

## 1<sup>ST</sup> DRYER GROUP INTERMEDIATE SHAFT DRIVE – CAGE DEFECT DETECTION

Vibration is probably the most important indicator of the mechanical integrity of rotating machinery. Overall vibration levels when trended, give immediate indication of change in the condition of that machine, however, the overall vibration levels are only a numeric value and do not allow identification of any specific underlying fault type or types. Vibration spectral information allows identification of any offending frequency component(s) thus enabling the analyst to determine the fault type and severity.

Vibration data collected from 1<sup>st</sup> Dryer Group intermediate shaft on February 2001 exhibited low and acceptable values, around 0.2 gE peak to peak. The bearing just replaced due to inner race defect. Next measurement the overall vibration level is increasing continuously. See Figure 1.



Figure 1 - Continued increase of overall vibration levels inboard bearing.

Examination of the vibration spectrum exhibited a peak at 712.5 CPM, along with harmonic activity and tied in to the calculated defect frequency for the intermediate shaft inboard bearing cage (Figure 2)

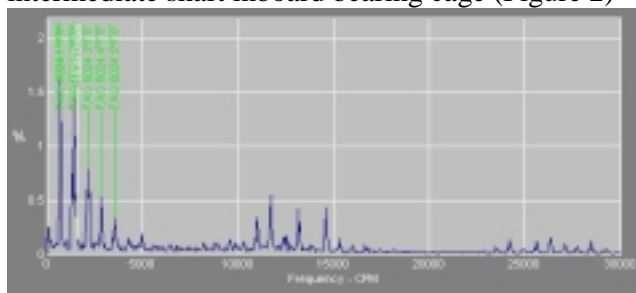


Figure 2 - Vibration spectrum indicating cage defect

Based on the overall vibration levels and the signs of bearing defect in the spectrum it was planned to replace the 1<sup>st</sup> dryer group intermediate shaft bearings as soon as the production process allowed.

On 18<sup>th</sup> April 02 shutdown the bearing removed. Figure 3 below shows the vibration spectrum taken from the same test point on the intermediate shaft after bearing renewal.

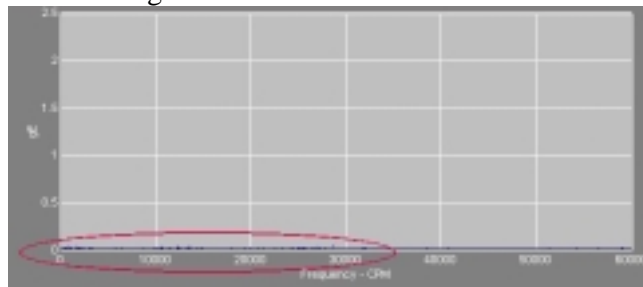


Figure 3 - Spectral activity recorded from the new bearing

Examination of the original bearings proved the analysis to be correct as several cage rivet broken out. The photograph below is clear evidence of this damage.

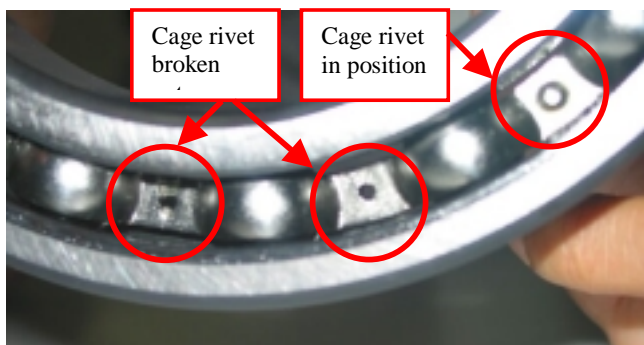


Figure 4 - Pictorial evidence of correct defect analysis.

The intermediate shaft was subsequently brought back into service with no disruption to the process, baseline vibration recorded at the intermediate shaft bearings indicated levels had returned to previous values.

Due to accurate analysis and prompt action, a catastrophic failure to the 1<sup>st</sup> dryer group components was prevented.