

## **OPTIMIZATION OF CEMENT BRICK MIXES CONTAINING CEMENT DUST BY TAGUCHI METHOD**

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### **Abstract**

Cement Kiln Dust (CKD) is a byproduct of cement manufacture. CKD is essentially cement clinker with relatively less binding specifications. Reuse of industrial by-product and natural materials has low environmental impact that insures a clean and safe environment. The aim of this study is to consume the largest amount of Cement Dust to produce cement brick. Sustainable materials were added to enhance the properties of brick. Optimization of cement dust and other investigated parameters were performed via Taguchi's parameter design method. Orthogonal Array was used to accommodate five control factors with four levels. C.D./Cement ratio and high modifying agent have significant effect on the quality characteristic i.e., compressive strength. Using sustainable materials in adequate proportions increases the compressive strength. The analysis of variance is performed to study the relative significance of the process parameters. C.D./Cement ratio has the highest contribution at 28 days of 53%. Conducting confirmation experiments is important in Taguchi's optimization technique to validate the predicted results. Taguchi's prediction was made to consume the largest amount of CKD. The confirmation mix has good agreement with the predicted values. The mean value of the compressive strength corresponding to the chosen conditions was 36MPa, which agree with the Egyptian Standard Specifications.

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