



# bluemarble

RISK SOLUTIONS

## Using the Forensic Schedule Analysis RP

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AACEI  
Houston, Texas  
March 2009

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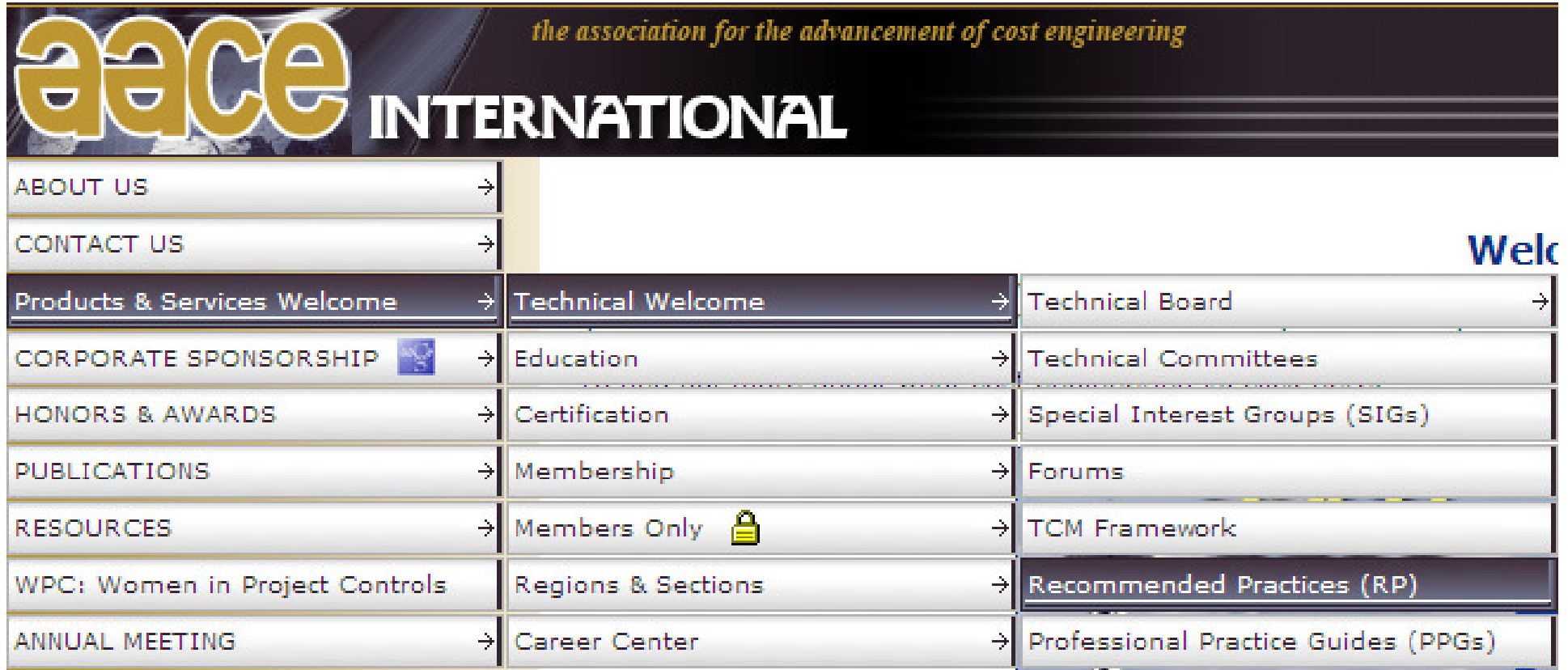
# AACEI's Recommended Practices



- Technical foundation of AACEI's education and certification products/services
- Formal and standardized development process within AACEI
- Subject to peer review by AACEI-designated Subject Matter Experts
- Approved by AACEI Technical Board

# History of the Forensic Schedule Analysis RP 29R-03

- AACEi has published numerous RP's
- RP-29R-03 Originated with AACEi in 2004
- Kenji Hoshino accepted responsibility to author the paper
- Committee was formed on a volunteer basis
  - Open to anyone
  - 20 co-authors (Including Philip Barnard & Anamaria Popescu)
  - More than 100 reviewers
- Final Release = June 25, 2007

# Where is the RP Located?



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HONORS & AWARDS →	Certification →	Special Interest Groups (SIGs)
PUBLICATIONS →	Membership →	Forums
RESOURCES →	Members Only  →	TCM Framework
WPC: Women in Project Controls	Regions & Sections →	<b>Recommended Practices (RP)</b>
ANNUAL MEETING →	Career Center →	Professional Practice Guides (PPGs)

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# Where is the RP Located?

## **DEVELOPING LOCATION FACTORS BY FACTORING: AS APPLIED IN ARCHITECTURE & ENGINEERING, AND ENGINEERING, PROCUREMENT & CONSTRUCTION**

**(Rev. October 2006)**

*AACE International Recommended Practice No. 28R-03*

TCM Framework:

7.3: Cost Estimating and Budgeting

10.4: Project Historical Database Management

This recommended practice provides a generic method of developing location factors in support of the Total Cost Management (TCM) cost estimating and budgeting and database management processes for construction related projects. The method applies to construction project types including buildings, infrastructure, utilities, process plants, and so on. This generic method provides a basis for users to tailor their own detailed process around their own needs and computing capabilities. Location factors are used during preliminary project evaluations (i.e., or 4 estimates). They are not intended to be used when preparing appropriation-quality estimates (i.e., Class 3 or better estimates).

## **FORENSIC SCHEDULE ANALYSIS**

**(Rev. June 2007)**

*AACE International Recommended Practice No. 29R-03*

TCM Framework:

6.4: Forensic Performance Assessment

## **IMPLEMENTING PROJECT CONSTRUCTABILITY**

**(Rev. July 11, 2008)**

*AACE International Recommended Practice No. 30R-03*

TCM Framework:

11.5: Value Management and Value Improving Practices (VIPs)

# Forensic Scheduling

- Forensic scheduling distinct from project scheduling
- Standard practices & protocols used in project scheduling not adequate for forensic scheduling
- Uniform practices for forensic scheduling can & should be established independent of legal standards & theories
- All methodologies subject to some manipulation
- All involve judgment by analyst, but
- Recognized standards & practices should minimize manipulation

# What's the Problem?

- No standards of practice on the methods
  - What they are called
  - What they are
  - How to perform one correctly
  - Circumstances for use
- Many users not even aware that no standards exist
- Subjectivity becomes prevalent
- Consultants have their “pet” methodologies
- Are not held accountable for accuracy or validity of implementation

# “How-To” Guide for Delay Identification/Quantification

- Compensable delay
- Excusable delay
- Inexcusable delay
- Schedule variances
- Schedule acceleration
- Schedule disruption, and
- Apportion delay between contracting parties

*From such analysis, legal conclusions concerning monetary damages flow*

# Typical Uses

1. Claims for:
  - Time Extensions
  - Compensable Delay
  - Constructive Acceleration
  - Schedule Disruption
  - Early Completion Bonus
2. Defenses to these claims

# Objectives

1. Provide a unifying, standard technical reference for existing schedule analysis methods
2. Standardize terminology associated with schedule delay analysis
3. Define the minimum procedural protocols the forensic scheduler should conform to when using each method
4. Reduce disagreement in the profession over methodology, allowing the focus to be on the factual evidence

# RP Organization

## **Part 1. Organization & Scope**

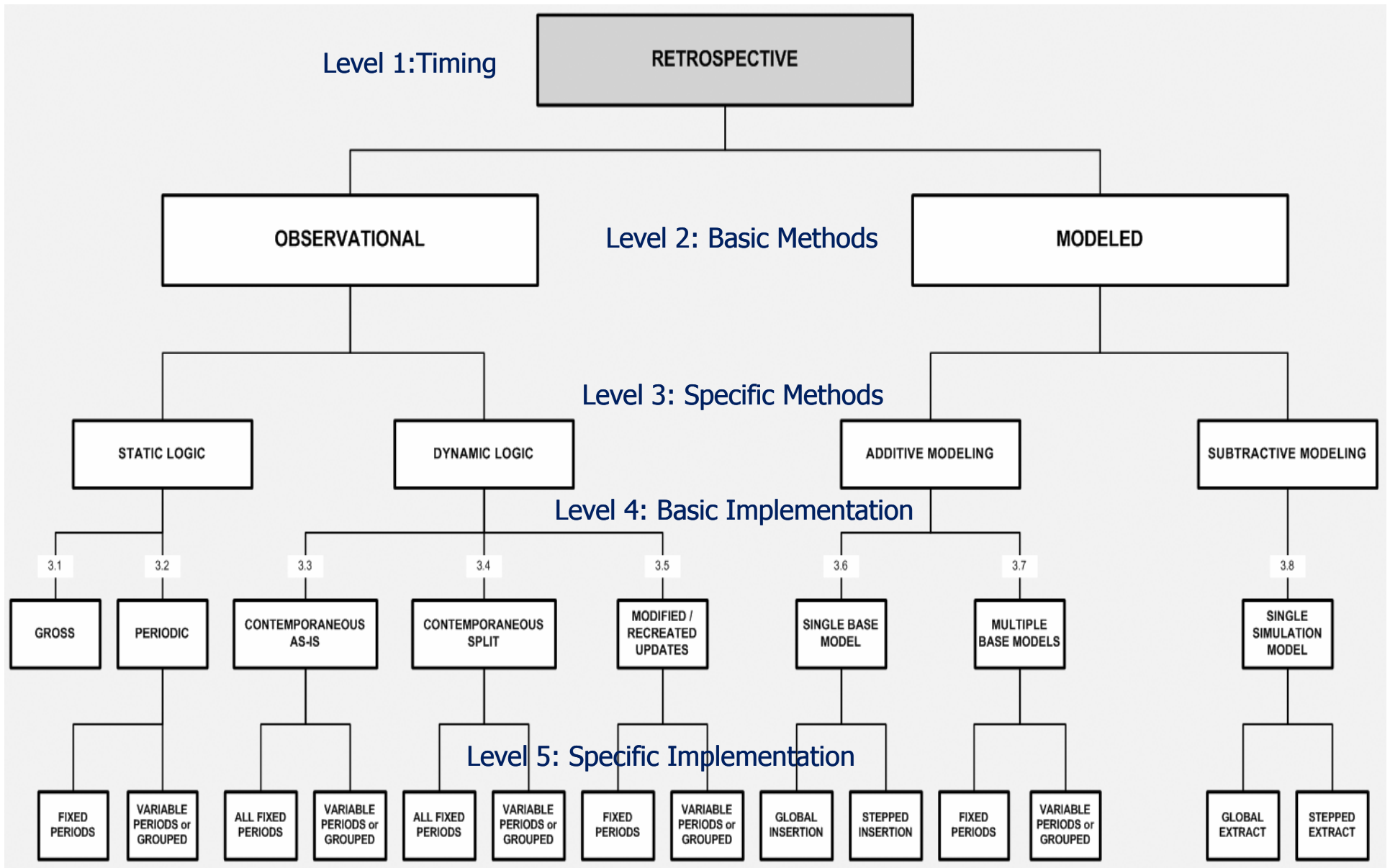
- 1.1. Introduction
- 1.2 Basic Premise & Assumptions
- 1.3 Underlying Fundamentals
- 1.4 Scope & Focus
- 1.5. Taxonomy/Definitions

## **Part 2. Source Validation Protocols**

## **Part 3. Method Implementation Protocols**

## **Part 4. Analysis Interpretation Protocols**

## **Part 5. Choosing a Method**



# Correlation to RP Sections

<b>Taxonomy</b>	1	<b>RETROSPECTIVE</b>													
	2	<b>OBSERVATIONAL</b>						<b>MODELED</b>							
	3	<b>Static Logic</b>			<b>Dynamic Logic</b>				<b>Additive</b>				<b>Subtractive</b>		
	4	<b>3.1 Gross</b>	<b>3.2 Periodic</b>		<b>Contemporaneous Updates (3.3 As-Is or 3.4 Split)</b>			<b>3.5 Modified / Reconstructed Updates</b>		<b>3.6 Single Base</b>		<b>3.7 Multi Base<sup>1</sup></b>		<b>3.8 Single Simulation</b>	
	5		<b>Fixed Periods</b>	<b>Variable Windows</b>	<b>All Periods</b>	<b>Grouped Periods</b>	<b>Fixed Periods</b>	<b>Variable Windows</b>	<b>Global Insertion</b>	<b>Stepped Insertion</b>	<b>Fixed Periods</b>	<b>Variable Windows or Grouped</b>	<b>Global Extraction</b>	<b>Stepped Extraction</b>	
<b>Common Names</b>	As-Planned vs As-Built	Window Analysis		Contemporaneous Period Analysis, Time Impact Analysis, Window	Contemporaneous Period Analysis, Time Impact Analysis, Window Analysis	Contemporaneous Period Analysis, Time Impact Analysis	Window Analysis, Time Impact Analysis	Impacted As Planned, What-If	Time Impact Analysis, Impacted As-Planned	Time Impact Analysis	Window Analysis, Impacted As-Planned	Collapsed As-Built	Time Impact Analysis, Collapsed As-Built		

# Level 1 - Timing

- Prospective
  - Delay analysis performed in “real time”; at or near time of event; prior to delay outcome; looks forward to estimate impact on remainder of schedule
    - ✦ **Example** – Time Impact Analysis
- Retrospective
  - Delay analysis performed “after the fact”; delay duration & impact known; outcome of event known
    - ✦ **Example** – Collapsed As-Built Analysis

*The key is the position of the analyst in real time*

## Level 2 – Basic Methods

### Observational or Modeled

- Observational Method
  - Examine existing schedules; compare one to another; make no changes; perform analysis of events using existing schedules
    - ✦ **Examples** – Windows Analysis, As-Built vs As-Planned
- Modeled Method
  - Insert/extract activities representing events to/from network; compare calculated results before & after modeling; determine delays & impacts
    - ✦ **Examples** – Collapsed As-Built, Time Impact Analysis, Impacted As-Planned

# Level 3 – Specific Methods

## Observational: Static or Dynamic

- Static Logic Observation
  - Compare one set of network logic to another set in same schedule; “static” means later logic compared with one set of as-planned logic
    - ✦ **Example** – As-Planned vs As-Built
- Dynamic or Progressive Logic Observation
  - Use schedule updates whose logic can vary from both as-planned & other updates
    - ✦ **Example** – Windows Technique

# Level 3 – Specific Methods

## Modeled: Subtractive or Additive

- Subtractive Modeling
  - Compare one schedule with another that was calculated by extracting events
    - ✦ **Example** – Collapsed As-Built
- Additive Modeling
  - Compare one schedule with another that was calculated by inserting events
    - ✦ **Examples** – Impacted As-Planned, Time Impact Analysis

# Level 4 – Basic Implementation

## Static Observational: Gross or Periodic

- Gross
  - Entire project analyzed as single analysis period
- Periodic
  - Project broken into 2 or more periods
  - Each period analyzed on own

# Level 4 – Basic Implementation

## Dynamic Observational: As-Is, Split or Mod

- Contemporaneous/As-Is
  - Evaluates differences between contemporaneous project updates without modification
- Contemporaneous/Split
  - Bifurcates existing updates into progress & logic changes; evaluates each separately
- Modified or Recreated
  - Modifies or recreates updates if usable or reliable contemporaneous updates don't exist

# Level 4 – Basic Implementation

## Modeled: Single or Multi Base

- Single-Base Simulation Modeling
  - Simulations (additions or subtractions) are done starting from one CPM network
- Multi-Base Simulation Modeling
  - Simulations (additions or subtractions) are done starting from multiple CPM networks

# Level 5 – Specific Implementation

## Fixed or Variable Period Length

- Fixed
  - Uses the regular periods established by contemporaneous schedule updates
    - ✦ **Example:** Monthly Update Analysis
- Variable
  - Analysis of periods of variable length dictated by the facts of the case
    - ✦ **Example:** Window Analysis

# Level 5 – Specific Implementation

## Stepped or Global Insertion or Extraction

- Global
  - one simulation by inserting or extracting all delays at one time
- Stepped
  - multiple simulations by inserting or extracting delays in chronological or reverse chronological order

# Source Validation Protocols

- 2.1. Baseline Schedule Selection, Validation & Rectification
- 2.2. As-Built Schedule: Sourcing, Organization & Validation
- 2.3. Schedule Updates: Validation & Reconstruction
- 2.4. Identification & Quantification of Delay Events & Issues

# Method Implementation Protocols

- 3.1. Observational / Static / Gross
- 3.2. Observational / Static / Periodic
- 3.3. Observational / Dynamic / Contemporaneous As-Is
- 3.4. Observational / Dynamic / Contemporaneous Split
- 3.5. Observational / Dynamic / Modified or Recreated
- 3.6. Additive Modeling / Single Base
- 3.7. Additive Modeling / Multiple Base
- 3.8. Subtractive Modeling / Single Simulation
- 3.9. Subtractive Modeling / Multiple Simulation

# Method Implementation Sections

- A. Description
- B. Common Names
- C. Recommended Source Validation Protocols
- D. Enhanced Source Validation Protocols
- E. Recommended Implementation Protocols
- F. Enhanced Implementation Protocols
- G. Identification of Critical & Near-Critical Paths
- H. Identification & Quantification of Concurrent Delays & Pacing
- I. Determination & Quantification of Excusable and Compensable Delay
- J. Identification & Quantification of Mitigation / Constructive Acceleration
- K. Specific Implementation Procedures & Enhancements
- L. Advantages & Disadvantages

# Analysis Interpretation Protocols

- 4.1. Excusability & Compensability of Delay
- 4.2. Identification & Quantification of Concurrency of Delay
- 4.3. Criticality & Float
- 4.4. Pacing Delays
- 4.5. Constructive Acceleration

# Choosing A Method

- 5.1 Factor 1: Contractual Requirements
- 5.2 Factor 2: Purpose of Analysis
- 5.3 Factor 3: Source Data Availability & Reliability
- 5.4 Factor 4: Size of Dispute
- 5.5 Factor 5: Complexity of Dispute
- 5.6 Factor 6: Budget for Analysis
- 5.7 Factor 7: Time Available for Analysis
- 5.8 Factor 8: Availability of Expertise and Resources
- 5.9 Factor 9: Forum for Resolution & Audience
- 5.10 Factor 10: Legal or Procedural Requirements

## Factor 2: Purpose of the Analysis

Useful to Analyze	RP Methodology							
	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
Compensable Delay	Yes	Yes	Yes	Yes	Yes			Yes
Non-Compensable Delay	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Concurrent Delay		Yes	Yes		Yes	Yes	Yes	Yes
Right to Finish Early		Yes	Yes					Yes
Contemporaneous Delay		Yes	Yes			Yes <sup>1</sup>	Yes	
Constructive Acceleration		Yes	Yes	Yes	Yes	Yes	Yes	
Cumulative Impact of Changes		Yes	Yes	Yes	Yes	Yes	Yes	Yes

1 – Assuming the baseline schedule did not change

## Factor 3: Source Data Required

Data Required for Analysis?	RP Methodology							
	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
Baseline Schedule	Yes	Yes	Yes	Yes		Yes	Yes	
Updated Schedules			Yes	Yes				
As-Built Record	Yes	Yes			Yes			Yes

# Conclusion

- First American How-to Manual
- Complicated
- Non-legal (meaning no legal citations, although clearly targeted at legal proceedings)
- Not for beginners
- A first step:
  - More methodologies may appear as well as non-CPM methods.
  - There will be comments and revisions
  - Will it become a court/legal standard?