INTEGRATED MODEL OF WEIGHTING AND EVALUATING DECISION CRITERIA FOR SUPPORTING BEST-VALUE CONTRACTOR SELECTION

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ABSTRACT

This study proposes an integrated model to facilitate the weightings and evaluations of tenders involved in the best-value contractor selection process. In the criteria weighting, an adaptive AHP approach (A^3) is applied. A^3 uses a soft computing scheme, genetic algorithms, to recover the weights of the various criteria based on the derived pairwise weighting matrix (PWM) of criteria. In the evaluations of tenders, two sub-models are proposed. The first sub-model is a bid price evaluation model (PRICE), and it is developed to deal with the quantitative criterion, i.e., bid price criterion. The second sub-model is a performance-based evaluation model (PERFORM), and it is employed to quantify the expected performances of other qualitative criteria for each bidder. The proposed model integrates with A^3, PRICE and PERFORM to support the best-value contractor selection. The benefits of this proposed model are demonstrated by applying it a real-world case project. Lessons learned from this case project are also summarized to provide future applications.

KEY WORDS

contractor selection, analytic hierarchy process, adaptive AHP approach, performance, utility function.

INTRODUCTION

Contractor selection is one of the most important decisions made by the construction project owner because selecting a suitable contractor plays a key role in successful execution of a construction project. The best-value (BV) approach (also called most advantageous tendering approach in Taiwan) is a multi-criteria decision making (MCDM) problem, and has been receiving much attention recently by considering that the bid price is not the only decision criterion (PCC 2000, Yang and Wang 2003). The BV method not only attempts to select a best-qualified contractor whose proposal is most favorable to the project owner by evaluating the bidder's proposed plans, but also the selected contractor can improve the ability of contract performance during preparing the bid materials. Contractor selection methods usually involves several tendering tasks, including identifying criteria, weighting criteria, evaluation of tenders such as scoring (or ranking) bidders with respect to criteria, and determining the

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