نحوه اثبات محق بودن به ادعا و دستور تغییر

ابزارهای حیاتی + نکات کلیدی

(بر اساس اسنادی از AACE و ASCE)

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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

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What we will learn?

- Recommended practice
  - **The Elements are Inter-related**
  - **Document Retention and Organization**
  - **Change Order Request or Claim Submission**

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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

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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

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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

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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

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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.

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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.

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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
      1. What work was being performed and
      2. 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

- Providing **many different line-item calculations**

  rather than a **single damage calculation**

  1. Improves the presentation of the claim,
  2. Shows precisely where losses occurred, and
  3. Allows for a more detailed entitlement analysis.

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.

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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.

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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 segreg**ates drywall installation** between walls and ceilings,

    but the **contemporaneous tracking** or coding **does not**,

    this can lead to the appearance of **overruns or underruns**.

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Reasonable costs developed from existing job data

- When using the **actual cost method**,

  demonstrating the actual costs using the **claimant's accounting records** is necessary.

- A contractor's claims for **productivity losses** may be **denied because** the **contractor failed to document**

  1. The costs on days when actual impacts occurred,
  2. What work was performed on those days, and
  3. What work hours were expended.

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.*

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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.

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Reasonable costs estimation

- Under the estimated cost method,

  the claimant may furnish a **wide variety of data**, including **estimates by**

  1. Contractor personnel,
  2. Calculations by expert witnesses,
  3. Cost data, and
  4. Accounting records,

  as support for the reasonable value for the damages.

- The **assumptions used** to estimate the damages must be carefully examined.
  - Frequently, **slight variations in assumptions** can produce **significant variations** in the outcome.

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Reasonable costs estimation

- **Varying the productivity rate** by an incremental amount can result in huge variances for large quantities of work such as piping, earthwork, or paving.

- **Varying the assumptions** to analyze the effect on calculations is often useful.
  - This can **avoid surprises later**, such as discovering that a slight change in assumption eliminates all damages.

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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.

Pricing Construction Claims and Change Orders

(Post Pricing)

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General pricing philosophy

- Claims typically begin with the submission of a change order proposal or a request for equitable adjustment (REA).
- In pricing claims, the contractor is advised to keep in mind the goal of **maintaining credibility** with the owner.
- Pricing data should be clear, accurate, and concise.
- Proposals should be **sufficient in detail** to **permit an analysis** of all material, labor, equipment, subcontracts, overhead costs, general condition costs, and profit.
- The proposal should cover **all work involved** in the modification, whether such work was
    1. Deleted,
    2. Added, or
    3. Changed.

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General pricing philosophy

- The **contractor should strive** to have the proposal prepared in an orderly, clear, concise, and contractually accurate manner to **minimize analysis delays** and to prevent **unnecessary misinterpretations** of the claim documents.
- Nothing is more **counterproductive and disheartening** than to invest a significant amount of time, money, and effort in a claim, **only to have it rejected** or returned because it is **incorrect or unacceptable** for analysis.
- Conversely, including **unnecessary documentation** in an effort to **bolster your claim** is also counterproductive;

  only documentation that is **pertinent** to the claim should be submitted.

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Unit price contract considerations

- Unit price contracts are based in **whole**, or in large part, on **unit prices**, frequently with estimated quantities of each unit.
- Contracts for heavy and civil construction, particularly highway and utility work, are often put out for bid and priced using a schedule of unit prices and estimated quantities.
- **Even lump-sum contracts** may contain **some items** that are based on unit prices.
- Issues often arise when the estimated quantities in the contract **vary significantly** from the actual quantities performed.

Unit price contract considerations

- A **body of law** has developed to determine when the owner or the contractor is **entitled to a price adjustment** under these circumstances, depending on whether the contract contains
  1. A **variation in quantity provision** concerning such price adjustments or
  2. **If it is silent on the issue**.

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Unit price contract considerations

- **Each unit price** must contain the variable costs for performing a unit of work and a share of the contractor's nonspecific costs, such as
  1. General condition costs,
  2. Overhead, and
  3. Profit.
- What is **included and not included** within a specific unit can become a matter of extreme importance

  when **significant changes occur** in either
  1. The quantities or
  2. The means, methods, or manner of performance.

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Unit price contract considerations

- The **determination of how units** are to be **calculated** for the purpose of payment is extremely important in **unit-price contracts**.
- **Disagreements** over the **measurement** of units are **not uncommon**.
- The contractor will likely be held to the prescribed unit price

  unless the contract specifically sets forth **different unit prices** for **different quantities** of work or materials.

  - **Absent a contract provision** allowing the unit prices to be renegotiated for quantity changes, the **general rule** is that a contractor or an owner **cannot require** a unit price to be renegotiated simply because of a **quantity change**.

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Unit price contract considerations

- If the **contract specifically provides** that a **change in quantity** will **not result** in a change of unit price, **neither the owner nor the contractor** is entitled to an adjustment in the **unit price** when the **quantity increases or decreases**.
  - Many form contracts contain provisions governing change in quantity.

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Unit price contract considerations

- For example, **AIA-A201, Standard General Conditions**, contains the following provision:
  - *7.3.4. If unit prices are stated in the Contract Documents or subsequently **agreed upon**, and*
  - *if **quantities originally contemplated** are so changed in a proposed Change Order or Construction Change Directive*

    *that application of such unit prices to quantities of Work proposed will **cause substantial inequity** to the Owner or Contractor,*

    *the **applicable unit prices** shall be **equitably adjusted**.*

What is the problem here?

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Unit price contract considerations

- However, what constitutes a **substantial inequity** is not strictly defined, which can lead to **further disagreements** between the owner and contractor.

What is the solution here?

Unit price contract considerations

- Some contracts contain **clauses that specify** that an **adjustment in unit price** will be **permitted**

  if the actual quantities **vary by more than a certain percentage** of the estimates quantities.

  - These provisions are known as variation in estimated quantities (VEQ) clauses and are common in **government road-construction contracts**.
    - ✓ The existence of a VEQ clause generally **reduces the number of disputes** that arise concerning variations in quantity.

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Unit price contract considerations

- However, **even with a VEQ clause**,

  recovery may be denied if the increased cost of performing the additional units was **not caused by the variation** in quantity.

  - Some courts have held that if a quantity variation does **not come within the purview of a VEQ clause**,

    an appropriate adjustment can be made **under the differing site conditions or changed conditions** clause of the contract.

    - ✓ The **differing site condition clause** may apply **rather than the VEQ clause**

      in cases where the **cost of additional units** varies greatly from the contract price,

      no matter the reason for the increase.

Pricing elements and details

Stages in analysis – Damage analysis: Proposal for pricing the claims

Pricing elements and details

- The **basic elements** of the **change order/claim proposal** include:
  - **Summary**
    - Entitlement
    - Amount of request
    - Time extension
    - Parties involved in the claim
    - Reference to contract clauses and/or contract disputes act
  - **Narrative**
    - Growth in cost amount
    - Growth in time
    - Facts
    - Entitlement
  - **Schedule analysis, if applicable**
    - Time impact analysis, as-planned vs. as-built, windows analysis, etc.

Pricing elements and details

Stages in analysis – Damage analysis: Proposal for pricing the claims

Pricing elements and details

- The **basic elements** of the **change order/claim proposal** include:
  - **Pricing**
    - **Direct costs**
      - Labor (including all burdens)
      - Supervision directly related to work
      - Owned and rented equipment
      - Permanent materials
      - Job materials
    - **Mark-up**
      - Jobsite overhead
      - Home office overhead
      - Profit
      - Bond
      - Insurance

Pricing elements and details

Stages in analysis – Damage analysis: Proposal for pricing the claims

Pricing elements and details

- The **basic elements** of the **change order/claim proposal** include:
  - **Pricing**
    - **Impact costs**
      - Impact on other activities
      - Delay costs (standby time, escalation)
      - Acceleration costs (overtime and premium hours, disruption)
      - Lost profit
      - Lost productivity costs (disruption)
      - Lost overhead

Unit price contract considerations

- In **forward pricing**, the most convenient and acceptable method of pricing is to
  1. **Estimate** production rates for the changed work,
  2. **Show** crew compositions and expected crew hours required to perform the changed work, and
  3. **Determine** the type of equipment and equipment hours needed to support the crews.
     - **Material costs** should be listed separately and substantiated with quotes, invoices, or price lists.

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Unit price contract considerations

- For **post pricing**, names and dates of **laborers** and **equipment** should be listed, summarized, and submitted along with the rate and hours **expended**.
  - **Copies** of time cards are **usually not required**, so long as they are available for verification.
  - On **force-account change orders**, the work is commonly documented and verified **daily** by **both** the owner and the contractor.
  - On large projects, a **contractor may claim** it had to perform force-account work
    but **no owner's agent** could be **located to substantiate** the need or costs incurred for the **alleged work**.

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Unit price contract considerations

- A **contractor** should be **cautious** in performing additional work that is not approved.
- Where possible, pre-agreed

  equipment rates, unit costs, and/or crew rates

  should be established early in the project.
- In **many cases**, equipment rates and labor rates are **stipulated** in the **contract documents.**
  - This will **expedite the negotiation** and processing of individual changes.

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Production rates

- **Change orders** often affect the productivity rate at which the **changed work** can be performed and the productivity rate of the **unchanged work**.
- In computing production rates for **prospective changes** and to establish a **reasonable cost**,

  considering all factors that could increase or decrease the computed production rate is important.
- The size of the crews and the production rates are the two most important items **affecting the value of work** to be performed.

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Production rates

- The Construction Contract Negotiation Guide recommends including **all possible factors** that will influence production rates, including
  - Relative experience, capability, and morale of workers;
  - Size and complexity of the job;
  - Climatic and topographic conditions;
  - Degree of mechanization;
  - Quality of job supervision;
  - Existing labor-management agreements and/or trade practices; and
  - Learning curve, which is a function of size, type of work, interruptions, and lack of repetitive tasks.

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Production rates

- To **offset the advantage** that uncertainty always gives the contractor,

  the **negotiator** must bring analytical skills and experience to bear on the **work rate problem.**

- This is particularly important because **contractor-subcontractor direct labor** is commonly the single largest dollar item in construction.

- Thus, a somewhat small **"cushion" in a contractor's work rate estimate**, perhaps as **small as 2% of the total estimate cost**,

  may **double or even triple** the **contractor's profit margin.**

Pricing Construction Claims and Change Orders

(Impact and Inefficiency Costs)

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How impact costs are incurred

- Under the changes clause of the contract, the cost of performing **unchanged work** can be **included** in the equitable adjustment

  only if the performance of the **change affects such cost**.

  - *"If so, those **increased costs** of performing the **unchanged work** which are **directly attributable** to and which **flow from the change** are **properly compensable** under the change order."*

How impact costs are incurred

- **Examples** of impacts on unchanged work due to a change order are
  - Changes in sequence of work;
  - Changes in the manner and method planned to do the work;
  - Use of different types, sizes, and quantities of equipment;
  - Disruption to planned continuity of work;
  - Additional mobilizations and demobilizations;
  - Increased congestion of work areas (overcrowding);
  - Inefficiency incurred during winter work resulting from schedule changes in changed work;
  - Overtime or premium time incurred to overcome delays caused by the above; and
  - Additional supervision to manage the changed work.

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Specific, identifiable extra work

- **To calculate** the effect of changes on unchanged work,
  1. Showing specifically what increased costs were incurred or
  2. Showing what the actual cost was compared with what the work would have cost without the change order is necessary.

With **smaller change orders**, showing the added cost of an item of work is **much easier**.

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Specific, identifiable extra work

- *For example, the cost increase is somewhat easy to show*
  - *if an item took three shifts to complete where it normally would have taken two shifts or*
  - *if a larger crane was needed to perform the change order work and the same larger and more expensive crane was used to also perform the contract work.*
    - ✓ In such cases, it is simply a matter of computing the **additional hours** of equipment and labor used or planned for and the **additional materials** that were required.
    - ✓ With **larger** delay, disruption, or acceleration claims, the pricing of impact becomes more complex.

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Pricing inefficiency and loss of productivity

- Unfortunately, **most impact costs** are not as easily identified and quantified.

You learned this in Delay Analysis Course!

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Pricing inefficiency and loss of productivity

- **Productivity analysis** is a three-step process consisting of
  - **(1) Quantifying** the overruns and underruns that occurred;
  - **(2) Determining** the cause(s) of the overruns and underruns; and
  - **(3) Calculating** the actual productivity loss (if any), using the difference in productivity rates.

Pricing inefficiency and loss of productivity

- The general calculation for **quantifying the cost of lost productivity** is

$$\text{Unproductive work hours per unit} = \frac{\text{Work hours in affected area or time frame}}{\text{Units}} - \frac{\text{Work hours in unaffected area or time frame}}{\text{Units}}$$

$$\text{OR} \quad = \text{Actual}\left(\frac{\text{Work hours}}{\text{Units}}\right) - \text{Planned}\left(\frac{\text{Work hours}}{\text{Units}}\right)$$

$$\text{Total unproductive work hours} = \left(\text{Unproductive work hours per unit}\right) \times (\text{Units})$$

$$\text{Cost of lost labor productivity} = \left(\text{Total unproductive work hours}\right) \times (\text{Hourly labor cost})$$

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Pricing inefficiency and loss of productivity – Acceleration

- **Acceleration** occurs when the contractor is required to complete some or all of the work within a **shorter duration of time** than reasonably planned.
- Acceleration often results from delays early in a project or to complete more work resulting from **change directives** of the same duration as originally contemplated in the original contract.
- Acceleration on a project generally leads to
  - Overcrowding and trade stacking,
  - Increased crew sizes,
  - Increased shift lengths, and
  - Working more days per week,

  all of which can result in inefficiencies and lost productivity, leading to **increased costs**.

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Pricing inefficiency and loss of productivity – Acceleration

- Where the owner directed the acceleration or was otherwise responsible for the events necessitating acceleration,

  the contractor should be **able to recover the added costs** incurred from accelerating the work.

- Contractors should be **cautious about accelerating** without written direction from the owner.

- Keep detailed reports and identify additional costs by

  using **separate tracking numbers** to

  gather those hours for pricing at a **later date.**

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Pricing inefficiency and loss of productivity – Overcrowding and trade stacking

- **Overcrowding** is the simultaneous operation of several trades in the same area.

- Lowered productivity can result from **having more workers than can function efficiently** in a limited working space.

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Pricing inefficiency and loss of productivity – Overcrowding and trade stacking

- A contractor seeking to **prove lost productivity** from overcrowding must demonstrate that
  - **(1) Congestion or trade stacking** was not originally contemplated, because the work was planned sequentially,
  - (2) The **overcrowding** resulted from the owner's actions, and
  - **(3) Productivity losses** resulted from the congestion.
- As an example, if an electrical item that takes three workers is shifted into a period of time where 15 workers are already performing their drywall and painting activities, a **20% crowding factor (3/15)** has been incurred, affecting all **18 workers**.

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Pricing inefficiency and loss of productivity – The size of work crews

- As **more workers are added** to the optimum crew size,

  contractors can expect **diminished returns** on each additional worker—

  each new worker will increase crew productivity less than the previously added worker.

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Pricing inefficiency and loss of productivity – The size of work crews

- **Increasing crew size above optimum** usually produces a **higher rate of progress** but at a higher unit cost.
  - A contractor must show that
    - ✓ The larger crew or shift work was not planned,
    - ✓ That the owner caused the change that forced the increased crew size, and
    - ✓ That actual productivity loss was incurred

      to recover under a productivity loss theory.

Pricing inefficiency and loss of productivity – Shift and/or Days and Hours Worked per Week

- Working more than eight hours per day or more than five days per week introduces **premium pay rates** for workers and results in **efficiency losses.**
  - The efficiency losses result from a slower pace maintained by workers and fatigue from **longer hours**.
    - ✓ Working sustained overtime of 50 hours per week for six weeks will result in a productivity loss of approximately 15%, and
    - ✓ working 60 hours per week for six weeks will result in a productivity loss of approximately 28%.

Pricing inefficiency and loss of productivity – Shift and/or Days and Hours Worked per Week

- As noted in The **Business Roundtable**,
  - *"After five to six weeks of operations, there is a further drop in productivity, which levels out at a low point after nine to 12 weeks of sustained overtime operation."*
  - Industry studies indicate that

    the productivity of laborers who work 50 hours per week for a period of 10 weeks can decrease by as much as 35% and that 60-hour work weeks over the same length of time can result in a decrease of labor productivity up to 45%.

Pricing Construction Claims and Change Orders

(Material Costs)

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Introduction

- **Material cost claims** can be divided into two categories:
  1. Claims for additional material and
  2. Claims for the escalated cost of material.
     - For various reasons **attributable to the owner**, contractors may be **forced to purchase** materials that were unanticipated at the time of bidding.
     - Also, **contractors** may be **required** to purchase materials at prices higher than anticipated.

It is well recognized that contractors can recover the costs of additional material and escalated cost of materials.

The **cost of supplies** incurred as a result of **additional material requirements** is also recoverable as an element of construction claims.

ACEMI

Introduction

- Escalated material and labor costs can easily be **incurred when a project is delayed**, pushing the time of performance into later time periods than anticipated.
  - *For example, if concrete was anticipated to be placed in a given year but was delayed to a following year, the material could easily increase in cost.*
  - *Similarly, delaying labor into later time periods than anticipated could push the labor into new labor agreement periods with higher labor rates.*

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Reasons for material claims

- The **three most common reasons** for material claims are
  1. Owner-caused delay,
  2. Defective specifications, and
  3. Owner-directed changes.

- In cases of owner-caused delay,

  contractors seek primarily to recover the **escalated cost of the material.**

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Reasons for material claims

- In times of inflation,

  delays in the progress of a job often result in an **increase of the cost of material**.

- The **effect of inflation** is particularly **acute** in the construction industry,

  where the cost of labor and materials **escalate rapidly**, and

  is particularly pronounced when the material is based on **volatile commodities** such as petroleum products.

- **Claims** for escalated material costs are **not restricted** to inflationary economic periods.

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Reasons for material claims

- Defective specifications require **correction**, and

  compliance with corrected specifications may result in the contractor **substituting another material**.

  - However, substituting materials at no additional cost is **often impossible**.
    - ✓ Contractors may be **able to recover** the increased cost of **material substitutions** in certain situations.
      - o Contractors **may recover** the increased cost of performing in accordance with an owner's defective plans and specifications.

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Reasons for material claims

- If a **specification** calls for a general material and contains **no other specific representation**,

  the **contractor typically** bears the risk of the material's unavailability and is **not entitled** to an equitable adjustment.

  - However, material that is unavailable due to **abnormal circumstances** may result in cost or time **adjustments to the contract**.
    - ✓ *Examples of this are a concrete shortage due to the cement plant being unable to produce cement and drywall being unavailable because it was diverted to a different geographic area to address storm-related repairs.*

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Reasons for material claims

- The **contractor also assumes risk** even when an owner specifies a subcontractor or sole-source supplier.
  - If the contract requires a specific subcontractor, the **risk of nonperformance** remains with the contractor.

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Reasons for material claims

- Similarly, when a **sole source** is designated, the owner implicitly warrants **only that the specified source** will be **capable** of supplying the required material.

- Also, when a **unique material is specified**, an implied warranty exists that the **material will be available** to accommodate the construction schedule.
  - The **contractor may be responsible** to schedule its work to accommodate the **material availability**.

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Reasons for material claims

- Contractors should **not limit claims** solely to the increased cost of the material.
  - Contractors should be aware that, along with the **additional costs** of the substituted items,

    they may also be able to recover for **delay costs associated** with complying with the **defective specifications**.

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Reasons for material claims

- Moreover, a **change order** may **render previously purchased material** unsuitable or unusable.
  - Such material costs are **recoverable elements** of construction claims.

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Other costs associated with material claims

- Contractors should be aware of **costs other than the direct costs** of the additional or **escalated material**.
- Although these expenses may be tangentially **related to the actual cost** of the material,

  such costs are **recoverable and should be included** in all construction claims.

Other costs associated with material claims

- The **Federal Acquisition Regulation (FAR)** permits recovery of additional material costs for items **not actually used** on the project.
  - *Specifically, it states, "[i]n computing material costs, the contractor shall consider reasonable overruns, spoilage, or defective work (unless otherwise provided in any contract provision of the contract relating to inspecting and correcting of defective work)."*

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Additional material quantities and cost calculation

- Calculating additional material quantities is a **fairly simple process** because material quantities are **easily identifiable**.
- Maintaining accurate records facilitates establishing the quantity of additional material used on a project.
- In the absence of records or other supporting data, contractors may establish and calculate the quantity of additional materials by reference to the **project's drawings**.
- The difference between
  1. The quantity of materials required by the original drawings and
  2. The quantities actually used on the project

  is the amount of additional materials that were required.

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Additional material quantities and cost calculation

- If no drawings are available,

  the quantity of additional material may be determined by **comparing**

  - The contractor's original estimate for material with the
  - Actual quantity of material used.

Pricing Construction Claims and Change Orders

(Equipment Costs)

ACEMI

Introduction

- **After labor**, the greatest variable cost item on most construction projects is **equipment**.
- On projects involving heavy civil work,

  equipment costs are **closely related** to labor costs.

  - If additional labor is required, **additional equipment** is usually required because the work is **not completed with bare hands alone**.
    - ✓ Moreover, **equipment costs always increase** when a project is extended,

      even in the **absence of labor increases**,

      because **equipment costs are still incurred** whether or not the equipment is **operating**.

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Introduction

- Equipment is distinguished from small tools primarily on the basis of cost.
  - Frequently, **small tools** are defined as those items falling under a set value limit, **typically $1,000**.
- Often, small tools are accounted for as a direct cost to a project, whereas **equipment** is usually capitalized.
  - ✓ Equipment, as a capital item, is considered to be charged to the project only for the time it is on the project.
  - ✓ Small tools, however, are typically considered to be consumed on the project.
- The distinction between equipment and small tools is important in claims analysis for purposes of **calculating increased costs**.

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Introduction

- Increased equipment costs often are incurred due to one of the following events:
  1. An extended performance period requiring the same amount of equipment to be on the project for a **longer time period**;
  2. Additional work on the project requiring either
     1. The same equipment on the project for a longer time or
     2. New or additional equipment to perform the new work; and
  3. Decreased productivity requiring **more labor** and, hence, **more equipment**.

In many construction claims, a **combination of all three factors** applies.

ACEMI

Introduction

- The cost of **mobilizing or demobilizing equipment** on an equipment intensive project can be **significant**.
- The **additional cost** of an unanticipated demobilization

  followed by a remobilization can be a compensable cost of a delay or suspension of work.

Additional Equipment Usage

- When **usage of additional equipment** has occurred on a project, the calculation of the **additional time period** for the equipment is somewhat simple.
  - If the equipment was **rented** from an outside vendor, the cost of that equipment is the rental cost plus the operating costs of that equipment.
  - Most contractors should have a **consistent method for accounting** for owned equipment.
    - ✓ However, if the contractor or an affiliate of the contractor **owned the equipment**,

      the **appropriate rate** for the equipment can be the source of **significant disagreement**.

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Additional Equipment Usage

- **Ideally**, the contractor will have cost-accounting records showing the equipment costs for each unit of work.
- The cost of equipment per unit of work is multiplied by the **additional work units** to obtain the **added equipment costs**.

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Additional Equipment Usage

- **Even** if the contractor does **not maintain such records**, **recreating** them may be possible by
  1. **Determining** the cost for the **appropriate equipment** over the entire time the work was performed and
  2. Then **dividing** it by the total number or work units to determine to **equipment cost per work unit**.
     - ❖ This can then be multiplied by the number of additional work units to determine the equipment cost.

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Additional Equipment Usage

- **When** additional equipment costs are required because of extended job duration,
  1. Determining not only that the equipment was **on site longer**
  2. But also whether it was **less productive** or whether it sat **idle part of the time** because of the **extension** of the schedule is necessary.

Additional Equipment Usage

- Another consideration is **whether** the **contractor made reasonable efforts** to reassign the equipment to **avoid leaving it idle**.
  - Of course,
    1. The uniqueness of the equipment,
    2. Whether it was specifically designed and purchased for one project, and
    3. The location of the site

       are factors to consider in determining whether the equipment could be reassigned reasonably.
  - ✓ **Proving exactly** when equipment was **assigned to a contract** and then **reassigned** can be **difficult**.

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Additional Equipment Usage

- When the equipment is **rented or leased** from an outside third party,

  the **cost of placing equipment** on **standby** when a **delay or suspension** of work has occurred is **simple**.

  - The costs of the suspension or delay can be determined from the **actual invoices** from the rental companies or lessors.
    - ✓ However, disputes frequently arise in valuing **contractor-owned equipment.**
      - o One method to **minimize the disputes** over the cost of contractor-owned equipment is to **set forth the rate** for **each specific piece or type** of equipment in the contract.

Additional Equipment Usage

- Recovery for idle equipment is limited to the equipment that is **actually idle**.
- In Pennsylvania Department of Transportation v. Herbert R. Imbt, Inc., the **contractor was denied** recovery for standby equipment costs because the **equipment was available to perform other work**.
  - The owner had ordered the contractor to **demobilize the equipment**, but the **contractor decided** to **leave the equipment on site rather than** divert it to another project.

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Additional Equipment Usage

- Because **large equipment** has to be moved from location to location by **truck at substantial cost**,

  contractors sometimes **elect to leave the equipment on site** until they have a use for it at a **specific location.**

  - While this method of **"storing" equipment is not uncommon**,

    the contractor is **not entitled to recover the cost** of the "stored" equipment as idle equipment.

Pricing Construction Claims and Change Orders

(Overhead and Profit)

ACEMI

Introduction

- In addition to the direct costs of performing extra work, a contractor is normally entitled to a **reasonable allowance** for overhead and profit,

  typically in the form of fixed percentage markups on the direct cost of the work.

- These markups are either specified in the original contract or agreed to in writing by the parties after the contract has been signed.

ACEMI

Introduction

- Combined rates for overhead and profit may be specified, such as **15% for overhead and profit**, or

  separate markups on **cascading direct costs** as are sometimes used in **U.S. Department of Veterans Affairs contracts.**

  - *Separate percentage markups are used, including two overhead elements—jobsite (or field) overhead and home office overhead.*

ACEMI

Introduction

- When **separate percentage markups** are used for overhead and profit, care should be given to identify **what each percentage is applied to**.
  - *Applying 10% overhead to the direct cost of the work and 10% profit to the direct cost of the work results in substantially different amounts than applying 10% overhead to the direct cost and then 10% profit to the sum of the direct cost plus the overhead.*
    - ✓ The total markup becomes 21% under the latter scenario.
- **Contractually agreed-upon labor rates** should be **analyzed to determine whether** those rates include markups,

  which would be in addition to the separately identified markups.
  - Inclusion of both in a claim could lead to the contractor obtaining a windfall.

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Project overhead rates

- Overhead costs include **two elements**: (1) fixed costs and (2) variable costs.
  1. Fixed costs remain essentially unchanged over time or volume of work, for example, the monthly rental cost of an office trailer.
     - The monthly cost of the office trailer will be the same every month, regardless of any changes or occurrences on the project.
  2. Variable costs fluctuate based on the volume of work, changes to the scope or schedule, and many other factors.
     - An example of variable costs is fuel.
     - Equipment may be used much more heavily during some periods of the project than others; therefore, fuel costs will be much greater during those high-use periods.

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Project overhead rates

- **If** an item usually included in **field overhead can be clearly segregated**,

  a court or board may list it as a **distinct item of damage**.

- In many cases, the contract sets forth a fixed percentage for field overhead markup on **change orders**.

- Because **many overhead costs** appear to be **fixed**,

  owners are very reluctant to pay **additional overhead costs** without convincing documentation.

- The burden of **proving that additional overhead** was **not only incurred**

  but necessary **solely as the result of the changed work** falls on the contractor.

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Project overhead rates

- On contracts without fixed-percentage markups,

  negotiating a supplemental agreement to the contract to permit fixed markups for minor changes is usually advantageous.

- This **saves both the owner and contractor** the time-consuming tasks of computing and analyzing overhead costs for **each and every change order**.

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Overhead on large claims

- **Major claims** have **several means of computing field overhead costs**, and the one offering the most reasonable results should be selected.
  - The **first method** is similar to that discussed previously—

    applying percentages based on cost experience,

    the original bid percentage, or

    the contract stipulated percentages to the **direct costs claimed**.

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Overhead on large claims

- **Major claims** have **several means of computing field overhead costs**, and the one offering the most reasonable results should be selected.
  - The **second method** is the total cost approach,

    where the **bid overhead** (plus any overhead received on other change orders) is

    deducted from the **total actual overhead incurred** during the **period** in question.

    - ✓ Use of this method typically requires the **contractor to prove** that its **original bid overhead** was reasonable and all-inclusive;

      otherwise, the contractor would **end up getting compensated** for its own bid errors.

ACEMI

Overhead on large claims

- **Major claims** have **several means of computing field overhead costs**, and the one offering the most reasonable results should be selected.
  - A **third method**, which amounts to a modified total cost approach,

    is to take the **total actual overhead** and **deduct** the **reasonable overhead**.
    - ✓ This method can be used over the entire project or for the affected time period only.
      - o Reasonable overhead can be computed several ways.

        The simplest method is to **apply a percentage** to the **direct costs** that would have been incurred had no change or delay taken place.

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Overhead on large claims

- **Major claims** have **several means of computing field overhead costs**, and the one offering the most reasonable results should be selected.
  - For **use in claims** where a delay or suspension of work has occurred, a fourth method can be used—the **average daily rate**.
    - An **average daily rate** for project overhead is calculated using the actual costs incurred and the actual days of performance.

      This rate is then **multiplied** by the number of days of delay or suspension experienced to arrive at the overhead cost for the affected period.

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Overhead on large claims

- **Major claims** have **several means of computing field overhead costs**, and the one offering the most reasonable results should be selected.
  - Lastly, a fifth method is to identify, isolate, and include as **direct cost items** that were added for the **purpose of administration** of the specific claim or change order.
    - ✓ *For example, an additional supervisor, bookkeeper, or engineer required strictly because of the change would not be fairly compensated in the normal percentage markup.*

      With this last method, the basic overhead for the change is computed on a **percentage basis**

      with an **additional charge** for the additional direct cost items.

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Overhead on large claims

- Using one or more of the methods for complex changes, such as those that add both significant work and additional time, may be appropriate.

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Home office overhead

- In addition to **field overhead**, contractors incur home office overhead costs.
- These are expenses that serve all projects, such as home office rent, telephones, salaries, taxes, payroll, insurance, and bookkeeping expenses.
- These are the costs incurred by a contractor to conduct business but are **not specific to any project**.
- As such, these overhead expenses are an **indirect expense** that benefits all projects and must be allocated to all projects on a shared basis.
- For the purpose of **routine change orders**,

  a fixed-percentage markup is often negotiated,

  as described previously, that is added to **direct costs**

  along with project overhead and profit.

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Profit

- Profit is usually a fixed percentage amount to be added to the **direct cost** of the changed work.
- Some contracts restrict the **general contractor's markup** for **tiered subcontractor's work** to a much smaller amount than allowed for direct work.
- Often, the **amount of profit** that can be **applied to changed work** is defined in the contract documents.
- In many cases, **separate profit markups** are used for **different types of work**.
  - The markups on a **contractor's direct costs** may be greater than that allowed on subcontractor costs or material costs.

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Profit

- Profit may be divided into two categories:
  1. Gross profit and
  2. Net profit.
- Generally speaking, gross profit is the difference between the cost of performing the work and the total contract revenue received.
- Gross profit margins can vary widely among contractors and projects because contractors typically include different cost categories in their overhead. Gross profit margins are often inaccurate reflections of a contractor's rate of return. Analyzing a contractor's financial statements is therefore useful to determine the true overheads and, hence, the gross and net profit margins.

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Profit

- Generally speaking, gross profit is the difference between the cost of performing the work and the total contract revenue received.

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- **Analyzing** a contractor's financial statements is therefore useful to determine the **true overheads** and, hence, the gross and net profit margins.

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Profit

- **Net profit** is profit **earned after the application** of overhead costs but **before the application of state and federal taxes.**
- In some cases, the net profit margin may **more accurately** reflect the recoverable profit percentage in a **construction claim**.
  - For example, **gross profits** may not be appropriately claimed **concurrently** with extended home office overhead costs.

Pricing Construction Claims and Change Orders

(Other Elements of Claim Pricing)

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Interest costs

- A **contractor** is responsible for **providing the capital required** to perform a **construction contract**.
- If the project owner **expands the scope of work** and **increases the contract price**, however, the contractor may be able to **recover the cost of borrowing funds** necessary to perform the additional work.
- This assumes the **contract does not contain** a clause that specifically disallows interest charges or other capital costs.

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Interest costs

- If the **contractor does not borrow** funds to perform change-order work,

  but **uses its available equity capital**,

  there **may be no recovery** from imputed interest, or the "cost" of this capital.

  - Contractors, however, **routinely argue** that although they did **not actually borrow** additional funds,

    they **lost the use of the funds they provided**, and that the lost use of those funds has a corresponding cost.

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Interest costs

- These **four factors** must be met for **interest costs to be allowed**:
  1. The owner must have directed the work;
  2. The funds must have actually been borrowed;
  3. The borrowed funds must be segregated in a separate account; and
  4. The borrowed funds must have been used only for the changed work.

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Insurance costs

- Insurance is a significant and growing cost element of construction contracts and on certain contracts can be **1% or more** of the total price of the contract.

- An **owner's action or inaction** may cause the contractor to incur **increased insurance costs** that are a recoverable element of construction claims.

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Insurance costs

- **Insurance costs** can increase due to owner-directed changes and owner-caused delays.

- **Insurance premiums** are generally based on the total dollar amount of the contract.

- When **owner-directed changes** increase the amount of the insurance premium, the contractor is **entitled to recover the difference** between the original premium price and the increased premium price.

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Insurance costs

- Similarly, owner-caused delays may require the **existing insurance policies** to be **renewed for the extended duration** of the contract.
  - When the **contractor incurs increased insurance costs** due to owner-caused delay,

    the **entire cost** of the extended duration or new policy is **often recoverable.**

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Bond costs

- Similar to insurance costs, **contractors incur additional bond costs** primarily when owner-directed changes or owner-caused delays occur.
- Like insurance, **bond premiums** are calculated on a percentage basis of the total contract value, and

  any **increase in the value of the contract** will increase the amount of the **bond premium.**
- Owner-caused delays may require the contractor to **obtain additional bonding** and incur increased bonding costs.
- In either situation, the **cost of additional bond premiums** is recoverable and should be considered and included in all claims and change orders.

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Legal fees, change orders, and claim-preparation costs

- The **costs of preparing** routine change orders are typically considered incidental to contract performance and included as part of the **overhead markup** added to the price of the change order.

- One situation where **discrete change-order-preparation costs** may be **allowed is when** the owner **requests** a price for a change order but never actually issues the change order.

Legal fees, change orders, and claim-preparation costs

- On **private and nonfederal** contracts, legal fees are typically **not allowed on claims unless** specifically **provided for in the contract**.

Legal fees, change orders, and claim-preparation costs

- However, the **fees of outside consultants** have been **allowed in some situations**.
  - *"In contrast to the cases where recovery was disallowed, these consultant services were provided at a time when both sides were amenable to a contract modification and were actively negotiating a price adjustment.*
  - *The efforts therefore provided a direct benefit to the contract and were not merely preparation of a claim."*

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