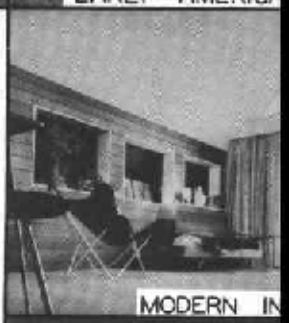

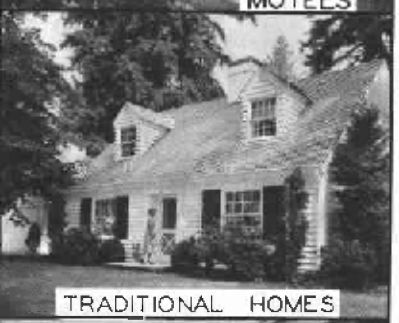

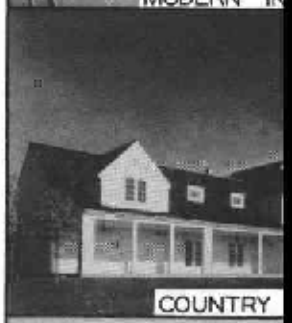

1929

*WOOD SIDING

FOR

BUILDINGS

* REPORT NUMBER 1929
BY F. A. STRENGE, EDITOR
FOREST PRODUCTS LABORATORY
FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE
MADISON 5, WISC.

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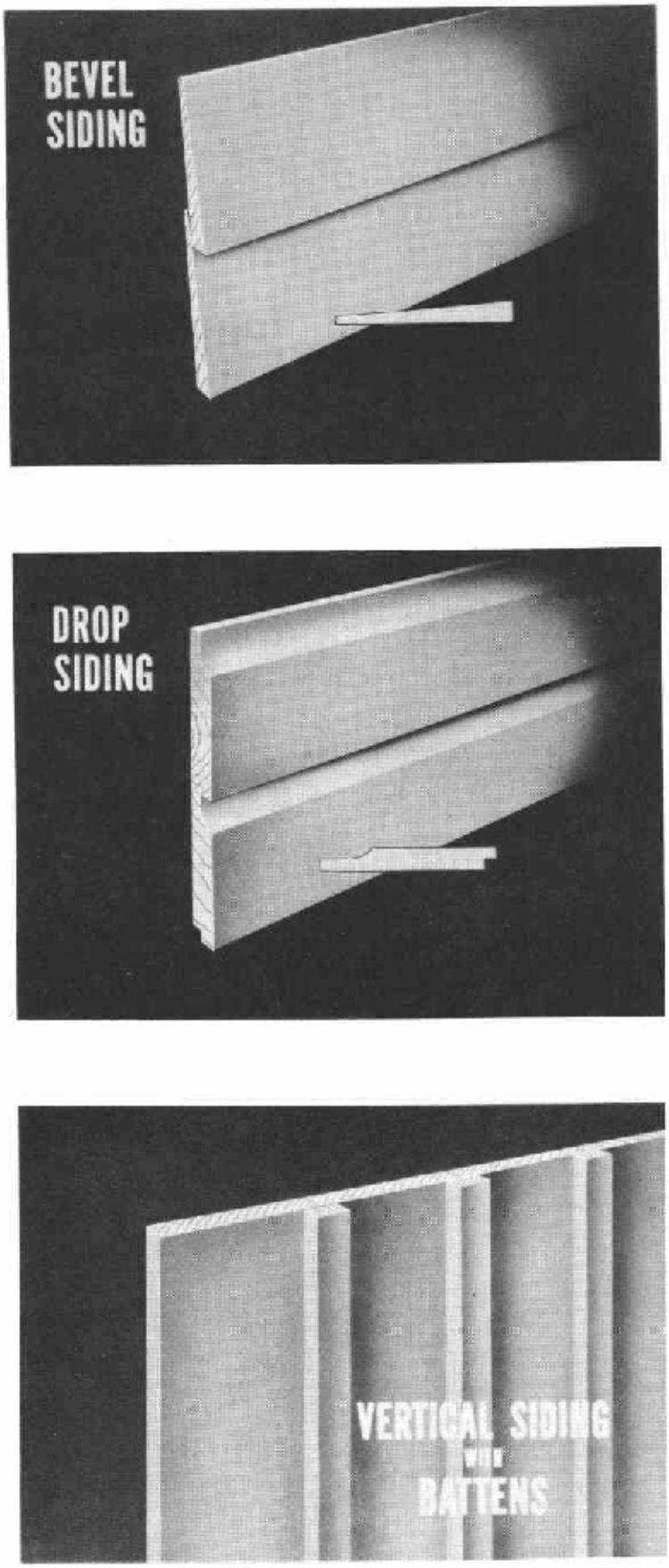

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Figure 1. Three principal types of wood siding.

WOOD SIDING FOR BUILDINGS

By
F. A. STRENGE, Editor

Forest Products Laboratory,[1] Forest Service
U. S. Department of Agriculture

Wood siding has long been a favorite material of Americans for finishing the exteriors of their homes. And for good reasons. It is economical to buy and put in place. It fends off the attacks of both hot and cold climates through the years with little or no perceptible wear. It comes in a variety of patterns and sizes to fit either traditional or modern styles of architecture. It has natural beauty and richness of color, or it can be painted any color that pleases the individual home owner.

For the same reasons -- notably its economy and serviceability -- wood siding also is much used for other types of frame buildings, from garages to large barns, warehouses, and stores. There is, in fact, a type and grade of siding for virtually every purpose and need, whether the first consideration is appearance, service, or cost.

Siding, of course, serves two purposes. It must withstand heat and cold, rain, snow, and parching dryness -- all the changes of the weather and the seasons -- in order to protect the building and its contents. And it must preserve a tidy, attractive appearance for many years of such exposure to the elements. Over the centuries, wood has proved that it can give that kind of service -- with extra dividends -- if certain common-sense fundamentals are observed in its use.

Natural Properties of Wood

In order to do its job well, a material must have certain natural advantages for the kind of service expected. Wood is almost unique in the combination of natural properties it possesses that fit it for long-time service as house siding. Practically all of the commercial softwoods marketed as lumber -- and several widely grown hardwoods as well -- have this useful combination of qualities to a greater or lesser degree.

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

(To be Rept. No. 1929)

One of the best-known of these natural properties is wood's workability -- that is, the ease with which it can be sawed, planed, shaped and otherwise worked to wanted patterns and sizes quickly and accurately. Thus, it can be mass produced in modern mills on high-speed machinery; and by the same token it can easily be cut and fitted into place piece by piece with hand tools on custom basis.

Another natural advantage of wood is its great stability with wide fluctuations in temperature and weather. Temperature changes that affect metals appreciably have no perceptible effect on the size of wood. Likewise wood siding, if properly installed, can withstand any range of moisture change from long-continued high humidity to prolonged summer drought without shrinking or swelling enough to destroy its serviceability. Unpainted wood wears away something like a quarter inch to the century. Kept painted, wood will last indefinitely as far as weathering is concerned.

Its ability to hold paint well is another natural characteristic of wood that fits it for use as siding. Ordinary house paint can be applied at ordinary temperatures with a brush to give an attractive finish that will retain its beauty for years. It can be repainted at proper intervals for the sake of change and to maintain appearance. The householder physically able to mount a ladder and wield a brush can do the job himself. Sometimes paint sprayers can do the work faster, as on barns and other structures with wall expanses unbroken by windows, doors, and trim.

A fourth property of wood essential to good service as siding is its ability to hold fastenings. If one or two precautions are observed, it can be nailed in place permanently; the main consideration here is to use nails that are as proof against the weather as the wood is. That is, steel nails should be coated with a nonrusting metal, or aluminum or other noncorroding nails should be used. Rusting can mar the best paint job -- and in time ruin the nails.

Wood siding also contributes valuable insulation to a structure. For example, it is about 12 times more efficient per inch of thickness in preventing loss of heat than is stone or ordinary concrete. A frame wall built of lath and plaster, nominal 1-inch wood sheathing, building paper, and bevel siding permits nearly 25 per cent less heat loss as does an 8-inch furred brick wall with lath and plaster. In the same fashion, wood siding helps keep interiors of homes cooler in summer and does not absorb and retain heat as do some other wall surfacing materials.

Strength ordinarily is not a major consideration for siding, because most frame buildings are so designed that the framing carries the loads. Coverage materials like siding, therefore, are applied chiefly to seal out the wind, rain, and other elements. Unquestionably, though, wood siding contributes to the rigidity and stability of the house. And it will withstand rather severe bumps and shocks without shattering.

As a rule, siding is made from the better grades of lumber and is well-seasoned for the conditions of service to which it is exposed. Seasoning is, of course, highly important and should be reguired regardless of the species or grade bought. A range of 9 to 14 per cent moisture content and average of 12 per cent is satisfactory in most parts of the United States. Properly seasoned, wood siding will give lifetime service without noticeable checking, splitting, warping, or shrinking and swelling. Moreover, the decay hazard is practically nonexistent if good construction practice is followed.

Kinds and Qualities of Siding

The three principal kinds of lumber siding are bevel, drop, and vertical siding. To these can be added shingle, or shake, siding; and plain or striated plywood. The great bulk of the siding used is of the three lumber types (fig. 1).

Bevel siding and its wider, thicker variant, bungalow siding, are made by resawing boards in half along a diagonal. Bevel siding is usually three-sixteenths inch thick on the narrow edge, seven-sixteenths inch on the butt edge, and 5-1/2 or 7-1/2 inches wide. With a 1-or 1-/2-inch overlap, these widths give a 4-1/2-or 6-inch face exposed to the weather. At least 1-1/4 inches of overlap is recommended for bevel siding 7-1/2inches wide and wider. The bungalow type of bevel siding is up to three-quarters inch thick on the butt edge and up to 12 inches wide. A novelty siding sometimes used is cut from 3/4-inch stock with a portion of the back beveled.

In estimating bevel siding requirements, it is necessary to increase the amount of siding for the wall area to be covered by the percentage of the total board width taken by the overlap. This amounts to about 30 per cent with 6-inch siding, or about 15 percent with 12-inch siding. The greater overlap is necessary for the wider sizes to compensate for greater shrinkage in width, although shrinkage is very small in any well-seasoned species.

Drop siding and its variant, rustic siding, come in a variety of patterns, the most common of which is shown in figure 1. This is the so-called shiplap joint. Drop siding is sometimes manufactured with a tongued-and-grooved (center-matched) joint. It may have either the cove-type molding shown in figure 1 along its upper edge or, in some types of rustic siding, beveled edges on the weather face. Drop siding is generally standardized at either twenty-five thirty-seconds or three-fourths inch in thickness (depending on species) and is nominally 4, 6, or 8 inches wide.

Vertical siding usually consists of square-edged boards and narrow strips called battens to cover the edge joints. Center-matched tongued-and-grooved boards are often used without battens, notably on gable ends, as vertical siding.

Shingles and shakes are used for siding in much the same way as for roofing. Shakes are machine-cut shingles with a scored face. Plywood is used in several ways, depending on the architectural treatment wanted. Full sheets of 4- by 8-foot or larger size are sometimes used. Or narrow sheets can be applied in lapped fashion much as bevel siding. Plywood shingle-type siding is also available, with the weather face grooved by shallow striations for a weathered effect and to conceal the fine surface checks that shrinking and swelling induce in some species.

Grades of Siding

Siding is graded primarily on the basis of its appearance value. That is, material clear of such things as knots, pitch streaks and pockets, shake and checks, and stain is top-grade siding. In the best grades, manufacturing defects such as raised and torn grain are also ruled out.

Bevel siding is manufactured almost exclusively in the Select grades. In many species, drop siding comes in both Select and Common grades. The same is true, of course, for vertical siding boards. Battens for vertical siding are usually taken from the Standard Moldings grade of finish lumber, although in some species a Battens grade is manufactured and in others square-edge strips of inch-lumber grades are used for the purpose.

Grade designations vary somewhat for different species, especially with respect to bevel siding (table 1). The top grade of bevel siding for most species is designated B and Better, which is a combination of grades A and B. In general, grade A permits no knots and the face side, at least, must be free of all physical and manufacturing defects. Grade B permits occasional very small knots and slight manufacturing defects that will not affect the finished appearance. The grade of B and Better is commonly sold and consists of Grades A and B in combination . Most species yield material classified in grades C and D, and some a grade E. The number of defects allowable, of course, increases progressively in the lower grades, and more waste is consequently involved in their use.

Exceptions to this general run of bevel siding grades in one way or another are redwood, western redcedar, southern yellow pine, cypress, Sitka spruce, and eastern hemlock. Their grade names are listed in table 1. In some species the top grades are cut to yield vertical-grained(V. G.) material in order to assure best service.

Drop siding is available in both Select and Common grades in many species. In most species four grades are usually manufactured (table 2). The top grade is usually knot-free, but in some species has a few scattered small, tight knots. The lower grades, of course, have progressively more knots and other defects which may necessitate some cutting and waste unless appearance is not primarily desired, as in barns and other utility buildings.

Square-edge or tongued-and-grooved boards intended for use as vertical siding are sold under the regular yard-lumber rules for boards. Common grades that admit loose knots and other defects that can cause serious maintenance troubles are not regarded as suitable for siding even when knots are admissible. B and Better or C Select boards, or equivalent grades by other names, are usually sold where top-quality material is wanted for appearance reasons. D Select and No. 1 Common boards provide low-cost utility siding.

Boards worked to shiplap pattern are occasionally used for siding on low-cost or temporary buildings. In general, however, shiplap-pattern boards of common grades are used for sheathing, subflooring, and the like.

Wood shingles are manufactured in four grades. Generally the first or second grade is used for house siding. For walls of barns, garages, and the like, a lower grade may be suitable.

Quality of plywood siding is based on two factors -- the type of glue used and the grade of veneers, particularly face veneers. For siding, plywood of Exterior type should be used, because it is made with waterproof glues. Face veneers are usually grade A or B.

Selecting the Right Siding

The siding best suited for a particular building is governed by (1) construction costs, (2) appearance, and (3) maintenance costs. The order of importance of these considerations will, of course, vary with the kind of building being erected, its use, and its expected service life.

Decision as to the type of siding -- bevel, drop, or other -- to be used is generally made on the basis of the kind of building to be erected. Bevel siding over sheathing is the predominant type used on houses except in the deep South, where mild winters make unsheathed drop-siding construction feasible, and often desirable and preferable. Bevel siding is preferred for sheathed houses because of its pleasing appearance. Bevel siding does not contribute as much strength and rigidity to unsheathed walls as does drop siding because of its thickness and the method of application, hence is rarely used this way.

Drop siding is economical and widely used for other types of unsheathed buildings as well as houses. Because of its uniform thickness, the boards lie flat against the studs and can be securely nailed. A fairly rigid wall is thus possible with proper bracing.

Vertical siding, much less commonly used than either bevel or drop siding, is applied to both sheathed and unsheathed houses. On sheathed houses, it is frequently applied over nailing strips that set it out from the sheathing, thereby creating an air space. On unsheathed houses, only building paper is between it and the studs. As nailing basis, short lengths of stud lumber called girts are placed horizontally between studs, about 4 feet apart.

Shingle siding is generally applied to sheathed houses. Plywood siding, on the other hand, is often used without sheathing.

Selection of Grade and Species

If cost is a poor second to appearance, it is a relatively simple matter to choose a species and grade of siding. A select grade of a species that is top-rated in all respects for siding purposes (table 3) is an almost automatic choice. On the other hand, in areas where these species are not commonly available other species are satisfactory even for high-quality residences.

As the item of cost increases in importance, it becomes more and more worthwhile to compare available species and grades. For moderately priced houses, as well as for utility buildings like barns and garages, many species can serve adequately. A good general rule is to take a select grade of a lower-priced species in preference to a low grade of a more expensive species. To put it another way, grade is more important than species where appearance is important.

Like most rules, of course, this one has its exceptions. Some woods are suitable only for rough structures. These generally are limited to hardwoods with pores larger than those in birch; for example, ash, chestnut, elm, hickory, oak, and walnut. These hardwoods need more careful attention when good painting is desired, are hard to nail and cut, and the pores must be plugged with filler at added expense. They are used most frequently in sawmill localities as siding for low-cost barns, sheds, and other outbuildings and temporary structures.

Woods used for siding are rated in table 3 on one important characteristic, their ability to hold paint. All of the woods listed can be kept durably painted, but they vary in the ease with which that can be done. With successive repaintings, moreover, species differences tend gradually to become less marked and may disappear entirely if shortcomings of the paints used or of the program of maintenance begin to dominate the outcome.

Woods of group 1 are least exacting in their painting requirements and give good results with the greatest variety of paints and painting procedures. Progressively greater care in selection of the kind and quality of paint and in conforming to the best painting practices is needed on passing from group 1 to groups 2, 3, and 4, respectively. The table includes some woods that are not ordinarily cut for siding; for example, the hardwoods in group 4, and most of the hardwoods in group 3. Likewise, western redcedar is by far the most plentiful and available of the cedars listed in group 1.

The softwoods listed in table 3 are suitable for siding in the groupings listed. Those in group 1 may be primed and finish coated, when desired, with kinds of paint that would be too hard and brittle for best service on other woods. Woods of group 2 need a priming paint that will remain tough and flexible; when the finish paint contains zinc oxide the primer should be zincless house paint primer, such as is generally sold for the purpose. Woods of group 3 are more exacting in their requirements than those of group 2, but less exacting than those of group 4.

The softwoods in group 4, which are the densest softwoods, are characterized by much hard summerwood in their annual rings and often by wide rings in rapidly grown wood. Brittle paint tends to flake off wide bands of summerwood much too soon. Thus the strong, abundant softwoods of group 4 need most careful choice of priming paint when they are first painted and selection of a tough finish paint of best quality. Either pure white lead paint or a zincless house-paint primer is reasonably satisfactory for the first priming coat on woods of group 4, but the best results are obtained when aluminum house paint made with a vehicle very long in oil and high in non-volatile content is used to prime the wood the first time. Two coats of white or light-colored finish paint will usually be needed over the aluminum primer in order to hide it satisfactorily.

Large quantities of drop siding are cut from such group 4 woods as Douglas-fir and southern yellow pine, however, and widely used on utility buildings and the more moderately priced houses. Edge- or vertical-grained material is preferred to flat-grained because it minimizes the difference in hardness between the summerwood and springwood of these species. This, of course, is generally true for all softwood species.

Table 3 shows a close correlation between density, as indicated by specific gravity, and the painting characteristics of a species. Within each species, of course, there may be a considerable range in density above and below the average specific gravity values listed, and this is often reflected in variations in ease of painting for a single species. For all but the densest (group 4) species, however, this variation is not significant enough to warrant consideration when buying siding lumber. Even in the select grades, ring count is generally ignored as a factor in grading. On the job, some segregation of wide-ringed pieces may advantageously be practiced by reserving them for use on inconspicuous parts of a building. This practice is also beneficial when mixed vertical-grain and flat-grain siding is used, the flat-grain material being used on the rear of the house or garage.

Although the species of groups 1 and 2 in table 3 are thus grouped because they are easy to paint well, other characteristics of these woods also qualify them for high rating as siding material. They have low shrinkage and swelling. Moreover, heartwood of the group 1 species has high decay resistance, a property that is useful where the decay hazard is high -- generally, only where there is contact with the ground or other construction features permit prolonged wetness or accumulation of moisture. Normally, however, good construction avoids such conditions. Two of the pines in group 2 have been widely and successfully used as siding since pioneer times although their heartwood is considerably less decay-resistant than that of the group 1 species and sapwood is not segregated. This long record of good service demonstrates that decay resistance is normally of little importance if good construction practices are followed.

The softwoods in group 3 are not quite so stable in dimensions as those in group 1. In workability, nailing, and strength, however, they are just as satisfactory.

The group 4 softwoods are the strongest and hardest. When well-seasoned, however, they are not especially difficult to work and nail, nor is their shrinkage or swelling excessive for bevel siding purposes. For drop siding, the greater strength of these species has obvious advantages.

Effect of Siding Defects on Paint

Siding lumber is graded primarily for appearance and according to its freedom from knots and other damaging imperfections -- both their character and size playing a part. Imperfections usually restricted in grading are, besides knots, pitch streaks and pitch pockets, shake, checks, wane, stain, and manufacturing defects like machining skips and torn grain.

Considerable quantities of knotty siding, especially vertical boards, are used for special architectural effects, often with natural finish. Such siding is usually graded on the basis of the quality of the knots. Conventional siding, however, as a rule is selected for its freedom from knots.

The number and prominence of the "natural" defects -- those which occur in the wood during tree growth -- varies to some extent with species. In some woods, for instance, knots may be relatively few but large; in others, pitch and similar extractives may be relatively common and serious with regard to paint maintenance.

Knots are troublesome according to their size and condition. The select grades of siding may include so-called "pin knots," which are smaller than one-half inch in diameter. Such knots are sound and tight, hence can be satisfactorily concealed and retain paint nearly as well as the clear wood. In the lower grades, knots may be larger and less tight and often absorb the oils in paint, thus tending to make paint lose its gloss over them. They can rarely be concealed, because they do not follow the clear wood in swelling and shrinking with changes in moisture content, and on weathering they often crack open, breaking the coating over them.

Paint applied over knots in the pines often becomes discolored by a yellow substance and soon becomes brittle and breaks off. It is common practice to shellac knots in these species, usually after they have been prime coated, to prevent them from taking too much oil from the paint. Shellac is not so durable outdoors as a good paint. Its service life can be lengthened somewhat, however, by adding 5 or 6 ounces of castor oil to a gallon of shellac varnish. A synthetic-resin sealer is recommended by the Western Pine Association instead of shellac for knots in western pines -- principally western white pine, sugar pine, and ponderosa pine.

It is seldom desirable to shellac knots in woods other than pine because such knots do not discolor or embrittle paint -- in fact, they often hold paint longer than does the clear wood.

If low grades are used, pitch pockets should be cut out with a chisel and the cavities should be filled with a good putty after the priming coat of paint has been applied. Small holes or broken knots should be puttied in the same way. Pitch streaks may mar the painted surface by exuding resin and embrittling the coating, hence material containing them should be cut out of the siding if appearance is important. Loose grain likewise is beyond remedy. Wood checks or cracks should be puttied after priming. Occasional light stain can be hidden satisfactorily with a good paint.

It is obvious that, where much cutting and patching work is involved, the added labor cost may easily exceed the cost of a better grade of siding lumber -- especially in a lower-priced species. Only when the coarser types of defects are tolerable, therefore, is a common grade of siding lumber economical. Even in the lower select grades of bevel siding some selection of pieces may be necessary to reserve the best material for the more conspicious areas.

Application, Care of Siding

Selection of a species and grade of siding is not in itself a guarantee of satisfactory service over a long period of years. Siding must be well seasoned, skillfully installed, carefully finished, and given periodic maintenance. Being well seasoned, it should be stored under roof at the building site.

In application, points to be watched are:

(1) that the siding boards overlap adequately, if bevel siding is used, or are carefully joined together if drop siding is used, or are properly covered with battens at the joints between square-edged boards if vertical siding is applied.

(2) That a noncorrosive kind of nail is used, such as zinc-coated steel wire nails or aluminum nails, to avoid rust spots, and that the nails are big enough to sink at least one-half their length into wood sheathing and the studs, or one-half their length into the studs if fiberboard sheathing is used. It is good practice to set and putty nails -- with a nonoil putty if a natural finish is to be used.

(3) That butt joints between ends of boards, corner joints, and edge joints along the roof lines of gables are tightly fitted. It is a good idea to caulk butt joints with white lead paste and to apply caulking putty along roof lines and around door and window casings to help seal out rain. Metal siding corners are often used with bevel siding; but if siding is butted against corner trim boards, white lead paste can advantageously be applied along ends of siding boards there also. Ends of siding boards should meet over a stud. Siding on dormers should not be scribed tightly against roof shingles; at least 1 inch of flashing should show.

Selection and application of paint is also of importance to the long-time satisfactory performance of wood siding. Siding wetted after installation should be allowed to dry before it is painted. For information on painting the reader is referred to the list of references at the end of this report.

Once a good siding wood has been properly installed, it is highly unlikely that any trouble will be experienced with respect to loosening of boards, splitting, or other mechanical breakage of the wood or fastenings. About the only difficulties that can arise are those concerned with paint maintenance. Proper construction features, such as ample roof overhang to shield the walls from sun and rain, together with wise choice and use of paint, should largely eliminate these. Information on good construction, paint maintenance, and related subjects is available in the list of publications appended to this report.

Table 1. --Bevel siding grades of principal commercial species

Species	Top grade	Second grade	Third grade	Fourth grade
Cypress.....	A	C Select	D	No. 1 Com.
Fir, white.....	B and Better	C	D	E
Hemlock				
Eastern.....	D and Better	.....	.....	.....
Western.....	B and Better V.G.	C	D	.....
Pine				
Eastern white...	B and Better	C	D	.....
Ponderosa.....	B and Better	C	D	E
Southern yellow..	B and Better	C	D	No. 2
Sugar.....	B and Better	C	D	E
Western(Idaho) white.....	B and Better	C	D	E
Redcedar, western	Clear	A	B	C
Redwood	V.G. Clear all Heart	Clear all heart	V.G. A	A
Spruce				
Engelmann.....	B and Better	C	D	E
Eastern.....	B and Better	C	No. 1	.....
Sitka.....	A V.G.	B	C	.....
Yellow-poplar[1]...	Clear	Selects	No.1 Com.	No. 2 Com.

[1] Principal hardwood commercially used for bevel siding.

Table 2. --Drop siding grades of principal commercial species

Species	Top grade	Second grade	Third grade	Fourth grade
Cypress.....	A	C Select	D	No. 2 Com.
Douglas-fir				
(Coast Region)..	B and Better	C	D	E
(Inland Region)..	C Select	D	No. 1	No. 2
Fir, white.....	C Select	D	No. 1	No. 2
Hemlock				
Eastern.....	D and Better	No. 1	No. 2	.....
Western.....	B and Better	C	D	E
Larch, western..	C Select	D	No. 1	No. 2
Pine				
Eastern white..	C Select	D	No. 1	No. 2
Lodgepole.....	C Select	D	No. 1	No. 2
Ponderosa.....	C Select	D	No. 1	No. 2
Red.....	C Select	D	No. 1	No. 2
Southern yellow	B and Better	C	D	No. 2
Sugar.....	C Select	D	No. 1	No. 2
Western (Idaho) white.....	C Select	D	No. 1	No. 2
Redcedar, western	B and Better	C	.....	.....
Redwood.....	Clear all Heart	A	Sel.Heart	Utility
Spruce				
Eastern.....	B and Better	C	No. 1	.....
Engelmann.....	C Select	D	No. 1	No. 2
Sitka.....	B and Better	C	D	E
Hardwoods.....	Clear	Selects	No.1 Com.	No. 2 Com.

Table 3. -- Classification of native woods for ability to hold aged coatings of house paints

Wood group No.	Description of group	Forest Service and other common names	Botanical name	Representative specific gravity[1]
1	Woods on which paints of the widest range in kind and quality give good service	Softwoods:		
		Baldcypress (southern cypress)	Taxodium distichum	0.42
		Alaska-cedar (Alaska cedar)	Chamaecyparis nootkatensis	.42
		Atlantic white-cedar[2]	Chamaecyparis thyoides	.31
		Incense-cedar [2]	Libocedrus decurrens	.35
		Northern white-cedar[2]	Thuja occidentalis	.29
		Port-Orford-cedar (Port Orford cedar)	Chamaecyparis lawsoniana	.40
		Western redcedar	Thuja plicata	.31
		Redwood	Sequoia sempervirens	.41
2	Woods on which care is needed to select a flexible priming paint such as pure white lead or a zincless house-paint primer.	Softwoods:		
		Eastern white pine (northern white pine)	Pinus strobus	.34
		Sugar pine	Pinus lambertiana	.35
		Western White pine (Idaho white pine)	Pinus monticola	.36
3	Woods more exacting than those of group 2 but less exacting than those of group 4 in requirements of flexible priming paint and finish paint of high quality.	Hardwoods:		
		American basswood[2]	Tilia americana	.32
		Aspen	Populus sp. [3]	.35
		Cottonwood[2]	Populus sp. [3]	.32 to .37[3]
		Magnolia[2]	Magnolia sp. [3]	.40 to .46[3]
		Yellow-poplar (Yellow poplar)	Liriodendron tulipifera	.38
		Softwoods:		
		Fir	Abies sp. [3]	.35
		Eastern hemlock	Tsuga canadensis	.38
		Western hemlock	Tsuga heterophylla	.38
		Lodgepole pine[2]	Pinus contorta	.38
		Ponderosa pine	Pinus ponderosa	.38
		Eastern spruce	Picea sp. [3]	.37
		Englemann spruce	Picea engelmannii	.31
		Sitka spruce	Picea sitchensis	.37
4	Woods that need most careful selection of suitable paints and for which aluminum house paint is particularly desirable for priming when the wood is first painted.	Hardwoods:		
		Beech[2]	Fagus grandifolia	.56
		Birch	Betula sp. [3]	.45 to .60[3]
		Maple	Acer sp. [3]	.44 to .57[3]
		Sweetgum (red gum)	Liquidambar styraciflua	.44
		Black tupelo[2] (blackgum)	Nyssa sylvatica	.46
		Water tupelo[2] (tupelo gum)	Nyssa aquatica	.46
		Softwoods:		
		Douglas-fir	Pseduotsuga taxifolia	.45
		Western larch	Larix occidentalis	.48
		Red Pine (Norway pine)	Pinus resinosa	.44
		Southern yellow pine	Pinus sp. [3]	.45 to .64[3]
		Tamarack[2]	Larix laricina	.49

[1] Average specific gravity for the species (based on oven-dry weight and volume when green) listed in U. S. Dept. of Agriculture Technical Bulletin No. 158, "Comparative Strength Properties of Woods Grown in the United States." Within any species, individual boards may vary widely from the average specific gravity.

[2] Species not included in comparative paint tests but classified according to similarity in properties to one or more of the species that were tested.

[3] More than one species of the family known by the same common name. In many cases, commercial shipments of lumber bought under the common name will contain boards from two or more of the species. For example, southern yellow pine lumber may contain boards from one or more of the following: loblolly (*Pinus taeda*), longleaf pine (*Pinus palustris*), shortleaf pine (*Pinus echinata*), and slash pine (*Pinus caribaea*).

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