

ICES 2024

TITLE OF PROJECT:

Development of Concrete Mixes for Sustainable Pavements: An Experimental and ANN Analysis

NAME OF ALL AUTHORS:

*Bichukale Rohit Shahaji, Sutar Anasar Pirso, Divate Mahantesh Shivanand, Shinde Sanket D.
UG Students, SVERI's College of Engineering, Pandharpur.*

NAME OF YOUR MENTOR: *Prof.C.R.Limkar*

NAME OF YOUR COLLEGE: SVERI'S College of Engineering, Pandharpur

ABSTRACT (150-300 words):

This research investigates the optimization of concrete mixes for sustainable pavements by varying combinations of Fly Ash, Silica Fume, and Recycled Concrete Aggregate (RCA). The study explores the influence of supplementary materials on the performance of concrete blocks, with Silica Fume ranging from 0 to 15%, Fly Ash from 0 to 15%, and RCA from 0 to 30%. Through extensive experimentation, the study evaluates the resulting concrete's strength, durability, and environmental sustainability.

Mix design in the study involves casting concrete blocks with optimized combinations of Silica Fume, Fly Ash, and RCA. The performance of the blocks is assessed under varying conditions to gauge their effectiveness in practical applications.

An Artificial Neural Network (ANN) model is developed to analyze the complex relationships between different material combinations and the performance of concrete blocks. The ANN model is trained and validated using experimental data, providing a predictive tool for understanding the effects of varied combinations on concrete properties.

In the experimental investigation, notable results were obtained. The specific combination of 5% Fly Ash, 9% Silica Fume, and 18% RCA yielded the highest compressive strength, averaging at an impressive 56 MPa. These combinations will help develop the ANN model's predictive accuracy, and showcase promise for application in real-world construction scenarios, aligning with the broader goal of advancing sustainable practices in the construction industry. The conclusions drawn from this study aim to inform the construction industry about eco-friendly and structurally efficient approaches to concrete pavement design.

KEYWORDS: Fly Ash, Silica Fume, RCA, Sustainability

CATEGORY: Concrete Technology and Building Materials