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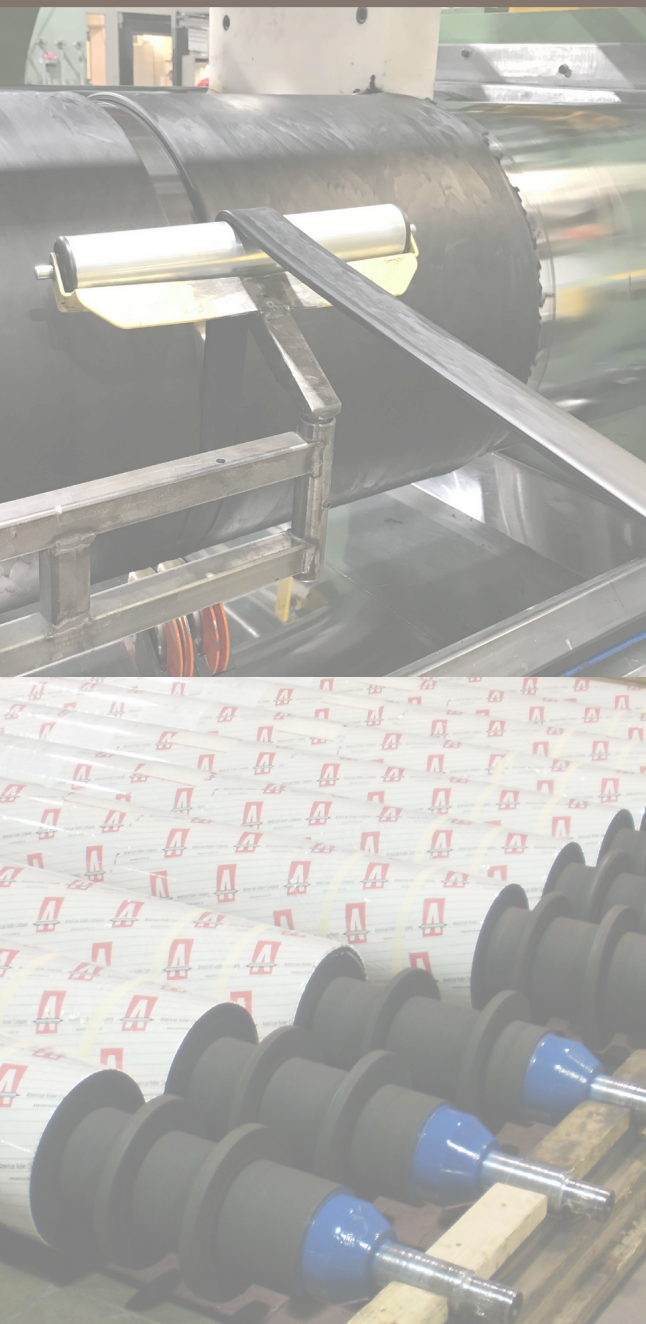
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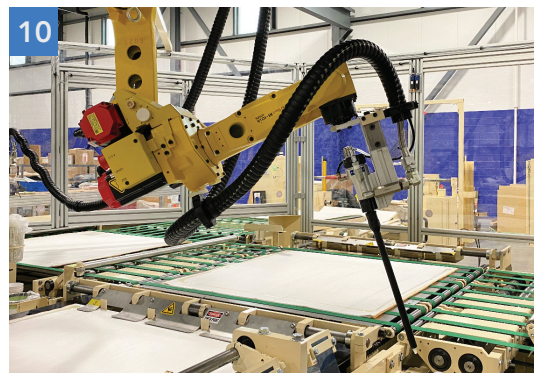
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Texas State of Mind



Angel Morris
Editor

It's that time of year when I start wondering how I've lived in Texas my whole life but somehow manage to still be surprised by the heat. I've always been more of an indoorsy person, but this becomes particularly true in the month of July. The older I get, the more I dream of retiring somewhere I won't break a sweat walking to the mailbox (particularly since the mailbox hangs just outside my front door!)

Despite the hellacious summers, Texans have a reputation for stubbornly considering our state special. There is the undeniable hospitality, live music distinction, world-renowned barbecue and Tex-Mex food. Things really are bigger here, with the state being the second largest in the country in both square miles and population. (And I won't even mention a little acronym called NASA, where they train U.S. and international astronauts. That's not just big, it's out of this world!)

Texas is proud to be synonymous with cowboys, horses and rodeos, even though a great many of us have nothing to do with any of those things. Texas is also responsible for the trifecta of brand deliciousness with DrPepper, Whataburger and Bluebell Ice Cream originating here.

Despite our amazing spring bluebonnet fields, our great state fair and our highly-recognized college symbol, the Texas Longhorn, it never hurts to look at ways to improve. (Let's just say being the only state with it's own powergrid may not be a bragging point.)

If your business has lots to brag about but is still considering improvement, this month's cover story shares the benefits of adopting UV LED technology for ink curing, particularly as it pertains to screen printing. We also discuss when it's time to automate in relation to safety, quality, delivery and cost. Especially fitting for summer, we take a look at how packaging film barrier properties impact your barbecue and beyond. The enhanced, more economical, cross-over characteristics of the latest films and synthetic materials, including laminated substrates and nonwovens, get analyzed in this issue's Converting Perspectives column.

Like Texans, industries around the globe can be proud of what they've got while still striving to be better. As we're fond of saying here in the Lone Star State: "If you can't stand the heat, get outta the kitchen." But if you want progress, adopt our mindset, "Don't Mess With Texas!"

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Why Screen Printers Should Invest in LED Exposure Units

By Jennifer Schloesser, Creative Director, Empire Screen Printing

A changeover to LED lamps is estimated to save companies around \$187,000 a year.

The benefits of adopting UV LED technology for ink curing are far-ranging for screen printing companies. UV LED ink curing technology provides a sustainable and environmentally friendly method of screen printing that cuts costs and protects employees. While many printers have adopted UV inks, they have been reluctant to adopt LED curing technology due to several challenges. These include a lack of readily available products from lamp manufacturers and the heavy up-front costs involved in either purchasing new machines or retrofitting old machines.

Screen printers, however, should overcome this reluctance

and invest in LED exposure units, as UV LED technology is ultimately better for their business, their employees and the planet than legacy ink curing methods such as UV curing with mercury bulbs. Not only is the ROI ultimately advantageous for screen printing businesses from a cost perspective, but it also helps companies mitigate health risks and meet consumer demand for sustainable, environmentally-friendly processes.

Shifting to Sustainable Screen Printing Processes

Screen printers consume the most energy when powering mercury

bulbs and cooling systems for their printing press. Mercury lamps produce high temperatures by emitting infrared energy. This heat can damage lamp housing and substrates if it is not managed properly, requiring significant effort and expenditures on behalf of screen printers.

Shifting to LED-based technology for UV curing results in a 98 percent more energy-efficient process. The LED lamps do not need substantial power input, as they can be plugged into standard wall outlets. In stark contrast to mercury bulbs, LED lamps also emit little to no heat, requiring significantly less elaborate cooling systems than mercury-based technology.

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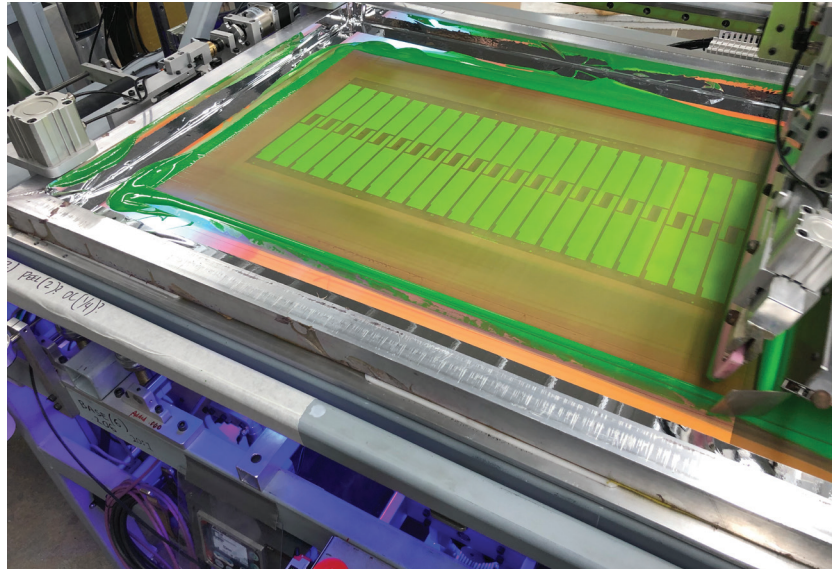
Mercury lamps remain on throughout the production day because heating these systems up and cooling them down takes time. There is no need, however, for LED lamps to remain running while not in use, as they instantly switch on and off. Unlike mercury lamps, LED lamps do not emit ozone, so screen printers further reduce energy consumption by cutting out the ventilation systems needed to filter out ozone.

In addition to cutting energy costs, shifting to sustainable screen printing processes will help companies meet evolving consumer demands. Consumers today often seek out products that are built with sustainable materials and processes. This is evidenced by a recent study by the IBM Institute for Business Value, which found that three out of five consumers report that at least half of their recent purchases include sustainable products.

Adopting an Environmentally Friendly Approach

Another motivation for screen printing companies to adopt an LED-based curing process is the fact that it is more environmentally friendly than a mercury-based approach. Several factors establish using LED lamps as a more environmentally friendly approach to ink curing than mercury lamps. Significantly, the overall reduction in energy consumption that results from adopting an LED-based curing process reduces the harmful emissions caused by many energy production processes.

Ozone — known to harm people, plant life and the broader ecosystem — results from using mercury lamps but not from LED



Shifting to LED-based technology for UV curing results in a 98 percent more energy-efficient process.

lamps. Alongside car exhaust and other gas-powered equipment, the Environmental Protection Agency currently lists printing shops as a common source of volatile organic compounds; that is, the compounds which lead to ozone. A shift toward LED-based curing, however, would drastically reduce ozone emissions that stem from printing shops overall, effectively dissociating them from industries such as oil and gas that are widely perceived as inflicting serious damage on the global environment.

In addition to eliminating the emission of pollutants such as ozone and volatile organic compounds, LED lamps do not need to be replaced as often as mercury lamps. Mercury lamps can be used between 1,000 and 2,000 hours and have to be kept turned on throughout the working day, such that they typically have to be replaced once every eight to 12 months. In contrast, LED lights, with their ability to quickly be shut off when not in use, can typ-

ically last over a decade without having to be replaced. Ultimately, this longer lifespan significantly reduces the amount of waste caused as a byproduct of the ink curing process.

A Curing Process that is Cost Effective

Many screen printing companies may be reluctant to adopt UV LED curing technology due to the upfront costs. However, when viewed holistically, investing in UV LED curing technology will cut costs over time. This is due to the reduced spending on energy, the elimination of common regulatory costs involved in the use and disposal of mercury lamps, and significant savings in maintenance costs.

It will only take three years for the investment in LED lamps to pay itself back in full. A study by Specialist Printing Worldwide found that, while the cost to retro-fit LED lamps can be up to \$535,000, shifting to LED

lamps will save companies around \$187,000 a year. Here, a major area where costs are cut is energy savings. For example, Empire Screen Printing spends approximately \$650 on energy to power its 3-color LED screen presses. In comparison, the same press using Mercury Vapor curing costs up to \$35,000 per year.

LED technology has improved over the years, leading to increases in the output of UV LED curing lamps. LED lamps can now output UV energy at the 395-nanometer wavelength and at 12-watt to 16-watt intensities. These options offer faster production speeds than the lower-watt lamps of years past, cutting costs by allowing more products to be manufactured more quickly.

Protecting Employees Throughout the Curing Process

One of the biggest motivations for screen printing companies to switch to an LED-based curing process is to create a healthier work environment and protect workers. A mercury-based curing process, if not well-ventilated, releases irritants into the workplace that can cause respiratory issues for workers. LED lamps, by contrast, eliminate ozone and generate minimal heat, removing the need for HVACs and allowing for air to be recycled without presenting hazards to employees. Screen printing companies looking to cut energy consumption and costs while protecting their

employees and the environment will find an ideal solution in UV LED curing technology. ■

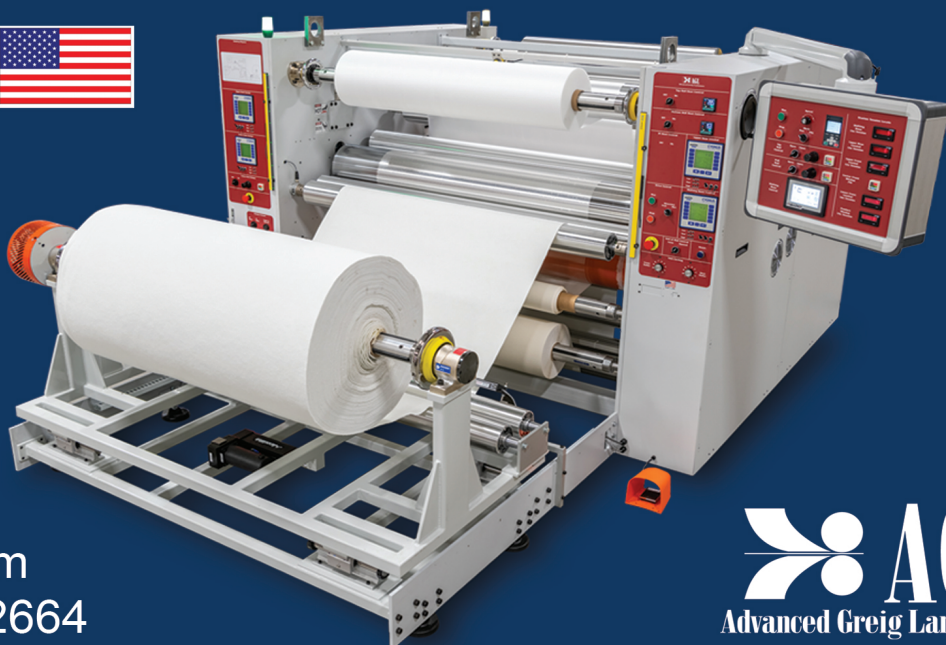
ABOUT THE AUTHOR

As Creative Director at Empire Screen Printing, Jennifer Schloesser oversees production artists, project managers, web developers, designers and marketing. She established a green committee and formally created a sustainability policy, implementing Empire's Environmental Management System (EMS). Her leadership led to more than 25 sustainability and safety awards for ESP, including the Wisconsin Manufacturers and Commerce, Wisconsin Family Business of the Year Award in 2016.

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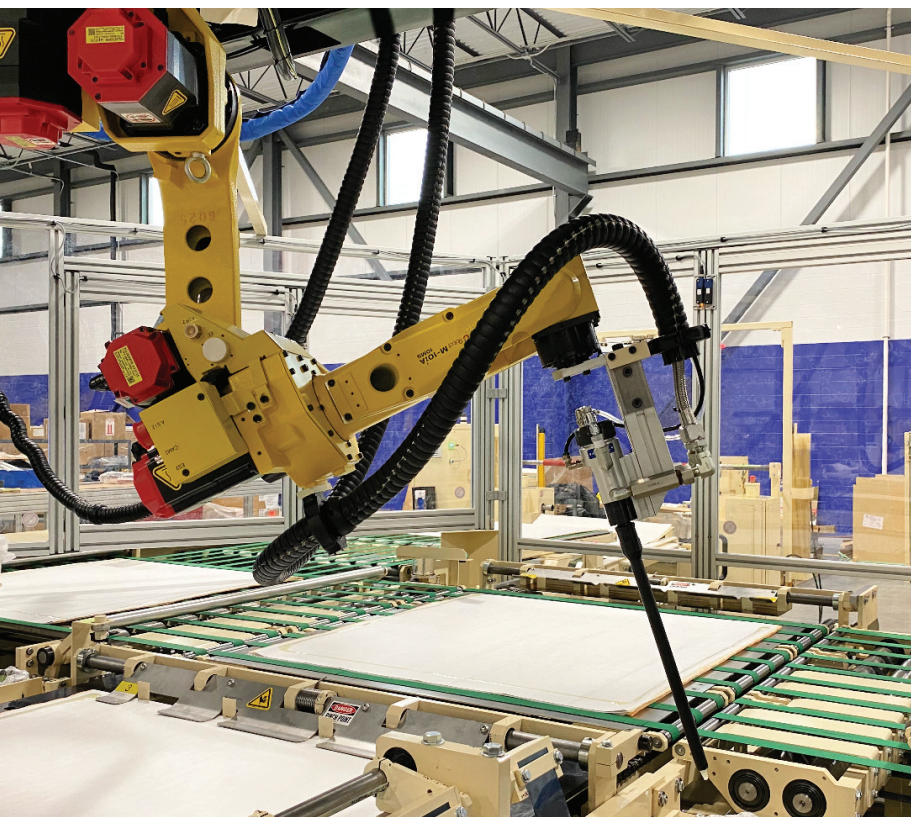
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The Importance of Safety, Quality, Delivery and Cost

Deciding When to Automate

By **Jay Roth**, Director of Sales, Elsner Engineering Works, Inc.



Glue robot for spiral wound filters.

How do you know when it is time to automate? Many look to the ‘Lean’ principles of Safety, Quality, Delivery and Cost. These are valid in choosing which operations to automate in your converting process.

Safety is an easy one. Although I still see some glaring hazards

occasionally, OSHA has done an excellent job of establishing workplace guidelines to take care of the obvious potential for injury. Where the work comes in is determining which tasks border into repetitive motion, fatigue or even just boredom. Distracted workers can find ingenious ways to cause injury

when they are not paying attention to even the safest tasks.

Quality. I have much respect for the craftsmanship some people put into their work. Many find it hard to give up on a process that they have perfected over their career. However, we must know when technology can move us forward. A robot can complete a task over and over again with extremely high repeatability. Consider the placement of glue beads in the construction of spiral wound filtration elements. Each element can contain more than 20 of the same repeat pattern. When applying by hand, we are naturally going to see at least minor variation. This leads to an open tolerance of what is acceptable. With a robot, the tolerance is tight and allows us to reduce waste in the final product.

Delivery. We have entered a new era of lead time and delivery expectations, and I have heard every excuse in the book for why parts, projects and even quotations are taking longer than ever before. The most repeated challenge is available labor. Whether it is a health concern, desire to work remotely, competitive job markets or lack of skills keeping people at their posts is an everyday concern in manufacturing today. It may sound cold, but machines don’t get sick, they don’t have to worry

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about which days their kids have off school, they are already at work when the weather is bad and they don't mind running a double shift when needed.

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operators adds to predictability and smooths the production cycle. We should no longer fear being replaced by robots, and we need to accept that automation improves our lives. I am sure the operator

manually stuffing rolls of wipes into a canister would prefer a quality control position. I bet the operator standing in front of his single manual machine all day would love the opportunity to

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manage a work cell of three or four machines where he simply needs to keep materials stocked.

Cost. It can be tricky to determine the fully loaded 'cost' of a product. Salary or hourly rate of everyone touching a product as its made is the most visible adder. We also need to consider the rest of a product's burden on the manufacturing process. We must ensure that we are truly capturing the time spent on paperwork, material handling, supervision, sales and marketing, and even opportunity loss (what are we turning away or not doing to complete this effort).

Looking beyond the overall gain in revenue is easier when we consider all contributing factors. That hefty machine price tag might give some sticker shock at

first, but weighing in all aspects can bring it into reason. Many are looking to establish 'lights out manufacturing' of their processes. The salaries and human costs (almost) go away if we can leave a machine running after the 5 o'clock whistle blows and our production team heads home. Of course, this is not for every application, but I think most can strive for at least lowering the human per product or machine ratio.

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customers and their front line employees to create machinery that gives us all satisfaction. ■

ABOUT THE AUTHOR

Jay Roth has more than 25 years of service with Elsner Engineering Works, Inc. With degrees from The Pennsylvania State University in both Electrical and Mechanical Engineering Technology, Jay is second-generation employee of Elsner.

Jay began in the machine shop, attended school at night, and worked his way into the engineering department. After more than 10 years as a machine designer, combining mechanical and electrical skills, Jay moved into the sales arena and now oversees the sales team and assists with other key areas of the company.

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Unwind and Rewind Web Guides

By **Aravind Seshadri**, President, Roll-2-Roll Technologies LLC

Unwind and rewind web guides play a crucial role in the roll-to-roll processing industry, ensuring proper alignment of the web at the entry and exit points of the machine. The performance of these systems relies on several factors, including sensor location and installation, actuator selection, motor type, etc. The second part of this article will cover the mechanical design considerations, while this installment covers the sensor location and installation.

Introduction

Terminal web guides are devices employed at the entry and exit points of a roll-to-roll machine to align the web to the desired cross-machine location accurately. The entire roll of the web, situated on the unwind/rewind stand, is moved along the cross-machine direction for proper alignment. These terminal guides are known by various names, such as shifting stand, shifting base, shifting sidelay, uncoil and recoil, payoff and tension reel, and roll positioning stands.

Although unwind and rewind web guides may seem similar, their installation and control system designs exhibit crucial differences. A well-designed terminal guide must have an appropriate mechanical design and control system based on process parameters.

Unwind Guiding

Unwind guiding involves moving the entire unwind roll assembly in the cross-machine direction. The stand is typically mounted on low friction linear bearings and

moved using an actuator. A web edge sensor, installed on the fixed machine frame, is usually placed just downstream of the last idler that shifts with the unwind stand. The sensor's feedback is used to move the unwind stand, ensuring

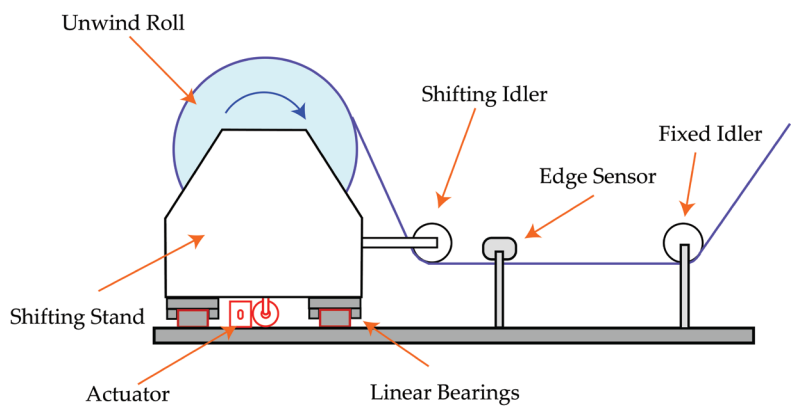


Figure 1

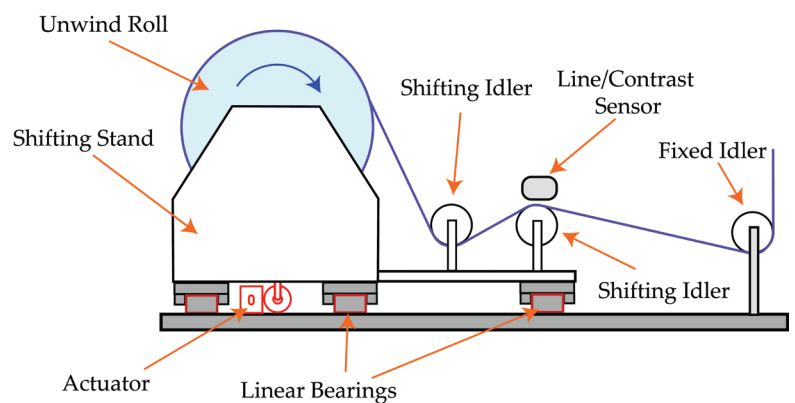


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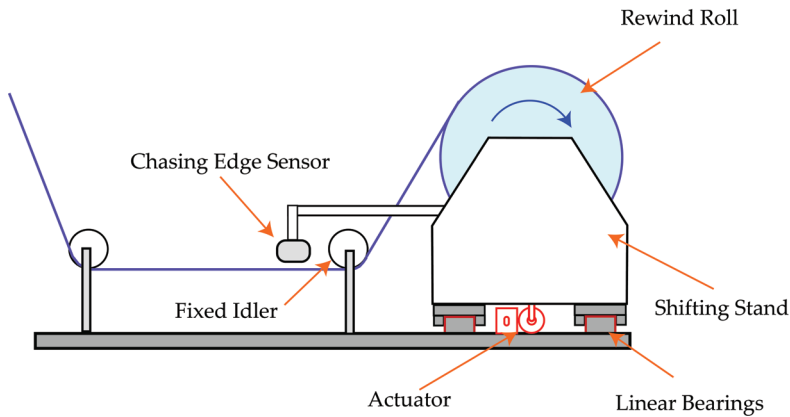


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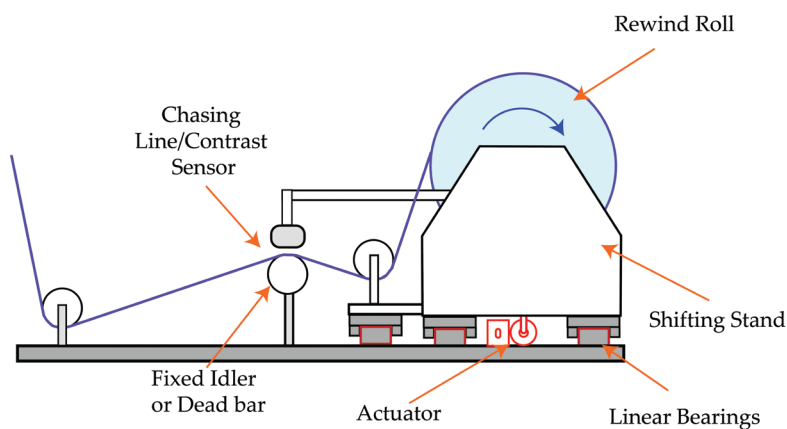


Figure 4

the web's correct cross-machine location within the roll-to-roll machine. Below are key items to check for proper installation of unwind guides for edge guiding application:

- Ensure that the web edge sensor is fixed and does not move with the unwind shifting stand;
- Position the web edge sensor just downstream of the last shifting idler on the unwind stand;
- Install the sensor as close as possible to the last shifting idler; and,
- Add at least one shifting idler on the unwind stand to prevent diameter variation from causing plane changes at the sensor.

The sensor installation when a line/contrast sensor is used is slightly modified as shown here with an additional stabilizing roller that moves with the unwind stand. Below are key items to check for proper installation of unwind guides for line/contrast guiding application:

- Ensure that the line is fixed and does not move with the

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- unwind shifting stand;
- Position the line/contrast sensor just downstream of the last shifting idler on the unwind stand;
- Add at least one shifting idler on the unwind stand to prevent diameter variation from causing plane changes at the sensor; and,
- Install the line/contrast sensor to look at the web supported by a backup roller. Ensure that the backup roller also moves with the unwind stand. And ensure that the backup roller is the last roller on the unwind stand.

Rewind Guiding

Rewind guiding involves the

Terminal web guiding systems play a crucial role in ensuring the accurate and efficient processing of web materials in various industries.

winding roll chasing the web, which technically does not guide the web. The sensor is mounted to the rewind stand, moving when the stand translates. The control system aims to maintain a constant relative position between the incoming web and the rewind stand, resulting in a straight wound roll. Installing the sensor

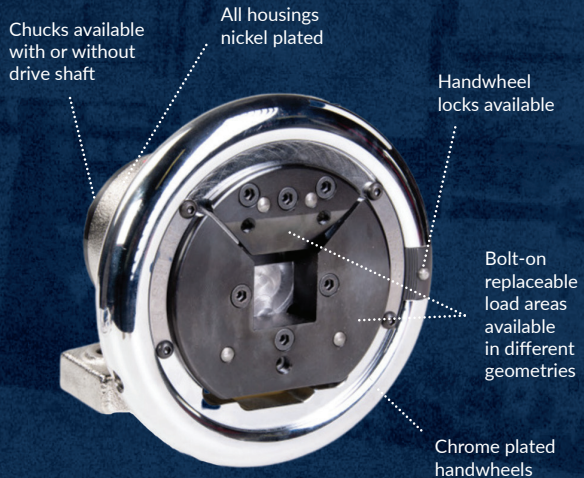
on the translating rewind stand provides a measurement of the incoming web relative to the stand.

However, if the sensor is installed on the fixed machine frame, the relative position between the web and the stand would be lost, preventing feedback loop closure. For rewind applications, the sensor should always be installed on the moving rewind stand. The checklist for proper rewind guiding installation includes:

- Ensure that the web position sensor is mounted on the moving rewind carriage;
- Verify that the sensor mounting fixture is stiff;
- Install the sensor to observe the web just upstream of the last fixed idler before the rewind stand; and,

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- Position the sensor as close as possible to the last fixed idler upstream of the rewind stand.

Similar to the unwind case the sensor installation when a line/contrast sensor is used is slightly modified as shown here with an additional stabilizing roller. In this case this stabilizing roller does not move with the rewind stand and it is a fixed idler roller. In some cases a dead bar may also be used.

Below are key items to check for proper installation of rewind guides for line/contrast guiding application:

- Ensure that the line/contrast sensor is mounted on the moving rewind carriage;
- Verify that the sensor mounting fixture is stiff; and,

- Install the sensor to observe the line/contrast position on the last fixed idler before the rewind stand.

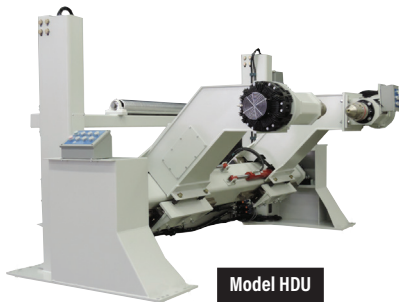
Conclusion

Terminal web guiding systems play a crucial role in ensuring the accurate and efficient processing of web materials in various industries. Apart from the sensor location several other key components such as actuators, motors, sensors, control systems and mounting configurations have a significant impact on the performance and reliability of these systems. In a later article, the mechanical design considerations for these types of web guides will be discussed in detail. ■

ABOUT THE AUTHOR

Aravind Seshadri has more than 18 years experience in the design of control systems for roll-to-roll systems specifically in lateral web dynamics, tension control, print registration and sensor development with over 25 publications and two patents. His contributions have been recognized by AIMCAL (John Matteucci Awards for Technical Excellence in 2017) and ASME (Rudolf Kalman Best Paper Award in 2011). He is President of Roll-2-Roll Technologies, a leading supplier of web guiding solutions for the roll-to-roll processing industry. He can be reached at aravind@r2r.tech or through <https://r2r.tech>.

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How Barrier Properties Impact Your Barbecue and Beyond

By Rob Tiller, Managing Director, PennPac

Food packaging films share a product-specific type of sealant film engineered from complex additives, resins and extrusion technologies.

With the summer months upon us, outdoor barbecues and family gatherings are the ultimate warm-weather activity. The grilling or roasting of various foods has evolved significantly since its beginnings in the 1500s, originally known as “barbacoa.” While there are many styles surrounding the use of direct and indirect flame, or as some prefer, hot smoke, one thing is certain — fresh meat, poultry and vegetables are a staple for most barbecue cookouts. This article will touch on some of the various specialty films, applications and characteristics used across the globe to keep those favorite cuts of meat, and other perishables requiring protection, fresh for that special summer day.

As one takes their weekly stroll through the local grocery store, typically there is a stop in the area we generally call the “meat aisle.” Within this area, we find numerous types of meat, as

well as non-meat products. From plant-based meat substitutes to T-Bones, and even whole turkeys, there’s an obvious commonality ... packaging films! Nearby, we also find fresh cheeses for those delicious charcuterie boards. All of which share a product-specific type of sealant film engineered from complex additives, resins and extrusion technologies to provide the food safety and performance required to withstand processing conditions, regulatory requirements and consumer expectations.

Understanding the Importance of Barrier Properties

While most consumers focus their attention on the price, brand and general appearance of the product, we unknowingly bypass the importance of the barrier properties the packaging films exhibit. Not only does this packaging provide

an attractive and informative shelf presentation, but it also provides the moisture, oxygen, oil, gas and light barriers essential for maintaining freshness.

Those steaks, sausages and chicken breasts appear fresh and vibrant through the heat-sealed and crystal-clear packaging films. A perishable product’s additives or natural formulation may be negatively impacted by many of the aforementioned properties, in addition to others such as flavor and odor. What film(s) get used for which product is simply determined by what “needs to stay out” and what “needs to stay in.”

Food categories, which require some level of flexible barrier protection include, but are not limited to: Bakery, confectionary, pet foods, chips/snacks, nuts, cheeses, meats, poultry and even dehydrated foods. As such, a cracker or chip, for example, will require resistance to light and



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moisture to maintain crispness.

Inversely, a dehydrated product such as jerky, is packaged to retain a specific level of moisture allowing for long shelf-life periods. Lastly, many fresh bakery products use a perforated specialty film designed to release moisture at a specific rate in order to remain crispy on the outside and soft and dense on the inside.

Types of Barrier Film Substrates Used in Specialty Films

Let's touch on the basic types of barrier film substrates used in the packaging of many of our favorite products to maintain the necessary shelf-life quality. Polyester (PET), Metallized Polypropylene (MPP)

Ethylene Vinyl Alcohol (EVOH), Polypropylene (PP), Polyethylene (PE), and Nylon (PA) are the most common materials creating many of the laminate structures used in most food packaging applications.

While each material provides its own array of characteristics, respectively, they are often strategically combined in lamination structures by both Packaging Engineers and Food Scientists, with a common goal — to minimize food waste.

What brings all of these materials together, is determined by what barrier is required for a specific product.

Typically, you will find EVOH, PA and PE/PP organized in a way that there are two skin

layers and a core. The EVOH is almost always used as the core because of its exceptional oxygen barrier properties. Nylon may be added as a tie layer for its strength and durability. In summary, when combining two or more films to make a laminated structure, you are essentially combining the barrier properties of all the materials.

Choosing the Right Packaging Film Supplier for Your Needs

In today's demanding and competitive perishable food supply chain, brand owners diligently work to drive a reduction in food product waste while maintaining a sensitivity to environmental conservation initiatives. As we continue to



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SPECIALTY MATERIALS

improve our daily food consumption, keep in mind that there are scientists and engineers working closely with regulatory bodies like the USDA/FDA, to ensure that perishable foods are properly processed and packaged to provide your family a safe, healthy and balanced diet.

Reach out to a reputable and experienced flexible packaging film supplier to discuss your food packaging barrier requirements to evaluate which materials are best suited for your application. ■

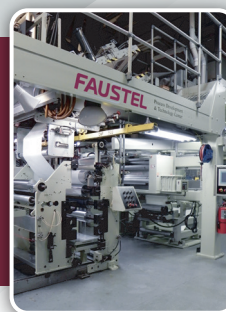
ABOUT THE AUTHOR

Rob Tiller is Managing Director at PennPac, one of the nation's leading flexible packaging film providers. With a commitment to Food Safety and reliability, PennPac facilities continue to extend timely solutions for specialty films and contract/toll-slitting needs. He can be reached at robtiller@pennpac.com.

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At all PennPac facilities, Product Safety begins with the approach. Consistent enforcement of purpose, culture, and policy yields favorable results when it comes to PennPac doing its part in supporting and complying with consumer health objectives. PennPac encourages open and honest communication which provides a friendly and enjoyable experience for both internal and external customers. To achieve the desired outcome, PennPac invests in the strength and commitment of its people. Employee engagement is the foundation of maintaining a solid quality culture allowing for reliability in the ever-changing flexible packaging industry. With effective front-line leadership working alongside a skilled, quality-conscious, and vested employee base, end users and converters can feel secure with flexible packaging solutions from PennPac.

Quality can be defined in diverse variations based on industry application. However, there is one commonality – Consistent quality equals little to no waste. Waste comes in many forms and is not just in the material. Examples of waste may be avoidable overtime, rework, excess motion, employee retention, defects, and many more. Speaking of material, did you know that PennPac facilities generate less than 2% film waste annually on millions of pounds slit? With a tremendous focus on continuous operational improvement, compliance, and education, PennPac



effortlessly provides reliable cycle times to feed the packaging supply chain, while concurrently honing on sustainability efforts.

As a true family-owned and operated business, PennPac embraces its evolution from a single slitter operation to a multi-facility, SQF (Safe Quality Food) certified, national provider of flexible packaging solutions. Throughout the decades, constant re-investment in technology and equipment has helped popularize PennPac's quality

and reliability within the packaging film industry. Operating with a balanced combination of state-of-the-art slitting equipment and teamwork, customers of all sizes experience first-hand, the reliability and ease of conducting business with PennPac.

When your next flexible packaging film opportunity arises, consider PennPac for custom slit or toll/contract slitting solutions. From wide-web film converting to small-run packaging operations, PennPac will develop a custom solution to fulfill your requirements with the quality and reliability you'd expect from a reputable organization. ■

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What's Special About Films and Synthetics?

By Susan Stansbury, Industry Consultant

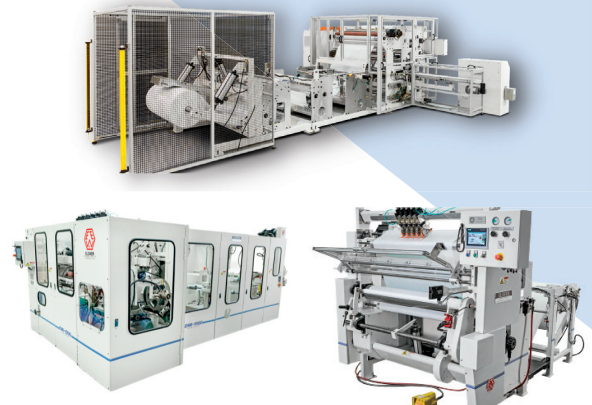
Companies who process film roll goods know how those materials will behave on their production lines, and they sell the materials' attributes. Whether known or new variations, it all begins with the film properties and benefits. The latest films and synthetic materials, including laminated substrates and nonwovens, may offer enhanced, or more economical, or cross-over characteristics, including:

- Higher levels of strength. When this can be achieved without adding to weight or thickness, it's a winner. A change of fibers, resins, or blends may do well;
- Higher absorbency, or alternatively, better hold out to moisture or other elements. Or, one side with holdout/high barrier properties and the other side having absorbency, such as a dental bib;
- Softness, drape or comfort to hands. Some film packaging has been a "crinkly" failure, while certain of the latest films offer superior "touch;"
- Good protection in packaging or surfaces with scratch resistance. Good protection also enhances the shelf life of contents;
- Aesthetic appearance in film

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- packaging — from printing, to color and embossed/texture appeal;
- Ease of printing is also a factor whether with thin materials or having efficient processing benefits. Top coatings can improve ink adhesion and printable top coatings on films is a factor in multi-color converting;
 - Targeted features for certain specialty markets, including healthcare, electronics and transportation;
 - Ability to incorporate other elements such as antimicrobials and to combine webs for more performance; and,
 - Meeting goals to be sustainable, such as using post-consumer recycled resins. The



recycled content packaging segment is said to have a CAGR of 6.5 percent.

According to *Allied Market Research*: The green packaging

market is emergent, and is anticipated to show significant growth in the next few years fueled by the advent of bioplastic, environmental concerns on sustainable development, and enforcement of stringent rules and policies by regulatory authorities. Rise in awareness among consumers for luxury goods toward green packaging techniques that use bioplastics as raw material across various sectors, including personal body care and pharmaceuticals has driven the market growth.

Technical Packaging Systems of Kalamazoo, MI, covers a wide range of representative end use products featuring various films including OPP (oriented polypropylene); polyethylene films; bags and shrink films; and plastic band-

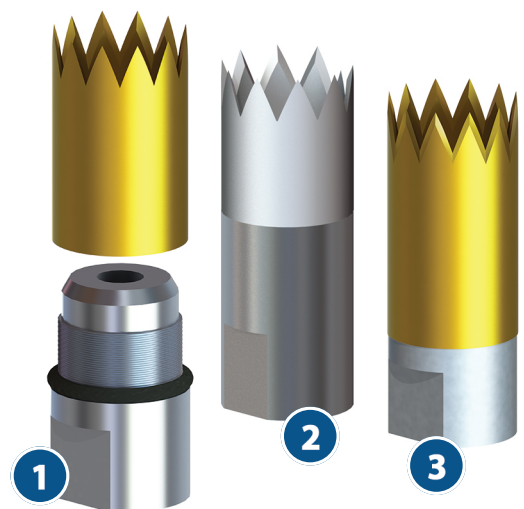
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ing. Their production of various films become these products:

- Corner protectors;
- Label stock;
- Polyethylene bags;
- Shrink films for frozen foods; and,
- Tapes and liners.

Dunmore, headquartered in Bristol, PA, focuses on label facestocks, packaging films and laminates for markets including cosmetics and personal care products; over-the-counter pharmaceuticals; eye care and infant care products. As a full-service supplier, Dunmore coats, metalizes and laminates films including PE, PP, PVC and PET. Dunmore has also worked to develop transparent polymer barrier films for photovoltaic conversion of light into

electricity applications.

Dunmore touts, “With our coating, metalizing and laminating capabilities, we can develop a unique packaging film solution for your application.” Packaging film options include water and oxygen barrier properties, heat seal, anti-fog, multi-layer film laminates, film and foil laminates.

In the printing industry companies like Legacy Flexo in Green Bay, WI, print films, nonwovens and paper. Knowing how to cut and print everything from thin films and stretchy substrates, to lofty nonwovens requires experience.

Understanding the ways all these myriad films and synthetics will process on various production lines involves handling from slitting-winding all the way through

possibilities like die-cutting, printing, converting, folding and packaging. As more and more tailor-made products are developed, each production step has to pass the processing test; and finally, deliver the envisioned properties in the marketplace. Product developers need to dial-in expertise of equipment suppliers and all others in the supply chain. ■

ABOUT THE AUTHOR

Susan Stansbury is a converting advocate with extensive experience in paper, converting, printing and related industries serving in roles including sales, marketing and product development.

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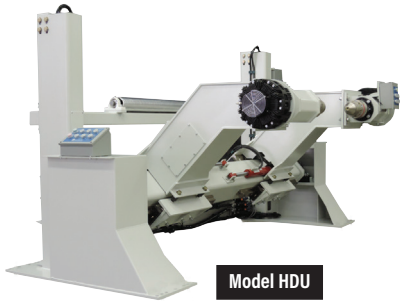


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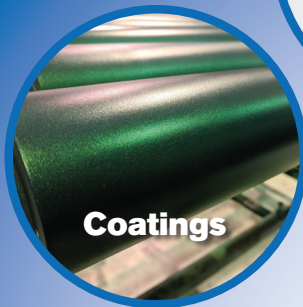
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