An Introduction to Bridge Design

Types of Bridge
- Beam Bridges
- Box Girder Bridges
- Arch Bridges
- Truss Bridges
- Suspension Bridges
- Cable Stayed Bridges

Beam Bridges
- Cheap & easy to manufacture
- Not very beautiful
- Beam needs careful design

Box Girder Bridges
- Cheap and cheerful
- Easy to manufacture
- Not very beautiful
- Girder needs careful design

Supporting Beams
- To improve the performance of a simple beam bridge, the beam has to be supported.
- There are three basic ways to do this:
  > Arches
  > Trusses
  > Cables
Arch Bridges

The banks carry the load and keep the ends of the bridge from spreading out

Arch Bridges

- Very strong if well designed
- Can be very beautiful
- Tend to be very heavy
- Need very strong abutments

Truss Bridges

- Are mostly empty space, but very effective
- Solid components (beams, arches etc.) are replaced by triangulated assemblies of thin (usually metal) members
Truss Bridges
😊 Very good strength to weight performance
😊 Possibility of lots of repeated parts reduces manufacturing costs
😊 Can be incorporated into almost any design
😊 Can be very beautiful
😊 Lots of parts to be manufactured

Suspension Bridges
😊 Aesthetic, light and strong
😊 Can span distances far longer than any other kind of bridge
😊 The most expensive bridges to build
😊 Susceptible to “wobble” if badly designed

Suspension Bridge Wobble

Suspension Bridge Wobble
Cable Stayed Bridges

Undeniably beautiful
Compared to suspension bridges...

- Require less cable
- Are easier and faster to build
- Need stronger towers

Parallel attachment pattern
Radial attachment pattern