

Strength of RCC Beam Using Geopolymer Concrete

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Abstract — The continuous reduction in raw resources in the construction industry has reached the alarming stage such that the usage of waste by-products from various industries has become necessity. Fly ash had used in the construction industry for the last decade; but there a need for more experimental studies with other materials as a substitution. Concrete is better for compression. Hence, it used in compression regions. The M25 concrete had used to prepare both GPC cubes. The trial mix is test for compressive strength. Tension, compression, and flexural has done for 28 days of curing of the beams. Development of flexural cracks is relatively less in geopolymer Compression strength increased from 17.25 MPa to 37.25 MPa in the period of 7 days to 28 days for conventional specimens. In the GPC samples, the compression strength increased from 21.4 to 43.6 MPa for the same period.

Keywords: RCC Beam, Geopolymer Concrete

I. INTRODUCTION

Concrete is the most popular construction material. The benefits are reduction in the use of cement to reduce air pollution and improve the properties of concrete. In the cement factory, every ton of Portland cement produces about one ton of carbon dioxide in the atmosphere. The replacement alternatives for cement are fly ash, rice husk ash, or a combination of the above materials. Silicate and alumina are rich in fly ash. Hence, reaction with an alkaline solution is produced alumina silicate gel that will formed as Geopolymer concrete. Reinforced concrete is structural element. OPC has traditionally used as the binding agent in concrete. Because of the emission of carbon dioxide it affects an increase in global warming. Given the severe effect of carbon dioxide on the atmosphere and the constant escalation of industrialization and urbanization, there is a need to keep the building industry away from its intense dependence on Portland cement by using alternative binder systems. The source material of geological origin or by-product materials such as fly ash and rice husk ash to produce cement binding. Necessary ingredients in geopolymer concrete in the establishment of Geopolymer mordant sourcing such as geopolymer such as equipment as fly ash & rice husk. Geopolymer concrete can produced using scope of materials accessible normally and with mechanical waste items. Under different concrete mix proportions, the performance of the FRGPC beam can analyzed by mathematical modeling. GPC can be considered an eco-friendly material. Several tests can performed with varying pre-compression loading on the beams and can identify the behavior of flexural beams and the effectiveness of beams.

II. LITERATURE REVIEW

1) Prabir Kumar Sarkar- Conducted pull-out test carry out on geopolymer concrete beam and ordinary Portland cement concrete beam end specimens. These compared

the bond strength of GPC and OPC. Finally, the result of the study of Geopolymer concrete has more bond strength contrast to OPC. Increase in concrete cover to increase the bond strength of concrete.

- 2) Sarath B. Kumar Chandra, K Ramesh- In this, the author states that the flexural cracks were standard after the peak load at the mid-span of the beam. At failure load, all the beams deflected significantly in both mixes. Control mix and geopolymer mix crack patterns were similar. The failure occurred in all the beams made with OPC & GPC was started by yielding the tensile steel and continued by crushing concrete in the compression zone. &
- 3) Kumaravel- Conducting flexural test carried out on M40 grade concrete to control cementing existing in addition to two geological physical supports. Final results are compared by wet of experimental and numerical studies. Maximum deflection yield and ultimate load capacity of RCC beam are lower when compared to GPC beams.
- 4) Ranjan BV- Marks of testing conducted on a more scale during affected geological material. Geopolymer concrete is well suited to manufacture precast solid commodities that container second hand into transportation development.
- 5) Ranjan and Lilith- Conducting a change on environmental physical from beginning to end acquired to the heaven earth. Premeditated for their cram, they second hand in the neighborhood of to argument silica take off concentrated as starting point base material. The explanations made with end with end items for the consumption of hose-down geopolymer sturdiness. The greater than and done with that geopolymer have power over exceptional property in good health well matched to manufactured production insubstantial merchandise that indispensable in rehabilitation and retro inappropriate construction after a catastrophe.
- 6) Patil and Jerez- To their study, alkaline silicate answer occurs due to compound reacting flanked by hydrology that to in minute opening irrigate surrounded by tangible prevailing setting and unsure form silicate. The rejoinder possible will show the technique to weakness hammering, fantastic, number contraction, and potassium malfunction of configuration. The grades recommend with the intention of the point of alkaline silicate reaction outstanding to the absence of spontaneous sand & coarse aggregate intake of cinders basic geological insubstantial is substantially subordinate than RCC base material and healthy underneath the PCC entity entrance.
- 7) Amir M. and Sarong Shah- The writer equipped 3 revamp equipment using concrete-basic, geological containing strengthened slag binders.

III. CONCLUSION

From this project, we have concluded that the strength of GPC cubes is more than the RCC cubes. The developments

of flexural cracks are relatively less in geopolymer RCC beams compared to conventional RCC beams. The compressive strength is greater than before due to a decrease in porosity, as the fineness of fly ash is higher in the case of geopolymer concrete.

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