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Research paper

The Concrete Quality Testing for Trapezoidal Model of the Prefabricated Foundation

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Abstract

The foundation made of the stone material is widely used in the construction of houses in Indonesia. The need and limitations of stone materials as the basic ingredients of foundation building need innovative thinking of its development. This study aims to develop a substitute foundation made of stone with the foundation of precast concrete. Precast concrete foundation model developed with varied models. The methodology is to make varied models of trapezoidal precast foundation with the inside of the perforated part. The precast foundation model is very easy to do and practical. The conclusions show that the precast foundation is capable of accepting the expected and feasible loads used for house building foundations

Keywords: *Houses, Precast Foundation, Varied Model, Concrete, Feasible*.

1. Introduction

Changes in the structure frame home construction minimalist small scale in Indonesia is getting time there is a change. Changes that occur especially concerning the use of construction materials that are more economical but qualifies permission structure. Structural changes that occur which, in the lower part of the house. Part underwater structures in question are the Foundation. During this home in Indonesia using stone foundations than any other foundation. Foundation stone is considered relatively inexpensive, easy to work, the material can easily and without requiring any special skills. Problems that occur in the manufacturing of the foundation stone is stone material, the less willingness well as affect the continuity of the surrounding natural environment. [8], Doing research on different foundations of the foundation stone has been used with good results for the construction of houses. This study is an extension of previous research as well try different foundation model specifications. The main hope of the manufacture of different models will be known how worthy foundation receives a compressive force to prove worthy foundation used. Another expectation is the foundation researched has distinct advantages compared foundation stone. [1],[2],[3],[4],[6],[7],[9],[10],[12], Various experimental concrete mixtures using different materials have been made to obtain good results including in the experimental foundation test specimen. The trapezoidal foundation of this trial is expected to rest on ground strength with minimum conditions. [11] Elements in the soil will affect the carrying capacity of the foundation. The trapezoid foundation model is expected to meet the implementation with less stable soil conditions. [5], Development of trapezoidal foundation construction can be done by involving private parties so that it can be more widely used.

2. Literature Review

Foundation stone is one of the bottom structure of the most widely used in the construction of houses in Indonesia. The composition of the stone foundation construction. Implementation of the foundation stone is very simple and easy to do at that time where rock is abundant availability. This was shown using stone foundation community widely used surface of the earth. Figure 1.

Precast concrete foundation is a foundation component printing method in mechanization in factory or workshop to give time hardening and gain strength before it is installed. Because the process mixing concrete in a special place (workshop fabrication), the quality can be maintained. But in order to generate profits, the

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foundation precast concrete will only be produced if the number of typical forms reached a certain minimum, typical form in question is repetitive forms in bulk. Precast foundations advantages compared with conventional structures, among others Simplification of the construction, The optimum use of material and good quality materials, Completion finishing easy, Variation for surface finishing on the structure of precast elements can be easily carried out concurrently with the making The elements in the plant, such as: color and surface models can be formed in accordance with the draft and fast execution time.Implementation of the foundation stone is very simple and easy to do at that time where rock is abundant availability. This was shown using stone foundation community widely used surface of the earth.



Fig. 1: Implementation of stone foundation source:http://www.thiscobhouse.com/wp-content/uploads/2013/08/IMG_0791-1024x768.jpg

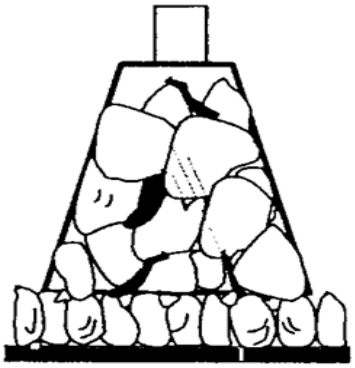


Fig. 2: Typical stone foundation [8]



Figure 3. Precast foundation in Indonesia [13]

In the Koespiadi et. al. 2016 study, the Technology Model Precast Foundation for Ecofriendly Solution, has conducted research by constructing a superficial hollow concrete foundation model using reinforced concrete with K-175 concrete quality, 8mm concrete steel reinforcement with U-28 steel quality (BJTP-28). The reinforcement is made of one double with a distance that varies between 14-19 cm for both vertical and horizontal bars. The precast foundation has a width dimension of 30 cm, height 80 cm, foundation foot width 80 cm and an additional width of 10 cm left and right side of the footprint. The conclusion is the value of compressive strength of precast concrete foundation on the 7th day of 8 tons with the crack of 0.002 cm after the press test, on the bottom side and the bottom sole due to centralized load, Figure 4.



Fig. 4: Precast foundation design and pressure test [1]

3. Methodology

This research method using experimental method is a research method to conduct experimental activities that get a result, from the results show the relationship between the variables of one variable to another. The methodology used in this study looks like a flow chart in Figure 5.

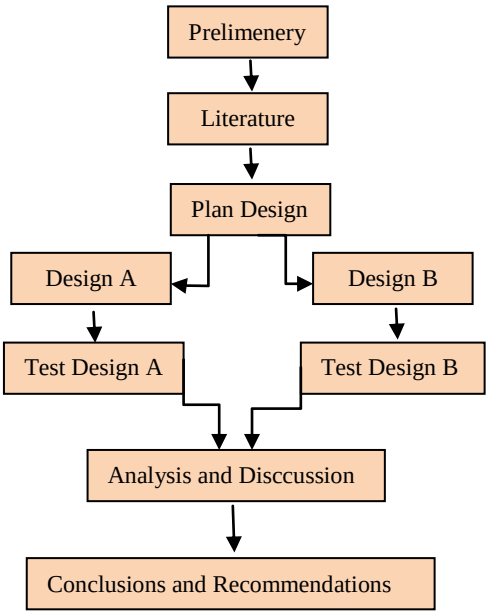


Fig 5: Flow Chart

The methodology of this research as follow :
Prefabricated Foundation Design
At this stage a precast foundation design process will be made, from the design of the model, the foundation design using reinforced concrete with the quality of K-175, comparison of a mixture of concrete that is used 1 cement: 2 sand: 3 pebbles, Ø6 mm

steel reinforcement with U-28 steel quality (BJTD-28). Reinforcements are made in one duplex with varying distance between 14-19 cm.

Preprint Formwork Formwork

At this stage, the process of preprinting (formwork) is made of precast foundation. The prepared 12 mm Multiplek material is cut in accordance with the size and design of the pre-cast foundation which has been determined and then assembled into a preprinted foundation formwork.

Figure 6 shows the foundation mold and the finished wire mesh chain. Wire mesh welding in the form of one layer without overlap connection.



Fig. 6 : Formwork precast and wire mesh A model

While figure 7 is a series of finished wire mesh and wire mesh welding in the form of one layer with overlap connection.



Fig. 7 : Wire mesh B model

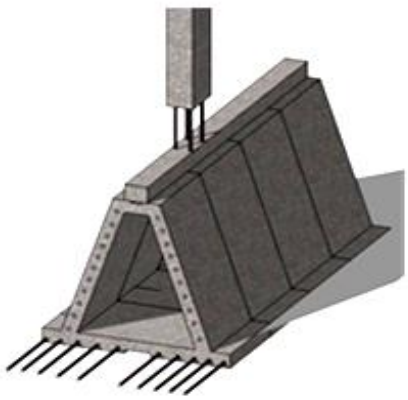


Fig. 8: Precast Foundation Design [1],[4]

In figures 8 and 9 there are differences in foundation design. The difference lies in the deep corner under the foundation. Figure 8, the inside corner there is no stiffener as high as 10 cm while in the figure 9 corner of the foundation there is the confession. This difference will determine the strength of the foundation test. Is the design foundation A better stronger the quality of the concrete than the design B.

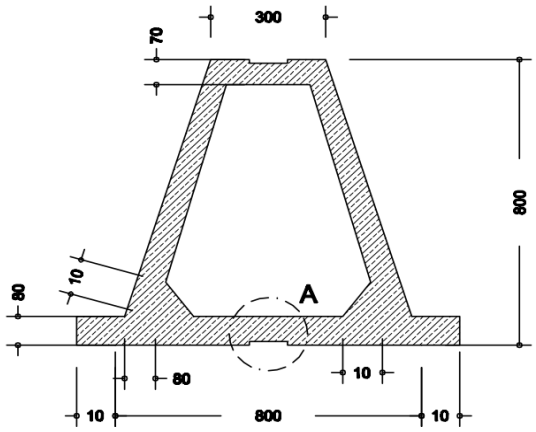


Fig. 9: Precast Foundation Design [1],[4]

The test process pressed the precast foundation using a manual hand hydraulic pump with a capability of 93 lbs, Fig. 10.
piston cylinder used as much as 2 pieces with resting on the rank of steel structure building.



Fig.10: Test Process Tap The Foundation [2]

4. Results and Findings

The results of two research foundation model that has the same specifications tested with the conclusion that the test while the trapezoidal foundation without reinforcement model of the inner side of the hole is able to withstand the compressive force of 8 tons. Precast foundation without reinforcement model of the inner sides of these holes have economic value that is less than the foundation stone. Making different sets of iron fillers produces compressive strength of 5.2 tons. Fracture occurs relatively in the same place between the foundation model A and the foundation B model both on the side of the wall and the bottom of the foundation.. Cracks occur on the left side wall, the right side wall and the bottom side of the foundation.



Fig. 11: Precast Foundation Design A & B

in fig. 12, the foundation is placed in the test apparatus of compression of concrete foundation using a hydraulic pump to obtain the ability to accept the load.



Fig.12: Pressure Test Precast Foundation Models

The compressive strength test is carried out gradually until the foundation is cracked. Cracks occur on the side wall, nagian bottom palm under the precast foundation. The foundation model A has a greater crack than in the foundation of model B. the compressive strength test is carried out gradually until the foundation is cracked. Cracks occur on the side wall, nagian bottom palm under the precast foundation. The foundation model A has a greater crack than foundation model B. The friction of the foundation model A reaches 0.5 cm while the fracture of the foundation model B is 0.15 cm. This rift can occur due to differences in different reinforcement. In addition, the foundation A model has no reinforcement in the angled position at the bottom of the foundation foot.



Fig.13: Side wall – bottom crack foundation



Fig. 14: Pressure Hammer Test Precast Foundation Model

To complete the laboratory test also conducted hammer test foundation test the average value obtained value of 297.83 kg / cm2, Figure 14.

5. Conclusion

The results of this study can be concluded that The Concrete Quality Testing for Trapezoidal Model of the Prefabricated Foundation with different iron filler circuit produces different compressive strength as well. Initial research yielded a compressive strength of 8 tons while a new power of 5.2 tons, it means decreased strength. Cracks that occur relatively have kesaamaan with previous research. Cracks occur on the left side wall, the right side wall and the bottom side of the foundation. These different results do not diminish the ability of the foundation to bear the burden of usage in simple home making. Need to do the press test again in order to obtain results as expected. This trapezoidal foundation has good prospects due to its relatively easy and environmentally friendly manufacturing. The use of natural materials a little at once can reduce the damage of nature around our environment. The foundations of so-called environmentally friendly due to the inside of the hole can be used for other utilities such as a cable, pipe dirty water or clean water. The foundation does not require excess material and can be mass / fabrication so that quality control so as to suppress the price per unit foundation especially in terms of labor costs.

Recommendations, Precast foundation of today still require further study design, in particular the manufacture of a full scale model. Foundation with other models still need to be developed both in terms of dimensions, material quality, material requirements, methods of implementation once the foundation of applications in the field.

Acknowledgement

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