Next Level Schedule Analytics & Automation

Speaker Name

- Speaker bio:
  - SmartPM Technologies, Inc
  - Industrial Engineer
  - 20 yrs experience in construction schedule analysis
  - PSP, CCE Certified
  - Fun fact: I Love Soup!

Topic Outline

- Announcement
- History of Scheduling
- Current State of Construction Scheduling
- The Future of Scheduling
- How will we need to Evolve as Schedulers
- Man vs. Machine - Who will be better at what?
- Questions & Comments

Announcement – Schedule Quality Contest

Sign up today!

- $250 for the best overall base line schedule score

- $250 for the best cumulative schedule score with 10 updates

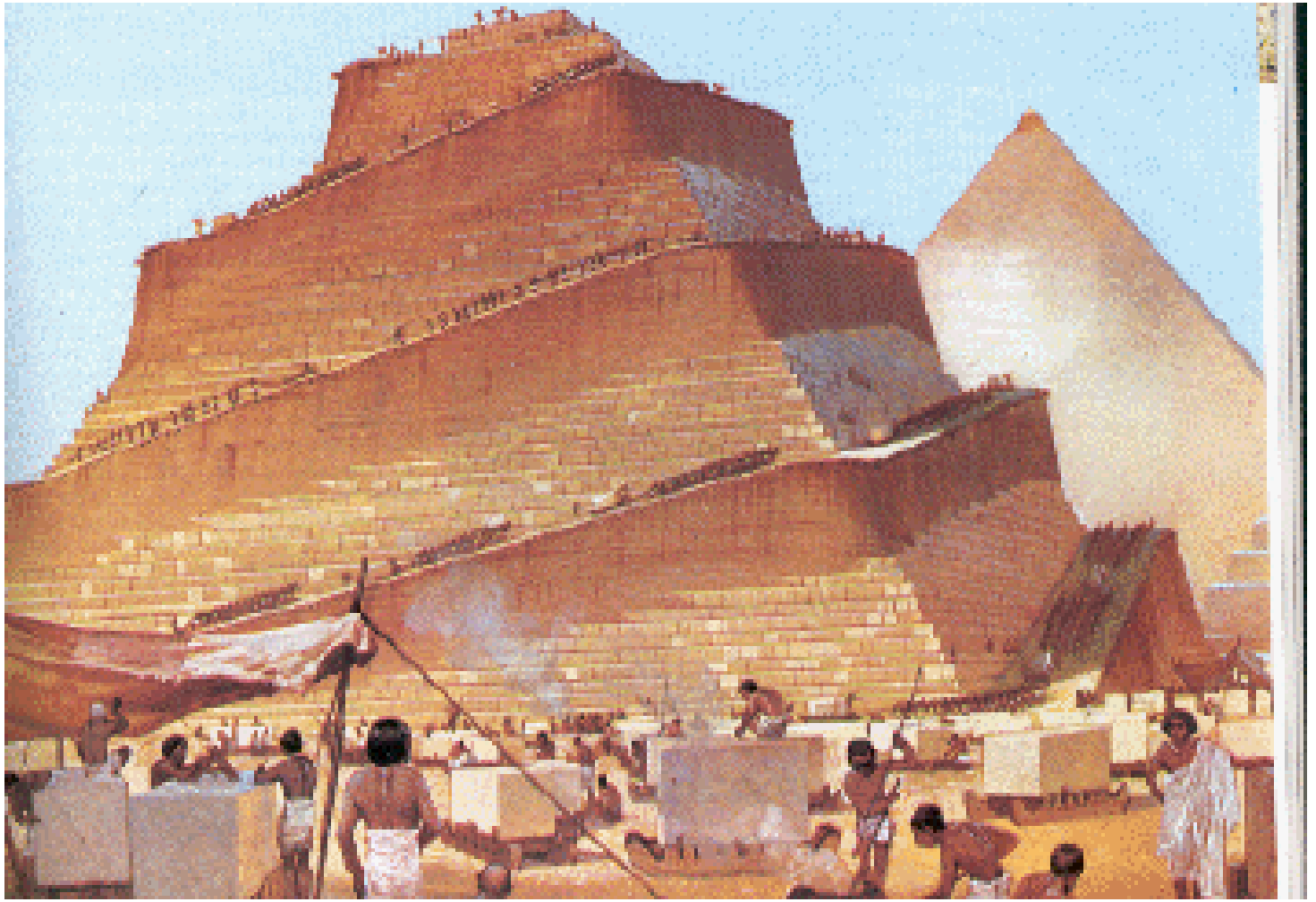
***Schedules graded using SmartPM's default DCMA based grading structure*

HINT – SmartPM's Quality Grading Criteria

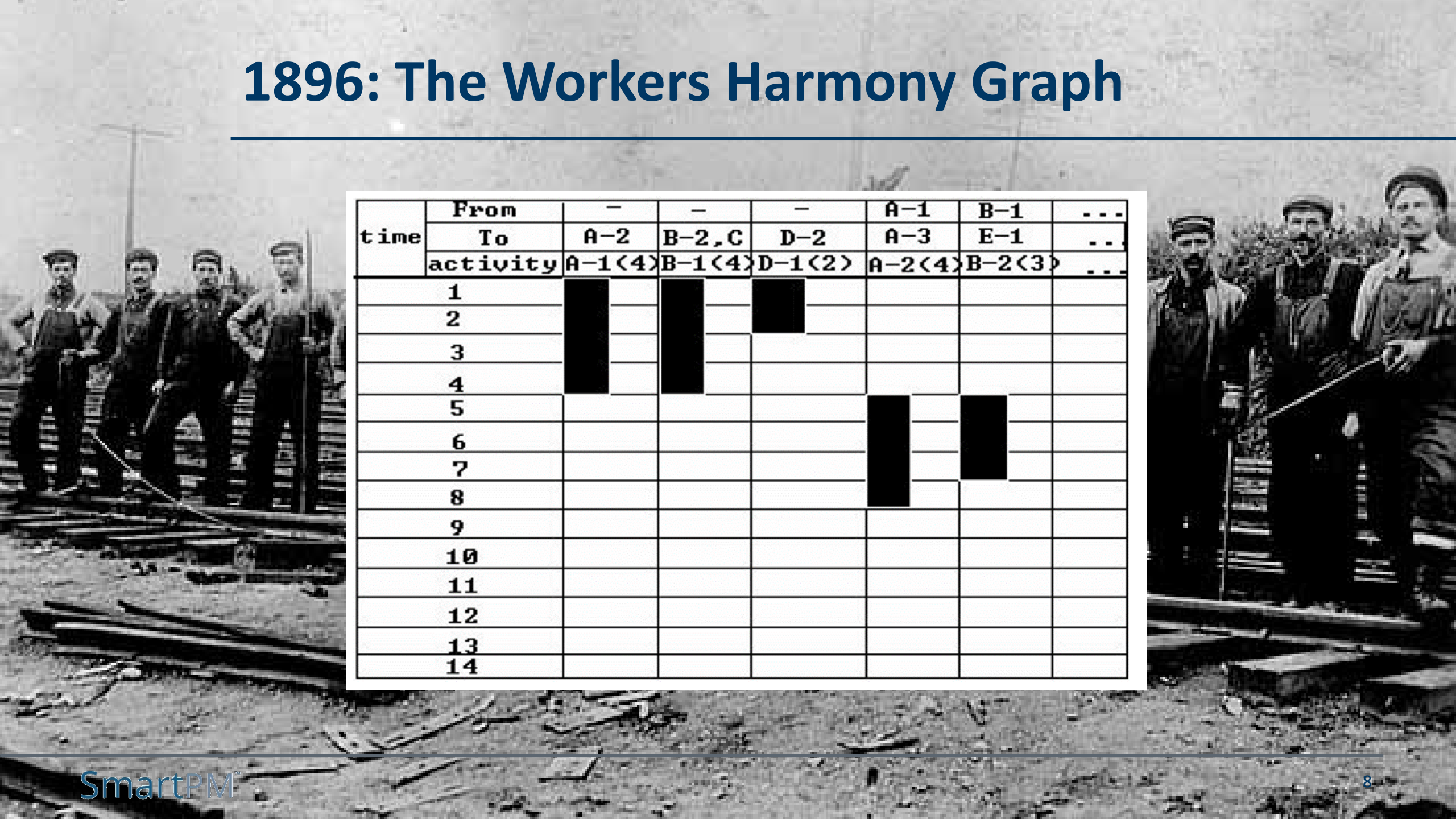
Metric	Criteria		
	Good Threshold	Acceptable	Unacceptable
Total Relationships	> = 1.5	> = 1.25	< 1.25
FS	> 90%	80% - 90%	< = 80%
SS	< = 5%	5% - 10%	> = 10%
FF	< = 5%	5% - 10%	> = 10%
SF	< = 0%	0% - 0.2%	> = 0.2%
Missing Logic	< = 2.5%	2.5% - 5%	> 5%
Negative Lag	< = 2.5%	2.5% - 5%	> 5%
Positive Lag	< = 2.5%	2.5% - 5%	> 5%
Constraints	< = 2.5%	2.5% - 5%	> 5%
High Float Activities (> 44 days)	< = 20%	20% - 33%	> 33%
High Duration Activities (> 44 days)	< = 2.5%	2.5% - 5%	> 5%
Critical Path %	10% - 20%	5% - 10% or 20% - 30%	< 5% or > 30%
Average Total Float	15 - 44 days	7.5 - 15 days	< 7.5 days or > = 44 days

THE HISTORY OF SCHEDULING

In the Beginning

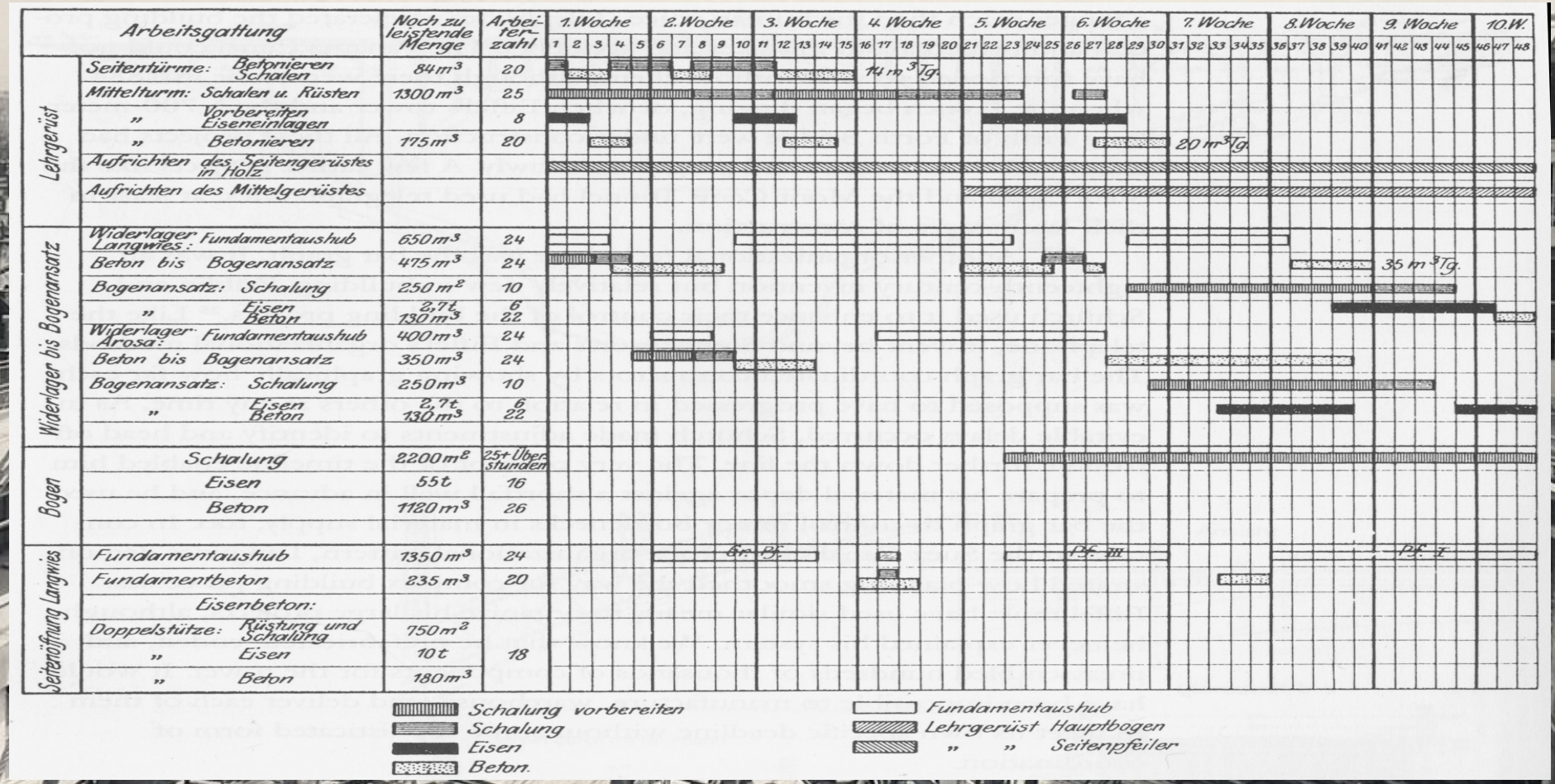


1896: The Workers Harmony Graph

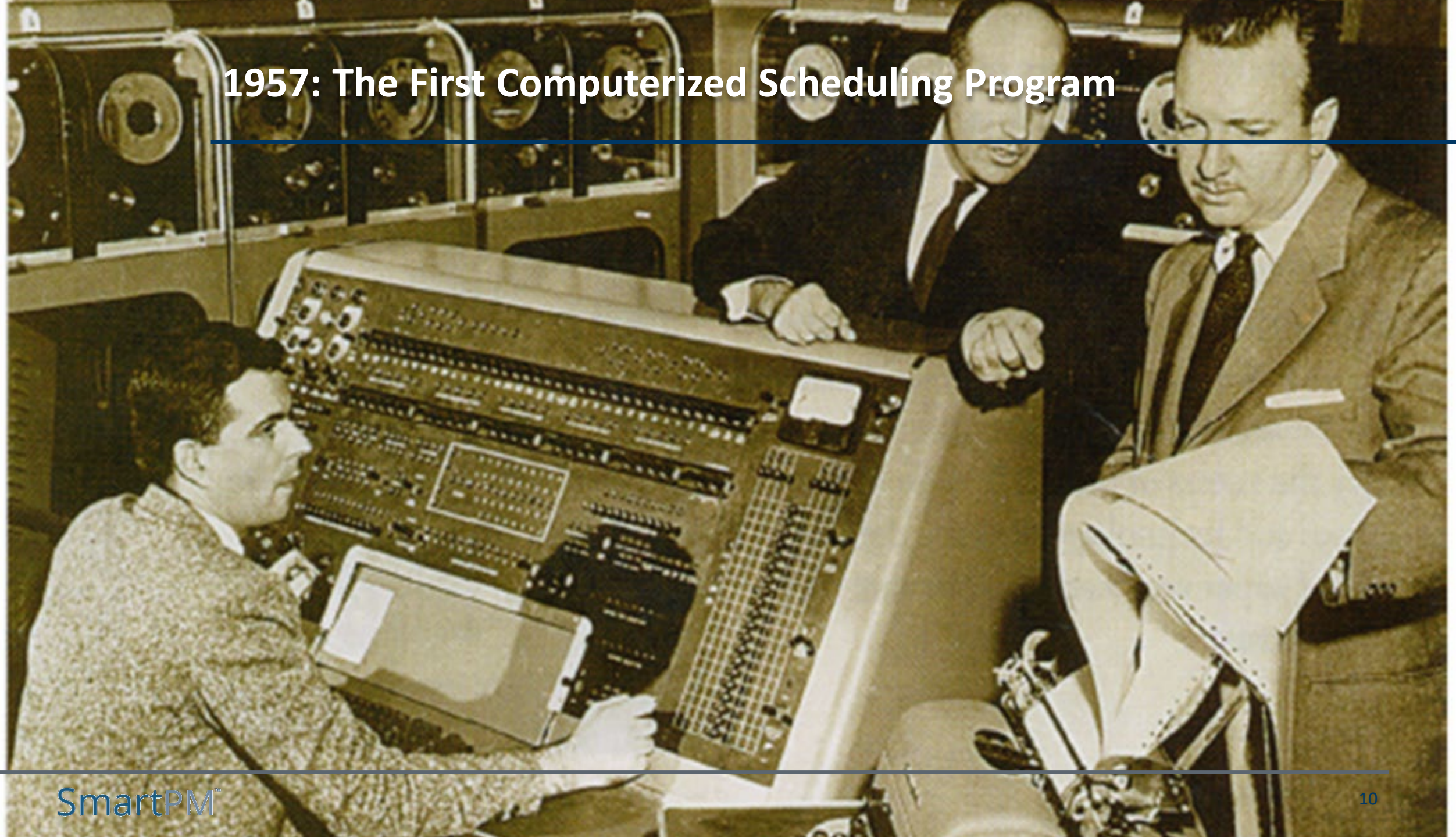


time	From	–	–	–	A–1	B–1	...
	To	A–2	B–2,C	D–2	A–3	E–1	...
	activity	A–1(4)	B–1(4)	D–1(2)	A–2(4)	B–2(3)	...
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

1912: Early Versions of a Graphic Bar Chart



1957: The First Computerized Scheduling Program



1983: Primavera Developed the First CPM Scheduling Program

THE CURRENT STATE OF SCHEDULING

The Schedule Analytics Age is Upon Us

Schedule Quality

Schedule Delay

Schedule Recovery

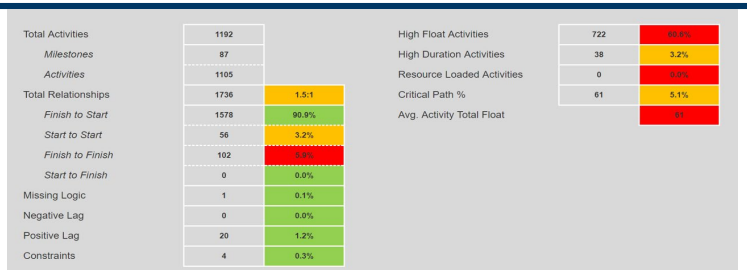
Schedule Risk

Schedule Feasibility

Schedule Predictive

Schedule Analysis Techniques and Technologies

Analyzing Schedule Quality



Total Activities	1192		High Float Activities	722	60.6%
Milestones	87		High Duration Activities	38	3.2%
Activities	1105		Resource Loaded Activities	0	0.0%
Total Relationships	1736	1.5:1	Critical Path %	61	5.1%
Finish to Start	1578	90.9%	Avg. Activity Total Float		61
Start to Start	56	3.2%			
Finish to Finish	102	5.9%			
Start to Finish	0	0.0%			
Missing Logic	1	0.1%			
Negative Lag	0	0.0%			
Positive Lag	20	1.2%			
Constraints	4	0.3%			

Preferred Technique: DCMA

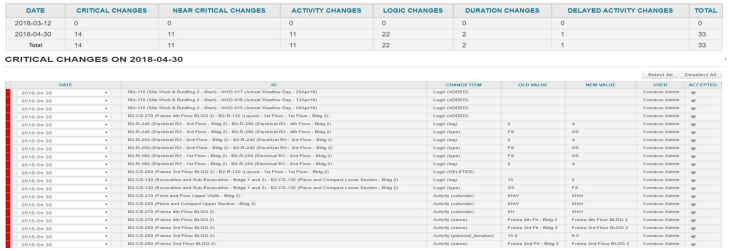
How Often: Every Schedule

Technologies: SmartPM™, Acumen Fuse, Schedule Analyzer, Steel Ray, Rubix, Schedule Cracker

Challenges: Most tools lack intelligence & require specialized Experience

Tips: Enforce Best Practices; Don’t accept bad schedules to avoid confrontation

Analyzing Recovery



DATE	CRITICAL CHANGES	NEAR CRITICAL CHANGES	ACTIVITY CHANGES	LOGIC CHANGES	DURATION CHANGES	DELAYED ACTIVITY CHANGES	TOTAL
2018-03-12	0	0	0	0	0	0	0
2018-04-30	14	11	11	22	2	1	33
Total	14	11	11	22	2	1	33

CRITICAL CHANGES ON 2018-04-30

Preferred Technique: Comparison, Half Step

How Often: Every Update

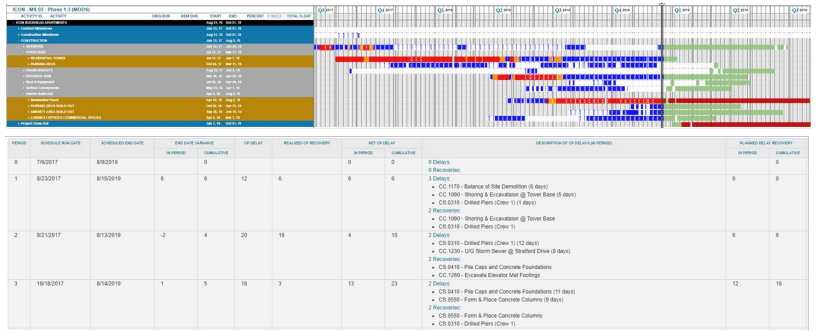
Technologies: SmartPM™, Claimdigger, Acumen Fuse, Schedule Analyzer, Rubix

Challenges: Manual Process is specialized & time consuming / Most tools are archaic, lack intelligence and require a specialist.

Tips: Focus on Critical and Near Critical Changes; Perform What – If Scenarios; Don’t fear the discussion about this

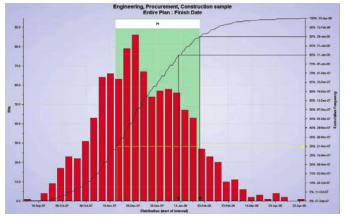
Schedule Analysis Techniques and Technologies

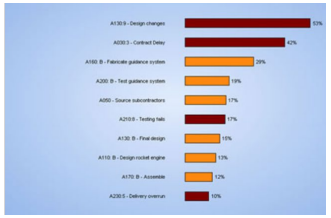
Analyzing Critical Path Delay



Preferred Technique:	Windows Analysis
How Often:	Every Update
Technologies:	SmartPM™
Challenges:	Manual Process is specialized, time consuming, subjective and arguable
Tips:	The more analysis the better; Document Assumptions; Objectivity Wins; Graphics need to Speak

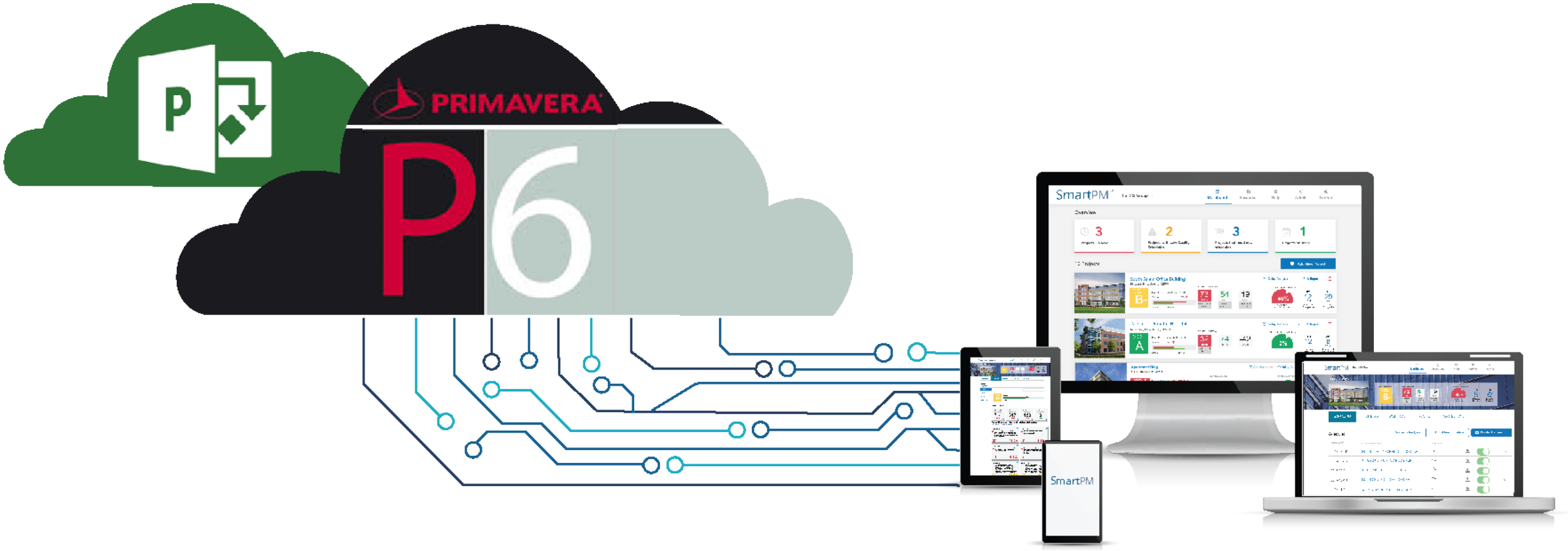
Analyzing Feasibility, Risk & Predictive Analytics





Preferred Technique:	Compression Analysis & Monte Carlo
How Often:	Every Update
Technologies:	Primavera Risk, SmartPM™
Challenges:	Manual Process is specialized & time consuming / Most tools lack intelligence and require a specialist
Tips:	Use Project Actuals to estimate Activity Distributions in Simulator; Use Critical Path Sensitivity data proactively; Reject overly compressed schedules. Be Objective.

Cloud Based Scheduling



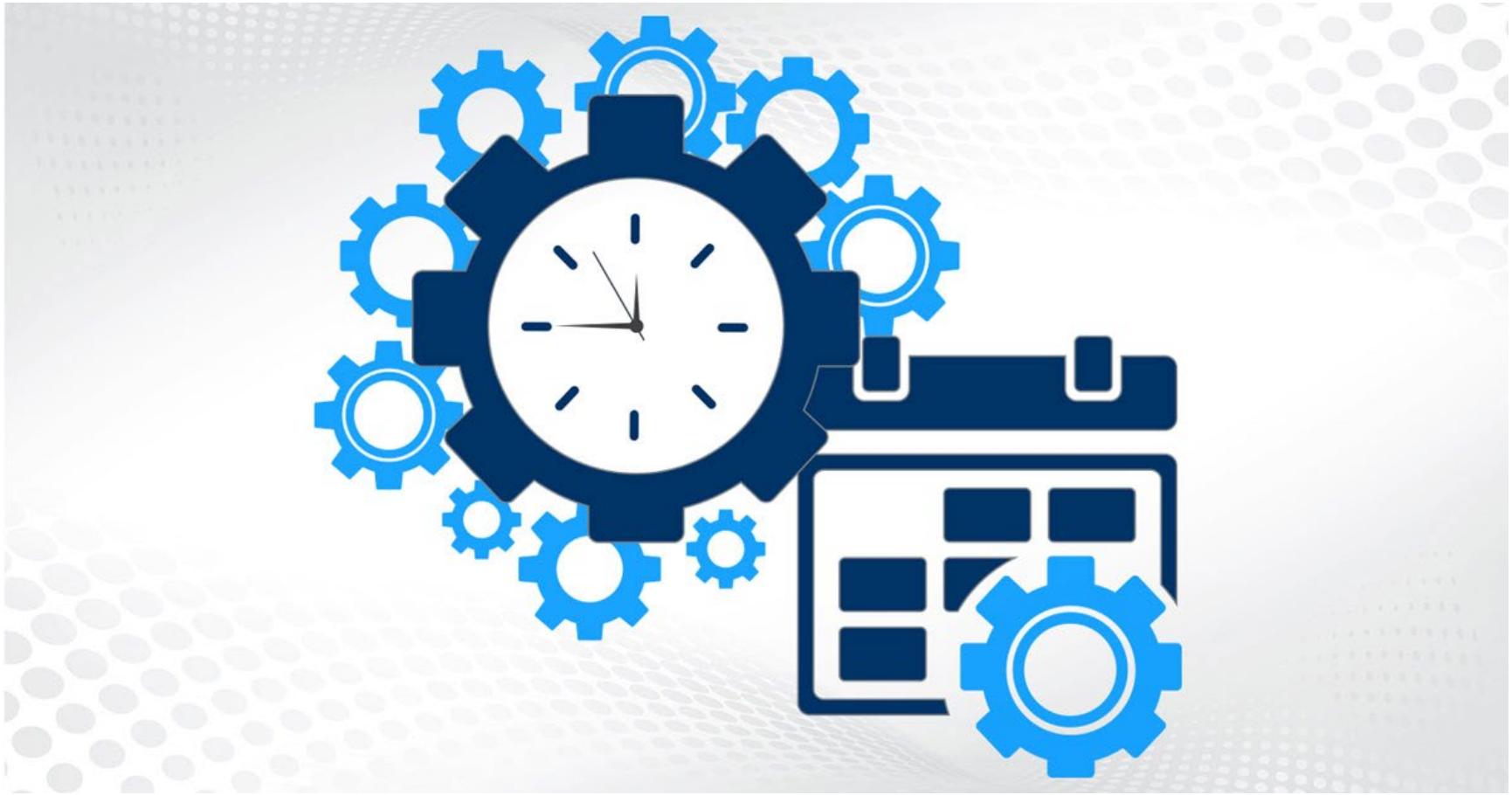
Complex Schedule Analytics Automation

THE FUTURE OF SCHEDULING

Mass Schedule Data Aggregation

Machine Learning & Artificial Intelligence

Scheduling Automation



THE EVOLUTION OF THE SCHEDULER

Preparing for the Future – Knowledge and Understanding

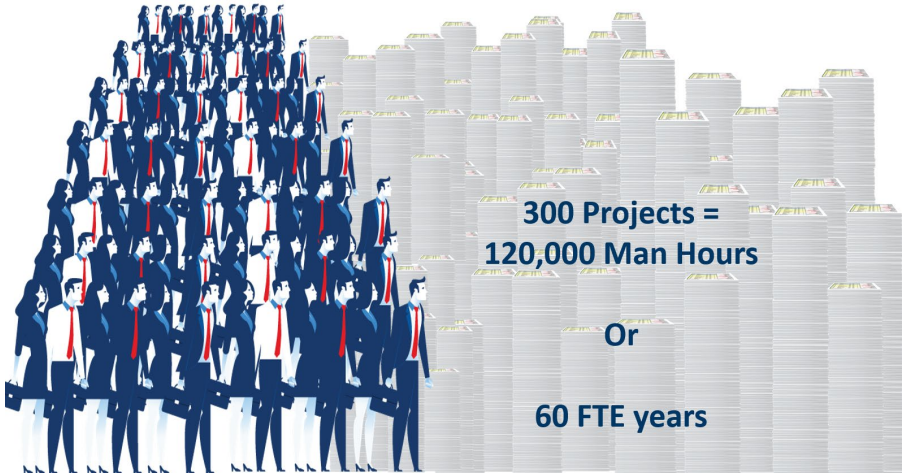
The Next Generation of Scheduling: Schedule-centric Analytics

Man vs Machine – Who will be better at what?

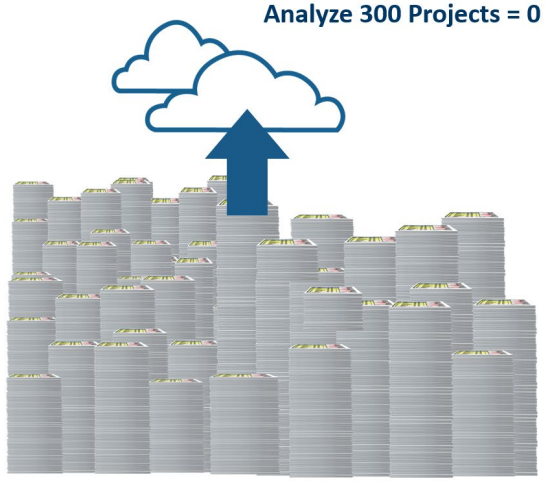
1 Project $25M = 400 Man Hours

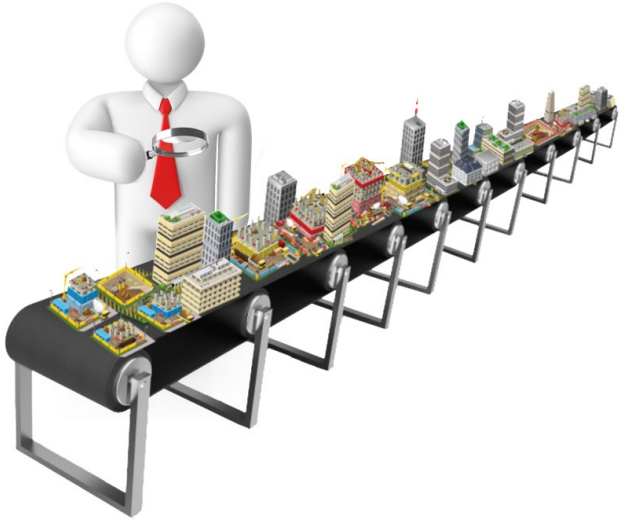
Schedule Quality	100 Hours
Delay Analysis	150 Hours
Risk Analytics	150 Hours

400 Hours



Analyze 300 Projects = 0 Manhours





My Prediction(s) – The industry will become Enlightened through Technology

1. The Schedule and the data behind it will be recognized for what it is: The most important data set in Construction.
2. Schedulers will be doing less busy work and more strategic work
3. There will be more Scheduling and Project Analyst roles, not less.

QUESTIONS/ COMMENTS?