

CASE HISTORY

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SLOPE PROTECTION OF SWAN RIVER IN THE STATE OF HIMACHAL PRADESH USING TECHGEO PN 30 AS GEOTEXTILE FILTER CLOTH HIMACHAL PRADESH, INDIA



Flood Protection Works

Client:	Products used:
	PP NON WOVEN GEOTEXTILE TECHGEO PN 30
Main contractor:	Quantity Supplied:
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	

Project Description:

The river Swan originates from Joh-Marwari village near Daulatpur Chowk in Amb tehsil in district Una, Himachal Pradesh. The river then flows through district Una and after traversing a distance of 85 km, the river Swan confluences with river Satluj at Anandpur Sahib in Punjab. The Swan River traverses a total distance of 65 km in Himachal Pradesh. The river Swan has a total catchment of 140,000 ha out of which 120,000 (85.7%) ha lies in the Himachal Pradesh. The river is fed by about 73 tributaries during its traverse in Himachal Pradesh.

In district Una, river Swan flows through inter-mountainous valley. The Catchment of river Swan is largely degraded due to significant human interferences. The forests have been cleared to meet the fuelwood, fodder and timber requirements, or for commissioning of various infrastructure projects. This has led to serious drainage problems. As a result, the entire precipitation results in rapid flow into the tributaries which ultimately reach Swan river. It results in flash floods leading to heavy floods causing large scale erosion of land, damage to property and crops, disruption of communication, loss of human lives and livestock, etc. Pebbles, gravel, soil, etc. are deposited in the early reaches of the tributaries and fine sediments consisting of sand, etc. flow with the run off and ultimately get deposited on agriculture fields causing heavy damage to land and property.

The task of flood management of Swan River is therefore of utmost importance. The total cost of the rehabilitation is 160 crores to be funded by Japanese Bank and Govt. of Himachal Pradesh and to be completed within a period of 8 years. The banks are required to be restored & completed by Financial Year 2014. But the authorities are hopeful to get the project completed by Start of Year 2012.

Project Details:

The methodology of River Bank Protection was proposed by M/s WAPCOS using Crated Apron, Geotextile and Stone Pitching on the Embankment. The crated aprons at the toe are so provided Swan River experience flash floods every season.

The project comprises of the following main components:-

- Embankment
- Stone spur
- Sluice gate

Embankments & Spurs

The core of the embankment shall be of clayey soil and spur will be in stones duly filled in wire crates. The top width of embankment is 6m with side slope of 2:1. Free board of 1m is kept and seepage protection is through clay core. The details of various protection measures are given in Table below.

Items	Embankments	Spurs
Stone pitching	30 cm thick with stones in 1.5 m x 1.5 m x 0.3 m size of wire crates	Stone core made up of crates of size 1.5m x 1.5m x 0.3m. Well anchored/ connected to the embankment.
Aprons	Aprons of width 6 m to 10 m of thickness 0.6 m in crates of size 1.5 m x 1.5m x 0.3 m in 2 layers (Average width 6.0 to 7.0 m)	Aprons of width 15 m made up of stones in crates of 1.5m x 1.5m x 0.3 m in single layer.
Filter bed	Conventional Filter Bed shall be replaced by using PP, Non-Woven Needle Punched Geo provided under launch apron and pitching.	Geo-fabric filter under spur and its apron.

Techgeo PN 30 as Geotextile Filter

The proposed Filter Cloth was seen as a replacement of conventional filter media comprising of graded aggregates hence was replaced with more effective PP Non Woven Geotextile of 300 GSM to control the properties as per the requirement of design by M/s WAPCOS.

Separation

TechGeo acts to separate two layers of soil that have different particle size distributions, This prevents base materials from penetrating into underlying soft subgrade soils, thus maintaining design thickness and integrity of the layer.

Filtration

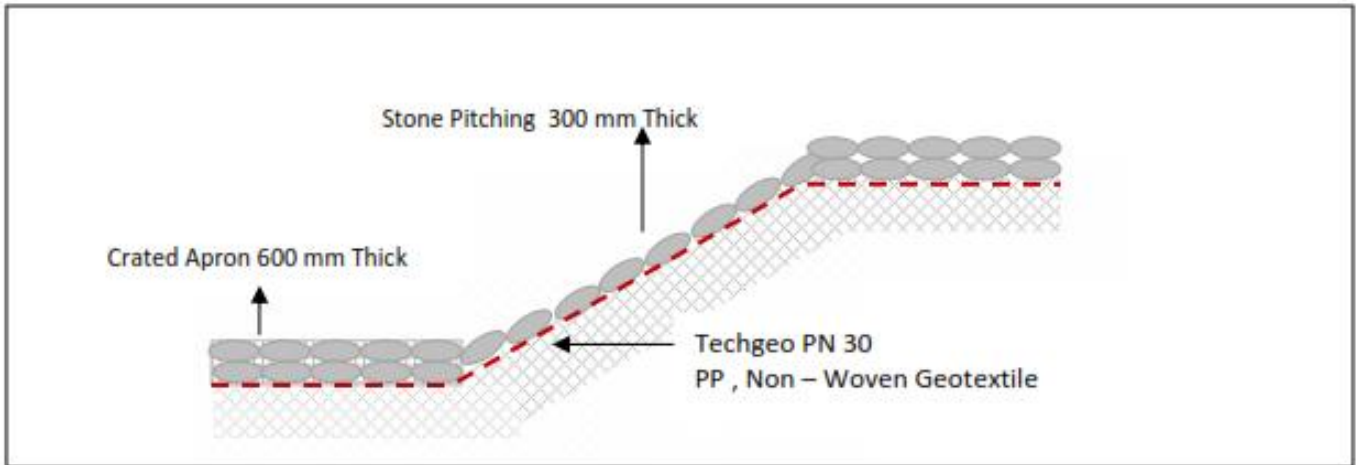
This allows water to move through the soil while retaining all upstream soil particles. It is used to prevent soils from migrating into drainage aggregate or pipes while maintaining flow through the system.

Drainage

TechGeo acts as a drain to carry fluid flow through less permeable soils. It dissipates pore water pressures at the base of embankments.

Property	Test Method	Value
Physical		
Mass per unit area	ASTM D 5261	300g/m ²
Thickness	ASTM D 5199	2.8 mm
Mechanical		
Grab Tensile Strength	ASTM D 4632	1150N
Grab Elongation	ASTM D 4632	50%
Wide Width Tensile Strength	ASTM D 4595	19.00 KN
CBR Puncture	ASTM D 6241	3900 N
Trapezoidal Tear	ASTM D 4533	475 N
Hydraulic		
Apparent Opening Size(dry)	ASTM D4751	150µm
Permeability	ASTM D4491	160 lts/sqm/sec
Endurance		
Ultraviolet resistance @ 500 hours	ASTM D 4355	70%

Specification of Techgeo PN 30



Typical Drawing



APRONS

Aprons of width 6 m to 10 m of thickness 0.6 m in crates of size 1.5 m x 1.5m x 0.3 m in 02 layers (Average width 6.0 to 7.0 m)

STONE PITCHING

300 mm thick with stones in 1.5 m x 1.5 m x 0.3 m size of wire crates

TECHGEO PN 30

PP, Non - Woven Geotextile used as Filter beneath Apron/Stone Pitching



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