Geo Environmental Solutions

Being One with Nature

DRAFT CASE STUDY

Slope Stabilization and Rockfall protection work in a deep cutting near Darekasa

Client:

South East Central Railway

GEO ENVIRONMENTAL SOLUTIONS

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1. About GES:

Geo Environmental Solutions (GES) is a specialised company in the Geotechnical and Environmental sector. We are equipped with the latest technologies and expert engineers to tackle the unlike situations in an efficient and smart way. Providing solutions for Geotechnical problems while taking care of environment is the key adopted by Geo Environmental Solutions. Our first objective is to plan the impact of each of our projects on the environment. The Company provides the solutions ranging from project initiation and feasibility, planning, environment and sustainability management, privatization and project advisory, detailed design tendering, project management and construction supervision, commissioning and finally to operation and maintenance.

Designing for the Slope Stabilization and Rockfall Protection work in a deep cutting near Darekasa is the another milestone we have achieved.

2. Location

- The site is located along the BG line near Darekasa Station (approximately 1 Km from Darekasa Station towards western side).
- This serves as the route for Howrah-Mumbai. The section falls under **South East Central Railway zone.**

3. Site description

- The rocks are slightly weathered and fractured with closely spaced joints.
- Mixed type vegetation is also observed at the site.

Fig. 1 Presence of vegetation

Fig. 2 Joint Pattern

Fig. 3 Railway line along slope

4. Analysis

After interpreting the site data, Kinematic analysis and Numerical analysis was carried out to analyse the stability conditons. The solutions provided for different chainages based on the results of analysis are presented in upcoming sections.

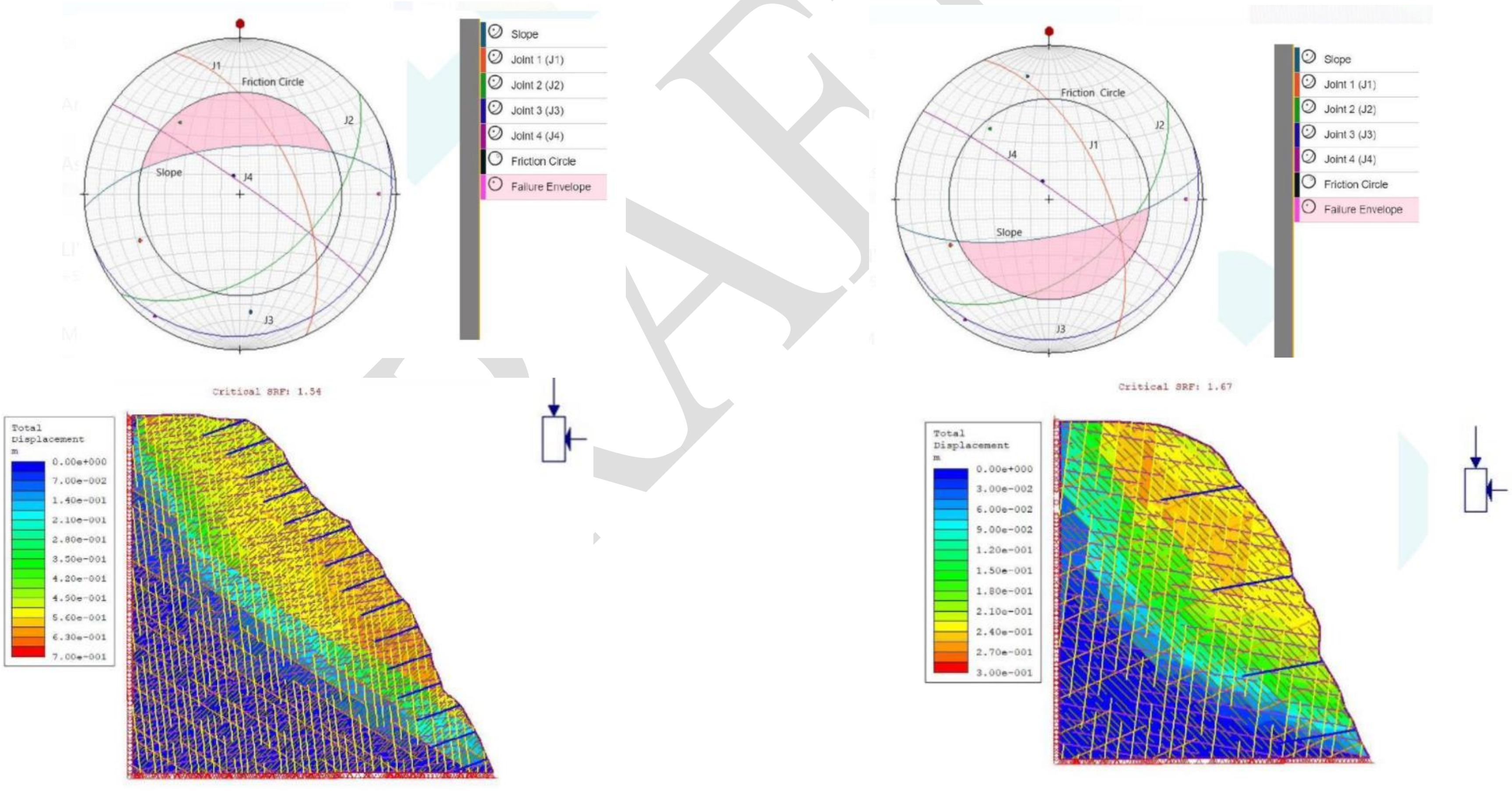
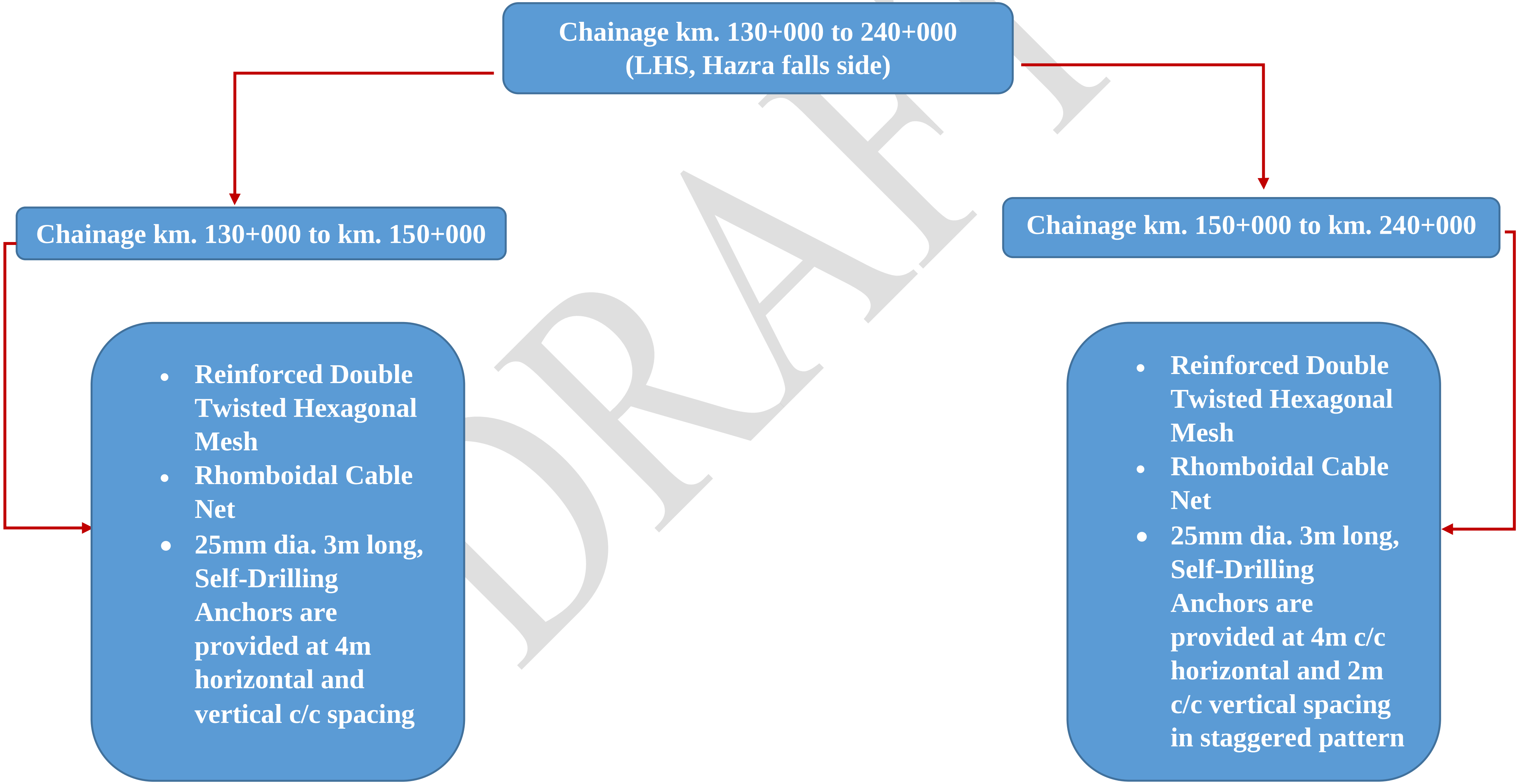


Fig. 4 Kinematic and Numerical Analysis

5. Solutions

The solutions provided for different chainages are presented below.



Chainage km. 90+000 to km. 270+000 (RHS, Tunnel side)

Chainage km. 90+000 to km. 150+000

- **Reinforced Double Twisted Hexagonal Mesh**
- **Rhomboidal Cable Net**
- **25mm dia. and 3m long Self-Drilling Anchors are provided at 4m horizontal and vertical c/c spacing**

Chainage km. 150+000 to km. 230+000

- **Double Twisted Hexagonal Mesh**
- **Rhomboidal Cable Net**
- **25mm dia. 3m long, Self-Drilling Anchors are provided at 4m c/c horizontal and 2m c/c vertical spacing in staggered pattern**

Chainage km. 230+000 to km. 270+000

- **Reinforced Double Twisted Hexagonal Mesh with Bottom Rhomboidal Net line.**
- **25mm dia. self-drilling anchors of 3m length are provided at top and bottom at 4m c/c spacing for top anchors and at 2m c/c spacing for bottom anchors.**

For reducing the water pressure drainage holes are provided. Perforated pipes of 35mm dia. are provided for 1/2 to 1/3 of slope height at spacing of 3 to 10m depending on the location and water flow.

6. Installation of Rockfall protection and Slope stabilization system

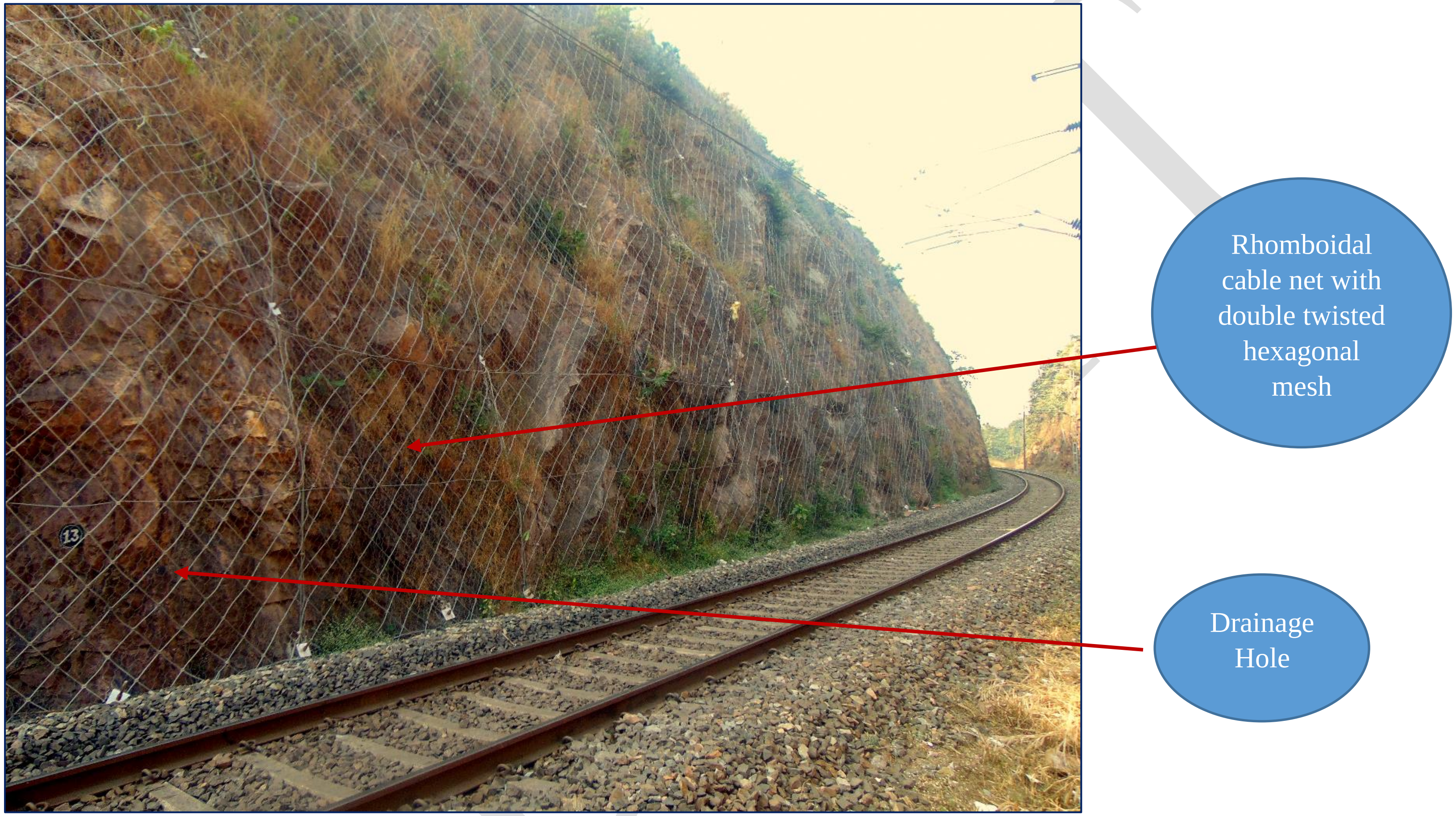


Fig. 5 Protection system

Fig. 6 Protected Slope

7. Conclusion

The rockfall protection and slope stabilization systems designed by **Geo Environmental Solutions** is wetted by IIT. These systems provides proven protection and stabilization against the threat of falling and sliding slope material and currently the railway line is functioning smoothly.