DEPARTMENT OF
PRIMARY INDUSTRIES

Agriculture Notes

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Stacking Sheaf Hay

Sheaf hay is most commonly made from cereal crops. The sheaves are stooked in the paddock for curing before being stacked, either in an outside stack or in a shed, before cutting into chaff. A stack of sheaves is built by hand using a pitchfork; it must stand or support itself

Introduction

The quality of sheaf hay changes only very slightly when in the stack, provided that it is not damaged by weather, vermin, etc. A well built and thatched stack offers good protection from weather.

Stack location

Choose the location of a stack to minimise the labour and handling in both stacking and transferring the sheaves.

A mobile chaffcutter moved to the stack site can be worthwhile because chaff is easier to transport than sheaves.

If a shed is available this should be used for weather protection of the hay. If the shed is next to the chaffcutter labour will be saved in carting and handling at chaffing time. A square or rectangular stack is built in a shed.

All-weather access is desirable as chaff is often cut when other farm work cannot be done. Select a situation with some protection from strong winds.

Stack site

Choose a level site on a dry area where moisture does not collect and where drainage water can be channelled away.

The site floor can be raised with filling; or a straddle floor can be built off the ground on posts with metal caps. The straddle floor offers some protection from vermin. Better vermin protection is provided by a galvanised iron wall, 600-800 mm high and buried in the ground with an L-shaped lip outward. This low wall can also offer a little protection from a slow creeping fire. If a netting fence is built above the wall, sheep can be allowed to graze up to the stack.

Stacks should be fenced as protection from all livestock. Keep the surrounds clean as a precaution against fire and vermin.

Stack shape

Various shapes can be built: square, rectangular with gable ends or with hip roof ends, parallel sides with round ends, and circular. The best one for a beginner to start building is the rectangular with gable ends. This type is described here with comments on variations.

When building a stack of any shape keep the walls vertical. As a stack is being built and as it settles, the hay naturally moves outward slightly nearer the eaves, hence the characteristic appearance of the sloping walls on many stacks.

Stack size

The density of new hay is about 100 kg/ m^3; it can be up to 120 kg/ m^3 for old or settled hay. Use the higher figure if calculating the number of tonnes of hay in an established stack.

In deciding what size a new stack should be, calculate the volume of hay in cubic metres by multiplying the tonnes by 10. When the volume is known, consider a rectangular ground shape with the length three times the width. The height to the eaves should be less than the width. Keep the width between 3-7 m. Less than

3 m is too narrow and insufficient binding of the stack could be the result. It if is too wide the stack has more tendency to sink in the centre. The vertical roof height from eaves to gable will vary depending on the stacking; usually it will be in the range of 0.5 to 0.7 of the width .

For larger quantities of hay use a longer stack or build a second one.

Example 1-The average yield from 2 ha could be

7 tonnes of hay; multiply x 10 = 70 m^3. The stack size could be 9 m long x 3 m wide x 2 m to eaves = 54 m^3; add on 9 m long x 3 m wide x .5 m (1.5 m roof height ÷ 3) = 14 m^3. Total 68 m^3, or nearly 7 tonnes.

Example 2 - for a larger quantity the stack size could be as shown in Figure 1:

16 x 5 x 4 = 280 m^3

16 x 5 x 1 = 70 m^3

350 m^3 or 35 tonnes

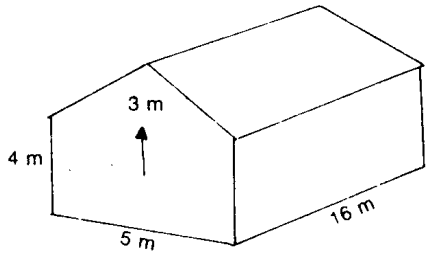

Figure 1.

Stack building

Preparation

Mark out on the ground the outer limits of the stack.

Placing of the sheaves starts at the outside and continues into the centre. One person, the pitcher, tosses sheaves from the load to a second, the turner, who is on the stack and turns the sheaves for the third person, the builder.

The builder naturally moves as the sheaves are placed in position. The turner should also be moving regularly and the pitcher should be pitching to a slightly different location each time, that is convenient for the turner. If the sheaves are pitched to the turner continually at the same location on the stack, this area of the stack becomes compressed as building continues, settles a different amount and so the stack becomes lop-sided.

A point to remember and often overlooked is that for easier and smoother working the prongs and handles on the pitchforks should be smooth.

Ground layer - first row (figure 2)

Place the first sheaf at the corner, butt to the end at the side line of the stack. Square corners can be built as in the figure, with all sheaves at right angles to a side or end, and with butts to the outside.

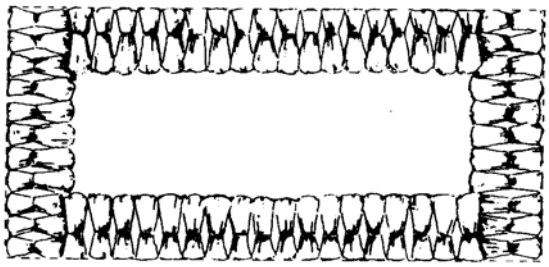

Figure 2.

The sheaves at the corners, parallel to the sides, must provide a firm base so use firm, well shaped sheaves. This applies throughout the building; use good sheaves near the outside and for the roof and place the shorter, rougher or looser sheaves near the centre.

Continue placing the outside or first row all the way round the edge of the stack.

Additional binding of the two or three sheaves at the corners can be assisted by taking a hank of hay from the outer sheaf and bending it at right angles onto the adjacent sheaf before placing another sheaf on top of it.

Ground layer-second row (figure 3)

The sheaves for the second row are placed butts inwards, with the bulk of the head well over the bands of the first row. Succeeding rows continue in the same way to the centre.

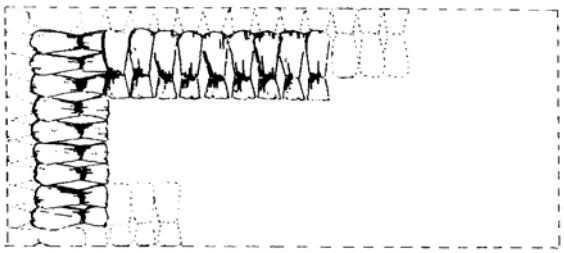

Figure 3.

When placing sheaves, choose the flatter way as they are already somewhat compressed. Keep all sheaves well pushed up to their neighbours.

Second layer-first row (figure 4)

All sheaves are slippery and will move if not bound. The second layer must bind the ground or first layer. Starting at a corner, place a sheaf butt outwards along the diagonal line of the stack. Place the second sheaf butt to the outside, with some of its head overlapping the head of the first. The third and fourth sheaves should similarly overlap the previous one so that, when the fifth sheaf is placed, it should be at right angles to the side of the stack. Continue all the way round the stack edge.

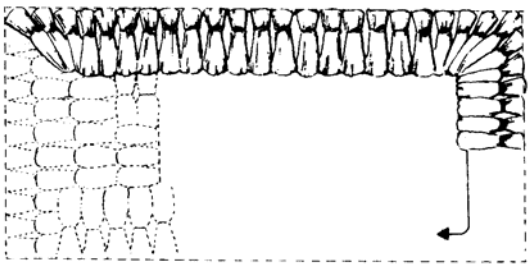

Figure 4.

For round or circular-ended stacks this is the method of placement for the ground layer as well as upper layers. It can

also be used for square or rectangular ground layers, but the methods shown in Figures 2 and 3 are considered better.

Second layer - second row (figure 5)

Butts outwards, overlapping the bands of the first row.

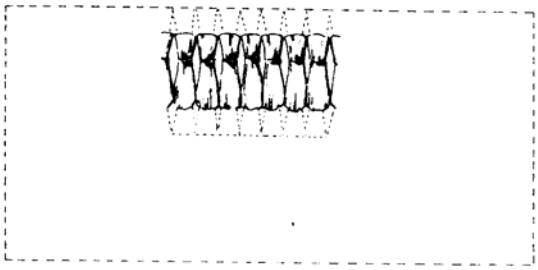

Figure 5.

The centre of the stack, beginning with this second layer, must be higher than the outer edges. Even the sheaves at the edges must have a slight downward slope to the outside, so that any moisture hitting the outside of the stack does not drain into the stack.

The degree of slope is regulated by the placement of the second and succeeding rows. The more the sheaves overlap, the steeper is the slope. If the sheaves are placed farther into the stack (less overlap), each layer is flatter. Aim to make the centre higher by about 10% of the width. For the two earlier examples in stack sizes, raise the centre 300-500 mm.

Successive layers

Building continues in like manner up to the eave layer.

Walls or outside edges

Keep walls vertical. A 'patter' is used to smooth and pack the butts of the outer sheaves. The 'patter' is made from a flat board about 350 x 250 mm to which a long handle is fixed at right angles to the board's length. A handle about two metres long will allow the operator to reach the top of the walls of all but the highest stacks.

The butts of the sheaves are patted in, not pulled in by the builder on top. The patting firms up the outer edges.

Eaves - (figure 6)

The height of the wall to the eaves is usually 3-4 metres.

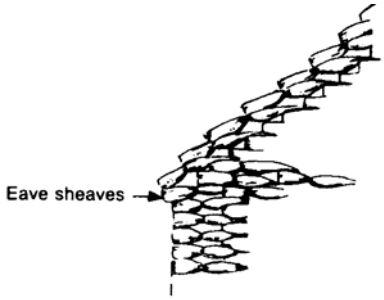

Figure 6.

To form the eaves and roof support, the sheaves in the outside or first row are placed to overhang the butt a short distance, about 100 mm.

The overhang can be in one (as shown) or two layers. Use firm, long, well shaped sheaves because this eave supports the lower thatching sheaves .

In a square-ended stack, the butts of the sheaves at the end wall are placed flush to take the vertical end wall right to the gable.

Roof - (figure 7)

In a rectangular stack all internal roof sheaves are placed as for building the stack; alternatively they can mostly be placed lengthwise with some binding near the centre. In circular or round-ended stacks the roof sheaves are all placed butts outward.

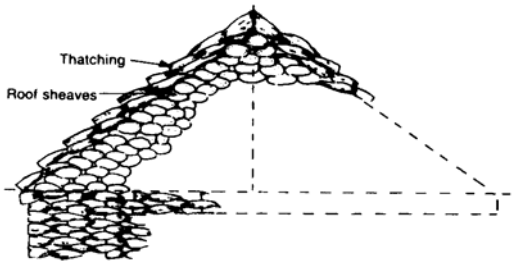

Figure 7.

The first roof layer is placed 100-200 mm in from the end of the eave sheaves. Succeeding roof layers are similarly placed in by the same distance. Two or three layers of roof sheaves are placed, depending on the length of the sheaves; then thatching can start.

The stepping-in of the roof sheaves provides the slope for the thatching sheaves, which are placed so their butts rest firmly on the eave sheaves, somewhat overhanging them. The heads lay onto the second or third layers of roof sheaves. The roof sheaves in the next layer are placed on top of the heads of the first thatching sheaves, thereby binding or holding them in place. The process is repeated to the gable.

The thatching sheaves have the bottom portion exposed, all sloping well downward. The hay above the bands is covered by the thatching sheaves above. For thatching use long, tightly bound, well formed sheaves.

Ridge forming-(figures 8 and 9)

Near the ridge of the roof the width will be reduced to two sheaves side by side. These two sheaves are tied together, either by twine, or by a hank of head and butt from one sheaf, twisted together and tucked well under the band of the adjacent sheaf (Figure 8).

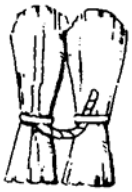

Figure 8.

A single row of sheaves is placed on top of the two rows lengthwise along the stack to form the ridge row (figure 9)

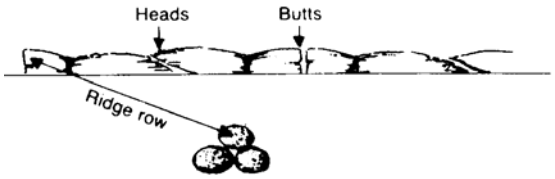

Figure 9.

Keep this top ridge row as level as possible by alternating the sheaves, butt-to-butt and head slightly overlapping the next head, as in figure 9.

Capping - (figures 10 and 11)

A thatching row is placed as previously along both sides of the ridge with the heads meshing on top of the single ridge row. Two alternative methods of capping can be used.

In figure 10 the capping sheaves are butted together at the top with heads down the roof slope. A hank of hay (as in figure 8) twisted together and pushed well into the stack or hooked under the bands of the roof sheaves, holds the capping in place.

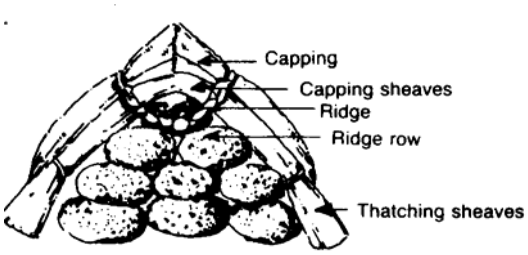

Figure 10.

The alternative method of capping is shown in figure 11. Place on top of the intermeshed heads of the thatching another single ridge row lengthwise; again keep it as level as possible by alternating the sheaves. The capping sheaves are similarly butted to form the ridge, which has a steeper angle.

In this method of capping, twine is used to tie the capping sheaves together. Twine is tied to the bands or round the sheaf at one end of the ridge, passed under or through roof sheaves, to the corresponding capping sheaf on the other side. The twine is pulled up firmly, tied, then taken on to the next pair of sheaves. Start at the end of the ridge and progress to the centre, then start again from the other end of the ridge.

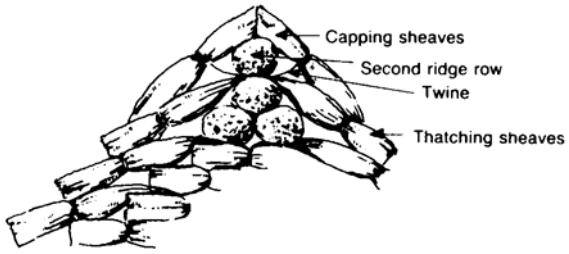

Figure 11.

Twine can also be used in the capping method shown in figure 10 if desired.

Tying

If the stack is in an exposed windy position or is to stand for a long period, additional tying can be used. The end capping sheaves at both ends of the ridge can be tied back to a peg pushed into the second or third capping sheaves and also into the roof sheaves below. Similarly, the end thatching sheaves down the edge or end of the roof can be tied back and held firmly in place.

Twine tying of the complete area of the thatch can be done if desired; using a large curved semicircular needle, twine is threaded through roof sheaves and then tied over the thatching sheaves. This complete twine tying is not usually necessary for sheaves but is certainly required if loose bundled thatching is used.

Stack protection

Thatching uses the same hay as is used in the stack. If waterproof tarpaulins or plastic-type covers are to be used it is necessary only to form the roof shape. The waterproof covers should cover all the roof area and just overhang the eaves. They should be tied down to drip water away from the walls of the stack; do not pull them in to the walls as then water can drain onto the stack walls.

Of course, no roof forming or thatching is required if the stack is built in a shed, and this provides the best protection.

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