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Productivity Analysis Of Hydraulic Static Pile Driver On Victoria Square Tower B Apartement

Arif Rahman Hakim, Amirul Akbar

Abstract— **In building an apartment construction required attention in the implementation of the construction, especially on the work of erection. The building location of Victoria Square Tower B Apartment in Tangerang Banten is located in a residential area and has limited space, so it needs a solution related to the erection work so as not to cause vibration/noise to the surrounding environment. In the case study of the construction of Victoria Square Tower B Apartment in Tangerang Banten, the erection method used was to use the Hydraulic Static Pile Driver tool. The types of work on the erection consist of Move to The Point, Lifting Pile, Clamping & Piling, Joint Pile (Welding), Dolly, and Cutting Pile. The results of descriptive analysis in this study obtained the value of production of tools Hydraulic Static Pile Driver lowest is 0.225 meter/minute or equivalent 13.5 meter/hour and the highest production value is 1,364 meter/minute or equivalent 82 meter/hour.**

Index Terms—**Apartment, Hydraulic Static Pile Driver, Value of Production.**

I. INTRODUCTION

Building and infrastructure construction projects continue to increase in line with the development of urban areas. The average project uses a pile foundation as its foundation. The realization of the foundation work of the stake requires a steering process using a certain stake. In densely populated urban areas, the exertion requires an environmentally friendly tool such as Hydraulic Static Pile Driver (HSPD) to minimize project impact. The use of this tool can reduce the loss of complaints from affected communities so that contractors' benefits are maintained (J.Y.Warsito & Hatmoko, 2016). Project Apartment Victoria Square Tower BTangerang Banten entered pile work in February 2015. The erection method used was to use the Hydraulic Static Pile Driver tool. The use of Hydraulic Static Pile Driver tool was chosen because the project location was in residential environment so as not to cause vibration / noise to the environment around at the time of project development. Some of the advantages of Hydraulic Static Pile Driver related to environmental issues include:

1. Suitable for polishing the pole in an area with limited movement because the pole can be designed in short sizes and spliced (Peurifoy, Schexnayder, & Shapira, 2006);
2. Allowing poles installed near existing structures without interrupting human activities (White, Finlay, Bolton, & Bearss, 2002);
3. Suitable for project site in densely populated areas and buildings (BPP (Berdikari Pondasi Perkasa), 2017);
4. The installation technique is almost free of vibration and little noise compared to other erection systems (Chan, 2006).

Advantages of Hydraulic Static Pile Driver with regard to technical issues are:

1. Construction rate is faster;
2. More efficient than other erection methods;
3. The quality of the erection is guaranteed to be similar to the pole test (Tan & Ling, 2001);
4. The jack force of the jack or the carrying capacity of the jack can be read directly through the manometers so that the compression force of the pole can be known at any given depth (Pertiwi, 2006).

The Tool description used in the Victoria Square Tower B Apartment project is Hydraulic Static Pile Driver Type ZYC 320B-B below:

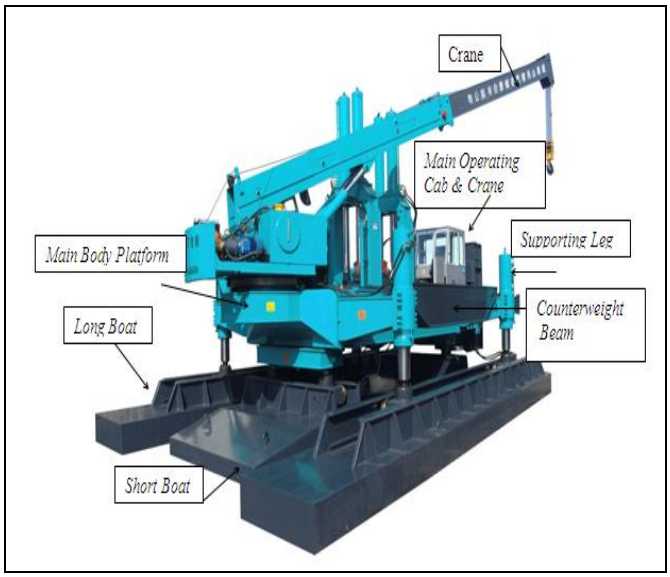

Figure 1.Hydraulic Static Pile Driver Type ZYC 320B-B

The Hydraulic Static Pile DriverType ZYC 320B-B element consists of:

1. Long Boat, This element serves as a front-rear drive rail foot.
2. Short Boat, This element serves as a right-rail drive rail.
3. Main Body Platform, The main body of the platform serves as the main body of Hydraulic Static Pile Driver.
4. Counterweight Beam, In this element are placed additional loads as anchoring pressure into the ground.

For an overview of the load placed on Counterweigh Beam as shown below:

Arif Rahman Hakim, Civil Engineering, Universitas Mercu Buana, Jakarta, Indonesia
Amirul Akbar, Civil Engineering, Universitas Mercu Buana, Jakarta, Indonesia

Figure 2. Loads On Counterweigh Beam

5. Clamping Box, This element is a tool to press the pile by clamping and then pressed. For an overview Clamping Box can be seen below:

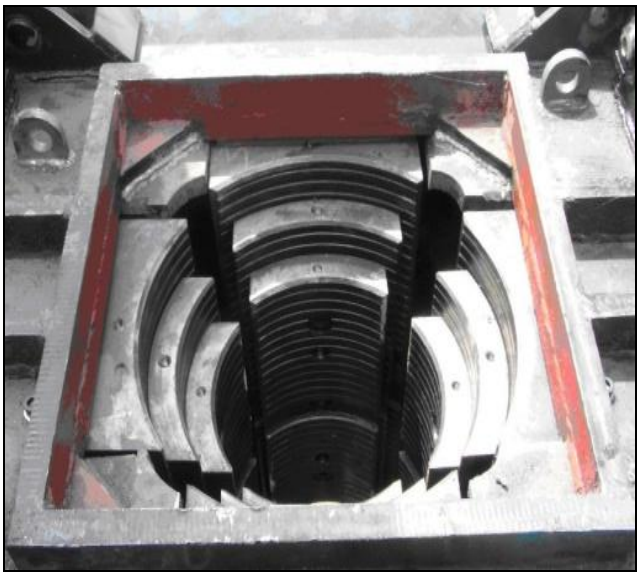

Figure 3. Clamping Box

6. Main Operating Cab & Operating Cab of Crane, Main Operating Cab is where the operator operates the Clamping Box to carry out pile planting, while the Operating Cab of Crane is where the crane operator to move the pile into the Clamping Box. Inside the Main Operating Cab there is a hardness or compressive measure to see if the pile has reached the depth level with the required hardness or not.
7. Supporting Leg, This element is a hydraulic engine to drive Long Boat and Short Boat.

Important factors of Hydraulic Static Pile Drivers productivity are implicit in soil behavior in the soil (Bowles, 1996), namely: soil type, pile size, depth of erection, and cycle time. Soil types cause differences in carrying capacity and ground friction. The size of the pile includes cross section and pile length dependent on construction load and depth of erection. The depth of the erection can be different in design. The timing of the pilot cycle is related to the number of construction activities that depend on the length of the stake and the depth of erection. All these factors greatly affect the productivity of Hydraulic Static Pile Driver.

II. METHODOLOGY

A. Research Methods and Material

Methodology This research was conducted by collecting data obtained from direct observation to the project / field. This research was conducted by explaining the stages through the Hydraulic Static Pile Driver, and process the data in the stage to find out the productivity of Hydraulic Static Pile Driver in the Victoria Square Apartment project Tower B Tangerang Banten Indonesia. The research location is Apartment Victoria Square Tower B Tangerang Banten located at Jalan Gatot Subroto Km.3 No.78 Tangerang City Banten Indonesia. The Victoria Square project will create 3 towers with mini malls on the ground floor. It is in the middle of Tangerang city and passed by the provincial class road. In the year 2015 began the work tower to 2 or called tower B. The study time was conducted from February 2015 until May 2015.

B. Data Collection

References (Literature) in compiling this research are obtained from various books and various research journals related to the topic, as well as general research journals, as well as references obtained from various internet websites whose material is related to the relevant topic of discussion. This data collection activity is an important step to be done so that this research can be implemented. Data collection is obtained directly from the project data or field data, in addition to field observations to support in terms of explaining the stages of execution via Hydraulic Static Pile Driver.

III. DATA ANALYSIS AND DISCUSSION

The Hydraulic Static Pile Driver tool consists of several sub machines that have different work functions. So each sub-machine has its own work method which is combined then becomes unity of the work method of erection. The type of erection work by the tool Hydraulic Static Pile Driver include:

1. Move To The Point;
2. Lifting Pile, Clamping & Piling;
3. Joint Pile (Welding);
4. Doli; and
5. Cutting Pile.

These types of work have different job durations from one another, so it needs to be analyzed how the method is to get the duration of 1 stopping cycle 1 point of stake on a project.

A. Field Data Analysis (Case Study)

Data piles that have been embedded dated 22 April 2015 can be seen in table 1 below:

Table 1. Number of Embedded Piles

No.	Number of Piling Piles								
	Pile 40x40	Pile 45x45	Pile 40x40		Pile 45x45				
1	IP 01	IP 03	418	647	427	467	505	543	661
2	IP 02	IP 06	419	652	428	468	506	544	
3	IP 04	IP 08	420	653	429	469	507	551	
4	IP 05	IP 09	421	655	430	470	508	552	
5	IP 07	IP 10	422	656	431	471	509	553	
6	IP 11	IP 12	423	657	432	472	510	554	
7	IP 13	IP 14	424	658	433	473	511	555	
8	IP 16	IP 15	425	663	434	474	512	557	
9	IP 18	IP 17	426	664	435	475	513	559	
10	IP 21	IP 19	493	665	437	476	514	561	
11	IP 22	IP 20	547	666	439	477	515	603	
12	IP 24	IP 23	548	671	441	478	516	605	
13	IP 25	IP 34	550	673	443	479	517	636	
14	IP 26	IP 36	598	675	459	480	536	637	
15	IP 27		599	679	460	498	537	638	
16	IP 28		600	683	461	499	538	639	
17	IP 29		643		462	500	539	640	
18	IP 30		644		463	501	540	641	
19	IP 33		645		464	503	541	659	
20	IP 35		646		465	504	542	660	

Based on the above data, the volume of piles that must be planted starting on April 23, 2015 can be seen in table 2 below:

Table 2.Remaining Unscheduled Pile

No	Type of Piling Pile	length (meter)	Total (unit)
1	Indicator Pile 40x40		0
2	Indicator Pile 45x45		0
3	Pile 40x40 Single	11	29
4	Pile 40x40 Connection	17	156
5	Pile 40x40 Connection	21	13
6	Pile 45x45 Single	11	238
7	Pile 45x45 Connection	17	103

recapitulation of pebble production based on pile profile and calculated productivity as in table 3 below:

Table 3. Rekapitulasi Produksi Alat Hydraulic Static Pile Driver

No.	Type of Piling Pile	Pile Length (meter)	Dolly (meter)	Results of the Cycle of Mount (minutes)	Produktivity/Q (m/min)
1	Single Segmen 450mm x 450mm x 11000mm	11	4	11	1.364
2	Single Segmen 400mm x 400mm x 11000mm	11	4	11	**1.364**
No.	**Type of Piling Pile**	**Pile Length (meter)**	**Dolly (meter)**	**Results of the Cycle of Mount (minutes)**	**Produktivity/Q (m/min)**
3	Single Segmen 450mm x 450mm x 11000mm	10	0	41	0.244
4	Single Segmen 400mm x 400mm x 11000mm	10	0	38	0.263
5	Pile Indicator Bottom Segmen 450mm x 450mm x 6000mm Upper Segmen 450mm x 450mm x 12000mm	18	4	41	0.537
6	Pile Indicator Bottom Segmen 400mm x 400mm x 6000mm Upper Segmen 400mm x 400mm x 12000mm	18	4	40	0.550
7	Bottom Segmen 450mm x 450mm x 8000mm Upper Segmen 450mm x 450mm x 9000mm	17	4	41	0.512
8	Bottom Segmen 400mm x 400mm x 8000mm Upper Segmen 400mm x 400mm x 9000mm	17	4	40	0.525
9	Bottom Segmen 400mm x 400mm x 12000mm Upper Segmen 400mm x 400mm x 9000mm	21	4	42	0.595
10	Pile Indicator Bottom Segmen 450mm x 450mm x 6000mm Upper Segmen 450mm x 450mm x 12000mm	17	0	72	0.236
11	Pile Indicator Bottom Segmen 400mm x 400mm x 6000mm Upper Segmen 400mm x 400mm x 12000mm	17	0	67	0.254

12	Bottom Segmen 450mm x 450mm x 8000mm Upper Segmen 450mm x 450mm x 9000mm	16	0	71	**0.225**
13	Bottom Segmen 400mm x 400mm x 8000mm Upper Segmen 400mm x 400mm x 9000mm	16	0	66	0.242
14	Bottom Segmen 400mm x 400mm x 12000mm Upper Segmen 400mm x 400mm x 9000mm	20	0	69	0.290

From the recapitulation, obtained the lowest production value is 0.225 meters / minute or equivalent 13.5 meters / hour and the highest production value is 1,364 meters / minute or equivalent 82 meters / hour.

IV. Conclusion

From the result of the discussion, there is an explanation about the working method of hydraulic static pile driver, starting from Move to The Point, Lifting Pile, Clamping & Piling, Joint Pile (Welding), Dolly, and Cutting Pile.

The results of descriptive analysis in this study obtained the value of production of tools Hydraulic Static Pile Driver lowest is 0.225 meters / minute or equivalent 13.5 meters / hour and the highest production value is 1,364 meters / minute or equivalent to 82 meters / hour. The Contractor concludes by considering factors affecting the delay of work, then the production value used is with value above the lowest production of 14 meters / hour

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Authors Biography

First Author. Arif Rahman Hakim is a bachelor of engineering and worked as a civil servant in ministry of Finance Republic of Indonesia who loves about civil engineering and environtmental engineering. Graduated in University Mercu Buana Jakarta 2016.

Second Author. Amirul Akbar is a bachelor of engineering and working in project civil engineering. Graduated in University Mercu Buana Jakarta 2016.