



GROUP

Harburg-Freudenberger
Maschinenbau GmbH

Technical Improvement Program (TIP)
for TBMs

TIP No. 01.001

Machine

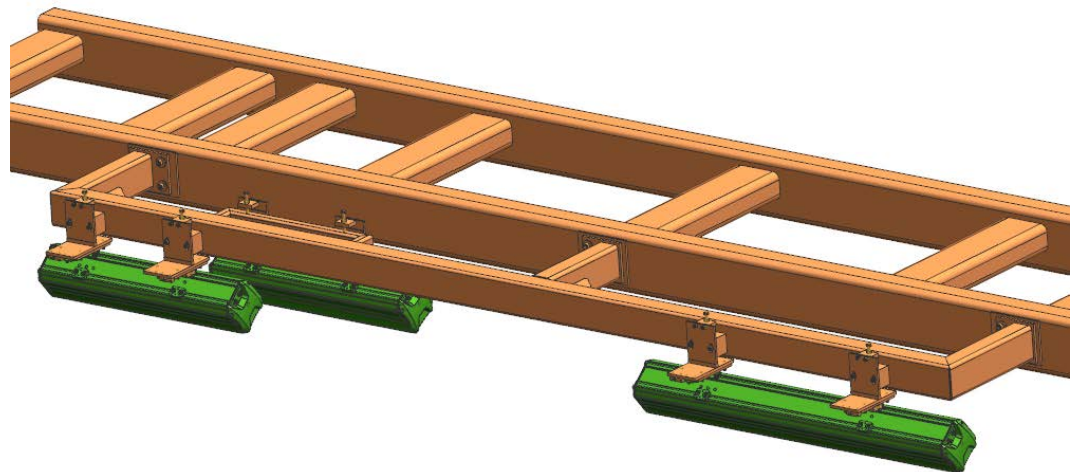


Laser adjustment: LAP System

Old laser system replaced with new automatic LAP System

advantages / benefits

- Faster and automatic adjustment
- Less downtime
- Recipe controlled



TIP No. 01.002

Machine

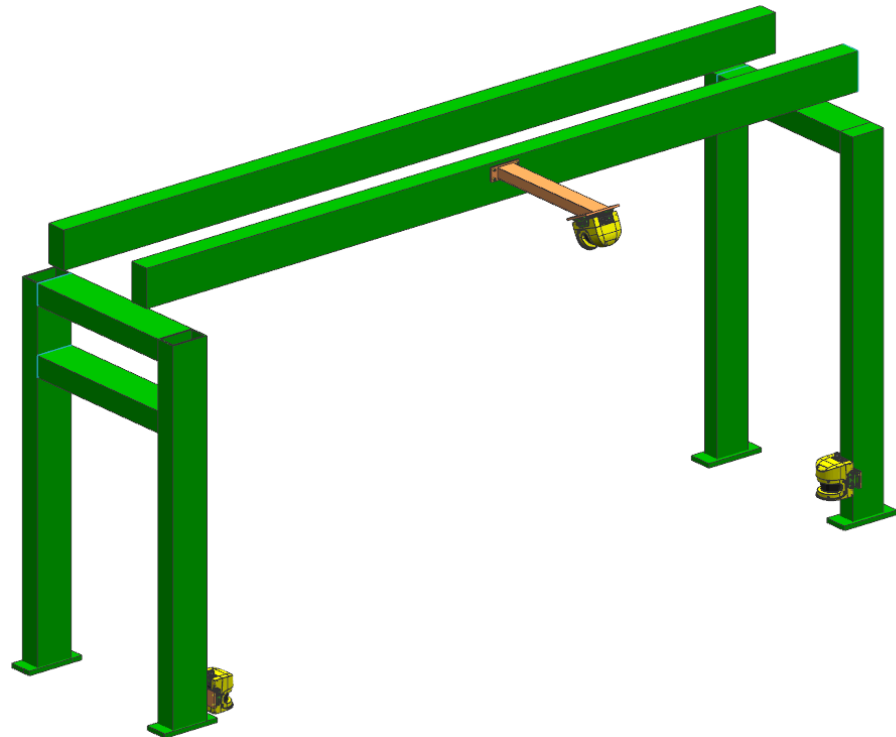


Safety scanner system

New safety system with Sick safety scanner

advantages / benefits

- Optimized safety system
- Less downtime
- New components



TIP No. 01.004 Machine

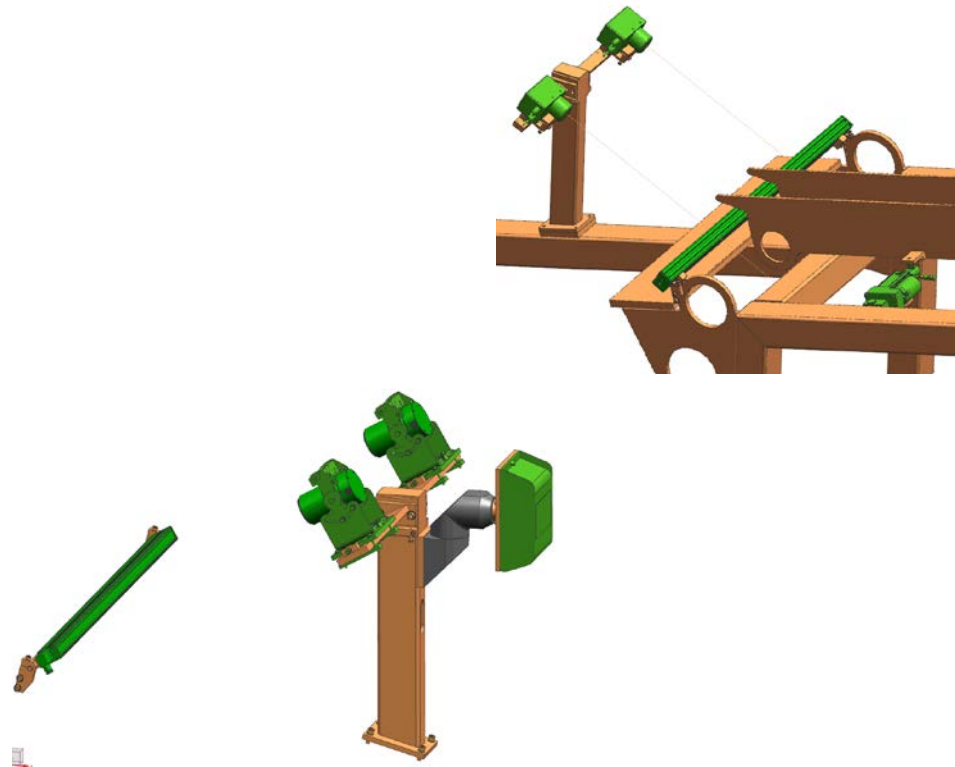


BST Upgrade (complete machine - 4 cameras)

*Centering System Upgrade to BST ProLogic CPU 32 system.
Belt Server and Ply Server. New ProLogic, Commander EKR and Cameras.
Without adjustment unit.*

advantages / benefits

- Replacement of obsolete camera type
- Spare parts available
- Improvement of control quality
- Use of reflector roll or strip
- Easy to replace or cleaning of reflector
- Independent of conveyor belt dirtiness
- Use of LED lights possible



TIP No. 20.002

Belt Server

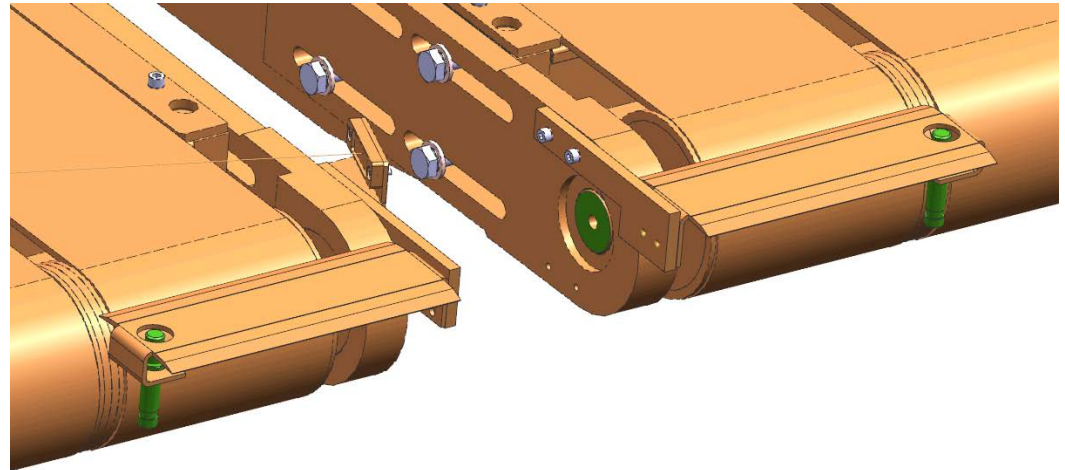


Run on material detector

Proximity switch on applicator to detect non-application of breaker material

advantages / benefits

- Detection of breaker material in case of wrong applicator setting
- Avoidance of building tire without breaker material



TIP No. 20.003

Belt Server

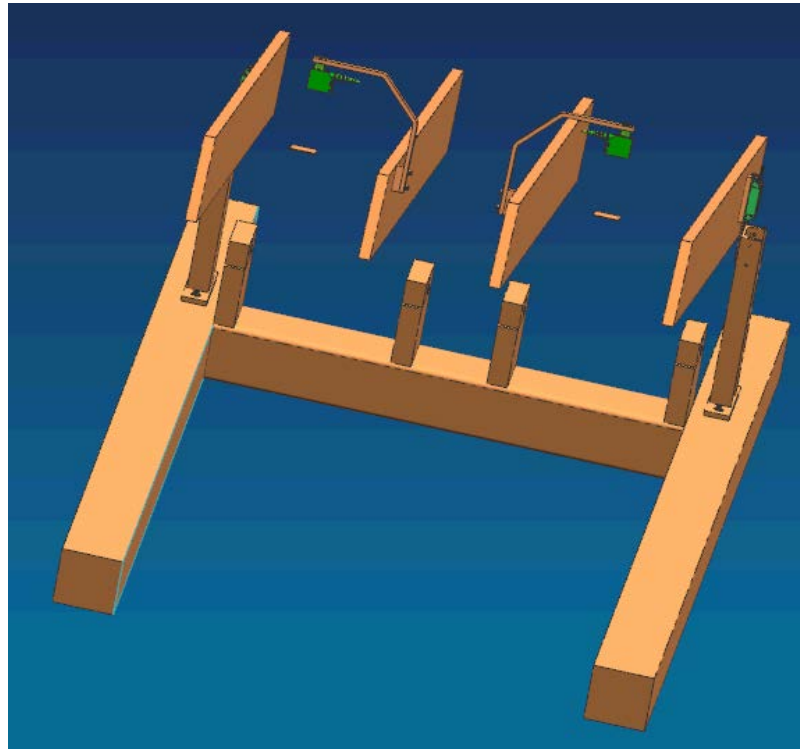


Length measurement photo eye

New length measurement photo eye with reflector

advantages / benefits

- Easy to adjust and maintain
- Measurement point is indicating by laser light
- Very fast to get good accuracy
- Improvement of quality



TIP No. 20.004 Belt Server

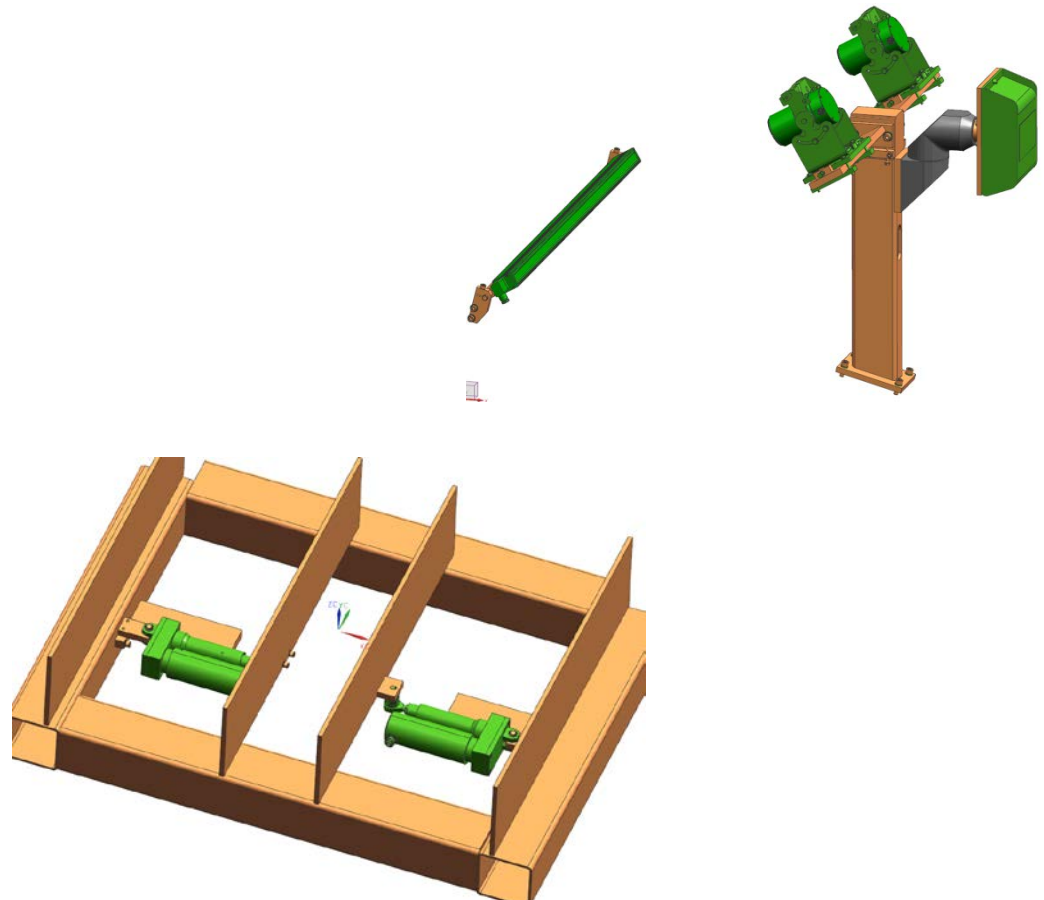


E+L Upgrade (Belt Server)

Change camera system to E+L type

advantages / benefits

- Change to E+L
- Following company rules
- Spare parts available



TIP No. 20.005

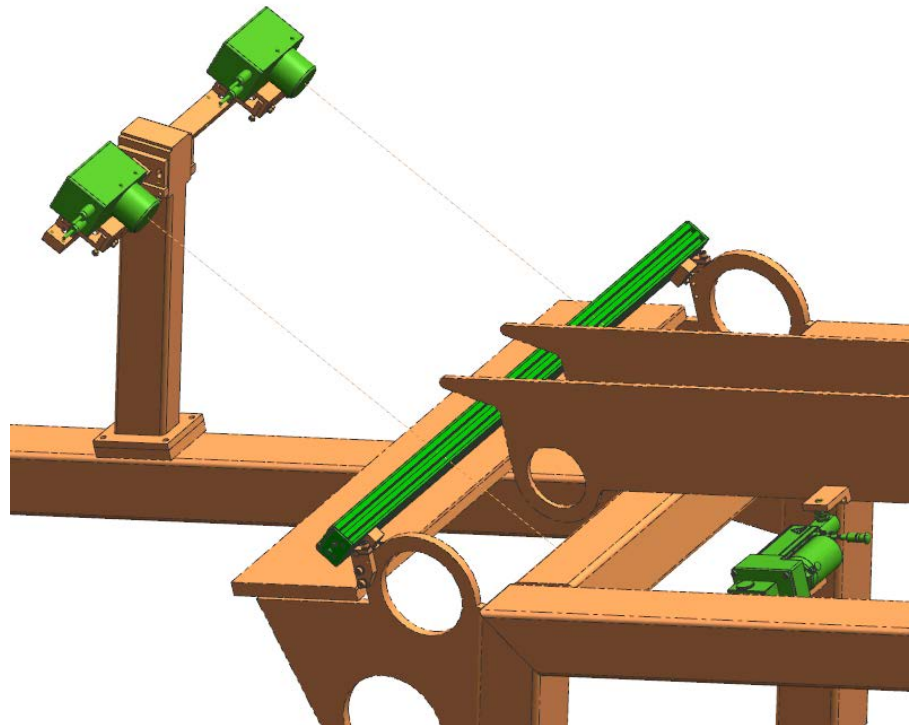
Belt Server

BST Upgrade (Belt Server)

Change camera system to BST type

advantages / benefits

- Replacement of obsolete camera type
- Spare parts available
- Improvement of control quality
- Use of LED lights possible



TIP No. 20.006 Pre Cut Tread Server

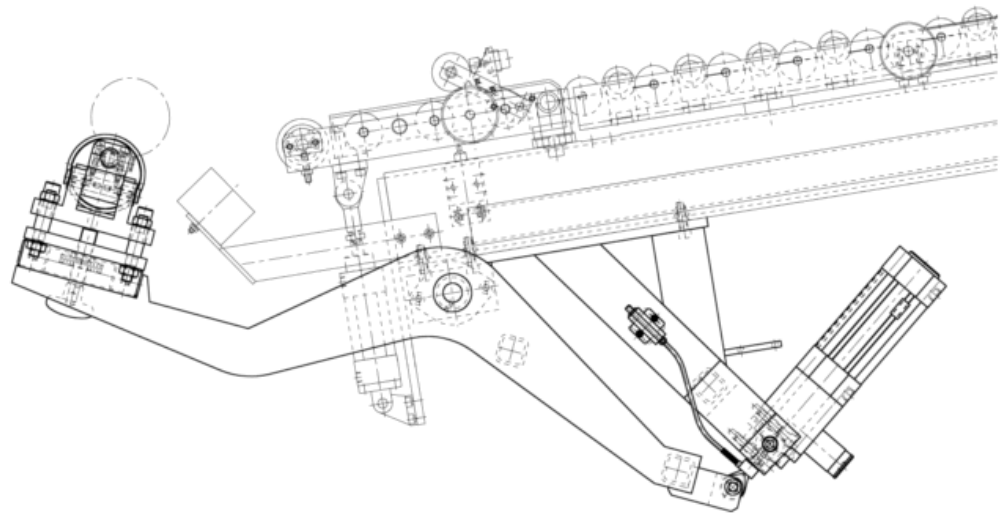


Multidisc roller

Multidisc roller pneumatically driven

advantages / benefits

- Optimized splice
- Constant tire quality
- Recipe controlled



TIP No. 20.007

Pre Cut Tread Server

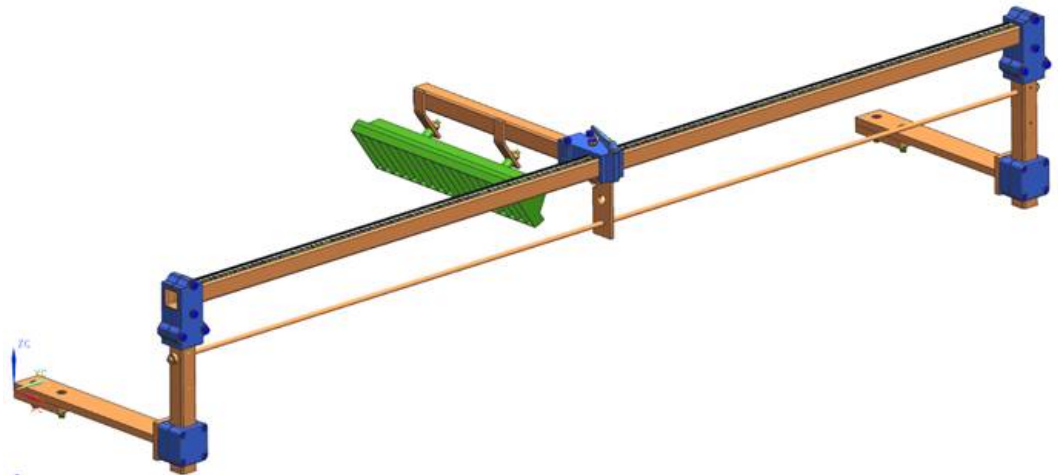


Splice heating

Splice heating at front and back side of tread

advantages / benefits

- Optimized splice
- Increase tackiness of tread
- Reduce splice heating time
- Improvement of quality



TIP No. 23.001

Belt Server

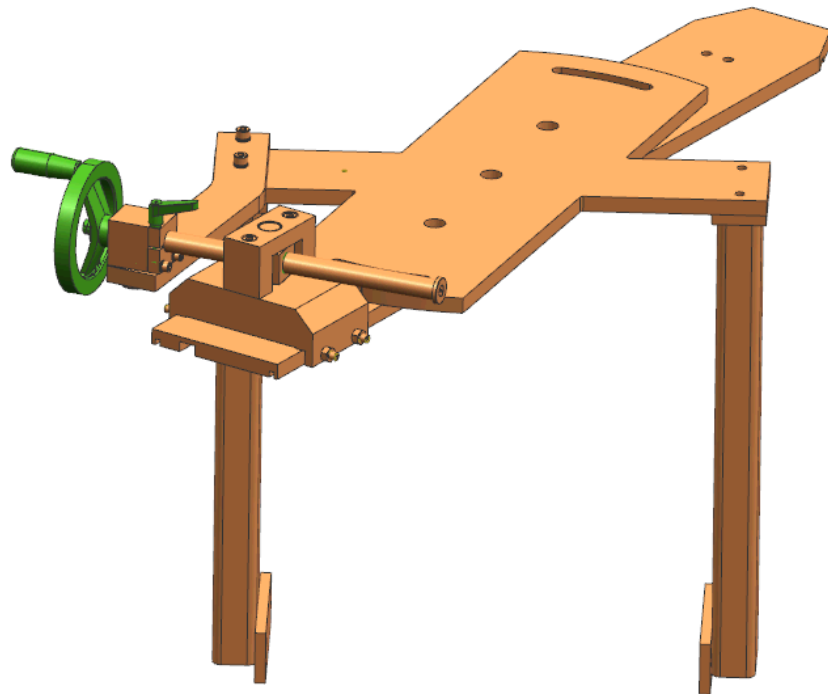


Angle adjustment

Adjustment by spindle and hand wheel

advantages / benefits

- Easier access
- Exact and easier adjustment
- Easy setup for recipe change
- Save time during dimension change



TIP No. 23.002

Belt Server

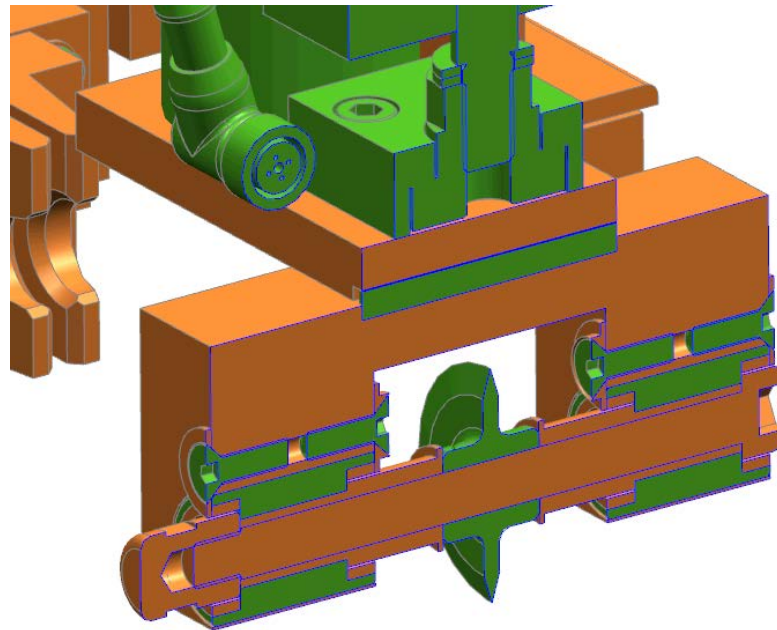


Pizza knife floating version

Lateral movement of knife to compensate angle deviation in breaker material

advantages / benefits

- Safer cut
- Follows small angle deviations
+/-1degree
- No cord jumping
- No miscuts
- More stable / continuous
production
- No blank cords



TIP No. 23.003

Belt Server

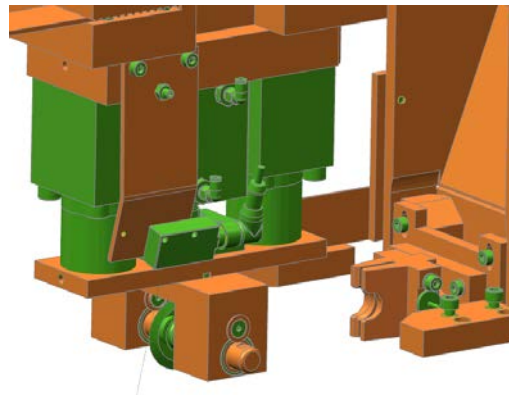
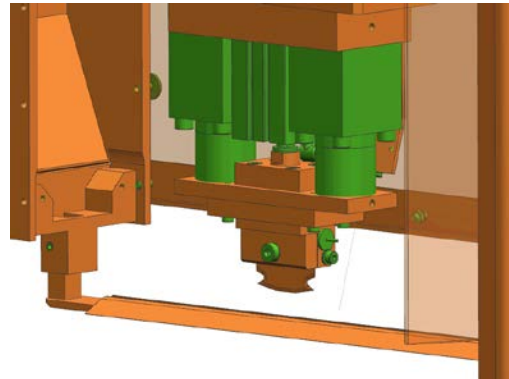


Hook knife

Change Pizza knife to hook knife including heating

advantages / benefits

- Knife is always heated
- Allows bigger cord angle deviation
- Some cords get blank
- Avoid stops of miscuts



TIP No. 33.001

Transfer ring

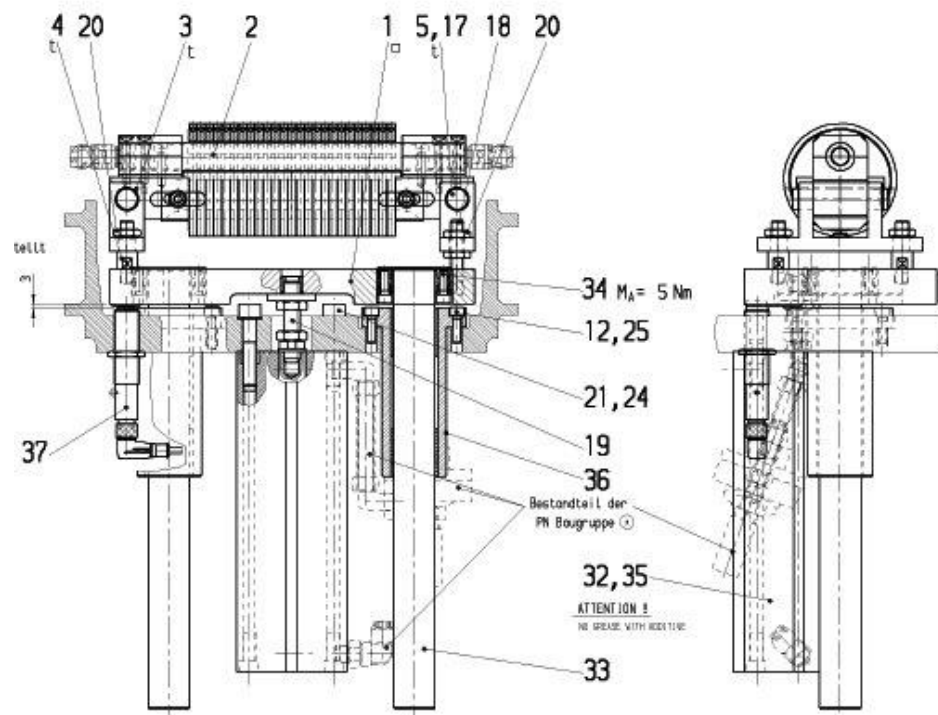


Multidisc roller for stitcher

Exchange existing stitcher with multidisc roller

advantages / benefits

- Optimized stitching
- Better splice quality in wing area
- Improvement of quality



TIP No. 33.002

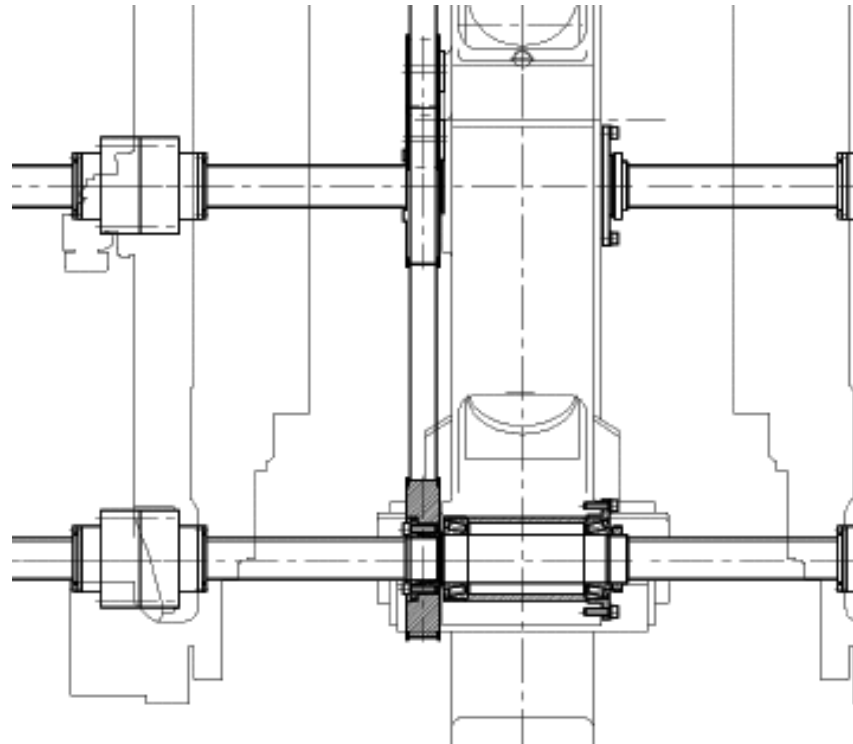
Transfer ring

Belt drive for pusher device

More resistant drive belt

advantages / benefits

- Optimized durability
- Less downtime
- More force for push-over cycle



TIP No. 33.004

Transfer ring

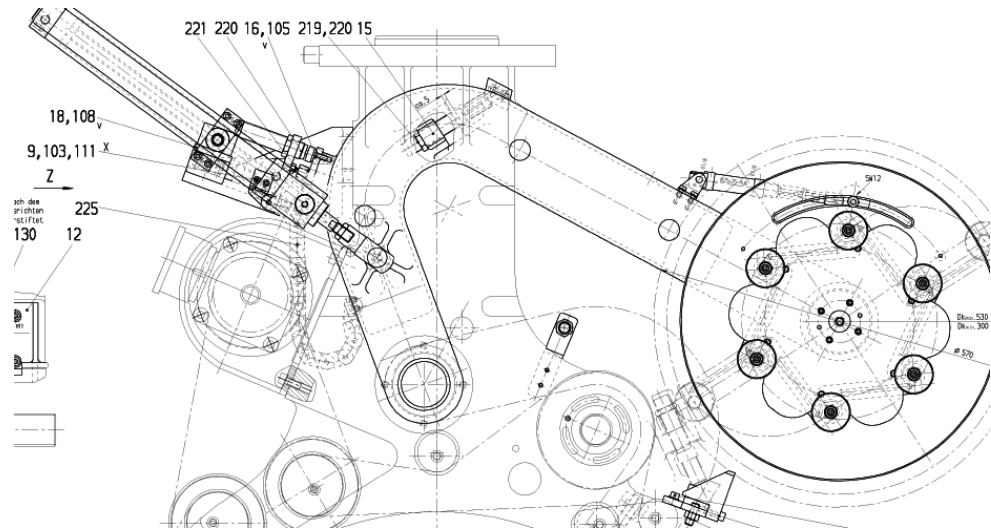


Bead setting device

Pneumatic cylinder replaced with electric actuator

advantages / benefits

- Decreasing of cycle time
- More precise
- Less problems with shocks
- Less vibration
- Easier to set up



TIP No. 40.001

Ply Server

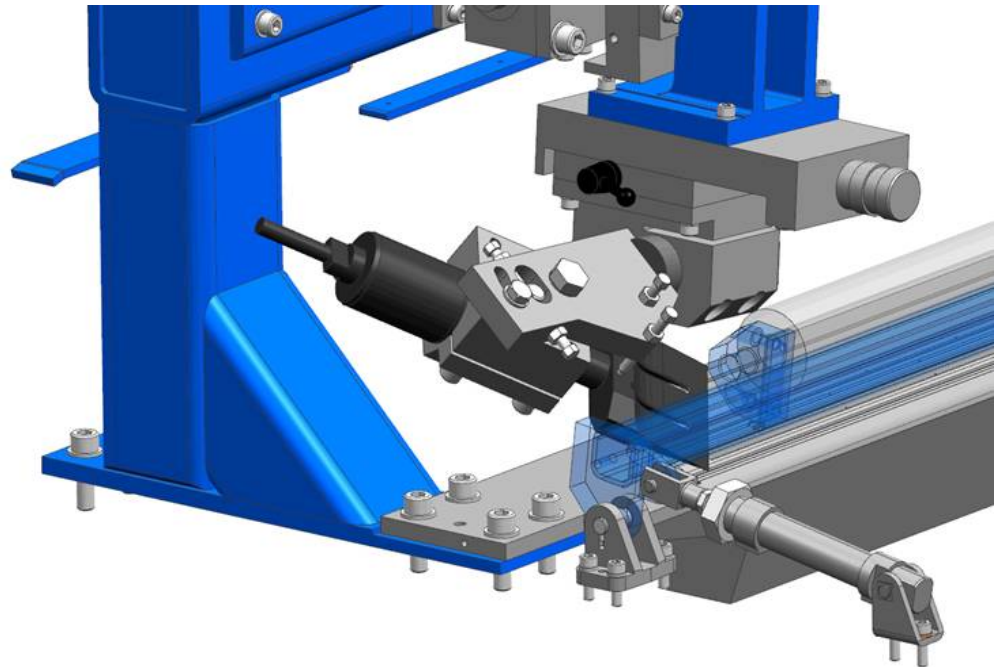


Ultra Sonic PA knife

*Replace circular blade with Ultra Sonic PA knife.
Replace drive with servo drive*

advantages / benefits

- Better Splice
- Perfect cut
- No abrasion of material
- Simple to adjust to new material
- Narrow angle of cut
- Long lifetime
- Uses both edges of knife



TIP No. 40.002

Ply Server

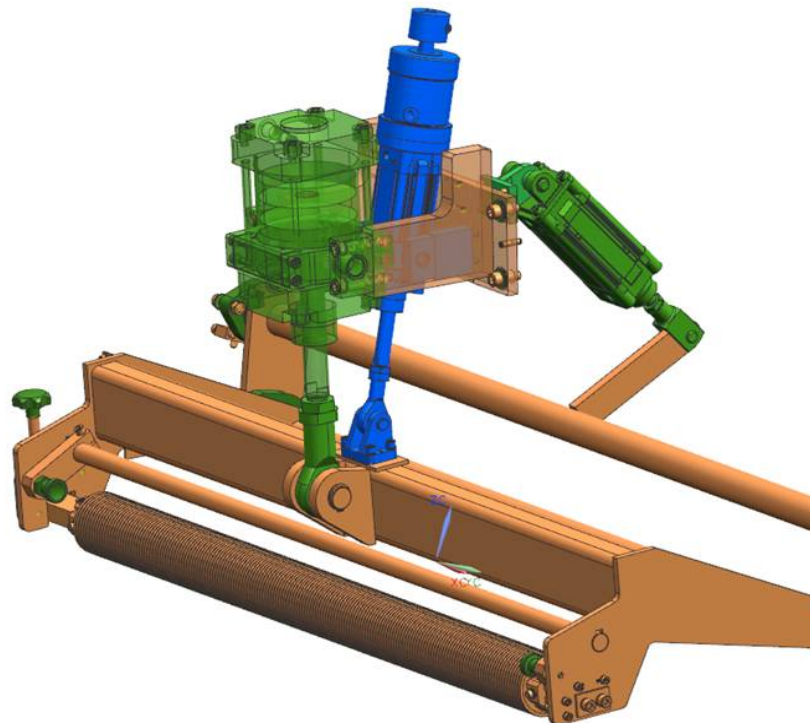


Multidisc roller and Hollow piston cylinder

Old cylinder replace by cylinder with mechanical adjustable lifting

advantages / benefits

- Hollow piston cylinder with stop block
- Exact run of material
- Adjustable to layer thickness
- No influence of weight of multidisc roll during application
- Better adjustment to contour of materials
- Less air traps between layers
- Less splice inspections by operator



TIP No. 40.005

Ply Server



Different surface type of foam (sponge)rolls

Foam roll covered with Perkal (cotton fabric)

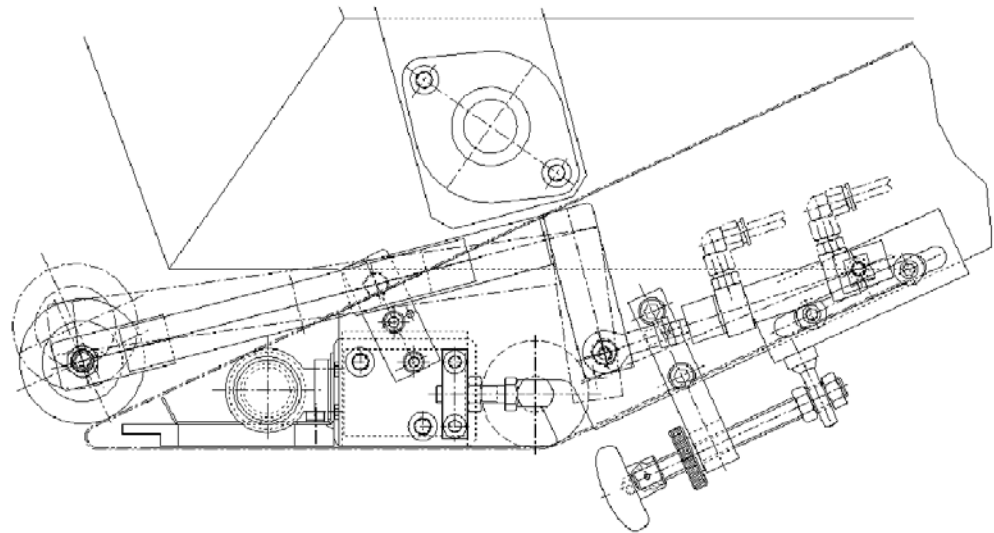
advantages / benefits

Adjustable roll

- Less influence of splice offset
- Improvement of application quality

New type of foam roll

- Longer lifetime



TIP No. 40.006

Ply Server

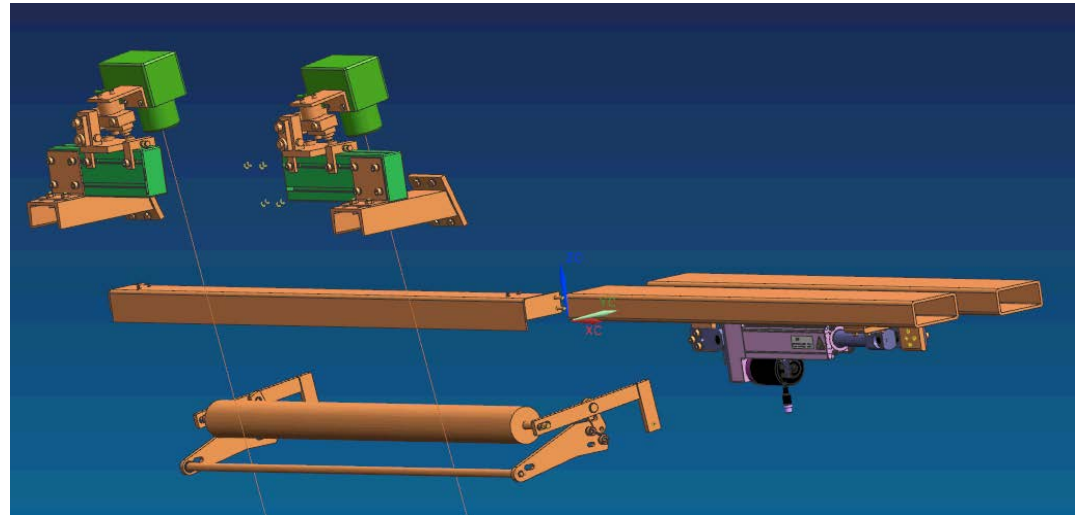


BST Pro system

Center control upgrade for new BST Pro System camera and adjustment unit

advantages / benefits

- Replacement of obsolete camera type
- Spare parts available
- Improvement of control quality
- Use of reflector roll or strip
- Easy replacement or cleaning of reflector
- Independent of conveyor belt dirtiness
- Use of LED lights possible



TIP No. 40.007

Ply Server

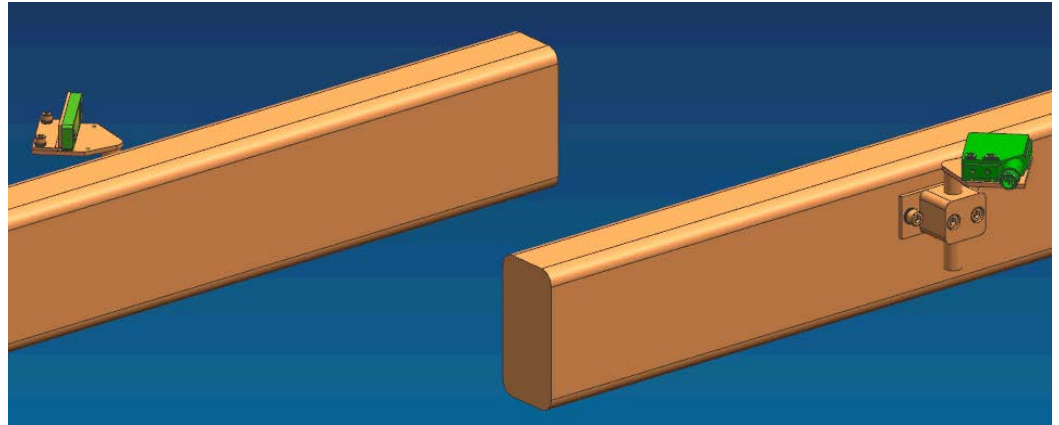


Light curtain

*Light curtain installed diagonally above material to detect material jam.
PA and BP material flow*

advantages / benefits

- Ensured detection of material jam
- Avoid damage of cutting device
- Improve quality of green tire



TIP No. 40.009 Ply Server

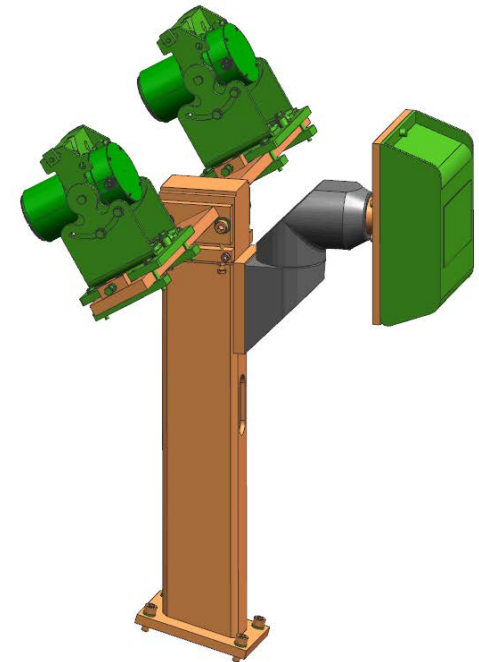


E+L Camera System

Installation of E+L Camera System

advantages / benefits

- Change to E+L
- Following company rules
- Spare parts available



TIP No. 40.012

Ply Server

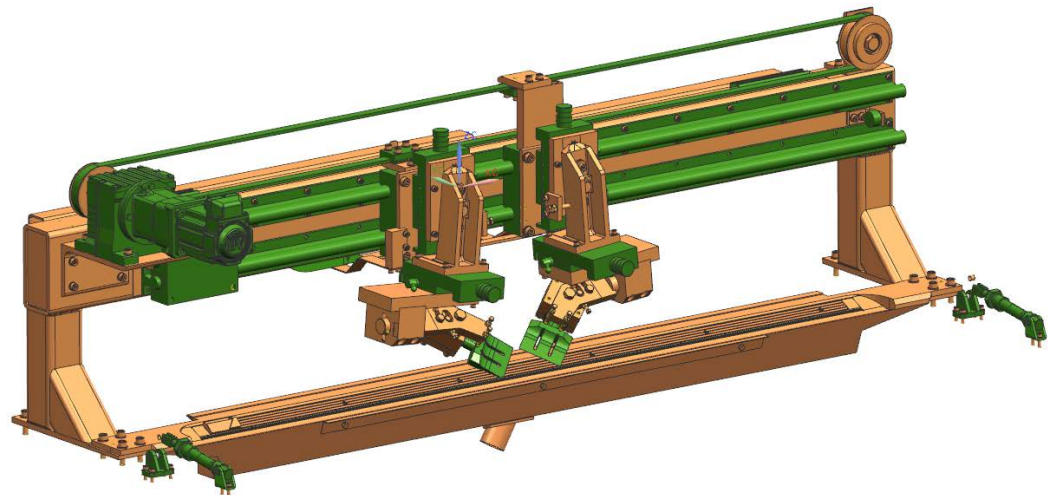


SW Cutter

Second cutter unit to improve cutting cycle for complex SW components

advantages / benefits

- Decreasing of cycle time
- Symmetrical cut profile
- Only 1 Servomotor use
- Knife base and guiding can be reused with modification



TIP No. 46.001

Ply Server

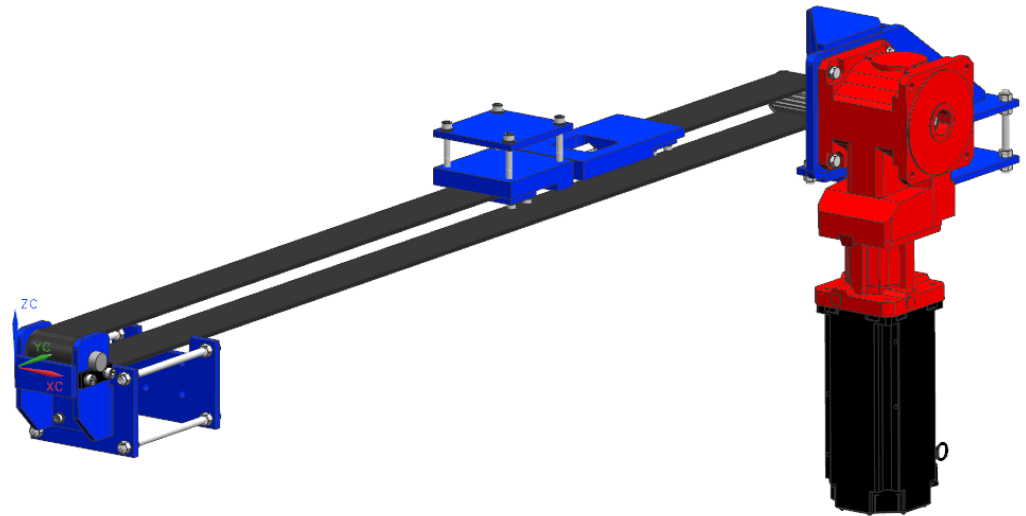


PA-Conveyor with belt drive

Replace pneumatic cylinder with servo drive and belt drive

advantages / benefits

- Safe solution
- Easy to adjust
- Needs no maintenance
- Easy to replace / install air cylinder
- No shock absorber failures
- Reduction of cycle time forward / reverse



TIP No. 56.001

Ply Server

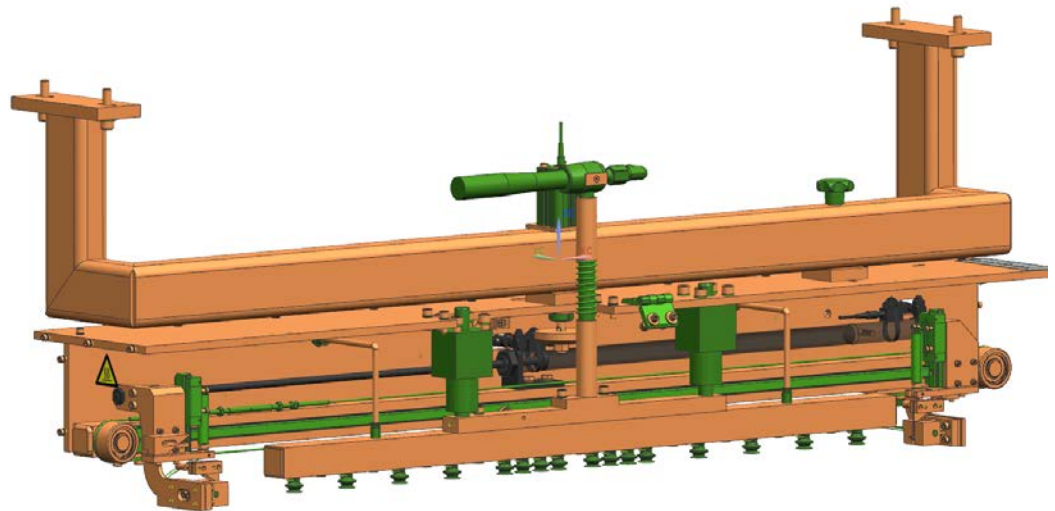


BP knife

BP hook knife servo controlled instead of pneumatic cylinder (alternative)

advantages / benefits

- Faster and more precise
- Servo controlled
- Improvement of quality



TIP No. 56.002 Ply Server

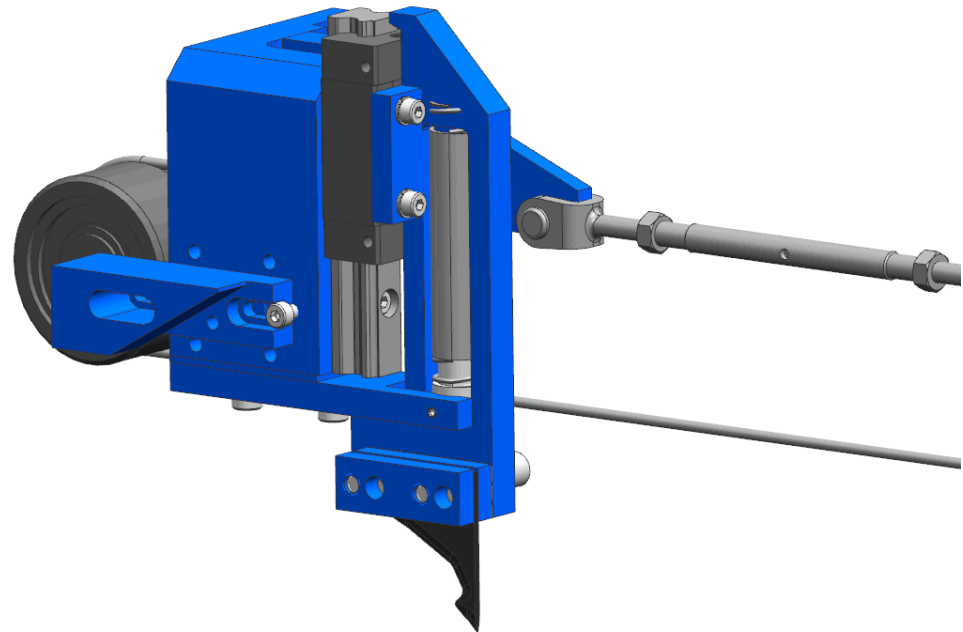


BP knife guiding

Knife guiding replaced with linear guide

advantages / benefits

- Precise guiding of knife
- Avoid cut problems \leftrightarrow 90 degree BP material
- Less cutting problems
- Less readjustments during production



TIP No. 62.001

Tread TOOS Reel Tread

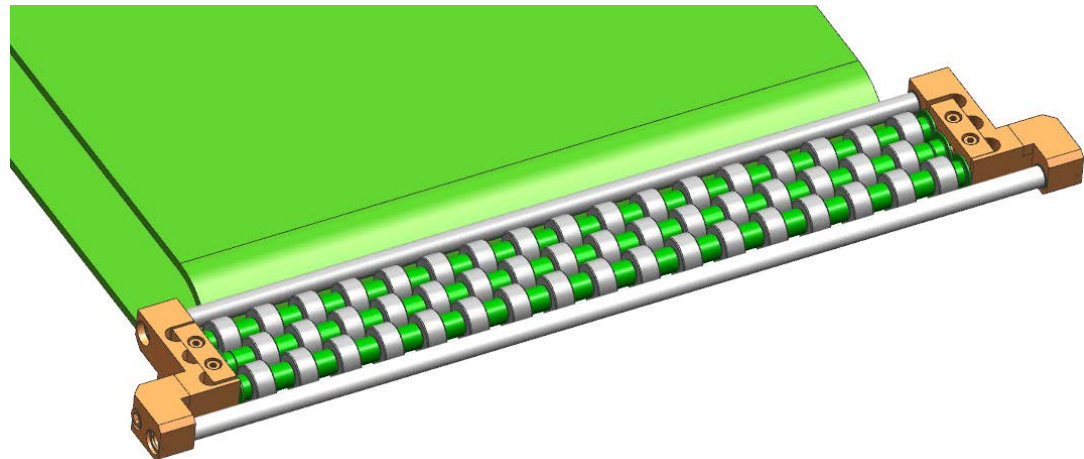


Roller guides in applying device

Different applying device design

advantages / benefits

- Improved safety of tread transport
- Avoid tread jam between rolls
- Quick exchange of centering roll
- Less downtime



TIP No. 71.001

JLB Server applying device

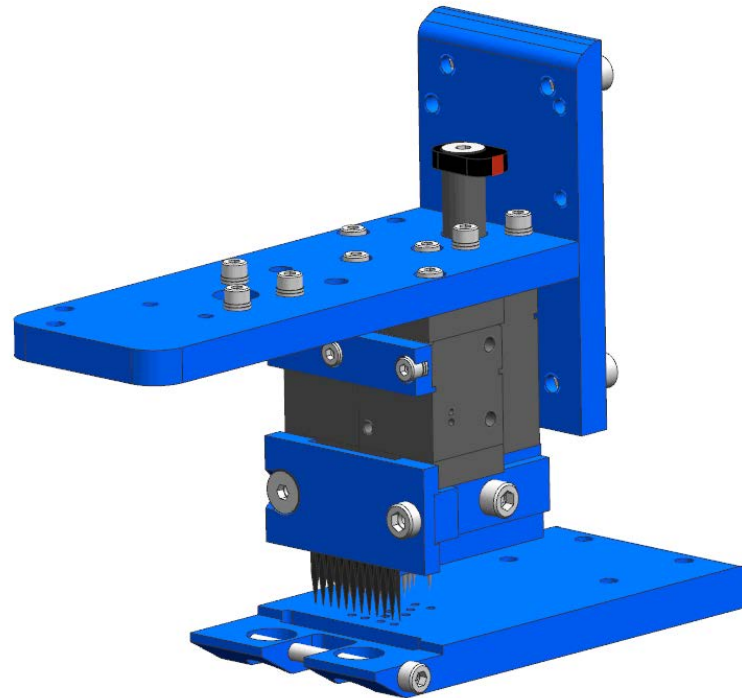


Special JLB knife nylon aramid

Modification of JLB head to special knife

advantages / benefits

- Cutting of Nylon or Aramid JLB / SOL material



TIP No. 71.002

JLB Server applying device

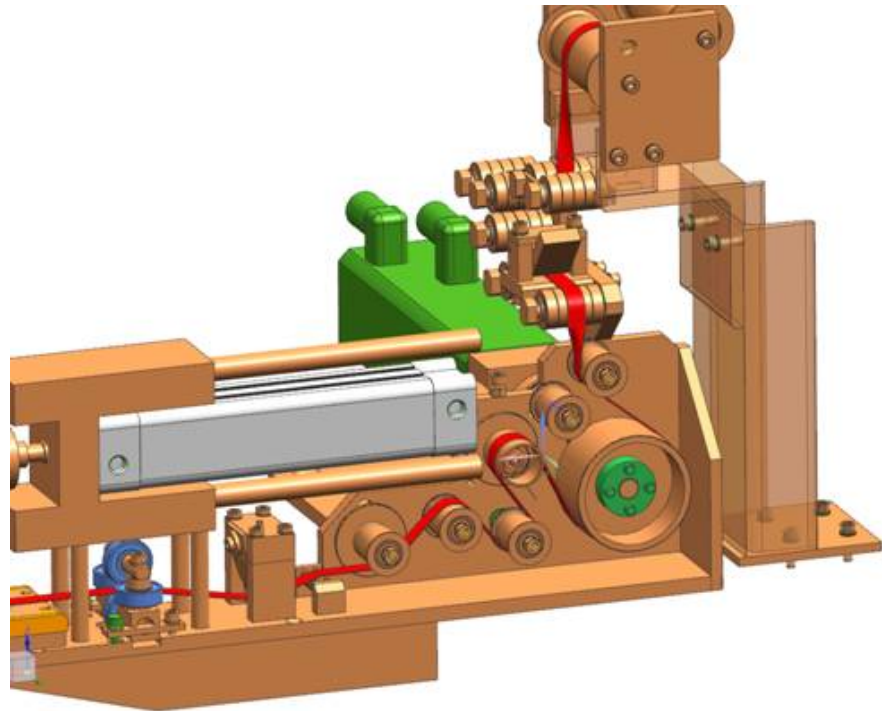


Tension control of JLB

*By pressure measuring device.
With new position of the material return stop*

advantages / benefits

- Display and / or recording of tension during application



TIP No. 71.003 JLB Server applying device

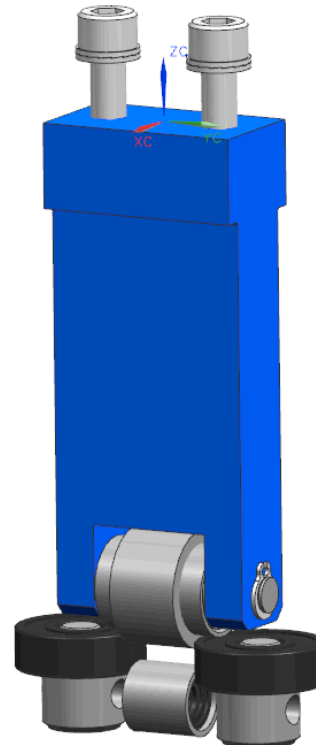


JLB head guiding device

Conversion kits for different width of JLB

advantages / benefits

- Exact JLB guidance



TIP No. 71.004

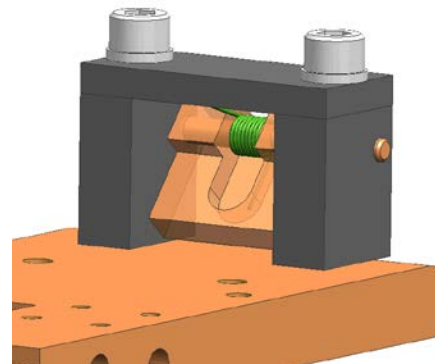
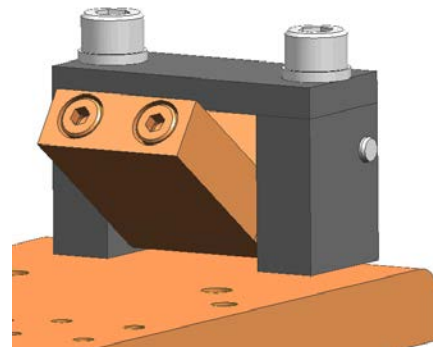
JLB Server

JLB Return stop

Different design of return stop

advantages / benefits

- Less material strip vibration
- Improvement of application quality
- Noise reduction
- Independent of material width



TIP No. 79.001

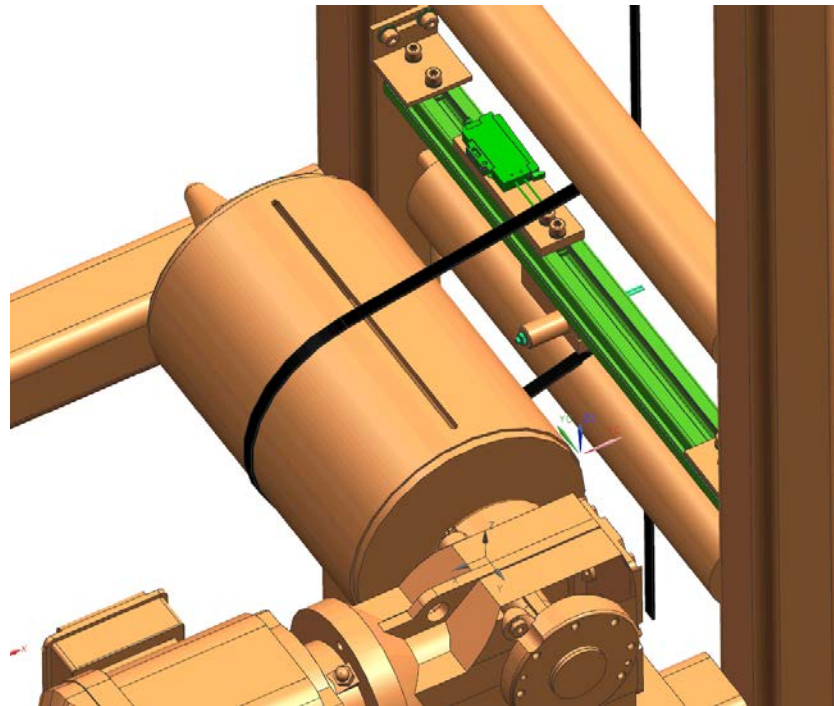
JLB Server

Material jam detector

Detector on JLB drive roll

advantages / benefits

- Avoidance of part damaging
- Detection when material is wrapped around drive shaft



TIP No. 79.003

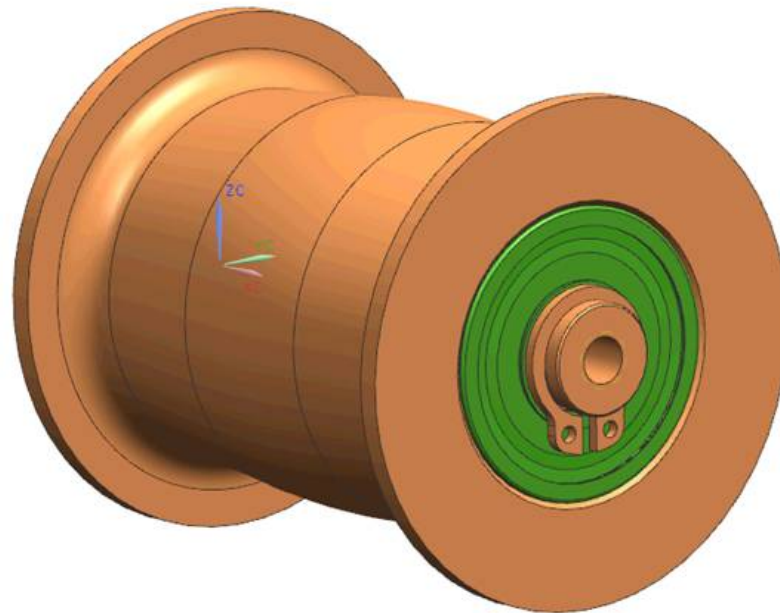
JLB Server

Dancer return rolls

Optimized return roll design

advantages / benefits

- Longer lifetime



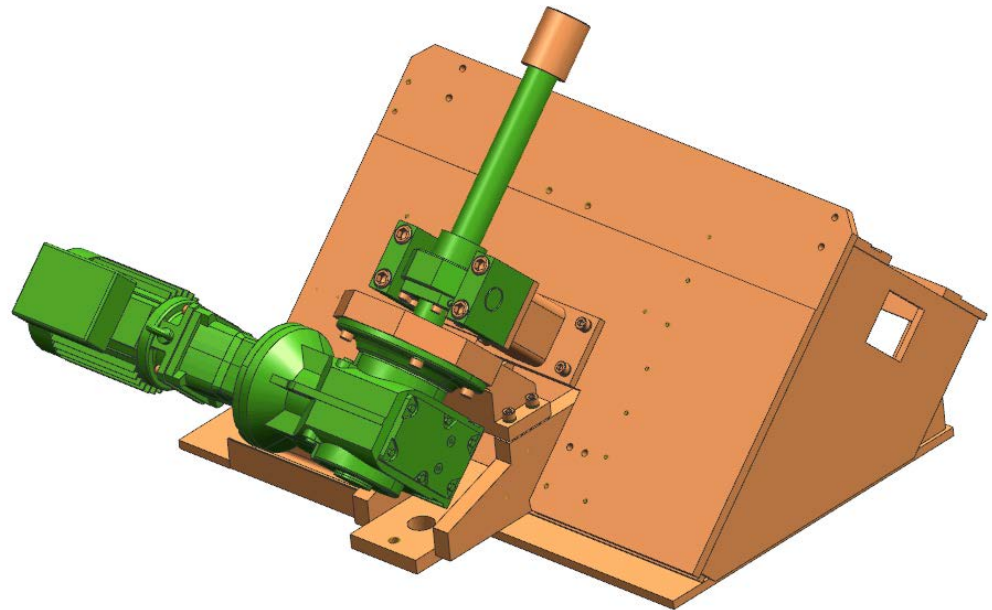
TIP No. 81.001 Shoulder roll unit

Ball screw drive for shoulder stitching

Change trapezoidalspindle to ball screw drive

advantages / benefits

- Easy to maintain
- Longer life time
- More precise





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