

The Modern Paper Mill

And The Effect Of Precision Grinding On Paper Production



One of the most prominent and modern paper mills in the United States – and paper industry as a whole – learned the importance of precision grinding through trial and error. For some, this path to excellence is a road they're willing to take. But paper manufacturers like you probably can't afford a trial period that hinders the quality of your paper production.

This particular paper manufacturer used a machine designed to produce 650 tons of paper per day at a speed of 4,000 feet per minute. These days, however, running your paper machine at its originally designed speed is a recipe for unemployment. The fact of the matter is that those design speeds simply do not meet the modern expectations of the paper industry. Instead, the aforementioned paper mill produced 800 tons of paper per day at a speed budget of between 4,250 to 4,300 feet per minute.

An Industry Changed For Good

Running machines faster than their design speed is not a unique practice. But these faster speeds could have a great effect on your customers. Large newspaper publishers have three main concerns when it comes the paper you provide them:

- What will it cost?
- Will the paper run without breaking their printing press?
- Will the ink print clearly on your paper, making for a good product for the reader?

Since the emergence of *USA TODAY*, the newspaper industry has had problems with four-color printing. Publishers need paper that runs on a color printing press, requiring the utmost quality from paper manufacturers. Already requiring high-quality paper, the new standard for color newspapers changed both industries for good.

Roll Grinding To Imperfection

Using an in-house grinder at the time, the aforementioned mill was on a search for roll grinding services and eventually chose another roll grinding company to service its rolls. When the job was complete, the mill's rolls looked good to the naked eye as soon as they came out of the packaging. The documentation also indicated that their rolls were in spec.

Yet, when the manufacturer put its rolls back into place and started its paper production, the mill started to experience high vibration and excessive caliper variation. Due to feedlines – induced into the rolls from imperfections in its shape and roundness – the subject paper manufacturer simply couldn't run its machine and produce a quality, acceptable product.

As it turned out, the issues with the rolls' shape and roundness were a product of manipulated data – an imprecise presentation that masked the true roll measures and falsely indicated that the mill's rolls were in spec.

Testing The Effect Of The Roll Imperfections

The subject of this case study was having serious caliper issues, affecting both the sheet strength running in the calender and the publisher's quality of printing on its paper. After experiencing such problems, the paper mill brought its rolls to PRG, which employed FP Innovations to test these rolls.

This world-renowned consultant and research group in the paper industry found significant problems with the rolls that the paper mill had ground. Its testing showed that the work done in house and by the competitor roll grinding company reduced the overall paper strength by 8.9%, caused by the aforementioned feedlines. The roll defect also weakened sheet elasticity by 11.9%. With less stretch, publishers have reduced runnability and suffer more breaks on the printing press.

Last, FP Innovations found that feedlines in the paper mill's rolls decreased Total Energy Absorption (TEA) by 18.8%.



The Result Of Precision Grinding

After bringing the paper mill's rolls in for testing, PRG ground the two sets of rolls to virtually eliminate its feedlines, and enhanced them with smart poly covers with sensor gauges. Following the precision grinding, the strength of the paper mill's rolls improved by nearly 9%, boosting its runnability.

When the manufacturer ground its rolls in house, they could only run for four months before needing additional work. After PRG's service, the rolls ran for 19 months. Moreover, a second set is expected to run for two years – an increased run life by 200% to 350%.

Additional results of the precision grinding include:

- 60% reduction in caliper variation
- 20% reduction in gloss variation – helping with ink variation, saving ink in four-color printing
- 10% reduction in density variation – bolstering paper strength
- Moved services from the calender into the press section of the machine
- 16% improvement in pressure variability
- 522% reduction in loading variation – from 56 PLI to 9

Even beyond these measurements, it was determined that the round rolls' cross-direction moisture profile in the press belt was the best they had ever measured on that machine. The greater product uniformity makes a significant difference in the publisher's printing process.

With machines running at faster and faster speeds, the effect of improper roll grinding and subsequent roll defects is magnified. The importance of precise grinds – within or beyond specification – is imperative. As this paper manufacturer found out, the difference between precision grinding and imperfect grinding services has an extreme impact on your production.

Tired of imperfections in your rolls cutting into your profitability and manufacturing efficiency? [Contact PRG and realize the benefits of roll perfection.](#)



About PRG

PRG is the leading large roll and cylindrical shaft grinding company in the western hemisphere. Our services improve the precision and profitability of critical manufacturing, industrial and power generation processes. For more information, visit www.precisionrollgrinders.com.