

## **Design And Build Prototype Of Plastik Waste Pyrolysis Into Fuel Oil Using Biomass Fuel**

Dedy Eko Rahmanto, S.T.P., M.Si. (Supervisor)

**Faujiyatur Rahmah**

Study Program of Renewable Energy Engineering  
Departement of Engineering

### **ABSTRACT**

*Plastik waste in Indonesia reaches 64 million tons every year. This is makes Indonesia the second largest waste producing country in the world. If this problem continues to be allowed, the volume of waste will continue to increase, so effective handling is needed, namely by converting plastik waste into fuel oil. This study aims to design and build prototype of plastik waste pyrolysis into fuel oil using biomass fuel. In addition, it also aims to find out the need for combustion needed and know the characteristics of oil from pyrolysis. This prototype is designed to reduce the volume of plastik waste, produce fuel oil, change the paradigm of waste into economic value and utilize biomass as an alternative energy source that is environmentally friendly. This prototype of plastik waste consists of 3 components, namely a furnace made of iron with diameter of a fuel chamber is 0.2 m and height of a fuel chamber is 0.25 m, the reactor is made of iron with capacity of waste plastik is 1 kg, and type of condensor is shell and tube made of stainless steel. The test was carried out for 2 hours with the measured temperature in the reactor being 207°C. Proses pyrolysis 1 kg of HDPE plastik waste consumes 5 kg of biomass from sengon wood. Pyrolysis of plastik waste produced 73 ml of oil and 282 grams of solid condensate. The characteristics of the pyrolysis oil are clear yellow color, oil density of 0.7 kg /l, viscosity of  $0.98 \pm 0.010$  cP, and calorific value of 52 MJ / Kg. Some of the test parameters this pyrolysis oil have similarities with the comparison parameters in the form of gasoline fuel. Therefore, this pyrolysis oil can be used as fuel after reprocessing.*

**Keywords:** biomass, oil, pyrolysis, plastik waste.