

Chenab Bridge

- Facts about Chenab bridge:
 - Length : 1.3 km
 - Height : 359 m
 - Spans : 17
 - Length of main arch : $\frac{1}{2}$ km
 - Life of the bridge : 120 years
 - Cable cranes were used for erection of steel arches, piers and trestles
 - Track linking :
 - H-beam Sleepers used : 2,487
 - Earth work : 10 Lakh cubic meter
- Quantity of Steel in Tonnes (Deck, Arch, Viaduct and Total)
 - Total Quantity of Steel = 28,660 MT
- Steel welding
 - More than 600 km, that is more than the length of Jammu to Delhi Railway track
- How challenging was the foundation
 - Foundation was a challenge because of weak and plasticity in rock, area was in main boundary thrust zone
 - Strengthening by special anchoring of rock, 66,000 rock and cable bolting, 18,000 special anchoring by Devidac bars
 - 70,000 meter cube concreting, and size of each foundation is more than 1/3rd of the football ground
- Eiffel Tower vs Chenab
 - Chenab Bridge Height = 359m
 - Eiffel Tower Height = 324m
 - Chenab Bridge height from river bed is 35m Higher than Eiffel Tower
- How it has been designed for Earthquake, What will be the impact of Earthquake on Bridge?
 - It was designed by carrying out Seismic Hazard Analysis of Earthquakes in the 350 km radius of the Bridge of the period of 20 years from 1991 to 2011
 - The Bridge will be able to sustain an earthquake of 8 on Richter Scale

- Wind Speed
 - The bridge has been designed for a wind speed of 266 kmph at 3 second gusts.
- Deflection at Highest Wind
 - Max deflection in the bridge is 204 mm.
- How strong is the bridge and how will it be monitored?
 - 143 numbers of sensors have been instrumented to monitor any real time changes or any geological activity, wind and impact of any outer forces
 - Blast load (intensity of bomb blast) of 40 kg TNT sustainability
- How much employment has been generated by the construction of this bridge?
 - 529 lakh mandays of employment
- Cost of Bridge
 - Rs. 1,435 Crores.
- Speed on Bridge
 - The maximum permissible speed (MPS) on the Bridge will be 100kmph. This is the same as the speed of the section.
- When did Work Start
 - First excavation was started in September 2005
- When Work Finished- Stagewise
 - Deck Superstructure of Viaduct portion: 2018
 - Fabrication completed: 2019
 - Closure of the Arch: Apr'2021
 - Golden Joint: 13.08.2022
 - Completion of Deck Superstructure: 22.10.2022
- Challenge encountered in one of the Foundation- ?, Depth of Foundation
 - In Arch foundation (S-50), open joint was encountered which was attended technically by carrying out Consolidation grouting with cement slurry (1:1 to 1:3) and ascertaining the effectiveness of grouting by seismic tomography (seismic waves were sent and uniformity of the strata was ensured).

- Tourist Attraction- What Arrangements?
 - Tourists can have a view of the Bridge from the view point of S-70.
 - Walkways tour over the bridge will be planned for regular tourists, and educational / engineering tours will be planned with details about the architecture and foundation
 - Selfie point and film shooting location will be developed
 - Boating can be arranged in the Chenab river and tourists can have a panoramic view of the bridge.

- Engineers who Designed
 - Dr. Pekka Pulikanen (WSP, Finland) – Substructure
 - Dr. Hoff (LAP, Germany) – Superstructure
 - Prof. T. Sitharaman (IISC, Bengaluru) – Slope stabilisation

- Engineers who supervised
 - Northern Railway side: Sh. B.B.S. Tomar (CE/N/USBRL),
 - working since 9 years on this bridge
 - AFCON side : Sh. Y. Tagore,
 - Joined in 2005 as a young engineer,
 - Now he is a Project Head of Chenab bridge from AFCON side,
 - He got married while posted here, and now has 2 kids
 - His family was residing with him till his kids reached middle school

- Verify once again that it is highest Railway Arch Bridge
 - It is the Highest Railway Bridge. The 3 highest Railway bridges are:
 - Chenab Bridge, J&K, India -359m
 - Najiehe Railway Bridge, Guizhou, China -310m
 - Beipanjiang Railway Bridge, Guizhou, China -295m

- Financial Progress before 2014 and after
 - Financial Progress before 2014 = 297 Cr.
 - Financial Progress after 2014 = 1,144 Cr.