

Case History

BEARING FAILURE DETECTION ON TOP WIRE GUIDE ROLL 3 DRIVE SIDE

Reference vibration measurement on the drive side bearing of a 350 RPM, 111 mm diameter wire guide roll pointed out a severe BPFO and BSF bearing damage with impact visible in the acceleration enveloping spectrum (see Figure 1 and Figure 2)

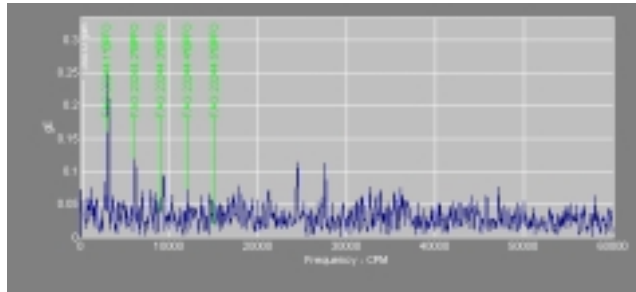


Figure 1 – Spectrum of acceleration Envelope measurement indicating outer race defect.

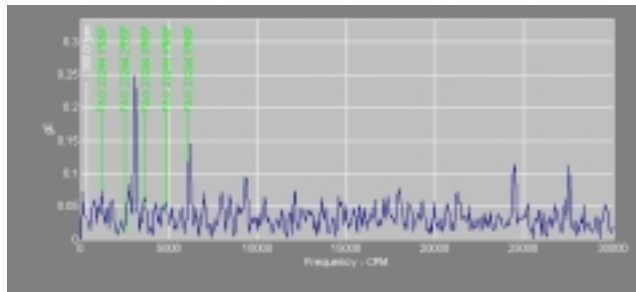


Figure 2 – Spectrum of acceleration Envelope measurement indicating roller defect.

Having so many multiples of BPFI and number of sidebands grows, this spectrum fits the description of a stage 3 bearing failure as described in the Technical Associates Illustrated Vibration Diagnostic (Figure 3).

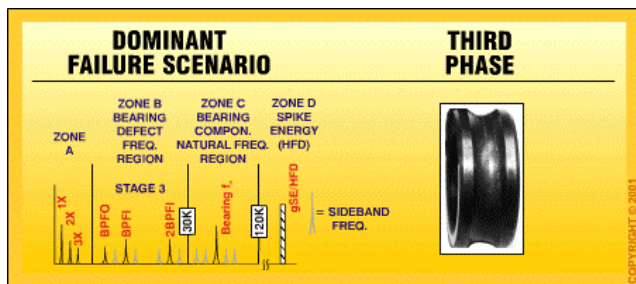


Figure 3: Stage 3 bearing failure

As per recommendation, the roll bearings were replaced on July 17, 2003. To confirm that a defect actually existed, the drive side bearing was cut open and visually inspected (see Figure 4 and Figure 5)



Figure 4 – Outer race defect found at drive side bearing.

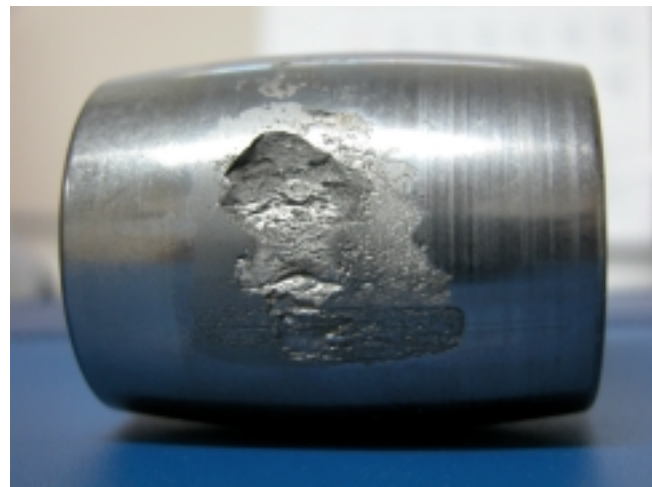


Figure 5 – Spherical roller damage found at drive side bearing

Failure of this bearing would have resulted in the paper machine shutting down for a minimum of 8 hours.

If left uncorrected, a catastrophic failure could have occurred resulting in damage to the roll, top wire and other component to this roll.

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Due to accurate analysis and prompt action, a catastrophic failure to the Wire Section components was prevented. If left uncorrected, would have resulted in the paper machine shutting down for a minimum of 6 hours.

COST CALCULATION:

1. Cost for planned repair (US\$):

Following value were used in the calculations:

- labour US\$ 5 / h
- Production losses US\$ 10,000 / h

The time for repair was evaluated to be 3 hours in case of planned repair.

Labour: 4 persons * 3 h * 5 US\$	US\$ 60
Material: New Bearing 23244 (S/C 112839)	US\$ 1,215
Maintenance Total	US\$ 1,275
Production Losses	US\$ 0
TOTAL	US\$ 1,275

2. Evaluated costs for unplanned repair (US\$):

When calculating the costs for unplanned repair it was assumed that the roll would be damaged and it would have to be replaced. It would take 4 hours for six men to change the roll and 2 hours to change the top forming fabric because the roll could not be changed without cutting the fabric.

Labour: 6 persons * 6h * 5 US\$	US\$ 180
Material: New top forming fabric (S/C 466086) New Bearing 23244 (S/C 112839)	US\$ 58,792 US\$ 1,215
Maintenance Total	US\$ 60,187
Production Losses 6 h * 50 tons/h = 300 * US\$ 200	US\$ 60,000
TOTAL	US\$ 120,187

3. Cost Efficiency:

US\$ 120,187 – US\$ 1,275

= US\$ 118,912