The Mechanics of Laminated Wood

Sometimes large wood members are made by gluing together many layers of thinner beams. The members made this way are called "glue-laminated" wood or "glulam" wood.

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Glulam wood offer a number of advantages:

- larger sections can be built up than can be obtained from trees (for instance, glulam members have been made up to 140 feet long)
- defects which reduce the strength of the wood can be cut out of the layers before they are glued together
- curved shapes, like the wood arches in the photograph, can be made by bending each layer around a mold before gluing all the layers together

At the Boston Nature Center, the wood members supporting the roof of the new building near the community gardens are all glue-laminated wood. The large arches supporting the roof of the Back Bay station are also glue-laminated wood.

In the demonstration, you can load several wood beams and measure how much they deflect under load. There are three beams:

1. a solid wood beam which is 0.4" thick
2. a glue-laminated wood beam that is also 0.4" thick

3. a set of 5 unbonded wood layers each 0.08" thick with a total thickness of 0.4"

First, load the solid wood beam and the glue-laminated beam with the same weight in the center of each beam. Notice that they deflect about the same amount.