CHAPTER I

INTRODUCTION

1.1. Background

Steel is one of the main materials often used for reinforced concrete, but lately, steel has a high price. Also, the use of steel is very limited to the construction industry. In developing countries, low-cost development is essential. Therefore, the selection of alternative steel replacement materials is carried out.

One of the interesting materials to be used as an alternative material is bamboo (Leelatanon, Srivaro, and Matan, 2011). Bamboo has a cheap price, bamboo also can grow quickly, so it makes bamboo can be easily acquired. Besides that, bamboo is one of the natural materials that is often used as a building material in developing countries. With low prices and the availability of bamboo that is easy to find in Indonesia, bamboo can be one of the alternatives for reinforced concrete and is expected to have the strength that can sustain the building as a replacement for steel (Ramaswamy and Mathew, 2019).

Research and development of bamboo reinforced concrete have been conducted in many countries, except in Indonesia. Indonesia desperately needs this alternative material to reduce the amount of development expenditure. In other countries many types of research use mechanical mixtures or coatings to

improve the behavior of bamboo, so that bamboo can be an alternative material to replace steel-reinforced concrete with bamboo reinforced concrete.

In this research, the author tried to analyze the compressive strength, tensile strength, modulus of elasticity, and flexural strength of Indonesian bamboo type Bamboo Petung (*Dendrocalamus asper*) as an alternative material to replace steel in reinforced concrete as beams in its implementation in Indonesia. Then, to improve the behavior of bamboo, it will be done by coating on bamboo using several types of coatings, such as araldite, coal tar, and epoxy resin.

1.2. Problem Statement

Based on the background, the problem statement that can be found are :

1. How much effect is given by coatings to increase the strength of bamboo as reinforced concrete for beams?
2. What type of coating gives a greater effect to increase bamboo strength?
3. What kind of crack pattern does the flexural test produce?

1.3. Limitation

1. This research is focused on analyzing the flexural strength of bamboo reinforced concrete as a beam.
2. Tests will be performed for analyzing compressive strength, tensile strength, modulus of elasticity of concrete cylinder, and flexural strength of the bamboo reinforced beam.
3. The type of bamboo to be used is Bamboo Petung (*Dendrocalamus asper*).
4. The types of coatings to be used are araldite, coal tar, and epoxy resin.
5. The specimen size that will be used is 1000 mm x 250 mm x 250 mm for a bamboo reinforced beam.

1.4. Objective

The objectives of this research is to find out the influence exerted by coatings on the strength of bamboo.

1.5. Research Benefit

The result of this final project is expected to provide information to the reader about bamboo that can be used as an alternative material for reinforced concrete and add information on how to increase the strength of bamboo with the use of coating. Hopefully, more research can be done about bamboo for reinforcement

1.6. Originality

There is a lot of research that has been done about bamboo reinforced concrete as beam and column. Meanwhile, research on coating bamboo as reinforced concrete to increase the strength of bamboo has been done, but just as a column.