Feasibility of Mobile Home Production by Lumber Dealers

RESEARCH REPORT 66-1

Rudard A. Jones

SMALL HOMES COUNCIL
BUILDING RESEARCH COUNCIL
UNIVERSITY OF ILLINOIS
FEASIBILITY OF MOBILE HOME PRODUCTION BY LUMBER DEALERS

Research Report 66-1

RUDARD A. JONES
Research Professor of Architecture and Director, SHC-BRC

June 1966

This publication is a report of a study performed by the University of Illinois Small Homes Council—Building Research Council pursuant to an agreement for cooperative investigation between the University and the National Research Council of the National Lumber and Building Material Dealers Association of Washington, D. C.

Copyright, ©, 1966 by the University of Illinois. All rights reserved. No part of this publication may be reproduced in any form without permission in writing from the publishers.

Price $5.00
ACKNOWLEDGEMENTS

Special acknowledgements are due to Mr. Edward Wilson, managing director of the Mobile Homes Manufacturers Association * for his assistance in furnishing information about the industry and for arranging visits to manufacturing members of the organization.

The author also wishes to specifically thank Mr. Max Herrli, Herrli Industries, Inc. and Mr. Frank Lucas, Skyline Homes, Inc. for their cooperation in this study.

Acknowledgement is also made to other individuals and groups that made contributions to the work.

---

*The name "Mobile Homes Manufacturers Association" is a misnomer in the sense that this organization encompasses membership from all phases of the mobile home industry, including suppliers, manufacturers, transporters, retailers, and park operators. The organization provides a wide variety of services to all of these elements of the industry. The Mobile Homes Manufacturers Association is located at 20 N. Wacker Drive, Chicago, Illinois.
**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>I. INTRODUCTION AND OBJECTIVE</td>
<td>1</td>
</tr>
<tr>
<td>II. DEFINITION</td>
<td>1</td>
</tr>
<tr>
<td>III. THE MOBILE HOME - PLANNING AND DESIGN</td>
<td>2</td>
</tr>
<tr>
<td>IV. THE MOBILE HOME - CONSTRUCTION</td>
<td>6</td>
</tr>
<tr>
<td>V. PRODUCTION</td>
<td>12</td>
</tr>
<tr>
<td>VI. DISTRIBUTION</td>
<td>16</td>
</tr>
<tr>
<td>VII. EVALUATION</td>
<td>19</td>
</tr>
</tbody>
</table>
CHAPTER I. INTRODUCTION AND OBJECTIVE

An increasing proportion of the low-cost housing market is being served by the mobile home industry; in fact, it is stated that 1 in 3 housing units costing less than $10,000 is a mobile home. The impact of the industry is further amplified by the statement that of all single-family housing units produced in 1965, 1 in 6 was a mobile home.

With this information in mind, the lumber dealers, traditional material suppliers and, to some extent, builders of single-family housing in the United States, became concerned as to whether it would be feasible and advisable for them to enter into the manufacture and distribution of mobile homes.

The objective of this study is to answer that question.

CHAPTER II. DEFINITION

A mobile home is a movable or portable dwelling constructed to be towed on its own chassis, connected to utilities, and designed without a permanent foundation for year-round living. It can consist of one or more units that can be telescoped when towed and expanded later for additional capacity, or of two or more units, separately towable but designed to be joined into one integral unit.

Large mobile homes are towed to their sites by trucks whose movements are controlled by state highway regulations or they are shipped on railroad flat cars.
CHAPTER III. THE MOBILE HOME - PLANNING AND DESIGN

Plans

A wide variety of plans is available from most mobile home manufacturers, as evidenced by their literature. In general, there are three widths: 8 feet; 10 feet; and 12 feet. On the basis of 1964 figures, the production of the 8-foot-wide unit is negligible, and the heaviest production is in the 10-foot-wide unit (approximately 60%), but this is rapidly being overtaken by the 12-foot-wide unit (21%). The remainder of the production is in the double-widths and expandables. Conversation among a number of individuals indicated that the future of the business lies in the 12-foot wide unit.

Due to transportation regulations, width limitations are very critical. All designs are based on maximum use of the available legal width, with careful attention to detailing so that no part or piece of the unit exceeds the limit.

Most units are from 47 feet to 60 feet long. Accommodations vary widely, and extend to the degree that it is possible to purchase a 4-bedroom, bath-and-a-half mobile home. Needless to say, some of the rooms are relatively small in any such arrangement, even though the overall dimensions may be 12 feet by 60 feet. The minimum ceiling height is 7 feet.

The basic arrangements, shown in Figure 1, may be categorized in three groups:

1. Living room at the front of the unit, followed by the kitchen, with the bedroom-bathroom section at the rear.

2. The kitchen is located at the front of the mobile home, with the living room in the center and the bedroom-bathroom section following.

3. One bedroom is located at the front of the unit, with the living room-kitchen following, and, finally, the bedroom-bathroom section. In the larger units of this type, a half-bath may be included in the front bedroom.

In all of these units it is apparent that the living room must also serve as the entrance and the main passageway.

As might be expected, the space provided in some of the rooms in a mobile home would be considered definitely below normal housing standards. This seems to be particularly true in the bedrooms, where the space provided borders on the absolute minimum. Bathrooms and kitchens, on the other hand, compare well with those of conventional housing; in some instances they are larger than those in small apartments.

Bedroom closets are usually equal to or greater than closets that are required by the Minimum Property Standards of the Federal Housing Administration and built-in drawers are provided as well. General storage provisions are almost non-existent. Also, few units have provision for a front entrance closet.
(1) Front Living Room (3 Bedrooms)

(2a) Front Kitchen (2 Bedrooms)

(2b) Front Kitchen (3 Bedrooms)

(3a) Front Bedroom (3 Bedrooms)

(3b) Front Bedroom (4 Bedrooms)

(3c) Front Bedroom Reverse Hall (2 Bedrooms)

TYPICAL FLOOR PLANS 12 x 60 MOBILE HOMES
(other sizes similar)

Figure 1
**Interior Equipment**

Mobile homes are very well equipped. Almost all kitchens have a double-bowl sink and, of course, are equipped with a range and refrigerator. The cabinets provided in the kitchen are generally more than would be anticipated in typical apartment units of equivalent size. Similarly, a great deal of expenditure has gone toward making the bath a relatively luxurious room. A full-size tub with shower overhead is included in nearly all units. Lavatories are counter type; in some units double lavatories are supplied.

All units are fully equipped with furniture, including built-in drawers and cabinets, carpeting, lighting fixtures, etc. In fact, some even come provided with standard pictures, decorative plaques, and artificial flowers. These provisions, of course, appeal strongly to the low-income purchaser as it is not necessary for him to make additional financial arrangements for the equipping and furnishing of the unit.

"Style"

A great deal of attention is paid to appeal and "style". For example, at one company we were told that "Spanish" is all the rage at the present. The "Spanish" interior consisted of a kitchen-dining room area raised one step above the remainder of the trailer, with the dining area surrounded by wrought iron railing for a balcony effect. The deep plush carpeting was red, the cabinet work was a dark oak, and a number of fake heavy cross beams had been added into the ceiling to contribute to the "Spanish" effect. In the writer's mind, this approach to the stylization of the mobile home was unfortunate; however, such applied styling apparently added to the saleability of the unit, or at least the manufacturer felt that it did. One would assume that this type of decoration might come and go very rapidly as is the case in housing styles where the "storybook" type was popular for a number of years but is now a detriment to resale in the areas where they are located. A great deal of effort goes into the idea of creating a plush or luxury atmosphere even in the smaller units.

**Exterior Design**

The critical limitation of the width of the unit - every inch counts - means that long sides of the unit must remain relatively flat with minimum protrusions. This essentially means that appearance of sides can be changed only by different materials and colors. Occasionally, prefabricated metal imitation shutters are screwed to the side of the unit along the windows -- it is obvious they are false because they could not cover the window completely; also, in one instance, it was seen that the two shutters on a window were of different size because of the location of the window near the corner of the unit. There is a certain amount of banding and decoration applied to the unit depending upon the direction of application of the siding, that is, whether it is vertical or horizontal.

Roof lines are changed in some instances. Some of these changes may be caused by the need to raise the ceiling in the interior; other times the varied roof line may be for styling only. Most of the effort to create exterior individuality appears on the front end of the mobile home where attempts are made to incorporate flower boxes, grills, etc. It is hard to believe
that some of the designs that are produced are useful in creating sales, but the manufacturers must believe such efforts are necessary.

Half-house Units (Sectionalized Houses)

Some of the manufacturers seem to be intrigued by the possibility of half-house or sectional units. They recognize, however, that many changes in their construction details will be necessary if they are to meet the code requirements of permanent housing. This includes a new floor system (the chassis will be only a temporary hauling device), 2 x 4 studs in the walls, and a different roof system. They also recognize that the plans, the design, and the exterior finish will have to be of a different character.
CHAPTER IV. THE MOBILE HOME - CONSTRUCTION

MATERIALS

Materials represent approximately 75% of the wholesale price of the mobile home unit. Nevertheless, inventories of materials held by the mobile home manufacturer are relatively low, since he plans to turn over his inventory from 12 to 20 times a year. A unique supply system described later accounts for this unusual turnover.

Types of Materials

Of the basic materials that go into the making of a mobile home, wood, plywood, and resilient flooring materials are materials that are normally handled by the lumber dealer. However, the forms, types, and sizes of these materials used in mobile homes are different from those used in standard residential construction. For example, the interior prefinished plywood is normally 3/16-inch thick and need be only 7 feet long. The plywood subfloor is a common thickness, 5/8-inch, but the length must be 10 or 12 feet to coincide with the width of the unit. Resilient tile materials may be the same as those normally used in house construction, but most mobile home manufacturers prefer to use sheet goods that come in a 10- or 12-foot width so that the entire finish flooring may be installed without seams. The wall studs used are 2 x 2's; however, in most instances, they are precut and notched to receive horizontal rails (girts) as in Figure 2. Clear white fir and spruce are the materials most preferred. Insulating fiberboard for ceilings once again varies from the standard product in that it is usually selected in a length that is equivalent to the width of the unit. Insulation is usually a lightweight blanket.

Certain items are specially made. For example, window units are designed to have as little thickness as possible so as not to project from the wall. Windows are usually of the jalousie or awning type with aluminum frames. They are installed after the siding is placed on the wall. Hardware items are also special.

Some materials and fixtures are identical with those used for regular house construction. Tubs and lavatories are usually enameled steel. Water closets are standard fixtures. Plastic-coated hardboard set in mastic in metal moldings is used for the shower walls over the tub.

Material Processing

Mobile home manufacturers prefer to buy as much material as possible in a precut and/or preassembled state. The one major item to which this rule does not apply seems to be kitchen cabinets. It is to be assumed that as yet no supplier has been able to furnish kitchen cabinets at a price that competes with in-plant manufacturing of these items.

Almost all materials are purchased prefinished whenever possible. Aluminum siding material is prefinished. Fiberboard ceilings are also prefinished. Wood moldings used throughout the house are either prefinished with conventional finishes or have an applied vinyl sheeting material. The only spray painting operations that are evident in most manufacturing plants are those located in the area where the kitchen cabinets are finished; however, some plants do spray paint the exterior of their units.
Materials Supply

Most mobile homes manufacturers attempt to operate with a minimum inventory of materials and supplies. They are aided in this effort by a unique supply system which has built up over the years. The heart of this system is the willingness of the supplier to warehouse large quantities of materials so that the manufacturer can be supplied on short notice - sometimes as little as 2 or 3 days. In essence, the suppliers carry the inventory. The nature of this procedure tends to create mobile home manufacturing complexes in certain areas. When a mobile home manufacturer sets up a new plant, basic suppliers tend to follow him and set up plants. This in turn brings additional mobile home manufacturers to the same area. At the present time, major complexes of this type are located in three areas: 1) Northern Indiana - southern Michigan, centered around Elkhart, Indiana; 2) Southern Georgia, centered around Americus; and 3) Southern California.
Materials Purchasing

Arrangements between the mobile home manufacturers and the materials suppliers are such that, although the inventory carried by the mobile home manufacturer is relatively small, he does not sacrifice the price savings that are justified by his volume. Purchase contracts are made for long periods of time on the basis of estimated sales. With this kind of order backlog, the supplier can mass produce in the most efficient way and give the manufacturer the benefit of this type of production. Where lumber is concerned, many firms contract with special buyers who make a business of providing lumber to mobile home manufacturers. These buyers know the type of lumber required and where it can be most readily secured at the most favorable prices. When such a buyer is operating for several large firms, the amount of purchasing that he represents is substantial and therefore he can buy at an advantageous rate for the mobile home producer.

Material Prices

It is not possible to obtain completely accurate information on costs of materials involved in mobile home construction, but some idea of the range of these can be obtained from the following representative figures. It should be remembered that most of these materials are precut or prefinished. Mobile home manufacturers are paying the following estimated prices for materials in the Midwest:

<table>
<thead>
<tr>
<th>Material</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior plywood, 3/16-inch</td>
<td>$.10 per sq. ft.</td>
</tr>
<tr>
<td>Prefinished interior plywood, 3/16-inch</td>
<td>$.12 per sq. ft.</td>
</tr>
<tr>
<td>Dimension lumber (processed)</td>
<td>$.10 per board foot</td>
</tr>
<tr>
<td>Asphalt impregnated fiberboard</td>
<td>$.045 per sq. ft.</td>
</tr>
<tr>
<td>Aluminum, .0196 thick</td>
<td>$.13 per sq. ft.</td>
</tr>
<tr>
<td>Aluminum, .024 thick</td>
<td>$.27 per sq. ft.</td>
</tr>
<tr>
<td>Adhesive</td>
<td>$.01 per lb.</td>
</tr>
<tr>
<td>Foamed styrene board</td>
<td>$.15 per sq. ft.</td>
</tr>
<tr>
<td>Galvanized sheet metal</td>
<td>$.19 per sq. ft.</td>
</tr>
<tr>
<td>Vinyl-surfaced board</td>
<td>$.27 per sq. ft.</td>
</tr>
</tbody>
</table>

STRUCTURAL SYSTEMS AND CONSTRUCTION DETAILS

Chassis

Mobile homes are constructed on a steel chassis. Generally speaking, the two members which run the length of the unit are I-beams, while the cross members are of 12-gage cold-rolled steel or bar-joist-type construction. The cross members are welded between the longitudinal members and are extended on either side to form outriggers to support the wood floor structure. Literature from mobile home manufacturers often speaks of the rigid steel chassis; in truth, however, the chassis in general is quite flexible in both the vertical and lateral directions. The vertical deflection is due to the extraordinary length of the chassis compared to the depth of the main longitudinal members (usually 8 inches) while the lateral flexibility is high.
because the frames are welded without any triangular reinforcement. Although, as mentioned above, the manufacturers speak of the stiffness of their chassis, it is apparent from observing the manufacturing process that the real stiffness is given to the structure by the side walls as they are fastened to the floor system.

Basic Structural System

Once the steel chassis has been completed, the assembly of the remainder of the structure generally follows the procedure used in building a house with platform (or western) frame construction. First, a platform floor is built, and, following this, the preassembled walls and partitions are set on the platform. Finally, the preassembled roof is placed on top the walls and partitions, thereby completing the basic structure.

Floor System

A typical floor construction placed over the chassis might be as follows, listed from bottom to top:

1. 3/8-inch or 1/2-inch insulation board.
2. 2 x 4 (sometimes 2 x 6) floor joists extending longitudinally.
3. Blanket or batt insulation placed between the longitudinal joists.
4. Plumbing and heating lines may be placed between the joists.
5. 1 x 3 or 1 x 4 cross pieces. In some instances, cross pieces are let into the top edge of the longitudinal joist to serve as supports for the edges of the plywood subfloor.
6. Plywood subfloor. The length of the plywood runs from side to side. The plywood is usually glue-nailed to the let-in strips, or if let-in strips are not used, tongue-and-groove or ship-lap plywood is used and is fastened with nail-gluing or is screwed and glued.
7. Finish flooring. Finish flooring is normally resilient flooring material applied in full-width sheets, or resilient tile material, or carpeting, or a combination of these materials.

Added stiffness is the reason sometimes given for placing the joists in the longitudinal direction; however, it appears that the chief reason is to simplify the installation of heat ducts and plumbing.

Normally, the frame work of the flooring system is assembled on a jig and the insulation board applied to it. The resulting construction is turned over and transferred to the chassis on the assembly line. Subsequently, the insulation, heating and plumbing, subfloor, and finish flooring are attached.
Exterior Wall Construction

The exterior wall of the typical mobile home is composed of the following materials listed from the inside surface to the outside:

1. 3/16-inch plywood.
2. 2 x 2 studs 16 inches on center.
3. Fiber insulation between the studs.
4. Horizontal rails let-in to the studs on the exterior face.
5. Exterior finish material, usually .019 or .024 aluminum.

Twenty-six gage metal strap anchors are used as additional ties between the wall and the floor, and metal (26 gage) straps are nailed to the studs in an X pattern to give added diagonal bracing. In the better constructions, the horizontal rails are staple-glued to the studs and the interior plywood is nail-glued or staple-glued to the face of the stud.

Wiring is always installed in notches in the stud, which may occur in either the interior or exterior face of the members. The wiring is protected by special steel clips fitted into the notches. If the wiring is to go into notches on the interior face of the studs, it is done in the jig before the application of the plywood interior finish. More commonly, the wiring is done from the outside after the exterior walls have been erected on the platform and the structure is in the assembly line.

Roof Construction

The typical roof construction of a mobile home unit may be described in the following list of materials which are arranged from the exterior surface to the interior:

1. One-piece galvanized steel roof covering. The one-piece sheet of steel is sized to extend two inches over the side wall and bent down over it.
2. 3/8-inch to 1/2-inch fiberboard decking.
3. Bowstring roof trusses consisting of a 1 x 2 for the rounded top chord and a 2 x 2 lower chord, assembled with nail-glued plywood gusset plates as shown in Figure 3.
4. Blanket insulation. (In some instances this is draped over the top of the roof trusses.)
5. Ceiling finish material, usually prefinished fiberboard. This is fastened to the ceiling with nails or staples which are concealed by plastic rosettes or by the bordering cove trim.
Interior Partitions

Interior partitions have essentially the same basic construction details as exterior walls.

Component Costs

Costs of the typical components described above may be estimated at the following prices, materials only:

<table>
<thead>
<tr>
<th>Component Part</th>
<th>Estimated Cost per sq. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>$.36</td>
</tr>
<tr>
<td>Side wall</td>
<td>$.45</td>
</tr>
<tr>
<td>End wall</td>
<td>$.47</td>
</tr>
<tr>
<td>Roof</td>
<td>$.38</td>
</tr>
</tbody>
</table>

(Labor costs may be estimated at $.07 per sq. ft. additional)

Standards

Members of the Mobile Home Manufacturers Association subscribe to American Standards Association Standard A119.1 which covers the plumbing, heating, and electrical installations for mobile homes. This standard is currently in the process of revision.

The association is currently working on a construction standard.

A smaller group of manufacturers within the MHMA (generally older firms) has formed the Mobile Home Craftsmen's Guild and has instituted the Gold Seal Program of quality and reliability. This program encompasses adherence to published standards for construction as well as heating, plumbing, and electrical installations.
CHAPTER V. PRODUCTION

Production Techniques and Facilities

Assembly Techniques. Mobile homes are built using the assembly-line technique, with major sections being fabricated in sub-assembly areas adjacent to the assembly line.

The sidewall sections, end walls, partitions, roof-ceiling structures, and cabinets are the parts that are ordinarily subassembled. If the chassis is not purchased, it will also be built in a subassembly area.

Once the chassis is assembled, it is placed on the line and the assembly line procedure commences. The first part of the floor system is usually subassembled and completed on the line.

Jigs for the subassembly of wall sections may be either in a horizontal or vertical position, but are more commonly vertical, or nearly so, as this position saves a considerable amount of space in the manufacturing area. The framework of the walls is usually assembled on the jig with the outside face down. The interior surface material is also applied in the sub-assembly area.

Wall panels are usually transported from the subassembly area to the main assembly line by small overhead hoists running on ceiling tracks. The vertical lifting of the hoists is accomplished by electric motor; the horizontal translation is done by hand. The walls are then nailed to the floor structure. Since the walls are fairly stiff in a vertical direction at this stage, and the floor remains flexible to some degree, it is necessary to draw the floor up to the plate of the wall before the nailing process can be completed. This is sometimes done with air-operated clamps in the larger fabricating plants.

The aluminum cladding material for the exterior (normally prefinished and precut) is fastened to the wall after the wall has been fastened to the floor.

There are two basic approaches to the use of the assembly line. In the first, the mobile homes follow through in-line with the major weight of the unit being carried on the standard running gear while the fore section is carried on a special dolly fastened to the hitch. The wheels of the front dolly normally run on a railroad track. This type of operation calls for a relatively long building, although this problem can be eliminated to some degree by the technique of using a return in-line assembly. In other words, at one end of the assembly building the trailer is turned 180 degrees and comes back along a second leg of the assembly line.

The subassembly shops are usually located along both sides of the main assembly line, and it is in these subassembly shops that the wall sections, front sections, partitions, roof, etc. are framed. In some instances these jigs for subassembly will be lined up at a 45-degree angle with the main assembly line in order to reduce the amount of turning that must take place when the subassembly is to be moved from its jig table to the trailer bed. Even with the 45-degree layout, this type of operation causes some difficulty.
"IN LINE" ASSEMBLY PLANT

Figure 4

"SIDE MOVEMENT" ASSEMBLY PLANT

Figure 5
The second type of assembly technique, sometimes designated "side-saddle", involves moving the mobile home units down an assembly line with the length of the unit perpendicular to the movement of the assembly line. In this case, two special dollies must be used to carry the unit since the transport wheels cannot be used. This type of assembly line allows many more units to be put on a given line, and it also has the advantage of having the long sides of the unit parallel to the jig tables of the subassembly areas which are located on one side of the line. Thus, transfer of a wall from a subassembly area to the main assembly line is much simplified. One manufacturer that has a large number of subsidiaries now uses this type of assembly line to the exclusion of all others. In fact, the company now has a standard design that it is using in building all of its newer assembly operations.

Other types of manufacturing units may have a balcony floor space above the subassembly and storage areas. The balcony is used for additional storage area and/or subassembly space.

Size of Production Facilities. Extensive information on the size of production facilities is not available, but three examples will give some indication of the range.

<table>
<thead>
<tr>
<th>Size of Plant</th>
<th>Production Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>200,000 sq. ft.</td>
<td>25 per day</td>
</tr>
<tr>
<td>50,000 sq. ft.</td>
<td>5 per day</td>
</tr>
<tr>
<td>24,000 sq. ft.</td>
<td>1-2 per day</td>
</tr>
</tbody>
</table>

Capital Investment in Production Facilities. Very often a mobile home manufacturing company is able to make an arrangement with the locality where it expects to establish a new plant to have the plant built by outside investors. The manufacturer then leases the plant from the group of investors and equips it according to his needs. It is estimated that $100,000 to $125,000 is necessary to complete the equipment of a mobile home manufacturing plant of the type that can produce from one to six units per day. This would provide all the necessary jigs, conveyors, swing cut-off saws, stapling machines, air compressors, paint equipment, etc., that is normally used in such an operation. This cost is in addition to the basic structure.

Labor

Of the wholesale price, 10% to 13% represents factory labor costs. In some plants the labor force is organized; in others, it is not. Labor is hired as factory labor; building trades are not employed as such. The larger the plant, the more specialized the labor may become. Every plant, nevertheless, requires a number of "swing" men - men who can fill in wherever they may be required, such as in operations where personnel are absent, or where production has been slowed due to some difficulty. In smaller plants, labor must be more versatile, as persons will be required to move from operation to operation.

Labor Costs. Hourly labor costs are not readily available, although there is some evidence that the rates lie somewhere in the $2.00 to $2.50 range.
In some plants, labor payments are on a piecework basis. This obviously gives management a better control on prices; it also allows labor some flexibility in working hours.

With respect to estimating labor costs as related to production, one source suggests labor costs per square foot of floor, walls, roof and etc. will average about $.07.

Number of Employees. The number of production employees obviously varies with the size of the operation and the production rate. The following table is an estimated employee schedule believed to be fairly representative of normal practice.

<table>
<thead>
<tr>
<th>Units Produced</th>
<th>Number of Production Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 6 per day</td>
<td>125</td>
</tr>
<tr>
<td>3 &quot; &quot;</td>
<td>60 - 70</td>
</tr>
<tr>
<td>1 &quot; &quot;</td>
<td>30 - 40</td>
</tr>
<tr>
<td>2 per week</td>
<td>15</td>
</tr>
</tbody>
</table>

Producers Financial Statement

It is difficult to obtain full information concerning costs and profits accruing to a manufacturer, but at least two sources indicate that, of the manufacturer's sales price, 70% to 75% is represented by material costs and 10% to 13% by labor costs.

A typical breakdown of a large manufacturer's statement may be approximately as follows:

- 74.0% Material
- 13.0% Labor
- 4.0% Production Overhead
- 3.5% Sales Expense
- 2.5% Administrative Expense
- 97.0%

3.0% Net Profit
CHAPTER VI. DISTRIBUTION

The Market

Mobile homes sales exceeded 191,000 units in 1965 and the association is predicting that 400,000 sales per year will be reached by 1970. The increase since 1964 has not been spectacular (1%) and the performance of different manufacturers has varied widely.

An examination of the data regarding mobile home ownership indicates that sales are greatest among the younger married couples and the retired, among those with incomes under $5,000, and among the skilled and semi-skilled working class. The accelerated expansion of the population in younger and older groups is one of the reasons given for the prediction of expanding sales.

Industry representatives consider that sales expansion is definitely tied to expanding the development of mobile home sites. The MHMA publishes data which states that in 1964, 22,000 mobile home parks with 1,000,000 spaces were in existence.

Manufacturer's Sales Practice

Most producers maintain a sales manager and one or two salesmen. Sales are primarily made by telephone - in fact, this method is so successful that some firms have lost touch to some degree with dealer practices and problems. Newer, less established firms of necessity concentrate more effort on salesmen in the field.

Producers build mobile homes to order only - all units are sold before being built. A manufacturer generally expects his dealer to keep at least two display units on his lot; the dealer must finance these. The manufacturer sells for cash; when the unit is delivered to the dealer, the transport agency expects to pick up a check for the cost of the unit. The dealer usually obtains his financing on the basis of short term credit.

Retail Sales

The Mobile Home Manufacturers Association estimates that there are approximately 7,000 mobile home retailers in the United States. Sales* are heaviest in Florida and California, followed by groups of southern states including Texas, Louisiana, Tennessee, North Carolina and Virginia. The East North Central States is also a strong market, with Illinois and Michigan leading the way.

Retailers generally maintain a lot where a number of units are kept on display. The usual retailer handles more than one line of homes. His mark-up over the manu-

*Based on December sales. The position of the North Central States would likely be stronger during the summer sales period.
Manufacturers' prices is from 20% to 25%.

Current retail sales prices average about $5,600 (for a 10' or 12' x 55') making the retail cost per square foot approximately $8.50 to $10.

Financing for the purchaser is generally handled through local facilities, and loan practices resemble auto loans to a considerable degree. Down payments are in the neighborhood of 20% to 30% and payments may take as long as 10 years though the average purchase contract is completed in 45 months.

Transportation Agencies and Methods

The completed mobile home unit is usually picked up at the manufacturer's yard by a tractor truck and transported over highways and streets to the ultimate destination - either a dealer's sales yard, or a point designated by the purchaser. Transport is handled by one of three agents:

- The mobile home manufacturer
- The mobile home dealer
- A transport firm

A limited number of mobile home dealers have equipment to haul their own sales. Once they have sold a model which they do not have in stock, they place their order, travel to the manufacturing plant, pick up the mobile home, and transfer it to its final site. No intermediate stop at the dealer's yard is required. Dealers also may pick up and transport their own display models.

The manufacturer and the transport company, however, are better able to cope with the problem of obtaining the necessary permits, selecting routes, etc., and therefore move the greater proportion of mobile home units. The armed forces permit reimbursement for mobile home transport at the rate of $.51 per mile. Depending upon distance traveled, the charges of the transport companies are in that general range and are regulated in interstate commerce.

Transportation Regulations

Regulations and regulatory bodies vary widely throughout the country, and they are in a constant state of change and revision. As mentioned above, this is one reason many mobile home dealers prefer to employ the services of a transport firm that specializes in the moving of mobile homes.

It takes a considerable amount of effort to keep up-to-date on the status of these regulations. There also exists the problem of overlapping jurisdictions of the different regulatory bodies. The prime concern, of course, is travel over state highways, but travel over county and township roads as well as city streets may be important at times. Toll roads also normally have their own rules regarding oversized loads.

A brief summary of the current situation (March, 1966) in the areas where mobile
home transit is most important is as follows: Ten-foot-wide units may be moved in all
areas. The movement of twelve-wides is still severely restricted in Minnesota, Illinois,
and Iowa, but progress is reported in negotiations with the latter two states. To over­
come the problems of passing through these states, units are sometimes shipped on rail­
road cars from the factory to a point from which over-road transit may proceed.

The Mobile Home Manufacturers Association is concerned with reducing the obstacles
of transport as well as keeping current information on all regulations and rulings. The
Association has one staff individual whose primary task is to keep up-to-date on this
subject. The legislative and transportation committee is active in pursuing necessary
legal modifications in transportation as well as other fields.

Mobile Home Parks

The success of the anticipated expansion of mobile home sales will depend to a considerable
degree on the availability of an adequate number of good parking sites. Parking sites are
being continually upgraded; it is now recommended that the minimum space be 3000 square
feet. Paved streets, paved parking pads, off-street automobile parking, covered terraces,
and recreational facilities are amenities provided in newer parks.

The MHMA has a staff of several members that aid members in the planning of new
parks. The experience of this division indicate parks are growing in size - the 1965 park
had an average of 225 to 250 spaces.

Costs of a new park, exclusive of land, are in the neighborhood of $2,000 per space. The FHA will insure loans for mobile home parks on the basis of $1,800 per space ($2,250 for
high cost areas).

Financing the park is a problem, but modifications of savings and loan regulations
has opened up a new source for funds.

A study of a number of years ago indicated that return on invested capital in mobile
home parks varied from -15% to +55%, with the median being 7%. As to return on equity,
the median was 16.5%.
CHAPTER VII. EVALUATION

Production of Mobile Homes

No lumber dealer should expect to profit greatly from an attempt to manufacture mobile homes as a sideline to his lumber selling operations. In fact, any such effort would appear to be hazardous. There is no reason why he cannot actually build mobile homes; however, it is doubtful he can compete profitably with established firms.

The production and marketing of mobile homes is so different from the production and marketing of fixed residences that, in reality, only the fact that people live in both types of structures brings them into common consideration. For a lumber dealer to be successful in the production and sale of mobile homes, it appears that it would be necessary to set up a subsidiary organization that could devote itself fully to the problems of the mobile home industry. The entrepreneur in this field would have to be accustomed to a different type of material market, labor, and marketing system.

At first examination, it might appear that it would be a relatively simple matter for a lumber dealer to employ a few skilled craftsmen, and to use these, along with materials in stock and surplus labor, to build mobile homes in some unused portion of the yard. These units could then be sold locally, with the lumber dealer profiting from both the manufacturing and the retail sale margins. Actually, there are flaws in all of these apparently favorable facts.

Standards of construction used in mobile home manufacture are entirely different than those required of fixed location housing thus some difficulty in changing from present building practices must be expected.

A considerable amount of space (for both the assembly of the unit and the storage of the necessary materials equipment, etc.) is required to produce one mobile home per week, which appears to be the minimum practical production. Since it is unlikely that the necessary space would be available, additional facilities would be required.

Very few of the materials are currently stocked by the lumber dealer in the form used in mobile home manufacturing. In addition, the lumber dealer would have to supply plumbing, heating, and electrical equipment, as well as furniture.

Labor in the mobile home plant is not employed according to crafts and trades; sometimes labor is paid for on a piece-work basis. It is likely, therefore, that a distinct differentiation between manufacturing and yard crews might have to be maintained to avoid conflict with lumber yard relationships with conventional building contractors and trade organizations. If the other route were to be chosen, that is the use of regular building trades in the manufacturing of the mobile home, labor costs would undoubtedly be out of line with those of the regular manufacturer of mobile homes.
It is also not likely that off-peak lumber business periods could be used to produce mobile homes as these periods coincide with the low demand period for mobile homes. Of course, mobile homes produced in these periods could be stockpiled for later sale, but this is a practice that would tie up capital in a questionable manner.

Finally, the lumber dealer would be obliged to build a completely new and different type of sales and distribution organization to handle mobile home sales – either as a producer or retailer.

Mobile Home Dealer

Should a lumber dealer become a mobile home dealer?

There are a number of factors favoring this idea. The lumber dealer is dealing in the housing market; mobile homes would enable him to reach a market that he cannot presently serve. He is well known in the community; he should have credit resources; he should be able to service the units satisfactorily. The retail mark-up (reputedly 20% - 25%) is favorable.

On the negative side are the space and costs involved in maintaining an adequate sales lot and the handling of sales. Also, it is possible that some persons might tend to associate the lumber dealer's standard home construction details with mobile home practices to the detriment of the former. Problems of relationship to the building industry might also arise.

Low-Cost Housing

A possible approach to the reexamination of the low-cost housing market might lie in the development of a housing type which would be fixed, yet lower in cost than the usual fixed house offered for sale.

Such a program might involve:

1. Provision of a low-cost developed area outside of normal city restrictions.
2. Design of and manufacture of a minimum utility core which can be easily moved from yard to site.
3. Development of a number of standard house designs suitable for the market with such houses to be built using the utility core.
4. Production of components suitable for the completion of the house package.

Such a program might also be very useful in the development of a variable vacation home package.

-20-