

Types of Defects in Timber as a Construction Material



Common Defects in Sawn Timber (Lumbers)

No tree is perfect. It's subject to defects from the time it emerges as a seedling to the last stages of Seasoning/drying. A defect is simply an abnormality or irregularity found in wood. There are many different types of defects arising from many different causes. For instance, there are natural and acquired defects caused by a broken limb or other injury, insect and fungal attack, or rapid tree growth. There are innate defects caused by the natural characteristic of wood to shrink or expand in response to water vapor in the air. And, there

are artificial and mechanical defects caused by incorrect sawing or machining (conversion), improper drying (seasoning), or improper handling and storage. Defects may be responsible for reducing wood's economic value, lowering its strength, durability and usefulness, marring its appearance, and in some cases, causing its decay.

This document is an attempt to classify the inherent defects in the wood with reference to causation of such defects.

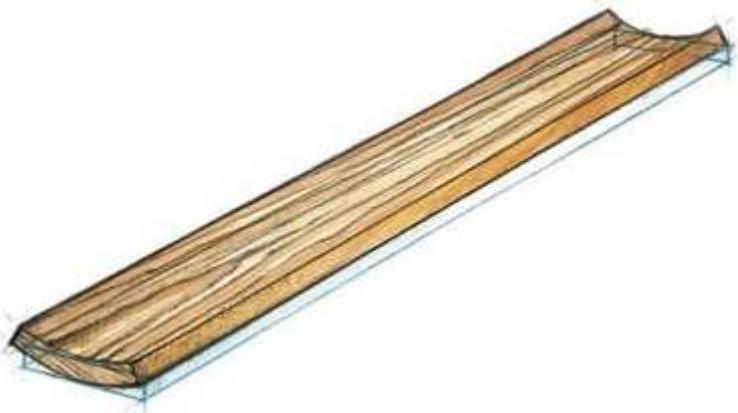
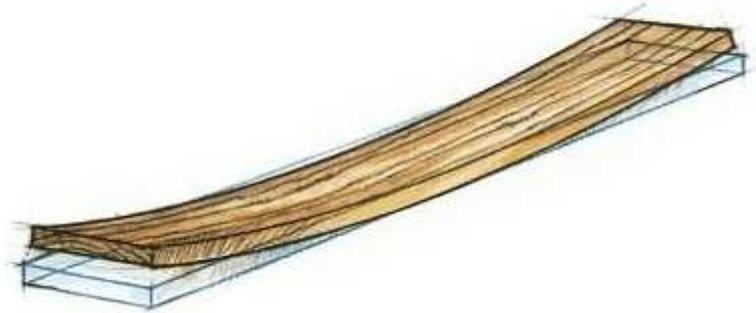




Defects in Sawn Timber (Lumbers) during kiln drying process

1. Bow

When the converted timber is stored for a longer time, some timber planks may have a curve along its length without sufficient block support, which is known as Bow.



2. Cup

If the timber planks curve along its width, then it is called Cupping of timber.

3. Check

Check is the formation of a crack in the wood, which will separate the wood fibers. They form due to over seasoning of timber.



4. Split

Split forms when a check extends from one end to the other end, which will split the wood into a number of pieces.

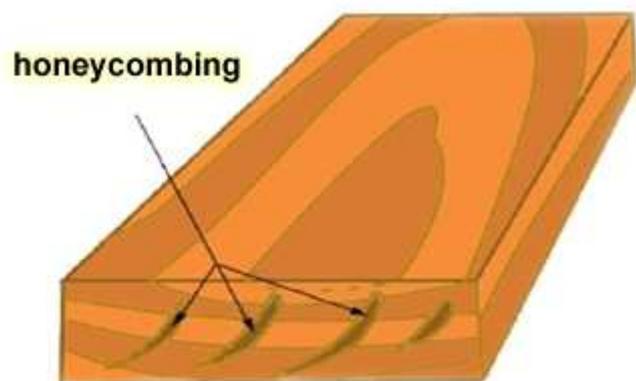


5. Twist

Twist forms when the timber piece is distorted spirally along its length. It looks like a propeller blade after twisting.

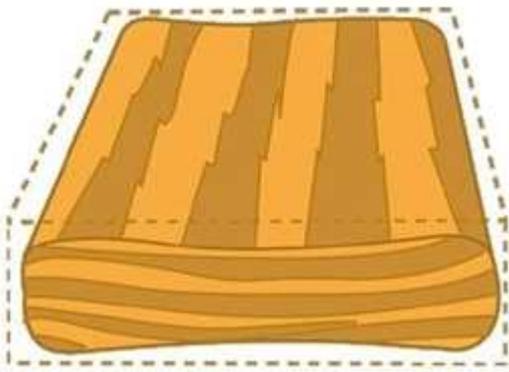
6. Honeycombing

Honey combing occurs in the inner part of the timber, which cannot be identified by just seeing. It is mainly due to stresses developed during the drying of timber.



7. Case Hardening

Case is nothing but the top surface of wood, which dries rapidly during seasoning, but the inner part didn't. Then this defect is called as case hardening.

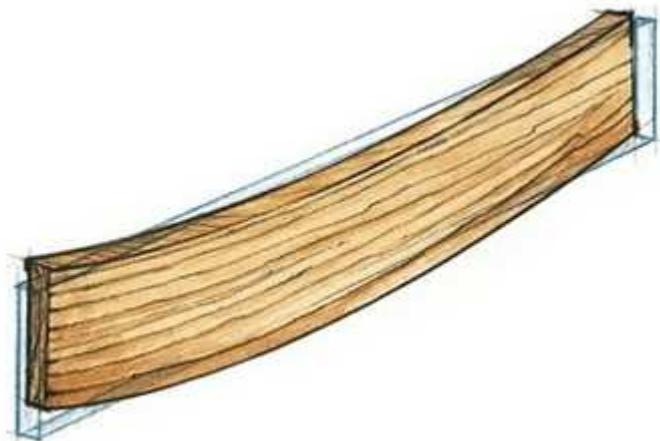


8. Collapse

During drying, some parts of the wood may dry rapidly while some may not. Because of this, improper drying shrinkage of wood occurs, that results in the defect called collapse.

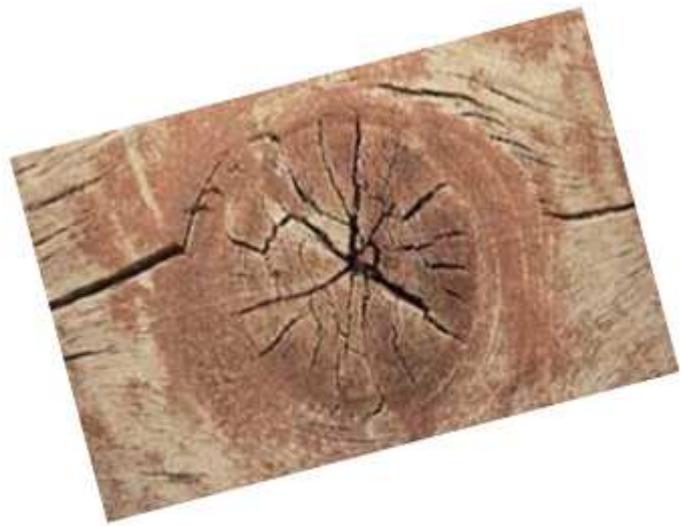
9. Warp

Warping is the loss of shape of wood due to stresses developed during drying. Cupping bowing, twisting of wood come under warping.



9. Radial Shakes

Radial shakes develop after the tree being felled down and exposed to the sun for seasoning. In this case, the cracks run radially from bark to the pith through annual rings.



Wood Defects During Sawing

1. Diagonal Grain

2. Torn Grain

3. Chip Mark

4. Wane

5. Slope of Grain



1. Diagonal Grain Defect in Timber

During the conversion of timber, different cutting saws are used. The cutting should be done properly. If there is any improper cutting by the saw, then a diagonal grain will appear.

2. Torn Grain

In the conversion, many tools are used. If any of the tools or any other heavy things are dropped accidentally on the finished surface of timber it will cause small depression, which is called torn grain.



3. Chip Mark

When the timber is cut through the planing machine, the parts of the machine may form chip marks on it. Usually, they are indicated by chips on the finished surface.



4. Wane

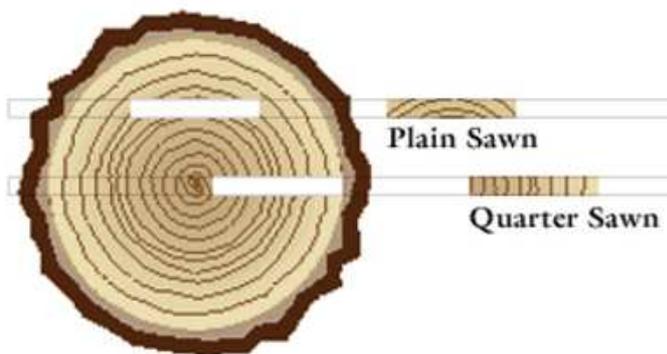
The edge part of the timber log contains a rounded edge on one side because of its original rounded surface. This rounded edge is called wane.

5. Slope of Grain

Localised slope of grain can be caused by knots. Slope of grain can also be caused by a slight bend in the tree, which means that when a straight board is cut out of it, there is a bend in the grain. This tends to be a longer feature and may go unnoticed in an appearance product.

Some species of Australian hardwoods (such as Jarrah and Blackbutt) can have “wavy grain”. This gives a very attractive rippled appearance in high surface finish applications.

Where timber is “backsawn”, the slope of grain can give interesting effects in the growth rings that enhance the appearance of the timber for some applications.





Defects in timber due to Insects

1. Termites in Timber

Termites also known as white ants which form a colony inside the timber and eat the core part of the timber rapidly. They do not disturb the outer layer of timber, so one cannot identify their presence. The trees in tropical and sub-tropical regions are mostly affected by these termites.

However, some trees like teak, Sal, etc. cannot be attacked by termites because of the presence of termite preventing chemicals in their cellulose part.



2. Beetles in Timber

Beetles are a type of insects that destroy the sapwood of the tree and make a tunnel-like hole from the bark. Usually, the diameter of the hole is around 2 mm. They convert sapwood into powder form, and larvae of these beetles use these holes. Almost all hardwood trees can be prone to damage by these beetles.

3. Marine Borers in Timber

Marine borers are found near coastal areas. They do not consume wood, but they make large holes of diameter up to 25mm in the timber to live inside it. They excavated up to 60mm deep in the wood. The wood attacked by marine borers is of less strength and discolored. They can attack all types of trees present in their region.

