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Efficient Warehouse and Materials Handling for Seedsmen

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EFFICIENT WAREHOUSING AND MATERIALS HANDLING FOR SEEDSMEN [1/]

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We seedsmen generally have not given sufficient attention to the warehousing phase of our operations. This is true because most seedsmen have grown into the seed business from a very small operation where most records could be maintained by memory. Today, the situation has changed drastically. Seed warehousing is a subject we must study more closely. My comments are directed primarily toward the seedsman handling a small to medium volume who has "growing pains" with warehousing.

There are some special problems associated with seed warehousing that often are not of as much concern to warehousmen handling products other than seed.

For example:

(1) slow turnover of inventory;

(2) Special environmental requirements for seed, such as dehumidification and refrigeration;

(3) many lots, varieties, and classes of seed;

(4) limited and varible storage life of seed lots. (The warehouseman's precept of first-in, first-out may not apply after seed quality is evaluated);

(5) special stacking and arrangements of lots for sampling by seed control and/or certification officials.

To increase our expertise in warehousing, let's consider the ideas of people outside the traditional disciplines of seed technology. Industrial engineers and the Materials Handling Institute are sources of good information. Many of the ideas for this discussion are taken from the publications listed at the end of this article.

Warehousing is not only a storage problem but also a materials handling system. Receiving, bulk storage, processing and warehousing are parts of the system. Warehousing is often divided into three basic steps; stocking, order picking and shipping. All of these phases of

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materials handling are important to an efficient product flow through the plant and are funamental to efficient materials handling. The obvious steps for upgrading a handling system are from MANUAL to MECHANIZED to AUTOMATED. Two important aspects of upgrading the handling system are:

(1) each step up is an exchange of capital investment for labor expense and,

(2) with each step up the operation becomes less flexible.

The capacity for the bulk and bag components of storage will vary tremendously depending on the type business operation - wholesale, retail, bulk, bagged, etc. When planning to upgrade or construct new facilities for bulk and bag storage, go to your records for processing/receiving/ shipping to determine how much of each type of storage is necessary.

Figure 1 shows a simplified way of determining how and what type storage will be required. In this example, the maxiumum difference between the cumulative bulk receipts and cumulative processing is the total amount of bulk storage that will be required. The maximum difference between the cumulative processing and/or bag receiving and cumulative shipments gives the total amount of bag storage space required.

One large corn processing company has partially solved the problem of periodic use of bag storage by placing portable bins inside a large air conditioned warehouse. These portable or "knock-down" type bulk storage bins hold the shelled corn seed before processing. After emptying a given bin, it is dismantled and stacked in another warehouse. The bagged seed is then stored in the vacated area. Each problem must be solved on its own merits because plant layout and materials handling are so closely related.

Maximum utilization of floor space is always desirable. One problem in utilization is called "honeycombing" or lost storage space in front of partial stacks caused by shipment of partial lots or storage of different size lots within the same area (Figure 2). This problem exists in all warehouses to some degree and only careful and constant attention can minimize it.

Stacking lots in the warehouse to permit inspection by seed control or seed certification inspectors is necessary. Figure 3 shows an example of seed lots stacked in pairs with approximately two feet of space between pairs to allow a walkway on at least two sides of the stacks. This utilizes a small amount of warehouse space but eliminates the need for movement after the inspection. Figure 4 is one alternative in which two lots are stacked side by side with space left for a third lot, which is stacked temporarily in the aisle. After sampling, the third lot is restacked into the space to obtain maximum floor utilization. This

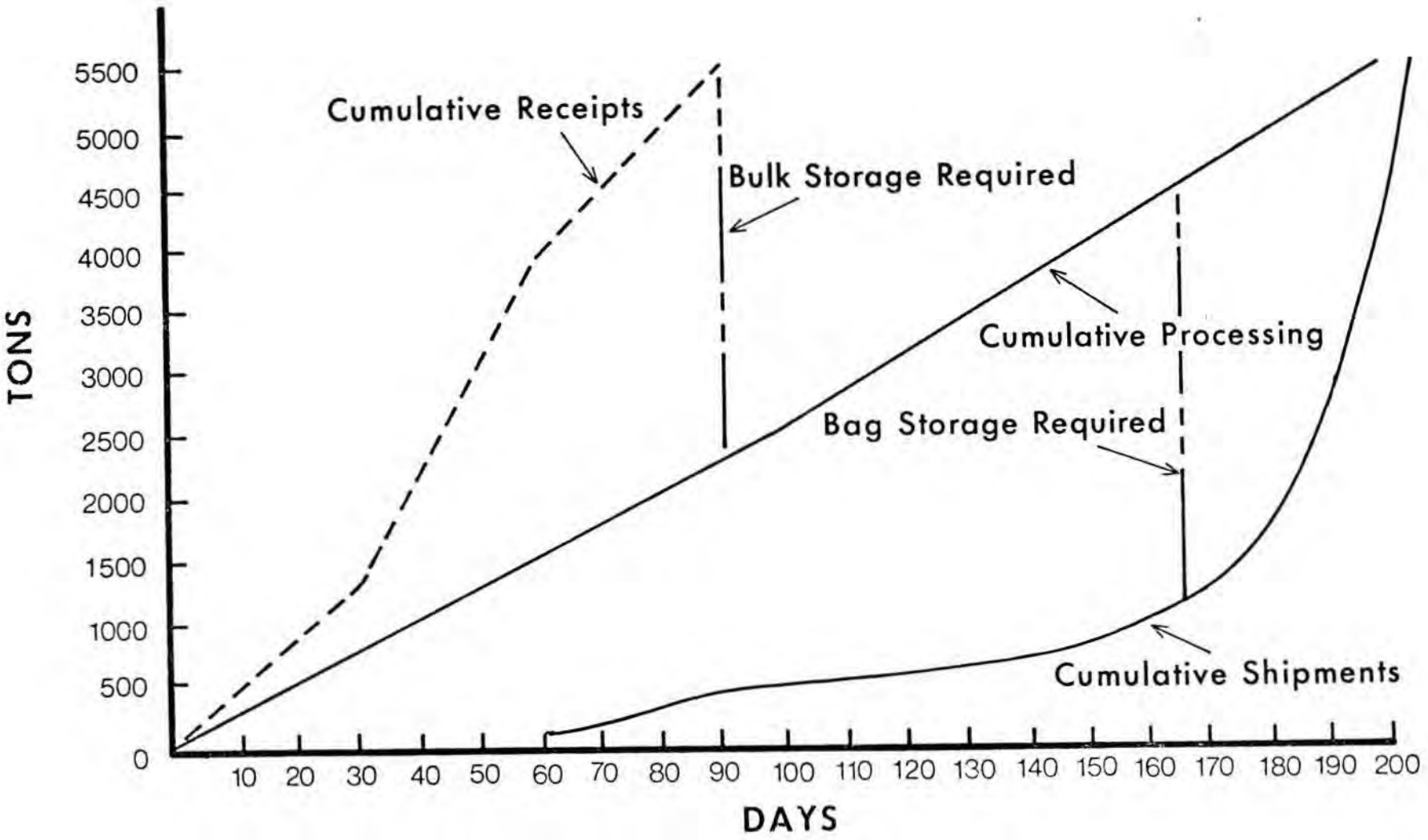

Figure 1. **Bulk and bag storage required at any particular time.**

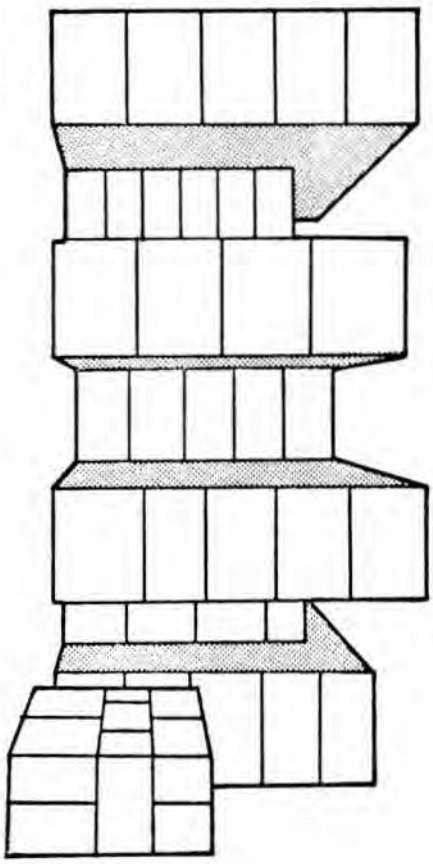

Figure 2. Lost storage space in front of partial stacks is called honeycombing.

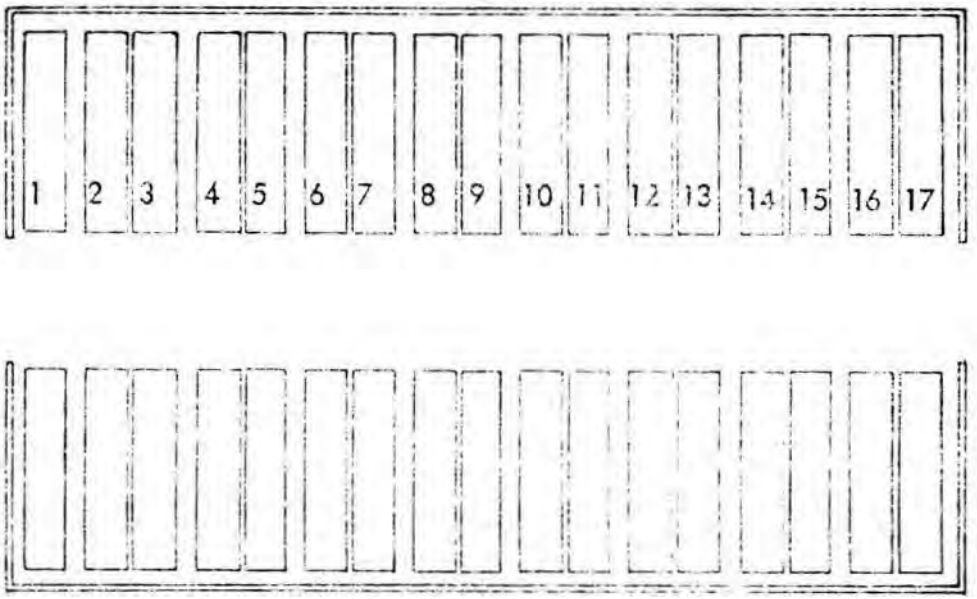

Figure 3. Example showing how seed lots are stacked in pairs with approximate 2 feet space between pairs to allow space for obtaining samples after lots are stacked in assigned lanes.

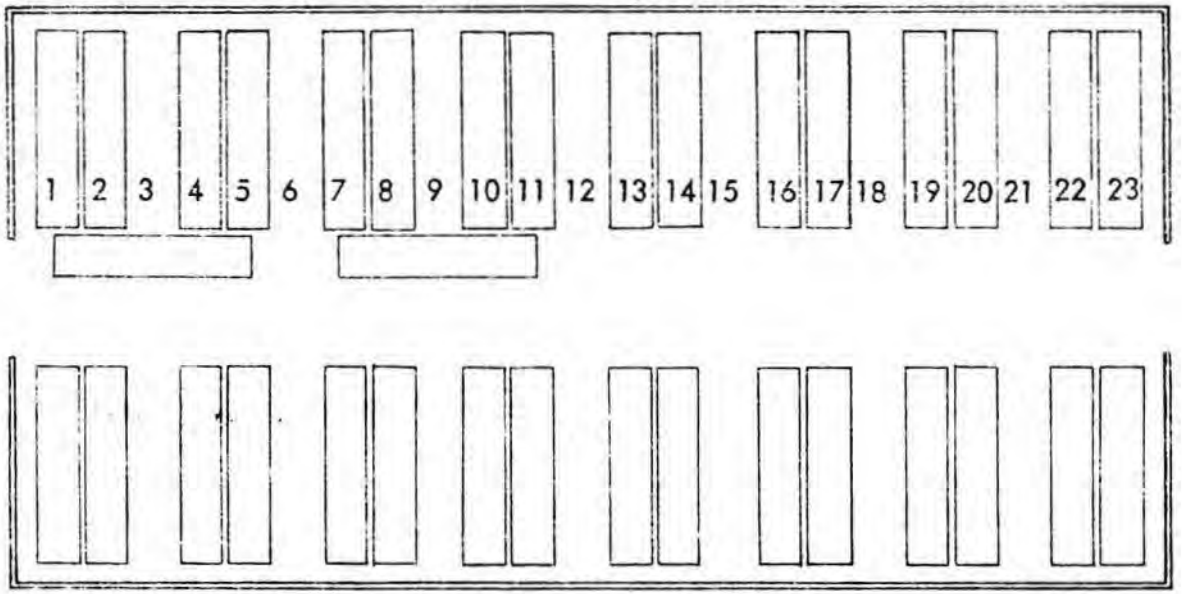

Figure 4. Example showing how seed lots are stacked in pairs of lanes with a vacant lane between the pairs to allow room for obtaining samples for germination.

makes the most efficient use of floor space at the expense of a small amount of extra handling. The principal fault of this system is the necessity of restacking when resampling is necessary.

Floor space utilization may be enhanced by stacking pallets at an angle instead of at right angles. This permits better space utilization through using more narrow aisles. Figure 5 is an example of this arrangement and Figure 6 shows the comparative advantage of an angular layout over on-the-square placement. The 35^{o} angle placement appears to be the most efficient resulting in an approximately 14% increase in space utilization. An angle of 10^{o} actually results in a loss rather than a gain in space utilization.

Utilization and layout of aisles is very important. Some guidelines that have been presented for warehouse layout are:

(1) keep the aisles straight;

(2) use both sides of working aisles;

(3) the length and width of aisles should be determined to avoid wasting storage space;

(4) use one-way traffic when practical;

(5) avoid dead ends in the aisles;

Width of aisles will depend upon the system utilized. With two-way traffic and right angle stacking, a 12-foot aisle width is about minimum for most seed warehouses. With one way traffic and angle stacking, aisles may be reduced to as little as 8-feet.Handling equipment and pallet size are also factors affecting efficient utilization of warehouse space.

Arrangement of stocks within the warehouse is affected by:

(1) product popularity;

(2) life of the item stored;

(3) the cube per order.

Figure 7 is an example of layout by product popularity where the fast moving lots of seed are placed closest to the dock work space, medium movers next and the slow movers furtherest away. Figure 8 is a modification of the same situation where lots are grouped by kind as, for instance, all corn lots are grouped together with varieties that move fastest stacked closer to loading dock. Another variation of this system could be the location of pick racks near the shipping and receiving dock. Order make-up personnel can make up complicated orders in

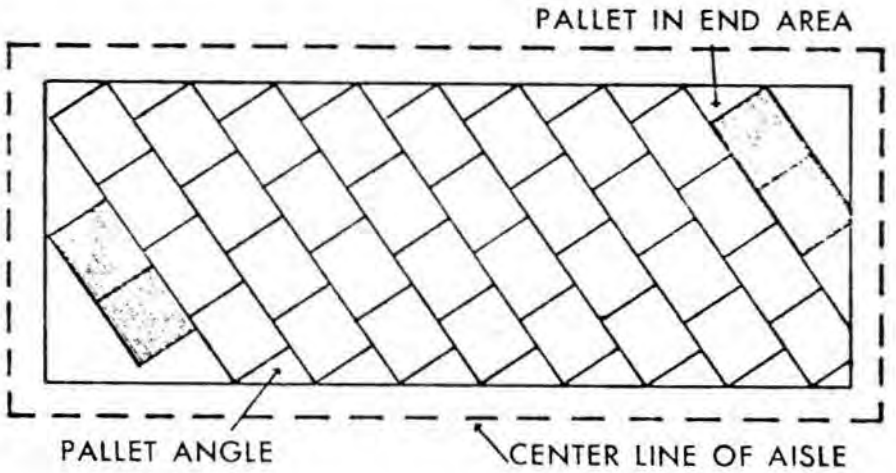

Figure 5. Angle stacking makes space possible when one-way, narrow aisles are used.

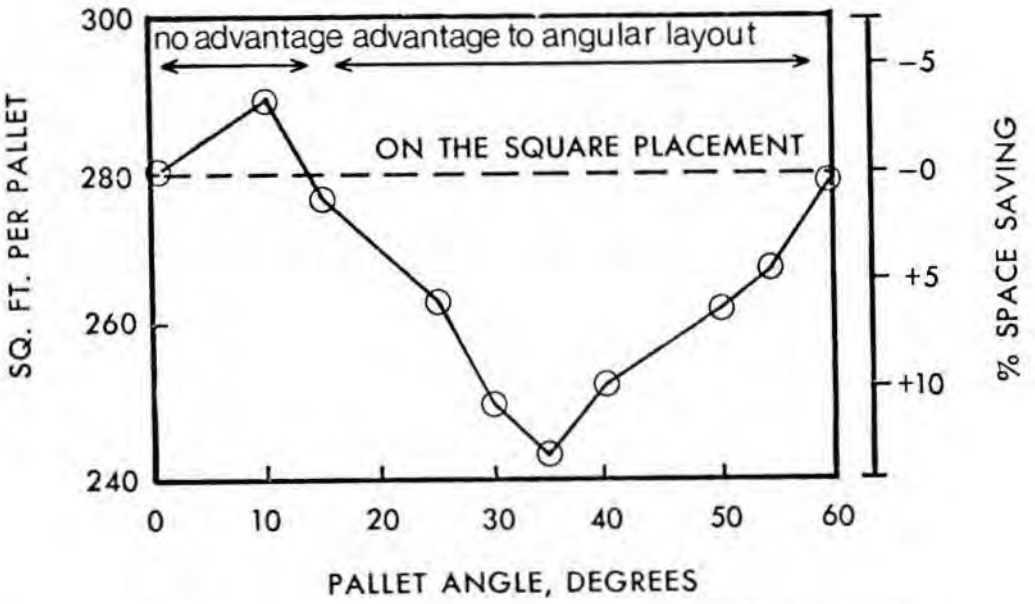

Figure 6. Comparative Advantage of an Angular Pallet Layout

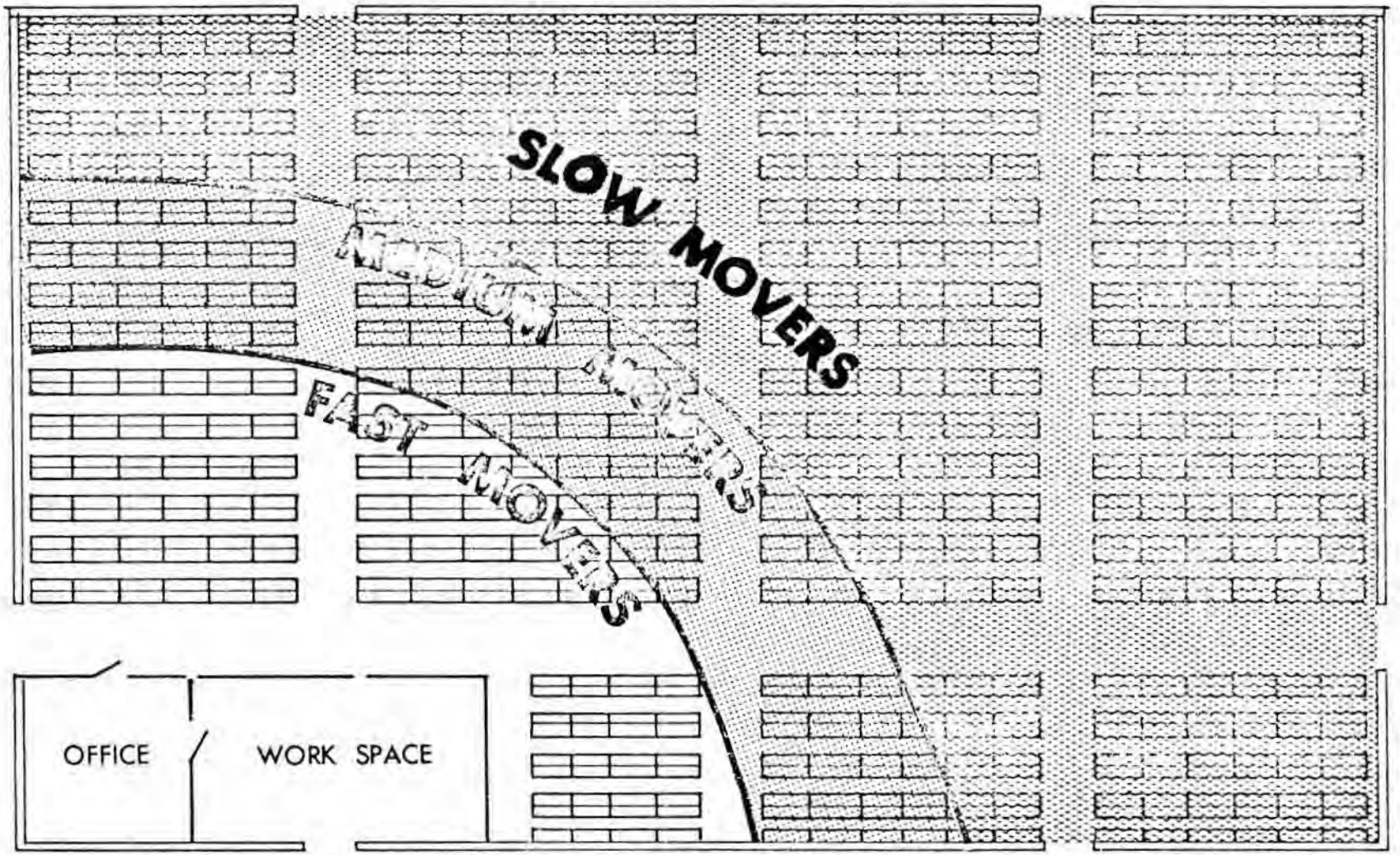

Figure 7. Storage of stocks by popularity. (From Storage and Materials Handling, TM 743-200, Dept. of the Army, U.S. Gov't Printing Office, Washington, D.C., p. 22-2).

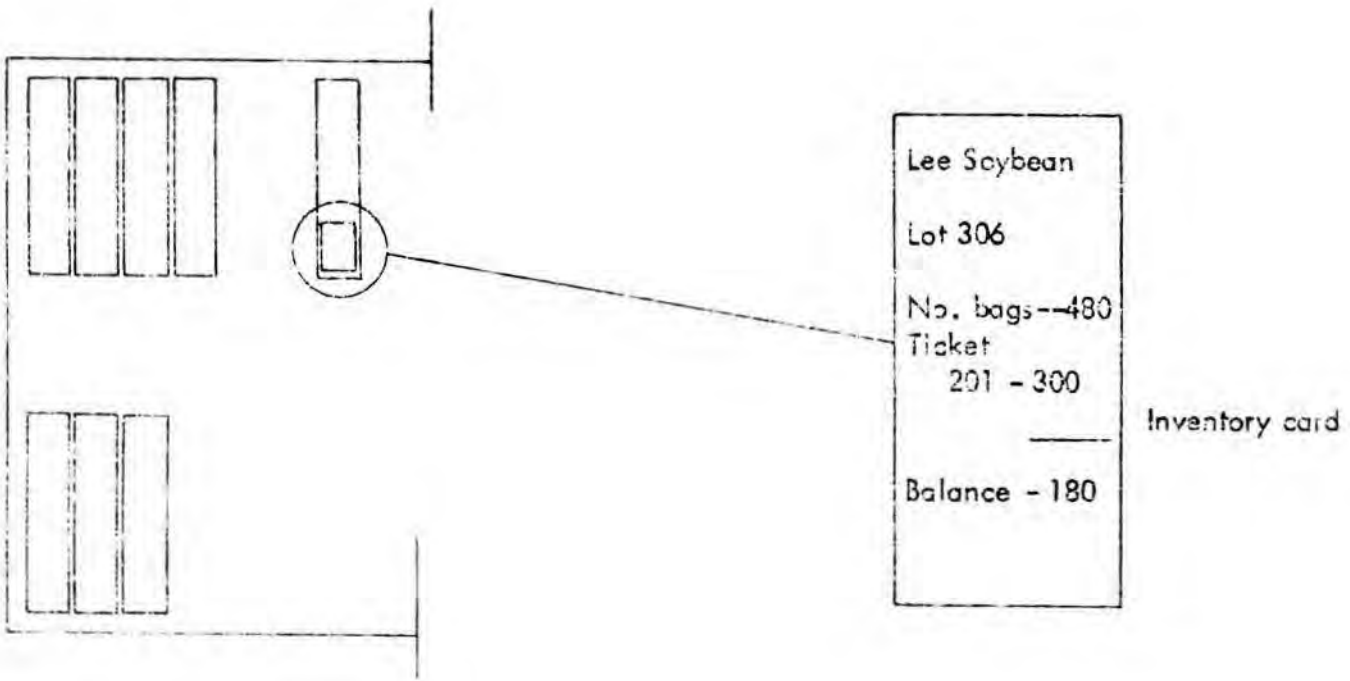

Figure 9. Example showing how inventory cards are kept on exact diagram of stacking lanes in warehouse.

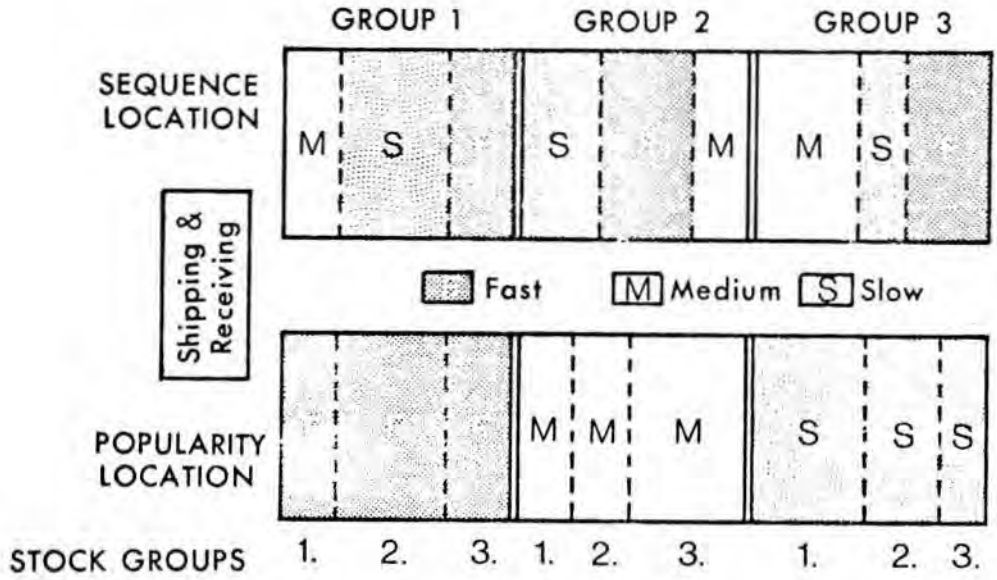

Figure 8. Popularity location maintained while retaining group classification. (After A. J. Briggs).

the same manner that a housewife picks her order from the shelves of a grocery store. Restocking the pick racks is from bay storage as needed.

Basically, improvement of warehouse efficiency involves three possibilities:

(1) change the arrangement of the destination or locations in the warehouse;

(2) change the sequence of operations;

(3) change the product mix.

Arrangement for efficient stakcing is important but it is doubly important for locating and retrieving lots efficiently. Many seedsmen have not yet taken the basic step of assigning warehouse area designations or painting traffic lines on the floor. A detailed floor diagram of the warehouse showing the location of each stack is as essential to inventory control as are traffic markers on the floor. A system of designating areas by letters and specific stacks by numbers is an excellent way of locating lots quickly. An example of such a location system is a typical athletic stadium, i.e., Section B, Row 12, Seat 21. Even drunks usually find their designated spot in 50,000 seat stadium.

Figure 9 shows an example of a floor plan that was developed to aid in lot location and inventory control. It is mounted on the wall of the warehouse office, convenient to the manager and the warehouse foreman. With inventory cards attached to the board, the lot, number of bags, shipping record, and balance-on-hand for each location is available at a glance.

All phases of warehousing discussed are pointed toward one objective; order make-up or order picking. Many warehousemen consider this the most important function of the storage activity. This function must move smoothly and rapidly if we are to attain the ultimate objective, efficient delivery of high quality seed at a reasonable price to the proper destination on time and at a profit.

Many of the functions of warehousing are completely integrated in most small management schemes. However, it is important that we consider stocking, order make-up, and shipping as separate entities, at least in our minds, when analzying warehousing problems. At some point, as volume grows, these three functions will be separated into actual designation of responsbilities. The exact point when this will be required will be determined by the size of the shipping, receiving, and warehousing operation; the degree of complexity of such operations, and the speed with which it is necessary to ship seed during the busy season.

Increasingly, seedsmen are required to respond more rapidly to retailers with smaller orders. It is not uncommon for a retailer to

order seed from the wholesaler only after he has received a request from the farmer. The seedsman who can respond quickly to such orders with high quality seed is the one who is going to continue to receive this business.

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