ACADEMY / TECHNICAL TRAINING SERIES

FINGER SPLICING

MODULE 08 / STUDENT TRAINING WORKBOOK

LEARNER NAME _____

DATE _____ TRAINER / ASSESSOR _____

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TRAINING SCOPE Theory and awareness only. Finger splicing requires competent personnel, site-specific risk controls, manufacturer-approved methods, suitable tooling and supervised practical assessment.

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Module Overview

This module introduces the principles of finger splicing for conveyor belts.

Finger splicing is a joining method where both belt ends are cut into matching “fingers” that interlock and are bonded together. The joint may then be cured, pressed or bonded depending on the belt type, splice system and manufacturer instructions.

Finger splices are often used where a smooth, flexible joint is required. They are commonly seen on lighter-duty belts, PVC belts, PU belts, food belts, package handling belts and some specialist belt types. In some cases, finger splicing may also be used on selected rubber or fabric belts where the belt design and splice system allow it.

Finger splicing requires accurate marking, careful cutting, clean preparation, good alignment and the correct bonding method. Poorly cut fingers, contamination, trapped air, wrong materials or incorrect curing can all lead to early splice failure.

This module is designed for engineers, fitters, belt technicians, maintenance teams, apprentices, supervisors and companies wanting to improve in-house conveyor belt splicing knowledge.

This module can be used as a classroom training guide, toolbox talk, apprentice handout or self-training document.

Important Safety and Training Notice

This module is for general training and awareness only.

Finger splicing should only be carried out by competent and trained people using the correct equipment, materials and method for the belt being joined.

Always follow:

- Site safety rules
- Risk assessments
- Method statements
- Permit-to-work systems
- Lock-off and isolation procedures
- Belt manufacturer instructions
- Splice material supplier instructions
- Press manufacturer instructions
- Adhesive or bonding system instructions
- Temperature, pressure and cure-time guidance for the specific belt and material system
- Electrical safety requirements
- Knife and cutting tool safety rules
- Company procedures
- Local health and safety requirements

Do not use a generic training guide as the only instruction for a live finger splice.

If you are unsure, stop and ask a competent supervisor.

Learning Objectives

By the end of this module, the learner should be able to:

1. Understand what a finger splice is.
2. Understand where finger splices may be used.
3. Explain the difference between finger splicing and stepped splicing.
4. Understand why accurate marking and cutting are critical.

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5. Understand the importance of finger length, width, pitch and alignment.
6. Understand the basic preparation sequence for a finger splice.
7. Understand why clean, dry and contamination-free surfaces are essential.
8. Understand the purpose of bonding films, adhesives, tie materials or uncured materials.
9. Understand the basic press, cure, cooling and finishing stages.
10. Recognise common causes of finger splice failure.
11. Complete a basic finger splice checklist.

1. What Is a Finger Splice?

A finger splice is a belt joining method where both belt ends are cut into matching fingers. The fingers from one belt end fit into the spaces between the fingers on the other belt end.

The joint is then bonded together using the correct materials and process for the belt type.

Depending on the belt and splice system, the splice may be:

- Heat pressed
- Cold bonded
- Hot vulcanised
- Thermoplastic welded
- Bonded using film, adhesive or rubber materials

The correct method depends on the belt construction and manufacturer guidance.

2. Why Finger Splicing Is Used

Finger splicing is used because it can create a smooth, flexible and low-profile joint.

It may be useful where:

- A smooth joint is required.
- Mechanical fasteners are not suitable.
- The belt runs over small pulleys.
- The belt runs at higher speed.
- Product transfer needs to be smooth.
- Scrapers, guides or product contact areas cannot tolerate metal fasteners.
- The belt is light-duty or thermoplastic.
- Hygiene or food processing requirements make mechanical fasteners unsuitable.
- Noise from a mechanical joint needs to be avoided.
- A flexible joint is required.

Finger splicing is common on many PVC, PU, light-duty and process conveyor belts.

3. Finger Splice vs Stepped Splice

A stepped splice normally overlaps fabric plies in steps. It is commonly used on multi-ply rubber fabric belts.

A finger splice uses interlocking fingers cut into both belt ends.

The main difference is:

- Stepped splice: plies overlap in layers.
- Finger splice: belt ends interlock in a finger pattern.

Finger splices can be very smooth and flexible, but they require accurate cutting and correct bonding.

The correct splice method depends on belt type, belt strength, pulley size, conveyor duty and manufacturer recommendations.

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4. When Finger Splicing May Be Suitable

Finger splicing may be suitable for:

- PVC belts
- PU belts
- Light-duty belts
- Food belts
- Package handling belts
- Process belts
- Airport and logistics belts
- Light incline belts
- Belts running over small pulleys
- Belts needing smooth transfer
- Certain specialist belts approved for finger splicing

Finger splicing may not be suitable for every heavy-duty rubber conveyor belt.

Before selecting finger splicing, always check the belt manufacturer's splice recommendation.

5. Limits of Finger Splicing

Finger splicing has limitations.

It may not be suitable if:

- The belt is too damaged.
- The belt is badly contaminated.
- The belt type is unknown.
- The belt is too heavy-duty for the method.
- The splice pattern is not suitable.
- The fingers cannot be cut accurately.
- The correct press is not available.
- The correct bonding materials are not available.
- The working area cannot be kept clean and dry.
- The team is not trained.
- The conveyor duty requires a different splice method.
- The manufacturer does not approve finger splicing for that belt.

A finger splice that is not suitable for the belt may fail quickly.

6. Main Parts of a Finger Splice

A finger splice may include:

Belt Ends

The two ends of the belt that will be joined.

Fingers

The tapered or shaped sections cut into each belt end.

Finger Root

The base of each finger where it meets the main belt body.

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Finger Tip

The end of each finger.

Finger Pitch

The distance between fingers.

Finger Length

The full length of each finger.

Bonding Material

This may be adhesive, bonding film, thermoplastic film, tie gum, skim rubber or other approved splice material.

Pressed Joint Area

The area covered by the press during bonding or curing.

7. Finger Length and Pattern

Finger length and finger pattern must follow the belt and splice specification.

The finger design may depend on:

- Belt type
- Belt thickness
- Belt strength
- Belt material
- Pulley diameter
- Conveyor duty
- Belt speed
- Manufacturer guidance
- Splice equipment available

Do not guess finger size.

If the fingers are too short, the splice may be weak.

If the fingers are too narrow, they may tear.

If the fingers are poorly matched, the splice may not align correctly.

8. Single Finger and Double Finger Splices

Finger splices may be designed in different ways.

Single Finger Splice

A single finger splice uses one interlocking finger pattern between the two belt ends.

It may be used on some lighter-duty belts or where the approved method allows it.

Double Finger Splice

A double finger splice uses two layers or two sets of interlocking finger patterns, depending on belt type and splice design.

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It may provide increased strength or flexibility for certain belts.

The correct style must follow the belt manufacturer or splice system recommendation.

9. Splice Planning

Before starting a finger splice, plan the job properly.

Check:

- Belt type
- Belt width
- Belt thickness
- Belt material
- Belt rating if known
- Existing splice type
- Pulley diameter
- Conveyor duty
- Finger splice suitability
- Finger length
- Finger pitch
- Splice pattern
- Press size
- Press temperature range
- Press pressure capability
- Bonding materials
- Shelf life of materials
- Working conditions
- Cleanliness
- Power supply
- Cooling requirements if applicable
- Competence of the person completing the splice

Do not start cutting until the splice pattern and method are confirmed.

10. Work Area Setup

A finger splice needs a clean and controlled work area.

Check:

- Conveyor is isolated and locked off.
- Belt is clamped and supported.
- Stored energy is controlled.
- Work area is clean.
- Lighting is suitable.
- Tools are organised.
- Cutting surface is stable.
- Splice materials are clean and dry.
- Press can be positioned correctly.
- Power supply is suitable.
- Cables are routed safely.
- Dust, moisture and contamination are controlled.
- No one is in the line of belt tension.

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Finger splicing is accuracy work. A poor working area leads to poor results.

11. Tools and Equipment Required

A finger splice may require:

- Tape measure
- Steel rule
- Straight edge
- Belt square
- Finger splice template
- Marker or chalk
- Cutting board or safe cutting surface
- Belt knife
- Hook knife
- Skiving knife
- Spare blades
- Blade disposal container
- Belt clamps
- Hand roller
- Stitcher roller
- Buffing tool where required
- Cleaning cloths
- Approved solvent where required
- Bonding film or adhesive
- Tie gum, skim rubber or approved splice material where required
- Release paper or silicone cloth
- Press platens
- Press control box
- Temperature probes
- Power cables
- Cooling method if required
- PPE

The exact equipment depends on the belt and splice system.

12. Inspecting the Belt Before Finger Splicing

Before marking or cutting, inspect the belt.

Check:

- Belt type
- Belt thickness
- Belt surface condition
- Belt edge condition
- Existing splice condition
- Ply or fabric condition if visible
- Oil contamination
- Grease contamination
- Moisture
- Product contamination
- Heat damage

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- Cracking
- Delamination
- Wear
- Holes or tears

If the belt is badly damaged, contaminated or worn, a finger splice may not be reliable.

13. Marking the Finger Splice

Marking must be accurate.

Before marking:

- Confirm the splice pattern.
- Confirm finger length.
- Confirm finger width or pitch.
- Confirm the belt centre line.
- Confirm belt end alignment.
- Use a proper template where available.
- Check the pattern before cutting.

The fingers on both belt ends must match.

Poor marking can cause gaps, overlaps, weak fingers or misalignment.

14. Using a Finger Template

A finger template helps mark consistent fingers.

Templates may be:

- Metal
- Plastic
- Printed
- Laser cut
- Manufacturer supplied
- Workshop made to an approved pattern

A template helps control:

- Finger length
- Finger width
- Finger pitch
- Finger angle
- Finger shape
- Repeat accuracy

The template must match the belt and splice specification.

Do not use an unknown template without confirming it is suitable.

15. Cutting the Fingers

Cutting the fingers is one of the most important parts of the splice.

Before cutting:

- Confirm the conveyor is isolated and locked off.
- Confirm belt tension is controlled.

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- Confirm the belt is clamped.
- Check the marking.
- Use a sharp blade.
- Use a safe cutting surface.
- Keep hands out of the cutting line.
- Cut with controlled pressure.
- Do not rush.
- Keep the blade upright where required.
- Avoid tearing the belt.
- Avoid cutting beyond the marked root line.

Poor finger cutting can weaken the splice.

16. Finger Root Quality

The finger root is the base of the finger.

The root area is important because stress can concentrate there.

Poor root quality may include:

- Over-cutting past the root
- Sharp cuts into the belt body
- Tearing
- Ragged edges
- Uneven cut depth
- Cuts that do not match the template
- Damaged fabric or reinforcement

Some splice designs may require a rounded or controlled root shape to reduce stress.

Follow the approved splice method.

17. Dry Fitting the Fingers

Before applying bonding material, the two belt ends should be checked together.

This is often called dry fitting.

Check:

- Fingers interlock correctly.
- No fingers are missing.
- No fingers are twisted.
- No gaps are excessive.
- Belt edges align.
- Centre lines align.
- Joint is flat.
- No finger overlaps incorrectly.
- No finger is too long or too short.
- Belt is not stretched or forced into position.

Dry fitting helps find problems before bonding starts.

18. Surface Preparation

The amount of surface preparation depends on the belt and splice system.

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Preparation may include:

- Light buffing
- Cleaning
- Removing gloss
- Removing loose material
- Preparing fabric or backing
- Applying primer
- Applying bonding film
- Applying adhesive
- Preparing thermoplastic surfaces
- Keeping surfaces clean and dry

Do not over-buff or damage the belt.

Do not touch prepared surfaces with dirty gloves.

19. Cleaning the Fingers

The finger area must be clean before bonding.

Check for:

- Dust
- Moisture
- Oil
- Grease
- Cutting debris
- Loose fibres
- Loose rubber
- Dirty glove marks
- Dirty tools
- Product residue

Use only the cleaning method approved for the belt and splice material.

Allow surfaces to dry before bonding.

20. Applying Bonding Material

Bonding material depends on the belt and splice system.

It may include:

- Adhesive
- Primer
- Bonding film
- Thermoplastic film
- Tie gum
- Skim rubber
- Uncured rubber
- Cover material
- Other approved splice material

Before applying:

- Check the product is correct.

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- Check shelf life.
- Follow application instructions.
- Keep material clean.
- Cut material accurately.
- Avoid wrinkles.
- Avoid trapped air.
- Avoid touching bonding surfaces.
- Apply evenly.
- Follow drying or open-time requirements where applicable.

Wrong material or poor application can cause splice failure.

21. Aligning and Closing the Splice

When the bonding materials are ready, the belt ends are brought together.

Check:

- Centre lines align.
- Belt edges align.
- Fingers interlock correctly.
- No fingers are folded.
- No fingers are trapped.
- No bonding material has moved.
- No contamination has entered.
- The joint is flat.
- No excessive gaps are present.
- No excessive overlap is present.

Use hand rollers or stitcher rollers where required to improve contact and remove trapped air.

22. Removing Trapped Air

Trapped air can create weak areas in the splice.

Air may be trapped between:

- Fingers
- Bonding film
- Adhesive layers
- Rubber layers
- Belt surfaces
- Cover materials

Use a hand roller or stitcher roller where required.

Roll from the centre outwards where suitable.

Do not trap wrinkles or folded fingers.

23. Press Setup for Finger Splicing

A finger splice normally requires a suitable press.

The press must match the belt and splice system.

Check:

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- Platen length
- Platen width
- Temperature capability
- Pressure capability
- Control box
- Temperature probes
- Power supply
- Cables
- Surface condition
- Release materials
- Cooling if required
- Press alignment over the splice

The press must apply even heat and pressure across the full finger splice area.

24. Temperature, Pressure and Time

Temperature, pressure and time must follow the belt and splice material specification.

There is no single universal setting for all finger splices.

The correct settings depend on:

- Belt material
- Belt thickness
- Belt construction
- Bonding system
- Press type
- Manufacturer instructions
- Site conditions

Do not guess settings.

Incorrect temperature, pressure or time can cause:

- Weak bonding
- Belt damage
- Melt damage
- Poor cure
- Blisters
- Surface marks
- Delamination
- Early failure

25. Curing, Pressing or Bonding Stage

During the pressing or curing stage:

- Maintain correct temperature.
- Maintain correct pressure.
- Follow correct time.
- Do not disturb the press.
- Keep the area controlled.
- Watch for abnormal issues.
- Keep unauthorised people away.

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- Follow the approved procedure.

The joint must be allowed to bond properly before handling.

26. Cooling the Splice

Cooling may be required before the press is opened or the belt is handled.

Opening or moving the splice too early can cause:

- Distortion
- Weak bonding
- Finger movement
- Surface damage
- Blisters
- Edge opening
- Poor finish

Follow the press and belt manufacturer’s cooling instructions.

27. Removing the Press and Release Materials

After cooling, remove the press carefully.

Check:

- Pressure has been released safely.
- Press parts are safe to handle.
- Hot surfaces are controlled.
- Release paper or cloth is removed carefully.
- The splice surface is not damaged.
- Cables and press parts are controlled.
- No dirt is dragged over the splice.

Press parts may be heavy and hot.

28. Trimming and Finishing

After pressing, the splice should be inspected and finished.

This may include:

- Removing release material
- Trimming excess material
- Checking belt edges
- Checking surface finish
- Checking finger outline
- Checking for blisters
- Checking for voids
- Checking for open fingers
- Checking for high spots
- Checking for low spots
- Checking joint flexibility

Do not cut into the splice when trimming.

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29. Final Finger Splice Inspection

Before returning the belt to service, inspect the splice.

Check:

- Fingers are fully bonded.
- No fingers are lifting.
- No open edges.
- No blisters.
- No visible voids.
- No contamination.
- No excessive high spots.
- No excessive low spots.
- Belt edges align.
- Centre line alignment is correct.
- Splice is flexible.
- Splice thickness is acceptable.
- Surface finish is acceptable.
- Tools and materials are removed.
- Guards are refitted.

If there is a serious defect, do not restart until it has been assessed.

30. Restarting the Conveyor

Restart must be controlled.

Before restart:

- Remove tools and materials.
- Refit guards.
- Remove waste and offcuts.
- Confirm everyone is clear.
- Follow site restart procedure.
- Run slowly or jog where possible.
- Watch the splice pass over pulleys.
- Check belt tracking.
- Check scraper or guide contact.
- Check transfer points.
- Check for unusual noise.
- Recheck after running under load.

Do not leave a new finger splice unchecked.

31. Common Causes of Finger Splice Failure

Common causes include:

- Wrong splice method
- Wrong finger pattern
- Fingers too short
- Fingers too narrow
- Poor cutting
- Over-cut finger roots

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- Poor alignment
- Contamination
- Moisture
- Dust
- Oil or grease
- Wrong bonding material
- Expired material
- Trapped air
- Poor rolling
- Incorrect temperature
- Incorrect pressure
- Incorrect pressing time
- Poor cooling
- Belt moved too early
- Belt unsuitable for finger splicing
- Pulley diameter too small
- Scraper, guide or transfer point catching the splice
- Conveyor tracking problem

32. Finger Splice Record

A finger splice should be recorded.

Record:

- Date
- Customer or site
- Conveyor number
- Technician name
- Belt width
- Belt type
- Belt thickness
- Belt material
- Splice pattern
- Finger length
- Finger pitch if required
- Bonding material used
- Material batch numbers if available
- Press used
- Temperature setting
- Pressure setting
- Pressing or cure time
- Cooling method
- Final inspection result
- Photos before and after
- Any follow-up action required

A splice record helps with quality control, future maintenance and training.

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Practical Exercise

Use a belt sample, finger splice drawing, workshop demonstration or training photograph and complete the following exercise.

1. Identify the Belt Type

Your answer:

_____

_____

_____

2. Decide Whether Finger Splicing Is Suitable

Your answer:

_____

_____

_____

3. Mark the Belt Centre Line

Your answer:

_____

_____

_____

4. Select the Finger Pattern

Your answer:

_____

_____

_____

5. Mark the Fingers

Your answer:

_____

_____

_____

6. Dry Fit the Belt Ends

Your answer:

_____

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_____

_____

7. Inspect the Prepared Surface

Your answer:

_____

_____

_____

8. Apply Bonding Material

Your answer:

_____

_____

_____

9. Check the Press Setup

Your answer:

_____

_____

_____

10. Complete the Final Inspection

Your answer:

_____

_____

_____

Knowledge Check

Question 1

What is a finger splice?

Your answer: _____

_____

Question 2

Why is finger splicing used?

Your answer: _____

_____

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Question 3

Name three belt types where finger splicing may be used.

Your answer: _____

_____

Question 4

What is the difference between a finger splice and a stepped splice?

Your answer: _____

_____

Question 5

Why must the finger pattern follow approved guidance?

Your answer: _____

_____

Question 6

Why is accurate cutting important?

Your answer: _____

_____

Question 7

What is the finger root?

Your answer: _____

_____

Question 8

Why is dry fitting useful?

Your answer: _____

_____

Question 9

Why must the finger area be clean and dry?

Your answer: _____

_____

Question 10

Can the same temperature, pressure and time be used for every finger splice?

Your answer: _____

_____

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Question 11

Why is cooling important?

Your answer: _____

_____

Question 12

Name three causes of finger splice failure.

Your answer: _____

_____

Self-Assessment

Tick each statement once you understand it.

- I understand what a finger splice is.
- I understand where finger splicing may be used.
- I understand that finger splicing is not suitable for every belt.
- I understand the difference between finger splicing and stepped splicing.
- I understand why the finger pattern must follow approved guidance.
- I understand why accurate marking is important.
- I understand why accurate cutting is important.
- I understand why finger roots must not be over-cut.
- I understand why dry fitting is useful.
- I understand why the splice area must be clean and dry.
- I understand why bonding material must be correct and in date.
- I understand why trapped air must be removed.
- I understand why press settings must not be guessed.
- I understand why the splice must cool before handling.
- I understand why final inspection and restart monitoring are required.

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