Sustainable Disposal of Water Treatment Plant Sludge by Reuse in Bricks Manufacturing

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Abstract- *One of the worldwide issue related with production of potable water is alum sludge. Alum sludge is a waste generated from coagulation and flocculation procedures of water treatment plants (WTP). Gigantic measure of this alum sludge is produced and disposed unsafely to the environment. This basically has negative effects to the environment. Traditional disposal strategies include disposition to watercourses, rivers, streams, conduits and landfills, which prompts collection of higher concentration of aluminum oxides in water and soil. Realize that amount of alum sludge may stay unavoidable in the current processing of drinking water treatment technologies. To agree of transfer of waste principles set by the local/government expert makes specialists searching for elective development materials as a substitute to conventional materials likes bricks, tiles in way of diminishing the effect of these waste on environment. This study attempts to replace an appreciable amount of conventional clay utilized as a part of bricks manufacturing with water treatment plant sludge.*

Keywords- water treatment plant, sludge, fly ash, clay, bricks, compressive strength

I. INTRODUCTION

Water treatment plants make water safe for drinking purposes, as well as produces huge measure of waste ordinarily known as water treatment residue or sludge. The sludge arrangement is for the most part relies upon factors like the nature of raw water to be dealt with, polluting influences in raw water, sort of coagulant utilized, measure of coagulant utilized for treatment and so forth. Numerous looks into have demonstrated that the aluminum causes Alzheimer, youngsters mental retardation. Subsequently, appropriate disposal of water treatment sludge is a critical parameter. As there is as of now a huge prerequisite of land for strong waste management, landfilling is not appropriate choice. Additionally water treatment sludge has different physical and chemical qualities which are like conventional clay. Also the sludge can possibly be utilized as a part of different materials. The reuse of sludge for different development materials is a viable method for diminishing the measure of sludge. And furthermore lessen the unsafe consequences for human life and environment. In numerous nations the reuse of water treatment sludge has been done in many construction materials like cement, aggregates, tiles, bricks, road foundation and so forth.

The fly ash disposal is also a major concern as it is generated in large quantities and are hazardous to health and environment. Fly ash is fine grained, fine particulate material that is carried away in the flue gas and generally gathered from the flue gas by methods for electrostatic precipitators or mechanical collection devices such as cyclones. Utilization of such fly ash in development road sub-base, light weight aggregate, low cost adsorbent for removal of organic compounds has been broadly inspected. As bricks are one of the most important material for construction work, the reuse of sludge in brick manufacturing can be a viable method for reuse of water treatment sludge and cyclone fly ash.

II. MATERIALS AND METHODOLOGY

2.1 MATERIALS :

The properties and the details of all kind of materials to be used in the brick manufacturing are as below:

2.1.1 Water treatment plant sludge :- Sludge has been collected from PCMC's water treatment plant, sector 23, Nigdi, Pradhikaran. Sludge has been dried in natural sunlight.

2.1.2 Clay :- locally available clay sample were taken which was used at kiln site for manufacturing of bricks.

2.1.3 Fly ash :- fly ash has been collected from Sant Tukaram Sahakari Sakhar Karkhana, Kasarsai. 10% fly ash has been used for all brick samples.

Fig no.1- WTP sludge

Table 1: chemical analysis of sludge from water treatment plant

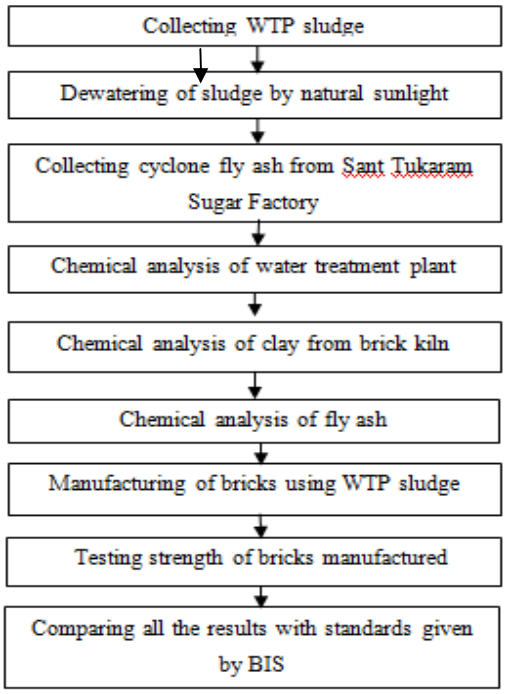
Ingredient	Weight (%)
P_2O_5	0.28
Cl^-	35.70
K_2O	0.82
Fe_2O_3	26.60
Na_2O	3.68
CaO	1.90
MgO	0.29
SiO_2	42.48
Al_2O_3	36.02

Table 2: chemical analysis of clay from brick kiln

Ingredient	Weight (%)
P_2O_5	1.31
Cl^-	11.33
K_2O	0.88
Fe_2O_3	30.61
Na_2O	4.81
CaO	1.10
MgO	0.13
SiO_2	45.60
Al_2O_3	30.82

2.2 METHODOLOGY

Flow chart of methodology for bricks manufacturing-



III. DISCUSSION

In this research the replacement of conventional clay by water treatment plant sludge is studied. The study will be conducted to determine the following-

2.2 Analysis of compressive strength, water absorption, efflorescence, soundness for water treatment sludge brick with various ratios.

2.3 Choose the optimum materials ratios to produce brick from water treatment plant sludge with cyclone fly ash.

IV. CONCLUSION

By finding out the maximum percentage of water treatment sludge that can be used in the manufacturing of bricks, reduce the harmful effects of water treatment plant sludge on human health and environment. Also to prevent the loss of conventional materials by reuse of waste.

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