

Documentation

Floor Length to Achieve Bunker/Pile Silo Filling Layer Thickness Spreadsheet

Brian J. Holmes
Biological Systems Engineering Department
University of Wisconsin-Madison
460 Henry Mall
Madison, WI 53706
Phone: 608-262-0096
FAX: 608-262-1228
bjholmes@wisc.edu

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Purpose:

This spreadsheet was developed to estimate the length of floor needed to achieve the desired forage filling layer thickness prior to packing forage in a bunker or pile silo.

Software Requirements:

The spreadsheet requires Microsoft Excel. Set the screen size % in the upper toolbar so at least column G is visible on the screen.

Equipment Needs:

Tape measure

Procedure:

1. With the tape, measure the **length** (cell B21) and **width** (cell B22) of the forage transport vehicle (ft).
2. Estimate or measure the **average fill height** (cell B23) of forage in the transport vehicle (ft).
3. If you have truck scales and the capability to measure moisture content, determine the average dry matter density of forage in the forage transport vehicle by dividing a load dry matter weight (wet weight (lbs) x dry matter content (decimal)) by the volume (length x width x depth) of forage in the transport vehicle. Without this knowledge, assume 5 lbs DM/ cu ft. This value is used as the assumed **average layer dry matter density** (cell B20)
4. Measure the **average width** (cell B18) of the storage to be filled. In the case of a bunker/pile silo the average width is $(\text{Bottom Width} + \text{Top Width})/2$ or the width at the half height of the wall for a bunker.

5. Estimate the average silage depth when the storage is full (**average silage fill height**) (B17). In the case of a bunker, the average depth is $(\text{Wall Height} + \text{Peak Height})/2$. In the case of a silage pile, the average height is the Peak Height/2.
6. Enter the values requested in the yellow cells of the spreadsheet.
7. Some useful information is printed in the blue background cells B24-B28.
8. The horizontal distance measured on the storage floor from the filling slope bottom edge to top edge is listed in the pink cells B29 and O33 (see figures referred to in 9 and 10 below). Based on the information provided, this is the distance over which the forage must be distributed to achieve the desired layer thickness before packing the forage. If this slope length is too long for you, try distributing and then packing a portion of the wagon/truck load each time. To avoid the tractor tipping over backward and to make the push up process easier, use a slope lower than 3 horizontal to 1 vertical (see cells B28 & C28).
9. A graph of the filling surface and top surface side view cross section of the bunker/pile is shown below row 40. The axes are not exactly matched in scale but are close. The graph gives a relative perception of rise over run for the slope. The values printed on the graph are the elevation above the floor for a given point on the curve representing the forage surface.
10. To the right of Column E at Row 29 is a cross sectional view of the filling slope. The red line represents the unpacked layer of forage placed on the filling slope. Dimensions obtained from the calculations portion of the spreadsheet are printed in the cells around the cross section. This drawing is not to scale.