PM in construction industry

Construction management 2.

Lepel – BME Department of Construction Technology and Management

19-03-2014

PM in general

Project integration management
- Project plan development
- Project plan execution
- Integrated change control

Project scope management
- Initiation
- Scope planning
- Scope definition
- Scope verification
- Scope change control

Project time management
- Activity definition
- Activity sequencing
- Activity duration estimating
- Schedule development
- Schedule control

Project cost management
- Resource planning
- Cost estimating
- Cost budgeting
- Cost control

Project quality management
- Quality planning
- Quality assurance
- Quality control

Project human resource management
- Organisational planning
- Staff acquisition
- Team development

Project communications management
- Communications planning
- Information distribution
- Performance reporting
- Administrative closure

Project risk management
- Risk management planning
- Risk identification
- Qualitative risk analysis
- Quantitative risk analysis
- Risk response planning
- Risk monitoring and control

Project procurement management
- Procurement planning
- Solicitation planning
- Solicitation
- Source selection
- Contract administration
- Contract closeout

PM in construction industry

Project safety management
- Safety planning
- Safety plan execution
- Administration and reporting

Project environmental management
- Environmental planning
- Environmental assurance
- Environmental control

Project financial management
- Financial planning
- Financial control
- Administration and records

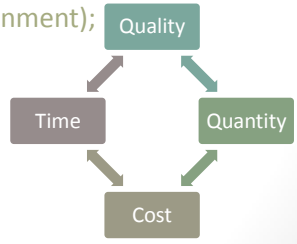
Project claim management
- Claim identification
- Claim qualification
- Claim prevention
- Claim resolution

- Construction Extension to PMBOK®Guide

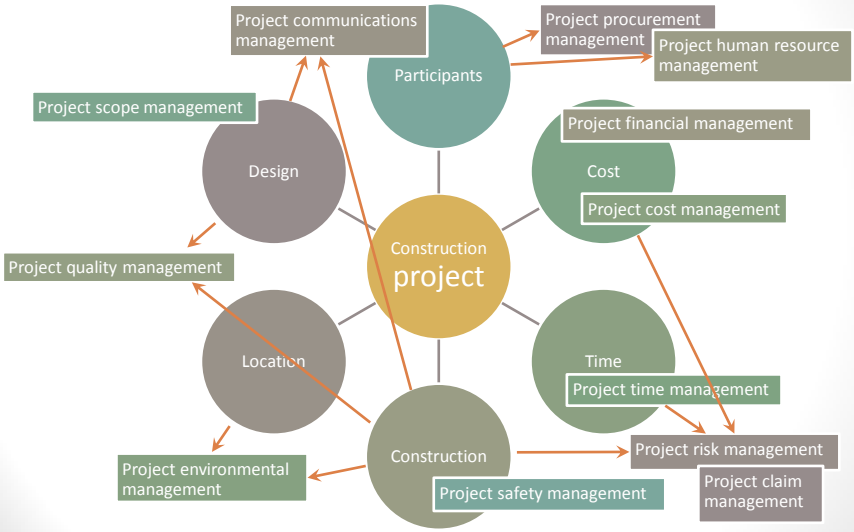
PM in construction industry

Because of the properties of construction projects, there are special fields in building PM

- safety management;
- environmental management;
- financial management;
- claim management;
- regulation management (legal environment);
- subcontractors management.



PM in construction industry



Communications management

Communications planning: determining the information and communication needs of the stakeholders:

- Who needs what information;
- When will they need it;
- How it will be given to them.

Information distribution: making needed information available to project stakeholders.

Performance reporting: collecting and distributing performance information:

- Status reporting;
- Progress measurement;
- Forecasting.

Administrative closure.

Communications management

Communicating

- The exchange of information – it has many dimensions:
  - Written and oral;
  - Internal (within the project) and external (to the customer, the media, the public, etc.);
  - Formal (reports, etc.) and informal (memos, ad hoc conversations, etc.);
  - Vertical (up and down the organisation) and horizontal (with peers).
- Project communication management means to decide how to communicate – including choosing media (written/oral) and style at different points of the project.

Communications management

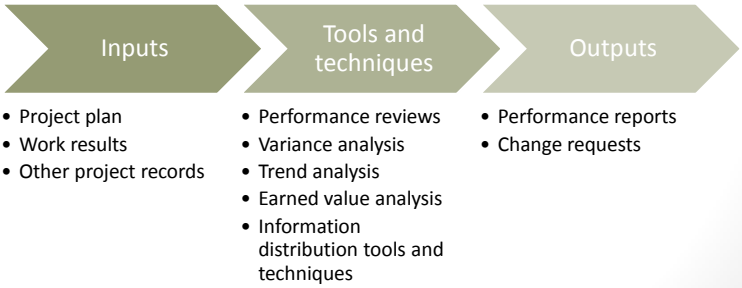
Communications management plan contains information on:

- Methods to gather and store various types of information – collecting and disseminating updates and corrections;
- Distribution structure: who gets what information and in what form (according to project organisation chart);
- Description of the information to be distributed:
  - Format,
  - Content,
  - Level of detail,
  - Conventions/definitions to be used.
- Etc.

Performance reporting

Performance reporting – a part of communications management

- Status reporting – „where the project now stands”;
- Progress reporting – „what the project team has accomplished”;
- Forecasting – predicting future project status and progress.



Performance reporting

How to measure progress?

- Based on milestones;
- Based on costs: how much has been spent;
- Based on work needed (in workers-day);
- Based on material consumption – in case of using materials of great volumes, e.g. earth, concrete, etc.
- Based on other units, e.g.:
  - Levels finished (in case of multi-storey buildings);
  - Flats finished (in case of residential buildings);
  - Length of road finished;
  - Etc.

Performance reporting

Milestone based measuring

- Costs and deadlines can be assigned to each milestone
- It is accurate at well-defined milestones, but can not be used between them
- Hard to use if a company has more constructions in progress at the same time

Milestone	Planned date (week)	Planned cost (HUF)	Actual date (week)	Actual cost (HUF)
Starting the construction	4	5 000	5	6 000
Finishing the foundation	15	12 000	16	14 000
Finishing the loadbearing structures	30	40 000	33	42 000
End of finishing works	40	50 000	42	56 000

Performance reporting

How to report performance?

- Comparing actual project results to planned or expected results (variance analysis):
  - Cost variances;
  - Schedule variances;
  - Variances from plan in the areas of scope, quality and risk, etc.
- Examining project results over time (trend analysis).
- Earned value analysis – the most commonly used method, it integrates scope, cost and schedule measures.

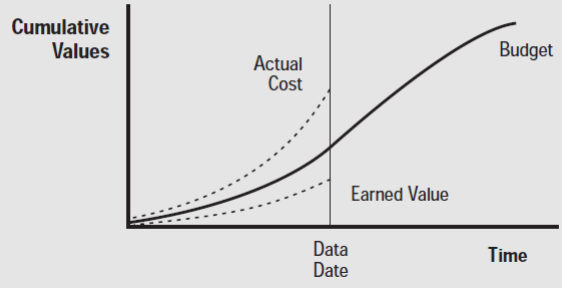
Performance reporting

Earned value analysis

- Key values:
  - The budget = budgeted cost of work scheduled (BCWS) – it is the plan;
  - The actual cost = actual cost of work performed (ACWP) – the total of direct and indirect costs – it is the reality;
  - The earned value = budgeted cost of work performed – it is an imaginary number;
- Most commonly used measures:
  - Cost variance: CV = BCWP – ACWP
  - Cost performance index: CPI = BCWP / ACWP
  - Schedule variance: CV = BCWP – BCWS
  - Schedule performance index: SPI = BCWP / BCWS

Performance reporting

Figure 10–2. Illustrative Graphic Performance Report



Performance reporting

Figure 10–3. Illustrative Tabular Performance Report

WBS Element	Budget ($) (BCWS)	Earned Value ($) (BCWP)	Actual Cost ($) (ACWP)	Cost Variance ($) (BCWP–ACWP)	Cost Variance (%) (BCWP÷ACWP)	Schedule Variance ($) (BCWP–BCWS)	Schedule Variance (%) (BCWP÷BCWS)
1.0 Pre-pilot planning	63,000	58,000	62,500	–4,500	–7.8	–5,000	–7.9
2.0 Draft checklists	64,000	48,000	46,800	1,200	2.5	–16,000	–25.0
3.0 Curriculum design	23,000	20,000	23,500	–3,500	–17.5	–3,000	–13.0
4.0 Mid-term evaluation	68,000	68,000	72,500	–4,500	–6.6	0	0.0
5.0 Implementation support	12,000	10,000	10,000	0	0.0	–2,000	–16.7
6.0 Manual of practice	7,000	6,200	6,000	200	3.2	–800	–11.4
7.0 Roll-out plan	20,000	13,500	18,100	–4,600	–34.1	–6,500	–32.5
Totals	**257,000**	**223,700**	**239,400**	**–15,700**	**–7.0**	**–33,300**	**–13.0**

Note: All figures are project-to-date.

Project risk management

- Risk: the effect of uncertainty on objectives, whether positive or negative.
- Project Risk Management:
  - identifying
  - analysing
  - responding to

  } project risk
  - maximising the results of positive events and minimising the consequences of adverse events.
- Risk Identification
- Risk Quantification

} Risk assesment

- Risk Response Development
- Risk Response Control

} Risk management

Project risk management

Risk assessment

- identification, probability estimate and impact analysis – make clear definition of risks, including chance of their occurrence together with assessing their impact on the project's outputs.

Risk management

- deals with identifying counteractions necessary to avoid or lessen chance of occurrence or to decrease impact of adverse consequences identified during risk assessment.

Project risk management

Risk Assessment:

- Exploring and identifying risks.
- Analysing risk factors in terms of their impact on performance (cost, schedule and quality).
- Estimating probability of the risk occurring during execution of the project.
- Assigning priorities to risks according to their probability, effects and range of damages associated, together with analysing chance of their simultaneous occurrence.
- Risk identification should address both internal and external risks.

Project risk management

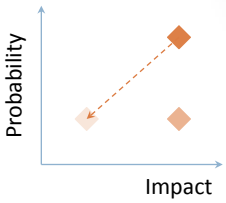
Inputs:

- Product description.
- Other planning outputs. For example:
  - Work breakdown structure;
  - Cost estimates and duration estimates;
  - Etc.
- Historical information – about what actually happened on previous projects. Sources can be:
  - Project files —records of previous project results that are detailed enough to aid in risk identification.
  - Commercial databases — historical information available to buy
  - Project team knowledge — the individual members of the project team may remember previous occurrences or assumptions.

Project risk management

Risk Management Priorities:

- High-impact, high-probability risks;
- High-impact, lower-probability risks;
- Lower-impact, high-probability risks.



What can be done?

- Avoiding the risk (eliminating);
- Reducing the risk (likelihood or impact);
- Transferring the risk to others (insurance);
- Contingency plans (to be implemented if the risk occurs);
- Accepting the risk (just monitoring).

Cost-effective countermeasures – compared with the likely damage if the risk occurred.

Project risk management

Reducing the risk

Risk factor identified	Reducing probability	Reducing impact
Lack of experienced staff	Employ skilled professionals, and/or consultant-experts	Experienced staff informally supervise the work of less experienced colleagues
Lack of technical infrastructure in the form of tools or access to tools	Hire or purchase necessary tools and resources	Increase time-span of project planned
Lack of necessary knowledge or of technical experience	Invite professional subcontractors with high reputation	Organize trainings and study courses for the staff
Multiple vendors or contractors included	Nominate “Main Contractor”	Increase project contingency times

Project risk management

Reducing the risk

Risk factor identified	Reducing probability	Reducing impact
Late deliveries, and tardy performance of subcontractors	Stipulate penalties in the contract	Schedule increased durations for activities
Deficient deliveries, and imperfect performance of sub-contractors	Screen sub-contractors, specify technical priorities and expectations	Stipulate warranty conditions in the contract
Unforeseen weather extremities	Use less weather-sensitive technologies	Contract Insurance Co., financial reserves, special contract closures