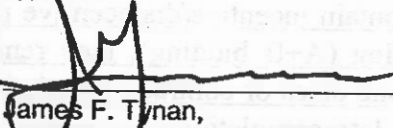


To: SUPERSEDED BY EI 04-043 EFFECTIVE 05/05/05		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 04-008
Title: PROJECT SELECTION GUIDANCE FOR CPM SCHEDULING PAY ITEM			
Distribution: ☐ Manufacturers (18) ☒ Local Govt. (31) ☒ Agencies (32) ☐ Surveyors (33) ☒ Consultants (34) ☒ Contractors (39) ☐ _____ ()		Approved:  James F. Tynan, Director, Construction Division Date 2-6-04	

ADMINISTRATIVE INFORMATION:

- This EI is effective with projects submitted for the letting of September 9, 2004. Application of this EI prior to this date is encouraged (See "IMPLEMENTATION" and EI 04-007).
- The guidance provided in this EI for Designers will be incorporated into a future revision of Chapter 21 of the Highway Design Manual.

PURPOSE:

This EI transmits project selection guidance for the pay item relating to Critical Path Method (CPM) scheduling.

TECHNICAL INFORMATION:

This EI is being released concurrently with EI 04-007 which transmits the special note and special specification for CPM Scheduling.

This EI requires Contractors to use Critical Path Method (CPM) scheduling techniques to plan and control their work on certain contracts. The project selection criteria for which contracts should incorporate CPM scheduling are contained in this EI.

Studies and experience have shown that CPM scheduling techniques are more appropriate for certain projects and that their use during construction to plan work and resolve time-related issues can help avoid costly delays and delay claims. Therefore, project selection criteria have been developed to identify those projects where CPM scheduling techniques are most suitable.

What is CPM Scheduling?

CPM scheduling is the representation of a project plan by a schematic diagram or network that depicts the sequence and interrelations of all the activities required to complete a project, and the logical analysis and manipulation of this network in determining the best overall approach to successful project completion. It is a technique that has been used by construction managers since the 1960s to coordinate the work of all the contractors required to complete a project.

It is beyond the scope of these guidelines to provide a detailed overview of CPM scheduling techniques. Project designers and engineers are urged to refer to the numerous publications on CPM scheduling and construction management for additional information. *Construction Planning & Scheduling, publication #3500.10*, published by the Associated General Contractors of America (AGC) is a good source of information on this topic. A copy of this publication can be reviewed at

Regional Construction Office or the Construction Division Office in Albany. Copies may be purchased from AGC.

Project Selection Criteria.

Projects that meet any of the following criteria must contain a CPM scheduling requirement:

- A. Projects that contain incentive/disincentive provisions for early completion, projects that use cost-plus-time bidding (A+B bidding), lane rental, or have time-related contract provisions such as interim milestone dates or contract completion date with significant liquidated damage provisions. Since early or late completions on contracts with these provisions will have a direct financial impact in the incentive item(s), it is imperative that there is an approved, detailed schedule. A CPM schedule will help ensure a successful completion by requiring detailed planning and regular updates. CPM will also help to determine the impact of additional work or unforeseen occurrences on the schedule. For projects with very short I/D phases or limited time-related work, the CPM requirement may only be required for part of the project. The Designer should contact Regional Construction to develop the appropriate special notes.
- B. Projects that require the Contractor to coordinate activities with utility companies, railroad companies, or other contractors that are working within or near the contract limits if their work is significant and could potentially delay the Contractor, i.e., many activities on the critical path must be coordinated with outside parties. This includes contracts let in stages where adjacent sections must be coordinated, buildings constructed with multiple contracts, i.e., separate contracts for general, plumbing, electrical, and HVAC. CPM on these projects will help avoid time related disputes and potential delay claims.
- C. Projects of regional significance, as determined by the Regional Director, such as projects critical to local safety, traffic, or program needs, i.e., projects with long off-site detours or extended lane closures. These projects usually get a lot of attention and may warrant additional effort to insure timely completion.
- D. Projects estimated to cost more than \$20 million. Large projects with many activities that must continuously interact, such as a major interchange construction or reconstruction project with several bridges, multiple construction phases, numerous subcontractors, etc., should be scheduled using CPM due to their size and complexity.

CPM Provision Selection Criteria.

There are 2 methods of providing a CPM schedule provision in a construction contract.

1. By special note.
2. By specification contract pay item.

Only one of these two methods shall be used for each contract.

CPM Schedule Special Note.

The special note titled "CRITICAL PATH METHOD SCHEDULE" (see EI 04-007) was written primarily for smaller projects and does not require computerization. Project Designers shall insert the Special Note into the PS&E package for projects that meet project selection criteria A, B, or C and cost less than or equal to \$10 million.

CPM Schedule Specification Contract Pay Item.

The CPM Schedule specification contract pay item (see EI 04-007) was written primarily for larger projects and requires computerization of the CPM schedule. The specification should be used for projects that meet project selection criteria A, B, or C and cost more than \$10 million. The specification shall also be used for projects that meet project selection criteria D.

The specification contains the requirements for CPM scheduling and requires the Contractor to provide the Engineer with CPM Scheduling software.

Design Implementation Procedure.

The project designer shall determine if a project meets the criteria for CPM scheduling and indicate in the Advance Detail Plan (ADP) transmittal letter which CPM provision will be used. The Regional Construction Engineer (RCE) will verify that appropriate projects contain the CPM scheduling requirement as part of the constructibility review process for all projects. The RCE may adjust the CPM requirements due to unique project conditions such as:

- The RCE may request that the specification contract pay item be used on a contract with an estimated cost of less than \$10 million if computerization of the schedule will assist the EIC during construction.
- The RCE may request that the CPM schedule only be required for part of a project, i.e., a short duration I/D phase. For these situations the CPM special note may be modified to only require partial project CPM scheduling.

For projects that meet selection criteria A, B, or C and cost less than \$10 million, the Designer shall submit the special note to the Design Quality Assurance Bureau with the PS&E submission.

For projects that meet selection criteria A, B, and C and cost more than \$10 million, and for all projects greater than \$20 million, the Designer shall include the "637.3550---20 M - CPM Scheduling" contract pay item in the Engineer's Estimate. The CPM contract pay item specification will be inserted into proposals by the Design Quality Assurance Bureau.

Only one CPM provision is required in each proposal, i.e., either the special note or the specification contract pay item.

Construction Implementation Procedure

Guidelines for construction field personnel are contained in §108-01, *Prosecution and Progress*, of the *Contract Administration Manual* (CAM) and are unchanged by this issuance.

IMPLEMENTATION:

- Action by the Designer - For cost estimation purposes use the following equation:

$$\text{Estimated CPM Scheduling Cost} = \$10,000 + [(0.0005) \times (\text{Total Engineer's Estimate})]$$

(Note: Round the amount to the nearest \$1,000)

- Action by Designer – For projects submitted for letting prior to September 9, 2004, for which the Designer chooses to implement the changes included in this EI, the Designer must include the appropriate insert (special specification or special note) with the PS&E transmittal and/or amendment request memo for inclusion in the construction contract bid documents. The Designer can obtain the required information and materials from the Department's Internet website at www.dot.state.ny.us/constr/637/section637.html.
- Action by Design Quality Assurance Bureau – Beginning with the effective letting date, the DQAB will be responsible for including the appropriate inserts as part of the contract proposal documents.

TRANSMITTED MATERIALS:

None.

BACKGROUND:

Standard Specification §108-01, *Start and Progress of Work*, contains the contract provisions for planning, scheduling, and monitoring the work. The standard scheduling provision leaves the choice of scheduling technique up to the Contractor. Therefore, the Contractor can meet the requirements by submitting a bar chart, a CPM network diagram, or other suitable graphical representation of the proposed work plan. For projects with few activities or activities that can proceed without much interaction, bar charts are normally used and are an acceptable method of communicating the proposed work plan. The disadvantage of bar charts is their inability to depict the interrelationships between activities or identify activities that are critical to project completion. For projects that have many activities that must continuously interact, a CPM network diagram is more appropriate and should be used.

CONTACT:

Direct questions regarding this Engineering Instruction to Larry Palaski or Rob Howland of the Construction Division at Phone: (518) 457-6472, Email: mo-construction@dot.state.ny.us. Include the EI number and title along with the contact person's name in the phone message/email when making inquiries regarding this EI.