

# How a Beam Works

Architecture

What happens inside a beam under load, in the terms you need at the section stage.

A loaded beam bends. The top shortens in compression, the bottom stretches in tension, and a neutral axis between them changes length not at all.

**DEPTH DOUBLED**  
**8x stiffer**

**USUALLY GOVERNS**  
**deflection**

- Depth is far more valuable than width.
- Doubling depth cuts deflection to about an eighth.
- Deflection usually governs before strength does.
- Continuity over supports reduces midspan bending.
- Cantilevers bend the other way: tension on top.
- Holes belong near the neutral axis, near supports.

## LOOK FOR IT

A joist on edge is many times stiffer than the same joist laid flat, for the same amount of timber.

Educational reference. Deflection limits, notching rules and hole positions are set by code and by the engineer.