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# LINEAR REGRESSION AND ARTIFICIAL NEURAL NETWORKS FOR MODELING COMPRESSIVE STRENGTH OF SOIL-BASED CLSMS

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## ABSTRACT

This paper aims to develop predictive models for compressive strength of soil-based controlled low-strength material (CLSM) using in backfilling construction. Two mathematical methodologies were applied: multiple linear regression and artificial neural network (ANN). The data employed for analyzing was obtained from our experiment conducted in laboratory, including compressive strength and ultrasonic pulse velocity (UPV). In the mixtures, Class F fly ash was used as a part of Portland cement; fine aggregate was generated from blending surplus soil and concrete sand with a prior selected ratio (6:4). As a result, two models for strength prediction have been successfully proposed (Model-A1 and A2). In each model, four strength predicted formulas were developed; one from linear regression analysis and three from ANN-based approach (feed forward, cascade back propagation and radial basis function neural networks). Correlation analysis shows that all the proposed regression equations exhibit a well-predicted capacity for compressive strength of the CLSM.

**KEYWORDS:** Unconfined Compressive Strength, Ultrasonic Pulse Velocity, Prediction, Artificial Neural Network