PREFACE

Expansive black cotton soils occur in the arid and semi-arid regions of the world. These soils experience large moisture related volume changes during dry and wet seasons. The high swell shrink potentials of expansive soils pose severe problems to dwelling houses, foundations, road ways, air ways, canals, embankment etc. Existing practice with heavy reinforced cement concrete and deep foundations costing hefty to the commons particularly in the rural areas. Therefore, there is a need to find an alternate method to the existing expensive method to amend the shrink swell soil with an economically viable using the locally available materials, the research study is proposed with the title “Studies on physico-mechanical properties of the amended expansive clay solid” and the thesis is organized in the following way.

Chapter-I: The proposed research programme is organized under different headings. In the introductory chapter salient problems posed due to expansive property of the black cotton soil is addressed. Also the importance of the remedial measures which is affordable to the commons is proposed to tackle with the three different objectives related to the shrink-swell behavior of the black cotton soils and the different non-swell soils used as a replacement material.

Chapter-II: In this chapter, a detailed review of literature performed towards the subject related to the soil mechanics is provided. The review is broadly made on the themes of mineralogical studies, physical properties of soils (including black cotton soils), amendments and engineering behaviors. Little more emphasis is given for laterite
materials as there is good number of different range laterite material included in the study.

**Chapter-III** : Chapter-III presents a detailed experimental programme of the study. The procedure used while identifying the ideal soil replacement as an amendment to the expansive soil, the procedure followed while conducting the experiments, also the means and ways of interpreting the results through the well practiced standard procedures are elaborated.

**Chapter-IV** : Chapter-IV comprises results and discussions, which examines the various properties governing the shrink-swell behaviour of the expansive soils. Identification of the different soils by their individual as well interactive physical and engineering behaviour are presented. The results tabled are presented and discussed with the related work carried out elsewhere. Chapter-IV examined the possibility of ideal soil replacement after testing soils of different regions. Most important physical properties are the soil classification based on AASHTO system. Atterberg’s limits and specific gravity. Popular engineering properties considered while planning and design of constructions are adopted for the study. The different engineering properties studied are swell pressure, shear strength, CBR, hydraulic conductivity and compaction property. The individual sample, the combination of swell and non-swell samples are subjected for the study.

**Chapter-V** : This chapter consists of the summary of the results, conclusions, future line of work and publications.
Chapter-VI : This section incorporate the references which are included in the reviews as well coated in the other chapters.

Chapter-VII : The detailed observations of the individual samples are presented through the standard record format sheet.