

HOW ULTRASOUND TECHNOLOGY IMPROVED BEARING LUBRICATION FOR CONSTELLUM



ABOUT CONSTELLUM

Constellium is a global manufacturer of innovative and high-value-added aluminum products primarily dedicated to aerospace, automotive, and packaging markets. With 27 manufacturing sites across Europe, North and Central America, and China, Constellium operates through three business units - Aerospace and Transportation (A&T), Packaging and Automotive Rolled Products (P&ARP), and Automotive Structures and Industry (AS&I) - to respond to the fast-evolving market needs. Constellium's Technology Center (C-TEC), located in Voreppe, France, and its new hub in Plymouth, MI, U.S., are responsible for designing and developing advanced aluminum alloys and solutions.

„Ultrasound technology has transformed our maintenance strategy at Constellium. By shifting to condition-based lubrication, we've seen a dramatic reduction in unplanned downtime, improved efficiency, and a significant cost reduction from outsourcing repairs. It's been an essential investment for our plant's success.”

Roger Carpenter, Constellium

THE PROBLEM

Constellium's Ravenswood, WV plant was facing critical failures on combustion fan bearings, motor failures due to improper greasing, malfunctioning auto-lubricators, alignment inconsistencies, compressed air leaks, and more. They were relying on time-based preventive maintenance for its lubrication program, which proved to be an issue since there is no textbook lubrication schedule that eliminates unplanned downtime and failure. Moreover, too much lubrication is just as harmful as too little. Condition-based predictive maintenance proved to be more dependable since it eliminated lubrication guesswork and listened to equipment.

THE SOLUTION

Condition-based maintenance, combined with ultrasound technology, enabled Constellium to listen to its assets and eliminate the guesswork that comes with time-based lubrication. Ultrasound equipment helped the team listen to the assets and determine exactly how much grease the bearings needed, which drastically reduced unexpected downtime and prolonged the life of the assets. The team matured its ultrasound program over time and moved to the Ultraprobe 15,000, paired with made-for-purpose grease caddies for condition-based lubrication.

THE RESULTS

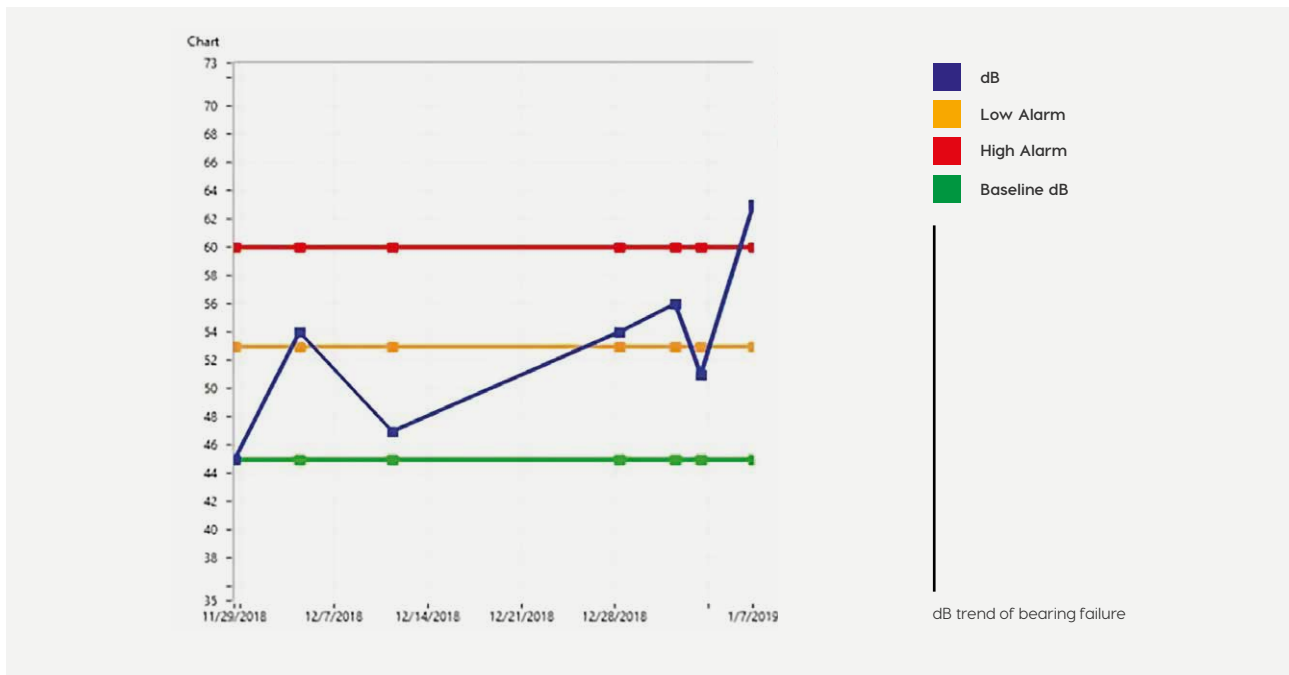
After implementing condition-based maintenance with ultrasound technology, Constellium noticed a significant reduction in unplanned downtime, a decrease in the cost of contracting work to third parties, improved lubrication practices on critical assets, and improved machine efficiency. The return on investment was immediate, and the team was able to make positive improvements to its maintenance strategy.

Point ID	Machine	Point	Date	Freq.	dB	Sens.	Low Alarm	High Alarm	Alarm Status
29	DC2 SNIF EXH	FIB	1/7/2019 8:18:55 AM	30	63	70	53	60	High
30	DC2 SNIF EXH	FOB	1/7/2019 8:20:05 AM	30	67	70	66	73	High
57	DC9 DOME, FLO	MOB	1/31/2019 12:20:17 PM	30	51	70	47	54	Low
69	DC10A EXHAUST	MOB	1/31/2019 12:26:16 PM	30	32	70	28	35	Low
70	DC10A EXHAUST	MIB	1/31/2019 12:26:29 PM	30	34	70	29	36	Low

Excerpt of a summary of bearing condition from DMS Software

EXAMPLE: EXISTING BEARING DEFECT IDENTIFICATION

The images below show the increase of the decibel over two months, indicating a rapid bearing failure. The bearing was already failing when ultrasound technology was applied.



Damaged shaft from bearing failure.

EXAMPLE: REDUCED BEARING FAILURE WITH CONDITION BASED LUBRICATION

During shutdowns, critical bearings were inspected and there were often signs of over lubrication. Using the Grease Caddy to perform ultrasound guided lubrication, the right amount of grease is added at the right time. Below are pictures of the same bearing, the first picture being before ultrasound guided lubrication and the second being after ultrasound guided lubrication.

Before Using Ultrasound



After Using Ultrasound



KEY LEARNING

- Time-based preventive maintenance can prove to be unreliable since there is no textbook lubrication schedule that eliminates unplanned downtime and failure.
- Condition-based predictive maintenance is more reliable since it listens to the equipment and eliminates guesswork.
- Ultrasound equipment helps in listening to assets and determining exactly how much grease the bearings need, which reduces unexpected downtime and prolongs the life of assets.
- Proper lubrication practices on critical assets can significantly reduce unplanned downtime and improve machine efficiency, leading to a reduction in the cost of contracting work to third parties.