PLANNING, SCHEDULING, AND PROGRESS MEASUREMENT

J. Andrianne
Tractebel Energy Engineering, Brussels, Belgium

N. McArthur
Port Glasgow Road, Kilmacolm, UK

Keywords : Arrow Diagramming Method, Bar chart or Gantt chart, critical path method, Early finish, OBS, PERT, PDM, WBS

Contents

1. Introduction

The management of a large project includes, among other things, planning, scheduling, control, analysis, and evaluation of the tasks that must be accomplished to finish a project.

Before the planning of a project can proceed the fundamental question outlined in Figure 1 must be addressed. Figure 2 outlines a typical planning and control chart.

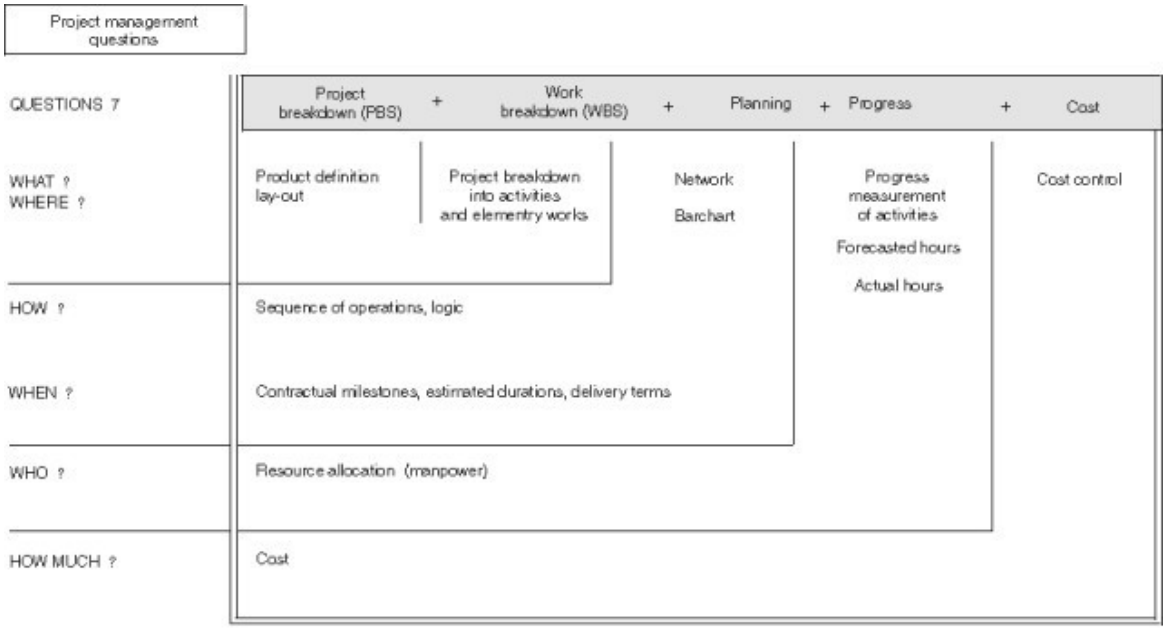

Figure 1. Project management question to be addressed at phase I.

These tasks, or activities as they are usually called in planning, take competent experts and time to complete. Some activities may proceed simultaneously, while others cannot start until previous activities are completed. The order in which these activities are achieved is defined by their logical constraints. Constraints can also be imposed by the availability of men, equipment, and money. This is called the scheduling.

The total list of activities can be represented in a graphical format after analysis and scheduling, by way of a Gantt chart. This allows an easy representation and interpretation of time-based information.

A project is successful if it proceeds according to a planned schedule and is completed when required. During the actual execution of the planned work it is therefore useful to compare the work being accomplished with the work that was planned. If ever a delay is uncovered, the planning can be checked to see if this has any consequences on the final completion date and therefore becomes critical. This is known as the Critical Path Analysis (CPA).

This article deals with the following items:

(a) Planning principle
(b) Progress measurement
(c) Analyzing and reporting
(d) Computerization
(e) Examples

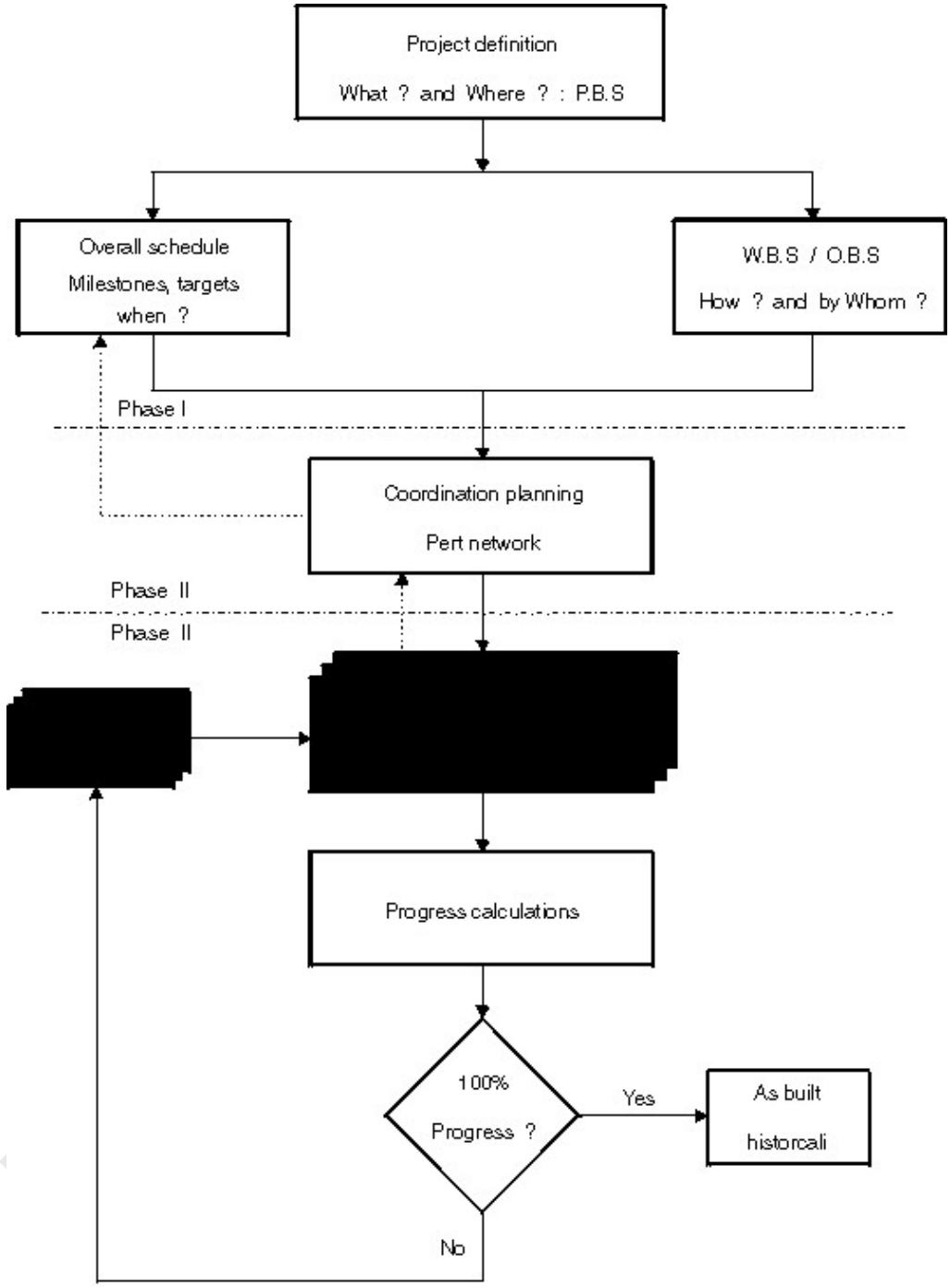

Figure 2. Project planning and control flow chart.

2. Planning and Scheduling Principles

2.1. Methodology

The planner's primary objective is to develop an instrument that will enable management to exercise control over planning and performance of a project. He must consider the project situation in a logical manner and thus form a structured method

through which management may receive the information it requires.

As shown in the following diagrams the planner has to:

(a) identify all project elements;
(b) identify all participants in the project;
(c) identify responsibilities for each element;
(d) identify key points;
(e) identify all interfaces.

2.2. Overall Schedule or Management Schedule

This first planning is a general planning which involves at the most about a hundred activities and milestones which represent the complete project, e.g. contractual or specific milestones, studies, procurement, erection, commissioning.

Here, the final and intermediate target dates are clearly identified. The first issue is laid out in a bar chart (Figure 3) which is not necessarily the result of a network calculation (see Figure 7).

2.3. Work Breakdown Structure

Based on the PBS (Project Breakdown Schedule) we define the project by establishing its structure, its skeleton, or its hierarchy: in other words its WBS (Work Breakdown Structure).

First we have to determine the PHASES of the project (See: The Desalination Project).

Each phase will be split into ACTIVITIES:

e.g.: Study phase will be split into process studies civil-works studies, mechanical studies, electrical studies.

Each activity will be split into TASKS:

e.g.: In the study phase, the civil works activity could be split into: soil analysis, layout of machine hall, embankments, construction drawings.

Phases, activities, and tasks are the three main levels for planning. The task can be divided into elementary jobs to make specific plannings or to measure the progress of the project.

The level of details can be different from one task to another.

A breakdown can be contractual, geographical, functional, organizational, or specific.

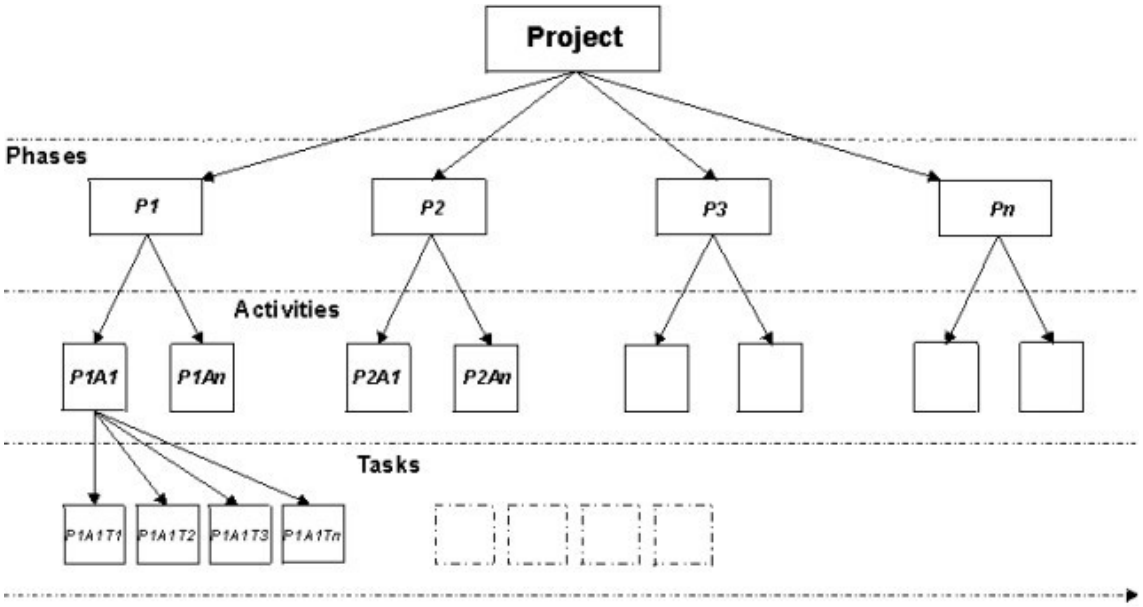

Figure 3. Example of structure project.

-
-
-

Bibliography and Suggestions for further study

Ahuja H N (1994) Project Management, Techniques in Planning and Controlling Construction Projects. Second edition, John Wiley, New York.

Alan Lamont; Jeffery Stewart; Woodrow Clark; N. W. Harris(1999),*The Global Sustainability Project And The LLNL China Energy Systems Model*, California University Livermore Radiation Lab

Alan Solomon (2010), Blythe *Solar Power Project*, Revised Staff Assessment, Part 2, California Energy Commission,CEC-700-2010-004-REV1-PT2

Artemis 7000/386, *Lucas Management Systems*, 23 Clayton Road Hayes Middlesex UB3 1AN England.

Artemis Schedule Publisher, *Lucas Management Systems*, 23 Clayton Road, Hayes Middlesex UB3 1 AN England.

B.B. Blevins (2005) , *Annual Project Updates for the Public Interest Energy Research Program* (PIER),CALIFORNIA ENERGY COMMISSION, CEC-500-2006-037-SD

Jones, M.R. (1989) "*The Potential of Decision Analysis as a Means of Integrating the Environment into Energy Policy*," Environment and Planning A 21 , 1315-1327.

Morris, M., J. Balsam, and V. Lynne. 2000. *The Montana AgSolar Project. Expanding the agricultural uses of solar energy in Montana*. National Center for Appropriate Technology. www.montanagreenpower.com/pdf/agso5-21.pdf [PDF/804K]