Classification Based on Main Span Length

- Short Span Bridges (up to 15m)
- Medium Span Bridges (up to 50m)
- Long Span Bridges (50-150m*)
- Extra Long Span Bridges (over 150m*)
  * (or 200 m)

Long & Extra Long Span Bridges

Long Span Bridges:
- Composite Steel Plate Girder Bridge
- Cast-in-place Post-Tensioned concrete Box Girder
- Post-Tensioned Concrete Segmental Construction
- Concrete Arch and Steel Arch

Extra Long Span Bridges:
- Cable Stayed Bridge
- Suspension Bridge

Akashi Kaikyō Bridge
Longest Suspension Bridge (Longest span = 1,991 m)
Russian Russky Bridge
Longest Cable-stayed Bridge (Longest span = 1,104 m)

Chaotianmen Bridge
Longest Steel Arch Bridge (Longest span = 552 m)

Canada Pont de Quebec Bridge
Longest Steel Truss Bridge (Longest span = 549 m)

Wanxian Bridge
Longest Concrete Arch Bridge (Longest span = 420 m)
Shibanpo Bridge
Longest Prestressed Concrete Bridge (Longest span = 330 m)

Brazil Rio-Niterói Bridge
Longest Steel Box/Plate Girder Bridge (Longest span = 300 m)

Economical Span Ranges for Segmental Construction

<table>
<thead>
<tr>
<th>Construction Method</th>
<th>Superstructure Depth – ft (m)</th>
<th>Economical Span Range – ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span-by-span Precast</td>
<td>Constant 6 (1.8)</td>
<td>up to 110 (to 33)</td>
</tr>
<tr>
<td>Precast</td>
<td>Constant 6 to 8 (1.8 to 2.4)</td>
<td>110 - 150 (33 - 45)</td>
</tr>
<tr>
<td>Precast/Cast-in-place</td>
<td>Constant 7 to 12 (2.1 to 3.6)</td>
<td>120 - 160 (36 – 48)</td>
</tr>
<tr>
<td>Incremental Launch Cast-in-place</td>
<td>Constant 8 to 12 (2.4 to 3.6)</td>
<td>up to 240 (to 72)</td>
</tr>
<tr>
<td>Precast</td>
<td>Constant 8 to 10 (2.4 to 3.0)</td>
<td>up to 200 (to 60)</td>
</tr>
<tr>
<td>Progressive Cantilever</td>
<td>Precast</td>
<td></td>
</tr>
<tr>
<td>Balanced Cantilever</td>
<td>Precast</td>
<td>Constant 6 to 12 (1.8 to 3.6)</td>
</tr>
<tr>
<td></td>
<td>Precast</td>
<td>Variable 6 to 20 (1.8 to 6.0)</td>
</tr>
<tr>
<td></td>
<td>Cast-in-place</td>
<td>Variable 6 to 40 (1.8 to 12.0)</td>
</tr>
<tr>
<td></td>
<td>Precast or Cast-in-place</td>
<td>Constant 6 to 15 (1.8 to 4.5)</td>
</tr>
</tbody>
</table>

Span by Span Segmental Construction

- Disadvantage - the capital investment in the equipment for this type of construction is considerable.
- Advantage – quick, simple erection (2-3 spans/wk); Easy geometry control; savings from less MOT; min. user delays; simple design; durable structures
Incrementally Launched Segmental Construction

- Disadvantage - Inefficient use of materials. Stringent dimensional control is an absolute necessity at the stationary casting site. Straight or constant radius. (not recommended)

Progressive Cantilever Segmental Construction

- Note – Various radius. A movable temporary stay arrangement must be used to limit the cantilever stresses during construction to a reasonable level

Free Cantilever Segmental Construction

- Note - The form traveler moves forward on rails attached to the deck of the completed structure and is anchored to the deck at rear.
- 4 to 6 segments/day (45 ft)

Cable Stay Segmental Construction

- Viaduct main span 66.5 m
Post-tensioned Precast Piers

Precast Pier Details & Erection

Single-cell Box with Inclined Struts

Sava River Bridge, Serbia

• Current trends in cross-section design lead to single cell box girders for increasingly wider bridges. Ribs or struts are used to provide additional transverse capacity.
Precast Joints

• **Type A** joints includes cast-in-place concrete joints, wet concrete joints or epoxy joints.
• **Type B** joints consist of dry joints between precast units.

Cast-in-Place Joints

- Reinforcing Bars
- Joint Preparation
- Bulkheads

Grouting top & bottom slab cantilever and continuity tendon

Anchor protection for interior & exterior anchors
PC Construction

- Camber
- Geometry control
- Prestressing parameters
- Erection loads
- Erection equipment
- Casting and erection manuals
- Integrated shop drawings

Cable-Stayed Bridge Construction

- 3 pairs of segments erected in cantilever
  - Epoxied segment joints
  - Segments post-tensioned

Bridge Reconstruction

Bridge Destruction and Construction
- Port Mann Bridge Construction
- Port Mann Bridge Deconstruction

Bridge Replacement
- NJDOT Accelerated Bridge Construction

Bridge Widening
- Illinois Tollway Fox River Bridge