PROTECTION TO THE SIDE SLOPES OF KABINI CANAL

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ABSTRACT:

Erosion of embankment slopes is being increasingly recognised as a problem needing effective and economical solution. It was found that Coir Netting, by promoting growth of vegetation, successfully controlled slopes erosion

1. INTRODUCTION:

Riverbank erosion problem is becoming acute in many alluvial rivers in India. Proper remedial measures need to be carried out, to prevent such bank erosion. The embankment slopes suffer extensive damages due to erosion from rainfall and flowing water. Gully erosion, Formation of Rills, Sheet Erosion and Toe Erosion are some of the forms of these damages. Controlling the erosion of fertile layer of topsoil is one of the mankind's foremost problems. Erosion consists of the loosing and transportation of soil particles. A heavy thunderstorm will throw into air up to 250 tons per hectare of topsoil and flowing water which can no longer be absorbed by the soil causes rills and gullies. The land and vegetation disturbances due to deforestation, mining and construction create conditions for accelerated erosion. Rainfall, agricultural and forestry disturbances cause India to loose 6000 million tons of precious topsoil annually (27% of India's land area is subjected to erosion).

2. PROPERTIES OF COIR FIBRE:

Coir is a biodegradable organic fibre material containing 46% lignin and 54% cellulose. Because of its high content of lignin, coir is much more advantageous in different applications for erosion control-reinforcement stabilization than other natural fibres. The fibre is hygroscopic and its moisture content is 10-12% at 65% relative humidity and 22 – 55% at 95% relative humidity. Of all natural fibres Coir has the greatest tearing strength and retains this property even in wet conditions.

3. MECHANISM OF EROSION CONTROL BY VEGETATION GROWTH:

The presence of netting on the slope controls the surface erosion in the following ways.

(a) The surface run-off gets divided into a number of small paths due to the numerous obstructions caused by the presence of netting. As a result, the overall damaging impact of flowing water is reduced.
(b) The soil and seeds are thereby preserved in place providing increased chances for germination and growth of vegetation.

The slope once covered with vegetation prevents the erosion in a number of ways. The vegetation cover on the slope reduces the impact of falling rain drops and retards the velocity of running water. The root network that penetrates deep into the soil, binds the soil particles together to improve the resistance to erosion and thereby improves the stability against failure of the slope.

3.1 Technique of Surface Control Using Coir Netting.

The slope is first leveled to remove any unevenness present like deep irregular gullies, projecting stones. Earth work excavation and gravel backing to be done, wherever necessary. A suitable fertilizer is mixed with the soil at the rate of 0.5 kg/10 sq. mtrs. Seeds of selected variety of deep rooted and quick growing grass are then spread over the slopes. Half the quantity of seeds is spread prior to covering of the slopes with netting and the other half subsequent to laying of the netting. The rolls of the Coir Netting are spread out of the slope and each roll is given overlapping of 4" with the adjacent one, and anchored firmly into the ground by steel staples.

3.1.1 Anchor Slot

Bury up the channel end in trench to 6" deep. Fix coir netting using staples (ref.3.3) at 6" intervals as shown in figure 1.

3.1.2 Junction overlap (joining two rolls)

Down-channel end of installed roll should overlap upchannel end of roll being installed. Overlap should be 18". The coir netting to be fixed at the intervals of 6" using staples as shown in figure-2.

3.1.3 Anchoring Ends at Structures

Cut trench 6" deep up-channel side of structure. Place Coir Netting on structure. Place beginning strip in trench in "J" fashion, as shown in figure 3.

Fill and tamp trench. Roll coir-netting up-channel at anchor ends at structure by using staples at the regular intervals of 6".

3.2 Hints about spreading grass for the control of erosions

On the top, catch drain or draining rainwater must be dug, at about 5' – 6'd before the edge. The surface, the chain groove must be dug for draining the rainwater as shown in figure 4. The Coir Net must be spread and pegged suitably, so as to have a firm touch with the soil all over. The grass by name Eragrostis Curvul, i.e. weeping lane grass or Digitaria Decumbens lane grass may be dibbled at 2" below the soil in every hole of the coir net with a packing of 6" x 6" as shown in 5. Soil mixed farm yard manure (decamped manure) must be spread to cover the entire surface.

3.3 How to staple coir netting

A team of two persons is the most efficient way to install staples. While one man drives the staples, the other walks ahead of him, carrying the staples and pushes them into the soil as far as possible by hand at correct intervals. Staples are inserted at intervals not greater than 3 to 4 feet along overlaps and down centre.

5. CONCLUSION:

The above full-scale field trail establishes the effectiveness of coir netting for erosion control. The process is not only simple and quick but also very economical, saving more than 50% in cost compared to conventional gravel lining process. The colour of the coir fibre is not a criterion for erosion control application. This is sure to give a fillip to the brown coir sector considering the abundant potential that lay untapped in the field of Geo-textiles.

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