Evaluation on Excavation Resistance in Bored Pile Method

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ABSTRACT

In recent years, the bored precast pile method has become the mainstream construction method for PC piles, since the bearing capacity of piles cannot be confirmed during construction as in the conventional driving method. It is common to estimate the bearing capacity of piles by calculating it using the data of the boring survey. Therefore, the construction manager needs to check whether the bearing capacity obtained in the bearing capacity calculation can be secured.

Generally, the load electrical current value of the auger driving device at the time of excavation is measured, and the arrival at the support layer is determined by comparing a qualitative change in the current value with the N-value.

In addition, when it is difficult to judge the formation by the electrical current value alone, in general, the change integrated electrical current value of the auger driving device, the vibration of pile driver, the change in the sound of the auger motor, and the like are comprehensively determined.

This paper focuses on the relationship between the integrated electrical current value and the N-value of the standard penetration test, and describes the correlation. It was difficult to evaluate it easily because of the effects of the excavation diameter, soil properties, auger motor, ground resistance around the rod, drilling fluid, etc., but the following tendencies were found. No major correlations were found in cohesive soil, but there were some in sandy and gravel soils.

In the future, it will be necessary to continue the research to grasp the hardness of the geology from the excavation resistance value and to make some quantitative judgment in the supervision of the bored pile.

KEY WORDS: A bored precast pile method; bearing capacity of piles; electrical current value; integrated electrical current value; N-value; drilling fluid

INTRODUCTION

The construction method of PC piles includes a hitting method and a bored pile method. Since the standards concerning the regulation of noise generated by specific construction work were established in 1968 in the Ministry of Health and Welfare and Ministry of Construction Notification No. 1, bored pile methods have become mainstream in urban areas. The pile bearing capacity can be easily checked by measuring the settlement amount in the hitting method, but a loading test must be performed in a bored pile method. It is a fact that this test is hardly performed because it takes time and incurs costs. With such a background, the research theme was to seek a method to confirm the pile bearing capacity.

At the time of pile construction, the integrated electrical current value displayed on the integrated control device was compared with the N-value obtained by the standard penetration test, and their correlation was examined.

The integrated electrical current value displayed on the integrated management device during pile construction was compared with the N-value obtained by the standard penetration test, and their correlation was examined.

The pile diameters used were four types including 400φ, 500φ, 700φ, and 900φ, and the pile lengths were all 25m. The stratum is composed of gravel soil, cohesive soil and sandy soil repeatedly from the surface, followed by cohesive soil. These were grouped by stratum, that is, gravel...