

Description

Under building, in the Webster's Unabridged dictionary, a **truss** is defined as follows: a framework of wood, metal or both for supporting a roof, bridge etc.

An **engineering text book** definition of a truss is as follows:

"A truss consists of a group of ties and struts so designed and connected that they form a structure which acts as a large beam. The members usually form one or more triangles in a single plane and are so arranged that the external loads are applied at the joints and theoretically cause only axial tension or axial compression in the members. The members are assumed to be connected at their joints with frictionless hinges or pins, which allow the members freedom to rotate slightly."

Trusses have been used in bridge building since the middle ages. Trusses are made up of a **top and bottom chord**, diagonals and vertical posts. These are the primary members of the bridge. The top chord of the truss is in *compression*^{*}, the bottom chord in *tension*. *** End diagonals** are in *compression*^{*}, **interior diagonals** can be in either *tension*^{*} or *compression*^{*} depending on the truss type and location of the member. **Vertical posts** are in *tension*.^{*}

Counter bracing or ties are diagonals, present in certain types of trusses, sometimes in the center panel.

Floor beams span transversely from truss panel points. **Stringers** span longitudinally, parallel to the trusses spanning the floorbeams.

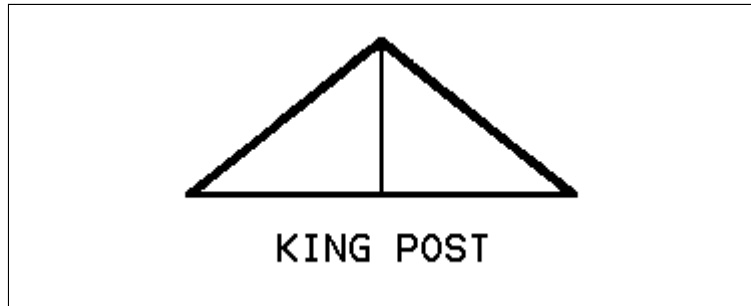
Top and bottom **lateral bracing** and portal bracing, sway bracing and struts are secondary members which help to stiffen the structure.

The **deck** is the surface on which traffic or pedestrians ride or walk.

*** Compression:** to press together or squeeze.

*** Tension:** a.) stress on a material produced by the pull of forces tending to cause extension
b.) a force or combination of forces exerting such a pull against the resistance of the material.

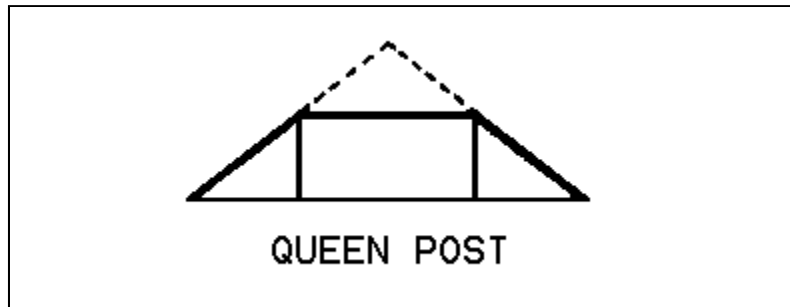
Truss Types



The traditional truss type with its origins in the middle ages. A king post truss is the simplest form of a truss bridge. This type has a bottom chord and two diagonal members meeting at the center of the structure. Some variations have vertical posts or diagonals.

Span Lengths: 20-60 feet

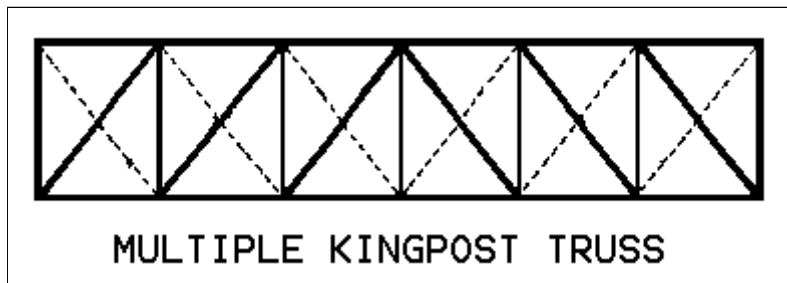
Forge Tappan Tuscarora



A Queen Post Truss a lengthened version of the King Post. The peak of the King Post is replaced by a horizontal top chord. This allows for bridges with longer spans.

Span Lengths: 20-80 feet

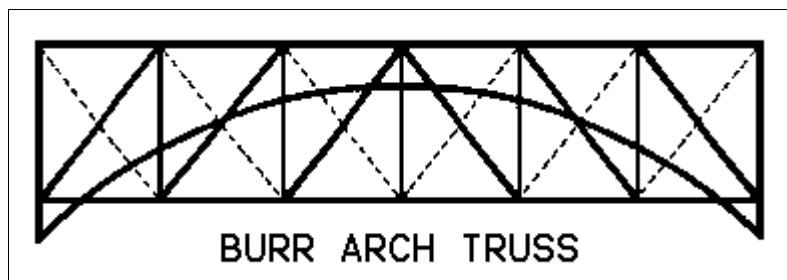
Copeland



A Multiple King Post Truss is series of King Posts trusses symmetrical about the center of the bridge. Bridge spans are longer than that of the King Post.

Span Lengths: 50-100 feet

Salisbury Center



A Burr Arch truss combination of a timber arch and a Multiple King Post.

Span Lengths: 50-175 feet

Perrines Hyde Hall



TOWN LATTICE TRUSS

A Town Lattice Truss is a system of timber diagonals with no verticals. Members take both compression and tension.

Span Lengths: 50-220 feet

Halls
Mill

Beaverkill

Bendo

Van Tran
Flat

New Paltz
Campus

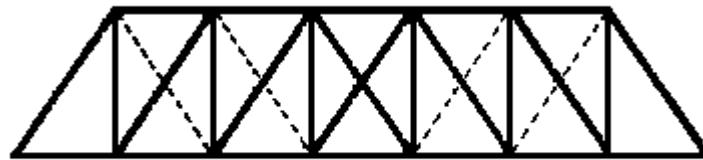
Eagleville

Shushan

Grants
Mill

Campbell

Fitches

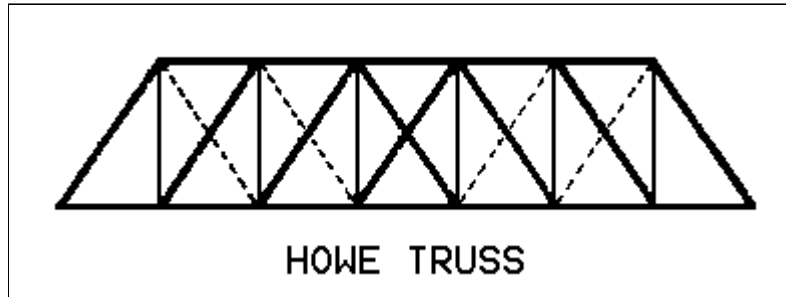


LONG TRUSS

The Long Truss, designed by Colonel Stephen H. Long in 1830 resemble a series of giant X's. All of its members are made of timber.

Span Lengths: 30-220 feet

Blenheim Downsville Hamden



The Howe Truss, invented by William Howe of Spencer of Massachusetts, is made up of timber diagonals and iron verticals.

Span Lengths: 30-150 feet

Jay Buskirk Rexleigh

Truss Diagrams Reference:

Sketches Scanned by permission of **Historic American Engineering Record - National Park Service - Office of Archeology and Historic Preservation - Oct. 1976**

Text Book Reference:

Structural Analysis, by Jack C. McCormac - Fourth Edition



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