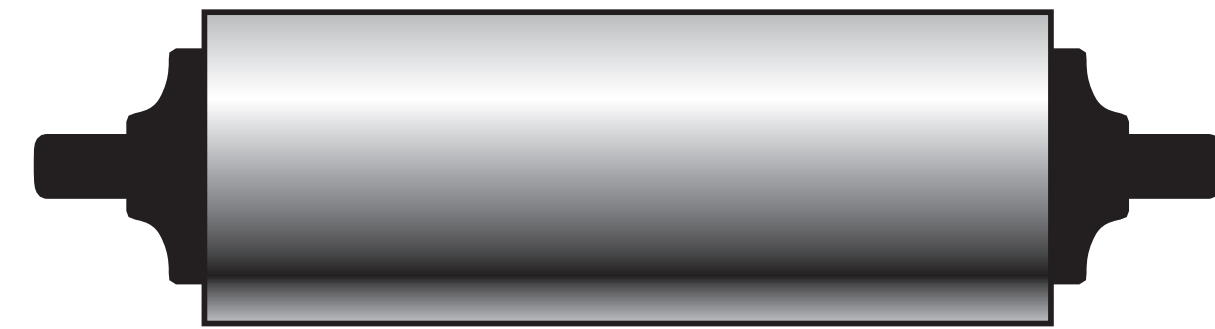


THE END OF THE LINE

HOW PRECISION CALENDER
ROLLS DRIVE PAPER
MACHINE PERFORMANCE

PRECISION



ROLL GRINDERS

Over 50 years of value-added service

**WEBINAR
SERIES**

precisionrollgrinders.com

CALENDER ROLL PERFORMANCE DRIVES PAPER MACHINE PERFORMANCE!

“I really don’t need that level of precision on calenders...”

YES, YOU DO! PAPER MACHINES NEED:

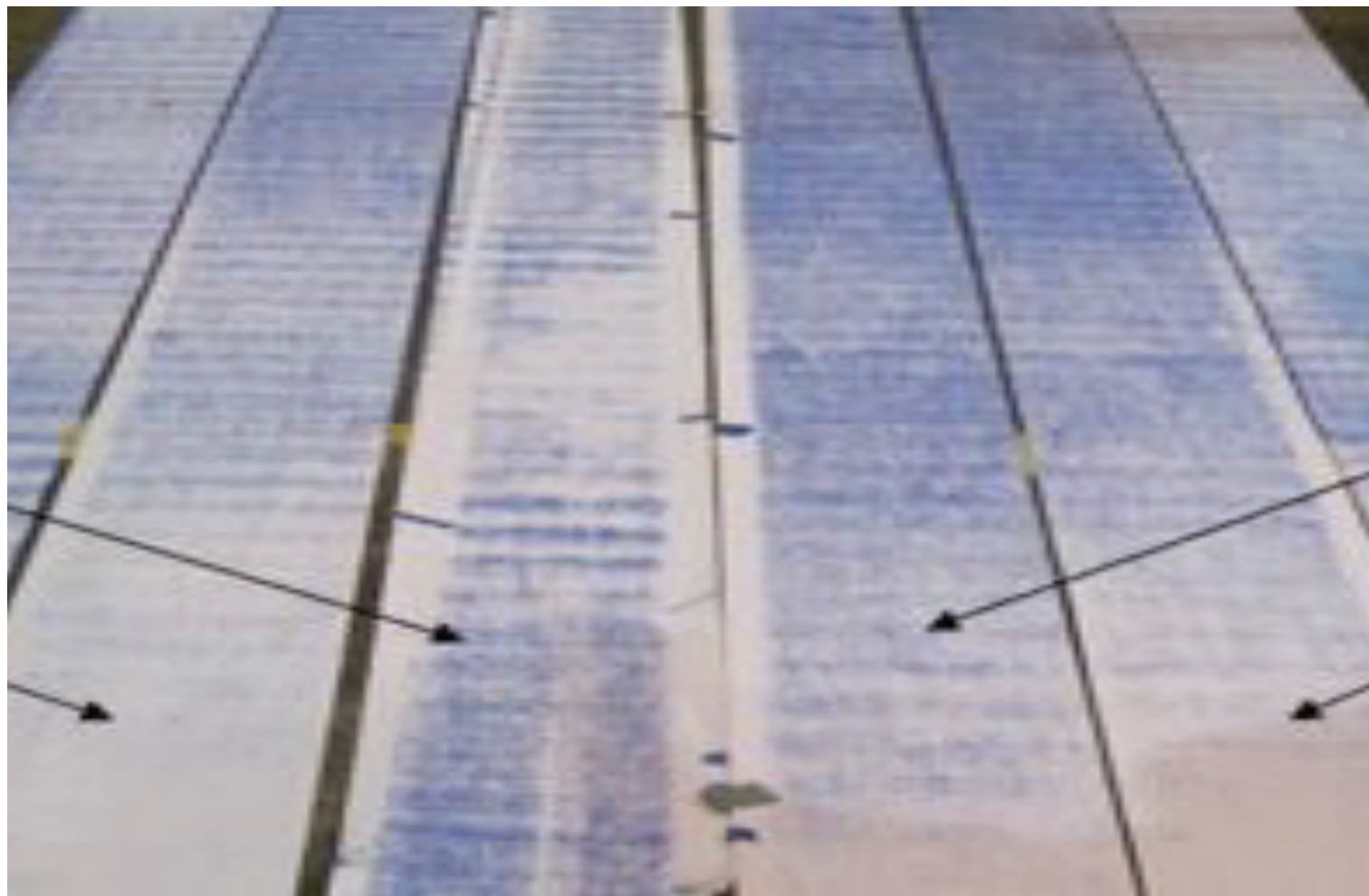
- Strength (STFI/Tensile)
 - ✔ Caliper variation directly correlates to strength variation
- Smoothness
 - ✔ Your customers demand a world-class print surface
- Good caliper control
 - ✔ Building a good reel – reducing spool losses, improving winder runnability
 - ✔ Better converting at your customer’s box plant, printer, laminator, etc.
- Longer calender roll run life
 - ✔ Reduced maintenance demand (time and people)
- Also... crowns in control, eliminating CD “fixers”



OPTIMUM CALENDER ROLL PERFORMANCE

CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION

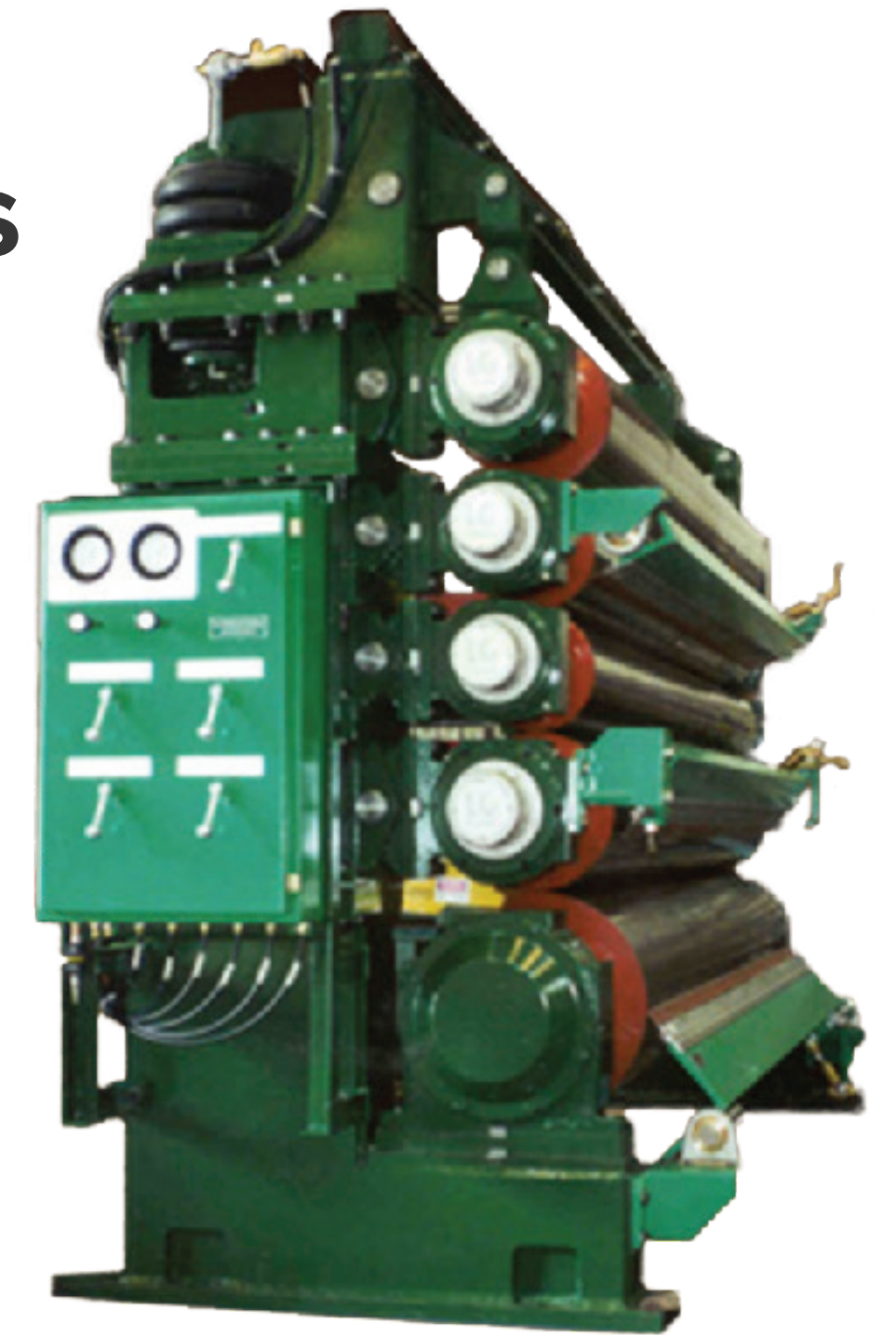
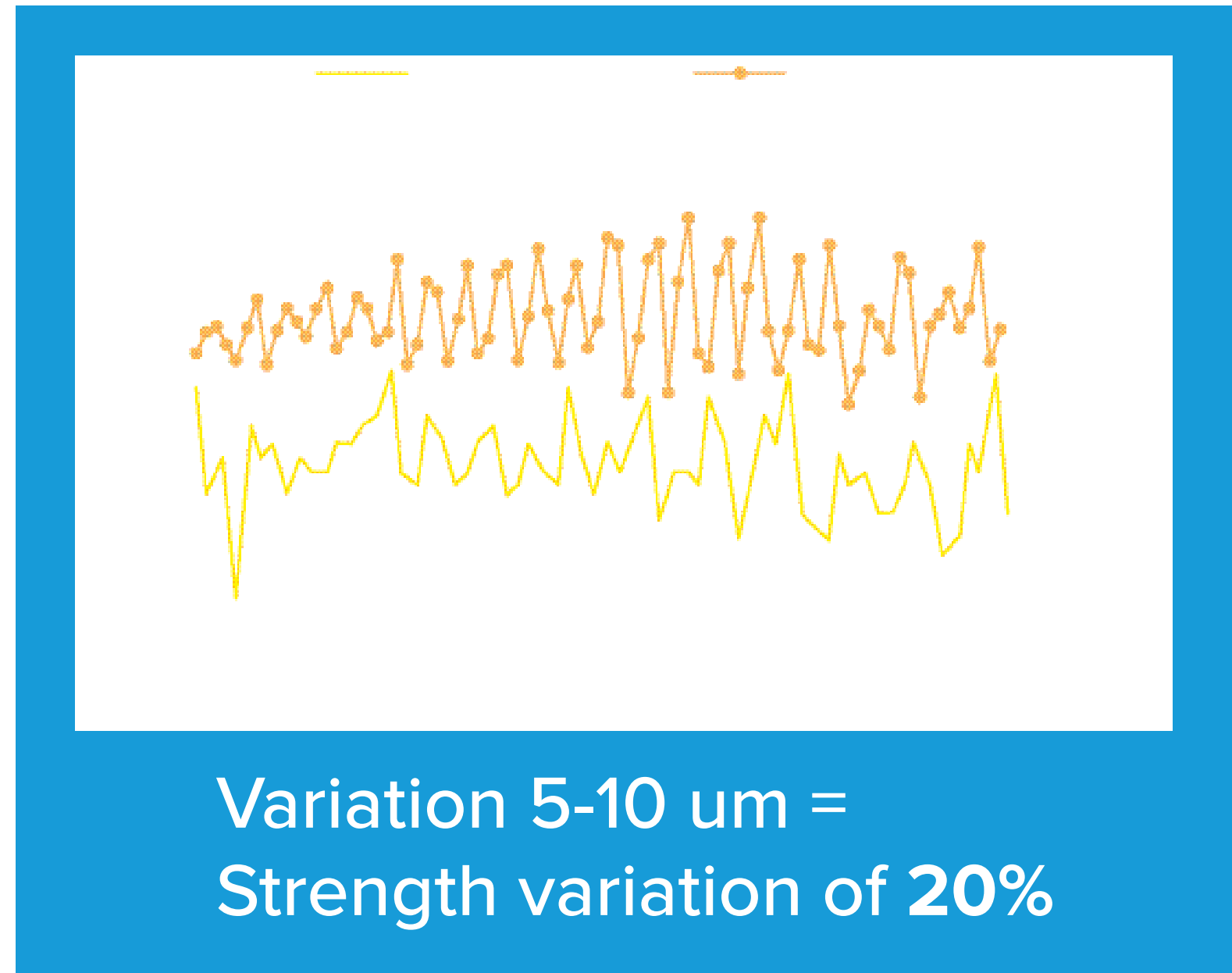
**Machine direction
variation or barring**



**This causes
strength variation**



**Sheet breaks
Winder breaks**



OPTIMUM CALENDER ROLL PERFORMANCE

REAL-WORLD CASE STUDY

**STFI VARIATION
IMPROVEMENT OF 54%**

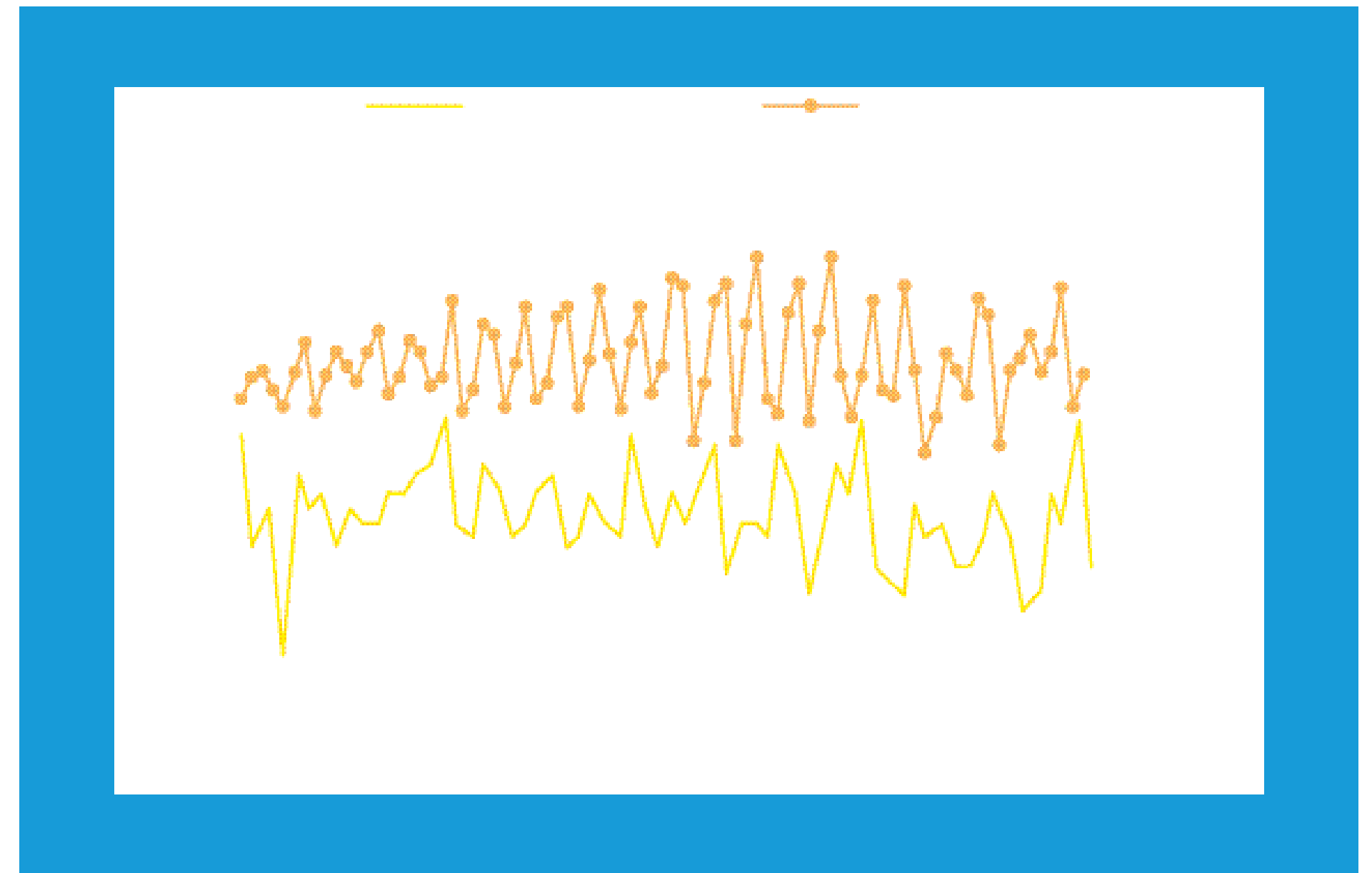
ALLOWED FOR BWT REDUCTION OF 0.2#/MSF

- ✔ Potential speed increase
- ✔ Potential fiber cost reduction

Before PRG Calendar Grinds – 3.7

After PRG Calendar Grinds – 1.7

**54% improvement led to BWT reduction 35.3#
to 35.1# = \$500,000/YR**



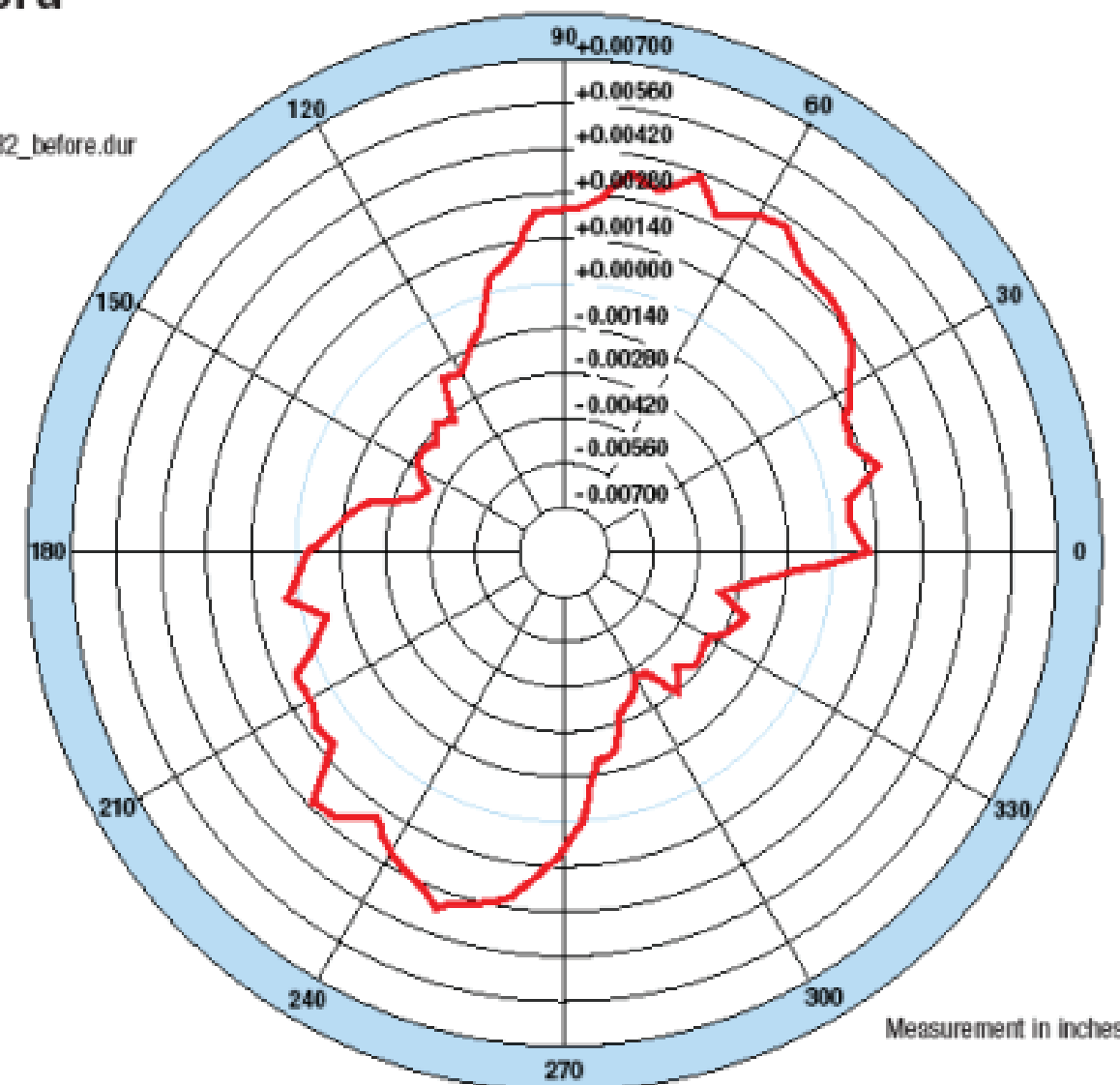
OPTIMUM CALENDER ROLL PERFORMANCE

CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION

- Machine direction variation or barring

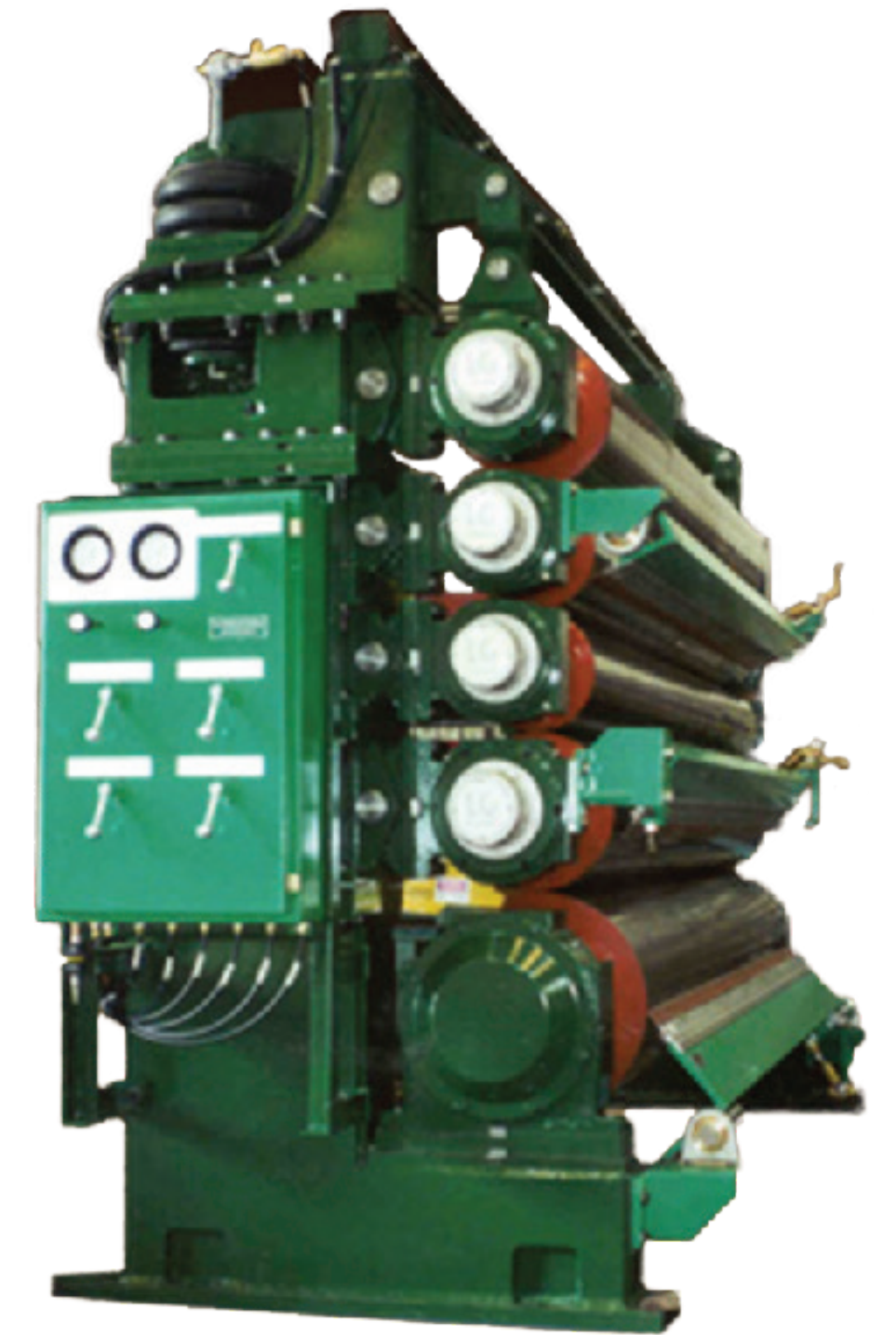
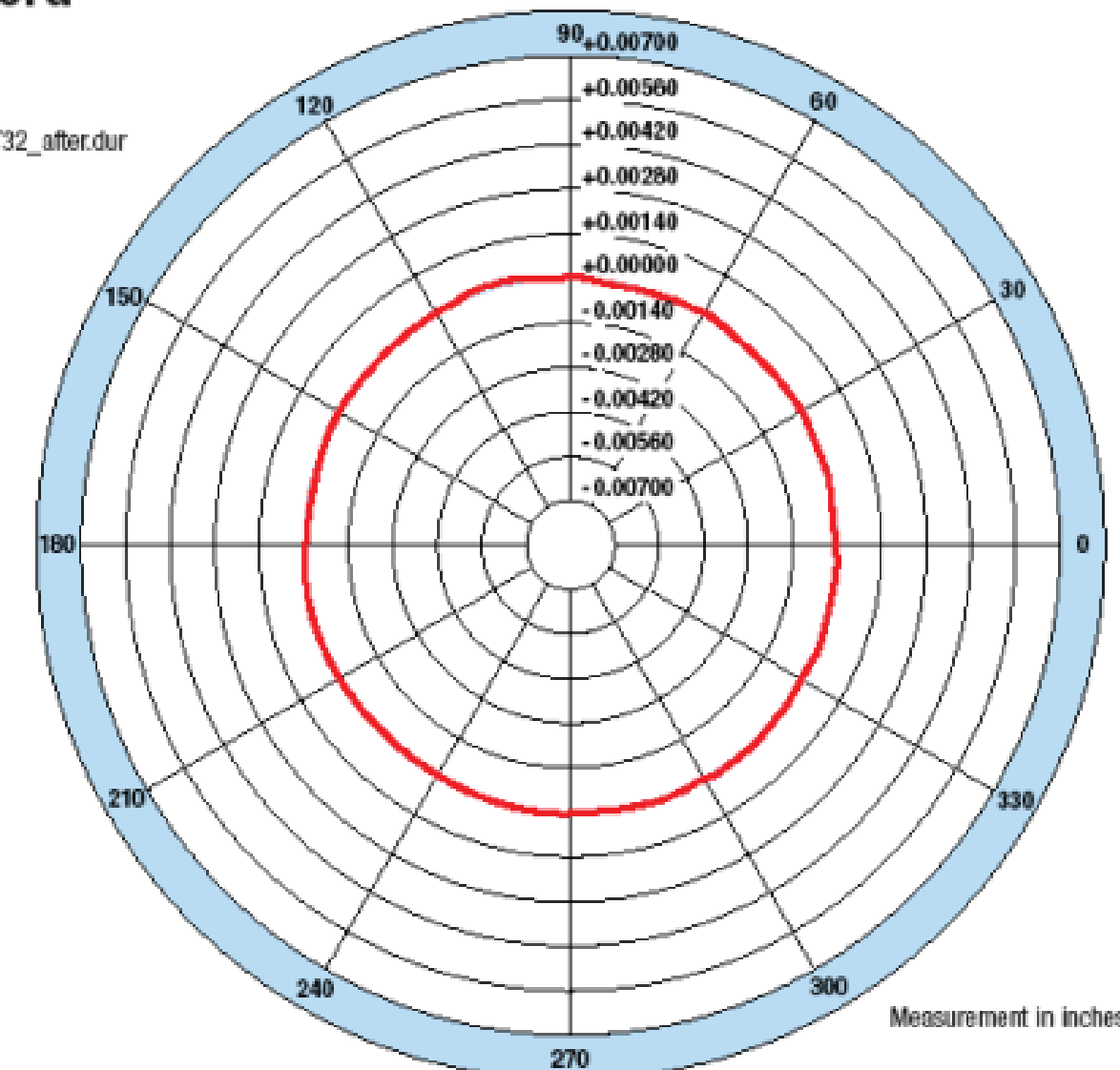
Measurement Record

Customer: Confidential
Customer Roll Number: competition/q00732_before.dur
Roundness: 0.00682
Measure Time: 18-10-05, 21:07
Probe Mode: T1+T2
Curve Zero Point: 77.0000 inch
Measurement Position: 263.5000 inch
Roundness: 0.00682



Measurement Record

Customer: Confidential
Customer Roll Number: competition/q00732_after.dur
Roundness: 0.00021
Measure Time: 19-10-05, 09:13
Probe Mode: T1+T2
Curve Zero Point: 77.0000 inch
Measurement Position: 263.5000 inch
Roundness: 0.00021

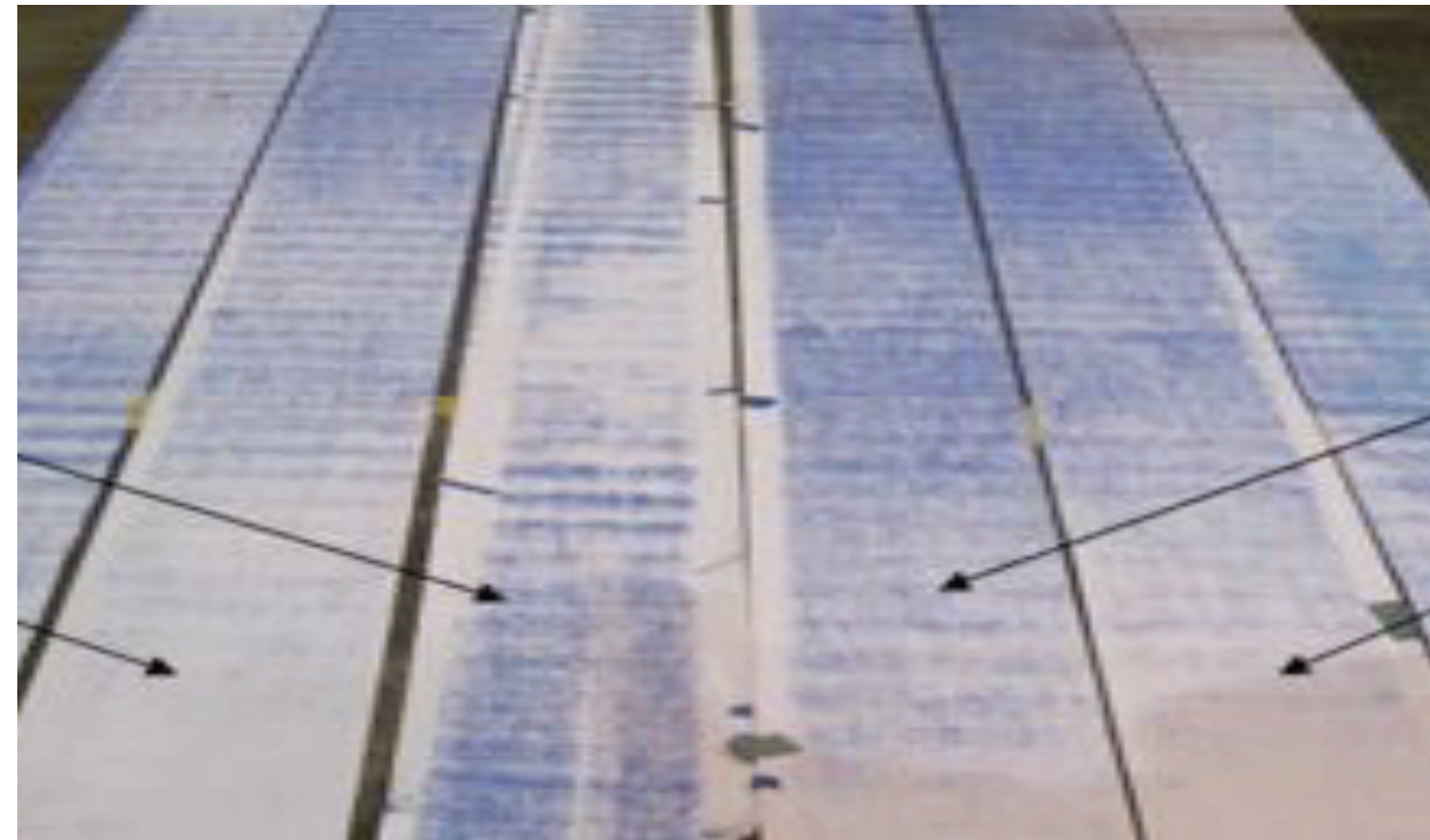
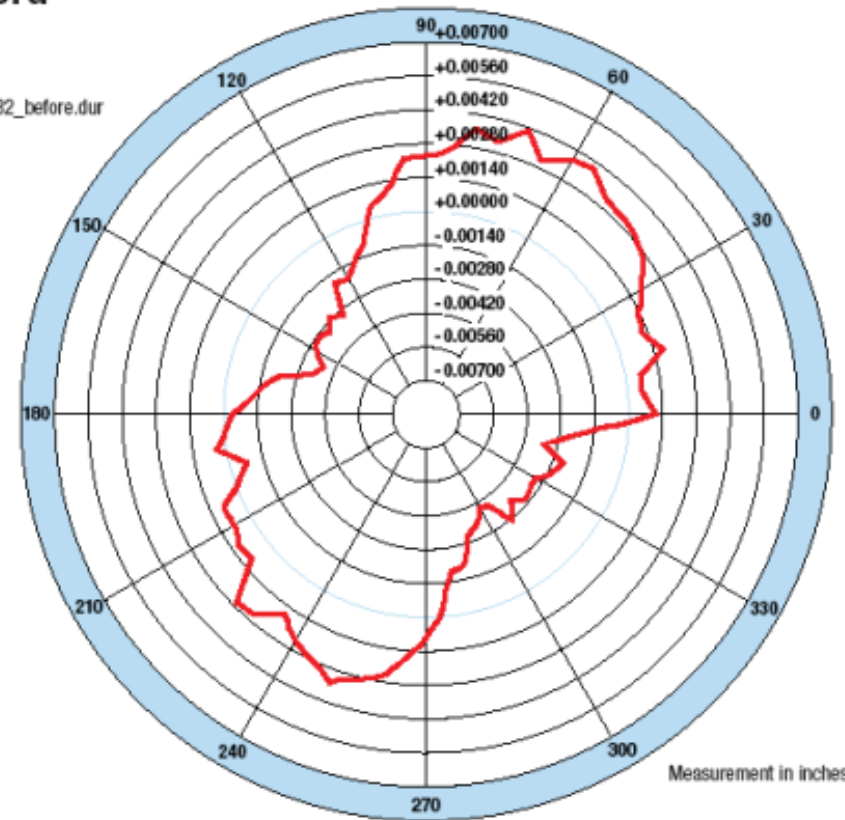


Original design specification on calender rolls = 0.0002”

OPTIMUM CALENDER ROLL PERFORMANCE

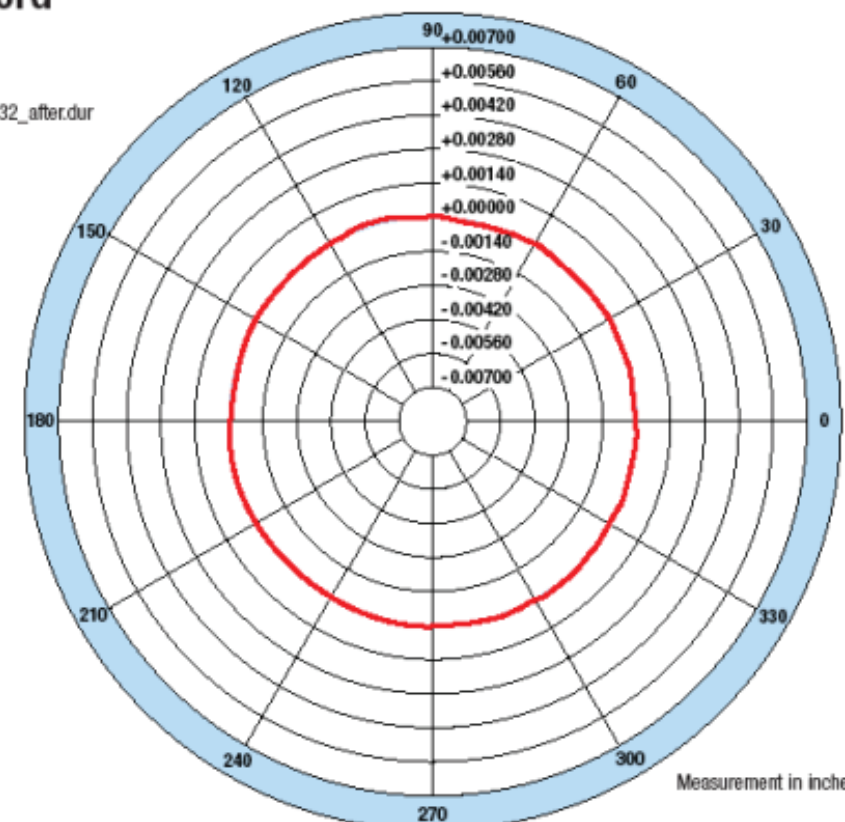
Measurement Record

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OPTIMUM CALENDER ROLL PERFORMANCE

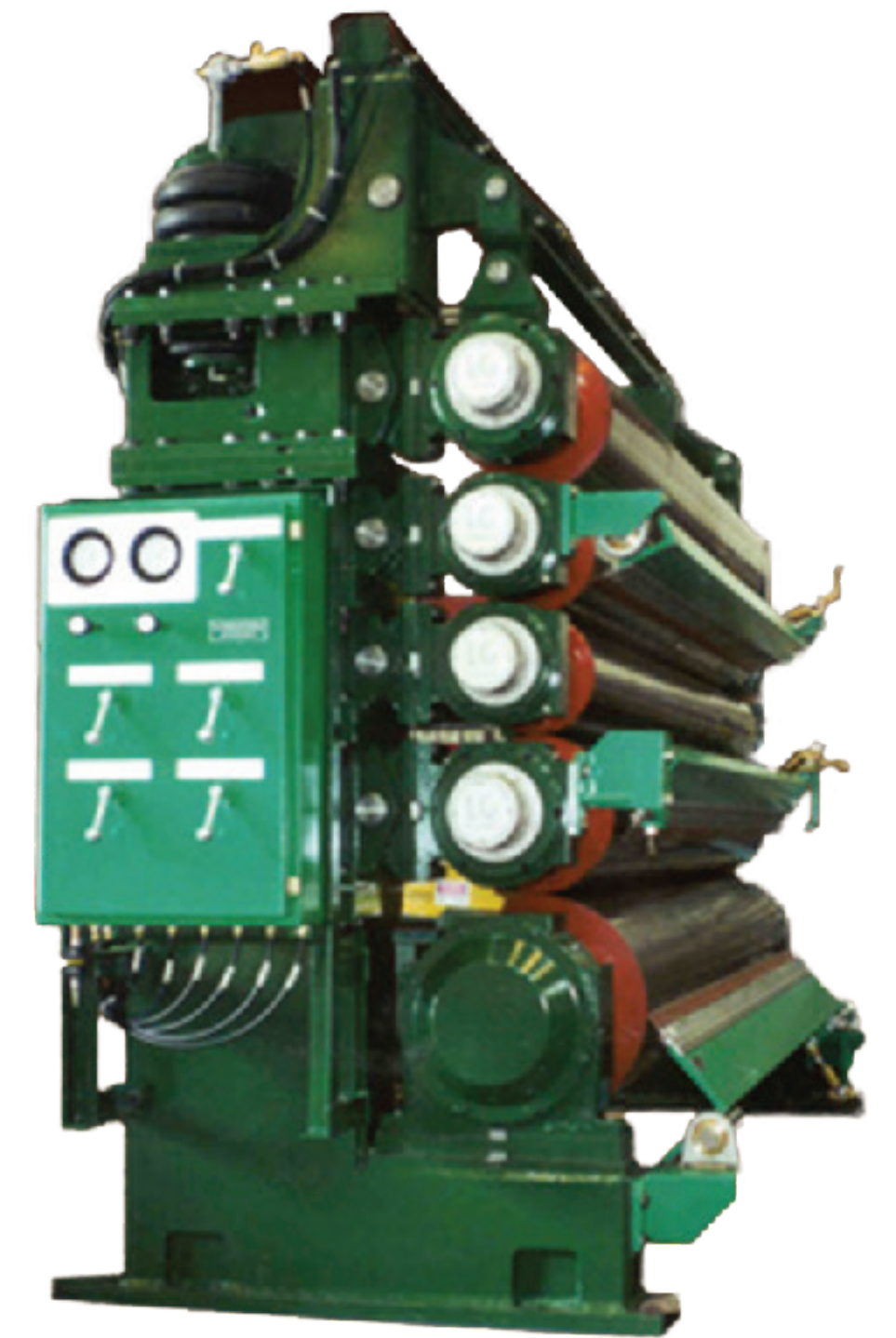
CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION
= **↑** MACHINE EFFICIENCY = \$\$\$

- Sheet breaks \longrightarrow 15 minutes/week = \$130K/yr.
- Winder losses \longrightarrow 2 tons/week = \$20K/yr.
- Off quality \longrightarrow 4 tons/week = \$40K/yr.
- Roll life \longrightarrow 9 mo. to 12 mo. = \$10K/yr.

TOTAL SAVINGS OF \$200,000 PER YEAR

Calculations based on machine time @ \$10K/hr.

Calculations based on off-quality loss of \$200/ton.



CALENDER ROLL PERFORMANCE = REAL ROI \$\$

THE REASON FOR 0.0002" OEM ROUNDNESS SPECIFICATION

REAL-WORLD EXPERIENCE

- Caliper CD variation 0.6 → 0.3
- STFI variation 3.7 → 1.7
- Sheffield smoothness 380 → 365
- Calender roll life 6 months → 18 months
- CalCoil and air hoses – *Removed*
- Crowns – *In control*

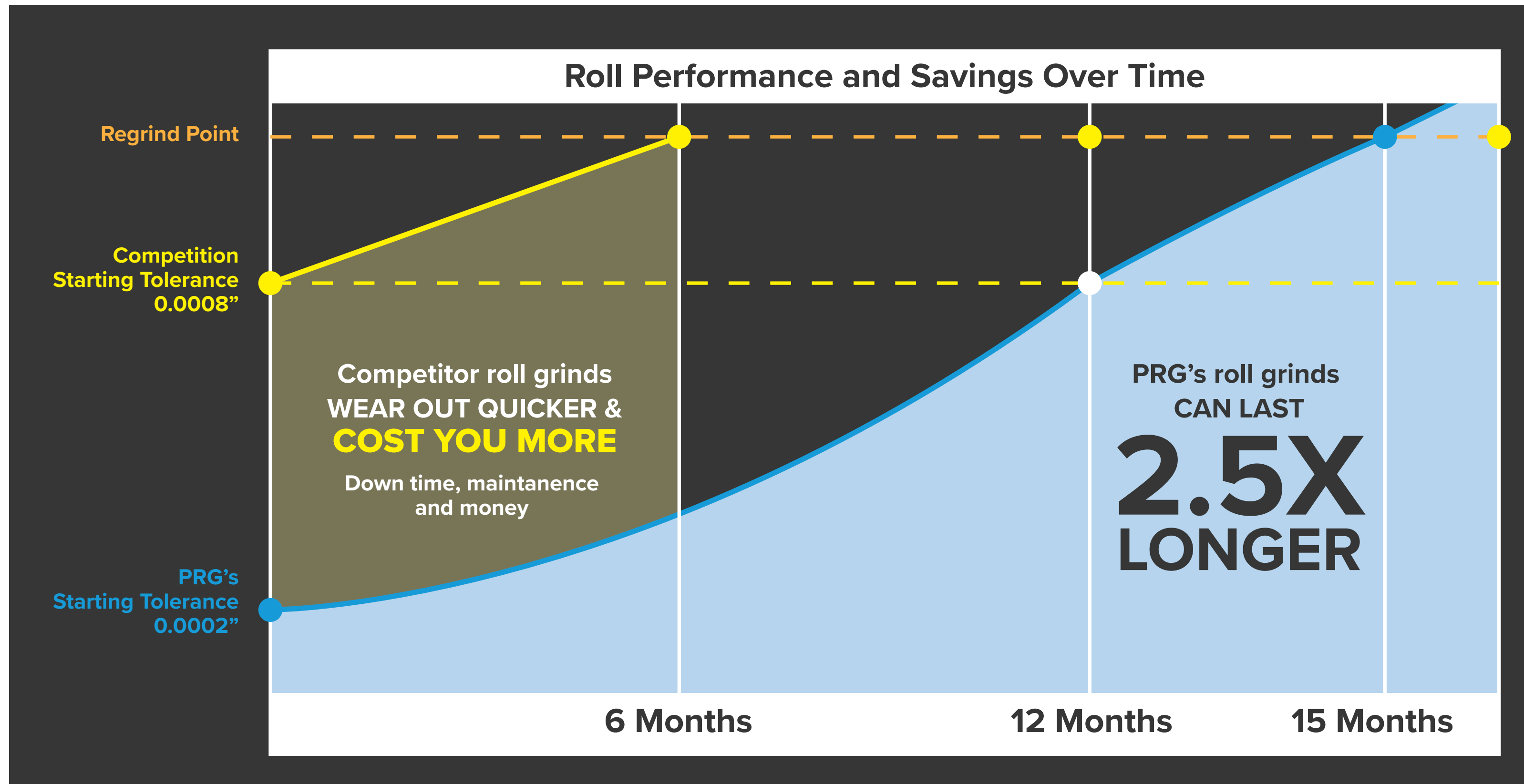


BOTTOM LINE

\$900,000+ PER YEAR OF ROI

This is a payback of 2 months or less even if a non-precision grind is FREE!

CALENDER ROLL PERFORMANCE = LONGER RUN LIFE

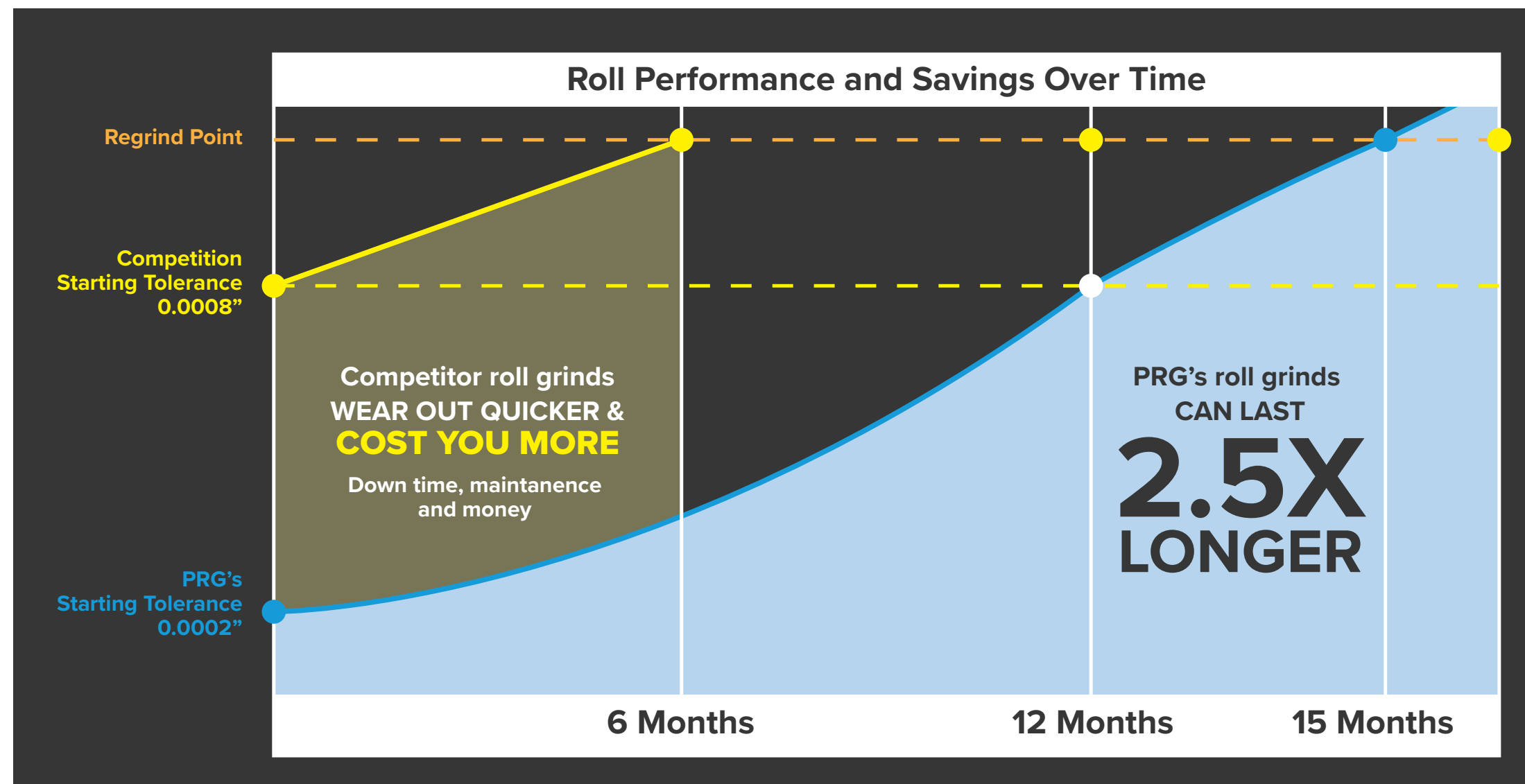


**ROLLS THAT
START CLOSER
TO PERFECTLY
ROUND START
UP FASTER &
RUN LONGER!**

PROMISE TO PROVIDE VALUE – CASE STUDY

OPTIMUM CALENDER ROLL PERFORMANCE

ROLL LIFE EXTENDED FROM
6 MONTHS TO 2 YEARS!



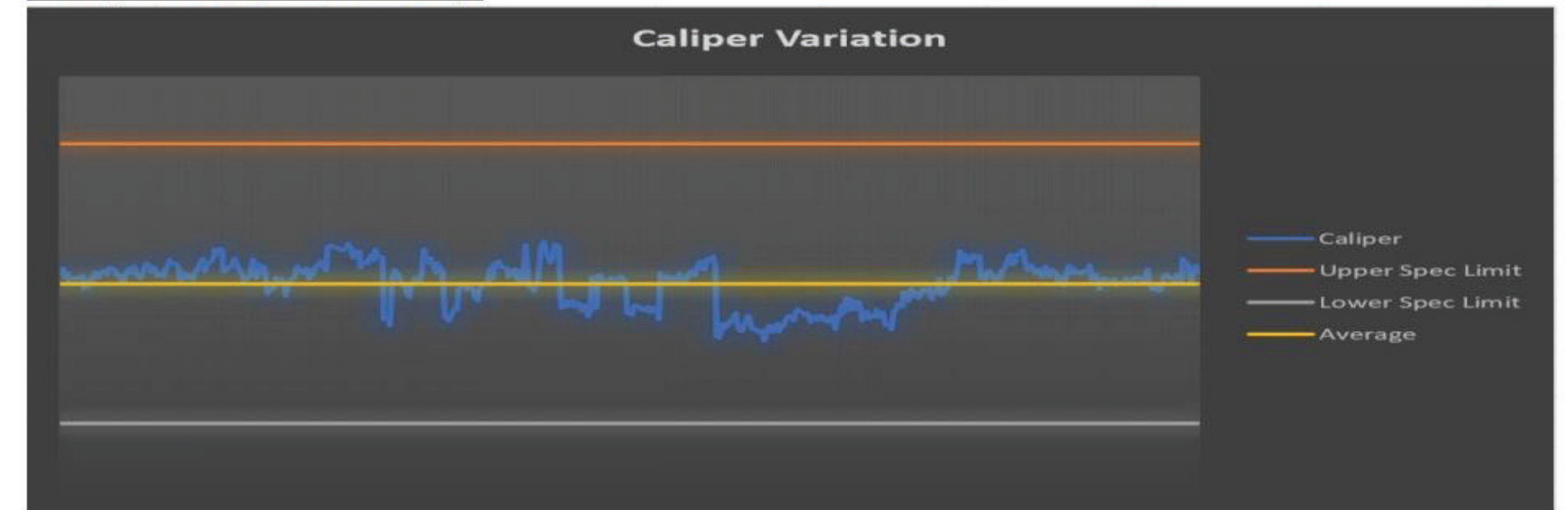
Executive Summary:

Prior to using Precision Roll Grinders, a **kraft paper** facility had the life of their two-roll calender stack last a maximum of six months before regrinds. Once Precision Roll Grinders ground both rolls in the calender stack, there was an immediate improvement towards the running efficiency of the rolls, the quality of product, and the time between re-grinds. This particular roll stack life was extended from 6 months to 24 months. Current analysis on the calender stack shows that the current rolls could last well over 36 months.

Value in Quality Grinds:

Having to suffer a significant amount of scrapped product due to poor calender roll profile, the facility gave Precision Roll Grinders a chance. Soon after installation, the facility found having their rolls ground on journals made a world of difference for their paper process. Over the coming calender life cycle, the paper facility found they could extend the life of their stack to 24 months. That's **four times past their expected roll life**, and still running!

Using Data to Tell the Story:



This particular customer puts more emphasis on their sheet profile metrics than other trackable variables. With this in mind, PRG has agreed to track their data pertaining to caliper to confirm that even though PRG's rolls run longer, they also help to produce a more compliant end product. The analysis on this particular calender stack shows that even after 24 months, not only does PRG provide value in lengthening regrind periods, but also allows you to create a better product for longer. Servicing your calender rolls every two years instead of every 6 months could lead to a **savings of \$100,000**. The reduction of variation in your process **could be worth 10x as much!**

PROMISE TO PROVIDE VALUE – CASE STUDY

CHANGING ONLY ONE ROLL MATTERS!

SAVED 6 HOURS OF DOWNTIME

How much is your machine worth/hour?

Is 6 hours = \$60,000 or \$200,000?

**Precision Calender Roll Grinding is
an investment with significant return!**

**It should not be viewed as simply a
maintenance cost. And your roll service
provider should have to prove it!**

Executive Summary:

Even replacing one roll in a paper calender stack can lead to significant improvement in the on your paper machine. A two roll calender stack was replaced after running only four months due to caliper variation with a top PRG ground roll and a competitor roll on the bottom. Having a single roll ground was impressive enough! The customer wanted two more rolls ground for the future.

Value in Quality Grinds:

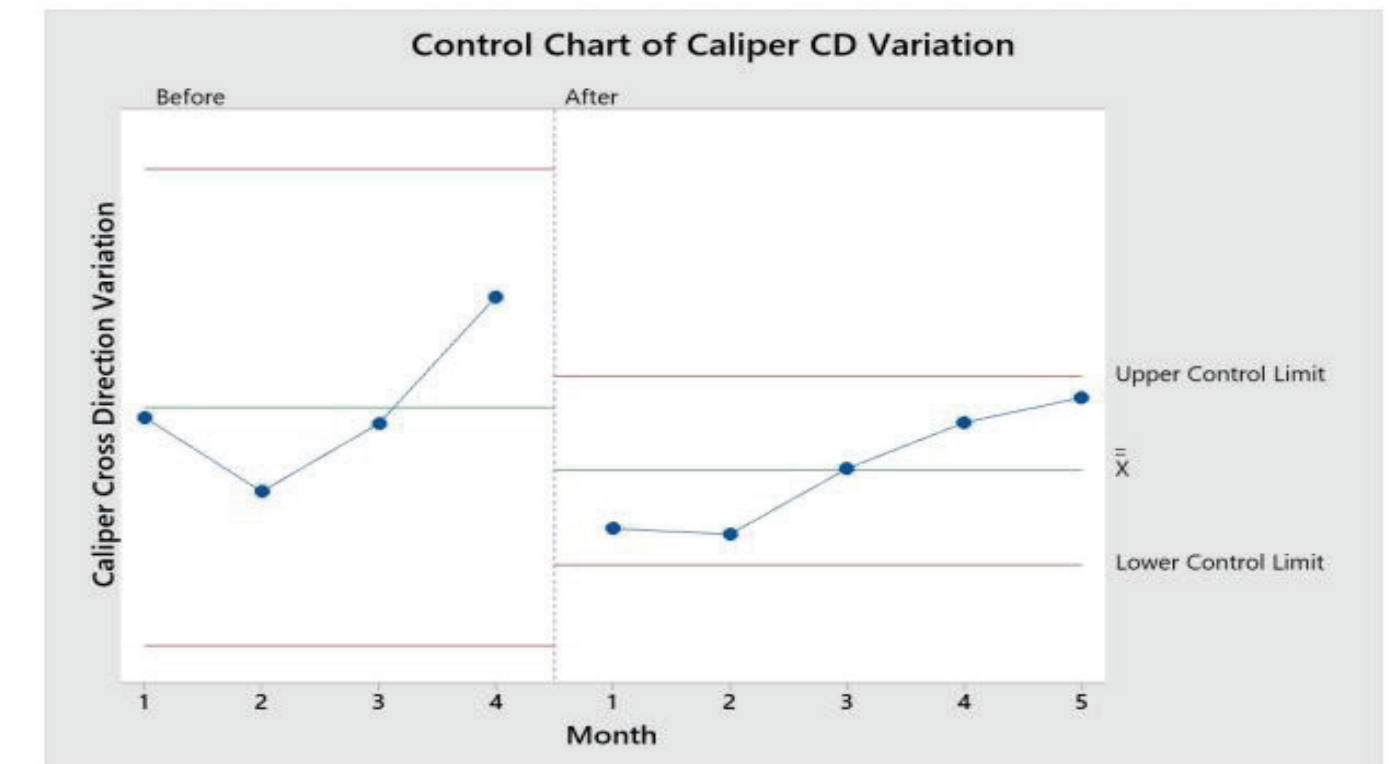
A large fine paper machine had a set of rolls that only ran for four months until corrugation issues plagued the paper being produced. Further inspection showed barring and feedlines in the calender roll face. The paper quality issues made the paper unsellable, leading to unexpected downtime and a long night for the maintenance crew. Needing an expedited grind, PRG was able to have this roll received, ground, and shipped within **five-days**. Once installed, there was nothing but positive outcomes for the paper machine according to both the operators and the data.

Let the Data Do the Talking:

Over the following months, machine operators indicated the rolls were running better than ever. Past issues the mill had with paper waste from corrugation and wrinkling virtually disappeared.

Although the customer was impressed with the paper quality, PRG commits to proving our value statistically.

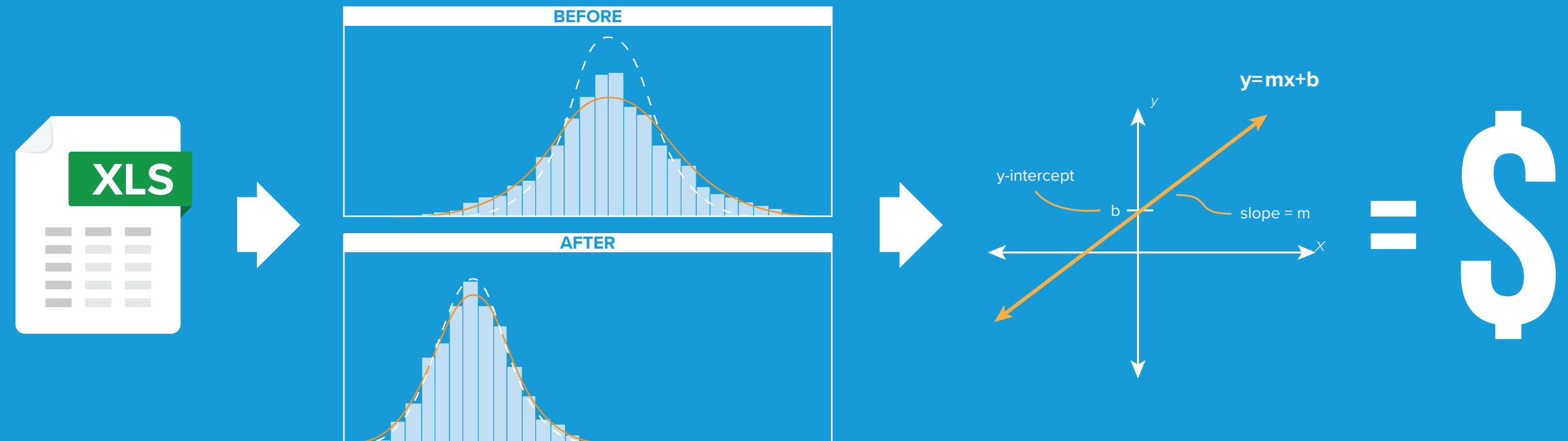
After running five months, caliper variation was analyzed to see what improvements were made. Data shows a first month reduction of 12% in caliper variation and reduction in variation of 6% over five months compared to the previous rolls that only ran four months. Even with a single PRG roll installed, we run longer and your paper is made to a higher quality. Imagine the value when your entire calender is to PRG standards! **6 down hours can be a loss of \$50,000, Unsellable paper can be a loss of \$25,000... IT ADDS UP FAST. Partner with PRG to gain real VALUE in roll services.**



PROMISE TO PROVIDE REAL ECONOMIC VALUE

PROCESS VARIATION
IMPROVEMENT = \$

- Joint Design of Experiment to reduce variation
- Data analysis on current process
- Implement plan for variation improvement
- Data analysis on improved process – predictive equation



PROVIDING VALUE IN A VIRTUAL WORLD

PARTNERING WITH YOU TO IMPROVE YOUR PROCESS ➡ REDUCING VARIATION

- Data analysis, sampling and testing
- Statistical validation of real benefits (\$\$)
- Virtual troubleshooting (pics/video)

*Send us your data,
samples, pics, video*



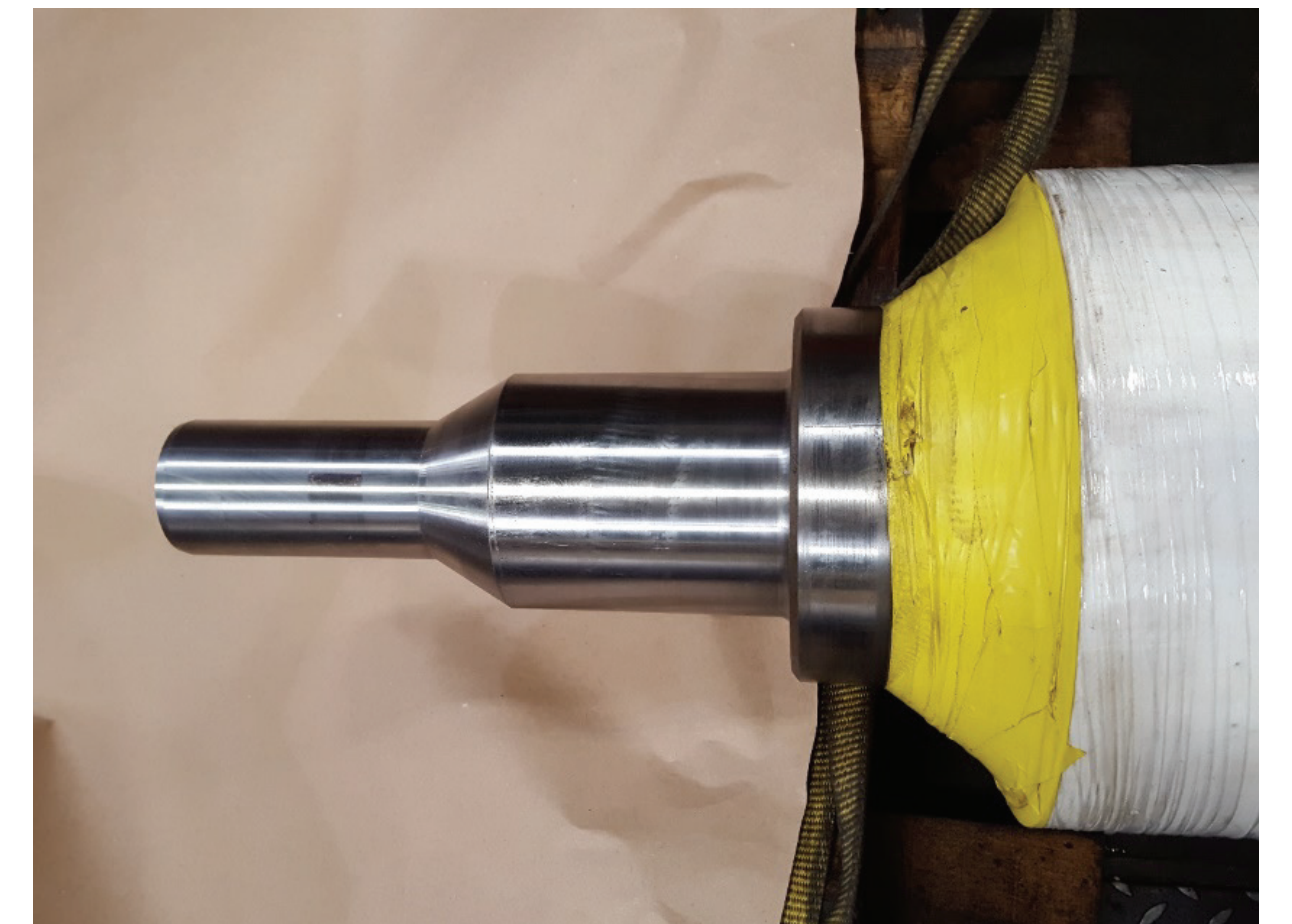
COST OF IMPROPERLY GROUND ROLLS

DESCRIPTION	VARIABLE	AMOUNT
PRG Grind Cost	\$20,000.00	
PRG Roll Life (months)	14.00	
Competitor's Grind Cost	\$10,000.00	
Competitor's Roll Life (months)	6.00	
Annual Savings due to Extended Roll Life		\$2,857.14
Production Hours Lost due to Improperly Ground Roll	2.00	
Lost Revenue Per Hour	\$3,500.00	
Total Lost Revenue due to Improperly Ground Roll		\$7,000.00
Scrap While Running Improperly Ground Roll (pounds)	50.00	
Cost per pound	\$50.00	
Total Scrap Cost due to Improperly Ground Roll		\$2,500.00
Revenue Per Hour at Normal Production Speed	\$3,500.00	
Percent Production Lost due to Degraded Speed	0.10	
Hours Run at Degraded Speed	24.00	
Revenue Lost Due to Degraded Speed		\$8,400.00
TOTAL COST OF IMPROPERLY GROUND ROLL		\$17,900.00

To use this justification tool simply insert the values appropriate for your operation into the green cells. Your projected savings will be automatically calculated and displayed in the lowest cell on the right.

ROLL LIFE AND START-UP – MECHANICAL EXCELLENCE

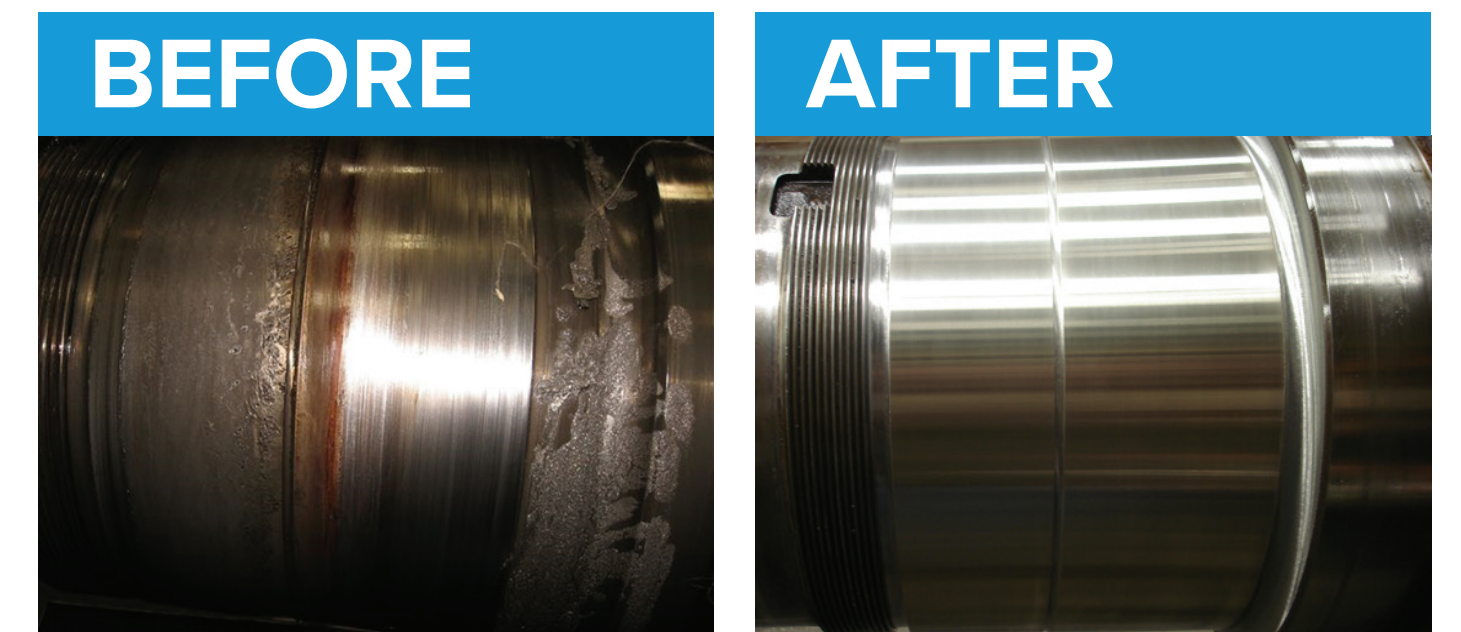
- Bearing Inspection
- Bearing Seat Grinding
- Bearing Replacement
- Complete Roll Inspection
- Complete Rebuilds/
Reconditioning
- Dynamic Balance
- Dynamic Leak Test
- Grinding
- Head Fit Repairs
- Journal Repairs
- NDT
- New Housings
- New Journals
- New Rolls
- Roll Modifications
- Vacuum Testing
of Suction Rolls



ROLL LIFE AND START-UP – MECHANICAL EXCELLENCE

PRECISION MAINTENANCE IS MORE THAN JUST PRECISION GRINDING

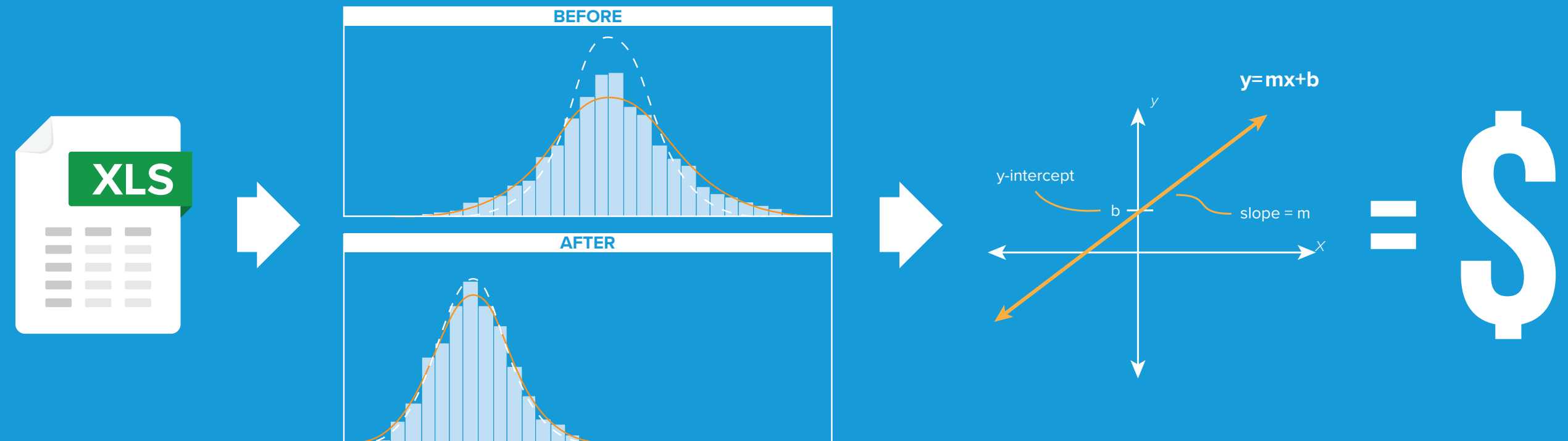
- Thorough inspection of bearings and housings
- Proper assembly of bearings and housings
- Replacement of worn or damaged bearings and bushings
- Journal repair and replacement
- Start up on time and produce profitable product



PROMISE TO PROVIDE REAL ECONOMIC VALUE

PROCESS VARIATION
IMPROVEMENT = \$

- Joint Design of Experiment to reduce variation
- Data analysis on current process
- Implement plan for variation improvement
- Data analysis on improved process – predictive equation



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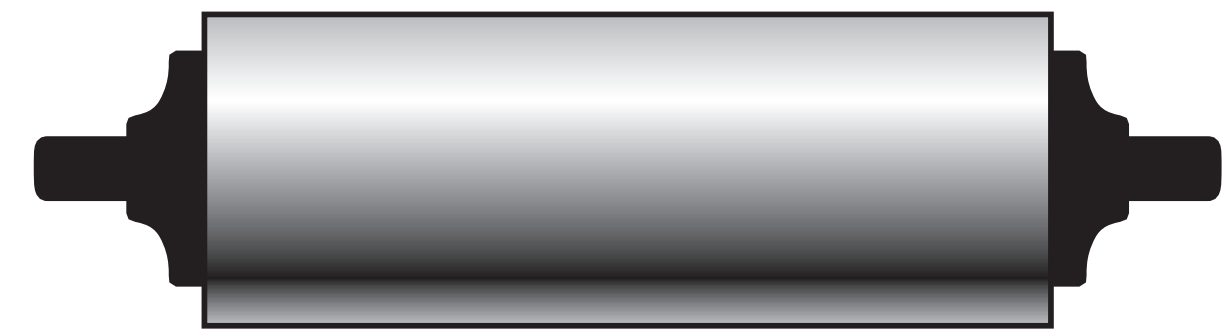
(870) 216-4000



**THANK YOU FOR
YOUR TIME.**

QUESTIONS?

PRECISION



ROLL GRINDERS

Over 50 years of value-added service

precisionrollgrinders.com