



Tensar®

**WALLS
AND SLOPES**

The new embankment provides improved access to the mining operations in a remote, mountainous area of Laos.

Tensar helps provide safe access

Tensar gabions and geogrids enabled an embankment with two existing tunnels and a crest road to be built quickly, easily and economically at a mine in Laos.

CLIENT'S CHALLENGE

The mining and metal producer needed to build a reinforced earth embankment incorporating two road tunnels, and a road along its crest, to improve access to one of its existing mines. The 13m high embankment, with 45° slopes, had to be easy to build by the clients team with limited geotechnical engineering experience.

TENSAR SOLUTION

Tensar's design for the embankment incorporated layers of uniaxial geogrid to reinforce the embankment fill, and used geogrid gabions filled with rock fill to form the face of the steep slopes. The result was fast, simple and economical to build and provided long-term stability to the embankment.

Vientiane

Reinforced soil walls and steep slopes

📍 Vientiane, Laos

BENEFITS

50% Savings

in construction cost

Minimising

material imports by using site-won material

Fast and simple

construction by in-house team with limited geotechnical expertise

REF TEN381



The reinforced soil structure was fast and simple to build, allowing the client to use its in-house construction team, saving time and money.

PROJECT BACKGROUND

The mining companies open cast mine is in a remote mountainous area, over 100km north of Laos' capital, Vientiane, producing copper, gold and silver ore for export across Asia.

The mine owner wanted to improve access by building a 13m high embankment carrying a road along its crest and incorporating two, 40m long, corrugated steel-lined road tunnels. This meant the embankment slopes had to be at least 45°.

The original plan was to build the embankment using site-won rock fill reinforced with geogrid, with grouted rock fill riprap slope facing to provide stability and erosion protection.

Buildability was an issue, as the embankment was going to be constructed by the asset owners in-house team, which had limited geotechnical engineering experience. The interfaces between the riprap, the geogrid and the tunnels were complex, plus compacting the embankment fill without any lateral restraint would be difficult.

Tensar worked with owner to develop an alternative solution, using uniaxial geogrid to reinforce the embankment fill and biaxial geogrid gabions to form the steep slopes. This solution would provide long term stability and protection to the embankment and was far easier to build.

More than 1,000 prefabricated gabions were assembled and filled on site and used with the uniaxial geogrid with a simple frictional connection. The gabions were customised easily to fit tightly around the tunnels and provided lateral restraint during embankment fill compaction.

Loke et al (2016), The Versatility of Geosynthetics in Slope Construction over Fill Tunnels – a case example. Indonesia 2016 Geosynthetics Conference, Jakarta, 10 May 2016

“The Tensar solution enabled the use of site-won material and a local work force, resulting in cost savings of more than 50% and faster construction, compared with the original design.”

Dr Loke Kean Hooi
Business Director - East Asia

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