

Condition Based Maintenance



James Fisher Mimic (JFM) believe that implemented correctly CBM is the optimum strategy for maintenance. Increasing pressure on maintenance budgets, asset availability and retention of maintenance knowledge can be addressed through the application of CBM.

Mimic CBM Services

- Maintenance benchmarking
- Maintenance improvement planning
- Availability modelling (reliability mapping)
- Criticality and risk based studies
- Collation and manipulation of data
- RCM, REM and FMECA studies and implementation
- Maintenance work planning and control
- Key performance indicators
- Condition monitoring definition and implementation
- CM Database template creation

James Fisher Mimic has a wealth of experience that can be used to create cost effective and efficient Condition Based Maintenance regimes. JFM is able to provide consultancy services to facilitate the cost efficient implementation of a CBM program. JFM has a breadth of experience covering 25 years managing and implementing CBM strategies in the maritime industries and for ship owners, successfully increasing availability and reducing maintenance costs.

Case Study Shaft Alternator Condition Monitoring

Situation

Following a catastrophic failure of a shaft alternator on a 4,000 tonne clean product tanker the owner approached JFM to avoid the problem in the future. The failure had cost in excess of \$90,000 in lost revenue and cost of repair

partially due to the impact of collateral damage when the alternator failed.

Economic Assessment

Further discussion with the owner identified that a Mimic condition monitoring system be installed to monitor the performance and continuous conditional health of the shaft alternator. Prior to the development of the alternator solution, Mimic was commissioned to investigate and develop an optimum Condition Monitoring (CM) regime for this vessel and its sister ships. Using Mimic's unique CM implementation process an optimum solution was created. This included the following aspects.

- Maintainability indices
- Operational availability
- Health
- Safety
- Environmental
- Quality

Combined with an economic sanity check, the process identified that equipment previously thought of as 'critical' could be maintained in an improved cost effective manner whilst other equipment, thought to be 'not critical' was actually included in the regime.





Results

Following installation and during Mimic routine performance checks, a change in the shaft alternator performance was identified. Prior to the installation of Mimic, these minor changes in performance would have gone unnoticed but with Mimic, a pattern of deterioration in performance was quickly identified. A fluctuation in flux field and output combined with a minor increase in vibration and temperature were monitored closely over a 24 hour period following initial identification and was found to be deteriorating badly with a prognosis of between 24 and 48 hours to failure. The owner decided to take the ship out of service. The shaft alternator was inspected and a loose diode cover was diagnosed. A new diode cover was installed and the problem rectified by ship's staff within 7 hours thus avoiding a catastrophic failure of the shaft alternator whilst incurring minimum downtime.

Benefits

Increased Capabilities.

Prior to the Mimic system installation the minor changes in performance had gone unnoticed.

Failure to act resulted in a catastrophic failure of the original shaft alternator and extensive collateral damage. With performance monitoring the onset of failure could be identified early and the risk of failure managed allowing the ship to continue trading with minimal loss of revenue,

Decreased Maintenance Costs.

The shaft alternator was repaired by the ship's crew at minimum cost. What had been an extremely costly repair on the original ship was avoided. The actual cost of repair was of the order of \$1,000 compared to \$60,000 for the original ship.

The Financial Case.

As the sister ship was found to be suffering from the same alternator fault the catastrophic failure was avoided. The owner believes that had Mimic CM been fitted on the original ship then the catastrophic failure

would have been avoided. The nature of the failure and the ability to prevent a recurrence resulted in significant savings.

Cost of Catastrophic Failure

\$60,000 repair costs
\$30,000 lost trading revenue
\$90,000 Total

Costs Incurred in Planned Repair

\$400 new diode cover \$600 labour
\$5,000 lost trading revenue
\$6,000 Total

Saving

\$84,000 Total

The investment in the implementation of the Mimic system was justified within 2 months of installation and ongoing performance monitoring continues to add value to the maintenance strategy of the owner's fleet of ships.