

## Bale Handling – Avoid Damage

**In research trials, one small (3mm) hole per bale resulted in an eight per cent loss of edible silage, while one large hole (24mm) resulted in one third of the bale being lost.**

On virtually all farms where baled silage is made, bales must be mechanically handled to place them in storage. Incorrect handling will damage the stretch film, resulting in aerobic spoilage and mould growth. Every effort must be made to avoid handling damage, as mould reduces the feed value of the silage and can make it dangerous to feed.

Air must not be allowed into silage bales. The thin polythene film barrier to gas movement must be kept intact. In baled silage, the polythene is much more important than in clamped silage. Baled silage differs from conventional silage in many ways:

- Bales have six to eight times more silage in contact with polythene.
- More than half of the silage in a bale is within 200 mm of the surface.
- The stretched thickness of the polythene on the bale is just 70 microns compared to 200 microns for a normal clamp cover.
- The density of silage within the bales is less than in pit silage.
- Bales are usually handled after wrapping.

These factors combined make it imperative that the polythene film is not damaged because if air entry occurs it will cause a lot of damage.

### Wrapper and Stubble Damage

The wrapper table, the drop table (or mat) and the stubble onto which the bale falls are all potential sources of damage. All wrapper surfaces that come into contact with the bale should be checked for damage or rough areas. The bale drop table should be adjusted to let the bale lower gently to the ground.

Certain types of stubble can occasionally puncture the bale in very sunny, dry conditions. Gentle dropping of the bale should help to minimise this, as would dropping of the bale on the damp ground from where the swath was lifted. Extra film (six layers) would also protect the bale in these circumstances. Wrapping at the storage site or a nearby grazing paddock would eliminate any stubble damage risk.

### Handler Damage

There are many factors that influence the damage caused by handlers to bales. These include:

- Bale size, shape and weight
- Time of handling
- Handler type, size and adjustment
- Operator technique
- Transport distance, speed and terrain
- Number of handling events
- Quantity of film on the bale
- Grass type in the bale (soft or stemmy)

While silage bales are nominally 1.2 m x 1.2 m (4' x 4'), many of to-day's balers produce bales closer to 1.3 m in diameter. Most wrapped bales are carried by 3-point linkage mounted fixed handlers, which consist of two round tubes or paddles that are reversed beneath the bale. Oversize bales or bales that have sagged are easily damaged by these handlers. Wet or soft bales should be handled immediately after wrapping. Heavy bales will put more pressure on the film where it is in contact with the handler and are more prone to damage, particularly if bales are being transported long distances over rough paths/fields.

### **Handler Type**

Fixed handlers are inexpensive and simple. The bars that come into contact with the film should be straight, rust-free and completely smooth to prevent film damage. These handlers will damage bales that are too wide or have sagged. The top link should be carefully adjusted to allow the handler to slide under the bale without damage. Some older handlers are too narrow for today's bigger bales.

Hydraulic handlers that use hydraulically adjustable rollers are usually fitted to front loaders. These can handle wide or sagged bales and are essential for damage-free stacking more than one bale high, or for loading bales onto flat trailers. However, they need to be operated carefully and skilfully.

### **Operator**

Operator skill and technique are vital in preventing bale damage. Careful manoeuvring of all types of handler when loading or unloading the bale is essential. An appropriate travel speed should be used, as bouncing during transport will increase the pressure on the film. Particular care is needed when tipping bales to store them on their end. Similarly, off-loading loader-mounted bales onto a stack is a demanding task.

### **Time of Handling**

Bales should be handled immediately after wrapping - preferably within hours. This will prevent damage being caused to sagged bales and will avoid disturbing the seal when fermentation is underway. Bales are more easily damaged if left overnight. Very high dry matter bales are more easily handled, as they retain their shape better.

### **Multiple Handling**

The more handling a bale is subjected to, the greater the likelihood of film damage. **Storage-site wrapping**, where the bales are brought to the point of storage to be wrapped, is the best way to reduce handling. However, the increase in combined bale wrapping operations precludes this system for many. Loading and transporting wrapped bales on flat trailers requires particular care as multiple handling and the trailer itself can be sources of damage.

### **Storage Method**

Bales are usually stored singly on their sides or ends, or alternatively they can be stacked two or three high, on their sides. Storing bales on their ends (tipping handler) will leave any handler damaged areas open to the atmosphere. Bales that are stored on their sides will often suffer less spoilage from handler damage. The damaged area is invariably at the bottom of the bale and the weight of the bale often forms a seal between the damaged area and the ground.

## **Damage Repair**

Bales should be carefully examined after handling. Damage should be repaired immediately after the bale is put in position, while damage is visible and access is still possible. Bales stored on their ends should be examined very carefully.

## **Film Quantity**

The more film applied to bales, the greater the level of protection afforded. The use of six layers of cover (24 turns) should be considered in all situations, and is economically viable where well-packed high dry matter (35 per cent) bales are produced. Six layers of film should be applied to bales that will be subjected to multiple handling operation.

While the level of mould recorded in baled silage experiments is variable, leading to difficulty with statistical analysis, in all trials at Oak Park, where four and six layers of film were used, lower levels of mould were observed with six layers.

## **Importance of Damage**

Severe handling damage, where the plastic is actually ripped, is easily seen. However, the damage caused by rusty handlers and/or rough transport and handling is often difficult to see. Small holes (1-3 mm diameter) can be caused between the handler and the bale. The importance of the holes should not be overlooked.

In a trial at Oak Park, the presence of six small holes (4mm x 2mm) per bale resulted in mould covering 26 per cent of the bale surface. Undamaged bales had less than one per cent mould. In Grange one small (3mm) hole per bale resulted in an 8.0 per cent loss of edible silage, while one large hole (24mm) resulted in one third of the bale being lost.

Handling damage must be prevented to avoid mould development and aerobic spoilage. Baled silage is not cheap, but aerobically spoiled baled silage can be the most expensive feed on any farm.

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