CASE HISTORY

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REINFORCED SOIL STRUCTURE TO SUPPORT BOW STRING BRIDGE AT KONDAPOCHAMMA SAGAR RESERVOIR, KALESHWARAM, TELANGANA

KALESHWARAM, TELANGANA, INDIA

TECHFAB INDIA

Reinforced Soil Wall

Client:	Products used & Quantity supplied:
GOVERNMENT OF TELANGANA IRRIGATION & C.A.D. DEPARTMENT	• TECHFAB METAL GABION - 8X10 - 2X1X0.8 - ZN+10%AL+PVC - 3000 CUM. • 0.3m THICK TECHFAB METAL GABION MATTRESS - 6X8 - ZN+10%AL+PVC - 1770 SQM. • TECHSTRAP GEOSTRIPS TS40 - 67,450 M • TECHGEO NONWOVEN GTX. PR 40 - 4600 SQM.
Main contractor:	
KNR CONSTRUCTIONS LTD.	
Consultant:	
IITH - PROF. B UMASHANKAR	
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2021

Project brief:

The Kondapochamma Sagar reservoir, located around 50 km from Hyderabad. This reservoir is another milestone in the multi-stage Kaleshwaram Lift Irrigation Scheme (KLIS) and was inaugurated in the last week of May 2020 by Telangana Chief Minister K Chandrashekhar Rao. This reservoir was constructed as part of the Telangana government's efforts to make Godavari a perennial river. The Kondapochamma Sagar reservoir receives water from the Markook surge pool, which in turn receives water from Akkaram pump-house.

The 15.8 kilometre-long Kondapochamma Sagar has a capacity of 15 TMC. Its full-reservoir level is 618 m and is envisaged to provide irrigation to more than two lakh acres of ayacuts through 13 canals.

The end of bow string walkway bridge of reservoir needs to rest about 18m inward (towards reservoir side) from the edge of the top of the embankment at level + 622.300. Hence, a widening over 20m was desired from the top of the embankment. Intake wells were inside the reservoir. To connect the embankment with the intake wells, bowstring bridges were adopted.

The present slope of the embankment was 1V: 2.5H. A steeper slope was needed to accommodate the seating of bowstring walkway bridge over the embankment. In order to create additional space adjoining to this is an existing embankment and to support the bow string walkway bridge, a reinforced soil structure was envisioned.

Photo 1 : Photograph of Reservoir before construction of Reinforced Soil Wall

Solution:

In order to create the additional space, a reinforced soil wall with Gabion fascia and Techstrap Geostrips reinforcement were decided to be adopted after evaluating various available options. The total vertical height of reinforced soil wall to be constructed was 16m (from +606.300 to +622.300). Hence, a two tired reinforced soil wall with no superimposed load from top wall on the bottom wall was found appropriate. Tiered wall ensured minimal reinforcement length to fulfill the need of the site not to disturb the core clay of the embankment.

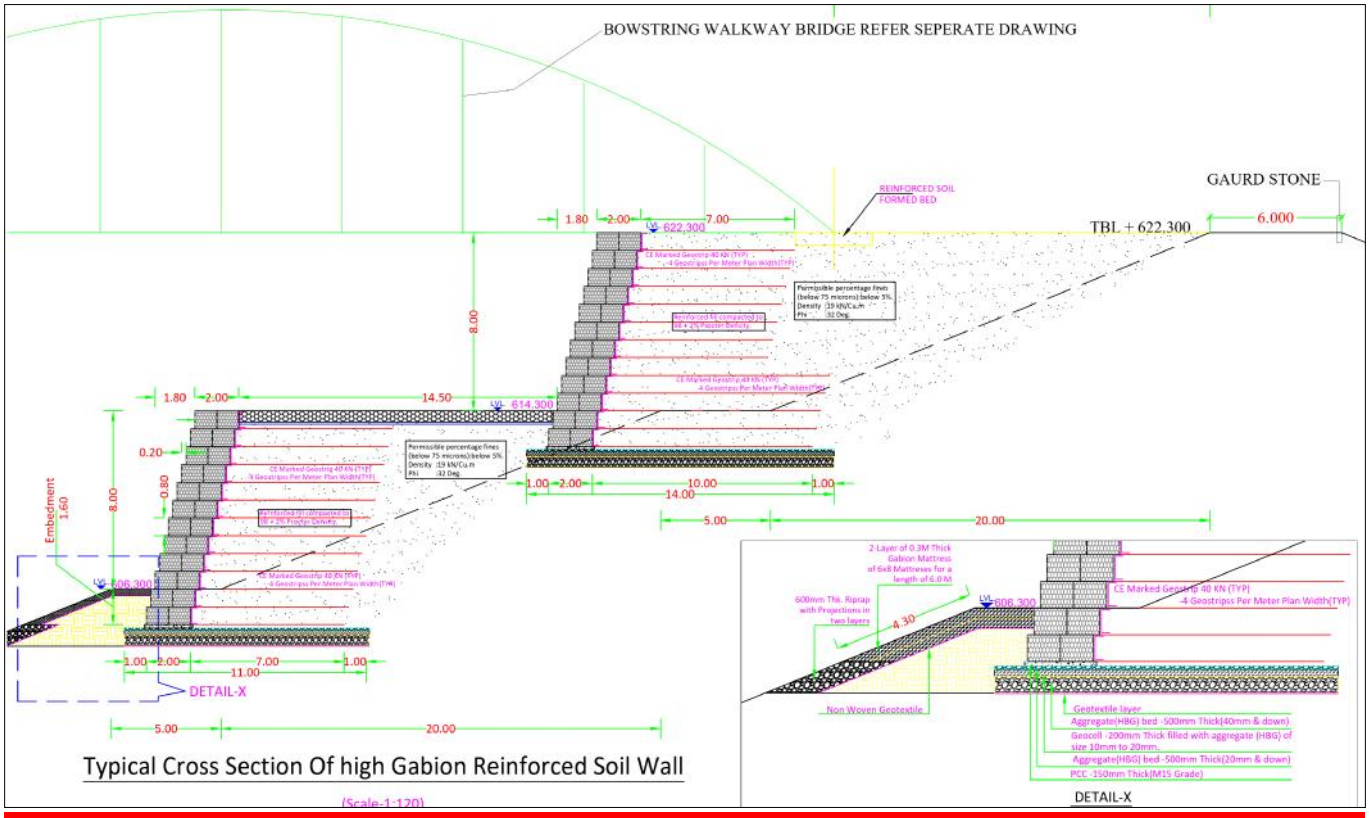
The vertical exposed height was kept at 8.0m and the wall was to be raised to level +622.300 from a level +606.300 leaving a 3m berm in front of the toe of the wall. Considering the sloping surface in front of the reinforced soil wall and a waterfront structure, an embedment of 1.6m was considered.

And a gabion mattress in front of the reinforced soil wall (both top and bottom walls) was recommended to avoid the scour of the toe of the structure. It was proposed to have a graded filling material inside the gabions to protect the backfill from erosion.

TechStrap Geostrips are geosynthetic strips specially engineered for the reinforcement of soils and other fills for the for the construction of reinforced soil walls. TechStrap Geostrips comprise a core of closely packed and tensioned high tenacity polyester filament yarn tendons encased in a sheath of linear low density polyethylene. We have suggested TechStrap Geostrips of tensile strength equal to 40kN (width of 85mm with long-term design strength of 22.3 kN and a coefficient of interaction (conservatively) taken as 0.7- 0.8) is selected for the purpose of designing the structure. The TechStrap Geostrip was more suitable as a soil reinforcement considering the lower possible installation damages to the material.

The structure was designed to take the loading of the bowstring walkway bridge. The wall is a two-tiered wall.

Also we have proposed TechCell Geocell filled with aggregate granular material as a reinforced foundation soil bed to support the loads coming from the bearing plate on the top reinforced soil wall.



Typical Cross Section Drawing of Reinforced Soil Wall

Photo 2 : During Construction - TechStrap Geostrips installation

Photo 3 : Installation of Gabion fascia units on Top wall

Photo 4 : During Construction - Top Wall

Photo 5 : Installation of Gabion fascia units on Top wall

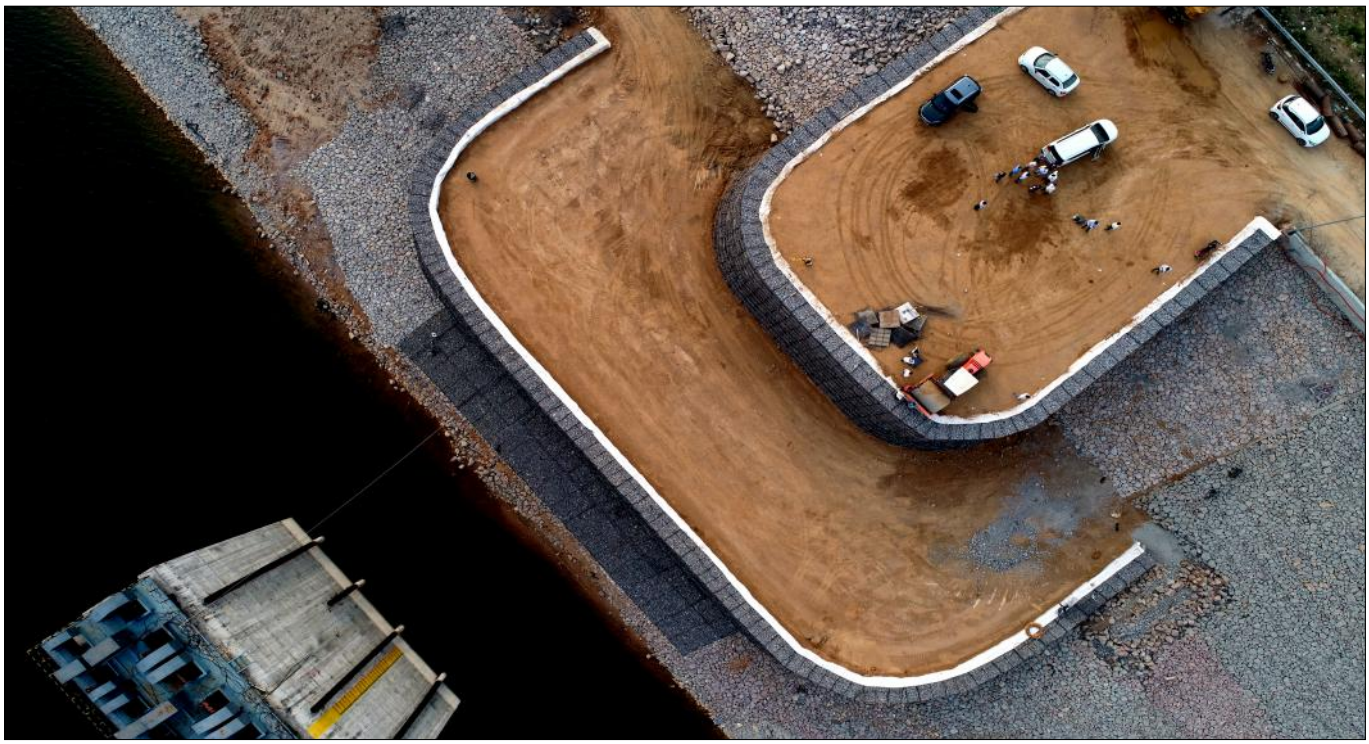


Photo 6 : Top view of the Structure

Photo 7 : Photograph of Completed Structure

Conclusion:

The construction of Reinforced Soil Wall is completed successfully. Extremely satisfied with the structure workmanship and materials, the department has decided to adopt the same system for the other two intake wells.

For further details kindly contact :

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