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REMA TIP TOP / North America, Inc.

SME 2019 - CONVEYOR MAINTENANCE AND SAFETY





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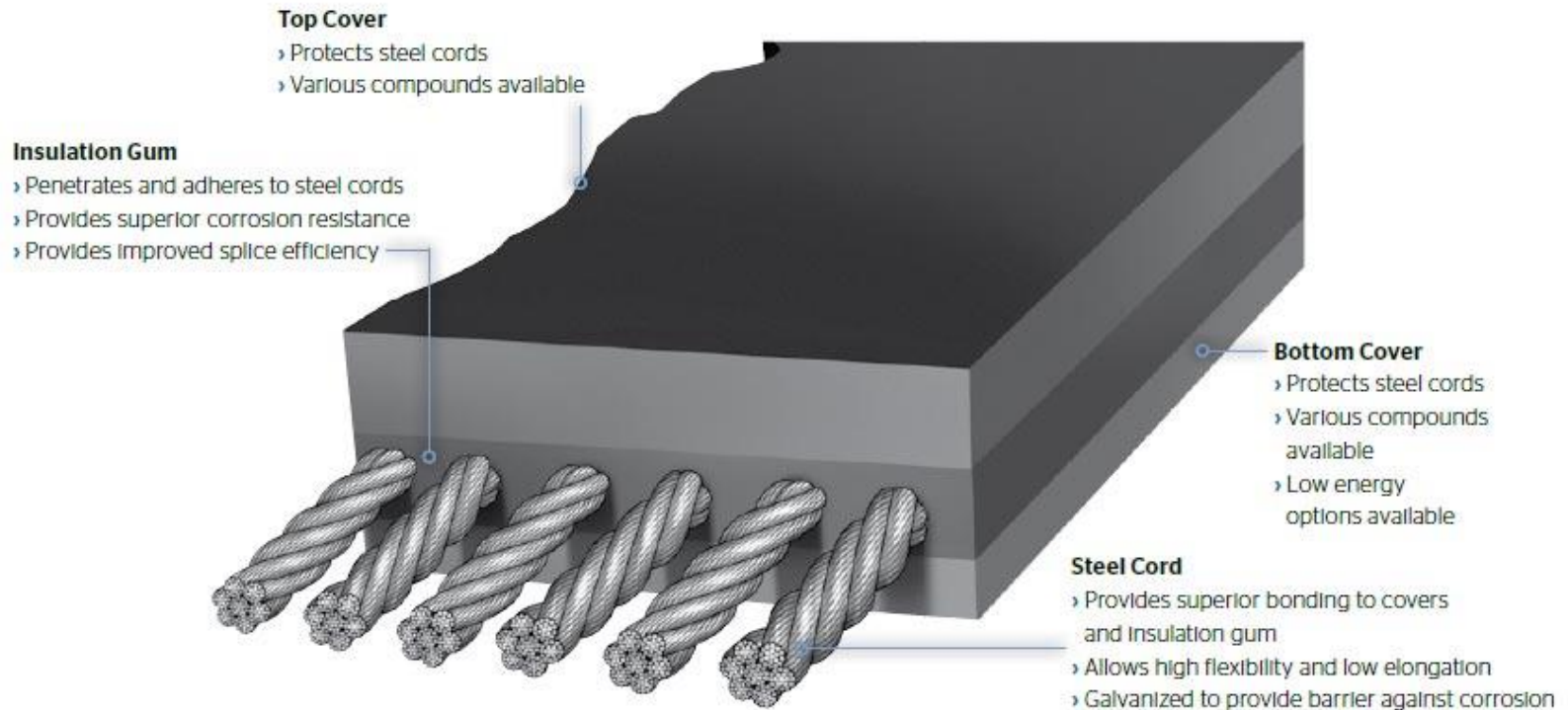
TOPICS COVERED

- Basic Belting Construction
- Basic Maintenance
- Belt Repairs



Basic Belt Construction – Steel Cable

Conveyor Belt Components





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Steel Cable Specification Breakdown

“Flexsteel Stacker” ST3500/48 3/4 x 1/4

**Rubber
Compound**

**Breaking
Tension**

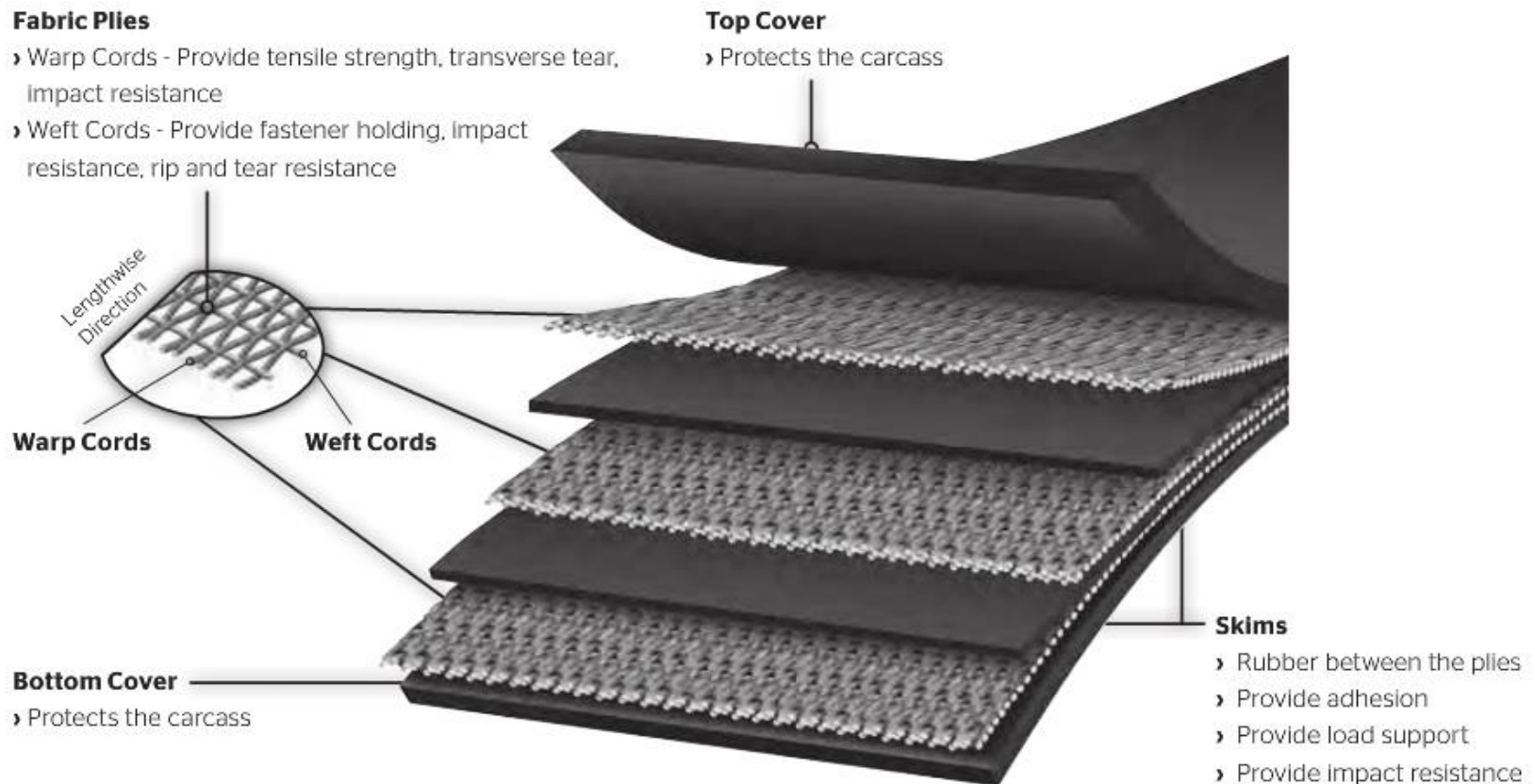
**Top Cover
Thickness**

**Bottom Cover
Thickness**

Basic Belt Construction - Fabric

Fabric Plies

- › Warp Cords - Provide tensile strength, transverse tear, impact resistance
- › Weft Cords - Provide fastener holding, impact resistance, rip and tear resistance



Fabric Belt Specification Breakdown

4/440 1/4 x 1/16 Grd II

of Fabric Plies

Working tension per
inch width (PIW)

Top Cover
Thickness

Bottom Cover
Thickness

Rubber
Compound



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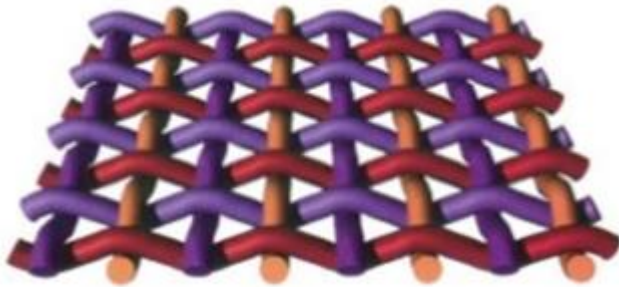
Working Tension

- A belt is rated by the amount of pulling force that it will withstand during operation
- MAXIMUM SAFE WORKING TENSION
RECOMMENDED BY THE MANUFACTURER
- Determined by the fabric
- US uses PIW, operational strength
- The rest of the world uses EP, breaking strength

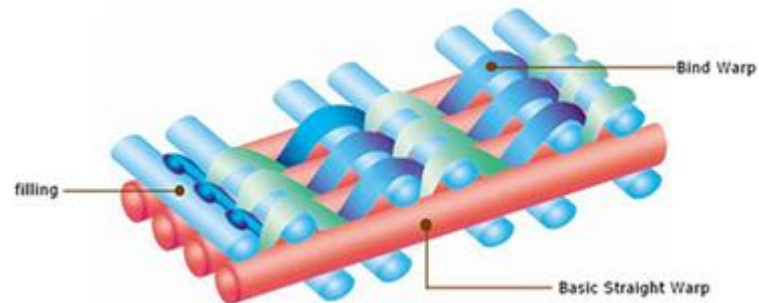
PIW + Safety Factor = Breaking Strength (EP)

Fabric Weave

Regular Weave



Straight Warp



Why does Fabric Matter?

It is the only strength member of the belt.



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Safety Factor

- The ratio between the working and breaking tension
- Provides margin for the extra tension introduced at start-up
- 10:1 safety factor used to be “norm”. Not rare to see 6:1 or 7:1.

Why does this matter?

PIW / SF	10:1	9:1	8:1	7:1	6:1	5:1
125	218.9	197.0	175.1	153.2	131.3	109.5
220	385.3	346.8	308.2	269.7	231.2	192.6
330	577.9	520.1	462.3	404.6	346.8	289.0
375	656.7	591.1	525.4	459.7	394.0	328.4
440	770.6	693.5	616.5	539.4	462.3	385.3
600	1050.8	945.7	840.6	735.6	630.5	525.4
800	1401.1	1260.9	1120.8	980.7	840.6	700.5
1000	1751.3	1576.2	1401.1	1225.9	1050.8	875.7
1250	2189.1	1970.2	1751.3	1532.4	1313.5	1094.6
1500	2941.2	2364.3	2101.6	1838.9	1576.2	1313.5



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Steel Cable Vs Fabric Belt – What do I need?

Steel Cable

- Low Elongation
- More troughability
- Can be made in higher breaking strengths

Fabric Belt

- Cost effective
- Rip resistant
- More readily available
- More splice options (mechanical, hot/cold splice)
- More belt configurations available (cleats, sidewall, etc)



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Rubber Compounds

- **RMA 2** - standard SBR; sand and gravel, aggregate, long overland belts
- **DIN Y** - equivalent of Grade 1, higher abrasion and tensile strength than RMA 2; good for hard rock mining seeing cut & gouge and high abrasion
- **DIN X** - higher abrasion and tensile strength than DIN Y; best for high impact and abrasion in tough applications
- **DIN W** - super high abrasion resistance, but less tensile strength than DIN X
- **MOR** - moderately oil resistant; recycling, grain and wood industries
- **EPDM** - high temp, 400 degree up to 700 degree. No oils present in product mix
- **MSHA K** - old msha grade part 18, only for above ground use
- **MSHA UG** - new msha grade part 14, underground approved

THE RUBBER IS ONLY PRESENT TO PROTECT THE FABRIC CARCASS, IT IS NOT A STRENGTH MEMBER AND MORE IS NOT ALWAYS BETTER!



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How do I know what belt I should use?

- Replacing exactly what is on the system can be dangerous, if you aren't considering any changes made to the operation.
- Factors that influence belt selection;
 - Minimum pulley diameter
 - Pulley wrap & lagging
 - Troughability
 - Type & Style of return
 - Pulley
 - Incline
 - Slider bed or troughed rollers
 - Overall length
 - Height of incline
 - Weight of material
 - Belt Speed
 - Loading zone

What happens if I install the wrong belt?

- Belt may wear faster than expected
- Belt may fail catastrophically
- Rubber compound may become spongy
- FIRE!
- Cleats and/or Sidewall may separate from belt
- Splice or fasteners may fail



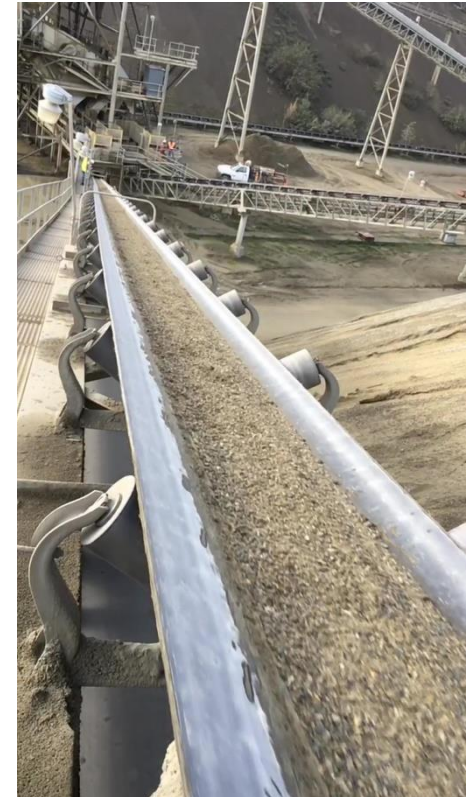
System Considerations

- A well designed system is critical to long term hassle free operation
- Evaluate your system on an annual/bi-annual basis noting changes in;
 - Product mix
 - Capacity
 - Operating hours
 - Maintenance program
 - Belt speed
 - Loading design
- Consult a professional to ensure no changes need to be made to system



Belt Tracking / Training

- Conveyor belt moves toward the end of the roller/idler it contacts first
- Check belt splice for accuracy and straightness
- Observe belt in operation empty and loaded for tracking tendencies
- Eliminate Spillage, Off-center loading and build-up of materials, factors that cause tracking issues
- Make one change at a time, observe belt in operation and note changes.



Inspections

- Plan a routine inspection during shut-downs.
- Inspect:
 - Rollers, Pulleys, Return rollers & belt guides for excessive wear, built up material and damage.
 - Belt Splice for wear on lace, cracks, missing components.
 - Sidewall and cleats for damage and missing sections
 - Tracking properly, going off consistently in one location OR one spot on the belt off consistently.
 - Tension - too tight or too loose
 - Spongy – belt has been exposed to oils or other contaminants



Cleaning

Good housekeeping is critical to proper operation.

- Product build-up will interfere with conveyor operation
- Makes access to system hard / impossible.



Belt Repairs

- Belt damage happens, now what?
 - Bolt Plate Fasteners
 - REMAGOO
 - RG 7000
 - Patches
 - Repair Strips
 - Saddle Sections



Belt Repair – Bolt Plate Fasteners

Pros

- Fast install
- Inexpensive
- No cure time

Cons

- Can't use with scrapers
- Wear idlers unevenly
- Not water/small particle tight
- Can catch on system and create damage
- Short term repair solution



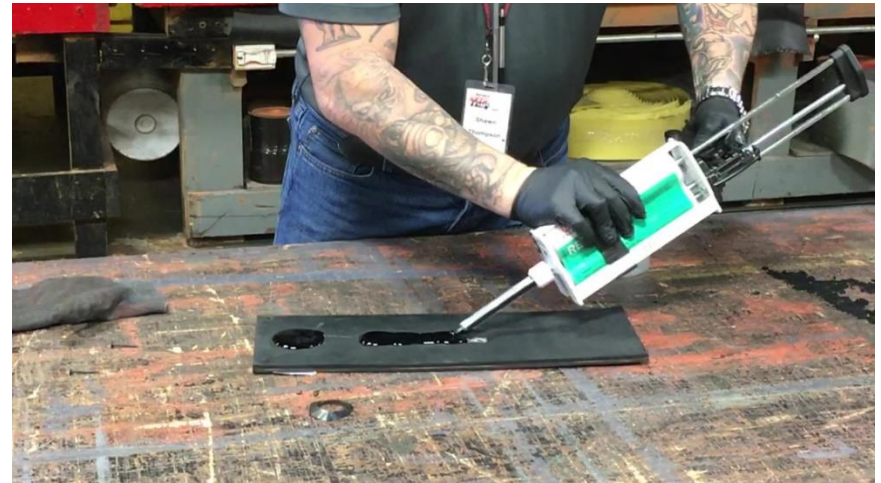
Belt Repair – REMAGOO

Pros

- Easy to use
- Cost Effective
- Water tight
- Can be used with scrapers

Cons

- Must be installed on flat surface
- Cure time



Belt Repair – RG 7000

Pros

- Easy to use
- Water tight
- Can be used with scrapers
- Can be installed on vertical surfaces
- Fast cure time

Cons

- More prep time



Belt Repair - Patches

Pros

- Easy to use
- Cost Effective
- Water tight
- Can be used with scrapers
- With or without fabric reinforcement
- Long term repair solution

Cons

- Limited to size of patch
- Requires more craftsmanship



Belt Repair – Repair Strips

Pros

- Minimal Cure Time
- Longitudinal Rips
- Water Tight
- Can be used with scrapers

Cons

- Time consuming
- Requires more craftsmanship



Belt Repair – Saddle Sections

Pros

- Can be mechanical or vulcanized in to belt run
- Cost effective if belt is in good condition
- Long term solution

Cons

- Requires longer section of belt
- Can create tracking issues
- Requires matching belt specs





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Who should be responsible for Maintenance?

- Everyone should know what to report.
- We recommend;
 - Designated maintenance personnel should be the only people making changes to the system, including;
 - Belt Tensioning
 - Adjustments to speed
 - Tracking the belt

A conveyor system is dynamic and changes to one area can have a drastic impact on the system.



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What more in-depth training?

- NIBA (The Belting Association) offers a 3T (Track, Train & Troubleshoot) Class that digs deeper into all aspects covered here.
- Next Class is; May 1-2 in Decatur, GA
- Check out www.NIBA.org for more information





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Q & A



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Thank you for your time!