CHAPTER 2

OBJECTIVES AND SCOPE OF THE INVESTIGATION

2.1 GENERAL

Availability of good subgrade soil is of primary concern in the design and construction of highway projects. Indian Roads Congress (IRC: 37-2001) specifies that the subgrade soil should have a California Bearing Ratio (CBR) of minimum two per cent. Also, where the California Bearing Ratio of the subgrade is less than two per cent, a capping layer of 150mm thickness of material with a minimum CBR of ten per cent shall be provided in addition to the sub base layer. Ground improvement technology has played a very important role in solving many of the major geotechnical problems in highway constructions as well as in other civil engineering fields. The uses of geosynthetic reinforcement as a basal reinforcement in the construction of embankments over soft soils and basal mattresses for the construction of roads over fills and shallow soft deposits have been well established. Over the last two decades, the use of geotextiles has received a tremendous application in the highway construction in many developing and developed nations of the world. The main functions which geotextile serve in highway construction are separation, reinforcement and filtration / drainage. The major disadvantage with polymeric geotextiles is that they are liable to pose environmental problems in the long run.

The availability and low cost of coir fibre make it an eco-friendly material, which suits geotechnical applications. To protect this need based / appropriate technology for rural development, more research work in this area with well-documented laboratory studies are warranted.
A number of published works are available which deal with different types of geosynthetics being used for separation, filtration, reinforcement, etc. But the data related to natural geotextiles is only very limited. This is particularly true with respect to the application of coir geotextiles used in road construction. Most of the works with coir geotextiles consist of applications in slope protection and erosion control. Hence there is a need for conducting studies to exploit the potential use of coir geotextiles as a highway construction material. The objectives and scope of the present study have been outlined in the following sections.

2.2 OBJECTIVES

The objective of the present study is to explore the possibility of utilising coir geotextiles for the construction of unpaved roads and embankments, after studying the functions and mechanism of coir geotextiles as separators, reinforcement, and for filtration / drainage.

This is achieved by conducting extensive laboratory investigations, which include the following:

- Estimation of the interface friction characteristics of coir geotextiles when placed in subgrade.

- Study of the strength behaviour of coir geotextile reinforced subgrades.

- Study of the effect of coir geotextiles on bearing capacity of soil.

- Analysis of the rut behaviour of coir geotextile reinforced unpaved road sections under static as well as repetitive wheel loads.

- Study of the performance characteristics of coir geotextile vertical drains.
• Evaluation of the strength and compressibility characteristics of coir fibre reinforced soil.

2.3 SCOPe

The present study focuses mainly on the applicability of coir geotextiles in satisfying the different functions of coir geotextiles, with respect to the unpaved roads and embankments. Coir geotextiles are widely used for improving the slope stability and slope protection of embankment. However, this aspect is not considered in the present investigation since sufficient studies have already been reported in this area.

The scope of the study is limited to the following with respect to materials used:

• The study is restricted to the use of three types of coir geotextiles designated as H2M6, H2M8 (both Woven type) and AGL C/201 (Non - woven type) procured from M/s Aspinwall Pvt. Ltd, Alappuzha, Kerala.

• Four types of soil (red earth from Palakkad and Kochi, clayey silt from Kochi and river sand from Pattambi), granite aggregates and screenings from a local quarry in Palakkad were used for the experiments.