

Effectiveness of Jute Geotextiles for Hill Slope Stabilization in Adverse Climatic Condition

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Abstract : Effectiveness of Jute Geotextiles (JGT) in hill slope management now stands substantiated. The reasons of its efficacy are attributed to its bio-degradability, hygroscopic property and its thickness. Usually open weave JGT is used for slope management. Thickness of JGT helps in reducing the velocity of surface run-off, thus curbing the extent of migration of soil particles detached as a result of kinetic energy of rain-drops and also of wind effects. Initially JGT acts as cover of the surface of slope thus protect movement of loose soil particles. Hygroscopic property of jute effects overland storage of the flow. JGT acts as mulch and creates a congenial micro-climate that fosters quick growth of vegetation on bio-degradation. In fact JGT plays an important role in bio-remediation of slope-erosion problems. Considering the environmental aftermath, JGT is the preferred option in developed countries for surface soil conservation against erosion. In India JGT has not been tried in low temperature zones at high altitudes where temperature goes below the freezing point (even below - 25° Celsius). The behavior of JGT in such low-temperature zones is not precisely known. The 16th BRTF of Project Himank of Border Roads Organization (BRO) has recently taken the initiative to try two varieties of JGT , ie, 292 gsm and 500 gsm at two different places for hill slope management in Leh, a high altitude place of about 2,660 mtrs and 4900 mtrs above MSL respectively in Jammu & Kashmir where erosion is caused more as a result of rapid movement of sand particles due to high wind (wind erosion. Soil particles of the region formed naturally by weathering of fragile rocks are usually loosely bonded (non-cohesive), undergo dissociation with the rise in wind force and kinetic energy of rain drops and are blown away by wind. Open weave JGT interestingly was observed to contain the dissociated soil particles within its pores and lend stability the affected soil mass to a great extent thus preventing its movement by extraneous agents such as wind. The paper delineates about climatic factors, type of JGT used and the prevailing site conditions with an attempt to analyze the mechanism of functioning of JGT in low temperature zones.

Keywords : climate, erosion, jutegeotextile, stabilize

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