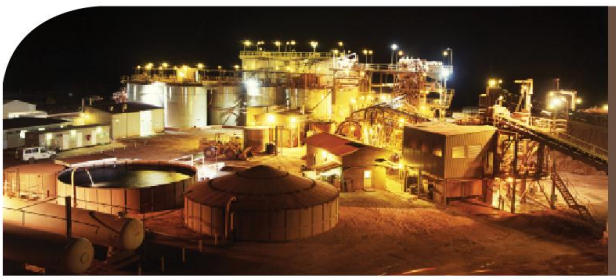
ALS Asset Care



AssetCare Counts #14

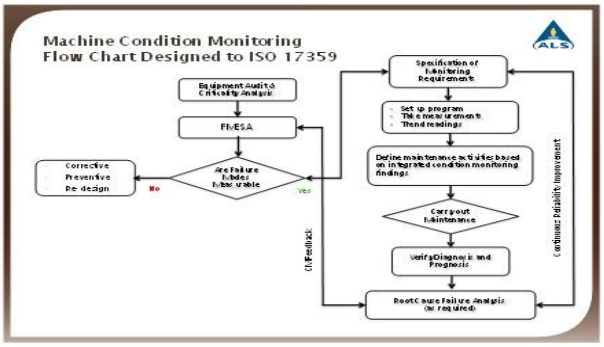
May 2012

Condition Monitoring and ISO 17359 - 2011

ISO 17359 – 2011, along with other associated standards, set out guidelines for the design and operation of a robust condition monitoring programme.

ALS Industrial has worked with many of our clients to design and operate condition monitoring programmes based on ISO 17359 and the related standards. The design of the condition monitoring programme is based on the identification of machine failure modes (FMEA) and the detection of the relevant symptoms (FMSA) which is the key element in the design of a successful condition monitoring programme. Shown below is a simplified flow chart of the process, covering the five distinct phases of a robust condition monitoring programme:

- Detection of failure modes / faults
- Diagnosis of the faults and their causes
- Prognosis of fault progression (covering the all-important question – how long would it last?)
- Identify optimum corrective actions
- Root cause analysis (and a continuous improvement process)



An example of the process for designing a condition monitoring programme for a conveyor pulley bearing is shown in the Failure Modes Effects Symptoms Analysis (FMESA) worksheet below. Here, one of the failure modes (raceway spalling in this instance) and associated symptoms is considered to identify the relevant condition monitoring requirements. In this instance, the best monitoring parameter for this failure mode is bearing stress monitoring, although the other parameters may still be taken to address other failure modes. The complete worksheet would include all of the credible failure modes and condition monitoring / maintenance controls such that all failures would be addressed. This analysis also links the condition monitoring programme and the machine maintenance strategy in a reliability based approach.

Failure Mode Effects Symptoms Analysis (FMESA) Worksheet

Area							FMSA Date:						
Equipment type							Completed by:						
							Approved by:						
Equipment No & description	Equipment Function	Component	Failure Mode	Failure Effect	Cause of failure	Failure Symptom	Primary Technique	Monitoring Frequency	DET	SEV	OCN	PCN	MPN
		Conveyor head pulley bearing	Spalling	Conveyor out of service	End of life	Increase in vibration velocity	Vibration monitoring	Monthly	4	1	5	4	80
						Increase in bearing stress levels	Vibration monitoring using special filtered / enhanced acceleration measurements to detect bearing fault signals	Monthly	5	1	5	4	100
						Increase in bearing temp	Infrared temperature monitoring	Weekly	3	1	4	4	48
						Audible noise	Electronic stethoscope	Weekly	3	1	3	3	27

There are many sites where this approach has led to improved reliability, where failure modes previously not detectable with the existing programme were identified and relevant measures were implemented to ensure their detection. The ALS Industrial Reliability Engineering Group works with clients across Australia to improve client condition monitoring programmes in a cost effective and efficient manner.

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