EASYchange®
BRUSH CONDITION MONITORING

*This paper may be used in conjunction with Cutsforth™ **EASY**change® Brush Condition Monitoring Professional Development Webinar from May 14th, 2020. You can find a recording at Cutsforth.com/BCM*

In this informational paper, we will explore the following questions:

- How can plants reduce the risk of ring fires, and unplanned outages?
- How can they improve manpower efficiency?
- How can plants monitor the condition of brushes remotely?
- How can they reliably measure for potential faults in exciters and collector rings without human intervention?

WHY MONITOR BRUSHES

When the check engine light comes on in a car, we check to see what's wrong, and how we can fix it.

Similarly, we continuously monitor brushes to get an advanced warning to know when they will need to be replaced. By monitoring brush vibration, temperature, and remaining brush length, we are able to reduce the risk of ring fires.

Through this advanced notification, like vibration monitoring on each brush, plants are able to predict when rings will start to go our of round and will need online truing. Plants are also able to plan their maintenance outages as needed rather than relying on a calendar.

Once we are able to determine when the next outage will be, we can efficiently allocate our resources elsewhere until the next outage.

INSTALL AND HARDWARE

Each EASYchange® carbon brush is outfitted with a sensor that wirelessly sends data to a localized touch screen display. This easy to use interface is installed near the brush riggings with easy and safe access so plant personnel walking by are able check the screen making brush changes easier and more efficient. More importantly, brush condition data can be exported to the control room to plan brush changes and collector maintenance. The data is then archived to measure data trends.

Displayed on the **Brush Condition Monitoring (BCM)** screen are brush life remaining, wear rate, temperature, vibration, and brush position. Historical data is recorded to analyze trends for each of these measurements.

For more information, contact us:
Cutsforth.com/Contact
800.290.6458 x.1
info@Cutsforth.com

DCS/HISTORIAN EXAMPLE

Once the data is exported to the control room or the data historian, it can be formatted and controlled any number of ways.

For example: based on the thresholds the plant sets, the historian will notify the control room when sensors malfunction or when their battery is low, how soon to replace brushes, and if vibration or temperatures are abnormal. These can be visualized in a chart or a trend line analysis.

CUSTOMER TESTIMONIAL

O&M Superintendent:

"Safety wise, [brush condition monitoring] is a great system. We're not changing our brushes as often, and our guys don't have to stick their hands in the machines to change them.

We're able to change the brushes on an as needed basis, instead of an arbitrary number [of brushes] each month. We're seeing some O&M savings, as well; we're probably able to save about 1/3 of our O&M budget, since our operators aren't having to go out and check on the brushes as often. Our operators really like the system."

FINANCIAL IMPACTS

Estimated Financial Assumptions

Cost of Ring Fire

FACTOR	ASSUMPTION
Risk of Ring Fire	1.25%
Direct Costs of Ring Fire Recovery	$185,000
Lost Revenue	$600,000
Cost of Replacement Power	$600,000
Weekly Manhours necessary to perform similar inspection	5/week
Annual Manhours necessary to perform similar inspection	260/year
5 Year Impact • Risk Avoidance: $58,912 • Manpower Impact: $66,899	$125,801
Return Multiplier	2.1x
Rate of Return	~23%

Estimated Return on Investment

Two Scenarios

Assumption: EASYchange Holders Already Installed	ASSUMPTION
Brush Condition Monitoring • Includes installation, Hardware, estimated electrical contracting work & integration • Excludes Warranties & Software Support	$60,000
Return Multiplier with BCM	2.1x
Rate of Return with BCM	~23%
Assumption: EASYchange Holders & BCM Installed Simultaneously	**ASSUMPTION**
Brush Condition Monitoring • Includes installation, Hardware, estimated electrical contracting work & integration • Excludes Warranties & Software Support	$60,000
EASYchange Brush Holders • Based on 48 Holders • Includes estimated installation & incremental mobilization costs	$46,500
Return Multiplier with BCM and Holders Installed	1.2x
5 YR Return on Investment	10%

CONCLUSION

Brush Condition Monitoring makes a plant safer, reduces cost, and lengthens time between maintenance outages by allowing decisions based on condition of brushes rather than relying on a calendar.

For more information on Brush Condition Monitoring or any of our monitoring systems visit **www.Cutsforth.com**

Note: All numbers are estimates. The results are illustrative only. Specific risks, costs, and prices will vary. This is not a guarantee of savings nor a guarantee of eliminating risk. Proper maintenance must be performed