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THIN, FACE-NAILED HARDWOOD STRIP FLOORING

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Introduction

A Nation-wide survey of building practices for low-cost housing was undertaken by Forest Products Laboratory personnel in the fall of 1950. This survey revealed that a thin, face-nailed, hardwood strip flooring is widely used and generally accepted in homes of all price classes in the San Francisco, Calif., area. The same type of floor was used to a more limited extent in the Indianapolis, Ind., area. Thin-strip flooring has also been used to some extent as a covering for old floors. This type of flooring is important from a wood-utilization standpoint and possesses certain other advantages which may be of general interest in the housing field. This report presents a detailed description of the San Francisco area floors and also describes an experimental floor of similar type which was laid in one of the offices at the Laboratory.

San Francisco Area Floors

The general prevalence of the face-nailed, thin, strip floor in the San Francisco area is indicated by the following. In the first home under construction visited by Laboratory personnel, a workman who was applying this type of flooring was asked why he was laying a special type of floor. He replied, "What other type is there?" An extensive survey in the entire area indicated that this was the only type of wood-strip flooring used, and the workman was no doubt unfamiliar with other types.

The flooring strips used were 5/16-inch-thick, 2-inch-wide, square-edged red or white oak strips of varying length. It was reported that the strips had a moisture content of about 10 percent at time of laying. The strips had planed top and bottom faces, but the edges were left as

¹Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

they came from the saw. The somewhat rough edges prevented the workman from laying the strips too closely, and this tended to eliminate buckling with increasing moisture content.

The strip floors were usually laid over rough-board flooring with a layer of building paper being placed between the rough and finished floors. A few instances were noted where the strips were laid over a plywood subfloor.

The strip flooring was carefully cut and fitted for each room when laid. Figure 1 shows a room with some of the strips nailed in place and with other strips loosely laid in place and ready for cutting and fitting. The ends of the strips are simply butt-jointed. It is quite common practice to lay about six strips of flooring parallel with the wall around the room to form a border and the rest of the flooring lengthwise of the room.

After the flooring is fitted and in place, each strip is face-nailed with 1-inch brads on each edge 6-1/2 inches apart along the length of the strip. For this operation a device called a nailing machine was used. The word "machine" may convey the wrong impression, since its function is somewhat limited. As shown in figure 2, the unit consists of a frame supported by three castors, with a hopper to hold the brads and a plunger that drives the brads into the floor. The brads feed one at a time from the hopper to the plunger. In using the machine, the operator rolls it to the spot to be nailed and then strikes the plunger one blow with a hammer, driving and setting the brad in one operation. The plunger sets the nail about 1/16 inch below the surface. The operator sits on a stool supported by castors to facilitate operation of the machine and to reduce operator fatigue. With this machine and an experienced operator, the nailing of a floor was accomplished rapidly.

After the floor had been completely nailed in place, the nail holes were filled with a commercial grade putty and the floor given a light sanding. The floor was then finished in the usual manner with sealer, wax, or varnish. The filled nail holes were not apparent in the finished floor except on rather close inspection.

Compared to conventional strip flooring, the thin-strip type of flooring appears to have the following advantages:

- (a) Less actual volume of lumber required per unit area.
- (b) Closer utilization of wood possible due to the thinner material required.
- (c) Easier to manufacture.
- (d) Shorter kiln-drying time.
- (e) The simple square-edged side and end-matching permits laying the floor in many pleasing patterns.

- (f) Thin strips would quickly reach moisture equilibrium with conditions prevailing at the building site.
- (g) The square-edged strips permit easy removal and replacement of defective or damaged strips in the finished floor.

Some of the possible disadvantages of this type of flooring are:

- (a) The thin strips limit the number of times the floor may be sanded and refinished.
- (b) Cost of laying may run higher in areas where craftsmen are not familiar with accepted methods.
- (c) Some buyer resistance to this type of floor may be encountered in areas where this construction is not common.
- (d) Special manufacture of the strips for small jobs would probably not be economical.

Laboratory Office Experimental Floor

An experimental floor of the type described was laid in one of the offices at the Forest Products Laboratory in March of 1951. White oak strips, kiln-dried to a moisture content of 9 percent were used. The strips were nailed to a subfloor of 3/4-inch-thick Douglas-fir plywood sheets bolted to the underlying concrete floor. Figure 3 shows the floor during construction. A nailing machine was not available, and the brads were therefore driven flush with the surface with a hammer and then set about 1/16 inch deeper with a nail set.

Figures 4 and 5 show two views of the floor immediately after completion. The nail holes were filled with a white-lead putty and appear quite prominent in the picture. The commercial firms use a darker putty which blends more closely with the wood. The floor was finished with two coats of sealer. The contrast between the appearance of the puttied nail holes and the finished floor appears more prominent in the photographs than was actually the case. The putty used appeared to darken with age, and at the present time the nail holes can be found only by rather close inspection. We have found that visitors who stop to inspect the floor do not notice that it has been face-nailed until this is pointed out to them.

In service, the floor has been subjected to relative humidities for short periods of time as low as about 15 percent during the winter months and as high as about 80 percent in the summer. It is probable

that the floor may have reached equilibrium at moisture conditions varying from about 30 to 65 percent. Periodic inspection has revealed no damage due to shrinking and swelling.

Figure 6 shows the same section of the floor shown in figure 4 after about a year's use in an office. It will be noted that the floor appears to be in good condition. The nail holes again appear more prominent in the photograph than is actually the case.



Figure 1. --Strip floor under construction in San Francisco area. Flooring is usually fitted in place over the entire area before it is nailed. Note border at the wall.

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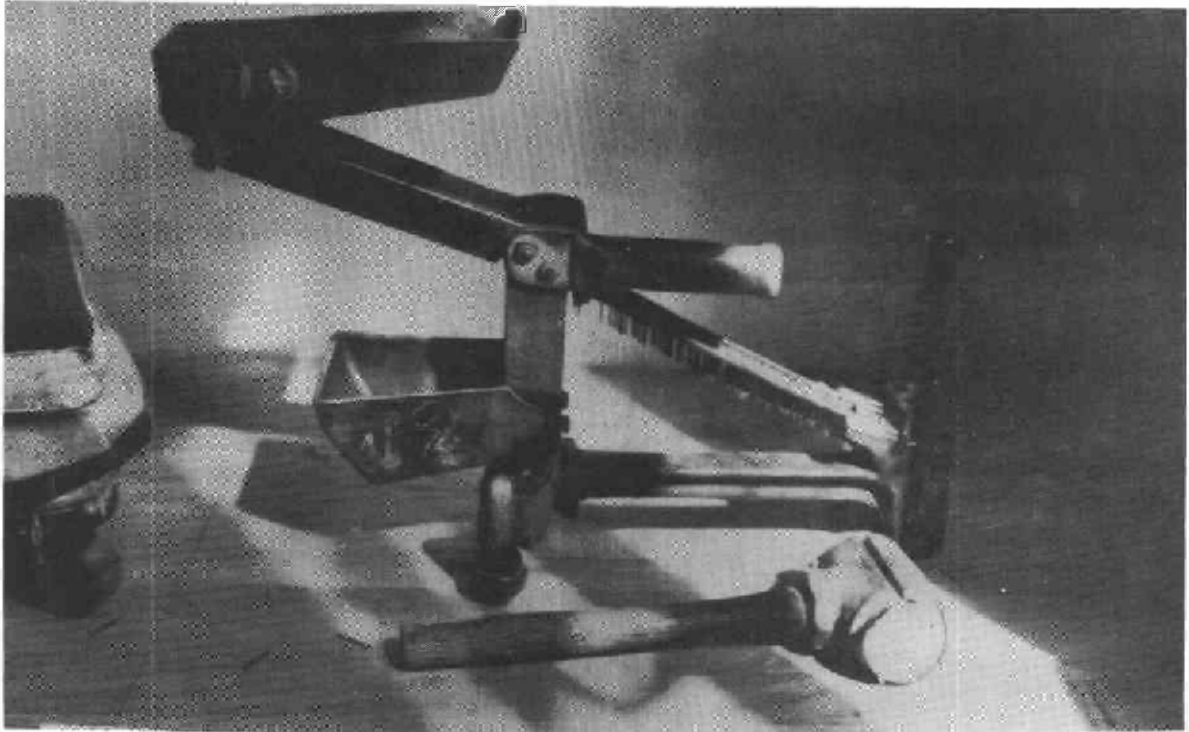


Figure 2. --Nailing machine used for face-nailing flooring in San Francisco area.
Nails are driven and set with one blow of the hammer on the plunger. Operator's stool shown at left.

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Figure 3. --Forest Products Laboratory office face-nailed, thin-strip white oak flooring during laying (March 5, 1951).

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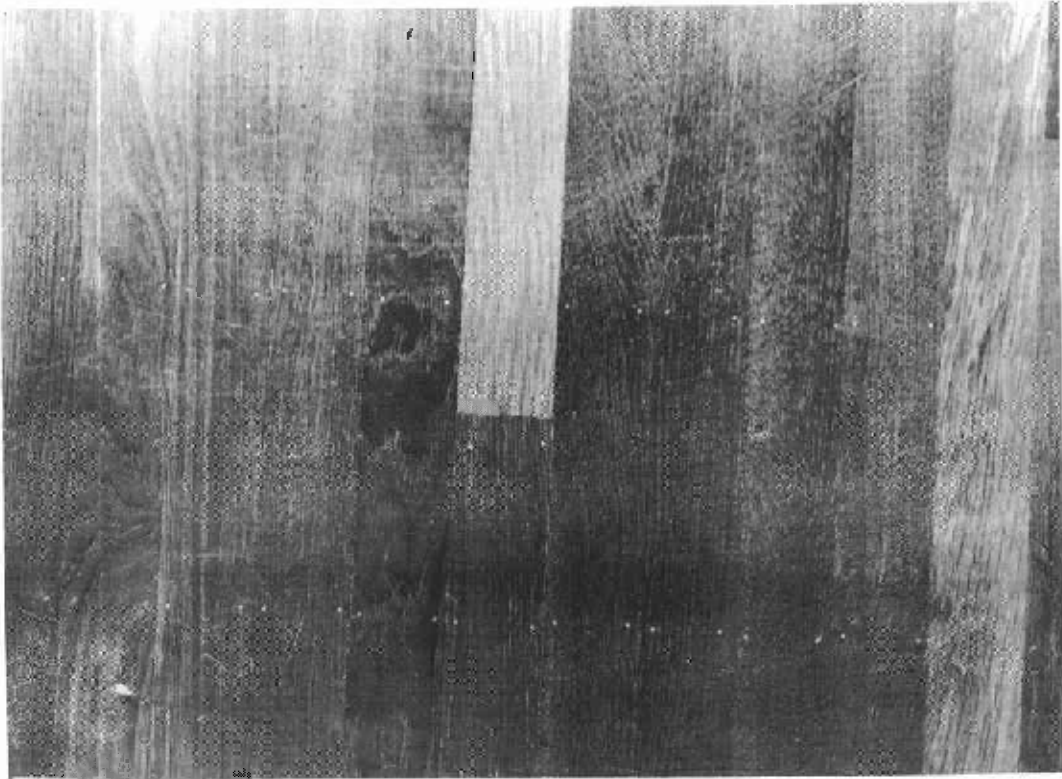


Figure 4. --Completed Forest Products Laboratory office floor immediately after laying. Floor has been sealed with two coats of sealer. Note nailing of butt joints.

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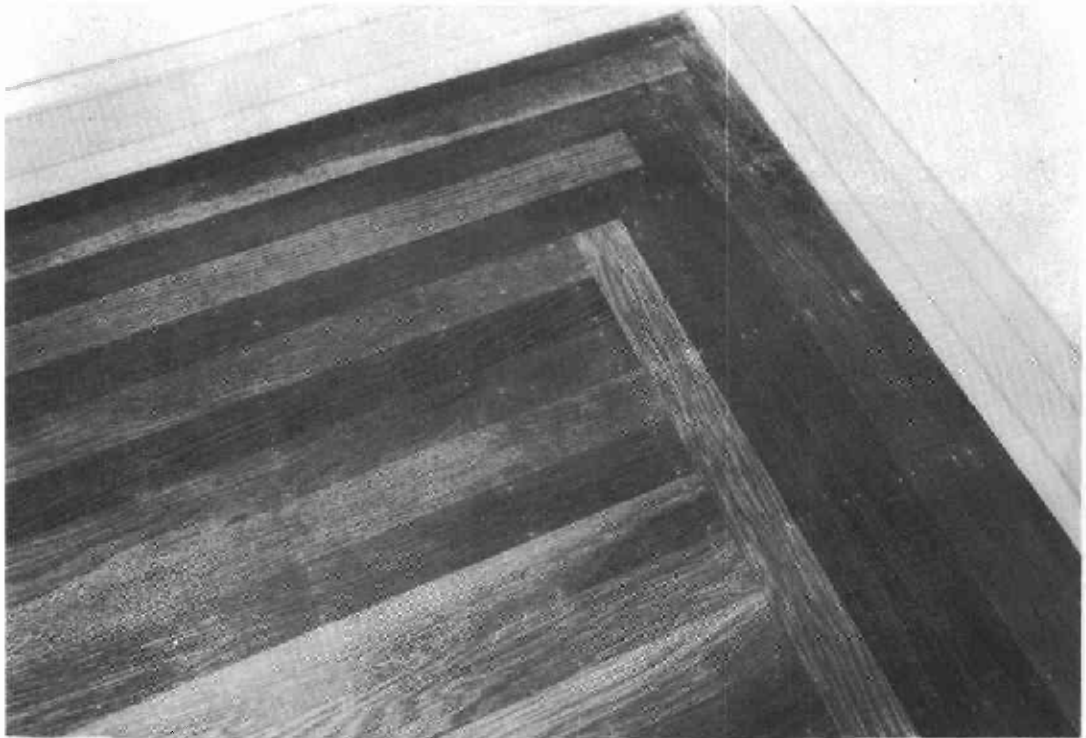


Figure 5. --Completed Forest Products Laboratory office floor showing border and corner detail.

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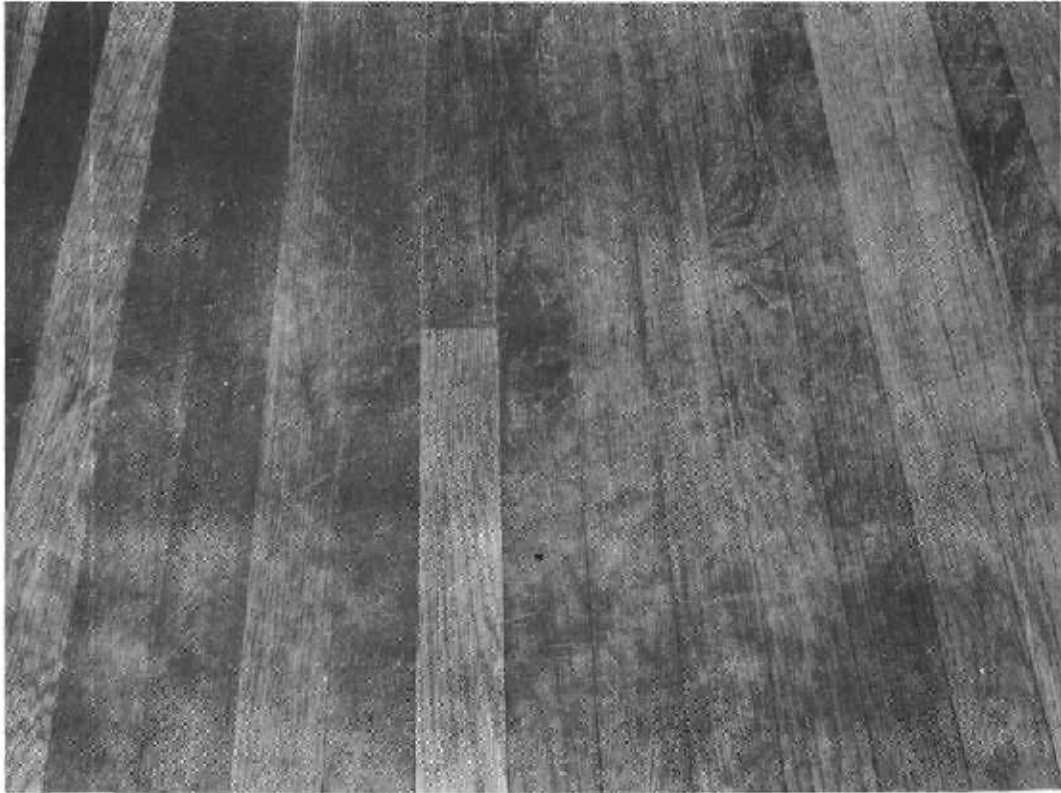


Figure 6. --View showing the same section of the floor as shown in figure 4 after about 1 year service as an office.

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