

Defects due to seasoning include checking, splitting and warping. These grades are caused by shrinkage.

Checking is the longitudinal separation of the fibres which does not extend throughout the whole cross-section of the wood. It is due to unequal drying. As the moisture evaporates more rapidly from the surfaces, they tend to shrink before the inner layers, and splitting results. The various forms of checks are:—

(a) *End Checks*.—These occur on the ends, especially if the pieces are large. They are caused by the moisture evaporating more quickly through the end grain than other surfaces and the shrinkage being held back by the greater body of wood. End checking can be minimized by painting the ends; this reduces the rate of end drying.

(b) *Surface Checks*, which form on the outer faces during the early stages of seasoning. Later they may close and are only exposed on dressing the timber.

(c) *Honeycomb or Internal Checks*.—These appear in the interior of the timber if the drying conditions are too severe in the early stages. The separation of the inner fibres is due to the shrinkage of the dried surface fibres being resisted by the wetter core, and when the internal moisture dries out later the core fibres are prevented from shrinking by the dry outer layers. A condition of stress results, known as *case-hardening*, and this produces honeycombing.

Checks are usually much shorter than shakes (see p. 58, Vol. I). The latter are not seasoning defects.

Splitting is the separation of the fibres which extends through a piece of timber from one face to another. Splits are sometimes called *through checks*.

Warping.—The various forms of this distortion are: Bow, cup, spring and twist.

(a) *Bow and Cup* are referred to on pp. 58 and 59, Vol. I.

(b) *Spring or Springing*.—This is a curvature of the edge of a piece of timber. The face is not affected and is therefore flat.

(c) *Twist or Wind*.—This is a spiral distortion (winding) along the length of a piece of timber.

Collapse.—This is a condition which may occur during the early stages of seasoning very wet timber which may shrink unevenly and/or excessively. The cells are flattened as a result of the partial vacuum created by the evaporation of the water and its retarded replacement by air. Collapse can be prevented if the timber is dried at low temperatures in the early stages.

Brashness or Brittleness may be caused to timber if it has been too rapidly dried or been subjected to high temperature in the kiln; such timber breaks with a short fracture.

METHODS OF SEASONING.—There are three methods of eliminating excess moisture from timber, *i.e.*, (1) air seasoning, (2) kiln seasoning and (3) a combination of air seasoning and kiln seasoning.

1. *Air Seasoning or Natural Seasoning* (see p. 56, Vol. I).—The timber is stacked either out of doors where the piles are roughly protected by temporary sloping roofs (each consisting of a double layer of low-grade sloping boards

which overhang the sides of the piles) to throw off the rain, or in an open shed having a roof and one or more walls. The site or floor should be well drained and covered with ashes or, preferably, concrete to prevent the growth of vegetation. The width of a pile varies from 6 to 12-ft., the height may be up to 16-ft. and the length depends upon that of the timber. Piles are best built on steel beams or rails supported at intervals by 9-in. square concrete or brick piers, 9-in. high, and three to four rows per width of pile; in the absence of beams the pillars are spaced at about 2-ft. 6-in. centres. If piers are not used, the timber in contact with the floor should be creosoted.

There are several methods of piling. Thus, that shown at c, Fig. 29, Vol. I, is common for softwood baulks. A more effective arrangement, as it ensures a better flow of air, is to reduce the number of baulks in every alternate layer. The piles are sometimes arranged with the timbers inclined in the transverse direction; any water which may enter the pile is thus effectively drained. Converted hardwood logs may be lagged or staked as shown at e in the above Fig. 29, the logs being stacked one above the other.¹ Boards may be piled as shown in the kiln at A and B, Fig. 3 (this volume), the 1-in. *piling sticks* being of well-seasoned softwood and spaced at from 2 to 6-ft. apart, depending upon the thickness of the timber to be supported. Narrow boards are often stacked in twos with about 1-in. space between each pair.

If timber is piled in the winter the evaporation of the moisture is gradual, and excessive surface shrinkage and checking will not occur.

The rate of evaporation in air seasoning is comparatively slow in this country and is only partly controlled. The degrade, such as checking, splitting and warping (see preceding column), is relatively small because of the humidity of this climate.

Under average climatic conditions it is not possible in this country to reduce the m.c. of timber by air seasoning to much below 20 per cent., although during a prolonged spell of hot weather the m.c. may be reduced to 12 per cent. As the average reduction is not sufficient for certain internal work (see p. 7), it is clear that air conditioned timber to be used for good class joinery should be dried still further by keeping it in a heated workshop or store before being finally dressed or framed together until the required m.c. has been attained.

In order that the timber may be available for use immediately the m.c. has been reduced by air seasoning to the required percentage, it is necessary to determine the m.c. when the timber is piled and thereafter at suitable intervals. The procedure for this purpose is similar to that described for kiln seasoning and described on p. 10.

Length of Drying Period.—The time taken in air seasoning depends upon the temperature and humidity of the atmosphere, efficient stacking, and the thickness and density of the timber. On the average it may be taken as a guide

¹ End checks are reduced by coating the ends with paint. Strips of wood nailed across the ends of the planks (see e, Fig. 29, Vol. I) after shrinkage has occurred prevent the extension of any splits which may have formed; the strips should not be fixed before contraction has taken place.