

# Packaging Line Changeovers:



## Conveyor Technology that Cuts Time

*A closer look at the dynamics impacting change-over times on a packaging line, as well as when new conveyors and add-ons can help, when they can't, and factors to consider in making the right selection.*

Perhaps nowhere as much as food processing and packaging does time truly translate into money. In a marketplace where margins are tight, competition is fierce and lower cost options are always eagerly embraced by the consumer, a food processor's ability to shave minutes off of production times will immediately correlate to a healthier bottom line.

Roughly defined as the time it takes to clean, adjust or prepare equipment to handle a different type of product or packaging, change-over times are a prominent adversary for streamlining food processing operations. They are especially prominent when discussing critical areas of food production such as:

- Lean manufacturing.
- Product expansion.
- Equipment investments.
- Overall Equipment Effectiveness (OEE).
- Shorter runs

This paper will offer perspectives on how each of these factors impact conveyor use and investment for food packaging lines. With market dynamics such as private label growth, plant consolidation, sustainable packaging initiatives, and increased customization, the need to shift from varying labels, containers and lot packaging materials has become vital in maintaining operational efficiency and market competitiveness.

When looking at change-over efficiencies, there are also a multitude of equipment types that could be discussed. However,



## Adaptable Changeover Conveyors



*These multi-lane conveyor utilizes counter devices on the guide rail for quick, exact measurement and rail positioning. A new conveyor line, this system is also adaptable to handle other package sizes in the future.*

it's the conveyor that plays the crucial role of getting product from location A to location B as efficiently as possible, and without causing harm to the product or workforce in the process. Literally the lifeline of the plant, there are a number of ways that conveyors can aid processors in reducing change-over times, especially in packaging environments.

### **First, A Step Back**

While the majority of this paper will be dedicated to offering insight on how conveyor usage strategies and investments can help minimize downtime, it is

equally important to examine those situations where conveyor investment or alteration is simply not the answer.

Perhaps the most prevalent inhibiting factor found in food packaging operations is the use of older conveyors or machinery that simply demand more time for change-overs. Because of their age, there might not be an add-on component or approach that can be implemented to help reduce the amount of time they consume in transitioning from one product to another.

Similarly, attempting to integrate some of these older units with

newer models can create awkward configurations. In many smaller or more customized applications, not much can be done to help hasten the change-over process. It is simply a dynamic of combining two different generations of equipment.

Other times, much can be done to get the conveyor ready with relative ease, but some equipment may demand longer cleaning cycles or a host of intensive modifications when switching between different packaging materials, container sizes or labels with varying adhesives or designs.

## ROI Changeover Strategy



PMMI (Packaging Machinery Manufacturers Institute) recently released VISION 2015, a report that consisted of machinery related market and economic strategies of over 70 end-user packaging professionals interviewed in the study.

A summary excerpt from Vision 2015, regarding changeover strategy:

*“Manufacturers should produce machines that feature flexibility. Such flexibility can be achieved through modular designs, simple adjustment, and tool-less and quick change-over processes. Flexibility, in the view of almost all attendees, enables production capacity to be increased or managed effectively in a ‘short-run’ environment without corresponding increases in operating costs on new machinery purchases.”*

For more information, visit [www.pmmi.org](http://www.pmmi.org)

Finally, and before we spend some time talking about the ways conveyor upgrades and add-ons can help in reducing change-over times, it's important to know how and if such an investment will mesh with the company's ROI strategy. Before any purchasing decision is made there has to not only be an understanding of how it will achieve the desired result, but also an assurance that any cost will be recovered once it is put to use.

In this instance, the initial cost of a conveyor add-on solution has to help save time, which translates into long-term cost

savings. If this cannot be determined or demonstrated, then such a purchase for the packaging line is not going to be the answer in negating the effect of change-over times.

### Rolling With The Changes

Each of the approaches to expanding conveyor capabilities offer a number of benefits, but equally important is their ability to address many of the general production issues and trends pertaining to packaging line change-overs, and overall line efficiency. Before we get to some specific solutions, the following offers some insight on the larger scale obstacles that can also be

addressed with conveyor add-on solutions.

### New Packaging Technology

This hits the food processor from a couple of directions. First, there is always new equipment designed to perform a given function more quickly, more efficiently and more effectively. Accompanying these advancements are challenges in integrating newer conveying equipment.

Innovation has also found its way to the package itself. Whether the goal is to be more environmentally friendly, comprise less material or simplify



## Top 10 Trends Shaping Packaging



### Summarized from *Leading Futurists . biz*

- 1. Carbon Footprint** - Consumers in the next decade will demand bigger changes in processes and systems.
- 2. Digital Printing** - Allows shorter runs, efficient SKU variations, rapid marketing, reduced inventories.
- 3. Design** - Focus on strategy, market appeal and sustainability
- 4. Hybrid packaging** - Combining two or more package technologies that create new sustainable package designs
- 5. Shrinking Packaging** - Reduce materials and package size
- 6. Food Safety** - Consumer demand will create smarter labels with instant access to ingredient origins.
- 7. Frugality Ideals** - Consumer mind set will fit with frugality in purchasing locally grown food and sustainable packaging.
- 8. Own bagging** will be enforced beyond grocery stores and into restaurants.
- 9. Composting** - New packaging will have ISO standards for composting and biodegradation.
- 10. Real Time Web Content** - Information will be live with constant, ongoing business and consumer conversations.

*Leading Futurists are published experts who provide futures and insights to executives and managers to make information accessible, meaningful and actionable. For more information about “Trends Shaping Packaging,” or about Leading Futurists, visit [www.leadingfuturists.biz](http://www.leadingfuturists.biz).*

usage, new packaging designs and their associated sizes, weights, shapes and compositions make the ability to adjust conveying equipment as quickly as possible a key element in not only reducing change-over times, but optimizing production as a whole.

### **New Materials**

With companies constantly looking to cut costs and offer “greener” alternatives, new material technology is impacting change-over times. As oil prices fluctuate, plastic costs are affected. Therefore, the implementations of new designs that use less plastic without sacrific-

ing strength are becoming more popular. With many of the same dynamics in place, rumblings of expanded aluminum use are also being heard.

These new or different materials also allow for greater flexibility in the shape of the package. In helping to drive consumer demand for products with limited opportunity for innovation, these new packages create fresh marketing angles for mature products. Basically, the package becomes the new product.

The ability to produce juice bottles that fit more conveniently in refrigerator doors and

beer bottles made of aluminum instead of glass are primary examples of how material selection is changing in the name of consumer convenience. To stay competitive and fresh in the eyes of consumers, the ability to accommodate these adjustments on the production floor is crucial and can be more simply enabled by reducing change-over times.

### **Just-In-Time (JIT) Inventory Management**

Add-on conveyor solutions enable food manufacturers to improve their entire operation’s efficiency. Ideally, this means getting more product out the door in less time, conserving

funds that could get consumed in labor and energy costs. The ability to get more product to customers more quickly also allows for more accurate planning, and hopefully lower raw material and finished product inventory.

Regardless of their focus, a key strategy for many manufacturers is the adoption of Just-In-Time inventory management. Simply stated, this allows for purchasing and producing only as much as is needed to meet current demand. This keeps cash flow more readily available for re-investment, instead of being tied up in inventory. Forecasting and price adjustments can then be made in accordance with the most current raw material costs. For packaging lines, this includes how oil impacts plastic or metal prices impact aluminum, brass or copper.

So the less time consumed during change-overs, the more quickly product can be packaged and delivered, in accordance with what customers want. This helps enhance the accuracy of forecasts, reduce inventory levels and maintain the cost and pricing benefits of a JIT approach.

### **More Of Less With Less**

One of the reasons change-over times have become so much more important of late is that the combination of increased private label business, the JIT inventory

A recent Private Labeling Food Manufacturing Survey shows:

“62% of private labelers surveyed, handle 10 or more unique labels in the course of a month.”

Visit [FoodManufacturing.com](http://FoodManufacturing.com) for more information.

approach, and additional product offerings via a wider range of new packages has produced more frequent, but shorter batch runs. It's not uncommon for many packaging lines to handle as many as five packaging changes during the course of a shift. In many instances 30-minute intervals are the maximum allowable time for change-overs, and these expectations are often put in place without adding personnel to the line.

A recent Food Manufacturing survey showed that 83 percent of respondents are involved in private labeling, with more than 62 percent handling 10 or more unique labels in the course of a month. Nearly 10 percent indicated they process products carrying over 100 different labels during an average month. And this only accounts for the label, not the variety of different packages that could come into play. Additionally, 78 percent of respondents are certain that they

will grow or maintain their level of private label business over the next 12 months. All of these factors will make change-over times on conveyors used in packaging that much more important in helping to control costs.

### **When New Conveyor Technology Can Be The Answer**

With a clearer understanding of the issues conveyor add-ons can help address, it's time to take a look at some specific solutions. What's interesting is that while many problems involve going to great measures in seeking out a solution, the answer to many change-over time questions on a packaging line can be found by taking a look at what's already present on the conveyor.

One category of such add-on innovations includes a collection of offerings described as Manual Solutions. While they're not as accurate as some of the other



conveyor add-ons that will be discussed, their cost and quick turn-around offer significant advantages in cutting change-over times. Due to their functionality, it is recommended to have maintenance personnel involved with their use. Examples include:

- **Tool-Less Guide Brackets.** Implementing brackets that can be adjusted quickly and simply by a ratchet or other hand tool offers a basic and inexpensive solution to adjusting guide rail widths.

- **Ruler Guides.** Not even requiring the use of a measuring tool, these brackets use simple notches that can be moved in accommodating products that vary in size. Whereas some guide brackets would require a degree of measurement in assuring the proper spacing, these guides do not. The result is a very quick and simplified way to change conveyor set-ups between product runs.

The next set of add-ons fall under the classification of Manual with Set Point solutions. Potentially the least technical but highly accurate option, Manual with Set Point add-ons will cost a bit more. A key benefit is the role they can play in helping to empower employees in a vital component of all lean manufacturing approaches. This stems from the fact that workers on the line can use these products without calling any specialized maintenance personnel; saving time

## Tool-less Technology



*The quick set rail with hand knob, has a spring that pops in place on the pre-set adjustment.*



*This hand wheel is integrated with the digital counter for fast and accurate rail adjustment.*



*Ruler guides can be bolted-on for quick adjustment, or etched as shown here.*



*Guides can be specially designed out of UMHW; they are set in place on the conveyor when needed to run a particular product size.*

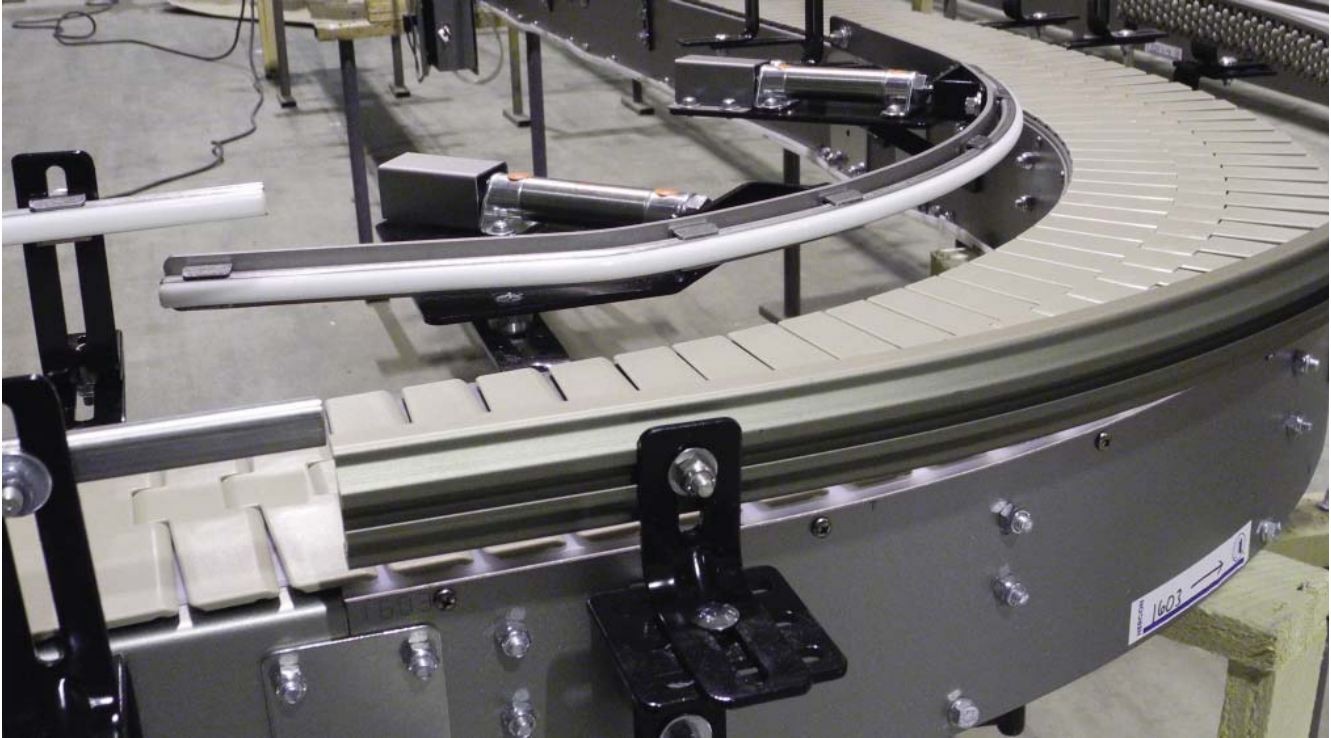
and cutting costs on multiple fronts. Some examples include:

- **Hand Wheels.** This tool-less option is exactly what it sounds like and can be used for changing rail openings, moving up to 20 ft. long sections of rail.

- **Digital Counter Rail Guides.** Regarded as extremely accurate and implemented in situations where extreme precision is nec-

essary, a counter rail guide can be integrated with the rail in order to set an exact rail width. A hand wheel is often used with a counter in providing incremental movement for precise positioning during change-overs.

- **Quick Set Guide.** Another tool-less option, the Quick Set Guide add-on allows for adjusting rail width in accommodat-



*Shown above is a pneumatic guide rail on a curve. Pneumatic and robotic rails are often used in overhead conveyor systems in high volume lines.*

ing different packaging sizes. It works with a positioning spacer that can be popped into place in re-configuring the rail. For example, different settings might include not using the spacer, using the spacer's short end or using its longer end.

The final set of add-on options are referred to as Automatic Controlled with Set Points. These options offer packaging lines the ability to fully utilize the innovative automation investments that have already been made in getting the most out of their current conveyors, and at a comparatively lower cost. These highly-controlled systems are geared towards the more technologically savvy production environments, but

make up for any operational complexity by achieving greater change-over efficiency, and improving overall equipment effectiveness (OEE) marks.

On the topic of OEE, it's important to note the impact higher performance ratings will have in improving maintenance procedures and overall operational efficiencies. The significant cost and time savings that accompany optimizing machinery performance will play a key role in reducing change-over disruptions.

Examples of Automatic Controlled with Set Point solutions include:

- Pneumatic Rails. Most suitable for high volume production

lines, these automatic rail adjusting offerings help save manpower and are typically used in overhead systems. They involve one rail lifting or lowering into position to accommodate different product packaging widths.

- Robo Rails. This automated solution also allows for varying package widths in high-volume applications. While it is considered potentially the most costly rail-changing solution, it's also the fastest, most versatile and most accurate.

Both of these automatic rail adjustment systems are highly controlled, utilizing Human-Machine Interface (HMI) technologies. This added process control capability allows for adjusting



**Planning a conveyor line?**

Visit our new  
**multi-media website**  
 at [www.nercon.com!](http://www.nercon.com)



Nercon Eng. & Mfg., Inc. is a designer and manufacturer of packaging and process conveyors and material handling equipment. Nercon is a 35 year old company that provides modular as well as engineered conveyor systems to manufacturers of consumer products throughout North America.

*Special thanks to Food Manufacturing magazine for their assistance with this editorial as well as PMMI and Leading Futurists for their permission to reference their research.*

over 100 feet of conveyor rails to the desired width in less than 60 seconds.

**Additional Purchasing Considerations**

While it's tempting to champion the mind-set that these less intrusive solutions will be the one-stop answer for every packaging conveyor concern, that would be a disservice to the industry. There are obviously a number of factors that impact line change-overs and need to be considered during the purchasing process, whether the discussion pertains to conveyors, add-ons or larger pieces of packaging equipment. They include:

- Long-term flexibility and potential re-purposing. If possible, new purchases need to offer an almost modular design that allows for handling different

types of products, as well as the ability to be used with a variety of complementary machines. The ultimate goal being that less expensive add-ons or similar alterations will be an option going forward.

- Cleaning. If required for the packaging line, the ability to clean the conveyor or machinery quickly in getting it back to full operational status is worth considering.
- Reducing waste. Whether it's less packaging material, lower energy consumption rates, fewer necessary operational personnel or reduced maintenance resources, new purchases should save more of something. In the case of everything mentioned here, cost savings are the ultimate benefit from less waste.

**Conclusion**

Change-overs are inevitable in the food processing industry, especially in packaging environments. So while they may be viewed as a necessary evil, the goal of this paper has been to present positive alternatives in addressing change-over times. As is usually the case, taking a proactive position in addressing these operational obstacles will prove to be the best course of action for your company, your current customers and the future of both.

© Copyright Nercon Eng. & Mfg., Inc.

*Consulting Engineer:  
**Dennis Buehring**  
 Dennis has over 25 years of experience in engineering and managing conveyor system projects. He has led engineering and services teams at Nercon, and currently holds the role of Sales Director.*