



**Effect of Change Orders on Project Cost and Schedule  
Overruns**

**(Iraq as a Case study)**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ  
دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ

□ صدق الله العظيم

سورة المجادلة آية 11

## **DEDICATION**

- To the soul of my beloved mother.
- To my dear father who raised me, educated me, supported me and never hesitated to provide me with all what I need.
- To my beloved wife who helped me in facing the difficulties of life and inspire me to accomplish this work.
- To my beloved son and daughter,
- To my brothers and sisters who granted me their encouragement and support.

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- Last but not least, I would like to thank all my colleagues and friends who gave me their support and encouragement.

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## **ABSTRACT**

The main objective of this thesis is to determine the factors that cause change order in construction projects in Iraq, through conducting a case on a number of projects of the Endowment.

In order to achieve the objectives of this study, the factors causing change orders in construction projects in a number of countries were determined along with their effects on cost and duration of construction projects, through conducting a comprehensive review of previous studies conducted on the subject of the thesis.

The methodology of the study consisted of preparing a special questionnaire to explore the factors causing change orders and their impacts on construction projects. The questionnaire was distributed to a sample of (151) consulting engineers and contractors working in the Endowment projects to answer the questions contained in the questionnaire. The answers of the respondents were analyzed using SPSS.

At the same time, a random sample of construction projects was chosen to be the subject of a case study. The project sample consisted of (30) projects, (20) of which were new construction projects and (10) were maintenance and rehabilitation projects. The projects were implemented in the time period from 2010 to 2014. After collecting and analyzing data, a comparison was made between the questionnaire results and those of the case study.

The study ended with a group of conclusions, the most important of which are: The most important factors causing change orders in construction project of Endowment in Iraq are (change in design) and (Errors and omissions in design or table of quantities) and the study confirmed that the factor (Differing site conditions) was the leading factor causing change orders in maintenance and rehabilitation projects..

Furthermore, the researcher presented a number of recommendations, the most important of which are: Serious and actual interest in designs and preparing and auditing them carefully along with terms, specifications and tables of quantities so that there is no or minimum contradiction between the contract documents and only minor changes are made and conducting accurate and detailed site investigation for maintenance and rehabilitation projects before preparing their tables of quantities.

## ARABIC ABSTRACT

### الخلاصة باللغة العربية

تأثير اوامر التغيير على تجاوز التكلفة والجدول الزمني للمشروع الهدف الرئيسي من هذه الاطروحة هو تحديد العوامل المسببة لأوامر التغيير في المشاريع الهندسية في العراق ، من خلال إجراء دراسة حالة على عدد من مشاريع دائرة الشؤون الهندسية في الاوقاف العراقية .

ولتحقيق الأهداف المرجوة من هذه الدراسة ، تم تحديد العوامل المسببة لأوامر التغيير وتأثيرها في عدد من الدول من خلال إجراء مراجعة للدراسات السابقة التي أجريت حول موضوع البحث . أما منهجية الدراسة فقد تكونت من إعداد استبانة خاصة بالعوامل المسببة لأوامر التغيير وتأثيرها وتوزيع الاستبانة على عينة مؤلفة من (151) من المهندسين الاستشاريين والمقاولين العاملين في مشاريع الوقف للإجابة عن الأسئلة . وجرى تحليل إجابات المستجيبين باستخدام نظام SPSS.

في الوقت نفسه ، تم اختيار عينة عشوائية من المشاريع لإجراء دراسة حالة ميدانية عليها . وتألقت العينة من (30) مشروعاً ، (20) مشروعاً منها من مشاريع الإنشاء الجديدة و (10) مشاريع من مشاريع الصيانة وإعادة التأهيل ، نُفذت بين عامي 2010 و 2014 . وبعد جمع البيانات وتحليلها ، تم إجراء مقارنة بين نتائج الاستبانة ونتائج دراسة الحالة . وقد توصلت الدراسة إلى مجموعة من الاستنتاجات ، من أهمها : أهم العوامل المسببة لأوامر التغيير في مشروع البناء للأوقاف في العراق هي (التغيير في التصميم) و (الأخطاء والسهو في التصميم أو جدول الكميات) و أكدت الدراسة أن العامل (اختلاف ظروف الموقع) . كان العامل الرئيسي الذي تسبب في اوامر التغيير في مشاريع الصيانة وإعادة التأهيل.

كما قدم الباحث عدداً من التوصيات ، من أهمها : الاهتمام الجاد والفعلي بالتصاميم وإعدادها وتدقيقها بعناية مع شروط ومواصفات وجدول الكميات بحيث لا يوجد تناقض أو أدنى تناقض بين وثائق العقد. ويتم إجراء تغييرات طفيفة فقط . وإجراء تحقيقات دقيقة ومفصلة عن مواقع الصيانة ومشاريع إعادة التأهيل قبل إعداد جداول الكميات الخاصة بهم.

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