

Sam Korb

21M.735 Tech Note 2: Wood

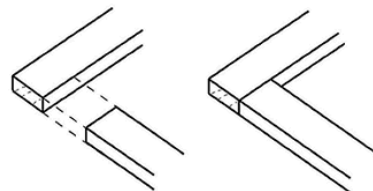
Joints

Wood can be purchased in two main forms: stick and sheet. In order to create any other shape out of wood, such as when constructing scenery for the theater, portions of sheet or stick wood must be joined. The simplest structure to build from stick wood is a rectangular frame, and for this, there are four joints, one at each corner. From there, complexity can increase exponentially, with cross members, out of plane members, anything the mind can dream up. The rich variety of structures that one can make with wood is evident both on the stage and off. The vast majority of joints that go into these constructions are derived from the original simple match-up; the right angle joint.

Within the classification of right-angle joint of two members of the same size and shape, there is even more diversity. Covered below are some of the major varieties, with some explanations for each.

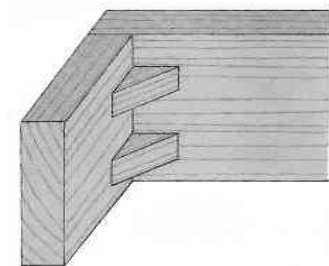
Butt:

The butt joint is by far the simplest of the joints: the end of one piece is butted into another.

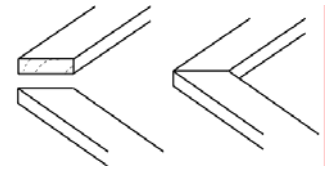


This must be attached with some other method of fastening, like glue or reinforcing sheets, as is common on flats. Though not inherently very strong, it is unbeatable for simplicity.

To increase stability, it can be used with supports, as in:

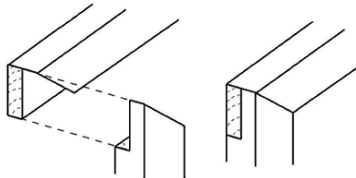


Miter:

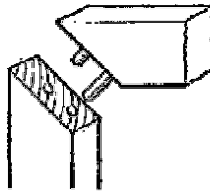


A miter joint is created by cutting the two pieces at supplementary angles, so the combined joint totals to 90 degrees. It has a better appearance than butt joint, as it doesn't expose the interior grain. This is slightly sounder than a butt joint, and it can be reinforced further by adding a lap (covered below) to form a half miter, or dowel pins or a tongue:

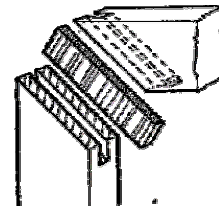
Half Miter



Dowelled Miter

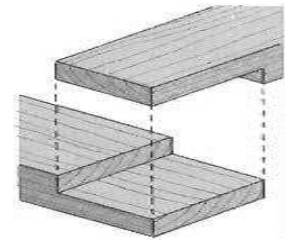


Tongued Miter

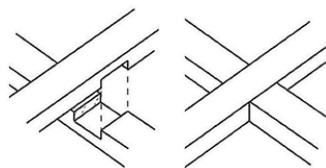


Lap/Halving:

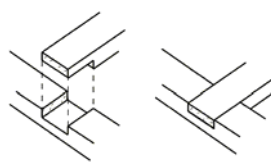
This joint is formed by cutting away half of the width of both pieces to be joined, so that they overlap. One of the convenient aspects of this joint is that it can be used in other configurations, like the cross and T joints:



Cross

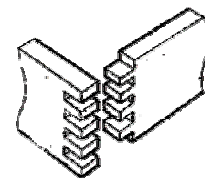


T



Finger:

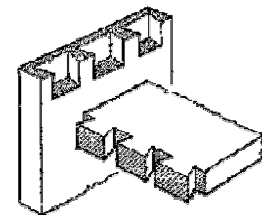
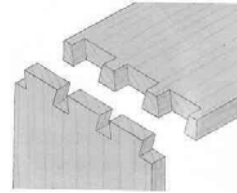
Continuing to increase in complexity and strength, there is the finger joint, which is formed by cutting matching notches out of



the two pieces. This provides good resistance to pushing along the members, but is fairly weak when it comes to forces that would change the angle between the members.

Dovetail:

To solve this problem, the dovetail was created. It uses a fairly complex pattern of tapered wedges to give a very solid joint. It is also considered to be the most aesthetically pleasing, and thus is often used on fine wood work or wooden houses. It generally requires special tooling to create the dovetails, adding to the difficulty of fabrication. The dovetail can also be partially lapped, as is popular with drawers:



For theater uses, a balance must be struck somewhere between structural stability, ease of fabrication, and aesthetics. If the structure will be hidden behind a flat or under a platform, it is obviously much less important what it looks like. Conversely, if it is to be an integral prop for the production, but won't be required to sustain any loads, aesthetics will come to the fore. However, given the large range of joint types, including those covered above and many more, it is likely that a suitable joint can be found for any application.

References, including picture credits:

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http://www.sirjlawes.herts.sch.uk/faculties/tech/cvs/wood_joints2/others.htm

<http://www.geoffswoodwork.co.uk/dovetail%20sides.htm>

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<http://members.shaw.ca/wgafurniture/sec1/jointscorner.html>