AACE INTERNATIONAL RECOMMENDED PRACTICE

14R-90

REQUIRED SKILLS AND KNOWLEDGE OF PLANNING AND SCHEDULING

AACE INTERNATIONAL

Rev. August 30, 2022

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REQUIRED SKILLS AND KNOWLEDGE OF PLANNING AND SCHEDULING

TCM Framework: General Reference
7.2 – Schedule Planning and Development

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Note: As AACE International Recommended Practices evolve over time, please refer to web.aacei.org for the latest revisions.

Any terms found in AACE Recommended Practice 10S-90, *Cost Engineering Terminology*, supersede terms defined in other AACE work products, including but not limited to, other recommended practices, the *Total Cost Management Framework*, and *Skills & Knowledge of Cost Engineering*.

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Disclaimer: The content provided by the contributors to this recommended practice is their own and does not necessarily reflect that of their employers, unless otherwise stated.

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INTRODUCTION

This recommended practice is intended to serve the following purposes: define the core skills and knowledge a planning and scheduling practitioner is required to have, and in doing so establish the core competencies for the AACE International PSP education and certification programs.

Knowledge is understanding gained through experience or study, while *skills* are abilities that transform knowledge into use. Core competencies are those whose usage is and which AACE International considers as being required for planning and scheduling practitioners to know and use.

This recommended practice (RP) lists the core competencies and provides general performance statements (e.g., "describe", "perform", etc.) 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.* [1] It also incorporates those elements of the *Total Cost Management (TCM) Framework* [2] 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. *TCM Framework* Fig 7.2.1 illustrates the process map for schedule planning and development and shows the basic workflow for planning and developing a schedule. This includes planning the project and planning for schedule development, establishing scheduling requirements, identifying activities, developing activity logic, estimating durations, allocating resources, submitting schedule deliverables, reviewing and validating the schedule, documenting and communicating the schedule, developing and maintaining schedule methods and tools, optimizing the schedule and establishing a control basis.

In addition to the *TCM Framework* and the scope of knowledge provided in this document, the following AACE recommended practices are related to the required skills of planning and scheduling:

- RP 20R-03, *Implementing Project Constructability*
- RP 23R-02, *Identification of Activities*
- RP 24R-03, *Developing Activity Logic*
- RP 27R-03, *Schedule Classification System*
- RP 32R-04, *Determining Activity Durations*
- RP 33R-15, *Developing the Project Work Breakdown Structure*
- RP 37R-06, *Schedule Levels of Detail – As Applied in Engineering, Procurement, and Construction*
- RP 38R-06, *Documenting the Schedule Basis*
- RP 39R-06, *Project Planning*
- RP 48R-06, *Schedule Constructability Review*
- RP 49R-06, *Identifying the Critical Path*
- RP 50R-16, *Trending and Forecasting of CPM Schedules*
- RP 54R-07, *Recovery Scheduling – As Applied in Engineering, Procurement and Construction*
- RP 55R-09, *Analyzing S-Curves*
- RP 64R-11, *CPM Schedule Risk Modeling and Analysis: Special Considerations*
- RP 70R-12, *Principles of Schedule Contingency Management*
- RP 90R-17, *Statusing the CPM Schedule – As Applied in Construction*

- RP 91R-16, *Schedule Development*
- RP 109R-19, *Schedule Change Management – As Applied in Construction*
- Any other recommended practice published under TCM Section 7.2.

PURPOSE

The purpose of this recommended practice is to:

1. Identify the applicable skills and knowledge for planning and scheduling practitioners from RP 11R-88 and the core competencies required for the AACE PSP Certification.
2. Establish a planning and scheduling guideline for training and professional development.
3. Provide ethics subscribed to by planning and scheduling practitioners.

This recommended practice is organized in three major sections consistent with the breakdown of traditional planning and scheduling "phases" as shown in Figure 1.

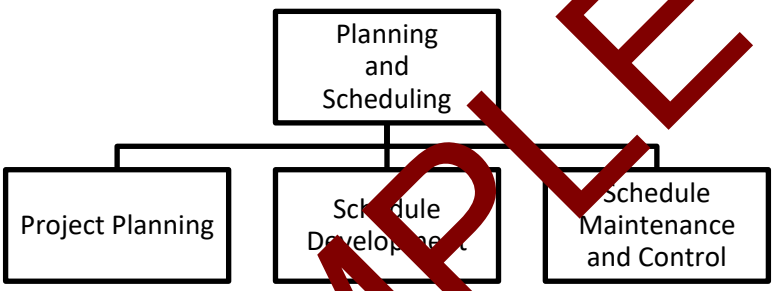

Figure 1: Planning and Scheduling Scope of Knowledge

A planning and scheduling practitioner should understand the core purposes of the scope of knowledge, which are as follows:

1. The purpose of project planning is to establish an acceptable course of action ("plan") to execute a project in an effective manner through the development of project scope and objectives.
2. The purpose of schedule development is to define activities, durations, and relationship logic to implement the project plan.
3. The purpose of schedule maintenance and control is to monitor, update, and communicate the schedule to reflect status and the impact of project changes.
4. The planning and scheduling practitioner provides the project management team with the expertise to plan, schedule, and control the project delivery in the most effective manner.

Planning and scheduling are distinct but related disciplines. Both terms are defined by AACE in Recommended Practice No. 10S-90, *Cost Engineering Terminology* [3]. It is imperative to understand the difference and purposes of these two skills, as described in the *Planning and Scheduling Phases* section below.

PLANNING AND SCHEDULING PROCESS MAP

Figure 2 (*TCM Framework* Fig 7.2.1) illustrates the process map for schedule planning and development and shows the basic workflow based on the plan, do, check, act (PDCA) control cycle.

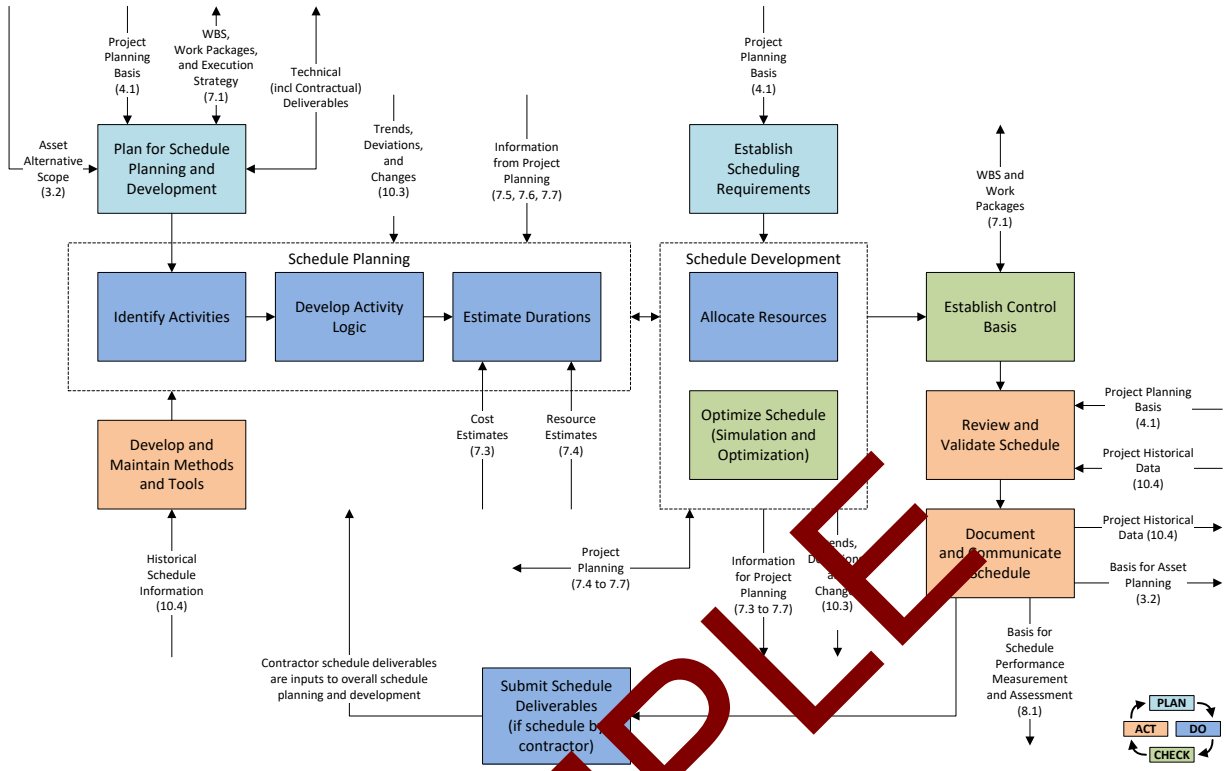

Figure 2. Process Map for Schedule Planning and Development [2]

The schedule planning and development process includes:

- Plan for schedule planning and development (Plan)
- Establishing scheduling requirements (Plan)
- Identifying activities (Do)
- Developing activity logic (Do)
- Estimating durations (Do)
- Allocating resources (Do)
- Submitting schedule deliverables (Do)
- Optimizing the schedule (Check)
- Establishing control basis (Check)
- Reviewing and validating the schedule (Act)
- Documenting and communicating the schedule (Act)
- Developing and maintaining schedule methods and tools (Act)

PLANNING AND SCHEDULING PHASES

Project Planning Phase

Planning, is defined in AACE RP 10S-90 and 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. A planning and scheduling practitioner should be able to read the applicable scoping documents (e.g., construction drawings) and understand the applicable sections of contract specifications.

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.
4. Identifying the cost/schedule/resource aspects of the scope of work.
5. Coordinating the scope of work and planning assumptions with the project management.

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.

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 the project planning phase include:

- **What?** The project's physical features and technical objectives.
- **How?** Work breakdown structure (WBS).
- **Who?** Resource commitments and organization breakdown structure (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 the timeline and sequence of deliverables.
5. Identify and evaluate constraints related to work hours or contiguous operations.
6. Determine the budget for each component activity, work package, or group of tasks.
7. Identify and evaluate risks.

The final output of the planning process is an optimized project execution plan for the selected alternative that best meets project objectives and goals.

Scheduling Phases

Scheduling is defined in AACE 10S-90 and consists of two distinct phases, development followed by maintenance and control.

Schedule Development

The purpose of schedule development 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 planning and scheduling practitioner 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 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 a schedule development process that establishes:**
    a. Schedule development process and procedures.