AACE® International Recommended Practice No. 14R-90

RESPONSIBILITY AND REQUIRED SKILLS FOR A PROJECT PLANNING AND SCHEDULING PROFESSIONAL

TCM Framework: General Reference
7.2 – Schedule Planning and Development

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Disclaimer: The opinions expressed by the authors and contributors to this recommended practice are their own and do not necessarily reflect those of their employers, unless otherwise stated.

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INTRODUCTION

This recommended practice is intended to serve the following purposes:

- Describe the roles and responsibilities of a Planning and Scheduling Professional (PSP) during the various phases of project planning and schedule development, management and control.
- Define the core skills and knowledge a Planning and Scheduling Professional is required to have in order to be considered a professional practitioner, and in doing so,
- Establish the core subjects for AACE International PSP education and certification programs.

Knowledge is understanding gained through experience or study and skills are abilities that transform knowledge into use. Core subjects are those whose usage is occasional to frequent and which AACE International considers as being required for planning and scheduling professionals to know and use.

This Recommended Practice (RP) lists the core subjects and provides general performance statements (e.g., “describe”, “perform”, etc.) in order to represent the level of proficiency expected in each subject area. These statements are guiding examples only, and are presented in a “verb-object” format.

This outline is intended to be a structural foundation for additional planning and scheduling products to be developed by AACE International and will continue to be modified as current practices change.

BACKGROUND

This revision retains most of the content of the previous version and includes information from RP 11R-88 Required Skills and Knowledge of Cost Engineering. It also incorporates those elements of the Total Cost Management (TCM) Framework that are deemed applicable for a planning and scheduling professional. It provides organization of the subjects aligned with the TCM Framework.

TCM provides an integrated structure and organizes the development of RPs. The AACE International Constitution and Bylaws (Section 3) defines Total Cost Management as follows:

“Total Cost Management is that area of engineering practice where engineering judgment and experience are utilized in the application of scientific principles and techniques to problems of business and program planning; cost estimating; economic and financial analysis; cost engineering; program and project management; planning and scheduling; cost and schedule performance measurement; and change control.”

PURPOSE

The purpose of this Recommended Practice is to:

1. Describe the responsibilities of a project planning and scheduling professional.
2. Incorporate the applicable skills and knowledge for Planning and Scheduling Professionals from RP 11R-88 and the core subjects required for AACE PSP Certification.
3. Establish a planning and scheduling guideline for training and professional development.

4. Provide ethics subscribed to by planning and scheduling professionals.

This Recommended Practice is organized in three major sections consistent with the traditional planning and scheduling "phases" of project planning, schedule development, and schedule management/control.

![Figure 1. PSP Scope of Knowledge]

**PURPOSE OF PLANNING AND SCHEDULING**

A. The purpose of project planning is to establish an acceptable course of action ("plan") to execute a project in an effective manner through the review of project scope and objectives.

B. The purpose of project scheduling is to 1.) Define activities, durations, and relationship logic to implement the project plan, and 2.) Monitor, update, and communicate the schedule to reflect current status and the impact of project changes.

C. The planning and scheduling professional provides the project management team with the expertise to deliver the project in the most effective manner.

**GENERAL CONCEPTS**

Project Planning as defined by AACE is, "the determination of a project’s objectives with identification of the activities to be performed, methods and resources to be used for accomplishing the tasks, assignment of responsibility and accountability, and establishment of an integrated plan to achieve completion as required" [2].

Project planning consists of:

1. Reviewing the scope of work, client requirements, division of responsibility, project objectives and constraints to develop the strategy for effective project delivery.

2. Identifying major activities to be performed and the preferred sequence in which they are to be accomplished.

3. Developing an integrated plan to effectively execute the scope of work and meet project objectives by identifying cost/schedule areas for the further definition of the scope of work.
4. Coordinating with project management.

Scheduling as defined by AACE is: (A) “The assignment of desired start and finish times to each activity in the project within the overall time cycle required for completion according to the plan [2].” (B) “Process of converting a general or outline plan for a project into a time-based schedule based on available resources and time constraints [3].” Another clarification of the term scheduling is: “Scheduling is the ordering of the activities within a plan utilizing additional discretionary logic restraints and constraints ... based upon the discretion of the project manager ... and including adjustments to activity-specific and total resource usage that may be directed [12].”

Furthermore a Schedule is defined by AACE as: (A) “A description of when each activity in a project can be accomplished and must be finished so as to be completed timely. The simplest of schedules depict in a bar chart format the start and finish of activities of a given duration. More complex schedules, generally in CPM format, include schedule logic and show the critical path and floats associated with each activity. (B) A time-sequence of activities and events that represent an operating timetable. The schedule specifies the relative beginning and ending times of activities and the occurrence of events. A schedule may be represented on a calendar framework or on an elapsed time scale. [3]”

Scheduling is described as two distinct phases: schedule development and schedule management/control.

**Schedule development includes the following,**

1. Establishing a schedule development process to develop a project schedule that includes the entire project scope of work, client requirements, schedule hierarchy, division of responsibility, schedule review, approval requirements, and distribution.

2. Developing a master project schedule, determining major milestones to achieve the project completion date.

3. Developing detailed schedules by WBS, and assigning costs, labor, and equipment to each activity to determine progress requirements to meet the project completion date.

4. Obtaining project team schedule review and approval.

**Schedule management/control includes the following,**

1. Establishing a regular basis for updating the project schedule to ensure the timely reporting of schedule information.

2. Record and assess the effects of project schedule changes.

3. Assessing actual progress versus planned progress to determine trends and variances.

4. Analyzing schedule trends, determining risks and developing options for corrective action.

5. Revising the project plan and project schedule (re-planning and re-baselining) as required.

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**PLANNING & SCHEDULING PROFESSIONAL’S ROLES AND DUTIES**

**A. Planning and Scheduling Professional Duties**
The Planning and Scheduling Professional’s duties are to assist the project management team in developing, monitoring, and updating an integrated project plan and schedule so that the project may be executed in the most efficient manner possible. This is accomplished by the following,

1. Assisting with the development and implementation of acceptable planning and scheduling techniques and methods.

2. Preparing procedures and guidelines for project planning and related scheduling management and control.

3. Supporting the project team efforts toward the development of the project plan and translating that project plan into the project schedule.

4. Leading development and analysis of project schedules, CPM software implementation, time impact and delay analysis, and review of periodic schedule updates.

5. Monitoring and updating accurate schedule progress toward achieving the desired project completion date and informing the project management team of changes to schedule outcome.

6. Prepare and provide schedule progress reports, trending charts, and schedule analysis. Maintain records of scope changes, trends, and variances that potentially affect schedule performance.

7. Assuring the credibility of the information contained in the schedule.

8. Assisting with the preparation of project time and cost claims.

9. At the completion of the project, assists in developing and recording the project’s historical schedule information and “lessons learned”, for future enterprise projects.

B. Planning and Scheduling Professional Training and Professional Development

1. Maintains a high level of technical expertise through continuing education programs and participation in cost/schedule related professional activities.

2. Provides technical training and guidance to project personnel on planning and scheduling subjects.

3. Develops leadership/team-building skills as well as written and verbal communication skills.

4. Advance their professionalism by participating in and advancing professional organizations dedicated to professional planning and scheduling.

C. Planning and Scheduling Professional Ethics

1. Ethics: The Planning and Scheduling Professional (PSP) must be familiar with and subscribe to the AACE International Canon of Ethics.

The AACE International TCM Framework (Section 11.1), states “at all times, each person in the enterprise must judge the means and the ends against personal and societal values and rules of conduct. In judging, people and organizations must ask questions about the means and ends such as: are they fair, respectful, responsible, honest and honorable? Society sets the framework for this questioning, but individuals and organizations make the judgments and set the rules. Most organizations have ethics programs or rules of
conduct. AACE International’s *Canon of Ethics*, which if violated by a member, may subject them to expulsion from the Association.¹

2. **Relations with Employers and Clients**: “Members will undertake only those cost engineering (scheduling) and cost (schedule) management assignments for which they are qualified. Members will engage or advise their employers or clients to engage specialists whenever their employer’s or client’s interests are served best by such an arrangement.”

### PLANNING & SCHEDULING PHASES

#### A. Project Planning

Project planning begins early and continues as the project moves through the various phases of the project life cycle from project conception through to project completion, and closeout. Rather than a straight-through process, it is best thought of as a planning cycle [13].

Most project management professionals agree that there is a basic five-step process involved in developing a project plan. Essential questions that are answered during project planning:

- **What?** The physical feature and technical objectives (scope).
- **How?** Work breakdown structure (WBS).
- **Who?** Resource commitments and organization breakdown structure (or OBS).
- **When?** Timeline initially and then the schedule later in the planning process.
- **How Much?** Budget estimate.

Based on these questions, the recommended sequence of actions to develop the project plan are as follows,

1. define the project scope;
2. establish the work breakdown structure (WBS);
3. identify resources and availability (people and capital assets);
4. establish timeline and sequence of deliverables; and
5. determine the budget for each component activity, work package, or group of tasks.

The Planning and Scheduling Professional assists the project manager to accomplish the following,

- facilitate the preparation of the project plan and work breakdown structure (WBS);
- facilitate the estimation of timelines and project phases;
- identify key project results and milestones;
- involve team members in the planning process; and
- involve the client in defining project goals and key results [13].

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1 The introduction to the *Canons of Ethics* reads: “The AACE International member, to uphold and advance the honor and dignity of cost engineering and the cost management profession and in keeping with the high standards of ethical conduct will (1) be honest and impartial and will serve employer, clients, and the public with devotion; (2) strive to increase the competence and prestige of their profession; and (3) apply knowledge and skill to advance human welfare.”
SCHEDULING PHASES

Scheduling involves two distinct phases: schedule development and schedule management/control. For these phases, project management sources identify the Planning and Scheduling Professional’s responsibilities to include the following:

- provide expertise to develop methodologies, techniques and tools for planning and scheduling;
- provide direct support and expert consulting advice to project personnel regarding planning and scheduling;
- ensure that required project planning and scheduling controls are appropriately implemented and maintained; and
- assist the project manager to establish realistic and achievable schedule baselines [13].

B. Schedule Development

The purpose of the schedule development phase is to implement the project schedule by converting the project plan into a logical arrangement and sequence of activities. During the schedule development phase, the following occur. The project planning activity definitions are refined. Activity durations are confirmed. Activity relationships and sequences detailed, and key milestones or events are confirmed. Resources or costs may be included in the schedule activities.

During the schedule development phase, the Planning and Scheduling Professional will interface with, and obtain input from, project personnel for the development of a project schedule that reflects the defined scope of work. The major output/deliverable from the schedule development phase is the project baseline schedule as documented in the schedule basis document. After schedule development is complete, including a quality review and stakeholder acceptance of the baseline schedule, then scheduling transitions to the next phase of schedule management and control. The schedule development phase is outlined as follows,

1. Initiate the schedule development process.
   a. schedule model and methods; and
   b. schedule development process and procedures.

2. Obtain input/data for schedule development.
   a. stakeholders;
   b. contract schedule specifications;
   c. other requirements; and
   d. output from project planning is input to schedule development
      I. schedule scope of work;
      II. project execution approach/methodology;
      III. work breakdown structure (WBS);
      IV. project milestones and key events;
      V. activity definitions; and
      VI. logical relationships.

3. Develop detailed project schedule.
   a. quality analysis; and
   b. constructability analysis.

4. Schedule development output/deliverables.
   a. baseline schedule;
   b. cash flow;
   c. resource histograms; and