



استفاده از ضریب هوشی (IQ)، هوش هیجانی (EQ) و هوش ارزشی (VQ) در مدیریت پروژه

فصل اول: استفاده از بهره هوشی (IQ) در مدیریت پروژه
بخش پنجم: چه زمانی و در چه مکانی مدیر پروژه باید ورود نماید و از IQ خود استفاده کند؟

ارائه دهنده:

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What we will learn?

- ❑ When and where the CMs plug in?
 - ❖ Part 1: Program/project phases
 - ❖ Part 2: Pre-construction
 - ❖ Part 3: Construction
 - ❖ Part 4: Post-Construction

Road map

In this section

WHO? EXPERIENCED MANAGEMENT
PROFESSIONALS IN CONSTRUCTION

WHAT? OWNER ADVOCATES

WHY? BECAUSE SOMEONE NEEDS TO LEAD

WHEN? DURING THE LIFECYCLE OF AN ASSET

WHERE? RIGHT ALONGSIDE THE OWNER

HOW? BY MANAGING TIME, COST, QUALITY
AND SCOPE



CMs in phases

- ❑ CMs can manage **projects and programs** from **pre-design to closeout** right alongside the Owner, when given the chance.
- ❑ **Many titles** are used for the various phases of the project's lifecycle such as:
 - ❖ Pre-construction, planning phase, concept phase, development phase, design phase, schematic design, design development, etc.
 - ✓ These refer only to the **activities** which occur **during the pre-construction** process.

WHEN?

**DURING THE LIFECYCLE OF
AN ASSET**

WHERE?

RIGHT ALONGSIDE THE OWNER



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CMs in phases

PROGRAM/ PROJECT PHASES - PART 1

PRE-CONSTRUCTION - PART 2

DEVELOPMENT PHASE

DESIGN PHASE

PROCUREMENT PHASE

CONSTRUCTION - PART 3

CONSTRUCTION PHASE

POST-CONSTRUCTION - PART 4

PROJECT CLOSEOUT PHASE

MOVE MANAGEMENT

When and Where Do CMs Plug in?

(Part 1: Program/Project Phases)

What do you do for a living?

❑ This section includes **matrices** organized by the phase of a **project's lifecycle** from pre through post construction listing

1. Responsibilities,
2. Processes and
3. Deliverables

of a CM.



"So what do CMs do for a living?"



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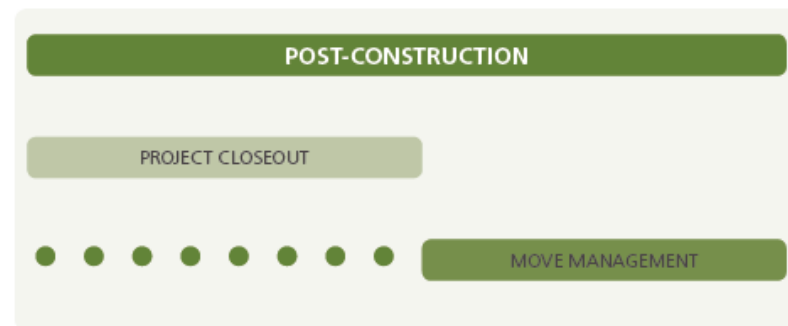
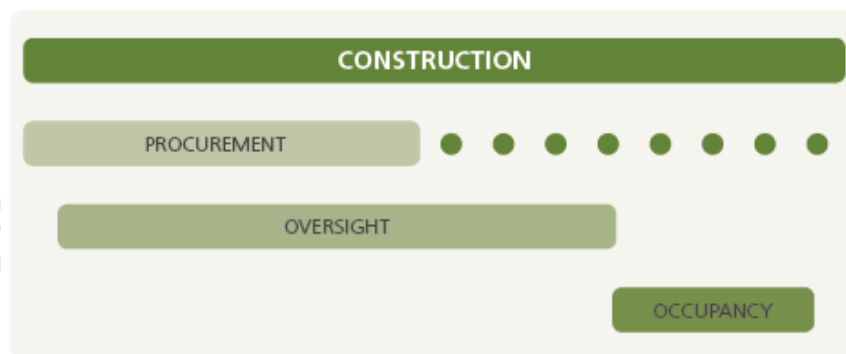
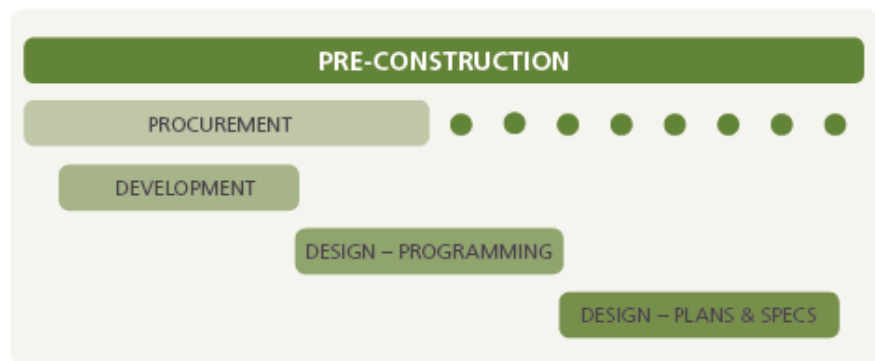
What do you do for a living?

- ❑ Of course, none of these will fit into a neat little elevator pitch, alternatively **simply state:**

"We are experienced management professionals who are the Owner's advocate throughout the lifecycle of a construction project or program. Our product is client satisfaction, which is best achieved by keeping our promise of delivering a quality project on time, on budget and within scope expectations. We do this by safely managing all risks through clearly defined responsibilities, well-documented processes, and best in class deliverables at every step along the way."

– Lisa C. Sachs, 2011

All phases at a glance

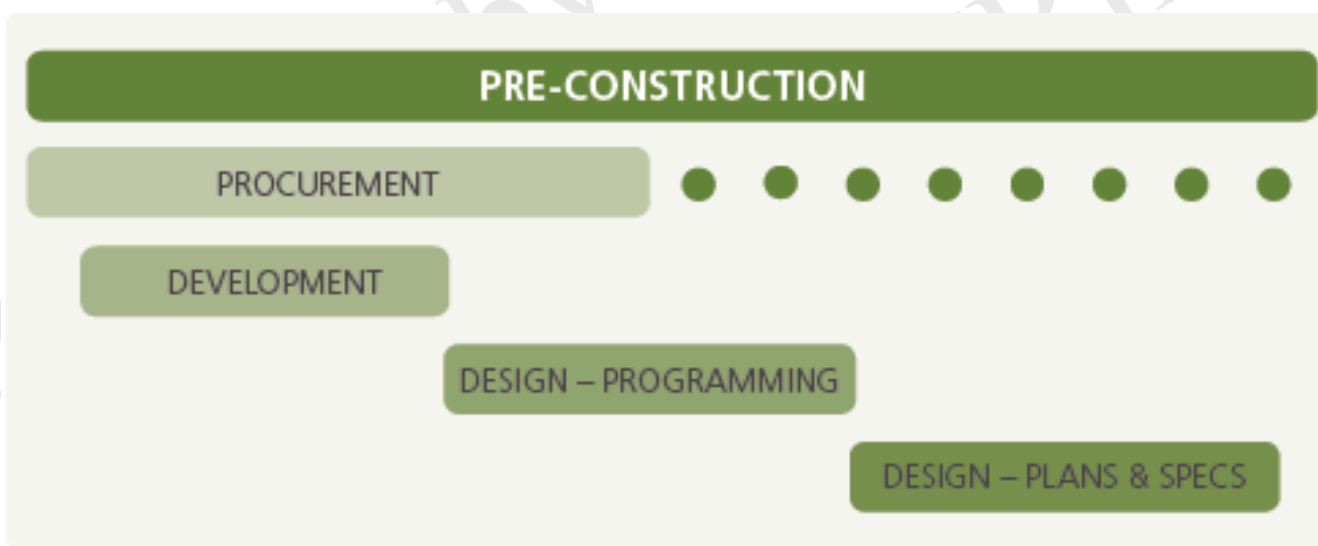


When and Where Do CMs Plug in?

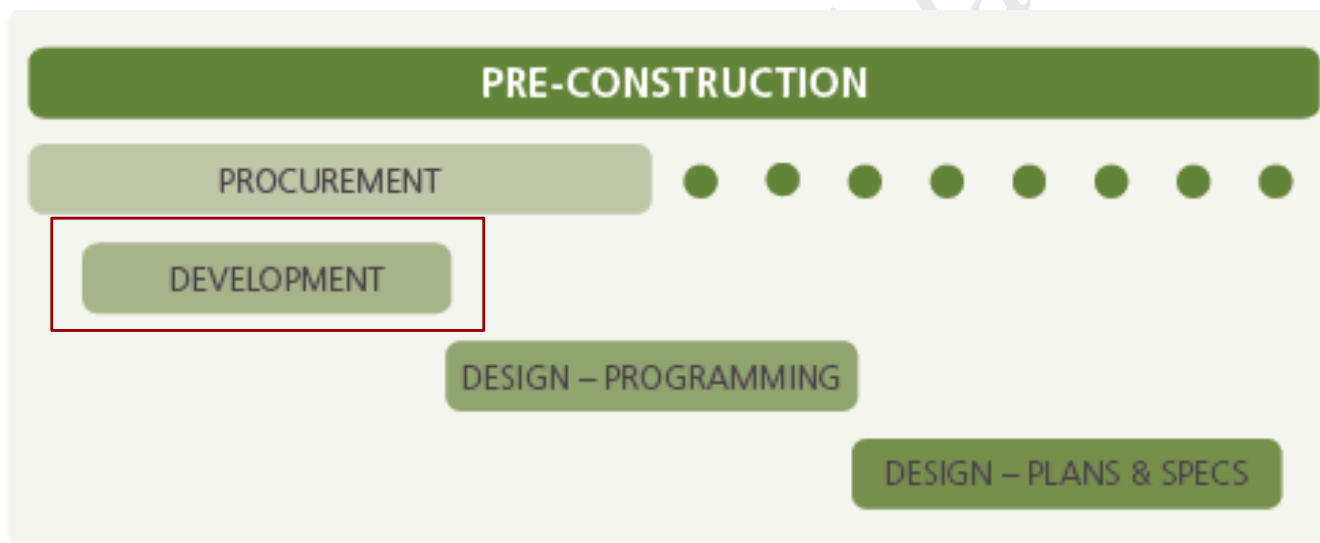
(Part 2: Pre-Construction)

Pre-construction phase

- ❑ You will note that **procurement begins** in **pre-construction** even **before the development phase**, since the **first task** is to hire the **CM/ Owner's Rep** and **continues through construction** so it is included in both phases.



Development phase



Development phase

- ❑ **Development** is the **first step** in the process.
- ❑ **Once funding** has been **identified**, a program or project **can** be **developed**.
 - ❖ First develop the **plan**.
 - ✓ To develop the plan you need an **organization**, and to ensure the organization works efficiently you need to
 1. Establish the **communication tools**,
 2. Target the **right people**, and
 3. Give them clearly **defined roles and responsibilities**.

What terms used commonly at the start of a program?

Development phase

What terms used commonly at the start of a program?

❑ Terms such as

1. Program Management Organization (PMO)
2. Program Management Plan (PMP)
3. Scope of Work (SOW)

are common terms used at the **start of a program**.

What do they mean and how useful are they?

Development phase

What do they mean and how useful are they?

1. **Construction Managers** who work on programs **help their Owners** make
 1. Early technical decisions
 2. Financial decisionsto
 1. Define further the **capital improvement program** and
 2. Develop the **roles and responsibilities** of all of the anticipated team membersthrough a **Program Management Organization (PMO)**.

Development phase

What do they mean and how useful are they?

2. Program Management Plan (PMP) is then **drafted** and,

once finally **approved**,

becomes the **Owner's guideline** for

1. Executing
2. Monitoring
3. Controlling the work

Development phase

What do they mean and how useful are they?

3. A **Scope of Work (SOW)** is then developed and

CM works diligently as an **integral part of the PMO implementation** team to ensure the **Owner's goals** **translate** into an achievable program that meets

1. Quality,
2. Scope,
3. Schedule and
4. Cost

expectations of the client.

Let's see each of them more in depth!

Development phase: Program Management Organization (PMO)

❑ The **first task** is to create a

1. **Program management organization chart** including **all stakeholders**
2. **Decision-making matrix** illustrating the **roles and responsibilities** of each.
 - ❖ **Selection of consultants** to join the **PMO** should
 1. **Run concurrently** with the **development of the PMP** and
 2. It is the **start of the procurement process**

How to form the organization?

Development phase: Program Management Organization (PMO)

❑ **Owners** may issue either

1. Request for Qualifications (RFQ) or
2. Request for Proposals (RFP)

to **professional firms** which describes

1. Overall program and
2. Qualifications

to fulfill the roles needed.

How does owner develop RFQ and/or RFP?



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Development phase: Program Management Organization (PMO)

❑ Many Owners will rely on their

1. Peers in the industry and/or
2. Legal counsel

to help **develop or modify RFQs or RFPs** from similar programs.

For these reasons an experienced construction attorney **and** CM
should be involved in the **drafting** of an RFQ or RFP.

Development phase: Program Management Plan (PMP)

- ❑ The **PMP** establishes the program processes and procedures for the intended scope of work.
- ❑ The **PMP includes**:
 - ❖ Financial management and control,
 - ❖ Program schedule (milestones and deliverables) and work plan,
 - ❖ PMO plus
 - ✓ Expected resources, budget,
 - ✓ Scope management,
 - ✓ Change management plan,
 - ✓ Issues management,
 - ✓ Quality management,
 - ✓ Risk and safety management,
 - ✓ Procurement management,
 - ✓ Program/project status reporting,
 - ✓ Communication plan,
 - ✓ Move management (including transition plan and interim housing),
 - ✓ Closeout plan and post-construction facility maintenance plan.

How to develop PMP?

Development phase: Program Management Plan (PMP)

❑ Development of the **PMP** involves:

- ❖ Planning and defining of the **program**
- ❖ Strategy definition of the Owner's program wide **capital asset management** and **implementation plan** with **long term goals** and objectives of the organization
- ❖ Set up of the **program's infrastructure** and **management information systems**
- ❖ Identification and incorporation of **continuous best practices**
- ❖ Identification of **program administrative** processes and procedures
- ❖ Update existing **design standards** and **specifications**
- ❖ **Project management** and **consultant resources**
- ❖ Project **planning, budgeting, and scheduling**
- ❖ Coordination of the **overall team**
- ❖ Program/project **status reporting**
- ❖ **Risk management** and **quality assurance**

A PMP is a living document with most areas of the PMP developed over the life of a program. A PMP is best regarded simply as "The Plan" and remember...plans are meant to be updated. Therefore, include the updating in your scheduled meetings with the PMO. Ensure the information is dynamic and retrievable in "real-time" versus stagnant, sitting on a bookshelf collecting dust.

Development phase: Program Management Plan (PMP) – Management Information System (MIS)

- ☐ A Management Information System (MIS) provides **information the PMO requires** to manage resources, technology and data.
- ☐ The Owner's management information system needs to be **evaluated based on specific criteria formulated** by the PMP to control and report on the progress of the program.
- ☐ **Existing computer systems** (hardware and software) are **evaluated and reviewed early**.

Development phase: Program Management Plan (PMP) – Management Information System (MIS)

Remember – communicate, communicate, communicate.

❑ We firmly believe that a **good CM never imposes systems** on the Owner unless welcomed,

and should be **flexible to tailor systems** to **suit** based on

1. People,
2. Program needs and
3. Tools already in place (if workable)

Development phase: Scope of Work (SOW)

- ❑ A **Scope of Work (SOW)** sets forth the **requirements** for a project.
- ❑ An **approved SOW** will detail the program **associated costs and schedule** of priorities.
- ❑ **Collaboration** with user groups, staff, (including site facility committees such as IT, maintenance, safety, etc.) and designers is
an **essential component** to the development of a **SOW**.
- ❑ The **Owner's existing Facility Master Plan (FMP)** is the template for **updating and appending the plan**
to ensure **alignment with objectives**.

If one does not exist then an **FMP RFQ/RFP** should be issued.

Development phase: Scope of Work (SOW)

- ❑ A **final Scope of Work** is then **drafted for approval** based on comprehensive working sessions with the **PMO Implementation Team**.
- ❑ A realistic **budget** and **schedule** can then be established for **final approval** which will factor:
 1. Cost escalations
 2. Market conditions
 3. Appropriate design
 4. Design and construction contingencies

Development phase: Execution strategies

- ❑ **Various execution strategies** to improve program cost, quality and/ or schedule are **likely to emerge** as the **program develops**.

e.g., assessment of project delivery methods or bid packaging strategies

- ❖ The **execution strategy, once approved**, is fully **documented in the PMP**.

- ❖ The **approved PMP** provides both

1. Technical Guidance
2. Administrative guidance

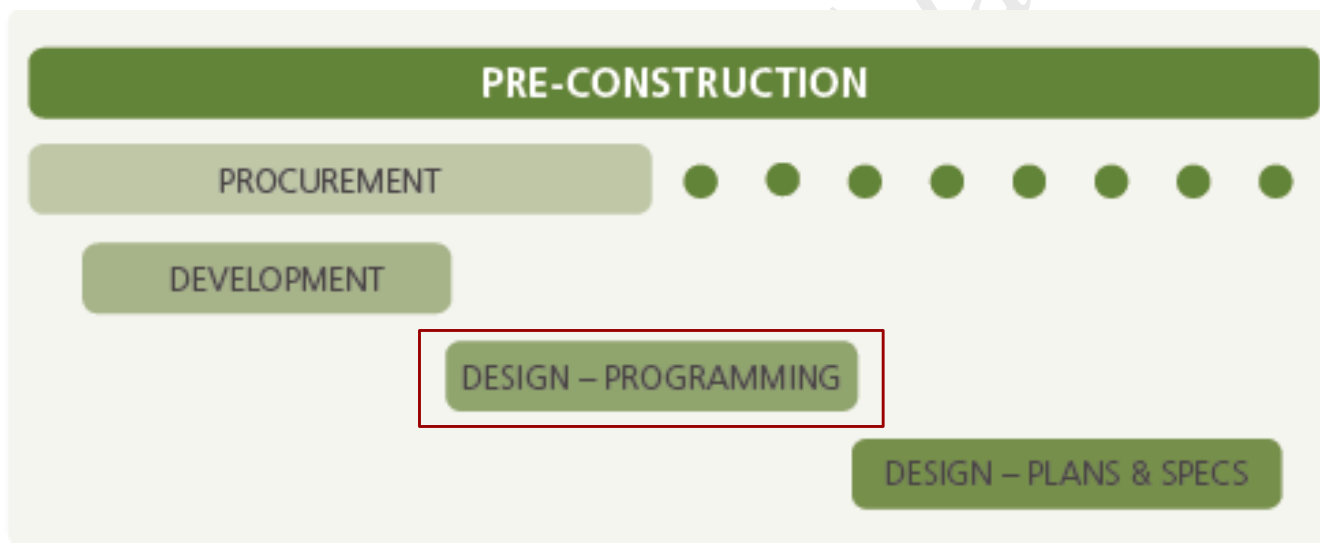
at the **executive level for the PMO**, and

remember...is **subject to change**.

Development phase: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Understand roles, responsibilities, approvals and review processes	1 Roles & Responsibilities	Roles & Responsibilities Matrix
- Prepare Professional Consulting Services RFP - Respond to Q & A - Assist in selection process	2 Professional Consulting Services RFP & Selection	Procurement Design Phase – Requests for Proposal (RFP) & Evaluation Matrices
- Prepare PMP to set process, procedures, standards including program, schedule, and budget criteria - Establish the team - Establish Program Charter: quality work, safe work, in scope, on schedule, on budget, - Develop work plan, budget, scope work, milestones, and reporting - Assess Technology Systems - Assess Team IT capabilities - Establish reporting systems - Validate Program - Plan adequate contingencies - Identify all program components impacting approvals, budgets and schedule	3 Program Development Program Management Office (PMO) Program Charter Work plan Management Information System (MIS) Scope & Budget Definition	PMO Organizational Chart Electronic Document Control Setup

Design phase – Programming



Design phase – Programming

❑ Construction management does **not start** on the **project construction site**.

❖ It is **our responsibility** to help **Owners be successful** from the beginning with their objectives.

✓ This **requires our understanding** of their

1. Goals,
2. Expectations and
3. Constraints.

To assist in achieving the client's goals, we provide **specific services**.

So, what should we do at this stage?

Design phase – Programming

- ❑ Once the **strategic planning** is in place from the Development or Concept Phase, **projects move** into early planning and programming stages to enable **further project definition**.

"He who fails to plan is planning to fail..."

– Winston Churchill

What can we do at this stage as a construction manager?

Design phase – Programming

❑ As Construction Managers, we **provide guidance and work plans** to facilitate the planning/programming phase.

❖ This includes

1. Further definition of **requirements**,
 2. Validation of **assumptions**, and
 3. Confirmation of **scope, budget, and schedule**.
- ✓ Also at this stage, **additional consultants are added** to the **PMO**

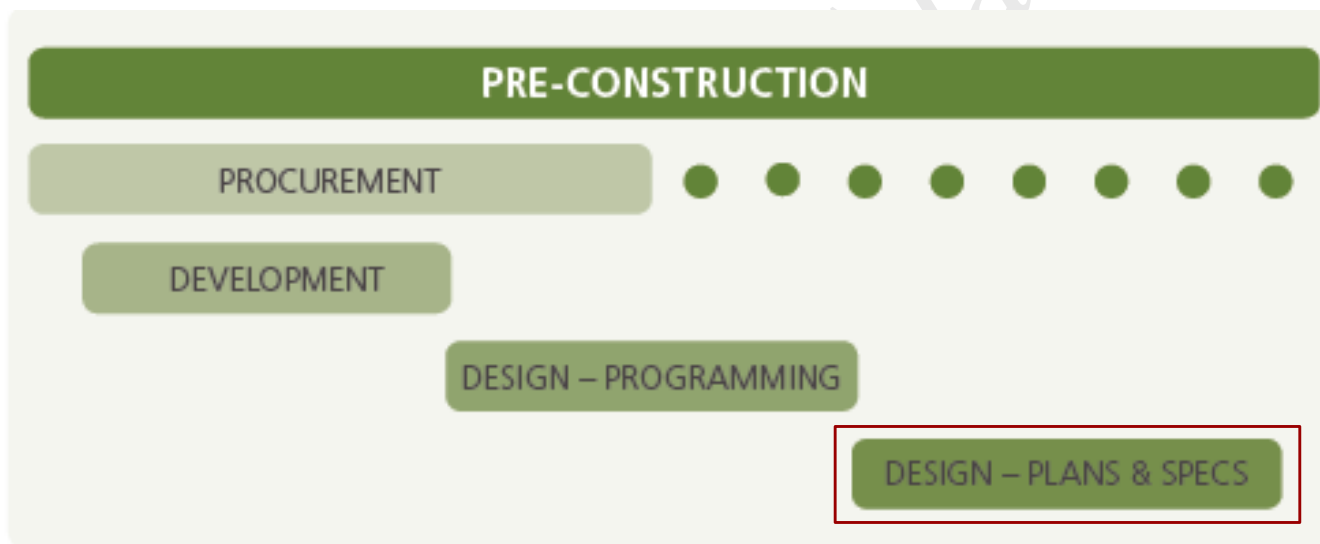
to support the **project plan** including

program consultants, geotechnical consultants, surveyors, hazardous material investigations and other environmental consultant specialists.

Design phase – Programming: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Establish project goals, financial constraints, schedule constraints - Issue schedule, budget, and goal statement - LEED consideration - BIM consideration - Address community relations	1 Kick off meetings Establish Project Team roles & responsibilities and project goals	Kick off meeting agenda Meeting minutes
- Establish rough program - Establish/confirm standards - Confirm growth projections - Determine space requirements to support technology	2 Definition of requirements	Project criteria documents Program Consultant RFP
- Evaluate entitlement needs - Coordinate soils investigations & site surveys - Assess need for hazardous materials surveys - Oversee MEP system evaluations - Confirm site conditions, infrastructure, and site logistics - Evaluate code & regulation impacts - Determine need for EIR - Initiate SWPP	3 Site and/or facility validation Site Visits Scope Project Budget Project Schedule	Soils report RFP Site Survey RFP Hazardous Material RFP Environmental impact record or negative declaration, historic survey request
- Confirm budget, schedule, project goals, project team, approval authority, and lines of communication - Issue confirming document for approval	4 Revalidation meeting Scope Project Budget + Schedule	Program document sign off

Design phase – Plans & Specs



Design phase – Plans & Specs

❑ As a **project** moves from a conceptual programmatic scheme to a concrete well defined project, there is a need to

1. Review **milestone deliverables**
2. Evaluate the **scope and goals** of the project,

in order that the **Owner's project goals** are met.

What goals?

Design phase – Plans & Specs

*The goals as already stated, typically fall into **four main categories** or objectives.*

Scope – the program's operation and functionality, aesthetics, and maintainability that control how the project is designed, constructed, and maintained.

Quality – the level of attributes expected and ensured through specified testing and monitoring procedures.

Cost – the price of achieving the required scope within the desired time frame and quality expectations.

Schedule – the timing of delivery of the required scope within the cost and quality objectives.

*The central mission of the Construction Manager is to utilize **his or her management skills and knowledge***

*to achieve the **right balance** of scope, quality, cost and schedule for the Owner.*

Design phase – Plans & Specs

- ❑ At this stage, design professionals are **retained** and CM works with the **design team** throughout the **design process**.
- ❑ Since different delivery methods impact **timing of procurement** for design phase services

We have chosen to **combine the procurement phase** for both design and construction following this section.

What major milestone deliverables?

Design phase – Plans & Specs

❑ The **four major milestone deliverables** to review during the design phase include:

1. Schematic Design,
2. Design Development,
3. Construction Document Progress Submittal, and
4. Construction Document Agency Submittal

How final submission approved?

Design phase – Plans & Specs

- ☐ Remember that the **final submission** to the approving agency is generally **not 100%** but **closer to 80%** and sometimes less if the **design team** has a **tight timeline**.
- ☐ Oftentimes a Post Agency Approval review is also **requested prior to bid** to ensure **all Owner and Agency comments / corrections** have been incorporated in the bid documents along with a **re-verification of the budget**.

*Consider that **different delivery methods** may require adjustments to milestones and durations.*

How CM and A/E ensure that a complete set of documents are prepared?



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Design phase – Plans & Specs

❑ This should always include a constructability review and back check of the **documents prior to bid**

❖ Watch out for “Scope Creep”.

*Oftentimes **project scope** grows from early **concept to final plan approval**
if not monitored closely,*

*because **scope changes** are why many projects bid over budget.*

How approvals obtained?



Design phase – Plans & Specs: Approvals and permits

❑ Approvals are obtained from

1. **Internal** stakeholders from the owner's side
2. **External** stakeholders including outside agencies.
 - ✓ Many view the **business of permit and entitlement** management as something of a **confusing black hole**.
 - ✓ **Construction Managers** are **not always experienced** in handling the politics of governmental regulations.
 - ✓ Depending on the complexity of a particular project, **specialty entitlement consultants** may be **needed** to augment the team.

Design phase – Plans & Specs: Approvals and permits

❑ **Permitting** and **entitlement** both involve **governmental agencies**;

however they are in fact **very different from each other**.

1. **Entitlements** regulate “**what**” can be built
2. **Building permit** controls “**how**” the project is built

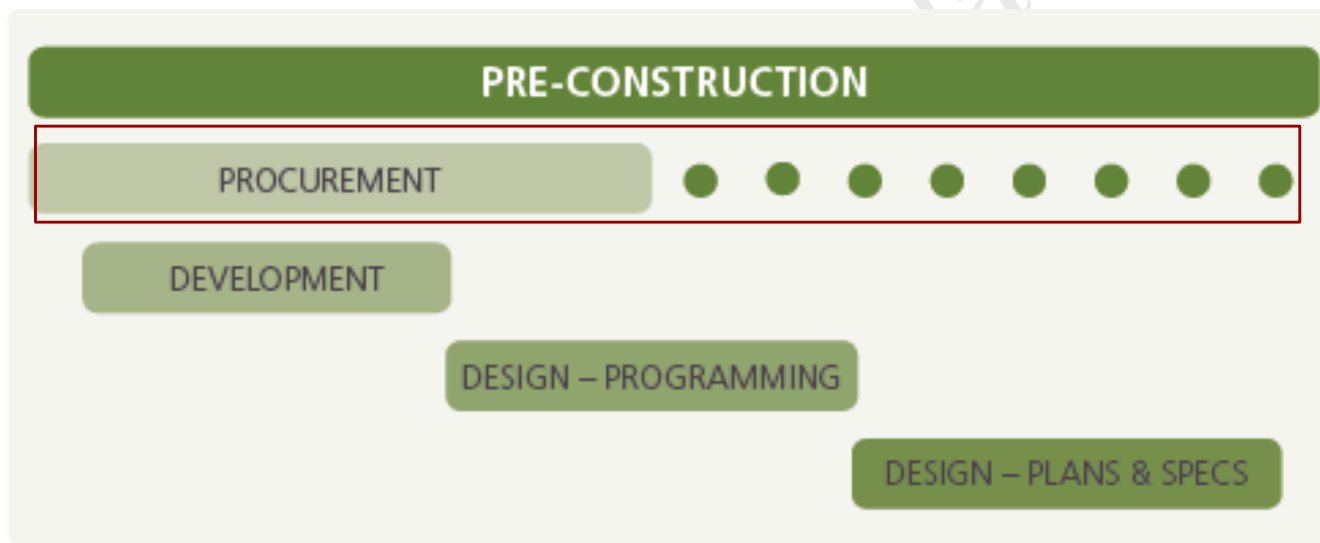
Entitlements secure the Owner’s right to improve their property subject to certain constraints that are commonly applied for through the zoning laws and/or other statutes. Many of these laws are statewide or national in nature such as the Clean Air Act, Environmental Impact Reports (EIRs), and historic regulations. Other laws are local such as Conditional Use Permits (CUPs), planning approvals, historic regulations, architectural reviews, etc. This process is usually undertaken very early during planning to determine what the government will allow to be demolished, reconstructed or newly constructed on the particular site.

Building Permits are the control mechanism for the policing of the building code and statutes that drive the physical construction so that it is built to local, state and federal regulations for safe construction. At this level, the plans are reviewed through a “plan check” process by the Building Department (or other governing authority) for technical issues, safety requirements, building code requirements, etc. This permit is more technical in nature and far less political than the entitlement process and usually takes place after the project is through the design stage.

Design phase – Plans & Specs: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Obtain SD's from program document, assess alternatives - Obtain client sign-off of the SD plans and confirm costs and schedule	1 Schematic Design Phase	SD Alternatives & Cost options SD sign off
- Coordinate design development meetings with client, A/E team and selected sub-consultants as required - Issue DD budget estimate for Client and Design Team review - Perform value engineering and phased constructability review and obtain Client sign-off of the DD plans. Confirm costs and schedule	2 Design Development Phase	DD cost estimate & value engineering DD constructability review DD sign off
- Coordinate construction document review meetings with client, A/E team and selected sub-consultants as required - Coordinate Client procured items and confirm responsible party for installations - Issue a CD project budget estimate for Client and Design Team review and obtain Client sign-off of CD plans	3 Construction Document Phase	CD cost estimate CD constructability review CD sign off
- Issue plans to approving agency for review concurrent w/final constructability review - Ensure constructability review and first round plan check comments are incorporated for issuance to bidders in bid set (or as an addendum if permit is not required prior to bid)	4 Construction Document Completion & Permitting	Bid cost estimate Bid set review Obtain all permits Back check documents to ensure incorporation of agency and CM comments

Procurement phase



Procurement phase – Design

- ❑ **Selection of the design team** typically occurs as the first step following
 - ✓ **Completion of the programming phase** and
 - ✓ **Receipt of the owner's authorization** to proceed with the project.
 - ❖ In most instances, the Owner may **have already retained a design architect or CM** to assist with **development of the program**.

The **RFQ/RFP selection process** used to hire **AE firms** for both

1. Program and
2. Design/production

is **similar** to the process used to **select CMs** and

is also used to **select consultants** who may be retained directly by the Owner.

Procurement phase – Design

It is most important at this stage to **understand what delivery method** will be used since this will **dictate the type of consultant contracts** to be used for these services.

How to select consultants?

Procurement phase – Design

❑ Once identification of **consulting needs** are identified,

1. **Request for Qualifications (RFQ)** for potential candidates can be issued.
2. If a **two step process** is used, then a specific **Request for Proposal (RFP)** is issued **following the RFQ** including criteria so that **pricing can be obtained**.
3. **Interviews** are then conducted and **scored** so that tabulation of results can be evaluated for a **fair selection process**.
 - ❖ The **CM** should assist with development of a **scoring matrix**.
 - ❖ It is critical to **ask the right questions** both in the **RFQ** and/ or the **RFP** documents issued as well as during the **interview**.
4. Finally, a **Construction Manager**
 - ✓ **Prepares recommendations** for approval and acceptance by the owner,
 - ✓ **Negotiates agreements** with successful candidates and
 - ✓ **Prepares packets** for governing body consent.

Procurement phase – Design

What primary questions should be asked from candidates?

Procurement phase – Design

What primary questions should be asked from candidates?

Have you...

- Experience with this type of project? When, Where and for Whom? What was your performance track record on containing project costs, staying on schedule and optimizing project scope for the Owner?
- Who is the lead on the project? Are the references listed for projects this particular individual worked on?
- Do you and your team have the requisite experience in working with applicable agencies?
- Are you presenting the team that will perform the work?
- Are you and your team working on any other projects of this nature currently?
- Why should we engage your services? What differentiates your firm?
- Tell me what you know about this project and if you have any recommendations, thoughts or concerns to share that will help ensure its success?
- What is your claims experience?
- Explain how you avoid changes to the design during construction?
- How do you control the quality of your documents (errors and omissions)?

What primary pricing items should be watched when evaluating fees?

Procurement phase – Design

What primary pricing items should be watched when evaluating fees?

- Hourly rates and identification of minimum charges
- Rate escalations
- Inclusions/Exclusions
- Reimbursable expenses and markups
- Subconsultant markups
- Insurance and professional liability limits of coverage

Procurement phase – Design: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Verify delivery model with client - Confirm consultant scope and selection criteria with client - Issue RFQ documents for consulting and/or construction services - RFP documents to outline scope and criteria - Identify type of agreement	1 Project Design & Delivery Method	Delivery Options Analysis Request for Proposal Documents
- Review RFP submissions and populate comparison spreadsheet - Review bid documentation and conduct interviews with client - Client makes final consultant selections - Finalize contract	2 Bid, Analyze, and Negotiate Services	Assessment of RFP responses and Agreements
- Conduct kick-off meeting with consultant and/or contractor, client, and user to define roles and responsibilities - Review schedule - Set milestone dates for the delivery of documents - Verify capital costs criteria for the project with the team	3 Initial Team Meeting Scope Design Criteria Project Budget Project Schedule Progress Reporting	Kick off Meeting Agenda Meeting minutes

Procurement phase – Construction

☐ Regardless of the selected delivery model chosen for the project

Construction Manager can assist with contractor selection and procurement.

☐ This will include the following sections:

1. Pre-Bid
2. After Bid Opening

Procurement phase – Construction: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Review Contracts, Div. I, General Conditions, and Supplementary Conditions with Risk Management & Legal - Ensure language is included for CM management, scheduling and confirm T&I requirements	1 Contract documents in consideration of selected delivery model	Assessment of bid documents Testing & Inspection (T&I) RFPs
- Generate bidder interest - Pre-qualify - Advertise - Hold pre-bid conference - Issue addenda - Analyze bids, recommend award	2 Bid and award	Addenda Pre-bid meeting agenda
- Prepare RFP for GC (if a GC is selected on fee and overhead basis prepare competitive bid to a minimum of 3 Subcontractors per trade) - Issue RFP documents to GCs - Schedule job walk with A/E team, specialty subconsultants as required - Collect and analyze GC bid submissions, generate bid qualification and pricing matrix for client review and approval - Conduct interviews with potential contractors - Negotiate final project costs and contract terms and conditions with the selected contractors - Make recommendation for the selection of the most qualified GC - Route construction contract for execution - If traditional DBB, confirm lowest responsive and responsible bidder	3 Bid, analyze, negotiate construction services	Bid evaluation Recommendation to award

Procurement phase – Construction

Pre-Bid:

- Compilation of final bid packages (including criteria development for Design Build).
- Development of the Requests for Qualifications, Pre-Qualifications and Bid Advertisements (in the case of Design Build both the contractor and the design team qualifications are reviewed).
- Assessment and evaluation of qualifications (including scoring criteria for selection based procurement).
- Pre-bid meetings and job walks (know the project before inviting bidders, and include Owner and design professionals as applicable to answer questions).
- Coordinate and distribute Requests for Information/Clarification and include any responses in written addenda (allocate adequate time from last addendum issuance to bid due date).

After Bid Opening:

- Develop bid tally and ensure an “apples to apples” comparison if a cost segregation sheet is part of the bid form.
- Conduct interviews if applicable.
- Make recommendations and obtain Owner approval.
- Review and analyze all bid submittals to ensure compliance with the bid form.
- Finalize agreements and secure necessary authorizations and documentation including certificates of insurance and bonds.

Procurement phase – Checklists

Some key checklists to use during the Pre-construction phase should include:

Contract Document Review Checklist (Division 00 and Division 01) also referred to as Front End Documents or Boiler Plate, not to be confused with the technical specifications;

Document Overview Checklist (Divisions 02 through 48) to identify things to look for when reviewing plans and specifications;

Pre-Bid Checklist in preparation for site walks with potential bidders on the project.

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP:

- Division 00 — Procurement and Contracting Requirements

SPECIFICATIONS GROUP

General Requirements Subgroup

- Division 01 — General Requirements

Procurement phase – Checklists: Contract document review checklist

Division 00 and Division 01

- ☐ **Review Owner Contract Provisions for CM Requirements** to include facilities, oversight responsibilities, and insurance protections.
- ☐ **Review Scheduling Requirements** to include language for early completion protection, acceptable scheduling software and requirement to provide updates electronically in virgin format, cost and resource loaded – manpower and equipment, earned value information – productivity analyses of a resource loaded CPM schedule to analyze lost productivity claim, minimum acceptable activity durations, who owns the float (extra days not on the critical path), built-in Owner reserve days if applicable (for unforeseen conditions), detailed breakdown of schedule of values, normal weather delay allowance, Owner furnished milestones identified for coordination, shop drawing submittals and adequate review periods, detail by building if applicable, phasing considerations, update requirements, and change requirements.
- ☐ **Review Change Modification Requirements** to include written notice requirements, definition of allowable labor, definition of allowable materials and equipment, identification of excluded costs – indirect not allowable vs. direct, allowable supervision hours, allowable markups, prevailing wage rate verifications if applicable, sample Change Order Request (COR) form with calculation methodology explained, Time & Material (T&M) requirements and verification of hours.
- ☐ **Review Submittals** Also substitution requirements and timing, preferably prior to bid award.
- ☐ **Review Payment Procedures** Frequency and form of payment application and certified payroll information if applicable.
- ☐ **Review Cash Flow Reporting Requirements:** Planned cash flow curve – projected manpower indicator, and histograms.
- ☐ **Review General Conditions Costs** Submittal of General Conditions breakdown of costs and/or daily delay costs.
- ☐ **Review Project Accounting** Audit/Access records clause in the contract documents, depending on delivery method.

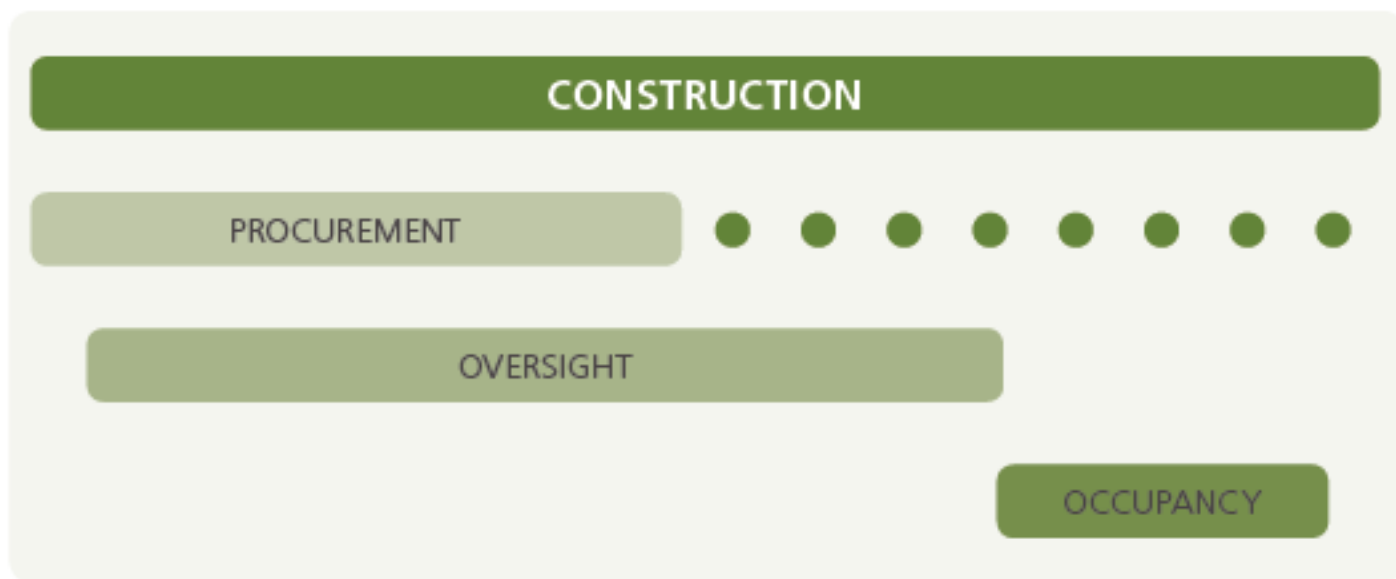
Procurement phase – Checklists: Pre-bid checklist

- ☐ **Pre-Bid Meeting Sign-in and Introduction** To include Owner representatives and design consultants.
- ☐ **Contract Documents** Ensure all bidders have access to the contract documents, indicate where documents can be obtained and whether the fee is refundable or non-refundable. Indicate any reference materials for review including soils reports, as-builts, utility surveys, hazardous materials reports, etc.
- ☐ **Critical Information** To include prevailing wage requirements, bid opening date, bonding and insurance requirements, liquidated damages, bid forms, instructions to bidders, project specifics, and any bid alternatives and how they will be evaluated at bid opening.
- ☐ **Contractor Safety Management** Review safety requirements.
- ☐ **Project Scope and Schedule** Design Consultant to summarize project scope and Construction Manager to review schedule requirements.
- ☐ **Roles, Responsibilities and Authorities** To include Construction Manager, Design Consultant, Inspector, Owner and User groups, Agencies.
- ☐ **Site Coordination Issues** Discuss any coordination issues impacting site occupants, utility approvals/shutdowns and other requirements .
- ☐ **Site Tour** Be prepared to walk the site. A mandatory bid walk is recommended for inclusion in the bid advertisement.
- ☐ **Questions and Answers** Allow adequate time for Q&A and follow-up in writing and via addendum if there are any changes to the documents.

When and Where Do CMs Plug in?

(Part 3: Construction)

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❑ Before commencement of work

CM should review the **PMP** to ensure project goals can be executed.

- ❖ Hopefully, you as a **CM** have been able to control the project's destiny in the **pre-construction phase**.

Unfortunately, many times Construction Managers are retained after plans have already been

1. Designed,
2. Approved
3. Bid and
4. CM had no responsibility in developing the PMP.

What is the art of CM here?

Construction

❑ The **art of Construction Management** is about

- ✓ Keeping track of all the issues.
- ✓ Staying focused on the details without losing sight of the program objective
- ✓ Being proactive

What skills needed here?

- ❑ There are **many skills required** to be a top notch Construction Manager.

But there are **four key ingredients**:

Manage a **Quality** project

on **Schedule** and

within **Budget**

meeting the **Scope** expectations of the client

while always managing

1. **Risk**, and

2. Running a **safe** project,

then you will have a successful project.

What is the mission of a CM during the construction phase?

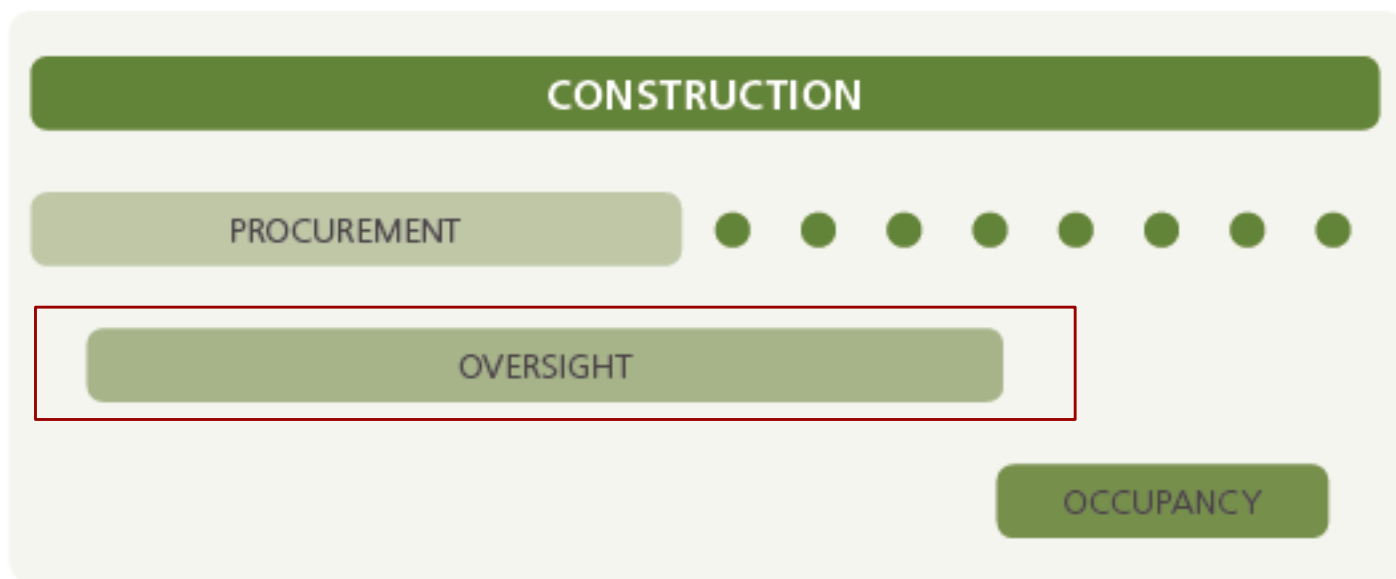
Construction

❑ The **mission of a Construction Manager** during the construction phase is to **expedite** and **improve** the **efficiency** of the **construction process**.

❖ This requires

1. Focused **planning and execution** of the project in terms of scope, cost, schedule and quality.
2. **Assisting** the team in completing their **contractual obligations** for **design intent** and **construction implementation**.
3. **Good communication** skills with all parties focused on their **common objective** will lead to success.

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Oversight

- ❑ Before commencement of the project, a **mandatory pre-construction meeting** should be held.
 - ❖ During this meeting it is important that the CM review the **roles and responsibilities** of the **PMO**
with emphasis on **his/her role** as owner advocate.
 - ✓ The **communication plan** from the PMP should be **distributed** during the meeting and discussed.
 - ✓ Most importantly during this meeting the CM should set a **collaborative and professional tone** while **facilitating the meeting**.

What is the best approach for CM during the construction?



During construction the CM should walk the site often – it is not a good idea to manage the project 90% of the time in front of your computer. The only way to know what is going on is to examine progress in the field and learn from the folks on the job what problems they may be having on the project.

What **factors** should be considered as you observe?

❑ As you observe the building progress, **pay special attention to:**

Safety risks

- Unprotected open trenches
- Fall hazards
- Protruding sharp objects such as exposed rebar

Visible progress or lack thereof

- If some areas are not moving forward – find out why work has stopped
- If the schedule shows progress and there is none – there is a problem

Manpower on site

- If the manpower is insufficient to achieve the contractor's schedule – there is a problem

Monthly pay application

- If the contractor's monthly pay application continues to be consistently low, and calculation of the remaining months by remaining dollars reflects an unrealistic goal – there is a problem



Oversight

- ❑ As you observe the building progress, **pay special attention** to:
 - ❖ When you are in the **trailer managing the paper flow** – and believe me there will be **plenty**
 - keep in mind that the **larger the contractor's team** the **more paper** will be coming your way.
 - ✓ The **Construction Manager** must manage and control the **flow of information** so that the work does **not stop due to administrative processing**.
 - **Our objective** is to manage the team to **ensure**
 1. All questions (RFIs) are answered in a **timely fashion**
 2. All submittals are submitted and processed **as scheduled**, and
 3. We **track and report** on **changes** to keep the project **on schedule and on budget**.



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Oversight

❑ As you observe the building progress, **pay special attention** to:

❖ There are **many other issues**;

however, an experienced team will perform a **“what if” analysis** and

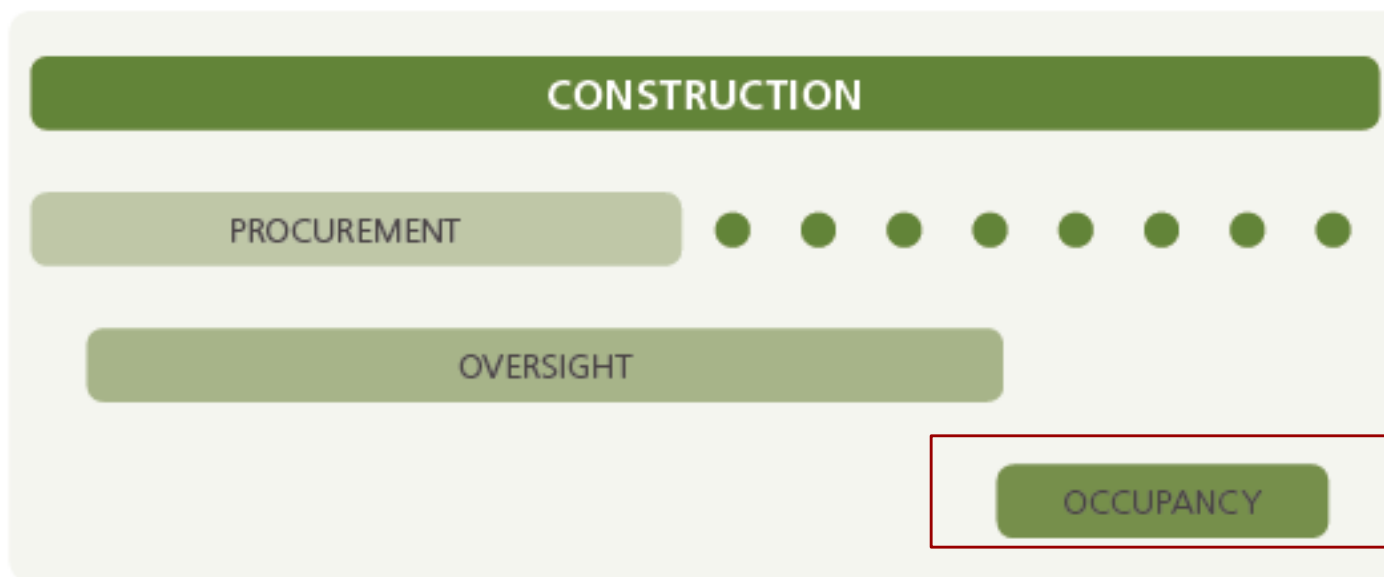
apply a **contingency** to these **unforeseen events**

to **minimize change order impacts**.

Oversight: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Confirm Goals—Budget Schedule & Quality - Confirm forms of communication with Team including Submittals, RFI - Review invoice procedures - Reinforce Project Goals - Introduce Project Team - Introduce Lines of Communication - Establish Authority Levels	1 Construction Job Start Kick off Meeting Scope Building Standards Construction Budget Construction Schedule Progress Reporting	Kick Off Meeting Agenda Formal recommendation to governing agency for issuance of Notice to Proceed (NTP)
- Monitor field performance—field reports, photo/video - Oversee and process RFI's, Submittals, Change Orders, Pay Applications - Issue monthly reports - Project Team Supervision - Monitor schedule adherence - Manage the Budget - Ensure proper Team Communication	2 Construction Oversight Project Schedule Project Budget Team Communication Problem Resolution	Maintain RFI/Submittal Logs, track & report on Change Orders, Cost & Schedule impacts; issue meeting minutes; maintain record documents; coordinate testing & inspections; Update schedules Issue Monthly Status Report
- Require GC to issue their written punchlist attached to request for project team punchlist - Coordinate user groups, Architect, Engineer & furniture punchlists - Require GC response to punchlist - Require Architect to inspect & issue Substantial Completion Document	3 Punchlist	Issue combined punchlist for all disciplines & representatives

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Occupancy

❑ Planning for closeout and occupancy is typically included in the **PMP**;

however achieving the goal of **smooth building operations** can be one of the more **challenging aspects** of construction,

working through different regulatory agency requirements and inspections.

What CMs should do?

Occupancy

- Confirm each service providers' approval of plans and timing for completion of their element of work. Are they part of the contractor's schedule?
- Check on agency requirements prior to occupancy to achieve licensing such as Health Department, Child Care Agency, or other.
- Pre-walk the site with the inspector sufficiently in advance to guarantee occupancy on the target date.
- Plan on additional time for fire/life/safety compliance.
- Confirm any special entitlement requirements that must be fulfilled to obtain a certificate of occupancy. Consider off-site improvements including street trees, sidewalk improvements, street lighting, and street utility upgrades for the property.
- Check that all systems are operational and meet the testing and commissioning requirements. Schedule specialists who designed the system with the maintenance staff to review testing and start-up.
- And finally, do not forget to get the air balancing report reviewed and approved by the mechanical engineer.

Occupancy: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Confirm Commissioning Requirements, schedule and attendees - Monitor vendors, conduct training - Obtain turnover test & documentation - Facilitate coordination of FF&E installations - Facilitate coordination of IT, security, and AV installations by separate vendors	1 MEP / LEED Commissioning if Required	Meeting Minutes & Reporting
- Monitor all required controlled inspection sign-offs - Monitor Governmental Authority sign-offs (Building Dept., Fire Dept., etc.) - Monitor obtaining of Temporary & Final Certificates of Occupancy	2 Certificate of Occupancy	Meeting Minutes & Reporting

Construction checklists

At the end of this section there are some key checklists to use during the Construction Phase.

Job Start Meeting checklist

Change Order Analysis checklist

Construction checklists: Job start meeting checklist

- ☐ **Introductions** Project Roles, Project Directory, review scope and phasing issues.
- ☐ **Payment Procedure and Requirements** Timing for review of monthly pay applications, number of copies, time of month, schedule updates, prevailing wage and labor compliance requirements as applicable. Review segregation of costs and project schedule timing for issuance and approvals.
- ☐ **Project Safety, Site Conduct and Housekeeping** Safety plan requirements. Address on-site concerns if facilities are occupied.
- ☐ **Mobilization** Use of existing facilities and/or, if applicable, mobilization of contractor's facilities and requirements. Review lay down areas following the meeting and video/photo document existing conditions prior to contractor's mobilization.
- ☐ **Hazardous Materials** Establish procedures and protocol for clearances, if applicable.
- ☐ **Notice to Proceed (NTP)** Official job start date for NTP to be established by agency with recommendation by PMO. Discuss scheduling of work hours, access and security issues.
- ☐ **Site Records** Maintenance of as-builts, daily reports, and logs.
- ☐ **Communications** Review routing and response times for all communications, submittals, RFIs, change orders, etc. Determine weekly meeting schedule timeframes.
- ☐ **24-48 Hour Notifications** Review the contractual inspection requirements and notifications for emergency repairs and/or weekend/overtime utility shut-off.
- ☐ **Change Notifications and Procedures** Review contract provisions for change order notifications and submittals related to time extensions and costs as contracted and included in PMP.
- ☐ **Procurement** Bid tabs & buy-out, fabrication, specialty equipment, mockups, shop visits.

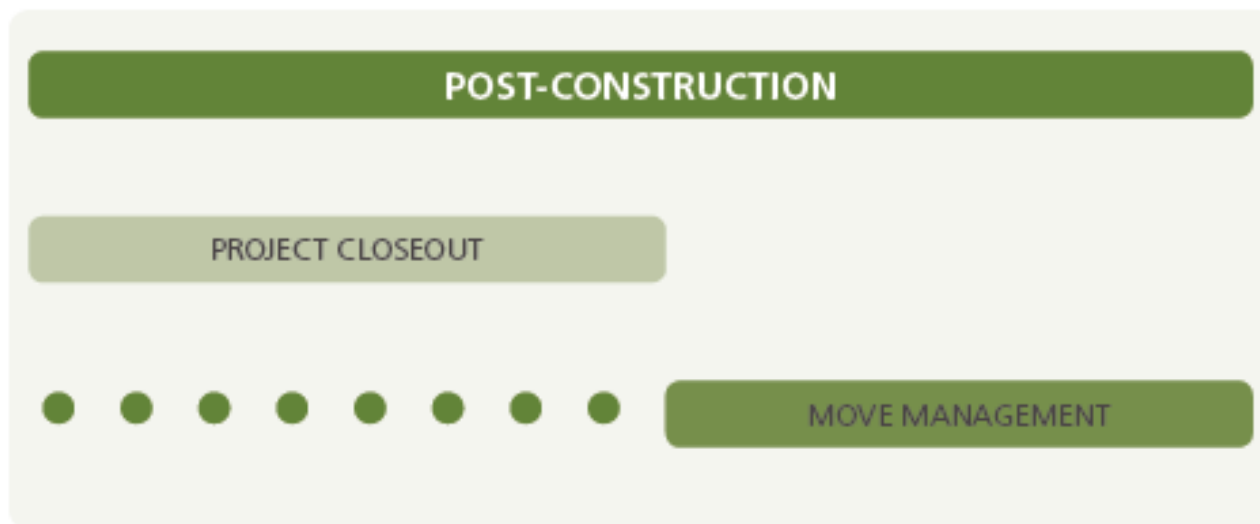
Construction checklists: Change order analysis checklist

- ☐ **Equipment & Tools** Confirm what is chargeable and appropriate for work.
- ☐ **Supervision** Appropriate resources and costs should be stipulated in the contract documents. In general only one superintendent in an 8 hr. period should be needed unless project acceleration is specifically requested (Warning!! Don't use acceleration language unless you mean it and are willing to pay for the consequences!) Confirm labor classifications are appropriate when assessing rates. If applicable, review certified payroll to confirm.
- ☐ **Materials & Labor** Confirm that quantities of materials and/or labor hours are not exaggerated.
- ☐ **Direct vs. Indirect Costs** Confirm allowable direct costs vs. not allowable indirect costs as defined in the contract. For example project management, scheduling, home office personnel, clean-up, as-builts, etc. are usually not chargeable since these generally are factored in as part of the contractor's markup.
- ☐ **Markups** Confirm that the method of applying markup calculations complies with the contract documents. Confirm allowable percentages for insurance and bond premiums. Also confirm that bond excess charges are paid at close of project.
- ☐ **Schedule Updates** After approval of contractor's initial baseline schedule, confirm schedule impacts monthly. Look for logic changes, incomplete logic ties, insufficient activity detail, inaccurate updates on actuals, insufficient durations for submittal reviews, inaccurate reporting on start of delay. Watch for concurrent activities, watch for who is due the float, and validate responsibility for delays as they occur.
- ☐ **Delay Claims** Request "Fragnets" or "Windows" for each claimed schedule impact to the critical path and review with Team scheduler. Just because there is a change doesn't mean it is a delay, and just because there is a delay doesn't mean it is always due to a change. Assign responsibility where it belongs and watch for concurrent delays.
- ☐ **Labor Rates** Perform a Labor Burden Percentage Analysis so there is agreement on rates from the start of the project if not specified in the contract documents.
- ☐ **Credits** Maximize credits due for deleted scope and do not be afraid to issue unilateral (contractor unsigned) change orders for fair value if needed. Ideally this can be mitigated through communications and reaching consensus. Keep the Owner informed of any unilateral change orders either credits or adds through formal monthly status reports.

When and Where Do CMs Plug in?

(Part 4: Post-Construction)

Post-Construction





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Post-Construction

- ☐ After the project is built the **CM cannot just walk away**.
- ☐ **What does it take** to closeout a project successfully
- ☐ Without it we risk **claims exposure** and **compromise warranty** period coverage.
- ☐ **How a CM manages** the post construction period is in some respects **more important than any other phase** in the process.

Remember, what is done last is how you will be remembered.

Post-Construction

- ☐ Why do we allow projects to be **occupied** for sometimes well over a year before filing a Notice of Completion?
- ☐ What is a Notice of Completion?
- ☐ Why do Owners think they are held hostage by **incomplete punch list** activities and settlement of **claims**?

As managers we need to guide this process and put in place the proper controls to facilitate its successful outcome.

What closeout activities should be **reviewed** with risk management and legal experts within **organizations** to help finish well?

Post-Construction

❑ Closeout activities to review:

- ❖ What is a **notice of completion (NOC)** and when is it filed?
- ❖ What should be included on the **punchlist** and how do I ensure timely completion?
- ❖ How do I **motivate** the team to see closeout through to completion?
- ❖ How do I **resolve** outstanding **claims**?
- ❖ When do I make **final payment** and what Do I owe?

What is a **notice of completion (NOC)** and when is it filed?

What is a notice of completion (NOC) and when is it filed?

- ☐ Is there language in the documents regarding Notice of Completion, Beneficial Occupancy, Substantial Completion, or Phased Occupancy?
- ☐ When do warranty periods **begin**?

*There is **no simple answer** to these questions which is why we always find ourselves asking the same questions on every project.*

How to manage this process?



What is a notice of completion (NOC) and when is it filed?

- ☐ Careful review of the contract documents is essential during the design phase before you go out to bid since **closeout starts** at the **beginning of a project**.
- ☐ Part of the confusion in this area is often due to **conflicting language** in the documents especially **when multiple participants** are involved in **their preparation**.
- ☐ Do **not recommend** filing of the NOC if the project is **not occupiable**.

What should be included on the **punchlist** and how do I ensure **timely completion**?

What should be included on the punchlist and how do I ensure timely completion?

- ☐ At this point, **projects move into the third stage of construction** when **contract billing(s)** are at **100% completion** and only **retention billing(s)** remain.
 1. In **Stage 1**, you dip your **toe into the water**, up to the first 5% to 10% of **progress billings**.
 2. In **Stage 2**, you **sink or swim** in the middle of the construction phase.
 3. In **Stage 3**, you are **lost on a desert** island.

Why desert island?

What should be included on the punchlist and how do I ensure timely completion?

❑ How many times **punchlist completions** stretch from week to week to **endless months?**

❖ Many times we continue **making reports** with the **hope** that
contractor will complete his or her punchlist scope of work.

Is the contractor always at fault?

What should be included on the punchlist and how do I ensure timely completion?

- ☐ Absolutely not.
- ☐ Clearly the documents either include **scope** or **exclude scope**.
- ☐ Only **contracted scope of work** is the responsibility of the **contractor**.
 - ❖ Any other items may include design deficiencies, construction change proposals that were never pursued on an approved change order, or damage caused by owner or owner's vendor; all of these should be included on a **separate owner's list** but **not on the contractor's contractual punchlist**.
 - ✓ Provide a process for both
 1. Contractor's punchlists
 2. Owner's wishlists.

How do I **motivate** the team to see **closeout through to completion**?



How do I motivate the team to see closeout through to completion?

- ☐ You must **prove** to the agency that in fact what you **built** is **what is shown** on the **approved** plans and specifications.
- ☐ Just as **retentions are withheld** from the **general contractor** to ensure successful project closeout so should **retentions or lump sum** set aside **amounts for specific closeout activities** be considered in your various **consultant agreements**, depending on the type of agreement.

How do I motivate the team to see closeout through to completion?

- ❑ You are now alone with **no way off the desert island.**
 - ❖ Unless a **passenger on a passing cruise ship** happens to hear **your cries of distress.**
 - ✓ **Correcting the unfinished work** if the contractor abandons the project is an **added cost,**
which should have been remedied under the **original contracted scope.**
*Now the **one year warranty period** is **invalid**, and
the **correction costs** are **impacting your budget** limiting funding
for the **next construction project.***

How do I motivate the team to see closeout through to completion?



How do I resolve outstanding claims?

How do I resolve outstanding claims?

❑ Do not confuse closeout with claims resolution.

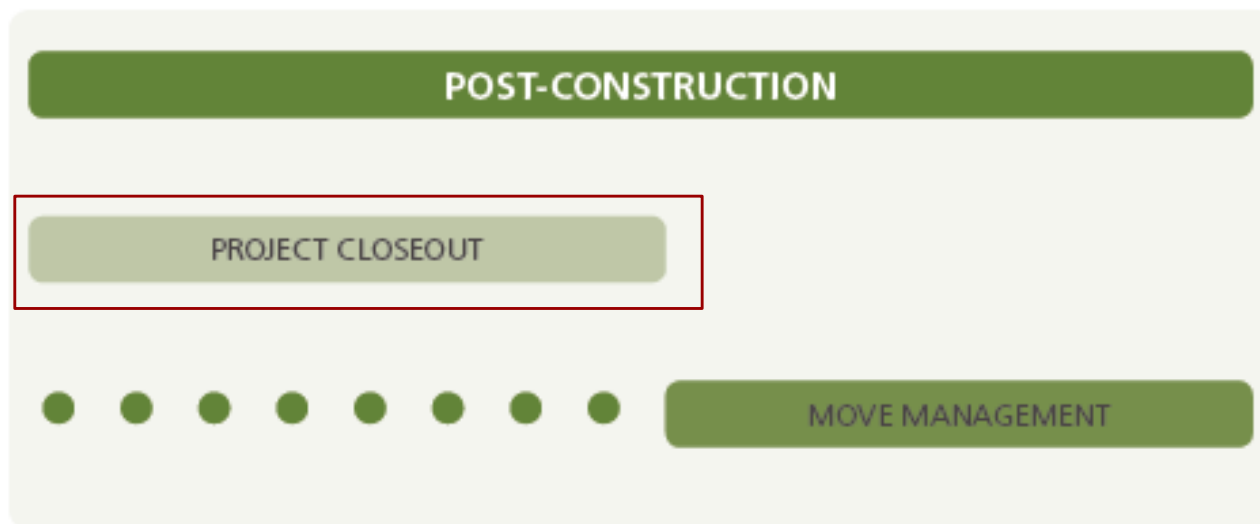
❖ The two should be kept on **completely separate tracks**.

❑ By demonstrating

- ✓ **Consistent and fair treatment** of the contractor throughout construction,
- ✓ **Timely processing** of change orders, and
- ✓ Prompt payments,

if **litigation occurs** it is very **likely an owner** can be defended through the
CM's effective record keeping.

Post-Construction



Project closeout phase

- ❑ **Planning for a smooth transition** from construction to **occupancy** should begin during the **pre-construction phase**.
 - ❖ *Requirements for testing, start-up, training and turnover all need to be included in the **construction documents** as scheduled in the PMP.*
- ❑ It will be the **CM's responsibility** to follow up with the **contractor's corporate office** on completion of **all contractual obligations**.

What should be usually included in this phase?

Project closeout phase

☐ This includes

- ❖ Warranties,
- ❖ Turnover of maintenance and operation manuals
- ❖ Completion of record drawings or as-builts
- ❖ Gaining a certificate of occupancy for the project
- ❖ Final physical construction completion – including sign off of all punch list items
- ❖ Final project financial completion
- ❖ Final project documentation and archiving
- ❖ Final training and operational handoff

Let's see the checklist

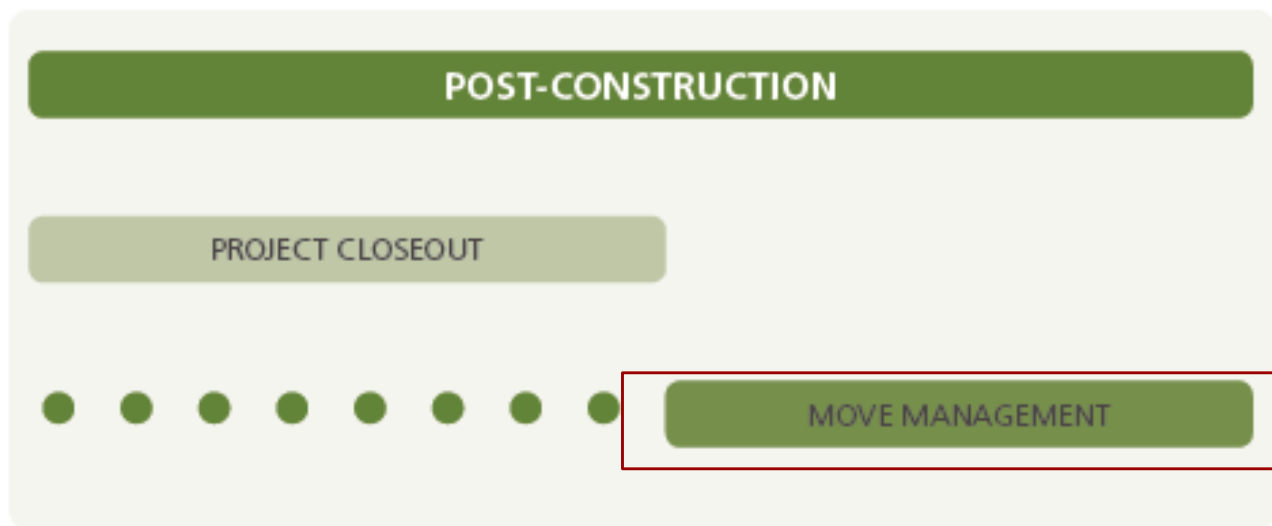
Project closeout phase: Closeout checklist

- ☐ **Punchlists** Coordinate all punchlists and oversee sign offs for each building. Ensure participation by User Groups, Maintenance Personnel, Design Professionals, and Inspectors as applicable.
- ☐ **Project Communications** Verify that all Notices of Non-Compliance (NNCs), Change Order Proposals (COPs), Change Order Requests (CORs), Requests for Information or Clarification (RFIs) or (RFCs) and Bulletins or Architectural Supplemental Information (ASIs) are resolved, priced and closed.
- ☐ **Warranty Period** Confirm start of warranty period based on contract. Substantial Completion or Beneficial Occupancy for final project or per phase / Building Occupancy as applicable. Substantial Completion Letter to be issued indicating pending items.
- ☐ **Manuals, Warranties & As-Builts** Obtain all Subcontractor Contact Info., Operations & Maintenance Manuals including Warranties as well as Test and Balance reports, As-Builts, and receive A/E sign-off. Determine responsibility for As-Built preparation and CAD or BIM transfer requirements back to Owner.
- ☐ **Keys and/or Access Codes** All master keys, gate keys, electrical panel keys, elevator and handicap lift equipment keys, mechanical equipment keys, building keys and/or access codes are turned over to Owner.
- ☐ **Project Reports** All final reports are turned in from Contractor, Architect, Inspector, Specialty Inspectors, Geotechs, Haz Mat Inspector, as applicable including Inspector daily logs.
- ☐ **Extra Stock** Turnover of all extra parts and materials per the specifications including submittal sign-off by Owner.
- ☐ **Approvals for Occupancy** Approving agency sign-offs and/or certificates including State elevator inspection, fire inspectors, building inspector, and other entitlement approvals as applicable.
- ☐ **Training** Coordinate all training sessions for systems. Including fire alarm, clock, lighting, EMS controller, lifts/elevator, fume hoods, etc.
- ☐ **Releases** Obtain all final lien releases and claim release sign-off.
- ☐ **Agency Approval** Determine what documents are required to be submitted to applicable authorizing agency for final processing and approval.
- ☐ **Financial Closeout** Ensure all credits have been negotiated and change order premiums for bonds and insurance paid.

Project closeout phase: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- Monitor punchlist sign-offs - Provide deadline for completion - Assess value for remaining items not completed by deadline	1 Punchlist Completion & Sign Off	Punchlist Completion Letter
- Obtain As-Built, Keys, Operational & Maintenance Manuals, Warranties - Obtain extra stock per spec section - Obtain training sign-offs - Obtain Air Balance Reports approved by Architect/Engineer - Obtain commissioning sign-offs	2 Closeout Package Coordination	Closeout Submittal Log Closeout Notification Letter
- Obtain Final Lien Releases - Process final GC 100% pay application excluding retention - Issue final report - Resolve outstanding claims	3 Project Cost Reconciliation	Issue Final Report
- Review Closeout package with client - Obtain signed letter accepting closeout documents and archive files - File NOC - Process Release of Final Retention after appropriate NOC filing period	4 Notice of Completion (NOC)	Recommendation for NOC Filing
- NOC Filing is independent of any litigation activities	5 Claims Support	Reports and Analyses as Required

Post-Construction



Move management phase

- ❑ **Construction Managers** oftentimes are responsible for assisting the Owner in development of the transition and move management plan.
- ❑ Installation of **furniture, fixtures, and loose equipment** (also referred to as **FF&E**) typically **begins**
as soon as the **certificate of occupancy** is in place and
Owner has **physical control** of the facility.
 - ❖ As the **FF&E** and Owner's stock and supplies are **delivered and stored**,
facility manager typically conducts **orientation sessions** with the staff
who will occupy the facility in **preparation for operations.**

Move management phase: Responsibilities, processes and deliverables

CM RESPONSIBILITIES	CM PROCESSES	CM DELIVERABLES
- During Development Phase, meet with Client to define move schedule & scope	1 Define Move Scope	Move Scoping Questions
- Develop and issue a relocation RFP based on the defined Scope of the move - Conduct a job site walkthrough of existing location and identify all contents to be relocated to the new facility - Review relocation RFP responses and make vendor recommendation to the Client	2 Move Coordination & Procurement	Relocation RFP
- Conduct move coordination meeting with Vendor and Client to establish criteria and present packaging instructions to staff - Ensure adequate boxes and other materials are provided to the Client by the mover - Coordinate with movers and reserve freight elevator - Verify with Client's IT staff the relocation criteria of any existing phone and data equipment and the responsible parties for relocation of this equipment	3 Move Oversight Team Communication Scope Project Budget Project Schedule	Meeting Minutes
- Ensure relocation supervisor has walked the new space and accepted existing condition of the space (all damage related to the move will be the responsibility of the Relocation Vendor to report)	4 Move Punchlist	Issue Punchlist

Final note

And let's not forget that after the project is closed and completed the Owner now needs to maintain the newly created asset and verify its performance on an ongoing basis, also known as Asset Management.



"You mean you wanted to be able to clean the building too?"



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فصل اول: استفاده از بهره هوشی (IQ) در مدیریت پروژه
بخش ششم: مدیر پروژه چگونه از بهره هوشی (IQ) خود در جهت ایجاد ارزش افزوده در مدیریت موفقیت آمیز پروژه استفاده مینماید؟

ارائه دهنده:

سید محمدرضا علوی پور

(PhD, PMP, CMIT)



استفاده از ضریب هوشی (IQ)، هوش هیجانی (EQ) و هوش ارزشی (VQ) در مدیریت پروژه
مدیر پروژه چگونه از بهره هوشی (IQ) خود در جهت ایجاد ارزش افزوده در مدیریت موفقیت آمیز پروژه استفاده
مینماید؟

What we will learn?

❑ How does CM add value?

- ❖ Introduction
- ❖ Part 1: Manage schedule
- ❖ Part 2: Manage cost
- ❖ Part 3: Manage quality
- ❖ Part 4: Manage scope
- ❖ Afterword: Owners & CMs

Road map

In this section

WHO? EXPERIENCED MANAGEMENT
PROFESSIONALS IN CONSTRUCTION

WHAT? OWNER ADVOCATES

WHY? BECAUSE SOMEONE NEEDS TO LEAD

WHEN? DURING THE LIFECYCLE OF AN ASSET

WHERE? RIGHT ALONGSIDE THE OWNER

HOW? BY MANAGING TIME, COST, QUALITY
AND SCOPE

How Does CM Add Value?

(Introduction)

How does CM add value?

- ❑ The **CM adds value** to a project by representing the **Owner's interests** with a **deep knowledge** of the **design and construction process**.

*The CM also facilitates this process and makes
it run smoothly by*

*enhancing and improving **communication**
among all the team members and
stakeholders.*

HOW?

**BY MANAGING
TIME, COST,
QUALITY & SCOPE**

**PROVIDE SOLUTIONS,
DON'T JUST PASS
PAPER ALONG!**

Let's see the simple way to describe **how a CM adds value** at every stage of the process

How does CM add value? – Do's & Don'ts of a CM

DO'S

- ☐ Always communicate with a positive twist
- ☐ Have another person read sensitive correspondence – think how trial transcript excerpts read on the front page of the newspaper (including emails)
- ☐ Keep people informed to protect Owner's interests
- ☐ Always act in a professional manner and show respect to your peers
- ☐ Clearly define primary responsibilities and authority, and coordinate in between the cracks
- ☐ Inform parties verbally first, then follow-up in writing on sensitive issues, creating partnerships
- ☐ Resolve problems as they arise
- ☐ Always seek expert advice, benefit from other Team Members' experience and expertise
- ☐ Use an eraser
- ☐ Always stay in control
- ☐ Keep all parties regularly informed on status projections re: time and cost
- ☐ Always present options to Owner when a problem needs to be solved
- ☐ Maintain Central Files and share information with your Team
- ☐ QA/QC documents before issuing
- ☐ Use the tools available to you
- ☐ Take responsibility
- ☐ Coordinate, problem solve, communicate, be an active listener and above all *be proactive*

DON'TS

- ☐ Don't react defensively
- ☐ Don't issue your first heated draft
- ☐ Don't leave questionable correspondence unanswered
- ☐ Don't threaten or react in an explosive or condescending manner
- ☐ Don't assume authority you don't have, and don't drop the ball because you think someone else is responsible
- ☐ Don't put in writing something that should be first communicated verbally, so as not to offend or be interpreted incorrectly
- ☐ Don't hope the problems will disappear
- ☐ Don't risk your career by biting off more than you can chew
- ☐ Don't use a jackhammer
- ☐ Don't allow yourself to be bullied into a decision you disagree with, use the Contract language to the Owner's benefit
- ☐ Don't avoid bad news and insulate the Owner from the facts
- ☐ Don't present the problem without solutions
- ☐ Do not hoard information
- ☐ Don't issue documents in haste and have to redo later
- ☐ Don't reinvent the wheel
- ☐ Don't blame or bad mouth others, instead look at what you could have done better
- ☐ Don't drop the ball, look to others for solutions, hope the problem will go away, ignore what appear to be minor issues, and react negatively

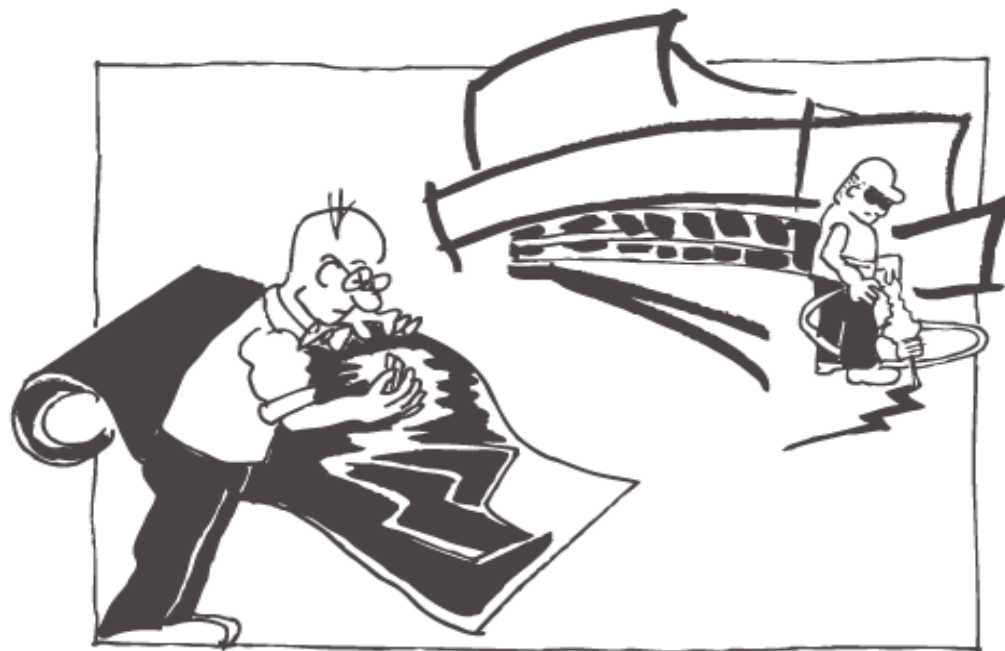
How does CM add value? – Sections

Part 1: It will focus on managing the **schedule** throughout the life of a project or program

Part 2: It focuses on managing **costs**

Part 3: It focuses on **quality**, and

Part 4: It focuses on preserving the project **scope** as originally envisioned by the client.



Use an eraser, don't use a jackhammer

How Does CM Add Value?

(Part 1: Manage Schedule)

How the CM should manage the schedule?

- ❑ It is important that CMs **stay on top** of the **project's progress**,
starting with the planning of **milestone deliverable commitments**
made during pre-construction all the way through occupancy.

*The trick is to plan each step of the way so that you **balance need** with **available dollars**.*

That is the **value** a good CM.

What can be done **proactively** to ensure good planning methods during the pre-construction phase and during construction?

Proactive planning

- ❑ Once **financial, physical** and **other constraints** are clearly identified
schedule can then begin to be formulated with **two** of the most important
components.
1. **Start date for agency approval** which could **trigger funding** or
construction
 2. **Required completion date**

What is the next step?

How the CM should manage the schedule?

❑ **After identifying** the **start and finish dates** of construction,
next step is to **select a delivery model** best suited for

1. **Timeline** and
2. Owner's **preference** and **risk tolerance**.

❖ **Each delivery model** has

different durations or overlapping timelines

What is the important step for CM in developing the schedule?



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How the CM should manage the schedule?

☐ Finish the schedule and **build in contingencies**,

especially for **things beyond anyone's control** such

as **agency approvals**.

What should happen when you receive owner's approval?

How the CM should manage the schedule?

- ❑ Once you obtain **Owner approval and buy-in**,
then you must **monitor**, **track** and **report** often both verbally and in writing
throughout the **life** of a project.

Communicate, communicate, communicate.

If you present the problem **without a solution**, you add **no value**.

How the **design consultants** keep on track?

Keeping design consultants on track

❑ Include **milestone deliverable dates** or **durations** in their design consultants' **agreements.**

❑ It is then the **responsibility of the CM** to

1. **Monitor progress** periodically and
2. **Request copies** of deliverables at each design phase

to

1. Review and
2. Validate

that the **percentage of completion promised**
matches the actual progress of the work.



Keeping design consultants on track

❑ CM should ensure that

1. All owner requirements are **communicated** to the design team in a **timely manner** and
2. Any open questions get answered as **quickly as possible**.

How the construction keep on track?

Keeping construction on track

- ❑ During construction, the CM **shifts** from milestone scheduling to Critical Path Method (CPM) scheduling

which is a **far more detailed** approach to project scheduling.

- ❑ Schedule intended to be used for
 1. **Communication** of current status and future expected results,
 2. **Management** tool
 3. **Dispute** resolution tool

Who is in the **risk** of developing the schedule?

Keeping construction on track

❑ As the Owner's representative,

CM is not at risk for **developing** and **controlling** the schedule.

❖ However, the **CM needs to understand**

1. What to ask from the contractor and
2. What duration is realistic for the overall delivery of the project
so that the Owner is protected.

Let's look at some **contract provisions** to include coordinated language for scheduling

Keeping construction on track: Contract provisions

- Language for early completion protection
- Specify acceptable scheduling software
- Require formatted disc to be provided
- Cost and resource loaded – manpower and equipment
- Minimum acceptable activity durations specified
- Define who owns the float
- Owner days
- Normal weather delay allowance
- Owner furnished milestones identified for coordination
- Shop drawing submittals and adequate review periods
- Detail by building if applicable
- Phasing considerations
- Update requirements
- Change requirements

Keeping construction on track: Contract provisions

- ❑ If the Owner has **detailed contract scheduling requirements**,
be sure there is a **representative** on your team who
can **review** the scheduling **criteria** and **monthly updates**
so that **every change made** during construction does **not cause**
costly delay impacts.

What primary **schedule tactics** should be aware?

Keeping construction on track: Schedule tactics

- Early completion – acceleration claims
- Logic changes, incomplete ties
- Lack of resource loading
- Insufficient activity detail
- Overly simplified schedules
- Tend to avoid identification of contractor - caused delay
- Over emphasis on Owner change impacts to schedule
- Inaccurate updates on actuals
- Insufficient durations for submittal reviews
- Inaccurate reporting on start of delay
- Watch for concurrent activities
- Watch for who owns the float

- ❑ The **greatest value** a CM offers in **scheduling responsibility** is **assurance** that the project will be **delivered in a timely** fashion from **design through construction** without any **claims**.

How to accomplish this?

Keeping construction on track: Schedule tactics

- ❑ This is accomplished by
 - ✓ Clear identification of schedule **contract deliverables**,
 - ✓ Constant monitoring of “**real**” progress,
 - ✓ Working closely with the team to **determine delays** and **develop recovery options**, and
 - ✓ Expert use of the **scheduling technology**
- to ensure that the **costs of delay impacts** are **anticipated** and **mitigated**.

How Does CM Add Value?

(Part 2: Manage Costs)

Cost management

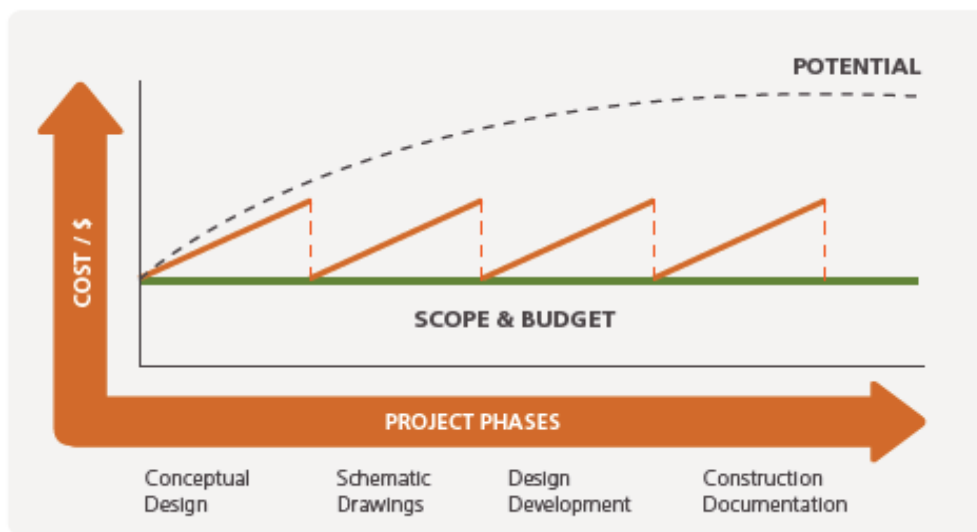
- ❑ One of the **CM's primary responsibilities** is to maintain the **project budget** from design through construction.
 - ❖ Very early in the process, **Conceptual or Rough Order of Magnitude (ROM)** budgets are developed to address the need to understand the **expected project or program costs**.
 - ❖ These budgets are used traditionally to help
 1. **Determine** the project **pro-forma (project financial model)** and
 2. **Set expectations** on **overall project costs** and **cash flow needs**.

Cost management

- ❑ Milestone estimates are the tools used to **ensure** that **checks and balances** take place to curb scope growth,

otherwise known as “**scope creep**”.

*There are typically **four different levels of milestone estimates** that should be undertaken at a minimum on every project.*



Cost management

❑ There can be a post agency review or pre-bid estimate

if many changes were made, and

let's **not forget** the **conceptual or programmatic estimate**

at the **very early development phase** of a project.

❖ It is during the estimate reconciliation process that

Owners find out if they are

1. Suffering scope creep or

2. Scope growth early on.

What should be performed in **every project** at this step as a
post-agency review?

Value engineering

- ☐ All projects should go through a **Value Engineering (VE)** process
if not formally, **at least informally**.
- ☐ This will provide the **greatest value** to the Owner,
while at the same time, meeting all
*functional, space, safety, quality, operability, maintainability, cost
and schedule objectives.*

How **VE** could be performed?

Value engineering

❑ The VE process is **best performed early** in the **design development phase** and includes the following five phases:

- **Information Phase** – The team gathers information about the program requirements, project design, background, constraints, and projected construction costs. The team performs functional analysis of systems and sub-systems to identify high cost areas.
- **Speculative/Creative Phase** – The team identifies alternatives for accomplishing the function of a system or sub-system.
- **Evaluation/Analytical Phase** – The team evaluates alternatives to determine those with the greatest potential for cost savings and project enhancement.
- **Development/Recommendation Phase** – The team researches selected alternatives and ideas, and prepares descriptions, sketches, and lifecycle cost estimates to support VE recommendations/proposals.
- **Report Phase** – The team presents VE recommendations to the Owner, in writing, at the conclusion of the VE workshop, if a formal VE process is used.

What should be done **before going out to bid**?

Before going out to bid

☐ Before going out to bid, be sure

1. Budget includes an **adequate contingency** for **change order reserve**
2. All **non construction (soft costs)** have been factored –
so as **not to eat away** at the **project contingency** for unforeseen
conditions during construction.

Let's look at some **contract provisions** to include coordinated
language for cost related items

Cost management: Contract provisions

- Definition of allowable labor
- Definition of allowable materials and equipment
- Excluded costs
- Allowable supervision hours
- Allowable markups
- Prevailing wage rate verifications
- Sample change management documents including Change Order Request (COR) form with calculation methodology
- T&M requirements and verification of hours

What primary cost tactics should be aware?

Cost management: Cost tactics

- Equipment and tools (inappropriate for work, confirm chargeable)
- Supervision in excess of one superintendent in an 8 hour period
- Wrong labor classifications and excess hours of work
- Exaggerated material quantities
- Allowable indirect vs. direct costs – i.e. project management scheduling, home office personnel, clean-up, as-builts, etc. not chargeable
- Method of applying markup calculations
- Insurance excess amounts
- Bond excess charged but not paid
- Labor burden percentage analysis
- Credits due

- ☐ On almost every construction project CMs manage, they have to deal with **change management**.
- ☐ Many times, Owners are **overcharged for change orders**.

How Does CM Add Value?

(Part 3: Manage Quality)



Quality management

❑ Managing the **quality** of a project includes the quality of the **process** not just the **product**.

❖ As CMs, we are **responsible for maintaining**
all of the project communications and administrative documents.

How to perform **document control**?

Document control

- ❑ There are **two primary areas** to address under document controls.
 1. One is the **documents themselves**, which need to be
 - i. **Maintained** for **historical** use and
 - ii. **Tracked** for **follow-up** on all activitiesso that **no balls** are dropped.
 2. The other is **identification** of the **flow of communications** and **response time**.

What historical control documents include?

Document control

❑ Historical control documents include:

- ❖ submittals,
- ❖ requests for information (RFIs),
- ❖ daily reports,
- ❖ change order requests (CORs),
- ❖ change order proposals (COPs), and
- ❖ change orders including all backup such as bulletins, architectural supplemental instructions (ASIs), work orders or field orders, construction change directives (CCDs), and the like.
- ❖ payment applications,
- ❖ schedules,
- ❖ monthly reports,
- ❖ meeting minutes and
- ❖ correspondence files.
- ❖ safety records, and photographic history of progress and site conditions.



Document control

- ☐ The **Construction Manager** must also recognize that a **healthy project** will also, most likely, result in a **quality project**.

What keeps a job healthy?

- ☐ Keeping the **flow of money moving** at the **same pace as construction** helps to ensure the **construction team** is **not tempted to cut corners**.
- ☐ **All invoicing** must be processed in a **timely manner** since **cash is king**.
- ☐ **Timely contractor payment** is a **key metric to a quality** deliverable.

Do not hold invoices!

Quality control

1. Issue quality constructible documents

- ❑ **First opportunity to control quality** is before committing to a contract during the pre-construction phase.

*So make sure the **AE team** specifies current products and **don't dust off a five year old spec book** and think the same HVAC model is still available or for that matter the **company is still in business**.*

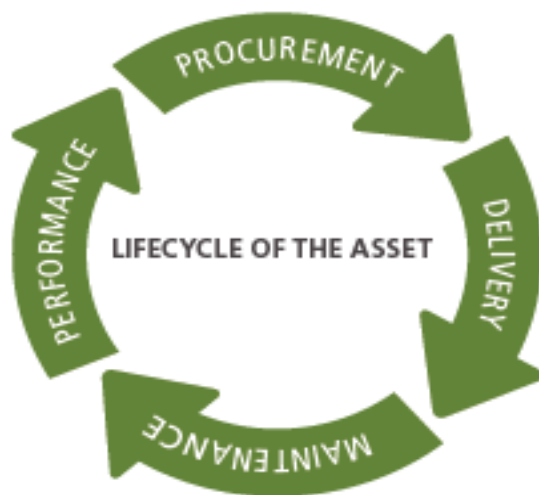
2. **Ensure quality work in the field**

- ❑ **Second** is through observation during construction.

*The latter is through **monitoring the work** to ensure each installation and every material put in place is in **conformance with the plans and specifications**.*

Quality control

- ❑ **Quality objectives** must be planned early and should be expected to last through the **lifecycle of the asset**, from **procurement through maintenance**.



Quality control

- ❑ The industry has been trending towards **more collaborative construction processes** among builder,

owner and design professional through the use of **Building Information Modeling (BIM)**, **Integrated Project Delivery (IPD)** and **LEAN Construction**.

Applying BIM/IPD's systematic lifecycle approach,

*a CM can clearly add tools ensuring value **beyond the life** of a construction project.*

What items to look for when reviewing plans?

Quality control

- ❑ Constructability reviews, peer reviews, and code compliance reviews are frequently used during the **preparation of plans and specifications** to mitigate potential risks to the project.

❖ It is the **Construction Manager's responsibility** to

1. **Confirm** that the plans released for bid are quality documents, well-coordinated and constructible.
2. **Consider** sustainability, maintainability, appropriate systems to be maintained that suit
 1. Client's needs,
 2. Adequate training, and
 3. Sufficient warranty periods.

What about testing and inspection?

Quality control

□ While

1. **Contractor** is **ultimately responsible** for adhering to the quality standards established in the contract documents
2. **Inspectors** are responsible for **inspection and reporting** on any **deviations**,
quality management is the **concern of all project team members**.
 1. The **PMP** should establish the **procedures** for **quality assurance**.
 2. **Each program** should include
 1. **Mandatory inspections** and **testing** required by the **specifications**,
 2. **Any other procedures** that are prudent to **assure that quality standards** are achieved.

How Does CM Add Value?

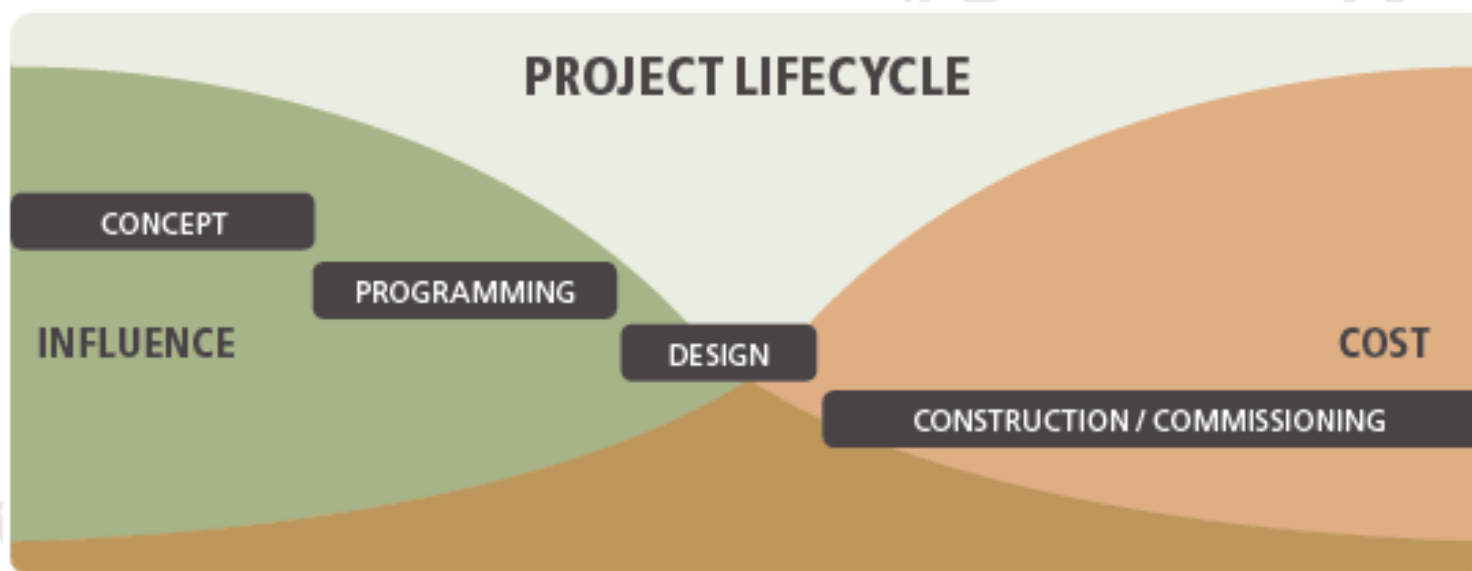
(Part 4: Manage Scope)

Scope management

- ❑ **Managing scope** is a **continuous process** throughout the lifecycle of a project.
- ❑ **Managing scope** involves **management** of
 1. Budget,
 2. Schedule and
 3. Qualityof the project as addressed before.
- ❑ Hopefully, it has become **crystal clear** that the **earlier CMs are involved** on a project or program providing their insight and **skills on cost, schedule and quality** **more influence CMs have** to help the owner control a successful outcome.

Scope management

- ❑ Clear expectations of budget, scope, quality and project duration upfront and throughout the design process saves dollars later once you are in construction.



Scope management

During construction scope = change management

❑ How often have you heard the following words from your Owner's lips:

"I do not expect there to be any change orders on this project"?

I would suspect more than once, if not repeatedly.

What are **three primary opportunities** to control the project outcome?

Scope management

❑ We would suggest that you consider **three primary opportunities** to control the project outcome.

1. The **first and best opportunity** is in the **pre-construction phase** before the budget is fixed.
2. If that **does not work** because you are not brought into the picture early enough, have **no fear**.
 - ❖ You are still in luck. You can include **contract language to mitigate** the battles that will ensue.
3. Finally, if you **miss out on both design and bid or procurement** phase opportunities to manage scope,
 - ❖ You still have **some wiggle room** for at least **clarification and setting the job** on the right path at the **start of Construction** when wounds from the last job have healed.

Scope management: Design phase

☐ Plan an **adequate contingency** for

1. Design phase

- ✓ Starting at a **higher percentage** in the **concept phase** and **reducing** as the documents become more refined

2. Construction phase

in the Owner's budget.

Realistic expectations make it easier to manage and control the construction process.

Scope management: Pre-bid phase

- ❑ Include **upfront language in the contracts** to
make **change order management easier** during construction.
 - ✓ **Overzealous contract requirements** can be **costly**
as contractors attempt to mitigate their exposure or risk.

Scope management: Construction phase

❑ At the start of the project, **request all the necessary information** you can in preparation **for change orders**

so that you can **agree upfront** on **cost issues**,

with **no surprises or conflicts** under stress or time constraints.

✓ Most importantly, **resolve schedule issues as they occur**.

○ If the project is **on time** it most likely will be **on budget**.

What should you watch out for in the **owner's budget** to ensure that the **construction contingency** is protected?

Scope management: Construction phase

- The terms new construction vs. renovation construction contingency, or other project type considerations and complexities impacting percentage allocation.
- Other cost considerations must be adequately budgeted including hazardous materials abatement, testing and inspection, moving expenses, owner furnished items, legal fees, permits, design fees, capitalized interest, etc.
- Adequate markups in cost estimates for contingencies, cost escalation factors, market conditions - bid factor, to ensure successful bid results.
- Consider use of bid alternates and value analysis recommendations if value engineering opportunities do not occur during the design process.
- A comparison review by the CM of the cost estimate prepared by the design consultant with reconciliation of variances.
- What kind of items can be included in the contract documents to facilitate change order management during construction? Consider the benefit of each item and, if not requested, the potential for negative ramifications.
- Resource/cost loaded CPM schedules and updates – for the Owner's protection, so make sure you have an expert in your camp who understands the requirements.

Scope management: Construction phase

- Written notice requirements – stay on top of potential delay items.
- Written change order requirements and procedures, with allowable defined mark-ups (include sample documents in the bid package clearly representing the calculation methodology).
- T&M requirements and verification of hours.
- Detailed breakdown of schedule of values – confirm costs are appropriately allocated for project start-up (suggest a mobilization line item at bid), adequately detailed to review pay requests and useful for order of magnitude pricing confirmation when changes occur as either adds or deducts.
- Frequency and form of payment application and regular inclusion of change orders.
- Earned value information – productivity analyses of a resource loaded CPM schedule can be useful to analyze lost productivity claims.
- Certified payroll information – analyze to identify excessive labor burdens on acceleration claims and compare labor rates charged for changed scope.
- Planned cash flow curve – projected manpower indicator.
- Submittal of general conditions breakdown of costs.
- Submittal of contractor's daily delay costs.
- Submittal of equipment rates – understand what equipment items are chargeable and their use.
- Allowable direct vs. indirect costs adequately defined upfront, i.e. no costs added to change orders for project management, as-built updates, or scheduling updates for change orders.
- Audit/access to records clause in the contract documents.

What items should be clarified and/or requested at the start of the job (or at time of bid if possible) but definitely before issuance of the first change order proposal?

Scope management: Construction phase

- Hourly rates of labor – defined labor burdens in the specifications, to ensure correct labor classification assigned to the work.
- Allowable supervision costs.
- Allowable markups and correct mathematic application.
- Allowable direct vs. indirect costs to be included in change orders.
- Agreed method of pricing MEP items.

And watch out for exaggerated material quantities and/or labor hours for work to be performed.

Scope management: Construction phase

- ❑ To **control costs during construction**, be sure to emphasize to the team (including user groups) that **all communications must be routed** to or go through the **CM**
 - ❖ **CM** must be involved in **all meetings**.
 - ❖ This is especially important **during the design phase** so you can be alerted to any “**scope creep**”.
 - ✓ **Bring** any **cost issues** to the **Owner early** so they can be dealt with effectively.
 - ✓ **Approve** only a **realistic schedule of values** for work **in place** so the **Owner is never behind** at any given moment.
 - ✓ **Process** all payment applications promptly including **changes** as they occur to **mitigate claims**, preserving the project scope.

Scope management: Construction phase



"Well...we made a few design adjustments to stay within budget"

How Does CM Add Value?

(Afterword: Owners & CMs)

Afterword: Owners & CMs

GOOD OWNERS

- ☐ Make decisions in a timely manner
- ☐ Provide needed information
- ☐ Pay in a timely manner
- ☐ Provide leadership and vision
- ☐ Are open to ideas
- ☐ Are open and transparent in their reporting

BAD OWNERS

- ☐ Procrastinate
- ☐ Are non-responsive
- ☐ Hold invoices
- ☐ Bury their head in the sand
- ☐ Are inflexible
- ☐ Don't communicate good or bad news

GOOD CMS

- ☐ Embrace new technologies available worldwide
- ☐ Minimize disruption and downtime impacts to Owner
- ☐ Understand how to integrate seamlessly into Owner's organization, adding value when needed and where needed
- ☐ Are always one step ahead of the specialists to help guide the Owners
- ☐ Are always implementing Best Practices
- ☐ Are always watching for exceptions, exclusions and assumptions to help guide the Owner

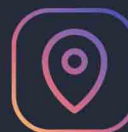
BAD CMS

- ☐ Fear Change
- ☐ Don't communicate with User groups
- ☐ Impose their own systems
- ☐ Are reactive, not proactive
- ☐ Do not implement Lessons Learned
- ☐ Don't mind the store

موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

دفتر آموزش

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