



مدیریت تغییرات قراردادی در پروژه‌های EPC

فرایند یکپارچه + نکات حیاتی

(بر اساس اسنادی از AACE و PMI و Long International)

ارائه دهنده:

سید محمدرضا علوی پور

(PhD, PMP, CMIT)

CMAA Authorized Trainer

دانشگاه Illinois Tech آمریکا

What we will learn?

- ❑ Introduction
- ❑ Change Order Definition and Other Change Order-related Considerations
 - ❖ Change Order Definition
 - ❖ Change Management Defined
 - ❖ Demonstrated Elements of a Change and Change Order
- ❑ Change Order Procedures

What we will learn?

☐ Change Management Process

1. Identification of Potential Change to Contract
2. Contractor Submits Change Order Request to Owner
3. Owner Evaluates Contractor's Entitlement to Change
4. Contractor Revises or Cancels Change Order Request, or Disputes Owner's Change Order Request Rejection
5. Prepare the Proposed Change Order
6. Owner Reviews Proposed Change Order
7. Owner Decision to Approve or Request Further Discussion
8. Owner and Contractor Negotiate Change Order
9. Agreement Reached on Change Order
10. Parties' Decision to Revise, Cancel or Dispute PCO
11. Revise Proposed Change Order
12. Change Order Cancelled
13. Contractor Prepares Claim
14. Claim Submitted by Contractor to Owner
15. Finalization of Formal Change Order
16. Change Order Execution

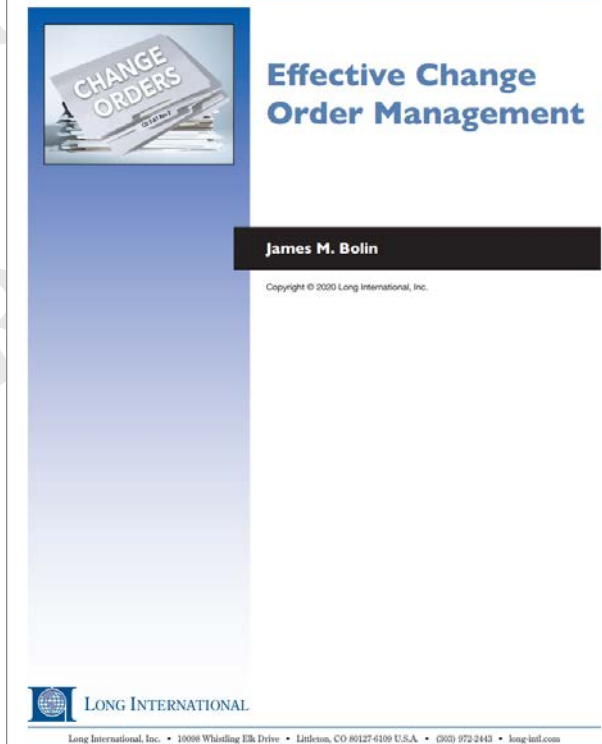
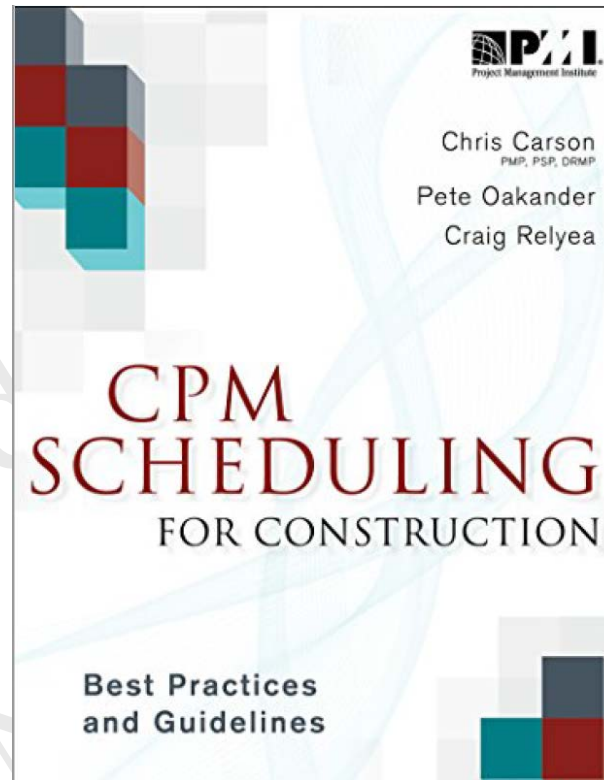
What we will learn?

- ☐ Change Management Document Control
- ☐ Appendix: Sample Change Management Template
- ☐ Final Notes:
 - ❖ Conclusion
 - ❖ Other References
 - ❖ Contributors

Reference



Primary reference



Introduction

- ❑ This recommended practice (RP) of AACE International addresses the **process** of change management as applied in **engineering, procurement, and construction**, given the **lack of one** in the terms of the **construction contract**.
- ❑ This process **applies across** various contracting strategies or delivery methods.

What this RP does not include?



RP intention

☐ This RP does **not** include

scope changes (allowable by contract)

associated with unit price work.

☐ **Nor does** this RP address the process concerning the **management of changes**

that are internal to a single party

that does **not affect another party** to a contract.

Is it a standard?



RP intention

- ❑ This RP is intended to provide **guidelines (i.e., not a standard)** concerning the change management process on a **capital construction project** that most practitioners would consider **good practice** for use where applicable.

Who can use?





RP intention

❑ This recommended practice is relevant to **stakeholders** on a capital construction project; for instance,

1. Owner,
2. Contractor,
3. Construction manager, or
4. Other stakeholders.

❑ **Although** this recommended practice is **written in the context** of a contract between owner and contractor,

it is **applicable to any parties** contracted to perform a project, including owners and architect-engineers (A/E), as well as general contractors and sub-contractors.



- ☐ It is recommended that change management **processes be agreed** upon before the work commences because experience has shown that one cannot go into projects **assuming a perfect world** whereby
 1. **Owner** never changes its mind,
 2. **A/E** never alters or errors with its design documents,
 3. **Contractor** never performs **poorly or mismanages** its work, and
 4. **Natural events** do not interfere.
- ☐ That perfect world does **not exist** in the context of capital construction projects.



❑ In 1775 **Samuel Johnson** said:

“Change is not made without inconvenience, even from worse to better.”

Prepared by Dr. Alavipour
DO NOT DISTRIBUTE



Changes consequences

- ❑ After **more than 250 years**, this quote (citing the Dictionary of the English Language edited by Richard Hooker) still **holds meaning in the construction industry**.
- ❑ Changes on projects may create
 1. **Varying amounts** of tension and
 2. Potential **distrust**between the contract parties.

*However, in industries in which **projects are the norm**, it is now typically understood that change is endemic, brought on by an explosion in the development of technology and communications.*

How change is defined?





Change definition

❑ In the context of a project, a **change** is defined as an alteration or variation to

1. A scope of work and/or
2. The schedule/cost

for completing the work.

❖ However, **changes** can include more than alterations or variations to scope.

Change can also include **revisions** to contract terms and other administrative revisions.

❑ **Construction contracts differ** from most legal agreements in that they consider and expect that changes will occur.

How to deal?



Change definition

❑ In order to **deal** effectively with the changes that might arise on a construction project,

the project participants should have a comprehensive and workable process for

1. Identifying and
 2. Managing
- changes.

What are the types of changes?





Types of changes in RP

- ❑ **Two commonly** occurring categories of scope changes on construction projects are either
 1. Changes **directed** by the owner, or
 2. Changes identified by the contractor as a result of an action or inaction of the owner, also known as **constructive changes**.
- ❑ An **owner-directed change** may ultimately become a constructive change if the **contractor believes** it will be impacted by the **directed change**.

Does the owner have the right to issue a change?



Right to change

- ❑ It is common practice for the owner to have the **right** to make, or direct, **changes** to a **contractor's scope** of work during the design or construction phases.

Reasons for changes?



Reasons for changes

❑ Changes may come about for **many reasons**, such as:

1. Correction of errors in the drawings or specifications;
2. The owner exercising its prerogative to change the scope; or
3. The emergence of **factors or events** with magnitudes **none of the parties** could have anticipated or controlled.

**Change Order Definition
and
Other Change Order-related
Considerations**

Change order definition

❑ In the design and construction industries, the primary change management tool used to

1. Document and
2. Authorize

changes to the contract is the change order, also
referred to as a variation or contract modification.

Let's see the definition

Change order definition by AACE

❑ A change order is defined as:

❖ A **document**

1. requesting and/or
2. authorizing

1. scope and/or

2. baseline

1. Change or
2. Correction

**Does it differ from the perspective of
owner and contractor?**



Change order definition by AACE

1. From the owner's perspective,

it is an **agreement** between the project team and higher authority
approving a **change** in the project control baseline.

2. From a contractor's perspective,

it is an **agreement** between the owner and the contractor
to **compensate** for a **change** in scope or other conditions of a
contract.

❖ It **must be approved** by both the client and the contractor
before it becomes a legal change to the contract.

How it differs with other references'
definitions?





Change order definition by other references

- ❑ A **Change Order** is a **document** that contractually alters an original agreement between the **signed parties**.

مدیریت ادعاء و اختلافات در طول چرخه حیات پروژه
توسعه و مدیریت برنامه در فاز طراحی (Design Phase) برای مدیریت ادعاء و جلوگیری از دعاوی و اختلافات در پروژه

Potential killer contract clauses – Change orders

- ❑ AIA A201-2017: General conditions for construction

§ 7.2 CHANGE ORDERS
§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- 1 The change in the Work;
- 2 The amount of the adjustment, if any, in the Contract Sum; and
- 3 The extent of the adjustment, if any, in the Contract Time.

172 ذکر مطالب فوق تنها در صورت ذکر منبع بلامانع است. www.dralavipour.com By: Alavipour, PhD, PMP, CMIT

What was field order?



Change order definition

❑ Comparatively, **Field Work Orders (FWO)** are **directives** from an engineer or construction manager that either

1. Clarify or
2. Request

minor changes to the contract documents.

❑ FWOs are typically **minor revisions** that usually do not have a significant impact the contract budget or schedule.

Let's see the definition of AIA here!



Change order definition



مدیریت ادعاه و اختلافات در طول چرخه حیات پروژه

توسعه و مدیریت برنامه در فاز طراحی (Design Phase) برای مدیریت ادعاه و جلوگیری از دعاوی و اختلافات در پروژه

Potential killer contract clauses – Change orders

☐ AIA A201-2017: General conditions for construction

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

What if the contractor implements the "Minor Changes" without prior notice?

It needs to have TIA analysis!
Remember I emphasized in the Delay Analysis course?

How does the scope play an integral role?



Change order definition

- ❑ It is important that the **scope of the work** for the project be completely defined in the contract so that **disagreements** over scope changes can be minimized.
- ❖ However, it is **common on projects** that the parties **find disagreement** over **what scope or factors** may comprise a change order and/or its impact.
 - ✓ This **disagreement is not unusual** because the nature of each change will predictably affect each party in different ways.

How disputed issues could become further intensified ?





Change order definition

- ❑ The **resolution** of Change Orders can also become the source of disputed issues between the owner and the contractor on projects.
- ❑ The **disputed issues** become further intensified if the **change order process** is inadequately managed.
- ❑ The owner's and the **contractor's diverging and competing interests** relative to the changes on a project may also become a factor in judiciously resolving the differences.

Why having the process matters other than dispute resolution?





Change order definition

- ❑ The **owner's priorities** are focused on predicting and controlling the **costs** so that the **funding**, which is budgeted for a project, does not become **jeopardized**.
- ❑ Also, the owner usually places a **high priority** on achieving a certain completion date for the project, and often will include contractual liquidated damages to be paid by the contractor if the contractual completion date is not achieved, absent any delays for which the contractor may be **entitled to a time extension**.

Let's see the change order from the contractor's perspective!





Change order definition

- ❑ **For the contractor**, Change Orders entail several factors, which can be potentially complicated.
- ❑ First, Change Orders are often viewed as a **means of increasing** the scope of a project and offer a source of additional revenue.
 - ❖ However, this **supplemental work** can also present the contractor with the problem of having to **proceed with the completion** of change-related scope of work **prior to negotiating and finalizing** the entitlement and payment for a change.

Why and how the contract affects?





Change order definition

- ❑ The **contract** may require the **contractor to proceed** with the extra work **pending the resolution** of the valuation of a Change Order, which may also **require the contractor to finance** the cost of the alleged additional work until resolution occurs.

When the contractor accepts to do that?





Change order definition

- ☐ The **contractor** will normally proceed with scope changes
if it is **confident** that it will be fairly compensated for the alleged extra work at a later date.
- ☐ The contractor also has an **incentive to complete** the contract work in a timely manner because “time equals money,” i.e.,
the contractor’s field staff and other time-related costs **continue to rise**
if the **contract work** is delayed beyond its planned completion date.

What construction contract clauses
should consider regarding the change?



Change order definition

- ❑ Construction contracts often include **conflicting clauses** regarding changed work.
 - ❖ On one hand, a **contract may state** that the contractor cannot proceed with the work for a change in the **absence of a written and approved** Change Order.
 - ❖ On the other hand, language in a contract may **also state that** the **owner has the right to order** the contractor to perform extra work without an agreement for compensation.



Change order definition

❑ These **conflicting clauses** place the contractor in a position of having to **make a choice** between

1. **Performing** the extra work at the risk of having to **later possibly accept** a reduced payment, no payment, or making the decision to refuse to proceed with completing the work.
2. The later choice, however, may place the contractor in a **position of default**, which could possibly result in the contractor being **terminated** on a project by the owner.

Remember we talked about that?

Change management defined

❑ **Change management** is a broad topic and can be found in almost all industries. In the context of capital construction projects, according to the TCM Framework, change management is defined as:

❖ ...The **process of** managing

1. Any change to scope of work and/or
2. Any deviation,
3. Performance trend, or
4. Change to an approved or baseline project control plan.

How this process related to the project control cycle?



Change management defined

❑ **Change management** is a broad topic and can be found in almost all industries. In the context of capital construction projects, according to the TCM Framework, change management is defined as:

- ❖ The change management process is used to approve or disapprove changes in the **scope** and **baseline plans**,
thereby **closing** the project control cycle loop.



Change management defined

- ❑ It is **common** on capital construction projects that the contracts between the owner, designer, and construction contractor include a **clause addressing** the formal process by which changes are addressed once they are identified.
- ❑ This same clause also typically identifies roles and responsibilities among the owner, designer, contractor, and other stakeholders **concerning each step** of the change management process.



Demonstrated elements of a change and change order

❖ It **must be approved** by both the client and the contractor **before** it becomes a legal change to the contract.

❑ Typically, in order for an owner to **approve a change order requested** by a designer or contractor,

there are **three primary elements** that should be demonstrated. They are:



Demonstrated elements of a change and change order

1. Demonstration of Entitlement

1. The contractor **must demonstrate** that it has a contractual right to make the requested change and the change is not already contained in the scope of its current agreement with the owner.
2. That is, the contractor **must demonstrate** that
 1. The change was caused by the owner, or
 2. The owner was responsible for the changed condition.



Demonstrated elements of a change and change order

2. Demonstration of Causation

- ❖ The contractor **must demonstrate** the cause and effect relationship between
 1. Impact that was not its responsibility and
 2. Effects the impact will have on its ultimate **project cost** or ability to **complete** the project as originally contracted.
- ❖ The **element of causation** is often the most difficult to demonstrate of the three elements.

Demonstrated elements of a change and change order

3. Demonstration of Quantum

❖ The contractor **must demonstrate** that the cost or schedule **impacts** that

1. Have been or
2. Will be realized

as a result of the **change** are reasonable and supportable.



Demonstrated elements of a change and change order

☐ If the change was **owner-directed**,

the **contractor** is typically **not required** to demonstrate entitlement;

as the **contractor** would therefore have contractual compensation for **cost** and **schedule** impacts.

Change Order Procedures



Recommended practice

- ❑ **Changes** often have a **major impact** on the success of projects.
- ❑ The **procedures** that are defined for change management in the general conditions sections of most construction contracts **address the steps** to take following the **initiation of a Change Order**.
 - ❖ However, these guidelines do **not normally** identify the requirements for **managing the change** and its **impacts**.

Items that should be considered as part of a project's Change Order procedure include the following:



Recommended practice

❑ For the design and pre-construction phases of a project:

- ❖ Written contracts, agreements, procedures, and roles and responsibilities should be **established and accepted** during a project's early phases.
- ❖ **Difficulties** and **issues** may arise that may **affect the execution** of the work if these documents are **not in-place**.



Recommended practice

❑ For the design and pre-construction phases of a project:

❖ **Define** and **establish** a detailed change management process for the project that is part of the design plan and procedures for the project.



Recommended practice

❑ For the design and pre-construction phases of a project:

❖ **Anticipate** that changes will **inevitably occur** on a project and **plan** for it accordingly.

✓ If the necessary steps for managing changes are **not taken**, the Change Order process will **not be managed well** and the project will suffer.



Recommended practice

❑ For the design and pre-construction phases of a project:

❖ Attentively **monitor** the trending of the project's **design progress**.

❖ At the **completion of the work** related to the design,

it is important that the **owner initiate and communicate** a “freeze” of the design.

❖ **Any revisions** to the established scope of work will be measured against this **baseline for the design**.



Recommended practice

❑ For the design and pre-construction phases of a project:

- ❖ During the **design and pre-construction** phases of the project, identify areas of uncertainty and areas lacking fully defined scope.
- ❖ **Evaluate** the **risks** that may be associated with these areas.



Recommended practice

❑ For the design and pre-construction phases of a project:

❖ **Conduct** constructability reviews and **institute** a value engineering program to **assess the feasibility** of the project's design and defined work scope.



Recommended practice

❑ For the design and pre-construction phases of a project:

- ❖ **Introduce** changes as **early as possible** during a project in order to help minimize the impact of the change.
- ❖ **Comparatively**, it is **more cost effective** to include changes early in a project **than to wait until** the later stages of the project.



Recommended practice

❑ For the design and pre-construction phases of a project:

- ❖ **Fully define** the work scope for **each change** in terms that are understood by all parties.
- ❖ This **clear and concise definition** helps to reduce confusion or the **misinterpretation** of the requirements of a change by the parties.



Recommended practice

❑ For the design and pre-construction phases of a project:

❖ **Avoid** delaying the approval of changes that **will ultimately be approved**.

- ✓ **This tactic** results in the changes being **pushed to later** in the project where they become **more costly** to implement.
- ✓ It is a **misconception** to believe that the **issues** related to Change Orders **resolve themselves**.



Recommended practice

❑ For the design and pre-construction phases of a project:

- ❖ **Authorization** for a change should be mandatory before implementation,
regardless of the **type of agreement or contract**.
- ❖ **Authorization** should be timely and decisive.



Recommended practice

❑ For the design and pre-construction phases of a project:

❖ In **advance of releasing** the project design and bid package documents for tender and construction,

ensure that the **documents** are complete and fully definitive.

Recommended practice

❑ For the construction phase of a project:

❖ **Evaluate** the contractor's bid proposal to ensure that

- ✓ **Documents** are complete and
- ✓ **Cost and schedule** reasonably represent the scope objectives and timelines required for the project.



Recommended practice

❑ For the construction phase of a project:

❖ **Review** the **contractor's construction** procedures, methods, and resources to confirm the contractor's capabilities and flexibility to handle

1. Types,
2. Magnitudes, and
3. Quantities of

change orders that are expected for the project.



Recommended practice

❑ For the construction phase of a project:

❖ Establish a **comprehensive system** for budget and schedule baseline control.

Prepared by Dr. Alavipour
DO NOT DISTRIBUTE



Recommended practice

☐ For the construction phase of a project:

❖ Process, approve, and execute Change Orders

in a **timely manner** to avoid **disputes and claims** that may affect the progress and completion of the project.



Recommended practice

☐ For the construction phase of a project:

- ❖ Do **not proceed** with the **work** for Change Orders without authorization and avoid verbal authorization.

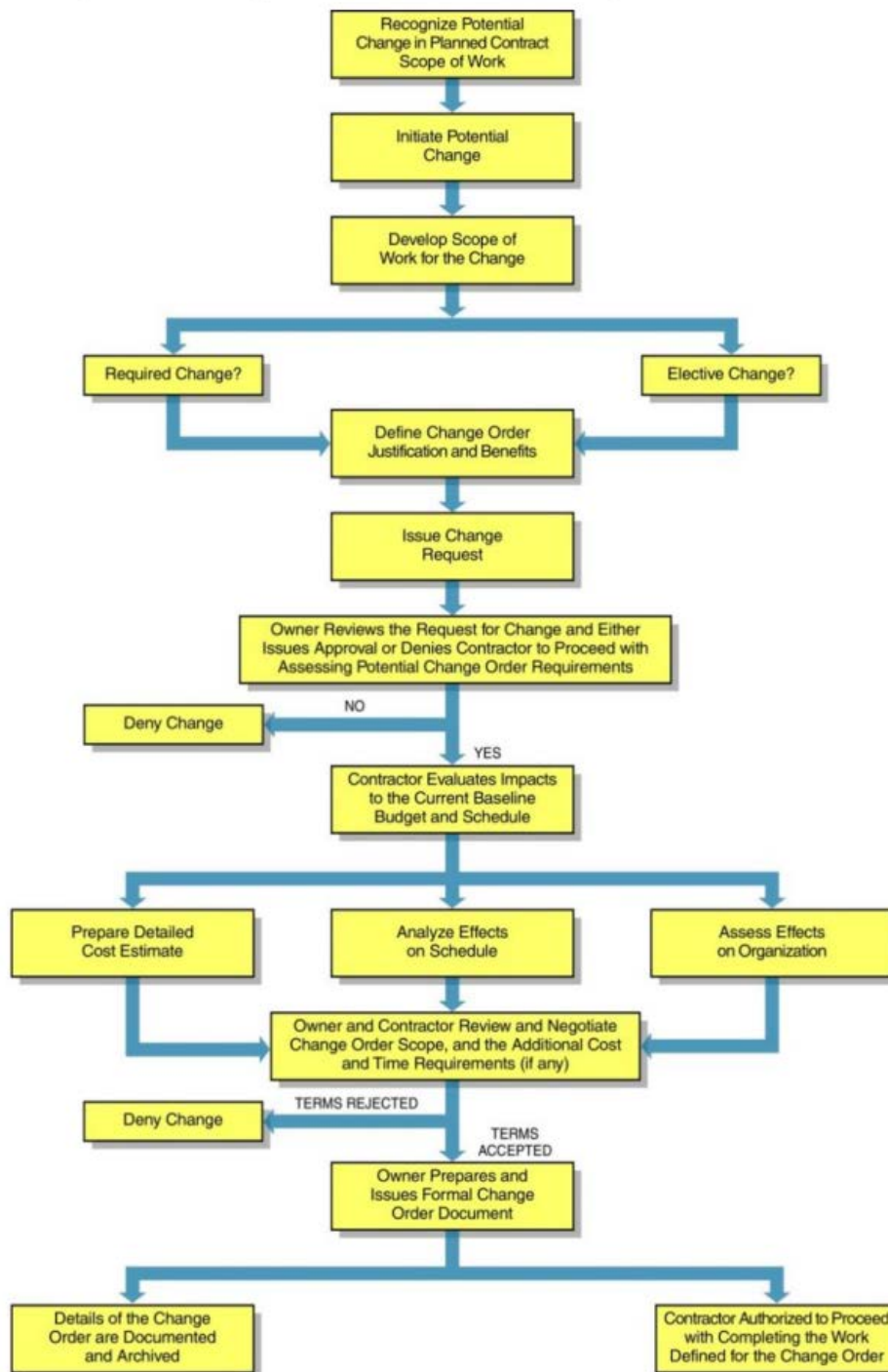


Recommended practice

❑ For the construction phase of a project:

- ❖ To **avoid confusion** and **misinterpretations** of the work scope and requirements that are defined for Change Orders,
work to ensure that the packages for each change are **complete**.
- ❖ **Actively follow up** with the parties involved and **solicit any questions** or requests for clarification.

Change Management Process





Recommended practice

- ☐ The **change management process** is most often a stepped, sequential process.
- ☐ The steps that take place are listed as follows:

1. Change Identification and Initiation

- a. Identification
- b. Notifications
- c. Reviews

Recommended practice

- ☐ The **change management process** is most often a stepped, sequential process.
- ☐ The steps that take place are listed as follows:

2. Preliminary Submittals

- a. Preliminary Change Request
- b. Reviews and Responses

Recommended practice

- ☐ The **change management process** is most often a stepped, sequential process.
- ☐ The steps that take place are listed as follows:

3. Change Order Submittal

- a. Potential Change Order Document
- b. Review and Responses



Recommended practice

- ☐ The **change management process** is most often a stepped, sequential process.
- ☐ The steps that take place are listed as follows:

4. Approvals, Rejections and Recourse

Recommended practice

- ☐ The **change management process** is most often a stepped, sequential process.
- ☐ The steps that take place are listed as follows:

5. Change Order Execution

Recommended practice

- ☐ The **change management process** is most often a stepped, sequential process.
- ☐ The steps that take place are listed as follows:

6. Claims



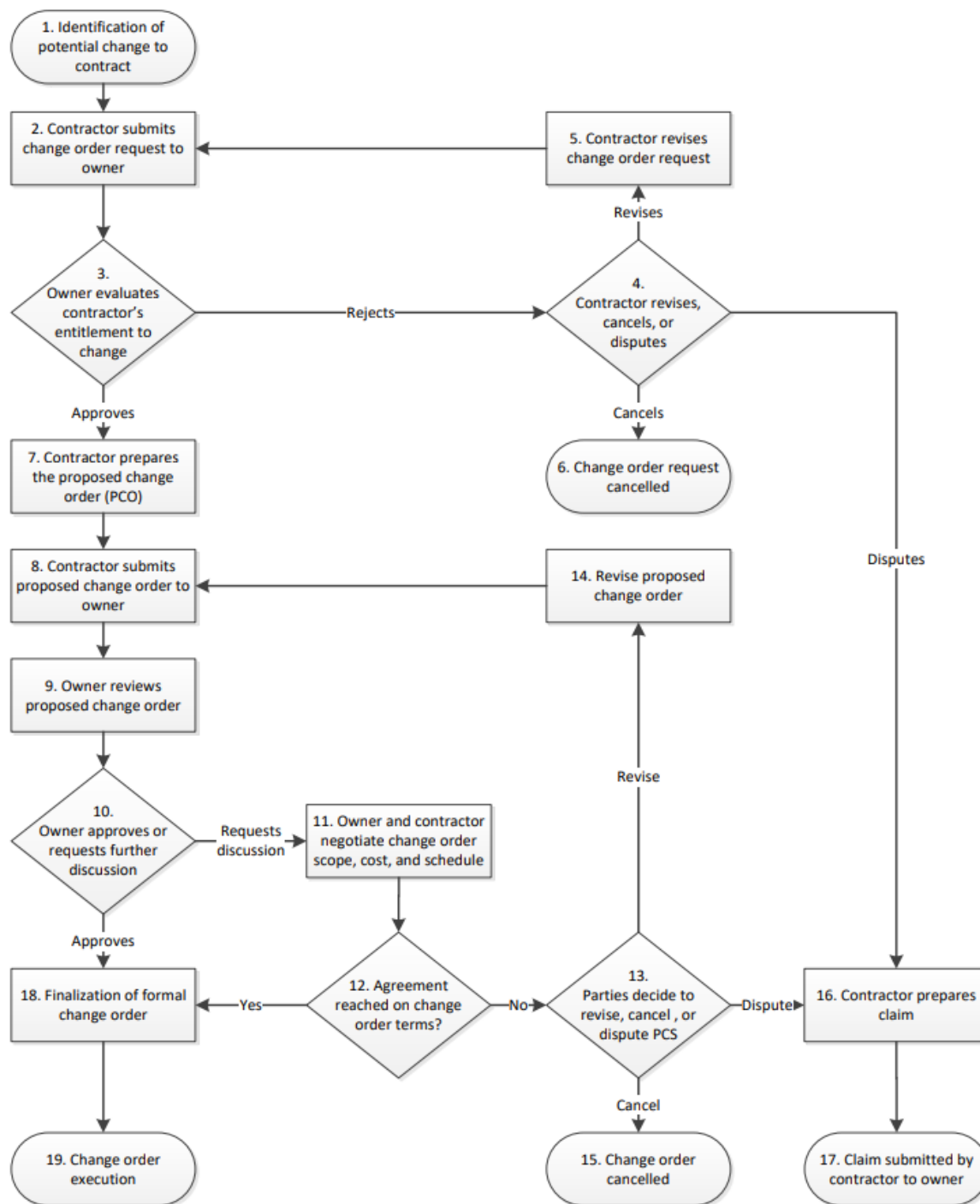
Recommended practice

- ❑ Typically, **every** construction project's change management process includes **some form of each** of these categories.
- ❑ The **nomenclature** may be different, and there may be **interim steps** included, but the **above categories** are **common** throughout the construction industry



Recommended practice

- ❑ **Figure 1** summarizes in more detail the change management process for a **typical capital construction project**.
- ❑ **This process flow chart** is a more detailed version of the one found in **Section 10.3** of AACE's Total Cost Management Framework.





Recommended practice

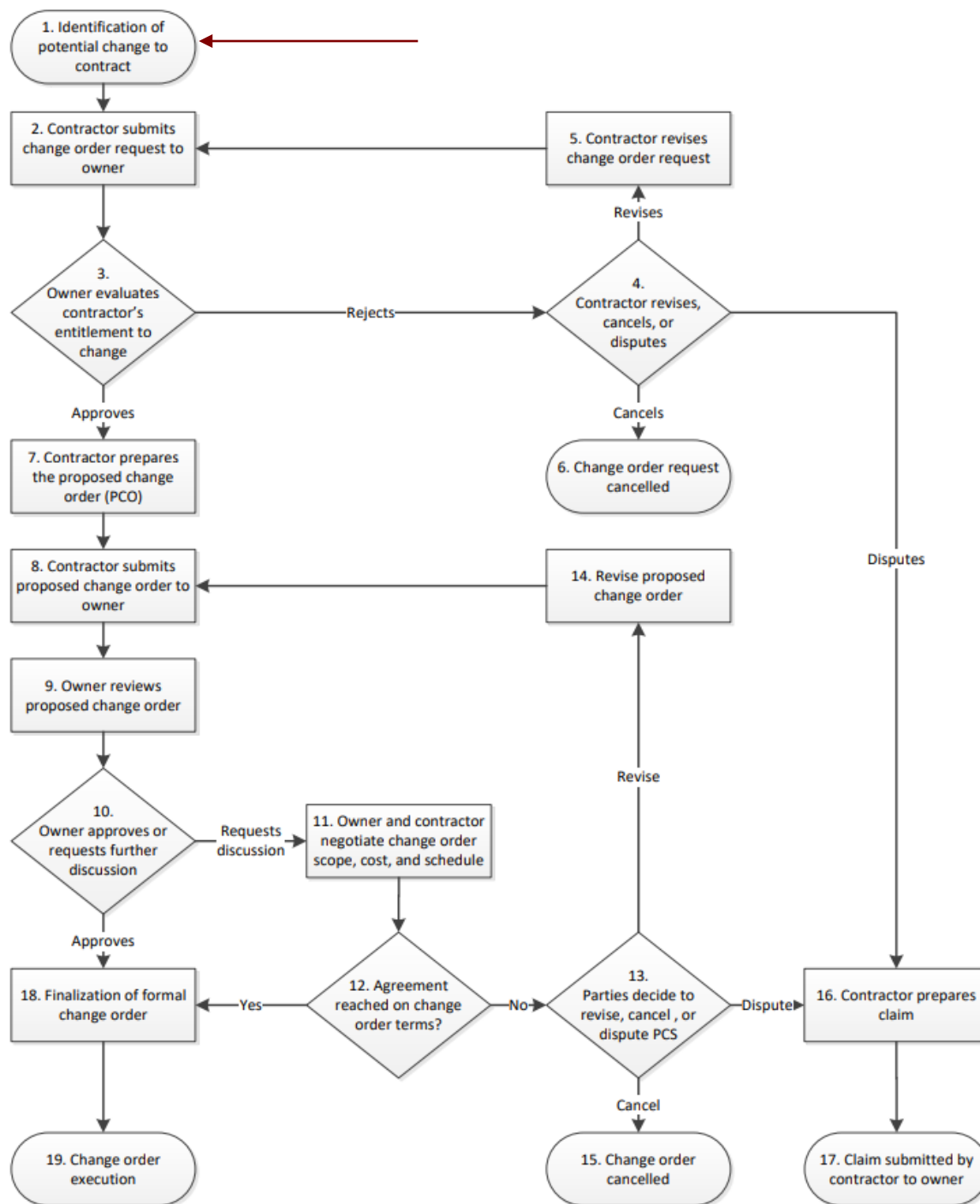
- ❑ This process flow chart **works equally** well for a **singular** designer, construction contractor, or design/build (EPC) contractor.
- ❑ It is **recommended** that the owner and contractor **assign members** from their respective teams to be **responsible** for
 1. Executing,
 2. Reviewing, or
 3. Supportingeach aspect of the change management process identified in Figure 1.



Recommended practice

- ❑ In the following paragraphs, **each numbered stage (box)** found in Figure 1, the Summary Change Management Process flow chart, is **further described**.

Prepared by Dr. Alavipour
DO NOT DISTRIBUTE





1. Identification of Potential Change to Contract (Box 1)

- ☐ It is important that the **parties** to a design and/or construction contract understand and act in **good faith** in accordance with the terms of the contract.
- ☐ A **change** to the contract can **only occur** if the parties **recognize** that a change has occurred.
- ☐ Changes can be identified **by any party** to a project contract and can be **associated** with **myriad causes**.

Most changes can be classified as having one or more of the following causes:



1. Identification of Potential Change to Contract (Box 1)

☐ Design Modifications

- ❖ These involve revisions to the contract drawings and specifications on a project, and they are **usually initiated** by the owner, the owner's representative or the owner's engineer.
- ❖ It should be noted that if the owner **initiates** a revision to any aspect of the design before it has been completed, the designer may be entitled to additional costs and/or a time extension.



1. Identification of Potential Change to Contract (Box 1)

❑ Design Modifications

❖ This point is especially important on a project that is delivered using the design/build methodology, also known as EPC,

because in addition to the impacts that may affect the **designer's ability** to

1. Complete on time and
2. Under budget,

the design modifications **may also affect**

1. Procurement,
2. Construction costs and schedule

depending on **what point in time** of the project the change occurred.



1. Identification of Potential Change to Contract (Box 1)

❑ Errors and Omissions

- ❖ These **address the items** that are determined to be defective or missing in the contract set of **drawings and specifications**.
- ❖ Several studies reveal that on construction projects that use the traditional design-bid-build delivery process,
design errors and omissions generally account for the **primary cause of change orders**.



1. Identification of Potential Change to Contract (Box 1)

☐ Changes to Means and Methods

- ❖ These occur when the **owner or outside agencies** impact the contractor's planned means and/or methods for executing the work.



1. Identification of Potential Change to Contract (Box 1)

☐ Changed Conditions

❖ These reflect **actual physical conditions** encountered

but were unforeseen and materially differed from the conditions

that were identified in the contract documents or were conditions not normally found in the area of the project site.



1. Identification of Potential Change to Contract (Box 1)

☐ Additional / Reduced Work Scope

❖ At the **owner's discretion**,

the **contract scope of work**

1. May be **expanded** as a result of enhancements to the design or
2. May be **reduced** because of budget considerations and value engineering.



1. Identification of Potential Change to Contract (Box 1)

☐ Owner-Directed Schedule Acceleration or Slowdown

- ❖ Based on the **owner's directive** to modify the contractor's planned performance on a project,

the contractor may incur **additional costs** and **expenses** when the scheduled project performance is accelerated or delayed.

- ❖ In addition, if the contractor does **not receive** justifiable time extensions for excusable delays,

it may require that the **contractor accelerate** the work to compensate for the delays in order to meet the **contractual milestone dates**.



1. Identification of Potential Change to Contract (Box 1)

☐ Work Sequencing

- ❖ This change is a result of the **owner's requirement** to **revise** the contract's planned sequence for completing the work tasks on a project.
- ❖ The **owner's directive** may impact
 - ✓ Contractor's scheduled and
 - ✓ Available labor, material, and equipment,
 - ✓ As well as the contract time for completing a project.



1. Identification of Potential Change to Contract (Box 1)

❑ Adjustments to the Unit Pricing

- ❖ This change is based on **cost overruns** that result from revisions to the **contract unit prices**.
- ❖ **Increases** in a contract item budgeted quantity or material item budgeted quantity are the **most common** reasons for an adjustment to a **unit price**.



1. Identification of Potential Change to Contract (Box 1)

☐ Force Majeure Delays

- ❖ These generally include **extensions** to the project schedule based on events for **which neither** the owner nor the contractor is **accountable** or have the ability to control, such as:

acts of God, strikes and labor disputes, and unusual weather-related delays.



1. Identification of Potential Change to Contract (Box 1)

☐ Added Cost Incentives

❖ These are **implemented by the owner** to

❖ **Encourage** the contractor's participation in **value engineering** on a project

or

❖ **Entice** the contractor to **accelerate** the completion of a project.



1. Identification of Potential Change to Contract (Box 1)

☐ Delayed, Denied, or Restricted Access to a Project Site

❖ This occurs when a **contractor** is unable to **fully access a project site** due to

- ✓ Owner's inability to grant access or
- ✓ Obtain the necessary permits.



1. Identification of Potential Change to Contract (Box 1)

☐ Inappropriate Rejection of the Contractor's Work

- ❖ This is based on the **owner's incorrect rejection** of work elements that **were completed** by the contractor.
- ❖ A change order may be **appropriate if** **subsequent investigation** indicates that the work completed was acceptable and in accordance with the terms and conditions of the contract.



1. Identification of Potential Change to Contract (Box 1)

☐ Delays to Owner-Supplied Services and Materials

❖ These are **impacts to a project schedule** resulting from the owner's inability to provide

services, permanent materials, and/or equipment

within a timeframe that is consistent with the requirements defined in the contract.



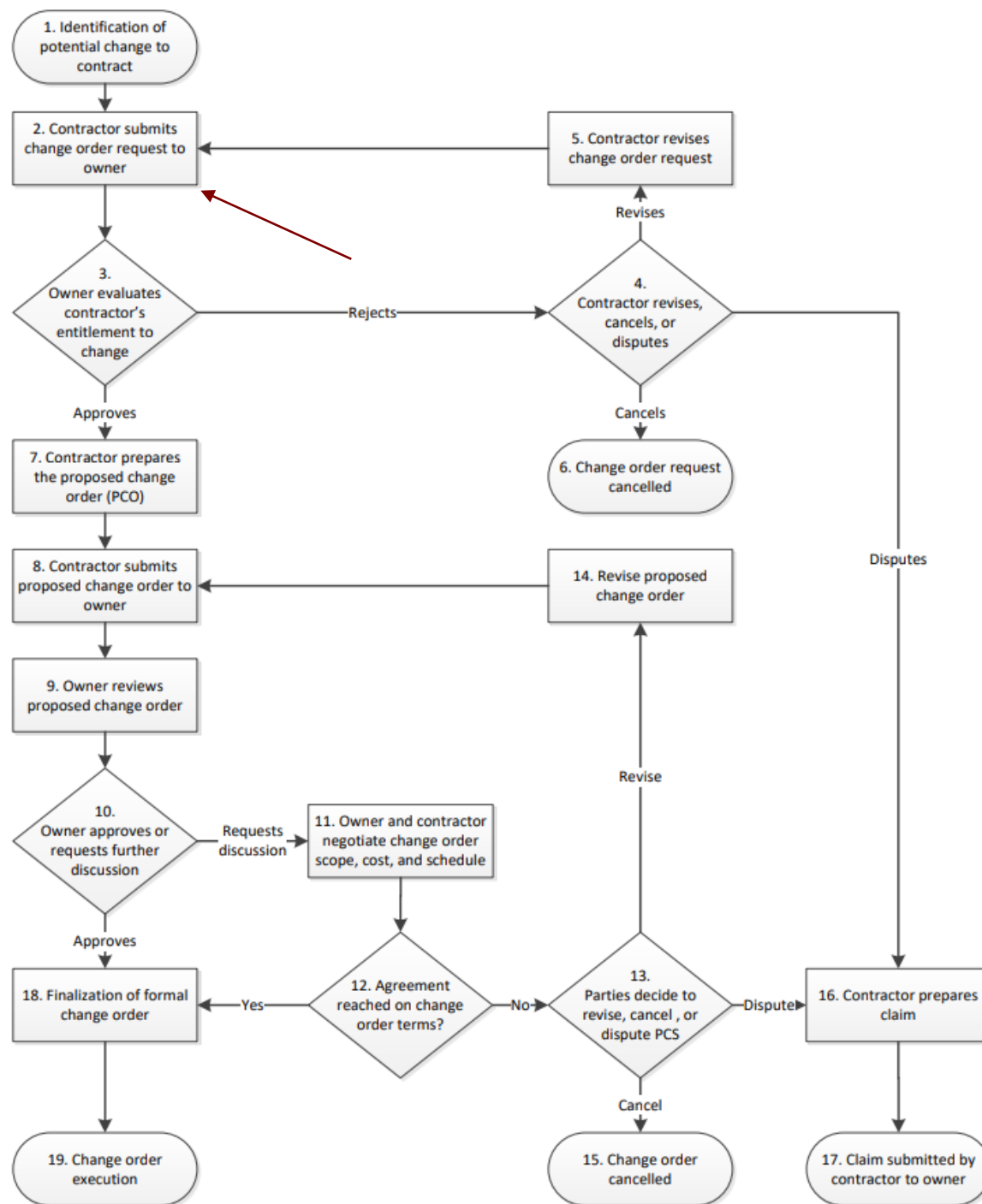
1. Identification of Potential Change to Contract (Box 1)

☐ Owner Interference

❖ This results from the **owner directing**

subcontractors, sub-consultants or vendors

without direct contractual authority (bypassing the prime contractor).





2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Procedures for initiating a change order

❖ The **procedures** for initiating a Change Order have a tendency to **differ between projects**,

as **owners** and **construction managers** each have their **own established requirements and preferences**.

Although there may be some variances, the following items address the practices that are normally expected on a project.

2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ Once the designer or contractor **determines** that a **potential change** has occurred, timely written notice should be provided to the **owner** communicating that a **potential change** to the project has been identified.

What is the name of this notice?



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ The notice, **often referred** to as

- ❖ Change order request (COR) or
- ❖ Potential change notice (PCN),

is typically **conveyed**

1. **Formally** through letter and/or template form, or
2. **Informally** as an email or other manner allowed by the contract.

Is it acceptable to verbally notify?



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Although an **attorney** should be consulted,

unless otherwise **specified** in the contract,

verbally informing of a potential change during a meeting between the parties is **not usually an acceptable** means of providing notice

unless it is **followed up in writing** via

1. Meeting minutes or
2. Correspondence.

**What criteria this notice of change
should include?**





2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Notice of a change should include the following **four criteria**:

1. Notice should be in an acceptable written form;
2. The **content** of the notice should **describe** the event or occurrence causing
 - ❖ Change,
 - ❖ Effect on the contractor's work, and
 - ❖ Expected cost and schedule impact;
3. The notice should be **submitted to the owner** in a timely manner, which is often specified in the contract; and
4. The notice must be given to the proper recipient.

Why timely notice is important for owner?





2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ The **primary reason** for providing a COR is that it **allows the owner** **timely opportunity** to mitigate the effects of the change with the **least amount of impact** to the project's cost or schedule.



2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ Once a changed condition has been **identified**,
construction contracts often have a **notice clause** that specifies
the **number of days** by which a contractor has to formally
communicate to the owner
that a potential request for change to the contract is being
evaluated and may be submitted.
- ☐ Change order requests are typically a **one to three-page form letter**.

What COR should include?





2. Contractor Submits Change Order Request to Owner (Box 2)

❑ The COR should include:

- ❖ A **short (one to two paragraphs) description** of the reason for and nature of the changed condition.
- ❖ **Detailed description** of the **affected scope**, e.g. unit, geographic location, level, etc.
- ❖ The **date** on which the changed condition was **identified**.
- ❖ A **rough order estimate** of the potential cost and schedule impacts, **if quantifiable**.
- ❖ The proposed reimbursement terms; e.g. unit price, lump sum, reimbursable, etc.
- ❖ Any **other details** that will aid the owner relative to the change and **development of mitigation strategies** regarding the potential cost or schedule impacts.
- ❖ **How the change** will affect the performance measurement baseline (PMB).



2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ It is also important that the **date the notice was submitted** is **identified** on the change order request.
- ☐ If the request is submitted as a **formal letter or form**, the **owner's document control staff** may **stamp** the letter with the date it was received.
- ☐ The **submittal date** is important as the contract terms may **specify the number of days** after a change has been identified by which the **COR must be submitted**.

Should the contractor start preparing a draft change order at this stage?





2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ **Prior to allowing** the contractor to proceed with preparing a draft change order,
owners typically want to determine **whether they agree** to the contractor's entitlement to the potential change.
- ☐ **Approval** typically means that the owner concurs that, according to the terms of the contract,
the **conditions do exist** in which the contractor is entitled to a change to the contract.

What if the owner directed a change?





2. Contractor Submits Change Order Request to Owner (Box 2)

☐ If the **owner directed the change**,

then by default,

the contractor would be **entitled to request relief** from potential cost and schedule impacts.

What is the responsibility of the contractor here?



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ On these occasions when the owner has directed the change,

the contractor's responsibility is to **submit**

1. Cost estimate and
2. Resulting schedule impacts

to the owner.



2. Contractor Submits Change Order Request to Owner (Box 2)

- ❑ It is recommended that **both parties** to a COR keep complete and organized records as the **issue transforms** from a COR to a proposed change order and then to a change order.

What should these records include?



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ These records **should include**

- ❖ Correspondence,
- ❖ Drafts,
- ❖ Analyses, and
- ❖ Any other information relevant to the potential change.



2. Contractor Submits Change Order Request to Owner (Box 2)

❑ DEVIATION REQUEST [FORM 013]

- ❖ The **contractor** completes and submits a “**Deviation Request**” form to the owner or its representative on a project.
- ❖ The purpose of this form is to **document the deviations** that have been determined from the **original contract documents**.
- ❖ This form serves as a **notification by the contractor** of any changed conditions, omissions, or discrepancies that may result in extra work.
- ❖ The owner can either **approve** or **disapprove** the request, dependent on the **validity or justification** of the change.

Deviation request: Sample form 01

DEVIATION REQUEST

No. _____

Owner _____

Contractor _____

Project _____

Project No. _____

Date _____

Subject _____

Drawing Nos. _____

Specification Nos. _____

Original Contract Requirements _____

Reason for Deviation Request _____

Proposed Deviation _____

Any Change to Contract Cost? ☐ Yes ☐ No If Yes, Describe _____

Any Change to Contract Time? ☐ Yes ☐ No If Yes, Describe _____

☐ APPROVED ☐ DISAPPROVED

CONTRACTOR _____ DATE _____ OWNER / OWNER'S REPRESENTATIVE _____ DATE _____



2. Contractor Submits Change Order Request to Owner (Box 2)

❑ INITIATOR CHANGE ORDER REQUEST [FORM 02]

- ❖ This form can be **initiated** by the owner, the owner's representative, a project engineer, or the contractor.
- ❖ The preparation and submittal of this form are **intended** to define the scope of work

that is involved in completing a potential change and to demonstrate the **justification for the change**.

- ❖ The owner's signed endorsement indicates its **authorization to proceed** with the issuance of a Change Order.
- ❖ The Change Order Request offers **notification** on a project that the **possibility exists** for an **adjustment** to the contract price and schedule as a result of a potential Change Order.

Initiation change order request: Sample form 02

INITIATOR CHANGE ORDER REQUEST

No. _____

Project _____

Project No. _____ Contract No. _____ Contract Date _____

Contractor _____

Proposed / Submitted By ☐ Owner ☐ Owner's Rep ☐ Engineer ☐ Contractor

Name _____ Date _____

Change Order Justification _____

Description of Work to Be Performed _____

Contractor is authorized to proceed with this Change ☐ Yes ☐ No On _____ DATE

Approved _____ OWNER _____ DATE



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ CHANGE ORDER TECHNICAL JUSTIFICATION [FORM 03]

- ❖ This form is usually **prepared** by the owner's representative or a project engineer.
- ❖ The **intent** of this form is to **provide the owner** with documented credibility and justification

relative to **completing** the work scope for a **potential** Change Order.

Change order technical justification: Sample form 03

CHANGE ORDER TECHNICAL JUSTIFICATION

Potential Change Order No. _____
Contract Change Order No. _____
Contractor _____
Contract No. _____
Prepared / Submitted By ☐ Owner's Representative ☐ Engineer
Name _____ Date _____

Description of Change _____

Reason for Change _____

Alternatives Considered _____

Impact of Non-Incorporation _____

Approved _____
OWNER DATE



Design phase trend tracking log





2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ An **important step** in the initiation process is
 1. For the **originator** to classify whether the change is **required or elective**, and
 2. For the **owner** to confirm and approve this **designation**.

- ☐ The **determination** of whether a change is **required or elective** will influence
 1. **Justification** for the change and
 2. **How** the change will be **evaluated**.

The differences between the two classifications include the following:



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Required changes must be implemented, and typically include those changes that are necessary to meet:

- ❖ Basic, defined venture/business objectives;
- ❖ Regulatory or legal requirements; and/or
- ❖ Defined safety and engineering standards.

2. Contractor Submits Change Order Request to Owner (Box 2)

- ☐ Elective changes are those that are proposed to **enhance the project**, but are **not required to meet** the original project objectives.
- ❖ Therefore, elective changes **may or may not be implemented**.
- ❖ This type of change is **not mandated**.



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Change order backlog

- ❖ It is **advantageous to both** the owner and the contractor that potential Change Orders on a project are processed in a fair, equitable, and timely manner.
- ❖ The failure to do so most often results in an **increased probability** of extended disputes and claims between the owner and the contractor.



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Change order backlog

- ❖ A **significant amount** of Change Order backlog, in terms of quantity and value, is **indicative** of a project that is in **trouble**.
- ❖ The backlog is typically attributed to
 1. Above-average submission of change order **requests** by the contractor and/or
 2. Owner's inability or reluctance to promptly process the potential change orders.



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Change order backlog

- ❖ A large backlog of **unresolved potential Change Orders** generally falls into one of the following categories:

1. **UNDISPUTED**

- ✓ Includes potential Change Orders that
are **not in contention** and
their **processing** is delayed because of inadequate
administrative support, procedures, or funding.

2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Change order backlog

- ❖ A large backlog of **unresolved potential Change Orders** generally falls into one of the following categories:

2. **DISPUTED**

There are **two reasons** for a potential Change Order to be disputed.

2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Change order backlog

- ❖ A large backlog of **unresolved potential Change Orders** generally falls into one of the following categories:

2. **DISPUTED**

- ✓ In the first case, the owner and the contractor are **unable to come** to an **agreement** that the **scope of work** that is identified in the potential Change Order actually **represents a change** to the contract scope.



2. Contractor Submits Change Order Request to Owner (Box 2)

☐ Change order backlog

- ❖ A large backlog of **unresolved potential Change Orders** generally falls into one of the following categories:

2. **DISPUTED**

- ✓ In the second case, the owner and the contractor both **agree that the work scope** is a change to the contract scope of work,
but are unable to agree on the value or cost of the potential Change Order and/or its time impact.



2. Contractor Submits Change Order Request to Owner (Box 2)

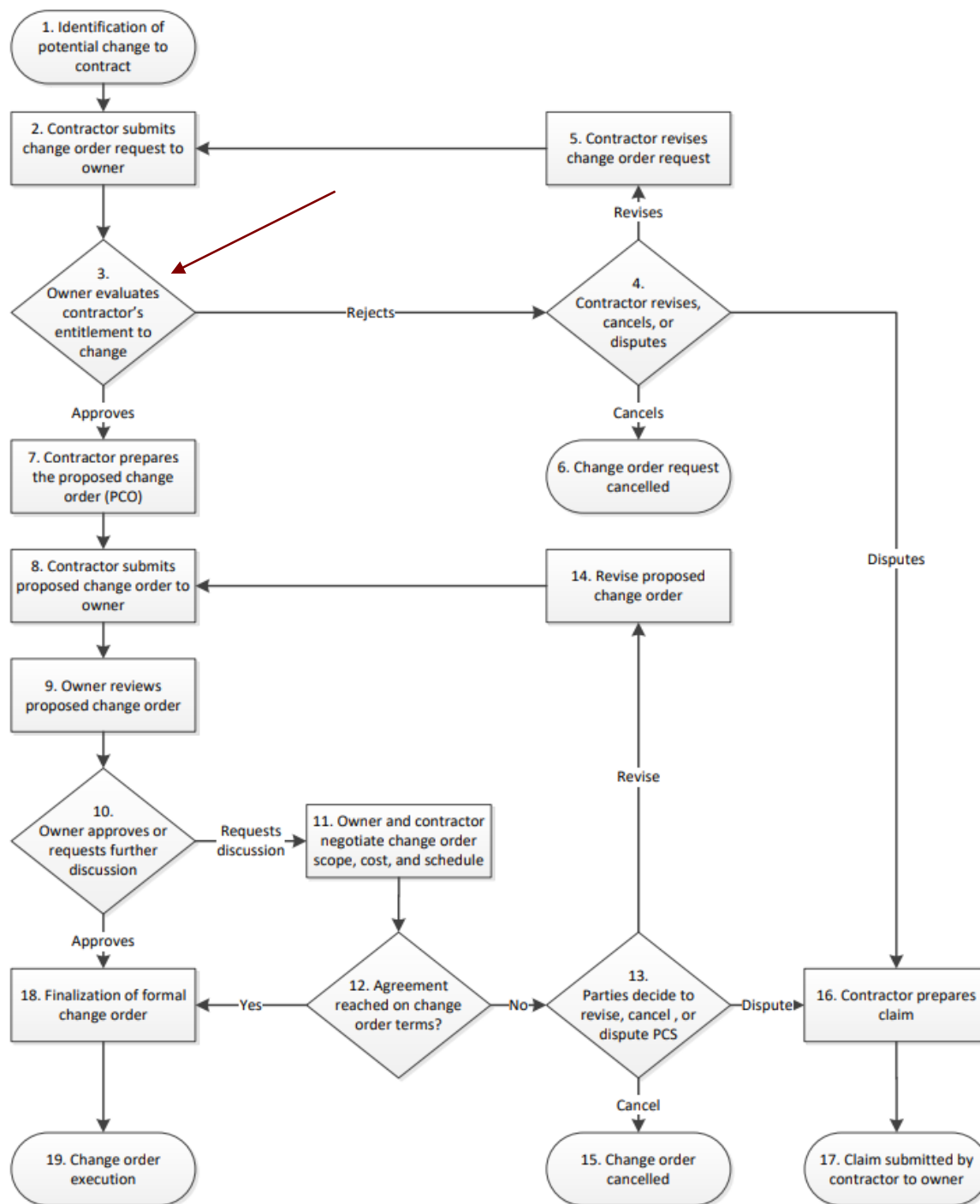
☐ Change order backlog

- ❖ A large backlog of **unresolved potential Change Orders** generally falls into one of the following categories:

2. **DISPUTED**

For potential Change Orders that are **disputed**, the approval and compensation may be **delayed**.

The issues, if they are ignored or unresolved, can later **become claims**.





3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

- ❑ Often a step is **added** in the change process **where the owner** is given the **opportunity to approve or reject** the change order request **before** the contractor moves towards developing a formal change order.
- ❖ The purpose for the **owner's review** is to provide the **owner an opportunity to decide** whether the contractor has **entitlement** to the change.
 - ✓ *That is, the owner or one of his representatives evaluate the details provided by the contractor concerning the change to ensure that the proposed scope change was not previously part of the contractor's scope of work and that it aligns with the intended purpose of the project.*

What happens then?



3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

☐ If the **owner agrees** that the contractor is **entitled** to submit a change order proposal,

this step is typically where the **owner would determine**

whether the potential change is the **result of**

1. Being extra work,
2. Contingency,
3. Force majeure,
4. Etc.

Why is this important to the owner?



3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

☐ This **decision is important** to the owner

as it often **identifies** the line item source

within its **internal budget** from which **funding for the change** will come.

What if the owner rejects?



3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

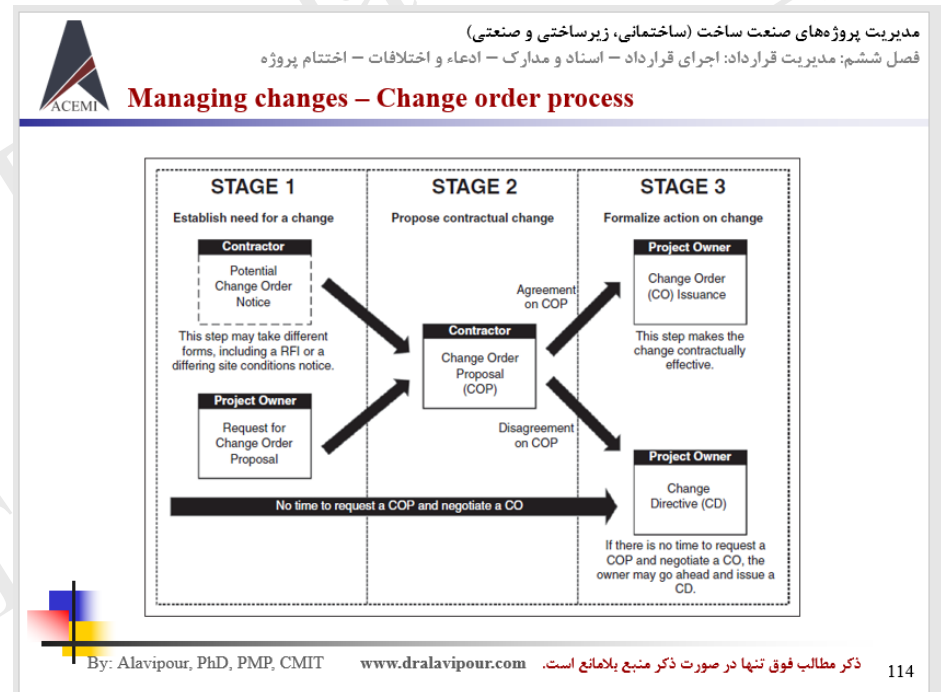
- ☐ If the **owner rejects** the change order request as submitted, the **contractor** may be **informed** as to whether **resubmission** of a modified version of the change order request will be considered.

What if the owner approves?



3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

- ❑ If the **owner approves** the contractor's PCN or COR,
then the next step is for the **formal change order** to be prepared.



Can the work affected by a change be performed until a change order is executed?



3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

- ❑ It is **common** in the construction industry that **work affected by a change cannot** be **performed until** a change order is executed.
- ❖ However, if the construction contract **does not state otherwise**, the **contractor may be allowed** to proceed with the changed work **before a formal** change order has been executed.

Should the owner respond to the notice?

3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

- ☐ **Sometimes**, submittal of a potential change notice from the contractor to the owner requires **no response** from the owner and **serves only** as a notification to the owner.

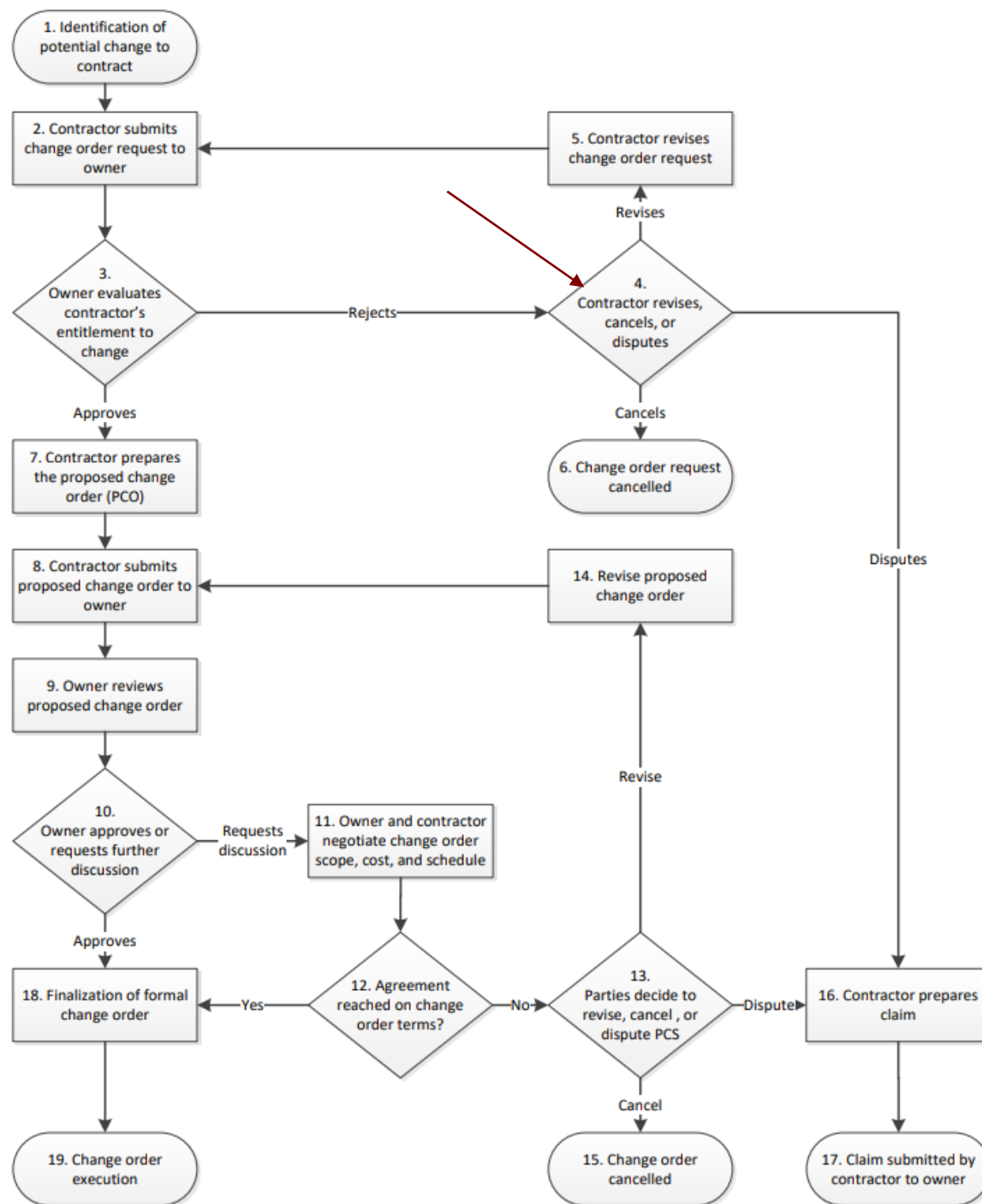
What if the change is directed by the owner?



3. Owner Evaluates Contractor's Entitlement to Change (Box 3)

☐ If the change is **directed by the owner**, then **review of entitlement** is not necessary.

☐ For a **unilateral change** the **amount** for cost and schedule impact is determined by the owner and is not negotiated.



4. Contractor Revises or Cancels Change Order Request, or Disputes Owner's Change Order Request Rejection (Box 4)

- ☐ If the **owner** rejects a change order **request submitted** by the contractor, the contractor has **three options** concerning how it should proceed with the change request.

Those options are:

4. Contractor Revises or Cancels Change Order Request, or Disputes Owner's Change Order Request Rejection (Box 4)

a) Revise the Change Order Request & Resubmit (Box 5):

- ☐ There may have been a **particular detail** about the change request that **cause rejection** by the owner.
- ☐ The detail may be **small or a significant portion** of the change.
- ☐ The **owner may recommend** resubmitting the change request with the specified changes.
- ☐ The contractor, therefore, has the option to **make the recommended change**, and **resubmit the change request**.

4. Contractor Revises or Cancels Change Order Request, or Disputes Owner's Change Order Request Rejection (Box 4)

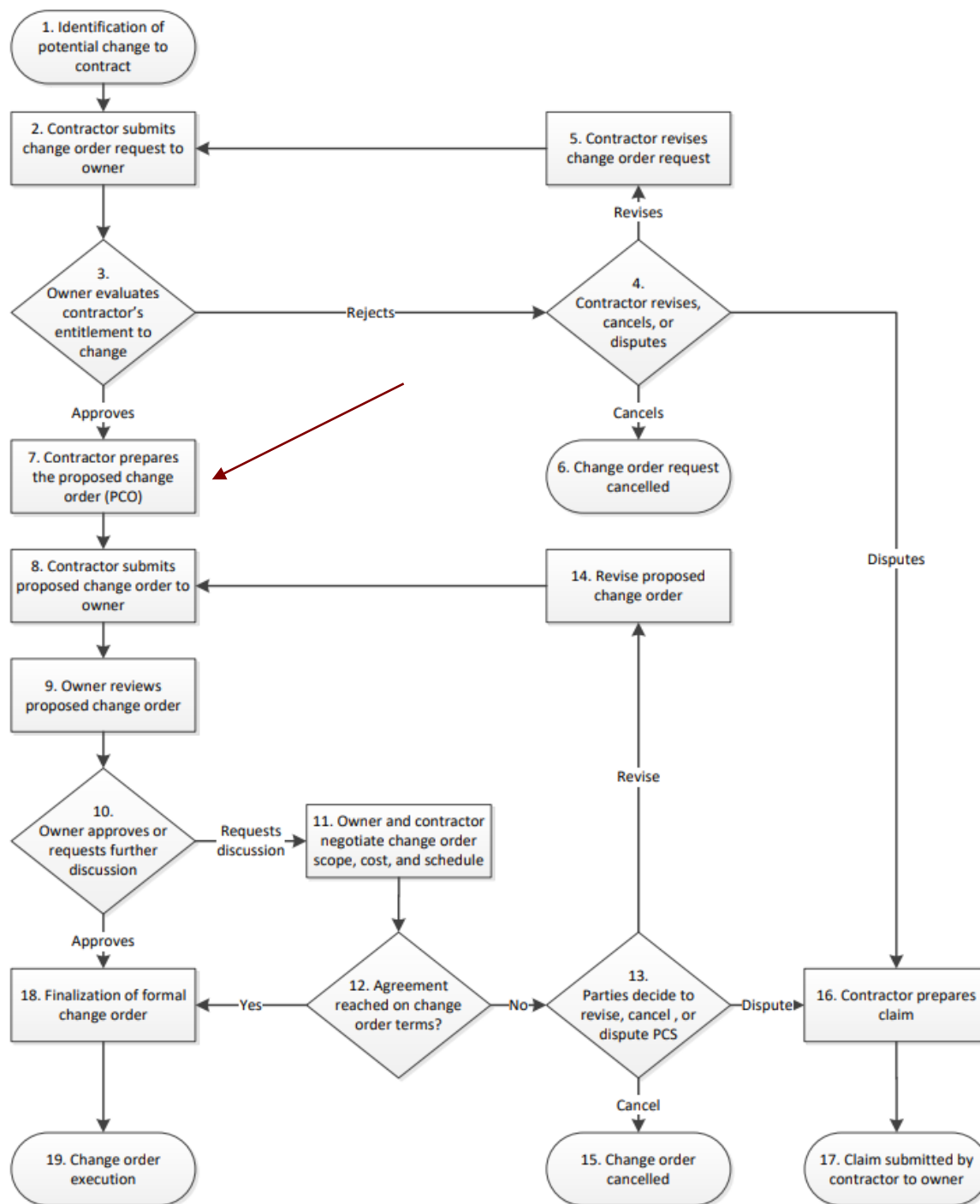
b) Cancel the Change Order Request (Box 6):

- ☐ Possibly as a result of **learning new facts** about the circumstances concerning the change request or for other reasons,
the contractor may choose to **cancel** the change request.

4. Contractor Revises or Cancels Change Order Request, or Disputes Owner's Change Order Request Rejection (Box 4)

c) Dispute Owner's Rejection:

- ☐ If it appears that the **owner is unwilling** to acknowledge the contractor's entitlement to a change,
the contractor has the **option** to prepare and submit a formal claim (Boxes 16 & 17).

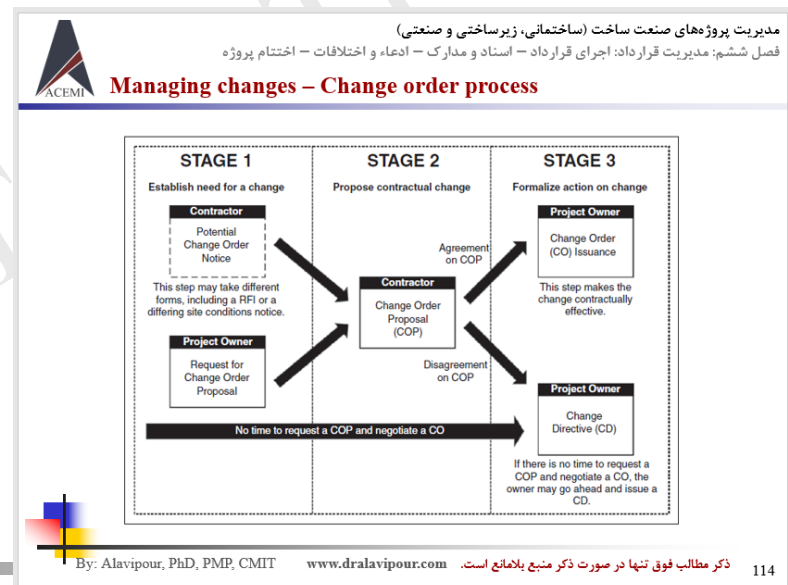




5. Prepare the Proposed Change Order (Box 7)

□ Once

1. COR has been initiated and **approved by the owner**, or
2. If the **owner has approved** the contractor's pricing estimate and schedule impacts in response to a directed change,
the **next step** for the contractor is to prepare a proposed change order document for the owner to evaluate.





5. Prepare the Proposed Change Order (Box 7)

☐ Factors resulting from change orders that influence a project's performance and costs

- ❖ The work for Change Orders can **necessitate** that the contractor **redirect** the labor, material, and equipment resources that were **originally** budgeted, scheduled, and designated to be used to support the **completion** of the tasks identified for the contract scope of work.
- ❖ As a result, the **contractor's plan** for completing the project may be **impacted**.
- ❖ The **factors from Change Orders** that may **affect the planned performance** of a project include the following:



5. Prepare the Proposed Change Order (Box 7)

☐ Factors resulting from change orders that influence a project's performance and costs

❖ ORIGINAL PROJECT SCOPE

- ✓ Change Orders can have a **combination** of direct, indirect, and cumulative impact on the **cost** and **schedule** to perform the original scope of work on a project.
- ✓ During the **later phases** of a project, the **impacts** that are the result of a change can become **even more significant and complex**.
- ✓ The **reason** for this is because during the later stages of a project, **construction is in full swing** and there are **more parties and elements engaged**.
- ✓ It also becomes **more difficult** and **less efficient** to implement a change as time progresses on a project.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

❖ LOSS IN PRODUCTIVITY

- ✓ The contractor will **evaluate**
 1. **How** the work for the change will be **performed** and
 2. **What effect** that this added work will have on the **original contract scope of work**.
- ✓ If the work related to a change places the **contractor's labor and equipment resources** in competition with the original project scope of work,
the performance of project work may be **adversely affected**.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

- ❖ LOSS IN PRODUCTIVITY

- ✓ The **Construction industry Institute** notes that
“on projects with less than six percent of hours spent on changes, productivity was better than planned.”
- ✓ Conversely, when **more than six percent** of **planned hours** were spent on changes, productivity was **worse than planned**.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

- ❖ SCHEDULE INTERFERENCES

- ✓ The contractor should consider whether the work defined for a **change** will have any **effect** on
the sequence and duration of the activities in the contract schedule.
- ✓ If the activities on the schedule's **critical or near-critical** paths are impacted by scope changes,
the **contract completion date** of a project may be extended
unless **acceleration** of the work is **performed**.



5. Prepare the Proposed Change Order (Box 7)

- ❑ **Factors resulting from change orders that influence a project's performance and costs**

- ❖ **SCHEDULE INTERFERENCES**

- ✓ The **dates for contractual milestones** may also be affected by the additional work scope.
- ✓ **Disruptions to the schedule** from a Change Order may result in **additional costs**,
irrespective of any change to the **completion date**.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

❖ SUBCONTRACT IMPACTS

- ✓ The contractor **notifies** and **shares** with its subcontractors, the **documentation** for each potential Change Order affecting a given subcontractor's work.

Who should evaluate cost and schedule impact?



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

❖ SUBCONTRACT IMPACTS

- ✓ Based on this information, the **contractor instructs** its **subcontractors** to fully evaluate the **cost** and the **schedule** impact that a potential Change Order may have on their contract work scope.
- ✓ This information is **then incorporated** into the **Change Order documentation** that is submitted by the contractor to the owner.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

❖ CUMULATIVE IMPACT OF MULTIPLE CHANGES

- ✓ The **contractor** must evaluate the collective impact that Changes Orders have on the contractor's resources, including its
 - o Administration,
 - o Field supervision,
 - o Labor,
 - o Equipment,
 - o Schedule,
 - o Site congestion,
 - o Etc.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

❖ CUMULATIVE IMPACT OF MULTIPLE CHANGES

- ✓ As the **number of Change Orders** becomes more **prevalent** and the **performance of the work** related to the Change Orders becomes **more compressed**,

the **contractor's planned productivity** for performing the original contract work scope can **become diminished**.

Therefore, it is important that the contractor assess the collective impact that the numerous change orders may have as the project progresses.

What does it include?





5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

- ❖ CUMULATIVE IMPACT OF MULTIPLE CHANGES

- ✓ This includes

identifying and appraising the **anticipated cumulative demands** that the extra work places on the **planned** work effort and resources.

What happens if we fail to do that?



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

❖ CUMULATIVE IMPACT OF MULTIPLE CHANGES

- ✓ The **failure** to do so may **require the contractor** to file a claim at the **end of a project**
to **collect for the cumulative impact** from all the Change Orders.
- ✓ It is also important to note that the impact and effect of the Change Orders may be **more important than the number** of changes.



5. Prepare the Proposed Change Order (Box 7)

- ❑ Factors resulting from change orders that influence a project's performance and costs

- ❖ EXPOSED RISK

- ✓ **Contractors** should also take into account any **uncertainties** that may be **associated** with the revised work scope as part of the **assessment** of a potential Change Order.
- ✓ **Additional cost and time** should be added by the contractor to its cost **proposal submittal** for a potential Change Order as a **contingency** to compensate for the possible impact from these undefinable factors.

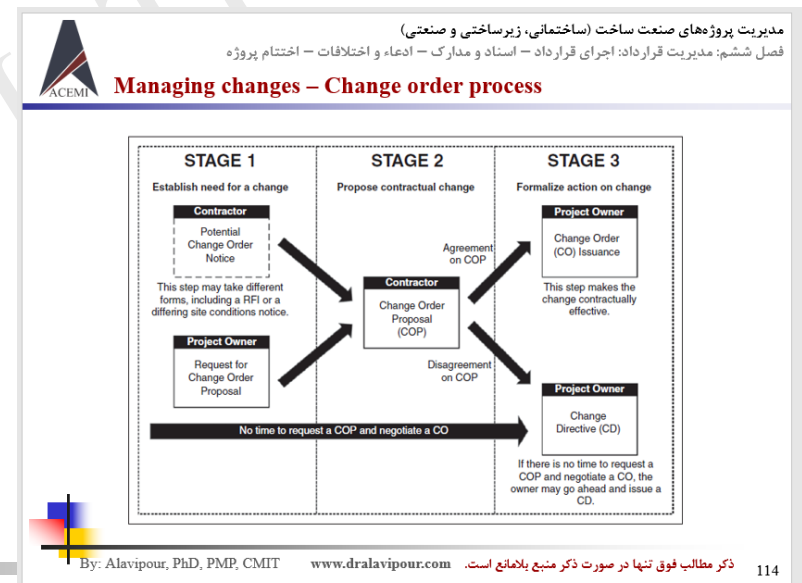


5. Prepare the Proposed Change Order (Box 7)

□ Once

1. COR has been initiated and **approved by the owner**, or
2. If the **owner has approved** the contractor's pricing estimate and schedule impacts in response to a directed change,
the **next step** for the contractor is to prepare a proposed change order document for the owner to evaluate.

What to include in PCO?





5. Prepare the Proposed Change Order (Box 7)

- ☐ The **proposed change order (PCO)** should contain or reference a detailed written narrative indicating:
- a) scope change, entitlement, causation for the change;
 - b) estimated cost; and
 - c) time impacts, along with the associated analyses.

*This step in the change management process often **cannot be completed until the contractor has acquired the necessary data and other information** associated with the change.*

What the scope of work portion of the PCO should primarily include?



5. Prepare the Proposed Change Order (Box 7)

a) The scope of work portion of the PCO should primarily include:

- 1) a **detailed description** of the scope of work of the change, including **references** to related drawings and specifications, owner requests, etc., and
- 2) a **comprehensive discussion** of what caused the change.



5. Prepare the Proposed Change Order (Box 7)

a) The scope of work portion of the PCO should primarily include:

- ❖ The **proposed change order** scope of work document is a narrative that should be **organized** and **written** in **simple terms**.
- ❖ The **person writing** the scope of the potential change should be **cognizant** of the audience that eventually could be **reading** the document, including attorneys and adjudicators.
 - ✓ Therefore, work acronyms should be **avoided** **unless** they are **clearly defined** in the document or contract documents.

What about price estimate of the change?



5. Prepare the Proposed Change Order (Box 7)

b) A price estimate of the change in scope should be included with the PCO.

❖ The **estimate** should be well **documented and supported** with

- ❖ Drawings and specification references,
- ❖ Take-offs, vendor quotes,
- ❖ Labor hour quantifications,
- ❖ Unit costs, and
- ❖ Any other information

that will be helpful to the owner in understanding how the estimate was developed.

What other information the PCO should identify?



5. Prepare the Proposed Change Order (Box 7)

b) A price estimate of the change in scope should be included with the PCO.

- ❖ The PCO should also **identify**

how the actual costs will be incurred;

i.e., whether the cost of the change will be accrued as **fixed-price**, **reimbursable**, **unit price**, etc.

- ❖ If there are **time-related costs** that result from a forecasted delay to the project, those costs must be in **alignment** with any resulting time extensions requested.

How about the time extension?



5. Prepare the Proposed Change Order (Box 7)

c) If the end date of the contractor's schedule is forecasted to be delayed as a result of the change,

the **PCO** should include the number of resulting impact days for which it is requesting an **extension of time**.

Do we need delay analysis here?



5. Prepare the Proposed Change Order (Box 7)

c) If the end date of the contractor's schedule is forecasted to be delayed as a result of the change,

the **PCO** should include the number of resulting impact days for which it is requesting an **extension of time**.

- ☐ It is important that the **delay quantification** be **supported** by a delay analysis.
- ☐ The **most common** delay analysis methodology used to calculate an extension of time during a project that is in progress is the **time impact analysis (TIA)**.
- ☐ The delay analysis should be adequately supported and replicable so that the **owner is able to validate it**.

❖ *All data and information used to perform the delay analysis should be included and submitted with the PCO. AACE Recommended Practice 29R-03 is recommended as the guideline to choose the appropriate analytical approach.*

Methods for change order basis of calculation?





5. Prepare the Proposed Change Order (Box 7)

❑ Methods for change order basis of calculation

- ❖ The **pricing** for potential Change Orders can be developed using one of several methods.
- ❖ The **choice of method** can be established by the contract,
 1. From a post contract agreement between the owner and the contractor, or
 2. At the contractor's discretion.
- ❖ Each of the methods has **distinct advantages and disadvantages** that are dependent upon the nature of a project and the requirements specific to the given change.

The pricing is typically based on one of the following practices:



5. Prepare the Proposed Change Order (Box 7)

☐ Methods for change order basis of calculation

❖ UNIT PRICE

- ✓ Based upon the **unit price items that are approved** as part of a project's construction contract between the owner and the contractor.



5. Prepare the Proposed Change Order (Box 7)

❑ Methods for change order basis of calculation

❖ LUMP SUM

- ✓ The owner and the contractor **agree** that the added work scope, which is defined by the change, will be completed on a fixed price basis, including the costs of the **contractor's overhead and profit**.
- ✓ A **contractor** accepts the risks and liabilities that are associated with completing the extra work for an **agreed to price** when the extra work is completed using this method.

What is the choice of the contractor here?



5. Prepare the Proposed Change Order (Box 7)

❑ Methods for change order basis of calculation

❖ LUMP SUM

- ✓ To **ensure that adequate compensation** is included in the contractor's pricing for the proposed Change Order,
the contractor will include **additional costs for contingency**
to offset the risks and unknowns that it perceives to be associated with the added work scope.
- ✓ The **estimated costs** are then evaluated and negotiated between the owner and
the contractor to ensure that the **finalized cost** for completing the extra work is **fair and reasonable**.



5. Prepare the Proposed Change Order (Box 7)

❑ Methods for change order basis of calculation

❖ TIME AND MATERIALS (T&M)

- ✓ In using this method, the **value of the scope** of the extra work that is identified for a potential Change Order is based on the actual direct expenses

for supervision, labor, materials, equipment, etc., that are incurred by the contractor.

- ✓ **Factors** are also included that address the **allowances** for the contractor's overhead and profit requirements.

- For many projects, the **provisions** for the contractor's overhead and profit factors are addressed in the **General Conditions** section of a project's specifications or in the Changes section of the Contract.

Who tolerates the risk?



5. Prepare the Proposed Change Order (Box 7)

☐ Methods for change order basis of calculation

❖ TIME AND MATERIALS (T&M)

- ✓ When the extra work for a potential Change Order is completed on a T&M basis, the **associated risks and liabilities** become the **owner's responsibility**.

When to use?



5. Prepare the Proposed Change Order (Box 7)

☐ Methods for change order basis of calculation

❖ TIME AND MATERIALS (T&M)

✓ The T&M method for basing the cost estimate is **often used**

1. If an **agreement** on the value of the extra work for a potential change order **cannot be reached** between the owner and the contractor or
2. If the **full scope** of the change **cannot be clearly defined** at the time that the change order is **identified** and
the **owner directs** the contractor to proceed with completing the work.



5. Prepare the Proposed Change Order (Box 7)

☐ Methods for change order basis of calculation

❖ TIME AND MATERIALS (T&M)

✓ Also, the **contractor** may opt to use the T&M method

if the **contractor** prefers **not** to assume the risks that may be associated with a potential Change Order.

What should be done next?



5. Prepare the Proposed Change Order (Box 7)

- ☐ The **proposed change order** may **add or subtract** scope, cost, and/or time from the contractor's contract.
- ☐ With the **creation** of the first proposed change order on a project, a **PCO record file** should be **started**.
- ☐ Each **PCO submitted** to the owner should be **identified** with a unique identification number for **tracking and identification** of supporting documentation.
- ☐ The **name** of the change order initiator should be identified on the **PCO document**.



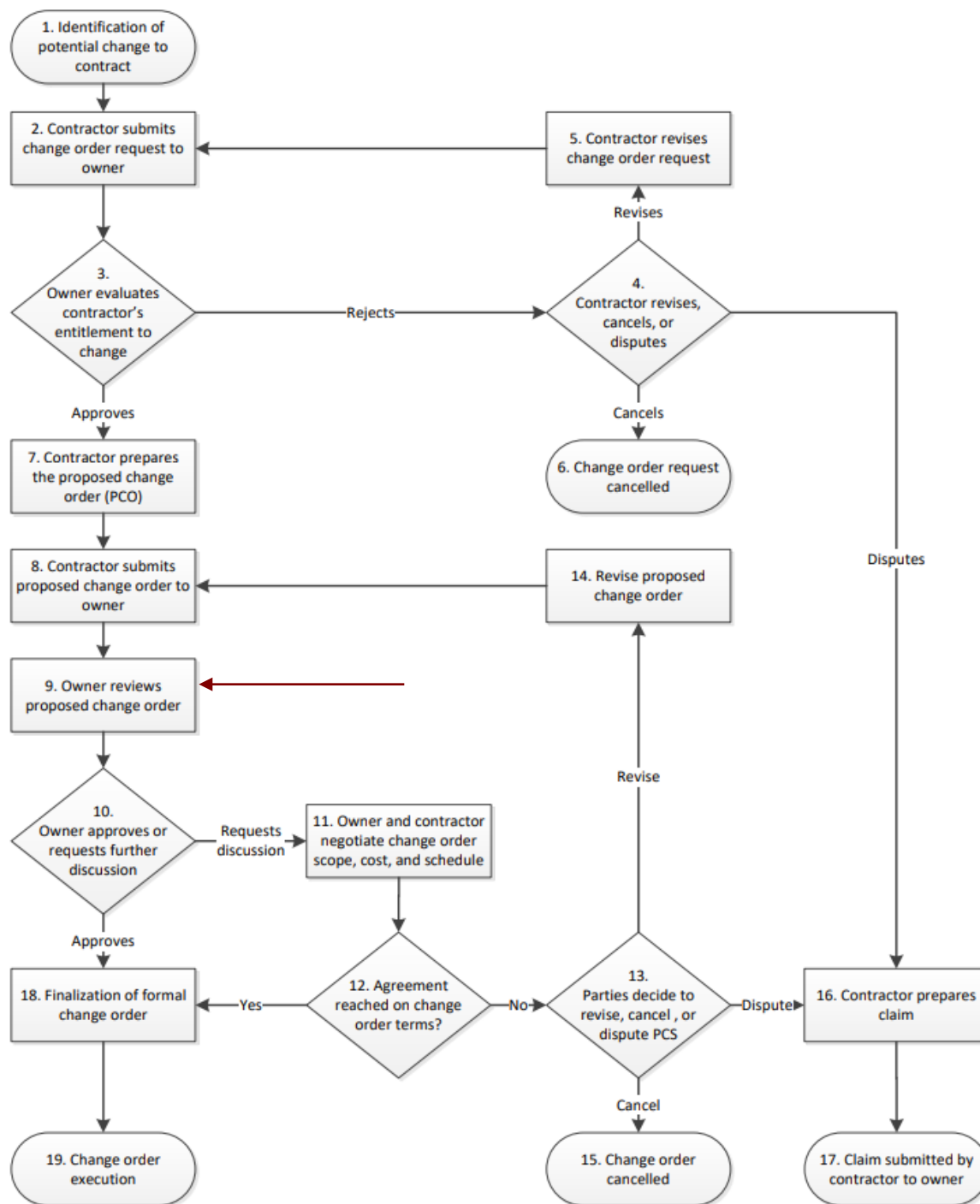
Design phase trend tracking log





5. Prepare the Proposed Change Order (Box 7)

- ☐ Once the **contractor has completed** preparation of the **PCO**, it is **submitted to the owner** for consideration. (Box 8)
- ☐ It is recommended that the contract be reviewed concerning the **time the contractor is allowed** to prepare a proposed change order, as well as the **necessary steps** required to request additional preparation time to **gather data** or other necessary information.





6. Owner Reviews Proposed Change Order (Box 9)

- ☐ The **contract** between the owner and contractor allows the owner a certain, **but not always,**

specified amount of **time to review** the **contractor's PCO submittal** before responding to the contractor.

Why the owner needs this time?





6. Owner Reviews Proposed Change Order (Box 9)

- ☐ The **time spent by the owner** is used to **verify** that
 1. The **original scope** of the **change** and
 2. The **cause** for the change
 1. Has been **adequately explained**, and
 2. That the **cost** and **schedule analyses** are reasonable and supportable.

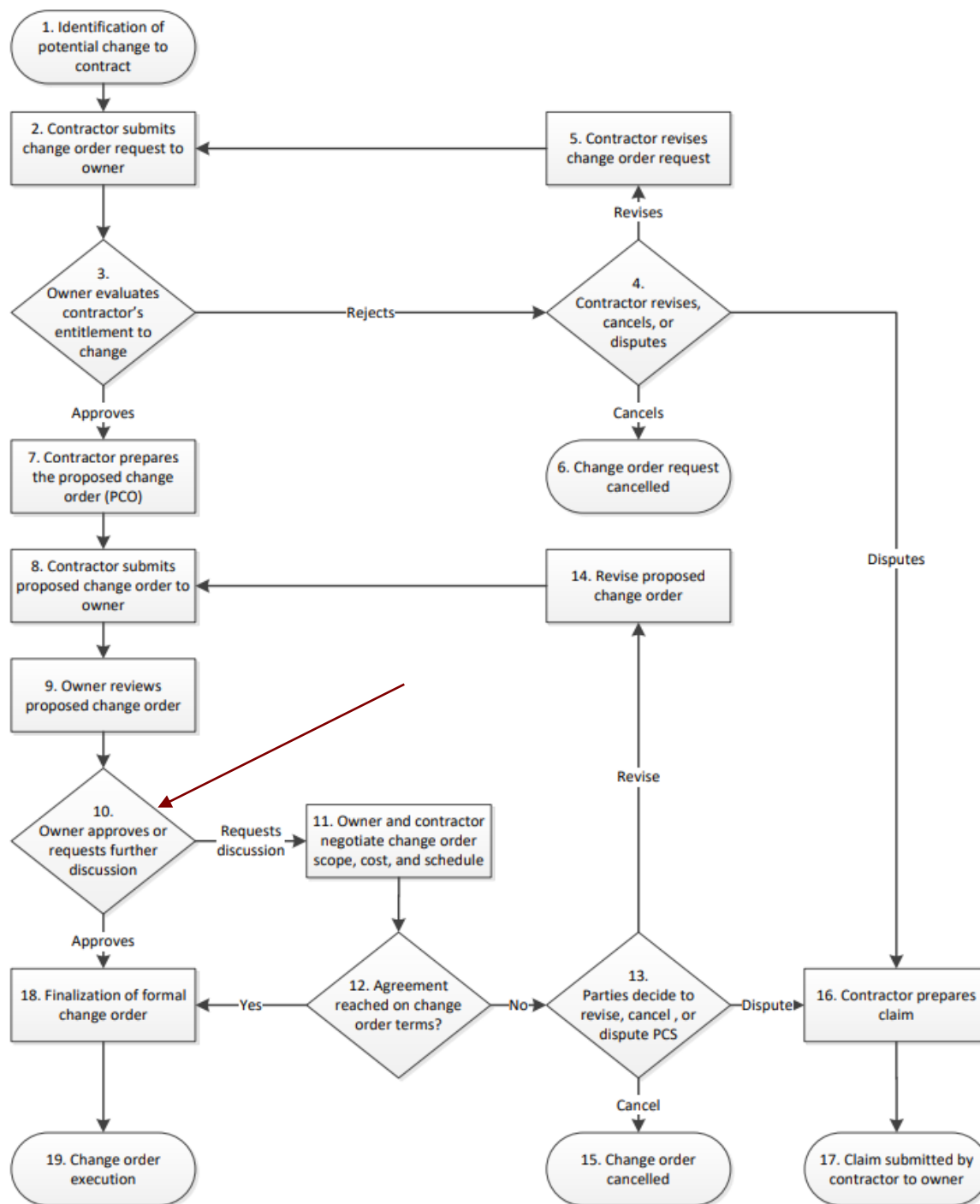
What if the owner needs more information?





6. Owner Reviews Proposed Change Order (Box 9)

- ☐ During this point in the process, the **owner may request** more information from the contractor in order to complete its review of the PCO.
- ☐ The **owner's requests** should be reasonable and **not meant** to extend the review time.
- ☐ The **contractor** should **respond** to the owner's requests in a **timely** manner.





7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ **After** the owner has

1. **Received** the **information** it needs concerning the PCO and
2. **Completed** its **review**,

the owner typically has three response options:

- a. **Accept** the PCO document as it is with no further questions or recommended revisions and proceed to **finalizing the change order** for signatures.

(Box 18)



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ **After** the owner has

1. **Received** the **information** it needs concerning the PCO and
2. **Completed** its **review**,

the owner typically has three response options:

b. Meet with the contractor to

1. Discuss any questions or
2. Negotiate scope, cost or schedule aspects of the PCO

(Box 11).

This step may **occur less formally**; e.g. via phone call or email.



7. Owner Decision to Approve or Request Further Discussion (Box 10)

❑ After the owner has

1. **Received the information** it needs concerning the PCO and
2. **Completed** its **review**,

the owner typically has three response options:

- c. An **option seldom used by owners** at this point in the change management process would be to **reject the PCO** and make no **further effort** to **negotiate** the scope, cost or time impacts.

❖ This step is not **included in the process diagram (Figure 1)** since it is **not recommended**

after the **owner** has already recognized and approved **entitlement**.

How the owner should evaluate costs and time?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

- ❖ The owner must have **confidence** that the **contractor's assessment** of the costs to complete the extra work for a potential Change Order is **fair and reasonable**.
- ❖ There are **several actions** that the owner can undertake to avoid being overcharged.

What are those actions?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

- ❖ The **owner's approach** in reviewing the proposed costs for a potential Change Order is **dependent** upon the method of calculation that was **used by the contractor** and **agreed** to by the owner in preparing the estimate.
- ✓ How the costs are reviewed and verified is determined by whether the costs were based on a unit price, lump sum, or a T&M type of estimate.

The requirements for evaluating estimates that are based on one of these three methods are discussed below:



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Unit price

- ✓ In many **construction bid forms**, the owner includes a listing of unit price items

that the contractor completes by filling in the **rates for each item** as part of its **bid proposal submittal**.

Should it include also a contingency?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Unit price

- ✓ These **unit price rates** are typically inclusive of the **total estimate** of direct and indirect costs, including the contractor's overhead, profit, contingency, etc.
- ✓ Therefore, the **construction contract** between the owner and the contractor will include the **unit prices** that were proposed by the awarded contractor.

What the owners need to do here?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Unit price

✓ For **validating** the costs of a proposed Change Order,

the **owner** needs to

1. **Verify** the material quantities that the contractor is **reporting** for the extra work and

2. **Compare** the unit prices that the contractor has **applied** to the material quantities with those unit prices that are **identified** in the contract.

o The **proposed** change order **unit prices** should be the same as the unit prices that are **included in the contract**.



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

- ✓ The **owner** should **prepare** an independent cost estimate of the scope of work for each potential Change Order.
- ✓ This cost estimate should be **detailed** and **comprehensive** in format because it is used as the basis for **comparing** and **validating**
 1. Material quantities,
 2. Labor production rates, and
 3. Pricingthat are **proposed** in the **contractor's submittal** for the potential Change Order.

Does the owner need to prepare independent estimate?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

- ✓ If possible, the **independent cost estimate** should be completed in advance of receiving the potential Change Order pricing from the contractor so that a **review** can be completed without delay.

How this independent estimate should be prepared?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

- ✓ The **owner's independent cost estimate** should be based on
 1. Current market rates and costs as well as
 2. Those **rates and costs** that may be specifically established in the contract documents.

The direct and indirect costs should take into account the following:



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ WAGE RATES

- If a project is **supported** by union craft labor, the current hourly rates are generally available for the location specific to a project in a **published format or on the Internet**.
- The **rates that are used** in developing the **independent estimate** need to be inclusive of
 - payroll burdens,
 - taxes, and
 - insurance.

What if these rates are not included?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ WAGE RATES

- If it is **apparent** that these rates do **not include** those provisions, a factor of **approximately 30 percent** can be added.

What other items may need to be considered?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ WAGE RATES

- However, **consideration** must also be given to **other elements** that may be required for a project and which may increase the cost of labor, such as
work schedule (i.e., overtime work),
and transportation allowances,
etc.

How to base the estimate for permanent material?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ MATERIAL COSTS

o For its estimate, the contractor will generally **base the unit costs** of the **permanent materials** on

1. Actual invoiced costs, or
2. Quoted costs

that are **solicited** from the material vendors and suppliers.

- This information, however, is **often not made available** to the **owner**.

What are the options for obtaining this information?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ MATERIAL COSTS

o The options for obtaining this information are to either

1. **Contact and request the information directly** from vendors or suppliers, or
2. Base the unit material costs on the **current rates that are published** in a cost guide, such as R.S. Means, Lee Saylor Construction Cost Index, Page, Richardson Process Plant Construction Estimating Standards, etc.

Do we need to consider allowance here?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ MATERIAL COSTS

o If required, **additional allowances** for

1. Handling,
2. Shipping,
3. Storage,
4. Tariffs, and
5. Duties

should also be considered and appropriately accounted for where required.

How to estimate equipment costs?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ EQUIPMENT COSTS

o The contractor commonly will use

1. Its **corporate rates** for owned equipment or

2. Rental rates on leased equipment

as the basis for the estimated equipment costs.

o The **owner** usually will **not have access** to the rates that the contractor used

unless such **rates are included** in the contract.



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ EQUIPMENT COSTS

- As an **alternative**, equipment rental firms can be contacted directly and the rates for the equipment solicited.
- Also, estimating publications such as R.S. Means address the average monthly, weekly, daily, and hourly rental rates for many equipment items and the hourly operating cost for each.

How about subcontract costs?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ SUBCONTRACT COSTS

- If the work or part of the work for a proposed Change Order is to be **completed by a subcontractor,**

the **contractor will often attach a copy** of a subcontractor's quotation or estimate.

- The **contractor** will apply an additional percentage to a subcontractor's price to cover the **contractor's costs** for

- Supervision,
- Administration, and
- Profit.



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ SUBCONTRACT COSTS

- If the extra work **delays the contract schedule**, the contractor may also request additional compensation to cover the extended overhead on a project.
- The **owner's approach** to evaluating a subcontractor's costs for labor, materials, equipment, overhead and profit should follow the **same process** that the owner uses in verifying the reasonableness of the contractor's costs.

How about small tools and consumables?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ SMALL TOOLS AND CONSUMABLES

- ✓ The contractor normally includes an **allowance** to **offset** the replacement cost for

1. Small tools and
2. Purchase of construction supplies and consumable items.

How about small tools and consumables?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ SMALL TOOLS AND CONSUMABLES

✓ This **allowance** is most often calculated as

1. A **percentage** of the total direct labor cost, or
2. A **cost per man hour** basis.

How about overhead and profit?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ OVERHEAD

- o To cover the costs of the contractor's home office and field management and overhead,

the contractor will include a **cost allowance** that is based on the **actual financial requirements** for the corporate and the field offices.

- The percentage, as a factor of the total direct cost for the extra work, **varies** between contractors and projects.

Percentages between 8.0 percent and 15.0 percent are usually considered reasonable.





7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Lump sum

✓ PROFIT

- o The contractor's profit, as a **percentage** of the sum of the total direct and indirect costs, should be within a **reasonable range**.
- o Typically, the contractor's profit on change order work is **not expected to exceed 10.0 percent**, and could be lower.

How about time and materials?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Time and materials

- ✓ For extra work that is completed on a T&M basis, the **contractor's unit rates and markups** for overhead and profit that are applied to the **contractor's actual costs** for Change Orders are based on either
 - 1) the **rates** that were solicited during the bidding phase of a project and included as part of the project's construction contract between the owner and the contractor, or
 - 2) the **unit pricing and markups** that were negotiated between the owner and the contractor **following the award** of a construction contract.

When and how to report the work?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Time and materials

❖ At the **completion** of the work for a Change Order,

the contractor will **submit the copies** of the daily work reports for the extra work to the owner

as part of the contractor's monthly payment request submittal.

What the reports should document?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Time and materials

❖ These reports document the **actual**

labor, material, and equipment resources

that were **expended** by the contractor on an hourly or daily basis to complete the extra work scope that is defined by the Change Order.

Do we need invoices?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation and verification of costs

❖ Time and materials

✓ In addition to the daily work reports,

the owner can **request** that the contractor **submit as backup**,
copies of the invoices from its

1. Subcontractors,
2. Material vendors, and
3. Suppliers

that were involved in supporting the work for the Change Order.

How about evaluation of the time?



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation of the time impact

❖ The **contract schedule** for a project may be impacted or delayed by the work involved in completing a Change Order.

1. If the extra work is determined to be **non-critical** as a result of the absorption of the total float on the affected activities, the completion date of the contract schedule will **remain unchanged**.
2. However, if the changed work is found to **extend or delay** the completion of activities that are on the **critical path** of the schedule, the completion date of a project will **slip from the planned date**.

When evaluating the potential time impact for Change Orders, consideration should be given to the following:

Independent analysis for time?

7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation of the time impact

❖ It is important for the **owner to complete an independent analysis** of the contract schedule for a project to

1. **Identify** the **activities** that are **affected by the proposed changed work** and
2. **Verify** whether the scope of work for a potential change order **impacts the schedule** and the **contract completion date**.

Cumulative impact?

7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation of the time impact

- ❖ Consideration should also be given to the cumulative impact of multiple Change Orders on the contract schedule,
which could affect the **labor productivity** of the unchanged work and delay its completion.



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation of the time impact

- ❖ The **timely identification** of potential issues and delays on projects permit the development of recovery schedules that may help to **mitigate some** or **all** of the potential delay.



7. Owner Decision to Approve or Request Further Discussion (Box 10)

☐ Evaluation of the time impact

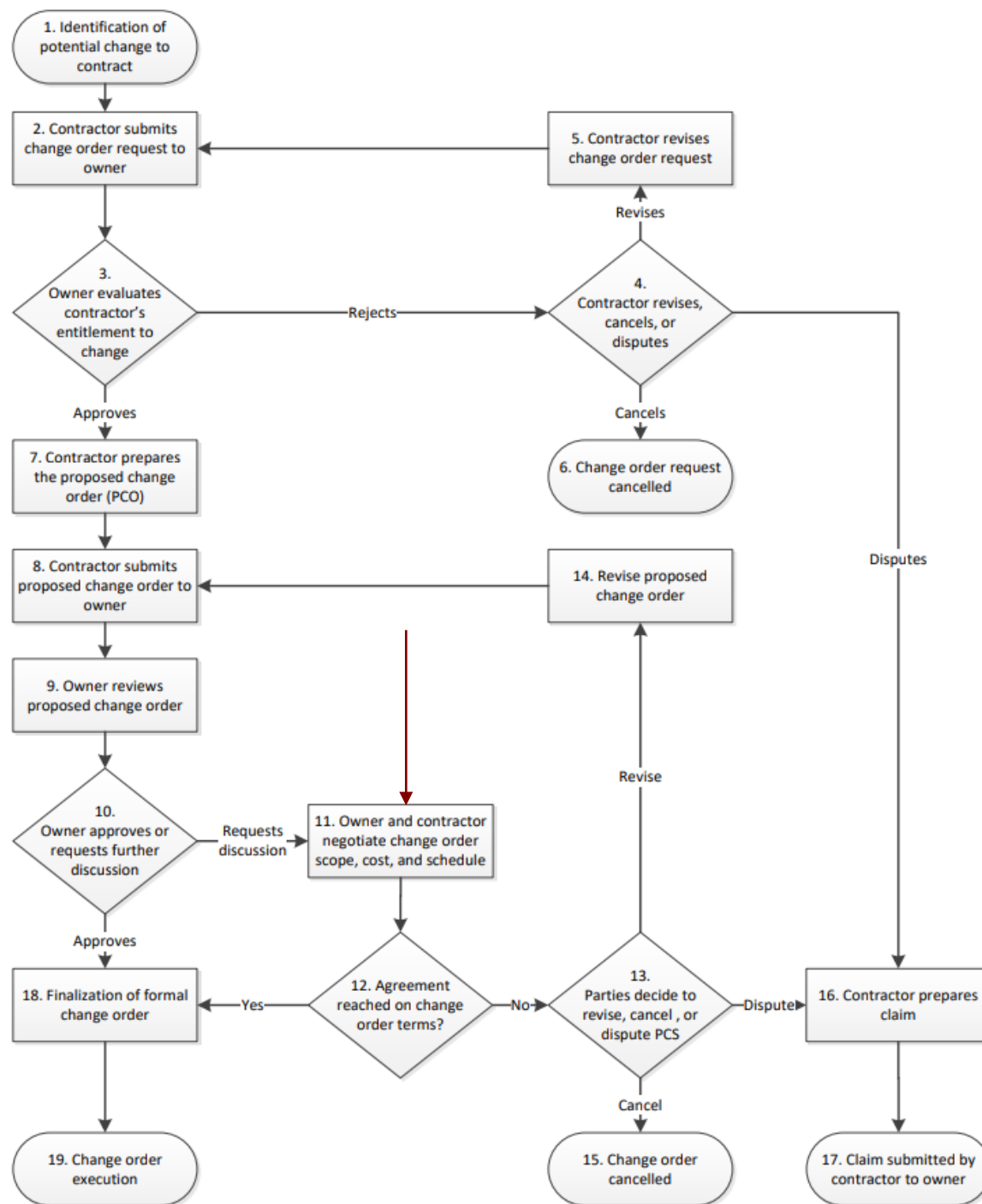
- ❖ The owner should consider **including a procedure** in the contract scheduling specification

that **defines the procedures** relative to

1. Preparation,
2. Format, and
3. Submittal

of the **contractor's schedule analysis** for **potential** Change Orders.

- ❖ The procedure should also address the approval process and the incorporation of the ratified revisions into the contract schedule.



8. Owner and Contractor Negotiate Change Order (Box 11)

- ☐ There will be times in which the **owner requires more explanation** concerning the PCO, and **exchanging emails** is no longer effective.
- ☐ The **owner's questions** may address
 1. Contractor's scope definition,
 2. Process by which it developed the pricing estimate, or
 3. How the time extension was determined.



8. Owner and Contractor Negotiate Change Order (Box 11)

- ❑ On many construction projects, there are **on-going scheduled change management meetings**

between the owner and contractor in which the agenda would **include PCO** that need face-to-face discussion.

- ❖ Typically, only the **more difficult PCOs are discussed**, and these meetings are meant to

1. **Resolve any unresolved** issues and/or
2. **Differences** in an expeditious manner.



8. Owner and Contractor Negotiate Change Order (Box 11)

Negotiations between owner and contractor may require a series of revisions to the PCO (see Box 13) and meetings to achieve an accord.



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

- ❖ The **method** by which the Change Order was priced usually **dictates** the level of negotiation that may be required to resolve the additional costs and time.



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ UNIT COST

- ✓ If the work for the proposed Change Order proceeded on a Unit Cost basis, it is characteristic that the unit rates that are used were established on the project and **agreed** to prior to the start of the work for the Change.

What to focus here?



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ UNIT COST

✓ The negotiations for this type of change are then focused on

1. **Quantities reported** to be used by the contractor and
2. Whether the change **warranted an extension of time** to the project schedule.



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ TIME AND MATERIALS

- ✓ Similarly, for Change Order work to be completed on a Time and Materials basis, it is expected

that the unit hourly rates for **labor and equipment** for the project

have been **ascertained in advance of the start** of work for the Change Order.

The owner's approval is based on?



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ TIME AND MATERIALS

- ✓ Therefore, the **owner's approval** of the costs for the Change Order is based on a review of
 1. The **time card records** and
 2. Copies of **material invoices** presented by the contractor, and potentially, the **subcontractor invoices**.

Evaluate time in time and material to negotiate?



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ TIME AND MATERIALS

- ✓ The **schedule** for the project is also **evaluated to determine** whether the work for the **proposed Change Order** may have affected the completion of critical milestone dates or the overall project completion date.

How about lump sum format?



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

- ✓ If the proposed Change Order was priced on a **Lump Sum basis**, the **contractor's estimate proposal** is inclusive of the risk that is relative to completing the scope of work for the change.
- ✓ The **contractor** may also **consider** that the **estimate details** for the cost of the proposed Change Order are **proprietary**.

For this Change Order method of cost calculation, the elements for negotiations and resolution include the following considerations:



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

- ✓ The preparation of an **independent cost estimate** and a **schedule analysis** of the work scope defined by a potential Change Order by the owner are **advantageous**.



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

- ✓ If the **timing allows**, the **cost and time impact** of a potential Change Order should be established and settled upon **prior to proceeding** with the **start** of the work for a Change Order.
- ✓ Due to the **speed** at which projects progress and the urgency of completing the Change Order work, the **prospect of evaluating** the estimated cost and time impact in advance is **not always possible**.

What to do in this case?

8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

- ✓ When the contractor's proposal is **prepared** during or following the **completion** of the work for a Change Order,

the **estimate** is generally based on the contractor's accounting of

1. Actual man hours expended,
2. Actual quantities of materials used, and
3. Actual operating hours for the construction equipment items utilized.

Is it more difficult compared to the case
when negotiating in advance?



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

- ❖ Because the **estimate** is relying on the contractor's records, the **owner's validation** can be **more difficult** than completing an evaluation of the contractor's proposal that was **prepared in advance** of proceeding with the work.

What is the reason?



8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

- ✓ The **reason** for this difficulty is that the **contractor's records** may **not be made available** to the owner
 - if such **costs are mixed** with the base scope of work which is **paid** for on a lump sum or fixed price basis.
- ✓ If, however, they are **made available**, the records are **often not as complete** or comprehensive as they should be.
- ✓ Frequently, the process suffers because of **differing personalities** and from **heightened emotions**.

How to resolve this issue?

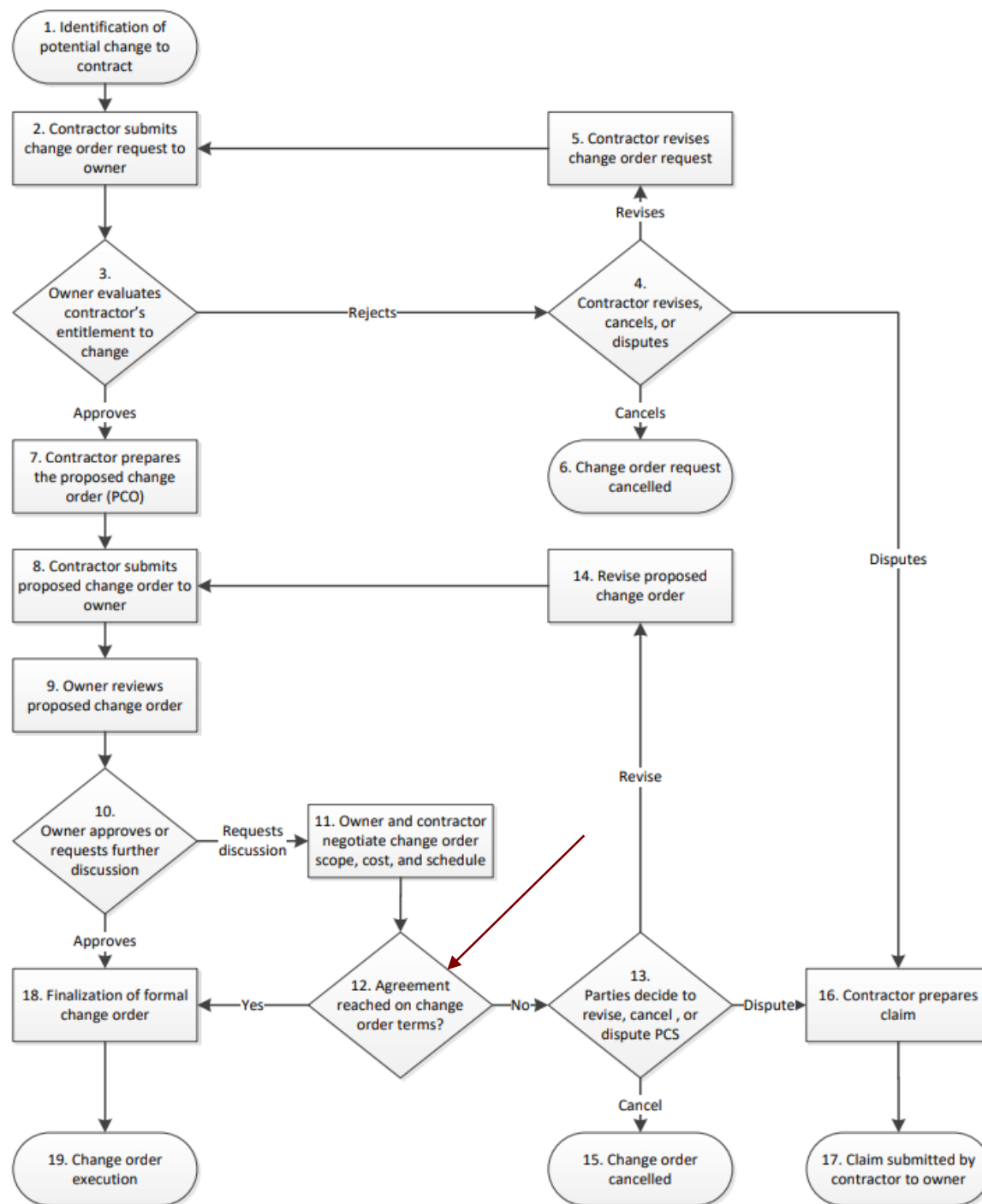


8. Owner and Contractor Negotiate Change Order (Box 11)

☐ Change order negotiations and resolution

❖ LUMP SUM

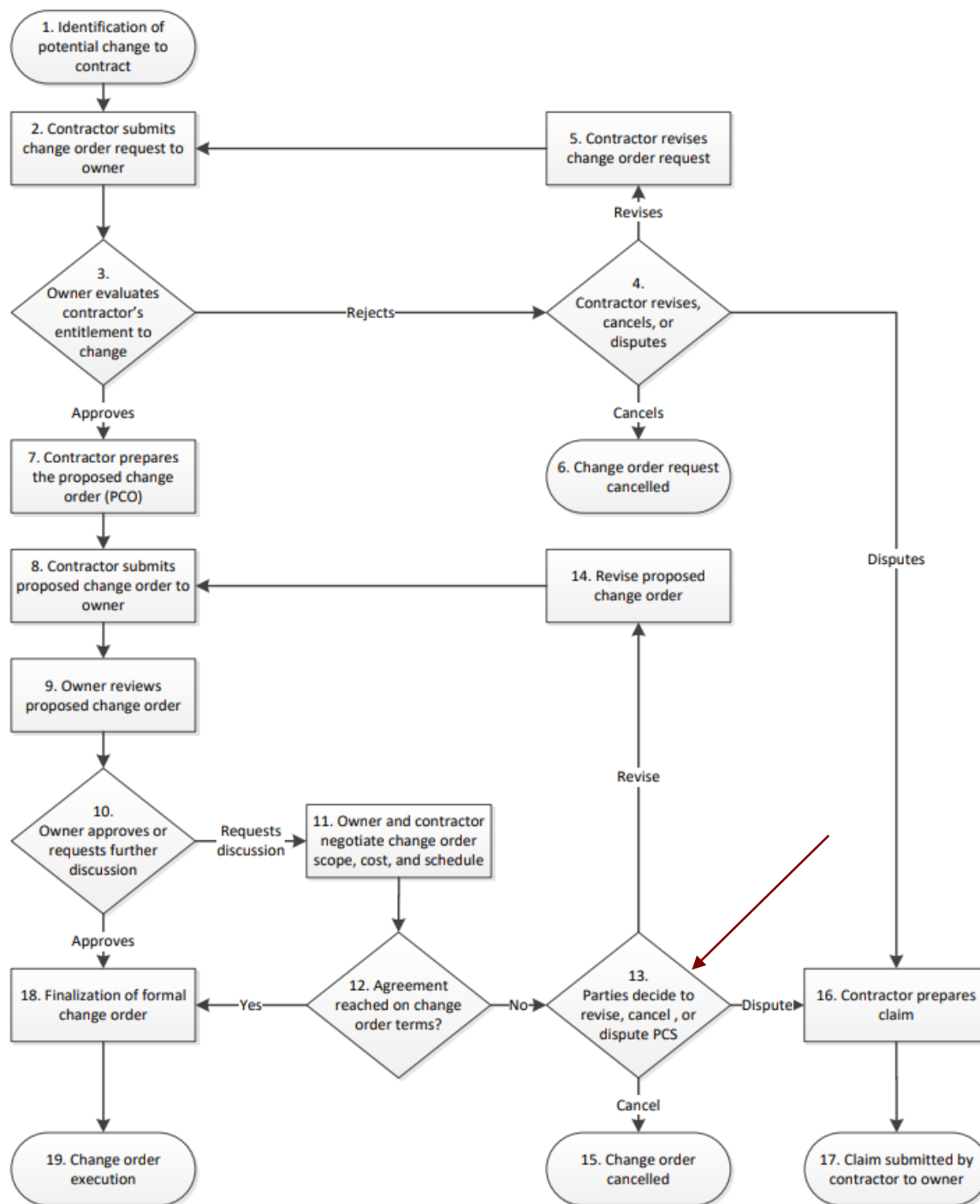
- ✓ To be **productive**, the focus of the negotiations should remain on the **factual circumstances** that are related to the Change Order.
- ✓ During negotiations, **disagreements** are often **experienced**, which can impede the progress for finalizing the Change Order.
- ✓ It is important to **actively resolve** any disputes as they develop so that an accord between parties can be **reached in a timely manner**.
- ✓ This attention by the parties will help to **minimize** the **filing of claims** on a project.





9. Agreement Reached on Change Order (Box 12)

- ❑ Ultimately, there comes a point in which the owner and contractor either **reach an accord, or not.**
 - ❖ If an **accord is reached** between the owner and contractor, **finalization of the change order proceeds** (See Box 16).
 - ❖ **If not**, the parties must determine the **next steps** to take with the PCO (See Box 13).





10. Parties' Decision to Revise, Cancel or Dispute PCO (Box 13)

- ❑ The **change management terms** found in construction contracts often state that the **contractor cannot commence** work until a change order has been **executed**;

however, this process is often by-passed.

- ❑ In the **interest of avoiding** further impacts to the project schedule and maintaining a good relationship with the owner,

the **contractor may agree** to

Commence the changed work and finalize the change order

1. **concurrently** or

2. **After** the work has been **completed**.

*With this bypass of the change management process, **cancelling the PCO** is a less viable option.*

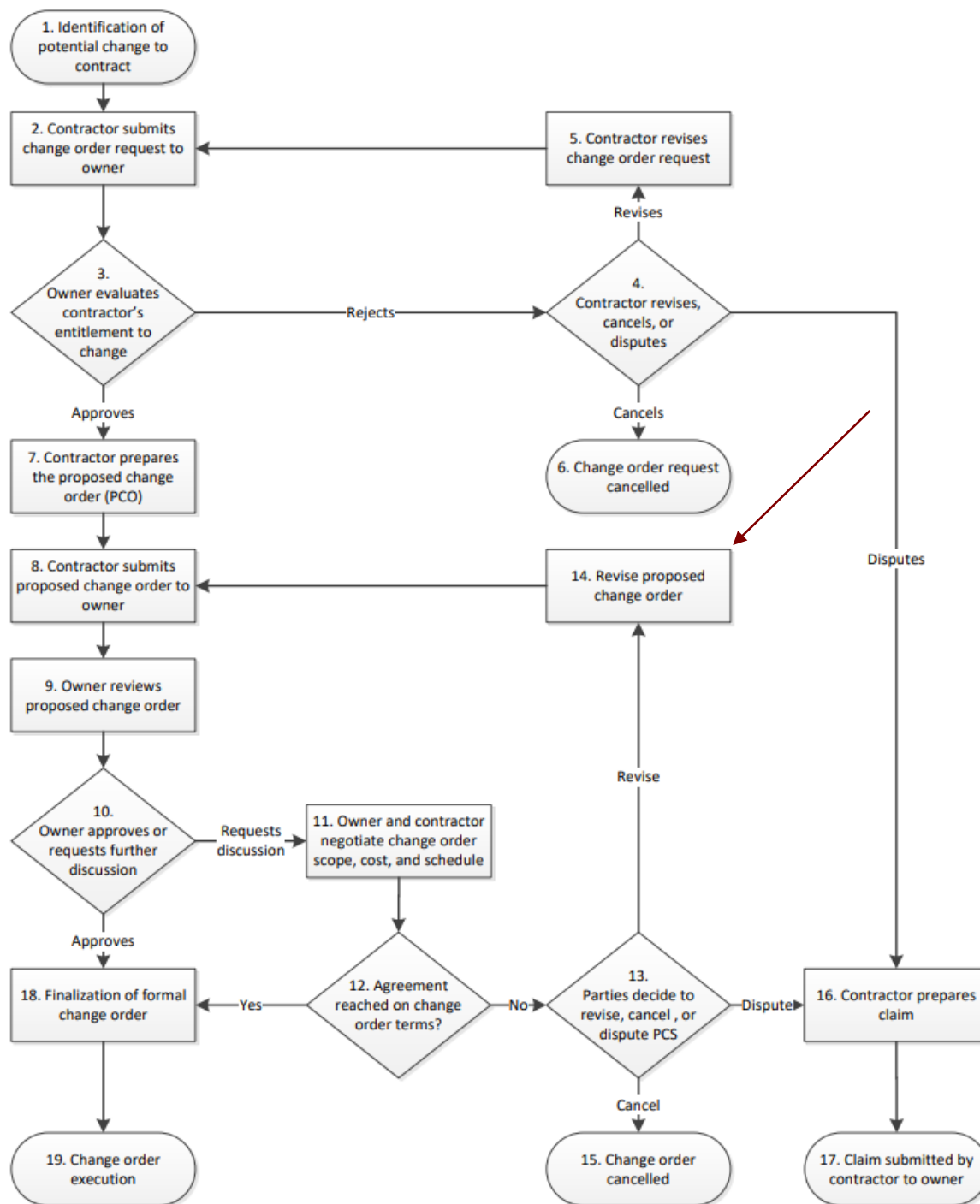


10. Parties' Decision to Revise, Cancel or Dispute PCO (Box 13)

☐ If there **remain unresolvable differences** between the owner and the contractor concerning a PCO,

the parties may conclude that **agreement cannot be reached**.

❖ In these instances, the parties must decide on **one of three options** concerning the future of the unresolved PCO:

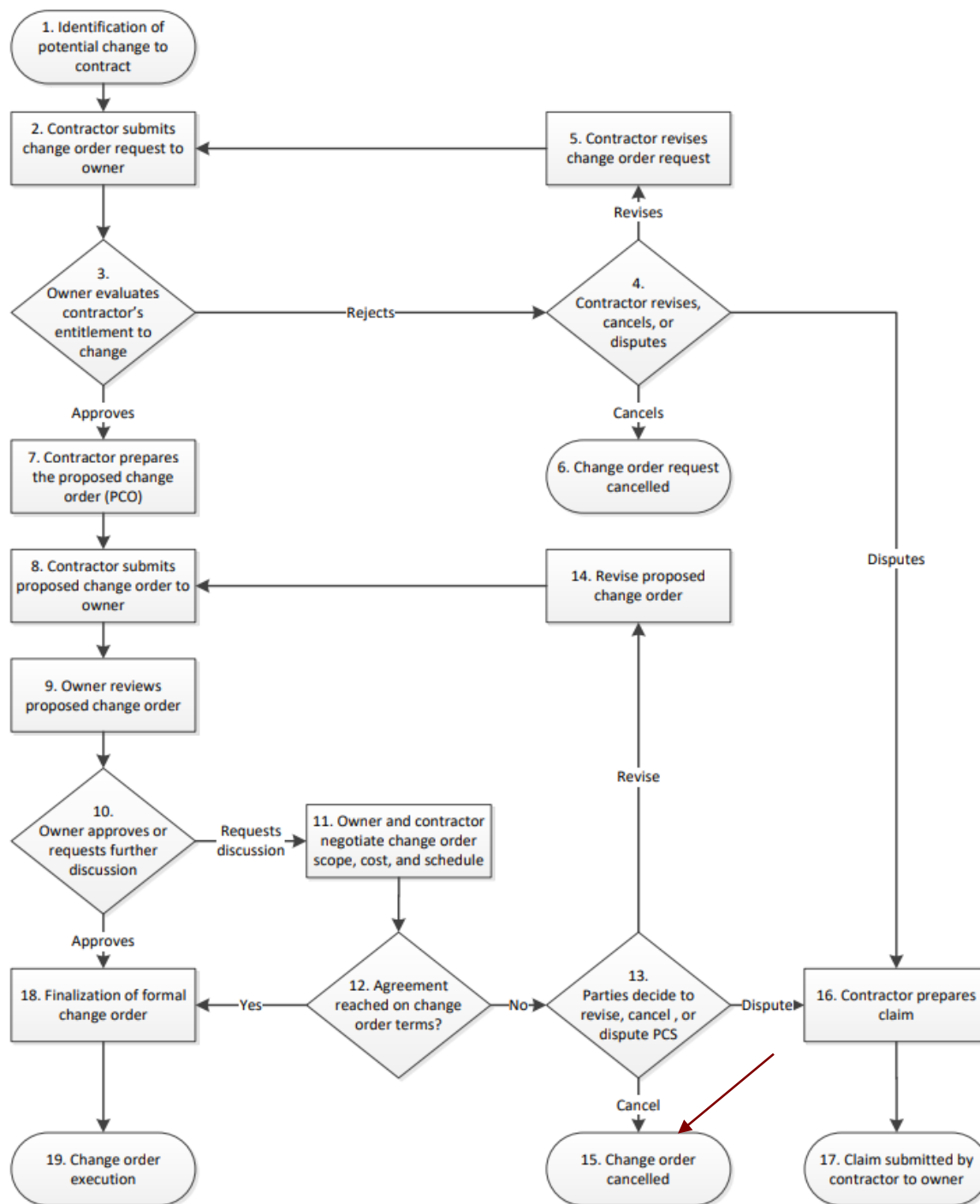




10. Parties' Decision to Revise, Cancel or Dispute PCO (Box 13)

❑ Option 1 (Box 14):

- ❖ The parties choose to continue to **try to find a common ground**, which may include more revisions and discussions.
- ❖ **Attempts are often made** to resolve differences at higher levels of management in both organizations.
- ❖ This may **prolong the process** of executing a change order in a timely manner, which increases the **possibility** that a **dispute** will **arise**
if the **contractor agreed** to perform the work even before agreement was reached on the scope, cost and/or schedule impact.

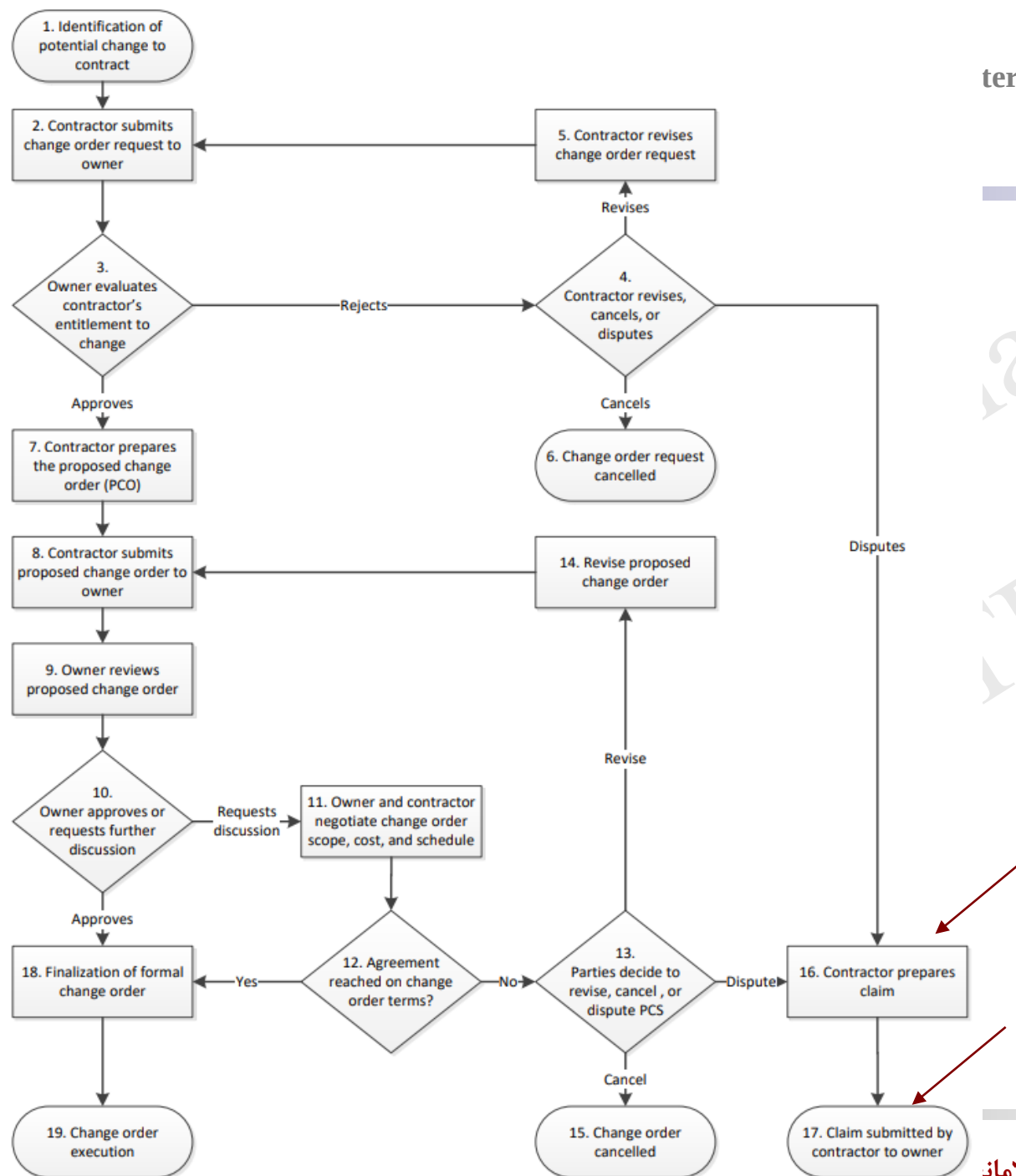




10. Parties' Decision to Revise, Cancel or Dispute PCO (Box 13)

☐ Option 2 (Box 15):

- ❖ The **parties agree** to cancel the changed work, and therefore, the PCO.



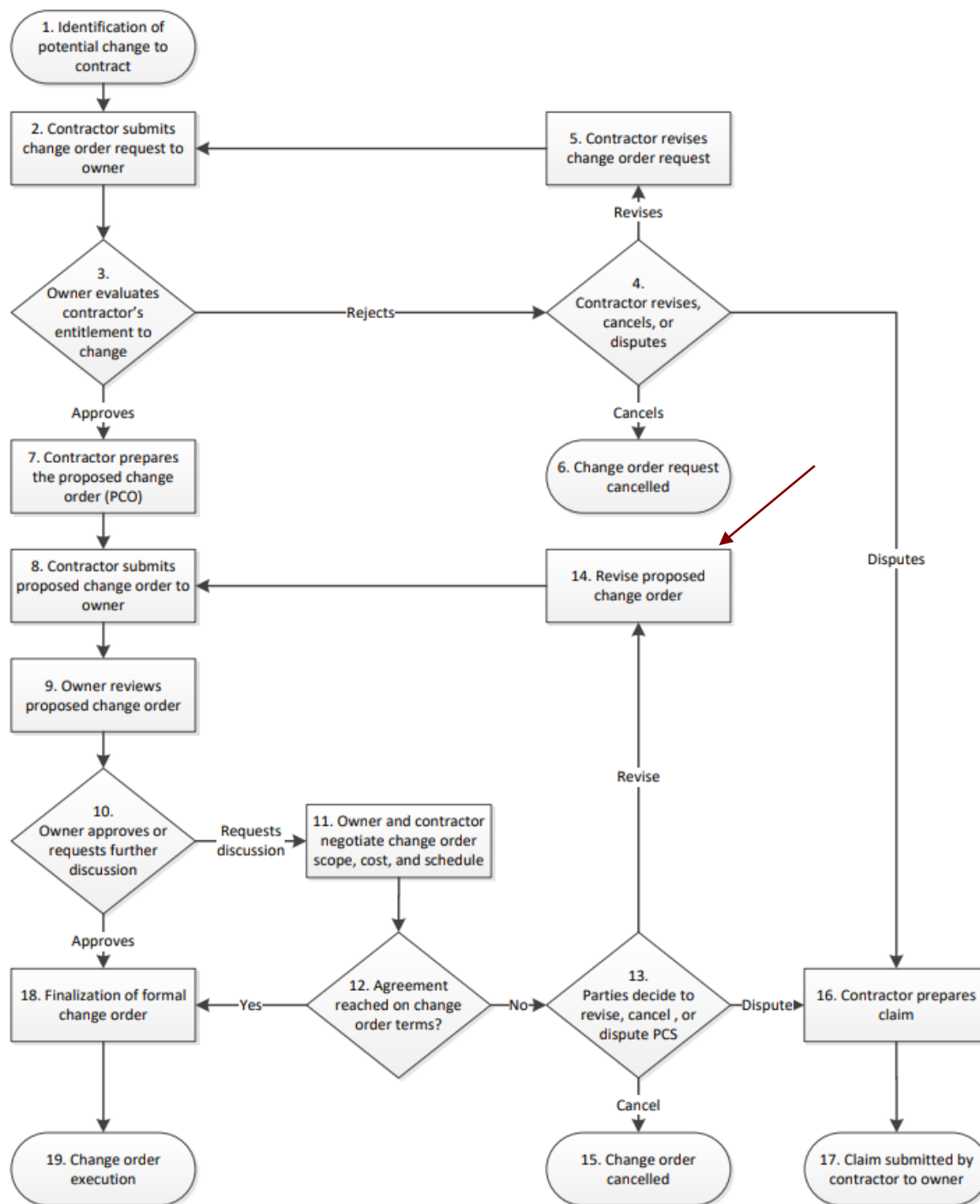


10. Parties' Decision to Revise, Cancel or Dispute PCO (Box 13)

❑ Option 3 (Boxes 16 and 17):

❖ The **parties may decide** that they cannot come to an agreement on the PCO's scope, cost, and/or schedule impacts.

1. If the **owner demands** that the changed work be performed, it may issue a directed change order.
2. If the **contractor deems** the directed change order is substantial enough in terms of cost and schedule impacts,
the **contractor may proceed** under protest and will often prepare and eventually submit a formal claim to the owner.





11. Revise Proposed Change Order (Box 14)

- ❑ As a result of owner comments, negotiations between the parties, or the introduction of new information,

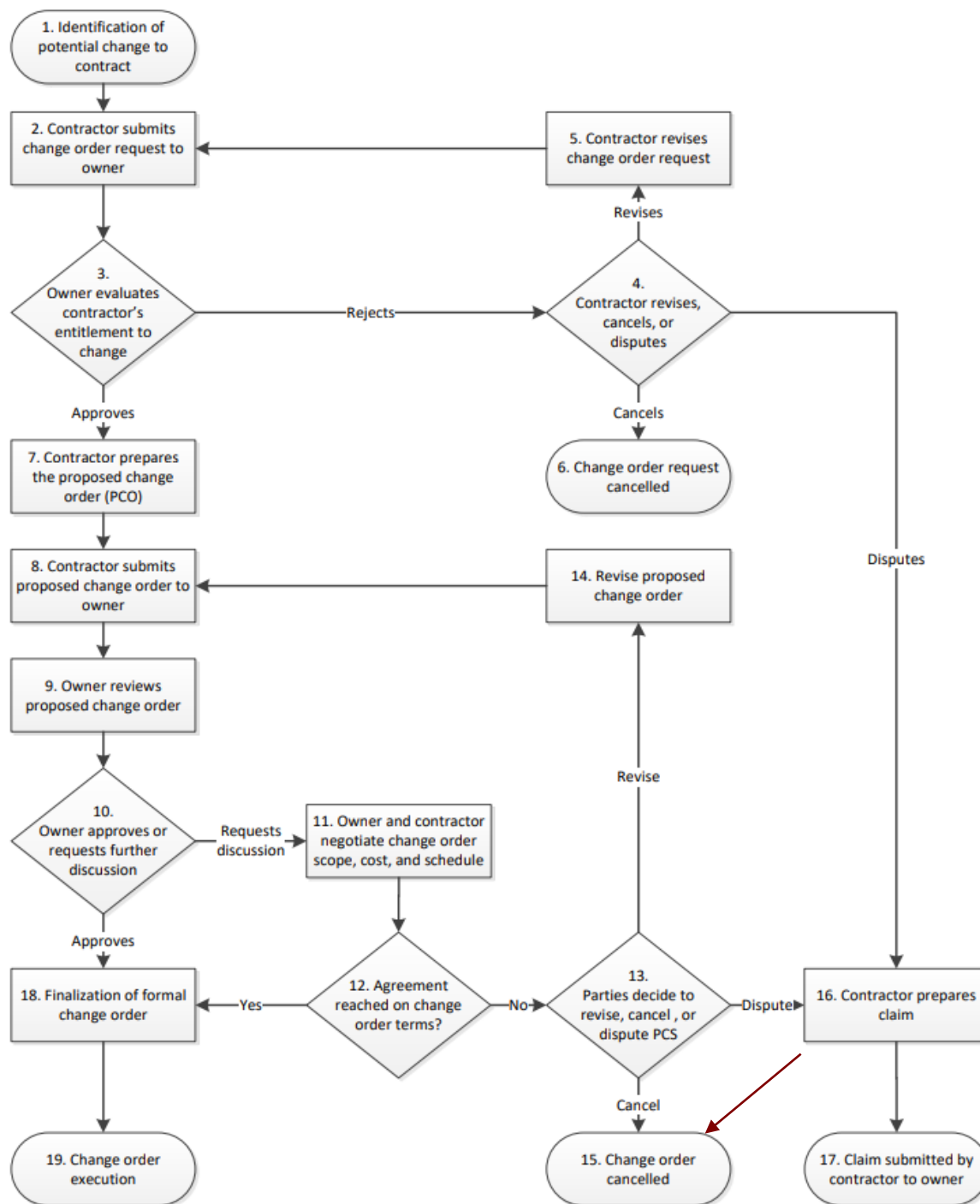
the **contractor** may choose to **revise the PCO**.

- ❑ **Revisions** to the PCO may become an iterative process as a result of **multiple negotiation meetings** between the parties.

- ❑ **Revisions** to a PCO should be a collaborative process between the owner and contractor.

- ❑ Once the **revision is complete**,
it is **submitted** to the owner for review.

The owner should be **cognizant of any forecasted impacts** to **contingency and/or management reserve** budgets affected by the change **(See Box 8)**.

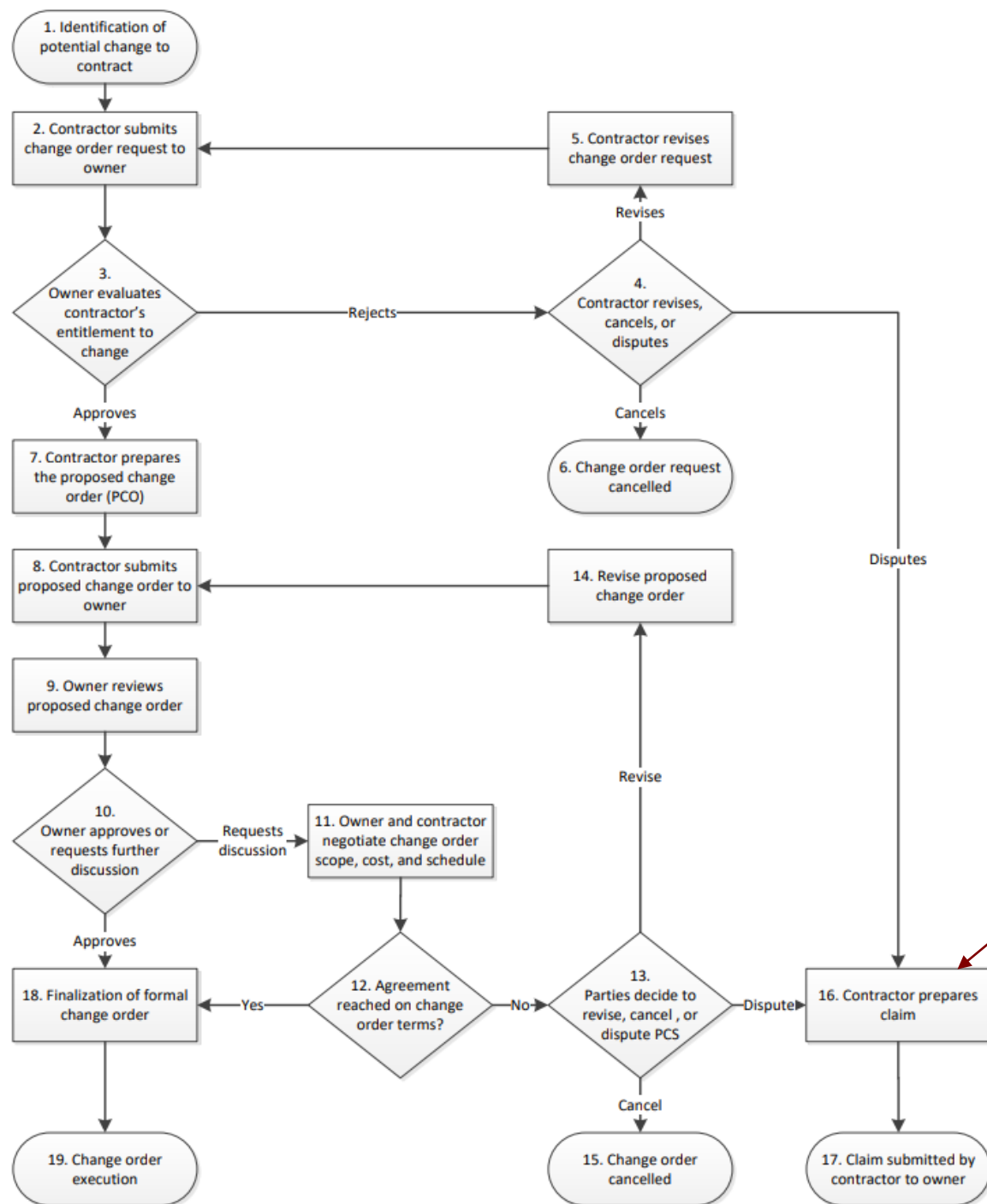




12. Change Order Cancelled (Box 15)

☐ If the **owner determines** that

1. Price of the work or the schedule impact is **more than** it expected or can **tolerate**, and
2. Parties cannot come to an amicable agreement on the PCO,
the **change request** can be cancelled,
assuming that the **contractor had not already** started or performed
the work.





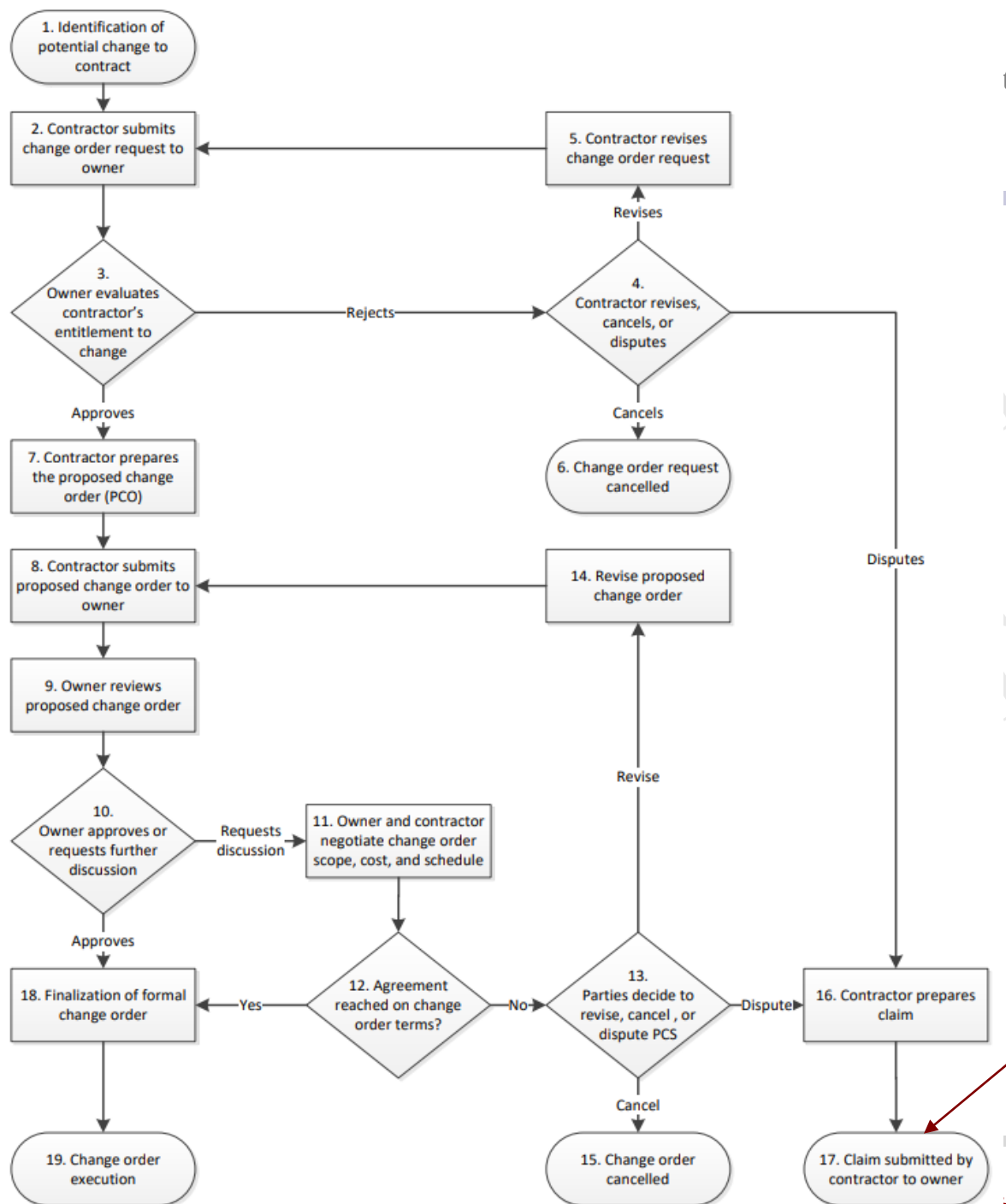
13. Contractor Prepares Claim (Box 16)

- ☐ A claim is defined as,
 - ❖ “A demand or assertion of rights by one party against another for damages **sustained** under the terms of a legally binding contract.
 - ❖ Damages might include money, time, or other compensation to make the claimant whole.”
- ☐ Most often, the **contractor** is the party that prepares and submits a **claim**.
- ☐ After **exhausting all other possibilities**,
preparing and submitting a claim should be the **last option** that a contractor uses to **resolve a change impacting** its project cost and/or schedule.



13. Contractor Prepares Claim (Box 16)

- ☐ To **prepare a claim** the contractor should follow a **similar process** that was used to prepare the proposed change order.
- ☐ In addition, the claim should include **relevant communications** between the parties during the negotiation process.





14. Claim Submitted by Contractor to Owner (Box 17)

☐ The **purpose** for preparing and submitting a claim to another party is to put that **party on notice** that

1. There is a **claim** concerning a specific portion of the work on the project, and

2. From the **perspective of the claimant**,

1. Necessary narrative,

2. Supporting information,

3. Data, and

4. Analyses

are sufficiently provided to demonstrate its **entitlement** to disputed damages.

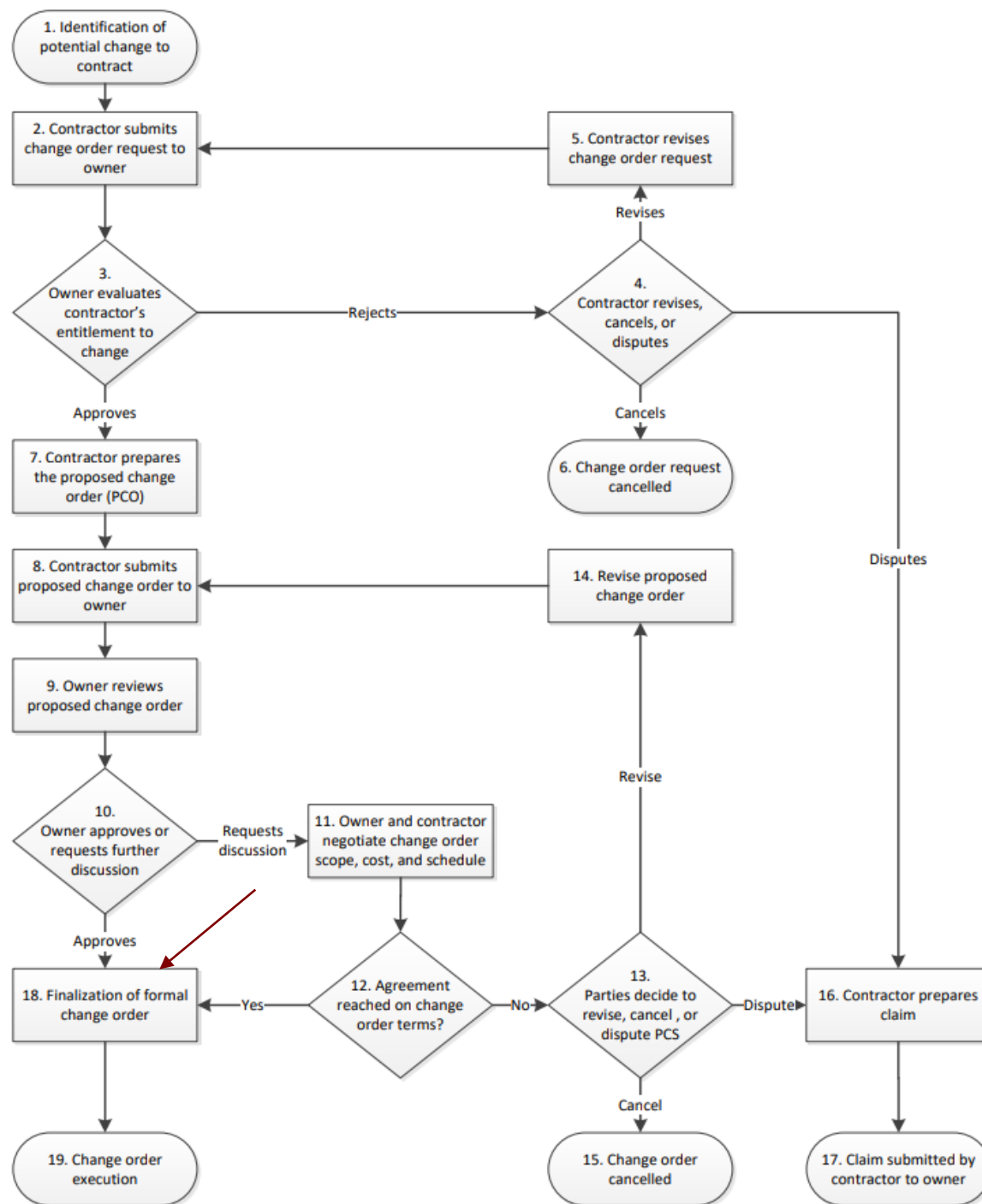


14. Claim Submitted by Contractor to Owner (Box 17)

❑ Although **claims** can be negotiated internally between the parties' organizations,

- ❖ Most often they are adjudicated by third parties, such as
- ❖ Dispute resolution boards,
- ❖ Arbitration tribunals,
- ❖ The court system, or
- ❖ Other alternative dispute resolution entities or processes.

Most construction contracts specify the forum for the dispute resolution process.





15. Finalization of Formal Change Order (Box 18)

- ❑ Once the owner and contractor have **reached an accord** concerning the scope, price and/or schedule impacts associated with a PCO, the **change order status** should transition from proposed to finalized for execution.



15. Finalization of Formal Change Order (Box 18)

- ☐ The **prepared change order records** should include
all scope, pricing, schedule information, and analyses agreed upon by both parties.
- ☐ Additionally, any meeting minutes, photographs, requests for information (RFI), other relevant documentation, as well as correspondence between the parties during their negotiation of the PCO should be included.

This extensive package of information will help toward resolving any disputes that may arise later in the project.



15. Finalization of Formal Change Order (Box 18)

- ☐ Depending on the **contract terms**, either party can **prepare** the final change order document.
- ☐ A change order should be executed to **formalize** the change to the contract **after it has been resolved** and a **final disposition** has been determined, **even when the claim** submitted resulted from a disputed PCO.



15. Finalization of Formal Change Order (Box 18)

☐ Finalization of the change order

- ❖ Typically, the **Change Order documentation** is captured in the following formats:



مدیریت ادعاء و اختلافات در طول چرخه حیات پروژه
توسعه و مدیریت برنامه در فاز طراحی (Design Phase) برای مدیریت ادعاء و جلوگیری از دعاوی و اختلافات در پروژه

Potential killer contract clauses – Change orders

- ☐ AIA A201-2017: General conditions for construction

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.



By: Alavipour, PhD, PMP, CMIT www.dralavipour.com ذکر مطالب فوق تنها در صورت ذکر منبع بلامانع است. 145



15. Finalization of Formal Change Order (Box 18)

❑ Finalization of the change order

❖ **CHANGE ORDER (FORM 04)**

- ✓ Following the conclusion of the negotiations and the attainment of an equitable settlement, a **formal Change Order** document is prepared by the owner in conjunction with the contractor.
- ✓ This document contains
 1. Complete and final language that defines the total cost or credit impact, in addition to
 2. Any schedule revisions that are related to the change in the contract scope of the work.
- ✓ The **endorsement** of the Change Order contractually binds all the involved parties.

Change order form template

Owner Name Here	Change Order		Change Order No.
Client/Project:		Revision No.	
		Potential Change No.	
		Document No.	
		Contract No.	
		Date:	
Change Order Title:			
Part 1 - Reason / Cause for Change			
☐ Safety	☐ Cost	☐ Schedule	
☐ Operations/Maintenance	☐ Extra Work	☐ Design Development	
Detailed Description, History, and Cause of Change (Attach additional sheets as necessary):			
Referenced Supporting Documents:			
Part 2 - Schedule Impact			
Schedule Impact to Project Substantial Completion Date (Number of Days):			
Describe in detail the delay impacts and attach delay analysis (attach additional sheets as necessary):			
Part 3 - Cost Impact			
(Attach Detailed Estimate as necessary)		Hours	Cost
Engineering			
Project Management			
Procurement			
Material/Equipment			
Construction			
Sub-total:			
Overhead and Profit			
Total:			
Part 4 - Approval			
Owner Responsible Manager		Contractor Responsible Manager	
Printed Name:		Printed Name:	
Title:		Title:	
Company Name:		Company Name:	
Signature:		Signature:	
Date:		Date:	



15. Finalization of Formal Change Order (Box 18)

☐ Finalization of the change order

❖ **CHANGE ORDER LOG (FORM 05)**

- ✓ This document is often **prepared** and **updated** by the owner,
but the **contractor could be responsible** for the preparing and
updating the **Change Order Log**
with **review and approval** by the owner.
- ✓ The **purpose of the log** is to provide a current summary of the Change
Order activity for a project.





Change order long: Sample form 05

CHANGE ORDER LOG

Project No. _____ Project _____ Contract No. _____ Contractor _____ Page ____ of ____

[illegible]



15. Finalization of Formal Change Order (Box 18)

❑ Finalization of the change order

❖ MONTHLY PROJECT SCHEDULE UPDATES

- ✓ Typically on projects, the **construction contract** requires the **contractor** to prepare and update the contract schedule on a monthly basis.
- ✓ In addition to **updating the status** of activities that are in-progress or completed during the reporting period, the **contractor addresses** in the contract schedule the details of the logic revisions and impacts that were agreed as part of the **Change Order negotiations** between the owner and the contractor.



15. Finalization of Formal Change Order (Box 18)

☐ Finalization of the change order

❖ MONTHLY PROJECT SCHEDULE UPDATES

- ✓ It is important that the **owner review** the contractor's monthly schedule update submittal

to ensure that the **revisions that were agreed** to in the Change Order have been **correctly** identified and implemented.

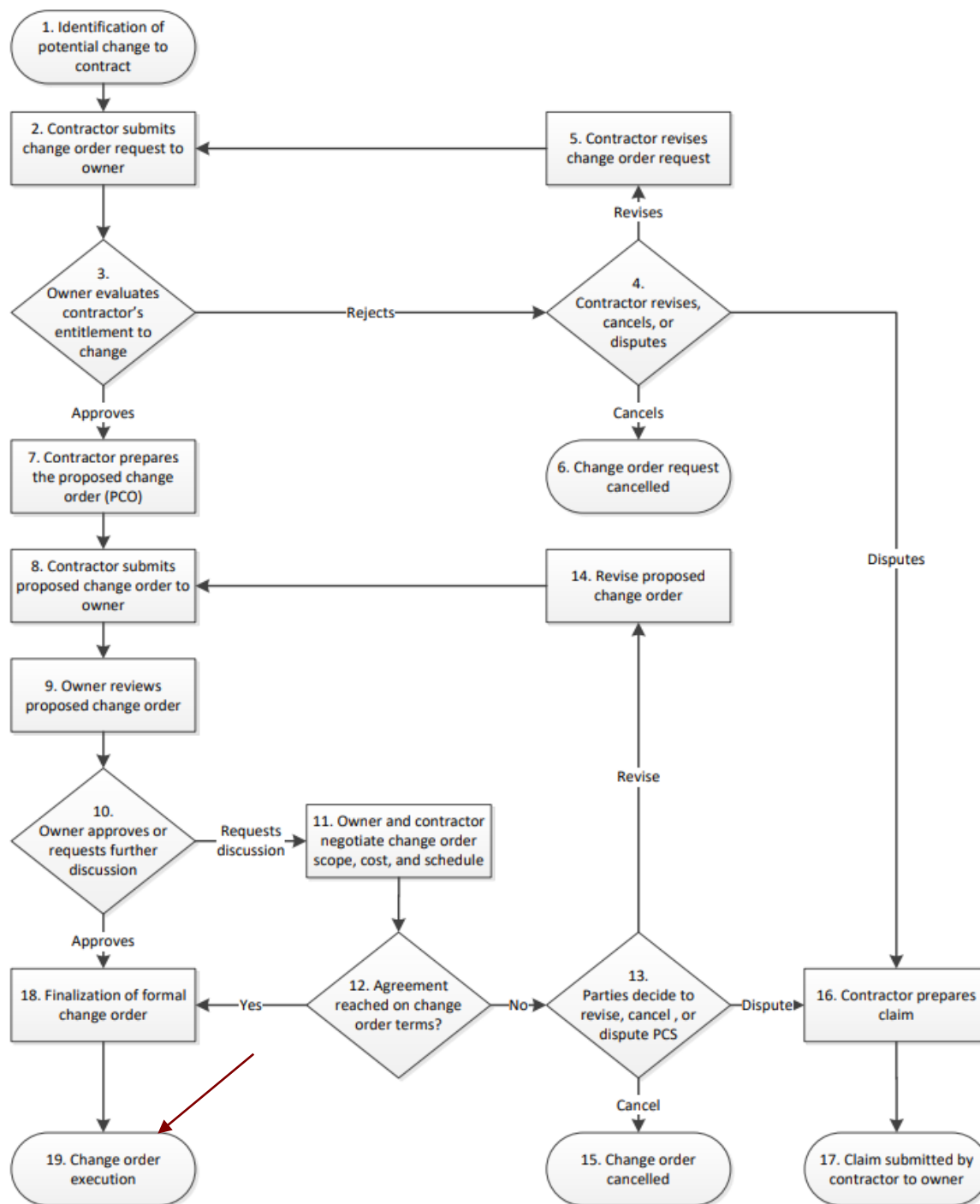


15. Finalization of Formal Change Order (Box 18)

❑ Long: Finalization of the change order

❖ RECORD OR AS-BUILT DRAWINGS

- ✓ As a part of its contract obligations, the **contractor is typically compelled** to mark up the contract drawings with the **as-built details** for a project.
- ✓ This task also includes the **revisions** that were addressed and approved in the **Change Order documents**.
- ✓ The **owner** should periodically **review** the level of detail and progress of the **contractor's as-built drawings**.
- ✓ **Any deficiencies** should be **immediately** addressed.





16. Change Order Execution (Box 19)

- ☐ The last step concerning a recognized project scope change is the **execution** of a change order; whether it is
 1. An **agreed-upon change** between the parties or
 2. A **disputed claim** that has been **resolved**.



16. Change Order Execution (Box 19)

- ☐ Execution of a change order entails **signatures** by both parties on a change order form,

signifying their agreement to all terms and conditions identified in the document.
- ☐ Depending on the terms of the contract, signatures can be faxed, communicated via esignature, or wet ink signatures.
- ☐ It is recommended that **all signatures be dated**.
- ☐ These **dates may differ** from the effective date specified in the change order.

Change Management Document Control



Change Management Document Control

- ☐ It is important that the **owner and contractor** keep well-organized and complete records for each change,
regardless of whether the change was fully executed or not.
- ☐ The documentation included in the file should be **relevant to the change issue**; and should **support or refute** a party's contractual right to the change, causation, the cost, and the schedule impacts.
- ☐ In **anticipation** of change negotiations,
a **well-organized change management document control system** will facilitate **quick access to information**
that either **supports or refutes** the changes or **claims** under consideration.

Appendix: Sample Change Management Templates



Templates

مدیریت تغییرات قراردادی در پروژه‌های EPC
بر اساس اسنادی از AACE و PMI و Long International

- ☐ Templates provided during the lecture

Prepared by Dr. Alavipour
DO NOT DISTRIBUTE



Final Notes



Conclusion

- ☐ The change management process is one of the most important aspects associated with a successful construction project.
- ☐ In the absence of a construction change management process defined in the construction contract, this recommended practice provides an option to consider.
- ☐ Each of the boxes identified in the process diagram should be further defined by the construction management team, including roles, responsibilities, and procedures.
- ☐ The change management process provided in this course can be modified to suit the needs of the user.

1. Pickavance, K. (2005). Delay and Disruption in Construction Contracts. London, LLP.
2. Callahan, M. T., Editor, (2005). Construction Change Order Claims, 2nd ed. Aspen Publishers.
3. Turner, J. R. (2009). The Handbook of Project-Based Management: Leading Strategic Change in Organizations, The McGraw-Hill Companies, Inc.
4. AACE International, Recommended Practice 10S-90, Cost Engineering Terminology, AACE International, Morgantown, WV. (latest revision).
5. Park, M. and F. Pena-Mora (2003). "Dynamic change management for construction: introducing the change cycle into model-based project management." System Dynamics Review 19(3): 213-242.

6. Stephenson, H. Lance CCP, Editor, Total Cost Management Framework: An Integrated Approach to Portfolio, Program and Project Management, AACE International, 2nd Ed, Morgantown, WV.
7. Warhoe, Stephen P., (2012). Applying Earned Value Management to Design-Bid-Build Projects to Assess Productivity Disruption: A System Dynamic Approach. Section 2.4.2.
8. AACE International, Recommended Practice 52R-06, Time Impact Analysis – As Applied in Construction, AACE International, Morgantown, WV. (latest revision).

- ❑ AACE International (2009). Recommended Practice No. 45R-08. Retrieved from www.aacei.org AACE International. (2009).
- ❑ Recommended Practice No. 48R-06. Retrieved from www.aacei.org Jensen, D. Jr., Murphy, J.D. Jr., and Craig, J. (1997). “
- ❑ The Seven Legal Elements Necessary for a Successful Claim for a Constructive Acceleration.” Project Management Journal, March, 1997. McLaughlin, G. T. (2011). Lessons learned from recent, large and complex construction projects.
- ❑ Paper presented at the PMI Scheduling Community of Practice Conference, San Francisco, CA. Mirza, M. A. (2005). Construction claim management.
- ❑ Paper presented at the PMI Global Congress, Asia Pacific Proceedings. PMI, Newtown Square, PA



Contributors

مدیریت تغییرات قراردادی در پروژه‌های EPC
بر اساس اسنادی از AACE و PMI و Long International

Dr. Stephen P. Warhoe, PE CCP CFCC FAACE Hon. Life (Primary Contributor)

Robert B. Brown, PE FAACE

Larry R. Dysert, CCP CEP DRMP FAACE Hon. Life

John K. Hollmann, CCP CEP DRMP FAACE Hon. Life

Lori A. Lee, CCP

Douglas W. Leo, CCP CEP FAACE Hon. Life

Mabrouk Mabrouk, Sr. CCP

John P. Orr, PSP FAACE

Todd W. Pickett, CCP CEP FAACE

Richard C. Plumery, EVP

H. Lance Stephenson, CCP FAACE

James G. Zack, Jr. CFCC FAACE Hon. Life





نحوه اثبات محق بودن به ادعا و دستور تغییر ابزارهای حیاتی + نکات کلیدی (بر اساس اسنادی از ASCE و AACE)

ارائه دهنده:

سید محمدرضا علوی پور

(PhD, PMP, CMIT)

CMAA Authorized Trainer

دانشگاه Illinois Tech آمریکا



What we will learn?

☐ Introduction

☐ Recommended practice

❖ Elements Necessary to Demonstrate Entitlement Basis for a Change

Order Request or Claim

- ✓ Causal Event Occurrence
- ✓ Adherence to Contract Change Notice Requirements
- ✓ Contractual Entitlement to Request a Contract Change or Make a Claim
- ✓ Demonstration of Causation
- ✓ Prudent Effort to Mitigate any Impacts
- ✓ Assignment of Responsibility
- ✓ Quantification of Impacts

What we will learn?

☐ Recommended practice

❖ **Change Order Request or Claim Submission**



What we will learn?

❑ Pricing construction claims and change orders

❖ Forward pricing

- ✓ Risk in forward pricing
- ✓ Use of standard formats
- ✓ Material quantities and prices

❖ Post pricing

- ✓ Cost analysis
- ✓ Actual costs
- ✓ Reasonable costs developed from existing job data
- ✓ Reasonable cost estimation



What we will learn?

❑ Pricing construction claims and change orders

❖ The proposal – Request for equitable adjustment

- ✓ General pricing philosophy
- ✓ Unit price contract considerations
- ✓ Pricing elements and details
- ✓ Production rates

❖ Impact and inefficiency costs

- ✓ How impact costs are incurred
- ✓ Specific, identifiable extra work
- ✓ Pricing inefficiency and loss of productivity



What we will learn?

❑ Pricing construction claims and change orders

❖ Material costs

- ✓ Reasons for material claims
- ✓ Other costs associated with material claims
- ✓ Additional material quantities and cost calculation

❖ Equipment costs

- ✓ Additional equipment usage
- ✓ Cost of equipment



What we will learn?

❑ Pricing construction claims and change orders

❖ Overhead and profit

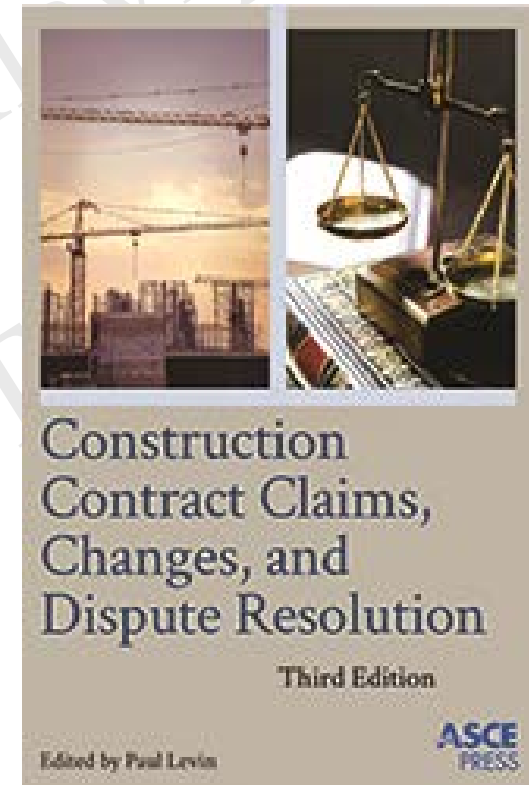
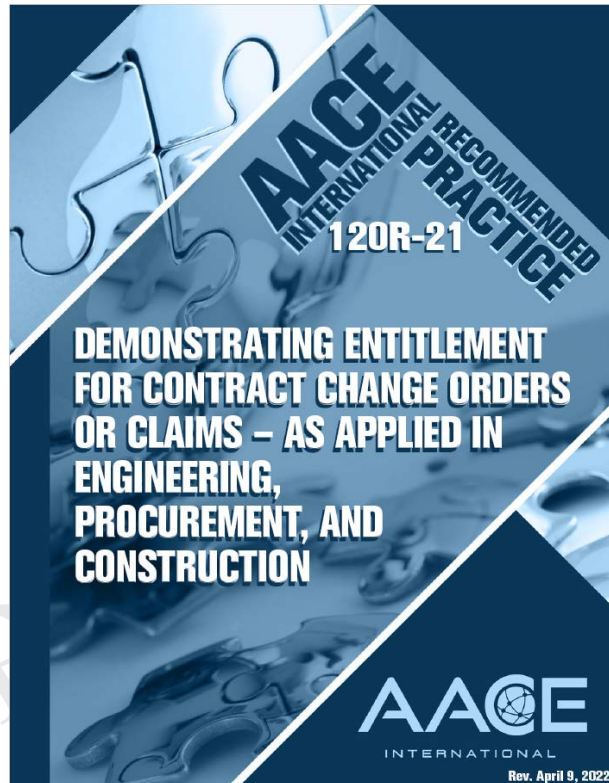
- ✓ Project overhead rates
- ✓ Overhead on large claims
- ✓ Home office overhead
- ✓ Profit

❖ Other elements of claim pricing

- ✓ Interest costs
- ✓ Insurance costs
- ✓ Bond costs
- ✓ Legal fees, change orders, and claim-preparation costs

Reference

Primary reference



Introduction

- ☐ The **foundation** of the **construction process** is the contract.
- ☐ The contract should describe in **detail**
 1. The scope of the contractor's work,
 2. The amount of work to be performed,
 3. The schedule over which it will be performed,
 4. The conditions existing at the site, and
 5. The amount and method of payment.

Are we allowed to change them?



Changed work

❑ Contractors **expect both** to

1. Perform changed or additional work and
2. Receive appropriately adjusted compensation and schedule
as a result of the changed and/or additional work through change orders
issued by the owner.

What does claim mean here?

☐ Claims **result when**

the parties are **unable to reach an agreement** on price and/or time to perform extra work,

including costs and time for delays, acceleration, and impact costs experienced on the project.

*A claim is the contractor or subcontractor's substantive **description** and **detail** that supports the change in time and extra costs incurred, or to be incurred, due to changed or added work.*

In case of dispute?

- ☐ In case of a dispute over the amount to be paid, the amount sought is often termed “damages.”

Prerequisite?

❑ The **party paying** for the added work, typically

1. Owner or its representative (when a contractor initiates a claim) or
2. Contractor (when a subcontractor initiates a claim),

needs **detailed** schedule and cost **analyses and discussions** to understand, negotiate, and justify extra contract time and costs.

❑ This recommended practice (RP) addresses the **necessary elements to determine technical entitlement** for

1. Change order request (COR) or
2. Claim

as **applied in engineering, procurement, and construction.**

❑ While any definitions **provided by contract documents** would **supersede this RP**,
in the **absence of clarity in the contract**,
this RP defines key elements of the change request process.

These elements of a COR or claim **apply to any typical** design, procurement, and
construction contracting strategy or delivery method.



RP intention

- ❑ This recommended practice is **relevant to stakeholders** on a capital construction project; this includes
owner, contractor, subcontractor, construction manager, or other stakeholders.
- ❑ **Although** this recommended practice is written in the context of a contract between an **owner and contractor**,
it is equally **applicable to any parties** contracted to perform a project including owners and architect-engineers (A/E), as well as general contractors and their subcontractors.
- ❑ This RP can **also be used as an internal change management** guideline within an organization's management procedures.
 - ❖ In the context of this recommended practice, the **contractor is assumed** to be the **claimant**.
 - ✓ Of course, this is **not always the case**.
The owner/employer, A/E, and a subcontractor can also be claimants as well.

- ❑ For more discussion concerning the project change management process, refer to AACE International's **RP 100R-19, Contract Change Management** – As Applied in Engineering, Procurement, and Construction.

❑ The **approval** of a change order **may not occur** in a timely manner, which may indicate that

the **owner feels** the contractor has **not provided enough information or analyses** to justify increasing the contract compensation or granting an extension of time to the project schedule.

❖ Often, what the owner finds **missing in a COR** is

1. One or more of the required elements of a change order, or
2. That one or more are inadequately demonstrated.

These elements are further discussed in the Recommend Practice section.

What is the solution?

☐ It is recommended that

1. The **elements** that should be demonstrated in a contract **COR**, and
2. The **extent** to which they should be described,

be **agreed upon before** the contract is signed and work commences.

☐ Because the potential stakes associated with disputed changes can be significant, **many disputes** can be **avoided** with this common understanding established well before the project begins.

*A **facilitated alignment session** at the start of the project is a good way to bring such expectations into common agreement.*

Why disputes arise?

❑ **Disputes** often arise due to the parties' inability or unwillingness to come to an **agreement** on pending contract changes in a **timely manner**.

❖ If an **agreement cannot** be achieved on **one or more CORs** during project execution,

the contractor **may choose to re-submit** the disputed CORs as **claims** at the **end of the project** to recover cost and time impacts for which it believes it is **entitled**.

Recommended Practice

- ❑ The **change management** plan should align with the specific needs of the project.

For example, **avoid using** a change management process intended for a cost reimbursable contract on a fixed price contract project.

*Experience has shown that most change management processes **focus primarily on cost elements** of a change and not enough is written that addresses proper treatment of schedule change management.*

- ❑ One **option of a change management process** can be found in AACE's Recommended Practice **100R-19**, Contract Change Management – As Applied in Engineering, Procurement, and Construction.

But important questions that should be addressed?

1. **Prior to contract execution**, it is recommended that the parties agree to what elements should be **included in a COR** to form the bases of the change.
- ☐ It is also recommended that the parties agree on what types of documentation and analyses would be necessary to serve as **support to each** of the following basis elements.

**Elements Necessary to Demonstrate
Entitlement Basis for a Change Order
Request or Claim**

- Typically, contracts place the burden of **demonstrating** the following elements on the **claimant**.

*For an owner to approve a change order requested by a designer or contractor, the following are **seven primary basis elements** of the request that should be satisfactorily demonstrated.*



Seven primary basis elements

□ They are identified as:

1. Causal event occurrence;
2. Adherence to contract change notice requirements;
3. Contractual entitlement to request a contract change or make a claim;
4. Causation;
5. Prudent effort to mitigate any impacts;
6. Assignment of responsibility; and
7. Quantification of impacts.



Seven primary basis elements

- ☐ The following is a description of each element and why it is important to be included in the change order request or claim.



Casual event occurrence

❑ **Before** a contractor can establish causation (**see item no. 4**), this element establishes **whether** an event that potentially caused an impact has actually occurred.

❖ Normally, upon **discovery** of the changed condition,
this knowledge is **shared amongst** the contractor's project team so that
the appropriate **internal steps** are taken to
initiate and support the change order request.

❑ A causal event that impacted the contractor may also have been an action that did not take place,
such as a **missed deadline** by a party it had **no control over**
but **had to rely on** to complete its work.

*This element of a substantiating that a causal event occurred **may seem to be simple to demonstrate**, but failure to do so has led to **many disputes**.*



Casual event occurrence

- ❑ A simple example could be determining whether **adverse weather** occurred such that it **impacted** the contractor's **ability to work**.
- ❖ Typically, contracts allow the contractor to submit a **change order request** if it was impacted as a **result of adverse weather**.

What is the common dispute about that?



Casual event occurrence

❑ Sometimes, there can be a dispute on

whether a rain event **occurred at all**,

especially at **locations** where rain measurement **stations are too far away to**

adequately quantify the amount of rain that fell on the project site.

*Of course, actions should be taken **prior to the project's onset** to*

account for and **quantify**

the possibility of adverse weather,

*but these measures are **not always anticipated** or are **simply not taken**.*

Who has the responsibility to demonstrate?



Casual event occurrence

- ❑ As the **claimant**, it would be the **contractor's responsibility** to demonstrate that the event **did indeed occur**.
- ❑ Therefore, the contractor would have to provide **evidence in the form of such records** including
 - ❖ Certified test results,
 - ❖ Photographs,
 - ❖ Contemporaneous weather records,
 - ❖ Minutes of meetings, and
 - ❖ Other documentationto show that the event that **caused the impacts** for which it has claimed did occur



Casual event occurrence

☐ **Without** first demonstrating or gaining acknowledgement from the owner that an **event occurred**,

it would be **impossible** to demonstrate a **causal relationship** to the alleged **resulting impacts**.



Adherence to contract change notice requirements

- ❑ It is important that **all parties** to a contract be **familiar** with the terms of the contract.
- ❑ In this case, particular focus should be on the change management process and the claims submission process,
part of which should include the **submission** of a proper and timely notice.



Adherence to contract change notice requirements

- ❑ Typically, **construction contracts** require that once the **contractor has identified** a potential changed condition,
 - it has a **specified number of days** to provide notice to the owner of a potential change;
 - the **submission of other documentation** may also be subject to time limitations.



Adherence to contract change notice requirements

- ☐ The **first step** in requesting a change order or prosecuting a change order claim is to **recognize** the potential contractual basis for an **adjustment** in time or price.
- ☐ **Early recognition** is required to ensure that **notice requirements** are met, and that costs and documentation needed to support the change order claim are maintained.

Reasons for timely notification?



Adherence to contract change notice requirements

- ❑ Among the **reasons timely notification** should be submitted to the owner are the following:
 - ❖ Provides the **owner a chance** to **examine** the actual conditions on-site or **investigate** the issues under examination at the time of their occurrence;
 - ❖ Gives the owner a better chance to **mitigate** the potential adverse effects of the issues under examination (e.g., delay-causing events, adverse conditions, previously unknown site conditions, or changes to the scope);

Adherence to contract change notice requirements

- ❑ Among the **reasons timely notification** should be submitted to the owner are the following:
 - ❖ Provides the owner with an opportunity to **explore more** reasonable and/or less costly options, and possibly change its work plan by:
 - ✓ **Modifying** the design to avoid or otherwise better manage **pertinent risks**;
 - ✓ **Requesting** the **contractor** to provide a proposal or change order request to execute the changed work;
 - ✓ **Identifying** changes such as change in the **contractor's means and methods** or to **exclude** certain work elements **from the contractor's scope of work**;



Adherence to contract change notice requirements

- ❑ Among the **reasons timely notification** should be submitted to the owner are the following:
 - ❖ Provides the owner with an opportunity to adjust its budget and pursue additional funding opportunities as needed.



Adherence to contract change notice requirements

❑ **Not all** notice **requirements** in a contract are the **same**.

❖ *For example, for force majeure and differing site conditions clauses, notice timing is often shorter than for other types of change / delay.*

✓ Further, the required elements for a proper notice may change from one contract clause to another.



Adherence to contract change notice requirements

- ❑ Additionally, there may be **continuing notice obligations** to keep the **client updated** on how the contractor is “spending the client’s money”.
- ❖ *For example, with respect to notices of delay, sometimes it may **take months for a delay event** to run its **full course** and the contractor to acquire the necessary data to support its claim.*
 - ✓ In this case, contracts may require **monthly updates** be submitted to the owner that inform on the status of delay event.



Adherence to contract change notice requirements

- ☐ **Contractors** often contend that the owner had constructive notice during meetings, progress reviews, and project progress reports that a change occurred that would impact its time and cost of performance.
- ☐ A contractor should **not solely rely on this contention** as there is significant uncertainty that a **court or arbitration panel** will make an award based on constructive notice and require formal notice for the COR or claim to prevail.

Estimate of cost and time included in the notice?



Adherence to contract change notice requirements

- ❑ Often, **contracts** require that the contractor include a high-level estimate of the pricing and schedule impacts within the **initial notice** of change.
- ❑ Informing the owner as **early as possible** of a potential change and the associated change to the contractor's pricing and schedule completion date allows the owner the **opportunity** to identify and consider other options if the contractor's estimated cost and schedule **impacts** can be avoided or mitigated.



Demonstration of causation

- ❑ **Once** a causal event has been demonstrated to have occurred or is occurring, the **next test** for the contractor is to demonstrate that this event **contemporaneously impacted** its forecasted final costs and completion date.
 - ❖ Although the event is contemporaneous, its **impacts may not be felt** until far into the **future of the project**.



Demonstration of causation

- ❑ The contractor must demonstrate that
 1. There was a **cause-and-effect** relationship between a **causal event** that was not its responsibility (or there was a shared responsibility) and
 2. The **effects that event had** on its ultimate project cost or ability to finish the project by the current contract completion date.



Demonstration of causation

- ❑ Demonstrating causation is often the **most difficult aspect** of a COR for the contractor to prove, **especially if** the contractor did not **keep good project records**.
- ❑ Often the need to start capturing detailed and relevant documentation **should have been underway before** the change event occurred.
 - ❖ It is **not typically feasible** for a contractor to **keep records in anticipation** for the possibility that a **change might occur**.
 - ❖ Quite often, an event **arises and issues** such as productivity loss are **not immediately understood**;
therefore, it does **not immediately trigger** the start of detailed record keeping.



Demonstration of causation

- ☐ A **list of common causes** of changes can be found in RP 100R-19.



Demonstration of causation

- ❑ Reverting back to the rain event example, the contractor will have to **demonstrate** *that the magnitude of the adverse rain that occurred was **not only unanticipated** per the terms of the contract, but also **affected the project's ability** to move forward efficiently, or not at all, as per the schedule.*
- ❑ It must also be demonstrated that **additional costs** were incurred to **mitigate or respond** to the rain's effects.



Demonstration of causation

❑ It is recommended that the contractor provide

1. Labor and other productivity records,
2. Photographs of work affected by the rain,
3. Correspondence,
4. Vendor records, and
5. Evidence that the project's critical path was impacted by the event.

❖ There should be a clear understanding of the work that was **contemporaneously on or near the critical path** at the time the **causal event occurred**.

❖ Additionally, the **contractor** should **demonstrate concurrent delay** if it occurred.



Prudent effort to mitigate any impacts

❑ Typically, contracts require that **both parties** have a **duty to mitigate** the impacts of a change.

❖ However, if a contractor intends to request a **change order for impacts** resulting from a change,

the owner will typically request that the **contractor demonstrate** the mitigation efforts it performed and the show the resulting effects.

✓ It is recommended that a contractor confronted with a changed condition

should make its **best efforts to mitigate** the potential impacts of the change.



Prudent effort to mitigate any impacts

- ❑ **Providing evidence** that the contractor acted to avoid or mitigate the **impacts** resulting from a change should **indicate to the owner that** the **COR** resulted **only after the contractor did its best** to reduce the cost and schedule impacts.



Assignment of responsibility

❑ **Identifying** the party that is **responsible** for a change may **seem simple** to demonstrate, and **often is**.

❖ *For example, the owner would most likely be responsible for the additional costs that arise as a result of a change in scope that it directed.*

✓ However, this is not always the case when **determining who is responsible for delay** and the **associated costs**.

○ This can sometimes be challenging, especially when other **intervening effects are simultaneously impacting** the project schedule.



Assignment of responsibility

- ❑ With respect to **delays** arising from **changes**, including owner-directed changes, the contractor will have to demonstrate that the change impacted the project schedule's critical path or other contractually-defined milestones at the time that the change occurred.

What if the contractor cannot demonstrate?



Assignment of responsibility

- ☐ If the contractor **cannot demonstrate** that the change will affect the **contemporaneous critical path** once the changed work is performed, then there are **no time impacts** to the project completion date.



Assignment of responsibility

❑ However, there may be **events** that affect the contractor's direct cost of performing the work

even though the event, change, or owner-caused action did **not affect the current critical path** of the project;

for example, acceleration or disruption costs.

An event, change, or owner-caused action may result in **delay to a subcontractor's work** that was **not on the current project critical path**, but that **subcontractor's work was extended** in time compared to its planned schedule for completion, and thus its **time related costs** were increased.



Assignment of responsibility

- ❑ Lastly, **determining responsibility** for a change and its resultant impacts can be difficult to establish **retrospectively** as a result of poor project documentation, especially when:
- a) A change was **not specifically directed** by the owner,
 - b) **Occurrence** of the causal event **cannot** be established, or
 - c) When **causation cannot** be clearly determined.

As noted previously, it is important for both parties to maintain good records contemporaneously throughout the life of the project.



Quantification of impacts

- ☐ For the contractor to be **granted an increase** to its contract price or a time extension as a result of a contract change, it must **quantify** the **associated impacts**.
- ☐ That is, the **contractor must calculate** how much additional money and time would be needed to successfully complete the project according to the terms of the contract.

Quantification of impacts

- ❑ The **contract** should define **what documentation** the contractor is to **submit** to the owner in support of its requested cost and time extension quantifications that result from a contract change.
 - ❖ However, **contracts** are often **silent or ambiguous** with respect to **what supporting** analyses and documentation the contractor is to provide.

This understanding is especially important when the **changes** are **related to quantifying** the effects of disruption and project delays.



Quantification of impacts

- ❑ It is recommended that the contractor demonstrate that the cost or schedule impacts, which **have been or will be realized** as a result of the change, are **reasonable** and **supportable**.
- ❖ Although these terms can be **subjective in interpretation**, it is important that the **claimant only include quantification** of costs or delays that it can reasonably support.



Quantification of impacts

- ❑ Concerning a **time extension request**, if not specified in the contract, a common way to **contemporaneously quantify** forecasted schedule impacts is through the use of time impact analysis,
 - using the most **recent schedule update** prior to the occurrence of the event, change, or owner-caused action or inaction.



Quantification of impacts

- ❑ The amount of information and analyses necessary to demonstrate each element should be **scalable** based on the complexity of the project and the specific issue being evaluated in the COR or claim.

Pricing construction claims and change orders?
Another section!

Change Order Request or Claim Submission



Change order request or claim submission

- ☐ It is important that the COR or claim is written in as concise and cogent manner as possible.
- ☐ **Graphics** are always helpful in communicating points that would otherwise **require multiple paragraphs** to describe.
- ☐ **Claim visuals** can play important roles in simplification and proper presentation of a claim, especially in **complex cases**,
because they are used to organize records, findings, and analyses in the most **efficient and visually attractive** ways using illustration techniques.



Change order request or claim submission

- ☐ The use of these techniques along with **other elements** of a claim such as claim narratives and other supporting documents improves readability and makes the arguments more compelling.



Change order request or claim submission

❑ Whether a COR or claim, it should be submitted using the **following guidelines**:

1. The **submission** should present a complete package, with **all necessary supporting data**, so that it be utilized...as the basis for proving the claim with little extra work.
2. The **presentation** should offer a complete, accurate, and truthful narrative about the conditions encountered on the project.
3. The **presentation** should admit and take into account **problems** that are the...**claimant's...own responsibility** and that had a significant effect on the project.

(The alternative to this can be a **disaster** when the...**claimant's...credibility** is shattered at a hearing or trial.)

4. Finally, the **submission** should reflect **pricing** that is not grounded in the “**twilight zone.**”





Change order request or claim submission

- ☐ The contractor's COR or claims submission should be based on **facts** and **avoid attempting** to rely on opinions or other information that is not fact-based.



Contributors

نحوه اثبات محق بودن به ادعا و دستور تغییر
بر اساس اسنادی از ASCE و AACE

Dr. Stephen P. Warhoe, PE CCP CFCC FAACE Hon. Life (Primary Contributor)

Saad Ishac

Richard J. Long, PE

Donald F. McDonald, Jr. PE CCP PSP FAACE Hon. Life

Dr. Seyyed Amin Terouhid, PE DRMP PSP

Prepared by Dr. Alavipour
DO NOT DISTRIBUTE

Pricing Construction Claims and Change Orders

(Introduction)



Introduction



مدیریت ادعاء و اختلافات در طول چرخه حیات پروژه
آنالیز، ارزیابی و حل دعاوی و اختلافات در فاز پس از ساخت/اجرا (Post-Construction Phase)

Stages in analysis – Damage analysis

❑ Pricing of claims falls into two categories:

1. Forward pricing

where the **price and time** are **negotiated before** the **work is done**.

2. Post pricing,

where **pricing and time adjustments** are made **during or after**
performance of the work.

❑ In applying either type, the pricing elements of the claim itself are the same and include

1. Direct cost of performing the changed work,
2. Impact and/or delayed performance costs (impacts on direct costs),
3. Project overhead costs,
4. Markups for overhead and profit.



Introduction

- ❑ **Many different methodologies** have been used to successfully price claims.
- ❑ What is important is that the pricing elements are carefully **calculated** and **substantiated**.



Forward pricing

- ☐ Forward pricing establishes a **price** before the work is done.
- ☐ The owner and contractor (or contractor and subcontractor) **agree on**
 1. The **work** to be performed,
 2. The amount of **costs** to be incurred,
 3. The **time** required to perform the changed work, and
 4. The **amount** to be paid.
- ☐ This is a **practical approach** and offers **great advantages** to both parties.
- ☐ The owner or contractor can negotiate a **fair and reasonable** price and time to perform the work **before directing** the work to be performed.



Forward pricing

- ☐ The owner or contractor **also knows** the **additional cost** to be incurred because it has **been fixed** by the agreed-upon change.
- ☐ The contractor can
 1. Logically integrate the changed work into the schedule,
 2. Procure the required materials, and
 3. Perform the work.

Unfortunately, the pace of construction projects often prevents changes from being forward priced and agreement being reached prior to performing work.

- ❑ **Post pricing** is used to establish the price for changed and added work after performance of the work.
- ❑ Common post pricing methods are force account, or time and material, in which payment is based on **records of actual** work hours, materials, and equipment used.
- ❑ This method is **most commonly used** when an owner directs a contractor to make discrete changes during performance where the **changed work** can be segregated from the base contract work.



Post pricing

- ❑ Often, **directly capturing** the added cost is **not possible**, such as when the owner directs a *pipe size to be increased from 6 in. to 10 in. in diameter*, affecting multiple areas and trades throughout the project.
- ❑ **Directly capturing** the impact costs or labor inefficiency costs on **unchanged but affected** base contract work and the **changed work** is often difficult.
- ❑ These are the circumstances **where disputes** over the cost and time to perform changed work most often arise.
- ❑ **One benefit** to post pricing changes is that the **actual increase in cost is known** rather than estimated.

Pricing Construction Claims and Change Orders

(Forward Pricing)



Introduction

- ❑ In the Modification Impact Evaluation Guide (although withdrawn by the Corps, the statements about forward pricing remain relevant),
the U.S. Army Corps of Engineers emphasizes the **importance of agreeing on price and time terms**
before allowing the contractor to proceed with modified or changed work.

*The guide states, “The **attitude** that the **urgency** for reaching a settlement no longer exists once the NTP [notice to proceed] has been issued is **self-defeating**.”*



Introduction

- ❑ For many reasons, it is **advantageous** to the contractor to delay final settlement of all modifications until the work is finished.”

Why the contractor believes this?

- ❑ The guide gives the **following reasons** a **contractor would find** delaying settlement of modified work until all of the work has been completed **advantageous**:
 - ❖ The contractor can be **less cost-conscious** in doing the work.
 - ❖ **Some of the risks** contractually assigned to the contractor are **shifted to the Corps of Engineers**.
 - ❖ The contractor will have **actual cost data** with which to confront the Corps of Engineers.
 - ✓ (Actual cost data under this circumstance does **not necessarily represent reasonable cost**.)

What is the challenge here?



Challenges in forward pricing

- ❑ When a construction **change directive** is issued,
the **contractor must perform** the work;
the **cost** of that work will be determined at a **later date**.
- ❑ The **contractor assumes** that any and **all costs** it incurs will be **compensable**,
while the owner will argue that **not all costs** were necessary or reasonable
and/or some costs were excessive,
thereby resulting in a **dispute**.



Advantages of forward pricing

❑ The guide notes **advantages of forward pricing** but goes on to say that

“[a] major benefit of settling modifications before performance is that it encourages prompt revision of the progress schedule,

thus maintaining accurate knowledge of the sequencing of

1. The remaining work,

2. The final contract price, and

3. The final completion date.

❖ *The schedule then remains a **realistic tool** for determining the **impact of changes** on the contractor's operations.*

❖ *An up-to-date **CPM schedule is a prerequisite** to forecasting the presence and extent of impact.”*



Advantages of forward pricing

- ❑ An **updated current schedule** also allows for independent **analysis of future changes**.

Thus, the **impact** to the project of each change can be **determined**.



Advantages of forward pricing

- ❑ However, **although** forward pricing has certain **advantages**,
most changes are not settled in time to avoid impacts to the follow-on work.
- ❖ As a result, many **forward-pricing proposals** are withdrawn then resubmitted with **actual costs**
because **owners fail to approve** the change in time to take advantage of the risk allocation inherent in the forward-pricing method.

Does owner accept contingency?



Risk in forward pricing

- ❑ Owners **rarely** accept contingencies in price proposals.
 - ❖ Sometimes, the **owners/engineers** do **not fully inform** the contractors of **all cost implications** a change order might have on the project.
 - ✓ *For instance, an owner may change equipment furnished, but fail to inform the contractor of a **longer lead time** to **obtain the new equipment**.*
 - *Thus, the contractor is left to develop the full scope of required services to cover all unanticipated potential costs of the changed work*



Risk in forward pricing

- ❑ A change order price proposal should **include everything**, within reason, that the **change** could affect directly or indirectly.
 - ❖ This includes schedule impacts and the effect on base contract work **not directly changed** but nevertheless made more **difficult or costly to perform**.
 - ✓ The **standard changes clause** for government contracts and in many standard form contracts recognizes **claims** for impact on **“unchanged” work**.



Risk in forward pricing

- ☐ In **estimating a new job**,

ideal conditions, worst conditions, or conditions somewhere in between can be assumed when **preparing the bid**.

- ☐ In forward pricing, **more is known** about the conditions in which the work will be performed;

therefore, the **cost proposal** should include costs based on the **actual conditions** encountered or expected.

- ☐ These **conditions** should be **documented** as part of the **cost proposal**.

What to do with risks then?



Risk in forward pricing

- ☐ The **contractor's estimate** should define all probable risks and problems and **base its pricing** on those problems and risks that are more substantial and probable.
- ☐ Where **substantial risks** are identifiable, but **unlikely** and/or **difficult** to quantify, they should be **explicitly excluded** from the **change proposal**.

What if change order seems likely to affect
unchanged work ?



Risk in forward pricing

- ☐ In the event a change order seems **likely to affect unchanged work** but **cannot** be
- (1) discerned,
 - (2) accurately estimated, or
 - (3) negotiated,
- the contractor should **expressly exclude** those risks from its **proposal** and **reserve the right to claim** such cost and time extensions at a **later date**.



Material quantities and prices

- ❑ **Additional work** is the **most common reason** to require additional material.
- ❑ A **detailed material takeoff** should support the quantity of additional material, and **invoice or quote backup** should support any increased costs.
- ❑ **Buying small amounts** of additional material may result in higher unit costs for the additional materials.
- ❑ **Increased costs** also result from **improperly specified materials** (or defective specifications).



Material quantities and prices

- ☐ A **contractor** would then **submit material** in compliance with the **corrected specifications**.
- ☐ The contractor should be **able to recover** the increased cost of the substituted material.



Material quantities and prices

- ❑ A contractor should **weigh** the same considerations as in the **original bid** regarding material **takeoff and pricing** when estimating material costs for change orders.
- ❑ Changes often involve **small material quantity purchases** with increased handling; as such, more attention should be paid to pricing to **ensure all applicable costs** are considered.
 - ❖ Sources for material prices include quotations, published price lists, records, handbooks, and published indices.



Material quantities and prices

❑ Factors to account for when pricing materials include

- ❖ Purchasing practice—higher prices of a reliable supplier,
- ❖ Salvage value of job material and excess purchases,
- ❖ Greater cost of odd lot sizes,
- ❖ Quantity discounts not applicable or not able to be taken,
- ❖ Cash discounts not applicable or not able to be taken,
- ❖ Transportation and handling costs (special deliveries),
- ❖ Inspection and testing costs,
- ❖ Taxes and duties,
- ❖ Escalation, and
- ❖ Storage.



More...

نحوه اثبات محق بودن به ادعا و دستور تغییر
بر اساس اسنادی از ASCE و AACE

See claim management course...

Pricing Construction Claims and Change Orders

(Post Pricing)



Cost analysis

- ☐ The contractor always has the burden of proving both the entitlement to and the amount of requested additional costs.



Cost analysis

☐ The contractor is **obligated** to provide

1. The best evidence of damages possible under the circumstances, and
2. Good, detailed presentation of damages

can frequently result in a greater recovery of the costs incurred.

❑ **Courts** have shown a **strong preference** for the actual cost method of calculating damages.

❖ *The U.S. Court of Claims stated in Bruce Construction Corp. v. United States, “As we have said above, there is a presumption that actual costs paid are reasonable. That presumption must be overcome by which every party alleges its unreasonableness.”*

✓ *In this method, the actual cost records of the contractor are used to “itemize and total the cost of each piece of equipment or material and each manhour necessitated by the [breach].”*



Actual costs

- ❑ This method is **also referred** to as the “**segregated**” or “**discrete**” cost method.
- ❑ If the **existence of the claim is known** prior to completion of the job, arranging the **contractor’s cost-accounting system** to allow for the **immediate identification** of damages may be possible.
 - ❖ **Every effort** should be made to **segregate the damages** by issuing separate cost-accounting codes to **track** the labor and material for the changed work.
 - ✓ However, this is often not possible



Actual costs

- ☐ For example, when work is **both added and deleted** by a change,
no actual cost record will exist for the **deleted work**.
- ☐ When **separate cost codes** are not established,
the changed work labor and material are **comingled with the base work** labor
and material,
making the **separation** of costs **difficult** without signed time tickets,
invoices, or some methodology to identify the changed work discretely.
✓ If
 1. The changed work was **highly inefficient**, and
 2. **No separate cost codes** or tickets were produced,
an accurate accounting of the work hours **cannot be determined**.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Original estimate:

- ✓ The **contractor** will generally have prepared an original estimate or budget **prior to submitting** a bid or proposal for the project.
- ✓ These **estimates** are typically broken down into **various accounts or cost codes** that reflect the work to be performed.
- ✓ Within the various accounts, **numerous subaccounts** can be included, depending on the **level of detail the contractor desires**.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Cost reports:

- ✓ One of the most important categories of documents is the **contractor's cost reports reflecting actual costs** incurred in performing the work.
- ✓ In reviewing cost reports, there are generally two types of reports to examine.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Cost reports:

- ✓ One is an overall project cost report, frequently called a “**job cost report**,” “**work-in-progress report**,” or “**job status report**.”
 - This report shows all incurred costs on a job, such as labor, material, and equipment, arranged by cost code or account.
- ✓ The second type of report is a labor-only report, focusing on **labor expenditures** by cost code or account.
 - Such reports frequently give work hour data, hourly cost data, and unit cost data.

*Both types of reports are normally available in **summary and detail** formats.*



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Labor records:

- ✓ Labor cost is **often the largest** variable cost a contractor incurs and is a frequent **source of damage claims**.
- ✓ Labor records include documentation such as timesheets, overtime reports, and cost records.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Quantities:

- ✓ The **anticipated quantities** of work to be performed are usually included in the **initial estimate**.
- ✓ Most estimates include a **quantity takeoff**, which is the count or measure of the quantity of material required along with the labor required to install those materials.
- ✓ These **quantities** should be compared with the actual quantities of work performed to determine whether **cost overruns or underruns** are related to quantity differences.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Schedules:

- ✓ The **original schedule** is typically updated on a regular basis, generally **monthly**.
- ✓ The **updated schedules** are important to any delay or acceleration claim, as **critical path impacts** on a monthly basis can be identified.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Pay applications:

✓ Pay applications can be a **source of information** on the **quantity of work performed**,

allowing for an **analysis** of the **amount of work performed** by period and type,

particularly for **unit price contracts**.

✓ Pay applications can be used to **identify** an earned cost as **compared** with an actual cost per pay period.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Changes estimates:

- ✓ When the **owner directs** a change in work, the contractor is generally **requested to submit an estimate** of the increased or decreased costs and time resulting from the change.
- ✓ In **performing a claim analysis**, **revisions** to the budget in the cost report should be **reconciled** with approved change orders.
- ✓ *As an example, if an additional 500 work hours are added, the budgeted work hours should reflect an increase of 500 work hours as compared with the actual work hours expended for the same work item.*



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Daily logs and reports:

- ✓ The **daily logs or daily reports** of the prime contractor and subcontractor provide a contemporaneous view of what work was being performed and any problems encountered.
- ✓ The architect, engineer, and the owner's representatives may also maintain periodic reports.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Daily logs and reports:

- ✓ Daily logs and periodic reports can provide insight into
 1. **What actually occurred** on the project on a day-to-day basis, and in some occasions
 2. **Why** specific events occurred, or
 3. **When** and **how much** added equipment was used in a specific time period.
- ✓ Often, the daily logs and/or reports are the best source of **contemporaneous project information** to confirm extra costs claimed.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Productivity reports:

- ✓ For self-performed work, a **daily or weekly record** is kept, showing installed units and work hours for **each labor cost code**, as compared with the estimated productivity rate for the same work item.
- ✓ These reports reflect when **productivity problems** occurred and, if properly developed, document the **causes of poor productivity**.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Photographs:

- ✓ **Date-stamped photographs or videos** are excellent ways to record actual conditions or components of the changed work.



Reasonable costs developed from existing job data

❑ However, **most** construction project **documentation** will include **some or all** of the following **categories of documents**:

❖ Unit cost reports:

- ✓ Unit costs **pulled from a computer** report alone **cannot be expected to prove** factual evidence of cost.
- ✓ Unit costs vary widely, depending on
 1. Quantities recorded,
 2. Material purchases made (and recorded),
 3. Size of crews used, and
 4. Types of equipment deployed for a particular period.



Reasonable costs developed from existing job data

- ☐ When **detailed cost records exist**,
whether they are segregated for the claim or not,
a **line-by-line analysis** of the cost records must be performed.
- ☐ During the **first review** of the records,
every item with a **significant variance**,
either overrun or underrun,
should be **identified** and the **causes** of these variances
determined.



Reasonable costs developed from existing job data

❑ Focusing **only on the overruns** can be a mistake;

sometimes **underruns** are equally informative.

❖ Examining the **reasons for underruns**

can **avoid making unjustified claims** for large labor overruns

that **actually resulted** from the **contractor's performance** in lieu of subcontracting certain items.



Reasonable costs developed from existing job data

❑ **Costs** should be explored to determine whether certain **correlations exist**.

❖ As an example, if an **excavation contractor** has significant labor overruns, **corresponding overruns** in equipment costs should be present.

✓ If those overruns do **not exist**,

closer scrutiny is required

because the **equipment and labor costs** should move in parallel.



Reasonable costs developed from existing job data

- ❑ The **coding** of the actual work must also follow the **same process** as the original estimate.
 - ❖ For instance, if the estimate and budget segregates **drywall installation** between walls and ceilings,
but the **contemporaneous tracking** or coding **does not**,
this can lead to the appearance of **overruns or underruns**.



Reasonable costs developed from existing job data

- ❑ The project documentation and cost records must be kept so as to **sufficiently support** the claimed amounts.
 - ❖ Ideally, the project documentation and cost records will **supplement each other**.
 - ✓ In some claims, **law or contract mandates** the use of actual costs.
 - *For example, in **termination for convenience** cases, many contracts require that the contractor be **compensated based on actual costs expended**.*

Reasonable costs estimation

- ☐ **One approach** often used in construction claims is to estimate the amount of damages.
- ☐ Contractors are often able to estimate damages with **some degree of accuracy**.
- ☐ Determining damages by estimating is **not unreasonable**, because contractors survive economically by accurately estimating the cost of projects prior to construction.
- ☐ If **enough discrete items** are known, then reasonable **assumptions can be made** and **reasonably accurate estimates** of damage costs can be calculated.



Reasonable costs estimation

- ☐ When using this method,
being cognizant of **other projects performed** by the contractor with similar problems or similar design or use
is necessary so that **comparisons** between the projects can be made.
- ☐ **Many contractors** maintain histories of their projects that allow such cost comparisons.
- ☐ **Historical information** on prior projects must be examined so that the **validity of the contractor's estimate** can be analyzed accordingly.



More...

نحوه اثبات محق بودن به ادعا و دستور تغییر
بر اساس اسنادی از ASCE و AACE

See claim management course...

Pricing Construction Claims and Change Orders

(Post Pricing)

موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

دفتر آموزش



تهران، بلوار فردوس شرق، مجتمع آبگینه، طبقه سوم اداری، واحد C42



+۹۸ ۲۱ ۴۶ ۱۰۰ ۴۴۵



+۹۸ ۲۱ ۴۶ ۱۰۰ ۴۵۰



info@dralavipour.com



www.dralavipour.com



@alavipour_pm



@acemi_social



@alavipour_pm



@IRANACEMI

