

Construction Technology L1



**Shoubra Faculty of Engineering
Civil Engineering Department**

**Prepared by:
Dr. Mahmoud El-Mohr
Dr. Emad El-Dardiry**

Construction Technology Outlines?

Week No.	Lecture Title
1	Introduction to construction Engineering and Technology.
2	Drilling, Excavation and Excavating equipment & related Cost I.
3	Drilling, Excavation and Excavating equipment & related Cost II.
4	Tractors and related Equipment.
5	Introduction to Construction Contracts
6	Contracts types and selection of the most suitable contract based on the available information.
7	Engineering Fundamental of Moving earth I.
8	Mid-term Exam
9	Compaction Techniques
10	Ready Mixed Concrete I and asphalt mix.
11	Ready Mixed Concrete II.
12	Introduction to Dewatering of underground water.
13	Types and design of Formwork
14	General revision

What is Construction?

❖ Construction:

it is the process in which all plans, drawings, specifications, materials and permanent equipment are transformed by the Contractor into finished facility (usable building).

❖ Characteristics of Construction project:

- Temporary, it must have start and end. Its duration varies from few days to few years.
- Unique, there are no similar projects.
- Progressively elaborated. The detailed characteristics of the project are not known in advance, they are:
 - **Defined in steps.**
 - **May be revisited and refined when more information is available.**
- **All projects must either meet their objectives or be terminated.**

I- What is Construction?

Construction Industry

Resources

Construction Project

Input

Processing

Output

Drawings

Specifications

Materials

Permanent Equipments

Human Resources

Processing by
the Contractor.

Building
Facility



Comparison Between projects & Operations

	Projects	Operations
Durations	Temporary - has definite beginning and end (although duration may vary from few days to several years)	Ongoing activity Process (repeated process)
Objective	Achieve desired goals and close the project	Sustain in business as long as possible
End Results	Production of "Unique" facility	Sustain in business as long as possible
Progressive Elaboration	Projects are progressively elaborated	Not necessary progressively elaborated

Steps of Construction:

1. Concepts and ideas expressed by the owners are turned into design drawings, specifications, Bill of quantities by the Consultants.
2. Budget and time schedule are then prepared by the Project Manager.
3. Tender Documents are then compiled and completed by the Project Manager, and will then be issued to the short listed Bidders (list of pre-qualified bidders).
4. Offers received from the bidders are technically analyzed by Consultants and financially analyzed by the project manager.
5. Based on the analysis of both Technical and Financial offers, successful bidder will then be selected as the project contractor.
6. Contract will then be prepared by the Project manager and it has to be signed by both the Owner & the Contractor.
7. Performance bond to be submitted by the contractor and advance payment to be paid by the Owner.

Nature of Construction Process:

1. The Contractors strive **يسعى جاهدا** very hard to be out of the job. The faster and the better they perform the sooner they will be looking for another job, the bigger the profit will be.
2. The word cyclic has a larger meaning in construction, many employees working for a short duration in remote sites and then being laid off as the project completed.
3. The construction labor force comes together at the start of the project and must be quickly appointed by the project management, directed and managed by the project manager as will be described later.
4. Construction is inherently dangerous occupation involving large and costly construction equipment.
5. The ability of contractor to win contract and achieve a profit is determined by two vital assets: people and construction equipment.

Develop Project Team

- Develop Project Team is the process of improving the competencies, team interaction, and the overall team environment to enhance project performance.
- Project managers should identify, build, maintain, motivate, lead, and inspire project teams to achieve high team performance and to meet the project's objectives.
- Teamwork is a critical factor for project success, and developing effective project teams is one of the primary responsibilities of the project manager.
- Project managers should create an environment that facilitates teamwork.
- Project managers should continually motivate their team by providing challenges and opportunities, by providing timely feedback and support as needed, and by recognizing and rewarding good performance.
- High team performance can be achieved by using open and effective communication, developing trust among team members, managing conflicts in a constructive manner, and encouraging collaborative problem-solving and decision-making.

Objectives of Developing Project Team

Objectives of developing a project team include, but are not limited to:

- ❖ Improve knowledge and skills of team members in order to increase their productivity and their ability to complete project deliverables, and as a result lowering costs, reducing schedules, and improving quality.
- ❖ Improve feelings of trust and agreement among team members in order to raise morale (معنويات), lower conflict, and increase team work; and Create a dynamic and cohesive team culture to improve both individual and team productivity, team spirit, and cooperation, and to allow cross-training and mentoring (توجيه) between team members to share knowledge and expertise.

Tools & Techniques of Developing Project Team

1 Interpersonal skills مهارات التعامل

- These are sometimes known as “soft skills,” and are particularly important to team development.
- The project management team can greatly reduce problems and increase cooperation by understanding the sentiments مشاعر of project team members, anticipating their actions, acknowledging their concerns, and following up on their issues. Skills such as empathy (تقمص عاطفي), influence, creativity, and group facilitation are valuable assets when managing the project team.

Tools & Techniques of Developing Project Team

2- Training

- Training includes all activities designed to enhance the competencies of the project team members.
- Examples of training methods include classroom, online computer-based, on-the-job training from another project team member, mentoring, and coaching توجيه وتدريب
- If project team members lack necessary management or technical skills, such skills can be developed as part of the project work.
- Scheduled training takes place as stated in the human resource plan.
- Unplanned training takes place as a result of observation, conversation, and project performance appraisals
- Co-location is an example of training.

Tools & Techniques of Developing Project Team

3 Team-Building Activities

- ❑ Team-building activities can vary from a five-minute agenda item in a status review meeting to an off-site, professionally facilitated experience designed to improve interpersonal relationships.
- ❑ The objective of team-building activities is to help individual team members work together effectively.
- ❑ Team-building strategies are particularly valuable when team members operate from remote locations without the benefit of face-to-face contact. Informal communication and activities can help in team building.

Steps of Developing Project Team

Most of theories state that there are five stages of development that teams may go through. Usually these stages occur in order. However, it's not uncommon for a team to get stuck in a particular stage or slip to an earlier stage. Also, projects with team members who have worked together in the past could skip one stage or more.

1. **Forming.** This phase is where the team meets and learns about the project and what their formal roles and responsibilities are. Team members tend to be independent and not as open during this phase.
2. **Storming.** During this phase, the team begins to address the project work, technical decisions, and the project management approach. If team members are not collaborative and open to differing ideas and perspectives the environment can become destructive.

Steps of Developing Project Team

3. **Norming.** In the norming phase, team members begin to work together and adjust work habits and behaviors that support the team. The team begins to trust each other.
 4. **Performing.** Teams that reach the performing stage function as a well-organized unit. They are interdependent and work through issues smoothly and effectively.
 5. **Adjourning.** In the adjourning phase, the team completes the work and moves on from the project.
- The duration of each particular stage depends upon team dynamics, team size, and team leadership.
 - Project managers should have a good understanding of team dynamics in order to move their team members through all stages in an effective manner.

Owner:

1. Specify the required facility that can be completed within the available time and budget .
2. Finance the project.
3. Approve the project budget and time schedule prepared by the project manager.
4. He may provide important information to the project such as due dates and other milestones, important product features.
5. If a serious conflict arises between the project manager and the customer, the sponsor/Owner may be called in to resolve the dispute.

Role of Parties Involved in Construction?

Consultants,

1. Prepare design drawings that meet both owners and user requirements.
2. Prepare project specifications.
3. Prepare Bill of Quantities.
4. Supervise Construction activities and ensure that work completed is in conformance with the project drawings and specifications.
5. Review shop drawings prepared by the Contractor.
6. Issuance of compliance certificate of the work done to assure the owner that work is done in accordance with the project specifications.

Role of Parties Involved in Construction?

Role of Contractor:

1. Transform the drawings into a finished facility in accordance with the project specifications.
2. Prepare shop drawings for all trades as necessary.

Role of Project Manager,

- Monitoring Progress of work and resolve any problem hindering progress.
- Appointing both consultants and contractors.
- Coordinating the entire work from design to handing-over stage.
- Coordinate work between different contractors.
- Managing Construction operations to be completed within the available time, budget and with the desired quality.

Project Manager Role Follows:

- Keeping the work progressing at site as scheduled and planned.
- Held regular progress meetings and issue minutes of meeting.
- Avoid claims but in case of claims, the project manager should assess and evaluate the claim and write his recommendations to the Owner.
- Forecasting project cash flow for the project.
- Pre-tender evaluation of contractors.
- Evaluation of Tender Bids and select the appropriate contractor.
- Issuance of variation orders, in case of additional work outside the original scope.
- Review of both contractors and consultant payments in order to be paid by the owner.
- Forecasting Final cost of the project.

Project Manager qualifications:

1. He must be an Integrator
2. He must be a Communicator
3. He should be Team Leader
4. He should be a Decision Maker
5. He should be able to create a suitable environmental climatic conditions.
6. He must have considerable experience so that he is familiar with the work.
7. He must have an experience in the application of management techniques such planning, scheduling, time control, Integration, cost estimation, quality, human resources, Communications, Risk analysis and procurements.
8. He must have the personality and insight that enables him to work with other people.
9. He must be able to resolve & overcome any arisen problem.
10. He must be able to be a leader and problem solving.

See You Next Lecture

THANK YOU!