U.S. DOT Federal Railroad Administration

Office of Passenger and Freight Programs

Monitoring Procedure 34 - Project Schedule Review

# PURPOSE

Competent scheduling is required for sound project planning and control of costs and risks. This Monitoring Procedure (MP) describes how the Monitoring and Technical Assistance Contractor (MTAC) conducts a project schedule review to determine whether the sponsor’s project schedule is reasonable given the project conditions.

# KEY PRINCIPLES

The MTAC should evaluate the Grantee’s Project Schedule for completeness and reliability; usefulness as a management tool; the degree to which it reflects the project scope, cost, management practices, and the method of project delivery.

# REQUIRED DOCUMENTS

Before performing the review, the MTAC will meet with the Grantee and its staff and consultants to discuss the purpose of the review, and obtain required information, including but not limited to:

1. Schedule Assumptions (see a sample schedule in Appendix A of this MP)
2. Description of the schedule development, control process, and procedures
3. Latest schedules in electronic format

# Scope of Work

## Review of Schedule

The MTAC should review the Grantee’s project schedule, related staff, and processes:

In planning, the Grantee develops a schematic schedule showing all project phases. In PE, the Grantee sets forth a more detailed schedule including activities within PE, FD, and related to the selected delivery method; schedule control procedures; and schedule control personnel.

In FD, the Grantee develops an Integrated Baseline Schedule showing critical project activities, logic flow and durations, including identification of agreements for third parties, utilities, and real estate/ROW. The schedule is recommended to be cost/resource-loaded.

Below are Schedule Essentials for any project phase:



In addition, the MTAC should review the project schedule and the Grantee’s schedule staffing, capabilities and processes as follows:

1. Evaluation of the Grantee’s schedule
   1. *Format*. Is the schedule format consistent with relevant, identifiable industry or engineering practices? Does it use software appropriate for the size and complexity of the project?
   2. *Quality.* What is the structure, quality, and detail of the schedule?
   3. *Completeness.* Is the schedule mechanically correct and complete and free of material inaccuracies or incomplete information?
   4. *Work Breakdown Structure.* How has the project work breakdown structure been applied to develop the schedule?
   5. *Phasing and Sequencing:*
      1. Does the schedule contain activities that adequately define the entire scope of the work being performed?
      2. Is the schedule sufficiently developed to determine the validity, stability, and reasonableness of the project critical path?
      3. Are near-critical paths easily identifiable and reasonable in terms of their logic and proximity to the project critical path?
      4. Are the schedule assumptions for project phase durations reasonable?
         * Check for consistency with Grantee’s Schedule Assumptions (see Appendix A)
         * Review project calendars used in the schedule (see Appendix B of this MP)
         * Assess the validity and reasonableness of activity durations for major elements on the critical path and the critical path schedule contingency (float)
         * Have labor and material availability been factored into construction durations?
      5. Are the project schedule structure and sequencing logical and reasonable?
         * Is sequencing, through the use of predecessors and successors, identified for all material tasks?
         * Is the work sequenced efficiently, i.e. can/should work be conducted in parallel that is shown in sequence?
         * Is the use of constraints identifiable, justified, and reasonable?
         * Are work areas identified in construction and properly sequenced from the appropriate predecessor activities (i.e., right-of-way acquisition, permitting, etc.)?
         * Are the durations and logic reasonable for temporary construction and physical construction constraints, such as transportation or site access restrictions?
         * Are project calendars appropriately defined and utilized and include allowances for seasonal weather variations?
   6. *Hierarchy.* Is the hierarchy of schedule elements evident?
      1. Is a top-level summary included to clarify phases or groups of activities?
      2. Is the schedule detail beneath the ‘hammock’ or summary level task based?
   7. *Cost/Resource-loaded Schedules.*
      1. A cost/resource-loaded schedule enables the Grantee to be a more “informed consumer” of a construction contractor’s schedule. If the schedule is cost loaded for construction activities, examine the flow of cost through time and assess the following:
         * Do the quantities and costs assigned to activities in the schedule match those in the cost estimate?
         * If the schedule critical path and logic ties among activities are reasonable, does the cost curve presented seem reasonable? Is the money flowing too fast? Are the costs front-end loaded?
         * When the initial cost distribution is accepted, that curve becomes a baseline from which project progress is compared. If actual expenditures are “above the curve,” investigate why project funds are being spent faster than anticipated. Verify the cost distribution was accepted by all parties including the construction contractor.
         * Consider the cost impacts if the project experiences delays or finishes early.
      2. A resource-loaded schedule is the hardest to develop, but yields valuable information: Consider the job loading for the project for a daily work force and a monthly work force; how many people should be on the project; how many people and related equipment can fit into the available work space.
   8. *Contingencies.* Discuss with the Grantee the exposed and hidden (patent and latent) contingency in the schedule, including amounts and how it is expressed in the schedule.
      1. Develop a bar chart to illustrate the placement of this contingency across the project design phase and the major contract packages during construction
      2. Describe the adequacy of proposed contingency at milestones
      3. Describe the MTAC’s approach to identifying schedule hidden contingency, e.g. talking with the Grantee’s scheduler, etc.
      4. Evaluate schedule elements that are functionally equivalent to schedule contingency but not identified as such, including extended durations, forced float, dummy activities, or positive lag values
      5. Determine if the use of constraints is identifiable and reasonable
      6. Float available in the schedule, at any time shall not be considered for the exclusive use of either the Grantee or the contractor. During the course of contract execution, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month will also contribute to the reserve of float. An accepted schedule showing work completed in less time than the contract completion date will be considered to have Project Float.
2. Evaluation of the Grantee’s schedule control methods and staff
   1. The approach to and use of scheduling tools, such as scheduling software
   2. Grantee internal procedures for schedule maintenance; plan and timing of schedule reviews; procedures for schedule change and update
   3. Use of a work breakdown structure
   4. Assignment of staff responsibility for schedule, cost loading, resource loading, etc., and the adequacy of the scheduling staff and software for the size and complexity of the project.
3. Evaluation conclusions, recommendations
   1. Validate the usefulness of the schedule as a project management tool. Does it provide pertinent information on the overall pulse of the project? Does the schedule indicate to the reader what project work should be happening? If the schedule and project reality don’t match, is the project ahead or has it slipped?
   2. Evaluate the level of definition of the schedule and elements within for relevance to the project phase
   3. Describe areas of concern; uncertainties, constraints to sequencing or duration; identify risks and provide a list of risks associated with the schedule. If requested, the MTAC will provide a written comparison of the proposed schedule with similar project(s) and analyze the differences. The MTAC will draw conclusions and provide recommendations based on this comparison.
   4. Make suggestions to improve the schedule and proactively help the Grantee solve schedule problems.

Items (basis for duration assumptions) should be tailored to the project; items shown are for example.

| **SCHEDULE ASSUMPTIONS** | **DURATION (Months)** |
| --- | --- |
| Planning & Concept Design |  |
| PMP and Sub-plans  Alternatives Analysis  Service Planning / Infrastructure Design  NEPA, Tier I  Service Development Plan  Cost Estimate, Schedule, Finance Plan  Reviews by FRA along the way and at end  Total | X  X  X  X  X  X  X  XX |
| Preliminary Engineering |  |
| PMP and Sub-plans  Design  Refinement of Service Planning  NEPA, Tier II or Project  Cost Estimate, Schedule, Finance Plan  Value Engineering  Risk Assessment  Reviews  Total | etc |
| Final Design |  |
| PMP and Sub-plans  Design  Cost Estimate, Schedule, Finance Plan  Constructability Review  Risk Assessment Refresh  Reviews  Total |  |
| Bid and Award of Construction Packages |  |
| Bid package A, B, C, etc.  Prepare and bid documents  Award |  |
| Construction |  |
| Track, ROW, guideway, Segment A, B, C  Systems  Stations  Inspections, Safety Certifications, Reviews  Testing |  |
| Training of Operator and Staff / Simulated Rev. Operations |  |
| Revenue Operations |  |

For capital projects, two calendars predominate. The majority of the physical construction activities are based on a five-day work week with non-work days for holidays and weather delays. Design and other activities are based on a five-day work week with non-work days for holidays. Additional calendars can be used for other activities.

The MTAC should ensure Grantees provide calendar information for their Project Schedules, and the number of schedule activities associated with each calendar -- useful for calculating acceleration and delays. Below are examples.

|  |  |  |  |
| --- | --- | --- | --- |
| **Calendar Name** | **Number of Activities Assigned** | **Number of Activities on Critical Path/Total Duration** | **Number of Non-Critical Activities With Less Than 30 Days Contingency/ Avg. Contingency** |
| Construction 5 Day w/Union Holiday & 30 Weather Days | 2649 activities | 700/36 months | 2000/10 days |
| Engineering/Procurement/Permit Calendar | 1555 activities |  |  |
| DTP/DTE Business Days | 446 activities |  |  |
| Standard 5 Day Work Week | 100 activities |  |  |
| Winter Outage Calendar w/30 Weather Days | 21 activities |  |  |
| 5-Day Week, 2-Shift | 10 activities |  |  |
| 7-day Workweek  Test/Commission  Yard Modification  Pre-Revenue Operation  Start Revenue Operations | 9 activities | 9/6 months |  |
| 54-Hour Outage calendar | 5 activities |  |  |
| Weekend Outage Calendar w/30 Weather Days | 4 activities |  |  |
| NATM Tunneling w/Union Holiday & 2 Weather Days | 2 activities |  |  |
| **TOTAL** | **4801 activities** |  |  |