

ANALYSIS OF FACTOR AFFECTING CHANGE ORDER IN CONSTRUCTION INDUSTRY USING RII METHOD

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Abstract— The construction process is a complex one and is associated with various changes. These changes usually lead to issuance of change order. Change orders are usually issued to cover variations in scope of work, material quantities, design errors, and unit rate changes. Change Orders in construction often have a serious impact on the quality, time, and cost of projects. Hence, Change Orders require proper analysis and action to measure the causes and effects of change orders. It is difficult and risky to manage them but it is required to manage change order in construction projects. However, past research has been done on change order are mostly qualitative and there is a lack of quantitative research. Success of construction project is affected by various causes of change order, minimizing adverse effects of change order and proper control measure of change order. This paper presents the analysis of factors affecting change order of 70 respondents from several category of construction professionals of central Gujarat region using RII method.

Keywords- Change order, Causes of change, Effects of change, Control of change, Impact, Analysis

I. INTRODUCTION

Change orders have long been an inherent part of the construction industry. It is seldom to spot a construction project being executed without a change which normally arises as a result of some causes attributed to the different parties involved in the project execution. Upon acknowledging its existence, the change – or variation is formally regularized by the issuance of a change order which is a document describing the scope of the change and its impact on both cost and / or time. If no agreement is reached between the parties of the project on the change, it turns into a claim or dispute that may negatively affect the execution of the project and curtail its chances of successful completion. Change orders are not new to the construction industry; they are old and well-known part of the business. Changes occur on a daily basis on almost every project. They may change amount and type of work, quantity and type of material, method of construction, and amount and type of labor. Most of change orders issued during the construction period. In some cases, change orders cause confusion and, no unique method is available for avoiding or managing them effectively. The conventional approach is to include a percentage of the project cost as a contingency in the contract budget for their occurrence.

II. OBJECTIVES OF THE STUDY

This paper has been an objective to act as a foundation for future studies and its results will become worthwhile information in efforts to identify causes of change order thus proper management to minimizing effects on construction project and to recognize proper control measures for resolving change order.

III. RESEARCH METHODOLOGY

The data collection to determine the most influential factors of change order in construction project was done through a survey by explorative questionnaire to the respondents involved in daily activities of construction firms in various regions in the central Gujarat region of India. The questionnaire was designed such that, therefore respondents can give the rank to each factors based on the Likert scale. The analysis of these data was done by Relative Importance Index (RII) method using Microsoft Excel.

IV. DATA COLLECTION

A total number of 70 respondents were surveyed from the central Gujarat region of India, namely cities like Ahmedabad, Anand, Nadiad and Vadodara out of which 7 Clients, 11 Consultants, 20 Contractors and 32 Engineers. A ranking of the factors was achieved from the Relative Importance Index (RII) method.

V. DATA ANALYSIS BY RELATIVE IMPORTANCE INDEX (RII) METHOD

The data collected was manually analysed by the RII method with the help of which a decimal figure for each factor is obtained which is known as its Relative Importance Index. This index is used to rank the factors.

Top 10 factors from each category were analysed using RII Method and ranked as shown in Table 1.

TABLE 1: - RANKING OF FACTORS RELATED CHANGE ORDER IN CONSTRUCTION PROJECT

FACTORS CAUSES	RII	Rank
Owner's financial problems	0.8857	1
Change of scope	0.8381	2
Change in design	0.8238	3
Change of project schedule	0.8119	4
Unavaibility of equipment	0.7952	5
Defective workmanship	0.7857	6
Contractor's financial difficulties	0.7738	7
Weather conditions	0.7714	8
Unavaibility of skill manpower	0.7571	9
Poor design, poor working drawing details	0.7167	10
EFFECTS		
Increase of the cost of the projects	0.8310	1
Increase in duration of individual activities	0.8310	1
Delay in completion schedule	0.7476	2
Demolition and Re-work	0.7167	3
Decrease in quality of work	0.7095	4
Delay of materials and tools	0.6786	5
Delay in payment	0.6738	5
Dispute between owner and contractor	0.6595	6
Decrease in productivity of workers	0.6405	7
Hold on work in other areas	0.6214	8

CONTROLS		
Review of grey areas in contract document	0.6952	1
Negotiation of change order	0.6476	2
Timely approval of change order	0.6262	3
Checking and review of design changes for feasibility	0.5714	4
Giving considerations to indirect effects in change order pricing	0.5524	5
Freeze the design	0.5262	6
Clarity of scope of change	0.4881	7
Appropriate approval in writing	0.4500	8
Early setting of change order handling procedures	0.4357	9
Team effort between parties	0.3595	10

VI. CONCLUSION

The construction industry is considered as an important sector in the world as it develops and achieves the goals of society. A questionnaire-based survey used to evaluate the perceptions of respondents which are professionals of construction industry towards factors affecting change order in construction project in central Gujarat Region. 85 questionnaires were distributed out of which 70 questionnaires were returned as follows: 7 from client, 11 from consultants, 20 from contractors and 32 from engineers as respondents. The respondents were asked to indicate the level of importance of each of the 49 factors as not important, very less important, less important, moderate important, high important and very high important on change order in construction industry.

The results indicated that the most important cause of change order are (a.) Owner's financial problems, (b.) Change of scope, (c.) Change in design factors, most important effects of change order (a.) Increase of the cost of the projects, (b.) Increase in duration of individual activities, (c.) Delay in completion schedule and most important controls for change order are (a.) Review of grey areas in contract document, (b.) Negotiation of change order, (c.) Timely approval of change order.

ACKNOWLEDGEMENT

The Authors thankfully acknowledge to Dr. C. L. Patel, Chairman, Charutar Vidya Mandal, Er. V. M. Patel, Hon. Jt. Secretary, Charutar Vidya Mandal, Mr. Yatinbhai Desai, Jay Maharaj construction, Dr. F.S.Umrigar, Principal, B.V.M. Engineering College, Dr. L. B. Zala, Head and Professor, Civil Engineering Department, Prof. J. J. Bhavsar, Associate Professor, Civil Engineering Department, B.V.M. Engineering College, Vallabh Vidyanagar, Gujarat, India for their motivations and infrastructural support to carry out this research.

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