



U.S. DEPARTMENT OF AGRICULTURE • FOREST SERVICE
FOREST PRODUCTS LABORATORY • MADISON, WIS.

In Cooperation with the University of Wisconsin



U.S.D.A. FOREST SERVICE
RESEARCH NOTE
FPL-0237
1977

LUMBER USE TRENDS IN MOBILE HOME CONSTRUCTION

By

H. EDWARD DICKERHOOF, Industry Economist

Forest Products Laboratory,^{1/} Forest Service
U.S. Department of Agriculture

The mobile home industry is a large and expanding lumber market within the housing industry. A sturdy wood frame lies under the metal wall and roof skin found on most mobile home units. When compared with data compiled in 1970 (1),^{2/} the latest Forest Service, Department of Agriculture survey findings indicate the average mobile home now uses much more lumber for framing. This increase in lumber usage is attributed to larger units and better quality construction--with the quality factor generally thought to be most important.

Better quality homes with sturdier framing are produced now because of higher standards established: (a) Voluntarily by the mobile home industry, (b) by individual States, and (c) by the U.S. Department of Housing and Urban Development. The latter standard became effective June 15, 1976, and is commonly referred to as the "Federal standard."

^{1/} Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

^{2/} Underlined numbers in parentheses refer to literature cited at end of this report.

To determine changes in lumber framing requirements since 1970, the Forest Service conducted a mail questionnaire survey of all mobile home manufacturing plants in the United States. Data were obtained for units manufactured in 1974. Although the "Federal standard" has been adopted since that time, it is very similar to the requirements of the American National Standards Institute (ANSI) Standard A 119.1 or the National Fire Protection Association (NFPA) Standard 501 B, which had been adopted in 46 States by 1974 (2,3).

Sample

Data were compiled from 165 usable questionnaires returned. Approximately 450 plants were in operation in the United States at the time of the survey. Responding plants represented approximately 37 percent of all existing plants. These responding plants manufactured 94,470 units or approximately 29 percent of the 330,800 mobile homes manufactured nationwide in 1974 (5).

Definition of Terms

Several different styles of housing units are manufactured in factories. Thus, a few definitions are in order before structural wood use is discussed by type of unit.

Mobile home.--"A structure transportable in one or more sections, which exceed's either 8 body feet in width or 32 body feet in length, built on a permanent chassis and designed to be used as a dwelling with or without a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning, and electrical systems contained therein." (4)

These units are commonly referred to as single-wides.

Double-wide mobile home.--"A mobile home consisting of two sections combined horizontally at the site while still retaining their individual chassis for possible future movement." (4)

Type and Size of Units

Because of the strong trend toward double-wide units in recent years, data were obtained for both single- and double-wides. The percentage distribution of types and widths is shown in table 1. The average unit (all lengths and widths--excluding hitch) manufactured by our responding plants had a floor area of 947 square feet. Double-wides average 1,340 square feet, while single-wides average 817 square feet.

Lumber

In 1970, mobile homes used an average of 1,680 board feet of lumber per unit or about 2.2 board feet for each square foot of living area (1). In 1974, lumber use increased to 2,520 board feet or about 2.7 board feet for each square foot of living area. Thus, much more lumber was required per unit--both in total and per square foot. The increased total amount of lumber is due in part to the increased size of the average mobile home unit. However, the increased use of lumber on a square-foot basis reflects the use of larger framing members in combination with closer spacing of joists and wall studs.

In 1974, an average of 2,255 board feet of lumber was required for single-wides, or about 2.8 board feet for each square foot of living area. Double-wides required an average 3,317 board feet of lumber, or about 2.5 board feet for each square foot of living area.

Estimates of lumber consumption in 1970 indicated that double-wides used more lumber than single-wides (2.1 versus 2.7) on a basis of board feet required per square foot of living area. The reverse of this situation in 1974 was probably due in large part to the widespread use of the ANSI Standard A 119.1 or the NFPA Standard No. 501 B, coupled with industry efforts to build better quality units.

Because of the heightened interest in lumber use trends in mobile home manufacture since 1970, specific information was obtained for single- and double-wides regarding dimensions used for floor, wall, and roof framing. The percentage of different sizes of framing lumber used is shown in table 2. Data on the spacing of framing members was not specifically requested.^{3/} However, supplemental information obtained from follow-up telephone calls and in many company brochures indicated that framing 16 inches on center was commonly used to meet performance criteria outlined in the codes or standards.

^{3/} The ANSI Standard A 119.1, NFPA Standard 501 B, and the new "Federal standard" are all performance-type codes. Although some framing spacing and dimensions are specified, most requirements are design oriented.

Conclusions

Mobile home units manufactured in 1970 consumed, on the average, 1,680 board feet of lumber. By 1974, lumber use per unit had increased by 50 percent. Because construction standards for mobile homes are very similar to those required for site-built homes, lumber use per unit will not likely increase much in the next few years. But the total volume of lumber required by the mobile home industry annually will be a major factor in the total U.S. lumber market.

During the 7-year period, 1970-1976, home shipments averaged approximately 400,000 units per year (6). Shipments reached an all-time high of 575,900 units in 1972 but in 1975 plummeted to 212,700 units--the lowest level in 10 years (6). Although the mobile home industry is currently showing definite signs of recovery, it is difficult to find any data or general economic outlook that would warrant a prediction of a rapid return to the high shipment levels registered in the early years of the decade. Rather, for the upcoming 3-year period, 1977-1980, it is likely that shipments will return and temporarily stabilize at near the 400,000 unit per year average established over the past 7 years. Therefore assuming, on the average, 2,500 board feet of lumber will be used per unit, the mobile home industry will require about 1 billion board feet of lumber each year for the period 1977-1980.

Acknowledgments

The author thanks the staff of the Manufactured Housing Institute for their advice and assistance as well as the many plant managers and other corporate officials that provided the data reported. The author also thanks Edward W. Whitehorn, Computer Specialist, Southeastern Forest Experiment Station for his work on the computer program used to compile and analyze the data.

This study was initiated at the Southeastern Forest Experiment Station while the author was stationed at the Forestry Science Laboratory, Athens, Georgia.

Literature Cited

1. Fasick, Clyde A., Edward H. Dickerhoof, and Dewel J. Lawrence.
1973. Evaluation of the use of wood products in mobile home
manufacture. Forest Prod. J. 23(6):11-16.
2. Federal Register.
1975. Mobile home construction and safety standards. Part II.
Department of Housing and Urban Development 40(244):58752-58792.
Dec. 18.
3. Manufactured Housing Institute.
1974. Quick facts about the manufactured housing industry.
Chantilly, Va. 12 p.
4. Manufactured Housing Institute.
1975. Quick facts about the manufactured housing industry.
Chantilly, Va. 12 p.
5. Mobile Homes Manufacturers Association.
1975. 1974 Mobile Home Data Book. 23 p.
6. U.S. Department of Commerce.
1977. Construction Reports. Series C 20-77-1. Housing starts.
Jan. 1977. Issued March. p. 13.

Table 1.--Type and width of mobile home units produced by sample respondents and all manufacturers in the continental United States, 1974

Type and width	1974	
	Sample respondents	All manufacturers ^{a/}
	Percent	
Single-wides		
12 feet	34	42
14 feet	41	32
Other	<u>b/</u>	1
Subtotal	75	75
Expandables	<u>b/</u>	1
Double-wides		
20 feet	<u>b/</u>	<u>b/</u>
24 feet	22	22
26 feet	<u>b/</u>	1
28 feet	<u>2</u>	1
O t h e r	<u>b/</u>	<u>b/</u>
Subtotal	<u>25</u>	<u>24</u>
Total	100	100

^{a/} Source: Mobile Homes Manufacturers Assoc., 1974 Mobile Home Data Book (4).

^{b/} Less than one-half of one percent.

Table 2.--Percent of different lumber dimensions used in floor, wall, and roof framing in the manufacture of single- and double-wide mobile homes, 1974

Framing component and lumber dimensions	Single-wides	Double-wides
	Percent used	

Floor joists		
2x4	18	5
2x6	75	88
2x8	6	5
Other	<u>1</u>	<u>2</u>
	100	100
Interior wall studs		
1x3	14	11
1x4	6	5
2x2	17	11
2x3	44	46
2x4	16	26
Other	<u>3</u>	<u>1</u>
	100	100
Exterior wall studs		
2x3	9	3
2x4	90	96
Other	<u>1</u>	<u>1</u>
	100	100
Roof rafters and trusses		
1x2	18	10
2x2	49	38
2x3	9	18
2x4	4	18
2x6	5	5
Other	<u>15</u>	<u>11</u>
	100	100