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## WOOD USAGE TRENDS IN THE FURNITURE AND FIXTURES INDUSTRY

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### Abstract

Trends of wood use in the furniture and fixtures industry are examined. Wood consumption statistics from the 1972 Census of Manufactures are used to update prior Forest Service surveys, and separate estimates are made for 1977 consumption. A methodology for making up-to-date estimates of wood usage is also presented.

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<sup>1/</sup> Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

Table 1. --Value of 1972 shipments of the furniture industry, by sector

SIC code	Name	Value of shipments
		<u>Billion dollars</u>
25	Furniture and fixtures	11.29
251	Household furniture	7.41
2511	Wood household furniture	2.87
2512	Upholstered household furniture	2.10
2514	Metal household furniture	.89
2515	Mattresses and bedsprings	1.05
2519	Household furniture N.E.C.	.17
252	Office furniture	1.10
2521	Wood office furniture	.25
2522	Metal office furniture	.85
253	Public building furniture	.53
254	Partitions and fixtures	1.52
2541	Wood partitions and fixtures	.79
2542	Metal partitions and fixtures	.73
259	Miscellaneous furniture and fixtures	.73
2591	Draperies, blinds, and shades	.36
2599	Furnitures and fixtures N.E.C.	.37

## Introduction

Several surveys on wood usage by manufacturing industries have been conducted over the past 20 years. The furniture and fixtures industry (Standard Industrial Classification 25) has consistently emerged as one of the major users. Furniture making has been the major market for hardwood lumber and veneer and for particleboard. Substantial volumes of hardwood plywood, softwood lumber and plywood, and hardboard have also been used. Thus, changes in market share or activity have important ramifications for the industries supplying wood products.

In this study, past survey results by the Forest Service (3, 4)<sup>2/</sup> were updated using more recent Census of Manufactures (5, 6) and industry (1) data. The various estimates were then converted to use factors<sup>3/</sup> in order to study market share trends over the survey years and to project subsequent consumption.

## Furniture and Fixtures Industry

In 1972, the furniture and fixtures industry consisted of over 9,000 establishments employing 462,000 workers who produced \$11.3 billion worth of goods (table 1). The industry is divided into five classes, with the household furniture sector accounting for two-thirds of the total value of shipments. Next comes the partitions and fixtures sector (13 pct of shipments), followed by office furnitures (10 pct), miscellaneous furnitures (6 pct), and public building and related furnitures (5 pct).

The industry is highly regionalized with 46 percent of the work force located in the South and 24 percent in the Midwest. The Northeast and the West account for 18 and 12 percent of the workers, respectively.

The industry is vulnerable to business cycles and suffered a deep recession during 1974-1975. With the recovery of the economy in general and the housing industry in particular, furniture production has also snapped back to prerecession levels.

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<sup>2/</sup> Underlined numbers in parentheses refer to Literature Cited at end of this report.

<sup>3/</sup> Use factor is a measure of intensity of use independent of the level-of activity. It is defined as use per unit of activity.

## Data and Methodology

Surveys of wood usage in manufacturing industries were conducted by the Forest Service in 1960 (3) and 1965 (4), by the U.S. Bureau of the Census for all commodities in 1967 (5) and 1972 (6), and by the American Plywood Association for softwood plywood in 1972 (1). The assumptions used to compile the data from these surveys were as follows:

(1) The more specific to a commodity a survey was, the more accurate it was assumed to be. Thus, the APA canvass was rated above the Forest Service surveys in accuracy, which in turn were ranked ahead of the Census tallies. Accordingly, for 1972 softwood plywood consumption, APA estimates were adopted over the Census numbers in four industry sectors (SIC codes 2511, 2512, 2531, 2541). Also, the 1967 Census estimate of hardwood lumber consumption by industry 2511 had a large reported standard error. Since it differed significantly from previous Forest Service estimates (after allowance was made for changes in market activity), it was reduced by 10 percent to conform with the other data.

(2) For the Census data, several commodities consumed were reported by total dollar value only. To make volume conversions, unit values were assumed based on unit values for the same commodities reported elsewhere in the Census.

(3) A large fraction of the commodities consumed by the various industries in the Census surveys were not specified by kind (NSK). Since it was reasonable to assume that some wood materials were included in this group, the reported wood volumes were increased. The correction factors were derived from the assumptions that (1) the dollar value of a specific wood commodity within the NSK group was proportional to that commodity's share among the reported commodities and (2) the unit value was the same, i.e.,

$$A = B \times C/D \quad (1)$$

$$\begin{aligned} F &= A \times G/C \\ &= B \times (C/D) \times (G/C) \\ &= B \times G/D \end{aligned} \quad (2)$$

$$\begin{aligned}
X &= G + F \\
&= G + B \times G/D \\
&= G \times (1 + S/D)
\end{aligned}
\tag{3}$$

where

A = Dollar value of commodity A within the NSK group  
B = Dollar value of all commodities NSK  
C = Dollar value of commodity A specified  
D = Dollar value of all commodities specified  
F = Volume of commodity A within the NSK group  
G = Volume of commodity A specified  
X = Volume of all commodity A.

### Results

Table 2 shows the estimated volumes of wood products consumed by the furniture and fixtures industry during the 4 survey years. The associated use factors were derived by dividing the volume estimates by the index of furniture and fixtures production published by the Federal Reserve Board (2). This index measures the physical volume of output by the industry. It is derived monthly from electric power consumption data collected by the generating utilities.

#### Lumber

The total lumber use factor was stable at around 2.75 billion board feet per index unit in the 1960's (fig. 1). In 1977, however, it dropped to 2.30 billion. (This was partly due to the reclassification of the kitchen cabinet sector into the wood products category (SIC code 24). Using the old industry definition raises the use factor to 2.54 billion for a more modest decline of 0.21 billion.) This drop reflects the inroads of plastics and wood composition boards (hardwood and particle-board) into the furniture markets. The year of 1972 was also one of high prices and material shortages. This led to temporary savings in material that may have exaggerated lumber's decline.

Looking at the use factor by species shows little change in softwood lumber usage, but a large drop in hardwood lumber in 1972 (fig. 1).

Table 2. --Wood use in the furniture and fixtures industry  
(billion feet) and use factors (billion feet  
Per production index unit (1967 = 1.0))

Commodity	1960	1965	1967	1972 including kitchen cabinets	1972 excluding kitchen cabinets
Hardwood lumber <sup>1/</sup>					
Consumption	1.59	1.98	2.26	2.59	2.37
Use factor	2.20	2.09	2.26	1.98	1.82
Softwood lumber <sup>1/</sup>					
Consumption	.37	.61	.49	.73	.63
Use factor	.51	.65	.49	.56	.48
Hardwood plywood <sup>2/</sup>					
Consumption	.33	.44	.62	1.09	.91
Use factor	.46	.46	.62	.83	.69
Softwood plywood <sup>2/</sup>					
Consumption	.38	.26	.31	.59	.51
Use factor	.53	.28	.31	.45	.39
Particleboard <sup>3/</sup>					
Consumption	.09	.33	.38	1.27	1.04
Use factor	.12	.35	.38	.97	.80
Hardboard <sup>4/</sup>					
Consumption	.33	.51	.44	.96	.78
Use factor	.45	.54	.44	.72	.60
Hardwood veneer <sup>5/</sup>					
Consumption	.80	1.22	1.31	1.39	1.22
Use factor	1.10	1.29	1.31	1.07	.93

<sup>1/</sup> Billion board feet.

<sup>2/</sup> Billion square feet (3/8 in.).

<sup>3/</sup> Billion square feet (3/4 in.).

<sup>4/</sup> Billion square feet (1/8 in.).

<sup>5/</sup> Billion square feet (surface measure).

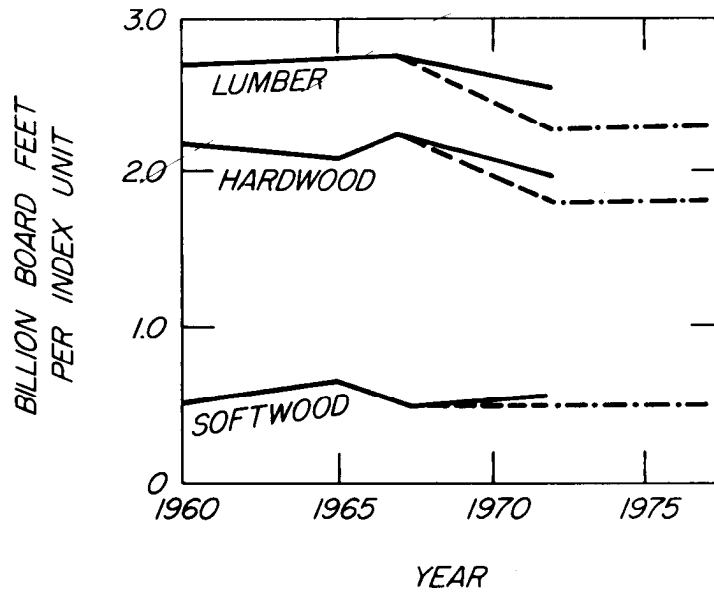


Figure 1.--Lumber usage per production index unit (---excluding kitchen cabinets).

(M 146 269)

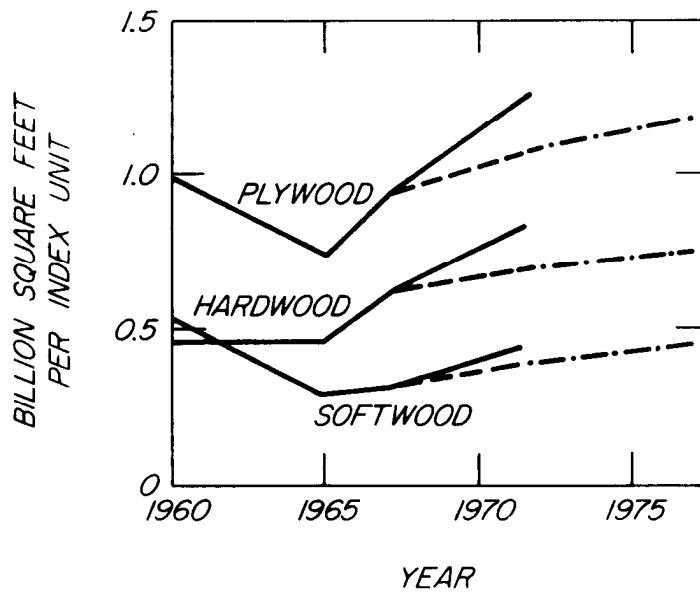


Figure 2.--Plywood usage per production index unit (---excluding kitchen cabinets).

(M 146 270)

Consumers have shown a consistent preference for wood as opposed to metal or plastic furniture. Consequently, it is unlikely that drastic changes occurred in lumber usage since 1972 despite the high prices for both softwoods and hardwoods. The 1977 softwood and hardwood lumber use factors are accordingly projected 0.48 and 1.85 billion board feet per index unit, respectively. (The Forest Service is currently conducting a new survey on wood usage in manufacturing. It will be possible to check the accuracy of these projections later in 1978.)

### Plywood

Total plywood usage has trended erratically upward during the 4 survey years (fig. 2). Hardwood plywood in particular showed a consistent upward direction from 0.46 billion square feet per index unit to 0.83 billion-(adjusted to include kitchen cabinets) in 1972. Softwood plywood rose from 0.28 billion in 1965 to 0.45 (adjusted) in 1972. Both usage factors are expected to show more modest gains because of increased competition from composition boards. The softwood and hardwood plywood use factors are projected at 0.45 and 0.75 billion square feet per index unit in 1977.

### Wood Composition Boards

The survey data indicate that particleboard and hardboard usage grew rapidly in the past 20 years, reflecting the growth of these industries. Between 1960 and 1972, the particleboard use factor increased eightfold from 0.12 billion square feet per index unit to 0.97 (adjusted), and the hardboard use factor rose from 0.45 to 0.72 (fig. 3). There are, however, two factors which probably slowed further growth: (1) market saturation and (2) the development of a new substitute product, medium density fiberboard. Because of these considerations, the particleboard and hardboard use factors were assumed to increase only moderately to 0.83 and 0.63 billion board feet per index unit.

### Hardwood Veneer

Hardwood veneer usage showed a slight downward trend between 1960 and 1972, dropping from 1.10 billion square feet per index unit (surface measure) to 1.07 billion (adjusted) (fig. 4). It was assumed that this market stabilized since 1972 and the projected use factor was unchanged at 0.93 billion in 1977.



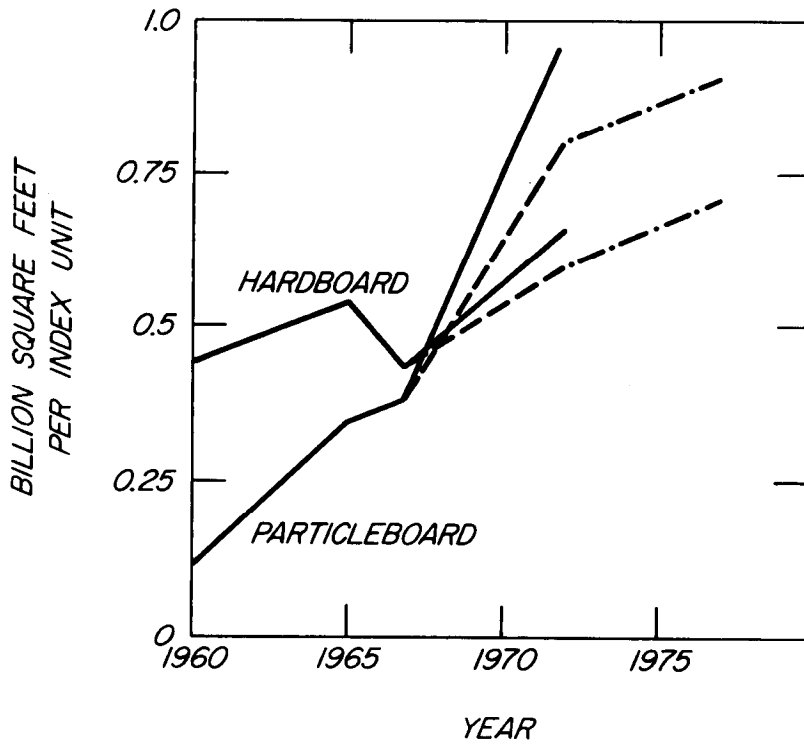


Figure 3. --Composition board usage per production index unit (---excluding kitchen cabinets).

(M 146 271)

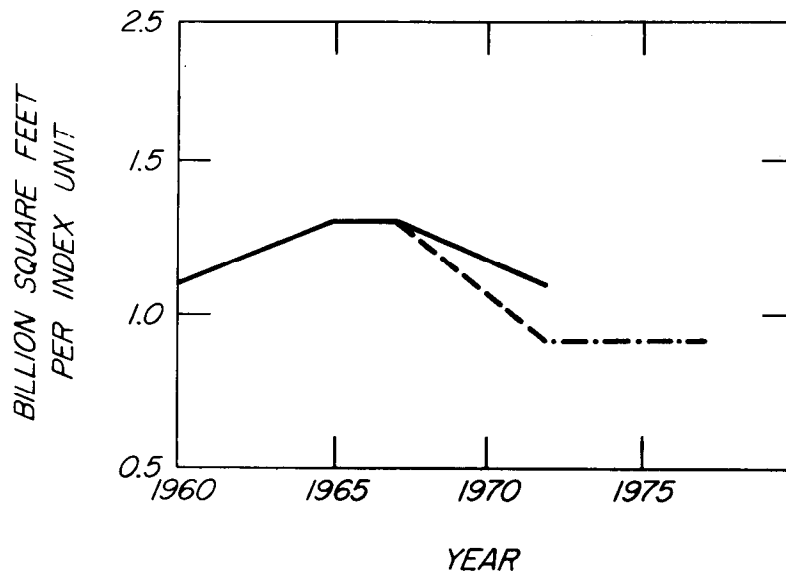


Figure 4. --Hardwood veneer usage per production index unit (---excluding kitchen cabinets).

(M 146 268)

### Estimated 1977 End Use

The Federal Reserve Board's furniture and fixtures index was reported at 1.40 in 1977 (1967 = 1.0). Multiplying the index by the use factors projected above yields estimates of consumption of the various products (table 3). Using this technique, estimated lumber consumption by the furniture industry in 1977 was more than 3.25 billion board feet versus 3.0 billion in 1972. Plywood consumption was 1.67 billion square feet, up 18 percent from 1972. Hardwood and particleboard consumption were also significantly higher than in 1972, showing 13 and 11 percent gains. Hardwood veneer consumption was up 7 percent.

### Application of Use Factor Technique

One major cause of uncertainty and market misjudgement in the forest products industries is the absence of data on end use consumption. Accurate and timely information on industry sales is collected and made available by the various industry associations. However, this information is often misleading. Because industry sales occur at the far end of the marketing chain, they generally lag the turns in the market. By the time changes from the consuming sectors are relayed through the various strata of market intermediaries (retailers, wholesalers, brokers, etc.), producers, acting on prior signals, may have committed themselves to actions that may be inappropriate in the changed circumstances. This often shows up in inventory swings that lead to exaggerated price changes and market instability. The 1969 explosion in lumber and plywood prices, followed by a precipitous decline, was a recent example of this phenomenon.

By utilizing information on market activity indicators, such as housing starts and mobile home shipments as well as use factors, producers can gain valuable insight into the state of the market. Multiplying these use factors by their respective market indicators yields estimates of total consumption. Thus inventories can be monitored in the pipeline. By comparing estimated consumption with reported mill shipments (sales) plus net imports, the changes in field inventories can be calculated, i.e.,

$$(1) \text{ Stocks} = \text{Stocks}_{-1} + \text{mill shipments} + \text{net imports} - \text{end use}$$

or

$$(2) \text{ Stocks} - \text{Stocks}_{-1} = \text{mill shipments} + \text{net imports} - \text{end use}$$

That is, if mill shipments plus net imports exceed estimated end use, field inventory accumulation is implied and vice versa. By making these calculations, early warning signals of impending market imbalances are made available.

The Forest Service is engaged in reestimating the wood usage factors for the various end markets. The use factors presented above represent one phase of this effort.

Conclusions and Summary

The major conclusion of this study is, that despite sharply higher prices, wood products have not lost their share of the market within the furniture and fixtures industry during the period of 1960 to 1972. Slightly lower lumber usage was more than offset by increased utilization of plywood and wood composition boards. Especially noteworthy was the rapid growth of particleboard and hardboard usage, a phenomenon that slowed because of market saturation and the advent of medium-density fiberboard. Since 1972, additional market losses by lumber were deemed unlikely because of the traditional consumer preference for wood furniture, rather than metal or plastic furniture. Market penetration by plywood, particleboard, and hardboard also slowed because of market saturation and new product competition. Veneer usage, which showed little historical variation, was projected unchanged from the 1972 level.

Table 3. --Estimated 1977 levels of wood use by the furniture and fixtures industry

Commodity	Use factor	Quantity
Hardwood lumber	1.85	2.59 billion board feet
Softwood lumber	.48	.67 billion board feet
Hardwood plywood	.75	1.05 billion square feet (3/8 in.)
Softwood plywood	.45	.63 billion square feet (3/8 in.)
Particleboard	.83	1.16 billion square feet (3/4 in.)
Hardboard	.63	.88 billion square feet (1/8 in.)
Hardwood veneer	.93	1.30 billion square feet (surface measure)

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