

FINAL PROJECT  
ENERGY CONVERSION FIELD

**A NEW DESIGN OF DUST COLLECTOR BY USING  
BLUFF BODY METHOD  
AS TURBULENCE GENERATOR**

*Submitted in Partial Fulfillment to the Requirement  
For the Degree of Sarjana Teknik*

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## ABSTRACT

*Nowadays, some powder or cement production result dust to the air which harmful for healthy and production cost. For reducing them, processes use a dust collector. Bluff Body method as turbulence generator are applied to create a new design dust collector.*

*The testing be done by two ways. First, air distribution testing be done to find out whether the dust collector able to distribute the air to entire duct. Second, effectiveness testing be done by flowing the dust within 15 minutes for five times testing. Observation on parts construct the dust collector be held after that.*

*Based on the testing result, the dust collector able to distribute the air into entire of its duct. By observing the parts by the effectiveness testing, more dust be collected in front side of cylinder than the back side. Amount of dust on cylinders are less than trapper and lattice. The observation also be held on holder and basement.*

# I. INTRODUCTION

## 1.1 The Background of Study

Processes those are producing powder or cement always face several problems. Some of the dust is released to the air. It could effect to human respiration system. And also could damage the equipments on its area. As we know, this dust is part of losses product that unwanted to pass away to the air.

In case for reducing the dust, processes use dust collectors. Unfortunately, most of them consume much energy in operation. Consequently, the production cost is also get higher. On other hand, most companies are trying to reduce their production cost.

In fluid mechanics, Bluff Body is known as a body that generates the turbulence regime. In this regime, the pressure rate is smaller than the environment. It also causes the velocity rate close to zero behind the Bluff Body. These factors may cause the dust be collected much than the environment.

Idea for applying the Bluff body method in a dust collector appeared. Bluff body is required for generating turbulence inside the flow fluid. After whirling occurs behind a Bluff body, collection of dust is expected. The dust falls to the storage because of lower pressure and velocity rate behind it. Beside easy for installation, low energy consumption also to be a power. Hence, a bluff body method dust collector expected as a solution for the problems of production processes above.

## 1.2 The Aims of Research

The aims of this research are:

1. Observing the effectiveness for solid particulates collection on the low pressure area of turbulence behind the Bluff Body.
2. Treating a more efficient device by applying the Bluff Body theory.
3. Comparing the bluff body, trapper and lattice for dust collection ability.

4. Creating a more effective device in case of function, saving energy, production cost for solid particle collection.

### **1.3 The Benefits of Research**

There are two main aspects for the benefits:

- a. Science and Technology Aspect
  1. Turbulence technology improving to dust collection in the air.
  2. Reducing the production of dust collector cost and creating a safe and applicative technology product in industrial area.
- b. Economic Aspect
  1. Reducing the production cost by a turbulence generator dust collector application.
  2. Creating a larger applicative work station to reduce the unemployment.

### **1.4 The Limitation of the Study**

The research concerns to measure the ability of dust collector to collect the dust that flowing through inside it in a same voltage rate 220 volt by creating and direct testing to the device.

### **1.5 The Methods of Research**

This ways of last research report writing are consist of five main parts for obtaining the more orient writing:

#### **CHAPTER I : INTRODUCTION**

Contain the background, research purposes, research benefits and problems limitation.

#### **CHAPTER II : LITERATURE PREVIEW**

Contain theories relate to cement, dust collector, flow regimes and fan.

#### **CHAPTER III : METHODOLOGY**

Contain of device designing, device creating process, and testing procedures.

## **V. CONCLUSION AND SUGGESTION**

### **5.1 Conclusion**

Designing, creating and testing this dust collector achieve:

1. Dust amount collection is not much on cylinder as expected. But, more amount of dust collection is collected on trapper and lattice.
2. Cylinder works as a turbulence generator of the flow, so that the flow crashed to trapper and lattice.
3. Most of the dust collected on the front side of the cylinder than the back one. It may caused by impact, that is flow stagnation motion on cylinder surface by crash, between the cylinder and the flow pass through it.
4. Dust amount collection is not much on the wake area.

### **5.2 Suggestions**

For more accurate research, progress suggestions forward are:

1. Development dust store mechanism of basement, so that a more dust collection effectiveness can be achieved.
2. Pay a high intention to material size, to keep size of each component for installation sufficient.
3. For keeping the result stay accurate, checking and maintenance on device are required.
4. In case of developing easy assembly and disassembly, more state material and assembly are also required.

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