Bale Press Maintenance and Bale Shape Uniformity

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Effects of Poorly Shaped Bales

- Difficult or impossible to stack bales properly
- Increased handling time per bale
- Loss/Decrease of available storage space
- Safety Concerns associated with bales potentially falling
- Increased storage costs
Factors that can influence bale shape

- Non-uniform feed to Battery Condenser
- Non-uniform feed to Press Box by Lint Feeder
- Moisture content of the lint cotton
- Press Dog maintenance
- Compression Chamber shape/maintenance
- Floor Sleeve vs. no Floor Sleeve
- Extrude Pressure (Door-Less Presses)
- Follow Block Clearance, Platens and Guides
Non-Uniform Feed

- Uneven spread of lint in lint flue riser and across Battery Condenser Drum can result in a “big ended” bale at the press.
- Uneven distribution of lint in the charging box by the lint feed device can result in a “rolling,” or heavy sided bale.
- Follow block guides help mitigate impact of “rolling” bale although accelerated guide wear may result.
- Uneven feed creates excessive side loading on press boxes, floor sleeves and hydraulic cylinder bearings resulting in premature failure and/or bed sill shift.
Big Ended Bale  Rolling Bale

Lint Moisture Content – Too Low

- Increases wear on press hydraulics, boxes and floor sleeves due to higher pressures.
- Causes lint to roll out from under Tramper and causes Press Dogs to malfunction.
Lint Moisture Content – Too High

- Increases wear on press hydraulics and press boxes due to “Stiction.”
**Press Dogs**

- Press dogs are a necessary evil on short box presses.
- Not unusual to see Dogs missing or inoperable due to lint accumulation or missing components.
- Unrestrained lint cotton tends to “boil” out of the press box creating tags and wads which can ultimately affect final bale shape.
- This is especially true when processing low moisture cottons.
LINT WADS BEGINNING TO FORM
DOG STUCK IN DOWN POSITION

WADS FORMING
Compression Chamber Shape/Maintenance

- Compression Chamber geometry has the greatest impact on final bale shape.
- Worn or Distorted Press Doors and worn Door Linkages are the cause of “wedge” shaped bales in Door type Presses.
- Oversized Floor Sleeves and “Lint Extrusion” are the causes of “wedge” shaped bales in Door-Less type Presses.
Floor Sleeves

- Floor Sleeves are an extension of the Compression Chamber on up-packing door-less type Presses.
- The function of a floor sleeve is to accommodate automatic and semi-automatic tying systems on up-packing door-less Presses.
- Mis-alignment between the Press Box and Floor Sleeve can result in poorly shaped bales.
- Lint under compression “extrudes” through the gap between the top of the Compression Chamber and the bottom of the Floor Sleeve creating exaggerated folds at top of bale.
- Align inside of Floor Sleeve as close as possible with Press Box.
ALIGN SIDE WALLS AS CLOSE AS POSSIBLE
LINT EXTRUSION DURING COMPRESSION TAKES PLACE IN THIS GAP
FLOOR SLEEVE

EXAGGERATED FOLDS
BALE WITH SHARP CORNERS AND NO FOLDS OR BULGES
BULGE AT FULL COMPRESSION
**Extrude Pressure (door-less)**

- Extrude pressure for **down-packing** presses is the pressure on the “blind” end of the Top Ram at which the Press Box is stripped off of the bale during compression.

- Extrude pressure for **up-packing** presses is the pressure on the “blind” end of the Top (opposing) Ram at which the Top Ram backs away from the Compression Chamber allowing the semi-formed bale to extrude from the Press Box.
Extrude Pressure (door-less)

- Extrude pressure that is too low can lead to mis-shaped bales.
- Extrude pressure that is too high creates undue wear and tear on the press box, floor sleeve and hydraulic system.
Compression Chamber Schematic

Sources:
- Blodgett, Omer W., “Design of Welded Structures,” James F. Lincoln Arc Welding Foundation, Cleveland, OH, 1976, pp. 6.5-1 – 6.5-6
Compression Chamber Corner Stresses

Source: Culler, Barry, MCAE Technologies - 108 Little Ridge - Duluth, Georgia 30096
Bottom Ram Pressure vs. Box Stress

Chart 1

Stress
Final Compression
Extrude
TR Reaches Top Sill
BR Pressure

Pressure vs. Time
Stress (inverted)
Follow Block Configuration

- Missing, Worn or Improperly fitting Follow Block Guides lead to mis-shaped bales.
- Turn-ups on the ends of Platen Bars help keep strapping guide tracks clear but contribute to poor bale shape.
- Excess clearance between edge of Follow Block and Press Box allow Follow Block to move causing poor bale shape during compression. (¼” is adequate clearance)
Thank You