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Settlement of residential houses supported by piled foundation embedded in expansive soil

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Abstract

The damage has occurred on residential houses built on expansive soils. The weight of the walls and roof of the houses is transferred onto pile foundations through suspended tie beams and columns, respectively. The typical pile used to support the house was 30 cm in diameter and it was penetrated into the depth of 600 cm. The slabs or floors were rested on the fills. This study was conducted to determine all potential sources that initiated the settlement and damages to the houses. Site investigation to each and every houses that experienced settlement and damages was conducted to gather and inventory the pattern of the cracks or damages. The result of site investigation showed that there were no damages induced by swelling, but the settlements and cracks were triggered by settlement, instead. It was also noticed that the settlement of piled foundations located on the area that susceptible to the water infiltration relatively larger than those piled foundation in the covered area. Therefore, it was concluded that, based on the analysis, the damages which occurred on the residential ordinary houses were mainly caused by the settlement of the piled foundations and the fills due to the soil softening.

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1. Introduction

The demand of housing in urban area has been increasing in the last few decades. Accordingly, it requires large area of land for residential and infrastructures. Several Real estates in Surabaya, the second largest city in Indonesia, have been expanding to the areas that consist of expansive soil formation.

The ordinary low rise housing, which is built on expansive soils require better and more comprehensive design

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