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Estimating Floor Space for Farm Equipment Storage

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The machinery shop serves multiple roles on the modern farm, including equipment, parts and tool storage, equipment maintenance, fabrication and service, and office. Parts storage and service is becoming more important as service centers and parts distribution become widely scattered.

Basic steps required in planning the layout of a machinery storage building are: 1) decide what machinery is to be stored; 2) estimate the floor space requirements for that machinery; and 3) follow the guidelines in *MWPS-26, Farm Shop Plans Book*.

During the planning phase, analyze the efficiency of several alternative layouts. Consider equipment traffic patterns, door sizes and locations, and various storage arrangements for different work periods throughout the year. Careful attention to these details should result in the "best" storage building for your operation.

Why Machinery Storage?

The primary reason to store machinery inside is to protect it from weather. Sunlight and moisture have adverse effects on belts, bearings, tires, paint, seats, wood and, to a lesser extent, many other components. Machinery that has been stored properly usually has a higher resale or trade-in value, lower repair cost and less downtime. For additional details on the savings of stored machinery see NebGuide G95-1261, *Five Strategies for Extending Machinery Life*. In most cases, the economic benefits from storing machinery are much greater than cost of the storage.

What Machinery to Store?

Consider present and future storage needs not only for farm machinery, but also for lawn, garden or recreational equipment and farm truck fleet. To do this, consider what's happened in the farm business over the last five to seven years, and project ahead a minimum of three to five years. Decide which

existing storage facilities are to be retained, abandoned or converted to other uses. Then decide what equipment would be placed in the storage facilities. Knowing current and future storage needs, determine the new facility's size.

Estimating Floor Space Requirements

A survey of 300 Midwest farmers suggested that the minimum shop size is related to the size of the farm (see *Table I*). Recommended building width should be at least twice the door width. The door width is recommended to provide 2 feet clearance for equipment brought into the shop. The door height should be at least 1 foot clearance above the machinery (see *Table II*).

The floor space required for each particular item to be stored depends on a number of factors, including those illustrated in *Figures 1* through *3*. To determine minimum total storage area, work with the specific equipment to be housed, both current and future. Use actual dimensions for current equipment. *Table III* may be helpful for future or anticipated machinery purchases.

One method of calculating minimum storage area is to: 1) calculate the area for each item to be stored by multiplying the overall length times overall width; 2) sum the areas of all the items; then 3) add 15 percent to this total (i.e., multiply by 1.15) to allow for space between equipment.

Another method is to: 1) multiply the width plus 1 foot times length plus 1 foot for each machine (to account for space between); then 2) sum the areas of all the items. Both techniques produce the same result: the absolute minimum floor space required for tight, efficient, long-term machinery storage.

This minimum requirement for floor space is merely a starting point for sizing the building. It may account for future storage needs (if you included them), but does not allow for overnight or short-term storage of equipment during various work periods when it would be desirable to leave tractors and implements hitched. During such times, these units may have to be left outside or stored elsewhere – unless planned for in the original design.

Table I. Minimum shop dimension based on farm size (average from 300 farms).

Farm Size (Acres)	*Shop Size (sq ft)*	*Shop Width (feet)*	*Shop Length (feet)*
1,000	1,680	40	42
2,000	2,000	40	50
3,000	2,300	46	50

Table II. Suggested minimum shop door dimensions based on farm size.

	Door Dimensions (ft)	
Farm Size (Acres)	*Door Width*	*Door Height*
1,000	20	14
2,000	24	15
3,000	28	15

Table III. Typical floor area requirements of various items of farm equipment.
To see Table III, please order a hard copy of this publication from our Order Form or your local Extension Office.

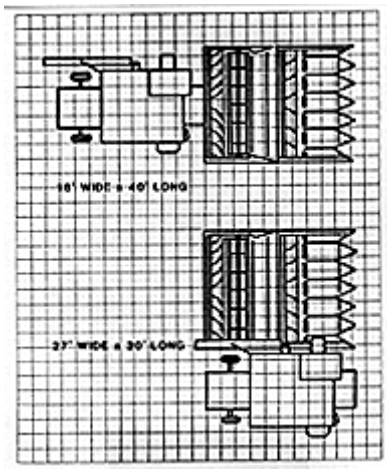

Figure 1. Storing self-propelled equipment (combines, pickers, forage harvester) with or without headers attached will affect space requirements. A 6-row combine requires about 20 percent more floor space when either the cornhead or platform header remains attached.

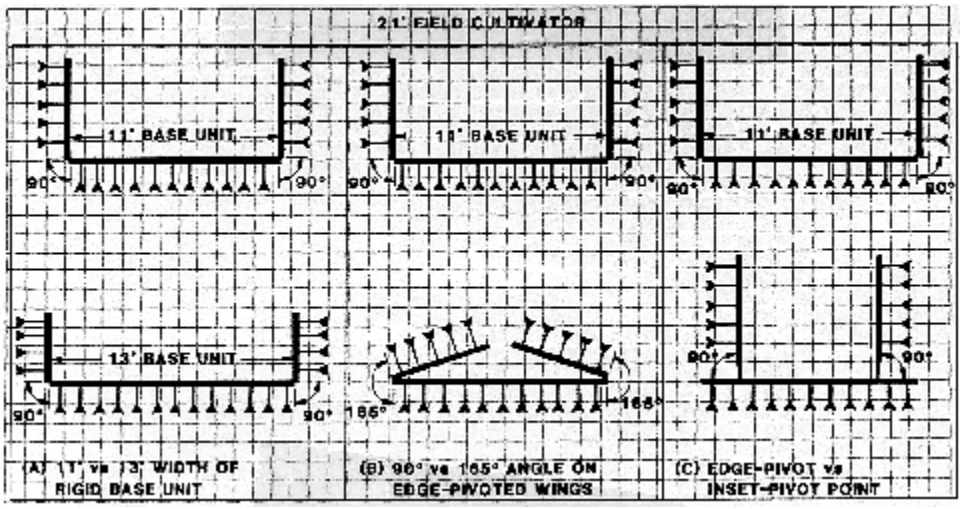

Figure 2. With fold-up implements, the base width and fold-up technique affects not only transport width, but also door size and storage space. With a 21 ft field cultivator shown: *(a)* a narrower base width reduces floor space but increases door height, *(b)* a greater wing-pivot angle with same base unit reduces both floor space and door height, *(c)* and inset pivot with the same base unit width and 90 degree pivot angle reduces floor space but increases door clearance.

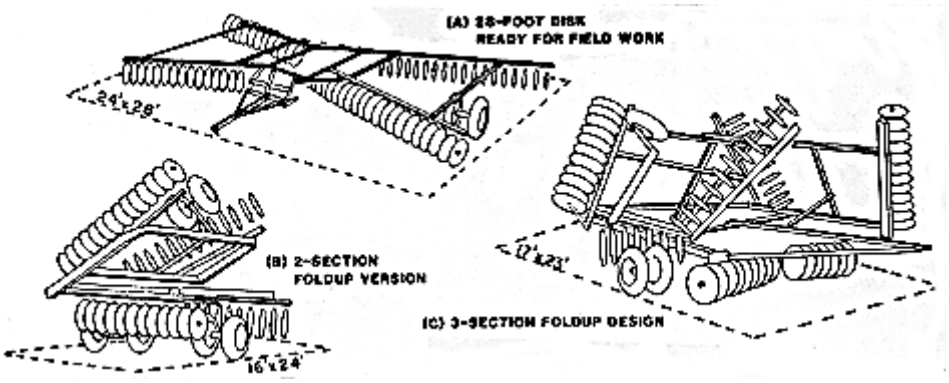

Figure 3. The same size machine from different manufacturers or earlier models may have different floor space requirements depending on the method and fold-up techniques. The 28-ft tandem disk may require: *(a)* 672 sq ft for field operation, *(b)* 384 sq ft for storage with a 2 section fold up, or *(c)* 391 sq ft in a 3-section configuration.

Publications

- *Farm Shop Plan Book*, MWPS-26. 1985. The book illustrates floor plans, cross sections and construction details for four farm shops sizes: 24'x32'; 32'x40'; 40'x48'; and 48'x56'. (32 Pages)
- *Machine Shed*: 40'x104', MWPS-74143 - 13 ft height clearance with 40'x40' shop
- *Machine Shed*: 48'x96', MWPS-74146 - 14 ft height clearance with 48'x40' shop
- *Machine Shed*: 60'x96', MWPS-74147 - 14 ft height clearance with 60'x40' shop
- *Machine Shed*: 30'x72', MWPS-74148 - 12 ft height clearance with 30'x40' shop
- *Machine Shed*: 56'x88', MWPS-74149 - 13 ft height clearance, no shop included, 40' clear span with a 16' shed attached for addition space.

Plans may be ordered from your Extension Educator at the nearest Extension Office, or directly from Agricultural Engineering Plan Service, University of Nebraska-Lincoln, 219A LW Chase Hall, P.O. Box 830726, Lincoln, NE 68583-0726 (phone: 402-472-1646, or FAX 402-472-6338).

[1]Modified from:

1. Parson, S.D., R.M. Strickland, D.D. Jones and W. H. Friday. Planning guide to farm machinery storage. AE-115, Purdue University, Cooperative Extension Service, West Lafayette, IN and
2. Hofman, V. and K. Hellevang. 1994. Planning Farm Shops. AE-1066, North Dakota State University Extension Service, Fargo, ND.

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