PM in construction I.

Construction management 2.
(BMEEPEKT601-BMEEPEKK601)
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PM in construction

- From **Idea** to **Hand-over** and use
  - Find out
  - Plan/Prepare
  - Perform
- Permanent enterprise
  - Longer time
  - Slightly (slowly) changing resources
- Temporary enterprise
  - 3-5 to 4-7 years
  - High intensity of human and material resources
  - Unique aims, participants, tools

![Graph showing resources over time with permanent enterprise and temporary enterprise](image-url)
The four definitive systems of means in the construction project management.

Someone

- Wants a building (has the idea / plot / money)
- Has to determine how the building will look (programme, design)
- Has to produce required materials, products, equipment for the construction of building
- Has to build it – control and direct
- Has to coordinate and harmonise the participants and the processes

"Architecture"

Quality  Quantity  Time  Cost  Space
PM in general

Human resource management

What is obligatory?
Can we have a free choice?
What are the main constrains?
Participants of a project

Participants
• Direct
  • Client
  • Designer
    • Architect
    • Structural engineer
    • Civil engineer
    • Mechanical engineer
    • Electrical engineer
  • Contractor
    • General contractor
    • Sub-contractors

• Indirect
  • Authorities
    • Public services
  • Financing organisations
  • Insurance companies
  • Etc.
  • External
    • Public
    • Media

Find out
Plan
Prepare
Perform

Participants of a project

• Client
• Designer (architect)
• Contractor
directly involved

• Bank
• Authorities
• Public utilities
• Public services

Consultant
• Project manager (PM team)
• Quality surveyor (supervisor)

Maintainer
• Facility manager
• User

Find out
Plan
Prepare
Perform
Participants of a project

**Historical model**

- client (investor)
- architect (master builder)
- design
- construction

**Basic model**

- client (investor)
- contractor
- architect
  - design (+consultation)
- construction

Directly involved participants
Participants of a project

Client
• Form
  • Individual / firm / institute
• Role
  • define the aim of the project
  • ensure financial background
  • select other participants (according to the legal commitments if exist)
• Tasks and duties
  • provide financial background, liquidity of the project
  • dispose with the construction site
  • procure the rights to build (attain building consent)
  • establish contract with the architect, consultant, contractor, etc.
  • share rights and risks
  • attain permission of use

Participants of a project

Designer - architect
• Form
  • Individual / firm
• Role
  • prepare the necessary drawings and documentations:
    • outline planning consent
    • planning consent/ building permit
    • construction plan
    • fulfilment plan
    • architectural supervision during the construction
  • Tasks and duties
    • help the client in professional way to attain building permit
    • prepare documentations according the national/international standards and legal prescriptions
    • coordinate the work of the co-operative designers and professionals

according to their contract
Participants of a project

Cooperative designers and professionals

- **Form**
  - Individual / firm

- **Role**
  - prepare supplementary specialist documentation in different fields:
    - structural design
    - installation design
    - electric design
    - landscape architecture
    - fire protection
    - monument, archaeological research
    - cost and time estimation/calculation, etc.
  - Additional drawings, plans or papers to the architectural documentation

- **Tasks and duties**
  - prepare documentations according the national/international standards and legal prescriptions
  - continuous co-operation and communication with the designer architect

Project Manager or PM team

- **Form**
  - Individual / firm

- **Role**
  - help the project with their professional work according to their contract in some or all of the following fields:
    - quality surveying
    - consultation
    - communication between the participants of the project
    - preparation of the construction project
    - selection of the other participants of the project (organizing architectural competition, tender, etc.), etc.

- **Tasks and duties**
  - depend on their contract - coordination
Participants of a project

Consultants

- Form
  - Individual / firm / (institute)
- Role
  - help the project with their professional advices (consulting)
    - directly or in a form of documentation
    - for the whole project or for single tasks
  - on different subjects:
    - feasibility
    - economy
    - investment
    - technology
    - architecture
    - real estate development
    - law,
    - etc.
- Tasks and duties
  - Depend on their contract

Contractor(s)

- Form
  - Firm
- Role
  - prepare the construction process
  - construct the building according the contract
- Tasks and duties
  - participate in the tendering process
  - contract with the client and with sub-contractors
  - construct the building according the national/international standards and legal prescriptions
  - co-operation and communication with the designer team, the authority and the client/PM
Participants of a project

Quality surveyor

- Form
  - Individual (firm)
- Role
  - ensure professionalism by controlling the plans and the construction work
  - propose alteration of the plan for the client, if it is technically or financially reasonable
  - take part in the hand over process
- Tasks and duties
  - control the plans in accordance with the standards and the legal prescriptions
  - control the assignment of the building
  - ensure the prosecution of the prescribed tests (e.g. soil mechanics)
  - control the construction: the construction logbook, hidden structures, quality, used materials, the volume of the completed work
  - inform the client if the completed work is according to the contract

Participants of a project

Authorities

- Typical authorities
  - local authorities – building department
  - Hungarian National Public Health and Medical Officer Service (ÁNTSZ)
  - local fire department (disaster prevention)
  - National Inspectorate for Environment, Nature and Water
  - National Office of Cultural Heritage (KÖH)
- Role
  - ensure the legal environment
- Tasks and duties
  - provide building permit
  - provide permission of use
  - give consent for the plans, for the technical solutions, etc., according to the legal prescriptions
Participants of a project

Public utilities, public services
- Public utilities
  - electric power supplying companies
  - gas works
  - water works
  - sewage works
- Public services
  - local chimneysweep service
- Tasks and duties
  - give a consent for the plans (capacity, standards, etc.)
  - verify the finished work

Participants of a project

Bank (financing institute)
- Form
  - Firm
- Role
  - provide credit for financing
  - ensure the liquidity of the project in case credit is granted
- Tasks and duties
  - consider the requests for credit
  - grant credit by schedule for the project
  - control the use of money
Participants of a project

Users
- Form
  - Individual / firm / institute – target group(s)
- Role
  - The activities of the users are in relation with the main function or with some of the sub-functions of the building.
- Tasks and duties
  - No defined task, but a representative group of users recommended to be involved in the planning phase of the project to define functional requests.

Maintainer
- Form
  - Individual / firm / organisation – the client, the user or independent
- Role
  - responsible for the operation and maintenance of the building
- Tasks and duties
  - facility management
Phases of a project

Phases of a construction project
- Inception phase - initiation
- Preliminary analysis
- Pre-feasibility study
- Planning
- Feasibility study
- Tendering + contract
- Construction phase
- Hand-over
- Operation and maintenance

Phases of a project

Phases of a construction project
- Idea
- Real Estate development
- Project development
- Formulating the AIM
- Finding the participants
- Project organisation
- Examining feasibility

Project preparation
Phases of a project

Phases of a construction project: project preparation

- Initiation
- Preliminary brief
  - List the client’s wishes and ideas about the building
  - Programme of the building (rooms/functions)
- Preliminary analysis
  - Detailed brief
- Feasibility study

Information required

- General limiting conditions
  - Budget
  - Deadline
  - Code requirements
  - Community values
- General building costs
  - by occupancy type
  - by location, etc.
- General forms of construction
  - which are appropriate?

Phases of a project

Phases of a construction project

Time

- Preliminary planning
  - Outline proposal
  - Scheme design
- Planning
  - Architecture
  - Structure
  - Building engineering
  - Etc.
Phases of a project

Phases of a construction project: planning

- Preliminary drawings and models
- Proposed design
- Detailed drawings
- Written specifications
- GOAL: to completely describe the desired construction
- Rough/preliminary cost estimate
- Draft schedule

- Architect
- Other specialists
  - Structural engineers
  - Civil engineers
  - Landscape designers
  - Mechanical engineers
  - Electrical engineers
  - Interior design
  - Etc.
- Outside consultants or employees

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Phases of a project

Phases of a construction project: planning

- Preliminary design
  - General building size and form
  - Selected basic construction and type of structural system
  - General use of materials
- Definitive design
  - Layouts of plans and elevations
  - Selection of essential control dimensions and modules
  - Description of basic materials and products

- Information required
  - General planning requirements
  - Reasonable alternatives for the basic construction
  - Unit costs (selected systems and materials)
  - Construction details appropriate to design goals and choices for materials and products
  - Dimensions and planning modules
Phases of a project

Phases of a construction project

- Approval by authorities
- Approval by public services
- Building permit
  According to regulation

- Detail design
- Documentation for tendering (tender set of drawings)
- Documentation for construction
- Tendering
  - Getting a bid from the contractor
  - Choosing from several possible contractors
- Signing the contract
Phases of a project

Phases of a construction project: preparation of implementation

• Set of contract documents
  • Complete construction details
  • Complete specifications (precise descriptions of quality, performance requirements)

• Typical questions for final design
  • What specific material or product is to be used for a given item of the construction?
  • What specific data must be recorded to completely identify a chosen material or product for design purposes?
  • What are appropriate details for the construction of various elements of the building?

Phases of a project

Phases of a construction project: preparation of implementation

• Qualification/prequalification

• Tendering
  • Open tender
  • Restricted tender — dep. on the number of contractors invited
  • Negotiated tender

• Contracting
  • Final cost estimate, cost plan
  • General time plan, detailed time plan
  • Construction site plans
Phases of a project

Phases of a construction project

- Planning/controlling the plot/time/costs
- Erecting the building according to the plans
- Supervision of construction
- Running-in; Hand-over – take-over

Phases of a project

Phases of a construction project: construction

- Managing resources
  - Labour
  - Materials
  - Machinery
  - Money
- Managing changes
  - Acceptable range for performance and alternatives
- Managing time
  - Verification of time schedules
- Managing quality
  - Procedures for inspections, tests, certifications, etc.
Phases of a project

Phases of a construction project: project closing

- Operation and maintenance of the building
  - Setting up and operating a Facility Management System
- Selling/renting the building
  - Users needs
- Evaluation of the project - Benchmarking
  - Comparing with other closed projects
  - Feed-back for future projects
  - Post-occupancy evaluation

- Operation and maintenance, FM
PM in construction

Quality
- Quality requirements
  - Detailed brief
    - Specification
      - Quality control

Quantity
- Architectural/ function program
  - Preliminary plans
  - Design/ plans
  - Detail design/ plans
  - Realization/ plans

Time
- Framework schedule
  - Draft schedule
  - General time plan
  - Detailed time plan
  - Time control

Cost
- Basic budget
  - Cost estimation
  - Cost plan at design stage
  - Cost calculation
  - Cost check

Quality requirements
- Detailed brief
- Specification
- Quality control

Architectural/ function program
- Preliminary plans
- Design plans
- Detail design plans
- Realization plans

Framework schedule
- Draft schedule
- General time plan
- Detailed time plan
- Time control

Basic budget
- Cost estimation
- Cost plan at design stage
- Cost calculation
- Cost check