

Application of MADM in a fuzzy environment for selecting the best barrier for offshore wells

A fuzzy Multi Attribute Decision Making (FMADM) method, which is suitable for treating group decision making problems in a fuzzy environment, is proposed for ranking offshore well barriers from a cost-benefit view point. It is obvious that much knowledge in the real world is fuzzy rather than precise. MADM decision data is usually fuzzy, crisp, or a combination of the two. A useful model is proposed here in order to handle both fuzzy and crisp data. Imprecision and ambiguity in the calculation of a performance rating are incorporated into MADM whereby fuzzy set theory provides a mathematical framework for modeling them. Human opinions often conflict in group decision-making. The purpose of fuzzy MADM is to aggregate the conflicting opinions. In general, one expert's opinion for a given attribute may be different from others'. Therefore, it is necessary to develop an appropriate method of aggregating multiple experts' opinions, taking into account a degree of importance of each expert in the aggregation procedure. The weights of all attributes and experts are estimated using a Fuzzy Analytical Hierarchy Process (FAHP). Finally, the best well barrier or risk control option (RCO) with respect to cost and benefit is selected using a Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method.