

AACE
INTERNATIONAL
**RECOMMENDED
PRACTICE**

50R-16

TRENDING AND FORECASTING OF CPM SCHEDULES

SAMPLE

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TRENDING AND FORECASTING OF CPM SCHEDULES

TCM Framework: 10.2 – Forecasting
10.3 – Change Management

Revised February 27, 2019

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TCM Framework: 10.2 – Forecasting

10.3 – Change Management



February 27, 2019

TABLE OF CONTENTS

| | |
|---|---|
| Table of Contents | 1 |
| Introduction..... | 1 |
| Recommended Practice..... | 2 |
| Determining Existence of Trends within CPM Update Data | 3 |
| Determining and Quantifying a Trend Based Upon Measured Past Performance | 4 |
| Use of Trend Data to Forecast Future Variation from a Baseline Schedule or Previous Forecast..... | 5 |
| Conclusion | 8 |
| Contributors..... | 8 |

INTRODUCTION

This recommended practice (RP) of AACE International introduces the concepts of trending and forecasting as applied in CPM planning and scheduling. This RP presents practices which utilize information from the measured progress and performance of an ongoing project. This RP should be distinguished from other practices that draw upon historical information from similar past projects in the preparation of the original baseline plan. As practitioners follow the unfolding of the project, they may identify trends that vary from the initial or subsequent baseline schedules. Potential trends should be communicated to project team members but show restraint in revising the logic network as a response to the identified trends. This RP suggests that a potential trend must be reviewed and assessed, but not to automatically override the original durations and sequences prepared by the initial project team for reasons discussed herein.

This RP is intended to provide guidelines (i.e., not a standard) for:

- Determining the existence of trends within CPM update data (measured progress) to date for a specified project.
- Determining and quantifying a trend or trends based upon such measured past performance.
- Use of such trend data to forecast future variation from an initial schedule or previous forecast.

CPM theory is built on the concept of forecasting activity and project completions. An RP on forecasting and trending must deal with the ability of CPM analysis to forecast or estimate the completion and the timing of discrete activities within a project. A traditional CPM schedule is a forecast because it is based upon the project management team's initially selected means and methods (including selection of crews, equipment and other resources), scope of activities, optional sequences for activities, estimates of productivity, activity duration, calendar, and external considerations. These parameters are generally static and not subject to modification except pursuant to a revision or re-baselining of the initial (or previous) CPM logic plan. Therefore, CPM schedule updates are normally limited to addition of information such as actual start and finish dates, percent completeness and remaining duration of work in progress; these updates do not extend to modifying any other data of the initial (or previously modified or re-baselined) CPM logic plan. Changes in the CPM schedule for reasons including scope growth generally require a change in baseline. If not referenced appropriately, the trends, impacts, and forecasts may not be accurate against an appropriate reference point.

February 27, 2019

RECOMMENDED PRACTICE

A trend, as generally identified in the preparation of an initial estimate or CPM logic plan for the purpose of forecasting project cost or schedule, may be drawn from many other projects deemed analogous to the current project. However, in this RP, trending and forecasting shall specifically focus upon the additional information derived after the start of and from the current project.

A trend, as relating to schedule analysis, may be an intuitively perceived or an analytically measured deviation from the initially estimated durations and other components comprising a CPM logic network and calculated schedule. This deviation is deemed to demonstrate a pattern and not mere random variation. An underlying characteristic of a trend is that if it is left unaddressed, there is a high probability it will continue. In the realm of a project, failure to address a negative trend may lead to delays or disruptions, while failure to recognize a positive trend may result in lost opportunity to gain savings in time and cost. Therefore, the first step of this RP shall be to consider if it is reasonable to assume that past performance indicates an actionable trend.

Some practitioners may ask, "If the contractor is not currently meeting his duration commitments, then why do we simply assume that he will suddenly start meeting the baseline production rates when we forecast (i.e. present an update)?" This question does not address if such poor past performance is part of a trend, if it is merely random variation, or if it is due to a series of unrelated bad luck. For example, bad performance in the past week based upon rain on Monday, an employee's heart attack on Tuesday, a concrete blowout on Wednesday, a traffic event delaying personnel and supplies arriving at the site on Thursday, and a neighborhood power outage on Friday, should neither constitute a trend nor be the basis of a forecast of future performance. On the other hand, a stretch of poor productivity without obvious cause may be the basis for determination of a trend which supports a forecast of similar future performance in the absence of remedial efforts.

The key point of the preceding paragraph is found in the phrase "without obvious cause," which occurs when neither project personnel nor computer algorithms based upon typically collected data reveal an underlying cause. However, a discovery that subcontractor "A" has issues of poor productivity in random weeks is less subject to corrective action than a discovery that subcontractor "A" has issues of productivity whenever subcontractor "B" is working in the same location concurrently. The determination of a trend may be quite simple, or it may require recognition of multiple independent factors acting in concert.

The first focus of trending analysis is to determine if, in fact, a trend exists followed by determining the cause or reason(s) behind the trend. Another possible focus is to compare past activities and conditions reflecting a trend with future activities or conditions in order to consider the likelihood of similar performance or to improve upon the noted trend. This then leads to the next issue which is to evaluate what may be the impact if a trend does exist and is left unaddressed. With issues of cost, any trend indicating higher or lower costs in the past will have consequences for the project if the trend continues into the future; such is not always the case for a CPM schedule (having activities with more or less float).

This RP discusses how information regarding past trends may be used to forecast future outcomes more accurately. A trend indicating that a selected subcontractor is experiencing lower productivity than assumed in the initial CPM network plan is relevant if his lower productivity does, or could over time, impact project completion or the work of other subcontractors. The primary purpose of trending analysis within this RP is to promote timely completion of the project.

Forecasting, based upon determination of a trend or trends within past performance on a subject project, can be either manual or automatic in nature. This RP considers a process for manual or automated modification of the initial or most recent modification or re-baselined CPM logic network, based upon measured past performance. The stipulated methodology for these modifications includes (but is not limited to) one or more of the following:

- Modifying the original durations of a subset of remaining activities.