TCO CASE STUDY #2

PAPER MANUFACTURING

Quality Machining Eliminates Unplanned Downtime

- **Application** = *Pump*
- **Motor Type** = *AC Induction*
- **Manufacturer** = *Baldor*
- **HP** = *400*
- **Voltage** = *4160*
- **RPM** = *3600*
- **Frame** = *G5010S*
- **Enclosure** = *TEFC*

The Challenge

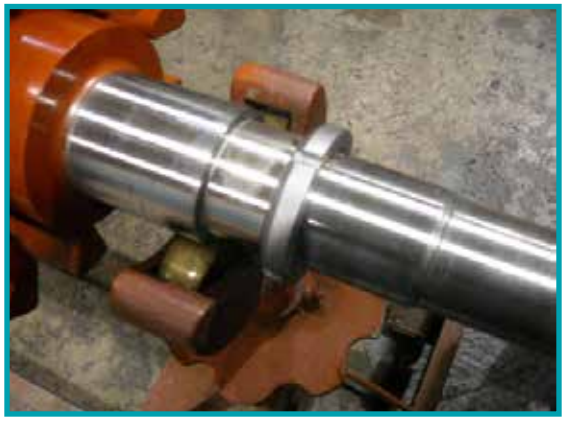
A North Carolina paper mill was experiencing repetitive failures on a pump motor. Bearings were failing and the root cause was not found. Their motor service provider could not help them solve the issue and the customer contacted IPS for assistance.

The Solution

Upon receiving and inspecting the motor, IPS immediately identified the following problems.

- The drive shaft journal was found to be improperly machined, causing misalignment. For a 6313 bearing, maximum tolerance for the shaft journal is 2.5592 inches. The drive shaft journal was measuring 2.5601 inches.
- Also, maximum tolerance for the bearing housing is 5.5128 inches. The drive end bearing housing measured 5.5131 inches. This improper machining also caused misalignment.
- The drive shaft was found to be bent, causing bearing preloading, overheating and failure, which was compiled by overgreasing of the bearings due to not understanding the root cause issue.

IPS properly machined and tested all components and returned the motor to the paper mill. The motor is currently back in operation and running with no issues.



Bent drive shaft resulted in bearing preloading, overheating and failure

Improperly machined drive end bearing housing caused misalignment

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TOTAL COST OF OWNERSHIP (TCO)

The Savings

After experiencing four failures before the motor was properly analyzed and repaired, the majority of savings comes from the elimination of need for repairs. With the addition of labor savings, an annual savings and return on investment totaled nearly $19,000. More concerning was the risk that the paper mill incurred with this issue. A back-up pump was available to run while this unit was out for repair. There was no other backup and no spare, so if this backup unit had also failed, the paper mill would have experienced a huge blow in unplanned downtime. At $50,000 per hour, merely one full day of unplanned downtime would have totaled $1,200,000.

COST ITEM	COST DESCRIPTION	ANNUAL TCO	IPS SOLUTION
Production	**Unplanned Downtime (Risk)**		
	Unplanned Downtime Rates ($ / Hour)	$50,000	0
	Downtime Failure Events (X / Year)	1	$0
	Avg. time down to replace (Hours)	24	0
	Sub-Total ($ / Year)	$1,200,000	$0
Labor	**Preventive Maintenance (PM)**		
	Standard Labor Rate ($ / Hour)	$60.00	$60.00
	Time to conduct (1) PM Event (Hours)	8	8
	PM Occurences - Existing (X / Year)	4	0
	Sub-Total ($ / Year)	$1,920	$0
Materials	**Repair**		
	Total events (Qty. / Year)	4	1
	Avg. repair cost ($)	$6,000	$7,000
	Sub-Total ($ / Year)	$24,000	$7,000
	1st Year TCO =	$25,920	$7,000
	IPS SOLUTION SAVINGS =		$18,920
	IPS RISK ELIMINATION =		$1,200,000

The Conclusion

Motors are vital to a plant's operation. The cost difference to have a quality repair performed pales in comparison to the cost of lost production. IPS once again can stand behind its statement of delivering reliability. If you are currently not using IPS for your electric motor and generator repair and would like to receive more information about TCO documented savings, contact your local IPS sales representative.

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