Comparative Long Run Economic Analysis of Steel and Concrete Projects in Jordan

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This Thesis is Submitted in Partial Fulfillment of the Requirements for obtaining the Master's Degree in Engineering Project Management

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April, 2018

AUTHORIZATION FORM

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DETECTION

this thesis is dedicated to my family, parents, friends and teachers have been a strong and steadfast support in my master journey. They taught me the value of life and faithful love. I can't fully express in words for priceless love and encouragement that Eng. Lubna Dani, Khalil Mahfouz, Abdalrahim Lafi , Mustfa Alsartawi ,Salim Albojoq , Zuhir , Ammar Ftaha and Mohmoud Badwi gave me in my life.

ACKNOWLEDGEMENT

my sincere and deepest acknowledgement are to my supervisor Dr. Walid Hassan and Prof. Dr. Ibrahim A. Mohammed for their continuous support, fruitful suggestions and constructive criticism during this work. Their immeasurable help is highly appreciated and will never be forgotten.

special thanks are attributed for their patience, help and valuable support during this study. I also extend my thanks to my Friends Eng. Mahmoud Badawi, Eng. Rakan Abumatar.

Most importantly, my deepest gratitude goes to my family Yousef Alshanty, Etidal Alashqar, Hazem Alshanty , Alaa Alshanty , Mahmoud Alshanty ,Ali Alshantyand Huda Alshanty; for their endless unconditional love, support, patience, prayers. Thanks for their continued motivation and support throughout my master's journey.

Thanks for all who helped me and are not mentioned in this acknowledgement.

ABSTRACT

This research thesis aims at finding the optimum solution to the select structural frame for beneficial projects in the planning stage in Jordan; either by using reinforced concrete structure or steel structure to select the optimum solution, economic comparison has been used in terms of cost and beneficial revenue.

A project has been selected as a case study. the study encompassed two alternative options (A and B), where the first one was constructed using reinforced concrete structure and the second using the steel structure

The study addressed the planning stage, including constructing plans and drawings, preparing the quantity lists, analyzing prices, preparing civil work plans using primavera …...etc. Cost, resources and quantities were assigned, and a plan was prepared to implement both projects in the shortest possible time period

Furthermore, the monthly cost for each project were extracted. Then, the economic analysis was conducted on these costs to know which alternative projects leads to achieve a higher long – run revenue rate.

It was shown that the difference in revenue between the two alternatives projects does not exceed 20 % period. The story area amounts to about 900 m^2 with total of 5 stories.

The results revealed that constructing the projects using steel structure was achieved within a time period of 9 months, whereas constructing the project using reinforced concrete structure was achieved within a time period of 12 month, which mean that steel structure projects saves time nearly 34 %, but compare with project concrete structed higher cost not less than 20 %

ملخص البحث

يهدف البحث هذه إلى إيجاد الحل الأمثل لاختيار الإطار الهيكلي للمشاريع الربحية في مرحلة التخطيط في الأردن؛ إما باستخدام هيكل الخرسانة المسلحة أو الهيكل الفولاذي، لاختيار الحل الأمثل تم استخدام المقارنة الاقتصادية من حيث التكلفة والإيرادات.

لأجراء الدراسة والوصول للحل الأمثل تم اختيار مشروع ربحي (مدرسة) شملت الدراسة خيارين بديلين حيث تم بناء أولهما باستخدام خرسانة مسلحة والثانية باستخدام الهيكل الفولاذي

تناولت الدراسة مرحلة التخطيط، بما في ذلك خطط البناء والرسومات، وإعداد قوائم الكميات، وتحليل الأسعار، وإعداد خطط العمل المدنية باستخدام برنامج البريمافيرا. تم تعيين التكاليف والموارد، وتم إعداد خطة لتنفيذ كلا المشروعين في أقصر فترة زمنية ممكنة

علاوة على ذلك، تم استخراج التكلفة الشهرية لكل مشروع. ثم، تم إجراء التحليل الاقتصادي على هذه التكاليف لمعرفة أي المشاريع البديلة تؤدي إلى تحقيق معدل دخل أعلى على المدى الطويل.

تبين أن الفرق في التكاليف بين المشروعين البديلين لا يتجاوز 20٪. لمساحة الطابقية حوالي 900 م 2 بإجمالي 5 طوابق.

أوضحت النتائج أن بناء المشاريع باستخدام الهيكل الفولاذي قد تحقق خلال فترة 9 أشهر، بينما تم بناء المشروع باستخدام الخرسانة المسلحة خلال فترة 12 شهر، مما يعني أن مشاريع الهياكل الفولاذية توفر 34٪ تقريبًا من المدة الزمنية، بتكلفة أعلى قد تصل الى 20٪.

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Abbreviations	Means
CPM	Critical Path Method
PERT	Program Evaluation
WBS	Work Breakdown Structure
OBS	Organizational Breakdown Structure
CBS	Cost Break Down Structure
SW	Schedule Works
CP	Critical Path
ES	Early Start
LS	Late Start
EF	Early Start
LF	Late Finish
FF	Free Float
IF	Interfering Float
BMS	Building Management System
ASP	Appalachia Service Project
ESP	Experienced Service Professional
LCC	Life Cycle Cost
NPV	Net Present Value