Introduction
What is a Bridge?
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Some definitions:

“a structure spanning and providing passage over a river, chasm, road, or the like.” [Dictionary.com]

“a structure carrying a pathway or roadway over a depression or obstacle (such as a river)” [Merriam-Webster]

“a structure that is built over a river, road, or railway to allow people and vehicles to cross from one side to the other” [Cambridge Dictionary]

“A bridge is a structure that is built over a railway, river, or road so that people or vehicles can cross from one side to the other.” [Collins Dictionary]

“A structure carrying a road, path, railway, etc. across a river, road, or other obstacle.” [Oxford Dictionary]

“a road, railway, or path that goes over a river, over another road etc, and the structure that supports it” [MacMillan Dictionary]

“A structure spanning and providing passage over a gap or barrier, such as a river or roadway.” [FARLEX]

None of them are complete but they define the basic characteristics of a bridge
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A bridge is a structure
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A bridge provides a passage for vehicles, people, water, materials, utilities, …
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A bridge crosses a natural or manmade obstacle.
Based on traffic carried:

- Road traffic
- Rail traffic  
  (Heavy rail, Light rail)
- Non-motorised traffic  
  (Pedestrians, Cyclists)
- Water  
  (aqueducts, canals)
- Utilities  
  (water, electricity, tele-communications, natural gas)
- Raw Material  
  (conveyor belts)
Bridge Classification

Based on traffic carried:

- **Road traffic**
- **Rail traffic**
  (Heavy rail, Light rail)
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Bridge Classification

Based on typology:
- Slab
- Girder
- Truss
- Frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:
- Slab (Plattenbrücke)
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Based on typology:

- Slab
- **Girder (Balkenbrücke)**
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss (Fachwerkbrücke)
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame (Rahmenbrücke)
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame (Sprengwerk)
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

• Slab
• Girder
• Truss
• Frame
• Strut frame
• Arch (Bogenbrücke)
• Suspension
• Cable-Stayed
• Extradosed
• Underslung
• Stress-ribbon
• Floating
• Movable
• Hybrid systems
Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- **Suspension (Hängebrücke)**
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- **Cable-Stayed (Schrägseilbrücke)**
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems

*clear distinction? (see notes)*
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- **Underslung (Unterspannter Träger)**
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- **Stress-ribbon (Spannbandbrücke)**
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
  - Floating (Schwimmbrücke)
- Movable
- Hybrid systems
Bridge Classification

Based on typology:
- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- **Movable** (Klappbrücke, …)
- Hybrid systems
Bridge Classification

Based on typology:

- Slab
- Girder
- Truss
- Frame
- Strut frame
- Arch
- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on typology:
- Slab
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- Floating
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- Hybrid systems
Bridge Classification

Based on typology:
- Slab
- Girder
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- Suspension
- Cable-Stayed
- Extradosed
- Underslung
- Stress-ribbon
- Floating
- Movable
- Hybrid systems
Bridge Classification

Based on material:

- Masonry
- Timber
- Iron
- Steel
- Concrete
- Composite
  (steel-concrete)
Bridge Classification

Based on material:

- Masonry
- Timber
- Iron
- Steel
- Concrete
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  (steel-concrete)
Bridge Classification

Based on material:

- Masonry
- **Timber**
- Iron
- Steel
- Concrete
- Composite
  (steel-concrete)
Bridge Classification

Based on material:
- Masonry
- Timber
- Iron
- Steel
- Concrete
- Composite (steel-concrete)
Bridge Classification

Based on material:
- Masonry
- Timber
- Iron
- **Steel**
- Concrete
- Composite
  (steel-concrete)
Bridge Classification

Based on material:
- Masonry
- Timber
- Iron
- Steel
- Concrete
- Composite
  (steel-concrete)
Bridge Classification

Based on material:
- Masonry
- Timber
- Iron
- Steel
- Concrete
- Composite
  
  (steel-concrete)
General Characteristics - Nomenclature

Half Section ↔ Half Elevation
General Characteristics - Nomenclature

- Half Section
- Half Elevation

Superstructure
Überbau
General Characteristics - Nomenclature

Half Section ↔ Half Elevation

Substructure
Unterbau
General Characteristics - Nomenclature

- Spread Footing: Flachfundament
- Back Wall: Rückwand (Widerlager-)
- Breast Wall: (hintere) Widerlagermauer
- Wing Wall: Flügelmauer
- Access Chamber: Unterhaltsraum
- Bridge Seat: Auflagerbank
- Approach Embankment: Vorlandbereich
- Half Section
- Half Elevation
- Pile Cap: Pfahlkopfplatte
- Driven Piles: Rammpfähle
- Abutments: Widerlager / Brückenende
General Characteristics - Nomenclature

Half Section ↔ Half Elevation

Drilled (Bored) Piles
Bohrpfähle

Pile Cap
Pfahlkopfplatte

Column
Stütze

Piers
Stützen / Pfeiler
General Characteristics - Nomenclature

- **Expansion Joint**
  - Fahrbahnübergang

- **Bearings**
  - Lager

- **Support and Articulation**
  - Lagerung und Dilatation
General Characteristics - Nomenclature

Deck Slab
Fahrbahnplatte

Intermediate Diaphragm w/ Access Opening
Zwischenquerträger mit Durchstiegsöffnung

End Diaphragm w/ Access Opening
Endquerträger mit Durchstiegsöffnung

Soffit
Untersicht

Span
Spannweite

Girder
Brückenträger

(Concrete Box Girder shown)
(Hohlkastenträger in Beton dargestellt)
Bearings (and expansion joints) are often treated as “accessories”, but this is inappropriate at least for bearings = structural components (see support and articulation).
General Characteristics - Nomenclature

Half Section <-> Half Elevation
General Characteristics - Nomenclature

Typical Girder Section
General Characteristics - Nomenclature

Typical Girder Section

- Deck (Top) Slab: Fahrbahnplatte
- Bottom Slab: Untere Kastenplatte
- Web: Steg
- Diaphragm: Querträger
- Access Opening: Durchstiegsöffnung
- Girder: Brückenträger
General Characteristics - Nomenclature

Typical Girder Section

- Pedestrian Railing
  Geländer
- Pedestrian Railing
  Leitschranke
- Fascia / Edge Beam
  Kappe (D)
- Guard Rail
- Kerb Stone
  Randstein / Schrammbord
- Noise Barrier
  Lärmschutzwand
- Sidewalk
  Gehweg / Randbord
General Characteristics - Nomenclature

- **Leitholm**
- **(Edge) Barrier (Rand-)Leitmauer**
- **Parapet Konsolkopf**
- **Pedestrian Railing Geländer**
- **Guard Rail Leitschranke (einholmig)**
- **Guard Rail Leitschranke (zweiholmig)**
- **Noise Barrier Lärmschutzwand**

**Bridge edges (CH)**
Brückenränder (CH)
General Characteristics - Nomenclature

- surfacing / Wearing Surface
- Belag / Deckbelag
- Sealing Membrane
- Abdichtung (Dichtungsbahn)
- Roadway Fahrbahn
- Profile Grade Line (PGL)
- Strassenachse (Trassierung)
- Inlet (Scupper)
- Einlaufschacht (ES)
- Cross Drain
- Ablaufleitung
- Longitudinal Drain
- Sammelleitung

Typical Girder Section
General Characteristics - Nomenclature

High point Detail
- 3 Layers of Mastic Asphalt
- 3 Schichten Gussasphalt
- Sealing Membrane
- Abdichtung (Dichtungsbahn)

Low point Detail
- 3 Layers of Mastic Asphalt
- 3 Schichten Gussasphalt
- Sealing Membrane
- Abdichtung (Dichtungsbahn)

Inlet (scupper) Detail
- 3 Layers of Mastic Asphalt
- 3 Schichten Gussasphalt
- Sealing Membrane
- Abdichtung (Dichtungsbahn)
General Characteristics - Nomenclature

Typical Girder Section

- **Roadway**
- **Median Barrier** (Mittel-)Leitmauer
- **Roadway** (Fahrbahn)
- (With Median Barrier) (mit Mittelstreifen, Trennung durch Leitmauer)
General Characteristics - Nomenclature

1. **Catenary System Mast**
   - Fahrleitungsmast

2. **Cable Tray**
   - Kabelkanal

3. **Ballast**
   - Schotter(bett)

4. **Drainage**
   - Entwässerung

5. **Utilities**
   - Werkleitungen

6. **Sleeper**
   - Schwelle

7. **Inspection Walkway**
   - Unterhaltssteg

8. **Railway**
   - Eisen-(Bahn)

9. **Service / Escape Way**
   - Dienst-/Fluchtweg

10. **Guard Rail**
    - Geländer

11. **Rail Track**
    - Gleis

12. **Typical Girder Section**
    - (Ballasted Track)
      - (mit Schotterbett)

The typical girder section shows the dimensions:
- Height of the ballast bed: ≥ 400 mm