2 PROBLEM: FILM SPLITTING ON THE BALE

Description:

One of the most common problems encountered when using wrapped silage bales is of the film splitting on the bale after wrapping. Often, this can occur weeks and even months after the wrapping was done. Many operators immediately blame the film, thinking inferior quality is to blame for the splitting. In reality, the reason the film has split is much more likely to be due to there being insufficient film layers in places on the bale, and it are in these places that the film splits.

This is often difficult to accept, as many believe they are applying enough turns to the bale to effect full bale cover, of 4 film layers all over the bale, with a minimum 50% over-lap of the layers. As we can show below, there are many reasons for incorrect or insufficient film cover of the bale.

Correct Number of Turns

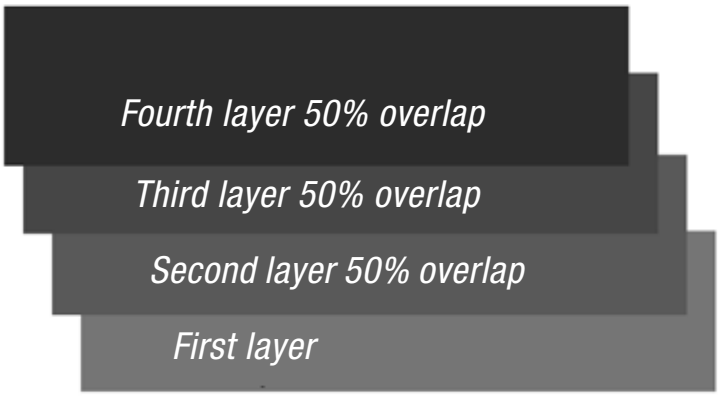
All bale wrapper manufacturers recommend the method to determine the correct number of turns as follows:

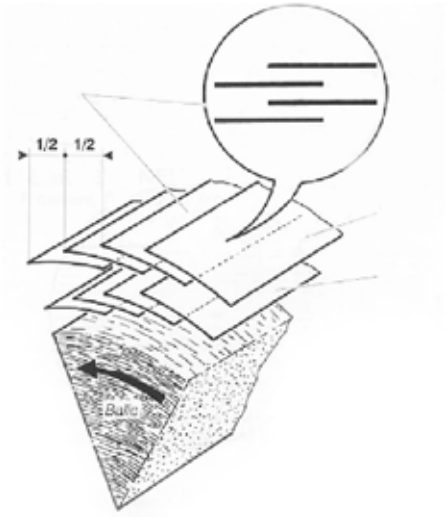
1. Count the number of turns required to completely cover the bale
2. Add one extra turn (to compensate for the narrowing of the film from the start of the cycle, when the film is held in the cut and catch mechanism)
3. Multiply this number by 2 for 4 film layers or by 3 for 6 film layers

Note that the 'extra' turn is added onto the first number, when the bale is covered the first time and not at the end of the calculation.

If the bale diameter is slightly more than 1.2m, the diameter becomes greater, which affects the accuracy of the planned 50% over-lap. In this instance, more turns will be required to ensure full and complete coverage of the bale.

Remember, it takes half a turn (two sides of the bale) for the film to open up to its full width on the bale.



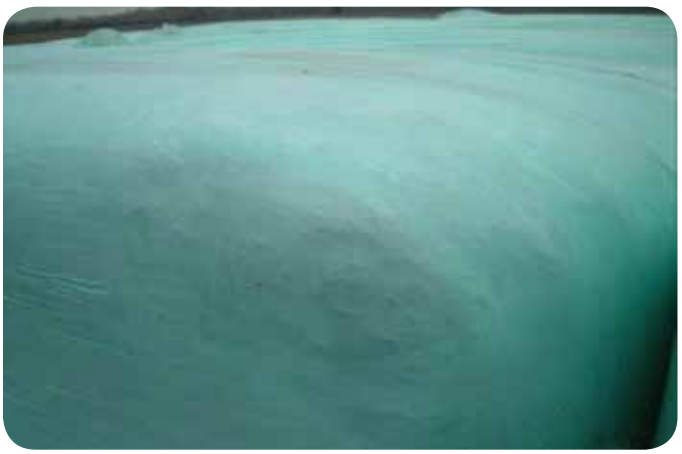


MINIMUM 4 layers 50% overlap (2+2)

Wrapping square bales

All film manufacturers recommend that when wrapping square bales, irrespective of what type of crop you are wrapping, the bale should be wrapped as if applying 6 film layers.

Unlike a round bale, which maintains the same attitude on the wrapper as it rotates and provides a uniform shape for the film to be allied to, the attitude of a square bale is constantly changing as it turns on the wrapper. Because of this, the bale should be wrapped as if applying 6 film layers to the bale – this is the only way to GUARANTEE AT LEAST 4 FILM LAYERS EVERYWHERE on the bale.



Deficiencies in wrapping square bales are very evident when using light coloured film.
This is particularly critical on the corners.

Secondary Stretch

The Pre-Stretch Unit (PSU) on the bale wrapper is calibrated, through the gears, to stretch the film between the paired rollers by 70%; this is to ensure the film width over-laps by the required 50% over-lap. However, there is the possibility that the film will also stretch between the rollers and the bale, when the film will 'neck-down' more than it should, which will affect the % over-lap of each film layer application to the bale.

This can easily be checked by measuring the width of the last film application on the end of the bale.

Correct film 'neck down' should be:

500mm film neck-down to 380-400mm
750mm film neck-down to 580-600mm

If secondary stretch occurs, it will increase film 'neck-down' and reduce the amount of over-lap between each successive film layer, creating areas on the bale with less than the required number of layers.

CORRECT FILM NECK-DOWN
580mm – 600mm

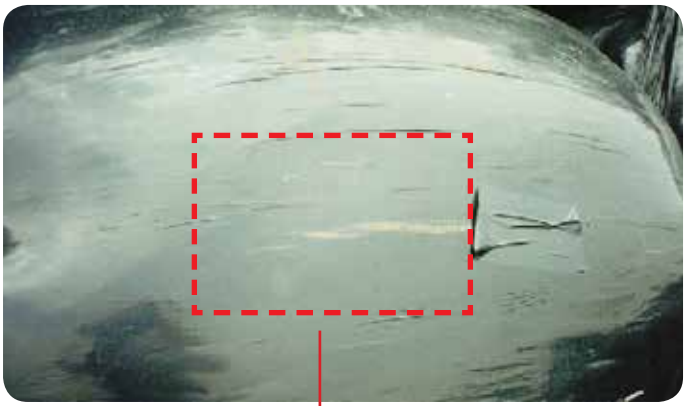
70% STRETCH

IN-CORRECT FILM NECK-DOWN

MORE THAN 70% STRETCH

If the PSU rollers on the wrapper are dirty or sticky, dirt and crop debris can easily become stuck to the rollers, causing damage to the film as it passes over them. It is not necessary for the film to have been punctured to cause it to break, often the smallest piece of dirt or debris can create a weakness in the film as it is being stretched that will cause it to fail.

Areas of the bale with less than the minimum required (the elliptical shape on the bale side on the left above) are difficult to see on black bales. The part of the bale with fewer film layers will eventually split either through weathering or as the bale settles in the stack. By cutting the film from around the split, it is easy to see that the split occurred where there were fewer layers of film. Sometimes the wrapping is so in-correct that only a single layer covers the bale in some places.



Samples were cut from the above bales and showed clearly that only one layer of film had been applied in these areas, instead of the recommended MINIMUM 4 layers.

When wrapping bales using light coloured film, any parts of the bale covered in less film layers than required are easy to see, as the dark crop below shows up through the area with fewer layers.

THERE ARE A NUMBER OF REASONS FOR IN-CORRECT FILM OVER-LAP

Sticky PSU Rollers

If the PSU rollers are sticky with film tack residue, the film will begin to stick to the rollers, causing 'secondary-stretch', which will reduce the film width being applied to the bale.

Note how the PSU rollers are shiny with film tack residue.

To over-come this, PSU rollers should be cleaned regularly, by rubbing vigorously with a cloth soaked in a solvent based cleaner. If the PSU has rubber coated rollers, it may be necessary to clean the surface then rub down with a hard wire brush, to create grip on the rollers.

Wrapping with black film that has been in exposed sunlight for too long may also exaggerate this situation, as it will allow the tack in the film to coat the rollers sooner and make the film much more pliable and prone to over-stretch.

Bale Indexing

The bale should be correctly placed on the turntable, to allow it to index correctly and uniformly whilst rotating. If this practice is not followed, the film cannot be applied correctly to allow 50% over-lap due to the bale's in-consistent indexing and rotation. This is often worse when collecting bales for wrapping whilst on the move.

Film Alignment

The film roll should be aligned correctly with the bale, neither too low nor too high. If this is not checked, the application of film will be affected as the bale turns, making the film not in line with the 'centre of rotation' of the bale.

This can often easily be checked, by looking at the pattern on the ends of the bale, where the many film applications should cross in the centre of the bale.

The bale on the left has in-correct film over-lap as the film roll is positioned too high for the bale (film roll centre-line marked in red - bale centreline marked in yellow), meaning the centre of the film is not in line with the bale's centre of rotation.

The bale on the right shows the correct pattern of film overlap, with the film roll correctly aligned against the bale.