

Parts of a Bridge Structure

The first bridges were likely simple logs placed over a stream. They would help people cross over without getting their feet wet. These days, bridges have gotten much more complicated and can span a large canyon or body of water. Engineers, like the ones who work at ADOT, build bridges and other safe structures for vehicles to travel from one place to another.

It takes different types of engineers to build a bridge. First you need a civil engineer to layout the roadway alignment; then a hydraulic engineer to determine if there are any issues related to crossing a waterway; a geotechnical engineer to advise on what type of foundation (abutments) to use; then finally, a structural engineer to design the beams, bridge deck, and other components. Here are some terms to know about bridge building:

Abutment: Abutments are the elements at the ends of a bridge that support it. They absorb many of the forces placed on the bridge and act as retaining walls that prevent the earth under the approach to the bridge from moving.

Approach Slab: A concrete slab below the pavement that extends ten or fifteen feet beyond the edge of the bridge. It helps to gradually transition from the flexible pavement on grade, to the rigid pavement on bridge structure. Providing this gradual transition in stiffness helps to avoid pavement cracks and bumps in the road.

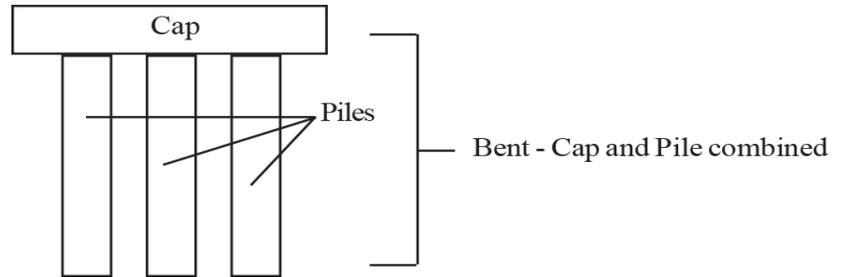
Arch: An arch is a curved structure that spans an open space. Bridges using arches were among the earliest large-scale engineering and construction projects. Arch bridges can span vast areas.



Beam: A long, rigid horizontal support part of a structure.

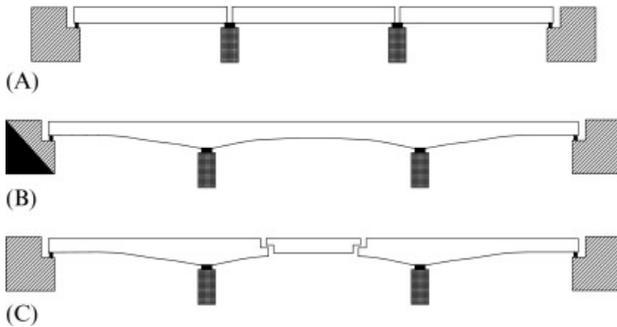
Bearing: A bridge bearing provides a resting surface between the piers of a bridge and its deck. Its purpose is to allow controlled movement between the two surfaces. Some types of bridge bearings allow back-and-forth motion, while others can accommodate twisting.

Bent: This is the combination of the cap and the pile. Together, with other bents, they act as support for the entire bridge.



Bridge: A structure built for vehicles or persons to cross over a road, railway, or water channel.

Cantilever: Cantilevers are structures that project horizontally into space supported on only one end. Smaller cantilevers are simple beams. Larger ones use trusses made from structural steel or box girders built from concrete. Cantilever bridges can span relatively long distances.

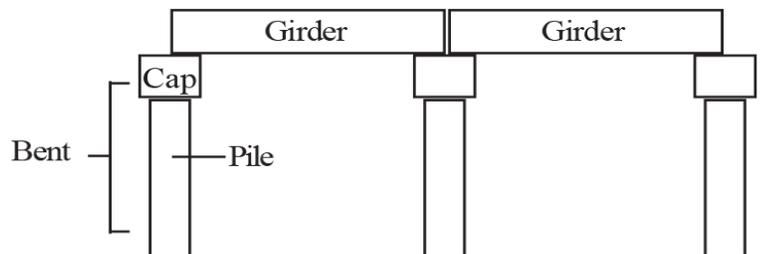


Column: A long, rigid, vertical (upright) support part of the structure.

Deck: The surface of a bridge where vehicles travel. They're generally covered with asphalt, concrete, or some other type of pavement.

Foundation: The foundation (or base) of a bridge is the element that connects the structure to the earth and transfers loads from it to the ground below.

Girder: a rigid horizontal structure and two supports, one at each end, to rest it on. These components directly support the downward weight of the bridge and any traffic traveling over it.

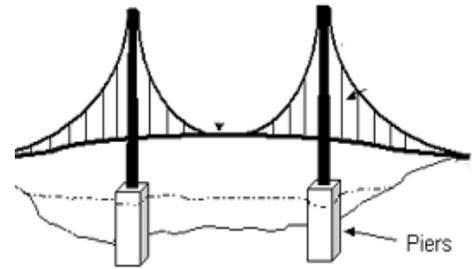


Guardrail: A guard rail is a system used on the sides of bridges — and sometimes, the median — to keep people and vehicles from entering unsafe areas or falling off the edge.

Header: Headers are the vertical forms constructed across the ends of each slab pour.

Low Steel: That point on a bridge which is the lowest part of the superstructure.

Pier: A pier is a raised structure that sits in a body of water to support a bridge. The open structure of a pier allows water to pass through it, preventing pressure from building up against it.

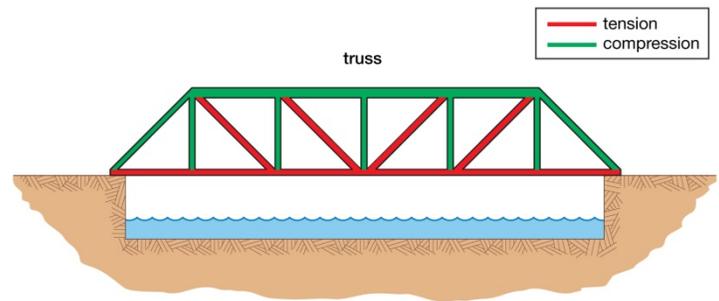


Pile: A pile is a vertical support structure that's used, in part, to hold up a bridge. It can be made of wood, concrete, or steel. A pile is hammered into the soil beneath the bridge until the end of it reaches the hard sub layer of compacted soil or rock below. Piles hammered to this depth leverage the grip and friction of the soil surrounding it to support part of the load of the bridge deck.

Span: The length of the bridge from one pier to another.

Superstructure: The superstructure is the part of the bridge that absorbs the live load. (The abutment, piers, and other support elements are referred to as the substructure.)

Truss: Part of the structure frame based on the geometry of the strength of the triangle.



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