

Applied informatics

Fundamentals of project plans by CPM - project management.

ZEMÁNEK, Z.– PLUSKAL, D. – SMETANA, B.

Fundamentals of project plans by CPM - project management.

1. Fundaments of project management
2. Planning methods – CPM, CCM, PERT
3. Principles and basics of plan management
4. Check questions and assignments

Aims of the lecture



1. Fundamental information about the project management.
2. Explain basic planning methods – CPM, CCM, PERT.
3. Explain the principles and basics of project plans.

Project management



- Possibility of project management was emerging with the emergence of writing and speech.
- The first application of methods can be demonstrated in large buildings.
- The first projects - with religious motivations.
- Evidence data, property, astronomy (floods), ...
- Imhotep was an Egyptian vizier, priest, architect - builder of the first pyramid - the first project "engineer"... [\[1\]](#)

Importance of project management

- A significant portion of system engineering.
- Uses in almost all fields.
- Applications:
 - crisis management
 - periodic activities (better use operational management, process management)
 - where chaos and disinterest prevails to improve the situation
- outcome depends mostly on the strength of the personality of the person. [\[1\]](#)

Why projects

- There are many reasons
- we will gradually cover them
- but now it is clear that

motto:

"Tell me and I forget, Show me and I'll remember, Let me do it and I will understand."

(Chinese proverb)

The terms

The working definition of the term PROJECT:

A project is a controlled process to implement a task using given sources with the ultimate goal in a predetermined, time frame!

Pitfalls designing IS:

"The information system will never find the information we did not put there before!"

Project

Projects are always so unique that the generally applicable procedures must always be adapted to specific requirements.

Important is the "creative" balance between general applicable procedures and specific applications.

Project – attributes:

- **Project**

- the very concept of the word indicates the process of planning and managing large-scale operations more than only project documentation, as it is often perceived by us;
- is characterized by uniqueness, systemic, limited resources, uncertainty and risk.

„The project is something that has a beginning and an end.“

Project – attributes:

- **Project**
 - is to achieve a change - a new solution, which is limited in time and cost;
 - is a unique and distinctive set of activities achieved mostly by a teamwork.
 - “Due to its unrepeatable character any project implies a certain degree of uncertainty and risk.”

Project

- TARGET
 - each project as a process wants to achieve an objective/target that was primarily intended.
- TIME LIMITS
 - date for the beginning and the planned completion date is set
- RESOURCES
 - limited and difficult to substitute.
- THE RESULTING SHAPE
 - uniqueness of the work = "work of art".
- RISK
 - uniqueness in new conditions with new applications.
- STRONG INNER RELATIONSHIPS
 - compared to the relatively weaker external links.

Project – attributes :

- **Project**

- a temporary nature, because all resources, both human and material and financial are conducted only to achieve the objectives;
- the efforts is to organize the resources specifically towards the target;
- is dependent on the interdependence of sub-activities with its unique problems!

„It is a specific creative activities to achieve the objectives.“

Components of a project

= Tasks

Each project of a certain size can be divided into a series of precisely-defined tasks.

The completion of tasks takes time. Certain tasks can be performed in parallel, while others must be executed sequentially.

= Milestones

They can also pinpoint certain milestones or subsidiary objectives that can be used to monitor progress of the project before it is completed (feedback).

= Sources

Each task also requires a sufficient amount of resources that can be people, tools (machines) or finance.

Resources in project:

= HUMAN (resources)

from project manager to operational staff.

= Material (resources)

manufacturing, space, technology and energy.

= Financial

own resources, investments, grants, projects, EU ...

= time

important factor, often authoritatively limited due to the intended date of termination.

Project phases

- Pre-project phase:
 - Shaping ideas = be clear about the objectives of the project
 - Analyzing the feasibility = Know the risks
 - Prepare implementation = prepare implementation plan and establish implementation team
- Project phase:
 - Implementation of the objectives of the plan = obtain the planned results
 - Application of risk management strategies to eliminate problems = project
- Final part:
 - Evaluation of the project
 - Archiving of project documentation
 - Analysis, conclusions - feedback [1]

Planning methods

- Project is a set of time-bound actions required to achieve a certain goal.
- Activities are closely interconnected in a technological and organizational continuity.
- The network graph is a model of the project = Special type of directed graph.
- Network analysis is the discipline of graph theory which is focused on the analysis of projects.

Planning methods

The goal of network analysis is the identification of critical activities:
= activities which may delay the completion date of the project,
= Identify additional data (reserve activities, etc.)
= Most widely used network analysis methods include CPM and PERT.

Method CPM - time analysis of deterministically valued network graphs

= In addition to identifying critical activities and slack activities.

PERT method - analysis of stochastic valued network graphs,

= Determine the probability of negative reserve at the vertices and the likelihood of compliance (exceeding) of the planned completion date of the project or its phases.

Network analysis - CPM

CPM - Critical Path Method

- Was first used to manage the annual maintenance works in the oil and chemical refineries.

Method CPM was established in 1957 by the company DU PONT (USA) and its authors are James E. KELLEY and R. MORGAN Waker.

This method exists in many modifications, but the basic idea and principle methods remains. [2]

Network analysis - CPM

CPM = enables the efficient planning of the use of scarce resources and management of people and equipment so that critical activities are implemented on time and activities with a reserve has been delayed without jeopardizing the project.

CPM Logic = uses single-task time estimates and it is expected that the completion time of the project is simply the sum of the task along the critical path (the longest cumulative time).

The critical path is a set of subsequent activities, where the delay of any positive time value will extend the delay of the project by this value. Critical activities are oriented activities within the critical path = These are usually well observed, so that the duration of the project has minimal value.

CPM – critical path

Critical Path - The heart of the project, decides the success or failure of the project as a whole in terms of time, but in practice it is often incorrectly explained, understood, and often underused.

= While understanding a few basic principles we can save considerable effort, money and time.

Language practices of project management is a description of the critical path much briefer, but more concise:

"The critical path is the most important thing is to be monitored in terms of compliance with the timeframe of the project. "

Network analysis - CCM

- Method CCM (Critical Chain Method) – is a superior technology network analysis
- It is a follow up of the CPM approach - includes availability of resources.
- The author of the method is E. M. Goldratt, as well as the theory of constraints (TOC), from which it is stemming.
- The aim is to determine the duration of the project on the basis of the so-called critical chain, which is a sequence of interdependent activities, with the least time to spare, which also takes into account the constraints imposed by the resources and shifting of implicit reserves activities in the buffer activity (buffers). [3]

Network analysis - PERT

PERT (program evaluation and review technique) - Method of evaluation and monitoring program. First use - the development of submarines capable of launching missiles Polaris.

Logic PERT

- Probabilistic estimates of the duration of each task with pessimistic, realistic and optimistic estimates for the completion of each task.

Using the methods of planning and managing projects based on PERT CPM and is now common in all types of construction works in large development projects such as the manufacture of aircraft, missiles, space and large mainframe computer systems.

CPM tools - MS Project

- MS Project - the most widely used program for project management.
- Designed for project management (planning, organizing and managing tasks and resources with limited resources and time).
- Management options, integrated specialized functions, process and management controls, group scheduling.
- Efficient use of resources.

CPM tools - MS Project

- Insert the basic time identification of the project / plan.
- Selecting relationships of tasks.
- Possibility of adjusting the working time of resources.
- Possibility of manual tasks insertion or insertion of data from the table.
- Simple allocation of tasks after completing the list of sources.

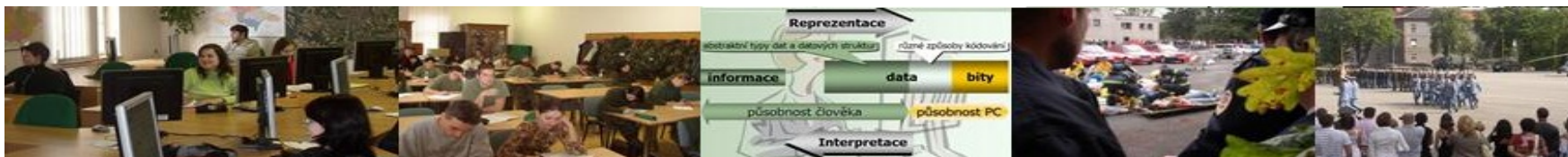
CPM tools - MS Project

- Creating links in a network diagram.
- Formatting a Gantt chart - critical path.
- Possibility to adjust overload sources.
- Possibility to create a baseline and alternative plans.
- Transferring tasks to MS Outlook in the later versions.

CPM tools - OpenProject

- Procedure is the same as in MS Project.
- The system has a 95% efficiency of MS Project.
- Does multitasking and is free of charge.
- The critical path is active and visible.
- OpenProject does not guide the creation of the plan.

Assignments



Prepare the first part of the textual assignment.



Study the principles of project management.



Study the CPM method in more details.

Resources:

1. BENDO VÁ, Klára. Základy projektového řízení. *Základy projektového řízení* [online]. 2012, č. 1 [cit. 2013-09-30]. Dostupné z:
http://www.ff.upol.cz/fileadmin/user_upload/FF-katedry/psychologie/publikace/Bendova/Bendova_K_a_ko_l_zaklady_projektoveho_rizeni.pdf
2. Kritická cesta. <http://cs.wikipedia.org> [online]. 2013, 16. 3. 2013 [cit. 2013-10-07]. Dostupné z:
http://cs.wikipedia.org/wiki/Kritick%C3%A1_cesta
3. Metoda CCM. <https://managementmania.com> [online]. 2013 [cit. 2013-10-16]. Dostupné z:
<https://managementmania.com/cs/metoda-ccm>