CHAPTER

2

STABILISATION OF LATERITE SOIL USING CANLITE SOIL STABILISER

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2.1 INTRODUCTION

The use of soil is an inevitable element in the construction process especially in developing countries. It is used extensively as a construction material in the building of roads, dams, embankments and airfields. According to Whitlow (2001), the properties of the materials need to be measured and evaluated before they are used and this has somehow imposed quality control measures in ensuring a quality product. In this sense, it is worth realising that the strength of the soils varies according to the different types of soils. Indeed, there are a wide variety of soils in Malaysia; one of the special soils is called laterite soil.

Laterite soils are found abundantly in Tropicana countries such as Malaysia. Laterite soil is well known in Asian countries as a building material for more than 1000 years and the temples in Angkor are a famous example of this early use. Generally, laterite soils are regarded as good foundation materials as they are virtually non-swelling (Alhassan, 2008). However, they contain an amount of clay minerals in which their strength and stability could not be guaranteed under loads,

especially under the presence of water (Oluremi et al., 2012). When laterite soil consists of high plastic clay, the plasticity of soil may cause cracks and damage on building foundations, pavement, highways, or any other construction projects. It is therefore important, to understand the behaviour of laterite soil and thus, determine the method of soil stabilisation.

Soil stabilisation has been introduced by researchers a long time ago in the geotechnical engineering field. Soil stabilisation is the process of improving the physical and engineering properties of soil to obtain some predetermined targets (Eisazadeh et al., 2010). Basically, mechanical stabilisation refers more to the compaction in the site while chemical stabilisation is using additives as an agent of stabilisation. Both of these stabilisation methods are to increase soil strength parameters and loading capacity and decreasing the settlement seem to be a more popular choice. This is due to its low cost and convenience, particularly in geotechnical projects that require a high volume of soil improvement.

2.2 MATERIALS

Despite of traditional chemical stabiliser, polymer emulsion which is considered the non-traditional chemical stabiliser has been introduced recently. The function of polymers is to enhance the strength of the soil; it is especially suitable to increase the strength of silty-sand soil under wet and dry conditions. Among the polymer emulsions, canlite and probase have been studied by many researchers recently such as Latifi et al. (2013) and Marto et al. (2013) in terms of laterite stabilisation.

In this study, a new polymer soil stabiliser namely canlite (SS299) has been introduced at various percentages of 2%, 8%, and 16% respectively. This chemical stabiliser is suitable for all types of soil-based construction. Therefore, the aim of this research is to study the behaviour of canlite-treated laterite soil in comparison with untreated laterite soil. The liquid polymer soil stabiliser which has been used in this research is canlite (SS299). This soil stabiliser was supplied by GKS soil stabiliser S/B which is a Johor-based company. Figures 2.1 and 2.2 show

the wet laterite soil and liquid polymer SS299 respectively. The physical properties of the natural soils are presented in Table 2.1. Based on Table 2.1, it can be seen that the laterite soil used in this study is considered soil with very high plasticity (i.e. liquid limit between 70% to 90%) which triggers the potential of swelling and the fact that its compressive strength (i.e. between 25 kPa to 50 kPa) is considered as soft soil.

Figure 2.1 Untreated laterite soil

Figure 2.2 Canlite (SS299) stabiliser