

ADVANCED ADHESIVES REPORT

YOUR CORRUGATING NEWSLETTER FROM HARPERLOVE

May 2017

Making your numbers

By Rex Woodville-Price

WHAT DO YOU MEASURE, AND HOW?

There is an old saying in the corrugating industry: "This is a tricky business because we buy paper by the pound and sell board by the square foot." While this is not entirely accurate and not all box plants do this, it does highlight a sometimes confusing truth: not every plant measures its output the same way.

WEIGHT, AREA, OR LENGTH?

Output based on weight will usually be stated as weight divided by time. This would be something like tons per hour or tons per month. Some integrated box plants prefer this type of measurement because that's how the mills measure output.

To express output based on area, the area is divided by time. This gives us terms such as million square feet per month. Independents commonly use this measurement because it relates more directly to how they measure sales.

When output is expressed in length, it will be stated as a lineal dimension divided by time. The result is a term such as million lineal feet per month. Corrugator crews tend to use this method since they have no control over the width of the orders and it allows them to compare machines of different widths.

WHAT DO THE NUMBERS MEAN?

These numbers can be a bit confusing when comparing different box plants running different product mixes. For example, consider two imaginary box plants producing the same square footage per shift. Plant A runs lightweight board and Plant B runs heavyweight double wall. Because of this Plant B will produce much more in tons per shift than Plant A. Likewise, two corrugators of different widths producing the same lineal feet will have different outputs in square feet.

Machine speed is often mentioned as well, although strictly speaking, it is not a measure of production. Speed is usually expressed in terms of a lineal dimension divided by a time unit, i.e., feet per minute. (We could also use miles per hour, but the number wouldn't be very impressive; 1,300 fpm = just 16 mph. Even a bicycle could beat that.) Speed can be misleading. As in the fable of the tortoise and the hare, it is average speed, including downtime, that matters most.

However and whatever you measure in your plant, the path to success is to establish benchmarks, set goals, and manage the entire process scientifically to achieve the improvements you seek. HarperLove is eager to help.

HOW DO YOUR NUMBERS COMPARE?

	<i>FAST</i>	<i>FASTER</i>	<i>FASTEST</i>
Top speed	700 fpm	1,000 fpm	1300 fpm
Average speed	500 fpm	700 fpm	850 fpm
Lf/h	30,000	42,000	51,000
Machine width	87 in.	98 in.	110 in.
Average web width	78 in.	87 in.	98 in.
Square feet/hr	195,000	304,500	416,500
Square feet/shift	1,560,000	2,436,000	3,332,000
Tons/hour	12.7	19.8	27.1

ASSUMPTIONS: In order to keep this table to manageable size, some assumptions were made.

- 1) To obtain average speed numbers from the top speed, consider that other factors aside from downtime will lower the average. Not all orders can be run at top speed because of restrictions such as cut length or heavyweight board. Order change dwell time will also have an impact.
- 2) Average web width numbers are lower than actual machine width because of side trim and scheduling efficiency.
- 3) For the conversion from msf to tons we use an average basis weight of 130 lbs/msf. To calculate lbs/msf for combined board you take the weight of the liners plus the weight of the medium multiplied by the takeup factor.

(Now when somebody tells how much they ran last shift, you'll know if they are bragging or complaining.)

How much is Corrugator Waste Costing You?

Waste in a box plant hurts the profitability of the plant in two ways. It turns valuable linerboard and medium into less valuable scrap, and it consumes machine time without producing sellable product. Fortunately, there is a clear way to calculate the financial impact of waste and of waste reductions.

To calculate the financial impact of wasted linerboard and medium:

1. Multiply the total tons the plant consumes annually by the corrugator waste percentage; this will give you the total amount of corrugator waste in tons per year
2. Subtract the price the plant gets for its scrap (\$/ton) from the plant's cost of containerboard (\$/ton); this will yield the impact of wasting one ton of containerboard.
3. Multiply the answer in step 1 by the answer in step 2.

Example Calculation:

1. 60,000 tons consumed per year X 9.0% waste = 5,400 tons of waste per year
2. \$700 per ton (containerboard) - \$130 per ton (scrap) = \$570 per ton cost of waste
3. 5,400 tons per year X \$570 per ton = \$3.08 million per year

To determine the value of the corrugator time which was lost while producing waste (i.e., non-sellable product):

1. Multiply the corrugator waste percentage by the number of hours the corrugator runs per year; this will give you the number of hours that the corrugator runs each year producing waste.
2. Determine the hourly value of corrugator time using one of the methods below. The appropriate method will depend on the specific situation in the plant (running overtime to meet demand, opportunities to sell additional product, etc.).
 - a. The plant's hourly machine burden rate for the corrugator
 - b. The total wage rate for all the corrugator employees on one shift multiplied by 1.8. This assumes that incremental production efficiency will reduce overtime, overtime is paid at time-and-a-half, and that employee benefits are approximately 20% of compensation.
 - c. The profit contribution from an hour of corrugator production which would be approximately the average tons produced off the corrugator per hour multiplied by the difference between the average selling

price (\$/ton) and the average containerboard price (\$/ton). This assumes that incremental production efficiency will increase the plant's output and the plant can sell the incremental production.

3. Multiply the answer in step 1 by the answer in step 2.

Example Calculation:

1. 9.0% waste X 250 production days per year X 24 run hours per day = 540 wasted corrugator hours per year
2. \$500 per corrugator hour
3. 540 hours per year X \$500 per hour = \$270k per year

The total cost of corrugator waste to the plant is the sum of the two calculations above.

Value of reducing corrugator waste—to determine the value of waste reductions, in step 1 of each calculation above use the percentage improvement instead of the total waste percentage.

Example Calculation:

1. 60,000 tons consumed per year X 1.2% waste reduction = 720 tons of waste reduced per year
2. \$700 per ton (containerboard) - \$130 per ton (OCC) = \$570 per ton cost of waste
3. 720 tons per year X \$570 per ton = \$410k per year improvement





ROBERT WOODS AND JOE GIOVANNI

We are pleased to announce that Joe Giovanni and Robert Woods have been promoted to Sales Territory Manager roles, effective January 30, 2017. Joe will cover the West and Northwest US, and Robert will cover the Southwest.

Both Robert and Joe bring extensive corrugator experience from previous employment as well as their many years with the HarperLove team. Their technical capabilities, training, market awareness, and customer focus assure our tradition of serving our customers through the solutions we provide.

TYLER HAGGARD AND DON WOLFE

We are pleased to announce Tyler Haggard and Don Wolfe have been promoted to Region Manager roles.



Tyler came to HarperLove in 2009 as a Technical Service Representative and will be leading technical service teams in the Northeast and North Central United States. Tyler has more than 28 years of experience in corrugated manufacturing, having worked

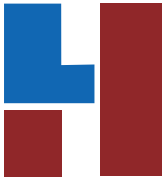
in plant operations and plant leadership positions at Packaging Corporation of America, Smurfit-Stone, and Georgia-Pacific.

Don will lead technical service teams in the North Central and Northwest United States. He joined HarperLove as a Technical Service Representative in 2001 following a successful career in manufacturing operations and plant leadership at MacMillan Bloedel, Weyerhaeuser,



and Smurfit-Stone. Don has more than 30 years of manufacturing experience in corrugated plants.

Alan Clark, HarperLove's CEO commented, "I am very pleased to have Tyler and Don serving in these management roles. They both possess the values, technical skills, and commitment to improving our customers' performance that are hallmarks of HarperLove's reputation and service model. It is a testament to the strength of our team and the depth of our bench that we can fill both these roles internally."



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LiquiBor™ - Powdered Borax Replacement



PROVIDING A CLEANER AND SAFER WORK ENVIRONMENT.

LiquiBor™ is a liquid replacement for powdered borax, providing all the performance benefits of traditional powdered borax while completely eliminating the health and safety risks of employee exposure to airborne borax dust.

With increasing health and safety concerns associated with powdered borax and regulation of employee exposure to borax in some markets, corrugated packaging manufacturers are facing potential restrictions of a critical ingredient. Our powdered borax replacement product comes in liquid form and meets this challenge by providing a direct substitute for powdered borax in the adhesive formula.

