

# ABX

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Construction Contracting and Administration

## Change Orders

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## **ABSTRACT**

**In this report the main causes that affect the change order have been discussed. These causes are ranked according to the importance index which measures their level of importance. In all four different types of charge orders have been fully discussed. Also the causes which affect the change order are also described in detailed. Effort is exerted to put forth some useful recommendations to administer work of project. Also some suggestions have been made to government officials to accelerate the smooth completion of projects by the contractors.**

**However it has been concluded that deficiencies in construction phases, setting proper and approved design and the behavior of the different parties involve in the construction are most severe causes of change order.**

## INTRODUCTION

Many articles have been written on change, change orders and change management. A change is defined in literature as many deviation from an agreed upon well-defined scope and schedule. A change order is the formal document that is used to modify the original contractual agreement and become part of project's documents.

A change order is a written order which authorizes the contractor to make addition, deletion or revision in the work within the time limit of the construction contract. It means the parties have entered into a new contract. It also means that a contract modification has been taken into account and that the terms of each change order needs proper consideration of these negotiations. It can also be referred to as a mini-contract. It is very flexible as it provides owners or their representatives to shift emphasis to make engineering medications to meet existing needs of requiring activities. Changes in the contract also mean that additional money must be added to the contract.

A contract change clause is added to define the way that owner, consultant and contractor will handle changes. A procedure must be set to process a change from the conceptual development until it materializes in the field. A change must be managed well in order to minimize its cost, schedule and consequential effects that can lead to enormous cost and schedule overruns. Further errors and omissions in engineering or contraction may face

a change. All these factors and many other necessitate changes that are costly and generally un-welcomed by all parties.

## PREVIOUS STUDIES

In the United States of America an extensive analyses have been done about contract modifications whereas in Saudi Arabia a single study has been done. Different surroundings, environmental and cultural factors have taken into consideration while doing the study

Rowland presented, in his study, a list of general rules to be followed or situations to be involved in an attempt to provide some insight into avoiding problem on construction process.

A survey was conducted to determine how the audits are currently used to solicit suggestions on how current procedures might be improved. Leidholt came up with five recommendations to improve the current procedures.

Williams and Beekler studied change order administration in the U.S. Army Material Command. Their report concludes that policy in the U.S. ARMY Material Command is relatively effective, but they also offered recommendations which may reduce the incidence of change order problems.

Resmond suggested that in a climate of intense competition, the winners of bid awards are not only willing to assume the risk of losing profits, but also are willing to improve their financial positions through excessive use of change orders.

## OBJECTIVES & LIMITATIONS:

In order to pursue the objectives, a study was conducted on the types of change orders, the causes of change orders and the administrative methods to over-come this problem. Followings are the contents in details.

The main objective of this research is:

- ✚ Undertake comprehensive analysis of types of construction contract change orders.
- ✚ Rank the frequency of all types of contract change orders in Saudi Arabia.
- ✚ Identify the severity factors of causes of contract change orders in Saudi Arabia.
- ✚ Recommend methods oaf effectively control contract change orders in Saudi Arabia.

The followings are the types of change orders which are in practice in Saudi Arabia.

## Types of Change Orders:

Most construction practitioners follow two categories of change order **Informal** and **formal** change order.

Changes can be initiated by all parties in the construction process. All changes must be approved by the owner before implementation. Changes can be classified in many different ways depending on the basis and the purpose of

classifications. The cause or originator based classification is best suited for the basement of cost impacts of changes. A change introduced by the owner or his agent under the mechanism of the change clause is called Formal or Direct Change. A change that resulted from a failure to do or not to do on the part of the owner or owner's agent is called Constructive Change. This type is not initially documented as a change and hence becomes a potential source of dispute. A change outside the scope of the contract and executed only after complete redefinition of the scope and re-negotiation of the contract is called Cordial Change.

### **Formal Change Order**

This type of order is issued in writing by an authorized representative of the owner by the contractor to a subordinate contractor. Formal change order rarely causes problems because they are generally identified before they are incorporated. They are based on a planned and deliberate choice. The followings are the most common types of formal change orders:

#### **✚ Unilateral Change Order:**

A unilateral change order is issued when an agreement is reached in negotiations or when a contractor fails to submit his proposals in time. It is based on the owner's estimate of cost and time for work. A unilateral change order is desirable for the following reasons:

1. The burden of proof to the contractor is transferred.
2. The progress schedule is permitted.

3. The potential cost-plus contractual relationship is reduced.

Sometime it is not considered desirable for the following reasons:

1. It may require owner's decision which may generate appeals.
2. The contractor might receive payment for the work done, but this may reduce his incentive to reach mutual agreement.

It is, therefore, concluded that a unilateral change order should only be issued when reasonable efforts have been exhausted to reach an agreement.

#### **Bilateral Change Order:**

It is a supplementary agreement whereby the owner's directives are issued to the contractor with a bilateral agreement as to price or time. The supplemental agreements are understood as being mutual agreements for the parties to increase or decrease the work agreed upon.

It is essentially a new negotiated contract which must be founded upon a bilateral agreement of the parties, and it is considered to be the proper medium for making changes that are outside the general scope of a contract.

In Saudi Arabia, this type of change order is widely used and it is considered as most preferred form of a change order.

#### **Two-part Change Order:**

Under the following conditions, two-part change orders are used when it is necessary to issue a notice to proceed before agreement.

1. Where the changes involve a substantial sum of money and considerable time required to determine exact extent of the



change which would be inequitable to require the contractor to finance the change until the change is finally determined.

2. To provide for an interim payment or final costs when a time extension has not been settled. Some times consent of surety is required. In this case it will be possible to obtain it in conjunction with the issuance of the first part if the interim payment is provided.

#### **Notice to Proceed on Change Order “to be Negotiated”**

If the work must proceed before the pricing basis and/or schedule adjustments can be agreed, a written order will be issued. The purpose of this initial order is to provide the contractor of a formal notice to proceed with the work under modification. It will stat that a subsequent change order, signed by the authorized person, will be issued containing the price, time adjustment and additional details.

### **Informal Change Order**

A constructive change order arises from the informal acts and conduct of the owner by his representatives and it increases the contractor’s cost of performance. A constructive change order occurs when the agent of the owner act in a manner that has the same effects of formal written change order.

## CAUSES OF CHANGE ORDER

There are many causes of change order that may impact a construction project. As the construction project gets larger and complex, there is a possibility of change order increases. Seventy-eight significant causes of change orders were found, which the result of the others were. Some of these major areas were further divided into three or four divisions, which will be discussed in the following sections:

### **1. Change of Plans by Owner**

Change of plan or scope of a project is most significant cause of changes in construction. This type of change is normally costly especially if made later in the construction process.

### **2. Owner's Financial Difficulties**

If the owner faces any financial difficulties, this would force him to make changes in an attempt to reduce cost. Again proper planning and review of the project cash flow is enough to eliminate this problem.

### **3. Owner Change of Schedule**

A change in the schedule means the contractor will either provide additional resources in a shorter time or idle some sources that he committed for certain activities. In both cases additional cost is incurred.

### **4, Substitution of Materials or Procedures**

If the contract calls for the certain materials or work procedures, then a change order is required to substitute these materials or procedures. This feature of the Saudi market faces people to move away from lump sum contracts that cover supply of a material leaving the door open for the owner to select materials during installation.

### **5. Conflict between Contract Documents**

Different documents are often drawn by different engineers or design personnel during design phase of the project. However, the owner may find out that the government document representation are not the best and may decide to change.

### **6. Change in the design**

This happens most in project where construction starts before design is finalized. The owner may opt for such a philosophy if the project is schedule driven and time is the controlling element. A change in the design may also take place when the design is reviewed by the contractors and he may wish to make changes. The owner or project manager should be careful of approving preferential changes.

### **7. Lack of Coordination**

The owner should convey his new ideas and concerns which form the basis for changes to the consultants in a timely manner. Ways to improve coordination

include coordination meetings, progress reports and conference cells among others.

## **8. Environment**

Productivity may be increased or decreased according to environmental situation. The environment might cause many changes to protect cost and time. The environment was divided into four divisions: climate, social and cultural impacts, coordination of environment and geographical problems. Each cause is discussed as follows:

### **A . Climate:**

Saudi Arabia has a long, hot and almost hotly dry summer with a short cool winter season during which a little rain falls. Because of the dryness of the air and lack of cloud, isolation is considerable producing very high summer temperatures up to 45 or 50 degree C. However, circumstances allow the heat to escape from the surface and the temperatures drop. The night coolness is a boom in summer but leads to sporadic frost in the interior during winter.

The geographic location directly affects the Western Province of Saudi Arabia., which lies along the Red Sea coast. The highest relative humidity is reached at the end of the summer season in late August and early September. During October to April rainfall is irregular and unreliable. Surface winds are light to

normal during most of the year. These winds are usually accompanied by a rise in temperature and humidity.

Thus we note from the above that Saudi Arabia has one of the most extreme climate conditions that are unfavorable for contractors to work with. The contractors prefer to work during cool hours in the early morning or at the evening. The high temperature and humidity reduces the productivity of the labors and increases the maintenance cost of the equipment due to the high temperature on the engines.

## B. Social and Cultural Impacts:

The wealth created by the oil industry and the economic impetus has given Saudi Arabia the required rapid growth and change. As a result of this, the towns grow, resulting in the increase in the population and the general living standards of the people of Saudi Arabia.

These trends have accelerated many forces which have changed the population in Saudi Arabia. Large immigrants have come to the Kingdom from all over the world for employment opportunities. From Syria, Palestine Egypt, Lebanon, India and Pakistan the skilled and semi-skilled workers filled the gaps by the sudden and rapid growth. They have concentrated mostly in the cities and towns. The Bedu (the original residents of Saudi Arabia) have been fast quitting the towns and cities.

As a result of the conservative society of the Kingdom, foreign workers are isolated from the society because they don't socialize with Saudis. Another problem which affects the use of foreign labor is the special security problems imposed by the government for certain types of projects.

The religious practices of daily prayers, fasting and even the religious holidays are all not observed by non-Muslims workers in the Kingdom. Several conflicts can happen if Muslim workers are allowed to practice their religions while the

others continue to work because very few employees can be counted on to work during these periods.

Labors come to this country to improve their stand of living in their own country, and once they reach a certain level, they leave to their own country.

#### **C. Condition of Environment:**

Recently construction projects have increased in size and complexity of the technology of the typical project and the relatively sophisticated management skills. The subsystems that make a project have all increased in complexity. The integration of all these subsystem becomes more complicated as to managing the time, cost and quality of construction.

When subcontractors are not qualified or not organized, a failure might happen in certain items which would mostly affect the sequence of items and the contractor's and subcontractors program.

Safety procedures are very important. When accidents occur result in injuries or deaths, many problems may exist such as the injury or death of expert personnel and it will take time to find another one. The government might stop the work to complete the investigation about the accident. A delay would result and a change order would be most probable.

#### **D. Geographical Problems:**

Quite often the contractor and architect find that certain conditions are different from those anticipated.

The discovery of unknown physical conditions of an unusual would be expected at the site such as the existence of abnormal substances or the presence of rocks, which would often directly affect the contractor's performance.

When the contractor discovers the existence of artificial conditions, then the change must be made, depending upon the terms of the contract, more money will be added to someone. Geographical conditions can cause change to the project's cost and time by one or more of the following factors:

- a) Geographical change in the place of performance.
- b) Subsurface conditions
- c) Insufficient field surveying.

## CONCLUSION

The following conclusions can be drawn, based on the results of this research:

- 1 One of the main causes of change order is the poor or inadequate of early planning of the project. Before starting a project, both the owner and the contractor are responsible for this. Coordination and communication amongst various parties working on the project is of great importance to improve management and this controls problems and reduce change order.



- 2 Contract documents are very important cause of change order. There are always a lot of errors and confusions in the wordings, phrases, and sentences of the contracts, which results in many problems and changes.
- 3 Another cause of change orders is insufficiencies or mistakes in the field surveying. These changes are caused by insufficient field surveying efforts done by the contractors to carefully identify all underground utilities and soil conditions at a proposed site.
- 4 One of the main causes of the change order is shortages in project cost which might occur due to inadequate preparation of a project's budget or because of inflationary pressures.
- 5 Another major cause of change order is the owner personality with excessive bureaucracy in project's management. Owner's decision making process in the project's owner operation is major factor of change order. Sometimes, the actual contraction may differ from what the owner thought so a lot of change orders are created to adjust it.
- 6 One of the common reasons of change order is poor organization and performance of contractor.
- 7 Failure during construction and shortages of materials and equipment are major problems faced in construction which causes a change to the previous planned work schedule.

- 8 Lack of applicable code requirements in the last few years is also one of the reasons. Moreover, many problems exist among government agencies due to the lack of information and coordination between agencies.
- 9 It can be concluded from the result of this study that bilateral change order is the one that is mostly used and preferred to get the work being changed and done through. This is a good practice because this type of change orders is considered to be the proper medium for making changes with lead problems.

## RECOMMENDATIONS

In this section we will put forth my recommendations and review the administrative and common control procedures which can be applied to minimize the effects of change order. Prior to commencement of any contract, these measures should be taken so that change orders are not generated. Measures should also be taken to minimize impact of change order after they have been generated.

The following recommendations are submitted which hope meet your expectations.

### **1. Clarity in Change Order Procedure**

Before commencement of a project, the project engineer should clarify the followings:

2. All parties should agree the procedure to handle changes
3. All the forms and instructions to complete them should be made available.
4. The people who are responsible for approving, negotiating and reviewing should be identified.

By applying the above procedure, a lot of time and efforts in the beginning will be saved and the clarity of these procedures will be become clear

### **2. Quick Approval**

It is a time consuming factor to recognize the need to make a change and actually doing the change. If the period between recognition and implementation is longer, the change would be more costly and damaging. This control is quite important in large organization or large projects and a multiplayer environment.

### **3. Ability to Negotiate Changes**

To come to a successful agreement or change order, knowledge of contract terms, project details, a technical background in the field and negotiation skills are very important. Disputes, delays or making the wrong decision are the cause of lack of these skills.

### **4. Approval in Writing**

No changes should be made without any approval in writing. It is difficult to prove for compensation if there is no authorization in writing from the owner. In the hectic environment of construction many verbal agreement can be forgotten leaving the contractor disarmed in the battle to get compensation for a change.

### **5. Change Order Scope**

The scope for a change must be clearly defined. All affected drawings must be reviewed to insure the extent of construction or demolition and to see the effect of this change on other parts of the facility. When working in a renovation

project where there is a constant interact with existing structure, this gets critical.

## **6. Justification of Change**

To ensure that there is enough justification, a change request must be carefully examined. The authority that approves change must ensure a high benefit to see ratio to proceed with the change. To determine the extent of the effect of a change on scope, cost, material, finance etc. an extra effort must be exerted.

## **7. Review of Contract Documents:**

The contract terms and documents must be reviewed prior to building or award by the owners and contractors. Specific terms are formed to carry out this review. Special attention must be given to gray areas where different interpenetration can arise. All the clarifications should be made as early as possible particular vague part of documents.

## **8. Team Efforts**

Team efforts minimize impact of changes. Encouragement to the team effort endorses an effective control in change management. This approach requires that all parties (owner, contractor and consultant) work together to identify and implement project changes and openly share information on pricing and implementing of changes.

## **9. The followings are the most utilized controls by consultants of large building construction project**

1. Get clarity of the scope of work of the change order.
2. Review of design changes for feasibility before approval.
3. Get appropriate approval in writing.'
4. Should enter into negotiation by knowledgeable people

## **10. Work as per the schedule**

To avoid change order and to administer the work as per the schedule, the following recommendations are suggested:

1. Comprehensive surveys should be made of the proposed site in order to show all existing buildings, water, and power and sewer lines, roads which the contractor will have to reroute or remove.
2. There should be a close cooperation and coordination between the owner, architecture, engineers, general contractors and sub-contractors should exist to improve management and control problems.
3. Drawings and specifications should be reviewed for vague terms and conflicting information which are subject to interpretation. The engineers should allow sufficient time to perform a detailed and comprehensive review of such drawings and specifications.
4. It is recommended that a standardized form of contract should be executed. All the provisions of the contract should be read in such a way as to be meaningful, reasonable and consistent with the rest of the contract. Extensive contract formation controls, and contract

administration training and procedures will help in reducing change orders.

5. The owner should be fully aware of his financial capability to meet the financial requirement of the project. Careful preparation of a project will help to reduce cash flow problems.
6. A close coordination and communication amongst various government agencies, with standard procedures of release, permits and orders will help to avoid many changes to project time and cost.
7. To reduce any dispute later, it is strongly suggested that before awarding of a contract, reasonable rates for future change orders are developed.
8. Consideration should be given to cost and schedule impacts in evaluating a change order and implementation plan. The contractor must never be directed to precede with any change those results in an increase of a financial obligation until the availability of funds to cover the additional work has been confirmed.
9. Government offices should prepare a fair and reasonable independent cost and time estimate on the proposed change order to verify that the estimate prepared by the construction contractor is fair and reasonable.
10. The government representatives at the project site must know the limitation of their authority. Authority should be established by a written order describing the authority of the representative.

11. Standard forms and procedures of change orders are helpful in preventing the costly redevelopment of these tasks on each project.
12. A study should be performed to investigate financial problems associated with change orders and develop methods for calculating change order cost.
13. From actual completed contracts, a study could be done to investigate the effect of bidders on change orders rate when the level of competition increases.
14. A study might be performed which would investigate contractors which already are terminated and determine what percentage of the contract modifications were bilateral change orders and what percentage were unilateral change orders. This study could determine if the cost growth per contract was a function of the type of contract modifications which were issued.
15. From an administrative point, it is worth noting that owners of large building projects are not repetitive owners of such projects, and their union will be based mostly on one project.
16. Another justified recommendation for those owners is to get a project management consultant (from) PMC) to supervise both the design and construction activities to insure that the owners' need and expectations are met by the design. The practice of appointing PMC is rarely adopted currently.



17. To have an effective administration, it is recommended that the contractors should consider using a Work Breakdown Structure or other tracking system more often than what is now used. Many contractors indicate they are not using any type of structure system for their construction activities and this may lead to an inability to trace the effects of change orders on the rest of the project.

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