ACADEMY / TECHNICAL TRAINING SERIES

STEEL CORD SPLICING

MODULE 09 / ASSESSOR GUIDE & ANSWER KEY

LEARNER NAME _____

DATE _____ TRAINER / ASSESSOR _____

ONLINE TRAINING / VIDEO LINK _____

TRAINING SCOPE Theory and awareness only. Steel cord splicing requires specialist competence, approved drawings, site-specific controls and manufacturer instructions.

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Module Overview

This module introduces the principles of steel cord conveyor belt splicing.

Steel cord belts are used on high-tension, long-distance and heavy-duty conveyor systems. Unlike fabric belts, the main strength members are steel cords running lengthways through the belt. These cords carry the belt tension and must be prepared, positioned, aligned and bonded correctly during splicing.

Steel cord splicing is specialist work. It requires the correct belt information, splice drawing, cord layout, materials, equipment, press size, temperature, pressure, cure time, safety controls and experienced supervision.

This module is designed as an awareness and foundation training module. It helps learners understand what steel cord splicing involves, why it is different from fabric belt splicing, and why correct procedure is critical.

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.

Steel cord splicing should only be carried out by competent, trained and experienced personnel using the correct approved splice drawing and manufacturer procedure for the specific belt.

Always follow:

- Site safety rules
- Risk assessments
- Method statements
- Permit-to-work systems
- Isolation and lock-off procedures
- Belt manufacturer splice instructions
- Splice material supplier instructions
- Vulcanising press manufacturer instructions
- Approved steel cord splice layout
- Electrical safety requirements
- Lifting and manual handling procedures
- Company procedures
- Local health and safety requirements

Do not use a generic training guide as the only instruction for a live steel cord 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. 1. Understand what a steel cord conveyor belt is.
2. 2. Explain why steel cord belts are used.
3. 3. Understand the difference between steel cord and fabric belt splicing.
4. 4. Identify the main parts of a steel cord belt.
5. 5. Understand why the splice drawing and cord layout are critical.
6. 6. Understand the importance of cord stripping, cleaning and alignment.
7. 7. Understand why contamination, moisture and poor preparation can cause failure.
8. 8. Understand the basic sequence of steel cord splice preparation and build-up.
9. 9. Understand the importance of correct materials, press setup, curing and cooling.
10. 10. Recognise common causes of steel cord splice failure.

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11. 11. Complete a basic steel cord splice awareness checklist.

1. What Is a Steel Cord Conveyor Belt?

A steel cord conveyor belt is a conveyor belt that uses steel cords as the main tensile strength member.

Instead of fabric plies, steel cords run lengthways through the belt. These cords carry the pulling load and allow the belt to operate on longer, heavier or higher-tension conveyor systems.

A steel cord belt normally includes:

- Top cover rubber
- Bottom cover rubber
- Steel cords
- Core rubber
- Edge rubber
- Breaker fabric or reinforcement where fitted
- Adhesion layers around the cords

Steel cord belts are usually used where a fabric belt would not provide enough strength or would stretch too much.

Model Answer / Trainer Reference

A steel cord conveyor belt uses steel cords as the main strength member instead of fabric plies. The steel cords carry the belt tension and allow the belt to work on heavy-duty or long conveyor systems.

2. Why Steel Cord Belts Are Used

Steel cord belts are used where high strength and low stretch are required.

They may be used on:

- Long overland conveyors
- Mining conveyors
- Quarry conveyors
- Port conveyors
- Power station conveyors
- Heavy bulk material systems
- High-tension conveyors
- High-capacity conveyors
- Long centre-distance conveyors
- Steep or demanding applications

Steel cord belts can carry high loads over long distances with less stretch than fabric belts.

However, they are usually more expensive, heavier and require more specialist splicing.

Model Answer / Trainer Reference

Steel cord belts are used because they provide high strength and low stretch, making them suitable for long, heavy-duty and high-tension conveyor systems.

3. Steel Cord Belt vs Fabric Belt

A fabric belt uses fabric plies to provide strength.

A steel cord belt uses steel cords to provide strength.

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The main differences are:

Fabric Belt

- Uses fabric plies
- Usually spliced by stepped ply overlap or other approved methods
- More flexible in many general applications
- Common on quarry, recycling and general conveyors
- Usually lower tension than steel cord belts

Steel Cord Belt

- Uses steel cords
- Requires cord layout and overlap pattern
- Needs specialist stripping and cord preparation
- Requires accurate cord alignment
- Used on high-tension and long-distance conveyors
- Requires specialist splice materials and press setup

Steel cord splicing is more complex because each cord must be positioned correctly.

Model Answer / Trainer Reference

A fabric belt gets its strength from fabric plies. A steel cord belt gets its strength from steel cords. Steel cord splicing is more specialist because the cords must be stripped, cleaned, laid out and aligned correctly.

4. Main Parts of a Steel Cord Belt

A steel cord belt may include the following parts.

Top Cover

The rubber layer on the carrying side of the belt. It protects the cords from material impact, wear and environmental damage.

Bottom Cover

The rubber layer on the pulley side of the belt. It protects the cords and provides the running surface over pulleys and rollers.

Steel Cords

The main tensile strength members running along the belt length.

Core Rubber

The rubber surrounding and bonding the steel cords inside the belt.

Edge Rubber

The rubber at the belt edges. It helps protect the cords from moisture and damage.

Breaker Fabric or Reinforcement

Some belts may include additional fabric reinforcement or breaker layers to improve impact or rip resistance.

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Model Answer / Trainer Reference

The main parts of a steel cord belt are the top cover, bottom cover, steel cords, core rubber, edge rubber and any breaker fabric or additional reinforcement fitted in the belt.

5. Steel Cord Belt Ratings

Steel cord belts are often rated by strength.

Examples may include:

- ST500
- ST800
- ST1000
- ST1250
- ST1600
- ST2000
- ST2500
- ST3150
- ST4000

The ST rating normally relates to belt tensile strength.

A higher ST rating usually means a stronger belt, but the correct belt must still suit the conveyor, pulley diameters, take-up system, material, speed and working conditions.

The splice design must match the belt rating and manufacturer guidance.

Model Answer / Trainer Reference

Steel cord belts are often marked with an ST rating, such as ST1000 or ST2000. The rating relates to belt strength, and the splice design must match the belt rating.

6. Why Steel Cord Splicing Is Specialist Work

Steel cord splicing is specialist work because the splice must transfer high belt tension through individual steel cords.

The splicer must control:

- Splice length
- Cord overlap
- Cord layout
- Cord pitch
- Cord stripping
- Cord cleaning
- Cord alignment
- Cord spacing
- Rubber build-up
- Edge sealing
- Press pressure
- Temperature
- Cure time
- Cooling
- Final inspection

Small mistakes can create serious problems.

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If cords are damaged, misaligned, contaminated or incorrectly overlapped, the splice may be weak.

Model Answer / Trainer Reference

Steel cord splicing is specialist work because the splice must transfer high tension through individual steel cords. Each cord must be prepared, aligned and bonded correctly.

7. Splice Drawing and Cord Layout

A steel cord splice must be built from an approved splice drawing or splice specification.

The drawing may show:

- Splice length
- Cord overlap length
- Cord pitch
- Cord cutting pattern
- Cord arrangement
- Step arrangement
- Cover removal areas
- Rubber layer build-up
- Edge rubber details
- Breaker fabric position if used
- Press area
- Material requirements

The cord layout is critical because the splice strength depends on the correct overlap and arrangement of the cords.

Do not guess cord layout.

Model Answer / Trainer Reference

The splice drawing shows how the steel cords must be cut, positioned, overlapped and built into the splice. It must be followed because the splice strength depends on the cord layout.

8. Splice Length

Steel cord splice length depends on:

- Belt rating
- Cord diameter
- Cord pitch
- Cord construction
- Conveyor tension
- Belt manufacturer guidance
- Splice design
- Safety factor
- Material system
- Site requirements

A steel cord splice is usually much longer than many fabric belt splices.

Do not reduce splice length to save time.

A splice that is too short may not transfer the required tension.

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Model Answer / Trainer Reference

Steel cord splice length depends on belt rating, cord design, conveyor tension and manufacturer guidance. It should never be guessed or shortened without approval.

9. Cord Pitch and Cord Spacing

Cord pitch is the spacing between the steel cords in the belt.

During splicing, the cords must be laid out so they maintain the correct spacing and do not cross, touch incorrectly or become uneven.

Poor cord spacing can cause:

- Uneven load transfer
- Cord movement
- Weak bonding
- Bulges in the splice
- Uneven thickness
- Cord corrosion risk
- Early splice failure

Correct cord spacing is part of the approved splice design.

Model Answer / Trainer Reference

Cord pitch is the spacing between steel cords. Correct spacing is important because uneven cords can create weak areas and uneven load transfer.

10. Work Area Setup

Steel cord splicing requires a clean, safe and controlled working area.

Check:

- Conveyor is isolated and locked off.
- Stored energy is controlled.
- Belt is clamped and supported.
- Take-up is secured.
- Work area is clean.
- Lighting is suitable.
- Access is safe.
- Weather protection is in place.
- Dust and moisture are controlled.
- Tools are organised.
- Lifting plan is in place.
- Press parts can be handled safely.
- Cables are routed safely.
- Materials are clean and dry.
- The splice drawing is available.
- Competent supervision is available.

Steel cord splices can take a long time, so the work area must remain controlled throughout the full job.

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Model Answer / Trainer Reference

The work area must be safe, clean, dry and controlled. Steel cord splicing needs good access, good lighting, correct equipment, clean materials and competent supervision.

11. Tools and Equipment Required

Steel cord splicing may require:

- Tape measures
- Steel rules
- Straight edges
- Belt square
- Chalk line
- Marking tools
- Splice drawing
- Belt knives
- Stripping knives
- Hook knives
- Spare blades
- Blade disposal container
- Cord stripping tools
- Pliers
- Cutters
- Grinders or buffing tools
- Wire brushes where approved
- Cleaning cloths
- Approved solvent
- Belt clamps
- Pulling clamps
- Hand rollers
- Stitcher rollers
- Cord positioning aids
- Edge bars
- Cover rubber
- Core rubber
- Tie gum or bonding rubber
- Breaker fabric where specified
- Release paper or silicone cloth
- Vulcanising press platens
- Press beams
- Pressure system
- Control box
- Temperature probes
- Power cables
- Cooling hoses if required
- PPE
- Lifting equipment

The exact equipment depends on the belt and approved splice system.

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Model Answer / Trainer Reference

Steel cord splicing requires measuring tools, cutting tools, cord preparation tools, cleaning materials, rubber splice materials, belt clamps, rollers, vulcanising press equipment and suitable PPE.

12. Inspecting the Belt Before Splicing

Before preparing the splice, inspect the belt.

Check:

- Belt rating
- Belt width
- Belt thickness
- Cord condition if exposed
- Cover condition
- Edge condition
- Previous splice condition
- Damage
- Corrosion
- Moisture
- Oil contamination
- Grease contamination
- Chemical damage
- Heat damage
- Belt hardening
- Belt cracking
- Rip or impact damage
- Belt tracking damage

If the belt is badly damaged, contaminated or corroded, the splice may not be reliable.

Model Answer / Trainer Reference

The belt must be inspected before splicing to confirm its condition and suitability. Damage, corrosion, contamination or severe wear can affect splice quality.

13. Marking the Steel Cord Splice

Accurate marking is critical.

Mark:

- Belt centre line
- Cut line
- Splice length
- Cord exposure area
- Cover removal area
- Cord cutting layout
- Cord overlap pattern
- Edge build-up areas
- Press area
- Alignment marks

The centre line should be used for alignment because belt edges may be worn or damaged.

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All marks should be checked before cutting.

Model Answer / Trainer Reference

The steel cord splice must be marked accurately so the splice length, cord layout, overlap pattern and belt alignment are correct.

14. Cover Removal

The belt covers must be removed carefully to expose the steel cords in the splice area.

During cover removal:

- Follow the marked lines.
- Use controlled knife work.
- Avoid damaging cords.
- Avoid cutting too deep.
- Remove only the required material.
- Keep the work area clean.
- Protect exposed cords from contamination.
- Avoid moisture entering the splice area.

Damaged cords can reduce splice strength.

Model Answer / Trainer Reference

Cover removal exposes the steel cords for splicing. It must be done carefully so the cords are not cut, kinked, damaged or contaminated.

15. Cord Stripping

Cord stripping is the process of removing rubber from around the steel cords so they can be prepared and laid into the splice.

This is a skilled task.

During cord stripping:

- Follow the approved method.
- Work carefully along the cords.
- Avoid cutting cord wires.
- Avoid kinking cords.
- Avoid pulling cords out of position.
- Avoid damaging the cord surface.
- Keep cords clean.
- Keep cords dry.
- Remove rubber as required by the splice system.

The amount of rubber removed depends on the approved procedure.

Model Answer / Trainer Reference

Cord stripping removes rubber from around the steel cords so they can be prepared for the splice. The cords must not be cut, kinked, damaged or contaminated.

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16. Cord Cleaning and Preparation

Steel cords must be prepared according to the splice system.

Cord preparation may include:

- Removing loose rubber
- Cleaning the cord surface
- Keeping the cords dry
- Removing contamination
- Applying approved bonding material
- Avoiding corrosion
- Keeping cord spacing correct
- Avoiding damage to cord wires

Do not leave exposed cords wet, dirty or open to contamination.

If cords are rusty, oily or damaged, the splice may need specialist assessment.

Model Answer / Trainer Reference

Steel cords must be clean, dry and correctly prepared. Contaminated, rusty or damaged cords may not bond correctly and can weaken the splice.

17. Cord Cutting and Layout

The steel cords are cut and arranged according to the splice drawing.

The layout may include:

- Different cord lengths
- Cord overlap zones
- Alternating cord positions
- Cut-back patterns
- Cord spacing
- Cord grouping
- Edge cord treatment

Cord cutting must be accurate.

Incorrect cord length or layout can weaken the splice.

Do not change the splice pattern unless it has been approved by the belt manufacturer or competent technical authority.

Model Answer / Trainer Reference

The steel cords must be cut and arranged according to the approved splice drawing. Incorrect cord layout can reduce splice strength.

18. Alignment of Belt Ends

Both belt ends must be aligned correctly before the splice is built.

Check:

- Centre lines match.
- Belt edges are even.
- Belt ends are not twisted.

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- Cord layout lines up.
- Belt is not stretched unevenly.
- Belt is supported.
- Belt clamps are secure.
- Splice area is flat.

Poor alignment can cause tracking problems, uneven cord loading and splice stress.

Model Answer / Trainer Reference

The belt ends must be aligned using the centre line so the finished splice runs straight and the cords carry load evenly.

19. Building the Lower Rubber Layers

Before the cords are laid into place, the lower rubber layers may be prepared and placed according to the splice specification.

These may include:

- Bottom cover rubber
- Core rubber
- Tie rubber
- Cushion rubber
- Breaker fabric where required
- Edge rubber preparation

The materials must be:

- Correct grade
- Correct thickness
- Clean
- Dry
- Within shelf life
- Cut to the correct size
- Placed according to the splice drawing

Model Answer / Trainer Reference

The lower rubber layers form the base of the splice and help bond and protect the cords. They must be correct, clean and placed according to the splice drawing.

20. Laying the Steel Cords

The cords must be laid into the splice carefully.

Check:

- Cords follow the approved layout.
- Cords are straight.
- Cords are not crossed.
- Cords are not kinked.
- Cords have correct spacing.
- Cords have correct overlap.
- Cords sit into the rubber correctly.
- Cords are clean and dry.

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- Cords do not touch where they should not.
- Edge cords are positioned correctly.

Cord layout should be checked before the splice is closed.

Model Answer / Trainer Reference

Steel cords must be laid straight, clean and correctly spaced according to the splice drawing. Crossed, kinked or misplaced cords can weaken the splice.

21. Applying Core Rubber and Fill Materials

Core rubber and fill materials are used around and between the cords.

Their purpose is to:

- Bond to the cords
- Fill spaces between cords
- Support the cord layout
- Prevent voids
- Transfer load
- Protect the cords
- Build the correct splice thickness

The rubber must be worked carefully into position.

Avoid:

- Air pockets
- Wrinkles
- Gaps
- Contamination
- Incorrect thickness
- Poor edge fill

Model Answer / Trainer Reference

Core rubber and fill materials bond around the steel cords, fill spaces and help transfer load through the splice. Voids and contamination must be avoided.

22. Removing Trapped Air

Trapped air is a major risk in steel cord splicing.

Air pockets can create:

- Voids
- Weak bonding
- Blisters
- Moisture paths
- Cord movement
- Poor pressure distribution
- Early splice failure

Use hand rollers or stitcher rollers as required.

Work methodically across the splice.

Do not close the splice with visible gaps or trapped air.

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Model Answer / Trainer Reference

Trapped air must be removed because voids can weaken the splice, create blisters and allow moisture paths around the cords.

23. Building the Top Rubber Layers

After cord layout and core rubber placement, the top layers are built.

These may include:

- Core rubber
- Tie rubber
- Breaker fabric where required
- Top cover rubber
- Edge rubber
- Repair fill strips
- Release materials

The top cover must protect the splice and restore the belt surface.

The final build should aim for correct thickness and a smooth surface after curing.

Model Answer / Trainer Reference

The top rubber layers protect the steel cords and restore the belt surface. They must be built cleanly and to the correct thickness.

24. Edge Build-Up and Sealing

The belt edges are important in steel cord splicing.

Poor edge sealing can allow:

- Moisture ingress
- Dirt ingress
- Cord corrosion
- Edge separation
- Ply or rubber lifting
- Early splice failure

Edge rubber must be correctly fitted and consolidated.

A steel cord splice should not leave cords exposed at the edges.

Model Answer / Trainer Reference

Edge build-up seals and protects the splice edges. Good edge sealing helps prevent moisture, dirt and corrosion reaching the cords.

25. Release Materials and Packing

Before the press is closed, release materials and packing may be used.

These may include:

- Release paper
- Silicone cloth
- Edge bars

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- Pressure pads
- Packing plates
- Fill strips
- Caul plates where required

These materials help:

- Prevent sticking to platens
- Control splice thickness
- Support belt edges
- Improve pressure distribution
- Produce a smooth finish

Use only materials suitable for vulcanising temperature and pressure.

Model Answer / Trainer Reference

Release materials and packing help control the splice during pressing, prevent sticking and improve thickness, pressure and finish.

26. Vulcanising Press Setup

Steel cord splices often require larger presses and careful setup.

Check:

- Press length covers the full splice.
- Press width covers the full belt.
- Platens are suitable.
- Beams are suitable.
- Pressure system is suitable.
- Temperature controls work correctly.
- Temperature probes are positioned correctly.
- Power supply is correct.
- Cables and plugs are safe.
- Cooling system is available if required.
- Press parts are clean and undamaged.
- Edge pressure is controlled.
- Press is assembled evenly.
- There is enough safe access around the press.

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

Model Answer / Trainer Reference

The vulcanising press must be suitable for the steel cord splice and capable of applying even heat and pressure across the full splice area.

27. Pressure, Temperature and Cure Time

Pressure, temperature and cure time must follow the approved specification for the belt and splice material system.

There is no single universal setting for all steel cord belts.

Settings depend on:

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- Belt rating
- Belt thickness
- Rubber compound
- Cord construction
- Splice design
- Press type
- Material supplier guidance
- Belt manufacturer guidance
- Ambient conditions

Do not guess cure settings.

Do not shorten the cure to reduce downtime.

Incorrect pressure, temperature or cure time can cause serious splice failure.

Model Answer / Trainer Reference

Pressure, temperature and cure time must match the approved belt and material specification. They should never be guessed or shortened to save time.

28. Heating and Curing

During the cure stage:

- Maintain the required pressure.
- Maintain the required temperature.
- Follow the required cure time.
- Monitor control readings.
- Check for abnormal issues.
- Keep people clear of hot equipment.
- Do not disturb the press.
- Do not move the belt.
- Keep the work area controlled.

The splice must cure evenly across the full width and length.

Uneven heating can create weak areas.

Model Answer / Trainer Reference

Heating and curing bond the splice under controlled temperature and pressure. The press must not be disturbed, and the correct settings must be maintained.

29. Cooling the Splice

Cooling is part of the vulcanising process.

The splice should not be moved or opened too early.

Opening too early can cause:

- Distortion
- Blisters
- Weak bonding
- Edge opening
- Cord movement

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- Poor surface finish
- Internal voids

Follow the approved cooling procedure.

Some presses use water cooling. Others cool naturally or by another approved method.

Model Answer / Trainer Reference

Cooling allows the splice to stabilise before the press is opened or the belt is moved. Opening too early can damage the splice.

30. Dismantling the Press

Before dismantling the press:

- Confirm cooling is complete.
- Confirm pressure has been released safely.
- Check press parts are safe to handle.
- Use heat protection where required.
- Use safe lifting methods.
- Keep hands clear of pinch points.
- Keep cables and hoses controlled.
- Avoid dragging dirt across the splice.
- Store press equipment safely.

Steel cord splice equipment can be large, heavy and hot.

Model Answer / Trainer Reference

The press must be dismantled safely after cooling and pressure release. Press parts may be hot, heavy and awkward to handle.

31. Trimming and Finishing

After curing, the splice should be finished carefully.

This may include:

- Removing release material
- Checking surface finish
- Trimming flash
- Checking edges
- Checking cover rubber
- Checking for blisters
- Checking for voids
- Checking for soft areas
- Checking for exposed cords
- Checking for alignment
- Cleaning the work area

Do not cut into the splice or expose cords during trimming.

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Model Answer / Trainer Reference

Finishing includes removing release material, trimming excess rubber and checking that the splice surface and edges are sound.

32. Final Steel Cord Splice Inspection

Before returning the conveyor to service, inspect the splice.

Check:

- Splice is fully cured.
- Surface is smooth.
- Edges are sealed.
- No exposed cords.
- No blisters.
- No voids.
- No soft areas.
- No open edges.
- No contamination.
- No major high spots or low spots.
- Belt alignment is correct.
- Splice thickness is acceptable.
- Tools and materials are removed.
- Guards are refitted.
- Area is safe.

If a serious defect is found, do not restart until it has been assessed by a competent person.

Model Answer / Trainer Reference

The final inspection checks that the splice is cured, sealed, aligned and free from visible defects before the conveyor is restarted.

33. Restarting the Conveyor

Restart must be controlled.

Before restart:

- Remove tools and materials.
- Refit guards.
- Confirm everyone is clear.
- Follow site restart procedure.
- Start carefully where possible.
- Watch the splice pass over pulleys.
- Check belt tracking.
- Check scraper contact.
- Check pulley contact.
- Check for abnormal noise.
- Check for edge issues.
- Monitor under load.
- Reinspect after running.

A steel cord splice should be monitored carefully during initial operation.

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Model Answer / Trainer Reference

The conveyor should be restarted carefully and the steel cord splice should be monitored as it passes over pulleys, rollers, scrapers and loading points.

34. Common Causes of Steel Cord Splice Failure

Common causes include:

- Wrong splice design
- Incorrect splice length
- Incorrect cord layout
- Wrong cord overlap
- Damaged cords
- Kinked cords
- Poor cord cleaning
- Cord corrosion
- Contamination
- Moisture
- Oil or grease
- Wrong materials
- Expired materials
- Poor rubber fill
- Trapped air
- Poor edge sealing
- Incorrect pressure
- Incorrect temperature
- Incorrect cure time
- Uneven heating
- Opening the press too early
- Poor cooling
- Poor alignment
- Conveyor mistracking
- Pulley diameter issues
- Excessive tension
- Impact damage near the splice

Model Answer / Trainer Reference

Steel cord splice failure is often caused by poor cord preparation, wrong layout, contamination, trapped air, poor edge sealing, incorrect curing or conveyor problems after installation.

35. Steel Cord Splice Record

A steel cord splice should be recorded.

Record:

- Date
- Customer or site
- Conveyor number
- Technician name
- Supervisor name

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- Belt width
- Belt rating
- Belt thickness
- Cord pitch if known
- Cord diameter if known
- Splice drawing reference
- Splice length
- Cord layout used
- Materials used
- Material batch numbers if available
- Press used
- Temperature setting
- Pressure setting
- Cure time
- Cooling method
- Final inspection result
- Photos before, during and after
- Any defects found
- Any follow-up action required

A splice record helps with quality control, warranty review, maintenance planning and future fault finding.

Model Answer / Trainer Reference

A steel cord splice record provides evidence of the method, materials, settings, inspection result and any follow-up action. It is important for quality control and traceability.

Practical Exercise

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

1. Identify the Belt Type

Learner Answer

Check whether the belt is a steel cord belt by looking for steel cords, belt markings, ST rating or manufacturer information.

2. Record the Belt Rating

Learner Answer

Record the belt rating from the belt marking or documentation. Example: ST1000, ST1600 or ST2000.

3. Identify the Main Belt Parts

Learner Answer

The main parts are top cover, bottom cover, steel cords, core rubber, edge rubber and any breaker fabric or reinforcement.

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4. Review the Splice Drawing

Learner Answer

The splice drawing should show splice length, cord layout, cord overlap, material build-up, edge details and press area.

5. Identify Why Cord Layout Matters

Learner Answer

Cord layout matters because the splice strength depends on the correct overlap, spacing and position of the steel cords.

6. Identify Possible Contamination Risks

Learner Answer

Possible risks include moisture, dust, oil, grease, dirty gloves, dirty tools, rust, mud and contaminated rubber materials.

7. Explain Why Exposed Cords Must Be Protected

Learner Answer

Exposed cords can become contaminated, corroded or damaged, which can reduce bonding and splice strength.

8. Check the Press Setup

Learner Answer

Check that the press covers the full splice, has correct temperature and pressure capability, correct power supply, safe cables, probes and cooling where required.

9. Identify Three Causes of Splice Failure

Learner Answer

Examples include wrong cord layout, damaged cords, contamination, trapped air, poor edge sealing, incorrect cure time, incorrect pressure or poor alignment.

10. Complete a Splice Record

Learner Answer

Record belt rating, splice drawing reference, splice length, materials, press settings, cure time, cooling method, inspection result and photos.

Knowledge Check

Question 1

What is a steel cord conveyor belt?

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Suggested Answer

A steel cord conveyor belt is a belt that uses steel cords as the main strength members instead of fabric plies.

Question 2

Why are steel cord belts used?

Suggested Answer

They are used for high-strength, low-stretch, long-distance and heavy-duty conveyor applications.

Question 3

What does an ST rating refer to?

Suggested Answer

The ST rating normally relates to the tensile strength of a steel cord belt.

Question 4

Why is steel cord splicing specialist work?

Suggested Answer

Because each steel cord must be stripped, cleaned, positioned, overlapped and bonded correctly to transfer high belt tension.

Question 5

Why is the splice drawing important?

Suggested Answer

The splice drawing shows the approved splice length, cord layout, cord overlap and material build-up. It must be followed to achieve the correct splice strength.

Question 6

What is cord pitch?

Suggested Answer

Cord pitch is the spacing between the steel cords in the belt.

Question 7

Why must cords not be damaged during stripping?

Suggested Answer

Damaged cords can reduce splice strength and may lead to early failure.

Question 8

Why must exposed cords be clean and dry?

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Suggested Answer

Contamination, moisture or corrosion can reduce bonding between the steel cords and splice rubber.

Question 9

Why must trapped air be removed?

Suggested Answer

Trapped air can create voids, weak areas, blisters and moisture paths around the cords.

Question 10

Why is edge sealing important?

Suggested Answer

Edge sealing helps prevent moisture, dirt and corrosion from reaching the steel cords.

Question 11

Can one cure setting be used for every steel cord splice?

Suggested Answer

No. Pressure, temperature and cure time must follow the approved belt and material specification.

Question 12

Why must the splice be cooled before the press is opened?

Suggested Answer

Cooling allows the splice to stabilise. Opening too early can cause distortion, blisters, weak bonding or cord movement.

Question 13

Why should a steel cord splice be recorded?

Suggested Answer

A splice record provides traceability of the belt, method, materials, press settings, cure time and inspection result.

Question 14

Name three common causes of steel cord splice failure.

Suggested Answer

Common causes include wrong cord layout, damaged cords, contamination, moisture, trapped air, poor edge sealing, incorrect curing, poor alignment or conveyor mistracking.

Self-Assessment

Tick each statement once you understand it.

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- I understand what a steel cord conveyor belt is.
- I understand why steel cord belts are used.
- I understand the difference between fabric and steel cord belts.
- I understand why steel cord splicing is specialist work.
- I understand why the splice drawing must be followed.
- I understand why splice length must not be guessed.
- I understand what cord pitch means.
- I understand why cords must not be damaged.
- I understand why exposed cords must be clean and dry.
- I understand why cord layout and alignment matter.
- I understand why rubber fill and edge sealing matter.
- I understand why trapped air must be removed.
- I understand why press settings must follow approved guidance.
- I understand why cooling is part of the process.
- I understand why splice records are important.

Self-Assessment Answers

A learner should be confident with the following before moving to Module 10:

12. 1. Steel cord belts use steel cords as the main tensile strength member.
13. 2. Steel cord belts are used for long, heavy-duty and high-tension conveyors.
14. 3. Fabric belts use fabric plies; steel cord belts use steel cords.
15. 4. Steel cord splicing is specialist because each cord must be prepared and positioned correctly.
16. 5. The splice drawing controls the splice length, cord layout, overlap and material build-up.
17. 6. Splice length must follow approved guidance and must not be shortened to save time.
18. 7. Cord pitch is the spacing between steel cords.
19. 8. Damaged, kinked, rusty or contaminated cords can weaken the splice.
20. 9. Exposed cords must be kept clean and dry.
21. 10. The cords must be laid straight, correctly spaced and correctly overlapped.
22. 11. Core rubber and fill materials support bonding and load transfer around the cords.
23. 12. Edge sealing helps prevent moisture and dirt entering the splice.
24. 13. Trapped air can cause voids, blisters and weak areas.
25. 14. Temperature, pressure and cure time must follow the approved belt and material system.
26. 15. A splice record gives traceability and helps future inspection or fault finding.

Steel Cord Splice Awareness Checklist

Safety

- Conveyor isolated and locked off
- Stored energy controlled
- Belt clamped and supported
- Take-up secured
- Work area safe
- Correct PPE worn
- Lifting plan in place
- Press handling planned
- Electrical supply checked
- Fire risks controlled
- Competent supervisor present

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Belt and Splice Planning

- Belt type confirmed
- Belt rating confirmed
- Belt width measured
- Belt thickness checked
- Cord pitch confirmed if required
- Splice drawing available
- Splice length confirmed
- Cord layout confirmed
- Cord overlap confirmed
- Materials confirmed
- Material shelf life checked
- Press size confirmed
- Press capability confirmed

Preparation

- Belt inspected
- Centre line marked
- Splice length marked
- Cord layout marked
- Cover removal area marked
- Belt cut safely
- Covers removed carefully
- Cords stripped correctly
- Cords not damaged
- Cords clean and dry
- No oil or grease
- No moisture
- No corrosion issue unresolved
- Prepared area protected

Build

- Lower rubber layers placed correctly
- Cord layout followed
- Cords straight and correctly spaced
- Cords not crossed or kinked
- Core rubber applied correctly
- Gaps filled
- Air removed
- Edge rubber placed correctly
- Top cover rubber placed correctly
- Release material fitted
- Packing fitted correctly

Press

- Press clean and undamaged
- Platens cover splice area

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- Beams positioned correctly
- Pressure system checked
- Temperature controls checked
- Probes positioned correctly
- Power supply correct
- Cooling system ready if required
- Edge pressure considered

Cure and Cooling

- Pressure set to approved requirement
- Temperature set to approved requirement
- Cure time followed
- Press monitored
- Cooling completed correctly
- Press opened only when safe

Final Inspection

- Surface smooth
- Edges sealed
- No exposed cords
- No blisters
- No visible voids
- No soft areas
- Splice aligned
- Flash trimmed safely
- Tools removed
- Guards refitted
- Conveyor restarted carefully
- Splice monitored under load
- Splice record completed

Trainer Notes

This module should be delivered as an awareness module unless the learner is working under direct supervision of an experienced steel cord splicer.

Where possible, use:

- Steel cord belt sample
- Exposed cord sample
- Steel cord splice drawing example
- Cord layout diagram
- Core rubber sample
- Cover rubber sample
- Edge rubber sample
- Release paper or silicone cloth
- Hand roller
- Buffing tool
- Cord preparation tools
- Press platen example

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- Temperature probe
- Photos of good and failed steel cord splices

The trainer should show the difference between:

- Fabric belt construction and steel cord belt construction
- Correct and poor cord stripping
- Clean and contaminated cords
- Straight and kinked cords
- Correct and incorrect cord spacing
- Good edge sealing and poor edge sealing
- Correct rubber fill and visible void risks
- A splice record with full traceability and one without enough information

The key message in this module is:

Steel cord splicing is about strength, accuracy, cleanliness and control.

For self-training, the learner should read each section, review the self-study answers, complete the practical exercise and check their understanding using the knowledge check.

Module Summary

Steel cord conveyor belts are used on heavy-duty, high-tension and long-distance conveyor systems.

Unlike fabric belts, steel cord belts rely on steel cords for tensile strength. During splicing, those cords must be stripped, cleaned, arranged, overlapped, bonded and sealed according to the approved splice drawing.

Steel cord splicing requires specialist competence, clean working conditions, correct materials, suitable press equipment, controlled curing and proper cooling.

Most steel cord splice failures are caused by poor cord preparation, wrong cord layout, contamination, moisture, trapped air, poor edge sealing, incorrect curing or conveyor problems after installation.

This module provides awareness of the steel cord splicing process before moving into Module 10, which covers vulcanising press setup, belt change-out and maintenance.

Assessment Record

Learner name: _____

Assessor name: _____

Date: _____

Theory outcome: Competent / Not Yet Competent

Practical competence (separate supervised assessment): Not assessed / Assessed

Assessor comments: _____

Assessor signature: _____

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