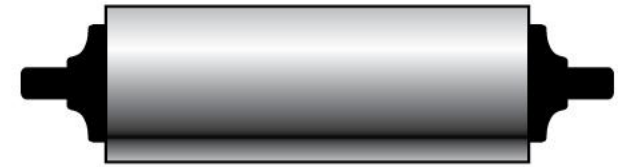


PAPER MACHINE CALENDER ROLLS: PRECISION GRINDING FOR OPTIMUM PERFORMANCE

PRECISION



ROLL GRINDERS

Over 50 years of value-added service

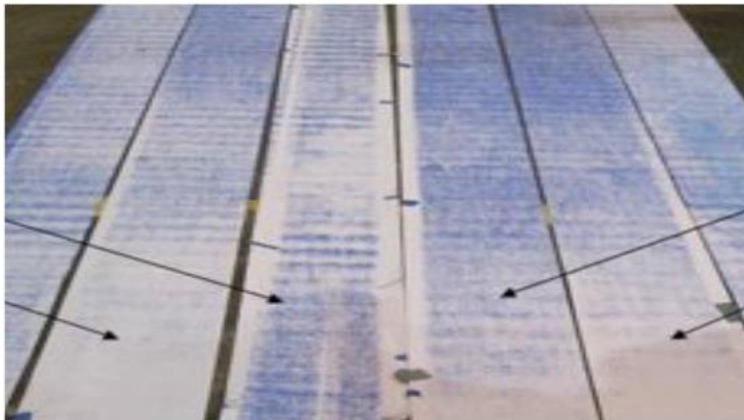
WEBINAR SERIES

precisionrollgrinders.com

CALENDER ROLL OPTIMUM PERFORMANCE

CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION

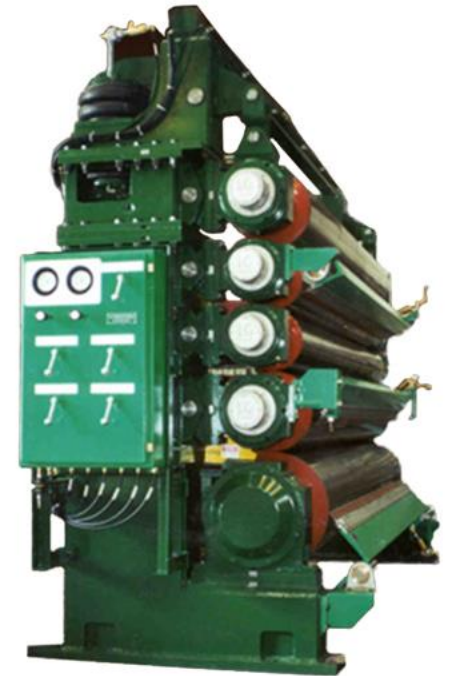
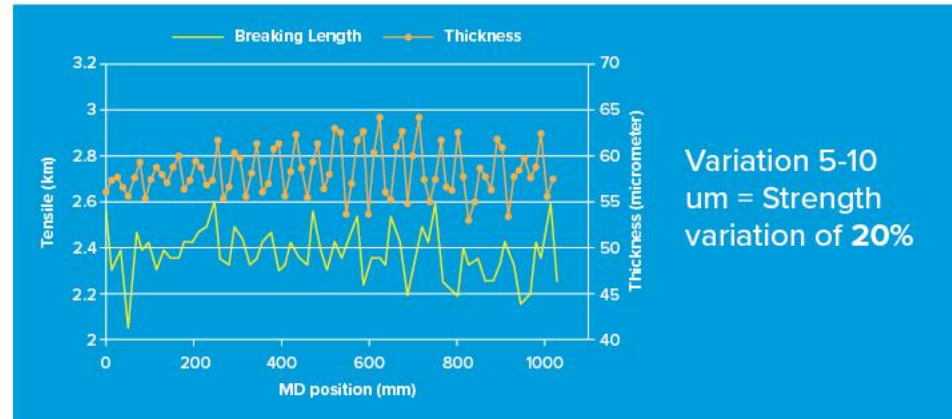
- Machine direction variation or barring



- This causes strength variation



- Sheet Breaks
- Winder Breaks



CALENDER ROLL OPTIMUM PERFORMANCE

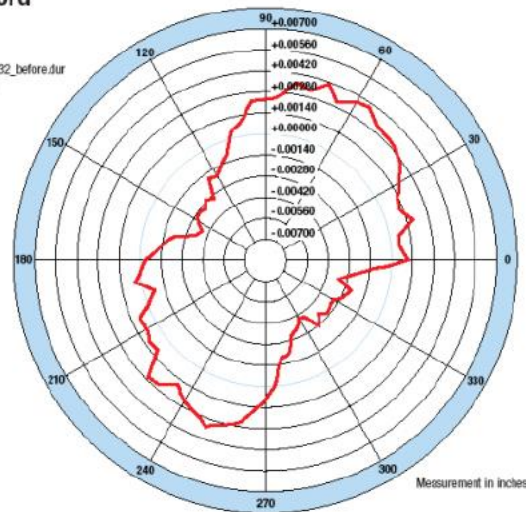
CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION

- Machine direction variation or barring

Measurement Record

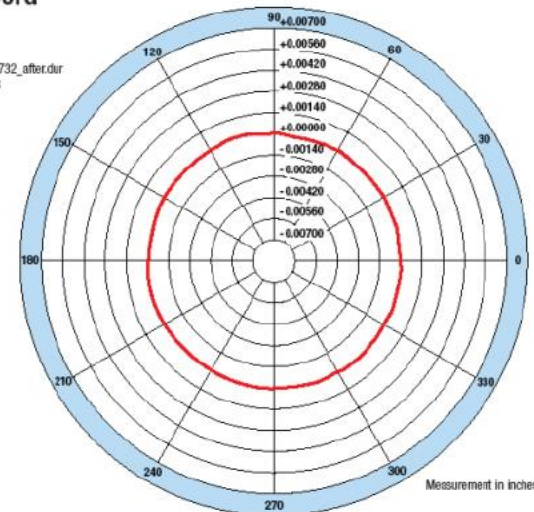
Customer: Confidential
Customer Roll Number: competition/q00732_before.dur
Roundness: competition/q00732_before.dur
Measure Time: 18-10-05, 21:07
Probe Mode: T1+T2
Curve Zero Point: 77.0000 inch
Measurement Position: 263.5000 inch
Roundness: 0.00682

Alerton, IA Leitzpart, KY



Measurement Record

Customer: Confidential
Customer Roll Number: competition/q00732_after.dur
Roundness: competition/q00732_after.dur
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

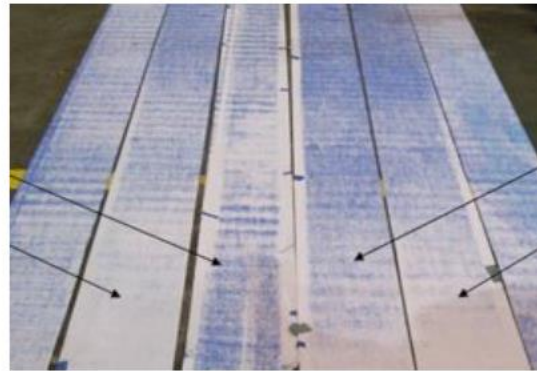
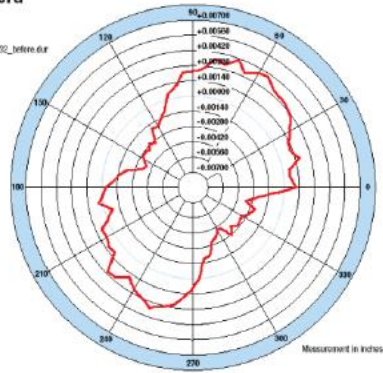


OEM Specification on calender rolls = 0.0002”

CALENDER ROLL OPTIMUM PERFORMANCE

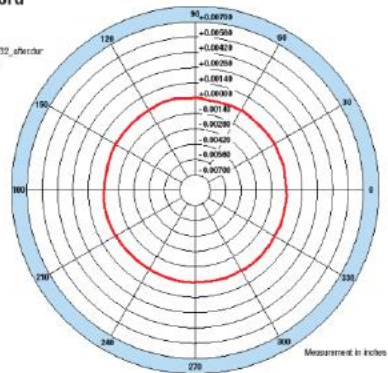
Measurement Record

Customer: Confidential
Customer Roll Number: comp0702_before_eur
Roundness: 0.0082
Measure Time: 18-10-06, 21:07
Probe Mode: T1+T2
Curve Zero Point: 77.0000 inch
Measurement Position: 263.5000 inch
Roundness: 0.0082



Measurement Record

Customer: Confidential
Customer Roll Number: comp0702_after_eur
Roundness: 0.0021
Measure Time: 18-10-06, 09:13
Probe Mode: T1+T2
Curve Zero Point: 77.0000 inch
Measurement Position: 253.5000 inch
Roundness: 0.0021



CALENDER ROLL OPTIMUM PERFORMANCE

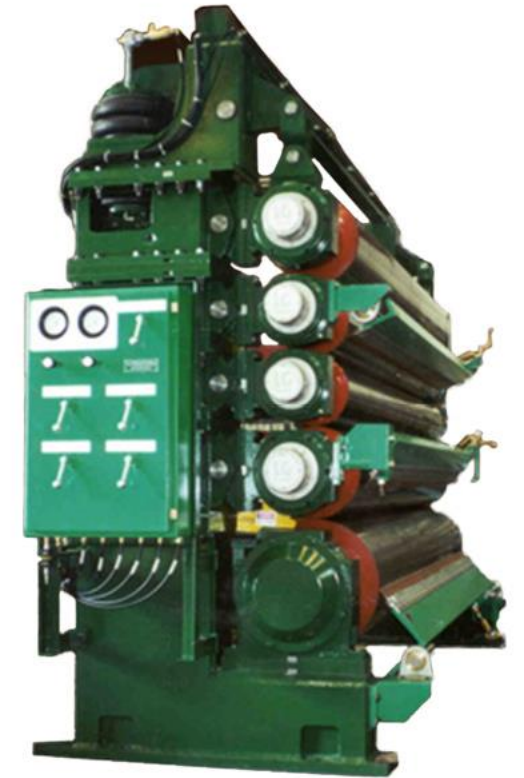
CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION

↑ Machine efficiency = \$\$\$

- Sheet Breaks → 15 minutes/week = \$130K/yr.
- Winder Losses → 2 tons/week = \$20K/yr.
- Off Quality → 4 tons/week = \$40K/yr.
- Roll Life → 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



PROMISE TO PROVIDE VALUE — CASE STUDY

OPTIMUM CALENDER ROLL PERFORMANCE

Improved STFI = 0.2# Basis Weight Reduction
\$500,000 per year

Reduced Spool losses at turn-up
\$300,000 per year

Improved Winder runnability
\$100,000 per year

\$900,000 PER YEAR OF ROI



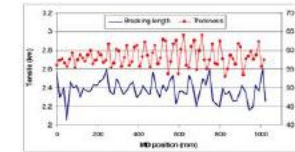
Precision Roll Grinders Value Study:

The Case for Precision Grinding Linerboard Machine Calendar Rolls

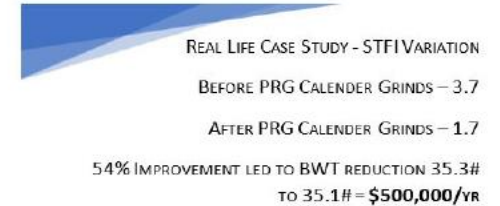
All too often calendar roll grinds are considered 'non-critical' on linerboard machines. After all, linerboard is driven by the strength of the paper, not by fine paper quality. Why would a linerboard machine need precision (0.0002" roundness) grinds? Isn't that a waste of money? NO. Linerboard calendar roll grinding is an *investment in your machine's profitability*, not just a maintenance cost. Here's why:

Calendar roll 'barring' and grind variation leads to strength variation:

Paper industry researchers (FP Innovations) proved that short-term calendar variation leads to strength variation in the lab. PRG and its partners proved it in mills!



Caliper variation 5-10 um =
Strength variation of 20%



Poor calendar roll grinds = losses at each turn-up = poor winder runnability



Before

After

Saving 250# of spool loss per reel = 1,000 tons/yr
\$300,000/yr of savings!

Improved Winder runnability = \$100,000/yr

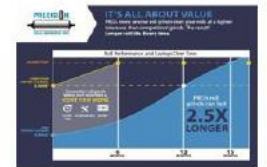
Additional Real-Life 'Perks' of Precision Calendar Grinds

CD Caliper 2sigma—0.6 to 0.3/ Sheffield Smoothness—380 to 365/ Mullen Variation—12.4 to 7.5
CaCoil, Air Hoses — REMOVED, Crowns in control/ Roll life extended 6 months to 18 months!

Bottom Line

\$900,000+ per year of ROI

This is a payback of 2 months or less
even if the competitor's grind is FREE!



PROMISE TO PROVIDE VALUE — CASE STUDY



Precision Roll Grinders Value Study

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:

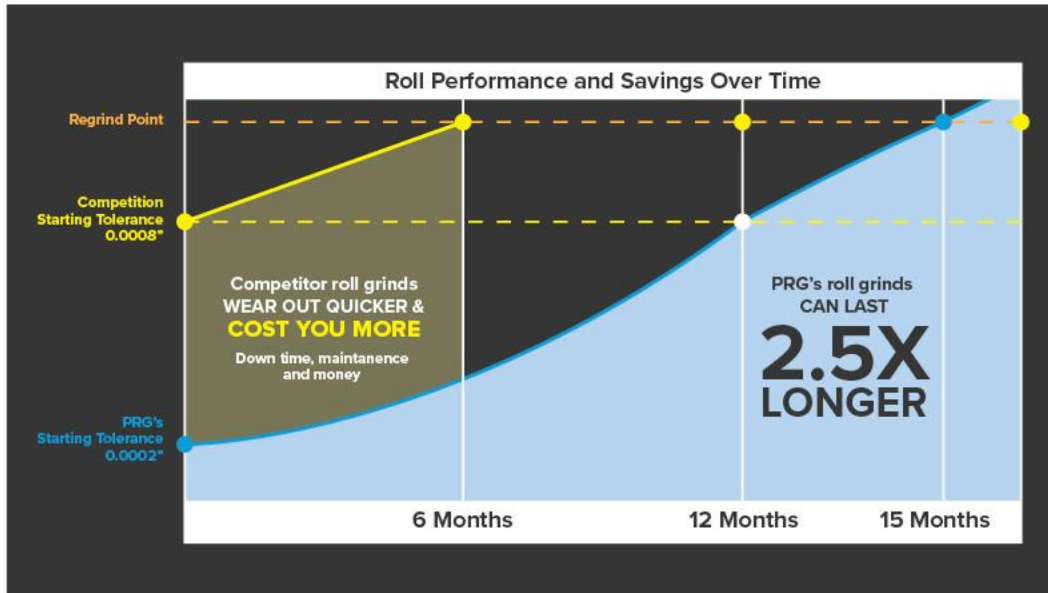
Having to suffer a significant amount of scrapped product due to poor calender roll profile, the facility gave Precision Roll Grinders a chance. Soon after installation, the facility found having their rolls ground on journals made a world of difference for their paper process. Over the coming calender 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!**

OPTIMUM CALENDER ROLL PERFORMANCE



ROLL LIFE EXTENDED FROM 6 MONTHS TO 2 YEARS!

PROMISE TO PROVIDE VALUE — CASE STUDY

CHANGING ONLY ONE ROLL MATTERS!

Saved 6 hours of downtime.

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!*



Precision Roll Grinders Value Study: One Roll Matters

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:

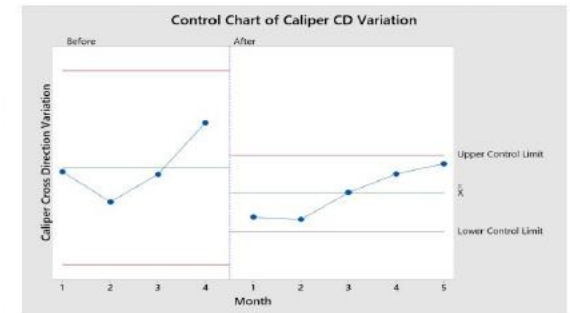
A large fine paper machine had a set of rolls that only ran for four months until corrugation issues plagued the paper being produced. Further inspection showed barring and feedlines in the calender roll face. The paper quality issues made the paper unsellable, leading to unexpected downtime and a long 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,

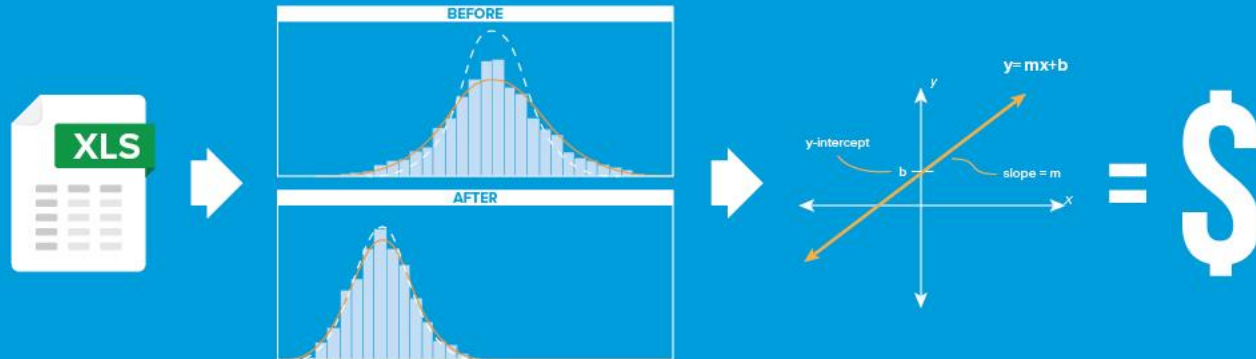
caliper variation was analyzed to see what improvements were made. Data shows a first month reduction of 12% in caliper variation and reduction in variation of 6% over five months compared to the previous rolls that only ran four months. Even with a single PRG roll installed, we run longer and your paper 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 YOUR ROLL SERVICE PROVIDER 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

**SHOW
ME THE
MONEY**

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

This total cost calculator tool will allow you to project the operational cost of an improperly ground roll and potential savings with an investment in PRG grinding services.

[CLICK HERE](#) to access your own fully functional calculator as a Microsoft Excel file. Simply insert your values within the green cells and your projected savings will be automatically calculated.

ROLL LIFE AND START-UP — MECHANICAL EXCELLENCE

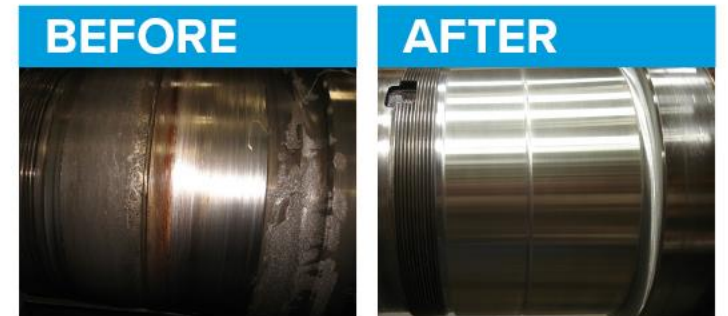
- Bearing Inspection
- Bearing Seat Grinding
- Bearing Replacement
- Complete Roll Inspection
- Complete Rebuilds/
Reconditioning
- Dynamic Balance
- Dynamic Leak Test
- Grinding
- Head Fit Repairs
- Journal Repairs
- NDT
- New Housings
- New Journals
- New Rolls
- Roll Modifications
- Vacuum Testing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



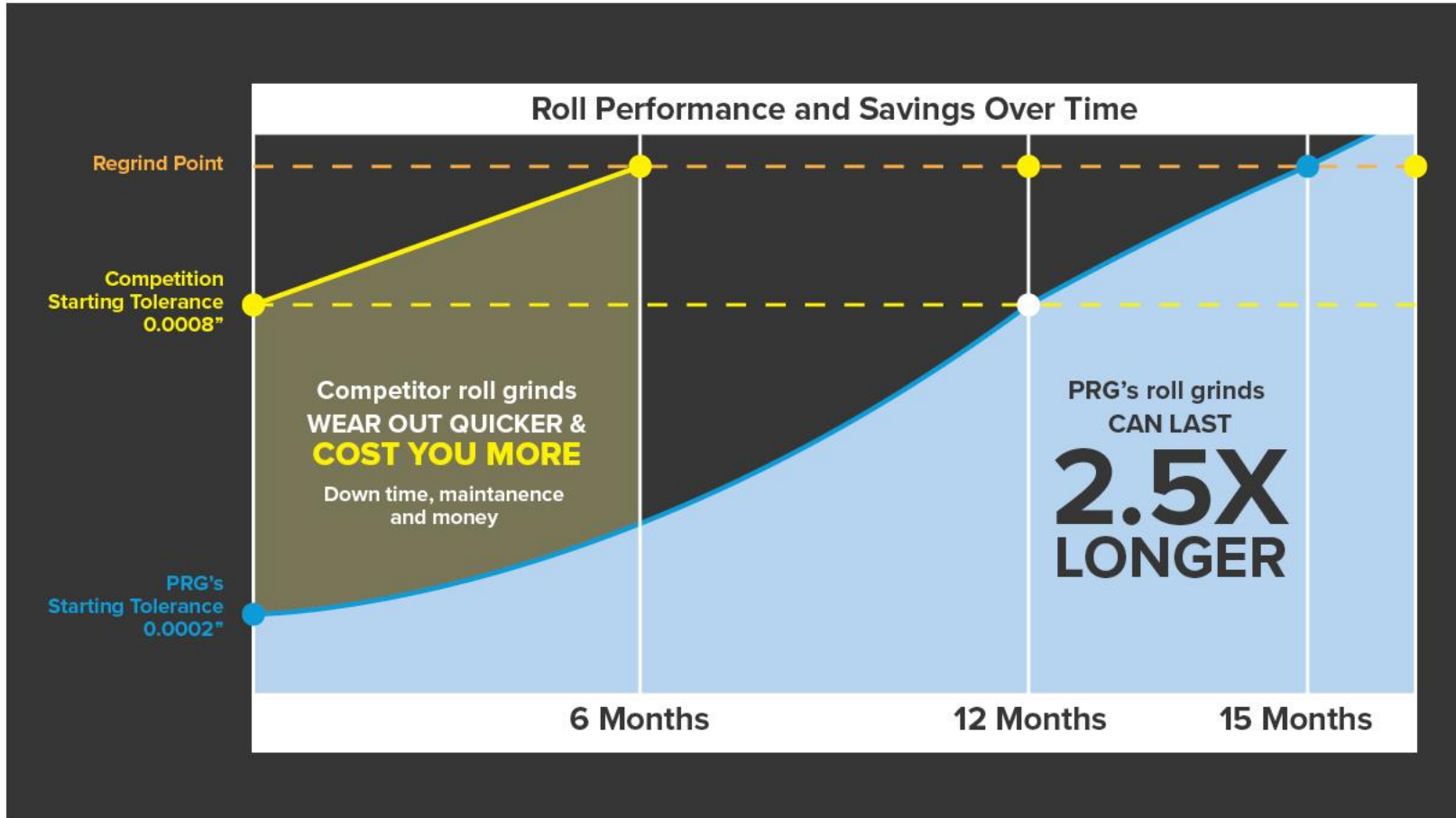
ROLL LIFE AND START-UP — MECHANICAL EXCELLENCE

PRECISION MAINTENANCE IS MORE THAN JUST PRECISION GRINDING

- Thorough inspection of bearings and housings
- Proper assembly of bearings and housings
- Replacing worn or damage bearings and bushings
- Journal repair and replacement
- On-time start-up and profitable production



ROLL LIFE AND START-UP

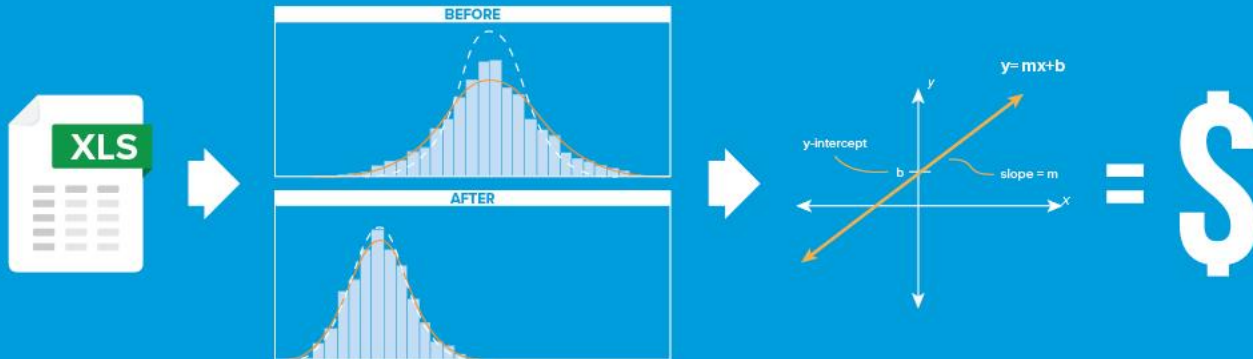


ROLLS THAT
START CLOSER
TO PERFECTLY
ROUND START
UP FASTER &
RUN LONGER!

PRG 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



CONTACT US

ALLENTOWN, PENNSYLVANIA

(610) 395-6966

CARROLLTON, GEORGIA

(770) 830-6323

LEWISPORT, KENTUCKY

(270) 295-4990

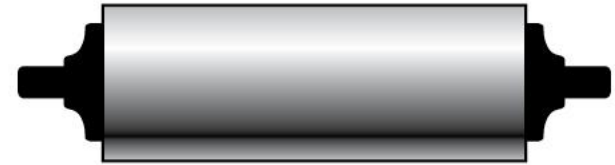
TEXARKANA, ARKANSAS

(870) 216-4000



QUESTIONS?

PRECISION



ROLL GRINDERS

Over 50 years of value-added service

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**THANK YOU FOR
YOUR TIME.**

PRECISION



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