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TITLE OF PROJECT:

Development of various concrete mixes for self-compacting concrete with a sustainable approach by using python.

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ABSTRACT (150-300 words):

This study pioneers the development of sustainable self-compacting concrete (SCC) mixes by leveraging Python for predictive analysis. We present the results of a comprehensive exploration involving the preparation and testing of 15 distinct concrete mixes, where cement is replaced with Fly Ash, Silica Fumes, and Metakaolin in proportions ranging from 0% to 15%. Our focus is on achieving a balance between compressive strength, workability, and environmental impact.

Experimental research included the casting and testing of concrete blocks, revealing that among the 15 mixes, the combination of 5% Fly Ash, 6% Silica Fumes, and 0% Metakaolin yields the highest compressive strength at 31.11 MPa. This optimal mix also exhibits excellent workability, with a uniform flow time of less than 8 seconds and a slump flow diameter ranging from 800 mm to 850 mm.

Beyond these empirical findings, our study integrates Python to predict future compressive strength on different days and explore results for additional mix combinations. The Python-driven predictive model enhances the efficiency of data analysis and provides a forward-looking perspective on the sustainable performance of these SCC mixes.

In conclusion, this research contributes to the evolution of sustainable construction materials. The Python-driven approach not only interprets current results but positions our findings as actionable insights for the construction industry, aligning with the broader goals of eco-conscious building practices. We recommend further exploration of the identified optimal mix for widespread application, marking a significant stride towards sustainable construction practices in the industry.

KEYWORDS: Fly Ash, Silica Fume, Metakaolin, Workability, Sustainability.

CATEGORY: Concrete Technology and Building Materials