

CUT-STOCK POSSIBILITIES IN WOOD-CONSUMING INDUSTRIES IN MIDWESTERN STATES

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CUT-STOCK POSSIBILITIES IN WOOD-CONSUMING INDUSTRIES

IN MIDWESTERN STATES¹

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Stock cut to the dimensions required for the fabrication of various factory products is receiving increased attention by both consuming factories and producing mills. Factories are interested in increasing their sources of wood supply; saw mills in finding outlets for types of material not adapted to manufacture into standard items of lumber. Basic economic problems of raw material utilization affecting the forest and wood-using industries as a whole are involved in cut-stock development as well as the immediate prosperity of individual units of industry.

To help industrial concerns become more familiar with cut-stock utilization a study was recently made by the Forest Products Laboratory among representative consuming industries in the Midwest. This study was chiefly concerned with existing conditions that are conducive to increased use of cut-stock. The results of the study are presented here for the guidance of present and potential producers of cut-stock, especially those concerned with western softwoods, which comprise a large proportion of the potential supply of cut-stock.

The consuming industries, which provide outlets for cut-stock, are numerous and diversified. Some are relatively new lines of manufacture, such as factory-built houses and trailers, the requirements for which are neither widely known nor standardized. Others, such as sash, door, and millwork manufacture, are of long-time standing, relatively well-known, and fairly stabilized as to methods of material procurement. Still others, as in the household equipment field, the manufacture of softwood furniture, and a wide range of miscellaneous products, have such specialized or variable requirements that knowledge concerning them is ordinarily obtained only through considerable individual effort.

Among the foregoing diversified lines of manufacture there is a wide range of species requirements. In many cases the consumers are accustomed to and have a marked preference for the soft, easy-working qualities of western pines. Other users, at present in the minority but capable of considerable expansion, can take good advantage of the higher strength properties of the denser softwoods.

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²Maintained at Madison, Wisconsin, in cooperation with the University of Wisconsin.

The following uses of cut-stock are dealt with in this report:

I. Factory House Group

House trailers
Prefabricated house framing
Precut houses

II. Sash, Door, Millwork Group

Door and window frames
Stock sash and doors
Screens and screen doors
Combination doors
Flush doors
Overhead doors
Shutters and blinds
Custom millwork

III. Household Equipment Group

Softwood furniture
Radio cabinet parts
Kitchen cabinets
Refrigerators and coolers
Laundry appliances
Trunks, luggage
Window shade rollers and slats
Venetian blind rails

IV. Miscellaneous Group

Toys
Caskets and rough boxes
Agricultural implements
Boxes and crates
Step ladders
Moldings
Retail yard stock
Picket and snow fencing

Each of the foregoing uses involves different requirements and any conclusion with respect to them as a whole has to be in general terms. Certain over all conclusions, however, can well be emphasized as underlying the situation with respect to all these consuming groups.

1. Most of the Midwest industries that fabricate products from softwood stock are buying some of their material in the form of cut-stock, but the great bulk of the wood used is bought as lumber. Analysis of their cutting bills shows that eventually the lumber is cut largely into pieces not over 4 feet long. As far as the ultimate size of cuttings is concerned, a potential market of several hundred million feet of cut-stock per year is indicated.

2. Wider scale purchase of cut-stock hinges largely on the reliability of the sources of supply. Consumers emphasize on every side the importance of this point. Most of the larger consuming plants, particularly those in the lines of manufacture affording the largest present and potential outlet for cut-stock, are equipped to cut up their own lumber if and as they choose. There are certain plants, usually small ones, which are not equipped to do more than the final machining, assembling, and finishing operations, and consequently are geared to the use of cut-stock completely. Both of these types of consumers need to be taken into account by producers in developing plans for cut-stock production.

3. Many consumers take the position that too many producers regard cut-stock as a sideline to be picked up or dropped at their convenience. Consequently, consumers are afraid to rely on cut-stock

to the extent of dispensing with their own cut-up facilities. Obviously the consuming factory has to have its cut-stock up to specifications; otherwise it offers no advantage over lumber. If the buyer has to do additional work on cut-stock in recutting to size, drying, and the like, or if it is badly below grade, he is better off to buy lumber in the first place. Many consumers in recent years have become soured on the use of cut-stock after receiving shipments that were far below specifications in size, grade, or seasoning. As much as 20 percent loss in cut-stock shipments is reported by some factories. There are many producers of cut-stock who have the experience, facilities, and inclination to do a good job of production. Any producer contemplating going into the business has to be prepared to think in similar terms.

4. Consuming factories, for the most part, have efficient methods and good equipment for cutting up lumber. If cut-up operations are to be transferred from the consuming plant to the sawmill near the source of supply, the equipment and methods used at the mill must be comparable with those used at the factory. The theoretical savings, such as lower freight costs and fuller utilization, to be gained by switching cut-up operations from the factory to the mill are large, but they are nevertheless not large enough to compensate for inefficient methods of production at the mill end. Cost-reducing, labor-saving methods are important factors in cut-stock production at western mills because labor rates are apparently lower at factories in the Middle West than at many western mills. With adequate equipment and manufacturing competence the potential savings in cut-stock can apparently be realized on an increasingly large scale. This presupposes adequate drying practices.

5. Of prime importance is the cut-stock producer's ability to meet the consumer's moisture-content requirements. Generally most cut-stock items used in millwork, sash and doors, furniture, window shade rollers, caskets, ladders, house trailers, and prefabricated house construction have to be kiln dried down to 6 to 10 percent moisture content. Other cut-stock items, such as screen door parts, shutters and blinds, combination doors, and laundry and household appliances have to be dried to 12 to 15 percent moisture content. Few cut-stock items are used in green condition.

6. Aggressive and capable merchandizing of cut-stock is, of course, a key requirement. Cut-stock, like everything else in normal times, will not sell itself. Use of cut-stock by many small plants, especially those in large cities, will be greatly facilitated if provisions can be developed among producers and distributors whereby split-car shipments for two or more consignees can be made. Central warehousing where users can obtain less than carload shipments or rush order stock appears to be a measure that would be highly effective in increasing the use of cut-stock.

7. Preparation of cut-stock for shipment is an important merchandising feature. As an aid in handling and storage by the consumer, cut-stock in all cases should be sorted and bundled according to size. In the case of items like sash and door stock, the unit parts should be

bundled separately, but complete sets shipped even in mixed cars. Palletizing the bundled stock as a further aid in facilitating movement and storage and in lowering handling costs should be encouraged where practical.

In summary, machines, seasoning facilities, and operating standards at the producing end comparable in efficiency with that to which the consuming factories are geared are basic requirements for expanded activity in this field. Special sorting and sizing facilities for small and low-grade lumber are involved. Reduction in handling costs by bundling, including use of pallets and lift trucks, should be given consideration. Several of these requirements imply production plants of substantial size. Centralized concentration plants seem to be called for when the sources of raw material are scattered among numerous small mills and logging operations rather than being in one location. At such plants the rough material from a group of small operations can be assembled for final manufacture and distribution. A producing organization, such as that already established and now fairly well recognized in the West, appears to be the key to what is needed.

Trade associations that are concerned with the manufacture of the products discussed in this report are listed in the Appendix. The names and locations of individual companies can often be obtained through association offices.

Factory House Group

Some of the most promising potential markets for cut-stock exist among industries in the factory house group, but they have not been extensively exploited thus far. House trailer manufacturers have indicated that about 60 percent of the wood parts used in trailer construction could be in cut-stock form. Some of the prefabricated house concerns indicate that about 30 percent of their wood material could be cut-stock. Precut house manufacturers, on the other hand, prefer long length lumber to cut-stock.

House Trailers

House trailer manufacture has steadily increased to a present annual production of 60,000 to 80,000 units. Although trailers are manufactured in all parts of the United States much of the industry is located in southern Michigan and northern Indiana. Important centers of production are Elkhart, Ind., and Alma, Mich. There are approximately 200 trailer companies in the United States with plants varying in capacity from 1 to 50 units output per day.

Of the 20 trailer companies visited incident to this study half of them, using approximately 26,000,000 board feet annually of Douglas-fir and ponderosa pine lumber, would have used part of this material in

cut-stock had it been available. The estimated cut-stock needs of those expressing an interest are 12,000,000 board feet of frame material and 2,800,000 board feet of cabinet stock. Little or no cut-stock is being used by these companies at present, primarily because they have either not been able to procure any, or lumber salesmen have not pushed cut-stock sales. With few exceptions all companies operate their own cut-up plants.

Douglas-fir is now used primarily for frame parts, although some goes into cabinets, doors, and window parts. It has to be sound, tight-knotted stock, kiln dried to 8 to 10 percent moisture content. Ponderosa pine is used largely in screen door stiles, window frames, and interior cabinet parts, and should be largely clear stock kiln dried to 8 percent moisture content.

Dimensions of the cut-stock parts vary with the type of trailer manufactured by the individual companies. Trailers may vary in length from 17 to 36 feet. Widths are fixed by highway limitations, and heights are also fairly well fixed by minimum head room needed so that a considerable proportion of the members are within a fairly narrow range of lengths.

As many as 70 floor assembly parts are used in a large house trailer. These parts range from 1/2 by 2-1/2 by 39-7/8 inches to 1-5/8 by 1-5/8 by 230-3/8 inches in size, and all of them could be developed as cut-stock items. With the exception of the variations in length of any given construction item, the above widths and thicknesses are quite common to any trailer. Trailer construction must incorporate light-weight materials; consequently, all wood parts are as small as strength and safety factors will permit.

Cut-stock parts currently needed by the manufacturers may be furnished rough, dressed S2S, or finished as called for in specifications. Some trailer plants are buying rough lumber and jobbing out their parts manufacture to millwork companies.

The following dimensions are illustrative of some of the sizes commonly used in trailer construction:

Frame stock - 1-5/8 by 2 by 19 to 64 inches
1-1/2 by 1-1/2 by 22 to 84 inches

Trim and door stock - 4/4 by 1-1/4 to 78 inches
4/4 by 3-1/2 to 78 inches
5/4 by 2 to 78 inches
5/4 by 3-1/2 to 78 inches

Cabinet and cleat stock - 3/4 by 1-1/4 by 12 inches
3/4 by 1-1/2 by 42-1/2 inches
3/4 by 3/4 by 6-1/2 to 43-1/2 inches

Screen door stiles - 3/4 by 2-1/4 by 59 inches

Screen door rails - 3/4 by 2-1/4 by 22-1/2 inches

Although little cut-stock is being purchased at present by trailer manufacturers owing to lack of supplies and seller interest, this industry offers a good potential market for cut-stock because of the many short and narrow dimensions of the wood parts going into trailer construction.

Prefabricated House Framing

The Prefabricated Home Manufacturing Institute states that there are 80 active firms now producing prefabricated houses as compared to 20 or less in the prewar period. Production in 1947 was estimated at 37,000 units and capacity at 100,000 to 120,000 units. Based on an industry estimate of 2,500 board feet per unit, lumber consumption in 1947 would be 92,500,000 board feet and potential annual consumption could reach 250,000,000 board feet. Several active firms are located in Illinois, Indiana, Michigan, and Ohio.

One of the larger prefabricated house manufacturers, using 10,000,000 board feet per year, buys 30 percent of his wood as finished cut-stock. Assuming 30 percent to be typical of the industry as a whole, then 28 million feet of cut-stock could have been bought in 1947 and 75 million feet at peak production.

Few plants at present, however, are using cut-stock because none is being offered while lumber is in heavy demand. Of nine prefabricated house plants visited, four indicated they could use 4,500,000 board feet of cut-stock.

Douglas-fir, southern pine, ponderosa pine, and Sitka spruce, depending on availability, are the chief lumber species used for prefabricated house framing materials and may be furnished rough, semifinished, or finished to specifications. Some companies prefer to finish the stock at their plants; others prefer finished stock as it decreases freight costs and eliminates additional labor costs.

Cut-stock should be a good framing grade and kiln dried to 10 to 12 percent moisture content.

Dimensions for cut-stock vary with the type of construction, and some general sizes are listed here:

Wall spacers - 1-1/8 by 1/2 by 12-7/8 inches

Roof spacers - 2 by 4 by 12 to 12-1/2 inches

Spacers (porches, stairways, ceilings) - 2 by 4 by 12 inches

Doorheaders - 1-1/2 by 2-3/8 by 13 inches

Floor and flue spacers - 1-1/2 by 5-1/4 by 8-1/4 to 12 inches

Window frame stock - 7/8 by 1-1/2 by 25 inches

The use of cut-stock in prefabricated houses has not been fully developed primarily because of the comparative newness and past instability of the industry. As it appears today, however, a large potential market exists here for cut-stock items that could be readily worked up in a sawmill with good remanufacturing facilities.

Precut Houses

Precut houses have been made for several years either by independent operators or even for some department stores. The precut house is not an assembled job as is the prefabricated type, but the parts are precision cut at the source and assembled on the site. A few well established manufacturers of precut houses are located in the Middle West.

They generally prefer to buy lumber, largely dimension, shiplap, sheathing, and siding, and to work it up into the various precut items. Although many small parts from 6 to 36 inches are used in framing a house, these parts are developed from offal in cutting up the lumber. Three pre-cut housing units were visited, but only one large plant, cutting up 135 million board feet of lumber annually, indicated that they could use about 1 million board feet of cut-stock. Sizes were 2 by 4, 2 by 6, and 2 by 8, in lengths ranging from 6 to 36 inches. Kiln-dried fir or pine in No. 2 Common and better grades was preferred.

As long as these manufacturers feel they can cut up lumber economically, it is doubtful that they will consider use of cut-stock at this time.

Sash, Door, and Millwork Group

When one thinks of softwood lumber for fabrication and cut-up purposes he thinks first of sash, door, and millwork because these items represent the product of one of the oldest and largest branches of the wood-using industries. The use of various forms of cut-stock in this field is well known. Door stock and knock-down frames have long been standard items of commerce. Core blocks for veneered and flush doors have been a commodity purchased in carload lots for many years.

Substantial expansion in the use of cut-stock by this group is not to be expected as much as in newer lines of manufacture. Different branches of the industry, however, hold different degrees of promise. Many of the larger and older plants in the Middle West specialize in stock sash and doors in addition to making a line of general millwork. They already have large investments in facilities for cutting up lumber, and some of them have long-established connections with sawmill operators. Probably no great change in the use of cut-stock is to be expected in such plants. The small plant making custom products in special sizes is another of the less promising prospects for cut-stock. On the other hand, there are plants specializing in one type of product, such as overhead garage doors or screen

doors. Such units of this industrial group probably offer the best prospects for the new producer of cut-stock.

Door and Window Frames

Frames are a companion item of sash and doors. In the Middle West they are made by sash and door manufacturers, custom millwork plants, or straight frame manufacturing plants. In addition, many western mills make frames which are shipped kiln dried, knocked down and bundled to dealers in consuming areas. Illinois, Iowa, Minnesota, and Wisconsin have a few exclusive frame manufacturers, Chicago being one of the main centers of production. One large Chicago frame plant uses one-half million board feet of lumber a month. Frames, particularly for doors, are not readily manufactured from cut-stock due to the long clear cuttings needed; therefore, long length lumber can be used to better advantage than cut-stock. The offal is generally worked up into cellar sash, barn sash, or smaller frames.

Some of the frames on the market today permit sound-knotted stock in certain parts, but in spite of this, clear lumber comprises the great bulk of the material entering into their construction.

Stock Sash and Doors

In general, the large woodworking plants in the Middle West engaged in mass production of standard sash, door, and millwork are located in towns or small cities with relatively favorable wage scales. Plants in Iowa and Wisconsin are among the largest in the country, and constitute perhaps the largest potential outlet for cut-stock.

Doors are by far the more important product, but sash offers an outlet for cuttings that are too small for use in solid doors. In addition to sash and doors, many plants make a full line of general millwork.

Some plants have contracted for the entire output of one or more western mills in order to insure getting enough of the required grades of lumber. Others have established small cut-up plants of their own in the West.

One relatively new development in the old and well known sash, door, and millwork industry deserves mention, namely, the large increase in the manufacture of these products by retail yards all over the region covered. This resulted from difficulty in obtaining sash, doors, and millwork through ordinary channels. Many yards have installed machines for making these products on a small scale, and have every intention of continuing this business as a part of their retail service. Several of these retail yards are in the market for cut-stock if it becomes available.

Out of the several large plants in the Middle West that use more than 300 million feet of ponderosa pine per year (and small amounts of other western species), only one considered the use of cut-stock impractical. The others indicated they could use a total of about 80 million

feet per year consisting mainly of a standard sash and door stock. A few would prefer cut-stock for their entire production but felt that there never has been enough offered at any one time to warrant complete dependence on it.

Steps being taken to reduce waste include making hardboard panels of sawdust and shavings, and the use of glued-up stock. Door stiles made of two and three smaller pieces and veneered with pine are being used by some companies; others are selling spliced frame parts and sash stiles. Some feel that under the pressure of unfilled demand, painted doors made up of glued-up stiles, rails, and muntins could gain public acceptance.

Ponderosa pine is the chief species used although small amounts of western white and California sugar pine are used, particularly for special millwork. Douglas-fir is seldom used in the Middle West although one firm indicated that it would consider using it for storm and barn sash if the price and supply of ponderosa pine remained as they are. Small amounts of redwood and redcedar are also used for storm and cold frame sash.

About 65 percent of the demand for cuttings appears to be for standard door stock. Window sash and casings account for most of the rest. About 80 percent is for 5/4 and 6/4 thicknesses ripped to full specified width and S2S. Practically all factories indicated they required grade No. 1 cuttings kiln dried to 8 to 10 percent moisture content. Dimensions are those indicated in the grading rules, the proportions varying according to the needs of the individual firms. Standard door cuttings are as follows:

Stiles - 5 and 6 inches by 6 feet 8 inches to 7 feet 6 inches

Muntins - 5 and 6 inches by 3 feet 6 inches to 4 feet

Top rails - 5 and 6 inches by 2 feet 4 inches to 3 feet

Bottom rails - 9 and 10 inches by 2 feet 4 inches to 3 feet

The sizes commonly used in sash and door manufacture could be readily furnished as cut-stock. However, the larger firms have indicated that unless the supply of cut-stock can be stabilized they will be forced to increase their cut-up facilities and rely more on standard lumber. In addition to the current shortage of cut-stock, the sash and door manufacturers have not been able to obtain all the shop lumber they require.

Screens and Screen Doors

The manufacture of screen doors and window screens increased tremendously following the end of World War II. This was primarily due to increased building and to modernization of homes and industrial buildings. Screens and screen doors are manufactured by stock millwork plants, custom millwork plants, retail yards, and independent screen manufacturers. Some idea of the growth of the custom screen business can be gained from the increase in number of plants in Detroit from 6 to 26 since the end of the war.

There are several large independent screen plants scattered throughout the Middle West, but not all are good cut-stock prospects as some indicated a preference for lumber.

Out of three large and six small plants visited in southern Michigan and northern Indiana, two large and one small plant indicated that they could use cut-stock. One large Michigan plant would take up to 5,000,000 board feet of cut-stock annually for window and screen door stiles, rails, and muntins. This plant with its four subsidiary plants located at other points in the country could use a total of 25,000,000 board feet of cut-stock annually.

The soft-textured woods, such as ponderosa pine, western white pine, redwood, and cedars are currently in demand. The stock must be clear, kiln dried to 12 percent moisture content, and may be either S2S or rough. Some dimensions commonly called for are:

Stiles - 5/4 by 2-3/8 by 57-5/8 inches
5/4 by 5 inches by 6 feet 9-1/2 inches
5/4 by 5 inches by 6 feet 11-1/2 inches
5/4 by 5 inches by 7 feet 1-1/2 inches

Screen doors (top and lock rails) - 5/4 by 5 by 29, 31 and 38 inches

Screen doors (muntin bars) - 5/4 by 4 by 12-1/2 inches

Door screens - 5/4 by 2 by 30 inches and longer
3/4 by 2 by 30 inches and longer
5/4 by 4 by 4-1/2 inches, random length

Window screens - 5/4 and 6/4 by 1-3/4 to 2 inches,
random length
5/4 and 6/4 by 3-5/8 to 4-1/2 inches,
random length

In brief, the postwar demand for screens and screen doors created a large backlog of uncompleted orders that will require a huge volume of lumber or cut-stock materials to complete. Potentially the large plants manufacturing screen doors offer an excellent outlet for cut-stock because of the narrow and short sizes that can be used. Producers who can furnish large quantities as well as quality cut-stock should cultivate these markets.

Combination Doors

Combination storm and screen doors are another millwork product made by large sash and door companies, independent manufacturers, custom millwork plants, and retail yards. All of the four plants visited in the Midwestern States would have used cut-stock had it been available. Based on current needs of these companies, an immediate market exists for 10,600,000 board feet of cut-stock.

The lumber demand of one large Michigan plant was so critical that they bought the entire output of four western sawmills, sorted out the upper grades of lumber for their own consumption, and resold the lower grades to retail yards.

Ponderosa pine is the chief wood used although other soft pines are used to some extent. Cuttings must be clear or practically clear, S2S, and kiln dried to 12 percent moisture content. Typical dimensions required follow:

5/4 by 4-3/4 inches by 6 feet 10 inches
5/4 by 4-3/4 inches by 2 feet 4 inches
5/4 by 9-3/4 inches by 2 feet 4 inches
5/4 by 7 inches by 2 feet
5/4 by 2-1/4 inches by 4 feet 9 inches
5/4 by 2-1/4 inches by 2 feet
5/4 by 1 inch by 2 feet
5/4 by 1 inch by 1 foot 2 inches

Combination doors are in heavy demand due to improvement of old homes and as standard equipment on new housing. Producers of cut-stock should find ready markets among manufacturers of combination doors as they incorporate many short and narrow items in their construction.

Flush Doors

Flush doors are in heavy demand. Several large plants in the Middle West, exclusive of stock sash and door plants, specialize in their manufacture. They may be made with solid cores or with grid construction. Both types require short and narrow material, and, therefore, are good outlets for cut-stock or stock sash and door plant offal.

One large Wisconsin plant uses about 15 carloads a month of 6- to 16-inch blocks for their solid cores. Due to curtailment in stock sash and door production, however, flush door manufacturers are in need of new stock sources.

Current yearly estimates of a few midwestern plants put their lumber consumption at about 15,000,000 board feet, of which two-thirds could be cut-stock.

Ponderosa pine is preferred. Solid core material must be clear or practically clear. Clear wood is preferred for grids, but occasional small, sound knots are allowed. Drying to 12 percent moisture content is required. Some of the typical stock sizes are as follows:

Core blocks - 5/4 and 6/4 by 1-13/16 by 6 to 16 inches

Grid - 1-1/2 by 1-1/2 by 81 inches

wood 1-1/2 by 3 by 29 inches

1-1/2 by 1-1/2 by 21 inches

1-1/4 by 1-1/2 by 23, 28, and 76 inches

In brief, a large portion of short, narrow cuttings is used in the construction of flush doors and this use offers a large outlet for such material. The large demand for flush doors, which is accentuated by the housing program, further tends to make this industry a good potential outlet for cut-stock for some time to come.

Overhead Doors

The overhead door industry, although confined to a few large plants, is a large and important one in the Midwestern States. This industry specializes in the production of overhead doors for garages and industrial buildings. Their production methods are patterned after those of the sash and door industry.

Plants visited in Wisconsin, Illinois, Michigan, and Indiana were interested in securing cut-stock whenever possible for the door parts. The plants contacted could use about 16,000,000 board feet of cut-stock annually if it were available. The annual lumber consumption of one large plant is estimated at 10,000,000 board feet. Sixty percent of this amount, it is estimated, could be cut-stock.

Sitka spruce and Douglas-fir are the species used in the greatest volume in the manufacture of overhead doors, although pine is used occasionally. Cut-stock or lumber should be $6/4$ and $8/4$ inches, largely clear, kiln dried to 8 percent moisture content, and surfaced two sides. The following list of cut-stock dimensions comprise about 40 percent of the total cut-stock requirements. Other cut-stock dimensions vary with the size of the doors manufactured. Doors 8 by 8 feet and larger, for example, require $8/4$ stock. Stock may be furnished rough or in finished sizes, the latter being preferred. Finished stock must be carefully machined to specifications in order to facilitate ready assembly at the consuming plant. Dimensions of cut-stock required for 8- by 7-foot door rails and stiles are:

Rails - $6/4$ by 4- $1/4$ inches by 8 feet
 $6/4$ by 5- $1/4$ inches by 8 feet
 $6/4$ by 2- $1/2$ inches by 8 feet

Stiles - $6/4$ by 5- $5/8$ by 20 inches
 $6/4$ by 4- $1/4$ by 20 inches
 $6/4$ by 4- $1/4$ by 18 inches
 $6/4$ by 5- $5/8$ by 18 inches

The overhead door industry has developed rapidly over the past decade, and offers good market possibilities for cut-stock in sizes readily obtainable from low-grade and waste lumber.

Shutters and Blinds

Shutters and blinds, like sash and doors, are essentially millwork products. They are produced both by large millwork plants and small independent plants in the Middle West.

Ponderosa pine is the principal species used. Cuttings are largely clear, should be at least air dry, and may be either rough or dressed. Some common dimensions needed are:

5/4 by 2 by 10 to 24 inches
5/4 by 2-3/8 inches by 4 to 6 feet 8 inches,
(56 inches preferred length)
5/4 by 4-3/4 by 10 inches and longer

Shutters and blinds are in heavy current demand as housing construction items, and makers of these items offer good potential markets for stock cut to size or sash and door offal.

Custom Millwork

Custom millwork plants and retail yards making special millwork are found in nearly every town of any size throughout the Middle West. In the aggregate these plants and yards consume many millions of feet of lumber annually for sash, doors, trim, moldings, screens, screen doors, combination doors, and built-in fixtures.

Custom millwork production has increased since World War II due to (1) inability of sash and door plants to supply retail needs, (2) expanded housing program, (3) increase in modernization of homes, and (4) huge industrial and institutional building program.

Some retail yards have installed permanent and complete fabrication plants, and are manufacturing all types of millwork. Approximately 30 plants and retail yards were visited, and the gross annual cut-stock requirements of 11 representative plants were estimated at 23,000,000 board feet, largely sash, door, and cabinet stock. Many smaller plants could also use a considerable volume of cut-stock.

Specifications as to size and quality are comparable to those of all sash and door millwork stock.

The custom millwork business is a very important one in the Midwest, and promises to remain so for many years. Because of the variety of items manufactured it is difficult to arrive at sizes that approach a reasonable degree of standardization and uniformity. Therefore, many small custom millwork plants buy lumber in less than carload lots for their woodwork needs. This field of manufacture would furnish a better outlet for items of cut-stock, glued-up stock, and lumber shorts, if central warehouses could be established in strategic areas where less than carload users could draw their supplies, or split-car shipments made to two or more millwork plants.

Household Equipment Group

Some of the larger and older users of cut-stock are found in this group. Manufacturers of softwood furniture, laundry appliances, and shade rollers and slats are particularly heavy users of cut-stock. Radio cabinet, kitchen cabinet, refrigerator, cooler and deep freeze, trunk and luggage, and venetian blind plants are other possible users of cut-stock on a more limited scale.

Softwood Furniture

The sixteen softwood furniture factories visited in the Middle West produce furniture of varied types, such as finished, unpainted, antique, rustic, and juvenile. They are large cut-stock users, and can use up to as high as 100 percent of this material in making the above furniture items.

One large Indiana plant making unpainted furniture consumes one million board feet of cut-stock and lumber a year. This company also owns three more plants in the East, each one of which uses an equal amount of cut-stock annually. The cut-stock used or which can be used by similar manufacturers in the Middle West is estimated as follows:

Finished furniture - 700,000 board feet
Unpainted furniture - 1,000,000 board feet
Antique furniture - 400,000 board feet
Rustic furniture - 2,500,000 board feet
Juvenile furniture - 2,700,000 board feet

Ponderosa pine is the species most commonly used in the manufacture of the foregoing furniture items. Other species, such as western white, eastern white, and sugar pine, are also used to a lesser degree.

Finished furniture (tables, desks, novelties) requires clear, kiln-dried, S2S, random-width, cut-to-length stock. Typical sizes are:

4/4 by 12, 14-1/2, 26, 28, 40, and 45 inches
5/4 by 24-1/2, 26-3/4, and 32-1/2 inches

Unpainted furniture requires chiefly clear grades of kiln-dried stock although there is some use of stock with small, sound and tight knots. Typical part sizes are:

Bench tops - 4/4 rough or 25/32 S2S by 3 inches and wider
in 18-inch lengths or multiples

Legs - 1-3/8 to 2 inches rough or 1-1/4 inches S2S by
1-3/4 inches and wider in 16-1/2-inch lengths
or multiples

Desk tops - 4/4 rough or 25/32 S2S by 3 inches and wider
and 25-3/4 inches in length or multiples

Drawer fronts - $4/4$ rough or $11/16$ S2S by 4 inches by
2. $-1/4$ inches in length or multiples

Panels - $11/16$ S2S by 11 by 24 inches
 $11/16$ S2S by 22 by 46 inches

Antique furniture requires sound, tight-knotted lumber of eastern white, western white, or ponderosa pine kiln dried to 8 percent moisture. About 10 percent of the lumber used is $12/4$, 50 percent is $4/4$, 25 percent is $8/4$, and 15 percent is $5/4$ and $6/4$. Items commonly used are:

$8/4$ squares by 25 to 28- $1/4$ inches
 $12/4$ squares by 29 inches
 $1-1/4$ by $1-3/4$ by 12 inches to $1-1/4$ by 9- $1/2$ by 52 inches
 $3/4$ by $3-11/32$ by 12 inches to $3/4$ by 7- $1/2$ by 35 inches

Rustic furniture of the cabin and outdoor type requires sound, tight-knotted stock, kiln dried to 8 to 10 percent moisture content. Ponderosa pine, western white pine, and eastern white-cedar are the principal species used. Typical sizes are:

Chair seats - $8/4$ by 16 inches square

Table tops - $8/4$ by 32 inches, random widths

For rustic furniture of the house and restaurant, knotty-pine type, about 75 percent is $4/4$ and 25 percent is $5/4$ inches thick. It is sound, tight-knotted, rough, or S2S, kiln dried to 8 percent moisture content. Western white pine is preferred, but ponderosa pine is often used. Typical sizes are:

$4/4$ to $5/4$ by 4, 5, and 6 inches by 24, 30, 32, 36,
and 48 inches

Juvenile and nursery furniture uses about 40 percent in $4/4$, 20 percent in $5/4$, and 40 percent in $6/4$ -inch thicknesses. This type of furniture is made largely from kiln-dried ponderosa pine lumber or cut-stock. Typical sizes are:

Bed and dresser stock - $4/4$ to $6/4$ by 4 inches by
20 to 48 inches

High-chair legs - $6/4$ -inch squares

Play-pen rails - $1-1/8$ by $1-1/8$ and $1-1/4$ by $1-1/4$
inches, random lengths

Play-pen slats - $3/4$ by $5/8$ by 30 inches

Nursery chair stock - 13/16 by 11 by 11-1/2 inches
13/16 by 4-5/8 by 13 inches

Play-table stock - 5/8 by 3 by 20-5/8 inches
3/4 by 6-3/4 by 7-1/2 inches

The pine furniture industry offers one of the good potential outlets for cut-stock with sound defects that can be made from low grades and waste lumber. Manufacturers will accept rough stock, but prefer dressed or semifinished stock.

Radio Cabinet Parts

The demand for radios following World War II caused many furniture and other woodworking plants to turn to the manufacture of radio cabinets. Today this is large volume business and several million feet of lumber go into radio cabinet parts and core stock. Some of the important radio cabinet manufacturing centers are Rockford, Ill., Saginaw, Mich., Fort Wayne, Ind., and Grand Rapids, Mich.

Most radio cabinets are built of hardwoods, but some plants use a considerable volume of western softwoods for frame parts. A substantial market might be built up for softwood core stock if prices were satisfactory. Two large manufacturers of radio cabinets in Saginaw, Mich., and Fort Wayne, Ind., indicated they could use up to 2,500,000 board feet of softwood frame and core stock annually if a source of supply could be established. Typical stock sizes are:

Frame stock - 1-3/4 by 2-1/2 by 15 to 33-1/2 inches

Core stock (panels) - 3/4 by 16-1/2 by 35 inches

Kitchen Cabinets

The manufacture of kitchen cabinets is a specialized industry, but quite diversified as to methods of operation. There are three general types of plants: (1) those whose entire production is kitchen cabinets, (2) sash and door and millwork plants that make cabinets as a companion item, and (3) small millwork plants and retail yards that make cabinets on a custom order basis. Plants of these types in the Middle West, especially in Indiana, make most of the cabinets manufactured in the United States. The large cabinet plants in this area are primarily hardwood and plywood users while the sash and door plants and custom woodwork plants use softwood lumber and plywood primarily. The plants using softwoods have in the past preferred the use of lumber to cut-stock because the different sizes of cabinets that have to be made to fit variable kitchen dimensions. There is, however, a definite

trend toward modular construction of cabinets which will enable stock sizes of cabinets to be built that will fit any kitchen. With this trend in construction and as sales increase, there will come a greater demand for some standard items of cut-stock, such as door and frame parts. It is a prospective market which cut-stock producers should cultivate as indicated by the needs of one plant in Davenport, Iowa, that can use at the present time 1,000,000 board feet of cut-stock annually.

The species generally preferred is ponderosa pine, which is required largely in clear stock, kiln dried to 8 to 10 percent moisture content. Stock may be furnished in various forms, such as individual cuttings, glued-up rough, dressed S2S, or finished dimensions. Typical dimensions required for cabinet stock are:

7/16 by 3-15/16 by 16 to 24 inches
25/32 by 7/8 by 16 to 40 inches
25/32 by 1-5/8 by 21 to 48 inches
25/32 by 3-1/2 by 16 to 48 inches
25/32 by 4-15/16 by 17 to 49 inches
25/32 by 7-5/8 by 21 inches

The tremendous increase in kitchen cabinet manufacture due to modernization of homes and new building construction has resulted in a large backlog of orders for cabinets. The many short, narrow parts entering into their construction and the progress being made toward standardization of cabinets will tend to increase the utility of cut-stock and the market for this material.

Refrigerators, Deep Freeze Units, and Step-in Coolers

The refrigeration industry, once a large user of wood parts, has, during the past decade, gone almost entirely to the use of metal. A considerable quantity of wood, however, is still used in the interior frame parts of the refrigerators and coolers, much of which is short and narrow stock.

Refrigerator manufacturers located in the Middle West probably produce the bulk of the refrigeration units made in the United States. Some manufacturers visited prefer to use cut-stock, while other produce the parts from lumber in their own plants. The home and trailer type of refrigerator offers the best market for cut-stock, whereas the step-in cooler and deep freeze manufacturers prefer long length lumber. The estimated volume of lumber used annually by two firms in Fond du Lac, Wis., and Detroit, Mich., is 10,000,000 board feet. This entire amount could be used in cut-stock form. Actually, however, very little cut-stock is used because of procurement difficulties.

Pine, spruce, and fir are the preferred species for refrigerator parts in the order named. Quality of cut-stock ranges from clear to that admitting some sound defects. It must be kiln dried to 8 percent moisture content. Some representative stock sizes required for refrigerator parts are shown below:

7/16 by 1/2 by 17 to 34 inches
1/2 by 1-1/2 by 9-5/16 to 24 inches
3/4 by 2-3/4 by 17 to 36 inches
3/4 by 2-7/16 by 21-3/4 inches
1-1/8 by 2 by 15-1/2 inches
1-1/8 by 3-5/8 by 11 to 50 inches
1-1/4 by 2-7/8 by 43 inches

The heavy demand for refrigerators and the inability of refrigerator manufacturers to buy either lumber or cut-stock plus the current high lumber prices are gradually forcing this industry into more use of steel and fiberboard. A market for wood parts still exists, however, and offers a good outlet for short and narrow cut-stock items.

Laundry Appliances

The laundry appliance manufacturers in general are large volume users of cut-stock items. The chief items today are ironing boards, washboards, curtain stretchers, and clothes driers, which are produced from short and narrow dimension products.

Several of these plants scattered throughout the Middle West produce one or more of the above items either as straight production items or as supplements to other production.

It is estimated the annual consumption of a few of the large plants engaged in the manufacture of the foregoing items is about 18,000,000 board feet of lumber and cut-stock.

Curtain stretchers are made largely from ponderosa pine or other soft pine lumber. Roughly, 8,000,000 board feet of cut-stock is used by curtain stretcher manufacturers in Wisconsin and Illinois. The material should be clear, reasonably straight-grained stock, and have a 12 percent moisture content. No machining of the stock is required other than that it be furnished S4S. Common sizes used are as follows:

5/8 by 3/4 inch by 4 feet
3/4 by 1-1/2 inches by 4, 5, and 6 feet
3/4 by 7/8 inch by 6-1/2 feet
3/4 by 1-3/4 inches by 4, 5, and 6 feet
3/8 by 2 inches by 4, 5, and 6 feet

Of the material currently used, about 60 percent is 4 feet long, 30 percent 5 feet long, and 10 percent is 6 feet long.

Washboards.--One plant in Lower Michigan uses 5,000,000 board feet of cut-stock annually in this item alone. The species most commonly used are Douglas-fir, western white pine, ponderosa pine, and sugar pine. They are primarily furnished as cut-stock, and must be clear and dried to 10 to 11 percent. No special machining of this stock is required other than that it be S2S. The sizes used are numerous, but a few of the common ones are:

Legs - 1 by 1-1/4 by 18 to 1 by 1-5/8 by 24-3/4 inches

Tops - 1 by 2 by 11-11/16 to 1 by 2 by 41-1/4 inches

Topnotch - 1-1/8 by 1-1/4 by 12 to 1-1/4 by 1-1/4
by 33-5/8 inches

Slats - 1 by 3-11/16 by 11-9/16 to 1 by 4-3/8 by
14-5/16 inches

Ironing boards.--A large portion of ironing board stock is glued-up by western producers, or precut for ready assembly. Some plants in the Middle West, however, fabricate their own boards from lumber and glued-up stock. An estimated use of two Michigan manufacturers is 5,500,000 board feet annually.

The chief species used is ponderosa pine. It should be clear, S2S, and kiln dried to 10 to 12 percent moisture content. Dimensions used for ironing board stock are:

1 by 3 by 46 and 54 inches

Clothes driers.--Clothes driers are usually manufactured in connection with other laundry appliances or by small plants buying their lumber and dowels in less-than-carload-lot quantities.

One plant in Wisconsin consuming about 2,400,000 board feet per year uses cut-stock for this item, specifying ponderosa pine, kiln dried, S4S. The dimensions used are:

3/4 by 1, 1-1/4 or 1-1/2 by 24 to 48 inches

The laundry appliance industry is an active and good outlet for cut or glued-up stock because of the short and narrow sizes usable.

Trunks, Luggage, Instrument, and Sales Cases

These products often consist basically of wood boxes, covered inside and out with fabric or leather and equipped with handle and metal fittings. Shooks are acceptable to some firms, but a majority prefer to buy lumber and cut it up themselves. Half of the plants visited in the Middle West used ponderosa pine, of which about 1 million feet was in cut-stock, or so-called "suit-case stock"

glued-up to make the required width. The chief woods used in addition to ponderosa pine are yellow-poplar and basswood. The quality is usually clear or practically so. Some of the typical sizes are shown below:

5/16 by 8-13/16 by 29 inches
5/16 by 11 by 20 inches
5/16 by 6-1/4 by 7 inches
5/16 by 6 by 12 inches
11/16 by 11/16 by 12 to 29 inches

A good market could be developed for ponderosa pine cut-stock because of the increasing difficulty of obtaining basswood trunk and luggage stock.

Window Shade Rollers and Slats

The window shade roller industry has been a primary cut-stock user for the past 35 years. This industry is centered in a few locations and is highly specialized as to equipment, material uses, and production methods.

Two of the country's largest plants are at Muskegon and Saginaw, Mich. It is estimated that their annual requirements are approximately 13,000,000 board feet of picket and slat stock and lumber. Seven other plants are operated by owners of the above plants, each using several million feet of cut-stock.

Because of its specialized nature the species most commonly used by this industry are eastern white, western white, ponderosa, and sugar pines. Douglas-fir is sometimes used in limited quantities.

Clear or practically clear stock is required for slats and rollers either in cut-stock form or lumber. It should be kiln dried to a moisture content of 6 to 8 percent.

Much of the cut-stock used by this industry comes in the form of 4/4-, 5/4-, and 6/4-inch squares or pickets and 4/4-inch flat stock developed by sawmills as a byproduct from edgings and other sawmill waste. Slat and picket stock may be furnished rough cut, S2S, or finished. Rough cut pickets should be full thickness when dried. Slat stock may be surfaced two sides, but should be 7/8 or 25/32 inch in thickness as specified. Sizes of roller, picket, and slat stock used are:

Slats - 4/4 thick by random widths (2 inches and over) by 36, 39, 42, 45, 49, 54, 63, and 72 inches; 90 percent of this stock is required in 36-inch lengths

Pickets - 4/4 squares by 16 inches long in 2-inch steps up to 72 inches
5/4 squares by 20 inches long in 2-inch steps up to 72 inches
6/4 squares by 20 inches to 72 inches long; 90 percent of the picket stock is required in 4/4-inch size and 10 percent in 5/4- and 6/4-inch

The shade roller industry provides one of the good, stable outlets for high-quality short and narrow cut-stock.

Venetian Blinds

Venetian blind parts include slats, facia, headers, and rails. These are all forms of molding, and are usually made at the venetian blind plant. Slats are produced on special machines, and are frequently made by jobbers or millwork plants and sold to local custom plants for assembly.

Ponderosa pine was found to be the species commonly used; venetian blind plants in the Middle West using 4-1/2 million feet of this wood annually. Clear material is required. Kiln-dried molding stock in long lengths is preferred, but a small percentage of shorter stock is acceptable. Thirty-five percent of the above volume is used to make facia, headers, and rail stock. Some common sizes of stock are:

Facia board - 1/2 by 3 to 4 by 23 inches to 16 feet (S2S)

Header stock - 5/4 by 1-1/4 to 3 by 23 inches to 16 feet (S2S)

Rail stock - 7/8 by 1-1/4 to 3 by 23 inches to 16 feet (S2S)

Because venetian blinds are largely assembled in small custom plants, long lengths are preferred to reduce waste and storage space. There is, however, a market for cut-stock for some of the smaller standard sized blinds.

Miscellaneous Group

Cut-stock requirements of various miscellaneous industries range from toy building-block stock to casket box shooks.

The toy, stepladder, and agricultural implement industries, particularly, offer good cut-stock markets in sizes that would allow for complete utilization of low-grade and waste lumber. Boxes, crating, and moldings offer less substantial markets for cut stock because they are usually made at the lumber source. Also retail yards should not be overlooked as possible markets for short-length and precut construction materials.

Toys

The wood toy industry includes many plants of all sizes making a wide variety of items. The raw materials consist of standard lumber, cut stock, and offal of other wood-using plants. Wood toys are subject to stiff competition from metal and plastic toys. The larger firms have narrowed the lines of wood toys offered, preferring to stick to their old well-established items. Some smaller diversified manufacturers have discontinued making toys.

Cut-stock being used by several midwestern toy companies amounted to 11 million feet annually, or 66 percent of their total volume of western species. In most cases cut-stock fills the entire requirements of those using it.

The bulk of the requirement for cut-stock among these plants is for educational toys, which include building blocks, building sets, and preschool toys. Building blocks and sets comprise 80 percent of this demand. Other important items include doll furniture, doll buggies, and games.

Over 95 percent of the current demand of wood toy manufacturers is for clear ponderosa pine, although western white and sugar pines are acceptable. The demand for Douglas-fir is negligible.

Kiln-dried stock is specified for wood toys. Squares are usually S4S, and flat stock S2S. Eased edges are specified by some concerns especially for building blocks and preschool toys. A few require rounded edges and machining to specific patterns. The following are some dimensions of stock used:

Building blocks - $8/4$ squares by 18 inches and up
 $8/4$ -inch flat stock in random widths and lengths
 $6/4$ squares 12 to 42 inches long

Building sets - $6/4$ by 8 by 12 to 22 inches
 $4/4$ by 4 by 20 inches
 $4/4$ by $7-5/8$ by 11 inches
 $3/8$ by $3/4$ by $11-7/8$ inches
 $4/4$ by $7/8$ by 20 inches
 $1/2$ by $3-3/4$ by $16-1/2$ inches

Preschool toys - $3/4$ by 3 by $20-5/8$ inches
 $3/4$ by $9-1/4$ by 30 inches
 $3/4$ by $15-1/2$ by 31 inches
 $3/4$ by $1-1/2$ by $10-5/8$ inches
 $3/4$ by $1-1/2$ by 11 inches
 $3/8$ by $1-1/2$ by $12-5/8$ inches

Doll furniture and buggies - 5/4 by 10 by 16-1/2 inches
4/4 by 3-5/8 by 23-3/4 inches
7/8 by 8 by 31 inches
5/8 by 8 by 16 inches
4/4 by 3-5/8 by 13-3/4 inches

Games - 4/4 by 3-3/4 by 22 inches
4/4 by 4-5/8 by 27 inches
4/4 by 7/8 by 20 inches
1-1/2 by 1-1/2 by 36 inches

This is still a good potential cut-stock market depending, of course, upon price and availability. If plants using cut-stock are forced to supplement their needs with lumber, they may swing over completely to lumber in order to absorb added overhead and production costs.

Caskets (Shells and Rough Boxes)

The casket industry is one of the more stable wood-using industries. The use of wood for caskets has given way to some extent to metal in recent years. Availability of metal and ability of people to afford the more expensive caskets are the reasons. Rough boxes are being replaced to some extent by plywood and cardboard shipping containers and by metal and concrete burial vaults. Nevertheless, it continues to be a major wood-using industry. Roughly, 25 percent of the industry is located in Midwestern States. U. S. Forest Service figures for 1940 (Lumber Used in Manufacture) show 114,864,000 board feet of softwoods, 38,238,000 board feet of hardwoods, and 1,225,000 board feet of foreign woods were used in the casket and rough box industry. Of the total softwoods used, 35 percent was ponderosa pine, 31 percent cypress, 11 percent Douglas-fir, and 9 percent eastern white pine. About half of the softwoods consumed are used in rough boxes.

Of the two types of wood caskets and coffins, the natural finished casket is largely made of hardwoods, such as walnut, maple, oak, cherry, and mahogany. The cloth-covered type is made either of less valuable species of hardwoods or softwoods.

The chief softwoods used in casket shell construction are cypress, ponderosa pine, redwood, Douglas-fir, and western redcedar. Sound, tight-knotted, kiln-dried stock is required. The average rough dimensions for casket shells are:

Bottom - 2 pieces, 1 by 12 inches by 7 feet

Sides - 4 pieces, 1 by 8 inches by 7 feet

Ends - 4 pieces, 1 by 8 inches by 2 feet

Ponderosa pine is the chief species used in the production of rough-box shook, but western white and eastern white pines, Douglas-fir, and redwood are other species used. Sound, tight-knotted, kiln-dried, S2S stock is required. The average rough-box shook dimensions are:

Sides - 2 pieces, 1 by 10 to 12 inches by 8 feet

Ends - 2 pieces, 1 by 10 to 12 inches by 26 inches

Top - 8 pieces, 1 by 12 by 28 inches

Top strips - 2 pieces, 1 by 4 inches by 8 feet

Bottom - 8 pieces, 1 by 12 by 28 inches

Corners - 4 pieces, 1 by 2 by 24 inches

Casket-shell and rough-box manufacture is an established nationwide industry using a variety of softwood and hardwood species, and it offers a good outlet for softwood cut-stock in the form of casket shell parts or rough-box shook.

Agricultural Implements

Agricultural-implement manufacturers have been heavy users of softwood lumber in the past, but the shortage of wood and substitution of metal parts have cut the use down in many cases to 50 percent or less.

The chief agricultural-implement manufacturers in the United States are located in the Middle West with plants in Ohio, Indiana, Illinois, Wisconsin, and Minnesota. It is estimated that their annual lumber consumption, all species and uses, will run close to 100,000,000 board feet. Southern yellow pine is still the chief species used, although a considerable volume used is western softwood species.

With a few exceptions the larger plants prefer lumber to cut stock as they have well-equipped cut-up plants and can readily work up their offal. This does not presuppose, however, that they would not use cut or prefabricated stock if it were available. Some 19 plants were visited, and 4 have been buying over 2,000,000 board feet annually of precut parts of western softwood species.

The western species used are Douglas-fir and ponderosa pine, chiefly the latter. All stock should be clear or practically so, kiln dried to 8 percent moisture content. Manufacturers prefer to buy finished parts run to pattern and ready for assembly, but will take rough stock also. The dimensions of the varied agricultural-implement parts are numerous, and only a few examples are given here.

Seed cleaner parts - Ponderosa pine is preferred. Pieces should be machined to pattern, and finished to specifications ready for assembly. Some sizes are: 4/4 by 3 by 5 inches; 4/4 by 18 by 18 inches.

Grain combine parts - Douglas-fir is preferred. Some rough dimensions required are:

Reel batts - 1/2 by 5 by 56 inches

Straw rack sides - 3/4 or 6/4 by 6-1/2 inches
by 5 feet

Some markets for cut-stock exist in the agricultural-implement industry, and can be secured by cut-stock producers if they cultivate these markets now. There is a strong movement in this industry, due to inability to get lumber or ample wood parts, to convert over to steel as soon as possible in order to maintain production schedules. Once they convert over to metal the wood markets will be practically finished.

Boxes and Crates

Common box and crate material is not generally thought of as cut-stock; hence no special study was given to it in this work. The country uses several billion feet of box and crate material yearly, however, and much of it is bought in the form of box shook and cut-to-size crating. But whereas most cut-stock is clear or practically clear, most box and crate material is made from Common grades and contains more or less knots.

Most of our native woods, both hardwoods and softwoods, are used for boxes and crates, at least to a small degree, but the favorites are woods of light to medium weight that do not split too readily in nailing and have good nail-holding power.

Cut-to-size crating probably holds more promise than box shooks for those who seek an outlet for Common-grade stock in small to medium sizes. Manufacturers of cedar chests and upholstered furniture, for instance, can use such material. Corrugated fiberboard boxes reinforced with wood cleats are coming into more use for the shipment of household appliances, such as washing machines, and these cleats offer another possible outlet for cut-to-size material.

Stepladders

The factor of personal safety in ladder construction requires specific standards regarding species, size, grade, and straightness of grain for some types of ladders. Extension and short industrial ladders, extension planks, stages, and trestles require clear,

straight, vertical-grain stock. Among 12 midwestern manufacturers of ladders, Douglas-fir, western hemlock, and Sitka spruce comprise more than 95 percent of the species in demand. Southern pine is used extensively in stepladder manufacture, and is frequently furnished as cut-stock. Nearly 4 million feet is required by the industry in the Middle West, about 85 percent of which can be stock cut to size. One ladder plant purchases stepladder parts, already fabricated, from a California firm. Examples of stock required follow:

Stepladders require clear Douglas-fir, southern pine, and western hemlock, kiln-dried stock, S4S. The sizes used are:

25/32 by 12-3/4 by 26-3/4 inches
25/32 by 11-5/8 by 36 inches
3/4 by 3-3/4 by 24-1/2 inches
3/4 by 3-3/4 by 12-1/2 inches
5/16 by 1-3/8 by 18 inches
13/16 by 4-3/8 by 30 inches

Extension and short industrial ladders require clear, straight, vertical-grain, kiln-dried Douglas-fir and Sitka spruce. The sizes used are:

1-5/16 by 2-3/4 inches by 10 to 20 feet
1-5/16 by 3-3/4 inches by 18 to 24 feet
1-1/8 by 1-3/4 inches by 6 feet
1-5/8 by 2-5/8 inches by 6 feet

Extension plank, stages, and trestles require clear, straight, vertical-grain, kiln-dried Douglas-fir and Sitka spruce. The sizes used are:

1-5/16 by 2-3/4 inches by 6 to 12 feet
17/16 by 1-5/8 inches by 6 to 12 feet

Stepladder stock is the main cut-stock possibility although there appears to be a limited potential market for long narrow stock recovered from slabs and edgings, depending on ladder specifications.

Moldings and Molding Stock

Moldings of various kinds and sizes are used in most of the wood products that were studied. They are made at millwork plants and specialty plants in the Middle West as well as at western planing mills. Moldings are made from standard lumber, or from special stock. Short and narrow moldings can often be made from slabs and edgings that would otherwise be wasted. By the use of a hopper feed attachment it is often practical to make moldings in relatively short lengths.

Sizes for moldings normally range from 4 to 20 feet in length, from 3/4 to 8 inches in width, and from 1/4 to 3 inches in thickness. Ponderosa and western white pines are preferred, but Douglas-fir and spruce are used on a smaller scale. The quality varies from clear to sound-knotted. Typical sizes ordered by a midwestern plant that uses 200 cars of ponderosa pine yearly are as follows:

50 percent in 10 different widths from 3/4 to 5-1/2 inches
75 percent in 6 different widths from 3/4 to 5-1/2 inches

The foregoing molding stock was wanted in 10- to 16-foot lengths, S4S, and kiln dried to 12 percent. Another company was in the market for 60 carloads yearly from 12 inches to 6 feet long, up to 3 inches in width, and up to 1-1/2 inches in thickness.

A small market for short molding and molding stock has developed and could probably be expanded.

Retail Lumber Yard Stocks

Retail yards, which handle large volumes of construction, maintenance, and repair lumber and household items, are of increasing importance as potential outlets for cut-stock and prefinished items.

Items, such as fence pickets, trellis slats, kiln-dried unpainted furniture, lath, pallets, kiln-dried sash, door, and millwork, rustic furniture, and precut cabins, are carried in many retail yards. As construction becomes more standardized, the possibility of retail yards carrying cut-stock items commonly used in house construction shows promise. Examples are door and window headers, chimney and fireplace headers, porch and step materials, bridging, short bracing material, dressed and matched roof and wall sheathing, and subfloor lumber and other short lumber items used in finishing cupboards, closets, and cabinets. Odd lengths and widths also have a definite place as construction lumber.

Lumber producers should not underestimate the place of the retail yard as an outlet for cut-stock. Through trade education and proper merchandising it can be expanded into a large volume business.

Picket and Snow Fencing

Pickets are used in the fabrication of many kinds of fencing, such as snow fence, corn cribs, silos, stock fence, and ornamental fencing around homes and yards.

One company in Galesburg, Ill., uses between 75 and 100 cars of pickets every year, and would increase this volume if more were available. One car usually contains about 80,000 pieces.

Douglas-fir, spruce, southern pine, and western hemlock are species most generally used in picket manufacture. For snow fences, portable corn cribs, and silo fences, the material can be rough, air-dried stock. The dimensions of the slats are:

1/2 by 1-1/2 inches by 3, 3-1/2 and 4 feet

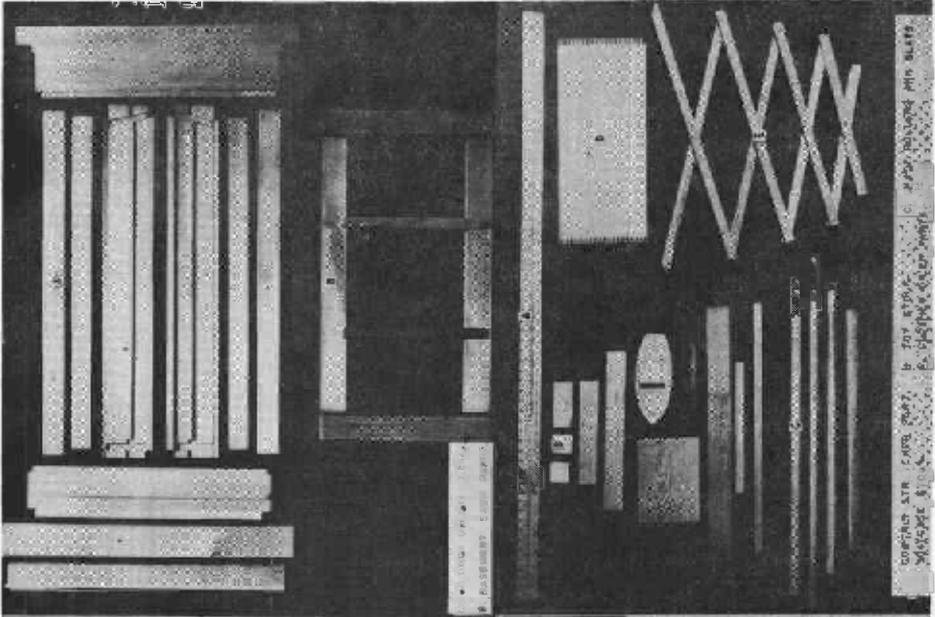
Picket material for snow fences, temporary silos, and picket fences offers one of the good outlets for short and narrow cut-stock in the Middle West. For some of these uses, such as snow fence, the service life is only 5 or 6 years, which means that constant replacement is in order.

APPENDIX

Trade Associations

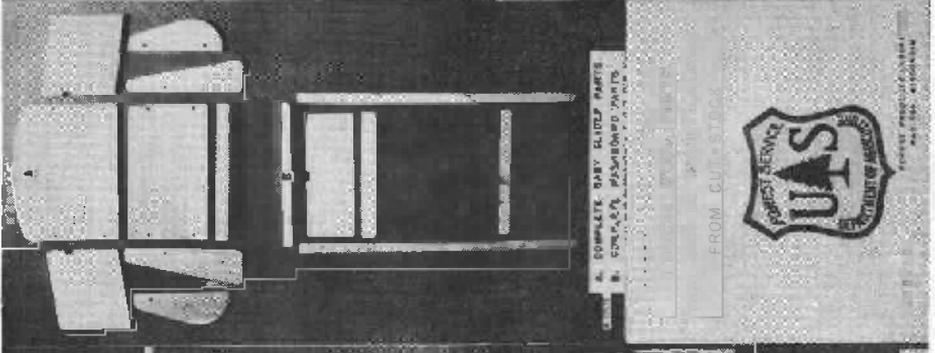
The following partial list of trade associations of the various wood-using industries discussed in this report has been prepared merely for the information of correspondents, and the inclusion of names in it implies no endorsement by any Government agency.

- American Ladder Institute, Rm. 405, 1835 K St., NW., Washington, D. C.
- Assn. of Window Shade Cloth & Roller Mfrs., Window Shade Institute,
60 E. 42nd St., New York City 17.
- Casket Mfrs. Assn. of America, 628 Sycamore St., Cincinnati, Ohio.
- Central Sash & Door Jobbers Assn., 30 N. LaSalle Bldg., Chicago, Ill.
- Cold Storage Door Mfrs. Council, 2125 NBC Bldg., Cleveland, Ohio.
- Farm Equipment Institute, 608 S. Dearborn St., Chicago, Ill.
- Luggage & Leather Goods Mfrs. of America, 220 Fifth Ave., New York City.
- Millwork & Cabinet Mfrs. Assn., 228 N. LaSalle St., Chicago, Ill.
- Natl. Assn. of Furniture Mfrs., 666 Lake Shore Dr., Chicago, Ill.
- Natl. Assn. of Ice Refrigerator Mfrs., 205 W. Wacker Dr., Chicago, Ill.
- Natl. Door Mfrs. Assn., 332 S. Michigan Ave., Chicago 4, Ill.
- Natl. Wooden Box Assn., Barr Bldg., Washington 6, D. C.
- Ponderosa Pine Woodwork, 111 W. Washington St., Chicago 2, Ill.
- Prefabricated Homes Institute, 908 - 20th St., NW., Washington, D. C.
- Toy Mfrs. of the United States, 200 Fifth Ave., New York City.
- Trailer Coach Mfrs. Assn., Civic Opera Bldg., Chicago 6, Ill.
- Wooden Box Institute, Call Bldg., San Francisco, Calif.
- Wood for Venetians Institute, 939, Russ Bldg., San Francisco, Calif.



A. COMPLETE, BAY CLIMB PARTS
 B. COMPLETE, BAY CLIMB PARTS

COMPLETE SET, COM. PARTS, B. BAY CLIMB
 COMPLETE SET, COM. PARTS, B. BAY CLIMB

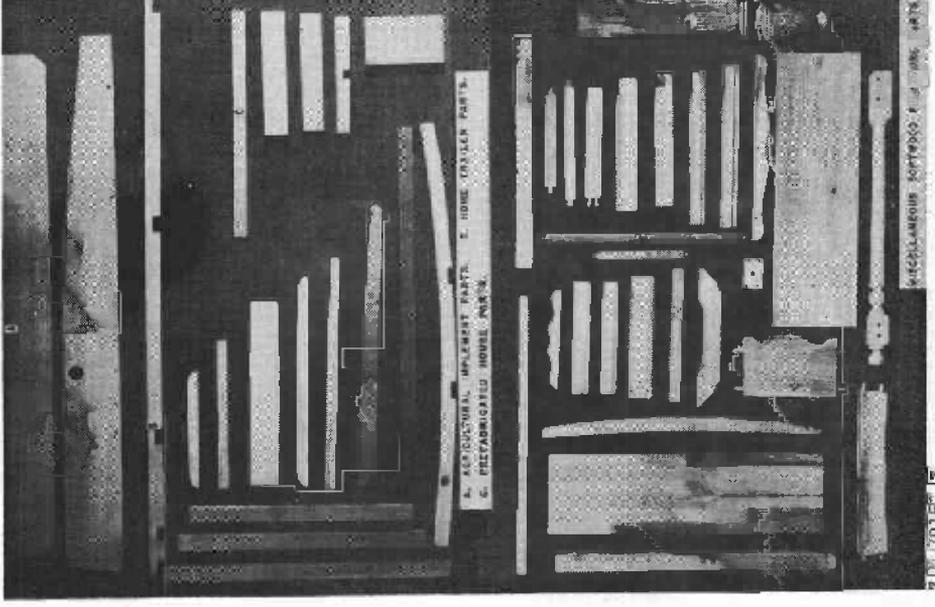


A. COMPLETE, BAY CLIMB PARTS
 B. COMPLETE, BAY CLIMB PARTS

FROM CURRICULUM



FOREST SERVICE
 U.S. FOREST SERVICE



A. STRUCTURAL, HALEY PARTS, C. HOME, HALEY PARTS
 B. STRUCTURAL, HALEY PARTS, C. HOME, HALEY PARTS
 C. STRUCTURAL, HALEY PARTS, C. HOME, HALEY PARTS

MISCELLANEOUS SORTING, F. BAY CLIMB PARTS