Static and Dynamic Testing Featuring
Current Signature Analysis

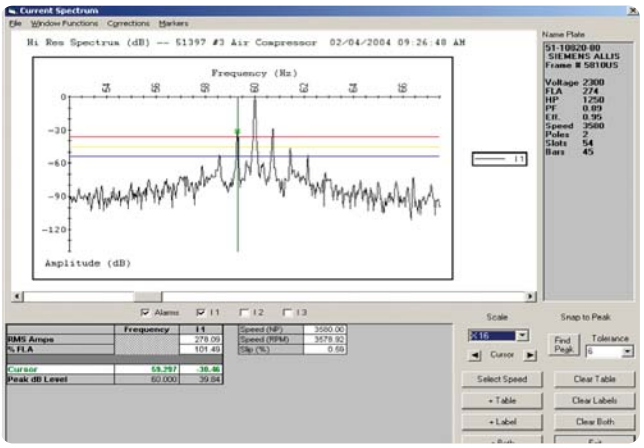
A Conservative Investment With Immediate Payback

Stress causes motors to fail. The stress can be mechanical, electrical, thermal or environmental. Our testing methodology inspects each portion of the motor system, including the stator, rotor, power circuit, insulation, air-gap and power quality.

Using multiple technologies, we can find stress long before costly damage occurs. They key is deploying the right technology so that the problem can be found early enough. Current, for example, is a leading indicator for many types of failures and therefore current signature analysis will show those failures log before another technology such as vibration analysis would.

PdMA Case Study – 1250 HP Air Compressor Motor

The rotor below had at least five broken rotor bars, a situation that was worsening over a two year period. The test data showed alarm level side-bands, indicative of a failing rotor. The motor was pulled during a planned outage, avoiding costly downtime and preventing complete failure and a likely rewind.



PdMA Case Study – Bare Connection in New Winding

This problem was found during a QA check in a motor repair shop prior to being shipped. Test results showed erratic phase to phase resistance readings. During the investigation that followed, a bare winding connection was found (no solder). The connection was repaired immediately, saving the shop a warranty rewind and sparing the customer unnecessary labor and downtime.

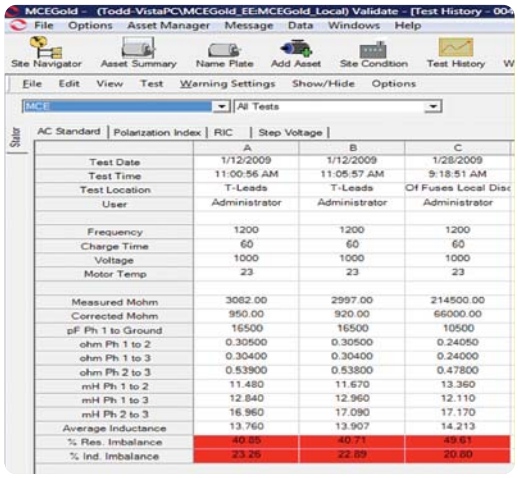
5418

View Condition Code Test Show / Hide

AC Standard	Polarization Index		
Test Date	01/04/2007	01/05/2007	01/05/2007
Test Time	12:06:06 PM	07:58:59 AM	10:35:22 AM
	Baseline		
Frequency	1200	1200	1200
Mohm Ph 1 to Gnd			
Charge Time	60	60	60
Voltage	5000	5000	500
Motor Temp	22	48	22
Measured Mohm	24240.0	1776.0	16270.0
Corrected Mohm	7000.0	3100.0	4700.0
pF Ph 1 to Gnd	32750	33000	30250
ohm Ph 1 to 2	1.00950	1.25900	1.00050
ohm Ph 1 to 3	1.44400	1.40450	1.00150
ohm Ph 2 to 3	1.43600	1.40200	1.00100
mH Ph 1 to 2	126.600	44.270	44.030
mH Ph 1 to 3	128.400	44.280	44.040
mH Ph 2 to 3	126.600	44.300	44.060
Avg. Inductance	127.200	44.283	44.043
% Res. Imbalance	22.14	7.10	0.05
% Ind. Imbalance	0.94	0.04	0.04
$ Power Loss	764.41	255.98	1.76
Test Location	Motor Leads	Motor Leads	Motor Leads
MCE #	030888HV	030888HV	030888HV
User			
Notes	No	No	Yes

High Resistance Connection, 460 VAC 50 HP

During a planned test outage, a significant resistive and inductive imbalance was found. Step by step troubleshooting led to the junction box. After un-taping the leads, the completely burnt connection below was found. The problem was corrected, saving what would have resulted in a blown winding.



MCEGold - (Todd-VistaPC\MCEGold_EE:MCEGold_Local) Validate - [Test History - 00

File Options Asset Manager Message Data Windows Help

Site Navigator | Asset Summary | Name Plate | Add Asset | Site Condition | Test History

File Edit View Test Warning Settings Show/Hide Options

MCE | All Tests

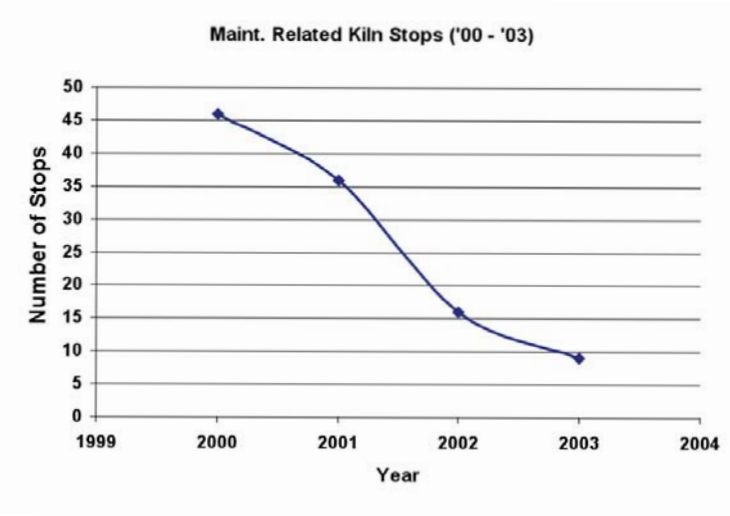
AC Standard | Polarization Index | RIC | Step Voltage

	A	B	C
Test Date	1/12/2009	1/12/2009	1/28/2009
Test Time	11:00:56 AM	11:05:57 AM	9:18:51 AM
Test Location	T-Leads	T-Leads	Of Fuses Local Disc
User	Administrator	Administrator	Administrator
Frequency	1200	1200	1200
Charge Time	60	60	60
Voltage	1000	1000	1000
Motor Temp	23	23	23
Measured Mohm	3082.00	2997.00	214500.00
Corrected Mohm	950.00	920.00	66000.00
pF Ph 1 to Ground	16500	16500	10500
ohm Ph 1 to 2	0.30500	0.30500	0.24050
ohm Ph 1 to 3	0.30400	0.30400	0.24000
ohm Ph 2 to 3	0.53900	0.53800	0.47800
mH Ph 1 to 2	11.480	11.670	13.360
mH Ph 1 to 3	12.840	12.960	12.110
mH Ph 2 to 3	16.960	17.090	17.170
Average Inductance	13.760	13.907	14.213
% Res. Imbalance	40.85	40.71	49.61
% Ind. Imbalance	23.25	22.89	20.80

Diagnostic Testing Payback of $330,000 PdMA Case Study

Cement Manufacturer

A large portland cement mill suffered from unplanned outages due to motor failure. In less than three months four motors were identified as developing problems. Over $5,000 per motor was saved in repair costs as the failures were caught early. Each motor would have resulted in no less than 10 hours of downtime (due to time to re-fire kiln), saving 1100 tons of clinker per motor.



About Portland Cement

Portland cement is produced by heating the ground raw materials in a rotating kiln to 1450°C. The raw mix consists of limestone, clay, bauxite, iron ore and quartz. The material formed is called clinker. It is ground to a fine powder and mixed with a small percentage of gypsum to make Portland cement. The cement is then sold to the building companies, who mix it with stone and water to build concrete-constructions.

The four clinker phases react in different ways when the cement is mixed with water. Aluminate and ferrite reacts fast but provides little strength development. Alite and belite react slower but increase strength. By combining the raw materials carefully it is possible to get different amounts of the four phases and thereby design cement with special properties for different types of constructions.

Ordinary Portland cement (OPC) is adjusted to general building standards in Sweden. It consists of approximately 67 wt% alite, 15 wt% belite, 9 wt% aluminate and 9 wt% ferrite.

A predictive maintenance program was implemented, incorporating diagnostic testing. The program consisted of:

- Vibration, current signature, infrared, and oil analysis
- Condition based maintenance
- Planned Inspections and Service
- Training