

MCAC

Mechanical Contractors Association of Canada

BUILDING SMARTER TOGETHER



CHANGE ORDER PROTOCOL

2022

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INTRODUCTION

Changes in the scope of work on a project are almost inevitable, and can include additions, deletions, or other revisions to the work. The scale and number of changes on any particular project can significantly affect the costs of the project. If handled improperly, these changes can lead to disputes and even litigation between the parties on a project.

The purpose of this Change Order Protocol is to provide a fair and reasonable process for the costing and pricing of Change Orders.

It should be noted that this Change Order Protocol is to serve as a guide, and that the terms and conditions of a Contract take precedence. As well, while this guide does contain lists of items to be considered in pricing a change, these lists are not exhaustive, and should not be exclusively relied upon.



GUIDING PRINCIPLES

The following principles should be considered through the Change process, and in the use of this Change Order Protocol. It should be noted that the many variables of a project, including geographic location, types of project delivery method (ie. Design-Bid-Build, Integrated Project Delivery, Construction Management etc.), and the different types of contract (ie. Stipulated Price, Lump-Sum etc.) may all provide for different means to addressing the Change process. These principles outline general best practices.

- Changes in the scope of work may be inevitable, however a greater effort to diminish the volume of contract changes on construction projects is strongly encouraged.
- Contractors should take all efforts to track their expenses throughout a project.
- The earlier changes in the Work are identified, the better. As soon as a potential change is identified, it is advisable that it is tracked by all parties to ensure costs and time are easier to negotiate once a Change Order is finalized.
- When changes become necessary, change orders should have a 21 calendar day turnaround. Contractors should submit an appropriately prepared quotation within 7 calendar days and Owners should approve/reject within 14 calendar days. If market or site conditions require, discretion is with the Contractor to modify the validity period on a prepared quotation.
- Change Orders are a preferred mechanism, and Change Directives should be avoided as much as possible.
- If it is necessary to issue a Change Directive in advance of approval pricing and all related approvals, this formal direction to proceed should not diminish the urgency to negotiate a final change order price.
- In circumstances where a Change Directive is issued and prior to the negotiation of an agreed upon price, Contractors should be entitled to invoice for progress payments of up to 75 per cent of Reimbursable Expenses
- Change Orders should be fairly and reasonably priced and payment of approved changes should conform to contract terms.
- Contractors are entitled to overhead and profit
- All parties should consider the role of Impact Costs in the pricing of changes

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- Reasonable disclosure of costs is encouraged, while excessive requests can be counter-productive, cause delays, and give rise to additional costs.
- The parties should be proactive in resolving disputes, and every effort should be made to ensure that these disputes will not impact the balance of the project.
- Statutory holdbacks are a legal requirement; additional holdbacks are redundant and lead to avoidable disputes.

CHANGE ORDERS AND CHANGE DIRECTIVES

For the purposes of this Protocol, Change Orders (Prior to approval, a Change Order can often be referred to as a PCN, CR, CCN, or CCO) and Change Directives are defined as follows, as per the **CCDC 2 – Stipulated Price Contract (2020)**:

- A Change Order is a written amendment to the Contract prepared by the Consultant and signed by the Owner and the Contractor stating their agreement upon:
 - a change in the Work;
 - the method of adjustment or the amount of the adjustment in the Contract Price, if any; and
 - the extent of the adjustment in the Contract Time, if any.
- A Change Directive is a written instruction prepared by the Consultant and signed by the Owner directing the Contractor to proceed with a change in the Work within the general scope of the Contract Documents prior to the Owner and the Contractor agreeing upon adjustments in the Contract Price and the Contract Time.

It is important to note that, unlike a Change Directive, a Change Order may be used to make changes also outside the general scope of contract documents. However, it should be noticed that specific contract documents will overrule such guidelines, and professional advice may be required to determine whether a proposed change is outside the general scope of the contract documents.

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Meanwhile, a Change Directive is used only if a change in the Work is within the general scope of Contract Documents, and is issued to require the Contractor to proceed with a change in the Work on a cost reimbursable basis prior to agreeing to the adjustment in Contract Price and Contract Time. Prior to executing any work related to a Change Directive, the Owner will advise as the method of validation of man hours spent, and materials and equipment used. The Owner will designate his authorized representative, authorized to approve the hours shown on the Time Sheets, and the related materials and equipment used to perform the Work. On the monthly progress bill, the Contractor will be able to bill for the approved labour, material, equipment, and other expenses incurred under the Change Directive.

After a Change Directive has been issued, both parties must expeditiously continue efforts to achieve agreement on the price of the change, and then record this agreement in a Change Order.

It is critical to note that supplementary instructions, including, but not limited to Site Instructions, Field Orders, or Stop Work Orders, are not Change Directives, and should not be treated as such. It is the responsibility of the Contractor to ensure supplementary instructions do not result in costs, otherwise a request for a Change Order needs to be submitted.

THE ROLE OF IMPACT COSTS

Changes in the Work are not necessarily limited to direct costs or site management. Changes can affect productivity throughout the duration of the Work, and the associated productivity loss can be difficult to quantify, particularly at the time of quotation. These Impact Costs are over and above the costs to perform the changes in the Work, and may also arise out of the cumulative effect of various changes.

An example of Impact Costs may arise when a clash is detected, and Work is paused until further direction is provided. Whenever work flow is interrupted by missing information and/or contemplated changes, there will be inefficiencies that are difficult to quantify as they occur.

Recommendation Concerning Impact Costs

One recommendation is for Contractors to qualify change quotations, indicating that the price being quoted only addresses what is known at the time of quotation, and only includes direct costs of the change, and not the impact of cumulative changes or the impact on scope work. The Contractor should also indicate in their qualification the right to request compensation if these costs are incurred and when they can be quantified. If a Contractor is going to claim for Impact Costs, it is crucial to have a detailed baseline schedule and ongoing tracking of actual progress.

THE EFFECT OF CHANGES ON CONTRACT TIME

When preparing a quotation for a Change, the Contractor should also state whether the change will have an impact on the Contract Time based on when the change is authorized. Examples of statements that can be added include:

- There will be no impact to the Contract Time if the authorization is given by (a certain date).
- There will be an impact to the Contract Time (state the effect) based on an assumed date of authorization of (a certain date).
- The impact to the Contract Time cannot be assessed at the time of the quotation, and the Contractor reserves its rights to provide a request for same once the change in the Work is complete and the impact is quantifiable.

The Contractor must supply supporting information sufficient to allow the Consultant to evaluate the quotation with regards to both the impacts on Contract Price and on Contract Time.

If applicable, the Contractor should request an extension to the schedule and/or acceleration cost adjustment required to the Contract Price.

PRICING OF CHANGE ORDERS

As a practice, it is important that all parties agree to costs to be included in a change at the outset of a contract. When pricing a change, all parties must agree to the costs to be included, including:

1. Direct Project Costs
 - a. Labour Rate
 - b. Supervision
 - c. Material
 - d. Shop Expenses
 - e. Site Management Costs
2. Job Cost/Expenses
3. Head Office Overhead and Profit
4. Liquidated Damages

1. DIRECT PROJECT COSTS

Direct project costs cover the Contractor's costs reasonably incurred at site to perform the Work related to the change.

a. LABOUR RATE

The Labour Rate outlined below is the actual fully burdened cost per hour of labour consumed on a Journeyman basis (the lower productivity rate for apprentices is offset by the hourly rate). It should be noted this Labour Rate does not include the cost of supervision, such as Superintendents, Foreperson, and Project Managers.

The Labour Rate below consists of but is not limited to the following:

- Base Rate
- Travel/Vehicle Allowance/Costs

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- Vacation/Stat Pay
- Union Deductions
- Pensions/Additional Payroll Expenses
- Ongoing training (if calculated a percentage of rate)
- Legislated Burdens
- EHT
- WCB
- EI
- CPP
- Technology Costs (ie. Cellular, WiFi etc.)
- Expendable Small Tools
- Additional Unionized Charges
- Rest Breaks
- Idle Time
- Safety
- Job Box Talks
- WHMIS
- Working at Heights
- Personal Protective Equipment
- Committees
- Labour Warranties
- Parking
- Safety Awareness Training
- Additional factors affecting productivity (ie. COVID-19)

Labour Hours Calculation

In absence of agreed to pre-authorized rates and units, it is strongly recommended that industry standard Labour Units are used in calculating labour units required to complete a change notice. Each change may have a variety of non-typical or abnormal factors that will require adjustments.

As a guideline, labour units should be derived from standardized trade publications such as the NECA Manual of Labour Units*, MCAA Labour Estimating Manual*, SMACNA Manual* and other such standardized trade units that may exist. It is understood that mitigating circumstances may exist that impact such standardized units.

**On a journey person basis*

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Factors that should be considered include:

- Site Conditions - Inadequate lighting and Housekeeping
- Clean up
- Material Handling - Unloading, Storing, Moving
- Time Keeping
- Mobilization and Demobilization
- Digital Layout/3D Scanning (ie. Trimble)
- Labour Warranties (if not included in labour rate)
- Estimating
- Design and Engineering Work
- BIM/VDC
- Testing/Commissioning
- Quality Assurance/Quality Control
- Fabrication Drafting
 - Measuring
 - Printing
 - Record Drawings and As Built
 - Interference Drawings
- LEED Requirements (ie. Garbage Sorting, Tagging, Disposing etc.)
- Installation Height - Reference should be made to the MCAA labour calculator, where different height requirements outline the requisite resources needed for the work.
- Multi Storey Factor -Labour adjustment must be made for taller buildings to reflect the rate of productivity loss.
- Environment Conditions -Extreme weather conditions either heat, humidity or cold may result in productivity loss. (Dust. restricted access. occupied premises. remote areas)

Availability of Personnel -When an adequate supply of personnel is not available, the loss of productivity must be taken into account.

- Stacking of the Trades -A change order may require many trades to perform their work concurrently and in a limited work area resulting in productivity losses.
- Out of Sequence Work – If a change affects the order in which the work is agreed to be scheduled, this may adversely affect the work required of the change as well as productivity.

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- Abnormal Work Schedule - Deviations from a normal work schedule will have an impact on labour productivity and required supervision.
- Crew size inefficiency - changes may require the use of larger than planned workforces.

b. SUPERVISION*

The cost of supervision includes:

- trade supervision, e.g. foremen and general foremen; and
- general supervision, e.g. superintendents and health and safety agents.

**If supervision is added as a separate cost, its pricing must be determined and tracked similarly to other labour costs.*

c. MATERIAL

Material cost must be fair to both parties and mutually agreed upon.

The price will include possible loss due to price escalation, waste, damage, vandalism, theft plus all applicable freight and taxes.

Material price should be based on Trade published prices (ie: Trimble, Allpriser and Trade Service) and project specific conditions.

d. SHOP EXPENSES

Expenses associated with the operations and maintenance of fabrication facilities. The major cost categories are the following:

- Facilities
- Shop Equipment
- Operating Costs

e. SITE MANAGEMENT COSTS

The Contractor should also be compensated for the costs incurred to manage the change, including:

Project Manager and/or Coordinator

This item includes the Project Manager and/or Coordinator fees related to the change. The Contractor should be compensated for the Project Manager's tasks, such as identifying the change and performing site visits, informing the Owner and Consultant

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about the change, suggesting solutions and alternatives, negotiating with the Owner and Consultant, etc.. As a best practice, the Contractor should use hourly rates when charging for these costs.

Safety Personnel

This item includes the costs related to safety management.

Site office

This item includes the additional costs related to the Contractor's site office, such as equipment, heating and energy costs, means of communication, messaging, etc.

Clerical staff

This item includes the compensation for the Contractor's clerical staff performing work related to the change.

Scheduling

This item includes the costs required to reschedule the Work when considering the effect of the change. It includes costs related to activities such as evaluating the impact of the change on the schedule, rescheduling the Work while awaiting a decision on the part of the Owner, modifying the schedule to consider the effect of the change, etc.

2. JOB COST/EXPENSES

Job Costs/Expenses are all costs necessary for the performance of a contract that cannot be tied directly to the material, labour or subcontractor costs. These costs/expenses can include, but are not limited to:

- Equipment
- Travel Allowance (if not in the labour rate)
- Equipment Rental
- Parking (if not in labour rate)
- Site Facilities
- Bonding
- Freight Rates

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- Site Clerical
- Storage
- Security
- Permits
- Consumables
- Inspection
- Insurance
- Financing
- Direct Room and Board/Living Allowances

3. OVERHEAD AND PROFIT

Overhead and profit are two separate and distinct items included in the cost of a change, and should be understood by all parties to the contract. As with other parts of a change, these items should also be agreed to at the outset of a project to avoid the potential for delays or disputes arising as the result of a change.

The following outlines the key differences between overhead and profit.

Overhead

Overhead, or head office overhead expenses, is also known as the fixed costs or indirect costs that allow the Contractor to operate its business; they are items that cannot be billed to a specific project or change.

With respect to overhead, there are several factors that should be considered. First, overhead should not be viewed on a sliding scale based on the cost of a change. Regardless of the size of a change, the costs included in overhead will remain the same. The price of a change should not affect overhead costs. Second, overhead expenses are billed at 10 per cent as a guideline. However, it should be noted that different sectors and regions will experience variations in overhead expenses, due to several factors. As is the case with labour rates, this percentage can vary based on market conditions, availability of labour, and other project factors. This percentage should be agreed to at the outset of the project.

Items included in head office overhead include but are not limited to:

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- office space;
- office equipment, furniture, and supplies;
- garage and storage space;
- heating, lighting, and energy costs;
- communications;
- general accounting and legal services;
- purchasing services;
- general administrative services;
- general insurance; and
- advertising and promotion.

A list of items that are included in the determination of the overhead costs should be included in the contract along with agreed upon percentage(s).

It should be noted that it is common that some of the items that are not part of overhead expenses such as bonds, insurance, legal, permits, etc., are considered by some Owners as an overhead expense. However, these should be considered as a job cost, and not part of overhead costs. Once again, these costs should be outlined clearly in contract documents.

Profit

The Contractor must also be compensated with profit; a compensation for the risks and effort taken by the Contractor to perform the additional work related to the change. Agreed upon markup percentages reflecting this should be included in the contract. In general, those percentages will be:

- 10 per cent for work done by own forces
- 10 per cent for work done by subcontractors
- Nil for credit change orders

The profit is, among other factors, dependent on;

- Industry Sector (Industrial, Mining, Commercial, Residential, Institutional etc.)
- Project size
- Location
- Market maturity
- Delivery Form
- Project Risk Profile

4. LIQUIDATED DAMAGES

Liquidated damages are a pre-determined sum agreed to in a contract that is recoverable if specific conditions, such as schedule, of that contract are not met. Change Orders may affect and even nullify liquidated damages clauses contained in contracts.

To avoid nullifying liquidated damages clauses, parties should consider accelerated material costs when pricing a change to ensure material is available and does not delay the project schedule.

FACTORS AFFECTING PRODUCTIVITY

Since 1971, the Mechanical Contractors Association of America has offered “Factors Affecting Labour Productivity.”* These factors illustrate the adverse effects on labour productivity resulting from causes beyond the direct control of the contractor.

**The factors listed below are intended to serve as a reference only. Individual cases could prove to be too high or too low.*

FACTOR	%LOSS		
	MINOR	AVERAGE	SEVERE
STACKING OF TRADES: Operations take place within physically limited space with other contractors. Results in congestion of personnel, inability to locate tools conveniently, increased loss of tools, additional safety hazards and increased visitors. Optimum crew size cannot be utilized	10%	20%	30%
MORALE AND ATTITUDE: Excessive hazard, competition for overtime, over-inspection, multiple contract changes and rework, disruption of labour rhythm and scheduling, poor site conditions, etc.	5%	15%	30%

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FACTOR	%LOSS		
	MINOR	AVERAGE	SEVERE
<p>REASSIGNMENT OF MANPOWER: Loss occurs with move-on, move-off men because of unexpected changes, excessive changes, or demand made to expedite or reschedule completion of certain work phases. Preparation not possible for orderly change.</p>	5%	10%	15%
<p>CREW SIZE INEFFICIENCY: Additional workers to existing crews “breaks up” original team effort, affects labour rhythm. Applies to basic contract hours also.</p>	10%	20%	30%
<p>CONCURRENT OPERATIONS: Stacking of this contractor’s own force. Effect of adding operation to already planned sequence of operations. Unless gradual and controlled implementation of additional operations made, factor will apply to all remaining and proposed contract hours.</p>	5%	15%	25%
<p>DILUTION OF SUPERVISION: Applies to both basic contract and proposed change. Supervision must be diverted to (a) analyze and plan change, (b) stop and replan affected work, (c) take-off, order and expedite material and equipment, (d) incorporate change into schedule, (e) instruct foreperson and journeyperson, (f) supervise work in progress, and (g) revise punch lists, testing and startup requirements.</p>	10%	15%	25%

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FACTOR	%LOSS		
	MINOR	AVERAGE	SEVERE
<p>LEARNING CURVE: Period of orientation in order to become familiar with changed condition. If new people are added to project, effects more severe as they learn tool locations, work procedures etc. Turnover of crew.</p>	5%	15%	30%
<p>ERRORS AND OMISSIONS: Increases in errors and omissions because changes usually preformed on crash basis, out of sequence, or cause dilution of supervisions or any other negative factors.</p>	1%	3%	6%
<p>BENEFICIAL OCCUPANCY: Working over, around or in close proximity to Owner’s personnel or production equipment. Also badging, noise limitations, dust and special safety requirements and access restrictions because of Owner. Using premises by Owner prior to contract completion.</p>	15%	25%	40%
<p>JOINT OCCUPANCY: Change cause work to be performed while facility occupied by other trades and not anticipated under original bid.</p>	5%	12%	20%
<p>SITE ACCESS: Interferences with convenient access to work areas, poor man-lift management or large and congested worksites.</p>	5%	12%	20%

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FACTOR	%LOSS		
	MINOR	AVERAGE	SEVERE
SITE ACCESS: Interferences with convenient access to work areas, poor man-lift management or large and congested worksites.	5%	12%	20%
LOGISTICS: Owner furnished materials and problems of dealing with storehouse people, no control over material flow to work areas. Also contract changes causing problems of procurement and delivery of materials and rehandling of substituted materials at site.	10%	25%	50%
FATIGUE: Unusual physical exertion. If on change order work and workers return to base contract work, effects also affect performance on base contract.	8%	10%	12%
RIPPLE: Changes in other trades; work affecting our work such as alteration of our schedule. A solution is to request, at first job meeting, that all change notices/bulletins be sent to Contract Manager.	10%	15%	20%
OVERTIME: Lowers work output and efficiency through physical fatigue and poor mental attitude.	10%	20%	30%
SEASON AND WEATHER CHANGE: Either very hot or very cold weather.	10%	20%	30%

RESOURCES

In developing this Guide, the Task Force responsible reviewed several resource documents, including those listed below. Members are also encouraged to look at the MCAA Change Orders, Productivity, Overtime: A Primer for the Construction Industry document, as it provides considerable information on changes and the associated issues.

- MCAC Change Order Protocol (2010)
- MCA America Change Orders, Productivity, Overtime: A Primer for the Construction Industry (2020 Edition)
- MCA Alberta: Change Order Guide - Contractor Resource Document (June 2020)
- CMCEF - National Change Notice Procedure Guide (November 2001)

Task Force Members:

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