

# STEEL CORD BELT SPLICING & VULCANIZING

*Deepak Om. Verma*

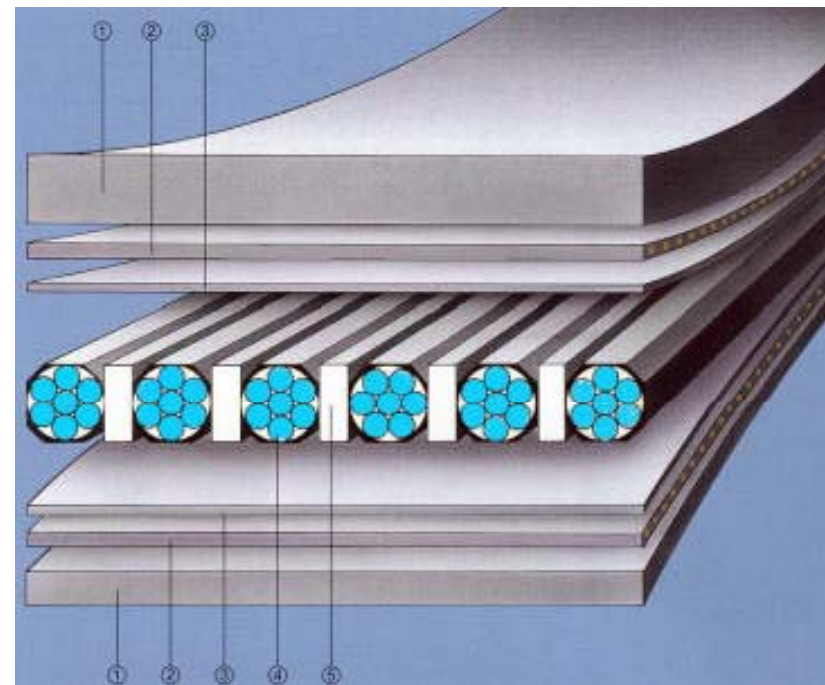


# STEP - 1

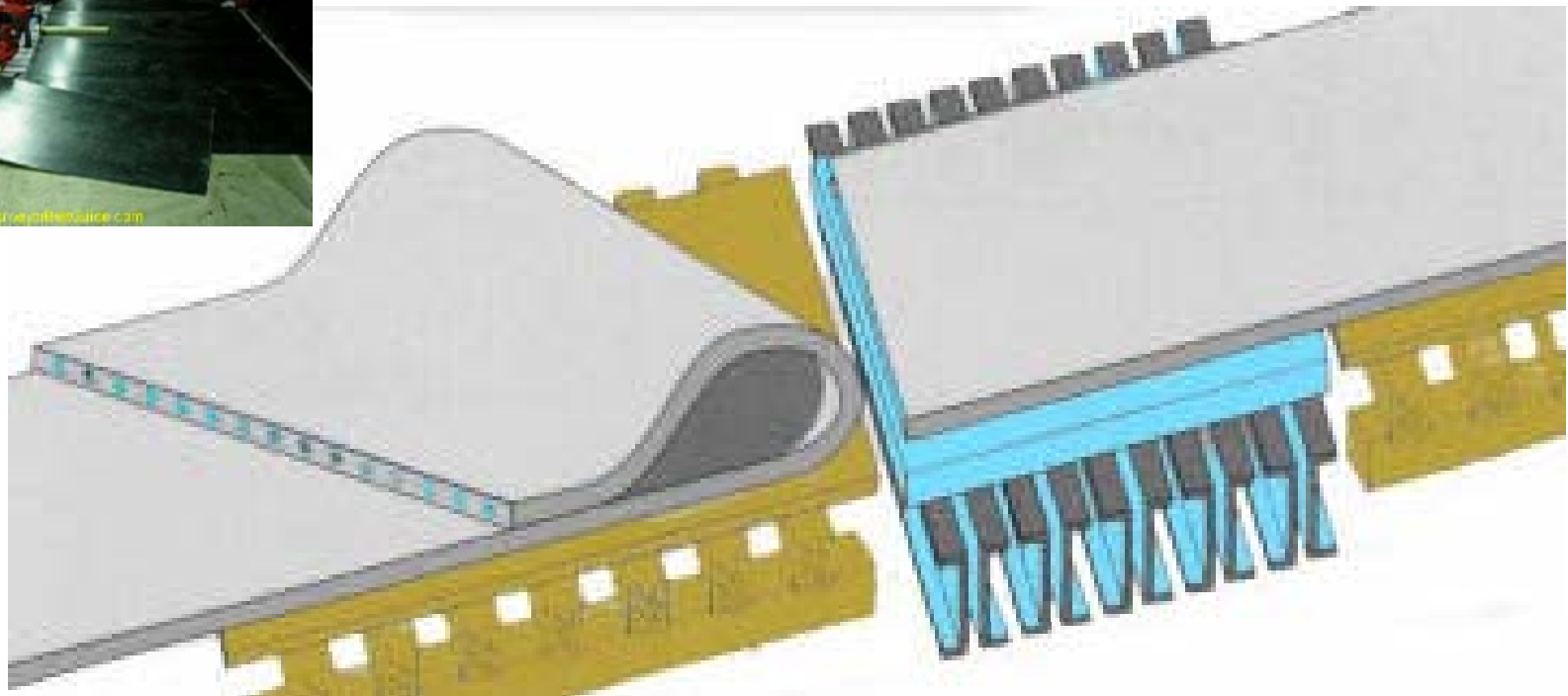
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The components of a steel cord conveyor belt splice:

- 1) Cover sheets.
- 2) (optional) Transverse reinforcement embedded in un-vulcanized core rubber. It is applied like a second core rubber sheet.
- 3) Core rubber sheets.
- 4) Steel cords with original core rubber.
- 5) Intermediate rubber strips

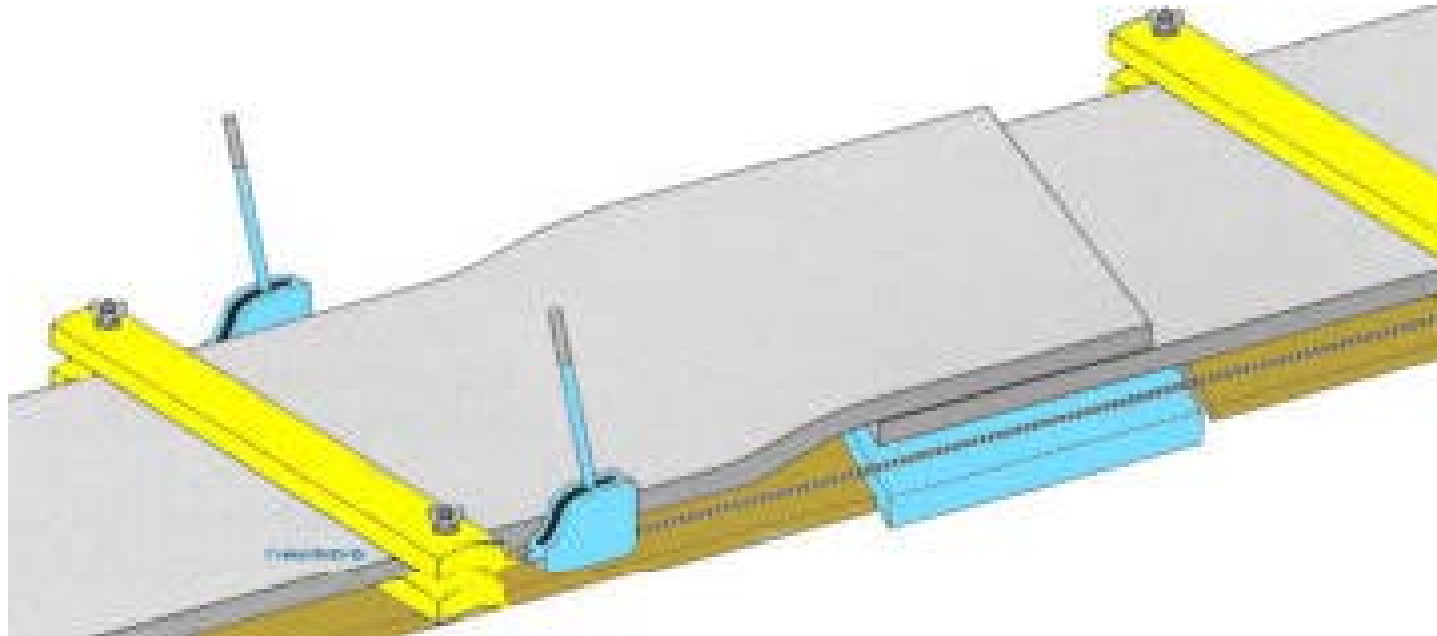


## STEP - 2



Setup of the working table. For positioning of the bottom platen(s) of the curing press both belt ends are folded back. The bottom part of the vulcanizer is used as a working table.

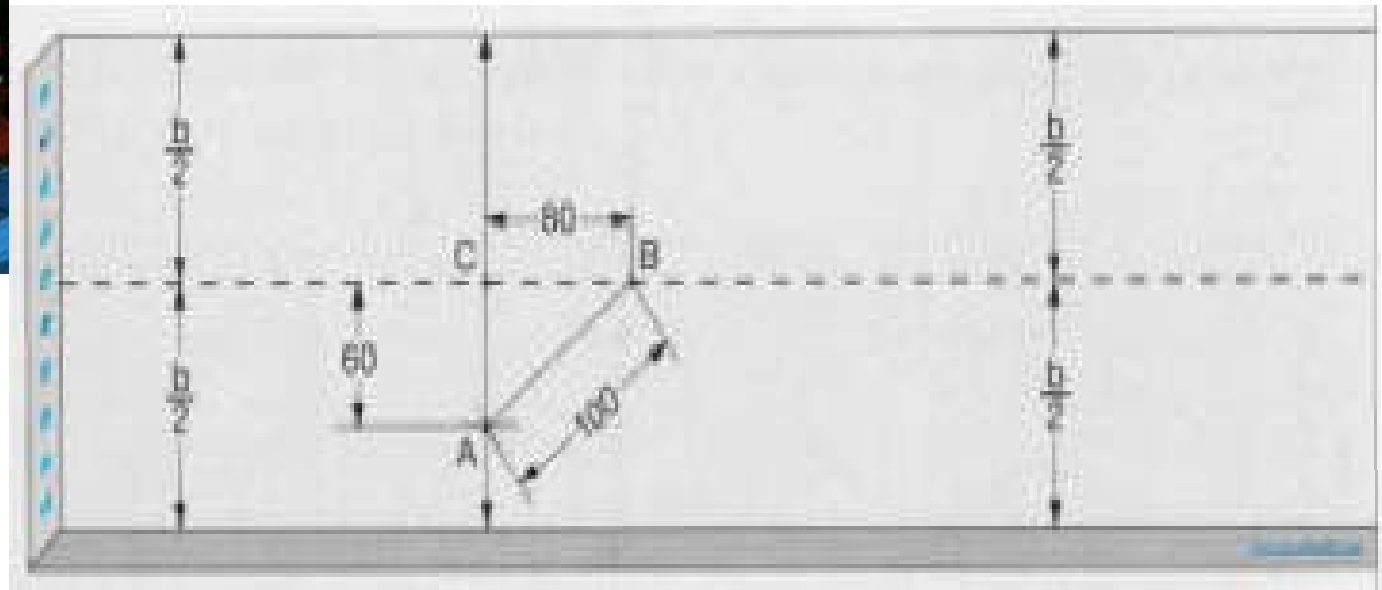
## STEP - 3



The belt ends have to be tensioned as much as possible to avoid sag. Both lengths will be laid one on top of the other over the whole splice length. If it is necessary to shorten the belt(s), a wedge-shaped strip of approx. 20 mm width is cut out of the upper cover so that the steel cords become visible. The steel cords will be cut with a high-speed abrasive cutting tool with fabric reinforced disc.

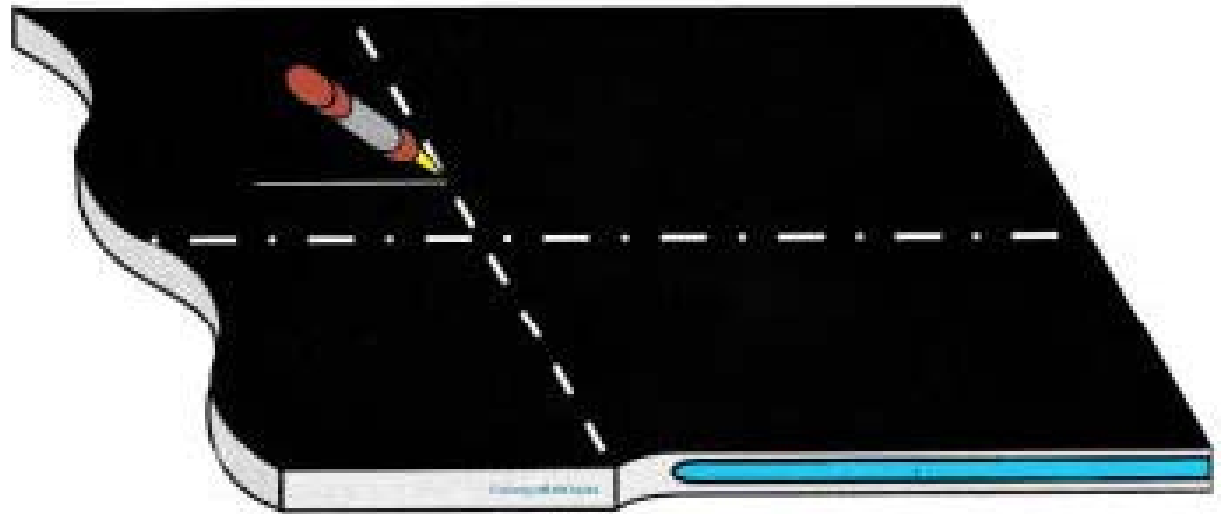
**Do not forget to take safety precautions!**

## STEP - 4



The belt centre is marked on both belt ends and also at a minimum of three other points that are approx. 1500 mm (5 feet) apart. These centre points are then joined into a centerline using a chalked string. Approximately half a meter behind the splice area a cross line is drawn at right angles to the centerline as a reference line. One marked belt end is placed on top of the other marked belt end. The centerlines on each end must be precisely aligned.

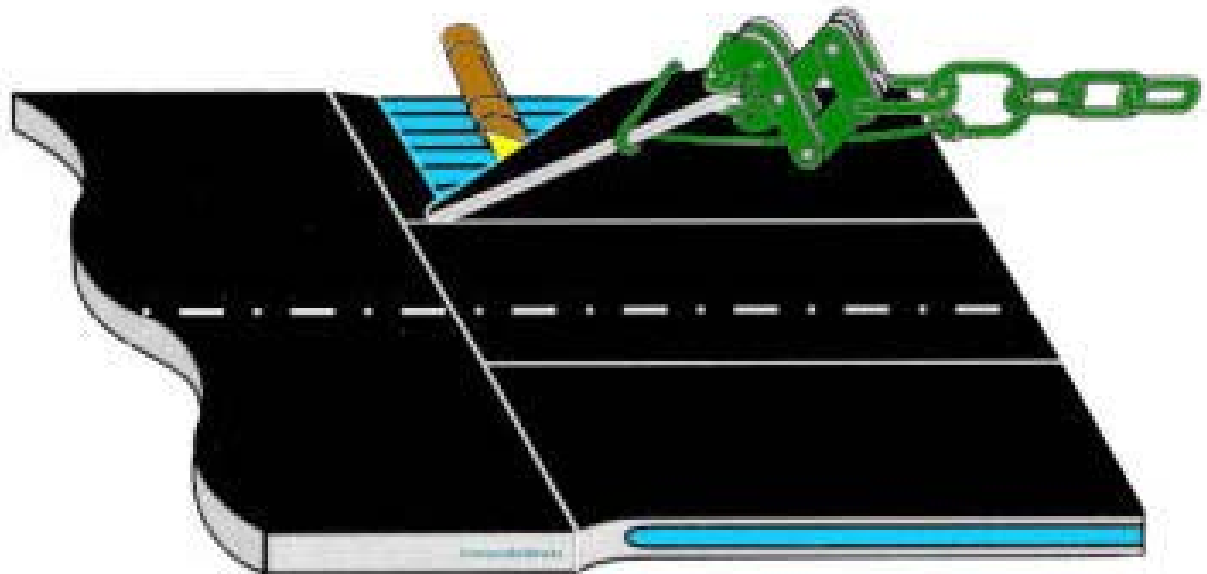
## STEP - 5



The cover is cut transversally down to the cables. The knife is held at a 45° angle. The rubber edges are removed as far as the first steel cord. The belt centre is marked on both belt ends and also at a minimum of three other points that are approx. 1500 mm (5 feet) apart. These centre points are then joined into a centerline using a chalked string. Approx. half a meter behind the splice area a cross line is drawn at right angles to the centerline as a reference line. One marked belt end is placed on top of the other marked belt end. The centerlines on each end must be precisely aligned.



## STEP - 6

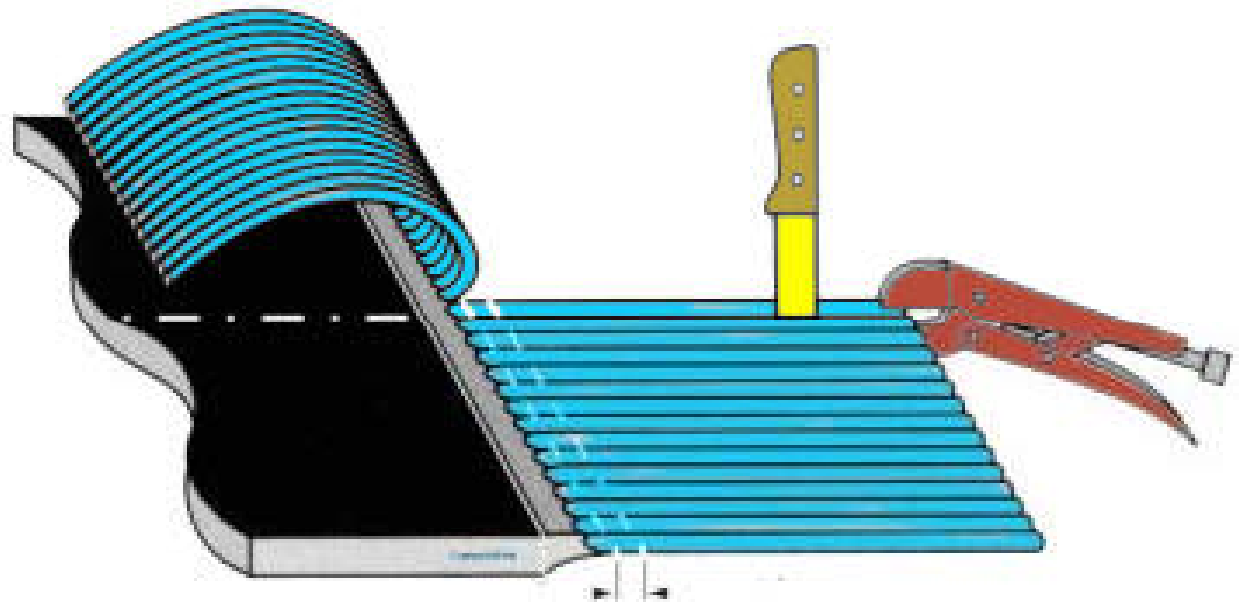


By means of a tensioning tool the cover is removed, supported by a knife that cuts between the cover over the steel cords.

**Do not tear the cover off!**

The procedure is repeated for the bottom sides of the belt ends.

## STEP - 7



The rubber between the steel cords is removed.  
The cords should be carefully buffed with a rotary brush.  
They remain completely covered by rubber after this procedure. This procedure can be done very conveniently with a "**Cord Stripper**".

**"Piano wires" or similar methods should not be used.**



## STEP - 8



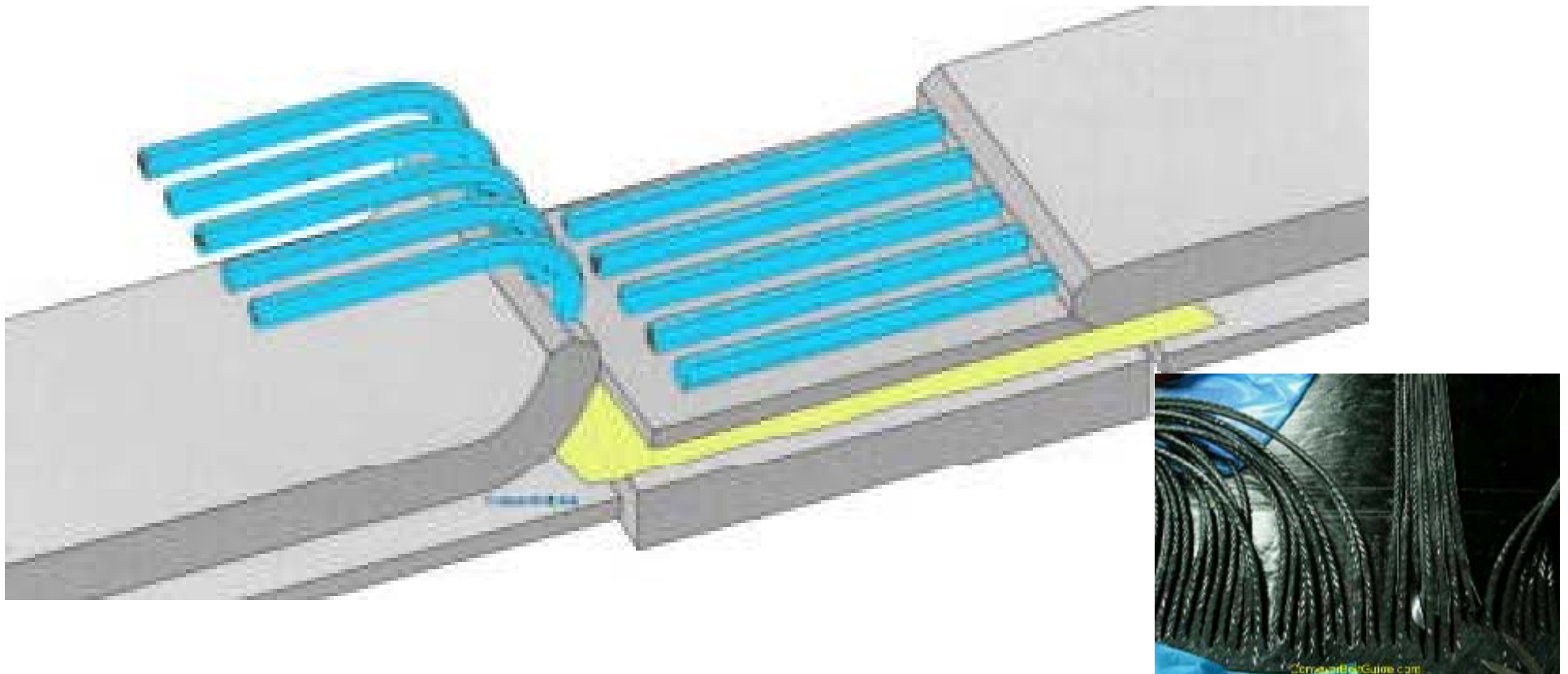
The top and bottom sides and the ends of the separated steel cords will be brushed with a grooved wire brush.

Buffing dust be swept off by means of a hand brush.

Do not use cleaning solvent!

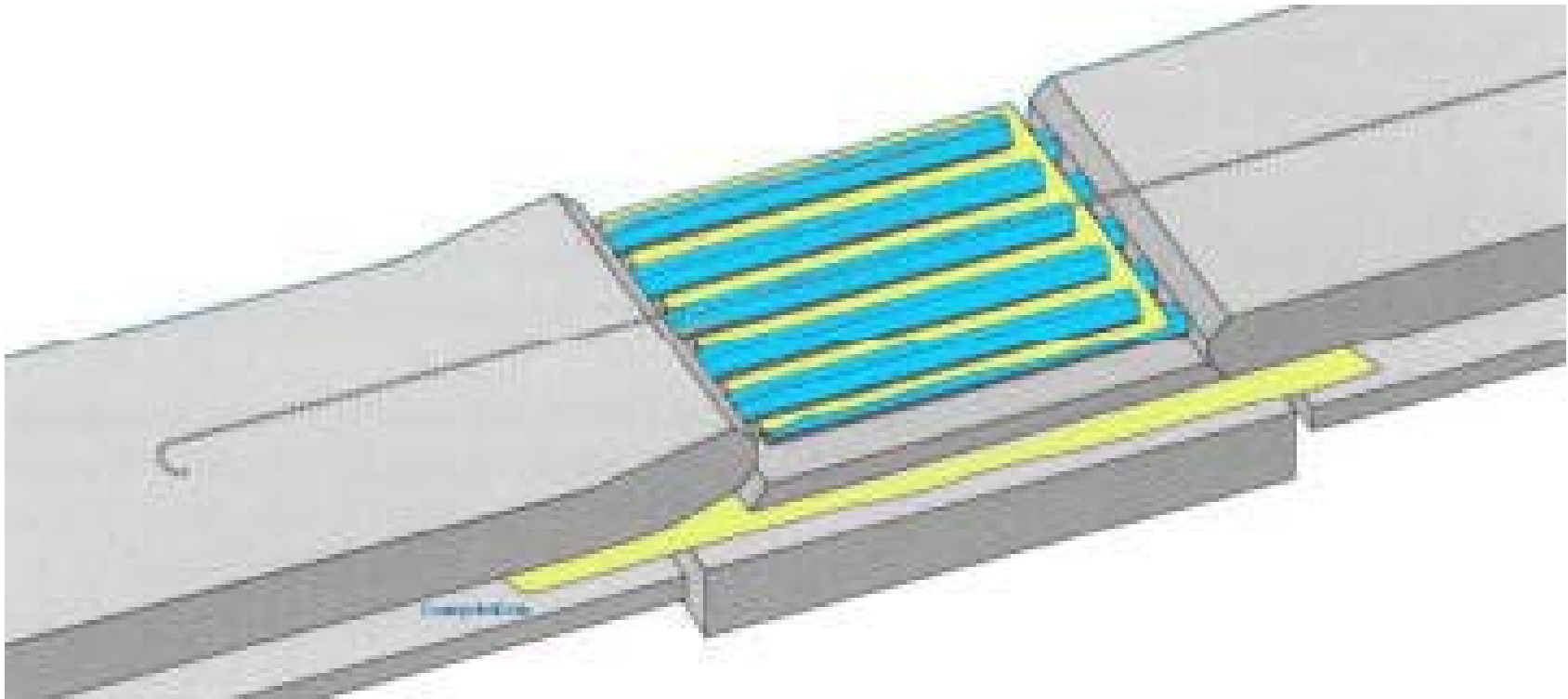
The steel cords will be coated with a special rubber solution, and dry completely.

## STEP - 9



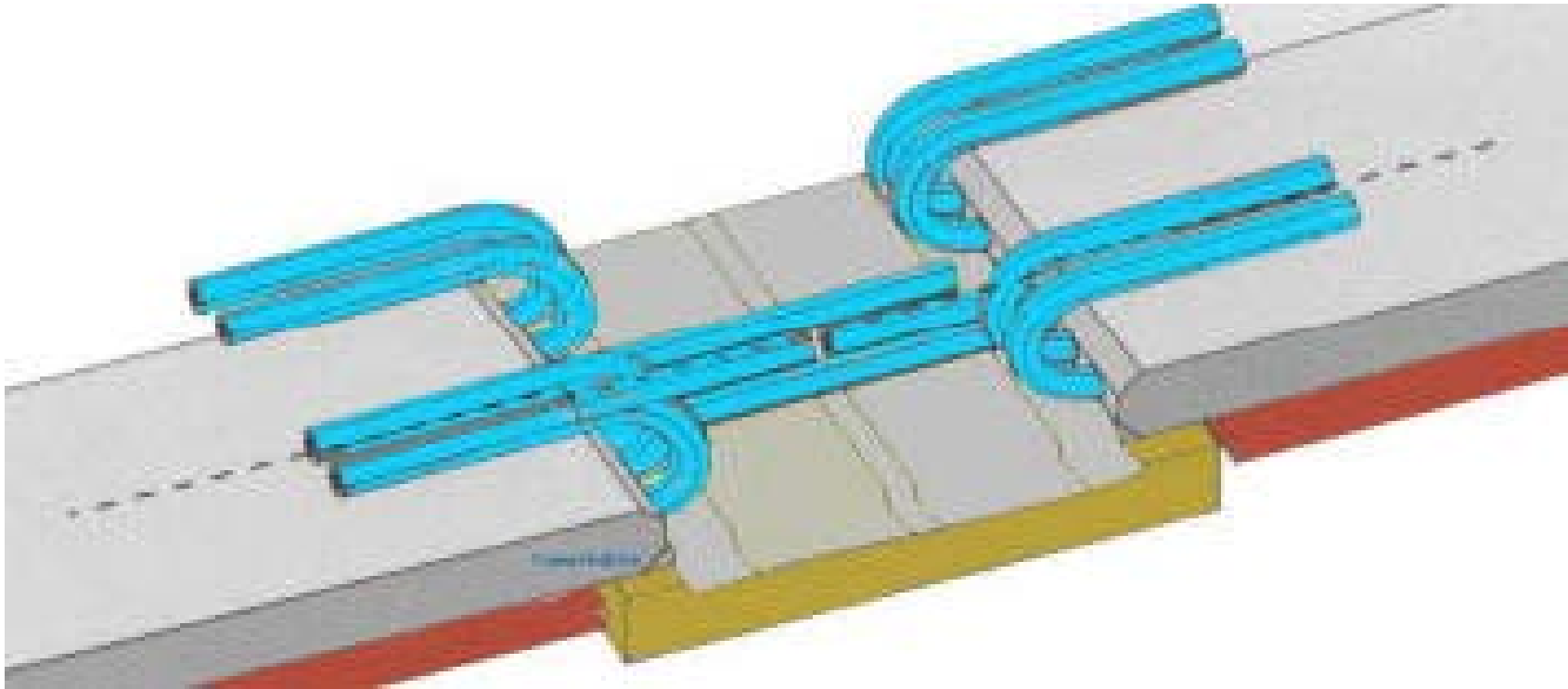
An un-vulcanized cover rubber sheet is placed at the bottom of the splice on top of a separation cloth.  
The cloth should be approx. 300 mm (12 inches) longer in the longitudinal directions.

## STEP - 10



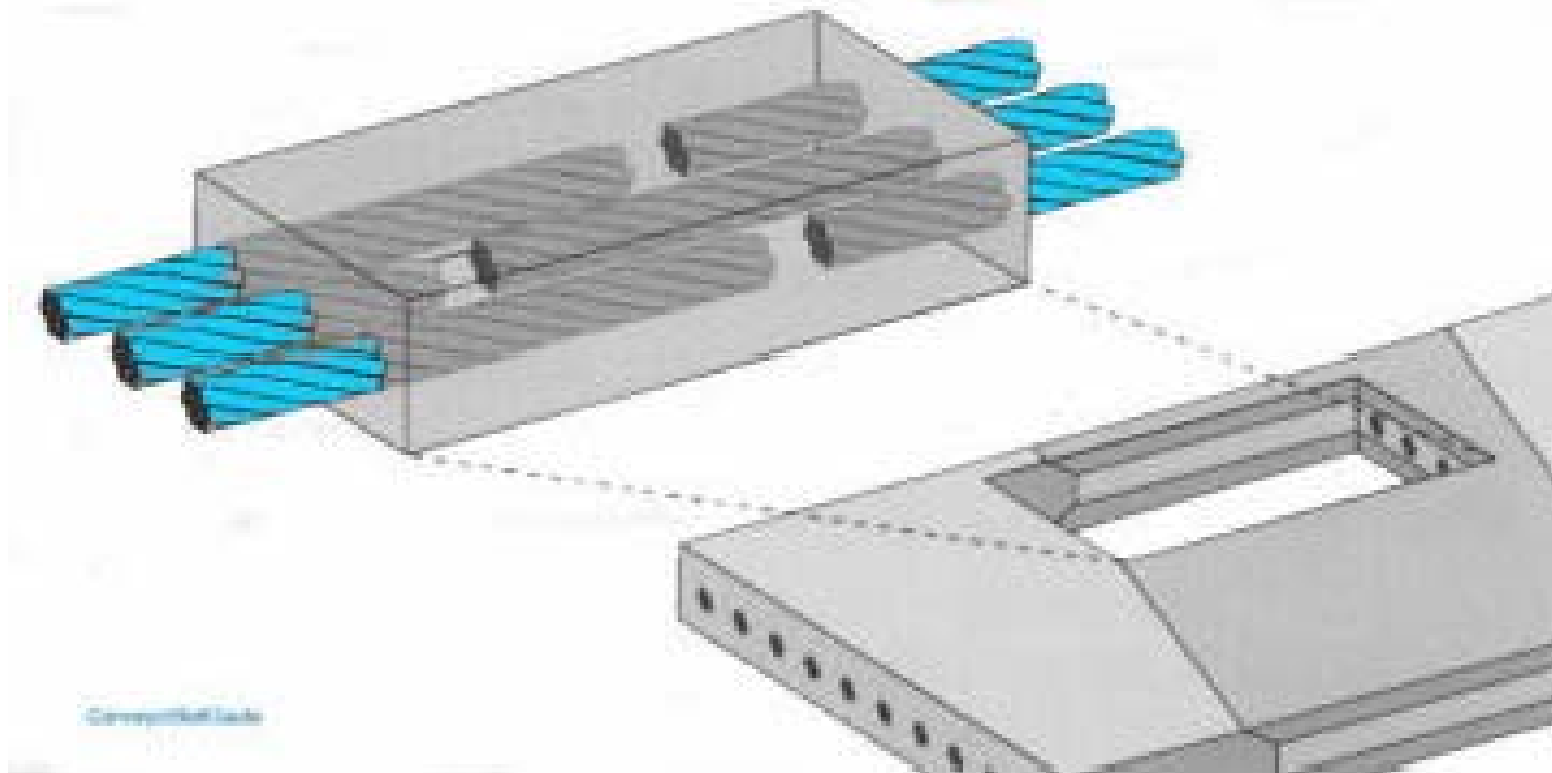
The alignment is checked again.

## STEP - 11



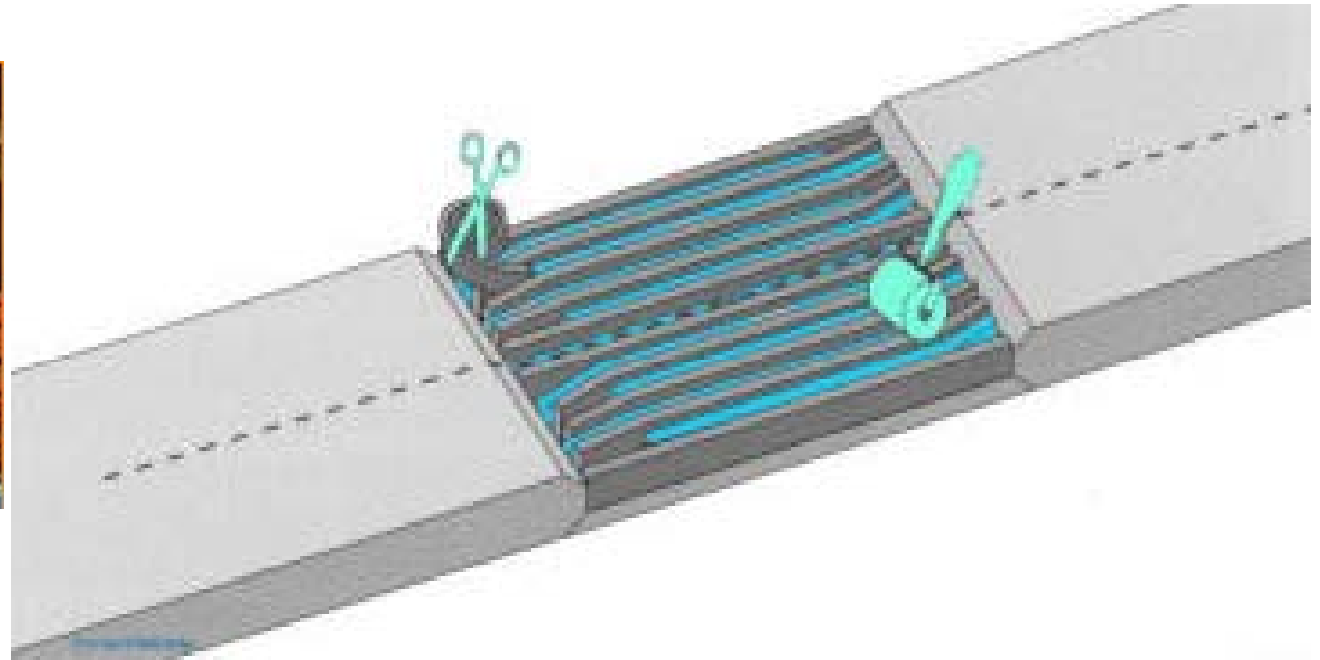
The steel cords have to be positioned as determined by the belt manufacturer or by the standard (f.i. DIN 22129).

# STEP - 12



By the way: No cable has contact to any other cable.

## STEP - 13



All gaps between the cables are carefully filled with intermediate core rubber up to the height of the cables.

The entire splice area will be sparingly coated with rubber solution and dry completely.

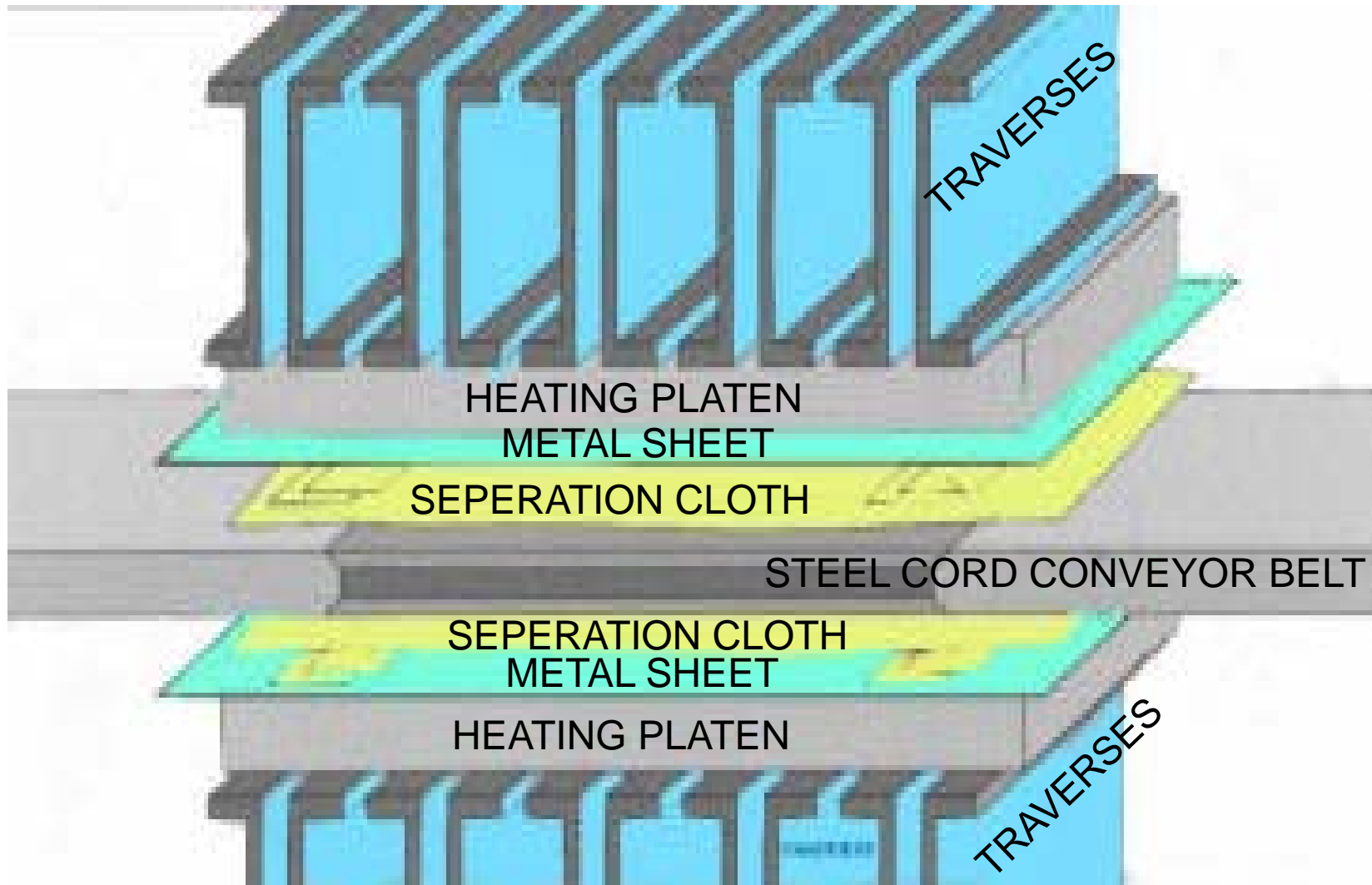
Rubber edges are applied on both belt sides, coated with solution and dry well.

The edges are tapped thoroughly with a mallet. Protruding rubber is cut off.

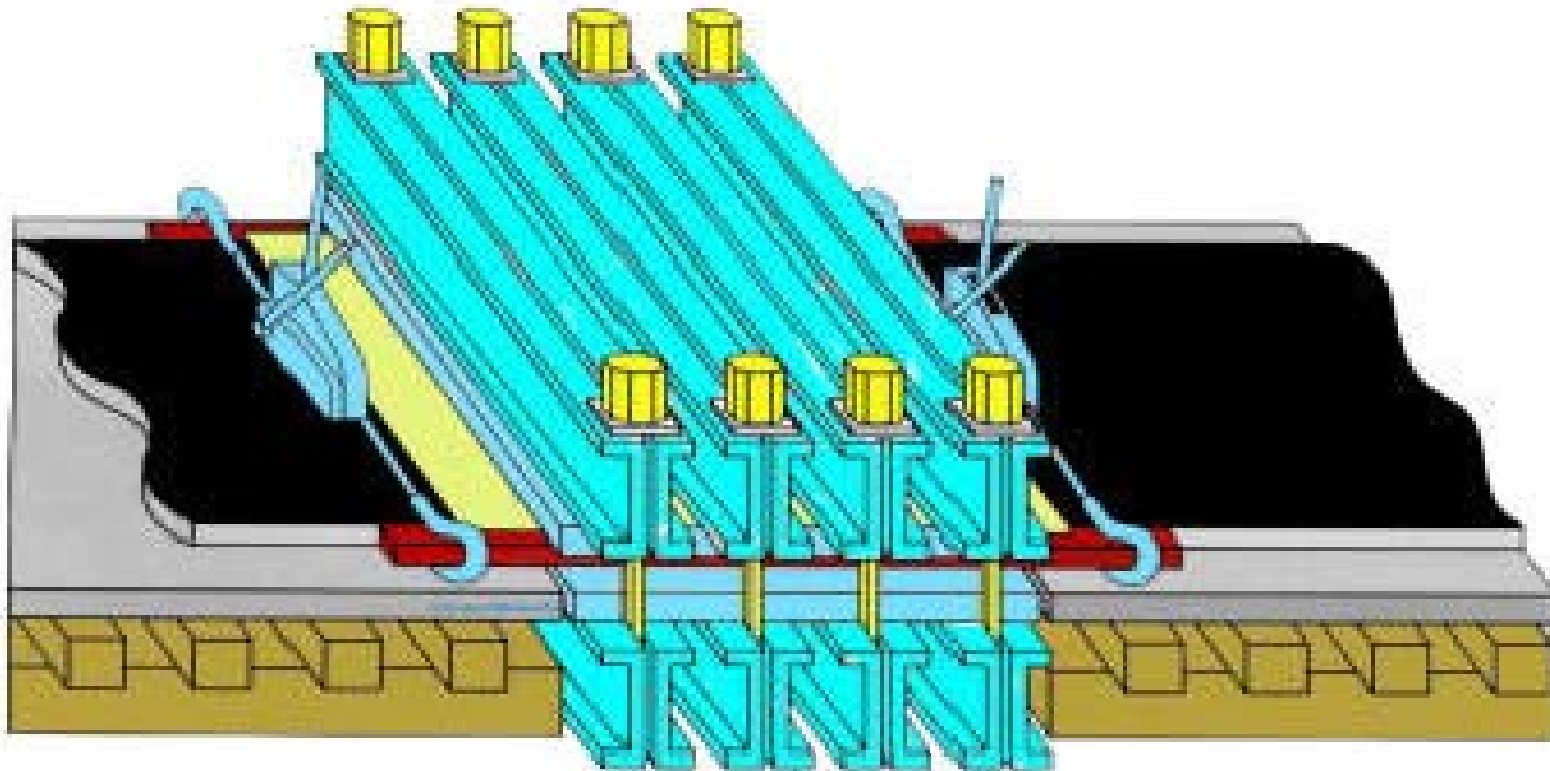
The straightness of the splice is again checked.



# DETAIL DRAWING



# DETAIL DRAWING



Edge bars, approx. 1 mm thinner than the belt, are placed against both belt edges and clamped outside the splice area.

**The bars are 1-2 mm (1/16 inch) thinner than the belt.**

# PHOTOS



# SCHEMATIC VIEW



Upper platens are placed and aligned (see video bottom right side).

End locking bolts are tightened slightly.

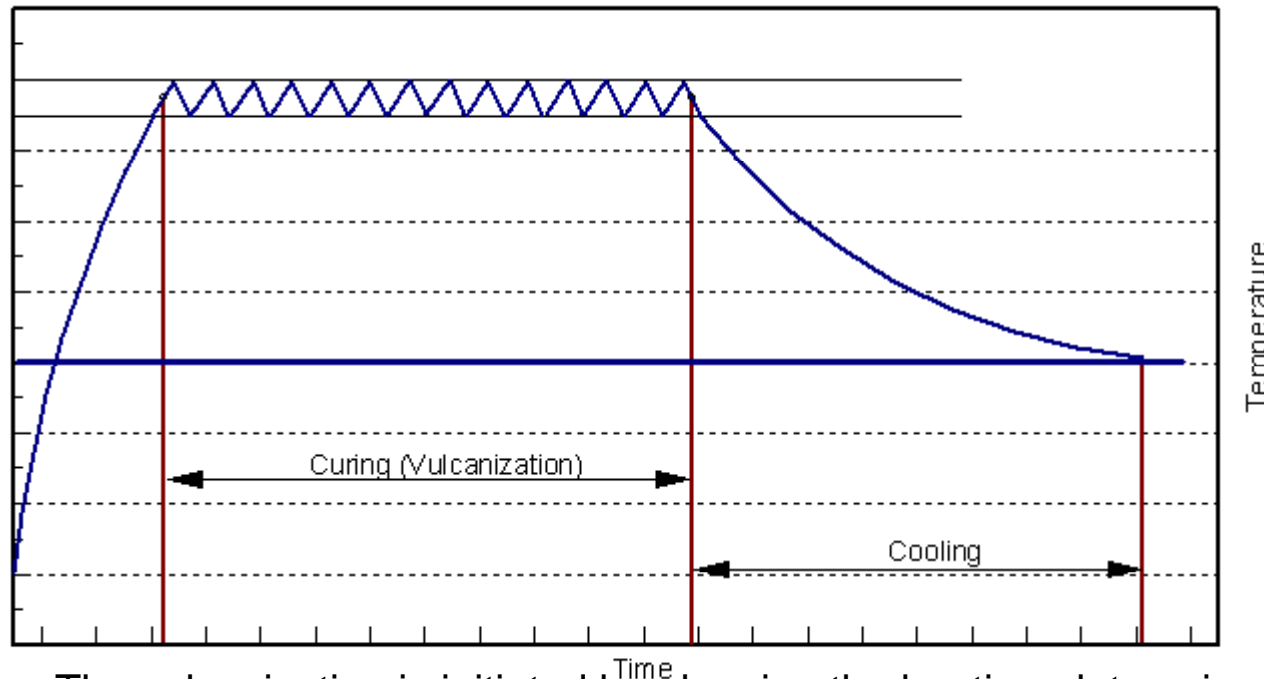
Oil pumps will be connected to upper traverses.

End bolts are tightened thoroughly.

Electrical cables are connected to the heating platens.

A pressure of approx. 10 bar (150 psi) is applied with oil pumps.

# GRAPH



The vulcanization is initiated by plugging the heating platens in. Pressure will be increased as temperature rises. Temperatures at all heating platens are controlled. Temperature is regulated by self-controlled heating platens or by switching energy on and off. After several minutes allow temperature to rise to 142°C (290°F). The curing time counts when temperature reaches 142°C (290°F). Disconnection at 145°C (295°F). Plugging-in again when temperature drops to 142°C. After curing time has elapsed, platens will be allowed to cool down to 80°C (150°F). A typical temperature/pressure curve is shown.

*Important: Please use the appropriate figures of your belt supplier! Here only examples are given.*

## HANDLING AND STORAGE – SPLICING MATERIAL

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Splice and repair material has a limited shelf life, because it is un-vulcanized. It is essential to transport and store the splice and repair material under specific conditions.

During the transportation of the material from the manufacturer to the site and at the site it has to be kept at a temperature between 5 - 18 °C. The best way of storage is in a refrigerated chamber at a temperature of approximately 4°C.

The material must not be exposed to direct sunlight and has to be kept indoors and dry.

Before the use of the splice or repair material it has to be checked whether it is still usable.

Bear in mind that the splice is the weakest point in a conveyor belt and fresh splice material is of high importance!

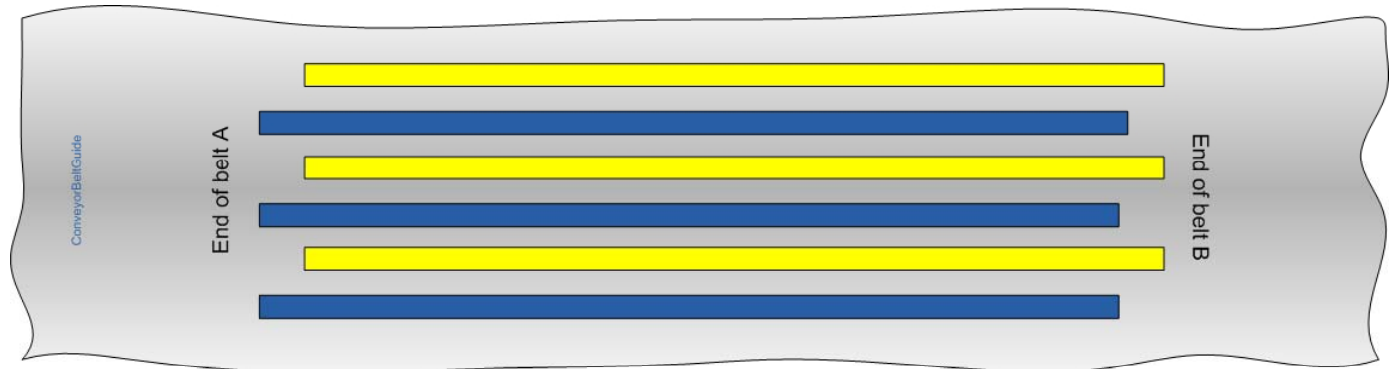
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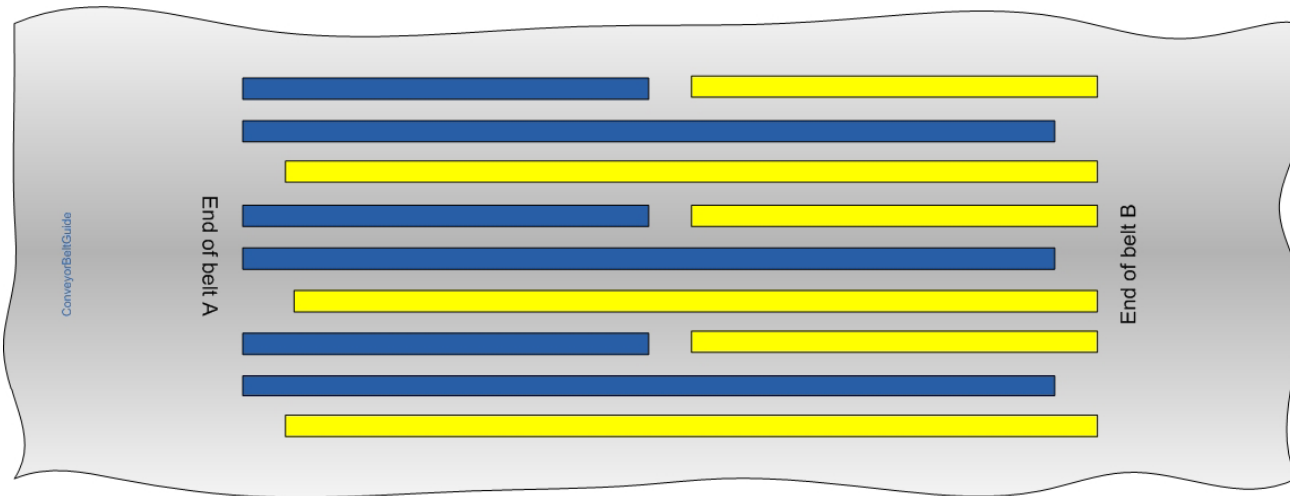
# STEEL CORD CONVEYOR BELT SPLICE CONFIGURATIONS



**One-step splice  
(up to St 2000)**



**Two-step splice  
(St 2500 to St 3150)**

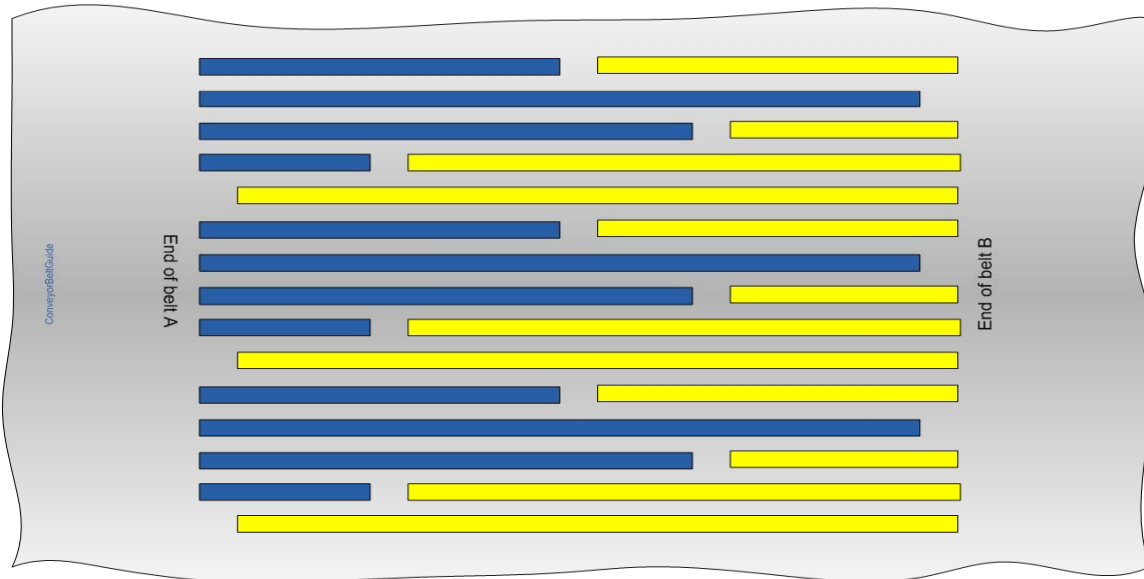
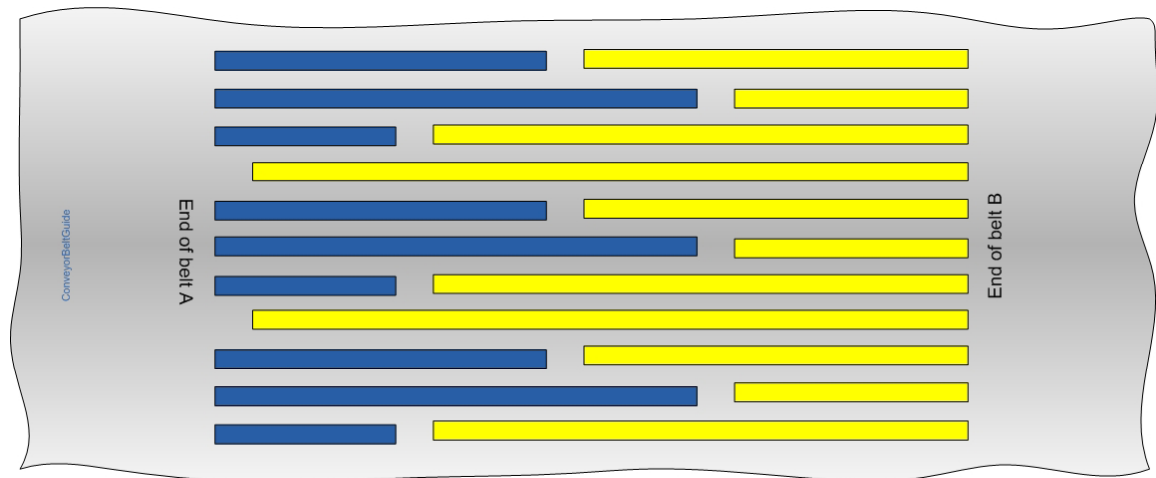


	ST - 1000	ST- 1250	ST - 1600	ST - 2000	ST - 2500	ST - 3150	ST - 3500	ST - 4000	ST - 4500	ST - 5000
<b>MINIMUM STEP LENGTH (mm)</b>	300	350	450	400	500	650	650	750	800	900
<b>SPLICE LENGTH (mm)</b>	600	650	750	1150	1350	1650	2350	2650	2800	4050

# STEEL CORD CONVEYOR BELT SPLICE CONFIGURATIONS



**Three-step splice  
(St 3500 to St 4500)**



**Four-step splice  
(St 5000 to St 7500)**

# STEEL CORD CONVEYOR BELT SPLICE CONFIGURATIONS



**Five-step splice  
(St 7800 and higher)**



*Thank you !*

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