INSIGHTS™
Belt Conveyor Maintenance
TECHNICAL SOLUTIONS FOR BELT CONVEYOR PRODUCTIVITY

Finger Splicing or Finger-Over-Finger Splicing

Choosing an endless splice configuration is an important decision for maximizing splice performance and longevity. Many factors should be considered when selecting the best splice for the application, including: belt construction, splice strength, conveyor design, application requirements, and commercial factors.

A Finger Splice (FS) is often the default consideration because of quicker fabrication. It is also the only type of endless splice that does not increase splice thickness of single ply belts. If a belt has multiple plies, then the user should consider if a Finger-Over-Finger (FOF) splice would better suit their application. To know if a FOF splice would bring benefit to the application, the following should be considered:

Splice Strength

The strength of the splice is directly related to the amount of bonding surface in the splice. With the FS, the bond strength is limited to the single linear bonding line of the fingers. The linear bonding is based on the length and width of the finger – the longer the bonding line, the stronger the splice. Consider the linear bond of an 80 mm long finger by 20 mm wide. This is stronger than a 50 mm long finger by 20 mm wide. With a single ply belt, the user will increase the linear bond through longer and/or narrower fingers. If the belt has multiple plies, then the user will typically consider a FOF splice.

The FOF splice is created by separating the plies and punching fingers on the two layers on an overlap. This allows for two linear bonds in addition to the bond between the offset layers. Typical FOF splices will be at least 25% stronger than standard FS of the same belt material.

In many light duty applications, the product being conveyed is quite light. Initially it may seem that the FS will provide adequate strength, but be sure to consider other factors that can impact splice quality, such as:

Conveyor Design

Some conveyor designs have features which may make the FOF a better choice. The primary difference between the FS and FOF splice is that the FOF has two layers of finger splices slightly offset from each other. This built-in step provides an additional barrier to forces wanting to push through the belt. Some conveyor designs where the FOF splice may be advantageous are:

- Belts with a V-guide installed – As the splice wraps the conveyor pulleys, extra tension at the V-guide can force the V-guide through the fingers of a FS. This same force is further exaggerated where belts are mistracking and the V-guide migrates out of the groove. The overlap of the FOF splice reduces the probability that a V-guide will contribute to premature splice failure.
- Conveyors with Segmented Transfer Rollers – Segmented Transfer Rollers are commonly used in higher tension applications where small diameter rollers are required for transferring product. The construction of many segmented rollers often creates isolated areas of increased tension across the belt width. These isolated higher tension areas often cause the single fingers of the FS to be forced open. The step of the FOF splice reduces the possibility that the higher tension areas can force open a finger.

Product Build Up Under Belt

Many times a belt is used for conveying or processing bulk products. Bulk products will commonly migrate inside conveyors and get lodged between the belt and the slider deck and/or rollers. Dough and chocolate transport applications are notorious for product build-up on conveyor rollers and pulleys. As with V-guide, these situations create areas of increased tension that are more likely to push through a FS than the offset fingers of a FOF.

Belt Impact

Belt impact can be found in applications involving a punching or stamping process on the belt surface or situations where small, heavy products are dropped onto the belt. The localized impact of some of these processes can affect individual fingers. Because fingers of the FS are cut entirely through the belt, the impacted finger is only supported along the edges. An impacted finger of the FOF is supported by overlapping the fabric below. A FOF splice is preferred in these applications.

Commercial Factors

There are commercial factors to take into consideration because the FOF requires the additional process of ply separation and punching fingers in two layers. The additional process requires some additional time, which does cost money. So the performance benefits of the FOF must be evaluated against the additional cost of fabrication. Contrasting this, it is common to have less belt material loss in preparation of the FOF than with the FS.

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Solutions From Flexco

The Ply 130™ Ply Separator and Pun M™ Mobile Finger Punch from Flexco can provide advantages for your FOF processing.

Novitool® Pun M™ Mobile Finger Punch

The Pun M is capable of preparing both the FS splice and the FOF splice. However, the FOF function of the Pun M yields less material loss than that of a FS. Each time the Pun M is used, the FOF function will save approximately 35 mm (1⅜") of belt length. Processing a 900 mm (36") wide belt costing $ 77.50/m² ($0.60 PIW) would yield nearly $2.50 in material savings in comparison to the FS*

**A typical FOF dimension is 50 x 20 mm with a 35 mm overlap and a typical FS configuration is 80 x 20 mm.*

Novitool® Ply 130™ Ply Separator

The Ply 130 is remarkably easy to use, having a single adjustment arm for easy set-up and repeatability. The precision of the Ply 130 allows for FOF appropriate ply-separation in a single pass.

Other Solutions from Flexco

The Novitool® Aero® Press is lightweight for easy transport to the jobsite, has integrated controls, air compressor, and forced-air cooling. The engineered lightweight design has been optimized to allow for both quick heating and cooling of the splice, ensuring the quality and long life of the splice. The Aero Press is capable of both the FOF and FS splice configurations.

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