

Fuzzy Decision Making to the Construction Project Management: Glass Facade Selection

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Abstract : In this study, the fuzzy logic approach (FLA) was developed for construction project management (CPM) under uncertainty and duality. The focus was on decision making in selecting the type of the glass facade for a residential-commercial building in the main design. The adoption of fuzzy sets was capable of reflecting construction managers' reliability level over subjective judgments, and thus the robustness of the system can be achieved. An α -cuts method was utilized for discretizing the fuzzy sets in FLA. This method can communicate all uncertain information in the optimization process, taking into account the values of this information. Furthermore, FLA provides in-depth analyses of diverse policy scenarios that are related to various levels of economic aspects when it comes to the construction projects' valid decision making. The developed approach is applied to CPM to demonstrate its applicability. Analyzing the materials of glass facades, variants were defined. The development of the FLA for the CPM included relevant construction projects stakeholders that were involved in the criteria definition to evaluate each variant. Using fuzzy Decision-Making Trial and Evaluation Laboratory Method (DEMATEL) comparison of the glass facade was conducted. This way, a rank, according to the priorities for inclusion into the main design, of variants is obtained. The concept was tested on a residential-commercial building in the city of Rijeka, Croatia. The newly developed methodology was then compared with the existing one. The aim of the research was to define an approach that will improve current judgments and decisions when it comes to the material selection of buildings facade as one of the most important architectural and engineering tasks in the main design. The advantage of the new methodology compared to the old one is that it includes the subjective side of the managers' decisions, as an inevitable factor in each decision making. The proposed approach can help construction projects managers to identify the desired type of glass facade according to their preference and practical conditions, as well as facilitate in-depth analyses of tradeoffs between economic efficiency and architectural design.

Keywords : construction projects management, DEMATEL, fuzzy logic approach, glass facade selection

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