

## Recent Development in the Utilization of glass waste for green concrete towards sustainable and energy efficient construction

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### INTRODUCTION & AIM

- 1) The conventional construction industry relies heavily on resource-intensive aggregates, contributing to environmental degradation.
- 2) By utilizing recycled waste, which is abundant in waste streams, we aim to not only divert glass from landfills but also create an eco-friendlier concrete composite.
- 3) Our research had focus on evaluating the mechanical properties, durability, and environmental impact of the glass-infused concrete.
- 4) Concrete ingredients is different material like binding material (cement+ fly ash), fine aggregate, coarse aggregate and water
- 5) Today construction cost is very high with using conventional materials due to unavailability of natural materials

#### The aim of this research are:

- 1) Minimization of construction waste with separate useable objects and substances from it, reusing them as far as possible.
- 2) Use natural construction materials restrictedly, replacing them as far as possible with waste suitable for construction purposes.
- 3) Experimental Investigation on waste Concrete to find its suitability to replace Natural Materials for Sustainable Development.
- 4) Explore the use of reused glass as coarse and fine aggregates.
- 5) Assess environmental sustainability, engineering properties, and economic viability.
- 6) Promote Circular Economy through the waste utilization and employment generation.
- 7) New employment opportunities in the secondary area of Circular Economy.

### METHOD

#### TYPES OF TEST CONDUCTED ON CEMENT :

- DETERMINATION OF STANDARD CONSISTENCY
- SETTING TIME OF CEMENT
- SOUNDNESS TEST ON CEMENT
- COMPRESSIVE STRENGTH TEST
- DETERMINATION OF SPECIFIC GRAVITY OF CEMENT

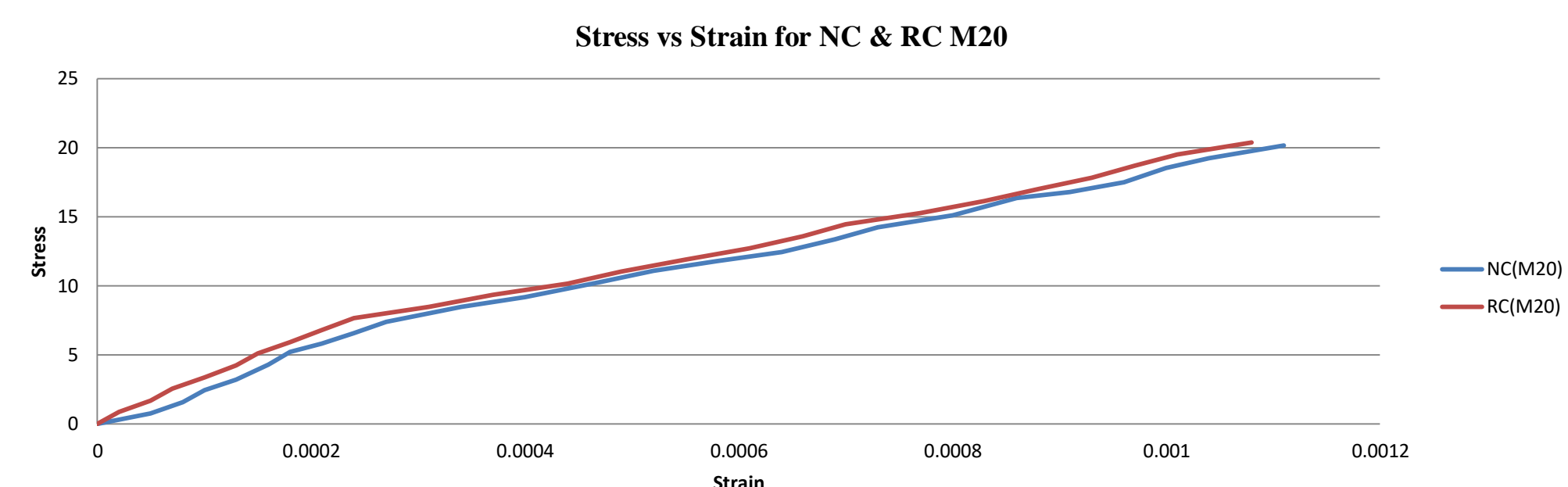
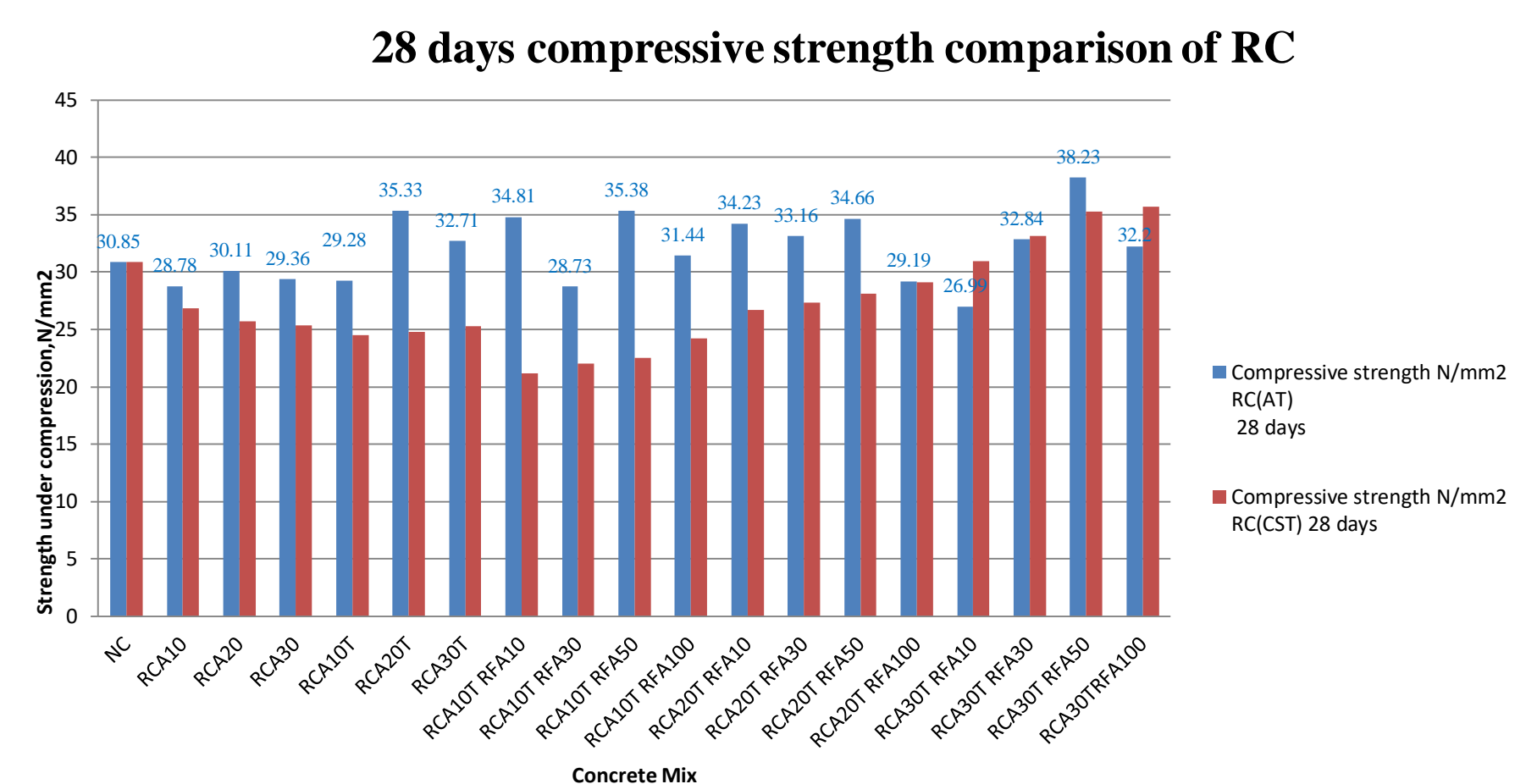
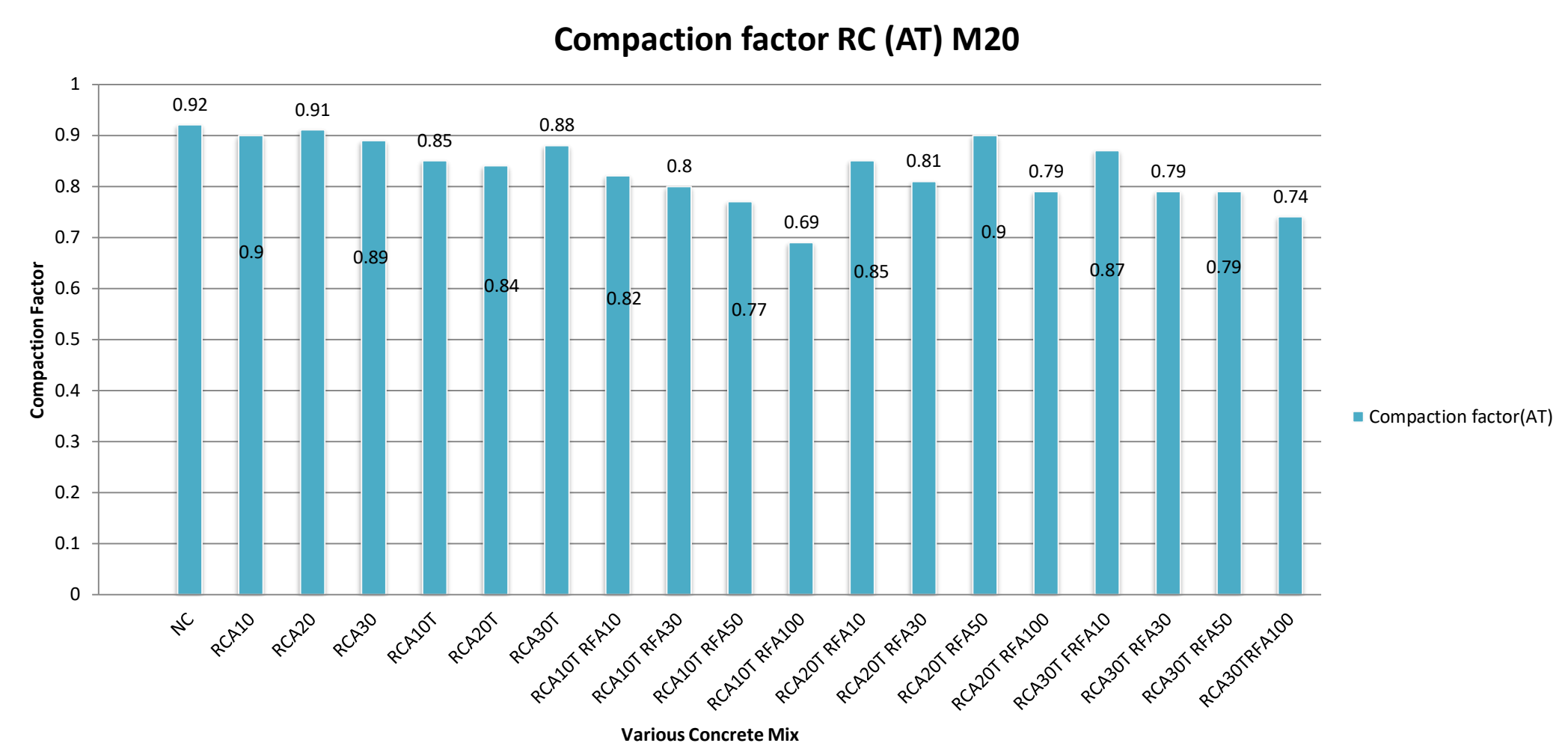
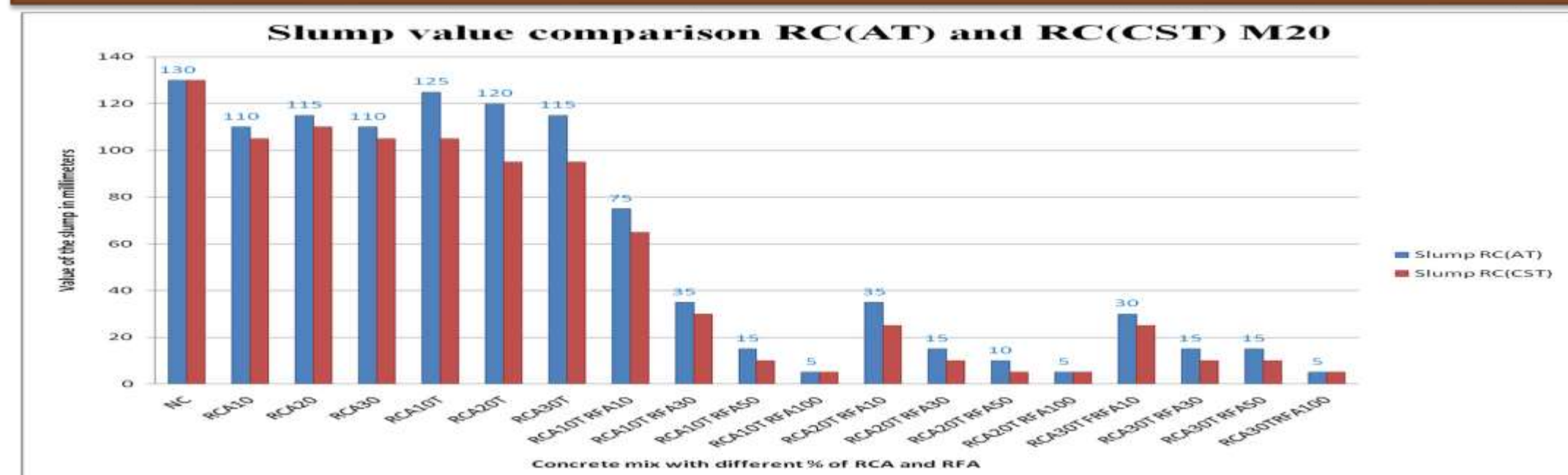
#### TYPES OF TEST CONDUCTED ON AGGREGATE

- AGGREGATE IMPACT VALUE TEST
- FLAKINESS INDEX
- ELONGATION INDEX
- SIEVE ANALYSIS OF COARSE AND FINE AGGREGATE

#### TYPES OF TEST CONDUCTED ON CONCRETE:

- SLUMP TEST
- COMPACTION FACTOR TEST
- COMPRESSIVE STRENGTH TEST
- SPLIT TENSILE STRENGTH TEST
- FLEXURAL STRENGTH TEST

### RESULTS & DISCUSSION



### CONCLUSION

1. The compressive strength of reused aggregate concrete, with 30% replacement of coarse aggregate, matches that of concrete made with natural aggregates.
2. Among the treatment methods, abrasion treatment proves to be more effective and suitable for removing attached mortar from reused aggregates, thereby enhancing their performance. Chemical and cement slurry treatments are less effective in comparison.
3. Compared to concrete built with natural aggregates, reused aggregate concrete mixes have a somewhat reduced workability. However, the workability of concrete with 30% coarse reused aggregate and 50% fine reused aggregate is comparable to that of normal concrete, with natural aggregates.

### FUTURE WORK / REFERENCES

- 1) Alyhya, W.S., Salman, G.A., Jadooe, A. (2025), "Revolutionizing recycled aggregate concrete: a dual approach using HCl treatment and silica fume". Civil Engineering Journal, 11(5). ISSN: 2476-3055.