

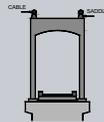
SUSPENSION BRIDGE



SUSPENSION BRIDGES

Of all the bridge types in use today, the suspension bridge allows for the longest spans. At first glance the suspension and cable-stayed bridges may look similar, but they are quite different. Though suspension bridges are leading long span technology today, they are in fact a very old form of bridge. Some primitive examples of suspension bridges use vines and ropes for cables.

A typical suspension bridge is a continuous girder with one or more towers erected above piers in the middle of the span. The girder itself is usually a truss or box girder though in shorter spans, plate girders are not uncommon. At both ends of the bridge large anchorages are placed to hold the ends of the cables.



The main cables are stretched from one anchor over the tops of the tower(s) and attached to the opposite anchor. The cables pass over a special structure known as a saddle. The saddle allows the cables to slide as loads pull from one side or the other and to smoothly transfer the load from the cables to the tower.

From the main cables, smaller cables known as suspender ropes are hung down and attached to the bridge deck.

Thus, unlike normal bridges which rest on piers and abutments, the girder or roadway is actually hanging suspended from the main cables. The majority of the weight of the bridge and any vehicles on it are suspended from the cables. In turn the cables are held up only by the tower(s), there is an incredible amount of weight that the towers must support.

Steel cables are extremely strong yet flexible. Like a very strong piece of string, it is good for hanging or pulling something, but it is useless for trying to push something. Long span suspension bridges, though strong under normal traffic loads, are vulnerable to the forces of winds. Special measures are taken to assure that the bridge does not vibrate or sway excessively under heavy winds.

Where are Suspension Bridges Used?

Suspension Bridges can be used almost anywhere that acceptable tower and anchorage foundation conditions allow. The span lengths of typical existing Suspension Bridges range from 70 to 1000 meters. The longest suspension bridge in the world is presently the Akashi Kaikyo Bridge with a main span of

1991 m. The articulation of the structure allows for a shallow superstructure with open and uncluttered views from the bridge. Though very pleasing in appearance, this bridge type is only cost effective today for the longest of spans.

3.5.3 What They Typically Cost

The typical cost of suspension bridges ranges from \$8,000 to \$9,000 US per square meter.



PARSONS