

THINNER AND FASTER

In today's global market we are all faced with shrinking profits and tougher competition. This is a whole new world with unheard of challenges.

With the advent of the internet, we see large buyers with supplier auctions where suppliers bid for the business. We have one customer where their major product pricing was reduced 30%. How do they make up that kind of loss?

There are finished products coming in from countries such as China, Mexico, India and Brazil at below-cost pricing putting some manufacturers out of business. Large customers such as the automotive industry are demanding a 5% decrease in costs for next year's orders. Sometimes they require matching prices of competitors from Taiwan or Korea or lose the business.

IT'S A WHOLE NEW WORLD!

How do we compete? We must lower our costs in all areas. In the manufacturing facility we need to be more productive and reduce raw material costs. We need to run faster with thinner substrates and use less coating.

You would think that all this pressure would be enough, but think again! In addition to crushing competitive pressure you also have more demanding environmental rules going into effect—WHEW!

Well, you better get busy if you're going to be here next year.

For starters, we need to be state of the art control-wise. We need better, more precise tension control. This will not only reduce waste but will increase productivity and permit you to run thinner, more delicate/difficult substrates.

The quickest way to improve tension is to drive the unwind. It is much more precise than a brake, and with today's drives, can handle a much broader range of diameters, widths and PLI (pounds per lineal inch of width of tension). On unwinds we typically recommend dancers with load cell feedback to overcome deviation from rolls that are out of round. The load cell indicates your exact tension all the time. You want unwind tension to be constant from full roll to core and normally much lower than winding tension. We also recommend directly driven rewinds-- not clutched-- if possible, for more precise control. The rewind requires much higher tension than unwinding with a reduction in tension or taper as the roll builds in diameter.

Of course, improved tension control throughout is best. The newest systems and software are far superior to the original digital control systems. With state of the art PLC control you can even store PID parameters with recipes for different

substrates. PID parameters are the tuning requirements for a particular web. A stretchy vinyl film would have vastly different PID settings than a rigid paper substrate.

The next area to look at would be web support idlers. Here's where you can make low cost changes and see immediate results. In order to run thinner webs at low tension and higher speeds, web support idler design is critical. Some of the normal things to consider are bearings, idler deflection/loading, inertia and finish. Deflection, loading and inertia need to be considered together. Loading causes deflection. To overcome deflection you must increase wall thickness of the idler which increases inertia. With increased inertia the idler will be harder to accelerate and conversely decelerate. This can cause scratching and in severe cases, web breakage.

Options here are:

- Thin wall aluminum with reduced wrap angle
- Aluminum/composite combination
- All composite

In all cases, the idlers must be as free turning as possible with the lowest practical inertia.

Options here are:

- New special free running shielded pre-lubricated bearing (larger diameter)
- Engineer small diameter bearings with special mounts

For instance, a 5/8 ID diameter bearing is capable of 1000# load at 1500 rpm. Two of these can support 2000#. The typical idler loading is 80# total.

Another area of concern is wrinkling. Normally you would use spreader rolls where you have a wrinkling problem. Spreader rolls can be as big a problem as a help!

Bow rolls require that the operator understand how to adjust and set them. They can also permanently distort the web. Flex or spiraled rubber spreaders work well but impart considerable tension into the web and can mark it as well. When processing a web it will always run to the tight side of the machine. Most operators understand this phenomenon and use masking tape on idlers to remove wrinkles. This is the criterion that is behind the reverse crown idler or parabolic spreader idler. It removes wrinkles at all speeds, requires no adjustment or masking tape and does not impart tension. Of course, for this to work properly alignment must be good and the finish on the idler must keep it turning.

In order to have a state of the art facility your line must be perfectly aligned. There are many companies that specialize in alignment. Have your machine realigned now.

The finish on the idler is critical for high speed operation.

For high speed operation in order for the web to track, the idlers must run at web speed. As speed increases, the coefficient of friction decreases, (that's why you can pull the tablecloth from under the dishes!). The boundary layer of air on the substrate and idler also affect idler speed and tracking.

Options here are:

- Sandblasting
- Engraving
- Plasma coating

COATING HEADS

For lower, more precise coating weights, the first systems that come to mind are multi-roll and slot die. All of this technology has been around for at least 50 years, so they are good, reliable systems. Both have their pros and cons. Multi-roll really shines at super low coating weights and slot die produces the smoothest coatings. Both have exceptional precision.

- Differential Offset Gravure
- 4-, 5- and 6-Roll Transfer Roll
- Curtain Dies
- Cascade Dies
- Slot Die, Single and Multi-Layer

This is old technology being revisited and improved.

In addition to standard systems, combination coating heads are also being utilized for increased productivity and precision.

Examples are:

- Transfer/Reverse
- Transfer/Blade
- Gravure/Mayer Rod
- Multi-Roll Combination

To make these heads more productive, they are becoming more operator friendly.

- Easier to clean
- Sleeved rollers for fast changes

- More precise gap adjustments
- Assemblies requiring no tools
- Cartridge and modular heads for offline cleaning
- Automatic splicing and transfer for non-stop production.

Non-stop production reduces waste. Systems range from very complex to simple with manual cutting.

- Shaftless, dual direction systems where you can change direction on the fly without rethreading
- Simple turret, shafted with manual cutting

Old technology with newer OSHA compliant designs. Also available are systems that can handle broader ranges of materials from light weight films to thick foams. This allows for more product variation, shorter runs and niche markets.

Another area for increased productivity is improved worker morale and efficiency. This can be accomplished with better material handling and more worker-friendly chemicals (raw materials and cleaning agents). Improved material handling can start with lightweight, composite air shafts. Next can come unwinds and rewinds that load from the floor or cart for reduced handling. Roll lifts can be integral to machines. Lift tables can be utilized for loading and unloading turrets.

The newest 100% solids adhesives and coatings are definitely something to consider. There is no fire hazard. They require much less energy consumption and are much safer to handle.

Examples are:

- UV curable acrylic PSA's
- 2-part and UV curable laminating adhesives
- Curable hot melt PUR's
- E-beam curable 100% solids coatings
- Environmentally friendly cleaning solutions

All of these make for a much happier working environment. This is not only a happier environment; it is a more productive, less costly and more profitable one, too.

- Lower insurance costs
- Reduced storage area
- Cleaner, more comfortable environment
- Happier, more productive workers
- Less waste
- Lower coating weight
- Less handling

- Higher quality product
- Higher profit level

TRY THESE FOR IMMEDIATE RESULTS!!

- Plasma coated reverse crown idlers before the rewind after the process (thin wall aluminum)
- Alignment
- 100% solids adhesives and coatings (try a little solvent!)
- Try UV in line with existing process for printing or top coating

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