



### Abutment

The ground end-support of a bridge, especially to resist the horizontal thrust of an arch.

### Aerodynamic stability

The ability of a bridge deck to withstand wind forces without damage from torsion, or oscillation: most relevant to cable stayed and suspension bridges.

### Anchorage

A secure fixing, usually in mass reinforced concrete, at the extremity of a side-span or anchor arm.

### Back span

The outer suspended section of a suspension bridge from the tower to the anchorage, balancing the central suspended span.

### Beam

A rigid, usually horizontal, structural element which may itself form an entire bridge.

### Bedrock

The solid rock layer beneath sand or silt, especially in a river-bed.

### Box-girder

A beam with a hollow square or rectangular section.

### Brittle fracture

The fracture of steel elements at low temperatures.

### Cable

The staying or suspending bridge element; in modern suspension bridges, the main supporting cable is hung from towers, and from steel wire bound in strands.

### Caisson

A bridge foundation, usually embedded in a riverbed by continuously digging out the material within the bed, so that the caisson sinks.

### Camber

A slight convexity on the road surface.

### Cantilever

A horizontal member fixed at one end and free at the other.

### Cast iron

A brittle alloy with high carbon content: high compressive strength, low tensile strength.

### Cellular construction

In the early 20th century American suspension bridges, the method of constructing towers from relatively small welded steel box units.

### Cement mortar

The mixture of sand, cement, water and lime that binds masonry and brick.

### Center of mass

The point of balance for any object. It's the key to structural stability. The force of gravity pulling at a structure travels along a line through the center of its mass. If the strength of the structure pushes through this same line, then the forces are in balance and the bridge will stay up.

### Chord

The top or bottom horizontal part of a truss.

### Cofferdam

A watertight structure allowing underwater foundations to be built in the dry.

### Composite construction

The use of different materials together in a single structure.

### Compressed-air chamber

The space at the bottom of a caisson, into which air is introduced under pressure to exclude water so that excavation can take place.

### Compression

The pushing force which tends to shorten a member; opposite of tension.

### Compression zone

The area under compression in the upper part of a horizontal beam.

### Compressive strength

The ability of a material to withstand compression.

### Concrete

A mixture of water, sand, stone and a binding element which hardens to a rock-like consistency.

### Creep

The slow permanent deformation of material under stress, as in shrinkage of concrete.

### Creeper crane

The cranes used for building a steel cantilever bridge, moving slowly along the upper chord.

### Dead load

A structure's own weight.

### Environmental load

The external forces on a structure, such as wind and water. Extrados the outer surface of the curve of an arch.

### False work

Temporary scaffolding during construction.

### Fender

A protective enclosure around a pier structure.

### Fill

The material, usually rubble or earth, used to fill the space behind the outer surface of a masonry bridge structure.

### Flange

The flat top and bottom plates of a box-girder.

### Formwork

Temporary boarding to hold concrete in shape while it hardens.

### Galvanizing

The coating of metal with zinc for waterproofing.

### Girder

A large beam, usually steel or concrete.

### Gradient of stress

The theoretically uniform change from purely compressive forces along the top of a beam to purely tensile along the bottom.

### Granite

A hard crystalline rock, suitable for masonry bridges.

### Haunch

The part of an arch between the springing and the crown.

### I-beam

A beam or girder with a I-shaped cross-section.

### Lime mortar

A non-waterproof binding material for masonry, consisting of lime, water and sand.

### Live load

The weight of traffic passing over a bridge.

### Mortar

A non-waterproof binding material for masonry, consisting of lime, water and sand. The mixture of sand, cement, water and lime that binds masonry and brick.



**Navigation span**

The part of a bridge with maximum clearance for shipping.

**Orthotropic deck**

A bridge deck which is stiffer in the direction of the span than it is laterally.

**Oscillation**

The movement, usually vertically, of a suspended bridge deck in the wind.

**Pier**

An intermediate support or the adjacent ends of two bridge spans.

**Portal**

A frame with side uprights connected by a horizontal member at the top.

**Post-tensioning**

The method of making prestressed concrete with steel strands tightened after the concrete has hardened.

**Pre-tensioning**

The method of making prestressed concrete with steel strands under tension as the concrete sets.

**Prefabrication**

The manufacture of structural units in an off-site factory.

**Prestressed concrete**

A modern type of concrete with stretched steel strands embedded in it to impart additional tensile strength.

**Reinforced concrete**

Concrete with steel bars or mesh embedded in it for increased tensile strength.

**Ripple**

The undulating motion of a suspended deck caused by wind.

**Scour**

The destructive effect on submerged piers from fast-flowing water.

**Shear forces**

Any force that tries to cut or slice structural parts of the bridge. A sheet of paper undergoes a shear force when it is cut with a pair of scissors.

**Side-span**

The outer suspended section of a suspension bridge from the tower to the anchorage, balancing the central suspended span.

**Side-sway**

The movement of a suspended bridge deck from side to side in wind.

**Soffit**

The under-surface of any piece of structure.

**Steel**

An alloy of iron with more carbon than wrought iron but less than cast iron, combining the tensile strength of the former with the compressive strength of the latter.

**Stiffening truss**

A truss usually beneath the entire deck of a suspension bridge.

**Strand**

A unit within a suspension bridge cable, itself formed from many individual wires.

**Suspender**

The vertical or zig-zag element on suspension bridges that links a cable with a deck.

**Suspension bridge**

Has a roadway that hangs from two main cables which are attached to supportive towers. Although similar to a cable stayed bridge, suspension bridges are different because their roadbeds are suspended by two sets of cables (the two main cables and the many suspender cables which attach the road to the main cables). This type of bridge can extend for well over 4000 feet.

**T-beam**

A beam or girder with a T-shaped cross-section.

**Tensile strength**

The ability of a material to withstand tension.

**Tension**

The pulling force that tends to lengthen a member.

**Torsion**

The strain produced by twisting.

**Tower**

The vertical element in suspension bridges from which cables are hung.

**Trapezoid**

A four-sided figure with one pair of parallel sides.

**Trusses**

Highly stable beams which form a network of triangles.

**Web**

The side-plates of a box-girder.

**Wire cable**

The staying or suspending bridge element; in modern suspension bridges, the main supporting cable is hung from towers, and from steel wire bound in strands.

**Wrought iron**

Soft and malleable alloy with very low carbon content; low compressive strength, high tensile strength.