



Walls and Slopes Nº 424

Glenmark Pharmaceutical Plant

📍 Gangtok, Sikkim, India

Benefits

40% cost savings
over conventional retaining
structure

2 months
construction time

Reduced carbon footprint
and no use of concrete

Flexible soil structure
with simple construction and
longevity of structure

The hills are alive – and reinforced

A 9m high 52° reinforced soil slope was built at Glenmark Pharmaceutical Ltd manufacturing facility at Samlik Marchak village in the state of Sikkim, India, to replace a failed masonry retaining wall.

CLIENT'S CHALLENGE

Glenmark's manufacturing facility is located in the Sikkim state, North-East India and the hills in this area are part of the Himalayas. Therefore, this region is prone to high seismic activities. The masonry wall that was built around the manufacturing facility towards the valley side developed cracks due to erosion of the toe slope. As a result, the manufacturing facility building was exposed to risk of settlement and possibly instability. The client needed to replace the failed wall and provide erosion control measures, but with minimal dust and business disruption.

TENSAR SOLUTION

After careful review of site conditions and constraints, Tensar suggested a scheme using a steep reinforced soil slope with wrap-around facing along with the need for drainage and erosion control measures at the toe of the slope. This suggested solution allowed the use of locally available soil for construction of the slope structure which reduced the cost of construction. This cost effective, flexible, and eco-friendly scheme was adopted by the consultant and approved by the client.



PROJECT BACKGROUND

Glenmark Pharmaceutical Limited is a leading manufacturer of medicines in India and has multiple production facilities across the country. In Sikkim they have a manufacturing facility at Samlik Marchak village where the region comes under Seismic Zone IV as per the seismic zones of India marked in IS1893 (Part-1)-2016.

This facility is built on hilly terrain and has multiple reinforced concrete and masonry retaining structures. The masonry wall on the north-east side of the site was found to be in distress after the 2019 monsoon. This was very close to the main production building and was posing a risk to the entire plant operations.

Tensar representatives visited the site to assess the condition of the damaged masonry wall, site constraints and subsoil conditions. Tensar reinforced soil solution was suggested to create a steep faced earth retaining structure. Stability was provided by incorporating Tensar uniaxial HDPE geogrids as primary soil reinforcement and Tensar TriAx® geogrids used as secondary reinforcement. Polypropylene bags filled with soil and organic fertiliser (manure) were also used to encourage vegetation growth on the slope face after construction was completed. The suggestion provided by Tensar was based on slope stability analysis using the versatile TensarSlope program.

Main contractor

Abhichandra
Constructions

Consultant

K K Doshi Consultants

Client

Glenmark
Pharmaceutical Limited