e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

MANUFACTURING OF BRICK FROM SEWAGE SLUDGE AND RICE HUSK

Mr. Rahul Jadhav[*1], Mr. Vyankatesh Shinde[*2], Mr. Rushikesh Kale[*3], Mr. Pruthviraj Patil[*4], Mr. Shivshankar Kendre[*5], Prof. Gomtesh Patil[*6]

[*1,2,3,4,5]Students, Department Of Civil Engineering , Shivaji University, Kolhapur, Maharashtra, India.

[*6]Guide, Professor Department Of Civil Engineering D.K.T.E. Textile And Engineering Institute, Ichalkaranji, Maharashtra, India.

ABSTRACT

Now a days, the decomposition of waste materials is one of the most difficult task as it effects the environmental factors. It causes soil pollution as it contains various inorganic contents. Also it causes air pollution as it contains unpleasant smell. It is necessary to utilize the waste like sludge due to high waste in industry. In ancient days , clay is used for brick making. The properties of contents in sludge and clay are nearly same. So, sludge is suitable material for brick making. Various diseases are caused due to increase in aluminium content in water as water from river mixed with industrial water . Rise husk is also part of composition in brick. It contains the silica and help to achieve desired strength of brick. Its cost is very low as it is waste from farm. This study includes the strength of brick when it is mixed with sewage sludge and rice husk.

I. INTRODUCTION

Waste from industry has become major problem in current times. Sludge from waste water is biodegradable but it requires large area and time to dispose completely. Brick is most important part in construction. Bricks are being used in construction from ancient times according to studies carried out in past. The composition of clay and sewage sludge is lot similar so sewage sludge can be used in manufacturing of bricks .The amount of sewage sludge generated from waste water treatment plants is very high so it has become major environmental problem. Sludge generated in plants is generally directly disposed in nearest water sources like river and lake which causes pollution of water source . That's why disposal of sewage sludge is major worldwide problem . Use of sludge from waste water treatment plants in production of bricks not only can reduce the environmental harm but also it can reduce cost of production of bricks as sludge is waste material. Rice husk is also waste material generated from agriculture. Rice husk contents high amount of silica which can help in improvising compressive strength of brick, so by using sewage sludge and rice husk we can produce bricks with cost efficiency.

II. METHODOLOGY

1. Literature collection
2. Sludge collection
3. Drying of sludge
4. Tests on sludge
5. Moulding of bricks
6. Drying of bricks
7. Burning of bricks
8. Tests on bricks
9. Comparising the results

III. OBJECTIVES

1. To suggest alternative to conventional bricks.
2. To make light weight bricks.
3. To achieve strength and feasibility.
4. To reduce cost of bricks.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

IV. METHODOLOGY AND TESTING

1. Material Collection :

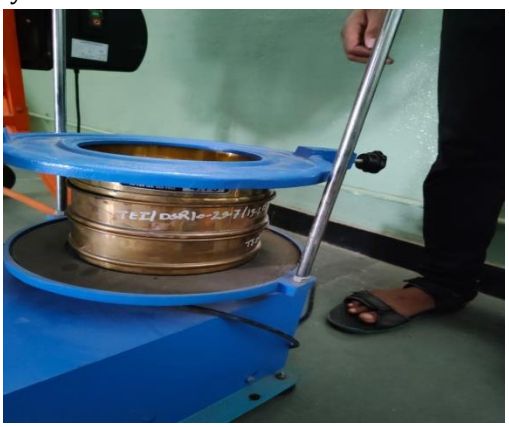
- Collection of sewage sludge, rice husk, soil, sand and water etc.

Waste water treatment plant

2. Testing of materials :

- Tests carried out on sludge:- Specific gravity , sieve analysis.

Specific gravity test



Sieve Analysis

3. Preperation of mix design :

- Percentage of all the materials were decided.

Percentage Of Sludge	Soil %	Rice Husk %	Water
10%	85%	5%	As Per requirement
20%	75%	5%	As Per requirement
30%	65%	5%	As Per requirement

casting of brick

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

4. Testing of bricks :

- Compressive strength test
- Water absorption test.
- Efflorescence test
- Size , Color and Shape
- Soundness test
- Hardness test.

V. RESULT AND DISCUSSION

1. Compressive Strength

Brick Type	Sludge (%)	Compressive strength (N/mm2)
1.	10	3.42
2.	20	3.23
3.	30	2.87

Compressive strength test on Universal testing machine

2. Water absorption test

Number	Percentage of sludge (%)	Weight before test (kg)	Weight after test (kg)	Percentage of water absorption (%)
1	10	2.960	3.450	16.56
2	20	2.890	3.381	17.01
3	30	2.822	3.383	19.91

3. Efflorescence test on brick :-

- Result :- No Efflorescence

4. Size ,Color and Shape test :-

- Result :- All are within standard limits.

5. Soundness test:-

- Clear ringing sound is produced and no breakage of brick.

6. Hardness test:-

- Result:- Bricks are sufficient hard .

7. Bricks with lower percentage of sludge have higher compressive strength than bricks with higher percentage of sludge.

8. Cost of brick with higher percentage of sludge is low.

9. Weight of brick with higher percentage of sludge is lower than brick with lower percentage of sludge.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

VI. CONCLUSION

The conclusion is finilised by using experimental results and tests. Brick is used as clay and rice husk is used to achieve strength. As we increase the content of sludge in the brick ,the strength of brick is lowered. Also, the quantity of rice husk in the brick is also limiting. At a certain percentage where the percentage of rice husk and sludge with soil gives maximum strength it can be considered as suitable mix proportions.

VII. REFERENCES

[1] "Brick Manufacturing From Treatment Sludge And Rice Husk Ash Water By Badr El-Din E Hegazy, Hanan A Fouad And Ahmed M. Hassana In Journal of Basic and Applied Sciences, 6(3): 453-461, 2012 Issn 1991-8178

[2] "An Overview Of Sludge Utilization Into Fired Clay Brick." By- Aeslina Binti Abdul Kadir. Ahmad Shayuti Bin Abdul Rahim International Journal of Environmental, Chemical, Ecological, Geological And Geophysical Engineering Vol:8, No:8, 2014 "Manufacturing Of Bricks Using Industrial.

[3] Sludge." By Ranjeet N. Kore Bhagataniruddha N. Chavan International Journal Dr. S. R. Of Research In Engineering. Science And Technologies Vol:2 March 16

[4] "Utilization Of Sludge In Manufacturing Energy Efficient Bricks" By- Mary Lissy P N1, Dr. MS Sreeja Iosr Journal Of Mechanical and Civil Engineering (Iosr-Jmce) E-Issn: 2278-1684, P-Issn: 2320-334x, Volume 11, Issue 4 Ver. Iii (Jul-Aug. 2014), Pp 70-73

[5] "Incorporation Of Water Sludge, Silica,Fume, Andrice Husk Ash In Brick Making." By- Badr El-Din Ezzat Hegazy, HananAhmed Fouad And Ahmed Mohammed. Hassana Advances Environmental Research, Vol. 1, No. 1 (2012) 83-96

[6] "Durability Of Bricks Cast With Industrial Sludge." By- G. Reddy Babul, N. Venkata Ramana 2 Iosr Journal Of Mechanical and Civil Engineering (Iosr-Jmce) E-Issn: 2278 1684,P-Issn: 2320-334x, Volume 6, Issue 4 (May. - Jun. 2013), Pp 43-46.