CHAPTER I
INTRODUCTION

A. Background

Indonesia is geographically is earthquake prone areas, because it is a meeting place for some of the world's tectonic plates which is always in move condition. At the beginning of the 21st century, the plate movement increases, so appear a series of strong earthquakes in Indonesia. According to "Theory of Plate Tectonicsk" geologists assumes the world consists of several plates that float, which each of these plates move in different directions so that a collision between two or more of the plates can not be avoided. There are two types of earthquakes are volcanic because volcanic and tectonic activity due to a shift in the earth's plates.

There are several factors that can cause damage to buildings in particular the walls caused by the earthquake. The first is the poor quality of building materials used. The use of materials that do not qualify very influential on particular building wall. The use of heavy aggregate such as merapi stone (andesit) is at risk of damage to buildings in the quake zone. Therefore, Another alternative is needed to replace the merapi stone. And pumice is most potential. Pumice is a light colored rock type, containing foam made from a glass walled bubble, and usually referred to as rocks glass volcanic silicate. These rocks are formed from magma acid by the action of volcanic eruptions that release material into the air. The second limitation of the implementation costs of building, material prices are not affordable the underprivileged be one of the obstacles the build of a home, Therefore, use of waste materials as an added material, it is fly ash. the addition of fly ash is expected to increase the density of the structure and help the economy of underprivileged, Fly ash itself does not have the ability to bind as well as cement. But with the presence of water and fine particle size, silica oxide contained by the fly ash will react chemically with the calcium hydroxide formed from the hydration process of cement and generate substances that possess the ability to bind. The third retaining wall reinforcement structure. By using bamboo tied

reinforcement wire bendrat, is expected to add strength to withstand earthquakes. Bamboo is a plant with a fairly high growth rate, about 3-10 cm each day. Unlike wood that take decades to obtain good quality wood, good quality bamboo bamboo can already be obtained when aged 3-5 years. Research trial mild wall panel uses local material and waste as the solution of building material in the quake zone will be do to overcome the above problems..

B. Problem Formulation

formulation of the problem as follows:

1. How the value of tensile strength of bamboo
2. How the compressive strength of cylinder concrete
3. How the difference between the specific gravity of wall panel use bamboo reinforcement and the merapi stone (andesite) with wall panel use bamboo reinforcement and the pumice stone.
4. How the difference between the loading point test of wall panel use bamboo reinforcement and the merapi stone (andesite) with wall panel use bamboo reinforcement and the pumice stone

C. Research Purpose

Research purposes as follow :

1. Analyze the value of tensile strength of bamboo
2. Analyze the compressive strength of cylinder concrete
3. Analyze the difference between the specific gravity of wall panel use bamboo reinforcement and the merapi stone (andesite) with wall panel use bamboo reinforcement and the pumice stone.
4. Analyze the difference between the loading point test of wall panel use bamboo reinforcement and the merapi stone (andesite) with wall panel use bamboo reinforcement and the pumice stone.

D. Benefit of Research

The benefits of this research is:

1. Optimizing the potential of local materials and waste.
2. This research is expected can be a potential development a mix of pumice, bambu, fly ash as a construction material.
3. This research is expected to be a solution to the problems in the construction of buildings in earthquake zones, especially the walls of the building.

E. Limitation of the Research

Limitations of the problems in this research are as follows :

1. Materials used in this research include :
   a. Fine Aggregate from Klaten.
   b. Coarse aggregate gravel from Klaten.
   c. Coarse aggregate Pumice from Klaten.
   d. Fly ash derived from PLTU Jepara, Central Java. (Taked from PT.Jaya Mix Sukoharjo).
   e. Cement that used is the Gresik brand portland cement.
   f. Water used for civil engineering laboratory of UMS.
   g. The bamboo used is kind apus with size 0,8 cm x 1,3 cm.
   h. Weir bendrat to tie bamboo reinforcement.

2. Test in Laboratorium Civil Engineering UMS, with kinds of test :
   a. Test the compressive strength of concrete cylinder with a diameter of 15 cm and 30 cm high.
   b. Testing fresh concrete used the slump flow.
   c. Test the tensile strength of the reinforcing thick bamboo 0.8 cm, width 1.3 cm.
   d. Test of flexural strength of reinforced precast concrete panels bamboo sized (80cm x 40cm x 8cm) and (80cm x 50cm x 10cm) with FAS 0.5 and pumice aggregate percentage: merapi stone (andesite) = 0: 100, 30 : 70, 40: 60, 50: 50; 60: 40, 70: 30, 100: 0 to each of 7 pieces.

e. Test of flexural strength of reinforced precast concrete panels bamboo sized (80cm x 40cm x 8cm) and (80cm x 50cm x 10cm) with FAS 0.6 and pumice aggregate percentage: merapi stone (andesite) = 0: 100, 30 : 70, 40: 60, 50: 50; 60: 40, 70: 30, 100: 0 to each of 7 pieces.

3. Mix the concrete with a weight ratio method, is cement : sand : gravel = 1 : 2 : 3
4. FAS use 0,5 and 0,6.
5. The load acting on the specimen is a vertical directional load.
6. Tests performed at 28 days

F. Originality of the Research

Research conducted by Prio Bayu Nugroho (2013) with the title of a review of compressive strength and flexural strength lightweight concrete beams without reinforcement using pumice stone as coarse aggregate with lime added material and aluminum pastes. The results showed that the lightweight concrete using added material aluminum paste and lime more expensive but if viewed in terms of the strength of lightweight concrete using coarse pumice aggregate with added material aluminum paste and lime is superior. Meanwhile, research on concrete reinforcement by using bamboo was made by Danang Gunawan W (2014) with the title of reviews flexural strength of concrete beams reinforcement laminated bamboo and concrete beams bertulangan steel on a simple beam, the flexural strength of concrete f'_c = 20 MPa with the test object shaped beam measuring 15 cm x 20 cm x 100 cm with a comparator using steel reinforcement. From the analysis done by using reinforced concrete laminated bamboo provides flexural strength similar to concrete reinforcing steel.

The current research attempted to examine the walls of lightweight panels using local materials and waste as building material solutions in the earthquake zone.