

# CASE STUDY ON SOIL NAILING TECHNIQUE USED BY NHAI ON EMBANKMENT IN KUZHIVILA

<sup>1</sup>Mayur Jain

<sup>1</sup>PG Student in hydraulics and water resource engineering

Delhi Technological University, Delhi

\*\*\*

**Abstract** - Soil Nailing Technique is used at an embankment rather than other alternative technique. This technique is selected by IIT Madras expert in constraints of time, money and availability of material, and durability. The design of soil nailing is done by IIT Madras Expert. Some Alternative technique is compared with soil nailing technique is AKAR PILES & ROOT SYSTEM and finally soil nailing technique is being selected

**Key Words:** soil nailing, Embankment, Akar Piles, Root System

## 1. INTRODUCTION

In Recent years, Soil nailing technique is widely used by geotechnical engineer for stabilizing steep slopes by nailed bar. These bar are usually installed with pressure in pre drilled holes and applied grout on it simultaneously. In our study this technique is applied at site where due to vibration generated by machine on road stretch. Lumps of Soil comes out from an embankments and create risk for the public which use the road. By seeing the condition by NHAI engineer, he stop using vibration machine and stop stretch work on road and by thinking about more risk, nhai officier help from IIT Madras faculty and from so many techniques, soil nailing techniques is being used in guidance of an expert and it is faster in construction and economic

## 2. Soil Nailing Technique And Others Alternatives

Nails is placed inclined forcefully on soil surface by nail injector machine and grout is applied simultaneously for filling the gap between the pre drilled holes and the nailed such that proper fitting of nail possible. soil nailing develop tensile forces. Due to this there is very less chance of losing soil from massive soil. this whole process comes under soil nailing technique.

### 2.1. Alternatives Methods

#### • AKAR PILES

Akar piles is mostly used in malasiya and it is very less used india. The idea of akar piles is generated from tree roots system. this method is combination method say soil nailing and grouting. It can be applied for natural slope and man made slope this method is used where slope failure depth is less than 4 m. first nails is inserted and then grout is applied such that grout makes connect the soil nails with soil. and looks like a tree roots.

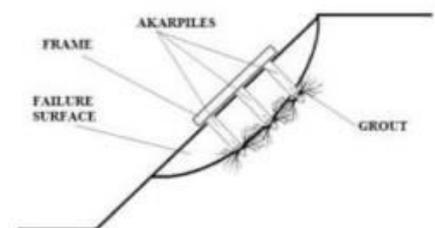


FIGURE 1. Schematic Diagram of AKAR PILES in Slope Stabilization

#### • ROOT SYSTEM

In this method we strength the soil by injecting vejetation and trees in soil, when the roots of trees increasing in soil and deep inside the soil then strength of ground is increasing it is simple but times consuming

### 3. DESIN DETAILS OF SOIL NAILING

The design details is developed by an IIT Madras Faculty and it is followed by NHAI Team

The design parameters are given below :

SR.NO	Parameters	Details
1	Type of soil	$\phi$ – soil
2	Angle of internal friction	30 <sup>0</sup>
3	Vertical height of slopes	16
4	Angle of slopes with vertical	10 <sup>0</sup>
5	Cohesion	0
6	Method of soil nailing	Grouted Nail
7	Horizontal and vertical space of nailing	1 m
8	Length of nail	6.4 m
9	Material of nail	Tor - Steel
10	Diameter of nail	25 mm
11	Bore Hole Diameter	100 mm
12	Mix Design	1:1.5:3
13	F.O.S	2.5
14	Inclination of nail with horizontal	10 <sup>0</sup>
15	Facing	Chicken Mesh

### 4. CONCLUSIONS

Soil nailing technique is widely used in india. And hence for our problem soil nailing technique is best suited for problem for vertical height of slopes more than 4 m

### ACKNOWLEDGEMENT

We would like to thank NHAI engineer mr suraj singh for providing data for soil nails walls used in present study

### REFERENCES

- [1]. Babu, GL Sivakumar, R. S. Rao, and S. M. Dasaka. "Stabilisation of vertical cut supporting a retaining wall using soil nailing: a case study." Proceedings of the Institution of Civil Engineers - Ground Improvement 11.3 (2007): 157-162.
- [2] Chun - Lan Lim, Chee – Ming Chan "An alternative soil nailing system for slope stabilization: Akarpiles" Cite as: AIP Conference Proceedings 1903, 090007 (2017); <https://doi.org/10.1063/1.5011610> Published Online: 14 November 2017
- [3]. Lazarte, C. A., Robinson, H., Gómez, J. E., Baxter, A., Cadden, A., & Berg, R. (2015). Soil Nail Walls Reference Manual (No. FHWA-NH I-14-007)