

# High Performance Linerboard Mill Implements METRIX™ Technology to Obtain Environmentally Sustainable Results of Reduced Basis Weight and Increased Production

## MILL OVERVIEW

<b>Grade:</b>	Linerboard
<b>Basis Weight Produced:</b>	35 and 42#/1000 ft <sup>2</sup> (170 and 205 gsm)
<b>Machine Type:</b>	Single Ply Fourdrinier
<b>Press Type:</b>	1st Straight through, 2nd LNP
<b>Production Rate:</b>	45 TPH
<b>Machine Speed:</b>	1700 - 2250 fpm (518-686 mpm)
<b>Furnish:</b>	65% OCC and 35% Kraft
<b>Wet-end Chemistry:</b>	Core Shell® 61067 technology, Thin & Thick Stock Potato Starch, Rosin Size, & Alum
<b>pH:</b>	5.2

## BUSINESS SITUATION

In order to meet market need and fulfill increased containerboard demand, an integrated paperboard mill wanted to increase its production capacity and reduce its Total Cost of Operation (TCO). The mill had struggled to run nominal basis weight to meet dry end sheet specifications on one of the Paper Machines. This forced the customer to run higher basis weight at reduced production rate due to steam limitation on the paper machine. Increased fiber utilization and decreased production rates have also increased the mill's TCO.

### CUSTOMER IMPACT

Increased production rate an average of 1.5-2.0% while realizing a 7-10 percent increase in manufactured square footage.

Savings of > 29.4 billion BTU/yr.

Lower basis weight resulted in fiber reduction of 4,847 tons per year. All wet-end chemical fed on a #/ton basis realized an annualized reduction equivalent to dosage rate multiplied by fiber savings of 4,847 tons.

Reduced >1,074 lb/year of VOC's (volatile organic compounds)



### ECONOMIC RESULTS



Operational return on investment - \$750 /hour of production or \$2,900,000/year.



More than \$135,000/year savings



More than \$1,100,000/year savings.



Mill is operating within VOC regulatory limits

*eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.*

To address the mill's key business drivers, NALCO Water proposed using its patented METRIX Technology for Strength and Productivity.

## BACKGROUND

In recent years containerboard demand has been rebounding in the worldwide economic recovery and globalization of the market. Faster machine speeds, increased operating rates, and the demand for fiber to fulfill production capacity need has been an ongoing challenge to the industry. This demand has caused fiber prices to escalate, especially recycled fiber such as OCC from recovery processes. Many producers are also implementing plans around fiber reduction as it directly relates to manufacturing cost and selling price. Management teams are discussing this every day in their plants. A well-managed chemical program and mechanical operation is an effective way to sustain the process of fiber reduction without compromising paperboard strength.

This integrated board mill uses a higher percentage of recycle fiber in

comparison to unbleached Kraft pulp. Over the years recycle fiber quality has declined, making it increasingly difficult to meet quality parameters at nominal basis weight and target production. Several mechanical and chemical trials also have not provided desired results. It is not uncommon for the Basis weight to run 2-3 pounds heavy. Running heavy creates several drawbacks that include increased fiber cost, decreased production rates, and higher energy costs per ton of board produced.

## ANALYSIS OF BUSINESS SITUATION

### Key Business Drivers

- Increase Productivity
- Produce Linerboard at or below nominal BW
- Reduce TCO

### Challenge/Opportunity

- Run to nominal basis weight without loss in strength
- Paper machine is steam limited on 35# and 42#
- Low OCC freeness compared to historical values - poor table drainage
- Reduce chemical consumption

## PROGRAM DESIGN

After a complete analysis and overall review of the mill, METRIX technology was selected for this customer since it has proven its effectiveness in a number of different board markets under varying furnish conditions. Vast experience with METRIX technology along with a thorough understanding of the papermaking process at this customer facility allowed NALCO Water to design a program that would provide maximum results at lowest possible cost.

In designing the feed strategy, existing wet-end additives were considered as well as their respective location to each unit operation. A feed location was selected that provided maximum METRIX technology retention with least interference from disruptive fines and colloidal material. The approach utilized a co-mix strategy with the existing Core Shell flocculant.

## KEY PERFORMANCE INDICATORS

- Target basis weight
- MSF (manufactured square feet - 1000 ft<sup>2</sup>) and production rate
- Ring Crush and Mullen
- Steam demand
- Refining energy

**PROGRAM RESULTS (ANALYSIS COMPLETED ON 35# AND 42#)**

**Running Paper Machine at Maximum Steam Consumption - Speed Optimization**

- 4.0-5.0 percent basis weight reduction
- 7.0-10.0 percent manufactured square footage increase
- 7.0-10.0 percent reel speed increase
- 1.5-2.0 ton per hour production increase
- 6.0 percent Reduction in refining energy per unit ton on 42#, no change on 35#

- Maintained target Ring Crush and Mullen
- METRIX 64110 technology dosage - 2.5#/ton (1.13 kg/ton)
- Minimal dosage change to existing wet-end chemistry
- Customer ROI - \$750/operating hour
- Saved 90,000 gallons per year in polymer makedown water

**METRIX Technology Response Prior to Speed and Basis Weight Change**

- 14 percent reduction in steam consumption
- 10 percent increase in both Ring Crush and Mullen, grade dependent

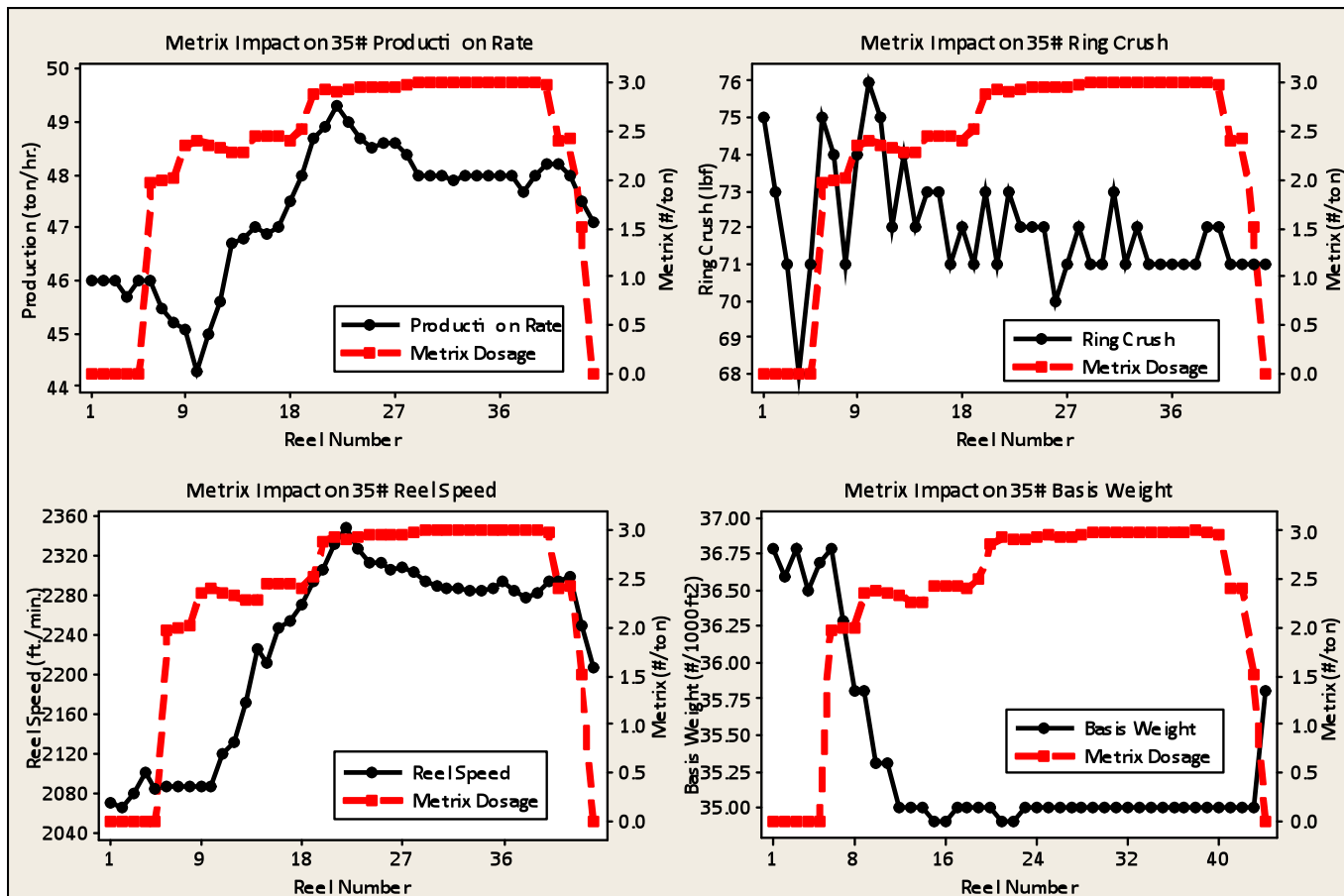


Figure 1 - METRIX 64110 Technology Results - 35# High Performance Liner.

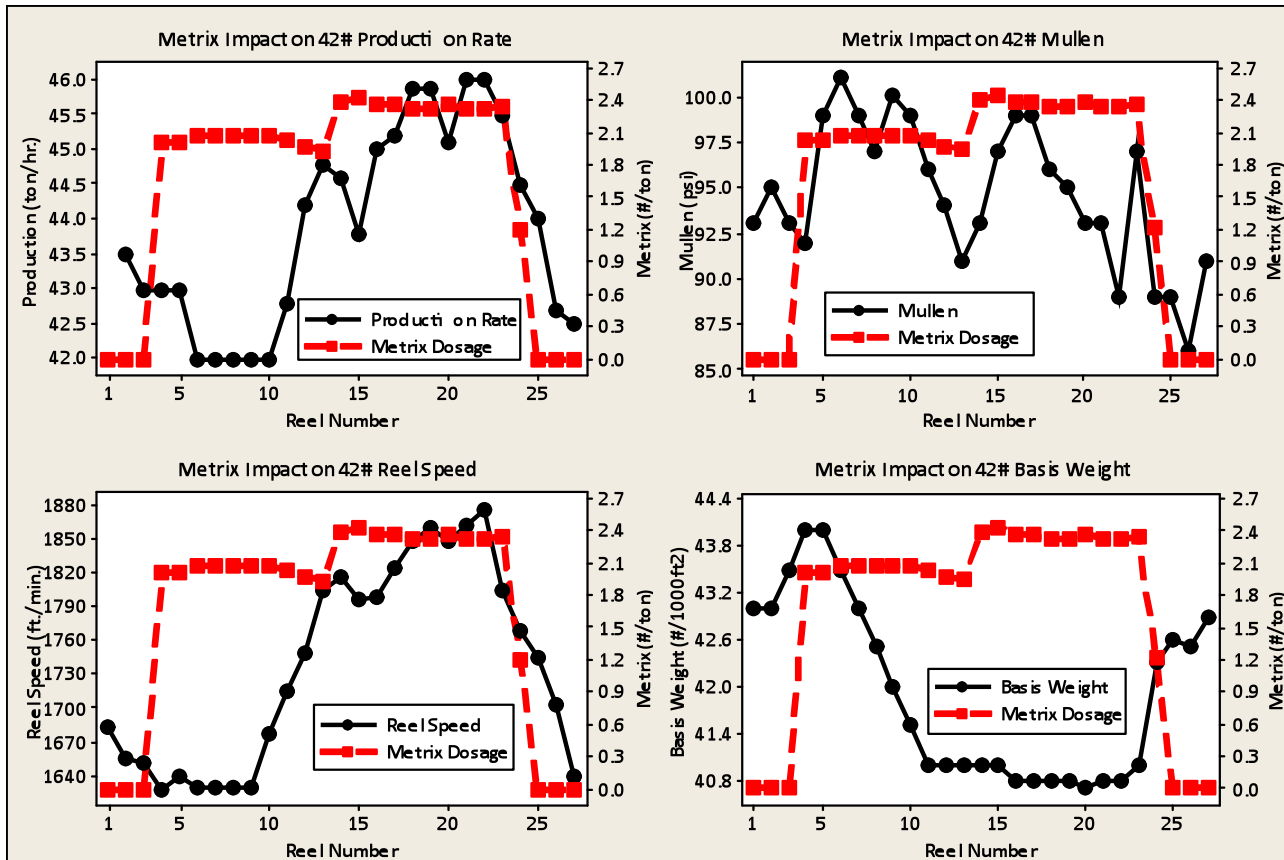


Figure 2 - METRIX 64110 Technology Results - 42# Liner.

## CONCLUSION

METRIX technology has allowed this papermaker to effectively reduce their total cost of operation while obtaining increased strength, increased production, and target basis weight. The success of this customer provides an excellent example of METRIX technology providing environmentally sustainable results.

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