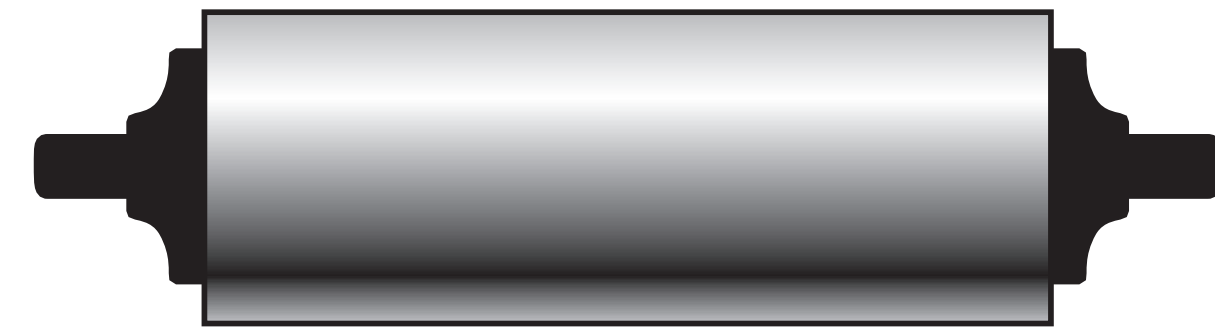


MOVING THE NEEDLE ON PAPER MACHINE PERFORMANCE AND COSTS

CAPTURING BIG RETURNS WITHOUT
CAPITAL COSTS BY UTILIZING
PRECISION ROLL GRINDERS

PRECISION



ROLL GRINDERS

Over 50 years of value added service

WEBINAR SERIES

precisionrollgrinders.com

PAPER MACHINES ARE *PRECISION* EQUIPMENT

Your paper machine was designed and built to very tight tolerances for good reason!

***Plus*, changing market conditions have required products at lower weights, higher strengths, higher production rates – all at reduced capital, operating costs and manpower.**

**TONS OF PRODUCTION IS
DEPENDENT ON TENS OF
THOUSANDTHS OF AN
INCH! YOUR ROLLS ARE
CRITICAL PRECISION
PIECES OF YOUR
PRECISION MACHINE.**

ROLL PERFORMANCE

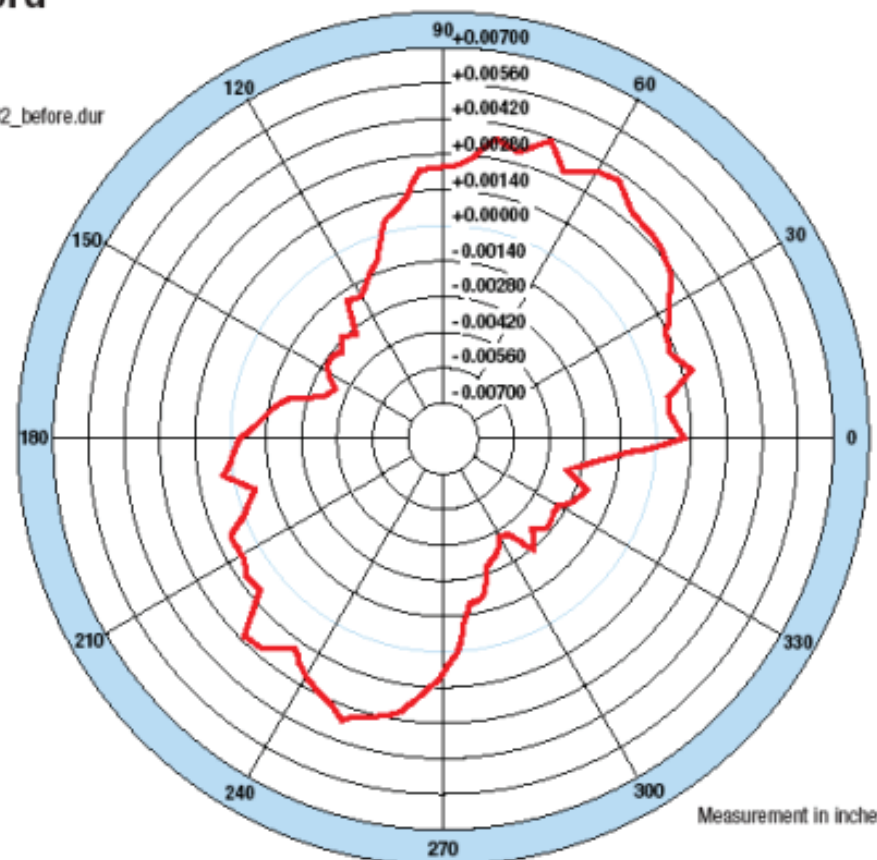
PROPER ROLL SERVICE = DECREASED VARIABILITY = \$\$\$\$

Straight to the Bottom Line without Capital

BEFORE PRG

Measurement Record

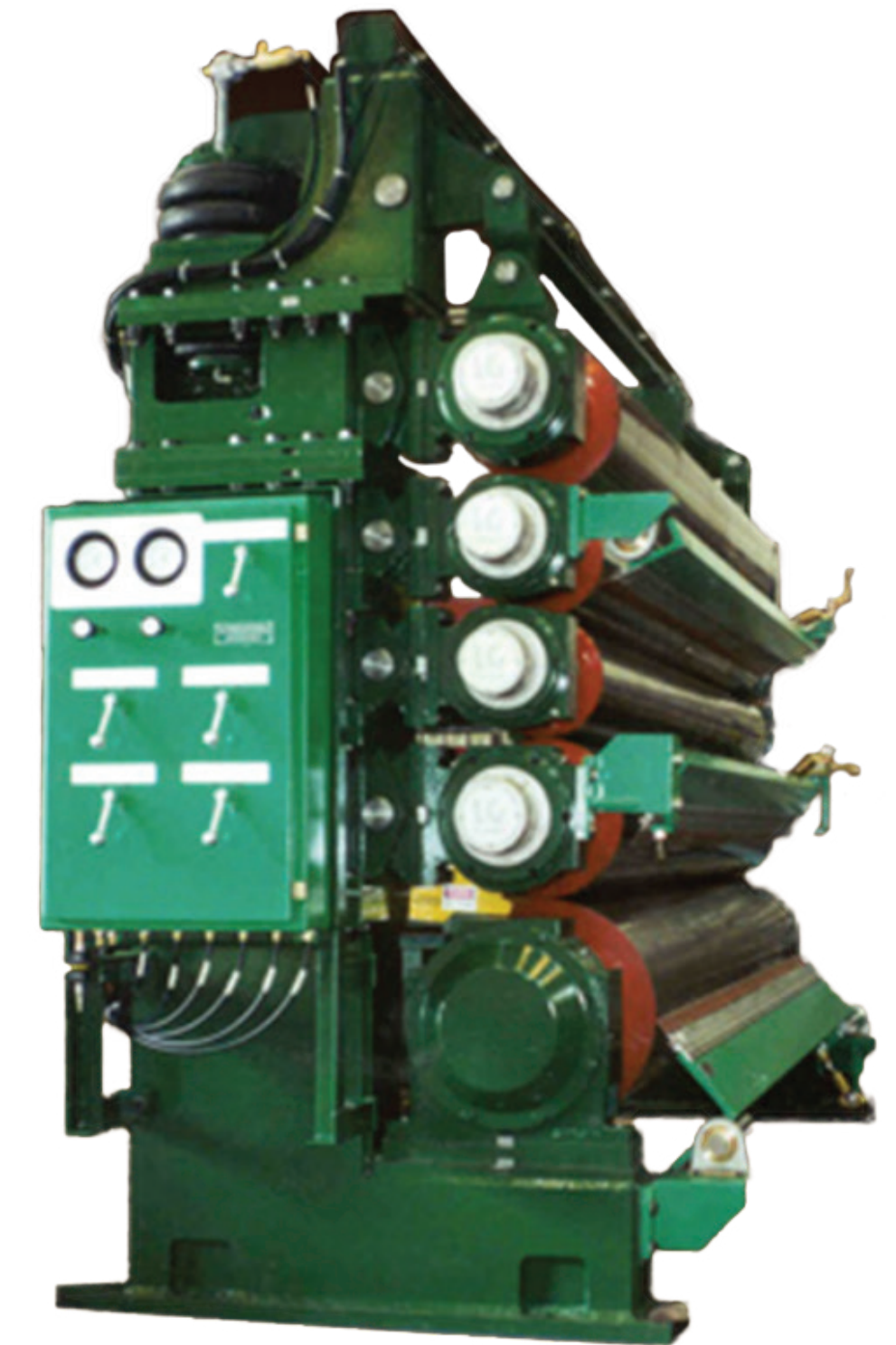
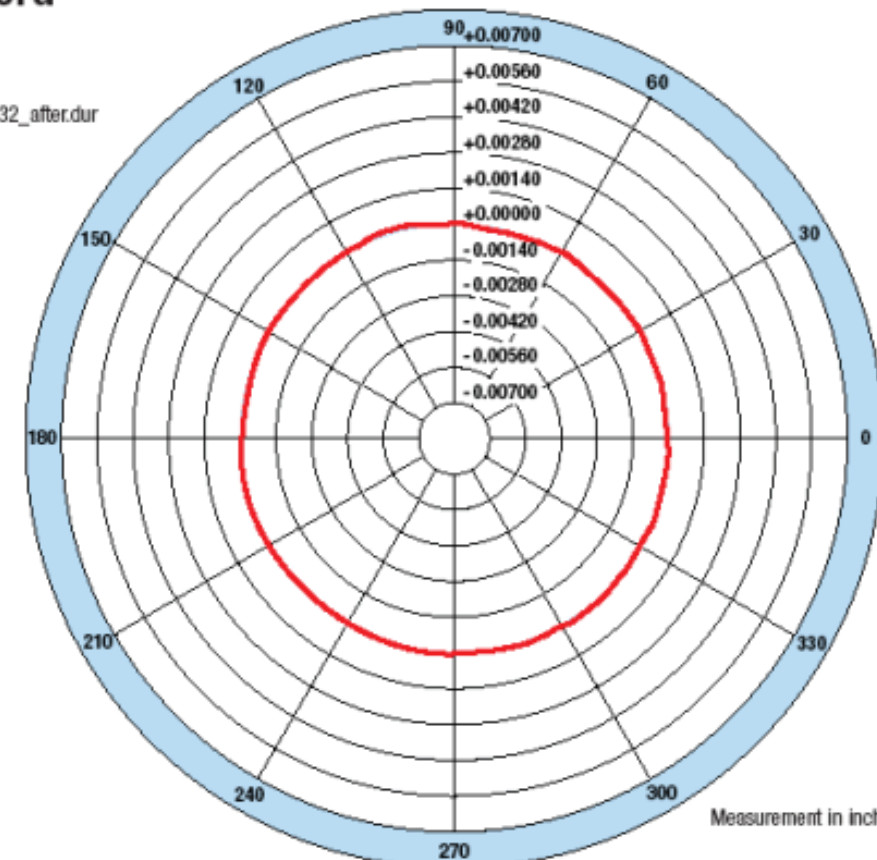
Customer: Confidential
Customer Roll Number: competitionq00732_before.dur
Roundness: 0.00682
Measure Time: 18-10-05, 21:07
Probe Mode: T1+T2
Curve Zero Point: 77.0000 inch
Measurement Position: 263.5000 inch
Roundness: 0.00682



AFTER PRG

Measurement Record

Customer: Confidential
Customer Roll Number: competitionq00732_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



OEM Specification on calender rolls = 0.0002”

DRIVE YOUR MACHINE PERFORMANCE HIGHER

FORMING SECTION PERFORMANCE = IMPROVED MD AND CD HIGH-FREQUENCY BASIS WEIGHT AND MOISTURE VARIABILITY

- Improved weight and moisture control
- Less issues carried down to the machine's other sections

SUCTION ROLL PERFORMANCE = IMPROVED VACUUM CONTROL

- More efficient water removal
- Energy reduction
- Longer roll run life

PRESS, BREAKER, SIZE AND COATER ROLL PERFORMANCE = IMPROVED MOISTURE VARIATION

- Reduction/elimination of wet streaks
- Energy reduction on suction rolls
- Longer roll run life

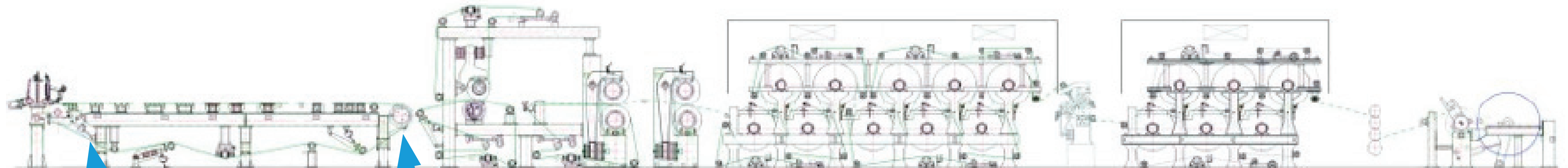
CALENDER ROLL PERFORMANCE = IMPROVED CALIPER VARIATION

- Better reel building, better winder performance
- Improved strength variation
- Fewer sheet breaks at the calender/reel
- Longer roll run life



REDUCE VARIABILITY AND COSTS FROM WET END TO DRY END

ALL WITH NO CAPITAL COSTS



CD and MD
Basis Weight
Variability

CD and MD Moisture Variability
Energy Savings
Reduction in Wet End Breaks

Steam Demand
Reduction

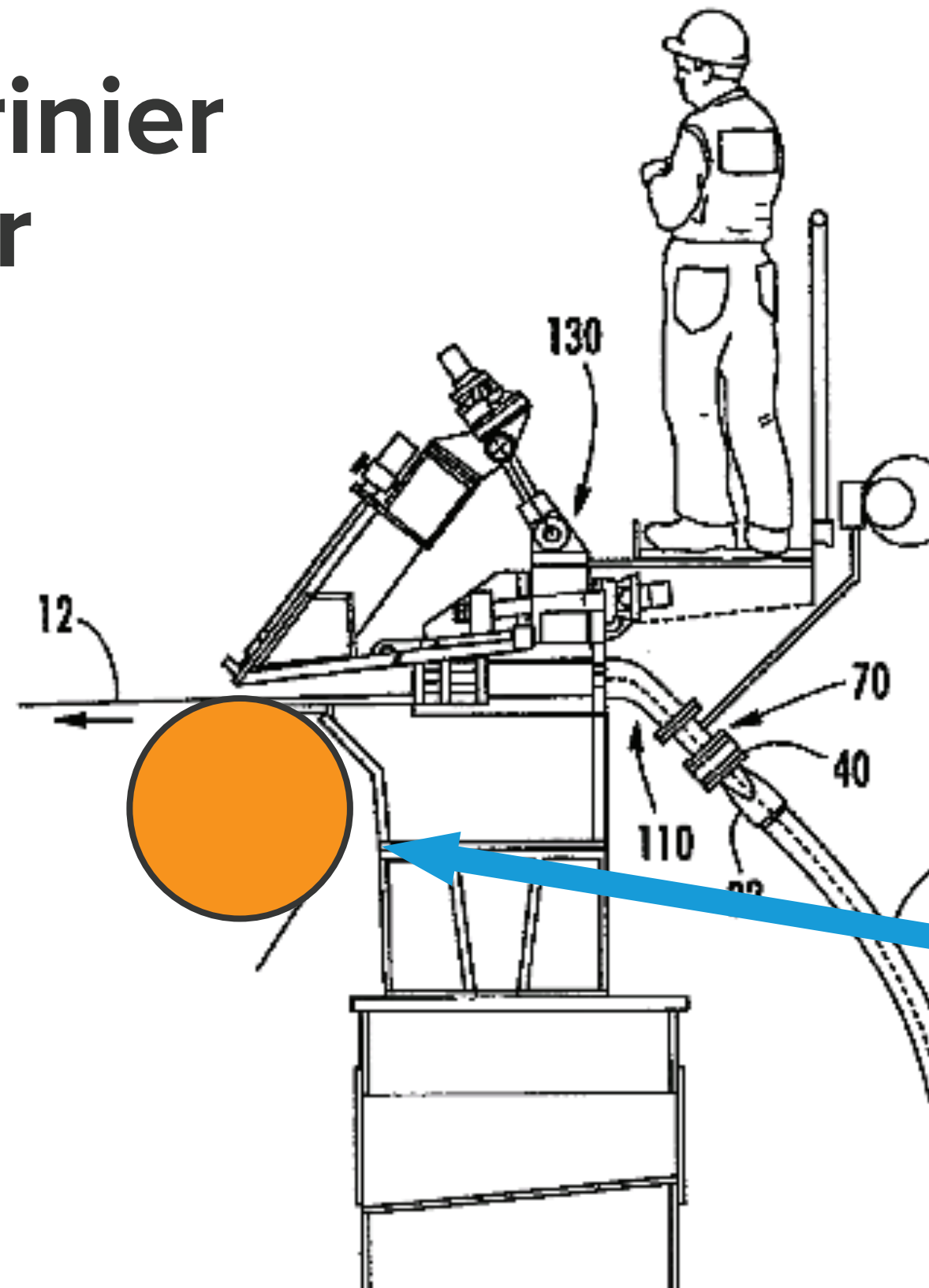
Size Press/Coater
Variability

CD and MD Caliper Variation
CD and MD Strength Variation
Reduced Gloss Variation
Improved Variability for End User

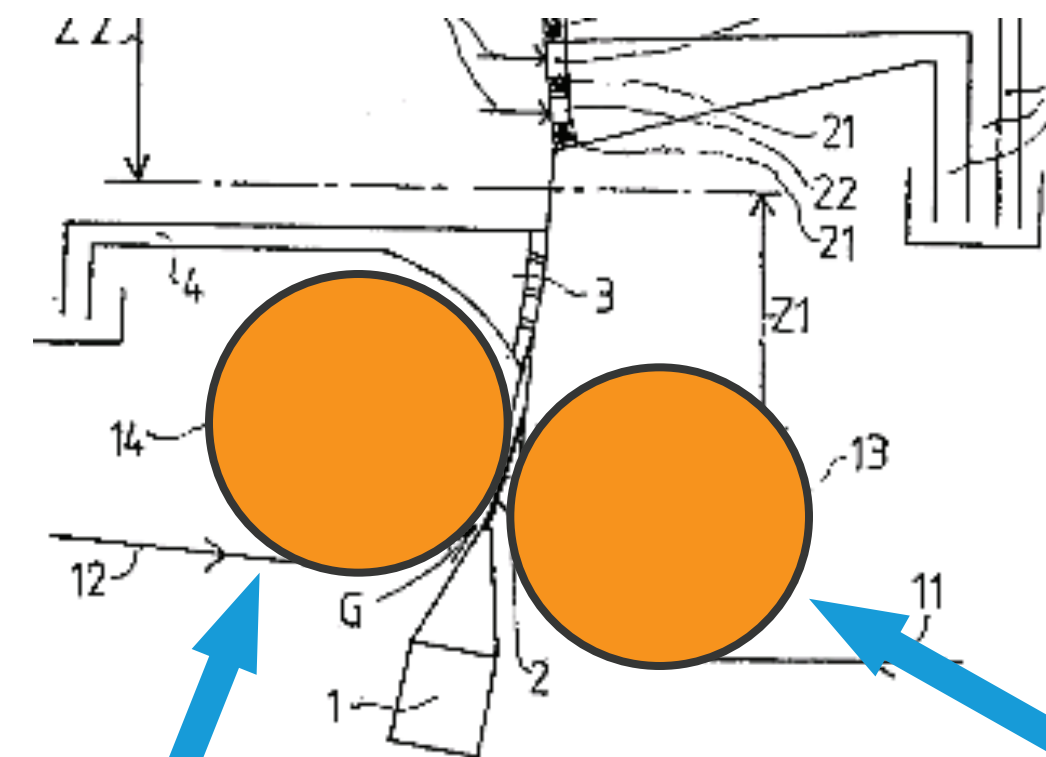
FORMING SECTION

AN IMPORTANT AREA IMPACTING FORMATION, CD/MD PROFILES AND SHEET STRENGTHS IS THE JET EXITING THE HEADBOX

Fourdrinier Former



Twin Wire Former

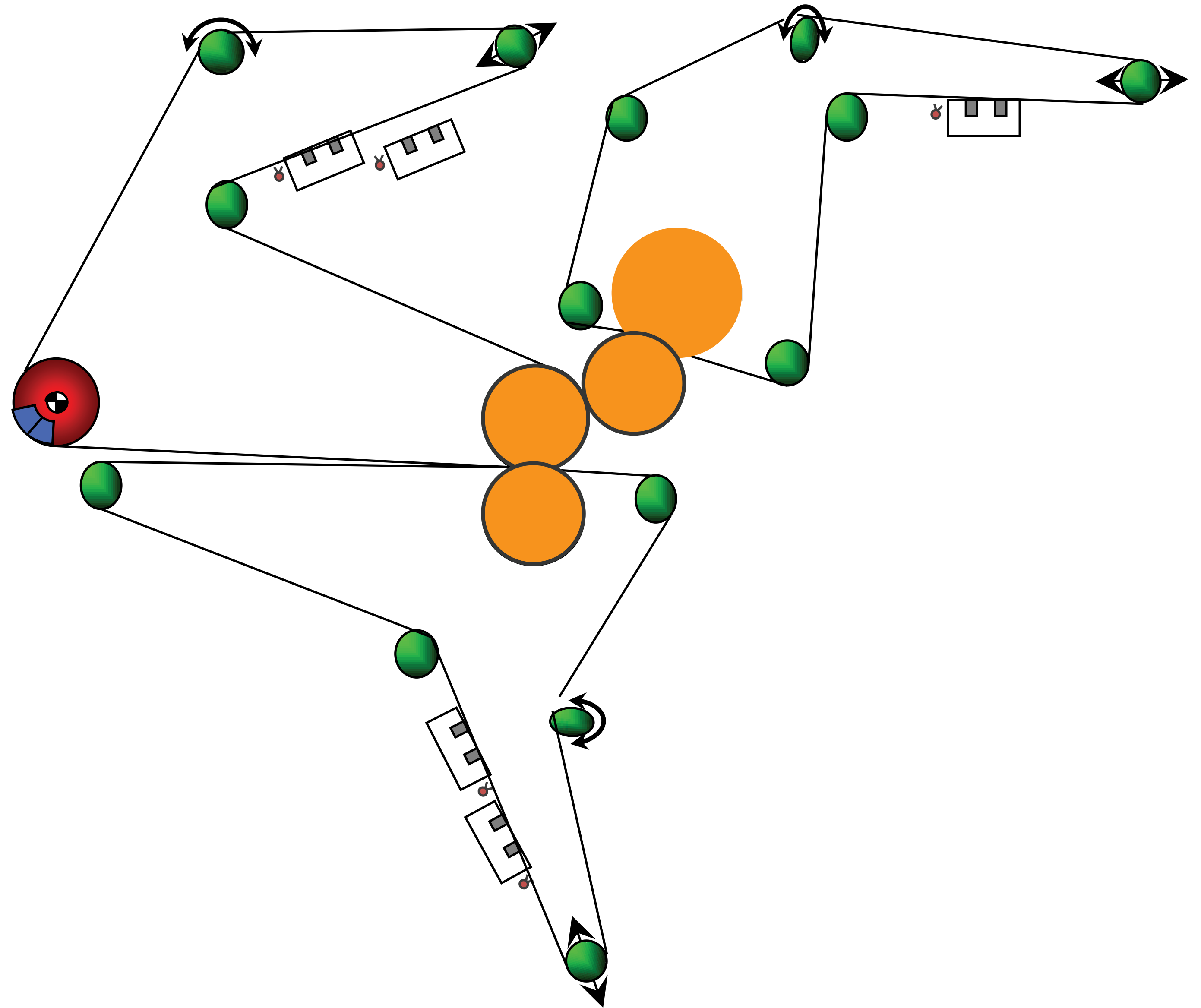


Breast Roll

Forming Roll

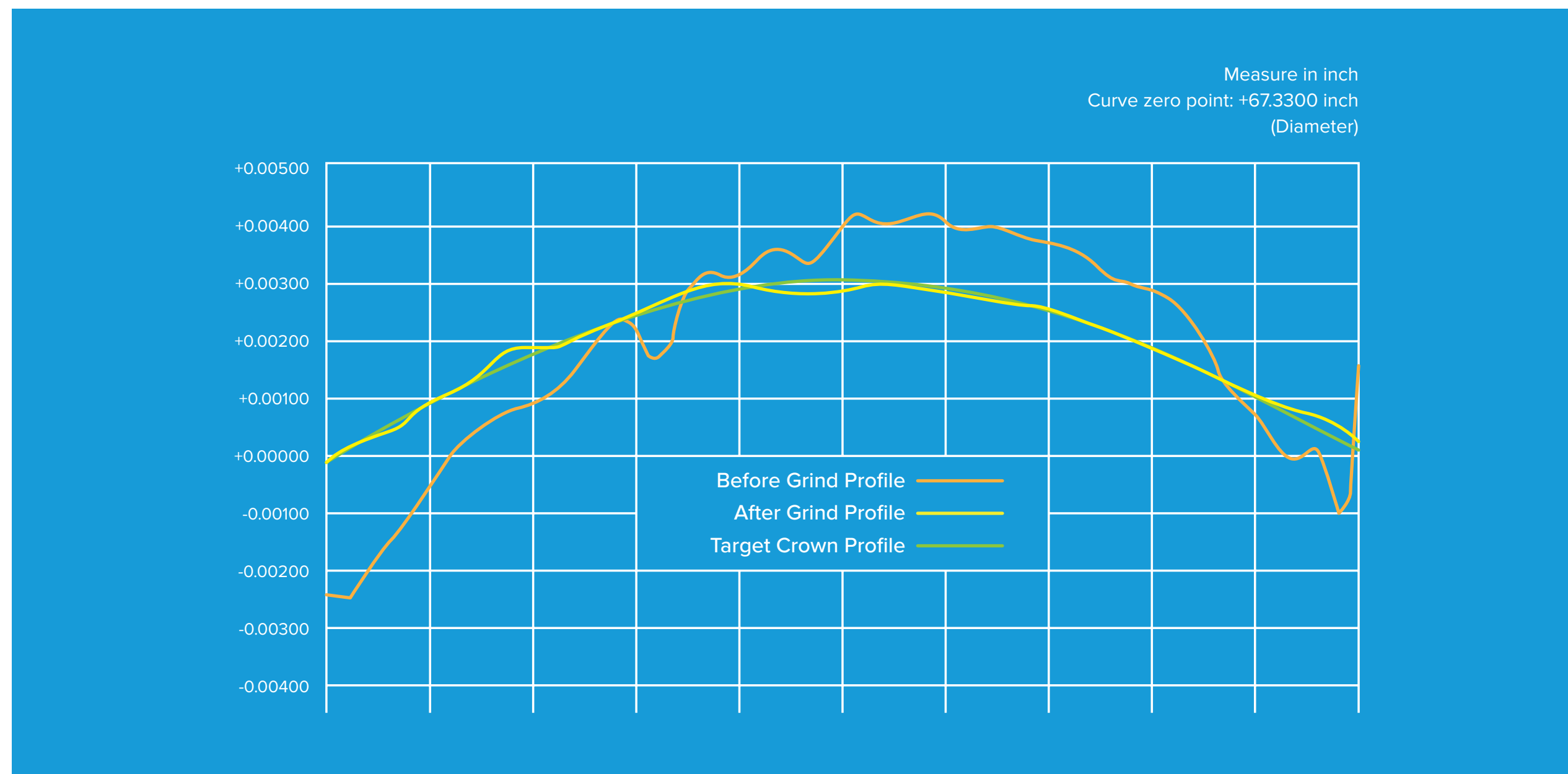
PRESS SECTION

**PRESS ROLL
PERFORMANCE =
IMPROVED MOISTURE
VARIATION AND
SOLIDS ENTERING
THE DRYER SECTION**



PRESS ROLL PERFORMANCE

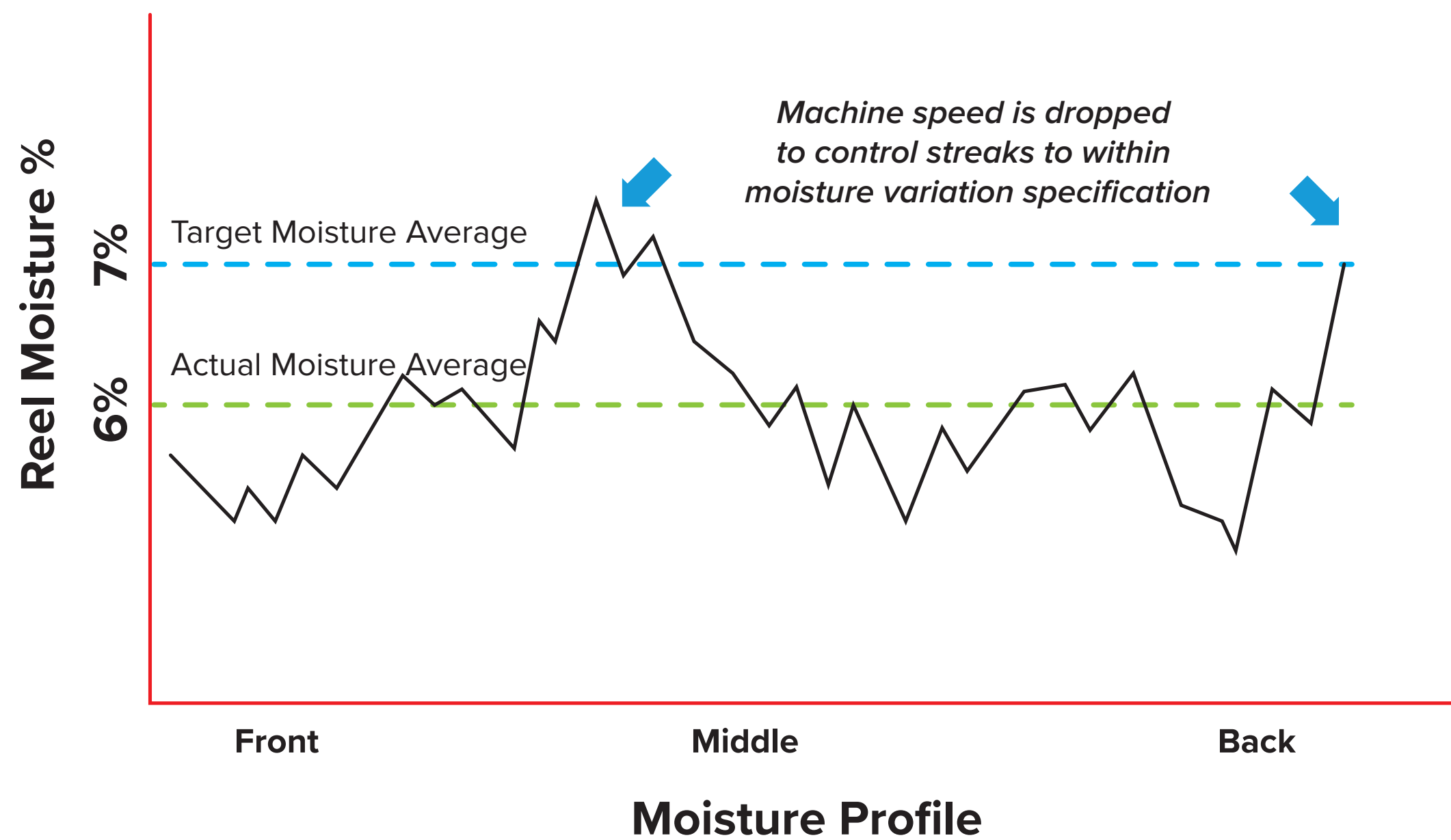
CENTERED ROLL CROWNS ARE CRITICAL!



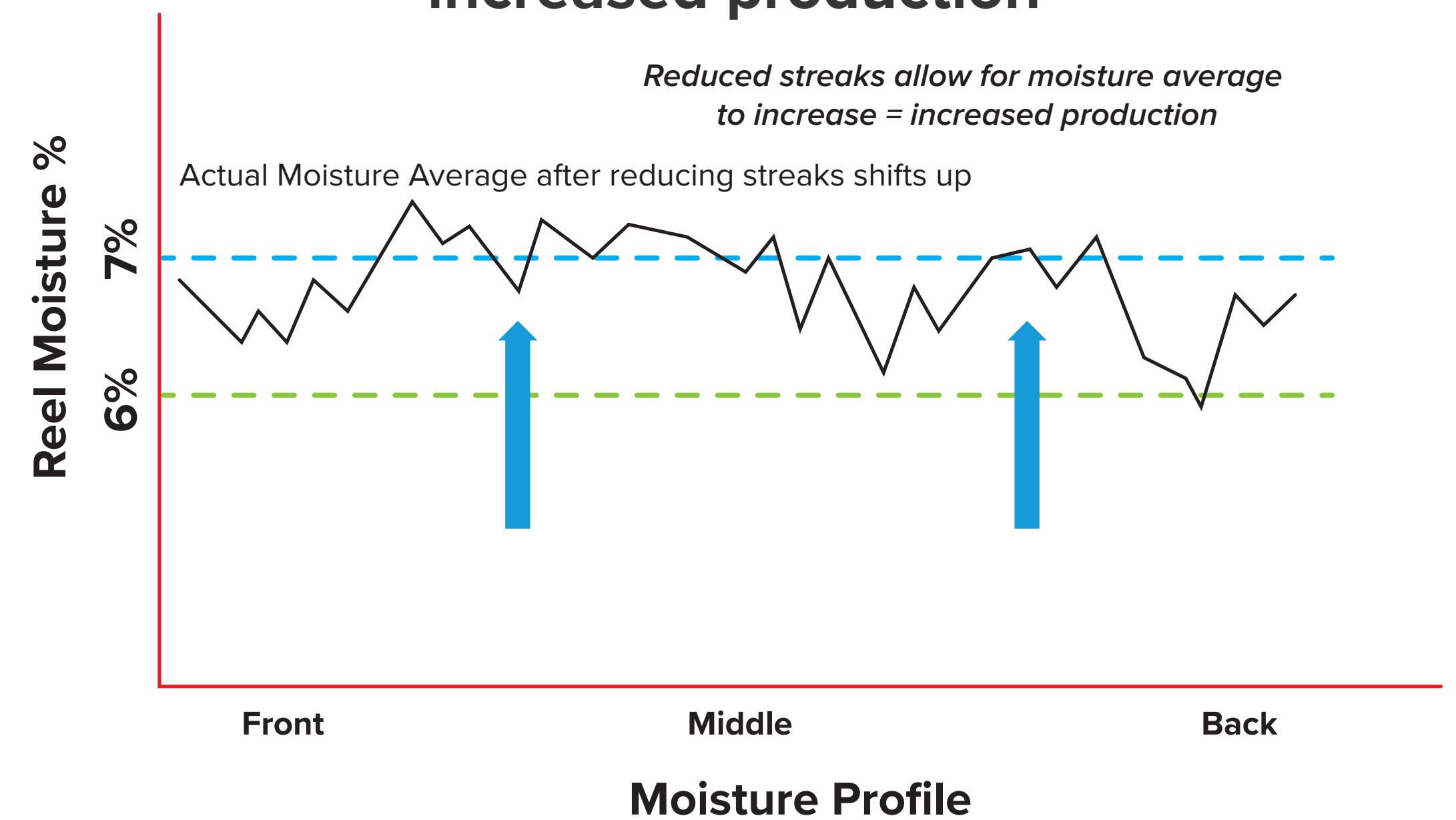
PRESS ROLL PERFORMANCE

PRESS ROLL PERFORMANCE = IMPROVED MOISTURE VARIATION = ENERGY REDUCTION

Moisture streaks = lost production



Reduced moisture streaks = increased production



PRESS ROLL PERFORMANCE

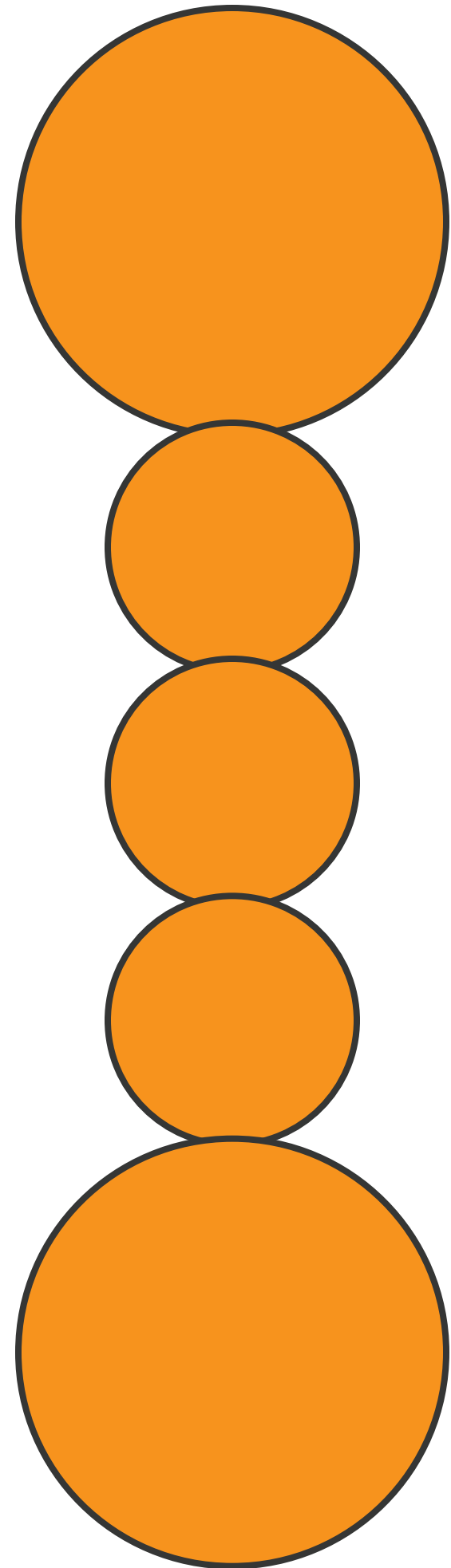
**PRESS ROLL PERFORMANCE = REDUCED VARIATION =
RUN TO TARGET & SPEED UP**

Reduced Streaks = Higher Moisture = Increased Production

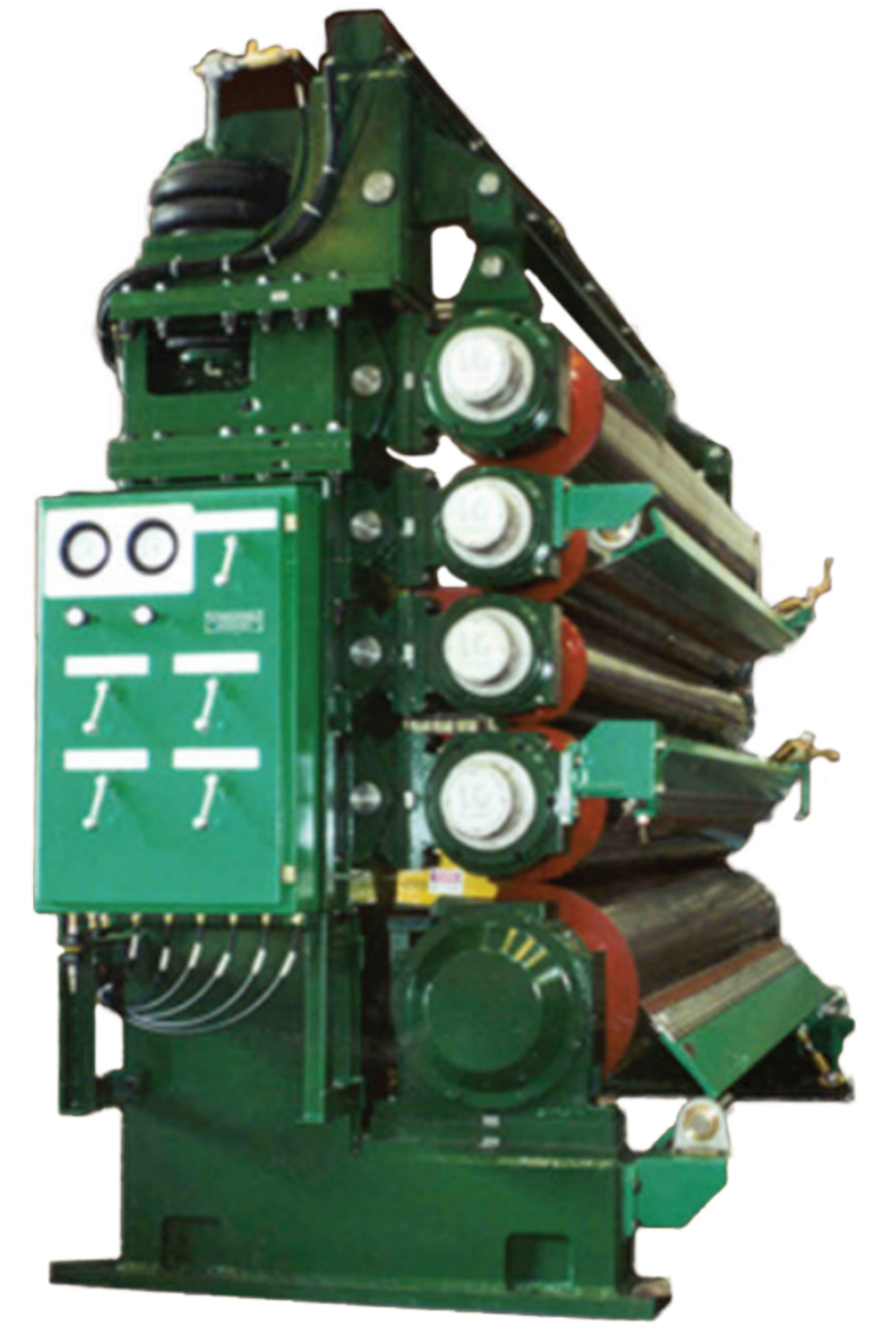
DESCRIPTION	VARIABLE	AMOUNT
Average reel moisture before (%)	6.2	
Average reel speed before (fpm)	2500	
Average production rate before (T/hr)	50.5	
Average reel moisture after (%)	7.0	
Average reel speed after (fpm)	2525	
Average production rate after (T/hr)	51.0	
Increased production per day (tons)	12	
Increased revenue per incremental ton	\$250	
Increased revenue/year (350 days) = \$1,050,000		

Don't dry up the sheet to where it is most expensive (dryer section) to compensate for moisture streaks in the press section.

THE CALENDER



RESULTS FROM A 200+ CALENDER ROLL RESEARCH STUDY BY FP INNOVATIONS HAS CONCLUDED THAT THE SECTION OF THE PAPER MACHINE MOST RESPONSIBLE FOR MD AND CD VARIABILITY IS THE CALENDER.



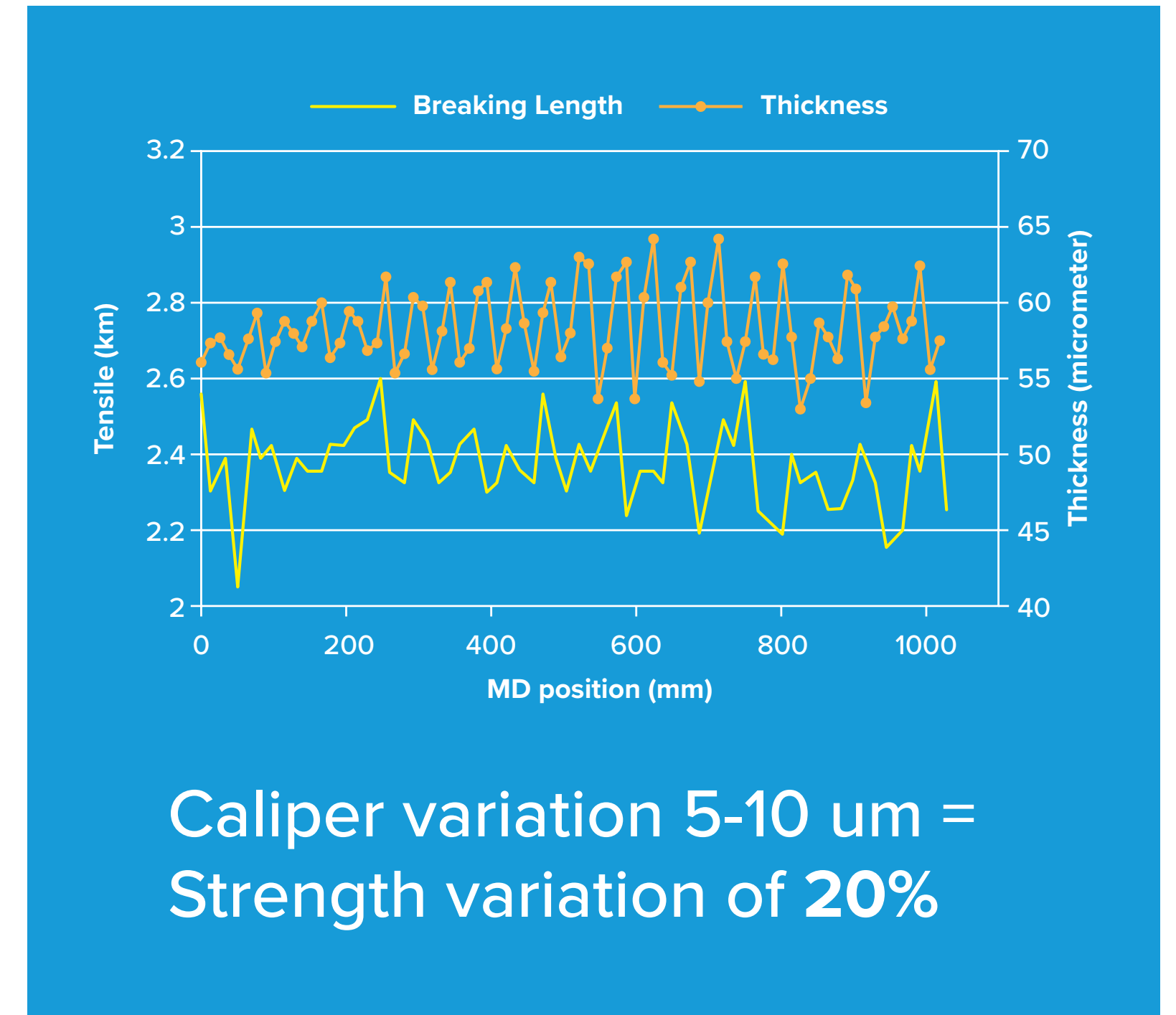
CALENDER ROLL PERFORMANCE

CALENDER ROLL PERFORMANCE = IMPROVED VARIATION = \$\$\$\$

- MD (Barring) and CD Variation



- This causes profile and strength variation leading to:
 - High cull losses
 - Downgraded product
 - Poor winder performance
 - Poor quality to the end customer



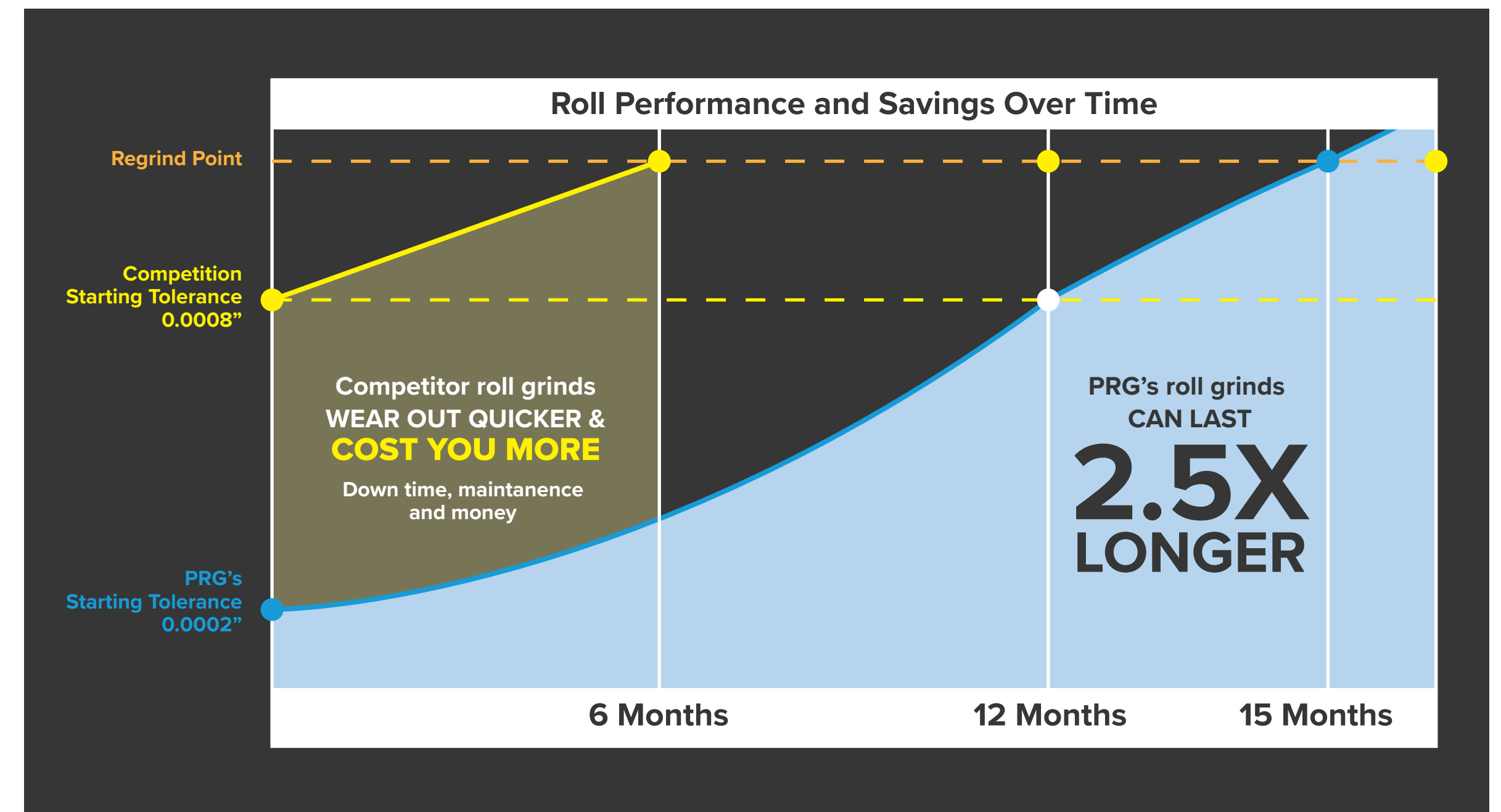
ADDED BONUS

PRG-SERVICED ROLLS RUN LONGER = ADDITIONAL SAVINGS TO THE BOTTOM LINE BY:

- Lower maintenance costs
- Increased manpower for scheduled shuts
- Higher availability of house cranes for other important work
- Longer-term product quality

IT'S ALL ABOUT VALUE

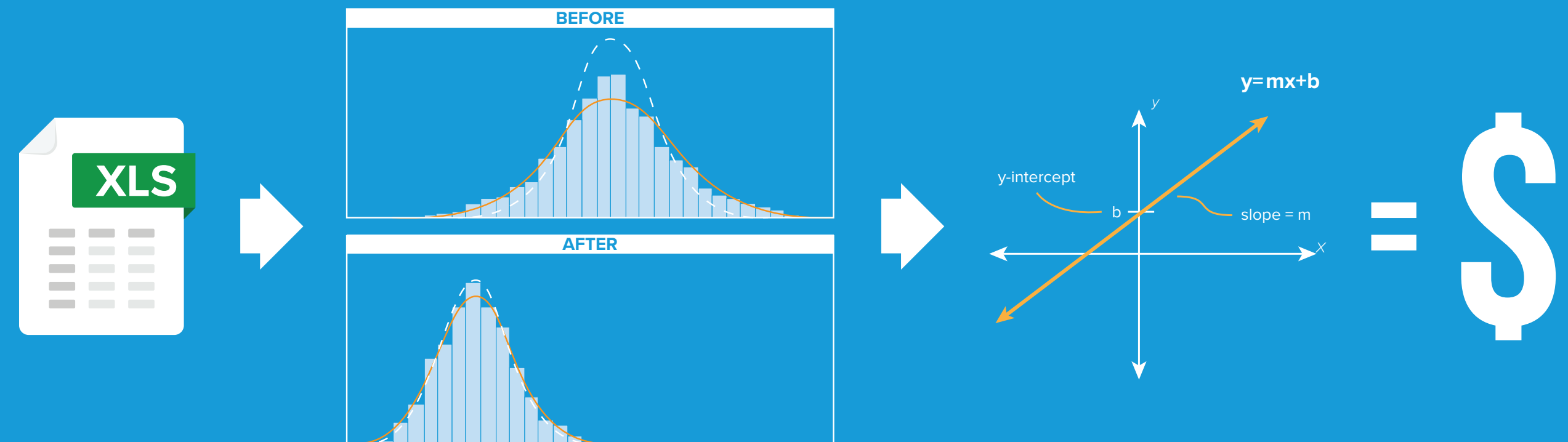
PRG's more precise roll grinds start your rolls at a tighter tolerance than competitors' grinds. The results? **Longer roll life. Every time.**



PRG PROMISE TO PROVIDE VALUE

**WE ARE COMMITTED TO HELPING
YOU REDUCE PROCESS VARIATION
AND INCREASE YOUR PROFITS!**

- Any troubleshooting on rotational equipment (video, pics)
- Data analysis on current process
- Joint Design of Experiment to reduce variation



ADJUSTING TO OUR NEW “VIRTUAL” PARTNERSHIP

ALLENTOWN, PENNSYLVANIA

(610) 395-6966

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TEXARKANA, ARKANSAS

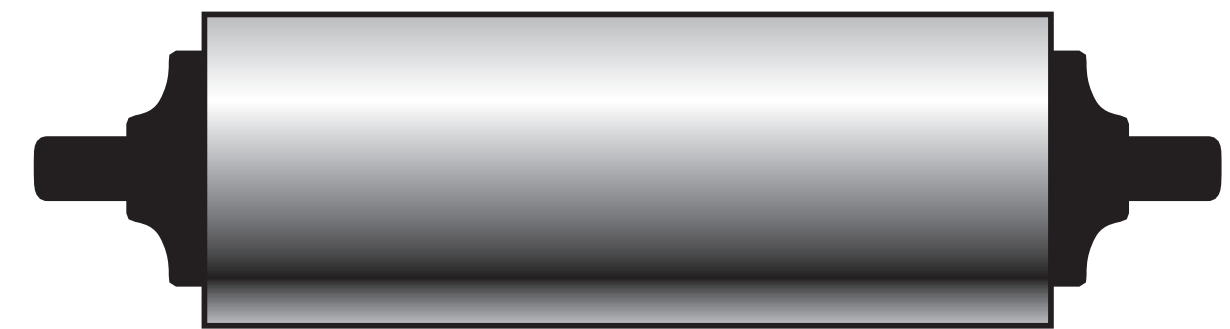
(870) 216-4000



**THANK YOU FOR
YOUR TIME.**

QUESTIONS?

PRECISION



ROLL GRINDERS

Over 50 years of value added service

precisionrollgrinders.com