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Use of Soil nailing Technique in Stabilizing the Natural Slopes in Central Sri Lanka

Slope failures are a common occurrence in many parts of the hill country in the periods of heavy rain causing loss of lives and property. Remedial measures taken have not been effective in some cases. Therefore it is necessary to develop new methods to stabilize such slopes.

Soil Nailing is a practical and cost effective technique to stabilize slopes and embankments through the introduction of reinforcing elements in to soil mass. Nails can be driven or inserted into pre-drilled holes followed by grouting. Nails are not stressed initially, but as the soil mass moves, tensile forces are mobilized in them to stabilize the slope. The technique is widely used in many countries around the world and the proven adveantages of low cost, speed of construction, design and construction flexibility and compatibility with the environment led us to investigate the applicability of the technique to Sri Lankan conditions.

Main objective of the research is to study the behaviour of soil nailed structures in Sri Lankan conditions and to find the improvements achievable in the stability of the slope Records from the past slope failures n=have shown that the failure surfaces in these lateritic formations are sometimes non circular. Therefore two analytical models were developed considering both circular and non circular modes of failure. The two models utilize the Bishop,s simplified method and the Janbu's simplified method respectively. Parametric studies were done to illustrate the potential of soil nailing technique.

Laboratory test programs were conducted to obtain the pullout resistance of nails in Sandysoils and in lateritic soils. Pullout resistance was expressed in terms of the bond coefficient fb. As the second phase of the research, laboratory model slopes will be constructed and loaded to failure. Data relating to the failure surfaces will be recorded and the models slopes will be bank analtzed using the models developed. A model slope without nails was already tested with a sandy soil.

In the final phase, soil nailing arrangements will be designed to stabilize some critical slopes in the hill country and the effectiveness of the technique will be evaluated.