Belt Conveyor
Experts Reveal All:

IN-HOUSE BELT SPLICING

LIMITING DOWNTIME IN YOUR FOOD PROCESSING PLANT

FLEXCO

INTRODUCTION

Tick, tock. Tick, tock.

Every second your belt conveyor system isn't running counts. And of all the times for a belt conveyor system to shut down, it seems to plague us the most when we're trying to increase production levels and move more product out the door.

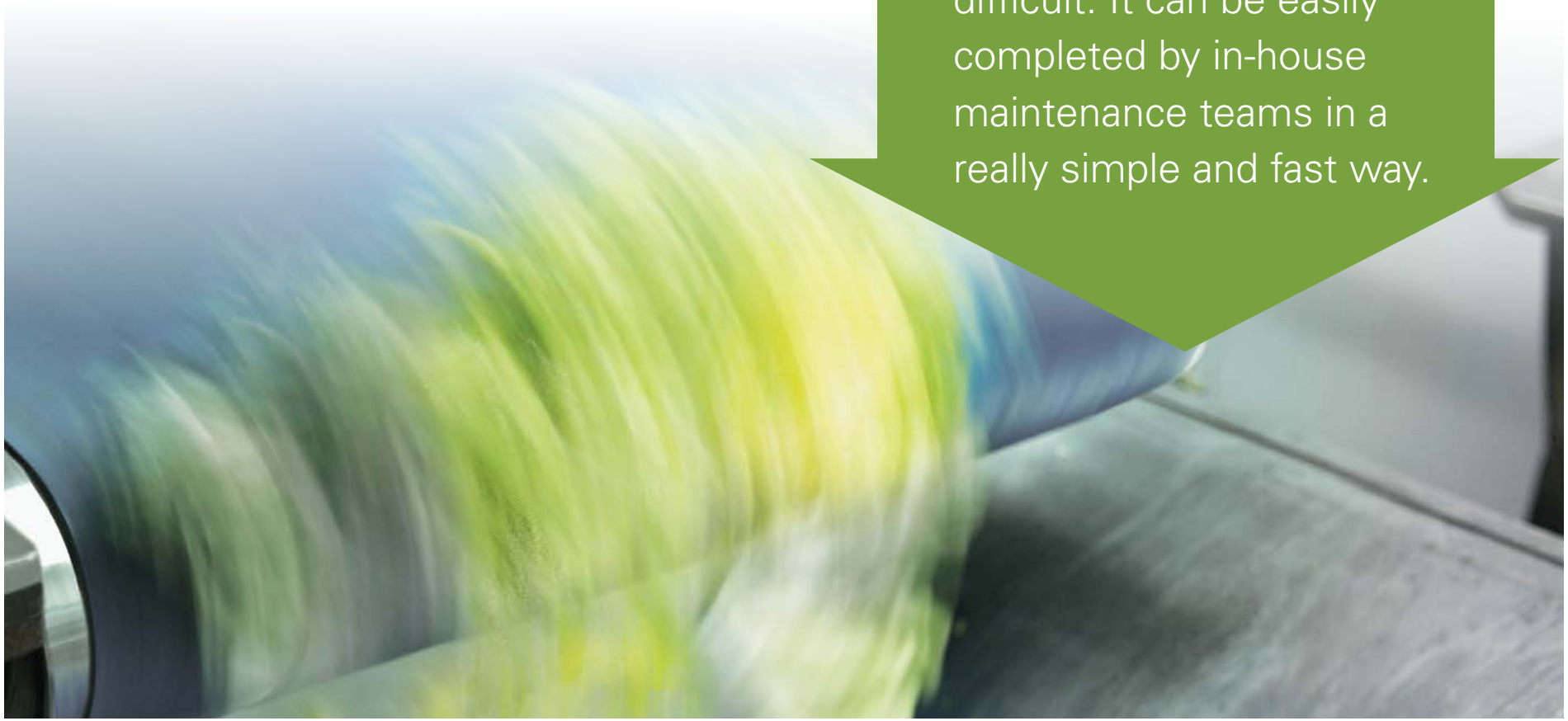
Shutting your system down to splice belts for maintenance or repairs seems simple enough. All it takes is a quick call to the belt crew to schedule a repair. So why is it costing you so much time and money?

Downtime is expensive.

Lost production time, unnecessary product waste, lost labour hours, and missed delivery schedules, along with the cost of waiting for the belt crew to repair the belt, can really affect your bottom line.

In this E-Book, our belt conveyor system experts break down exactly how you can reduce downtime and maintenance costs by bringing your belt splicing in-house. They will share the simple tools you need to make this productivity-boosting idea work for you, and demonstrate how much time and money you could save.

Getting your belt spliced and your system back up and running doesn't have to take so long. In fact, it can be quite quick. It also doesn't have to be difficult. It can be easily completed by in-house maintenance teams in a really simple and fast way.



What's in This Guide?

Part I

Downtime Demystified

The true cost of downtime explained with useful examples. Understand all the factors that, when combined, contribute to the total downtime cost. We'll give you a list of questions that will help you calculate how much belt splicing maintenance and repairs is costing your facility in downtime.

Part II

A New Idea That Will Save You Time and Money

Discover exactly how you can reduce downtime and maintenance costs by bringing your belt splicing in-house, including the new technology that is changing the belt splicing landscape. Learn how this idea will change the way you respond to a damaged belt, handle routine maintenance, and help you better manage your expenditures.

Part III

Investing in the Right Splice Press for Your Operation

Food processing operations have a unique set of requirements for belt splicing systems. To reap all the productivity benefits of do-it-yourself splicing, in-house teams must be equipped with the right tools to handle routine maintenance when it is least disruptive to your production schedule. Ideally, a press should offer fast cycle times, lightweight design, advanced technology, and versatility ... and still be simple to use.

Part IV

How to Get Started

Now that you understand the benefits of bringing belt splicing in-house, and you know the best tools are available for completing the task most efficiently, learn what to do first when considering bringing your belt splicing in-house, as well as what training and support is needed.

Part V

You Have the Power to Be More Productive

Your E-Book download comes with a free product demonstration. See for yourself why customers around the world trust Flexco to minimise downtime and decrease maintenance costs in food processing facilities. Our industry experts from around the world will show you how easy it is to limit downtime in your facility by bringing your belt splicing in-house – and, you'll be backed by a team that provides ongoing support.

Part I

1

Downtime Demystified

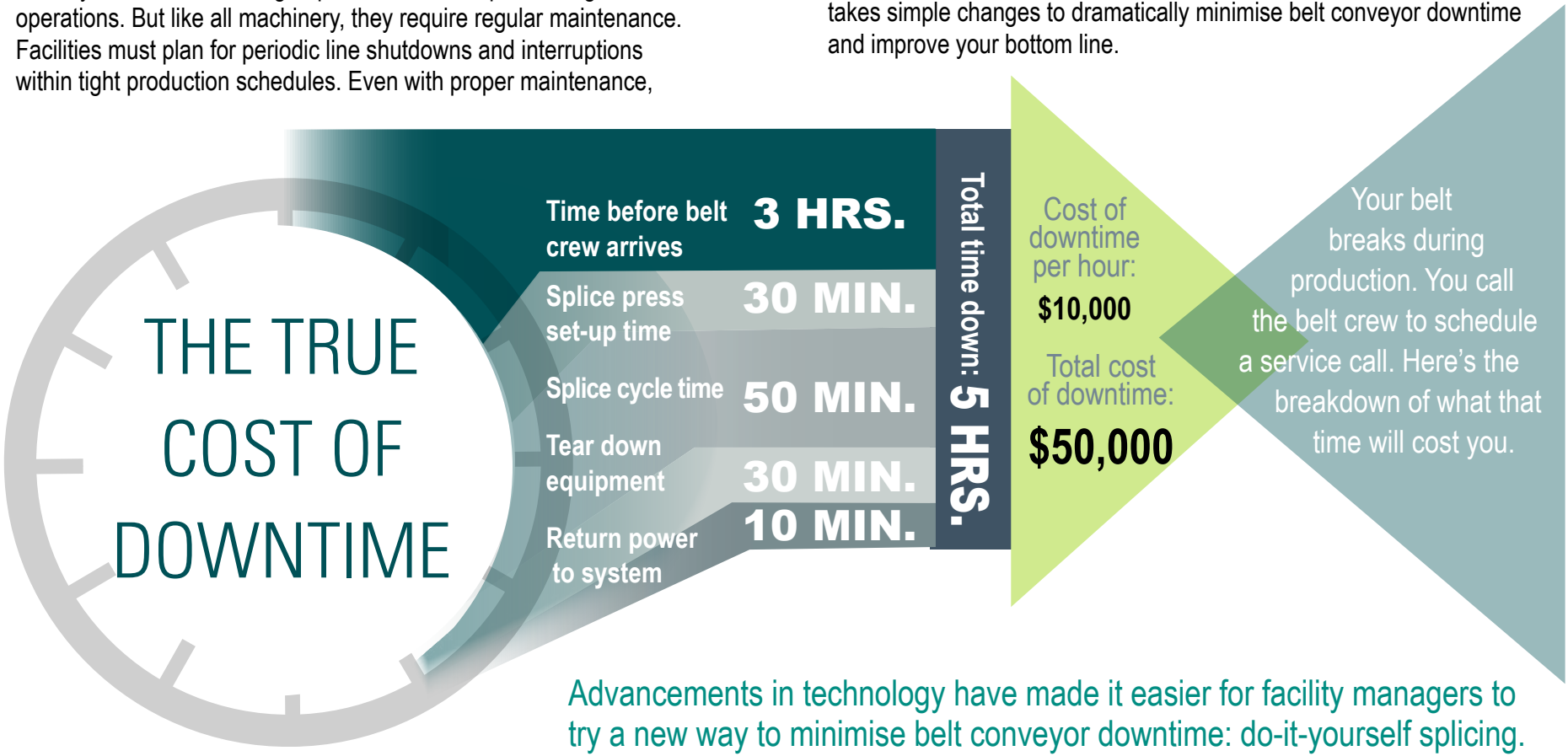
Downtime Demystified

Downtime. We think of this as the time during which your belt conveyor system is out of action or unavailable for use. And that is correct, however, many more things also contribute to the cost of downtime. A lengthy shutdown – planned or unplanned – can have big financial consequences.

Conveyor belts are an integral part of most food processing operations. But like all machinery, they require regular maintenance. Facilities must plan for periodic line shutdowns and interruptions within tight production schedules. Even with proper maintenance, conveyor belts can still undergo sudden breakdowns that bring your whole operation to a halt and cause considerable downtime.

Understanding the true cost of downtime is an important step towards identifying the largest areas of opportunity available to improve it. Those areas offer the biggest impact, not only on your bottom-line, but also on the productivity and efficiency of your whole system.

Smart companies are scrutinising every part of their operations in order to pinpoint new ways to boost efficiency and productivity. Fortunately, it only takes simple changes to dramatically minimise belt conveyor downtime and improve your bottom line.



Advancements in technology have made it easier for facility managers to try a new way to minimise belt conveyor downtime: do-it-yourself splicing.

Factors That Affect Downtime

Asking yourself these questions could help you better understand the impact downtime has on your business:

Product loss

What is your product loss cost? Is every minute spent down affecting the quality of the product? How much product can you afford to lose during an unscheduled downtime?

Missed deadlines

What happens when you miss a deadline for delivery to a customer? What is the cost of losing that business? How does it affect your customer relationship?

Labour loss

How much are you losing in wages? What does it cost you to have workers standing around, waiting for a belt to be up and running?

Belt repair

How many hours will you be down before a belt crew can get there? How much are they charging you for the splice installation?

Interrupted production flow

What additional production/processes are brought to a halt waiting for the belt to be spliced? How much is this costing you in terms of lost production hours and product scrap?

Part II

2

A New Idea That Will Save You Time and Money

A New Idea That Will Save You Time and Money

In-house belt splicing may be one of the biggest opportunities you have to make a dent in downtime. Let's take this idea a step further and explain why it is a much simpler solution to downtime than you may think.

Technology Advancement

Endless belt splices (sometimes called "vulcanised splices") are created by presses that use a combination of heat, pressure, time, and/or chemical bonding. In the past, thermoplastic endless splicing would require the services of a contracted belt crew.

Traditionally, these presses have been bulky pieces of machinery designed for professional use. Some presses weigh as much as 300 kg (140 lbs) and have many external parts (water hoses, electrical cables, water tanks, and more) that make them difficult to transport.

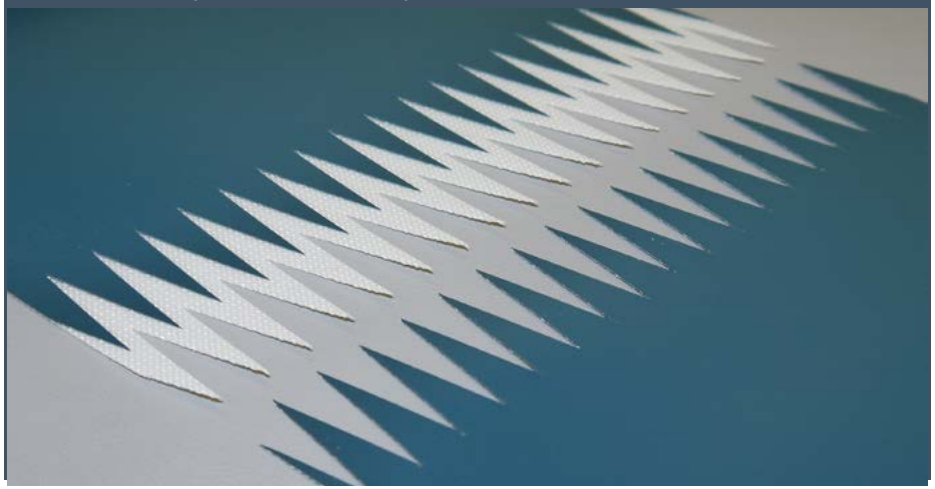
In recent years, however, the industry has seen a rise in technology that brought new presses to the market. These systems not only weigh much less than their predecessors, but also require few, if any, external parts. Many are even designed for intuitive operation, so they can be used with minimal training. These advancements have made do-it-yourself belt splicing an increasingly attractive option.

How Does Endless Splicing Work?

Endless splicing bonds two belt ends together by applying pressure with heat, allowing the thermoplastic material to flow and then bond together for a strong splice as the material cools and re-hardens.

Alternate methods for use with rubber belts typically involve a chemical bonding and curing process to create the splice.

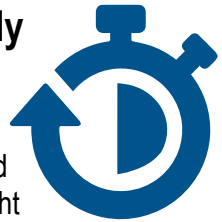
Endless splices are ideal for food and sanitary conveying applications and also in applications requiring low profile splices that will not mark conveyors or conveyed products.



The Value of In-House Belt Splicing

Bringing your belt splicing in-house has several benefits. Here are just a few reasons you'll want to seriously consider purchasing your own equipment and training your maintenance crew to splice belts.

Respond immediately to a damaged belt.



Of all departments, maintenance staff understand that sometimes their day might not go as according to plan. Emergencies, like a damaged splice, do arise. And when they do, they are a top priority. All focus must be put on getting the belt up and running as soon as possible to limit downtime and get production back on track.

In the past, thermoplastic endless splicing would require the services of an outside contracted belt crew. Once the crew arrived on-site, the splicing operation could take several hours from start to finish – hours where productivity would be at a standstill.

Owning your own press and using in-house maintenance teams to respond immediately to a damaged belt saves you hours of unnecessary downtime.

Handle routine maintenance when it's least disruptive.

Having a preventative maintenance plan is a smart way to be proactive about belt splicing. The goal of a successful preventive maintenance program is to establish consistent practices designed to improve the performance and safety of the equipment at your facility.

Inspecting and logging issues before they become serious problems can help prevent unscheduled downtime and the costs associated with emergency repairs and lost production. Moreover, the planned maintenance of equipment will help improve equipment life and avoid unplanned downtime and maintenance activity.

Having the ability to plan belt splicing maintenance around your own production and shift schedules means that you can halt your system for maintenance when it is least disruptive to your plant. A properly implemented preventative maintenance plan can save a considerable amount of time and money.

Manage expenditures better.

Budgeting is crucial in any maintenance department, so most companies focus on the cost of preventative maintenance in their budgets. But realistically, belt conveyor system shutdowns can occur without warning at any time. This means you also have to have a certain amount of money allocated for urgent repairs.

As a maintenance manager, budgeting for emergency belt repairs is an important task and can be tricky to estimate.

The costs associated with having an outside contractor conduct belt splicing at your facility can vary dramatically. Factors such as how long it takes the crew to arrive, how many people are required to conduct the work, what equipment they need to bring, the number of belts that need to be spliced, what day of the week they need to come out, or what time of the day it is, all contribute to increased cost.

Investing in the right punch tool and splice press for your operation is an important decision – but once you own the equipment needed to conduct the belt splicing, ongoing maintenance costs are minimized.

Cost savings are also realised by utilising existing in-house maintenance teams to conduct maintenance or repairs. With simple training and support from the right vendor, your maintenance teams can be equipped with the skills needed to control in-house belt splicing, which gives you the opportunity to better manage expenditures.

More In-House Splicing Benefits

Here are some other important benefits of an in-house preventative maintenance plan:

Equipment downtime is decreased
and the number of major repairs is reduced

Your equipment and machinery will last longer,
with fewer premature replacements

Overtime costs are reduced
because preventative maintenance is easier to schedule and breakdowns are handled quickly

Timely, routine repairs
circumvent fewer large-scale repairs

The work environment is safer
because of proactive repairs

Part III

3

Investing in the Right Splice Press for Your Operation

Investing in the Right Splice Press for Your Operation

Having your maintenance teams equipped with the right tools to handle routine in-house maintenance when it is least disruptive to your production schedule is another best practice when it comes to combating downtime at your facility.

Food processing operations have a unique set of requirements for belt splicing systems. To gain all the productivity benefits of do-it-yourself splicing, facility managers should look for presses with certain key features.

Fast Cycle Time

In belt splicing, the cycle time is the number of minutes it takes for the press to heat up, fuse the belt ends together to create a seamless bond, and cool back down. Today, many presses take roughly 45 to 60 minutes per cycle. However, certain products — like the Novitool® Aero® Splice Press — are able to complete a cycle in just 8-12 minutes. That could save around 35-45 minutes each time you splice.

Lightweight Design

Portability is a key consideration when choosing a press. The less the overall system weighs, the easier, faster, and safer it will be to transport to the production line. Conventional presses commonly weigh up to 136 kg (300 lbs) and can require nearly 18 kg (40 lbs) of additional components. Fortunately, there are some lightweight models on the market. The Novitool Aero Press, for example, weighs nearly 60% less than conventional presses and comes with a transport case with wheels, which makes it easier to bring to the conveyor.

MINUTES SAVED = DOLLARS SAVED

Every minute your belt is down, it's costing your operation money.

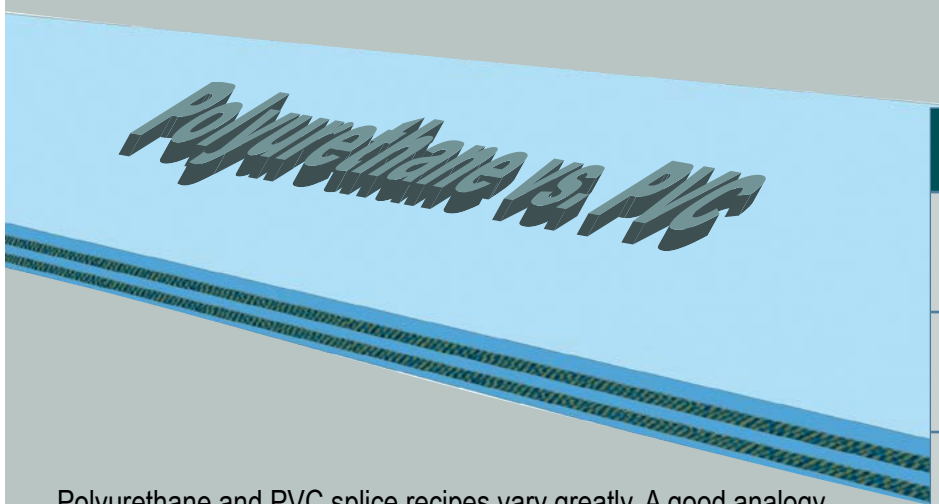
How much can you save by handling splicing in-house?

	Shutdown Cost	Time Saved (by doing it yourself)	Money Saved (by doing it yourself)
Step of Process: ACTIVE CYCLE TIME	$5,000/hour	40 minutes	$3,333/per splice
	$10,000/hour		$6,667/per splice
	$15,000/hour		$10,000/per splice
Step of Process: SETUP & TEARDOWN	$5,000/hour	20 minutes	$1,667/per splice
	$10,000/hour		$3,333/per splice
	$15,000/hour		$5,000/per splice
TOTAL	$5,000/hour	60 minutes	$5,000/per splice
	$10,000/hour		$10,000/per splice
	$15,000/hour		$15,000/per splice

Recipe Development and Storage Capabilities

How many different types of conveyor belts do you have in your facility? If you are like most food processing operations, you probably have at least three different types of conveyor belt within your facility. Each of those belts requires its own recipe for a strong and effective endless splice.

Developing a new splice recipe can be a challenging process – especially when there's insufficient technical information available. Experienced belt fabricators know that a recipe for a given belt will often work on one type of splice press, but not another.



Polyurethane and PVC splice recipes vary greatly. A good analogy to visualise the difference between the two is that polyurethane is a liquid that flows like water, whereas PVC can be compared to flowing molasses. Because of this great variance, care must be taken to ensure the right temperature, heating, and cooling processes are practiced for the best quality splice.

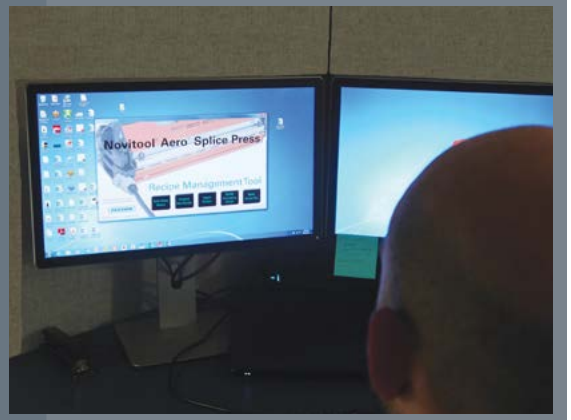
The following table provides a summary of important differences to consider when splicing both polyurethane and PVC conveyor belts.

CHARACTERISTIC	POLYURETHANE	PVC
TRANSITION FROM SOLID TO LIQUID STATE	SHARP; IMMEDIATE AT MELT TEMPERATURE	SLOW; GRADUALLY CHANGES AS TEMP INCREASES
TYPICAL SPLICE TEMPERATURE	160C	175C TO 180C
MELT VISCOSITY	LOW (FLOWS QUICKLY)	HIGH (FLOWS SLOWLY)
TYPICAL SPLICE PRESSURE	0.8 BAR	1.3 BAR
SPLICE DWELL TIME	DEPENDS ON BELT THICKNESS FOR THICKER BELTS (BELT INCLUDING SPLICE PADS)	
SPLICE PRE-HEAT TIME		

Conveyor belt manufacturers provide their recipe recommendations for some splice press models; however, these guidelines often do not account for all splice presses used in the industry. In these situations, having a proven and methodic approach to developing a splice recipe can save a lot of time and money while optimising the splice quality.

When the splice recipe is supplied, there are still challenges. How do all the different belt splicing technicians keep track of what recipe is for which belt?

To combat the problem of constantly inputting splice recipes, which leaves room for human error, the Novitool® Aero® Press features recipe management. Users can manually enter and save recipes at the press, allowing full control over customisation of the recipes. Alternatively, recipes can be imported via USB flash drive. Up to 990 recipes can be stored and segmented into categories for easy organisation. Users can recall saved recipes for specific belts, providing consistent, high-quality splice performance. Having recipes stored on the splice press means that anyone can operate the press at any time, without requiring prior knowledge of the conveyor belt characteristics.



Few External Components

Another factor that affects portability is external hardware. Traditional water-cooled presses have a number of external pieces and components, including:

- An open tank with a pump, which holds water used to cool the belt
- Hoses that connect the tank to the press
- Electrical cables to power the entire system
- A temperature controller
- A manually-operated air compressor

Systems with external components have other disadvantages. That's because every extra piece that must be attached or assembled increases set-up and tear-down time. This further lengthens the duration of a shutdown, which results in additional downtime.

A better option is an all-in-one, self-contained press. Products like these have built-in compressors and cooling systems, so the only extra component is a single, electrical cable. This simplified procedure for transportation, setup, and cleanup can shave an additional 20 minutes off the total splice time.

Voltage Versatility

Voltage is an often overlooked consideration when purchasing an in-house press. When choosing a voltage for your press, consider the voltage of your power source, whether an extension cord will be used, and other variables. Certain times of the day and year, like midday during the summer, will have higher demands for power due to the increase in demand because of running air conditioners. When making the decision of what voltage capacity to consider, note that voltage only affects the time it takes for the press to warm up. Dwell and cooling time is not affected by a lack of supplied power.

Some facilities are designed with connections at various voltage levels to accommodate different types of equipment. Managers in these facilities should opt for a press that is compatible with multiple power sources. For example, the Novitool® Aero® Press can be used with 110V or 230V single phase, 230V 3-phase, 400V 3-phase +N, and 460V 3-phase power sources by changing the power cord. The chart below illustrates the options based on press width.

AERO® POWER COMPATIBILITY FOR 625, 925, 1225, 1525, 1835, AND 2135

Item Code	Power	Country	625	925	1225	1525	1835	2135	Plug End
09008	1ph 230V, 10A	Australia	F	R	R	*N/A*	*N/A*	*N/A*	
09012	3ph 400V +N	Australia	F	F	F	F	F	F	
09013	3ph 400V no N	Australia	*N/A*	*N/A*	*N/A*	F	F	F	

(F= full power operation, R= reduced power operation)

Larger presses do need a higher power source, so having the option to select the right power for your press and for your plant is a flexible advantage.

Most conventional presses require a single operating voltage to be selected at the time of purchase. Yet, if the appropriate hook-up is not near the splicing location, the entire belt must be removed and brought to another location or a power transformer must be used.

Air-Cooling Technology

Air cooling is an innovative transformation from traditional water cooling methods. In food production applications, the threat of bacteria harbouring in water is a major concern, and so is diminishing quality.

> Testing conducted by our experts found that the quicker you cool down the belt, the less the material shrinks and the stronger the splice.

Traditional water-cooled splice presses do not have the same ability to control heating and cooling processes as air-cooled presses like the Novitool® Aero® Press. The press can set different temperatures for both top and bottom heating elements, allowing users to modify the splice parameters to achieve ideal splicing results for the belt. As the press allows for more control over the heating and cooling process, the splice has a superior and stronger finish.

Traditional water-cooled presses have an open tank that must be filled and connected to the press via hoses. During setup, water splashes and/or spills are common. Yet in environments filled with electrical equipment, this creates serious safety hazards. In addition, if the press is brought into the facility by a third party, the water tank, hoses, and other components carry the risk of outside contamination. Look for a press with a built-in air-cooling system and eliminate the waterborne safety and hygiene issues present with traditional water-cooled presses.

Integrated Air Cooling – *cooling fans are positioned in both **top and bottom** beams, reducing cool down time after splice is complete. **Average splice times of 8-12 minutes** can be expected.*

Finger Splicing Made Easy

Having the right press for your belt splicing is a critical element of decreasing downtime, but this can be taken a step further when you have the capability to punch your own fingers. Some companies purchase the belt with pre-cut fingers, which isn't just a more expensive option, but also limits the flexibility of spare belting since it has to be pre-punched in specific lengths. In-house punching capabilities allow you to gain the advantage of ordering belting in bulk, which is a much cheaper option than pre-punched and individual lengths of the conveyor belt.

So how do you prepare the belt ends for finger splicing or finger-over-finger splicing? By using a tool specifically designed to make this process quick, easy, and portable.

A tool designed specifically to effortlessly punch fingers into polyurethane and PVC conveyor belts for quick and easy installation of endless splices is a great option for limiting downtime in your facility. For example, the Novitool® Pun M™ Mobile Finger Punch is highly capable of preparing finger splices. The Pun M is manually operated and does not need electricity or air pressure. The punching force of 50kN (11,000 lbs) is created by pulling the lever, and is easily done with one hand by the average person.

To punch a belt, one belt end is positioned against the end stop and clamped in place. This enables precise fingers to be quickly punched with each lever pull. Because of its easy set-up and manual operation, the Pun M is an ideal tool for punching at the conveyor system, or in the workshop, to achieve accurate splices quickly.

Part IV

4

How to Get Started

How to Get Started

Now you know how easy in-house belt splicing can be, and you understand the best tools for completing the task most efficiently. But what happens next? Taking this productivity-boosting idea of bringing your belt splicing in-house requires your team to be trained on how to use the tool. Ongoing support for tips, tricks, and troubleshooting can also help you be more productive.

Choosing Your Options

When investing in a Novitool® Aero® Press, there are two main things to consider. One is what width of press you need, and the other is the voltage of the power source.

A good rule of thumb is to determine the widest belt width in your facility, and then invest in the press that can cover that width belt. This means you will be able to accommodate all the belts in your facility with one press. Some facilities have one size belt in one area of the plant, and another size belt in another area of the plant; so in this case, it may make sense to invest in two different width presses that can be utilised in different areas of the plant. The Novitool Aero Press comes in six different belt widths, starting at 625 mm (24 in) and continuing up to 2135 mm (84 in).

The other thing to consider is which power cable you require to use the press effectively in all areas of your plant. Voltage is an often overlooked consideration when purchasing an in-house press. When choosing a voltage for your press, consider the voltage of your power source, as mentioned in "voltage versatility."

Most presses on the market are voltage specific. The Aero Press is unique in that it is compatible with multiple voltages, allowing the user to select the power cords desired based on the various voltages throughout their facility.

Training and Support

When you invest in a Novitool Aero Press, you don't just receive the tool … you'll also be backed by a support team that helps you grow. If you have a distributor that you purchase belting from, more often than not they will be able to show you exactly how to use the press to install that belting in your plant. Flexco also has a team of experts around the world who are highly capable of showing our customers how to get the most out of their splice press investment. We'll visit your facility and install a test splice with your maintenance teams.

Most conveyor belt suppliers will provide a data sheet at the time of conveyor belt purchase that outlines the splice press settings that should be used with that belt. The data sheet contains the recommended parameters used to cook the belt. As these parameters vary between splice presses, if required, Flexco experts can also assist with troubleshooting the correct splice recipe for your conveyor belt. All you need to do is send Flexco some sample belting, and we can help you determine a starting point for your splice recipes by recommending parameters.

Part V

5

You Have the Power to Be More Productive

You Have the Power to Be More Productive

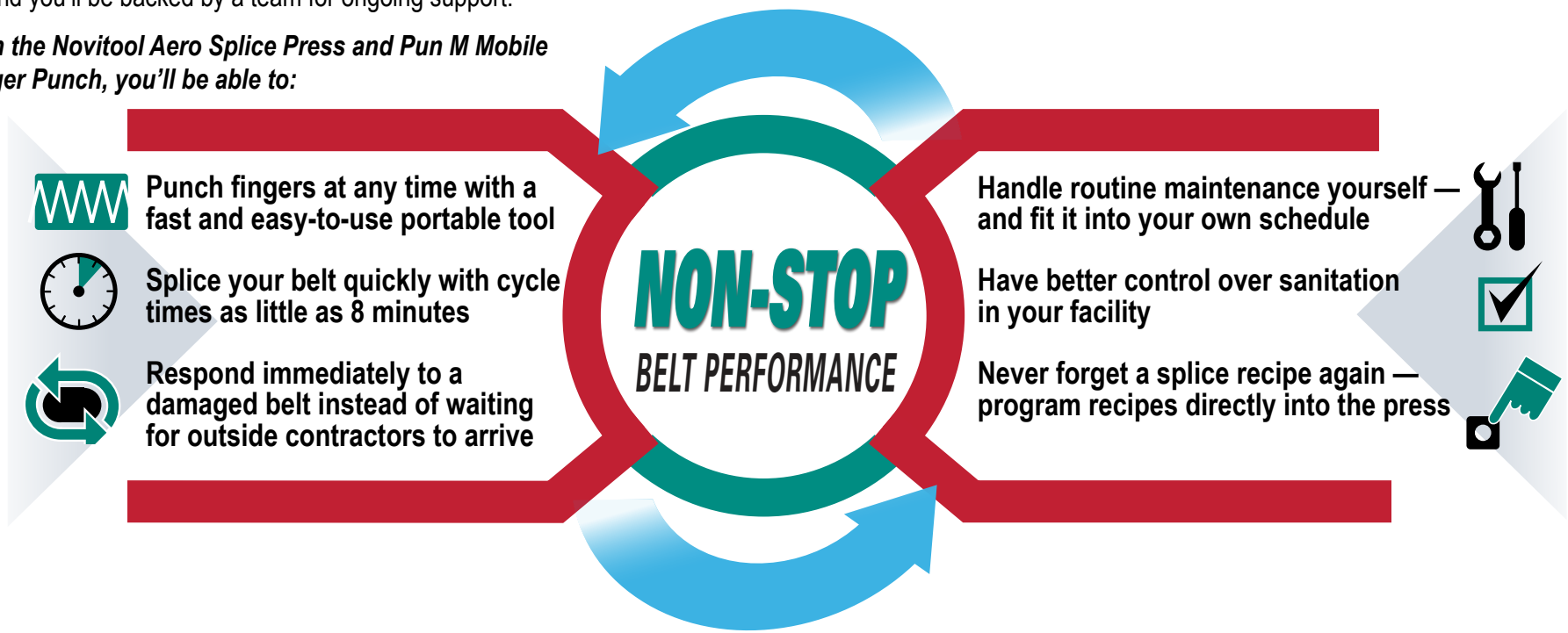
You can request a demonstration of the Novitool® Aero® Splice Press and Pun M™ Mobile Finger Punch at your facility.

See for yourself why customers around the world trust Flexco to minimise their downtime and decrease their maintenance costs. The Novitool® Aero® Splice Press from Flexco is everything you need to effectively combat downtime in your food processing facility. With the Aero Press, you can save time and money by easily bringing your belt splicing in-house — and you'll be backed by a team for ongoing support.

Follow this link to schedule a free demo customised for your specific operational needs, and we'll send our industry experts to show you exactly how easy it is to limit downtime in your facility.

Yes! I want a demo!

With the Novitool Aero Splice Press and Pun M Mobile Finger Punch, you'll be able to:



Like Everything You've Read, But Still Not Sure You Want To Do The Actual Splicing?

No problem, you can still reap many of these benefits by owning your equipment and still tasking the outside belt splicing contractor with the actual splicing. This way you control your equipment and do not have to worry about outside contaminants coming into your facility on someone else's equipment. You can also dramatically reduce the amount of time needed to begin the splicing by getting the equipment ready and in place for your contractor, realising the benefits of the quick splice cycle times.

Meet the Expert

Laurie Shorten

Laurie is our resident light-duty product manager in Australia and New Zealand. Laurie also doubles as our Australian field expert – spending his days travelling Australia and New Zealand to find the right solutions to best fit the challenges and applications of our clients. Laurie has over 20 years of experience in the light-duty conveyor belt industry. Laurie is available via email to answer any further questions or thoughts you may have about the Novitool line of endless splicing solutions.

lshorten@flexco.com

FLEXCO

www.flexco.com

12-18 W859