

# Paper Mill Avoids Downtime with Results of Surge Test

A pulp and paper manufacturer in the upper Northeast purchased an AWA IV to revitalize their motor testing program. Since then a number of faulty motors have been identified and repaired or replaced without any downtime.

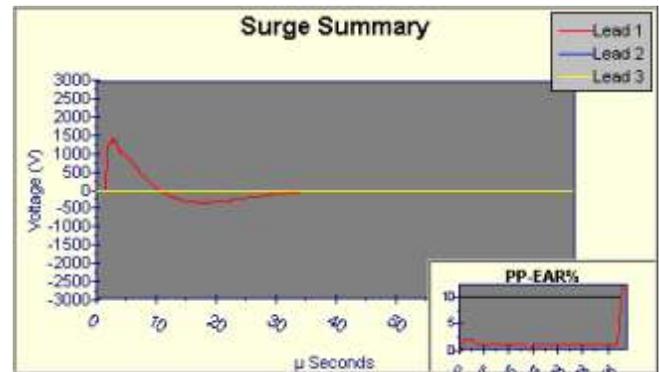
This 460 volt motor was found to have turn-to-turn weak insulation with the surge test. It is critical to the operation of all four of the paper machines at this facility. The motor was started and run for two months, until the motor could be scheduled for shut down and removed for repair. Of all the tests that were performed on this motor, the surge test was the only test that found this problem.

This 150 Hp motor is critical to the operation. To change this motor at this time would have interrupted all production since it was critical to the operation of all four paper machines. Had a failure occurred there would have been a minimum of 5-6 hours of downtime costing the company a

Results Summary		Test Date/Time 7/20/2006 9:11:41 AM	
Test ID:	480V w/o PI	Repair/Job #	
Tested By		Tested For	
Room #		MCC	
Location		Building	GROUNWOOD 480 VOLT
Temp Status	No Test Performed	PI Status	No Test Performed
Temp		Volts (V)	0
Resist Status	PASS	DA Ratio	0.0
L1-L2 (Ohms)	0.045	PI Ratio	0.0
L2-L3 (Ohms)	0.044	HiPot	PASS
L3-L1 (Ohms)	0.044	Volts (V)	2000
Max Delta R %	0.320 %	Current (µA)	0.21
Coil 1 (Ohms)	0.068	Resist (Mohm)	9383
Coil 2 (Ohms)	0.065	Surge Status	ppEAR LIMIT
Coil 3 (Ohms)	0.065	Peak Volt(V) L1	1530 Failed
Megohm Status	PASS	Peak Volt(V) L2	0
Volts (V)	500	Peak Volt(V) L3	0
Current (µA)	0.05	Max P-P EAR%	23%, ---
Resist (Mohm)	10412	EAR 1-2, 2-3, 3-1	0%, 0%, 0%

## -Motor Info -

- 150Hp
- Frequency - 60Hz
- Frame - 447-TY
- Volts Operating 460
- RMP - 1190



great deal of money. Since the motor did not fail catastrophically and was changed out during a normal maintenance cycle, the repair costs were minimized.

The essence of predictive maintenance is the ability to find motor issues prior to failure in the field. Surge testing is a must to be predictive. It is the very best method to find weak insulation turn-to-turn, phase-to-phase or coil-to-coil. IEEE, EPRI, Ontario Hydro are all independent organizations that have studied motors and how they typically fail. All agree that 80% of all electrical motor failures begin with weak insulation turn-to-turn. The surge test is the most efficient test available to find weak insulation turn-to-turn. If turn-to-turn weak insulation is not found a short will develop. Once a hard welded short is present within the motor it will fail within minutes leaving no time to be predictive.

All other tests passed because the part of the insulation and motor circuit that they evaluate were in good condition. Low voltage testing such as the winding resistance, meg-ohm, PI, inductance, capacitance, phase angle and even the DC HiPot do not evaluate the turn-to-turn insulation.

The most important point to make is concerning the myth of surge testing. Since this motor was surge tested, a weakness was found, and was put back into service for the next two months, proves that this highly important test is non-destructive. Every insulation system will fail at some point causing an electrically failure. It is finding these problems prior to catastrophic failure that gives value to maintenance professionals.

