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(71)Name of Applicant :

1)Dr. J.Rex

Address of Applicant :Associate Professor, Department of Civil Engineering, Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----

2)Malla Reddy Engineering College

Name of Applicant : NA

Address of Applicant : NA

(72)Name of Inventor :

1)Dr. J.Rex

Address of Applicant :Associate Professor, Department of Civil Engineering, Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----

2)Mr.A.Naga Saibaba

Address of Applicant :Assistant Professor, Department of Civil Engineering, Malla Reddy Engineering College, Maisammaguda (Post. Via. Kompally), Mechal-Malkajgiri-500100. Maisammaguda -----

3)Ms.A.Supraja

Address of Applicant :Assistant Professor, Department of Civil Engineering, B.V.Raju Institute of Technology, Narsapur, Hyderabad. Narsapur -----

4)Dr.R.Prasanna Kumar

Address of Applicant :Professor, Department of Civil Engineering, Geethanjali College of Engineering and Technology, Hyderabad. Keesara -----

5)Mr.Y.Kamala Raju

Address of Applicant :Assistant Professor, Department of Civil Engineering, Gokuraju Rangaraju Institute of Engineering and Technology, Hyderabad. Bachupally -----

6)Dr.Mehar Babu Ravula

Address of Applicant :Assistant Professor, School of Civil Engineering, Reva University, Bengaluru. Yelahanka -----

7)Ms.R.Harika

Address of Applicant :Assistant Professor, Department of Civil Engineering, Vallurupalli Nageshwara Rao Vignana Jyothi Institute of Engineering and Technology, Hyderabad. Nizampet -----

8)Manish Kumar

Address of Applicant :Assistant Professor, Department of Civil Engineering, SRM Institute of Science and Technology, Tiruchirapalli. Irungalur -----

(57) Abstract :

This work focuses on the development and characterization of lightweight aggregate concrete (LWAC) incorporating quarry dust and metakaolin to enhance compressive and flexural strength properties. The work aims to assess the synergistic effects of these supplementary materials on the mechanical performance of concrete, specifically its ability to withstand compressive loads and bending stresses. Various concrete mixtures are formulated by substituting conventional aggregates with lightweight aggregate pumice, and partially replacing cement with metakaolin, while incorporating quarry dust as a fine aggregate in four variable proportions. Comprehensive testing is conducted to evaluate the compressive and flexural strengths of the resulting LWAC specimens. The experimental results shed light on the influence of quarry dust and metakaolin on the mechanical behavior of lightweight aggregate concrete, offering insights into the potential for sustainable and high-strength construction materials.

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