Analysis of Bearing Capacity and Degradation of Borepile Foundation on Kretek Bridge Construction Project

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ABSTRACT
A strong bridge must have a solid foundation. A foundation is a foundation a strong building. one of the foundations commonly used in construction the bridge is a borepile foundation. The kretek 2 bridge is built using a foundation borepile and piles. So it is necessary to do research on the foundation borepile using existing N-SPT data in the project environment. The purpose of this study, in order to obtain the results of the carrying capacity and reduction obtained from the calculation of the N-SPT. Capacity calculation result bearing capacity of the foundation using the method of O'Neil and Reese obtained 3418.09 KN and foundation settlement using the Poulos and Davis method obtained 20 mm.

Keywords: *Borepile, Foundation Bearing Capacity, Deterioration*.

1. INTRODUCTION

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2. METHODS

Indonesia has many straits, mountains and rivers that make traveling from one area to another far and not economical.Therefore, bridges are indispensable to connect from one land to another and shorten the journey in the area to be passed. Humans have known bridges since the beginning of civilization the simplest can be made by knocking down a piece of wood and then stretch it to each bank of the river so that it can be used to cross the river. in its development the bridge was made more complex and various. Starting from wooden bridges that have been processed up to now bridge made of concrete and steel. A solid bridge must have a solid foundation. There are two kinds types of foundations, namely deep foundations and shallow foundations depending on the type and area what bridge to build. One of the most suitable alternative foundations with the characteristic is pile foundation .Bore pile foundation is wrong one pile foundation (borepile) [1]. In the construction of the kretek bridge, the two foundations used are borepile and pile foundations. And the author will analyze the calculations using the O'neil and Reese and Poulos and Davis methods. Research purposes. To determine the bearing capacity of the borepile foundation using the O'Neil and Reese method and the reduction of the Poulos and Davis method based on SPT (Standard Penetration Test) data on the Kretek 2 Bridge construction project, Yogyakarta.

Literature Review

Analysis of the Bearing Capacity of Borepile Pile Foundations in the Construction of the Fly . Project Over Martadinata Tangerang City According to Oemar [2] Tangerang City is one of the densely populated cities that carry out development. The Tangerang City Government focuses on the construction of other infrastructure such as high-rise buildings, dams to road access. The construction of the Martadinata fly over, the aim is to determine the carrying capacity of the foundation and the decline of the foundation in project development. fly over Martadinata. The research analysis used is taken frcoampathceityNu-SsiPngT tdhaetambeythaonda(lyRzeinegseth&e Oca'nrreyili)ngfor pile foundation settlement using calculations (Poulos and Davis). Analysis of Bearing Capacity of Single Pile Borepile Foundation in Hospital Project International Surabaya According to Wora [3] Expectations: Journal of Economic Education 13 (2),56-63,2019 Bored pile planning, where bored construction is a type of deep foundation which serves to carry the load from the superstructure of a 3-story building Surabaya International hospital building.In the construction of this project The analysis used is the Poulos and Davis method is the formula empirical, CPT, SPT. Are data fromfield investigations. Analysis of Bearing Capacity of Drill Piles with PDA Test Tool at Variation of Diameter Pole According to Geni [4] majoring in Civil Engineering, Bandung State Polytechnic 40012. Dynamic pile testing or commonly called Pile Driving Analyzer, is a a tool to determine the bearing capacity of the bore pile foundation. Research carried out so that the bearing capacity parameters of the borepile foundation can be known with the help of available tools. Technical Analysis of Borepile Foundation Supporting Capacity for Office Building PT. PLN (Persero) P3B Sumatra-Pekanbaru According to Roni [5] , the Islamic Civil Engineering Study Program in Riau, Jalan Kaharudin Nasution 133 Pekanbaru 28284 The choice of foundation in the construction of a building is very important required. Static methods are used to analyze and assume dimensions foundation depth according to SPT data. The foundation consists of 2 options and 6 assumptions for use obtaining borepile foundations in accordance with planning and modeling. Deep Foundation Technical Requirements For Tall Buildings According to Simatupang [6] the National Construction Service Institute Manager For tall buildings, the deep foundation design must meet certain technical requirements. Especially building SNI. In essence, the requirements is used to ensure the feasibility of the foundation on the building so than safe, caused by dead and live loads or earthquake loads according to estimation of the feasibility of the building. In order to achieve a safe foundation then the required number of piles must meet the requirements in order to withstandall existing loads.

3. RESULTS AND DISCUSSION

Borepile Data

Taken point	:	Abutment 1 (point 10)
Borepile foundation depth:		34 meters
borepile diameter	:	1 meter
Type of concrete	:	SCC *(Self Compacting Concrete) Concrete*
Concrete quality	:	fc'35 MPa
reinforcement	:	BjTS 420B Fy = 420 MPa
Slump test	:	Flow Slump 55-85 cm
Volume of concrete in 1 point:		28 k/N/m³

Secondary data obtained from PT Wika-Hutama tbk. Whereas primary data is obtained from case studies at development project sites kretek bridge 2.

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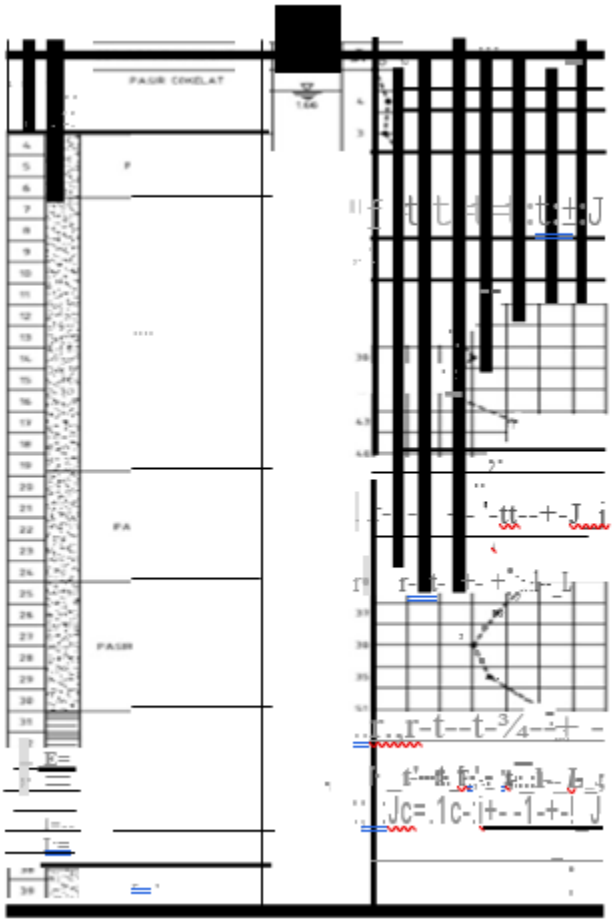

For the soil in BH-10, the soil layer is dominated by granular soil coarse (sand) with loose very dense status to a depth of -30 meters, and there is a layer of clay with a hard consistency at a depth of -31.5 meters up to -37.5 meters (Geotechnical data of kretek bridge project 2).

example		Water	Type	Gravel (%)	Sand (%)	Silt(%)	Soil clay(%)
bra 10							
SPT 1-1.5		19.51 2.85		0 79.27 20.12 0.15 80.77			0.62
SPT 2.50-3.00		23.38 16.84	-	18.76 35.4			0.32
SPT 4.00-4.50		20.52 12.54	-	15.94 0.25 64,445 33.8			0.15
SPT 5,50-6.00		28.01 23.77	-	25.73 0.85			0.33
SPT 7.00-7.50		19.01 22.59	-	0.48 64.81 33.26			0.49
SPT 8.50-9.00		19.73 2.941	-				1.51
SPT 10.00-10.50		19.36	-				0.44
SPT 11.50-12.00			-				1.26
SPT 17.50-18.00			-				0.5
SPT 22.00-22.50							1.2
SPT 29.50-30.00			-				1.45

SPT data	
Depth	bra-10
1.5 3	4
	3
4.5	11
6	11
7.5	11
9	10
10.5	38
12	22
13.5	30
15	19
16.5	43
18	40
19.5	32
21	37
22.5	37
24	47
25.5	37
27	30
28.5	35
30	51
31.5	60
33	41
34.5	19
36	23

O'Neil and Reese's method for bearing capacity of borepile foundation is obtained results :

Table 5.2 - Foundation bearing capacity results

Method	Location and point testing	Q Results
O'Neil and Reese	Abutment 1 (point 10)	3418.09 KN

5.3 Single Pole Drop

Poulos and Davis method for single pile settlement obtained the following results:

Table 5.3 - Single pile settlement results

Location	S
ABT 1 point (10)	20 mm

4. CONCLUSION

For calculations using the method used to produce the following data: The results of the calculation of the O'Neil and Reese method for the bearing capacity of the foundation on sandy soils are 3418.09 KN and the results of the calculation of the Poulos and Davis method for single pile settlement on sandy soils are 20 mm.

ACKNOWLEDGMENT

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