

Fuzzy expert system for estimating productivity rates for labour, plant and material

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The importance of cost estimating is well recognized as it predicts the costs of construction and provides a basis for the contractor to submit a bid for a project. As each project is unique and no two are quite a like, subjective judgments are needed to adjust the estimating norms, which are based on historical data and experience of estimators to suit the proposed site conditions. Hence, the estimating practice has large element of subjective process rather than a precise technical and analytical process.

The direct cost is established with two types of data namely factual and productivity. Factual data are fixed and can be determined with certainty. However, productivity data are not permanently fixed and need subjective judgments of estimators in determination. The established average norms of direct cost elements such as labour, plant and material have to be adjusted to suit each project conditions.

This study is aimed at developing an expert system model, which produces a deterministic output for productivity multiplier factor to adjust the standard average rates. As a mode of approach factors related to subjective adjustment of productivity norms have been identified. Further, effects of subjective factors on productivity, interactions among the subjective factors and relationship between construction activity characteristics and subjective factors have been quantified using expert knowledge and the artificial intelligence technique called fuzzy logic. The use of knowledge based expert system removes the subjective questionable human factors as much as possible by providing a base with objective data and improves the efficiency of the estimating practice.

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