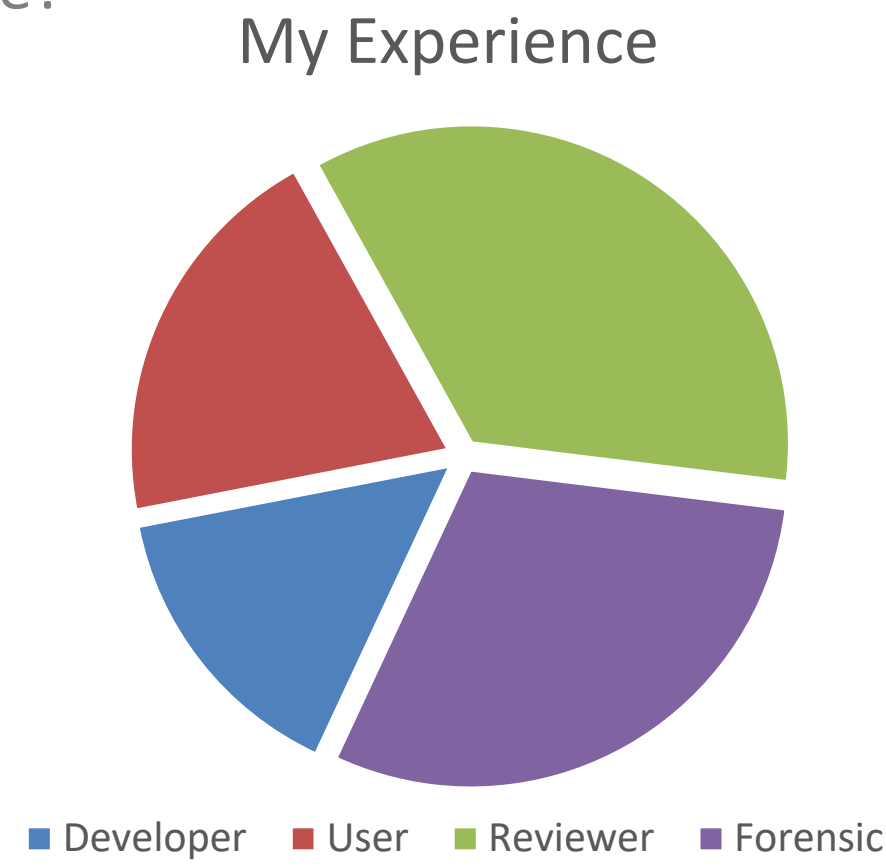
WHY ARE YOU DOING THAT…

AND IS IT BEST FOR THE PROJECT SCHEDULE?

PRESENTED BY:
A. Keith Rines, PE, CCM, PSP
MBP

Go to **www.menti.com** and use code **91 65 82 7**

- What is your primary scheduling role?
  - Developer/Planner
  - User/Field
  - Reviewer/Receiver
  - Forensic Analyst/Claims



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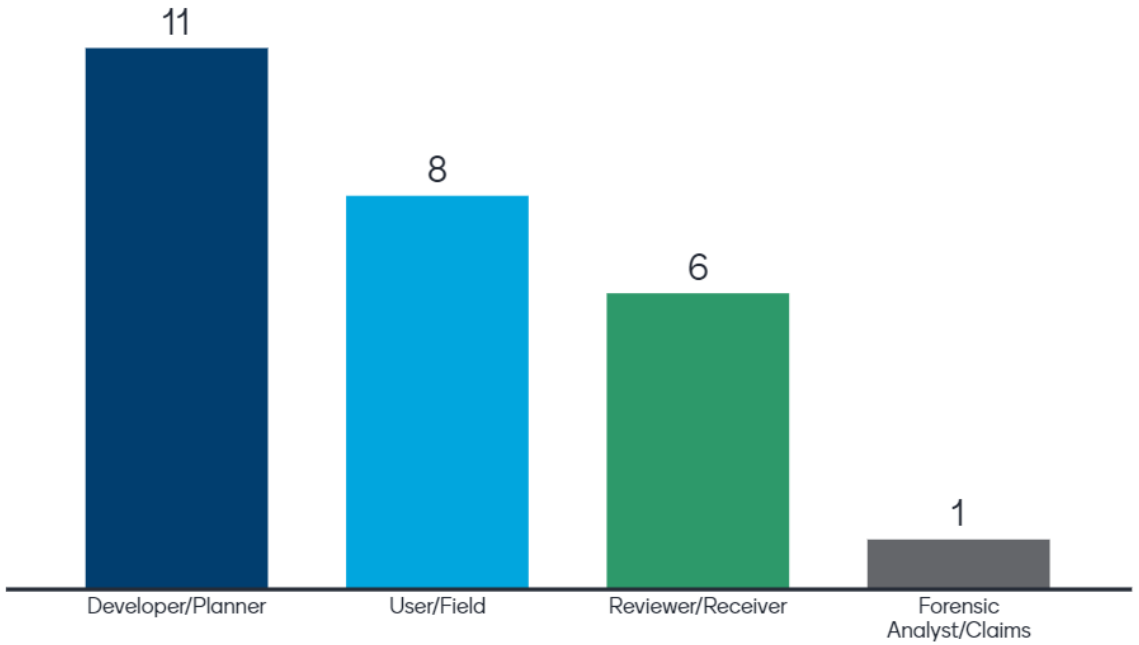
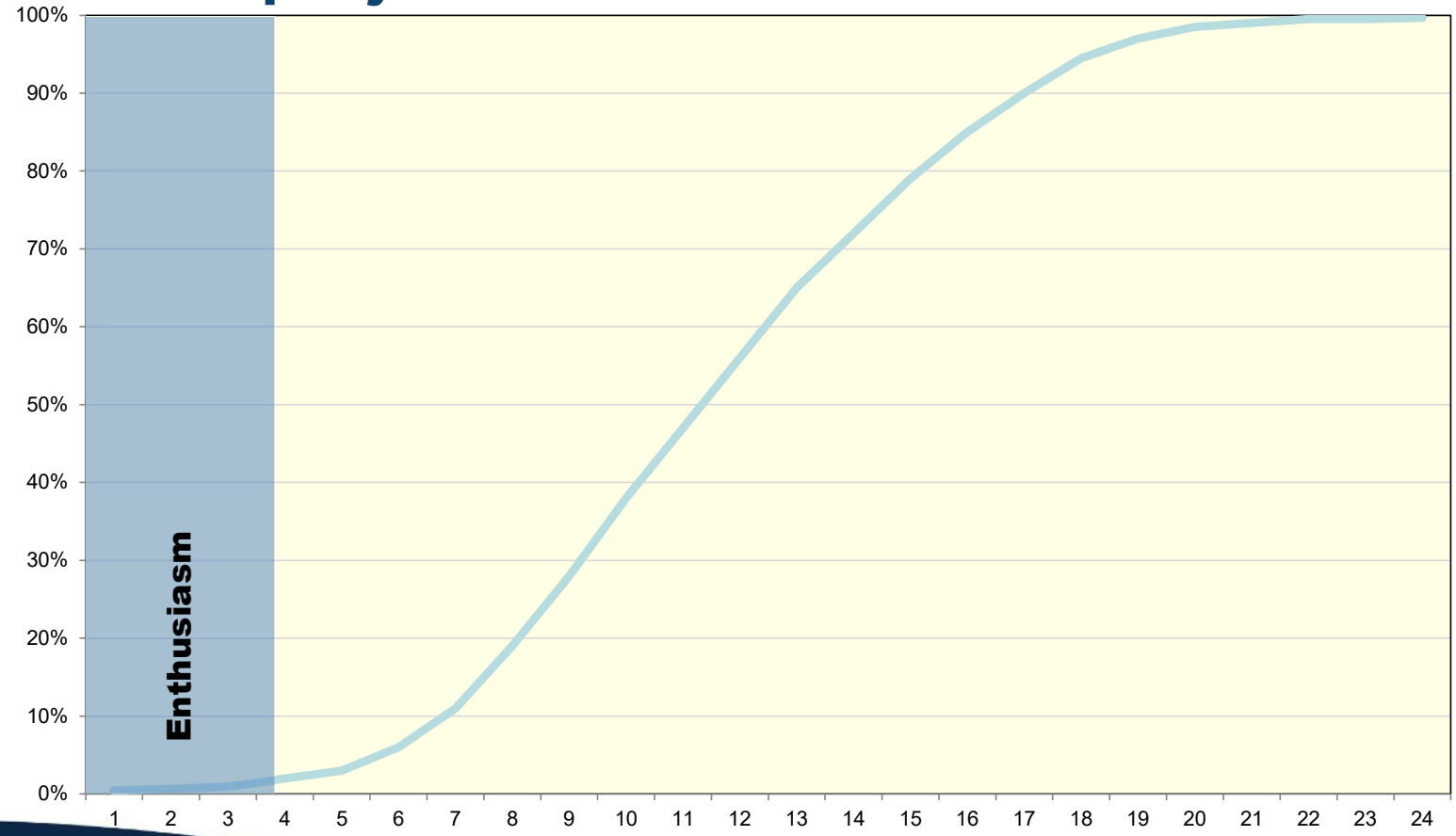
What is your primary scheduling role?



Learning Objectives

- Recognizing characteristics of a viable and effective schedule.
- Identify ways to integrate perspectives of all stakeholders.
- Engaging in proactive behavior to increase efficiency on the Project.

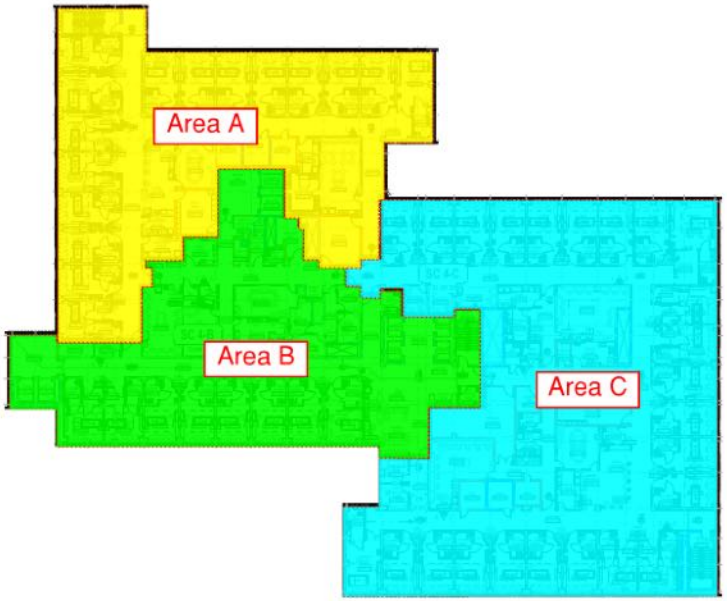
Phases of a project



#1 Rule

Read The Contract

E. Certification documentation shall be provided to COR 21 working days prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures

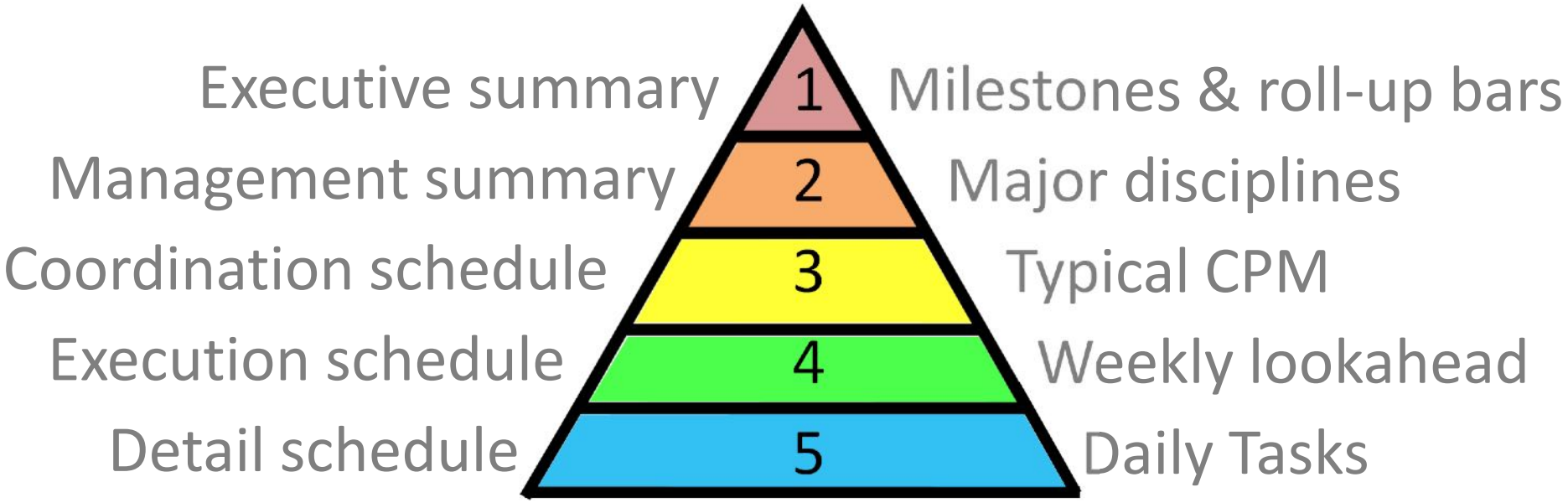


Pro Tip for all:
Keyword Search

Set Expectations at Kickoff meeting

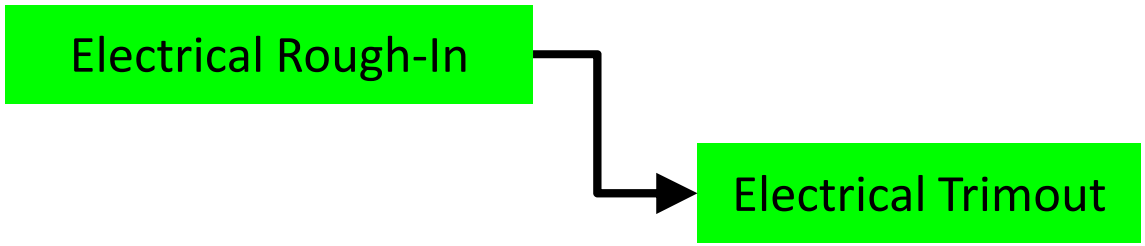
- Develop rapport
- Create commitments not just compliance
- Establish key milestones and work hours
- Agree to weather tracking method

Levels of schedules



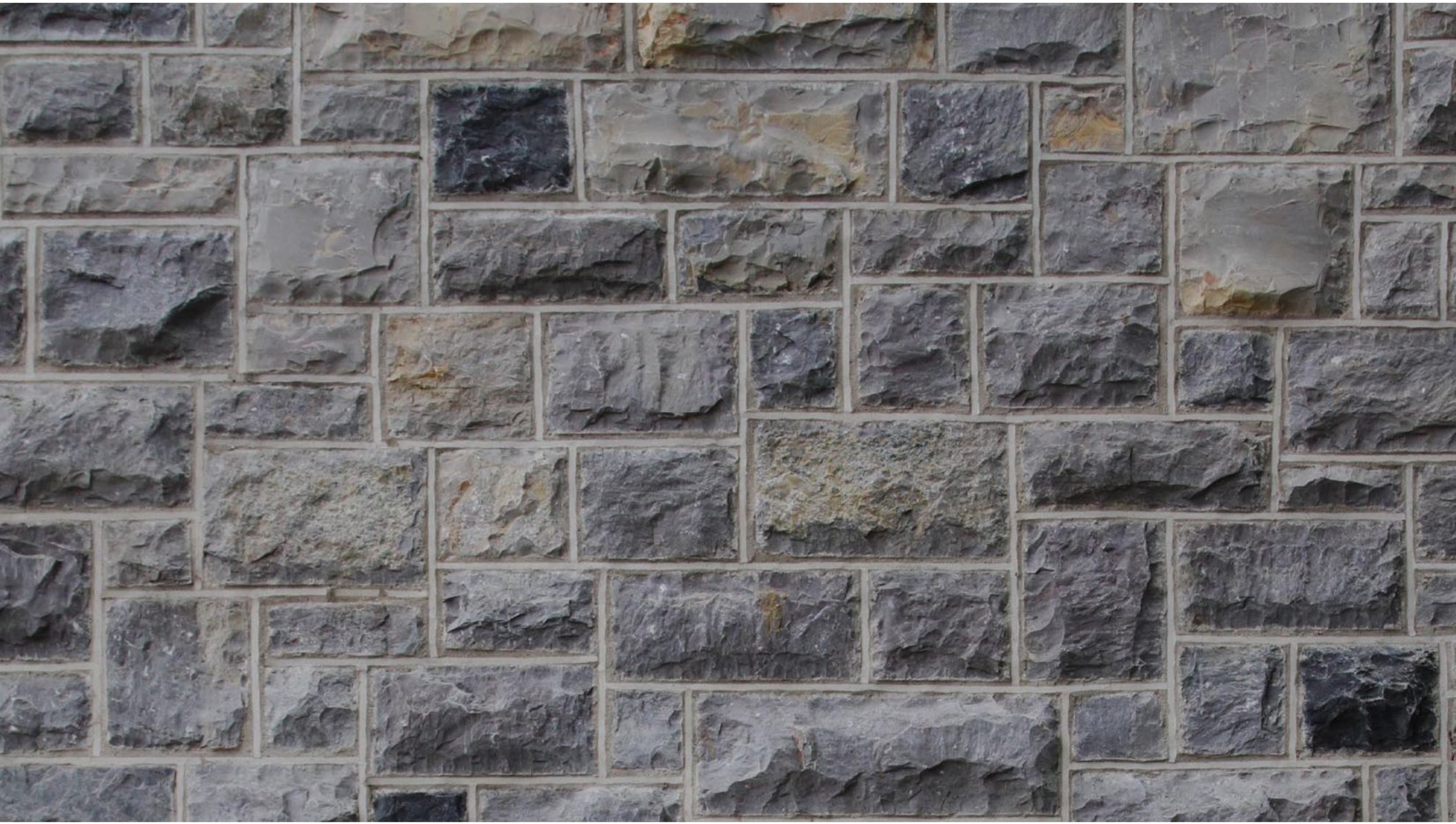
Characteristics of a practical baseline schedule

- Well-defined plan in Narrative
- Use activity codes along with WBS
- Intelligence in Activity ID, descriptions
- Sound logic and durations



Parkinson's Law

"Work expands so as to fill the time available for completion"



Estimated Duration

- Scope: 1,000 ft of trench
- Planned Duration = 15 work days

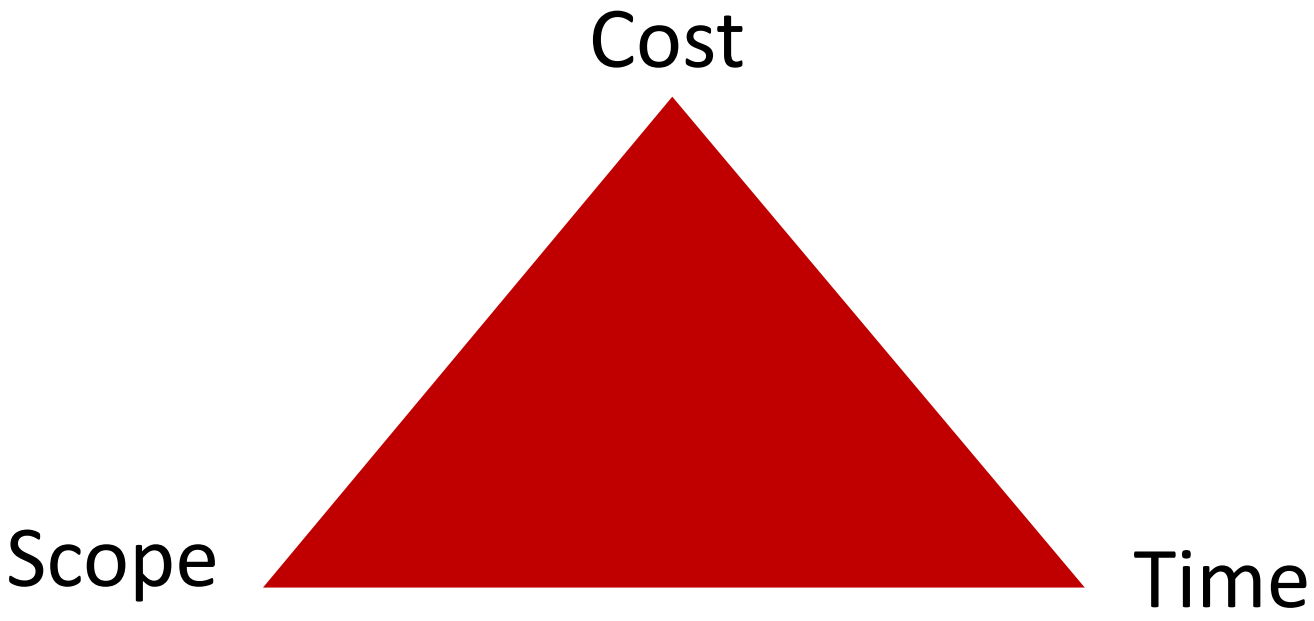
Planned Rate = 1,000 ft/15 days
= 67 ft/day

- Day 1: 50 ft
- Day 2: 60 ft
- Day 3: 55 ft

Average: 55 ft/day

Actual Duration = 1,000 ft/55 ft/day
= 18 work days

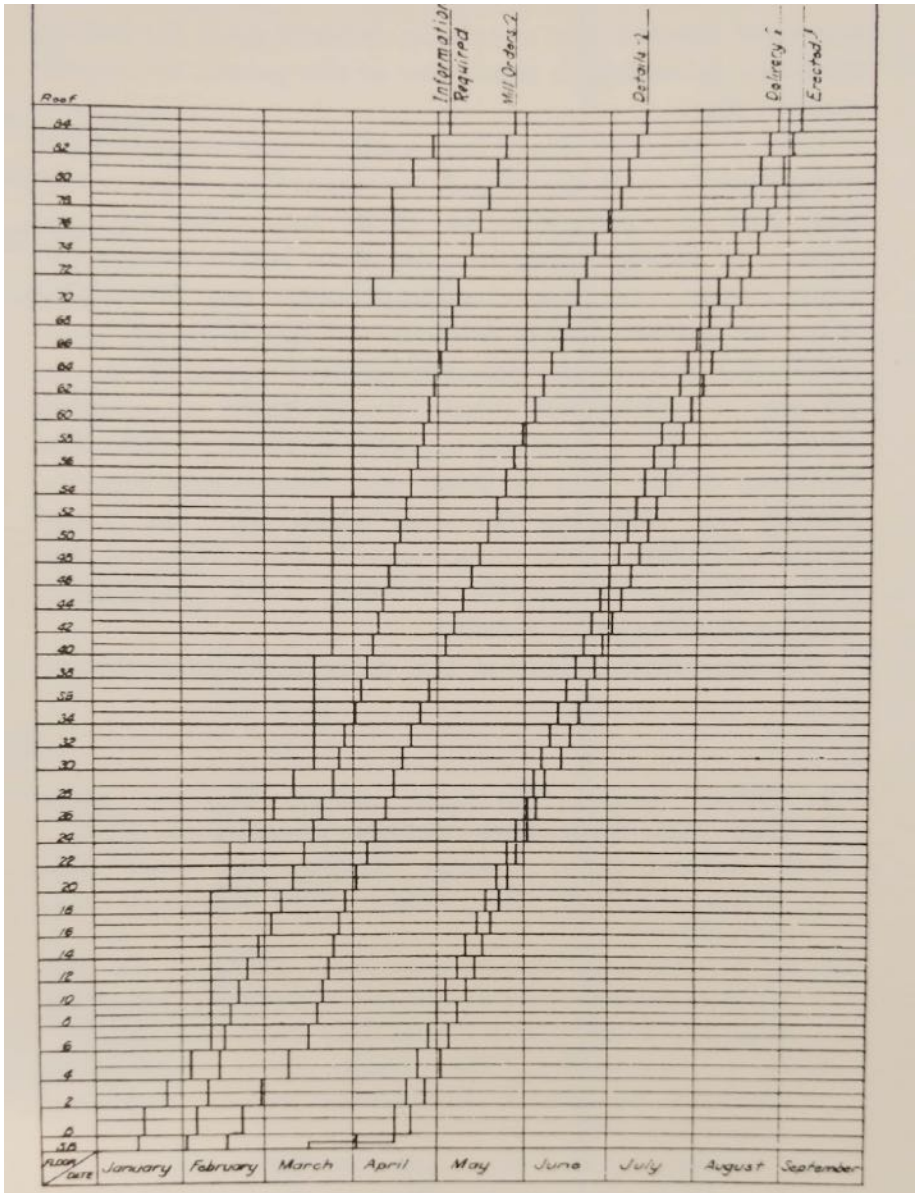
Factors controlling the schedule



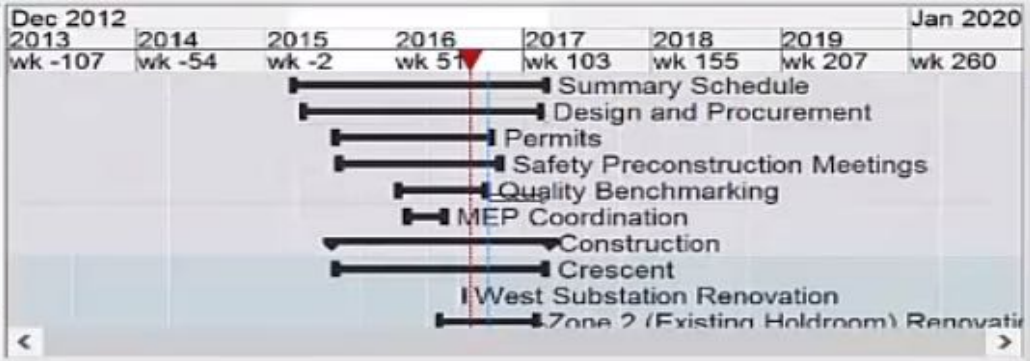
Factors controlling the schedule

Space visualization

- Linear (line of balance)
- 4D modeling
- Time location diagrams
- Pull planning (Last planner)

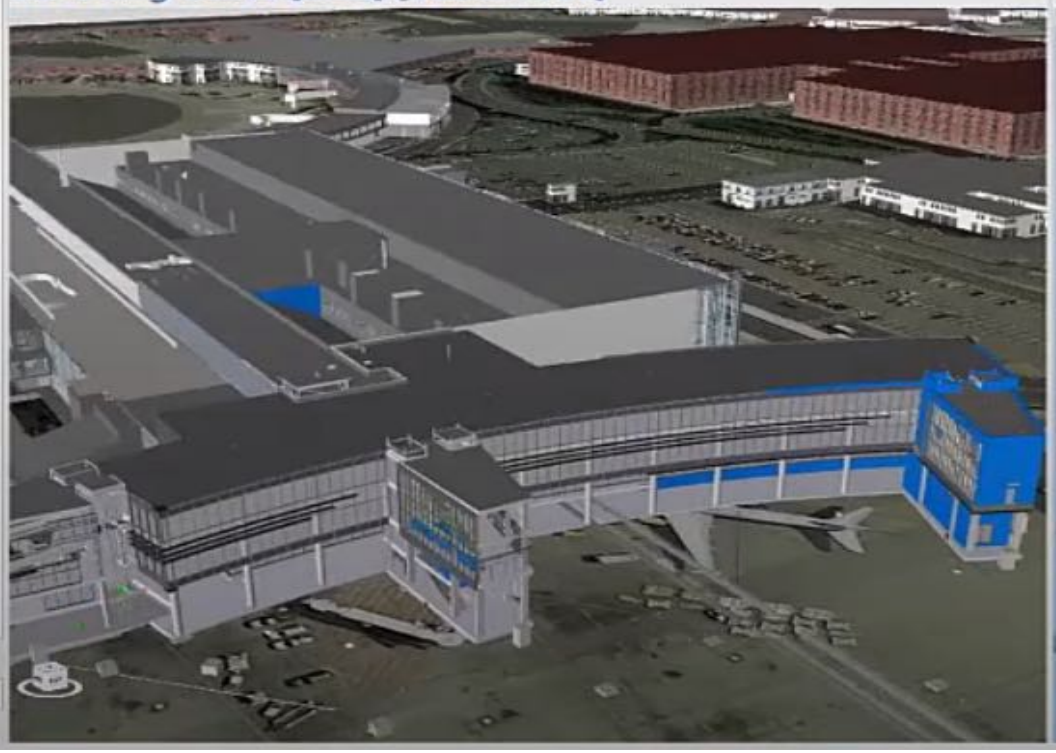


ID		Name	S...	F...	D...	B...	A
1	Term...	(4) Summary Schedule	3/9/2...	3/17...	507d	$0.00	
609	Term...	Design and Procurement	4/6/2...	3/1/...	475d	$0.00	
2058	Term...	Permits	7/7/2...	10/1...	318d	$0.00	
2092	Term...	Safety Preconstruction Me...	7/17/...	11/7...	328d	$0.00	
2144	Term...	Quality Benchmarking	12/3...	9/27...	187d	$0.00	
2169	Term...	MEP Coordination	1/25/...	6/2/...	91d	$0.00	
2281	Term...	Construction	7/6/2...	3/16...	424d	$99,46...	
2282	Term...	Crescent	7/6/2...	3/16...	424d	$83,52...	
3879	Term...	West Substation Renovati...	7/11/...	7/22...	10d	$10,71...	
3882	Term...	Zone 2 (Existing Holdroo	4/25/	2/16	204d	$4,841	

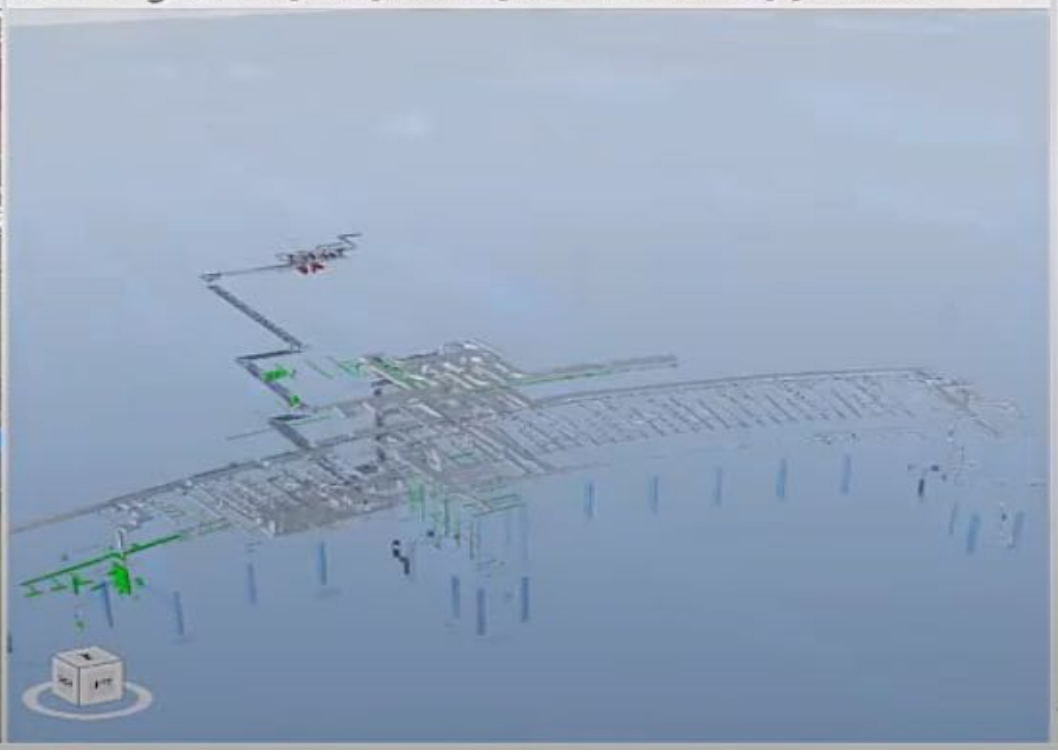


Support Gantt

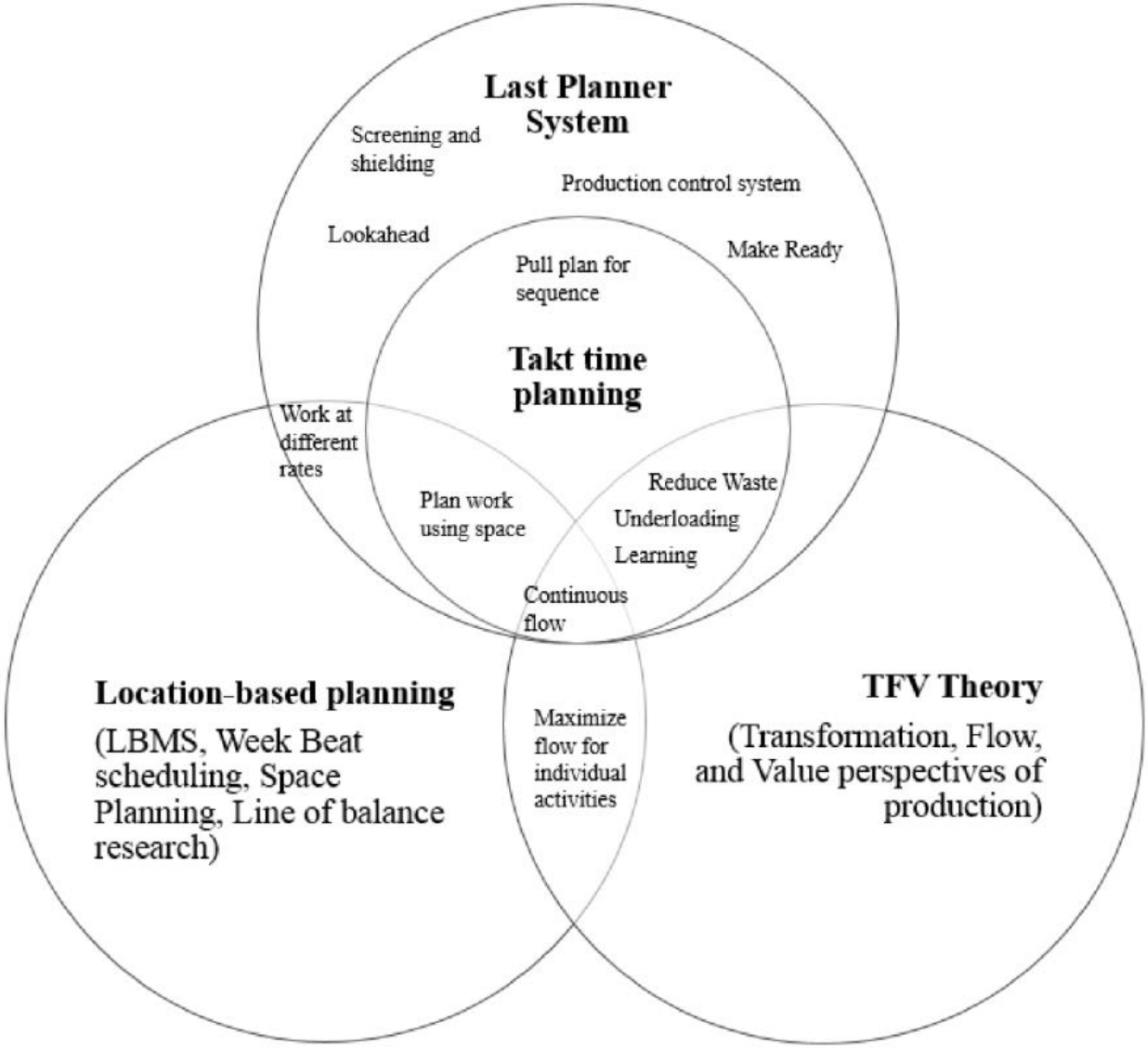
3D Using Dates [Best] [1228x1061]



3D Using Dates [Best] Filters[MEP animation] [1234x...



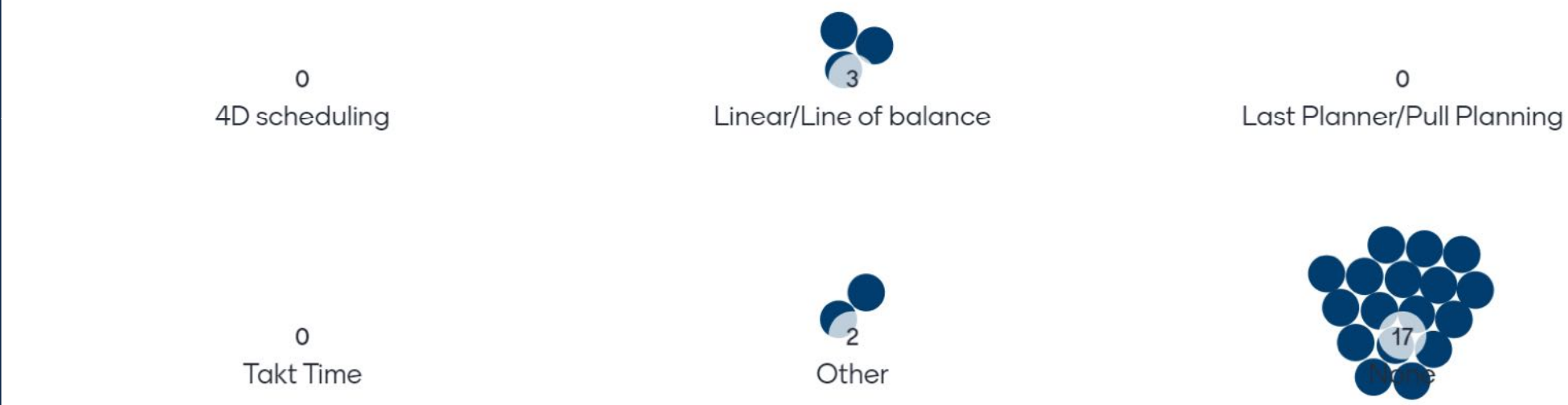
Beyond CPM



2019 UC Berkeley Dissertation by A.G. Frandson. “Takt time planning as a work structuring method to improve construction work flow”

Go to **www.menti.com** and use the code **91 65 82 7**

What alternative methods to CPM are you using now?



22

Recommendations for reviewers

- Use checklists
- Verify by-in from all stakeholders
- Develop mutual expectations
- Check continuity between areas
- Are all phases developed?
- Don’t rely solely on comparison software
- Confirm data with pdf

Pro Tip for all:
Ask Questions!

Check for impact of changes

Added and deleted activities

OD	TF	Budgeted Cost	Status
12	24	$30,060	Not Started
20	11	$0	Not Started
5	20	$3,200	Not Started

Started activities with matching Original and Remaining Durations

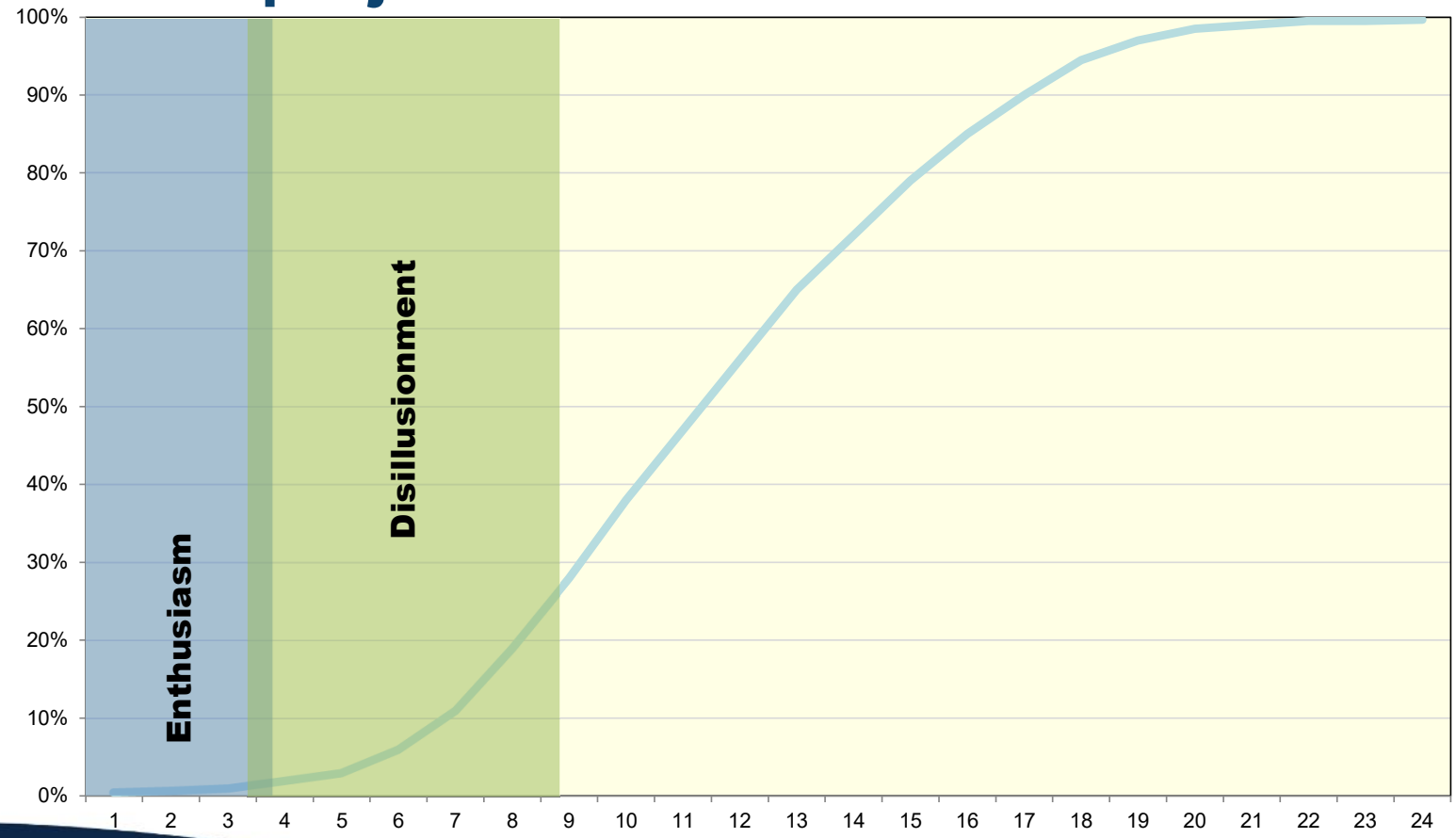
	OD	RD	Start	%
essible	3	3	08-Oct-20 A	40%
Floor	5	5	09-Apr-20 A	80%
round	5	5	04-May-20 A	90%
S. Com	5	5	15-Jun-20 A	95%
omp. A	5	9	27-Aug-20 A	98%
r Lobb	5	5	21-Oct-20 A	50%

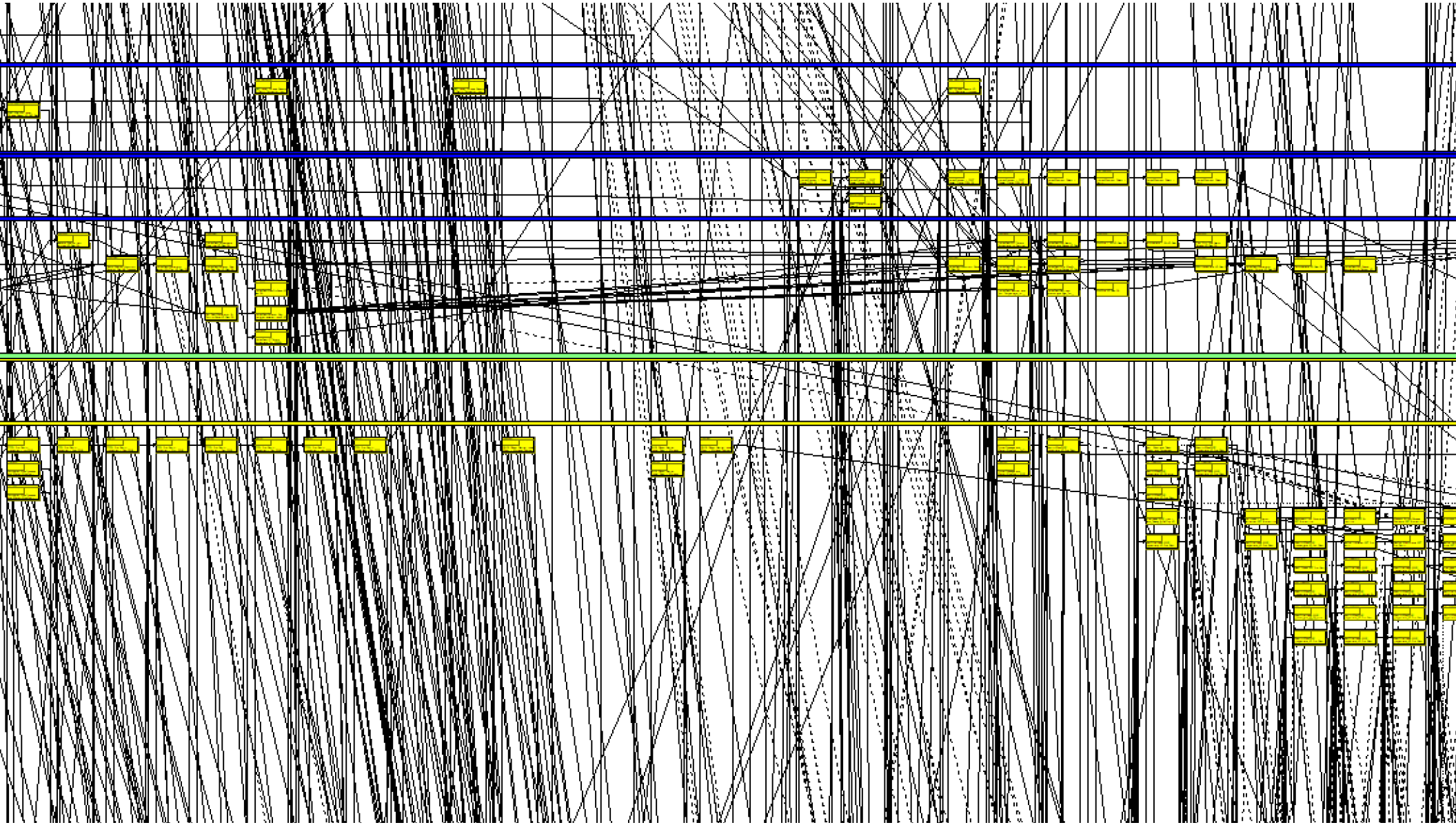
Pro Tip for all:
Be Proactive!

Look for activities in more than 1 category

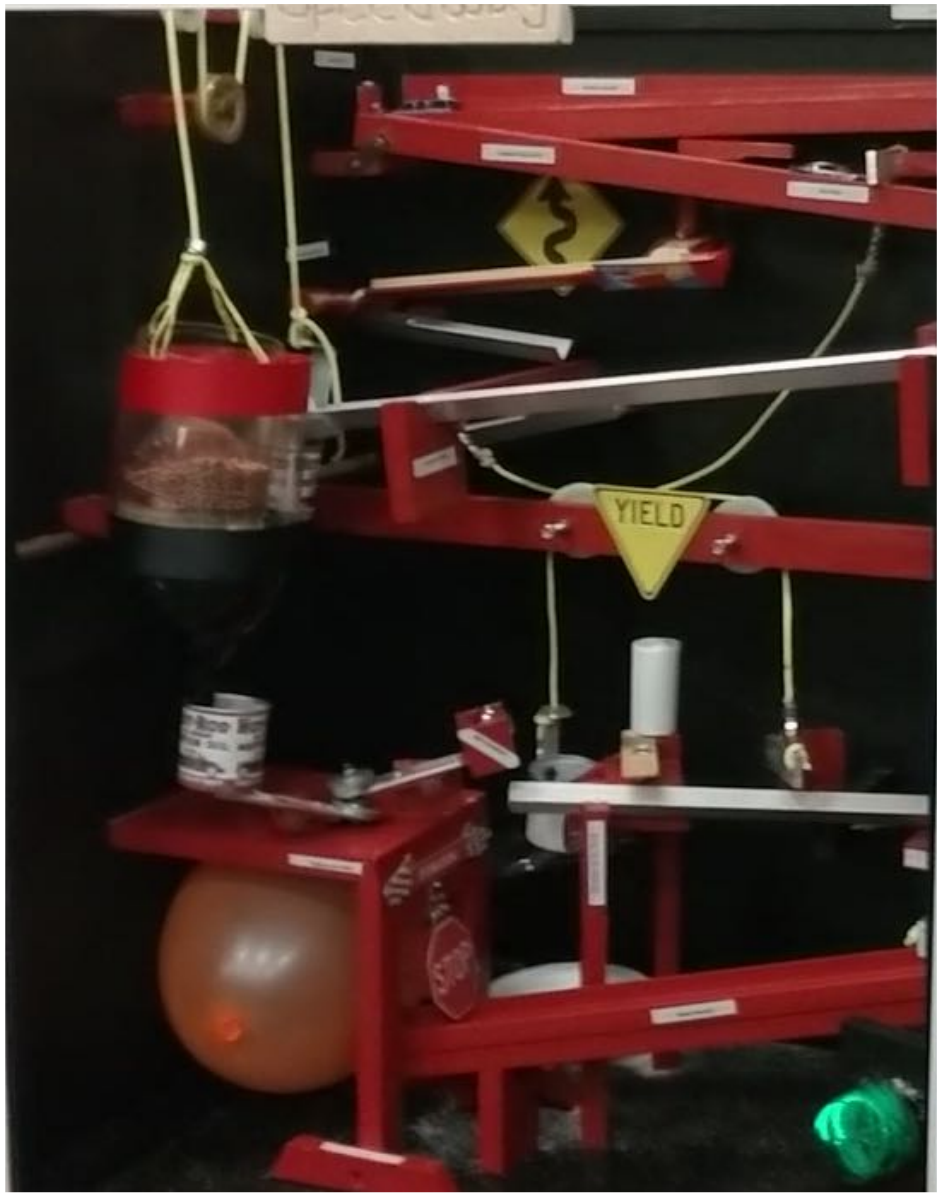
a. Missing Predecessors	0	m. Out of Sequence	116
b. Missing Successors	0	n. Actual Date > DD	0
c. Added Activities	7	o. Constraint Date Changes	0
d. Deleted Activities	0	p. Progress this month	120
e. Changed Descriptions	20	q. Missed start or finish	103
f. Changed Calendars	0	r. Started, OD = RD	14
g. Original Duration Changes	6	s. Dangling Relationships	21
h. Added Relationships	46	t. Physical % ≠ RD %	127
i. Deleted Relationships	61	u. Long duration activities	180
j. Relationship/Lag Changes	25	v. High Float	142
k. Budgeted Cost Changes	2	w. Active with 0 or 1 day RD	15
l. Missing Activity Codes	0	x. Negative Lag (Leads)	0

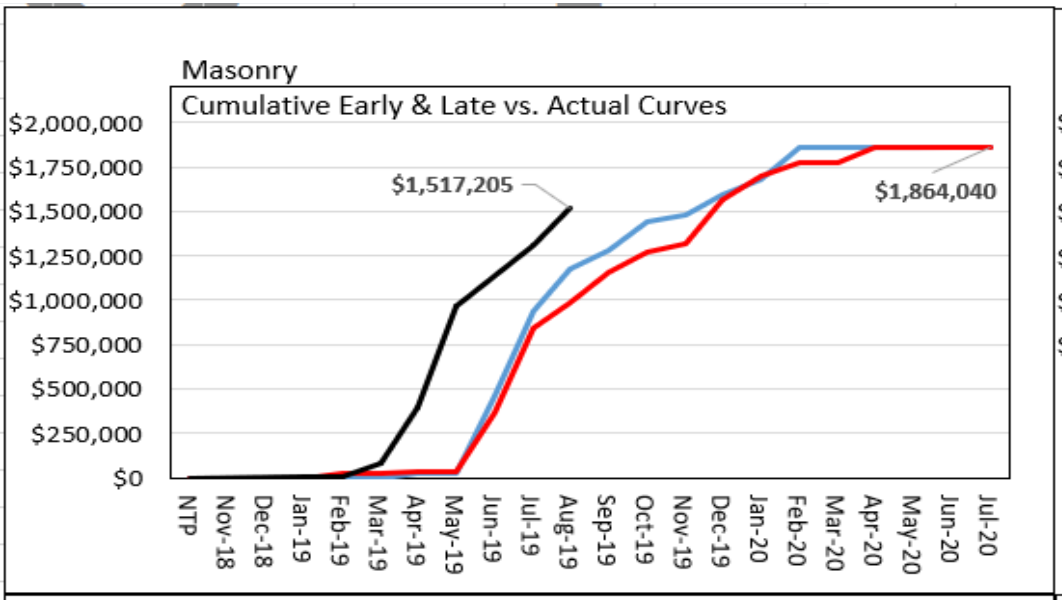
Phases of a project





Overly Complicated




Masonry
Cumulative Early & Late vs. Actual Curves
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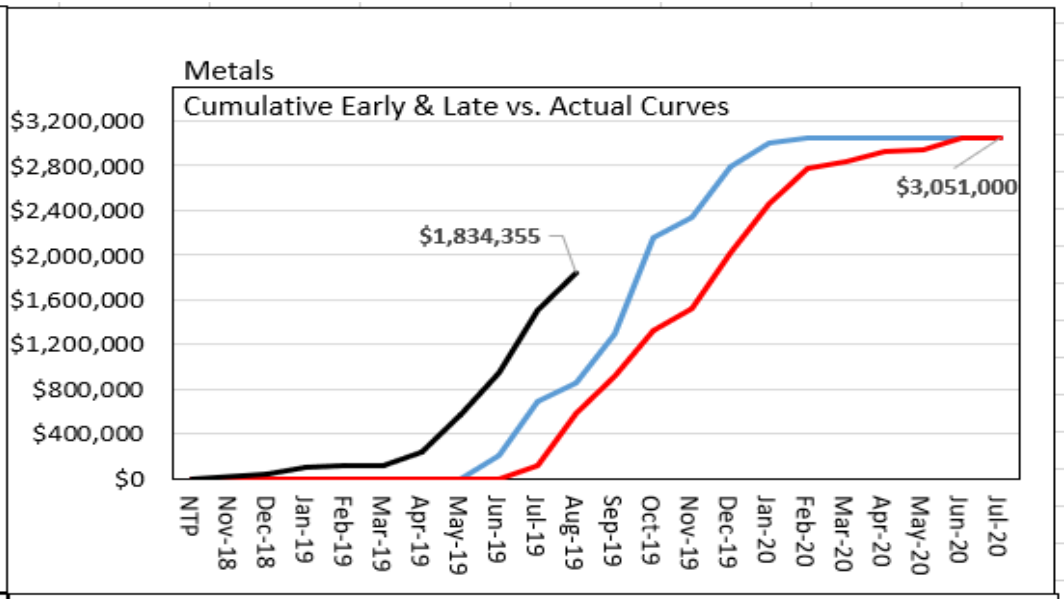
Metals
Cumulative Early & Late vs. Actual Curves
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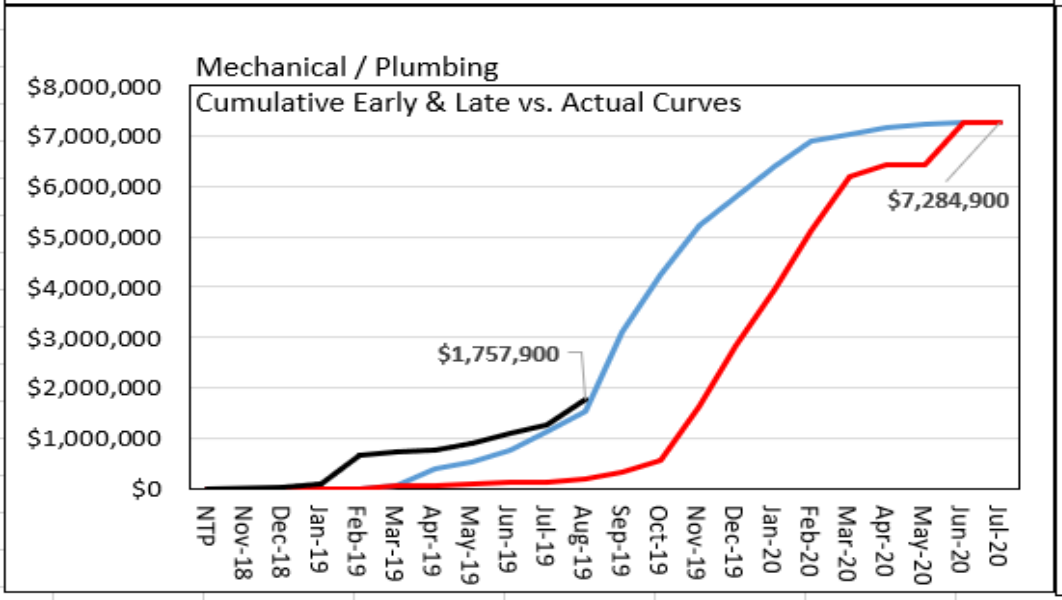
Mechanical / Plumbing
Cumulative Early & Late vs. Actual Curves
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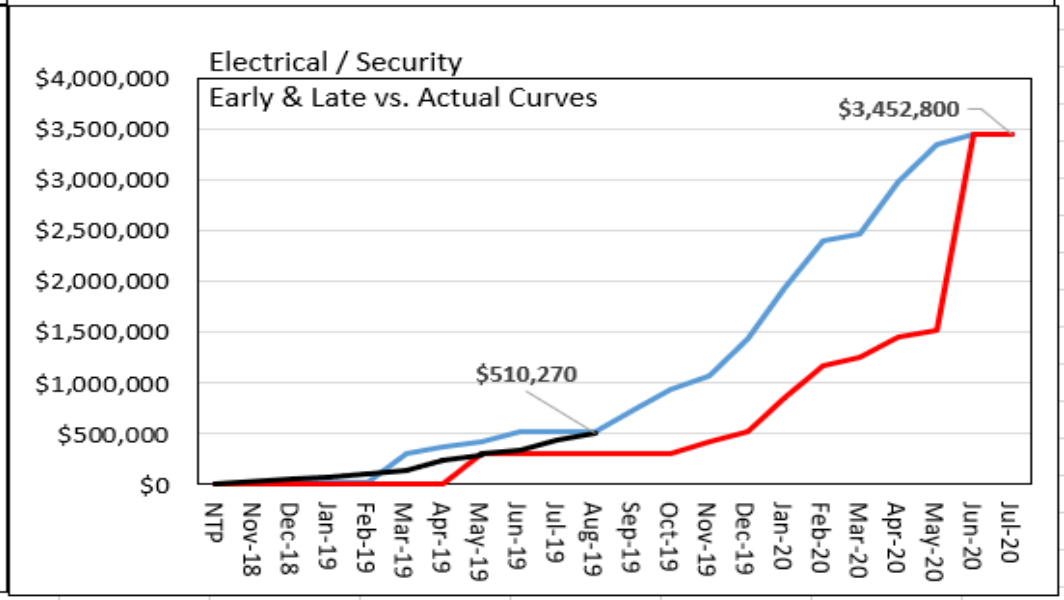
Electrical / Security
Early & Late vs. Actual Curves
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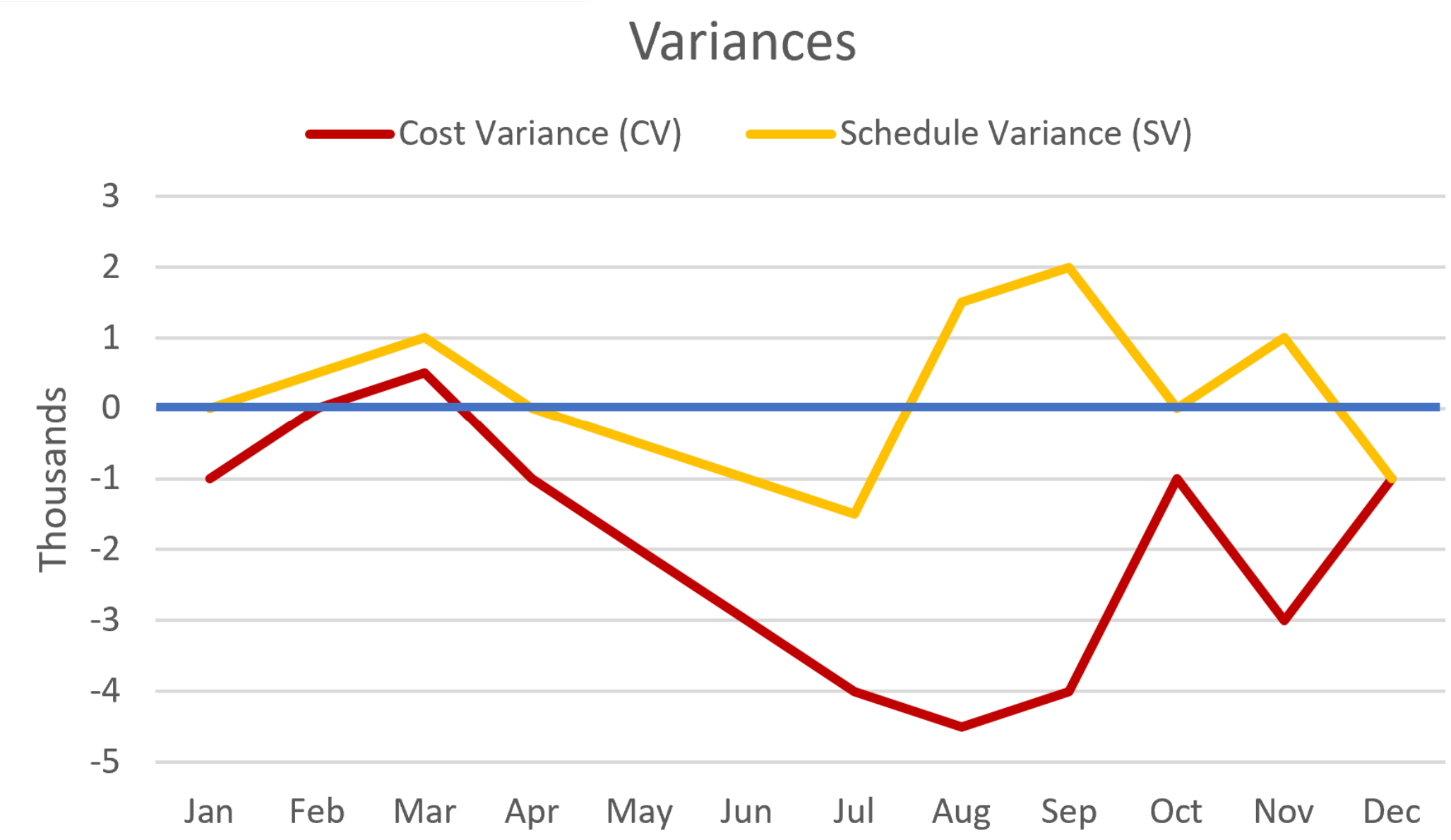
Variances
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Schedule Variance (SV)
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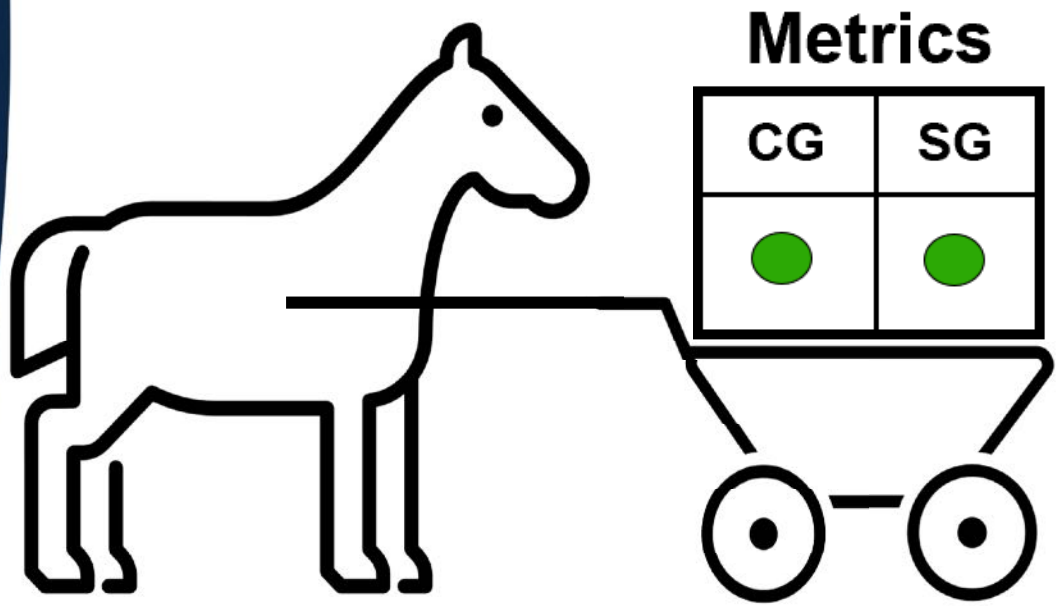
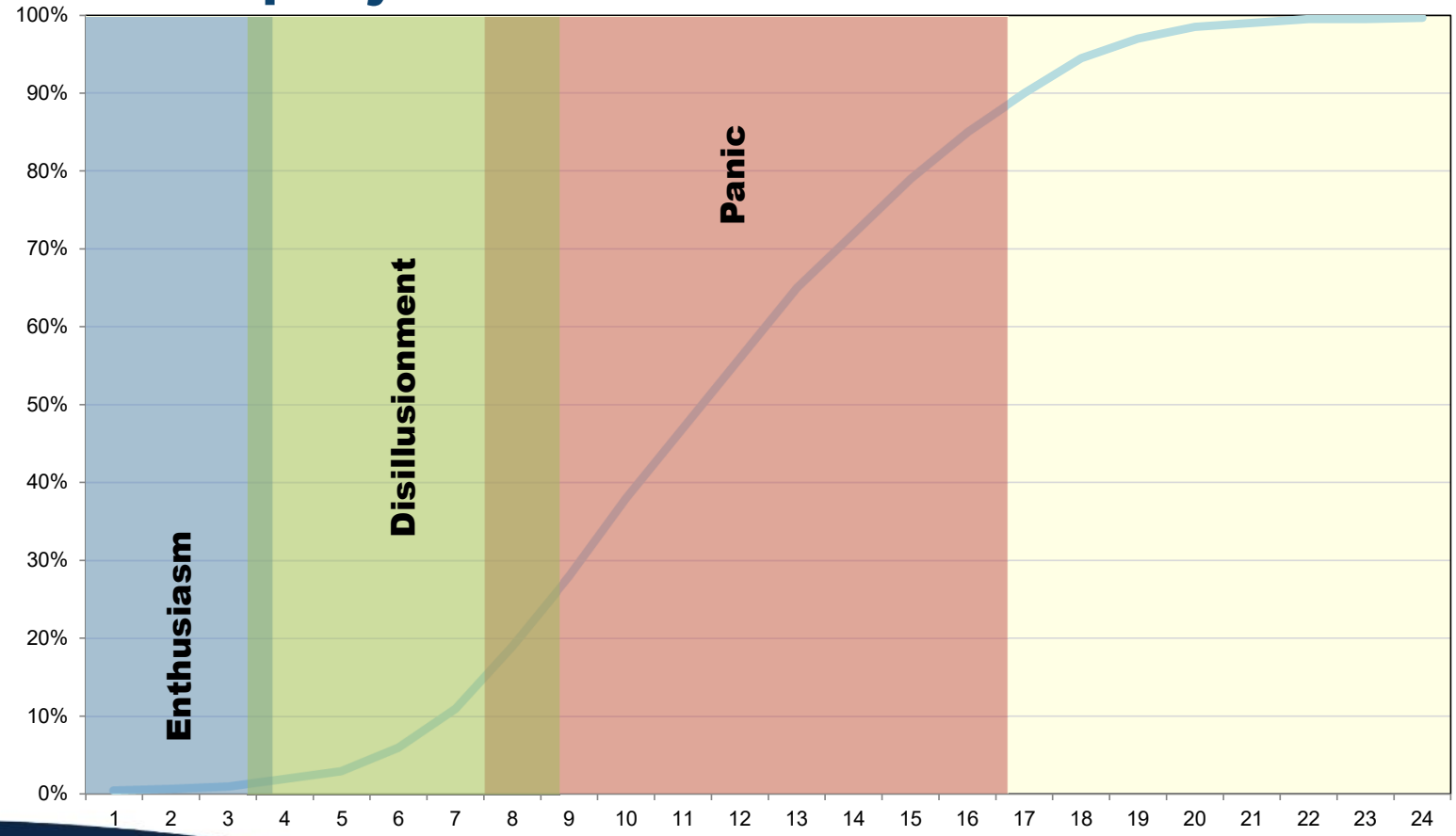
Go to **www.menti.com** and use the code **91 65 82 7**

What metrics are most important to you?

Metrics Management

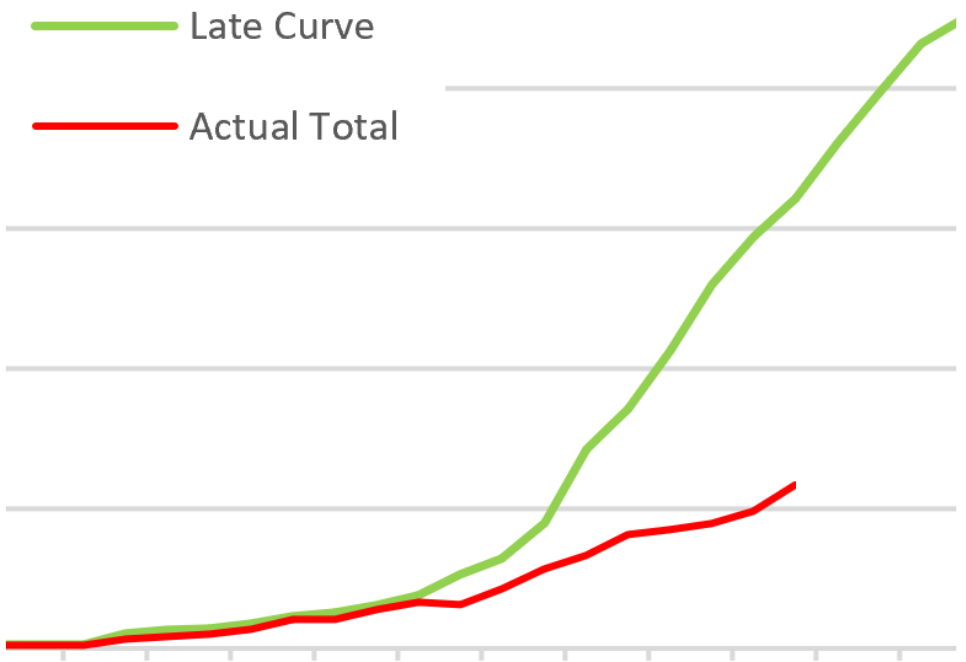


Phases of a project



Panic

- What are some reasons for slippage?



Go to **www.menti.com** and use the code **91 65 82 7**

What are some reasons for schedule slippage?

12

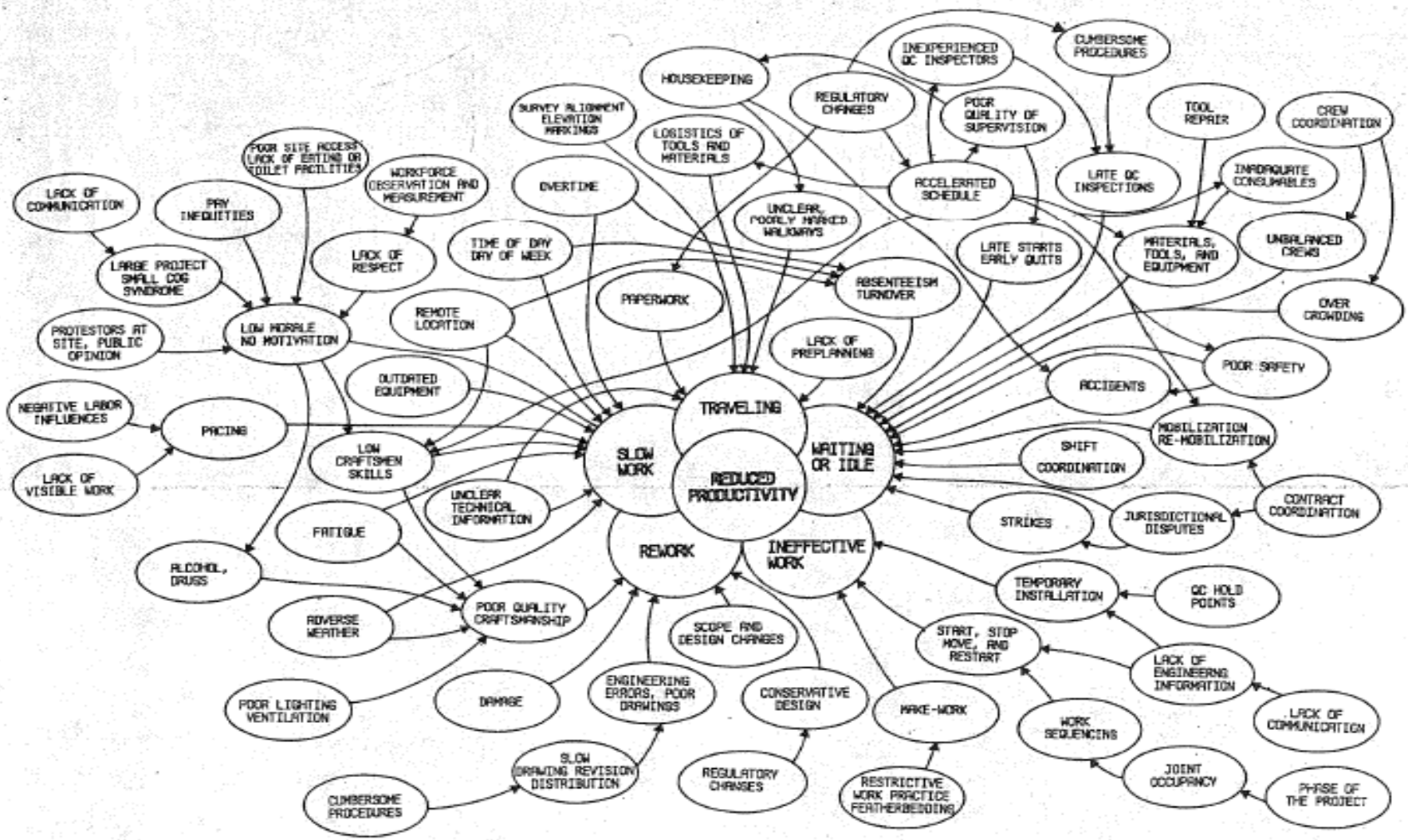


Figure 1. Craft Productivity Influence Diagram

1988 Project Management Journal article by G.L. Jansma. “The relationship between project manning levels and craft productivity for nuclear power construction”

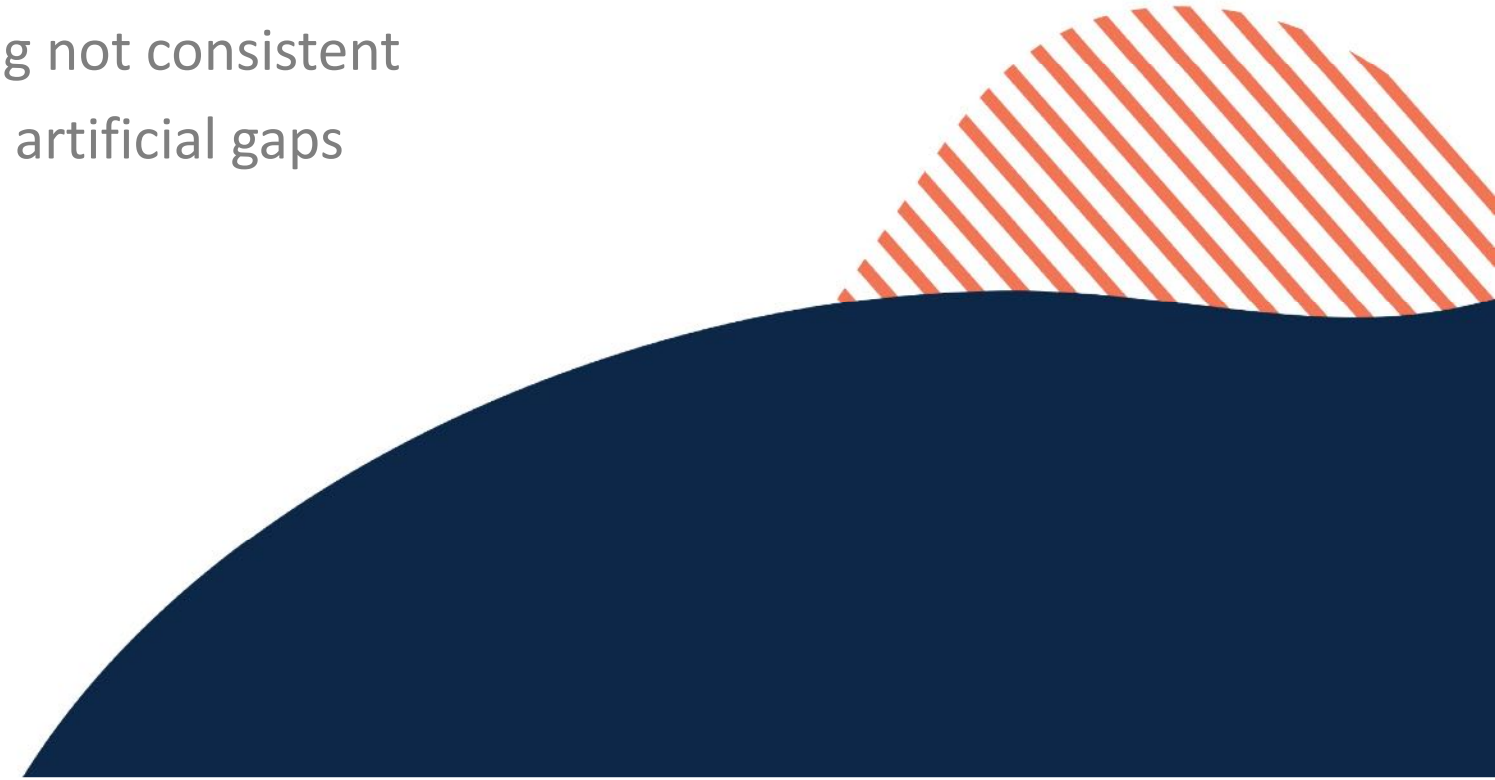

AVAILABLE
WORK
AVAILABLE
WORKERS

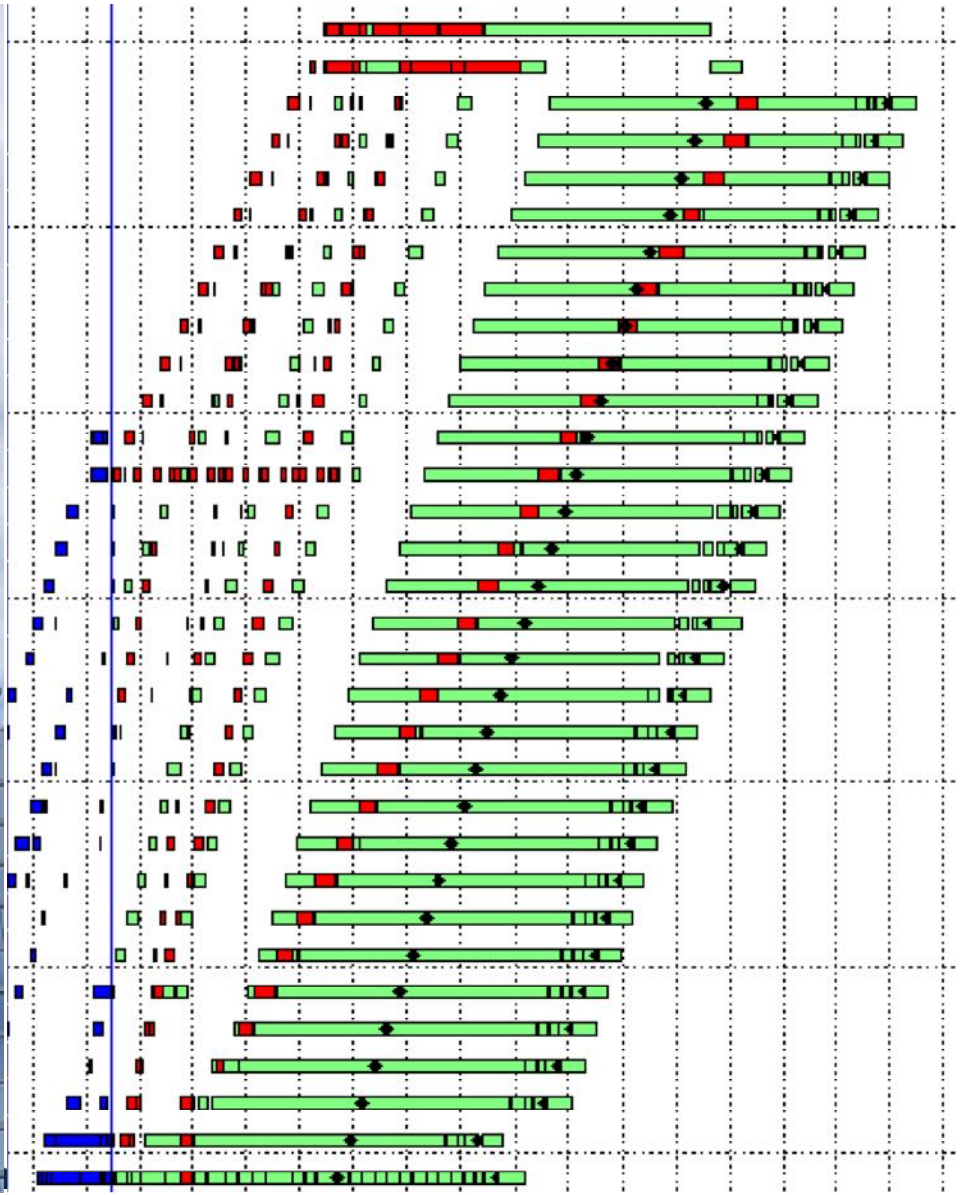
It doesn't matter how many "resources" you have.

If you don't know how to use them,
it will never be enough.

Out-of-Sequence Consequences

- Possible to have dangling relationships
- Come back work
- Flow resequencing not consistent
- Not fixing creates artificial gaps

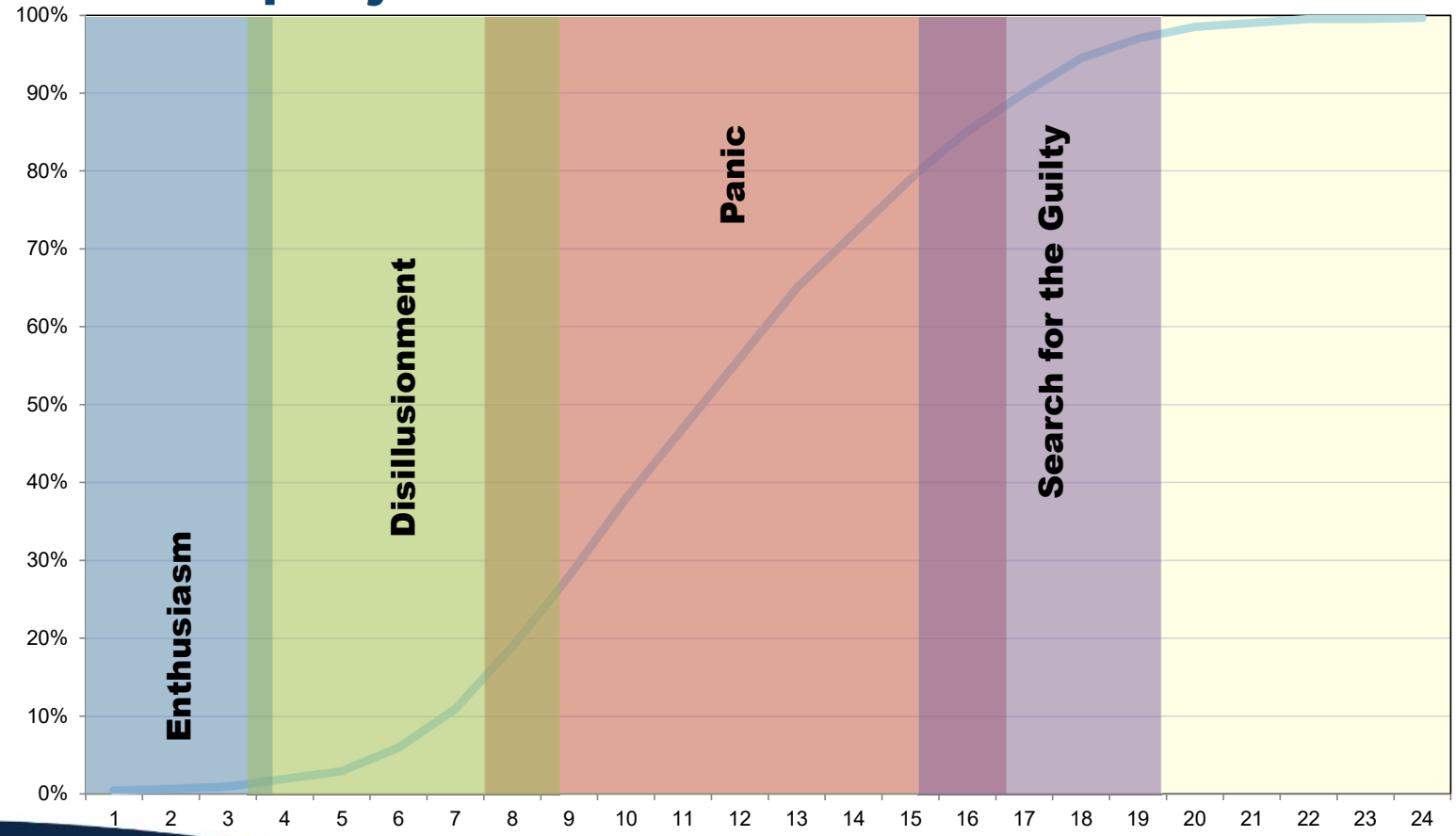




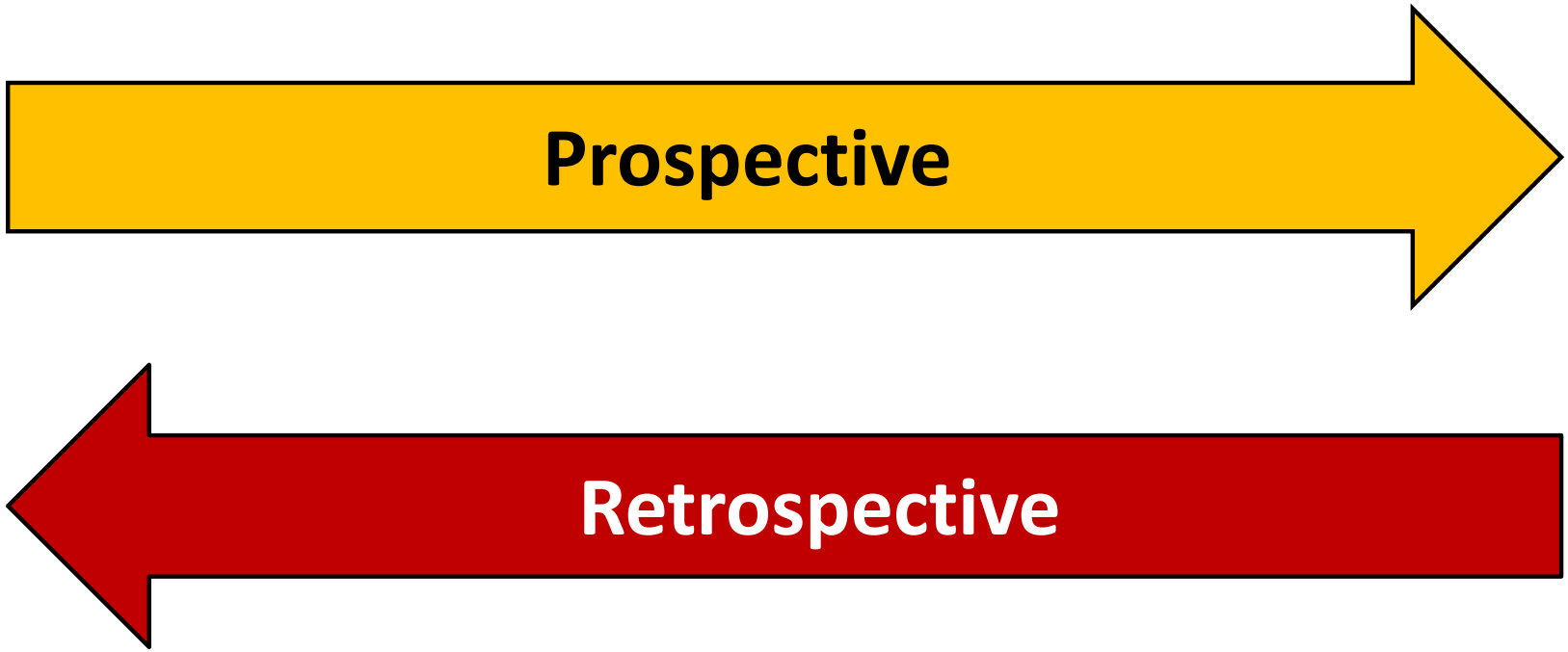
Other reasons for panic

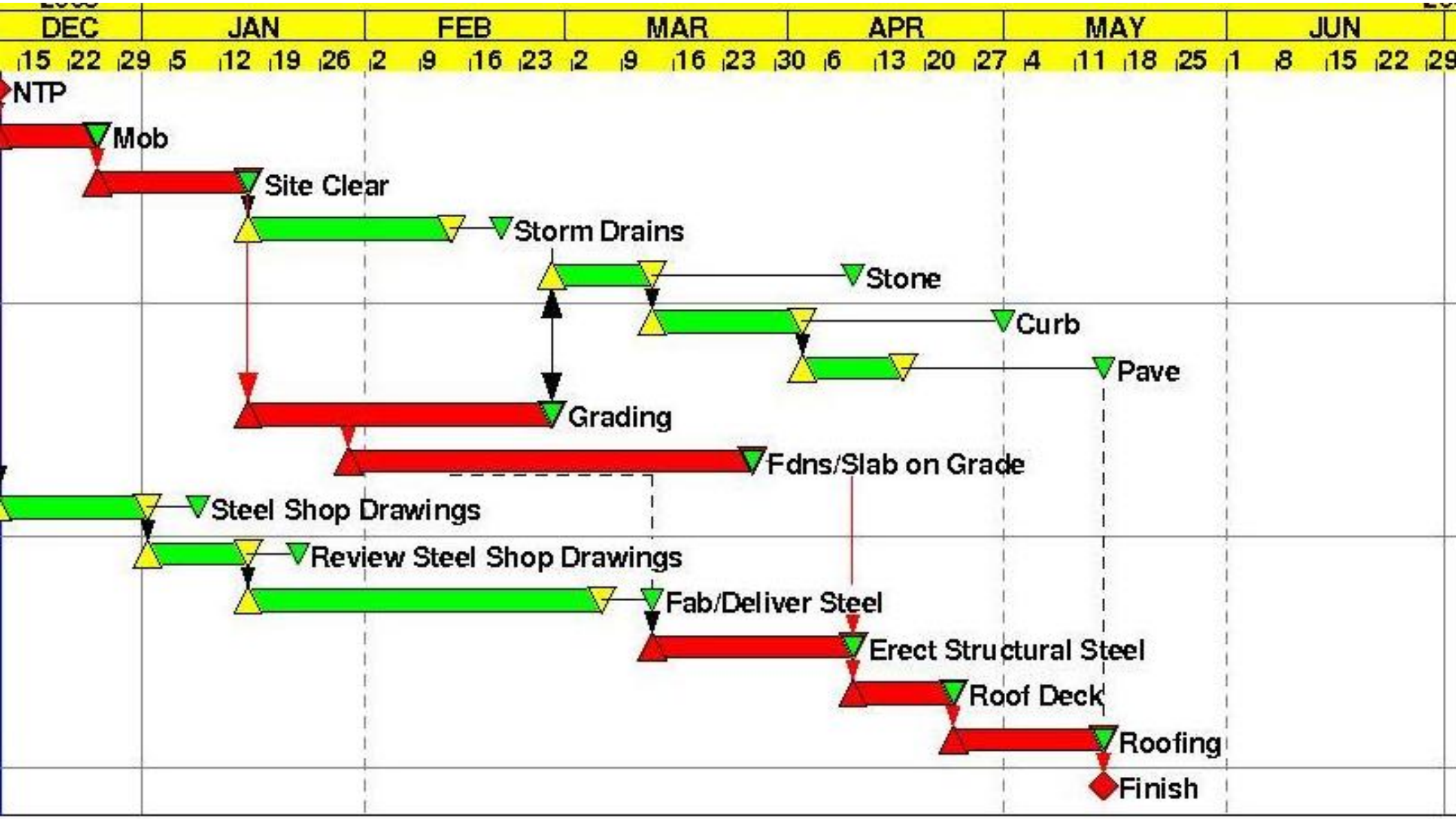
- Management corrective actions not included
- Stakeholders can be forced to work differently than originally planned
- Actual durations extend for months
- Multiple calendars can wreak havoc if not properly aligned

Phases of a project



Time Impact Analysis (TIA) Methods

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Erect Structural Steel
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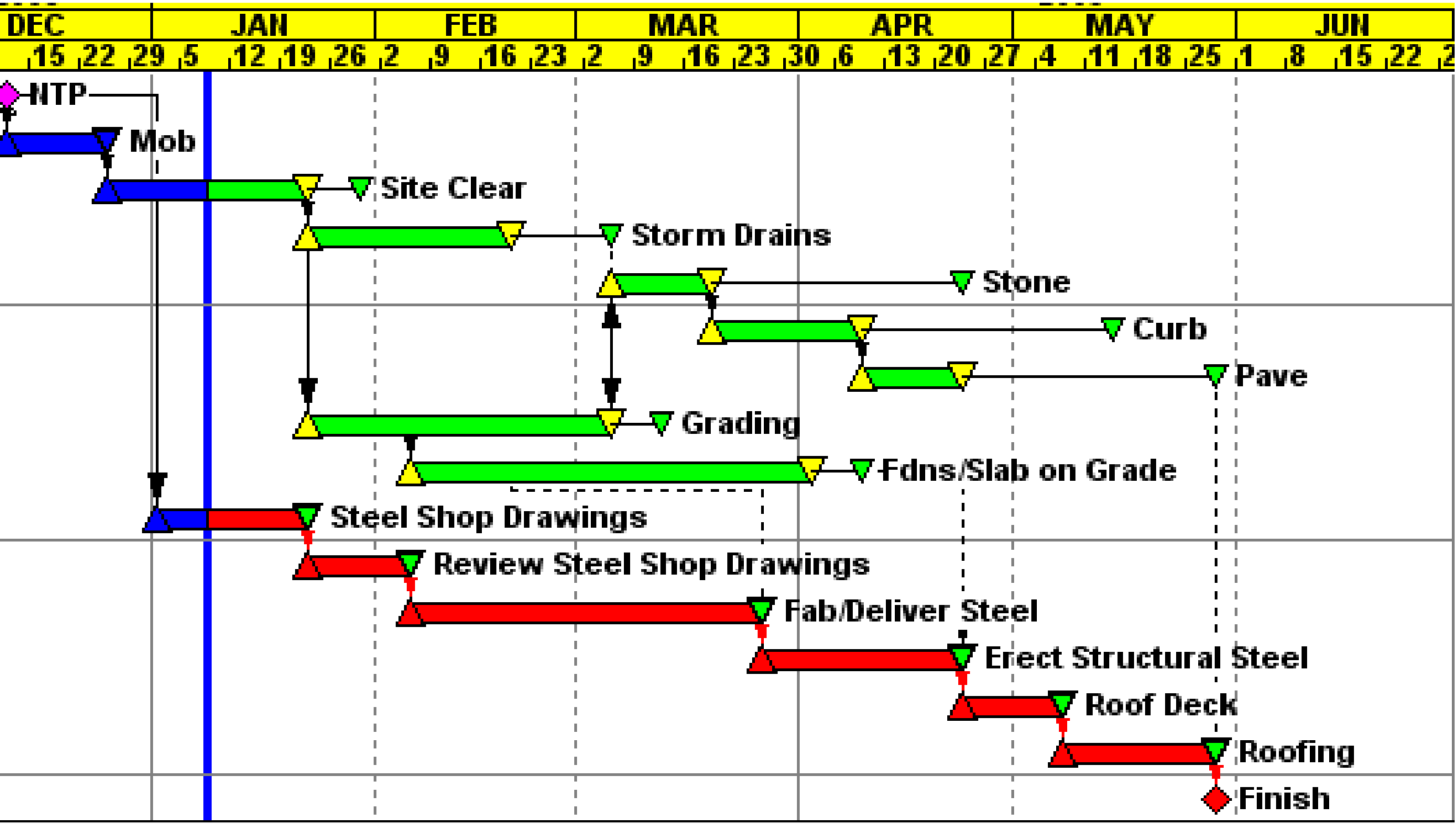
Roofing
Finish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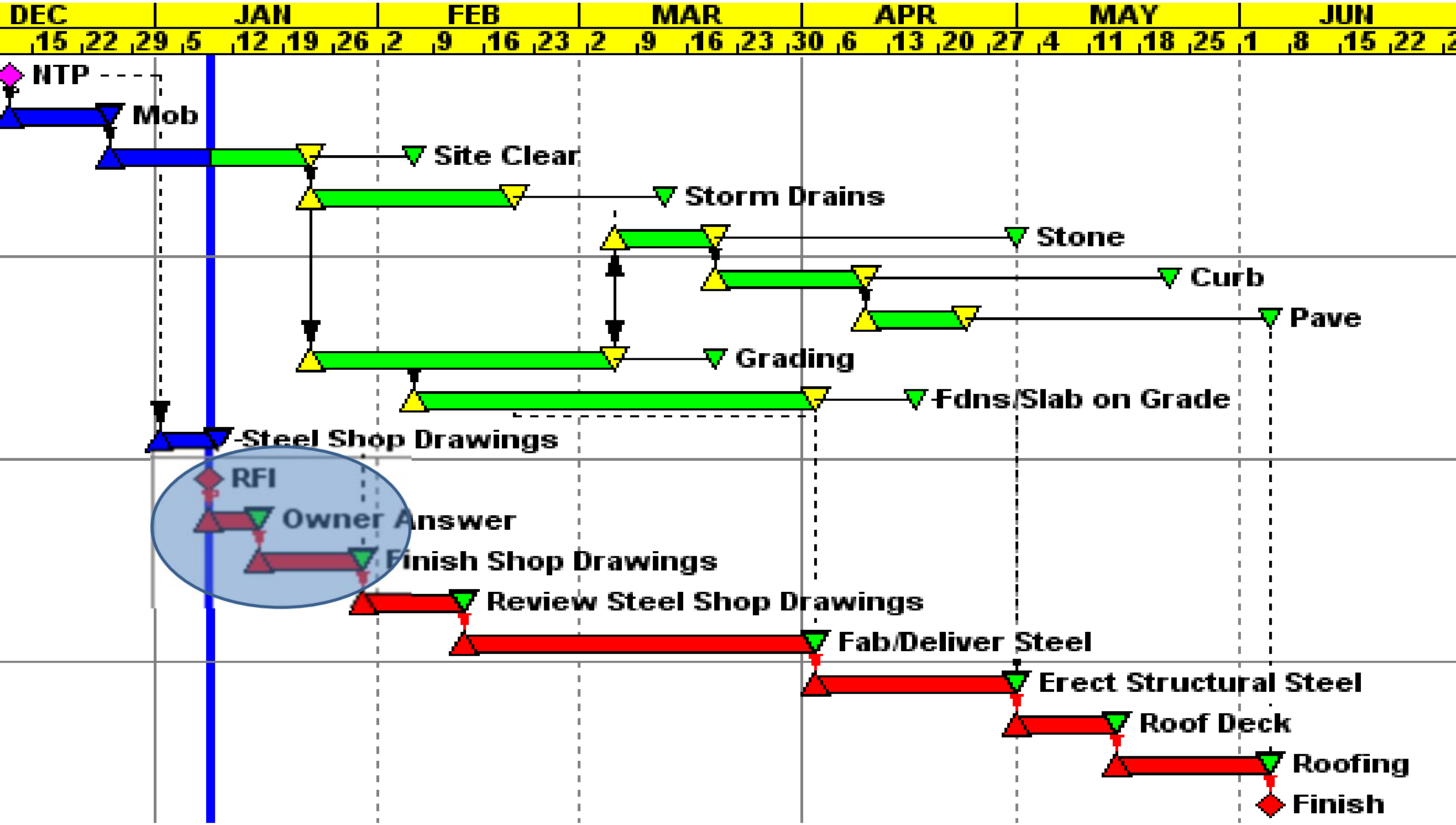
Fab/Deliver Steel
Erect Structural Steel
Roof Deck
Roofing
Finish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Fdns/Slab on Grade
Steel Shop Drawings
RFI
Owner Answer
Finish Shop Drawings
Review Steel Shop Drawings
Fab/Deliver Steel
Erect Structural Steel
Roof Deck
Roofing
Finish

AACEi Recommended Practice 29R-03

Taxonomy																
	1	RETROSPECTIVE														
	2	OBSERVATIONAL							MODELED							
	3	Static Logic			Dynamic Logic				Additive				Subtractive			
	4	3.1 Gross	3.2 Periodic		Contemporaneous Updates (3.3 As-Is or 3.4 Split)		3.5 Modified / Reconstructed Updates		3.6 Single Base[2]		3.7 Multi Base[1]		3.8 Single Simulation		3.9 Multi Simulation[1]	
	5		Fixed Periods	Variable Windows	All Periods	Grouped Periods	Fixed Periods	Variable Windows	Global Insertion	Stepped Insertion	Fixed Periods	Variable Windows or Grouped	Global Extraction	Stepped Extraction	Fixed Periods	Stepped Extraction
Common Names		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	Time Impact Analysis, Collapsed As-Built	Time Impact Analysis, Window Analysis, Collapsed As-Built

Footnotes

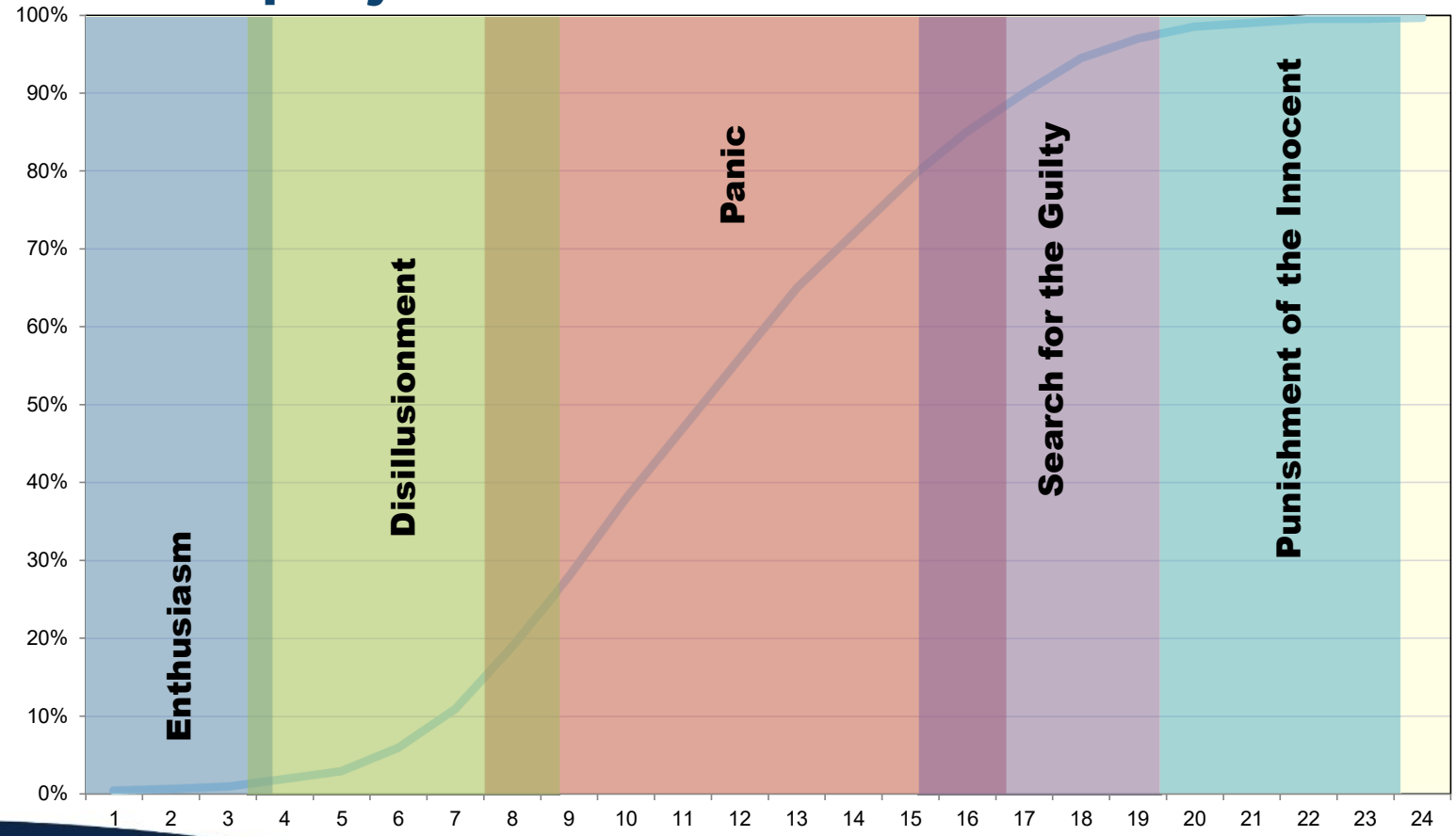
1. Contemporaneous or Modified / Reconstructed
2. The single base can be the original baseline or an update

Figure 1 – Nomenclature Correspondence (see enlarged size figure in Appendix A)

Retrospective TIA

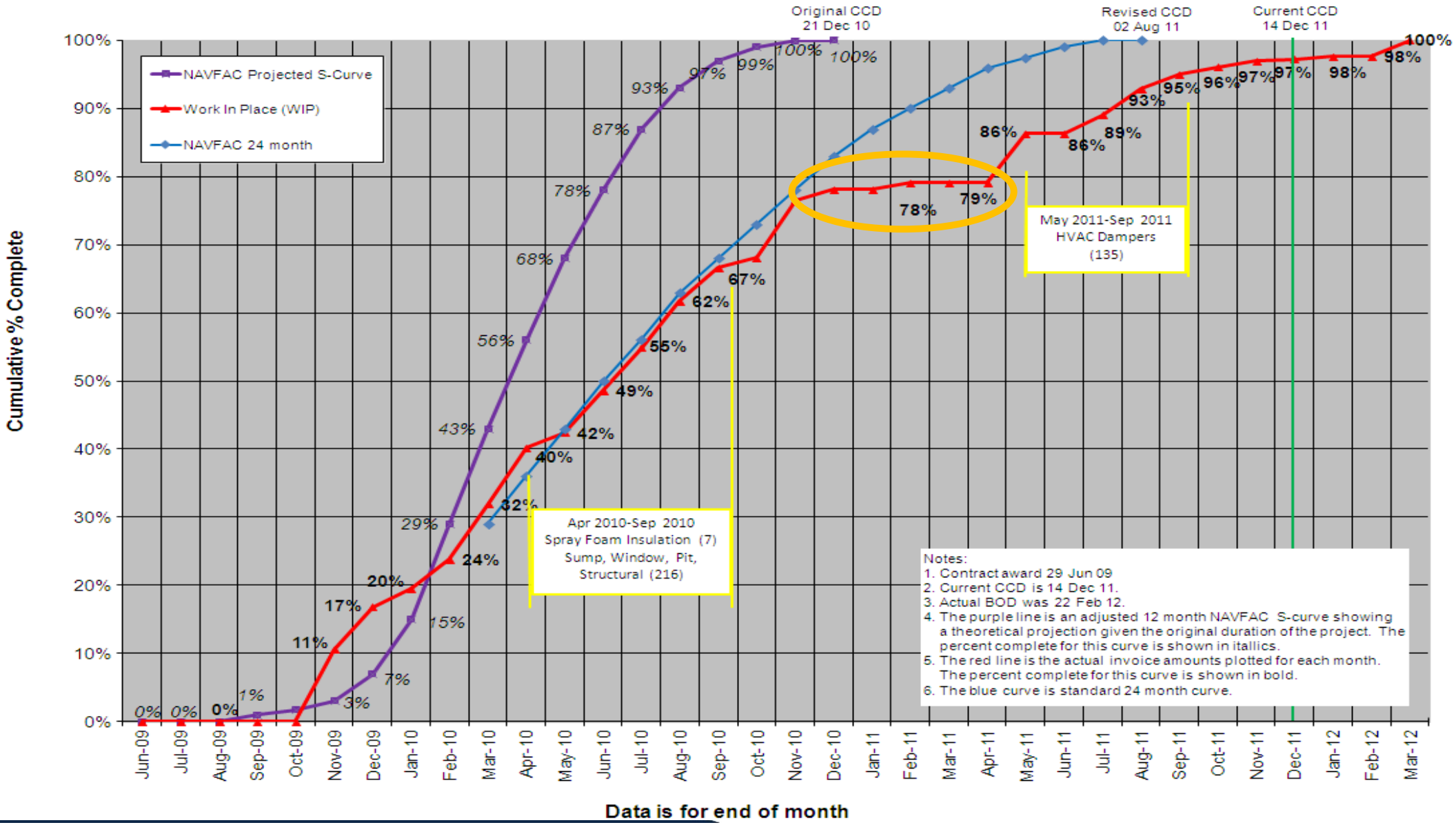
						Delay Responsibility	
Baseline/ Update	Impacted Schedule	Data Date (End of Week)	Predicted End Date (Weeks)	Change	Explanation	Contractor	Owner
X		0	22	--	Baseline schedule		
	X	4	22	0		0	0
X		4	24	2	Late start shop drawings	2	0
	X	8	25	1	Design change structural steel/Owner response	0	1
X		8	24	-1	Owner expedited review steel submittal	0	-1
	X	12	24	0		0	0

Phases of a project



Failure Reasons

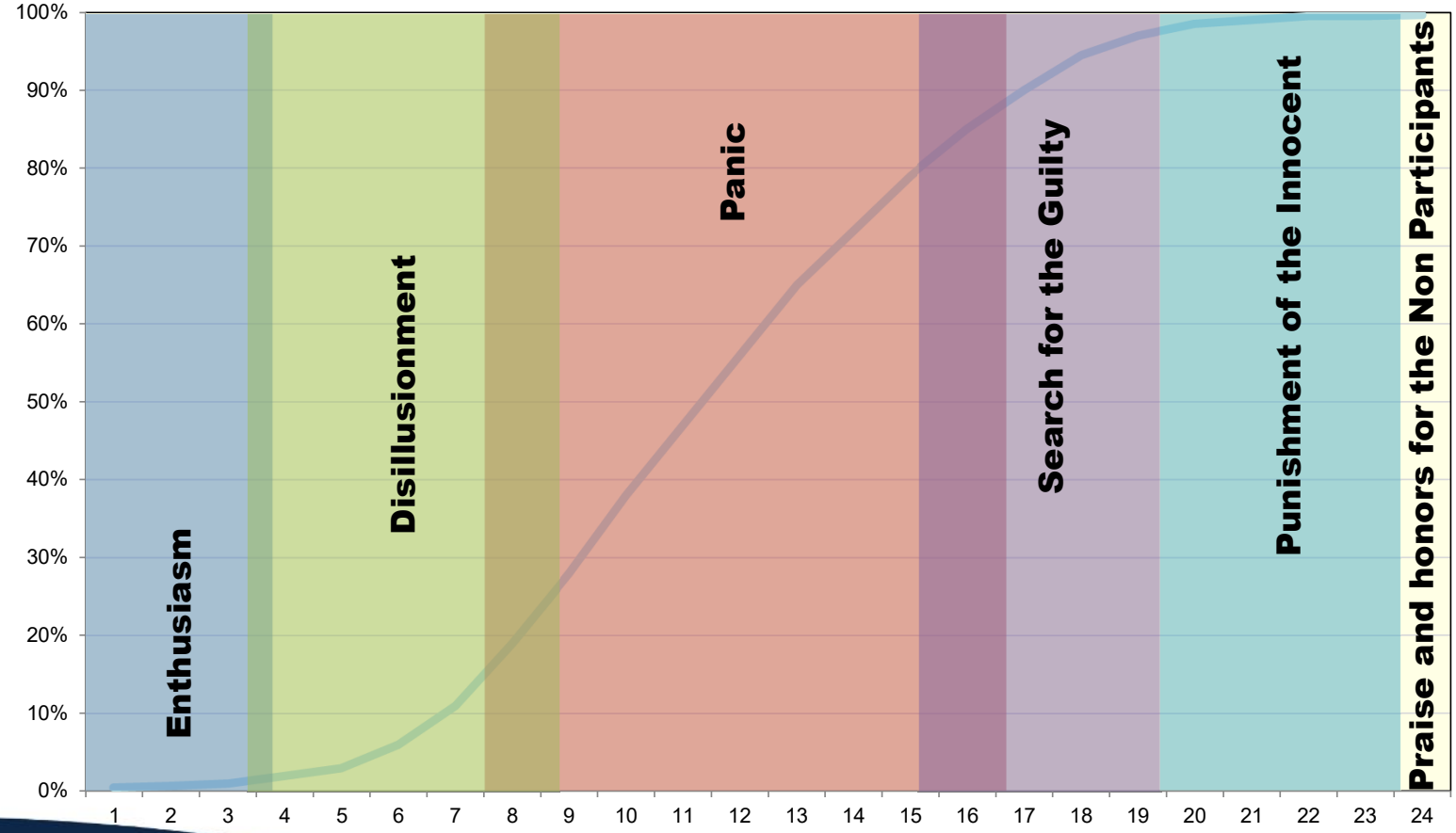
- Unclear or unrealistic expectations
- Lack of visibility
- Communication gaps
- Inadequate resource allocation
- Poor stakeholder involvement


Original CCD
21 Dec 10
Revised CCD
02 Aug 11
Current CCD
14 Dec 11
NAVFAC Projected S-Curve
Work In Place (WIP)
NAVFAC 24 month
Cumulative % Complete
Data is for end of month
May 2011-Sep 2011
HVAC Dampers
(135)
Apr 2010-Sep 2010
Spray Foam Insulation (7)
Sump, Window, Pit,
Structural (216)
Notes:
1. Contract award 29 Jun 09
2. Current CCD is 14 Dec 11.
3. Actual BOD was 22 Feb 12.
4. The purple line is an adjusted 12 month NAVFAC S-curve showing a theoretical projection given the original duration of the project. The percent complete for this curve is shown in itallics.
5. The red line is the actual invoice amounts plotted for each month. The percent complete for this curve is shown in bold.
6. The blue curve is standard 24 month curve.

Punishment of the innocent

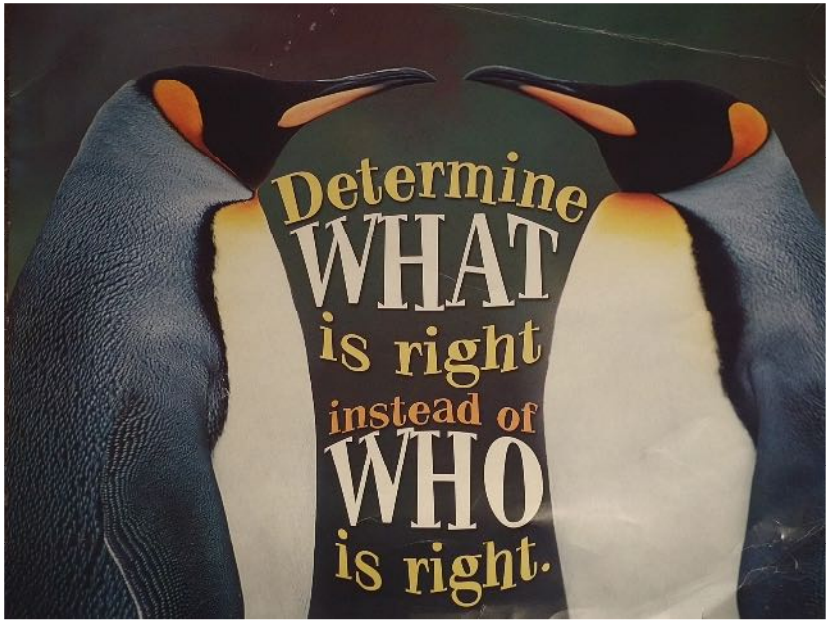
- Stay positive and professional
- Don’t retaliate
- Capture the lessons learned

Phases of a project



Summary

- Be proactive
- Read the contract
- Gain input from all shareholders
- Ask questions
- Open and honest communication



THANK YOU FOR YOUR TIME!

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