

Construction Variations Administration Practice

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Abstract

The maximum project performance would be achieved if the work invariably flows smoothly within time limits and anticipated budget. Contract change management is a critical part of contract administration, contract management, and ultimately project management. Variation order is an outdated term still commonly used to describe an architect's instruction requiring alterations, additions or omissions to the quality, quantity or design of the works. Variation or Alteration is an additions or omissions in work, materials, working hours, work space, etc. Variation orders result in time delay, cost overrun, quality defects, and other negative impacts. The main aim of this project is to know in detail about variation, variation order; administration of variation order, valuation of variation order and variation leads to claim. This paper is compiled by referring Civil code of the Empire of Ethiopia proclamation no. 165 of 1960, standard bid document national competitive bidder 2011, NEC3 and FIDIC. Conclusion and recommendations are also presented sequentially.

Keywords: Variation, Alteration, Variation orders.

1. Introduction

Contract change management is a critical part of contract administration, contract management, and ultimately project management.

Variation 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.

In project management, a change order (or variation order) is a component of the change management process in which changes in the scope of work (or project brief) agreed to by the client, contractor and architect are implemented.

Alteration or amendment of contract is the forms of contract in common use in the construction industry have been carefully drafted to take account of most of the situations which regularly arise during the course of building works. The forms are regu-

larly updated in line with decisions of the courts. The employer may wish to incorporate some special provisions in a particular contract to suit his own requirements. It is perfectly feasible to alter or amend a standard form provided: -

- The contractor is made aware of the alterations or amendments at the time of tender or at least before the contract is executed.
- If proposed after the contract is executed, both parties must expressly agree the proposed amendments.
- The amendments are carried out carefully so that no inconsistencies result.
- The amendments do not contravene legislation.

It is always advisable to obtain the assistance of a person specializing in building contracts and construction law if anything but minor amendments are needed, as any amendments may have wide-ranging ramifications.

Any amendments must be made on the printed form itself and signed or initialed by both parties. It is not sufficient merely to refer to amendments in the bills of quantities or specification because most forms contain a clause giving priority to the provisions of the printed form over any of the other contract documents. An alternative is to delete the priority clause and allow the usual principles of interpretation of contracts to prevail.

2. Variation

In legal terms, a variation is an agreement supported by consideration to alter some terms of the contract. No power to order variation is implied, and so there must be express terms in contracts which give the power instruct variations. In the absence of such express terms the contractor may reject instructions for variations without any legal consequences.

Standard forms of contract generally make express provisions for the contract administrator (generally the architect or engineer) to instruct variations (for example, FIDIC Clause 51.1, 1987, SBD-Works (NCB) - Prepared by the FPPA (Version 1, August 2011) clause 15.1 and also Civil code of the Empire of Ethiopia proclamation no. 165 of 1960 article 1335.-3).

FIDIC Clause 51.1, 1987

The Engineer shall make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:

- a. Increase or decrease the quantity of any work included in the Contract,
- b. Omit any such work (but not if the omitted work is to be carried out by the Employer or by another contractor),
- c. Change the character or quality or kind of any such work, Section IV. Part I. General Conditions of Contract,
- d. Change the levels, lines, position and dimensions of any part of the Works,
- e. Execute additional work of any kind necessary for the completion of the Works, or
- f. Change any specified sequence or timing of construction of any part of the Works.

No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with Clause 52. Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.

SBD-Works (NCB) - Prepared by the FPPA (Version 1, August 2011)

15.1 The Engineer shall have power to order any modification to any part of the works necessary for the proper completion and /or functioning of the works. Such modifications may include additions, omissions, and substitutions, changes in quality, quantity, form, character, kind, position, dimension, level or line and changes in the specified sequence, method or timing of execution of the works. No order for a modification shall have the effect of invalidating the contract, but the financial effect, if any, of all such modifications shall be valued in accordance with GCC Clauses 15.5 and 15.7.

Civil code of the Empire of Ethiopia proclamation no. 165 of 1960

Art. 1335.-3. Alteration.

The working plan may be altered on the request of either party where exceptional circumstances prevent its being carried in to effect or it appears for economic reasons desirable that it be altered.

Such provisions enable the continued, smooth administration of the works without the need for another contract.

Art. 3034. - Alterations required by contractor.

1. Where it appears necessary for technical reasons to make alterations in the work as originally agreed, the contractor shall, except in urgent cases, give notice thereof to the client.
2. The contractor shall give such notice notwithstanding that the proposed alterations do not result in the client having to pay an increased price.

2.1 Alteration of existing Buildings

Existing buildings often undergo alterations during their life to change, modify or improve their performance or the nature of their use.

Common examples of alterations include:

- Total or partial change of use.
- Extension
- Partial demolition.
- Linking or separating spaces.
- Making or closing openings.
- Retrofitting a new a component or feature.
- Refurbishing an existing a component or feature.
- Renovating an existing component or feature.
- Repairing an existing component or feature.
- Maintenance.
- Decoration.

3.Variation order

Variation order is an outdated term still commonly used to describe an architect's instruction requiring alterations, additions or omissions to the quality, quantity or design of the works.

Variations Alterations, additions or omissions in work, materials, working hours, work space, etc.

The contractor shall not make any alteration and or/ modification of the permanent works. Unless and until the engineer instructs or approves a variation.

A change order is work that is added to or deleted from the original scope of work of a contract, however, depending on the magnitude of the change, it may or may not alter the original contract amount and/or completion date. Variations may also be deemed to occur if the contract documents do not properly describe the works actually required.

Variations may not (without the contractors consent):

- Change the fundamental nature of the works.
- Omit work so that it can be carried out by another contractor.
- Be instructed after practical completion.
- Require the contractor to carry out work that was the subject of a prime cost sum.

A project manager then typically generates a change order that describes the new work to be done (or not done in some cases), and the price to be paid for this new work. Once this change order is submitted and approved it generally serves to alter the original contract such that the change order now becomes part of the contract.

SBD-Works (NCB) - Prepared by the FPPA (Version 1, August 2011)

15.2 All change orders shall be issued in writing; it being understood that:

- a. If for any reason, the Engineer shall find it necessary to give an order orally, he shall as soon as possible thereafter confirm the order by change order;
- b. If the Contractor shall confirm in writing an oral order given for the purpose of GCC Clause 15.2 (a) and the confirmation shall not be contradicted in writing forthwith by the Engineer, an change order shall be deemed to have been issued for the modification.

A change order for modification shall not be required for increase or decrease in the quantity of any work where such increase or decrease is the result of the quantity exceeding or being less than that stated in the bill of quantities or price schedule, as the result of valuation of works laid down in GCC Clause 63.

15.3 Except as provided by GCC Clause 15.2 prior to any change order for modification, the Engineer shall notify the Contractor of the nature and form of such modification. As soon as possible, after receiving such notice, the Contractor shall submit to the Engineer a proposal containing: -

- a. a description of the tasks, if any, to be implemented or the measures to be taken and a program for execution; and
- b. any necessary modifications to the program of implementation of tasks or to any of the Contractor's obligations under the contract; and
- c. any adjustment to the contract price in accordance with the rules as set out in this Clause.

15.4 Following the receipt of the Contractor's submission referred to in GCC Clause 15.3, the Engineer shall, after due consultation with the Public Body and, where appropriate, the Contractor, decide as soon as possible whether or not the modification shall be carried out. If the Engineer decides that the modification shall be carried out he shall issue the change order stating that the modification shall be carried out at the prices and under the conditions given in the Contractor's submission referred to in GCC Clause 15.3 or as modified by the Engineer in accordance with GCC Clause 15.5.

FIDIC 1987

Instructions for Variations 51.2

The Contractor shall not make any such variation without an instruction of the Engineer. Provided that no instruction shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this Clause, but is the result of the quantities exceed-

ing or being less than those stated in the Bill of Quantities.

New Engineering contract (NEC)3 Engineering and construction contract 2nd edition

A6.3.1.20 The ECC explains that "Variations to the works are made by a Project Manager's instruction to change the Works Information...A variation may comprise deletion or addition of work or alteration to work. It may include changes to the Employer's design, to design criteria or to performance requirements for the Contractor's design. Issue of a revised drawing or specification is a compensation event."

Prepare Change orders using the guidelines when contract revisions, additions, or deletions to the work are necessary. Prepare Change may be required due to: -

- An error or omission in the contract
- Differing site conditions
- Adding a specification
- Adding new items of work
- Resolving a dispute
- Changing the sequence of work or
- Other contract changes.

Submit change orders requiring a design exception to either the appropriate design division or Field Coordination Section for approval. Ensure that any change orders meeting either of the following conditions are signed and sealed by a licensed professional engineer: -

- Proposing major modifications or
- Modifying structural designs.

Send all change orders with original signatures to the Construction Division, Labor and Contract Administration Branch. Approved change orders must be maintained in the original contract file located at construction division.

Show all information and quantities about the proposed change on the change order. A performance bond is not required if the change order increases the contract cost.

For change orders requiring administrative approval, include a completed copy of the checklist with the transmittal letter of the construction division package forwarded to labor and contract administration to expedite the change order approval process.

If an agreement is not reached with the contractor regarding the scope of work and basis of payment for the change order, indicate on the change order form whether the work will proceed under force account or interim adjustment to the contract.

4. Identification of Variation

The following items are representative of the type of inquiries Reviewers of the Construction work should be pursuing. Additional inquiries should be developed and pursued as required.

pliance with the Joint Fire Code, carried out in advance of an instruction.

Table 1 Checklist for variation of works; Source Own work

No	Item	Comments/Yes/No/NA
1	The employer imposes to access or to use of any part of the site.	
2	Restoration work including removal of debris following damage, the subject of a claim under a Joint Names Policy covering new or existing buildings Schedule.	
13	When the employer carrying out the work in a particular order.	
4	Correction of an error in the Contract Bill of quantities.	
5	Correction of inadequacy in any design in the Employer's Requirements.	
6	Correction of a discrepancy within the Employer's Requirements.	
7	Alteration to Contractor's Designed Portion caused by a change in the Statutory Requirements after the Base Date.	
8	Confirmation by Architect of directions from the clerk of works.	
9	Change in the conditions under which work is carried out, resulting from a Variation to other work	
10	Emergency compliance with Statutory Requirements where caused by a divergence between Statutory Requirements and the Contract documents, including instructions and issued drawings.	
11	Changes to the quality and other characteristics of any item of work.	
12	Omission of any work unless it is to be carried out by others.	
13	Errors, discrepancies and divergence within or between documents listed in the Contract document.	
14	Postponement of any part of the Works by either party.	
15	Change to the quantities of any item of work included in the contract.	
16	Emergency Remedial Measures required by the insurer in compliance with the Joint Fire Code, carried out in advance of an instruction.	
17	If the employer restricts the limitation of working space or hours.	
18	Changes to the levels, positions and / dimensions of any part of the works.	
19	Any additional works, plant, material or services necessary for the permanent works. Including any associated test o completion	
20	Changes to the sequence or timing of execution of works.	
21	The character of the work for any item as altered differs materially in kind or nature from that in the contract.	
22	Change any specified sequence or timing of construction of any part of the Works.	

5. Administration of variation

After receiving an instruction regarding a change, the lead consultant collaborates with the other primary disciplines – structural or civil, mechanical, electrical, and plumbing – as well as the quantity surveyor or cost control consultant.

Together, this team reviews the potential impact of the request on the project's technical feasibility, schedule and budget. The lead consultant then summarizes the findings and recommendations for the owner.

After the owner approves the expected project impact, the design team revises the project documentation as needed, and then packages and issues it to the contractor as an instruction. The contractor reviews the instruction and replies within a contractually specified period of time, including implications for feasibility, timelines and cost.

Documents related to these instructions are either attached di-

rectly or issued separately under a transmittal that is cross-referenced to the instruction.

The instruction to the contractor may state that the scope changes aren't expected to have any impact on project timing or cost. In the event of a disagreement, the contractor can respond with a variation request or notice of a time extension or claim. Depending on the contract, the contractor may file a claim for time-related costs.

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15.9 Any change to the terms of the Contract must be recorded in writing and executed by authorized signatory of the Contractor and the Engineer. Such record of the change in question must address all consequential amendments required to be made to the Contract as a result of such change.

15.10 Changes will take effect as from the date specified in the

signed record of change and shall not have retrospective effect unless expressly provided for in such record.

15.11 Each record of change must be dated and sequentially numbered. Each of the Public Body and the Contractor will be entitled to an original executed counterpart of the record of variation.

15.12 Except as provided in any such record of variation, the Contract will continue in full force and effect.

Generally, Use the table below for change order administration or preparation:

Table 2: Change order preparation steps; Source : own work, 2022

Step	Action
1	Determine the most feasible solution while ensuring that Post engineering service parameters are satisfied. Estimate the cost of the proposed work using contract costs and information provided by the contractor.
2	Number each change orders consecutively. Note: Do not reuse change order numbers.
3	Insert the contractor's name as it appears in the contract.
4	Reference the controlling control-section-job number (CCSJ) on a project containing several control-section-jobs. <ul style="list-style-type: none"> When changes apply to a specific CSJ on the change order, mention it in the change order under the 'Explanation' field for Site Manager Contract change orders.
5	Show the limits of the proposed changes.
6	Indicate if a change is major or minor according to the definition of Government (ministry of construction).
7	For Governmental projects, indicate in the "For Department Use Only" box any federal non-participating amounts and days. A single change order cannot be set up as both federal participating and non-participating in Site Manager.
8	State the reason(s) for the change order listing the primary reason(s) if needed.
9	Describe clearly and concisely a description of and the reason for the work to be done. If a time extension (TE) is granted, state the reason for granting time.
10	Show only those bid items involved in the change, plus any force account work, items, quantities, or prices.
11	Attach a half-size copy of the applicable drawings.
12	If additional time is granted as part of the change order, number the time extension consecutively and include in the appropriate blank on the change order form.
13	If the change order involves third party funding, complete the funding notification form. Provide notice to the local government or other third party. Ensure that an authorized third-party representative sign. The Third-Party Funding Notification Sheet, regardless of the change order amount.
14	Sign and seal change orders in accordance with the "Procedures for Sealing Engineering Documents" outlined in the Design Division, Project Development Policy manual.
15	Submit the original change orders to Construction Division Labor and Contract Administration Branch and copies of change order must be given to each stakeholder.
NOTE: For change orders requiring administrative approval, include the Change Order Approval Checklist.	

Variation Valuation

The valuation of variations has been recognized as a prime cause of conflict and dispute in construction management. Such disputes often concern the prices and/or rates to be applied to the varied works. Scholars has identified the subjectivity of the decision-maker in interpreting the valuation rules to be the major problem, particularly with regard to defining the work conditions and/or characteristics during a variation event.

Each variation shall be evaluated in accordance with measurement and evaluation of works, unless the engineer instructs or approves.

The valuation of variations may include not just the work which the variation instruction is describes, but other expenses that may result from the variation, such as the impact on other aspects of the works. Variations may also (but not necessarily) re-

quire adjustment of the completion date.

Variations may be valued by:

- Agreement between the contractor and the client.
- The cost consultant.
- A variation quotation prepared by the contractor and accepted by the client.
- By some other method agreed by the contractor and the client.

Valuations of variations are often based on the rates and prices provided by the contractor in their tender, provided the work is of a similar nature and carried out in similar conditions. This is true, even if it becomes apparent that the rates provided by the contractor were higher or lower than otherwise available commercial rates.

In particular, the differences in approach construction contracts take to valuing variations and the implications of this, both during the project and in the assessment of tenders.

Construction contracts adopt two quite different approaches to the pricing of variations:

- A. Using rates derived from a breakdown of the contract sum and,
- B. Using a separate schedule of rates or prices

This distinction is often overlooked (or not fully appreciated), but it lies at the heart of a number of problem situations that arise in the valuation of variations.

A. Valuation using rates derived from a breakdown of the contract sum

Of the two different methods of valuing variations this first one is the most common. The contract's variation clause will provide that changes are valued using pricing information that directly relates to the buildup of the contract sum, for example, using the rates and prices in the bill of quantities (BOQ). A re-measurement contract will typically adopt this approach so that the rates in the priced BOQ will be used to value variations, as well as being used to price the final quantities for the original contract scope.

This methodology can be adopted for lump sum contracts as well. The lump sum may be supported by a breakdown showing how the contractor has built up the contract price. This can be in the form of a detailed BOQ or by a simpler breakdown. Provided that there is sufficient detail, the breakdown can then be used to derive rates and prices for variations.

B. Valuation using a separate schedule of rates or prices

The second, and alternative, approach to valuing variations is to use rates and prices that have no relationship to the contract sum. For example, a contract may contain a lump sum for the original scope but stipulate that variations should be valued by reference to an entirely separate schedule of rates. A lump sum contract can incorporate a detailed breakdown but with the proviso that this is only used for the assessment of stage payments (that is, a contract sum analysis form of document). Such a contract may require variations to be valued using a separate schedule of rates rather than the contract sum analysis.

There are two ways in which such a separate variation price schedule can operate:

- One option is for it to include prices for the additional items of work that may be required, such as the rate for excavating a cubic meter of soil or building a linear meter of fencing.
- Alternatively, it can set out rates for the resources that will be required to undertake the additional work, such as rates for defined staff, labor, materials and plant. Those rates are then used in combination to build up the valuation of the work undertaken.

Valuation of omissions

Under the traditional method of pricing variations, using a lump

sum breakdown, the process of valuing omissions is relatively straight forward. One effectively omits the part of the contract sum that relates to the deleted work. But if the parties use a form of contract that values variations using a separate schedule of rates then omissions can lead to significant problems and uncertainties.

The rate in the variations pricing schedule may bear no relationship to the money that will be saved if the work is not undertaken. Nor may it bear any relationship to the figures used by the contractor in calculating its lump sum price.

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15.5 The prices for all modifications ordered by the Engineer in accordance with GCC Clauses 15.2 and 15.4 shall be ascertained by the Engineer in accordance with the following principles:

- a. where work is of similar character and executed under similar conditions to work priced in the bill of quantities or price schedule it shall be valued at such rates and prices contained there in;
- b. where work is not of a similar character or is not executed under similar conditions, the rates and prices in the contract to be agreed through negotiation between the Engineer and the Contractor shall conform to the prevailing market price;
- c. if the nature or amount of any modification relative to the nature or amount of the whole of the contract or to any part thereof shall be such that in the opinion of the Engineer any rate or price contained in the contract for any item of work is by reason of such modification rendered unreasonable, then the Engineer shall fix such rate or price as in the circumstances he shall think reasonable and proper;
- d. where a modification is necessitated by default or breach of contract by the Contractor, any additional cost attributable to such modification shall be borne by the Contractor.

15.6 On receipt of the change order requesting the modification, the Contractor shall proceed to carry out the modification and be bound by these GCC in so doing as if such modification were stated in the contract. The works shall not be delayed pending the granting of any extension of time for completion or adjustment to the contract price. Where the order for a modification precedes the adjustment to the contract price, the Contractor shall keep records of the costs of undertaking the modification and of time expended thereon. Such records shall be open to inspection by the Engineer at all reasonable times.

15.7 Where on provisional acceptance an increase or reduction in the total value of the works resulting from a change order, or from some other circumstance which is not caused by the Contractor's default, exceeds 25% of the initial contract price (or as modified by addendum), the Engineer shall, after consultation with the Public Body and the Contractor determine any reduction from the contract price as a consequence of the application of GCC Clause 15.5. The sum so determined shall be based on the amount by which the increase or decrease in value of the works exceeds 25%. The sum shall be notified by the Engineer to the Public Body and the Contractor and the contract price adjusted accordingly.

15.8 The total value of the works resulting from a change order shall not exceed 30% of the total value of the initial contract price.

63. Valuation of Works

63.1 The following methods shall apply to the valuation of works:

(a) For unit-price (admeasurement) contracts:

- i. The amount due under the contract shall be calculated by applying the unit rates to the quantities actually executed for the respective items, in accordance with the Contract;
- ii. The quantities set out in the bill of quantities shall be the estimated quantities of the works, which shall not be taken as the actual and correct quantities of the works to be executed by the Contractor in fulfillment of his obligations under the Contract;
- iii. The Engineer shall determine by measurement the actual quantities of the works executed by the Contractor, and these shall be paid for in accordance with GCC Clause 64. Unless otherwise provided in the SCC no additions shall be made to the items in the bill of quantities except as a result of a modification in accordance with GCC Clause 15 or another provision of the Contract entitling the Contractor to additional payment;
- iv. The Engineer shall, when he requires any parts of the works to be measured, give reasonable notice to the Contractor to attend, or to send a qualified agent to represent him. The Contractor or his agent shall assist the Engineer in making such measurements and shall furnish all particulars required by the Engineer. Should the Contractor not attend, or omit to send such agent, the measurement made by the Engineer or approved by him shall be binding on the Contractor;

(b) For lump-sum contracts, the amount due under the Contract shall be determined on the basis of the breakdown of the overall contract price, or on the basis of a breakdown expressed as a percentage of the contract price corresponding to completed stages of the works. Where items are accompanied by quantities, these shall be firm quantities for which the Contractor has submitted his all-in price, and shall be paid for irrespective of the quantities of work actually carried out.

FIDIC 1987

Valuation of Variations 52.1

All variations referred to in Clause 51 and any additions to the Contract Price which are required to be determined in accordance with Clause 52 (for the purposes of this Clause referred to as “varied work”), shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as the basis for valuation so far as may be reasonable, failing which, after due consultation by the Engineer with the Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement, the Engineer shall fix such rates or prices as are, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

7. Variation related claims

One of the main causes of disputes is in the valuation of the variations. The problems within the valuation of variations have been much attributed to the failure of the traditional cost model, i.e. the bill of quantities. For example, a recent survey on the use of contracts in the building and construction projects revealed that on lump sum contracts, bills of quantities are still being used in up to 20% of the projects. The current traditional approach to valuing variations, favored by many clients, has been claimed incapable of providing an adequate scheme of compensation to contractors for any delay or disruption involved due to the variation. A particular constraint within the current valuation rules is the dependency on personal opinion or judgment.

Variations are often sources of dispute, either in valuing the variation, or agreeing whether part of the works constitute a variation at all, and can cost a lot of time and money during the course of a contract.

Conflict can be arisen when work is not mentioned quantities, drawings or specifications. In common law this silence does not mean the contractor has an automatic right to claim for extra payment. The client is not bound to pay for things that a reasonable contractor must have understood were to be done but which happen to be omitted from the bills of quantities.

Where there are items that, whilst they are not expressly mentioned, are nonetheless required in order to complete the works, then the contractor should have included them in their price. The bills of quantities and specification do not necessarily have to include 'every nail to be punched in'. For example, in fixing GRC façades it is necessary to have steel supports, and a reasonably experienced contractor must make provision for this in the contract price. Unless expressly excluded, such supports are not paid for as a variation.

Civil code of the Empire of Ethiopia proclamation no. 165 of 1960

Art. 3031.- Alterations required by client. ~ 1. Rights of client.

The client may demand that alterations be made in the work as originally planned where such alterations can technically be made and are not such as to impair the solidity of the work.

Art. 3032. - 2. Effect.

1. The client may require a reduction in the price as originally where the alterations required by him reduce the expenses contractor.
2. The contractor may require an increase in the price and his remuneration as originally agreed, where the alterations required by the client increase his expenses, work or liability.
3. Where the parties do not agree, such reduction or increase shall be settled by arbitrators appointed by the parties or, failing such, by the court.
4. The work shall be deemed to be absolutely different to the agreed work where it implies an alteration exceeding by twenty per cent the value at which the original work was or could have been estimated.

Art. 3033- 3. Contractor refusing alterations.

1. The contractor may refuse the alterations required by the client where such alterations affect plans, schemes or other documents on which the parties had agreed.
2. The contractor may also refuse the alterations where they are of such a nature or importance that they constitute a work absolutely different to the agreed work.

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16. Change in Laws and Regulations

16.1 Unless otherwise expressly agreed in the SCC, if, after the deadline for submission of the Bid, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in the Federal Democratic Republic of Ethiopia where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Completion Date and/or the Contract Price, then such Contract Price shall not be correspondingly increased or decreased and/or the Completion Date shall not be adjusted to the extent that Contractor has thereby been affected in the performance of any of its obligations under the Contract.

FIDIC 1987

Power of Engineer o Fix Rates 52.2

Provided that if the nature or amount of any varied work relative to the nature or amount of the whole of the Works or to any part thereof, is such that, in the opinion of the Engineer, the rate or price contained in the Contract for any item of the Works is, by reason of such varied work, rendered inappropriate or inapplicable, then, after due consultation by the Engineer with the Employer and the Contractor, a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In the event of disagreement, the Engineer shall fix such other rate or price as is, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60. Provided also that no varied work instructed to be done by the Engineer pursuant to Clause 51 shall be valued under Sub-Clause 52.1 or under this Sub-Clause unless, within 14 days of the date of such instruction and, other than in the case of omitted work, before the commencement of the varied work, notice shall have been given either:

- a. by the Contractor to the Engineer of his intention to claim extra payment or a varied rate or price,
- b. by the Engineer to the Contractor of his intention to vary a rate or price/

New Engineering contract (NEC)3 Engineering and construction contract 2nd edition

A6.3.1.21 Omitted work is a change to the Works Information and hence is a compensation event. The Prices are reduced if the effect of such compensation event is to reduce the total Defined Cost and the event is a change to the Works Information (NEC clause 63.10 for Options A and B and clause 63.11 for Options C and D).

A6.3.1.22 Furthermore, clarification of previously issued draw-

ings or specification which leads to a change to the Works Information is compensation event although not all of them will lead to additional time or monies. On the other hand, instruction to change the Works Information after acceptance of the Contractor's quotation for accepting a Defect is dealt with under NEC clause 44.2 rather than as a compensation event under clause 60.1(1).

A6.3.1.23 A change to the Works Information provided by the Contractor for his design which is made either at his request or to comply with other Works Information provided by the Employer is not a compensation event (NEC clause 60.1(1)). Such change refers to any change to the Contractor's design submitted with his tender and is different from the Contractor's proposed change to the Works Information provided by the Employer as stated in NEC clause 63.11 (for Options C and D).

Generally to minimize the claims arise due to variation or alteration instructions must be clear as to what is and is not included, and may propose the method of valuation.

Common causes for change orders to be created are:-

- The project's work was incorrectly estimated.
- The customer or project team discovers obstacles or possible efficiencies that require them to deviate from the original plan.
- The customer or project team are inefficient or incapable of completing their required deliverables within budget, and additional money, time, or resources must be added to the project.
- During the course of the project, additional features or options are perceived and requested.
- If the contractor has to add work items to the original scope of work at a later time in order to achieve the customer's demands, a fair price for the work items and fees must be added for the materials and labor.
- Extreme weather conditions cause delays or require additional work to complete construction.

If the engineer requests a proposal prior to instruction a variation. The contractor shall respond in written as soon as practicable. Either by giving reasons why he cannot comply (if this is the case) or by submitting:

- A description of the proposed work to be performed and a program for its execution.
- The contractor's proposal for any necessary modifications to the program and to the time completion. And
- The contractor's proposal for evaluation of the variation.

The engineer shall as soon as practicable after receiving such proposal respond with approval, dis approval or comments. The contractor shall not delay any work whilst awaiting a response.

Each instruction to execute a variation with any requirements for the recording of costs shall be issued by the engineer to the contractor.

8. Conclusion

Variations are often sources of dispute, either in valuing the vari-

ation, or agreeing whether part of the works constitute a variation at all, and can cost a lot of time and money during the course of a contract. Whilst some variations are unavoidable, it is wise to minimize potential variations and subsequent claims by ensuring that uncertainties are eliminated before awarding the contract.

This can be done by:

- Undertaking thorough site investigations and condition surveys.
- Ensuring that the project brief is comprehensive and is supported by stakeholders.
- Ensuring that legislative requirements are properly integrated into the project.
- Ensuring that risks are properly identified.
- Ensuring that designs are properly coordinated before tender.
- Ensuring the contract is unambiguous and explicit.
- Ensuring the contractor's rates are clear.
- Preparing concise drawings, bills of quantities and specifications, providing for all situations which are reasonably foreseeable.

The best way to prevent change orders is to take advantage of the oversight and analysis that comes with an independent review of our construction project.

Recommendation

Change orders can derail our carefully crafted budget and cause delays and conflicts within our project schedule. It may be impossible to avoid all change orders in any construction projects, but there are several simple things we can do to reduce the number of disruptions we have to manage. Here below I will look at five tips we can use to avoid change orders and reduce project costs.

1. Include More Detail in the Project's Design

If your contract documents don't include sufficient details about materials, you'll end up with change orders to take care of the ambiguity. For example, failure to include the underlying fabric in pavement construction will mean that a change order has to remedy the exclusion.

You can avoid change orders like this by starting the project with a complete design. More details in the design will mean that there's a much smaller chance of change orders once construction has commenced. Using advanced estimating software will help you to make sure you're working from accurate estimates from the start.

2. Meet Face-to-Face Regularly

While cloud-based construction software has become ubiquitous and extremely helpful in the industry, it's still important to meet face-to-face regularly with your team. These in-person interactions can help to clear up miscommunications and keep everyone on the same page.

Try establishing quick meetings at the beginning of each workday to give everyone an update on the construction process. Encourage team members to ask questions or share information that will help everyone to have a productive workday. You'll be able to clear up instructions that were misinterpreted and reduce the likelihood of change orders.

3. Establish a Change Order Process Up Front

It seems counterintuitive to establish a change order process up front if you're trying to avoid them, but the process can actually prevent some change orders from happening. If you have a document in your contract that establishes the process for initiating, authorizing, performing and paying for change order work, you can prevent some unauthorized change orders from being requested. Additionally, with the process (including the outlined payment) for change orders can be a deterrent, especially when the change orders include unnecessary requests.

4. Increase Coordination and Collaboration

Problems often arise when plans and specifications prepared by independent disciplines (plumbing, civil engineering, CoTM, etc.) are not managed and coordinated. If construction documents are completed and submitted without considering other disciplines and their documents, you put yourself at risk for change orders. Fix this problem and avoid change orders by coordinating the design performed by all the construction disciplines. Use software to share and coordinate these designs and to find any problems or discrepancies.

5. Establish Quality Control Processes

The final tip for avoiding change orders and reducing costs is to establish a quality control process for all stages and levels of the project. Your quality control shouldn't just begin on the job site; it should also include processes for ensuring quality during your design and technical documentation phases. By including testing and inspection at every stage and level of your project, you can catch problems early and reduce the instance of change orders later on. It also helps to reduce costs by minimizing the likelihood that you'll have to go back and fix problems in later phases of the project.

9. References

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