

**Industry:** Hydro Power  
**End User:** Northeast Electric Power Group Corporation  
**Application:** Turbine Guide Bearing  
**Thordon Grade:** SXL  
**Date of Original Installation:** 2003

### About:

Nestled in the upper reaches of the Songhua River in northeast China, Fengman Hydropower Station is operated by Northeast Electric Power Group Corporation (NEEPGC). The facility was originally built in 1937 and is equipped with ten turbo-generated units featuring a total installed generating capacity of 1002.5 MW.

### Challenge:

Fengman had been using rubber turbine guide bearings for decades, but there were problems with the material. Rubber hardens over time, substantially reducing its performance characteristics. As a result, the bearings in each turbine needed to be replaced at frequent intervals. To add to the maintenance challenge, the rubber bearings required huge amounts of lubricating water, had low loading capacity, high start-up friction and were prone to over-heating.

### Solution:

The Chinese had been using rubber for so long, they thought there was no alternative. They were surprised to learn that Thordon SXL could do a much better job. It was explained that Thordon SXL turbine guide bearings have earned an unparalleled reputation in the hydroelectric industry. An elastomeric polymer, SXL is renowned for its reliable operation, low coefficient of friction, long wear life, and excellent performance and reliability track record — spanning three decades.

After the engineers at NEEPGC were presented with the advantages of Thordon SXL they were optimistic, but cautious. They agreed to try the SXL bearing in one of the turbines as a test. One of the issues that initially concerned NEEPGC was the bearing design. They wanted to retain the same basic design as the rubber bearing, but enhance the performance. Fortunately, Thordon's engineering expertise and extensive application experience ensured NEEPGC's request would not be a problem.

### Results:

The Thordon SXL turbine guide bearing (970 mm [38 in] shaft diameter) was installed in the No. 7 turbine and during the next 17 months, a technical committee set up by NEEPGC evaluated the design, installation and performance. Ultimately, the end user concluded that Thordon SXL:

- improved the dynamic performance of the turbine
- had lower friction and, as a result, generated little heat
- was tough and experienced low wear rates (approximately 0.5 mm [0.02"] after 17 months)
- was very stable, reducing maintenance costs
- required significantly less lubricating water (approximately 27 m<sup>3</sup>/h [950 ft<sup>3</sup>/h] less, which equals a US\$37,000 annual savings)



As a result, the committee recommended that Fengman Hydropower Station continue to use Thordon SXL which ran without issue for the next 11 years before the turbines were completely replaced. It was the first time a Chinese hydroelectric plant has installed a Thordon SXL main guide bearing.