

## **CHAPTER I INTRODUCTION**

### **A. BACKGROUND**

Wall is one of the important elements of the buildings and serve to separate form a space in building and residence, in the development of rapid and all powerful, especially for the progress of the construction technology. Currently many discovered new innovation about the walls, one of these innovations is a wall panels precast trough fabrication or cast in situ with the main material is concrete, wall panels used to alternative for conventional wall because wall panels has a high quality and provide convenience in progress, as well as if the system very efficient in the structures that determine the construction budget. In this case should be done in construction cost is the use of materials or used lowest cost alternative materials.

Required methods and materials has advantages of better than already exist such as the selection materials like the brick as alternative of concrete and the manufacture of wall panels with brick that is placed differently is mounted horizontally to create a characteristic wall panels more lighter, and the dimension of the wall is thinner so that from the side of the form will be more efficient and effective.

The main types of material used in research is a brick because brick is a new alternative in wall panels technologies, not as with concrete, brick has lighter density than concrete in general density is 2000-2400 kg/m<sup>3</sup>. Because the brick main advantages exist on weight, so that used in high rise project will be able to significantly reduce of its weight, which can give impact on calculation of the foundation.

Wall panels generally used a mixture of normal concrete (water, coarse aggregate, fine aggregate, and cement) and include the reinforcement. But in this research the materials used only brick and mortar (water, fine aggregate, and cement) as well as the reinforcement in the form of wiremesh, because can give easily for processing. For the problem of strength wiremesh with normal reinforcement is a same, depend on the quality and type of used.

In this research will test the flexural and compressive strength of brick wall panels aims to find and get the good wall panels as alternative of conventional brick wall. Expected wall panels are commonly used for high rise buildings and can be applied to residence for resistant by earthquake.

### **B. Problem Formulation**

Formulation of the problem which is taken from the study wall panel with wiremesh reinforcement, among others :

- 1). How is compressive of brick wall panels with and without reinforcement.
- 2). How is flexural strength of brick wall panels with and without wiremesh reinforcement.

### **C. Research purposes**

The aim of research include :

- 1). Analyzing the value of compressive strength mortar cube.
- 2). Analyzing the value of compressive strength brick wall panels with and without reinforcement.
- 3). Analyzing the value of flexural strength brick wall panels with and without reinforcement.

### **D. Benefit of Research**

The expected benefits are as follows :

- 1). Practical benefits, get the value of flexural strength brick wall panels with wiremesh reinforcement.
- 2). The theoretical benefits, share knowledge on brick wall panels construction to alternative for a conventional brick wall eligible.

### **E. Scope of Problem**

Research is limited by following issues :

- 1). The cement used was portland cement type 1 with reference SNI 15-2049-2004 and use the brand PT Holcim production.
- 2). Fine Aggregate used in the form of sand that comes from Kaliworo, Klaten regency, Central Java, which refers from SNI 01-2847-2002.
- 3). Brick used from Klaten with a length 23cmx11cmx5cm refers from NI-10.
- 4). The water used is water from laboratory of Civil Engineering Program, Faculty of Engineering, University of Muhammadiyah Surakarta.
- 5). Water Cement ratio used 0.50.
- 6). Planning mortar using the method trial error with mix design a weight ratio between fine aggregate and cement of 1:4.
- 7). Steel reinforcement used wiremesh type M4  $\emptyset$  4mm, with size 2,1mx5,4m come from Kartasura Metal Production work.
- 8). Type of specimen :
  - a). Mortar cubes for compressive strength testing with a size 5cmx5cmx5cm.
  - b). Wall panels without wiremesh reinforcement for compressive strength testing with a length of 110cm, height 50 cm and 10 cm thick, by 2 samples.
  - c). Wall panels with wiremesh reinforcement for compressive strength testing with a length of 110cm, height 50 cm and 10 cm thick, by 5 samples.
  - d). Wall panels without wiremesh reinforcement for flexural strength testing with a length of 110cm, height 50 cm and 10 cm thick, by 3 samples.
  - e). Wall panels with wiremesh reinforcement for flexural strength testing with a length of 110 cm, height 50 cm and 10 cm thick by 5 samples.

9). Implementation of test test done in the Laboratory of Building Materials Faculty of Engineering, Department of Civil Engineering, University of Muhammadiyah Surakarta.

10). Testing is done at 28 days.

#### **F. Authenticity Research**

On previous research by Danang Tri Wibowo (2013) concerning a review flexural strength of wall panels using aggregate tile fragment with reinforcement welded mesh, concluded from the test results flexural wall panels obtained flexural stress 2,9 MPa, it can be used as a substitute wall panels for a building. While the research carried out by Barendra Agni Anji Jaya (2013) studied the flexural strength of review using a woven bamboo wall panels with styrofoam as alternative to aggregate, and get the value 3,6 MPa to wall panels, the value is more than conventional wall.

In this research will discuss the strength of wiremesh reinforcement with brick on the wall panels and applicated in horizontally with the aim to increase the strength support of flexible wall panels. From the research done today is expected to be answered and find answer wall panels as an alternative to the construction of the wall in buildings and more efficient as well as economical.