Brüel & Kjær Vibro

Application Note

Dramatic Economic Benefits Gained by Machine Condition Monitoring at an Aromatics Plant

*Within the course of five years of using the **Brüel & Kjær Vibro Type 2526 Data Collector**, the Esfahan Petrochemical Company has saved an average of US$200 000 per year in maintenance costs*

Fig. 1 Esfahan Aromatics Complex

Esfahan Petrochemical Company (EPC)-Aromatics Complex

EPC is Iran's first and primary producer of aromatics line of chemicals. Using naptha from the nearby Esfahan Refinery, it produces over 200,000 tons/year of Benzene, Toluene, Orthoxylene, Paraxylene and Mixed Xylenes each year. These products are used by a number of industries, including a couple of recently built downstream plants nearby. Around 65% of production is exported.

EPC is one of 9 petrochemical plants in Iran under the state-owned National Petrochemical Company (NPC) within the Oil Ministry. NPC is responsible for all of the country's petrochemical industry operation and development, and with a total annual production capacity of 15.6 million tons (2000), it is the second largest producer of petrochemicals in the Middle East.

Monitoring Strategy

EPC started production in 1994 and is a relatively new plant with modern process control system technology and effective quality, environmental, and occupational health and safety management systems. Immediate attention, however, was required in implementing a comprehensive condition-monitoring strategy.

Akbar Iravani, Manager of the Condition Monitoring Group at EPC decided to launch a 3-year pilot project using the Type 2526 Data Collector, which was already being successfully used in other petrochemical plants in Iran. The results of this project would form the basis for evaluating the feasibility of expanding to an on-line condition monitoring system for the critical machines.

The following machines were originally selected to be off-line monitored:

Machine	Qty
Pumps	276
Electric motors	204
Compressors	4
Fans, blowers	31
Mixers	26
Scrappers	2
Total	**543**

Table 1 Auxiliary machines monitored (11 steam turbines were also added in 1999)

Results

Significant benefits were achieved during the five years the portable monitoring system was used, right from the start:

- Machine downtime and its consequential lost production was significantly reduced
- Expensive machine failures were avoided that could have involved replacing the machine or doing extensive repairs
- Time between overhauls has increased

Maintenance savings were especially important for this company because of the difficulty in importing spares (see Figs 2-4).

Fig. 2 Total maintenance savings, not including savings from avoiding production losses

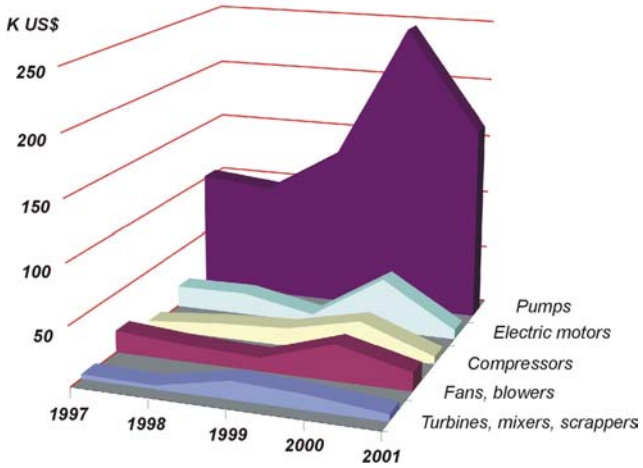

Fig. 3 Savings per year for each machine type

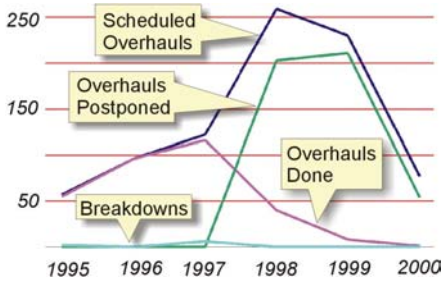

Fig. 4 Reduction in overhauls of 418 motors (pilot project is from 1997-2000)

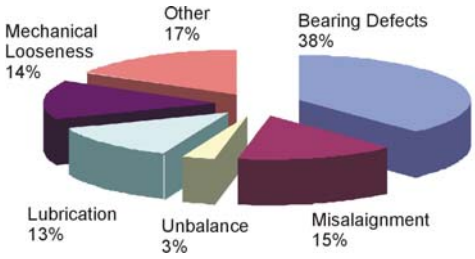

Fig. 5 Rotating machine faults detected, diagnosed and corrected during the pilot project

Conclusions

The 3-year pilot project was a complete success in reducing unplanned downtime, reducing catastrophic failures and reducing maintenance costs and spares needed. Plans are already underway to extend the monitoring system to an on-line system.

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