

Project Management for Construction works

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Introduction to Construction Project Management; what is Construction Project Management?

It is the overall planning, coordination, and control of a project from beginning to completion. It is aimed at meeting a client's requirement in order to produce a functionally and financially viable project.

The management of construction projects requires knowledge of modern management principles as well as an understanding of the **design** and **construction process**.

Who does hold the responsibility of Construction Project Management?

The Project Manager has the primary responsibility of Construction Management, which is planning a particular construction job and overseeing its progress along the way.

A Project Manager is responsible for accomplishing the stated project objectives. Key project management responsibilities include creating clear and attainable project objectives, building the project requirements, and managing the constraints of the project management triangle, which are **cost, time, scope or quality**.

⌘ **What is a Project?**

“A project is a unique set of co-ordinated activities with definite starting and finishing points, undertaken by an individual or organization to meet specific objectives within defined time schedule, cost and performance.

Every project is unique in its own way; there are certain basics which define most project work. These are: objectives, constraints, lifecycle.

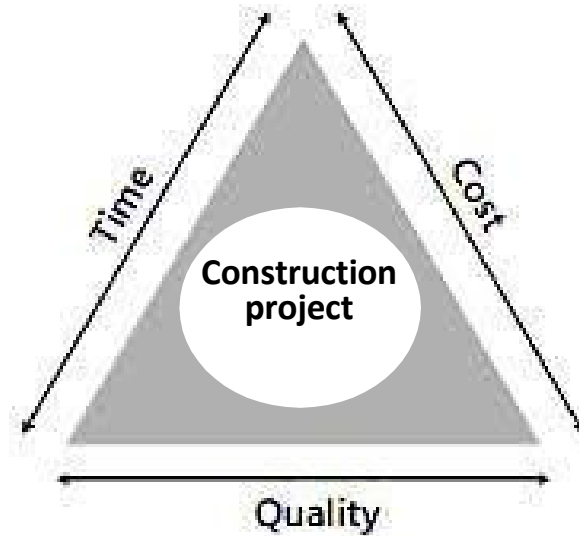
⌘ **Project Objectives;**

Objectives are describing what the project is trying to accomplish, or what business value the project will achieve. Generally, any project objectives can be described as follows:

- To ensure finishing and delivering the project on time.
- To ensure the delivery of the project within budget.
- To ensure reaching the required level of quality, through reducing errors, improving effectiveness, and applying the appropriate control.

Project Constraints;

Each project needs to be performed and delivered under certain constraints. These constraints are typically as shown below:



Mainly, project management wishes to provide at the end of the project a product which is delivered on **Time with a high Quality and minimum Cost**. However, it is practically difficult to achieve this.

The reduction of project's time involves increasing cost (this could mean using extra labor and equipment), or reducing quality of work.

Project Lifecycle (Project Development Stages)

As shown below, Initiation, Planning & Design, Execution, and Closing & Maintenance are any Project's development stage, whatever is its type of Project;

- **Initiation**: At this stage, project's scope is determined an understanding of the business environment to make sure that all the project's key controls are fully addressed and incorporated into the project. If this stage is not performed well, it is unlikely that the project is going to be successful in meeting the needs for which it was undertaken.

- **Planning & Design**: After the initiation stage is performed, the project's WBS is designed in addition to all other project's documents which are prepared pre-construction. Occasionally, a prototype of the final project's product is built and tested.

- **Execution**: This stage includes the actual procurement of the project's set plan or design.

- **Closing & Maintenance**: The Closing includes handing the final product over to the owner after the project is finished and the formal acceptance is signed and published. The Maintenance, which is an ongoing process, includes the correction of any errors have ever been made during the project's execution.

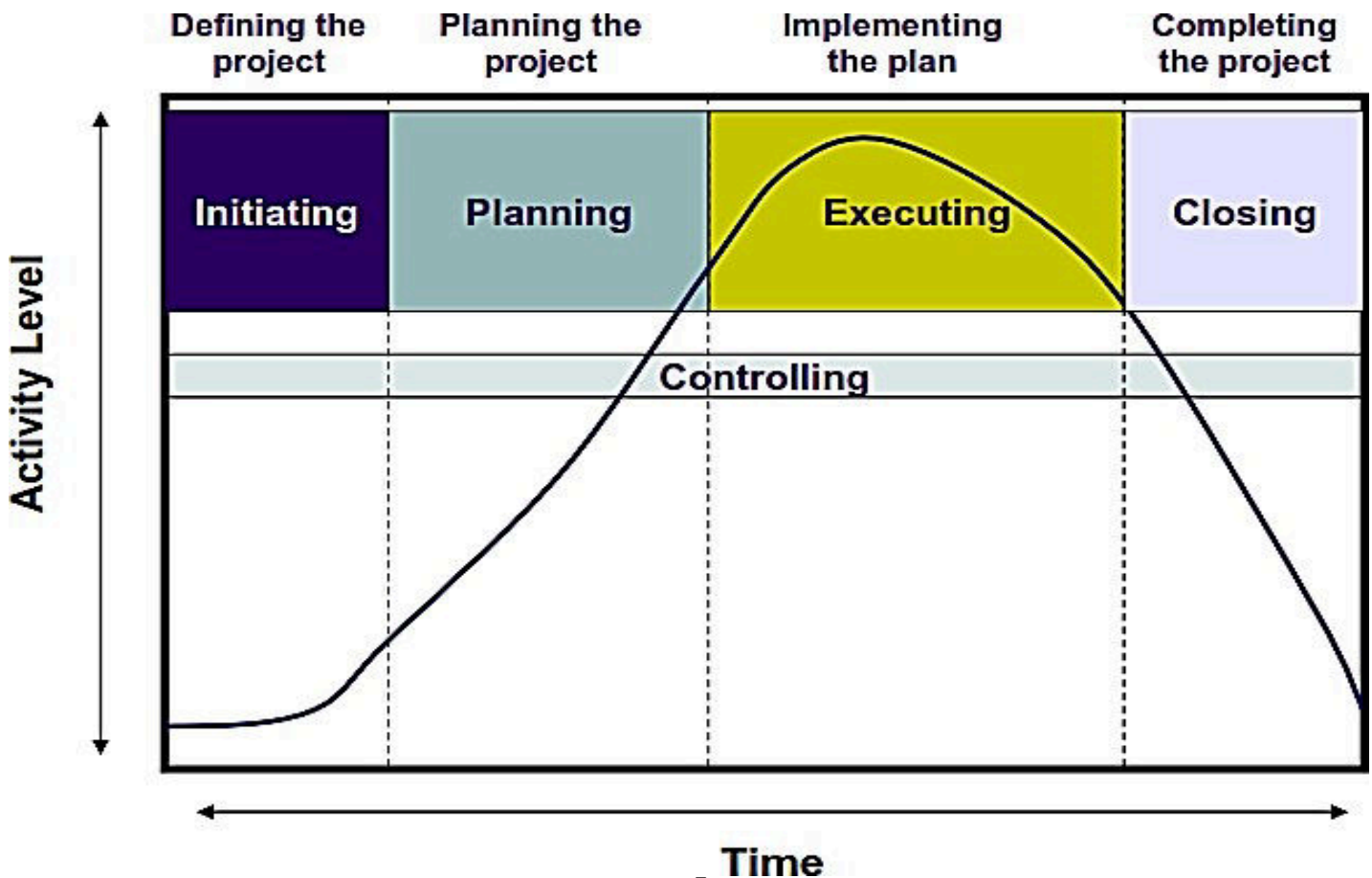
The figure shown below describes the activity of work during the project lifecycle:



Explanation about these essential steps generally in chart drawing;

- 1) **Initiation:** At this stage, project’s scope is determined. An understanding of the business environment to make sure that all the project’s key controls are fully addressed and incorporated into the project. If this stage is not performed well, it is unlikely that the project is going to be successful in meeting the needs for which it was undertaken.
- 2) **Planning & Design:** After the initiation stage is performed, the project’s WBS is designed in addition to all other project’s documents which are prepared pre construction. Occasionally, a prototype of the final project’s product is built and tested.
- 3) **Execution:** This stage includes the actual procurement of the project’s set plan or design.
- 4) **Closing & Maintenance:** The Closing includes handing the final product over to the owner after the project is finished and the formal acceptance is signed and published. The Maintenance, which is an ongoing process, includes the correction of any errors have ever been made during the project’s execution.

The chart shown below describes the activity of work during the project lifecycle:



Project Resources in construction field;

Any project's resources can be classified as follows:

- Time - Cost (Money) - Labor (Man-power) - Materials - Equipment (Machines)

In order to improve the application of any of the; (Money, Man-power, Materials, and Machines), so that they become more efficient and productive and therefore finishing the project on Time and at the required level of Quality, a control system of each resource should be prepared.

For example:

- **To improve Man-power**, (motivation, leadership, safety, productivity, and scheduling) should be improved.

- **To improve the application of Machines**, (productivity, Scheduling, construction method, and contracts) should be improved.

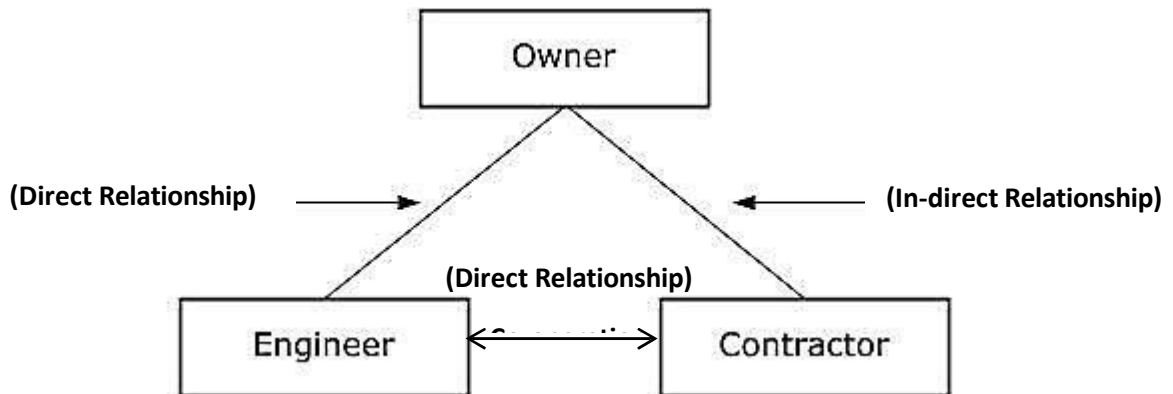
- **To improve the use of Materials**, (scheduling, quality, chemical, suitability, and purchasing/hiring) should be improved.

- **To improve the application of Money**, (sources of funds, scheduling, estimating, and cash-flow) should be improved.

⊕ Project Participants:

Each project, whatever is its type or what kind of construction involves, requires the participation of three main parties. These participants are the Owner, Engineer/Designer, and Contract.

The figure shown below displays the relationship between each of these participants:



In **addition to these main participants**, there are other sub-players, such as Consultants, Suppliers, Sub-contractors, and many others. They are working together under the role of the Project Manager in order to deliver the project's final product.

Types of Construction Projects

Construction work mainly includes anything is built and permanently attached to the ground. This includes different kinds of structures such as, multi-story buildings, bridges, dams, roads, etc.

Generally, construction work is classified under one of the following categories:

Building construction work. [For example, residential complex, commercial towers, hospitals, malls, etc.]

Engineering construction work. [For example, dams, bridges, airports, highways, etc.]

Industrial construction work. [For example, petroleum structures, electric-power plant, water plants, etc.]

Specialized construction work. [For example, deep tunnels, wind turbines, etc.]

Good Management in construction project will reduce many defects.

Three types of defects in construction Projects;

1. Material defects

Material defects happen when building material gets damaged—whether the defects come straight from the manufacturer or the damage occurs on site.

These types of defects can be particularly expensive; it's not uncommon to only notice material defects after a contractor uses them in the project. This is especially true for materials that ship out with defects.

2. Design defects

Design defects are a result of the design team failing to produce organized and accurate construction documents. These defects can occur through omission or error. Defects due to omission are typically fixed through change orders that add to the scope of work for one or more contractors. Defects due to errors generally require replacing parts or a redesign.

3. Workmanship defects

Workmanship defects are what usually come to mind when you think about defects in construction—they occur when someone fails to follow the project's documents when building components or structures.

A workmanship defect can be as simple as an aesthetic issue or as problematic as inadequate structural integrity. Either way, allocating liability and fixing the defect is typically a complex process.

Three causes of defects in construction project;

Next, let's look into three of the primary causes of defects in construction:

1. Inadequate quality control

Many defects in construction stem from poor quality-control procedures. Some factors that impact this include:

A lack of skilled laborers, Low-quality materials and Unrealistic deadlines.

In addition, not having proper inspection plans in place can prevent you from detecting defects early on in the project, resulting in more rework and less profit.

2. Inefficient document distribution

Even with so many automated solutions available in the construction industry, it's not uncommon for paper documents to be floating around both on site and in the back office system. This means contractors struggle to get the necessary documents signed and approved in time to stay on track.

Plus, builders might end up working with old versions of construction drawings without the design team's latest changes.

When different people have different versions of the same document, tracking project progress accurately becomes almost impossible.

3. Poor communication

When the project stakeholders, jobsite crews, office staff, and contractors aren't on the same page, progress slows down, and the chance for construction defects to pop up in your project becomes much higher.

Poor communication also leads to billions of dollars in rework, unnecessary delays, budget and cost overruns, safety issues, and more—it's arguably one of the most important aspects of project management and the construction industry as a whole.

Ways to avoid defects in construction

Finally, let's see how you can prevent those causes of defects in construction:

1. Change how you manage defects

To prevent defects in construction due to poor quality control, you need to overhaul your defect management processes. Helps prevent and reduce defects by allowing you to:

Give everyone access to punch lists and inspection documents identify site issues and pull the plug before one defect turns into many

- Send instant notifications about what's happening on your site
- Sign off on or reject documents without setting foot in the office.

2. Store your documents in one place

You can prevent defects in construction that stem from inefficient document management by ensuring everyone has immediate on-site access to important documentation.

Construction management software can help eliminate document damage and loss while speeding up distribution between teams by switching from paper to digital forms.

In addition, managing your documents with a dedicated digital platform allows you to verify and approve various documentation in the same place, giving all users access to the latest revisions, reviews, and comments.

3. Share progress and communicate in real time

Preventing workmanship defects in construction due to miscommunication requires using the right communication channels and sharing project progress in real time.

We can decrease construction defects by:

- Keep everyone involved in the project on the same page.
- Communicate with every crew in real time with a single app.
- Send mass notifications with tasks, site issues, comments, and daily summaries.
- Share team progress and reports using real-time visuals.

How to reduce defects in construction project;

The above three strategies to avoid defects in construction all have one thing in common that makes them successful: managing defects digitally instead of manually.

With the right software for defect management, you can:

- Instantly record defects and quality issues and assign tasks from your mobile device.
- Assign responsibilities and due dates to specific workers to handle defects.
- Attach documents, photos, and notes to each defect for complete transparency.
- Create templates to quickly conduct walkthroughs to identify on-site defects.

So we can see how easy managing on-site defects can be establishing an effective project schedule is probably the most critical factor for ensuring that a construction project is completed on time, within budget, and to the client's satisfaction. The benefits of project scheduling permeate all spheres of construction from start to finish.

Abstract

In project management, a schedule is a listing of a project's milestones, activities, and deliverables, usually with intended start and finish dates. Those items are often estimated in terms of resource allocation, budget and duration, linked by dependencies and scheduled events. A schedule is commonly used in project planning and project portfolio management parts of project management. Elements on a schedule may be closely related to the "work breakdown structure" (WBS) terminal elements, the Statement of work, or a Contract Data Requirements List. In many industries, such as engineering and construction, the development and maintenance of the project schedule is the responsibility of a full-time scheduler or team of schedulers, depending on the size of the project.

Project management scheduling; A Gantt chart is a type of bar chart that illustrates a Project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and Summary elements of a project. Terminal elements and summary elements comprise the work Breakdown structure of the project. Modern Gantt charts also show the dependency (i.e., Precedence network) relationships between activities. Gantt charts can be used to show current Schedule status using "percentage completed" shadings. Gantt charts can be used for scheduling.

- **Project Scheduling Enables Better Decision Making.**
- **Scheduling Keeps Better Track of Interdependent Tasks.**
- **Scheduling Helps With Better Cash Flow Management.**
- **Scheduling Helps Manage Project Changes.**
- **Conclusion.**

Conclusion

- Project management is the primary tool for executing the business plan, installing the businesses processes, and achieving the strategic ambitions of the entrepreneur.
- Project management helps to detail what tasks will be accomplished, who will be involved in completing the tasks, and when tasks should start and finish.
- Typically, projects progress in steps or incremental stages; however, other approaches for rapid, interactive project management are also widely used.
- Several tools can be used to manage the project and communicate timing and status, including task diaries, WBSs, and Gantt charts.
- Projects fail for many reasons. It is management's responsibility to determine whether the inherent risks in the project can be accepted and the project can be launched, or whether the project be delayed.

So construction project management is a critical tool in the never-ending process of growth and renewal. It allows the engineer managers to minimize and mitigate inherent risks and increase the potential for success of the launch and the ongoing operation of construction projects.

It is our hope that engineers begin their careers in project management for construction will be prepared to adopt the integrated approach of the essential four steps. Furthermore, experienced professionals in various fields may discover.