

A Report on

Construction Management



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Abstract

Construction management is most important in every field or type of construction. It makes things, procedures and processes easy to handle and to achieve the particular goals in a better way, in order to construct a long lasting construction work. Thus, there are some things discussed in the report required for a good construction management on practical basis.

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Introduction To Construction Management



In every matter of life, and in every field, the management has great importance, which is the main point to reach goals well. The management lead to the either failure of our plan or its success. The progress and success depend greatly on the management i.e. the best management will lead to the best ending of the plan.

Similarly, in the field of construction, it's management matters a lot regarding the progress and success of the particular project. There are many things in the planning a project, construction field, designing and other things in which the best management is essential for the better results.

Thus, we have to focus on some of the things which should be noticed and manage as well as possible.

"Construction Project Management (CM) is a professional service that uses specialized, project management techniques to oversee the planning, design, and construction of a project, from its beginning to its end."

The purpose of CM is to control a project's time, cost and quality. CM is compatible with all project delivery systems, including design-bid-build, design-build, CM At-Risk and Public Private Partnerships. Professional construction managers may be reserved for lengthy, large-scale, high budget undertakings (commercial real estate, transportation infrastructure, industrial facilities, and military infrastructure), called capital projects.

Contractor

Contractors are assigned to a construction project during the design or once the design has been completed by a licensed architect. This is done by going through a bidding process with different contractors. The contractor is selected by using one of three common selection methods: low-bid selection, best-value selection, or qualifications-based selection.

A construction manager should have the ability to handle public safety, time management, cost management, quality management, decision making, mathematics, working drawings, and human resources.

Functions of Construction Management

The functions of construction management typically include the following:

1. Objectives

Specifying project objectives and plans including delineation of scope, budgeting, scheduling, setting performance requirements, and selecting project participants. Maximizing the resource efficiency through procurement of labor, materials and equipment.

2. Implementation

Implementing various operations through proper coordination and control of planning, design, estimating, contracting and construction in the entire process.

Developing effective communications and mechanisms for resolving conflicts.

3. Construction Manager

The Construction Management Association of America (CMAA) states the most common responsibilities of a Construction Manager fall into the following 7 categories such as Project Management Planning, Cost Management, Time Management, Quality Management, Contract Administration, Safety Management, and CM Professional Practice. CM professional practice includes specific activities, such as defining the responsibilities and management structure of the project management team, organizing and leading by implementing project controls, defining roles and responsibilities, developing communication protocols, and identifying elements of project design and construction likely to give rise to disputes and claims.

Types of Construction

There are following types of construction, which need to be managed regarding the certain conditions and its own significance of construction.

1. Agricultural

Typically economical buildings, and other improvements, for agricultural purposes. Examples include barns, equipment and animal sheds, specialized fencing, storage silos and elevators, and water supply and drains such as wells, tanks, and ditches.

2. Residential

Residential construction includes houses, apartments, townhouses, and other smaller, low-rise housing, small office types.

3. Commercial

This refers to construction for the needs of private commerce, trade, and services. Examples include office buildings, "big box" stores, shopping centers and malls, warehouses, banks, theaters, casinos, resorts, golf courses, and larger residential structures such as high-rise hotels and condominiums.

4. Institutional

This category is for the needs of government and other public organizations. Examples include schools, fire and police stations, libraries, museums, dormitories, research buildings, hospitals, transportation terminals, some military facilities, and governmental buildings.

5. Industrial

Buildings and other constructed items used for storage and product production, including chemical and power plants, steel mills, oil refineries and platforms, manufacturing plants, pipelines, and seaports.

6. Heavy Civil

The construction of transportation infrastructure such as roads, bridges, railroads, tunnels, airports, and fortified military facilities. Dams are also included, but most other water-related infrastructure is considered environmental.

7. Environmental

Environmental construction was part of heavy civil, but is now separate, dealing with projects that improve the environment. Some examples are water and wastewater treatment plants, sanitary and storm sewers, solid waste management, and air pollution control.

Obtaining the Project

1. Bids

A bid is given to the owner by construction managers that are willing to complete their construction project. A bid tells the owner how much money they should expect to pay the construction management company in order for them to complete the project.

a. Open bid

An open bid is used for public projects. Any and all contractors are allowed to submit their bid due to public advertising.

b. Closed bid

A closed bid is used for private projects. A selection of contractors are sent an invitation for bid so only they can submit a bid for the specified project.^[3]

2. Selection methods

a) Low-bid selection

This selection focuses on the price of a project. Multiple construction management companies submit a bid to the owner that is the lowest amount they

are willing to do the job for. Then the owner usually chooses the company with the lowest bid to complete the job for them.

b) Best-value selection

This selection focuses on both the price and qualifications of the contractors submitting bids. This means that the owner chooses the contractor with the best price and the best qualifications. The owner decides by using a request for proposal (RFP), which provides the owner with the contractor's exact form of scheduling and budgeting that the contractor expects to use for the project.

c) Qualifications-based selection

This selection is used when the owner decides to choose the contractor only on the basis of their qualifications. The owner then uses a request for qualifications (RFQ), which provides the owner with the contractor's experience, management plans, project organization, and budget and schedule performance. The owner may also ask for safety records and individual credentials of their members. This method is most often used when the contractor is hired early during the design process so that the contractor can provide input and cost estimates as the design develops.

3. Payment Contracts

a) Lump Sum

This is the most common type of contract. The construction manager and the owner agree on the overall cost of the construction project and the owner is responsible for paying that amount whether the construction project exceeds or falls below the agreed price of payment.

b) Cost Plus Fee

This contract provides payment for the contractor including the total cost of the project as well as a fixed fee or percentage of the total cost. This contract is beneficial to the contractor since any additional costs will be paid for, even though they were unexpected for the owner.

c) Guaranteed Maximum Price

This contract is the same as the cost-plus-fee contract although there is a set price that the overall cost and fee do not go above.

d) Unit Price

This contract is used when the cost cannot be determined ahead of time. The owner provides materials with a specific unit price to limit spending.

Project Stages

In Construction

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Every project stage in every project have its own importance and significance according to which the project is managed, for the better results. In construction, there are many stages which should be managed with well plans and the progress of the company and the team work

The design stage involves four steps: programming and feasibility, schematic design, design development, and contract documents. It is the responsibility of the design team to ensure that the design meets all building codes and regulations. It is during the design stage that the bidding process takes place.

Design

1. Conceptual/Programming and feasibility

The needs, goals, and objectives must be determined for the building. Decisions must be made on the building size, number of rooms, how the space will be used, and who will be using the space. This must all be considered to begin the actual designing of the building. This phase is normally a written list of each room or space, the critical information about those spaces, and the approximate square footage of each area.

2. Schematic design

Schematic designs are sketches used to identify spaces, shapes, and patterns. Materials, sizes, colors, and textures must be considered in the sketches.^[3] This phase usually involves developing the floor plan, elevations, a site plan, and possibly a few details.

3. Design development (DD)

This step requires research and investigation into what materials and equipment will be used as well as their cost. During this phase, the drawings are refined with information from structural, plumbing, mechanical, and electrical engineers. It also involves a more rigorous evaluation how the applicable building codes will impact the project.

4. Contract documents (CDs)

Contract documents are the final drawings and specifications of the construction project. They are used by contractors to determine their bid while builders use them for the construction process. Contract documents can also be called working drawings.

Pre-Construction

The pre-construction stage begins when the owner gives a notice to proceed to the contractor that they have chosen through the bidding process. A notice to proceed is when the owner gives permission to the contractor to begin their work on the project. The first step is to assign the project team which includes the project manager (PM), contract administrator, superintendent, and field engineer.^[3]

1. Project manager

The project manager is in charge of the project team.

2. Contract administrator

The contract administrator assists the project manager as well as the superintendent with the details of the construction contract.

3. Superintendent

It is the superintendent's job to make sure everything is on schedule including flow of materials, deliveries, and equipment. They are also in charge of coordinating on-site construction activities.

4. Field engineer

A field engineer is considered an entry-level position and is responsible for paperwork.

During the pre-construction stage, a site investigation must take place. A site investigation takes place to discover if any steps need to be implemented on the job site. This is in order to get the site ready before the actual construction begins. This also includes any unforeseen conditions such as historical artifacts or environment problems. A soil test must be done to determine if the soil is in good condition to be built upon.

Procurement

The procurement stage is when labor, materials and equipment needed to complete the project are purchased. This can be done by the general contractor if the company does all their own construction work. If the contractor does not do their own work, they obtain it through subcontractors. Subcontractors are contractors who specialize in one particular aspect of the construction work such as concrete, welding, glass, or carpentry. Subcontractors are hired the same way a general contractor would be, which is through the bidding process. Purchase orders are also part of the procurement stage.

Purchase orders: A purchase order is used in various types of businesses. In this case, a purchase order is an agreement between a buyer and seller that the products purchased meet the required specifications for the agreed price.

Construction

The construction stage begins with a pre-construction meeting brought together by the superintendent. The pre-construction meeting is meant to make decisions dealing with work hours, material storage, quality control, and site access. The next step is to move everything onto the construction site and set it all up.

A **Contractor progress payment schedule** is a schedule of when (according to project milestones or specified dates) contractors and suppliers will be paid for the current progress of installed work.

Progress payments are partial payments for work completed during a portion, usually a month, during a construction period. Progress payments are made to general contractors, subcontractors, and suppliers as construction projects progress. Payments are typically made on a monthly basis but could be modified to meet certain milestones. Progress payments are an important part of contract administration for the contractor. Proper preparation of the information necessary for payment processing can help the contractor financially complete the project.

Owner Occupancy

Once the owner moves into the building, a warranty period begins. This is to ensure that all materials, equipment, and quality meet the expectations of the owner that are included within the contract.