

## PROJECT STUDY – Lukuia Section, Lohardaga-Tori New B.G. Railway Line Project-Execution works for Rockfall Protection & Slope Stabilization in cuttings of South Eastern Railway

### ABSTRACT:

Lukuia railway section is falling under the South-Eastern Railway jurisdictions, which is one of the 17 railway zones India. The area of the South-Eastern railway characterized by dense forest with high fragile terrain. With view to improve the passenger convenience, Indian Railway decided to protect the cut slope of new railway line from Lohardaga -Tori. This railway line passes through very challenging geological and climate terrain.

### INTRODUCTION:

Primary netting as GPS-H (Ring Net) series and secondary netting as Double Twisted Hexagonal mesh Rockfall protection system have proven system for this type of terrain. This system not only sustain huge load, also reliable for its high tensile strength as well as high bursting strength capacity of rock fall protection series.

### OST SLOPE PROTECTION ENGINEERING INDIA PVT LTD

offers the tensile strength of wire having the strength of 1770 N/mm<sup>2</sup>.

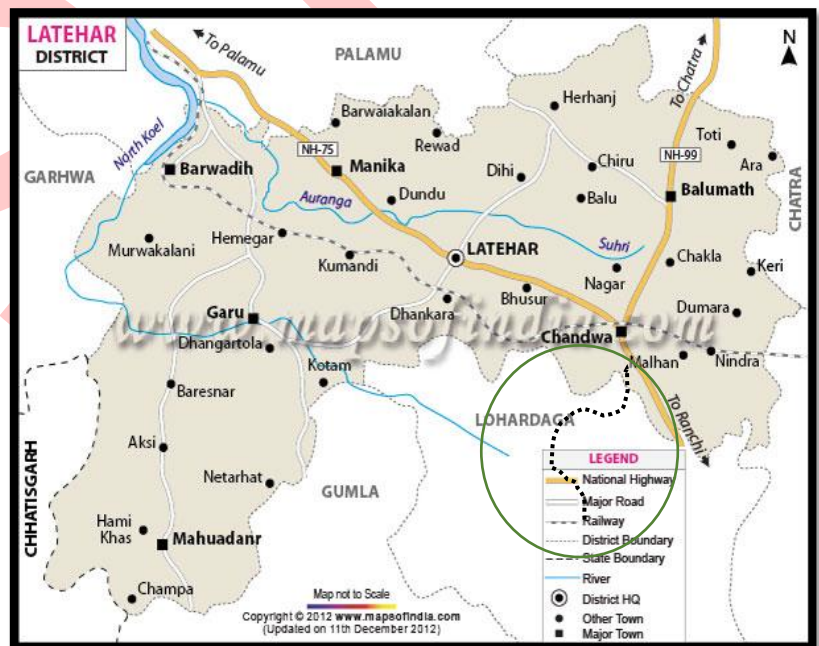


Figure 1 Location Map

## PROBLEMS DEFINE:

To construct new Railway line cutting has been done in Lukuia hilly terrain. Same times the cut slopes are almost vertical to trigger the risk of sudden rock fall on the track. During investigation it was found that the chances of shooting stones and large scale rock block



Figure 2 Initial Condition

failure can occur during rain.

## PROTECTION MEASURES:

After analysis the data and investigate the site situation, it was suggested to adopt secure drapery with suitable anchor and high strength ring net to protect the slope. Ring net not only resistant to high impact of rock also take huge load with maximum flexibility.

OST suggested high tensile Ring net and small aperture size double twisted hexagonal mesh as a secondary mesh. During rain the huge pore water pressure may develop along the joint planes and also the mineral intake water to swell up maximum to change his soil properties drastically to fail the slope. Chance of planer failure



Figure 3 During Installation

along the foliation and it can

generate large volume of earth flow during heavy precipitation. Secure Drapery with suitable anchor and high strength ring net are suitable to protect the slope. The GPS-H (H7 / 3.0 / 300) series high tensile strength ring net with Double twisted hexagonal mesh with top, bottom anchors , vertical & horizontal support rope , lacing wire. The Ring net is made of up 3mm

diameter of high tensile steel wire. The wire is made up of high carbon steel processed by gal-fan anti-corrosion technique. The tensile strength of wire is 1770 N/mm<sup>2</sup>.

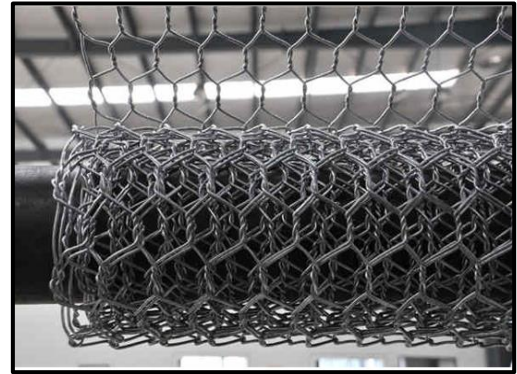


Figure 4 Ring net and double twisted hexagonal net (left to right)

### INSTALLATION:

Slope surface has been prepared before the installation of GPS H panels. Loose and unstable rock particles which could detach easily from the slope surface has been removed. The GPS H panels were hauled to the top of the slope with the help of an electric winch placed at the top of the slope. The top row of anchors has been installed initially then primary net was installed. After that we spread the GPS-H mesh to the surface then starting the surface anchoring finally we have to do the bottom anchoring to protect the slope. Total protection area is 10,000 sqm (approximate).



Figure 5 After Installation Finish

### CONCLUSION:

The GPS-H (H7 / 3.0 / 300) (ring net) rock fall protection system can be adapted to the site specific and static conditions in a very flexible manner.