

CHAPTER I

INTRODUCTION

A. Background

The apartment is a residential like a house in general, but if in housing, the lot is arranged horizontally while the apartment unit is made vertically so as to create a tall building that contains residential units. The Taman Melati Yogyakarta Apartment Project is one of the apartments used to support the residential needs of people living in Yogyakarta.

Taman Melati Yogyakarta Apartment Project located on Prof. Dr. Sardjito No. 66 road, Terban Gondokusuman, Yogyakarta City. Taman Melati Yogyakarta Apartment Project is a new structure consisting of a 5-story building. To be able to function properly the building, it must be planned as possible both in terms of cost and strength. The structure of the building consists of two major parts, namely the upper structure includes columns, beams, plates, and also the roof frame and the bottom structure includes the foundation.

Foundation work is one of the most important jobs in a construction, because the foundation has the function of bearing and holding all the loads that work on it, namely the structure load on top, then the stresses that occur due to the structure load will be channeled into the hard soil layer can carry the burden of construction.

In addition, to investigate the presence of hard soil layers, soil investigations such as the Standard Penetration Test (SPT) are carried out. The soil layer in Taman Melati Yogyakarta Apartment Project is sand soil with a depth of ± 0 to 40 meters. Groundwater level at that location is 14,50 meters.

The foundation used in this final project is the bored pile foundation with a diameter of 0,4 meters and 0,7 m at a depth of 12 meters. The reasons for planning the bottom structure using a bored pile foundation are as follows:

1. The building is in a densely populated area that is not possible to do the erection with heavy equipment because it will cause noise and vibration that will affect the surrounding structures,

2. The depth of the pile can be done using bored pile foundation,
3. Pile foundations that require a lot of heavy equipment may have to reconsider if implemented on a highway in a very crowded city because it will cause congestion,
4. Can be installed through rocks (gravel).

The bored pile foundation is the foundation whose installation is installed into the ground by drilling the soil first, then reinforcing the concrete and casting concrete. Noteworthy in the work of bored pile is the presence of ground water level and also a layer of sand. Drilling must be done using a casing or with a slurry system. This is done to prevent the occurrence of dug hole slides due to ground water. In addition it needs accuracy in casting concrete because the quality of concrete cannot be controlled properly due to the influence of groundwater levels.

From the results of the description above, the authors intend to make research in the final project entitled "Bored Pile Foundation Design at Project of Apartemen Taman Melati Yogyakarta".

B. Problem Formulation

Based on the background of the problem described above, the problem formulation of this study includes:

- 1) What is the structural load received by the bored pile foundation due to the building load on the Taman Melati Apartment in Yogyakarta?
- 2) What is the bearing capacity of the bored pile foundation of the Taman Melati Apartment in Yogyakarta?
- 3) What are the dimensions and reinforcement design of pile cap and bored pile foundation?

C. Research Objective

The objective of this research as a follow:

- 1) Analyze the load of the upper structure that works on the Taman Melati Yogyakarta Apartment which will be accepted by the bored pile foundation.

- 2) Calculating the amount of bearing capacity of the bored pile foundation of the Taman Melati apartment in Yogyakarta.
- 3) Analyze the dimensions and reinforcement design of pile cap and bored pile foundation.

D. Research Benefit

The benefits of this research as a follow :

- 1) Be a reference or example in the calculation of the structure under the building, especially the bored pile foundation.
- 2) Adding insight to science in the field of civil engineering, especially in the field of geotechnics regarding the bored pile foundation.

E. Limitation Problem

In order to prevent any expansion of the discussion in this research, this research should be given the following limitation problem:

- 1) The research location is the Taman Melati Yogyakarta Apartment construction project.
- 2) The bottom structure used is the bored pile foundation.
- 3) The bored pile foundation used is in the form of a circular with a diameter of 0,4 meter and 0,7 meter, the quality of the K-350 concrete and the length of the bored pile foundation is 12 meters.
- 4) Soil investigation data used is Standar Penetration Test data.
- 5) The soil layer found in the Taman Melati Yogyakarta Apartment construction project is sand soil, depth of ± 0 to 40 meters. While the ground water level in the project is 14,50 meters.
- 6) Not reviewing the construction implementation methods, architectural aspects, drainage system, cost budget plan, and construction management.
- 7) Calculation of bearing capacity of bored pile foundation on granular soil using Reese and Wright (1977) method.
- 8) Analysis of load the upper structure and foundation using SAP 2000 program.
- 9) Analysis of bored pile reinforcement using SP Column program.

- 10) The regulations used for building loading refer to SNI 1727-2013, which is about the minimum loading on buildings. And SNI 1727-1989 about Loading Regulations For Clause Building (PPPURG-1989).
- 11) The regulations used for earthquake loading refer to SNI 1726-2012 regarding procedures for planning earthquake resistance for building and non-building structures.
- 12) The regulations used for the design and reinforcement of pile caps refer to SNI 2847-2013 regarding structural concrete requirements for buildings.
- 13) The bored pile foundation reviewed is the foundation in the column which has the largest axial load.

F. Research Authenticity

The reseach of bored pile foundation with title “Bored Pile Foundation Design at Project of Apartemen Taman Melati Yogyakarta” has not previously conducted at the Universitas Muhammadiyah Surakarta.

But, in several university, the same type of research has already conducted. Similar studies include:

- 1) Nunik Dwi Wibarini and Salma ST. Zakiah (2016) published their research for the final project with the title "Bored Pile Foundation Design of Parking Building Bandung State Polytechnic".
- 2) Muhammad Mufti Hadi and Yulia Andriani (2012) published research for the final project with the title "Bored Pile Foundation Design at Project of Apartment Gallery Ciumbuleuit 2, Ciumbuleuit 42A road, Bandung".
- 3) Thedy (2016) published research for the final project with the title " The Study Design of the Foundation of the Bored Pile and the Diaphragm Wall of the World Financial Tower Circle Building, Mega Kuningan, South Jakarta ".
- 4) Ega Julia Fajarsari and Sri Wulandari (2013) published their research with the title "Bored Pile Foundation Planning in the Cikini Gold Center Project".
- 5) Edward Z. Halibu (2015) published his research for the final project with the title "Bored Pile Foundation Planning and Implementation Methods in the RSJ Building Construction Project Prof. Dr. VL Ratumbuysang Manado ".

- 6) Rizqy Adhitya Ramadhan (2018) published his research for the final project with the title " Bored Pile Foundation Planning in the Construction of the Arnava Hotel and Resort Batu City".
- 7) Dea Amanda Lutfi Harris (2018) published her research for the final project with the title " Planning Study of the Bored Pile Foundation in the Project of the Neo Java Condotel Batu".
- 8) Hendra Purbaya (2019) published his research for the final project with the title " Planning Study of the Bored Pile Foundation at the Hotel and Apartment Building in Arnava Batu, East Java".
- 9) Indana Else Wininda (2018) published her research for the final project with the title "Alternative Study of Bored Pile Foundation Planning in Building B Hotel Rayz Malang".
- 10) Dita Putri Wulandari (2019) published her research for the final project with the title " Bored Pile Foundation Planning in the Inpatient Building Construction Project of RSUD dr. M. Yunus, Bengkulu City ".
- 11) Achmad Dafik Idris (2019) published his research for the final project with the title " Bored Pile Foundation Planning at Rusunami Sentraland Bekasi West Java".

From the research that has been done, it can be concluded that there is no similarity in writing and plagiarism.