

Utilisation of Distillery Spent Wash as a Waste Management

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Abstract

Distillery spent wash is the unwanted residual liquid waste generated during alcohol production and pollution caused by it is one of the most critical environmental issue. Despite standards imposed on effluent quality, untreated or partially treated effluent very often finds access to watercourses. In research work two different test namely compressive strength test & water absorption test are performing. A distillery spent wash was added with replacement of water for prepare of fly ash brick with different percentage likely 20%, 40%, 60%, 80%, & 100%. The compressive strength test performs at different days like 7, 28, & 56 days respectively & water absorption test carried out at 27 days. From the analysis of data it will conducted that replacement of 100% spent wash with water give higher strength at end of 56 days compare to the standard fly ash brick. While it will provide nearer strength to the standard brick at 28 days when we replace the spent wash as 100%. Water absorption is also main factor for any brick & also during use of spent wash water absorption are less compare to the standard brick when use 100% spent wash. Also it will reduce during adding of spent wash as 40% and 60% compare to the standard brick.

Keyword- Spent Wash, Distillery Waste, Fly Ash Brick

I. INTRODUCTION

Sugar and distillery plants in our country play a vital role in the economic development of the nation. However the effluents from these plants cause very serious problems of water pollution resulting in bad odor, fish kills and so on. The industry as well as the regulatory authorities is now well aware of these problems and there is a growing awareness on the part of the public also to a very great extent in this regard. The disposal of these wastes poses a challenge to the Public Health as well as pollution control authorities. The present article describes the processes involved in these industries and gives the average quantity and characteristics of effluent produced from different sections of these plants, their pollution potential and the method of treatment and disposal of these effluents based on studies conducted by various authors. However, the solutions offered here cannot be applied as such for all cases. Each industry is unique in its own modifications to the methods for treatment of its effluent suggested, based on study of the particular problem taking into consideration the local situation, needs and ISI requirements. Composting with sugarcane press mud (solids obtained in the clarification of sugarcane juice, in the sugar manufacturing process), agricultural residue or other appropriate substrates. Composting is coming to be accepted as the only "Free of cost" solution to distillery effluent problem. But there is no technology which gives ZERO DISCHARGE solution to distillery effluent.

A. Scope of Report

- For casting of brick change in percentage is replace of water with distillery spent wash having percentage likewise 20%, 40%, 60%, 80%, and 100%.
- Compressive strength test and water absorption test will be analyzed for the fulfill the basic need of property of brick.
- Test will be carried out at the end of 7, 28, 56, days.
- Only compare the result of standard brick with distillery spent wash added brick.

B. Need of Study

- Distillery spent wash is the unwanted residual liquid waste generated during alcohol production and pollution caused by it is one of the most critical environmental issue.
- Now a days production of petrol was so much require and for that addition of 20% ethanol must require. As requirement of ethanol increase then production of spent wash also increases.
- So that was required to manage the spent wash for as a waste management and sustainable development

C. Distillery Waste Treatment Process

For distillery waste (spent wash) treatment sayan sugar factory have a 2 types of treatments are available.

- 1) Two Stage Bio Methanation (Anaerobic) Treatment.
- 2) Bio Composting

1) Anaerobic Treatment

Anaerobic treatment is the primary treatment given to the spent wash in sayan sugar factory.

- For first stage anaerobic treatment spent wash is cooled to 35 C before feeding into up flow type 3600 m³ capacity bio digesters (1800 m³ each ,2numbers) in bio digester plastic media is used for the biomass attachment. No pre-treatment by way of filtration or sedimentation is required before anaerobic treatment. Spent wash is neutralized by slurry of lime before feeding in digester. 60% digested spent wash is recycled for low consumption of lime. The hydraulic retention time about 15 days in first stage bio machination. After first stage bio machination digested spent wash is feeding into second stage up flow type four numbers of digester (460 m³ capacities each). Before second stage of bio machination fresh spent wash is also mixed with digester spent wash in small quantity. After two stage bio machination treatment digested spent wash used for Bio composting. In this system the complex organics are broken down and the end product is Methane having high calorific value. This methane gas is used as a Fuel in Boiler and energy conservation can be achieved.

II. FLY ASH BRICK

The basic mix proportion for fly ash brick is selected from the information survey performed to understand the manufacturing process of fly ash brick. As a part of this survey five production units having well reputation in Surat & Tapi district are visited. The information regarding plant location, experience in fly ash brick manufacturing field, raw material used in fly ash brick production, their proportions, methods of casting, raw material sources & purchase rates, are not allow by the main person of the mfg. plant so in this project above detail are shown properly. Samples of fly ash bricks are collected from manufacturer & tested for wet compressive strength & water absorption at 7 days, to finalize the mix proportion of brick to be examined further.

III. CASTING SCHEDULING OF FLY ASH BRICK

A. Experimental Work

Specimen ID	TYPE OF BRICK	SPENT WASH %	WATER %
A	FLY ASH	0%	100%
B	FLY ASH	20%	80%
C	FLY ASH	40%	60%
D	FLY ASH	60%	40%
E	FLY ASH	80%	20%
F	FLY ASH	100%	0%

Table 1: Replacement Levels of Fly ash Brick with Spent Wash in Mix Proportion

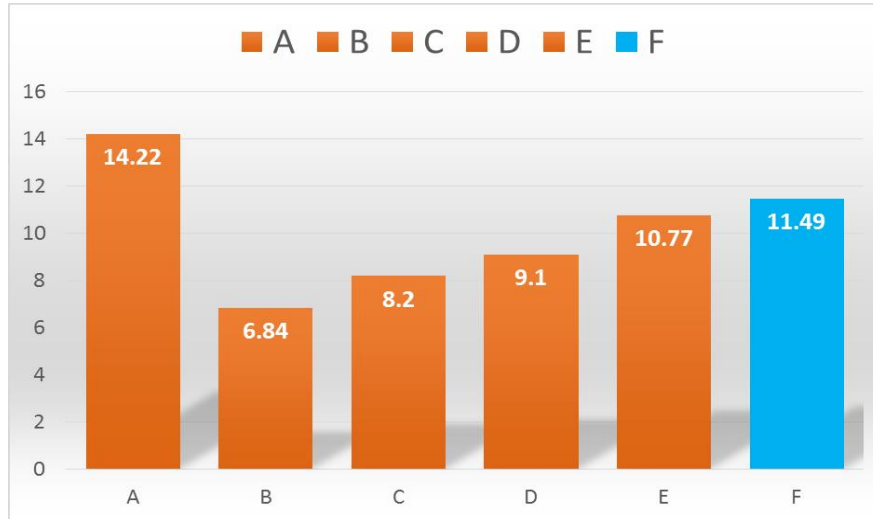
B. Casting Procedure of Brick

Brick Type	Compressive strength test (200×100×75) mm			Water absorption (200×100×75) mm	Total
	7 days	28 days	56 days	28 days	
	A	5	5	5	
B	5	5	5	5	20
C	5	5	5	5	20
D	5	5	5	5	20
E	5	5	5	5	20
F	5	5	5	5	20
TOTAL NUMBER OF BRICK					120

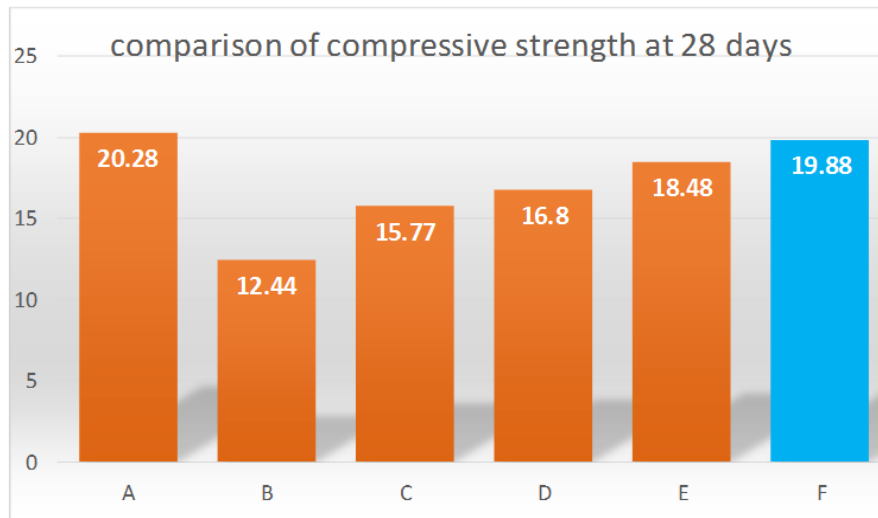
Table 2: Casting of brick at different days

Material	Yellow sand	Fly ash
Tagara	3	3.5

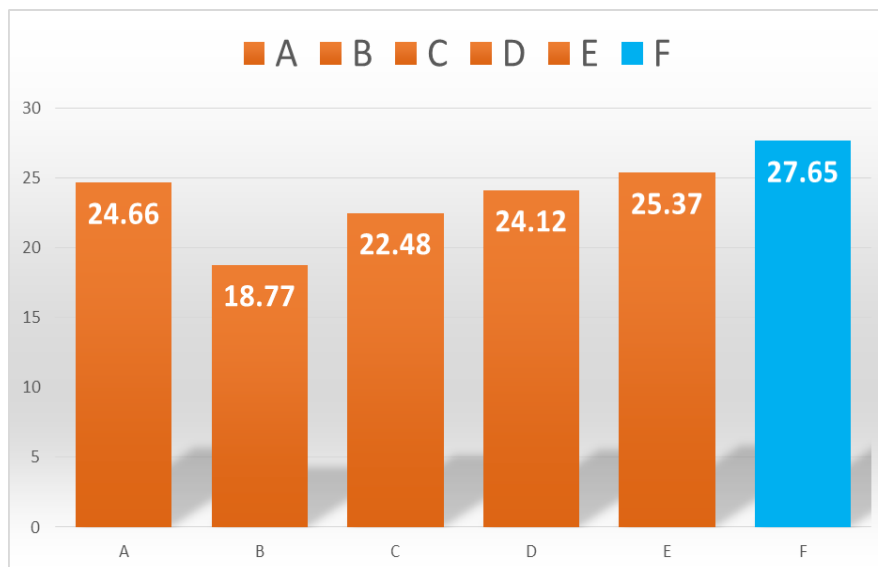
IV. RESULT ANALYSIS



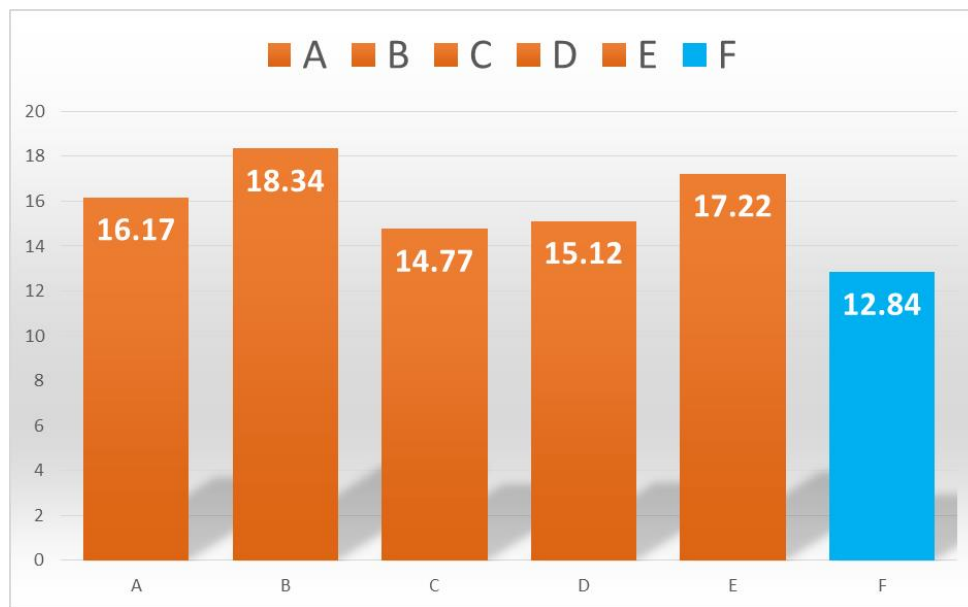
Graph 1: Comparison of water absorption at 28 days



Graph 2: Comparison of compressive strength at 28 days



Graph 3: Comparison of compressive strength at 56 days



Graph 4: Comparison of water absorption at 28 days

V. CONCLUSION

- In research work two different test namely compressive strength test & water absorption test are perform.
- A distillery spent wash was added with replacement of water for prepare of fly ash brick with different percentage likely 20%, 40%, 60%, 80%, & 100%.
- The compressive strength test perform at different days like 7, 28, & 56 days respectively & water absorption test carried out at 28 days.
- From the analysis of data it will conducted that replacement of 100% spent wash with water give higher strength at end of 56 days compare to the standard fly ash brick. While it will provide nearer strength to the standard brick at 28 days when we replace the spent wash as 100%
- Water absorption are also main factor for any brick & also during use of spent wash water absorpition are less compare to the standard brick when use 100% spent wash.
- Also it will reduce during use of spent wash as 40% and 60% compare to the standard brick.
- So it was beneficial to use sugar waste called spent wash for sustainable development and as a waste management and it will useful for construction material to increases the strength of it.
- For standard brick strength will gain higher during 7th days and 28th days respectively compare to the fly ash brick which replace by spent wash.
- Alternatively strength will gain higher when % of spent wash increases if part of water.

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