Harvester Maintenance and Seed Cotton Storage

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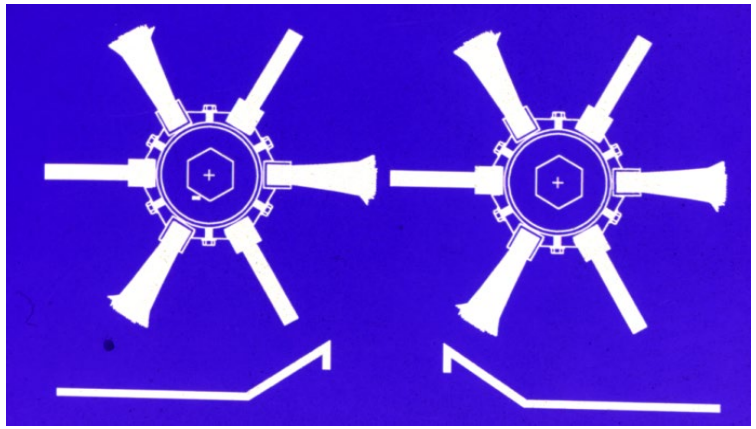
Topics

- Stripper Harvester Setup/Maintenance
  - Basket Strippers
  - CS690 Strippers
    - Calibrations
- Wrap System Maintenance
- Module Handling and Wrap Concerns
- Storing Seed Cotton in Conventional and Round Modules
  - Moisture
  - Storage Locations

COTTON STRIPPERS

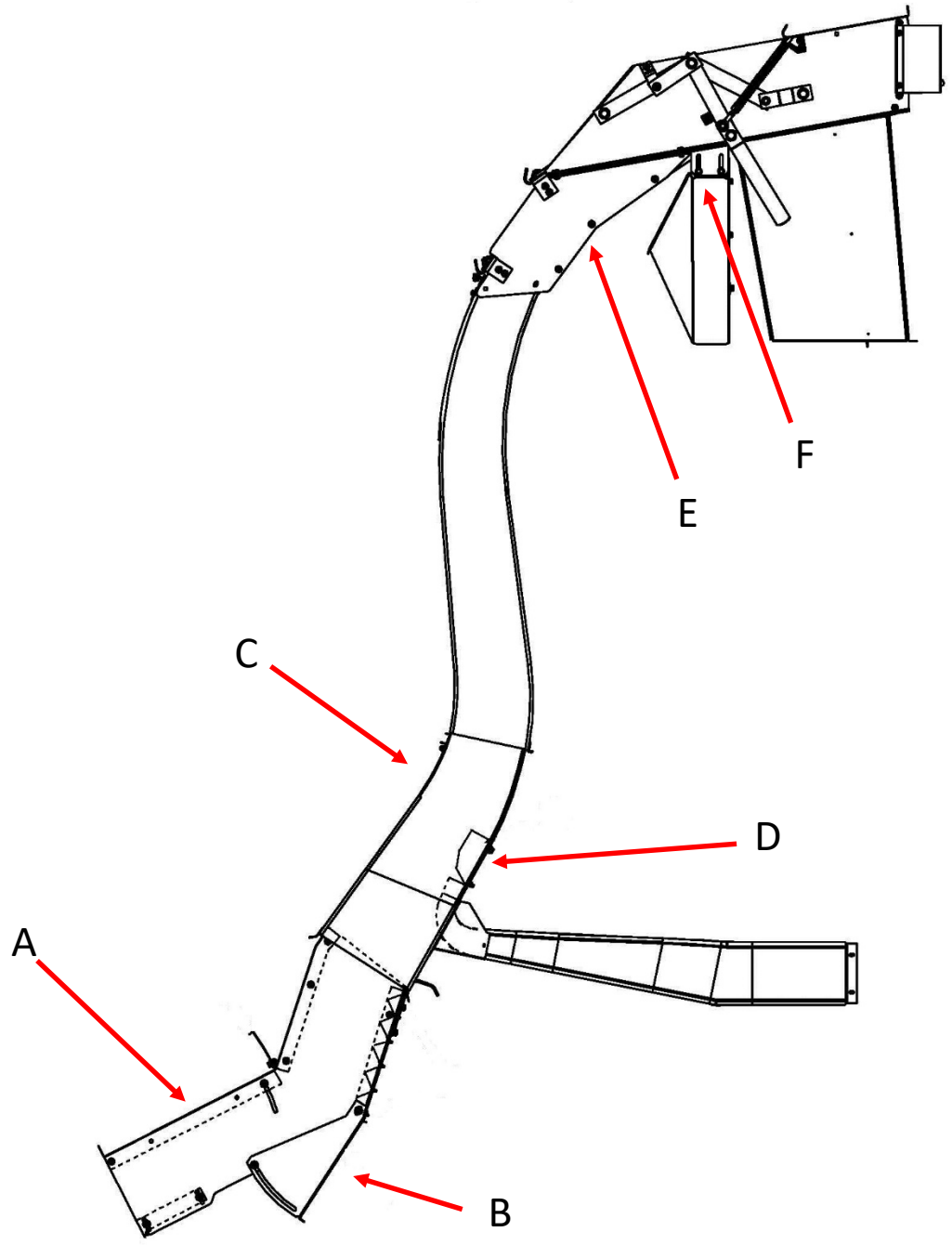
Stripper Setup and Maintenance

- Brushes and Bats remove open bolls, closed bolls, sticks, leaves, etc. from plants
  - “Non-selective” Harvest Method
- Factors Influencing Stripping Efficiency, Foreign Matter Content, and Field Productivity
  - Crop Condition
    - Desiccation/Defoliation
  - Weather/Moisture
  - Plant Size and Shape
  - Machine Settings
    - Header/Unit Height
    - Stripper Roll Spacing
    - Brush/Bat Sequencing
    - Air System Setup
    - Field Cleaner Grid Bars



Air System Setup

- Lower section
  - Lower panel to increase green-boll/rock separation (A)
  - Lower door adjustment (B)
    - More/Less vacuum on header discharge
- Mid Section
  - Air bleed door (C) and internal vanes (D)
    - Cotton distribution across full cleaner width
- Upper Section
  - Top inner duct panels (E)
    - Can be removed to help with plugging
  - Upper green boll/rock separation (F)
    - Can raise to skim off more bolls/rocks




Field Cleaners
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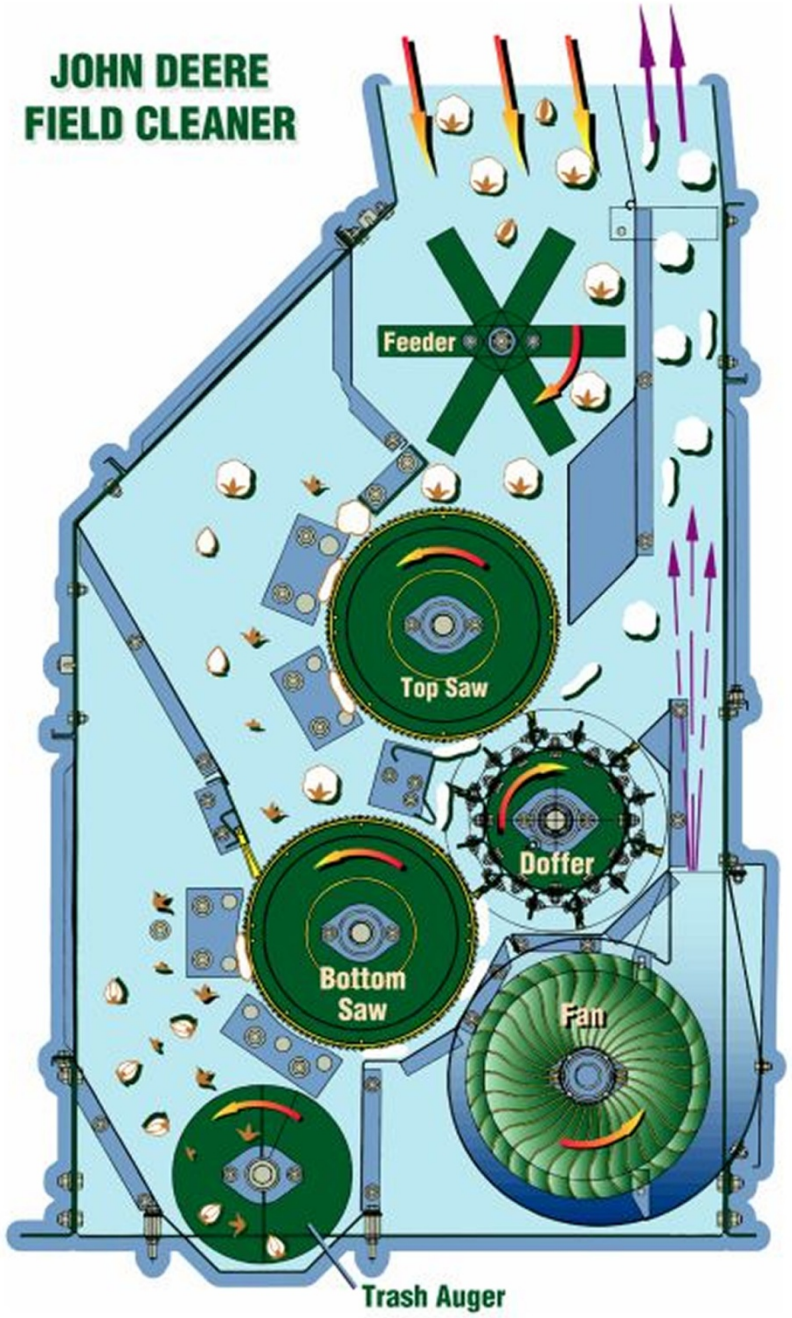
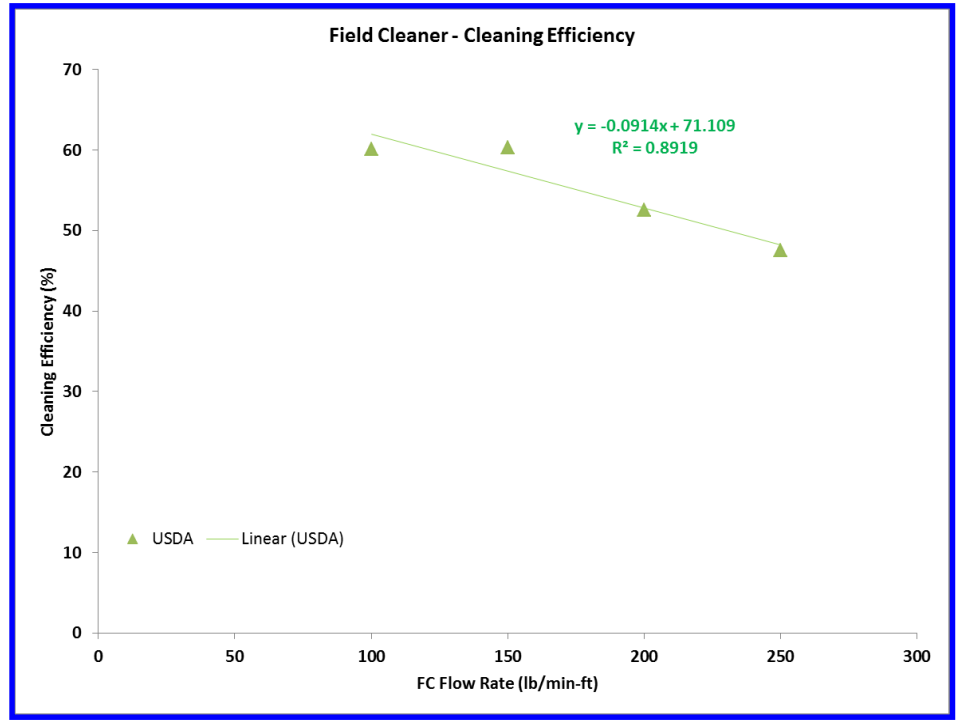
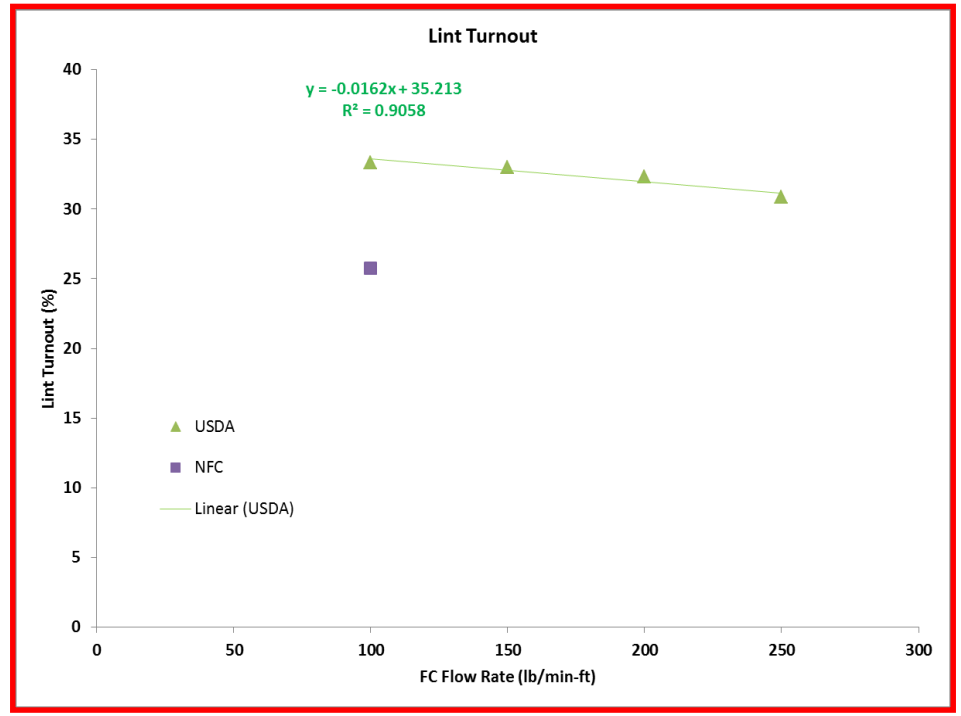


Courtesy of John Deere





Calibration Procedures on CS/CP690

- New OMB Strippers and Pickers have several sub-systems that require calibration
  - Calibration required when something “changes”
    - Part replacement, adjustment, or repair
    - Component wear
    - Accumulation of trash, mud, etc.

  - 21 separate systems can be calibrated from cab
    - HVAC Systems
    - Header and Unit Drive/Height Systems
    - Transmission
    - Multi-function lever
    - Cleaner Drive
    - Moisture Sensor
    - RMB Hydraulic Systems
      - RMB Gate/Handler Valves
      - RMB Rockshaft
    - Round Module Weight

Calibration Procedures on CS/CP690

- Moisture Sensor
  - open-air verification to check sensor function
- RMB Rockshaft
  - Ensures proper control of module diameter (weight estimation)
  - Large diameter modules are easily damaged in transport to gin
    - Diameter Setpoint Range: 40 - 94 in
    - 90 in max recommended for transport in conventional trucks due to squatting
- RMB Gate/Handler Valves
  - proper module positioning after ejection from RMB (weight estimation)
- Round Module Weight
  - Module weight estimation is influenced by module diameter, handler position, machine orientation, machine movement (3% vs 1.5%), and accumulation of material on handler
  - “Tare” adjustment for accumulation on handler
  - GPS TCM calibration is needed to adjust weight model for pitch and roll due to terrain
    - Performed through GPS receiver interface

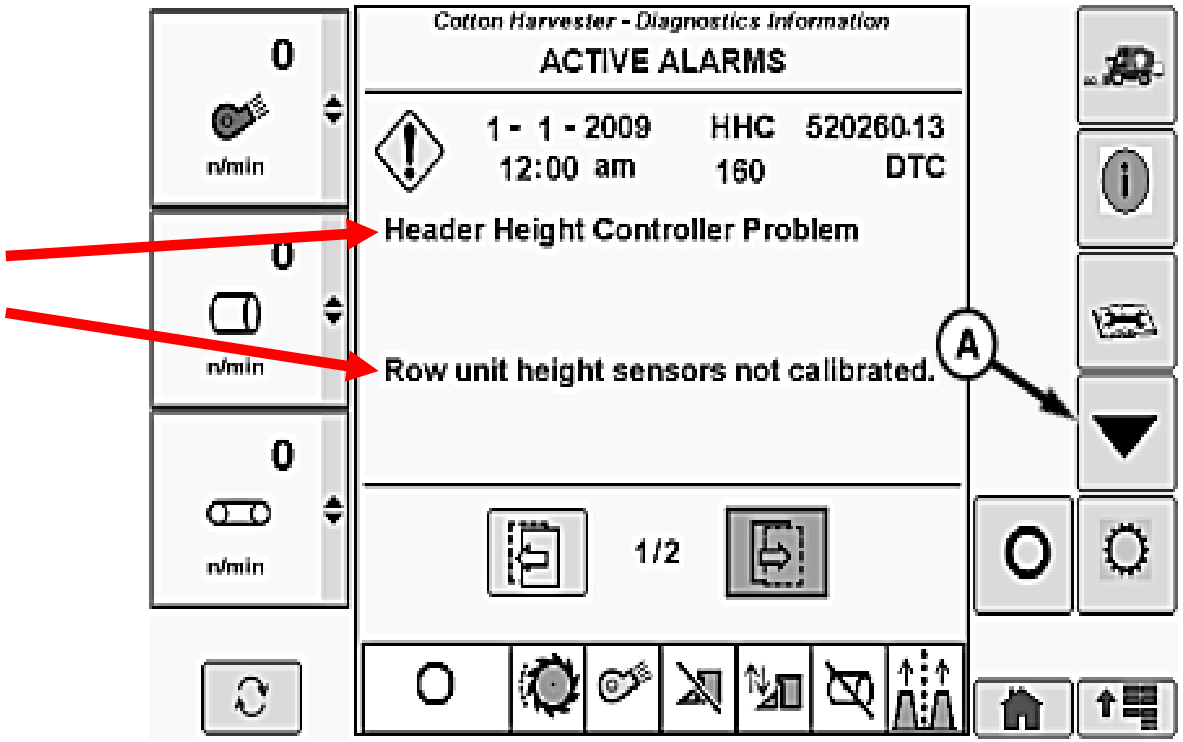
Performing Calibrations

1. Machine must be empty of cotton (accumulator, RMB, and handler)
2. Hydraulic oil temperature >122^{o}F
   - To warm, run cotton handling system using floor switch, engage cleaner/header drive, and run engine at full speed
3. Select Diagnostics Screen from Home Screen (A)

Performing Calibrations

4. Next Select Calibrations Screen “Down Triangle” Button (A) on Diagnostics Page

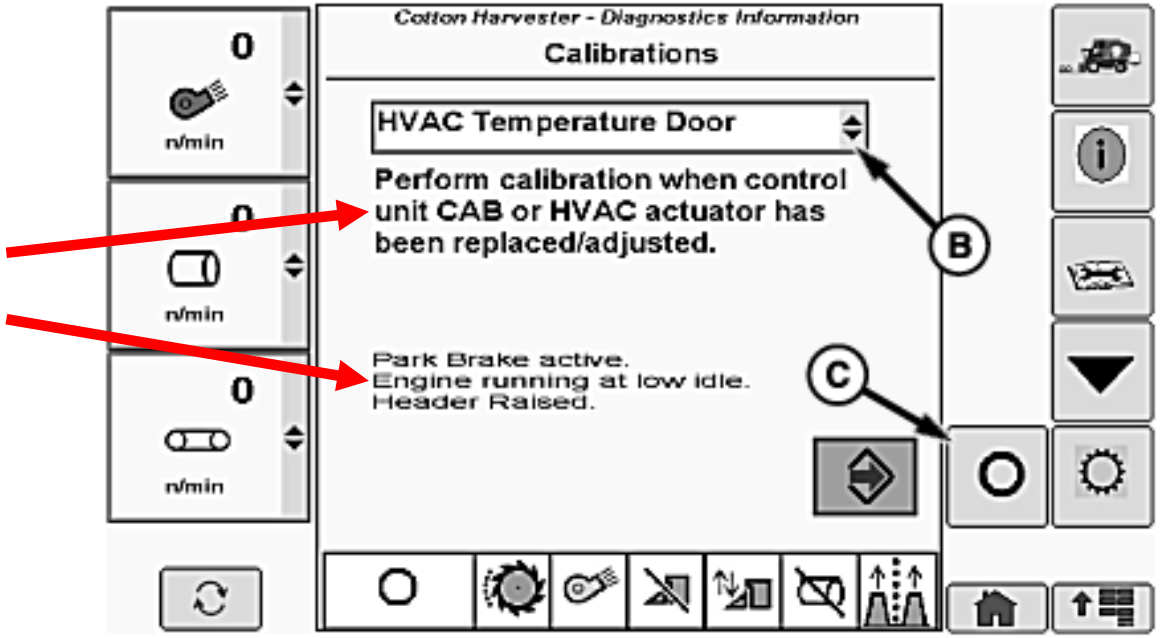
Diagnostics Page will display any current problems and what needs to be done to solve the problem



Performing Calibrations

5. Select system to calibrate from drop down menu (B) and follow onscreen commands to complete

Screen will display when calibration is required and what machine conditions are required to complete.



Keys for Trouble-Free Operation of Wrap System

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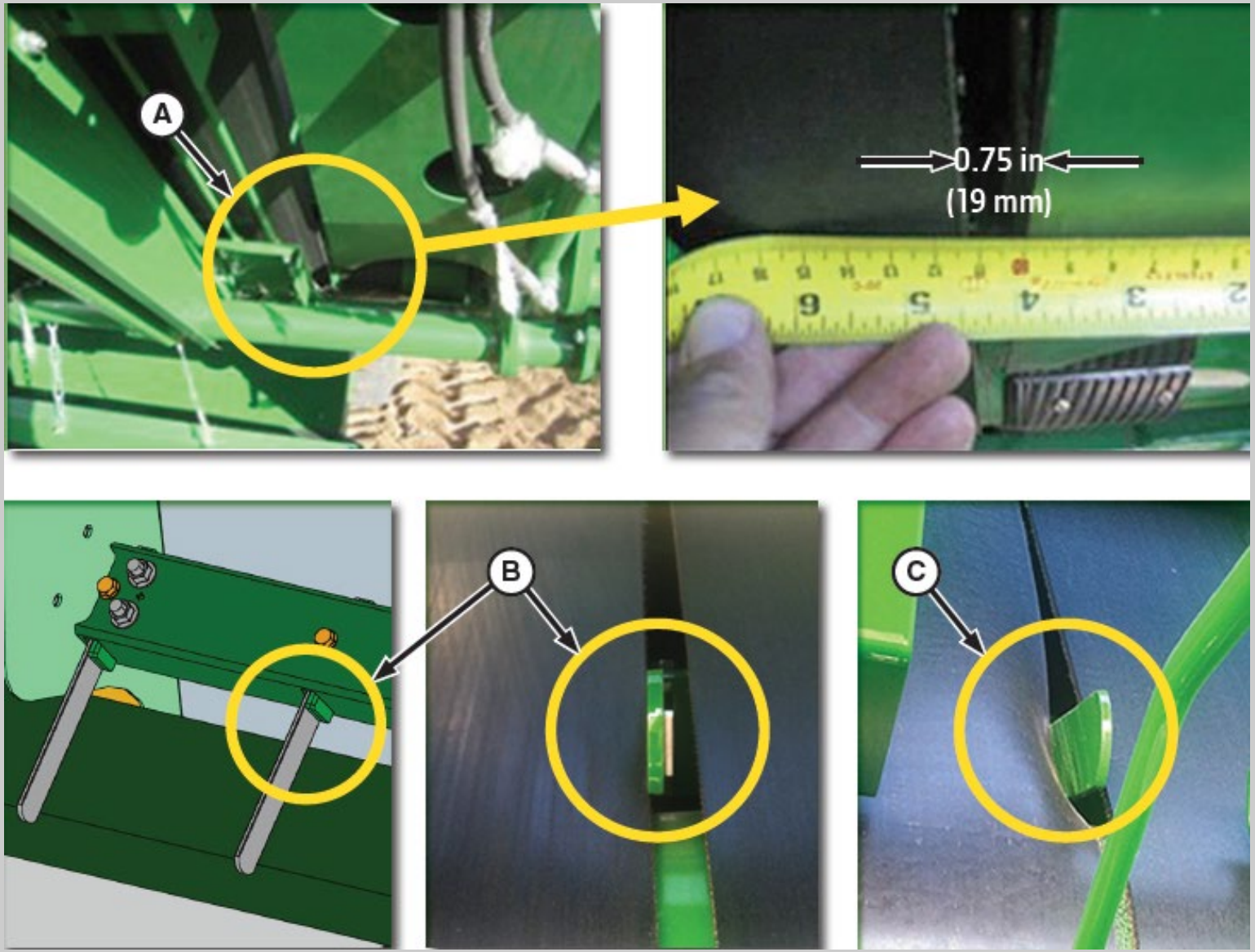
RMB Belt Position



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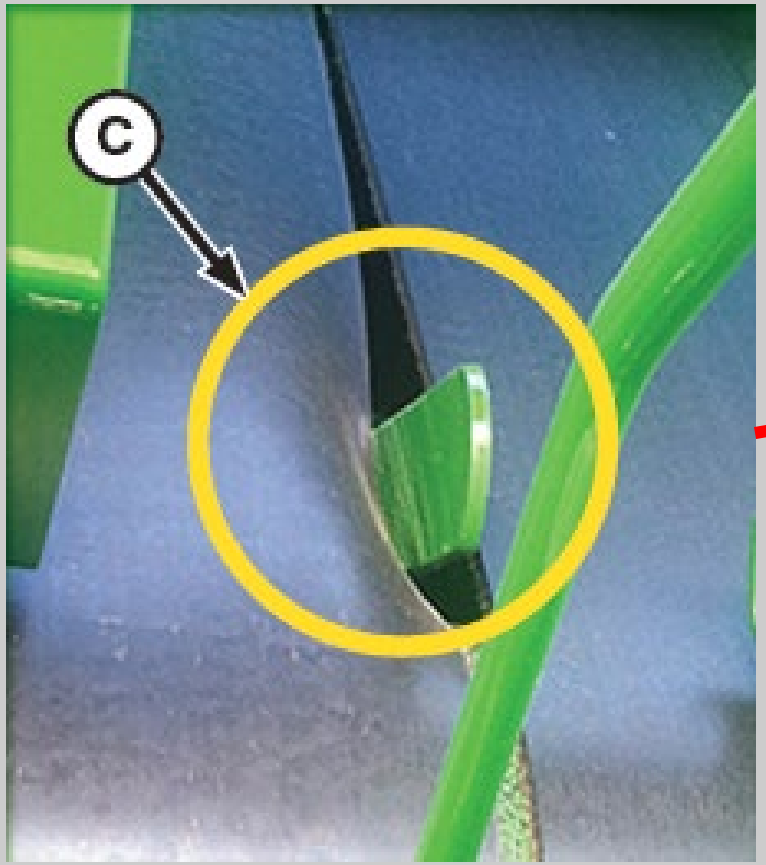
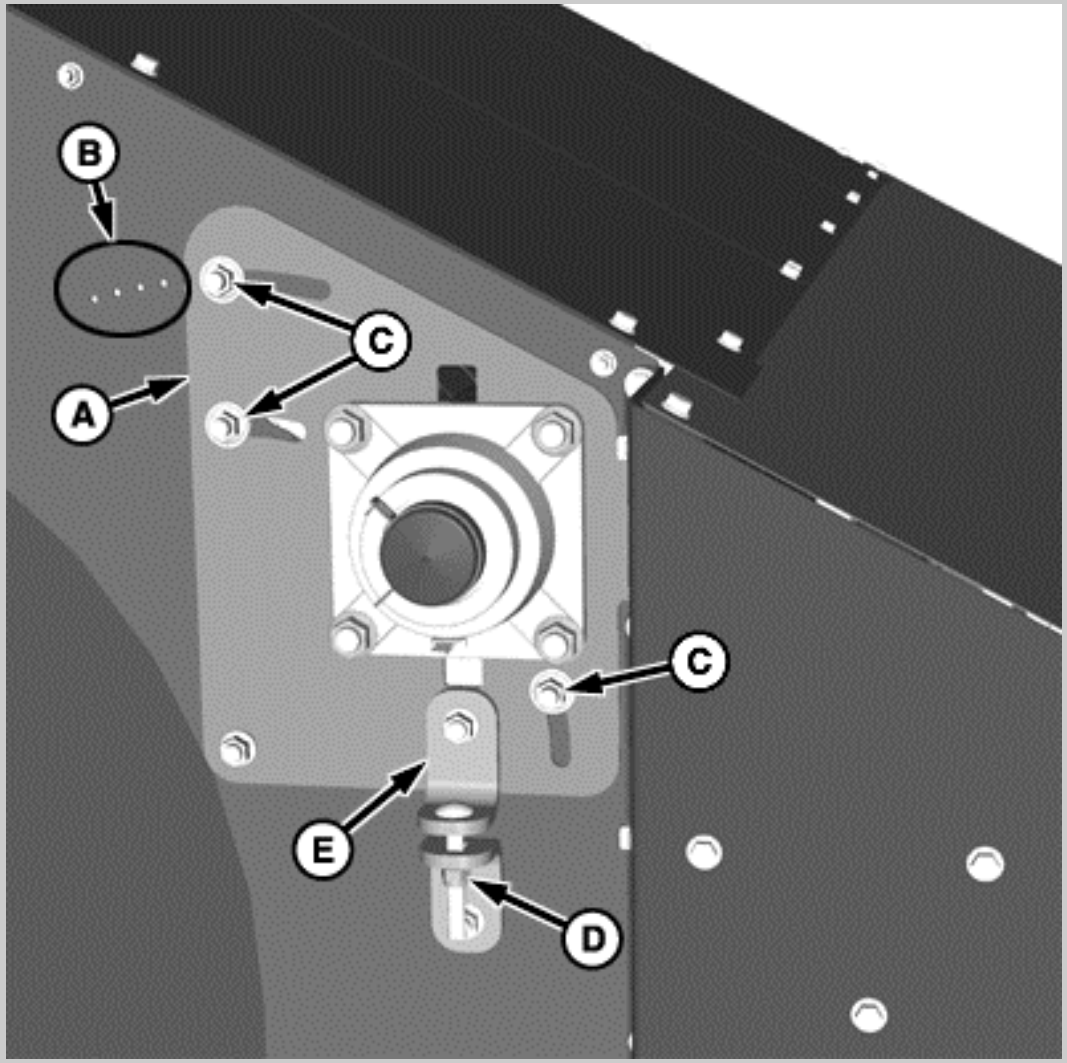
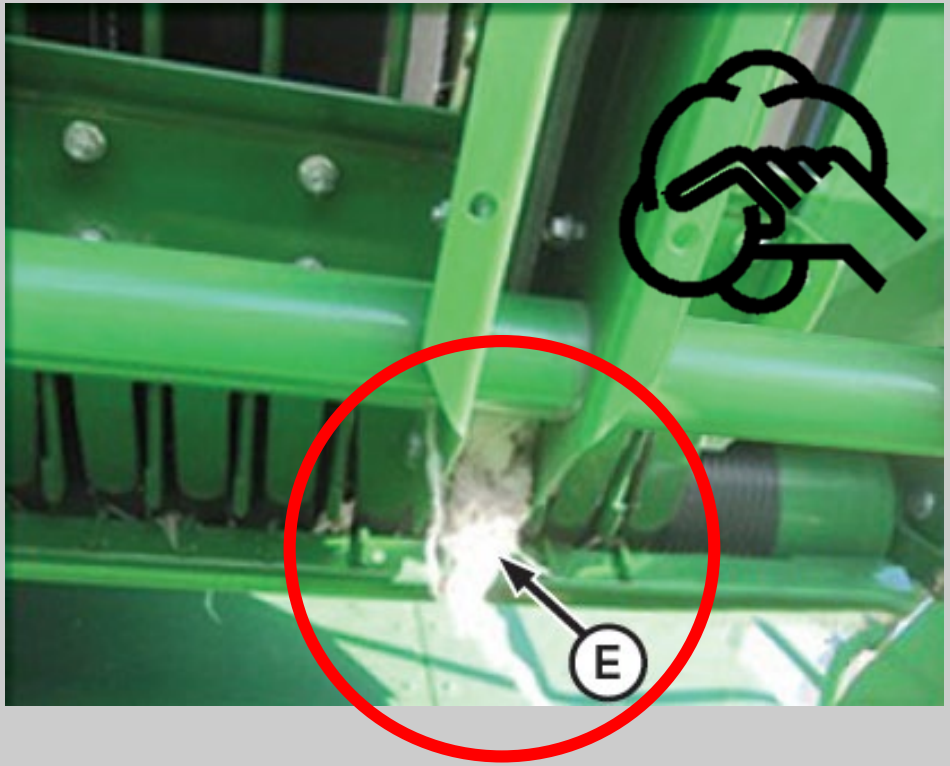
RMB Belt Tracking Adjustment

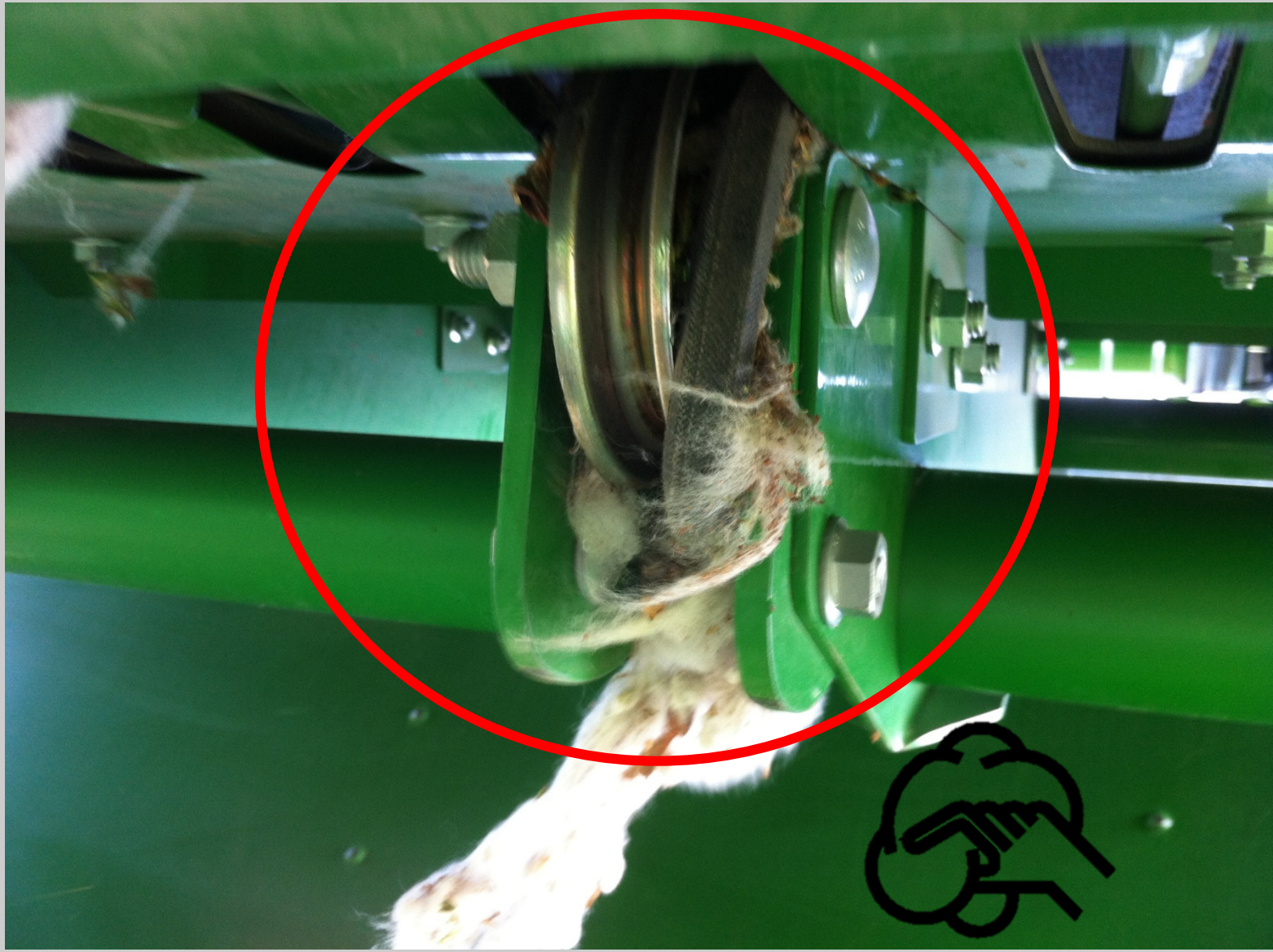




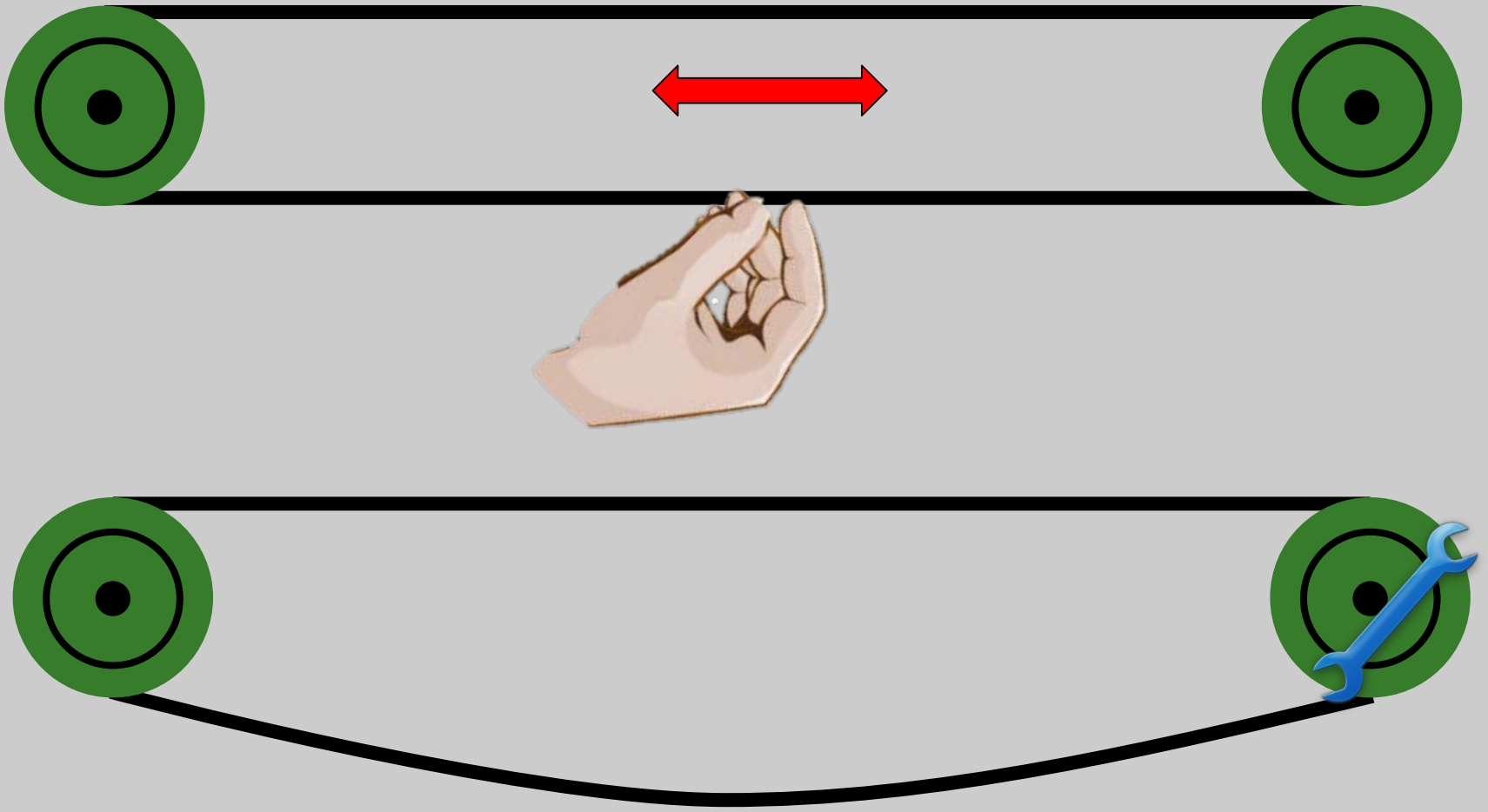
Inspect Lacing, Pins and Rivets

Clean Area Around Wrap Floor Belts

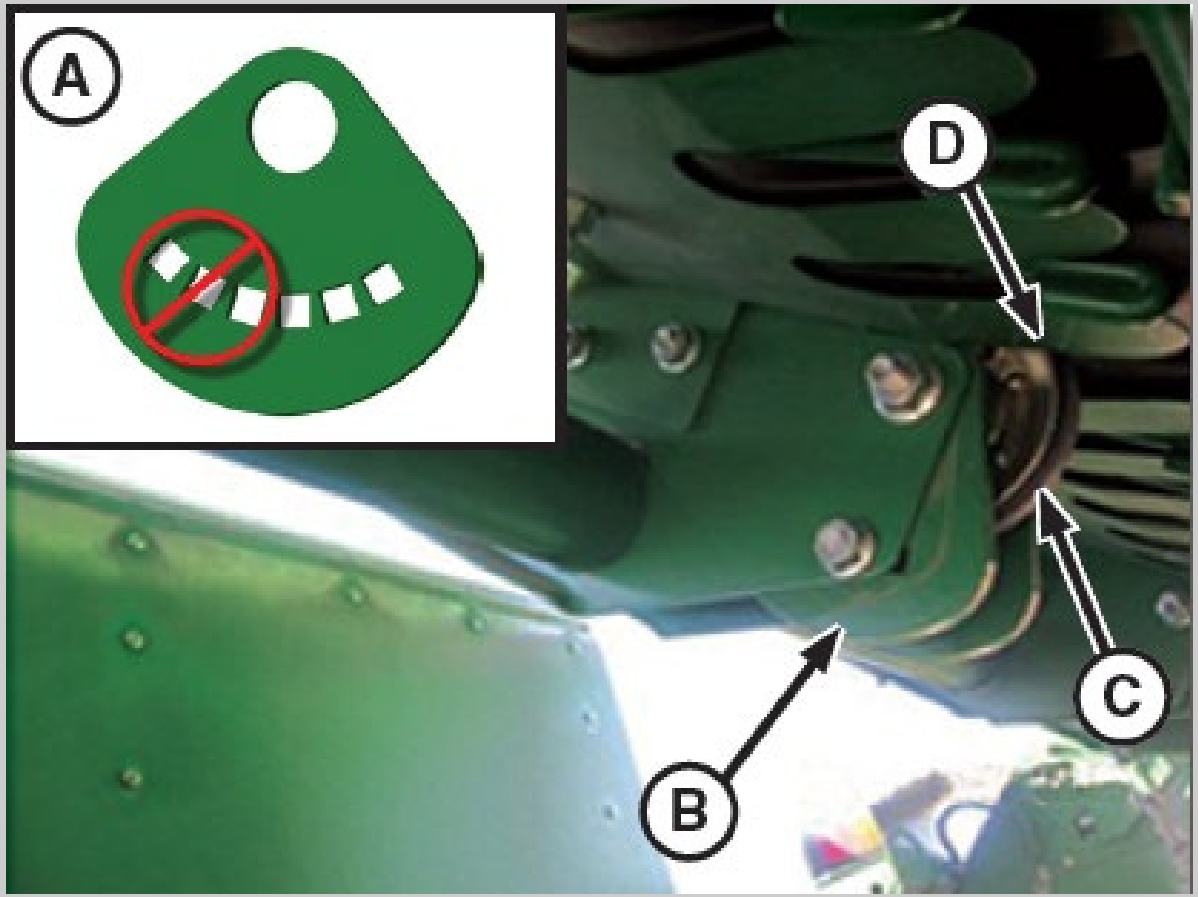


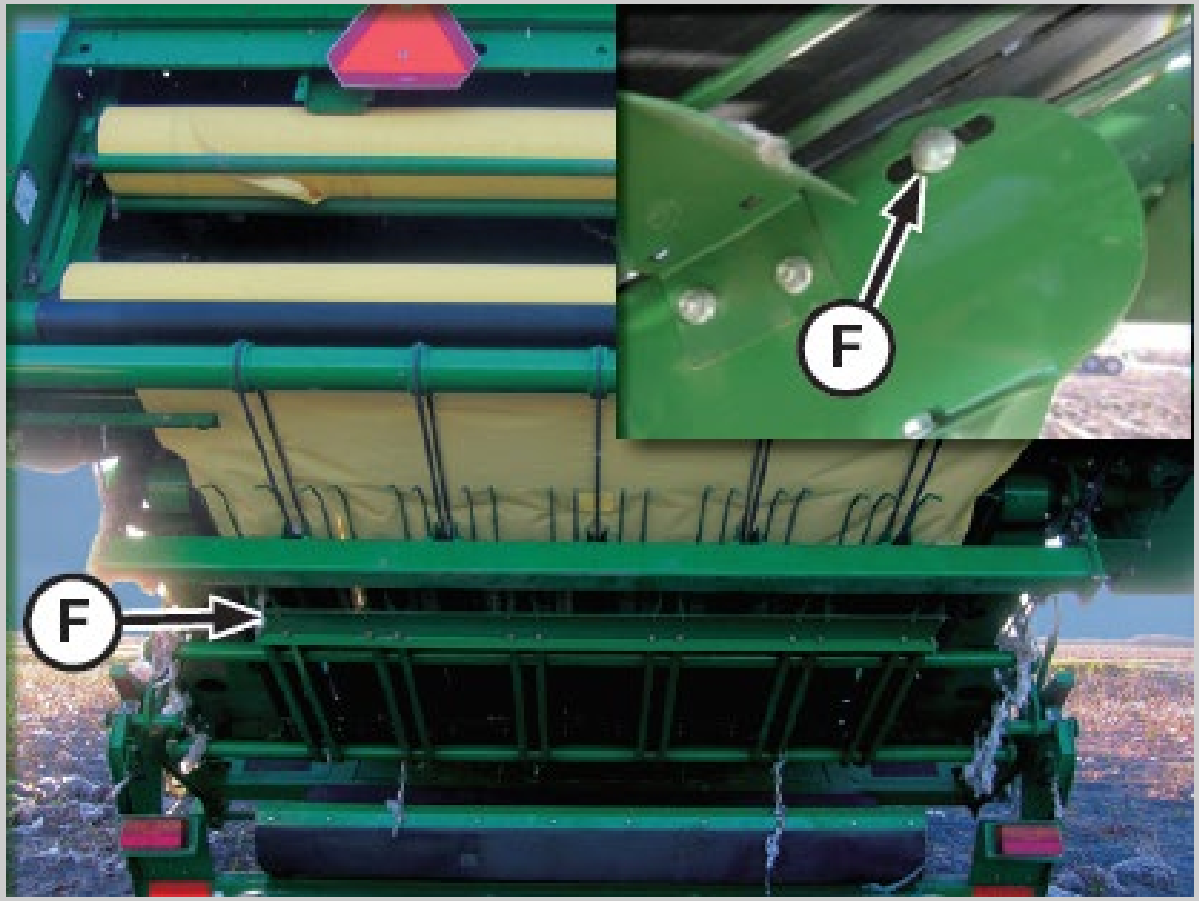


Check and Adjust Front Wrap Floor Belts

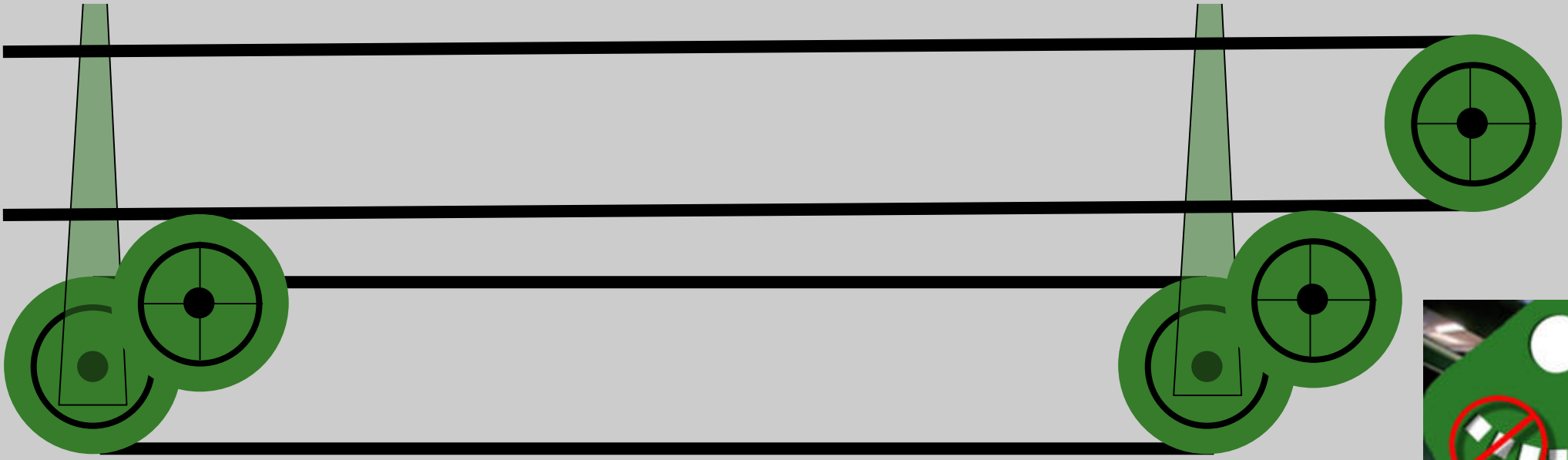


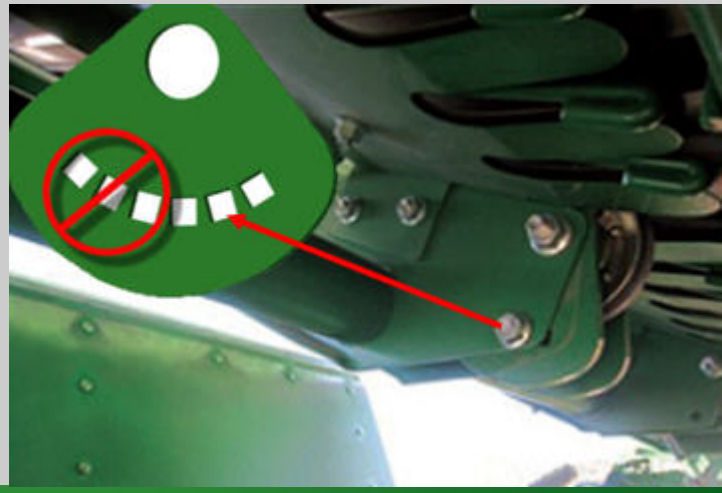
Wrap Floor Adjustment



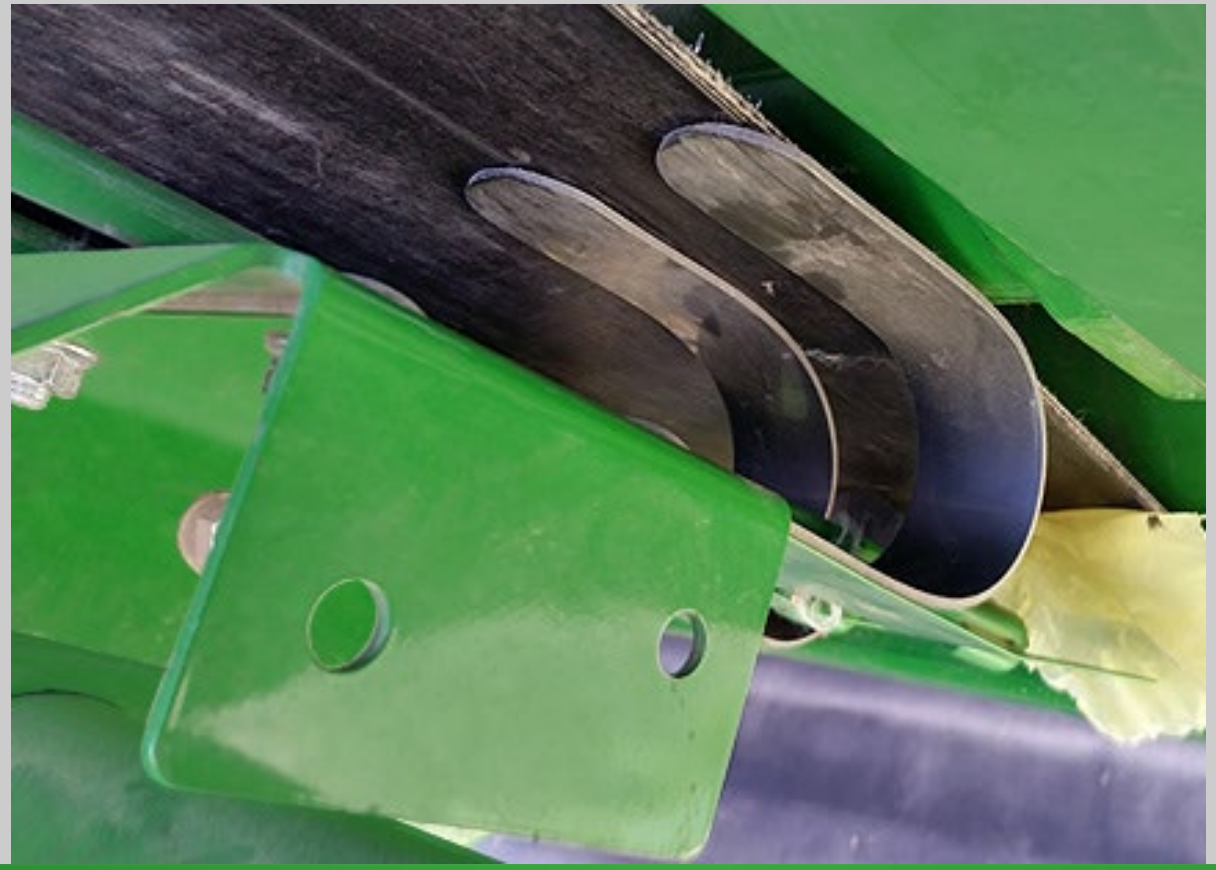


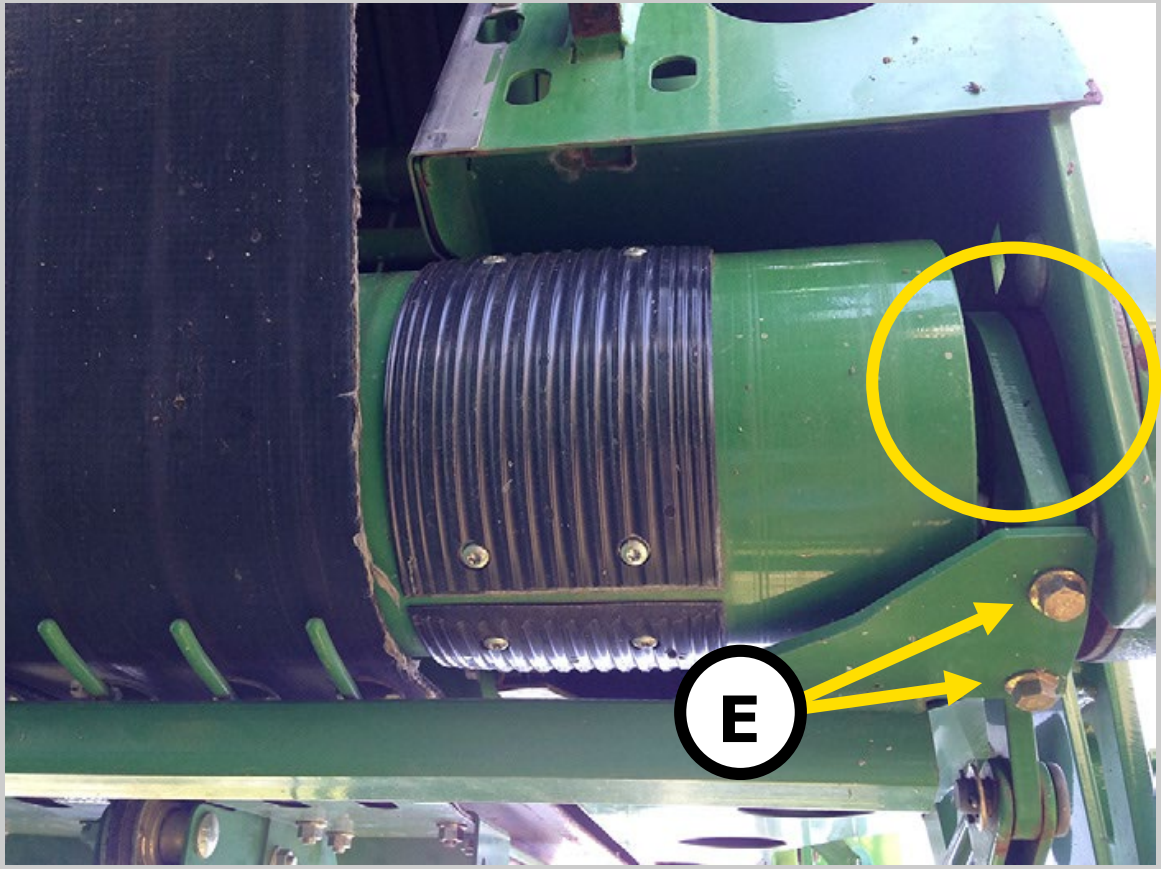
Test to Ensure All 6 Floor Belts Turn with RMB Belts





Inspect that:
Plastic fingers are not out of position or missing

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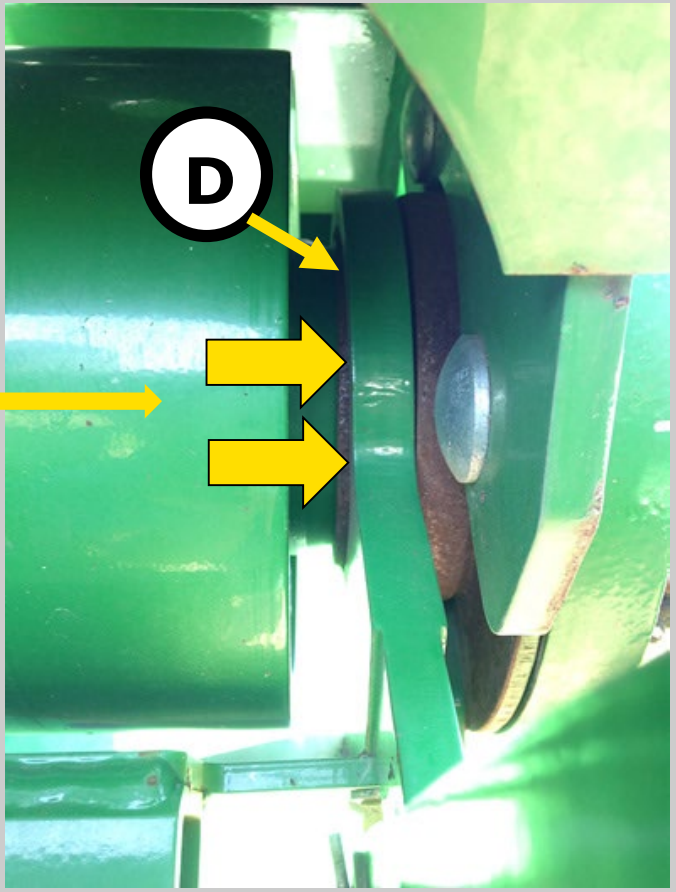
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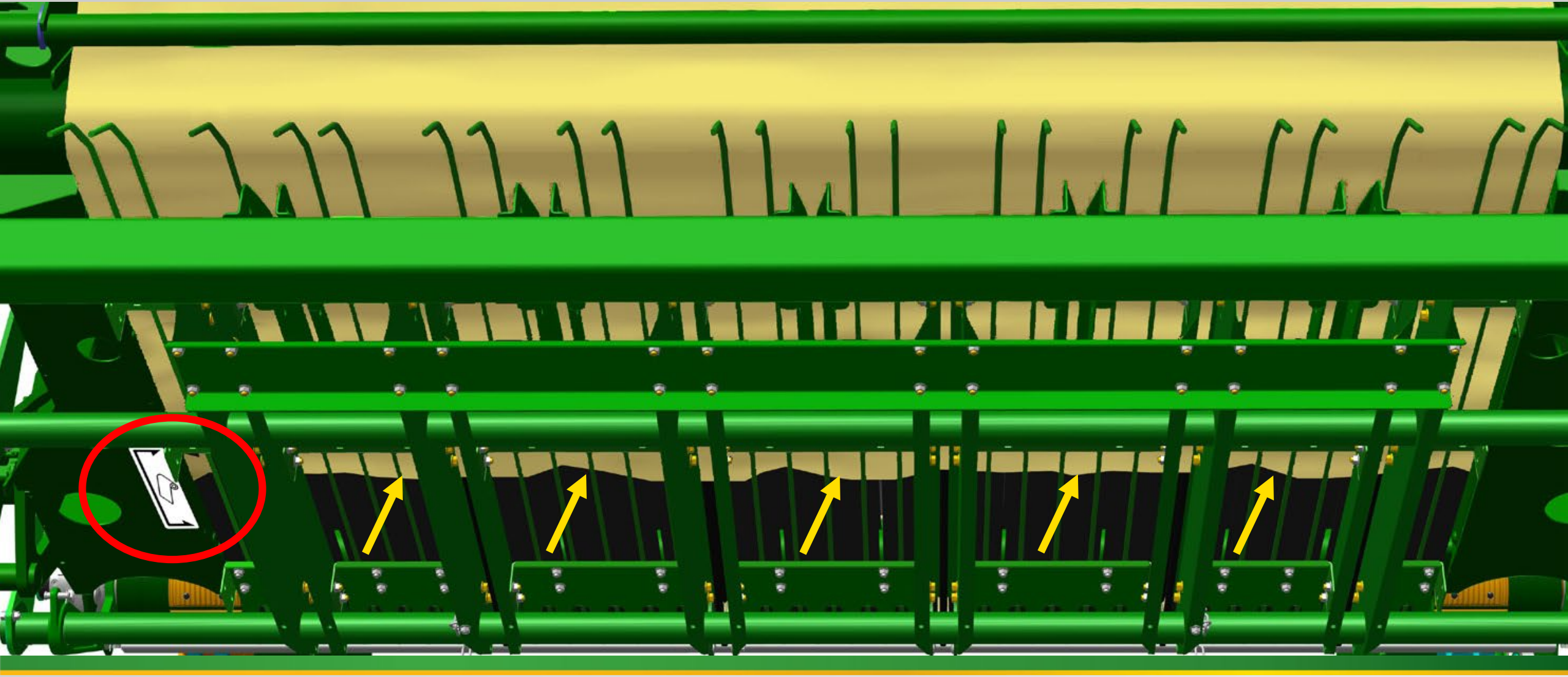
Inspect that:
Lower guide rod fingers are not touching RMB belts

Wrap Leading Edge



Wrap Troubleshooting

Loose edge cover

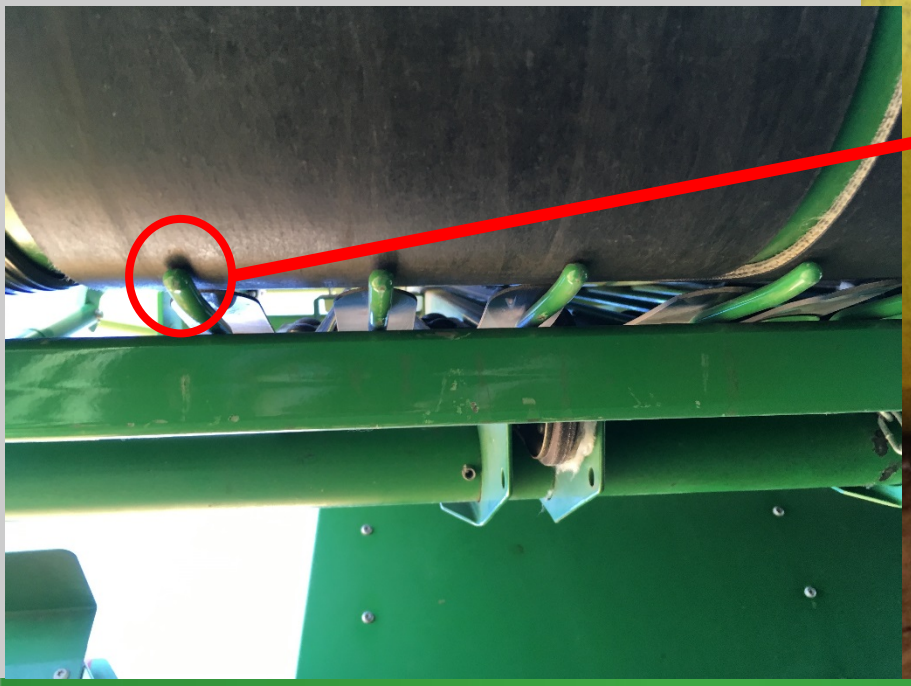
233 RPM

100 RPM

Z

Wrapped Rubber Roller

Intermittent Damage



Inadequate or No Cover-Edge

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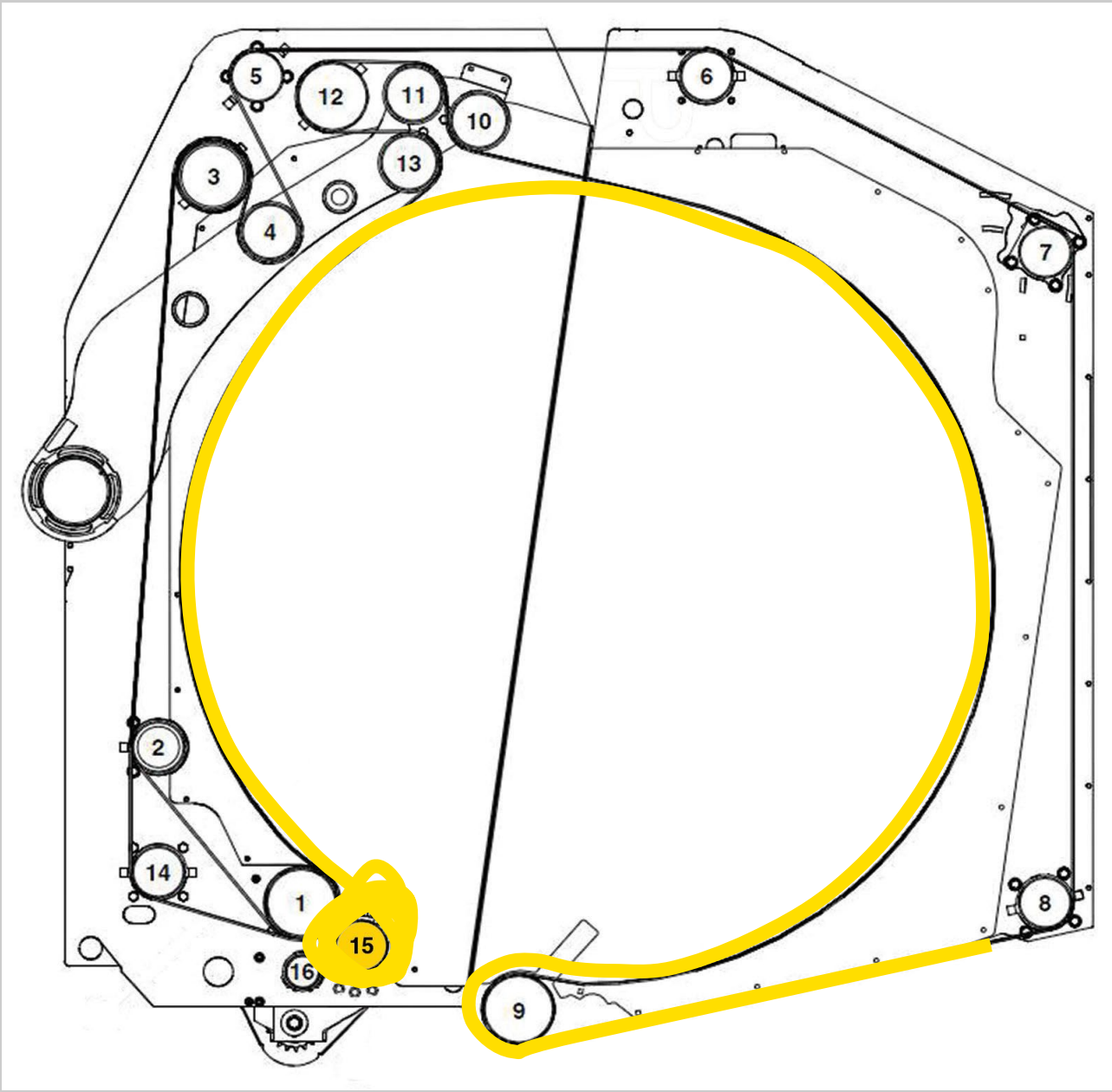
Edge Tear

Wrap Torn Dramatically

Unwrapped Module Ejected - Wrapping of the Starter Roll



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Partially Wrapped Module or Wrap Trailing Out of Gate After Eject

Multiple Wraps on Module with NORMAL Z–Lock Separation on Outer Portion

Wrap Damage by Improper Handling

Turning Tractor Before Forks Pulled Away From Module

Turning Machine or Raising Handler Before Handler is Away From Module

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Bottom Drug on the Stalks

Module Truck Chains Ran After Load Reaches Front of Truck

Damage From the Module Truck Side Wall During Load/Unload

Damage From Inappropriate Module Truck Chains

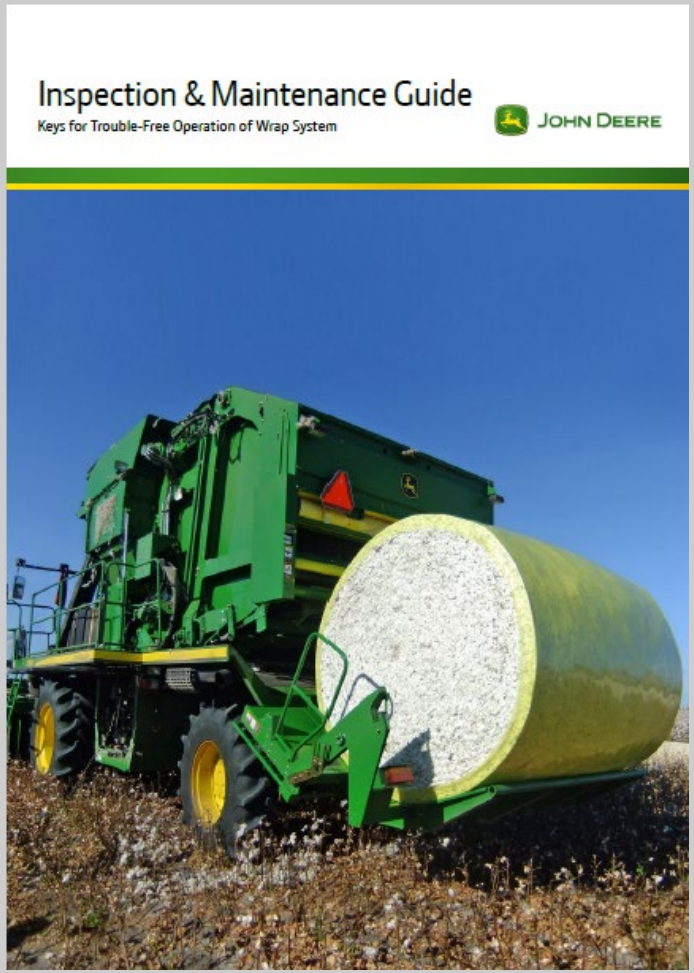
High Potential to Damage Wrap

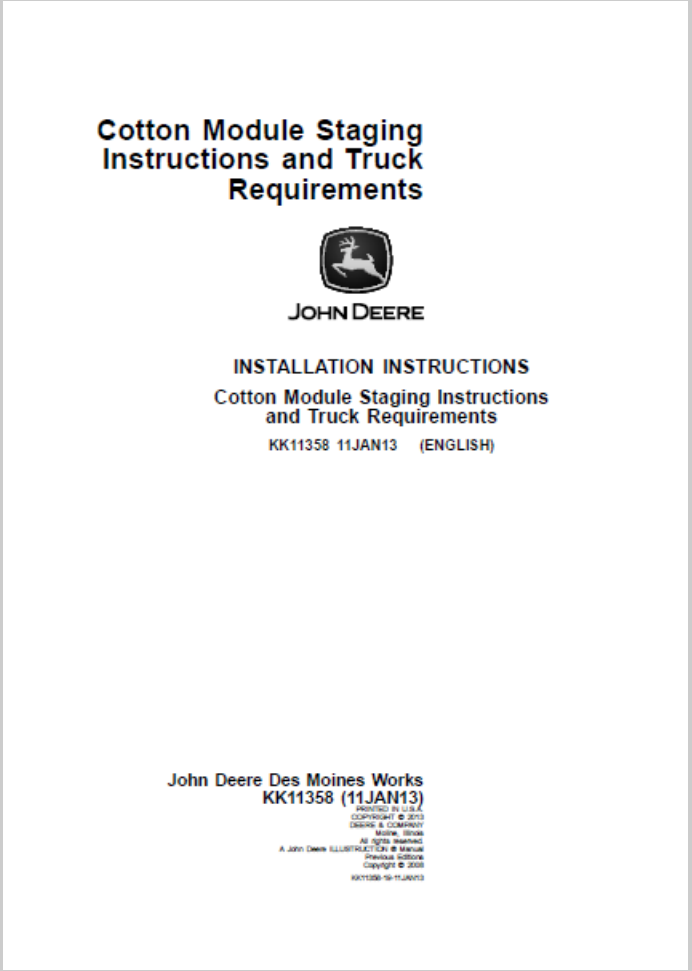
Typical Recommended Chain

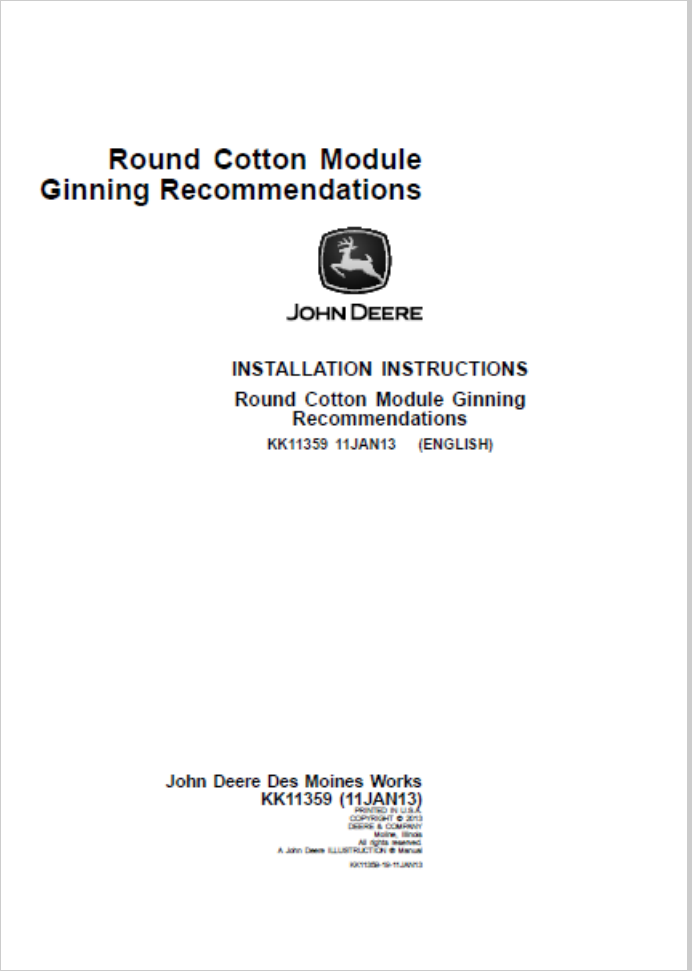
A Note on Module Wrap…

- Tama Group currently produces two types of TamaWrap™
  - Premium
    - Yellow and Pink
  - Value
    - Blue
  - All offered in Standard and Arctic configurations for different use environment
  - Concern from industry about use of Blue wrap
    - Cheaper price but will it increase contamination?
    - "Can be more susceptible to damage due to less robust construction"

Resources







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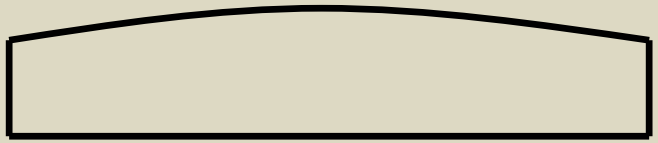
Additional Contamination Prevention Resources

- National Cotton Council
  - http://www.cotton.org/tech/quality/contamfree.cfm
  - English Video:
    - https://www.youtube.com/watch?v=5Pja_HbMElA
  - Spanish Video:
    - https://www.youtube.com/watch?v=3yY10XyF8mc&feature=youtu.be
- National Cotton Ginners Association
  - Round Module Safety Video
    - http://www.cotton.org/ncga/techpubs/round-module-video.cfm
- Cotton Incorporated
  - https://cottoncultivated.cottoninc.com/wpcontent/uploads/2020/08/PreventionOfContamination-HaulingModules-19Aug2020.pdf
- Tama
  - www.cotton-wrap.com

Seed Cotton Storage – Conventional Modules Two-Part System

ONE

- MODULE SHAPE: sheds water



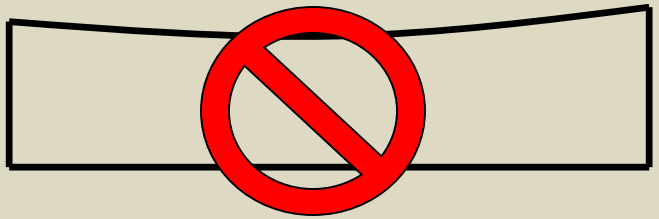
TWO

- COVER: prevents water entry

Searcy and Simpson, 2004

Module Shape

- Large, tight, well shaped
- Advantages
  - Covers work better
  - Less wind damage to cover
  - Overall efficiency at gin

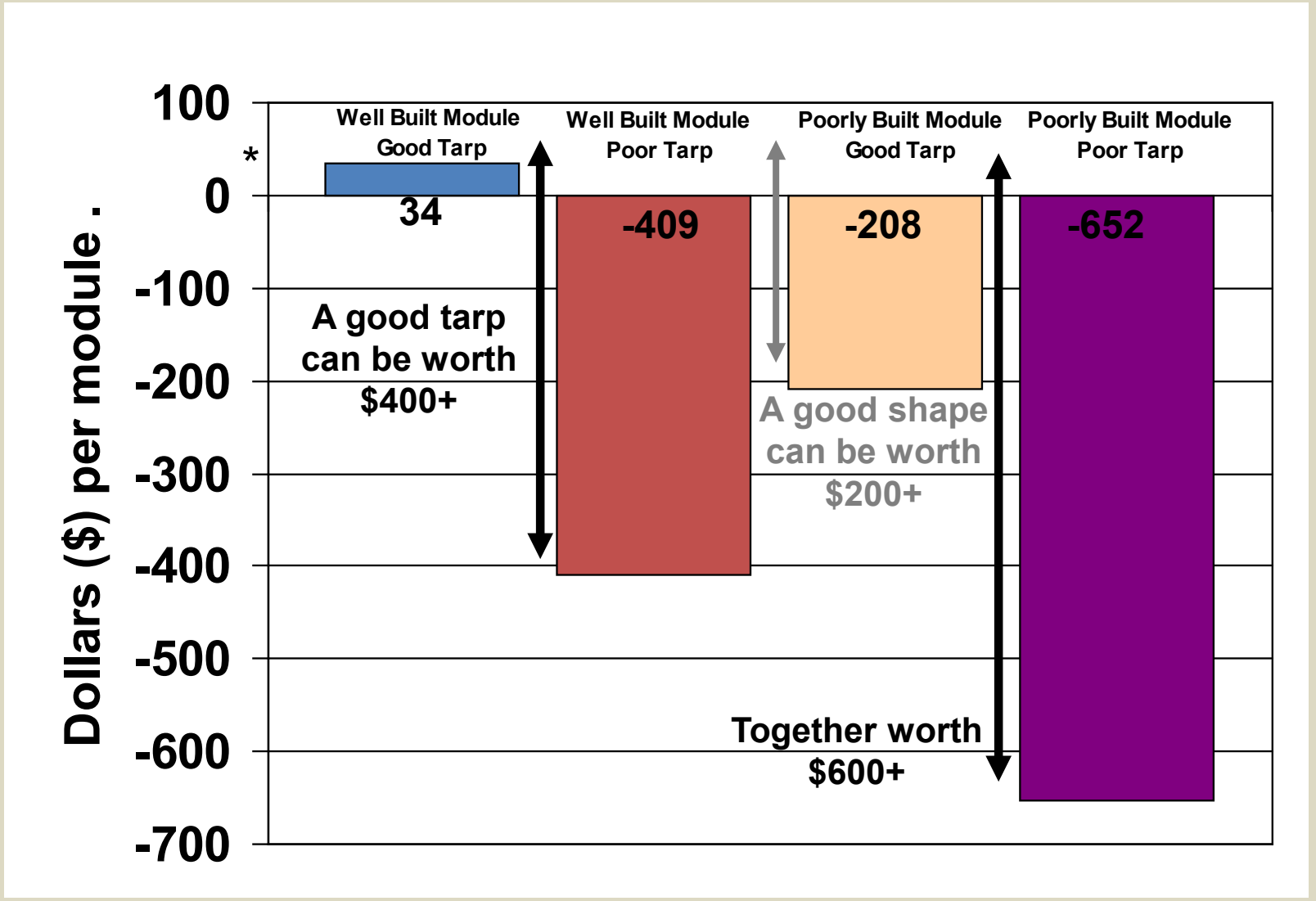


Seed Cotton vs. Water

- During storage
  Seed cotton must remain ≤ **12% MC**
- Above 12% MC
  - Yellowing will occur in module
    - Loss in grade and value
  - Seed and lint will rot
    - Loss in salable pounds

Previous studies have not quantified losses.

Lint Value Impact of Module Shape and Tarp Condition



*$0 line represents local base loan value

Effect of Module Shape and Tarp Condition on Turnout and Ginning Rate

	Turnout %	Ginning Rate (bph)
Good Module Good Tarp	34	42
Good Module Poor Tarp	27	29
Poor Module Good Tarp	31	34
Poor Module Poor Tarp	26	19

Source: What is the real cost of a cotton module tarp? Texas Cooperative Extension Pub# L-5478 2006

Down Time & Mass Loss

Storing Stripped Cotton in Round Modules

- Multi-year study to evaluate differences in lint and seed quality for stripper harvested cotton stored in round and conventional modules (Faulkner et al., 2012)

Results and Observations

- Results consistent over several years of study:
  - Moisture movement in round modules is more limited compared to conventional
    - Less susceptible to swings in environmental moisture
      - Package Bulk Density
    - Reduced “wicking” from ground
      - Module wrap
  - Moisture content at harvest is critical for round modules
    - “Sweating” – high harvest moisture, warm storage
  - Seed FFA content was negatively affected during long-term storage in most cases, but particularly for conventional modules

Observations

- Fiber quality
  - No module type or storage length differences in mic, length, and uniformity
  - Strength decreased with time
  - Color grade decreased dramatically after significant moisture penetration event in conventional
    - Little change over time for round modules
- Spacing of the modules is critical regardless of module type
  - Leave space between modules to allow moisture to run-off modules and not into modules.
  - Promotes ventilation
  - Don’t store modules in low areas

Moisture Effects

Thanks for your attention!
Questions?

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