Defects in Timber

Defects in Timber

- What we will look at today:
  1. Knots
  2. Resin Pockets
  3. Shakes
  4. Cupping, bowing and Twisting

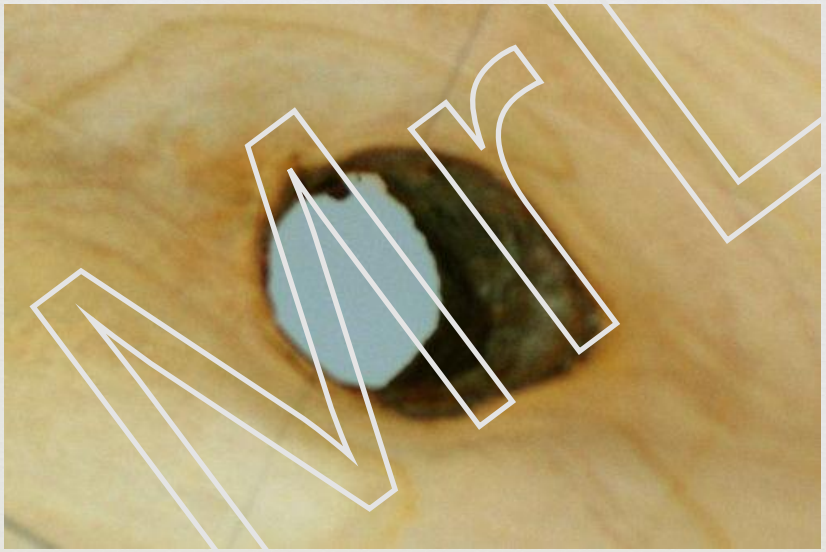
Knots

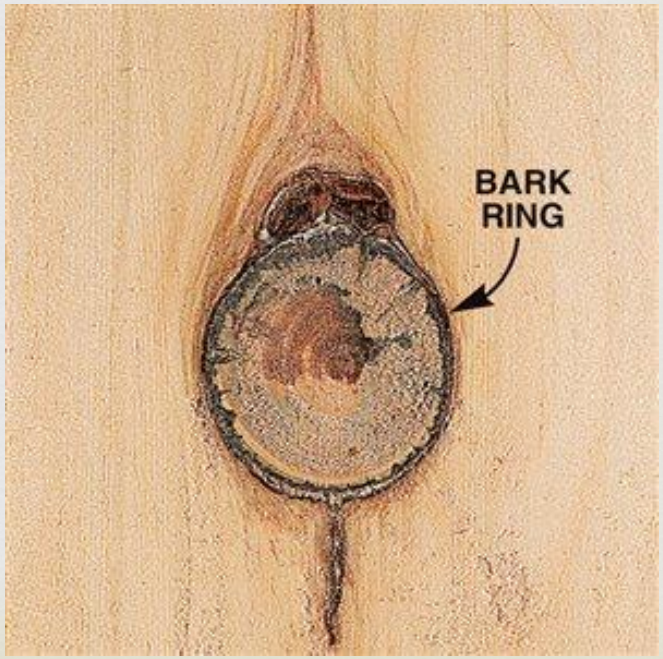
What is a knot?

- Knots are formed when the branches of the tree are cut off or fall off from the trunk
- All knots reduce the strength of the timber
- Grain around knots is twisted and irregular
- Reduces Strength
- Difficult to work
- Can give poor finish
- Dulls keen edge of woodworking tools

Dead Knot

- Branch stopped growing before tree is felled
- Dark in colour
- Knots which become loose and eventually fall out
- Hazardous during machining



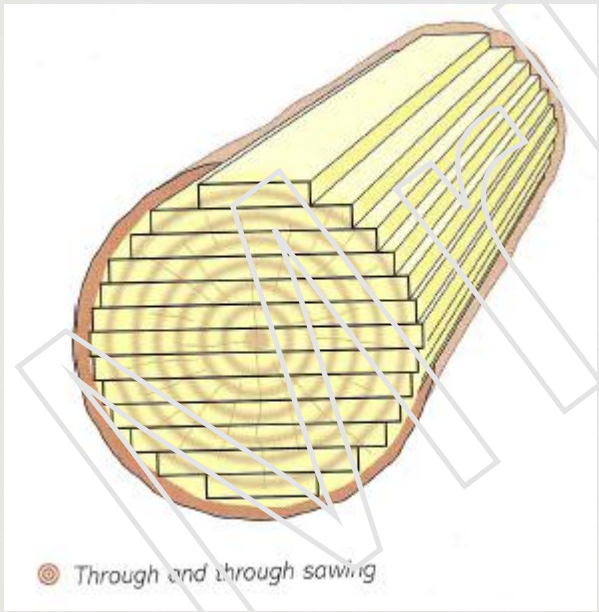


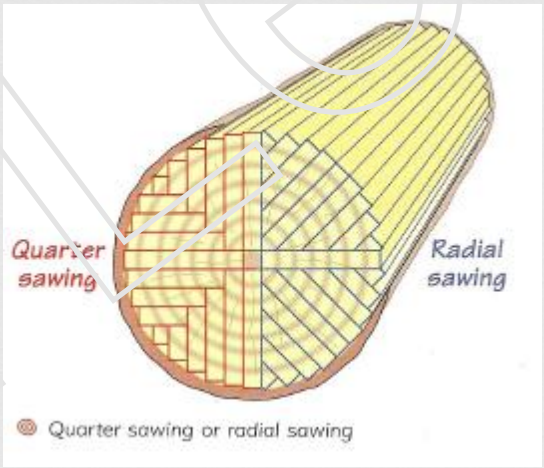
Live Knot

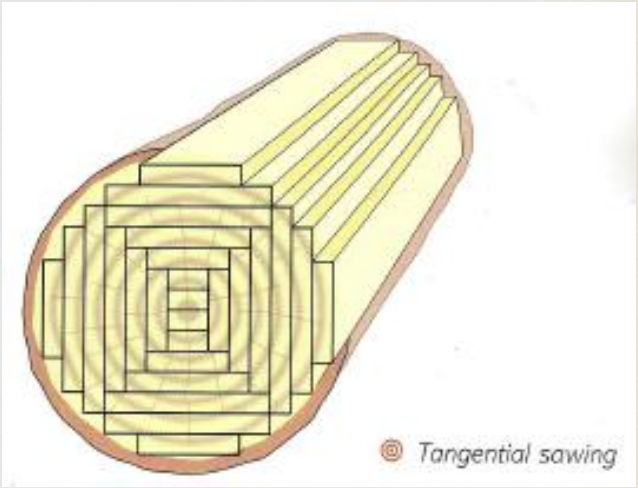
- What is a live knot?
- Knots that remain part of the wood
- Doesn't fall out of wood
- Lighter Colour than dead knots

Activity

What do you think knots would look like when timber is converted using different methods?







Solution

Jigsaw Activity

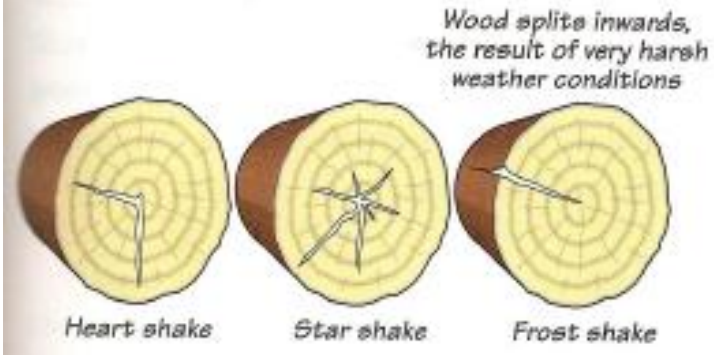
- Topics for groups
  1. Resin Pockets
  2. Shakes
  3. Cupping, bowing and twisting

Shakes

Shakes are splits in the end grain of wood. They happen along the ray lines and also along the annual rings. These splits are caused by tension forces which build up in the wood while the tree is growing. When it is felled, or during seasoning, these forces may be released. The weaker points in the wood break, like the weak link in a chain, and the split occurs. Different types of split (shake) have different characteristics.

Radial shakes

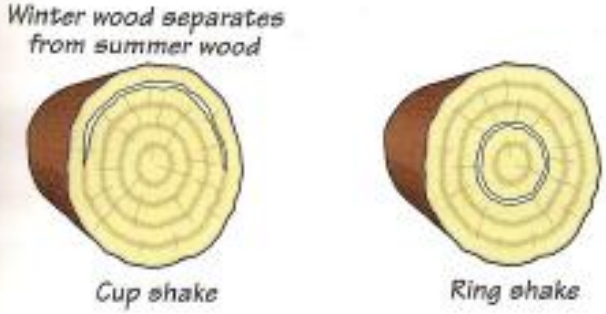
These occur in the direction of the rays. They include heart shakes, star shakes and frost shakes.



Radial shakes

Tangential shakes

Tangential shakes occur in the direction of the annual rings. They occur in old age in the tree, in seasoning or in strong wind. They include cup shakes where the split only runs along the annual ring. A ring shake is when the split runs right around the annual ring.



Cross (thunder) shakes

These are probably caused when the tree is subjected to a severe shock such as during felling or by a strain in the tree while it is living. The difference between these shakes and other kinds is the split or tear across the grain.

Cross (thunder) shake

Shakes

- Shakes occur when adjacent layers of cells become separated from one another
- This will appear as cracks on the end grain of the piece of wood
- The cause of shakes can be attributed to:
  - Wind causing the trunks to sway
  - Severe frost with contraction of the outer portion of the stem followed by expansion upon warming
  - Shrinkage of the heartwood
  - Unbalanced growth stresses

Artificial defects

Artificial defects occur as a result of stresses caused by poor stacking or seasoning. They include cupping, bowing, twisting or warping, end splitting, case hardening, honeycomb checking, staining (including chemical) and discoloration.

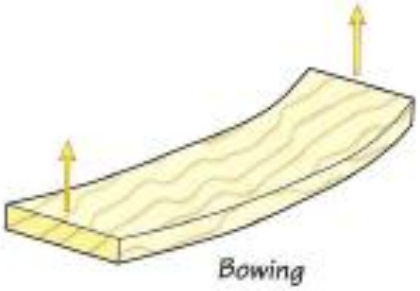
Cupping

This form of shrinkage forms a curve if you view a plank from either end.

Cupping

Bowing

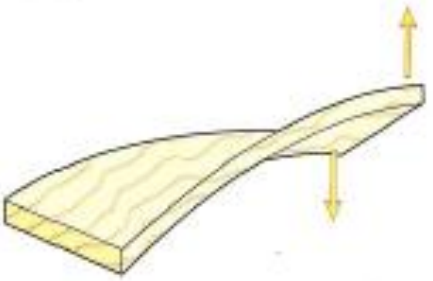
This takes the form of a bend along the length of the piece. Both cupping and bowing defects are often due to incorrect stacking of the boards during seasoning, where the stickers are too far apart or perhaps not directly above each other. It may also be as a result of poor stacking in a timber yard.



Bowing

Twisting or warping

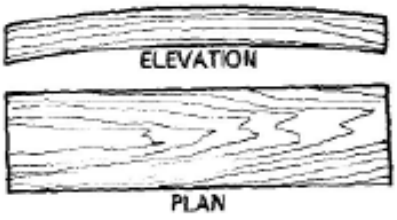
The two edges of the piece remain straight but the faces are distorted as if the two ends were twisting in opposite directions.



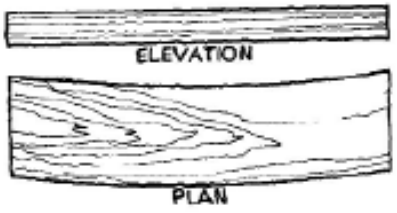
Twisting or warping

End splitting

This is caused if the ends of boards dry out too



A BOARD IS SAID TO BE BOWED OR CAMBERED WHEN ITS CENTRE IS RAISED



A BOARD IS SAID TO CONTAIN A SPRING WHEN ITS ENDS BEND INWARDS BUT WHEN IT REMAINS FLAT.

A BOARD IS SAID TO CONTAIN A TWIST OR 'WIND' WHEN ITS OPPOSITE CORNERS MOVE IN A SIMILAR DIRECTION AND WHEN IT LOSES ITS FLATNESS AS A RESULT.

Cupping, Bowing and Twisting

- Bowing can be as a result of improper stacking
- Spring is caused by longitudinal shrinkage or irregular grain
- Twisting can be caused by shrinkage along spiral or interlocking grain

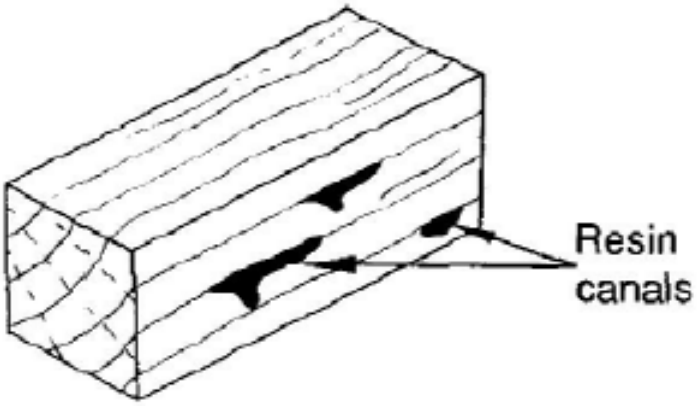
Resin Pockets/ Canals

- Most common in conifers
- Forms in internal cracks in the wood
- Cracks can be caused by high wind or extremes in temperature

RESIN POCKETS

These are small cavities in the wood that are fu
of resin. These pockets are often hidden fro
view (deep in the wood) and can cause timber t
weaken. When exposed they are unsightly an
the sticky resin can be messy.

Resin pocket



1.6.10 Resin (Pitch) pocket

An a opening, following the saucer shape of a growth ring containing an accumulation of resin. Apparent in many softwoods, mainly in spruces – it may appear as a resinous streak on the surface of timber. In warm weather sticky resin may run down vertical members. When the resin dries it takes on a resinous granular form which can be scraped away.