ACADEMY / TECHNICAL TRAINING SERIES

BELT PREPARATION & SURFACE CLEANING

MODULE 05 / STUDENT TRAINING WORKBOOK

LEARNER NAME _____

DATE _____ TRAINER / ASSESSOR _____

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TRAINING SCOPE Theory learning does not demonstrate practical competence. All live belt work, power tools, chemicals and preparation activities require appropriate authorisation, controls and supervised practical assessment.

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Module Overview

This module explains how to prepare and clean a conveyor belt before splicing, repairing, cold bonding or hot vulcanising.

Good belt preparation is one of the most important parts of conveyor belt work. A splice or repair can only be as good as the surface it is bonded to. If the belt is dirty, wet, oily, over-buffed, under-buffed, contaminated or incorrectly prepared, the splice or repair may fail early.

Many splice failures are not caused by the press, adhesive or rubber. They are caused by poor preparation.

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

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

Important Safety Notice

This module is for general training and awareness only.

Always follow:

- Site safety rules
- Risk assessments
- Method statements
- Permit-to-work systems
- Lock-off and isolation procedures
- Manufacturer instructions
- Adhesive and solvent safety data sheets
- Vulcanising material instructions
- Company procedures
- Local health and safety requirements

No person should carry out belt preparation, cleaning, buffing, solvent use, adhesive application or vulcanising work unless they are competent, authorised and trained for the task.

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 why belt preparation is critical to splice and repair quality.
2. Identify common causes of contamination.
3. Prepare a clean working area before belt work starts.
4. Understand the difference between cleaning, buffing and preparation.
5. Understand how to avoid damaging the belt carcass or plies.
6. Explain why moisture, dust, oil and grease can cause bonding failure.
7. Understand basic solvent and cleaning safety.
8. Recognise over-buffing and under-buffing problems.
9. Complete a basic belt preparation checklist.
10. Know when a belt surface is not suitable for splicing or repair.

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1. Why Belt Preparation Matters

Belt preparation is the foundation of a good splice or repair.

Before any belt can be joined or repaired, the surface must be suitable for bonding. This normally means the belt must be:

- Clean
- Dry
- Correctly marked
- Correctly cut
- Correctly buffed or prepared
- Free from oil and grease
- Free from loose rubber
- Free from dust
- Free from moisture
- Free from trapped dirt
- Protected from contamination

A strong splice depends on good contact between the prepared belt surface and the splice materials.

If the surface is poorly prepared, the joint may look acceptable at first but fail later under load, heat, movement or tension.

2. Common Causes of Poor Bonding

Poor bonding can be caused by many factors.

Common causes include:

- Oil contamination
- Grease contamination
- Water or moisture
- Dust
- Mud
- Loose rubber
- Over-buffed surfaces
- Under-buffed surfaces
- Damaged fabric plies
- Incorrect solvent use
- Incorrect adhesive or cement
- Expired materials
- Wrong splice material
- Poor drying time
- Cold or damp working conditions
- Poor pressure during bonding
- Incorrect temperature during vulcanising
- Handling prepared surfaces with dirty gloves
- Leaving prepared surfaces exposed too long

Good preparation reduces the risk of failure.

3. Preparing the Working Area

Before belt preparation starts, the work area should be made safe, clean and organised.

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Check:

- Conveyor is isolated and locked off.
- Stored energy is controlled.
- Belt is clamped and supported.
- Work area is clean.
- Lighting is suitable.
- Weather protection is available if outside.
- Tools are organised.
- Knives and blades are controlled.
- Grinding dust can be controlled.
- Solvents and adhesives are stored safely.
- Splice materials are kept clean and dry.
- No material can fall onto the splice area.
- The belt is protected from mud, water and contamination.

Do not prepare a splice area directly on dirty ground if it can be avoided. Use clean boards, covers or a suitable working platform.

4. Inspecting the Belt Before Preparation

Before cutting or cleaning the belt, inspect it carefully.

Check for:

- Belt type
- Belt rating
- Number of plies
- Belt thickness
- Cover condition
- Edge damage
- Previous repairs
- Previous splice quality
- Oil or chemical damage
- Heat damage
- Ply separation
- Cracks
- Cuts
- Gouges
- Wear
- Belt hardness or brittleness
- Trapped material
- Contamination

A belt that is badly damaged may need more than a simple repair or splice. In some cases, belt replacement may be safer and more reliable.

5. Cleaning Before Marking

The belt should be cleaned enough to allow accurate marking and inspection.

Initial cleaning may include:

- Removing loose material
- Brushing away dirt

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- Scraping off build-up
- Wiping dry surfaces
- Removing trapped material
- Cleaning around the splice area
- Cleaning the underside if required

Do not spread oil, grease or mud across the splice area.

If the belt is wet, allow it to dry where possible before marking and preparation.

6. Marking the Preparation Area

Before cutting, buffing or removing covers, the preparation area must be marked clearly.

Mark:

- Belt centre line
- Cut line
- Bias angle if required
- Splice length
- Step lengths
- Cover removal area
- Repair area
- Trim lines
- Edge lines
- Alignment marks

Check the measurements before cutting.

A common rule is:

Measure twice, cut once.

Poor marking can lead to poor alignment, wasted belt and splice failure.

7. Removing Loose Rubber and Damaged Material

Before bonding or vulcanising, remove loose, damaged or weakened rubber.

This may include:

- Loose top cover
- Split rubber
- Frayed edges
- Damaged repair material
- Old adhesive
- Contaminated rubber
- Burnt rubber
- Delaminated material
- Damaged skim rubber

Only remove what needs to be removed. Do not damage sound belt material unnecessarily.

If the damage reaches the belt carcass or plies, the repair method may need to be changed.

8. Buffing the Belt Surface

Buffing prepares the belt surface for bonding.

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The purpose of buffing is to:

- Remove surface contamination
- Remove glossy rubber surface
- Create a suitable bonding texture
- Prepare the surface for adhesive, cement or uncured rubber
- Improve contact between materials

Buffing should be controlled and even.

Do not:

- Burn the rubber
- Polish the surface smooth
- Cut into the fabric plies
- Overheat the belt
- Leave loose dust
- Remove too much material
- Damage the carcass
- Create deep grooves

The prepared surface should normally look clean, even and freshly prepared.

9. Over-Buffing

Over-buffing means removing too much material or damaging the belt.

Over-buffing can cause:

- Exposed fabric damage
- Weak plies
- Uneven splice thickness
- Reduced belt strength
- Poor bonding
- Burnt rubber
- Deep grooves
- Early splice failure

Over-buffing is often caused by too much pressure, the wrong tool, poor technique or rushing.

10. Under-Buffing

Under-buffing means the belt surface has not been prepared enough.

Under-buffing can leave:

- Glossy rubber
- Dirt
- Oxidised surface
- Old adhesive
- Loose material
- Poor bonding texture
- Contamination

A surface that has not been prepared properly may not bond correctly.

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11. Protecting the Belt Plies

The plies are the strength layers inside a fabric conveyor belt.

During preparation, the plies must be protected.

Avoid:

- Cutting into the fabric
- Tearing plies
- Over-buffing fabric
- Contaminating exposed ply surfaces
- Pulling plies unevenly
- Leaving loose cords or threads
- Damaging step edges

If a ply is damaged during preparation, stop and assess the damage before continuing.

12. Cleaning After Buffing

After buffing, loose dust and particles must be removed.

This may include:

- Brushing
- Vacuuming where suitable
- Wiping with clean cloths
- Using approved cleaning methods
- Keeping the area protected from fresh contamination

Do not blow dust into the splice area unless the method is approved and controlled.

Do not touch prepared surfaces with dirty gloves or oily hands.

A prepared surface can easily become contaminated again.

13. Solvent Cleaning

Approved solvents may be used as part of belt preparation, depending on the belt type, material system and procedure.

Always follow:

- Safety data sheet
- Manufacturer instructions
- Site rules
- Ventilation requirements
- Fire precautions
- PPE requirements

Basic solvent safety:

- Use only approved solvent.
- Keep containers closed.
- Keep away from sparks, flames and hot surfaces.
- Use in a ventilated area.
- Wear suitable gloves and eye protection.
- Do not smoke.
- Do not soak the belt.

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- Allow the surface to dry properly.
- Dispose of cloths safely.

Incorrect solvent use can cause safety risks and bonding problems.

14. Wiping Technique

When wiping a prepared surface, use clean cloths and controlled movement.

Good practice includes:

- Use clean, lint-free cloths where possible.
- Do not use oily or dirty rags.
- Wipe in one direction where suitable.
- Do not spread contamination around.
- Change cloths when dirty.
- Allow the surface to dry.
- Protect the surface after cleaning.

A dirty cloth can contaminate the surface again.

15. Moisture and Dryness

Moisture is a major cause of poor bonding.

Moisture may come from:

- Rain
- Wet belt
- Condensation
- Damp ground
- High humidity
- Washing water
- Wet material
- Cooling water leaks
- Wet tools or cloths

The splice area should be dry before bonding or vulcanising.

If the belt is damp, stop and dry the area properly before continuing.

16. Dust and Dirt Control

Dust and dirt can contaminate the splice area.

Common sources include:

- Quarry dust
- Recycling fines
- Sand
- Cement dust
- Wood dust
- Belt dust from buffing
- Dirty gloves
- Dirty tools
- Dirty ground
- Falling material

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Control dust by:

- Cleaning the area before work
- Using clean boards or covers
- Keeping splice materials covered
- Cleaning tools
- Removing dust after buffing
- Avoiding unnecessary movement over the splice area
- Protecting the work from wind

17. Oil, Grease and Chemical Contamination

Oil, grease and chemicals can be very difficult to remove from conveyor belt rubber.

Contamination may come from:

- Leaking gearboxes
- Leaking bearings
- Hydraulic oil
- Grease
- Fuel
- Process material
- Cleaning products
- Dirty tools
- Used gloves
- Contaminated cloths

If oil or chemical contamination has soaked into the belt, normal cleaning may not be enough.

The belt may need specialist assessment or replacement.

18. Adhesive, Primer and Cement Preparation

Some splice and repair systems use adhesives, primers or cements.

Before use, check:

- Correct product
- Shelf life
- Mixing instructions
- Application instructions
- Drying time
- Temperature requirements
- Surface preparation requirements
- Ventilation requirements
- PPE requirements

Do not mix products unless the system requires it.

Do not use expired or unknown adhesives.

Do not apply adhesive to a dirty or wet surface.

19. Material Storage and Handling

Splice and repair materials must be kept clean and protected.

Materials may include:

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- Uncured cover rubber
- Tie gum
- Skim rubber
- Breaker fabric
- Edge rubber
- Repair patches
- Adhesive
- Primer
- Cement
- Release cloth
- Silicone paper
- Cleaning cloths

Store materials:

- Clean
- Dry
- Covered
- Away from dust
- Away from direct sunlight if required
- Away from heat if required
- Within shelf life
- In original packaging where possible

Do not place clean splice materials directly onto dirty floors, wet ground or contaminated belt surfaces.

20. Preparing Repair Areas

For belt repairs, the damaged area must be prepared properly.

This may include:

- Marking the repair area
- Cutting away loose rubber
- Tapering the edges
- Buffing the surface
- Cleaning the area
- Checking the carcass
- Selecting the correct repair material
- Applying adhesive or uncured rubber as required
- Rolling out trapped air
- Curing or bonding according to the procedure

A repair should not just cover damage. It should remove weak material and bond to a sound prepared surface.

21. Preparing Splice Areas

For splice work, both belt ends must be prepared correctly.

This may include:

- Marking centre lines
- Marking bias angle
- Marking splice length

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- Removing covers
- Stepping plies
- Buffing prepared areas
- Cleaning dust
- Checking alignment
- Keeping surfaces clean
- Applying correct materials
- Protecting prepared surfaces before building

Both belt ends must match correctly.

Poor preparation on one end can weaken the whole splice.

22. Avoiding Re-Contamination

Once the belt has been prepared, it must be protected.

Avoid:

- Touching prepared surfaces
- Placing tools on prepared areas
- Walking over the belt
- Letting dust settle on the splice
- Leaving the surface uncovered
- Allowing rain or moisture onto the area
- Using dirty gloves
- Using contaminated cloths
- Allowing grinding dust from nearby work

Prepared surfaces should be bonded or built as soon as practical, following the correct procedure.

23. Signs of Poor Preparation

Signs of poor preparation may include:

- Glossy surface left after buffing
- Loose rubber
- Dust on surface
- Oily feel
- Damp surface
- Burnt rubber smell
- Deep buffing grooves
- Exposed or damaged fabric
- Uneven step lengths
- Frayed plies
- Dirty splice materials
- Adhesive not drying correctly
- Poor material contact
- Air trapped under repair material

If the preparation looks wrong, stop and correct it before continuing.

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24. Final Preparation Checklist

Before bonding, building or vulcanising, check:

- Conveyor isolated and locked off
- Belt clamped and supported
- Work area clean and safe
- Belt type confirmed
- Splice or repair area marked
- Damaged material removed
- Surface buffed correctly
- Plies protected
- Dust removed
- Surface dry
- No oil or grease
- No loose rubber
- Materials correct
- Materials clean
- Materials within shelf life
- Adhesive or cement correct
- Press equipment ready if required
- Alignment checked
- Team understands next step

Do not move forward until the preparation is correct.

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Practical Exercise

Use a belt sample, repair sample, training bench, conveyor photograph or controlled workshop area and complete the following exercise.

1. Inspect the Belt Surface

2. Identify Three Possible Contaminants

3. Mark a Repair or Splice Area

4. Explain Why the Belt Must Be Dry

5. Explain the Purpose of Buffing

6. Identify Over-Buffing

7. Identify Under-Buffing

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8. Explain How to Clean After Buffing

9. Check Splice Materials

10. Complete a Final Preparation Check

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Knowledge Check

Question 1

Why is belt preparation important?

Question 2

Name three common causes of poor bonding.

Question 3

Why should the working area be clean before preparation starts?

Question 4

What is the purpose of buffing?

Question 5

What is over-buffing?

Question 6

What is under-buffing?

Question 7

Why must belt plies be protected?

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Question 8

Why must dust be removed after buffing?

Question 9

Why is moisture a problem during belt preparation?

Question 10

Why are oil and grease difficult problems?

Question 11

Why should adhesives and cements be checked before use?

Question 12

What should you do if the prepared surface becomes contaminated?

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Self-Assessment

Tick each statement once you understand it.

- I understand why belt preparation affects splice quality.
- I can identify common contaminants.
- I understand why the work area must be clean.
- I understand why the belt must be dry.
- I understand the purpose of buffing.
- I understand the difference between over-buffing and under-buffing.
- I understand why belt plies must be protected.
- I understand why dust must be removed after buffing.
- I understand basic solvent safety.
- I understand why adhesives and materials must be checked.
- I understand why prepared surfaces must not be touched or contaminated.
- I can complete a final preparation checklist before bonding or vulcanising.

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