

# Effects of Design and Specification Changes in the Management Practice on Public Building Projects

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## ABSTRACT

The construction industry in Ethiopia is on fast growing mode which plays an Instrumental in the country development. Large and complex government buildings have been built, attracting domestic and International contractors. This situation coupled with inexperienced consultants and the client has led to inadequate design resulting in many changes to plans, specifications, and contract terms. Change and conflicts in construction projects, at work, and even in our daily lives are very common. Change orders have an impact on overall project performance. This is because change can cause substantial adjustment to the contract duration, direct and indirect cost, or both. In most cities of the country like Wolaita Sodo where new infrastructure and buildings are being built, the occurrence of change on public projects seem usual. The objective of the study is determining Effects of the design and specification change in the management practice on public building construction projects. The method used to collect data was questionnaire. around 94% of public building projects there is changes in the design and specification of public building construction projects. The main causes of changes in design in Initiated by the users/clients /owner, Architect/consultant originated, Contractor originated, Lack of coordination in the project team member and Differing site conditions. The level of effects of changes in design and specification of the public buliding project almost high and a big challenge in the practice of project management..

**Keyword:** -Design Change, Specification, Effects

## INTRODUCTION

### Background

The construction industry in Ethiopia is on fast growing mode which plays an Instrumental in the country development. Large and complex government buildings have been built, attracting domestic and International contractors. This situation coupled with inexperienced consultants and the client has led to inadequate design resulting in many changes to plans, specifications, and contract terms [1]. Change and conflicts in construction projects, at work, and even in our daily lives are very common [2]. Change orders have an impact on overall project performance [3]. This is because change can cause substantial adjustment to the contract duration, direct and indirect cost, or both. In most cities of the country like Wolaita Sodo where new infrastructure and buildings are being built, the occurrence of change on public projects seem usual. The implementations of public projects are expected to provide further thrust to the construction sector. Therefore, it is important to ensure these projects are being implemented successfully without any major problems while minimizing the adverse problem of change on the project outcome. Change in design and specification are issued to correct or modify the original scope of work because changes during construction of projects are unavoidable. As the number of changes in design and specification on a project increases, so does the possibility of misunderstanding among the contracting parties. Such a misunderstanding may occur because one or more of the parties lacks full knowledge of the change process itself,

the costs involved in implementing changes, or the delays, conflicts, and interruption of the construction sequence and schedule which can adversely impact project coordination [4]. The impacts of changes are not understood and rarely recognized, in terms of costs, quality and schedule. One of the harmful consequences of Design changes is rework or revision of work [5]. The work hours invested by the designers in the changes have been estimated in a 40 to 50% of the total of a project [6].

### **Objective**

To determine Effects of the design and specification change in the management practice on public building construction projects.

### **Significance**

It provides significant information to those construction company on the effects of design and specification management practice in public building projects.

## **LITERATURE REVIEW**

### **Design changes**

A change is defined in literature as any deviation from an agreed upon defined scope and schedule. Stated differently a change is any modification to the contractual guidance provided to the contractor by the owner or owner's representative [9]. This includes changes to plans, specifications or any other contract document. A change order is the formal document that is used to modify the original contractual agreement and becomes part of project's documents. Initially, the contractor receives the contract package in the form of plans, drawings, specifications and other documents. This constitutes the basis of his proposal. Contractor will calculate and bid based on this original package. Obviously, any changes to this set of documents will alter his plans and calculations. Changes can be initiated by all parties in the construction process. All changes however, must be approved by Owner or his representatives before implementation. According [10] any alteration or modification of the design, quality or quantity of the Works as shown upon the contract drawings and described by or referred to in the contract bills and specifications is referred to as Variation. A change order can also be issued through an architect's instruction during site inspections or meetings, however, all instructions issued by the Architect shall be in writing. Any instruction issued orally will be of no immediate effect, but will be confirmed in writing by the Contractor to the Architect within seven days. If not dissented from in writing by the Architect within seven days from receipt of the contractor's confirmation, the oral instruction will take effect as from the expiration of the latter said seven days [10]

### **Specification change**

A specification is a written description of the invention that includes the manner and process of creating, constructing, compounding, and using it. It should also state the practical limits of the operation of the invention. The description must be in complete, clear, concise, and precise terms to make the limits of the patent known, to protect the inventor, and to encourage the inventiveness of others by informing the public of what is still available for patent. Total disclosure of the invention is mandated to allow the public to freely use the invention once the patent has expired. No patent will be granted if the description purposely omits the complete truth about the invention in order to deceive the public. The specification concludes with the claims, which explicitly describe both the structure of the invention and what it does.

## **METHODS AND ANALYSIS**

The method used in order to achieve the objective the research was by distributing a questionnaire to the ongoing public construction projects in Wolaita Sodo town, accordingly we have distributed to 30 ongoing projects out of 40 Public projects in the town.

### Projects that have design and specification Changes.

Table1 below shows that response of on whether the projects they (the respondents were contractor, consultant, project manager, and office engineer and contract administrator) were involved in have experienced some changes in the design and specification;

Table 1: Response of Respondents

Response (whether the projects have design and specification Changes or not)	No of projects	Percentage
Yes	28	93.33%
No	0	6.67%
Total	30	100%

28 (93.33%) of the respondents had experienced changes in the design and specification in the projects they were involved in while only 2 (6.67%) of the respondents did not experience any changes in the design and specification in the projects of the projects they were involved.

### Causes of Changes in the Design

Table 2 Response of Respondents

Causes of design changes	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Total
Respondent	No	%	No	%	No	%	No	%	No	%	
Initiated by the users/clients /owner	0	0.00	2	7.14	3	10.71	10	35.71	13	46.43	28
Architect/consultant originated	0	0.00	2	7.14	4	14.29	18	64.29	4	14.29	28
Contractor originated	2	7.14	3	10.71	3	10.71	17	60.71	3	10.71	28
Lack of coordination in the project team member	3	10.71	5	17.86	6	21.43	12	42.86	2	7.14	28
Differing site conditions	0	0.00	3	10.71	2	7.14	22	78.57	1	3.57	28
New government regulations	3	10.71	4	14.29	4	14.29	14	50.00	3	10.71	28

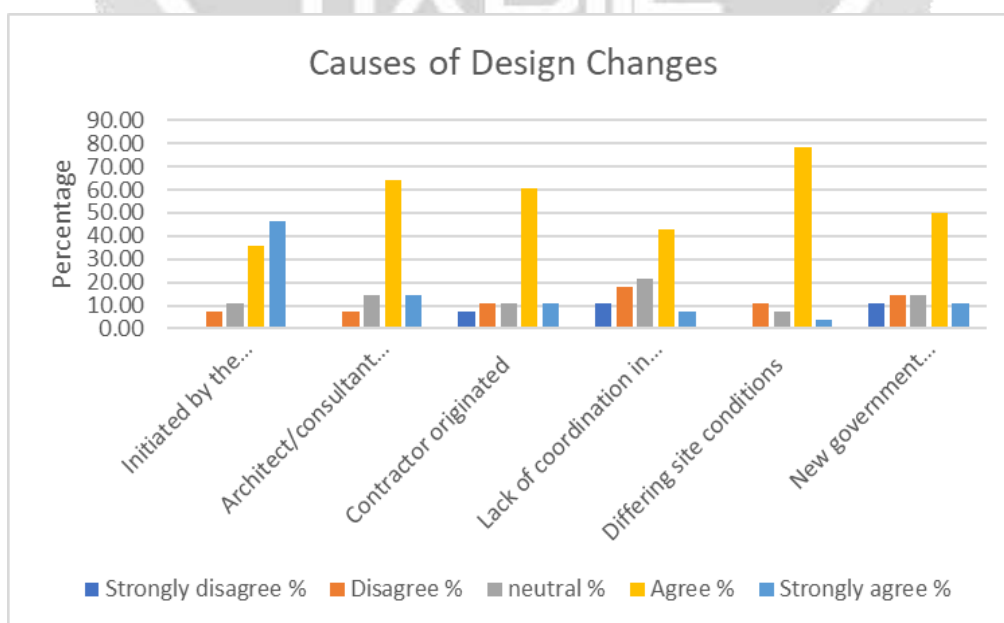


Figure 1: cause of changes in design

Table 2 and figure 1 above indicate the main causes of changes in design all factors are the causes of design changes in public construction projects are Initiated by the users/clients /owner, Architect/consultant originated, Contractor originated, Lack of coordination in the project team member and Differing site conditions

### Effect of design and specification change

Table 3: Level of effects

Level of effect	Low		Average		High	
	No	%	No	%	No	%
Delay in the completion date	2	6.67	6.00	20.00	20.00	66.67
Increase in project cost (cost overruns)	5	16.67	8.00	26.67	15.00	50.00
project productivity	4	13.33	15.00	50.00	9.00	30.00
Dispute between stakeholders	2	6.67	15.00	50.00	11.00	36.67
Demolition and rework	9	30.00	11.00	36.67	8.00	26.67

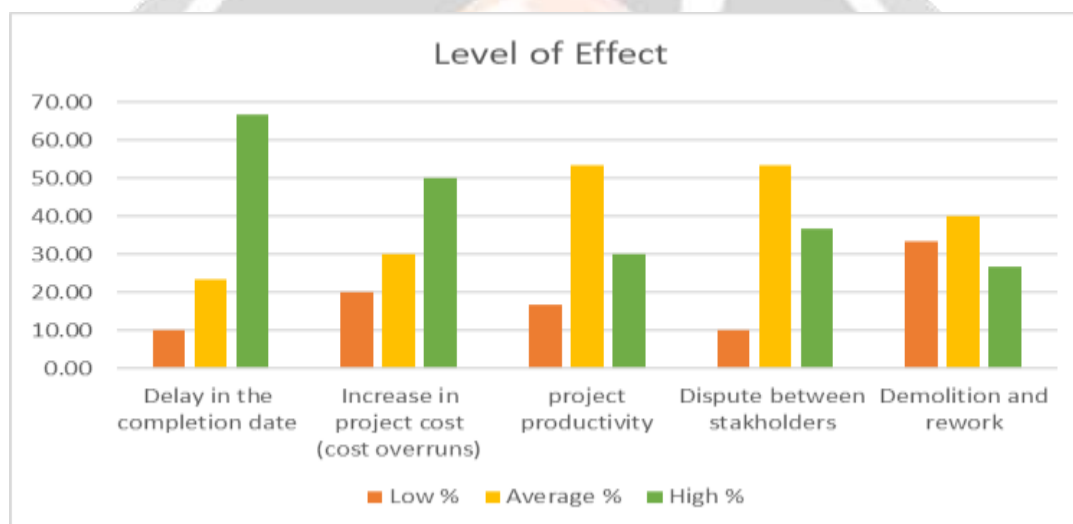


Figure 2: Level of effects

Table 3 and figure 2 above; shows the level of effects of changes in design and specification of the public building project on the stated factors; specially on completion date, cost of the project and dispute between stakeholders.

### CONCLUSIONS

According to collected data, around 94% of public building projects there is changes in the design and specification of public building construction projects

The main causes of changes in design in public construction projects in wolaita sodo are Initiated by the users/clients /owner, Architect/consultant originated, Contractor originated, Lack of coordination in the project team member and Differing site conditions

The level of effects of changes in design and specification of the public building project on the stated factors; specially on completion date, cost of the project and dispute between stakeholders.

## REFERENCES

- [1]. Andualem Endris Yadeta, Volume 4, Issue 4, July-August, 2016 the Impact of Variation Orders on Public Building Projects
- [2]. Arain and Pheng, 2006 INVESTIGATING THE CAUSES OF VARIATION WITHIN THE CONSTRUCTION PROJECTS IN UAE
- [3]. Ruben, N. 2008, "An analysis of the impact of variation orders on project performance", Cape Peninsula University of Technology, Theses & Dissertations, Paper
- [4]. Andualem Endris Yadeta Causes of Variation Orders on Public Building Projects in Addis Ababa
- [5]. A User's Guide, Understanding and Monitoring the Cost-Determining Factors of Infrastructure Projects
- [6]. Koskela 1992, APPLICATION OF THE NEW PRODUCTION PHILOSOPHY TO CONSTRUCTION September 1992 Stanford University
- [7]. Factors Causing Variation Orders and their Effects in Roadway Construction Projects
- [8]. International Journal of Business and Management August, 2008 Projects and Their Management: A Literature Review University of the West of England.
- [9]. Fisk, 1988 and Yu, 1996 FACTORS CONTRIBUTING TO VARIATION ORDERS: A SURVEY OF CIVIL ENGINEERING CONSTRUCTION PROJECTS
- [10]. MOWUD standard condition of contract for construction of civil work projects December.1994

