

Ch.6 Abnormal Wood Notes

Types of Abnormal Wood:

- Juvenile wood
- Reaction wood (SW: tension HW: compression)
- Branch wood
- Root wood

Juvenile Wood:

- Is any wood on a tree that is 5-25 years old.
- Usually has a thinner cell wall which makes it less dense and less strong.
- It is 40% to 60% less strong than mature wood due to the greater microfibril angle in the “S2” layer of the cell wall.

Juvenile Wood Products:

- Juvenile wood contains more lignin and hemicellulose, which is costly to extract from the fibers in pulpwood to make paper.
- Composite wood created using juvenile wood will result in shrinkage problems when the wood dries due to thin cell walls and a high microfibril angle.

Reaction Wood:

Compression Wood:

- Occurs only in **softwoods** on the side where compression occurs. (the side the tree is leaning on)
- The compression results in tracheids that are 30% shorter.
- It contains 8% to 9% more lignin and hemicellulose.
- Compression wood also creates 6% to 7% more shrinkage in lumber.
- Its density is greater than normal wood, yet its strength is the same as a result of a greater microfibril angle.

Tension Wood:

- Occurs only in **hardwoods** on the opposite side of the lean in a tree.
- It has *more* cellulose, yet *less* lignin and hemicellulose, and as a result when cut for lumber the cells collapse.
- Tension wood lumber is identified by the fuzzy appearance due to poor fiber patterns.
- The microfibril angle is *less than 5 degrees* which is less than normal wood
- It can be used to make “pure pulps” such as cellophane and rayon.

Branch Wood:

- Has a small diameter and has a higher bark ratio than the stem.
- Both hardwoods and softwood branches have more reaction wood than normal wood due to gravity.

Root Wood:

- 20% to 25% of a tree's fiber is found in the root wood.
- It is hard to clean and causes premature wear on machines that make pulp out of it as a result of all the dirt and unwanted materials.
- In *softwood* the root wood contains compression wood, and has fewer resin canals as well as less ray volume.
- In *hardwoods* the root wood of ring-porous species lack tyloses.

Take Home Message:

Despite the name abnormal wood, it does not appear different, yet its properties of density, strength, and response to drying make it abnormal.