A HYBRID MODEL FOR ASSESSING THE QUALITY PERFORMANCE OF DEMOLITION CONTRACTORS

MOHAMMADALI KAZEROONI SADI

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Doctor of Philosophy (Civil Engineering)

Faculty of Civil Engineering
Universiti Teknologi Malaysia

OCTOBER 2015

Dedicated to:

My Parent and my Wife, for their innumerable prayers and encouragement

ACKNOWLEDGMENT

This research would not be possible without the guidance of my supervisor Assoc.Prof. Dr. Arham Abdullah. He offered me the opportunity to study at the Universiti Teknologi Malaysia and guided and supported this research. I am thankful for his insightful comments, encouragement and criticism.

Appreciation also goes out to Lian Hup Sdn. Bhd., JSCE Sdn. Bhd., CIDB and DOSH for their valuable efforts and time and their participation in the case study of this research, in which their assistance helped me along the way.

I would also like to thank my family for the support they provided me through my entire life and in particular, I must acknowledge my wife and best friend, Fatima, without whose love and encouragement, I would not have finished this thesis.

ABSTRACT

The demolition project is reasonably labour-intensive and the shortage of qualified demolition contractors resulted in poor workmanship in many demolition projects. The current performance assessment of demolition contractors in Malaysia is highly based on subjective evaluation while a few of authorities and clients incorporated contractor past performance within the quality assessment process. This is due to the lack of an assessment framework that can supports the evaluation process of demolition contractors. However, different contractor's quality assessment methods have been successfully developed, but, there has been limited effort to view complexity parameters in the process of evaluation. Hence, it made it necessary to identify an appropriate assessment criteria in order to evaluate the quality of demolition contractor's performance in a structured way along with considering the complexity of demolition project. This research first applied the Delphi method as a scientific means to collect the required information for developing of the assessment framework, which constitutes thirty performance indicators for demolition contractors. Then, an assessment method has been developed in the form of a hybrid Quality Function Deployment (QFD) and Cybernetic Analytic Network Process (CANP) model for demolition contractors. This involves the use of QFD to translate the customer's expectations into assessment indicators and the CANP to weight the expectations and assessment criteria. Three different case studies were used to demonstrate the implementation of the model and the results indicated that despite the extensive consideration on cost and time in the assessment of demolition contractors, the safety indicators were rated as the most significant Malaysian clients' expectations for quality assessment of demolition contractor. The results also show that, the project complexity indicators, comparatively received high priority in the quality assessment of demolition contractors among all other indicators. In conclusion, this research has demonstrated that the developed hybrid model is an effective tool for assessing the quality of demolition contractor's performance and it is hoped that the research work may provide a first step into a better customer-driven demolition project, and eventually increase the quality of demolition projects over time.

ABSTRAK

Projek perobohan adalah berintensifkan buruh dan kekurangan kontraktor perobohan yang berkelayakan menyebabkan mutu tenaga kerja menjadi rendah dalam kebanyakan projek perobohan. Penilaian prestasi terkini untuk kontraktor perobohan di Malaysia adalah berdasarkan penilaian subjektif manakala beberapa pihak berkuasa dan klien menggabungkan prestasi kontraktor pada masa lalu dalam melaksanakan proses penilaian kualiti. Amalan ini dilaksanakan kerana kekurangan rangka kerja penilaian yang boleh digunakan untuk menyokong proses penilaian kontraktor perobohan. Walau bagaimanapun, kaedah penilaian kualiti kontraktor yang berbeza telah berjaya dibangunkan, tetapi, terdapat usaha yang terhad untuk melihat kerumitan parameter dalam proses penilaian. Oleh itu, adalah perlu untuk mengenalpasti kriteria penilaian yang sesuai untuk menilai kualiti prestasi kontraktor perobohan dengan cara yang sistematik dengan mengambil kira kerumitan projek perobohan. Kajian ini menggunakan kaedah Delphi sebagai cara saintifik untuk mengumpul maklumat yang diperlukan untuk membangunkan rangka kerja penilaian, di mana ia terdiri daripada tiga puluh petunjuk prestasi bagi kontraktor perobohan. Kemudian, kaedah penilaian telah dibangunkan dalam bentuk hibrid Fungsi Kualiti Penempatan Hibrid (QFD) dan model Proses Jaringan Sibernatik Analitis (CANP) untuk kontraktor perobohan. Ini melibatkan penggunaan QFD untuk menterjemahkan jangkaan pelanggan ke dalam penilaian petunjuk dan CANP untuk mengukur jangkaan dan kriteria penilaian. Tiga kajian kes yang berbeza telah dilaksanakan untuk demonstrasi implementasi model dan keputusan menunjukkan bahawa, walaupun banyak pertimbangan ke atas kos dan masa dibuat dalam penilaian kontraktor perobohan, petunjuk keselamatan telah dinilai sebagai jangkaan pelanggan Malaysia yang paling penting bagi penilaian kualiti kontraktor perobohan. Hasil kajian juga menunjukkan bahawa, petunjuk kerumitan projek menerima keutamaan yang tinggi dalam penilaian kualiti kontraktor perobohan berbanding petunjuk yang lain. Kesimpulannya, kajian ini telah menunjukkan bahawa model hibrid yang dibangunkan merupakan alat yang berkesan untuk menilai kualiti prestasi kontraktor perobohan. Adalah diharapkan hasil kajian ini dapat menyediakan satu langkah permulaan dalam projek perobohan berasaskan kehendak pelangaan yang lebih baik dan akhirnya meningkatkan kualiti projek perobohan dari semasa ke semasa.