

BRIDGE PROTECTION WORKS AT KOSI RIVER BIHAR, BIHAR, INDIA

Channelling Works

Problem

Kosi river is a trans-boundary river flowing through Nepal and India. It is also one of the largest tributaries of the Ganges. The river basin is surrounded by the ridges, which separates it from the Yarlung Zangbo river in the north, the Gandaki in the west and the Mahananda in the east.

Over the last 250 years, the Kosi River has shifted its course over 120 kilometers from east to west. Its unstable nature has been attributed to the heavy silt it carries during the monsoons. Flooding in India has extreme effects, and the country is second in the world after Bangladesh in deaths due to flooding, accounting for one fifth of global flooding deaths. Kosi is known as the "Sorrow of Bihar" owing to its widespread human sufferings in the past through flooding and frequent changes in course. The river is able to transport its heavy sediment load down the steep gradients and narrow gorges in the mountains and foothills where the gradient is at least ten meters per km. Instead of a single well-defined channel, the river has numerous interlacing channels that shift laterally from time to time.

National Highway-57 spans in the state of Bihar from Muzaffarpur to Purnia. The stretch is a vital link connecting the Northern India to the North Eastern states. Four laning of a bridge on the river Kosi on NH-57 was taken up including its approaches, guide bund and afflux bund.

Solution

Guide bund works and afflux bund were proposed with gabion mattress. Gabion mattress adopted here was of thickness 0.3m, with length varying as 3m, 2m and width of 2m. The gabion mattress are Zn+ PVC coated of mesh type 10x12, 2.7mm/3.7mm mesh wire dia. Approximately 2,00,000 sqm of mattress were provided for protection works as guide bund and afflux bund. In case of guide bund, the apron length extends to about 13m, while the protection on slope spreads to a length of 15m.

Advantages of gabion mattress:

- Durable structures.
- Simple to construct and cost effective.
- Flexibility and self draining.
- The siltation will increase the gravity behaviour of the structures, increasing stability.
- Eco friendly and allow vegetation to grow thorough pores.

Client: National Highway Authority of India

Contractor: Gammon India Pvt. Ltd.

Products used (Qty.)

- Reno Mattress 2,00,000 sqm

Date of construction: 01/2009 - 06/2009

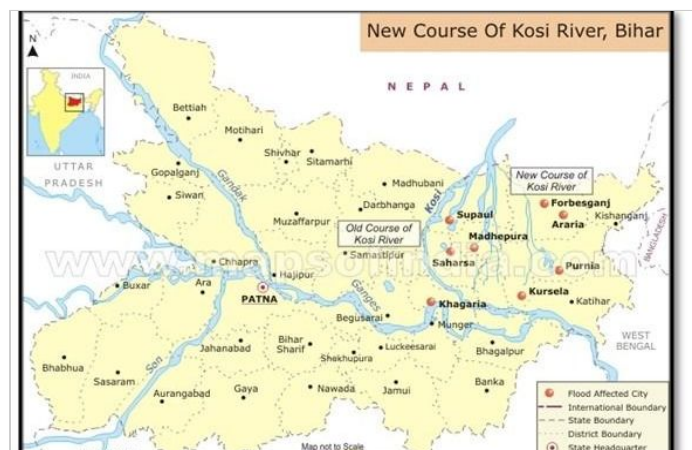


Photo 1: Map showing new course of Kosi river, Bihar



Photo 2: Before construction



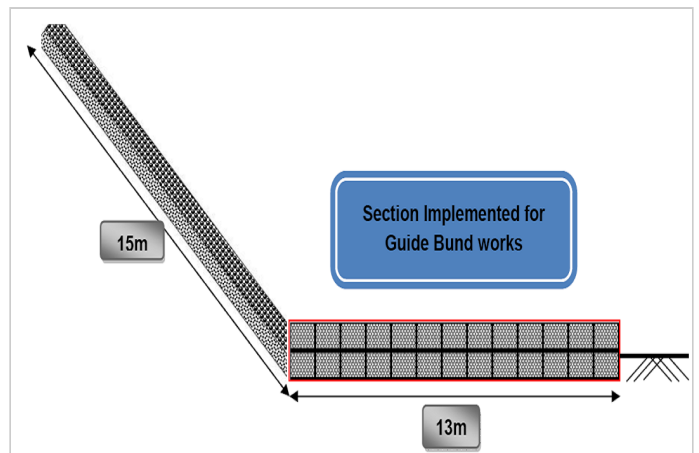
Photo 3: During construction



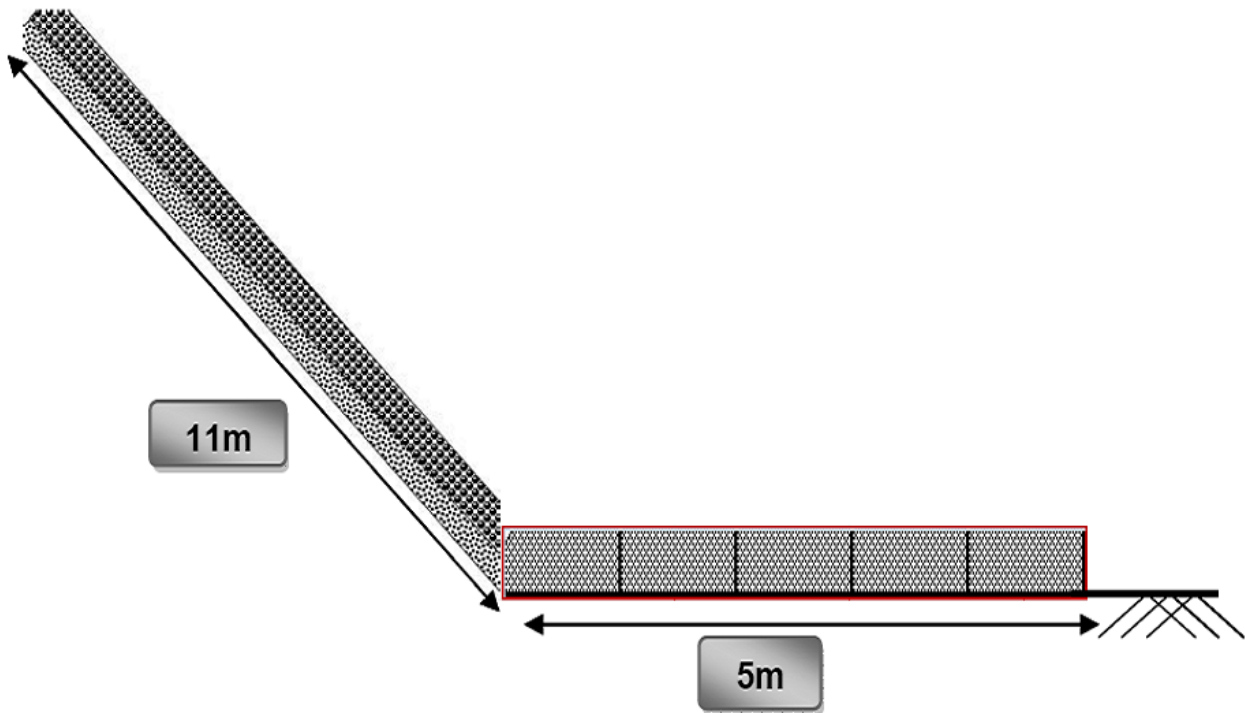
Photo 4: Completed structure



Photo 5: Completed structure



Drawing 1: Section implemented for guide bund works



Drawing 2: Guide bund afflux bund