Analysis of Physical Properties of Fuel Pellets

Yugandhara Dinesh Gujar
M.E. Civil- Environmental Engineering, Ananatrao Pawar College of Engineering and Research, Pune.

Dr. S. B. Thakare
Guide, Civil- Environmental Engineering, Ananatrao Pawar College of Engineering and Research, Pune.

S. M. Gawande
Professor, Civil- Environmental Engineering, Ananatrao Pawar College of Engineering and Research, Pune.

Abstract – This article gives the overall view of the articles published in International Journal of Emerging Technologies in Engineering Research. Abstract should be written in a motivate manner such a way it should make the readers to browse through the article completely. Abstract must be written with Times New Roman font with font size 9. Authors can make use of this template in preparing their final version of the manuscripts.

Index Terms – Oil Contaminated Cotton Waste, Hazardous Waste.

1. INTRODUCTION

There are three categories of hazardous waste enlisted in Hazardous Waste (Management, Handling and Trans Boundary Movement Rule, 2008) are recyclable waste, landfillable waste and incinerable waste. Oil soaked cotton waste is categorized under incinerable hazardous waste. Hazardous waste management is concern with the generation of hazardous waste. Pelletization technology is one of the effective technology can be used for utilization and minimization of oil soaked cotton waste by producing fuel pellets from them by using binder and additives. Physical characteristics of fuel pellets are important. In this context, physical characteristics such as durability index, impact resistance index was computed by durability test and vibration test respectively.

2. MATERIALS AND METHODOLOGY

2.1. Materials used:-

Shredded cotton waste, garden waste, saw dust and binder.

2.2. Methodology:

Oil soaked cotton waste was shredded using a textile cloth shredder into fine pieces of approx. 3-4 mm size. A mixture of known amount of cotton waste with binder and filler was prepared. Flour was used as binder whereas garden waste and sawdust was used as filler/ additives. The mixture was placed in pelleting machine and pellets were formed.

2.3. Post treatment of pellets:

Formed pellets allowed to sundry for further

3. RESULTS AND DISCUSSION

3.1 Durability index using vibration test:-

Vibration test was used for testing the durability of fuel pellets. The pellet sample of known weight was placed on the vibration machine. The vibration machine was vibrated for 15 minutes. The weight loss in the pellet sample was noted. Durability index was calculated by using the following formula,

$$\text{Durability Index (DI)} = \frac{W_1}{W_0} * 100 \quad (1)$$

Where,

W_0 = Initial weight of pellet sample before vibration test.

W_1 = Final weight of pellet sample after vibration test.

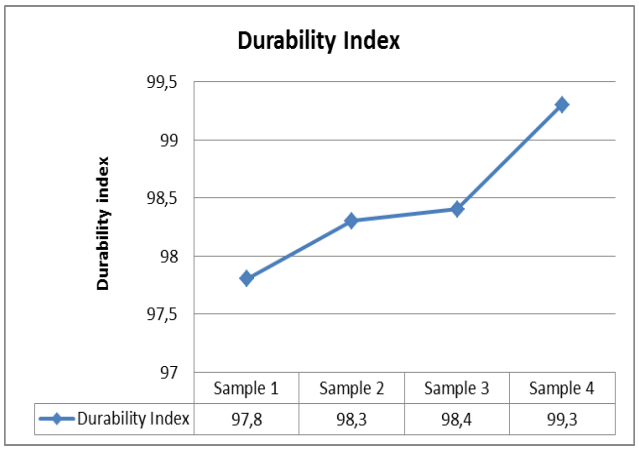

Figure 1 Resultant Graph of The Vibration Test.

Vibration test was used to calculate durability index where 50 grams of fuel pellets of each sample placed on the vibration machine. Vibration test is important in point of view of transportation of fuel pellets. The results obtained from the vibration test are depicted in figure 1.

3.2 Impact resistance of fuel pellets:-

The impact resistance index was calculated by using ASTM D 440-86 standard method. In this impact resistance test, fuel pellet was dropped twice from the height 1.83 meters onto the floor. The impact resistance index (IRI) was calculated by using formula,

$$IRI = \frac{100*N}{n} \quad (2)$$

Where,

N = number of drops

N = total number of pieces.

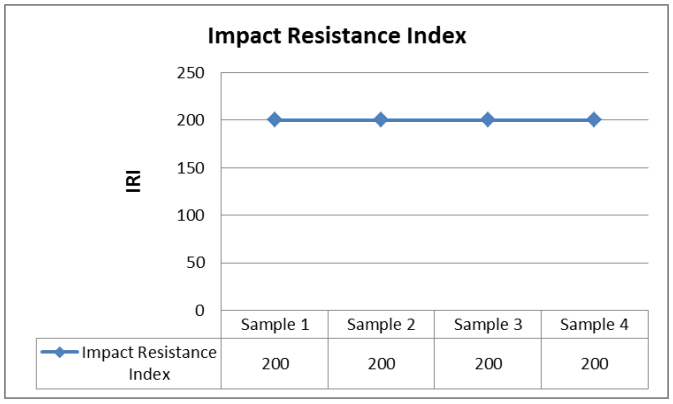

Figure 2 Resultant Graph of The Impact Resistance Test

Impact resistance index shows the impact resistance property of fuel pellets. The pellet was dropped on the floor twice from the height of 1.83 meter. The results obtained from the test are depicted in figure 2.

3.3 Calorific value:

Calorific value determines the energy content of fuel. Calorific value is the most important property of fuel. Calorific value of fuel pellets was determined by using a Bomb calorimeter.

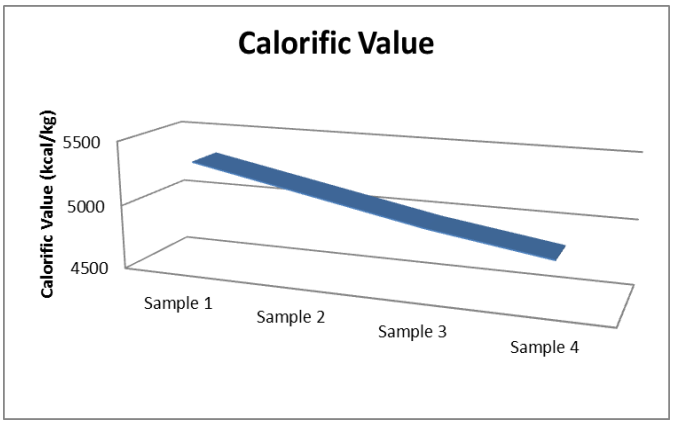

Figure 3 Resultant Graph of Calorific Value

4. CONCLUSION

Oil soaked cotton waste is minimized and utilized by producing fuel pellets from them.

- Filler play an important role to increase the durability of fuel pellets.
- The impact resistance index for all samples was found 200.
- Calorific value of fuel pellets affects with the aid of fillers.

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