

Change Management Systems in Construction Projects: Ensuring an Efficient Delivery System^{1, 2}

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ABSTRACT

With the high level of uncertainties associated with construction projects, it is natural to seek out underlying factors, all of which point in the same direction - project change. However, projects are executed by people, likewise systems are created by people. Change is a widely used operational and project-based term in the construction industry that spells scope increment or reduction, organizational restructure, a thin line between agreement and disagreement or a phrase – change order. All project and scope changes have systems designed to facilitate such orders. The term ‘order’ is used as change is due to a succession of events. But, more important are the people making decisions. In this paper I developed three alternative that could help solve the problem of how to ensure efficient delivery of project change using change management system by people in construction projects. These alternatives are to help owners, contractors and/or stakeholders within any construction project to better respect, communicate and make decisions towards project changes. Using a Multi-Attribute Decision Making analysis, I compared the various outcomes of these alternative and selected the better of the three alternatives. This paper recommends two of three proposed alternatives, with one better and both viable. The best alternative is that Owners. Contractors and/or stakeholders must unanimously establish and agree on an appropriate change management system, process and procedures to be adopted throughout the project duration. To conclude, the result of this analysis is only theoretical and needs to be tested in the real field to be really approved. In this way, this result could represent a good advice to follow in delivering project changes. Also, the least desirable alternative is viable and would greatly support in effectively managing project changes

Key words: Change management system, Communication, Contract Agreement, change management process people management and project change.

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INTRODUCTION

It's important to state that change management systems do not implement change, people make and manage changes. Considering the above statement, it is safe to say that change management systems are used to facilitate changes in projects, organisation or any endeavour with high risk and uncertainties such as the construction industry. This can be put into proper context when preparing an international or local contract involving bring people of different cultural background to work on a new construction project.

By embracing differences on such project, people from various cultural background and ideologies are made to come together. This could/is the typical case of most international constructions project hence a need for proper people management is interwoven in contract statement between owners, contractors, architect/ engineer and any third party involved in project. Managing diversity on projects could pose a challenge but this can be reduced using a properly crafted contract document.

The construction industry is known to be project-based, and this helps manage various phases (such as planning, cost estimation, contract bidding) in construction projects. Decision-making is an integral part of construction projects, inclusive of change management decisions. Ensuring proper link and communication amongst all project participants when a change order is raised is most expedient as well as proper statement of condition/ situation surrounding a change directive. In construction projects, producing desired outcomes or solving design issues could give rise to change usually in form of a proposal. Indeed, change is considered as a modification to an agreement between project participant. Likewise change management is a systematic management practice that resolves or minimizes incumbent occurrences that disrupt project processes. It is safe to that these systematic management practices would include proper, clear and documented agreements between participants involved in construction projects

Ensuring proper, clear and documented agreements is people management in the form of a signed and documented contract documents. This agreement should contain certain agreed conditions that help management communication issues, decision making, addresses diversity and fosters oneness for the duration of the project. This helps efficient delivery of established change management systems and effectiveness of all project participants.

OBLECTIVE STATEMENT

The sole aim of this paper is to provide important areas to consider when preparing a contract document to foster collaboration, understanding and efficient delivery of change management system when the need arises. This paper answers the question of ***how to ensure efficient delivery of change management system by people in construction project.***

METHODOLOGY

Feasible alternatives

- **Alternative 1:** Clear statement of contract terms
- **Alternative 2:** Direct and clear communication between project participants
- **Alternative 3:** Establish Change management systems and operations based on unanimous agreement between project participants.

DEVELOPMENT OF FEASIBLE ALTERNATIVES

Feasible Alternative 1

All project participants/ stakeholders should be present during contract negotiations and agreement to prepare a **clear statement of contract terms** with respect to individual considerations and the nature of the construction project including intended operations, processes, equipment, budget, milestones and deadlines. By doing so any dissatisfied participant is obliged to state their reservations. This is necessary to establish respect for cultural differences and initiate building trust.

Feasible Alternative 2

All project participants/ stakeholders should ensure direct and clear **communication** through regular meetings on project progress. Communication can be oral or in writing via a pre-established communication system. Adhering to strict and direct communication policy is a means to avoid misunderstanding due to misinformation as well as aid timely approvals during project delivery. Indeed, communication is inevitable to keep project on track, ensure stakeholders do not lose sight of intended deliverable and foster efficient change management when changes occur.

Feasible Alternative 3

Owners and contractors must establish and agree on an appropriate change management system to be adopted throughout the project duration; the chain of command, required conditions to request changes including exceptions (change directive), proper document type and method for executing change processes. It should be an **unanimously agreement** especially for changes that impact project budget and deadline.

OUTCOMES OF FEASIBLE ALTERNATIVES

Outcome alternative 1

Stating clear contract terms helps manage individual stakeholder's expectation as well as deflate any preconceived notion towards the construction project and other stakeholders. This helps **solidify stakeholder's conviction** to either participate or exit.

Outcome Alternative 2

By making regular meeting and assessments stakeholders are updated on project processes, challenges, stages and required changes. Such level of collaboration helps in prove **project transparency** as owners, contractors and architects/ engineers can freely express discomfort and necessary improvements or changes.

Outcome alternative 3

As project proceeds and necessary changes arise, a properly structure change management system ensures validations and consent to changes (with no exception to field orders) between project participants. This ensure effectiveness of project changes as well as a **share responsibility** towards project change outcomes.

I also included a SWOT analysis of the above discussed feasible alternative

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Alternative 1: Individual difference and notions towards project are abated. • Alternative 2: all project participants are well informed and updated on project progress. • Alternative 3: A clearly defines change management system and process 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Alternative 1: Contractors and architects must clearly understand owner’s requirements • Alternative 2: Honesty is required when communicating project issues and required changes • Alternative 3: Project change process might be too rigid
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Alternative 1: To embrace difference and build trust. • Alternative 2: To improve collaboration and project transparency. • Alternative 3: Shared responsibility towards project changes is fostered among project participants. 	<p>THREATS</p> <ul style="list-style-type: none"> • Alternative 1: Contract agreement between participants might be unsuccessful • Alternative 2: Breakdown of communication channels • Alternative 3: Change management system might fail at delivering desired project changes due to bureaucracy.

SELECTION OF THE ACCEPTANCE CRITERION

To evaluate each of the alternatives, we will use the **Multi Attribute Decision Making** process. The alternative that obtains at least 70% (or 0.71) in the Multi-Attribute Decision Making analysis results is the more accurate and could be adapted to any construction project. Each alternative must obtain at least 60% to be considered in the results, else the alternative is directly eliminated.

FINDINGS

To compare and choose the alternative the most adapted to my project, I used a Multi-Attribute Decision Making analysis. In this way, I chose 5 attributes which correspond to the question of *how to ensure efficient delivery of change management system by people in construction project?*

ATTRIBUTES	VALUES	RANK	FORMULA	RATIO	1-x
CLEAR STATEMENT	LOW	1	$(3-1)/2$	1	0
	MEDIUM	2	$(2-1)/2$	0.5	0.5
	HIGH	3	$(1-1)/2$	0	1
COMMUNICATION	NEVER	1	$(3-1)/2$	1	0
	OCCASIONALLY	2	$(2-1)/2$	0.5	0.5
	FREQUENTLY	3	$(1-1)/2$	0	1
SHARED RESPONSIBILITY	NEVER	1	$(3-1)/2$	1	0
	MAYBE	2	$(2-1)/2$	0.5	0.5
	TOTALLY	3	$(1-1)/2$	0	1
UNANIMOUS AGREEMENT	NO	1	$(3-1)/2$	1	0
	MAYBE	2	$(2-1)/2$	0.5	0.5
	YES	3	$(1-1)/2$	0	1
TRANSPARENCY	NO	1	$(3-1)/2$	1	0
	MAYBE	2	$(2-1)/2$	0.5	0.5
	YES	3	$(1-1)/2$	0	1

Fig 1. Multi Attribute Decision Making

Those **5 attributes** are the clear statement of terms, direct and communication, the sharing of responsibilities, unanimous agreement and transparency. These attributes are based on the outcomes that directly impact proposed alternatives.

Analysis and Comparison of the Alternatives

ATTRIBUTES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
CLEAR STATEMENT	1	0.5	1
COMMUNICATION	0.5	1	1
SHARED RESPONSIBILITY	0.5	0.5	1
UNANIMOUS AGREEMENT	1	0.5	1
TRANSPARENCY	0.5	1	0.5
TOTAL	3.5	3.5	4.5

Fig 2. Relative weighting

ATTRIBUTES	RANKING	FORMULA	RATIO (A)	ALTERNATIVE I		ALTERNATIVE II		ALTERNATIVE III	
				B	A × B	C	A × C	D	A × D
CLEAR STATEMENT	5	(1/15)	0.33	1	0.33	0.5	0.165	1	0.33
COMMUNICATION	3	(3/15)	0.2	0.5	0.1	1	0.2	1	0.2
SHARED RESPONSIBILITY	2	(4/15)	0.13	0.5	0.07	0.5	0.065	1	0.13
UNANIMOUS AGREEMENT	4	(2/15)	0.27	1	0.27	0.5	0.135	1	0.27
TRANSPARENCY	1	(5/15)	0.07	0.5	0.04	1	0.07	0.5	0.035
TOTAL	15	1	1		0.81		0.635		0.965

Fig 3. Additive weighing technique

SELECTION OF THE PREFERRED ALTERNATIVE

As observed from the above results, all alternative exceeded the 60% acceptance limit. Also, alternative one and three exceeded the 70% adaptability limit, making both the most probable solution to facilitate an effective change delivery system in construction projects.

This shows that participants (owners, contractors and/or stakeholders) in a construction project must agree and establish change management systems, processes, procedures and criteria with clearly stated contracts to effectively deliver change in construction projects. The implications of these two alternatives are:

- **Alternative 1:** Solidifies the convictions (positive or negative) of participants towards the project, likewise disarms them of preconceived notions, and fosters respect for the each other and the project proceedings. This ensures expectations are managed.
- **Alternative 3:** Encourages unanimous decisions, consent and agreement in establishing or adopting a specific change management system as well as deciding on the nitty gritty of the manage systems. This ensures effectiveness of project changes and a shared responsibility towards project change outcomes

Alternative two emphasizes direct and clear communication between project participants, to avoid misunderstanding caused by misinformation. This alternative attained above 60% on the analysis, hence is viable and could impact delivery of change management systems.

Furthermore, all alternatives are not rejected and alternatives one and three more suited to solve the problem, and alternative 3 besting all other alternative at 97% which implies that having a change management system isn't enough but clearly stating the processes, procedure, chain of command, people and criterion for implementing and controlling changes is far more important. Thus, all alternatives are accepted and could enhance project change delivery.

PERFORMANCE MONITORING AND POST – EVALUATION OF RESULTS

The main feedback to retain from this analysis is that all alternative are highly essential to proper changed management as well as effectively and efficiently deliver project changes. Hence by clear statement of contract terms, direct and clear communication and more importantly unanimous decision on change manage systems and operations to adopt any construction project should effectively deploy the desired project changes

Consequently, all the alternatives developed in this paper are feasible and viable and could be deployed in any construction project. Alternative three was agreed to be best according to the specific characteristics of this paper and to the Multi-Attribute Decision Making analysis carried out. To really validate or reject, these alternatives should be tested in the reality or at least compared to other studies which have been done on the same topic.

CONCLUSION

In conclusion, the most important alternative for effectively deliver change management systems in construction project according to this analysis is all project participants being involved in establishing or adopting a suitable change management system and its operations. Also, a clear contract terms would provide to proper management of project expectations and most importantly solidify conviction and involvement. These should be greatly considered and properly addressed within contractual terms. This paper emphasizes effective people management through established guide lines to deliver project changes facilitated by any established or adopted change management system.

FOLLOW ON RESEARCH

All findings in this paper are subject to testing in real-life construction projects to be validated or rejected. This is a theoretical paper that could be adopted by further investing percentage of success in effectively and completely delivering change management systems in construction projects, otherwise serve as validation, if already explored

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