MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Gwalior, Madhya Pradesh - 474005

A MIN -PROJECT REPORT

ON

"Optimizing the proportion of recycled brick aggregates in conventional aggregates based on the impact value criteria"

Submitted by

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Department of Civil Engineering

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CERTIFICATE

Madhav Institute of Technology & Science
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This is to certify that the project entitled " **Optimizing the proportion of recycled brick aggregates in conventional aggregates based on the impact value criteria** " presented by the students of group-13 in incomplete satisfaction of the necessity of the recompense of Bachelor of Technology degree in Civil Engineering at Madhav Institute of Technology & Science, Gwalior is a genuine work completed by the students under my watch and direction.

To the best of my insight, the matter epitomized in the theory has not been submitted to any other college/Institute for the recompense of any Degree or Diploma

Under the Guidance of-

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INTRODUCTION:

Reuse of construction waste as aggregates is becoming increasingly popular due to the environmental impact and economic cost of quarrying operations, the rising costs of hauling and landfill tipping fees, and incentives for sustainable construction practices, among other reasons. Brick aggregate and recycled brick masonry aggregate (RBMA) has not commonly been used in concrete in most western countries. Brick aggregate concrete is most often used in non-structural or non-critical applications. Brick aggregates are lighter than normal aggregates, and use of concrete that incorporates brick aggregates can significantly reduce the self-weight of a structure. Brick aggregates have the potential to enhance the fire performance of concrete due to their thermal expansion and conductivity properties.

Toughness of a material is its ability to sustain impact loading. The aggregates on an in-service road are also subjected to impact loading and it should be tough enough to resist impact under traffic wheel load. Toughness of aggregates is measured by the impact test. Aggregates Impact value gives a relative measure of resistance of aggregates to sudden shock or impact, which in some aggregates differs from its resistance to slow compression load.

Objective of Study:

The objective of this experiment is optimizing the proportion of recycled brick aggregates in conventional aggregates based on the impact value criteria.

Procedure Followed:

1. Take 350g of oven dried aggregates (100 –105 C) which passes through a 12.5 mm sieve and is retained on a 10 mm sieve.

2. Fill the measuring cylinder with aggregates in 3 layers, tamping each layer 25 times. After filling the cylinder, use the tamping road as a straight edge to remove excess aggregates.

3. Note the empty cylindrical steel cylinder (W1), then transfer the aggregates from measuring cylinder to cylindrical steel cup and note the combined weight of steel cylinder and aggregates (W2).

4. Place a cylindrical cup on the solid base plate of the impact test machine.

5. Release the hammer in order to apply impact load, 15 bowls are given at the interval of not less than 1 sec.

6. After 15 blows, remove the cylindrical cup and transfer the aggregates over the 2.36 mm sieve.

7. Sieve the aggregates through 2.36 mm sieve for 10 minutes and note the weight of aggregates passing through 2.36 mm sieve (which retain on the page) (W3).

8. Record the observations and calculate the aggregate impact value as per the formula given below:

Empty weight of the cylinder (W1) in (g)	Weight of cylinder with the aggregates (W2) in (g)	Weight of aggregates passing through 2.36 mm sieve (W3) in (g)
1911.5	2445	75

Impact test value: W2/W2-W1*100

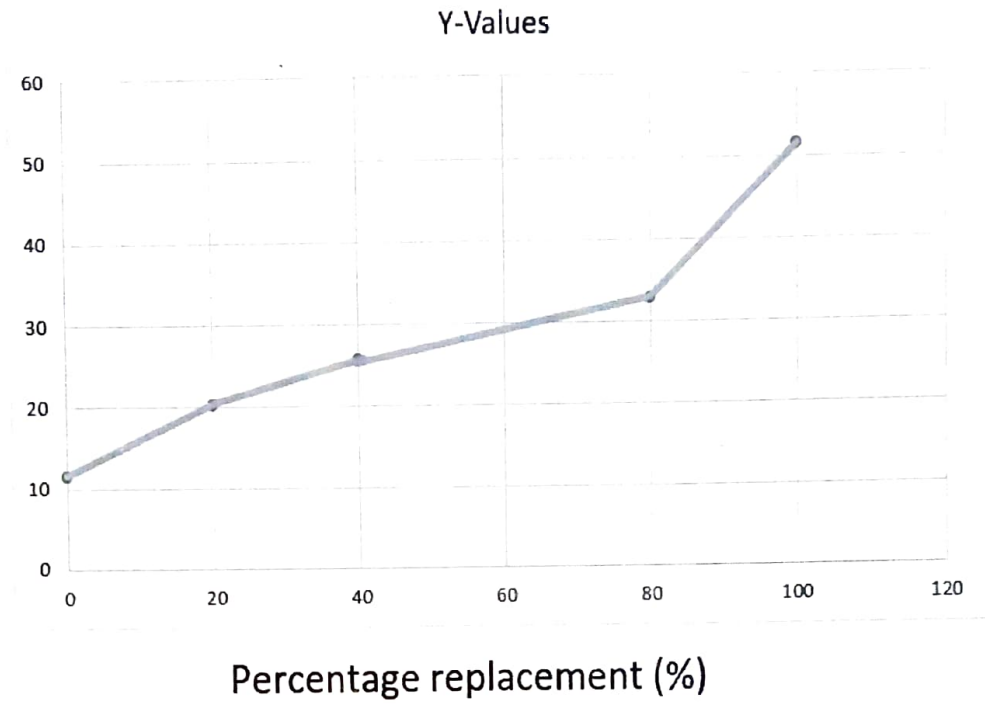
Impact test value: 14.06%

Since the impact value of aggregate is in the range of 10-20%, It is classified under toughness property: Strong

9. Repeat the procedure from step 2 for the second trial and report and report the aggregate crushing value as the average of both trials.

Observation Table:

S.NO.	Weight of sample (350 g) Ratio of aggregate: Brick	Weight of conventional aggregate W1 (g)	Weight of recycled aggregate W2 (g)	Weight of aggregate passing through 2.36 mm sieve. W3 (g)	Impact Value (%)
1.	100:1	1765	2115	40	11.42
2.	80:20	1765	2115	71	20
3.	60:40	1765	2115	90	25.71
4.	20:80	1765	2115	115	32.85
5.	1:100	1765	2115	180	51.42



Result:

Impact value = 30

Percentage Replacement = 67 %

Since the impact value is increasing gradually with the increase in quantity of recycled aggregate, therefore recycled aggregate can sustain higher load as compared to conventional aggregate.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CONCLUSION:

The aggregate impact value is a measure of resistance to sudden impact or shock which may differ from its resistance to gradually applied compressive load. The aggregate should therefore have sufficient toughness to resist their disintegrating due to impact. From the experiment it is clear that recycled aggregate has more impact value as compared to conventional aggregate and it can bear higher load.

References:

1. https://ts-nitk.vlabs.ac.in/exp/impact-test/procedure.html

2. https://www.researchgate.net/publication/263299587

Recycled brick masonry aggregate concrete: Use of brick masonry from construction and demolition waste as recycled aggregate in concrete.