

CHAPTER I

INTRODUCTION

1.1 Background

Garbage is one of the problems in the world that until now has not been able to solve the solution. While the old waste has not been decomposed, national waste production continues to increase along with the increase in Indonesia's population. Every day the waste continues to increase, both from household waste and industrial waste. Household waste is waste generated from daily activities in the household which does not include special waste and waste (PP No. 81 of 2012). Meanwhile, industrial waste comes from the remnants of industrial activities, such as factories. The condition of waste that continues to grow and it is not clear how to manage and reduce it is a homework for the government and the community.

Basically, the types of waste are very diverse, industrial waste, hospital waste, market waste and others. (According to Sujarwo, in the Samp Management Book) Based on the origin, waste is classified into two, namely organic waste and inorganic waste. Organic waste is waste that comes from biological materials that can be decomposed by microbes or are biodegradable. This type of waste can decompose and decompose naturally. For example, food waste and leaves. Meanwhile, inorganic waste is the opposite of organic waste. This waste comes from non-biological materials and is difficult or even non-biodegradable. Examples are plastic waste and mining residues.

Talking about inorganic waste cannot be separated from plastic waste. Plastic is one of the inorganic wastes that the decomposition process is very long. Meanwhile, the use of plastic in daily life continues to increase. The process of buying and selling in the market requires plastic, food wrapping using plastic. Even the items we use are made of plastic. This needs to be a concern for both the government and the community about how to manage plastic waste. Because if left unchecked plastic waste will continue to grow and will have an impact on our environment.

The government, non-governmental organizations, and the community themselves have tried to manage plastic waste in various ways. However, it still has not been able to overcome and reduce the problem of plastic waste. Efforts that have been made regarding the management of plastic waste at this time are by recycling plastic waste into other forms of plastic products, namely reduce, reuse and recycle. However, the recycling process does not reduce the volume of plastic waste so that when the recycled plastic product has lost its function, it will return to plastic waste. Therefore, other alternatives are needed to handle this volume of plastic waste. Plastic waste can indeed be lost by burning, but it is very dangerous for humans because it produces pollutants and carcinogenic compounds.

Research on the management and development of plastic waste has been carried out. What's interesting is processing plastic waste into an alternative energy source. So far, plastic waste is only burned, used plastic bottles are only sold to collectors to be reprocessed into plastic products. One of the studies on the management and development of plastic waste is to recycle it by means of pyrolysis. Pyrolysis is a plastic decomposition process by heating without oxygen to produce gas or liquid

that can be used as fuel. Besides being useful for reducing the amount of plastic waste, the pyrolysis of plastic waste is also useful as an alternative fuel oil.

The process of managing and developing plastic waste by means of pyrolysis is supported by the abundant natural resources of biomass in Indonesia. This can be utilized using gasification technology. Gasification is a chemical process of converting solid matter in the form of biomass into gas. Utilization of gasification technology is more efficient than using LPG as fuel. The combined use of plastic waste and biomass in Indonesia can produce an effective alternative energy.

Therefore, researchers conducted research on the management and development of the use of plastic waste into renewable energy and utilizing the abundant biomass in Indonesia. For this reason, the researchers appointed this as a final project with the title Utilization of PP Plastic Waste (Polypropylene) into Fuel Oil through the Pyrolysis Process with Sawdust mixed with Used Oil Briquettes Gasification.

1.2 Research Purpose

The purpose to be achieved in this research are as follows:

1. Knowing the effective temperature and effective flame duration of sawdust mixed with used oil briquettes gasification in the pyrolysis process of PP plastic waste.
2. Knowing the temperature in the distillation reactor.
3. Knowing the amount of mass of fuel resulting from pyrolysis
4. Knowing the quality of fuel from pyrolysis with the water boiling test.

1.3 Research Benefit

It is hoped that this research can be useful:

1. In the economic field, it is hoped that this research can provide a solution to the problem of dependence on fuel oil.
2. In the field of education, it is hoped that this research can contribute to the development of science. Especially in the field of energy.
3. Implementing the science of energy conversion related to plastics, gasification, and pyrolysis.

1.4 Scope of Work

To avoid the spread of the problem and considering the existing limitations such as: ability, time, and cost, the writer will give the problem limitations as follows:

1. The type of plastic to be studied is the type of plastic Polypropylene (PP).
2. Fuel in the gasification process using sawdust mixed with used oil briquettes.
3. The air supply is used for the gasification process at a speed of 10 m/s.
4. The plastic mass used is 3 Kg.
5. The fuel produced was tested by Water Boiling Test (WBT).
6. The WBT method Calculation of Water Boiling Test (WBT) not looking for thermal efficiency but looking for approximation calculation of heating value pyrolysis oil. This result is the result of the calculation approach, not a valid result.