**ENVIRONMENTAL/ SLOPE PROTECTION**

**Product:** PVC Coated Gabions Mattress

**Problem:**

The 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 monsoon. 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. Unfortunately, Kosi is known as the "Sorrow of Bihar" as it has caused widespread human sufferings in the past through flooding and very 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.

**Solution:**

The 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 200,000 sqm of mattress were provided for protection works as guide bund and afflux bund. Guide bund works and afflux bund were proposed with Gabion mattress. In case of guide bund, the apron length extends to about 13m, while the protection on slope spreads to a length of 15m as indicated in the figures.

**Client name:**
National Highway Authority of India

**Main contractor name:**
Gammon India Pvt. Ltd.

**Consultant:**

**Products used:**

**Construction info:**

**Construction Start:**

**Construction end:**
National Highway-57 spans in the state of Bihar from Muzaffarpur to Purnia. Four laning of a bridge on this NH-57 was taken up including its approaches, guide bund and afflux bund. The total length of the project stretch is 10.635km, including a major bridge across the river Kosi. The project stretch is a vital link connection the Northern states of India to the North Eastern State.
Advantages of Gabion Mattress:

- Structures made with Gabions and Mattresses are durable.
- Simple to construct and cost effective. Their flexibility and self draining characteristics make them preferable to other types of materials in the construction of water front structures.
- The porous nature allows vegetation to take its roots through these structures which will make them more stable and environmental friendly.
- With the passage of time, the siltation will increase the gravity behavior of the structures which will further enhance the Stability of the system.
Present Status: The photographs are taken in November 2011 and depict the present status of the site. Since construction, it has withstood 2-3 monsoon. The pictures clearly indicate the structure is stabilized and vegetation is taking roots.