



Timken® aerospace thin section ball bearings greatly reduce replacement costs

Challenge

While every aerospace application faces its own unique performance demands, they all have one thing in common: Bearing damage is not an option.

So when a rotorcraft customer learned of issues with its tail rotor de-icing system in two European helicopters operating in extreme cold temperatures, they contacted the application engineering team at Timken to find a solution.

In a matter of days, Timken engineers in Europe worked with the customer to conduct a teardown and field inspection to get to the bottom of the issue. After this initial inspection, parts were sent to Timken's application engineering team in the U.S. for a more detailed inspection and analysis.

Working together, the experts at Timken found that in extreme cold conditions there was significant contraction of the light alloy housing used in the de-icing system. This resulted in a loss of internal clearance in the thin section bearings.

Timken Solution

To help develop a solution, engineers used Timken's advanced bearing system analysis tool – Syber™. With Syber, the application engineers incorporated specific details of the tail rotor de-icing system – including the shaft and housing – to evaluate changes to the bearing geometry.

During this process they also performed a structural analysis of the assembly's light alloy housing and steel insert, and evaluated the effects of extreme temperature on the assembly's internal clearance and contact angle.

Following Timken's detailed analysis, engineers recommended changes to the bearing geometry, housing and insert to mitigate the effects of extreme cold temperatures.

Results That Matter

Thanks to the expertise of the Timken team, the customer could return its helicopters to service with confidence – knowing the problem had been solved. Additionally, the lessons learned from addressing this unique application issue will be applied across similar systems – both now and in the future.

