Timber Frame Construction

As its name implies, timber frame construction is a method of building which relies on a timber frame as a basic means of structural support.

Framed buildings are often referred to as 'lightweight construction', but don't be misled – like the skeleton in your body, it's a precision engineered structure that is remarkably strong and durable. (Definition from the Timber Frame Association)

Timber Frame Construction, in its present form, has been used throughout the Northern Hemisphere for over a century. Timber frame construction uses massive timbers that are tightly fitted together with mortise and tenon joinery, and then secured with hardwood pegs. There are timber frame buildings in use today that were built over 1000 years ago. In the middle 1800's with the advent of milled lumber, steel nails and mass production two by four framing became popular. Timber framing which required much more skill and labor began to decline in use. It was revived again in the 1960's .Timber framers today use the same methods and joinery that were used in the 13th and 14th century in a blend of old-world knowledge and today's power tools. Cranes lift the heavy timbers, which took over a hundred workers in times past. Today a timber frame can be erected with only four or five workers.

The timbers are cut in the shop weeks ahead. Pegged **mortise and tenon joints** are cut in to the timbers. Careful planning is necessary for success. Before raising day, the timbers are taken to the building site and assembled in cross sectional units called bents. The foundation of the building is readied with mortises cut in to the sub floor. The frames are stacked with blocks in between them. On raising day, the frames are raised one at time. Boards are clamped to them to hold them place while raising them, called a strong box. Come-along pulleys are also used to hold the frame in place while it is being raised and to bring sections together. Rafters are typically 8 x 12, posts are 8 x 8 and girts are 8 x 10. The posts of the bents have a tenon on their bottoms, which fit into mortises in the sub floor of the building. The space between bents is called a bay and is generally 14 feet. After each bent is raised the girts or horizontal members will be attached to join them. A frame is usually put up in one day. The exterior siding can be most any material. The beams are usually exposed on the inside.

(picture courtesy of Trillium Del Timberworks)
This is an example of a mortise and tenon joint that is 172 years old.

A mortise and tenon joint is a means of joining two pieces of wood at an angle to each other. The protruding tenon, cut at the end of one piece, fits into a corresponding recess called a mortise in the other.

European settlers brought timber frame methods to this continent and used them for many early buildings. Early American barns with their large open expanses were **timber frame buildings**. Timbers were cut weeks ahead and then assembled on the site. The individual sections called bents were raised with poles up to 30 feet long called pike poles. After each bent was raised the girts were connected. With careful planning and plenty of help, a large barn frame could be erected in one day. These barns raisings were often the social event of the year. Men worked while the women cooked enormous meals. After the barn was erected, the eating, socializing and dancing went on for long hours.

(picture courtesy of Trillium Del Timberworks)
This is an example of a timber frame barn being restored.

--information courtesy of Trillium Del Timberworks

Timber Framing Vocabulary

Beam:	a main horizontal member in a building's frame
Braces:	smaller timbers placed diagonally between posts and girts or plates to make a structure more rigid
Common Rafters:	closely and regularly spaced inclined timbers that support the roof covering, independent of the bent system
Girt:	major horizontal timber that connects posts
Plate:	the major horizontal timber which runs from one end of the frame to the other and supports the base of the rafters
Purlin:	a horizontal member of the roof frame which runs between rafters
Rafter:	sloping main timber of the roof frame
Mortise and Tenon:	any joint consisting of a projection (tenon) on the end of one timber and a corresponding slot (mortise) on the other
Peg:	a hardwood dowel usually ranging from 5/8 of an inch to 2 inches in diameter
Tenon:	the projecting end of a timber that is inserted into a mortise
Beetle:	a heavy wooden maul or mallet used in cases in which material would be damaged by a sledge hammer
Come Along:	a hand operated ratcheting wench. Uses include tightening joinery during assembly, as a safety tie and for pulling frame components together during erection
Draw Knife:	a tool having a blade with a handle at each end; by drawing it toward you, you can shave surfaces
Framing Chisel:	large chisel with long, heavy blades: strong enough to be hit with a heavy mallet
Mallet:	a tool like a hammer with a wooden, rawhide or rubber head
Pike:	a long pole with a pointed steel head used in raising bents; also called a barn pole
Slick:	a wide bladed and long handled chisel pushed by hand to create flat surfaces
Bay:	space between two timber bents
Bent:	a structural section of the frame which is composed of a line of vertical posts and the horizontal timbers that connect them
Bent Design:	the functional and artistic pattern of timbers creating the bent
Timber Frame:	a load-carrying structure of timbers ranging in size from 4x4 and up

--vocabulary courtesy of www.dreamingcreek.com