

Project Planning and Control Methods

Lecture #1

Introduction to Project Management

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Construction Engineering and Management



Outline

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- What is a project?
- Construction projects
- What is project management?
- Project management jobs
- Why project management is important?

What is a project?

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□ Definition

“A temporary endeavor undertaken to create a unique product, service or result” (PMI 2008, p. 434)

First examples come to the mind: building a house, a bridge, a refinery, a highway.

Temporary: to have a start and an end.

Unique: with different specification (design, structure, material, location). Different projects might be similar but are not the same.

Product, service or result: in general they are called *deliverables*.



Which one of the following examples is not a project?

- Teaching the project planning and control course
- Completing an assignment
- Hosting a party
- Going to a trip
- Washing the dishes

What is a project?

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□ **Points to remember about project**

- Not every work package fallen under project definition is considered a project in the real industry work (e.g., can be called task, report, draft, assignment, etc)
- The nature of different disciplines and the organizational culture affect project definition perception (e.g., a similar outputs asked as a class assignment in Sharif University might be considered term project in Tehran University!!!!)
- What are assumed as projects in industry usually have long durations (normally longer than several days, several weeks or even several months)
- Industrial projects normally involve several parties (owner, project manager, contractors, regulatory bodies, consultant, project employees)
- Projects can be very different in sizes, from several hundreds to billions of dollars value (e.g., a term project for a course to exploratory sky shuttle projects)

Construction projects

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□ Different types of projects

- Computer software projects
- Research projects
- Automation projects
- Aerospace projects
- Military projects
- As well as construction projects

□ Construction Project

- A process that consists of the building or assembling of infrastructure
- Examples of a construction project varies from road construction, building construction, bridge construction, tunnelling, pipeline construction, and industrial plant construction.

Construction projects

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- **Why holding construction program (focusing on project nature of the construction sector) as a specialized field for engineers?**
 - Compared to other types of projects, number of construction projects is very high; in many countries construction projects driving the countries economy.
 - Iran: (Source: http://en.wikipedia.org/wiki/Construction_industry_of_Iran)
 - Turnover of construction industry in Iran is around \$154 billion in 2016
 - Construction sector contributed to 21% of GDP in 2011
 - Share of industrial construction in Iran: 3% (2005); 30% (2012)

Construction projects

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- USA:
 - Total money spent in construction industry is around \$2596 billion which is 13% of the GDP in 2017 (U.S. Bureau of Economic Analysis; <https://tradingeconomics.com/united-states/gdp-from-construction>)
 - 5.5 million out of 143 million people work in the construction sector (US Bureau of labor statistics)
- Dealing with construction projects requires specific engineering background (mainly in the field of civil engineering) to understand terminologies and tools involved in projects
- To be able to successfully manage construction projects, engineers need to know project management (including project planning and control) body of knowledge (which is basically applicable to all types of projects)

What is project management?

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- **Project management:** is the application of *knowledge*, *skills*, *tools* and *techniques* to project activities to meet the project requirements.(PMBOK 2008; p6).

Project management consists of the set of activities to define the project, plan for the project execution, arrange for the project executing and control the execution progress.

Project Manager: is the person assigned by the performing organization to achieve the project objectives. (PMBOK 2008; p13).

- Knowledge: specific discipline's knowledge and project management body of knowledge



Question: Are we expecting a project manager to know all knowledge used in the project?

What is project management?

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- ▣ Skill: earned from past work experiences. Negotiation skills, communication skills; leadership skills; problem solving skills.

Past experience in the same type of projects is a huge asset for learning skill required!



Question: For managing a new multi-level highway intersection construction project we have two cases to employ as the project manager; 1) a person with 15 year work experience in managing bridge construction projects. He has BSc degree in mechanical engineering 2) a PhD graduate in construction management with 8 years of experience in managing industrial construction projects. Which one you are going to hire and why?

What is project management?

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- ▣ Tools: bidding and contracting tools; estimating and budgeting tools; project scheduling tools; project communication tools.



Question: Are we expecting a project manager be professional in the majority of the tools used in the project?

- ▣ Techniques: dispute resolution techniques; human resource management techniques.



Question: Are we expecting a project manager be completely familiar in the majority of the techniques used in the project?

Project management job

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□ PM job positions

- **Project manager:** oversees the entire project (planning, staffing, material procurement, implementation, control, commissioning, etc.)
- **Project coordinator:** does similar (but usually partial) tasks to the project manager, but under project manager's supervision. This position is usually defined in big projects or is given to the junior project managers.
- **Project scheduler:** prepares the project schedule; collects project progress information; prepares project progress reports; updates project schedule based on feedback received from project management team.

Note: The main subject of this course is project scheduling

Project management jobs

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- ❑ **Project planner/ Project planning and control/ Project control:** normally is a used as a substitute name to the project scheduler. Sometimes other types of planning and control than time (e.g., scope, cost, and communication) is expected to be taken.
- ❑ **Project estimator:** estimates the project cost usually during the contract phase.
Past experience, historical data and development of the project norms play significant roles in development of good estimates.
- ❑ **Project expeditor:** is not a member of project team and gathers project progress/ standing for the performing organization's management team.
- ❑ **PMP:** Project management professional is told to the people who have a good understanding about different project management body of knowledge. PMP certificate also is given to the individuals who have passed PMP exam held by PMI.

Project management jobs

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- **Construction project manager:** is a project manager managing construction projects.
- **Construction manager:** is not a project based job position. It is a position usually set in the construction companies to support different issues related to the construction (or field installation) phase of the construction projects (e.g., human resource and equipment procurement issues)
- **Job market for project management jobs**
 - Project management and construction project management jobs are among the most demanding jobs; they share similar concepts all around the world; they are reasonably well paid jobs.

Project management jobs

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Structural Engineer

what: job title, keywords or company

where: city, state, or zip

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Average Structural Engineer salaries for job postings nationwide are 23% higher than average salaries for all job postings nationwide.

Project management jobs

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Construction Manager Salary

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Average Salary of Jobs Matching Your Search



Average Construction Manager salaries for job postings nationwide are 13% higher than average salaries for all job postings nationwide.

Project management jobs

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what: job title, keywords or company

where: city, state, or zip

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Average Project Manager salaries for job postings nationwide are 24% higher than average salaries for all job postings nationwide.

Project management jobs

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Project planning Salary

What

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Average Salary of Jobs with Titles Matching Your Search



Average Project planning salaries for job postings nationwide are 29% higher than average salaries for all job postings nationwide.

Why project management is important?

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- Projects usually consist of complex combinations of highly depended activities; improper project management can result in a substantial time and cost increase at the project completion or even the project's failure.
- Examples:
 - Over estimation will cause the company lose many bids and as a result lose considerable money put in the bid process
 - Under estimation will bring loss to the project
 - Missing project constraints in the project schedule will bring delays to the project
 - Wrong resource leveling will add to the project's human resource cost
 - Unseen risks endanger the project and can add to the project time and cost
 - Improper quality plan and control will result in declined quality of the project outputs



Thank you!