Q My fireproofing partner and I need to settle a bet. I say a beam and a girder are the same thing, and he says they are different. He also says a joist and a truss are the same thing, and I say they aren’t. Can you help? —A.S., Minnesota

A Wachuwannano can sympathize with your confusion regarding the terms “beam” and “girder,” because in researching your question we came across a number of resource texts that used one term to define the other. One source, for example, said that “a girder is a large beam,” while simultaneously saying that “a beam (is) also sometimes called (a) girder.” However confusing those definitions might be, they mask the fact that the two terms do not define the same item and that using them interchangeably is both grammatically and technically incorrect.

Specifically, a girder is defined by ASTM Committee D-7 as “a horizontal member used to support heavy loads such as other beams along its length.” A few other sources corroborate this definition by saying a girder is defined by its ability “to support (a) concentrated load along its length” or that a girder is used to “support other structural members along its length.” Taken as a series of composite thoughts, all the definitions point to two common notions: one, that the loads on a girder are concentrated at various points along the girder and, two, that to be defined as a girder the structural member must support another horizontal member.

A beam, on the other hand, is generally defined as being a structural member that is “transversely supporting a load” or is “any structural member (that) is supported at each end (and) that supports a load.” Where girders are characterized by their ability to support other horizontal structural members and to take concentrated loads along their length, beams are generally defined by their end attachment method into another horizontal structural support member and their ability to support a load that has been applied across them.

What it all means is that a girder is a horizontal structural member that supports another horizontal structural member—a beam—and is supported by a vertical structural member—a column or some other load-bearing assembly. Simply stated, the columns hold up the girders that support the beams that combine with the girders to hold up the floors.

A joist is a single horizontal support member, or a series of horizontal support members functioning together, used to construct a floor or a roof. Joists are generally formed from wood or steel and are supported at their extreme ends and, if necessary, at their midpoint. Typically a series of joists is laid on edge, with the joists parallel to each other, and flooring or roofing sheathing material is laid on top of them to create a floor or roof.

Trusses are structural components composed of a combination of members, usually to form a triangle-shaped roof support. You see them commonly used to frame peaked roofs of houses. They are composed of perimeter members called chords—in a triangular truss the chords are the outside edges of the major triangle—supported by internal cross bracing members known as webs.

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