution

Number of monitoring systems:

- 13 FAG SmartCheck devices
- 1 FAG SmartController

Power supply:

Power over Ethernet (PoE)

Additional signals:

Speed
(0-10 V analog signal from customer PLC)

Monitored assemblies:

13 tube forming gearboxes

Monitored components:

- Shaft and gear bearings
- Brass worm gears

Monitored parameters:

- Machine vibration
- Speed
- Temperature

Analysis method:

- Vibration analysis (time signal and spectrum)
- Trend analysis