

## A Framework for an Automated Decision Support System for Selecting Safety-Conscious Contractors

**Authors :** Rawan A. Abdelrazeq, Ahmed M. Khalafallah, Nabil A. Kartam

**Abstract :** Selection of competent contractors for construction projects is usually accomplished through competitive bidding or negotiated contracting in which the contract bid price is the basic criterion for selection. The evaluation of contractor's safety performance is still not a typical criterion in the selection process, despite the existence of various safety prequalification procedures. There is a critical need for practical and automated systems that enable owners and decision makers to evaluate contractor safety performance, among other important contractor selection criteria. These systems should ultimately favor safety-conscious contractors to be selected by the virtue of their past good safety records and current safety programs. This paper presents an exploratory sequential mixed-methods approach to develop a framework for an automated decision support system that evaluates contractor safety performance based on a multitude of indicators and metrics that have been identified through a comprehensive review of construction safety research, and a survey distributed to domain experts. The framework is developed in three phases: (1) determining the indicators that depict contractor current and past safety performance; (2) soliciting input from construction safety experts regarding the identified indicators, their metrics, and relative significance; and (3) designing a decision support system using relational database models to integrate the identified indicators and metrics into a system that assesses and rates the safety performance of contractors. The proposed automated system is expected to hold several advantages including: (1) reducing the likelihood of selecting contractors with poor safety records; (2) enhancing the odds of completing the project safely; and (3) encouraging contractors to exert more efforts to improve their safety performance and practices in order to increase their bid winning opportunities which can lead to significant safety improvements in the construction industry. This should prove useful to decision makers and researchers, alike, and should help improve the safety record of the construction industry.

**Keywords :** construction safety, contractor selection, decision support system, relational database

**Conference Title :** ICCSEE 2016 : International Conference on Civil, Structural and Environmental Engineering

**Conference Location :** San Francisco, United States

**Conference Dates :** September 26-27, 2016