

# 15

## Manufactured Boards

### KEYWORDS

blockboard  
fibreboard

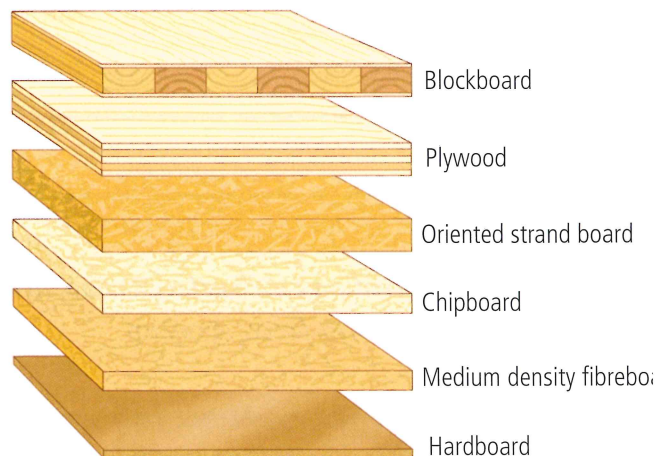
hardboard  
oriented strand board

plywood  
veneers

Man-made boards are made by processing timber or timber products into board form. These boards have many advantages. Manufactured boards have become an important substitute for solid wood. They help to conserve tropical forests by using timber products such as sawdust, timber particles, veneers and smaller sections of timber. These boards are an economical alternative to solid woods and have become important materials in their own right. They provide large, flat areas of stable wood of uniform thickness. They are mainly used for worktops, bedroom and kitchen units.

### Types of manufactured board

- Blockboard
- Plywood
- Oriented strand board (OSB)
- Chipboard
- Medium density fibreboard (MDF)
- Hardboard



Types of manufactured board

## PLYWOOD

A difficulty with solid wood is that thin sections break easily across the grain, so wide sheets are weak. Plywood is made with layers of wood arranged with the grain going in both directions, which makes it strong. This allows a board to be made that is strong and thin.

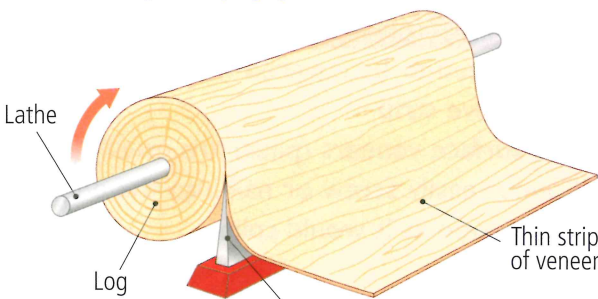
Plywood has an even surface with few knots or uneven grain. It doesn't warp or twist and does not split even when nailed near the edge.

Plywood is made by gluing together thin veneers (thin sheets of wood called plies) like a sandwich, to form the thickness of the board required. Veneers are sheets of wood cut from the surface of a plank, or by rotary cutting from a log.

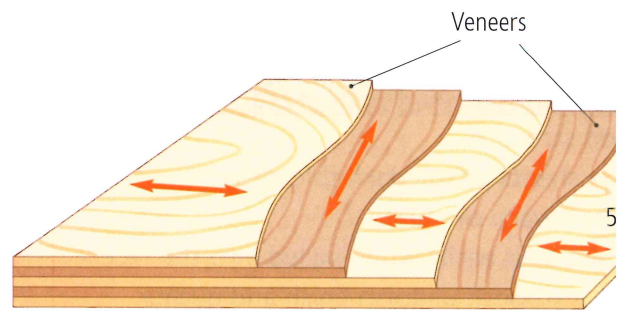
In plywood, each layer is positioned so that the grain is at right angles ( $90^\circ$ ) to the layer below it, as shown below. There are always an odd number of plies in plywood, e.g. 3, 5, 7, so that the grain of the two facing (outside) veneers point in the same direction.

Plywood quality varies and there are many types available, which may be grouped into two main categories: interior and exterior quality.

### Interior quality plywood



*Rotary cutting of veneer*



Shows the grain direction of plywood veneers

*Make-up of plywood*

The veneers of interior grade plywood are less resistant to decay and the adhesives used to bond them are not water-resistant. If used outdoors the interior grade will come apart.

### Exterior quality plywood

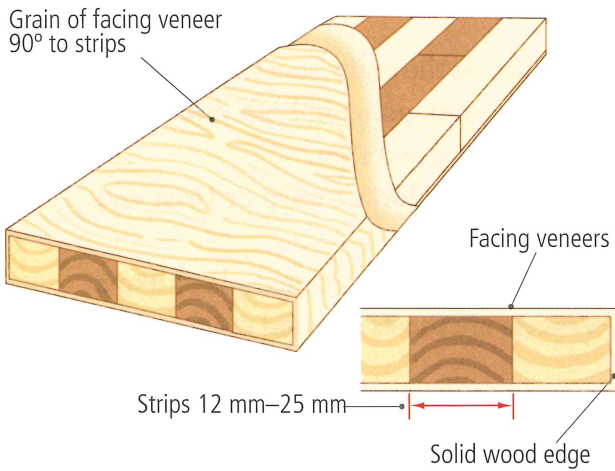
The exterior grades of plywood are made with durable veneers and water-resistant glues are also used.

WBP is a term used to describe an exterior grade and it stands for **Water and Boil Proof**. WBP plywood is resistant to water, heat, chemical, fungal and insect attack.

Marine plywood contains high-quality veneers of naturally durable timbers bonded together with WBP glue.



*Examples of plywood*



Blockboard

Marine ply is used where the plywood will be exposed to water for long periods of time, for example in boat building.

### Blockboard

Blockboard is a strip core board. It is made of thick strips or battens of solid wood, usually softwood, glued together and covered with veneer on both sides just like plywood. It is a thick board, usually 12 mm–25 mm wide, as thin boards would be difficult to manufacture. The grain of the facing veneer runs at 90° to the direction of the solid strips. The strips in the centre are cut from lower quality timber.

### Advantages and disadvantages of plywood and blockboard

| Advantages   | Disadvantages  |
|--|--|
| <ul style="list-style-type: none"> <li>● Good strength</li> <li>● Large sheets of standard thickness</li> <li>● Do not warp or shrink</li> <li>● Do not split easily when nailed into the face</li> <li>● Have a smooth uniform finish and quality</li> <li>● Thin sheets of plywood can be bent into shape</li> </ul> | <ul style="list-style-type: none"> <li>● Edges need to be covered with a decorative strip</li> <li>● The surface veneers (plies) are usually poor quality</li> <li>● Cannot easily screw or nail into the edge of plywood as it would split</li> </ul> |

### PINEBOARD/LAMWOOD

The sheets of wood are manufactured from strips of solid wood that are glued together into a wider board. When bonded the sheets are sanded smooth to a uniform thickness. Although hardwood examples are available for worktops, the wood generally used is pine. The sheets can be obtained in thicknesses of 12 mm–25 mm.

Pineboard is used where large areas of wood are required in a solid form such as table tops, shelving units and worktops. These wide sheets do have a tendency to cup.

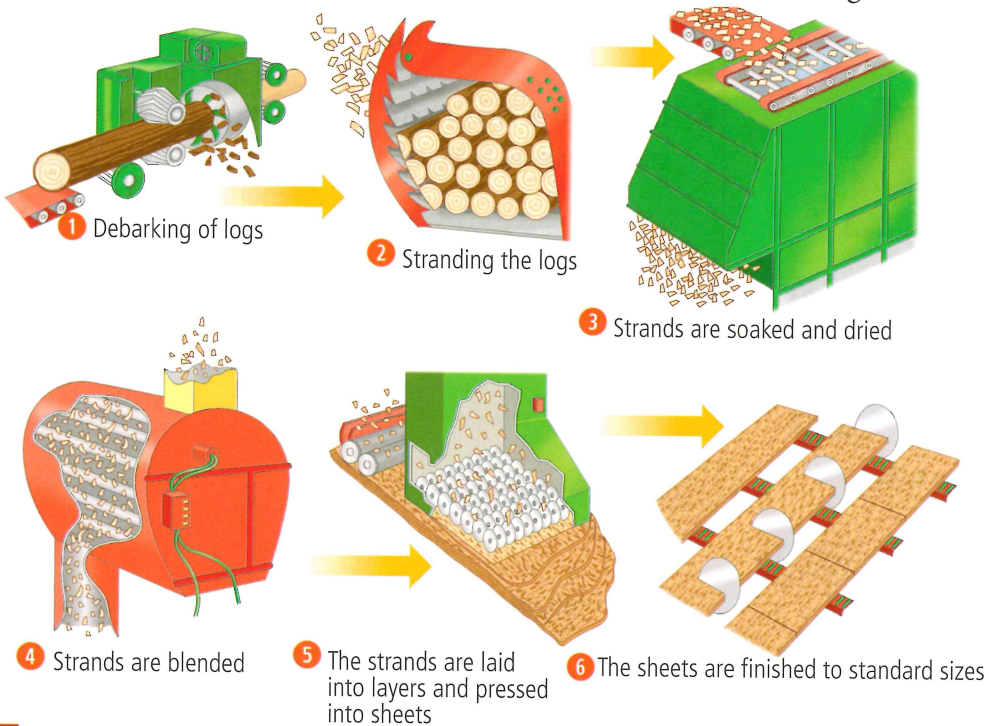


Pineboard/lamwood

## OSB – oriented strand board

Oriented strand board is a relatively new manufactured board. It is made in Waterford by Louisiana Pacific. It is a material that looks similar to chipboard, but has many of the characteristics of plywood. Wooden strands or flakes are processed from the tree log and are then bonded together under heat and pressure, using a synthetic adhesive and wax. The strands are aligned in two outer layers and an inner core positioned at right angles to the outer layers, creating a three-ply effect. This gives the board its strength.

The board comes in standard sizes and is suitable for a wide variety of uses. It is used in packing cases, flooring, furniture manufacture and timber-framed buildings. It has moderate moisture resistance and resistance to fungal attack.

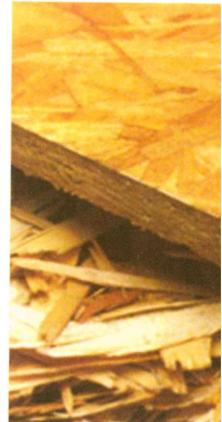


### Making OSB

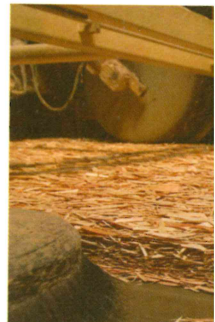
## Chipboard

Chipboard is made by taking graded wood chips and mixing them with synthetic resin glue. Then the mixture is pressed or formed into rigid sheets of regular thicknesses. They are sanded down to give the finished product.

Chipboard is often laminated with plastic laminates or decorative wood veneers such as oak, mahogany and ash for furniture construction, worktops, bedrooms or kitchen units. There is also a flooring grade used by the building industry.



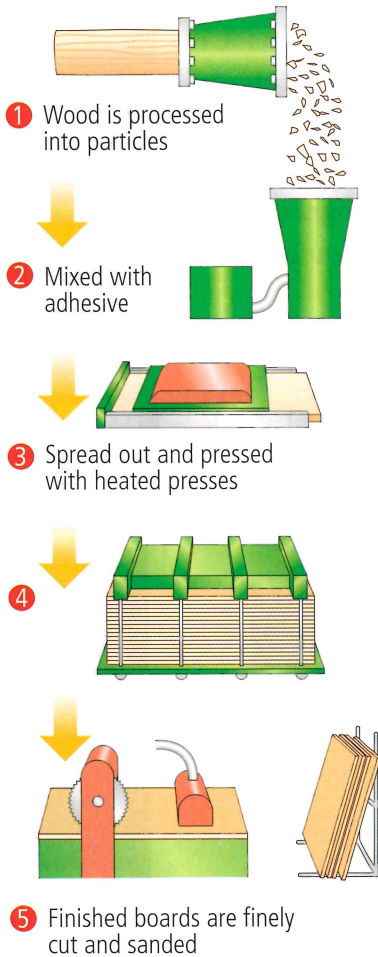
OSB – oriented strand board



The strands are out in a mat



Chipboard



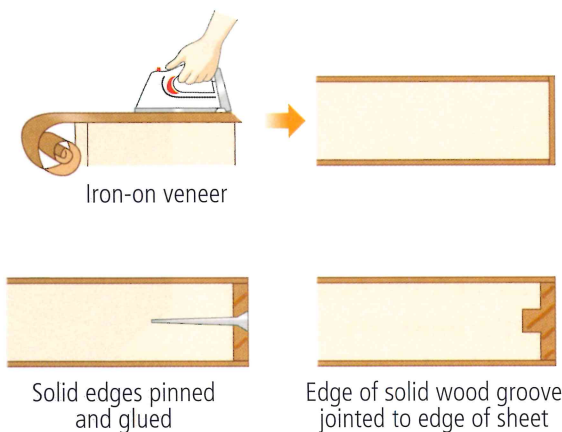
Particle boards (chipboard and OSB) have become popular because:

- 1 They help in the conservation of trees
- 2 The waste from timber felling (forest thinning) and conversion are included in their manufacture

Advantages and disadvantages of OSB and chipboard

| Advantages   | Disadvantages  |
|--|--|
| <ul style="list-style-type: none"> <li>Uniform thickness</li> <li>They can be veneered with decorative veneers and laminates</li> <li>Relatively cheap</li> <li>Use timber that might otherwise be wasted</li> </ul> | <ul style="list-style-type: none"> <li>Surfaces and edges normally require a veneer or laminate</li> <li>Chipboards are weak</li> <li>They are not water-resistant so are used indoors</li> <li>Generally chipboards do not take screws/nails well, as the small particles are easily separated</li> </ul> |

Making chipboard



The edges of chipboard and some other boards are unsightly and need to be covered. On the left are some ways of finishing the edges of manufactured boards.

Edges of chipboard should be covered

## MDF

**Medium density fibreboard (MDF)** is another board that is very popular. It comes in standard sheet sizes and thicknesses. The board is similar to hardboard in colour but it is considerably stronger. It has a very smooth surface on both sides. These surfaces do not need to be sanded before finishing. The sheets can be obtained with decorative veneers or laminated surfaces as with chipboard.

Other types of fibreboard are HDF (high density fibreboard) and LDF (low density fibreboard).

## Hardboard

Hardboard is made from pulped wood and wood waste. The wood is pulped using steam and heat, which gives fluffy brown fibres. The fibres are bonded using glues and pressed between heated plates to give finished sheets. The sheets have one smooth surface that is glossy and one textured surface.

The finished sheet is a uniform material with high density. They are usually obtained in thin sheets (between 3 mm and 9 mm). Hardboard is inexpensive and can be obtained with surface laminates (giving the effect of another wood). It is used in the bottoms of drawers, the back of cupboard carcasses and as a hard-wearing underlay to floor coverings and in interior door construction. Hardboard is not water-resistant so is not used outdoors.

## Sheet sizes

Manufactured boards are made in standard sheet sizes in large sheets, which are 2,438 mm (8 ft) long and 1,219 mm (4 ft) wide. However, smaller sizes can also be obtained in some shops.

Laminated chipboard can be obtained in smaller standard panels that are already edged with laminate. These panels are ready to use, which makes them suitable for making shelves and units.

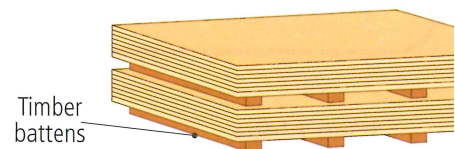
Sheets are obtained in various standard thicknesses from 6 mm to 25 mm.

## Care of sheets

Sheet material should be stored properly. Incorrect stacking can result in distortion or other damage to the sheets. Sheets are stored inside in dry conditions to protect them from the weather or dampness. Sheets should be stored on the flat with suitable support from timber battens as shown.



MDF – medium density fibreboard



Correct storage of sheets

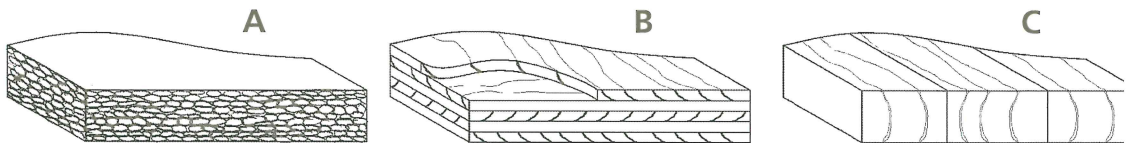


## Exercises

- 1 What is meant by the term manufactured board?
- 2 Name two manufactured boards and say where each would be used.
- 3 Suggest a manufactured board that you would use in the bottom of a drawer and give reasons for your choice.
- 4 In relation to manufactured boards what do the letters MDF stand for?
- 5 Give two advantages of plywood over solid wood.
- 6 Explain how the veneers are cut in the manufacture of plywood.
- 7 Describe two places where chipboard might be used.
- 8 Draw a sketch showing how the layers of plywood are put together.
- 9 Explain what the letters OSB stand for.

## Exam Question

- 1 (a) Name the three manufactured boards labelled A, B and C in the diagrams.



- (b) State four advantages of manufactured boards.
  - (c) With the aid of notes and freehand sketches describe, in detail, the manufacture of one of the above boards.
  - (d) State how the use of manufactured boards can help reduce the current rate of global deforestation.
- (JC, HL, 2008)

## Web Links

[www.afrc.uamont.edu/pattersond/Coursework/Undergrad/plywood.htm](http://www.afrc.uamont.edu/pattersond/Coursework/Undergrad/plywood.htm)

<http://osbguide.tecotested.com/osbtour>

[www.jobdone.com/technical\\_info/how\\_its\\_made.php](http://www.jobdone.com/technical_info/how_its_made.php)