

# SmartPM™

4-6 October, Nationals Park, Washington DC



What We Learned from Analyzing 18,000 Construction Schedules and How to Apply it to Bettering Project Controls

Presented by: Michael Pink, CEO of SmartPM Technologies

 **Project Controls**  
**EXPO**  
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# About the Presenter



Michael Pink

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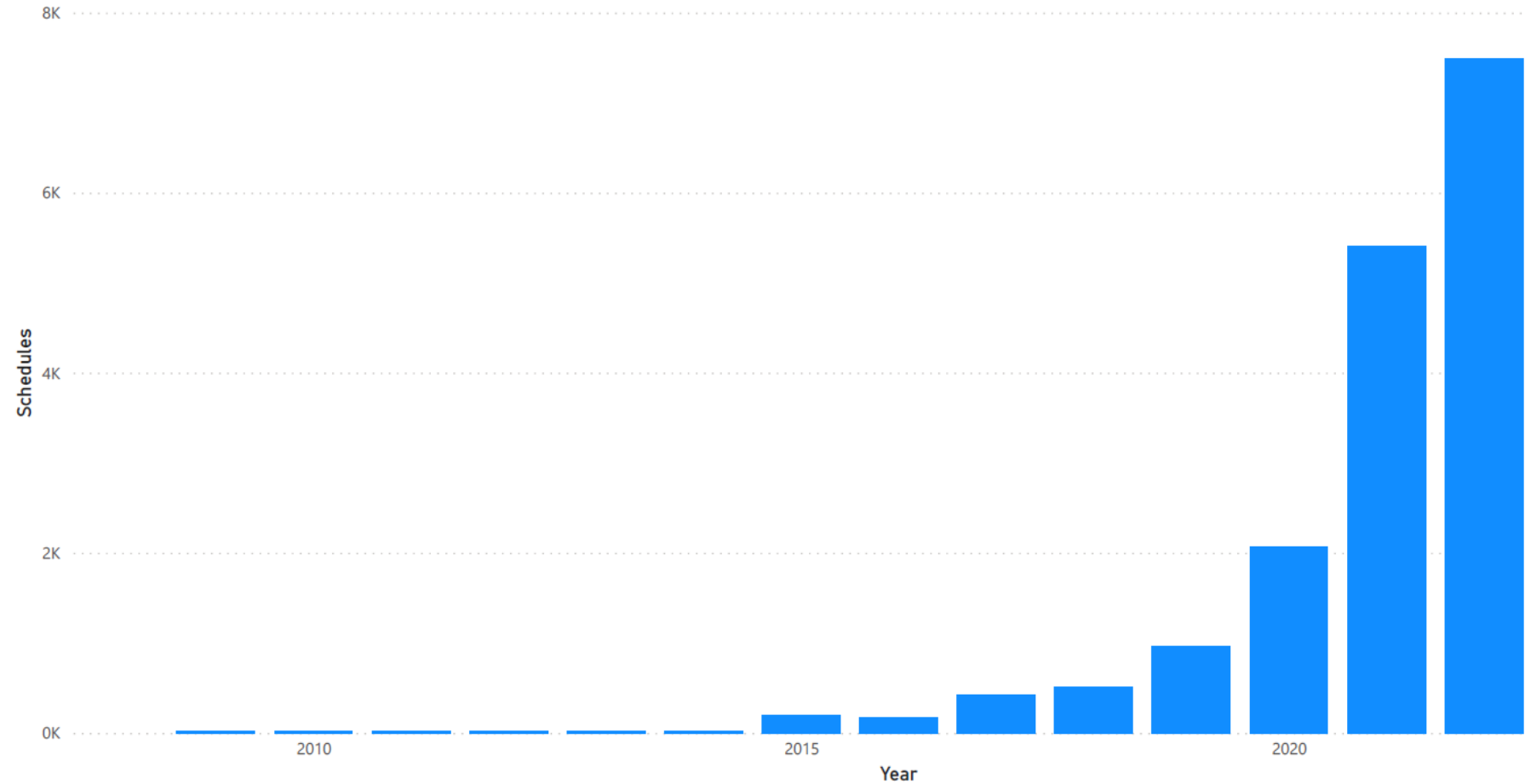
- Founder and CEO – SmartPM Technologies, Inc.
- 20 years as a Construction Schedule and Delay Analyst (Deloitte, KPMG, FTI)
- Certified as PSP, CCE through the AACE
- BS in Industrial Engineering from Georgia Tech
- MBA from NYU University



# SmartPM Database of Schedules (18K+ Schedules on 1,250 Projects)



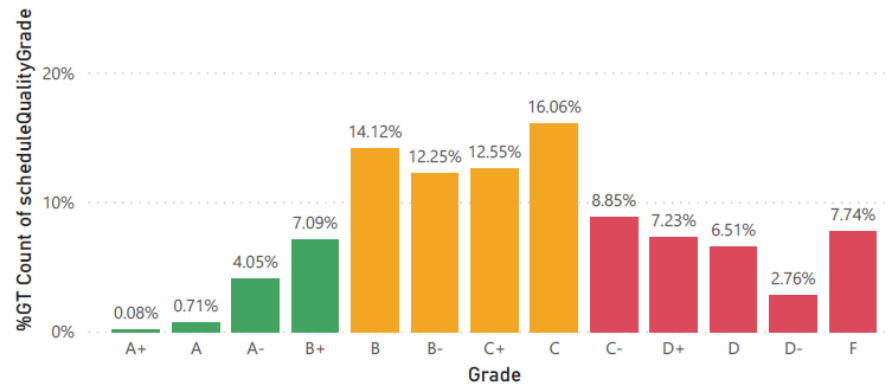
Schedules by Year



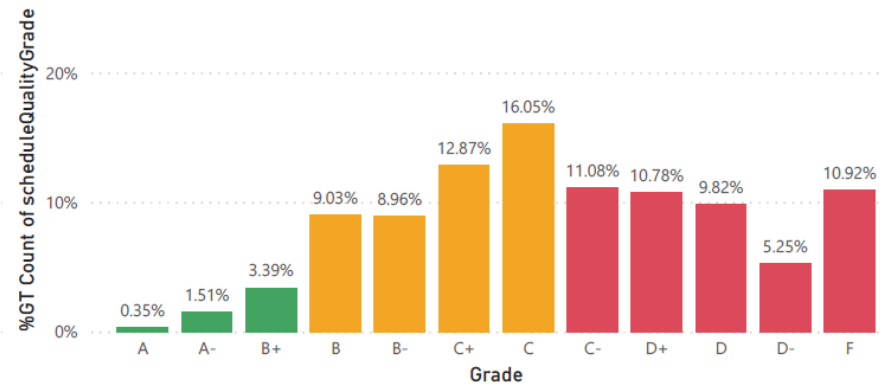
# Schedule Quality Metrics

(based on Standard DCMA Guidelines)

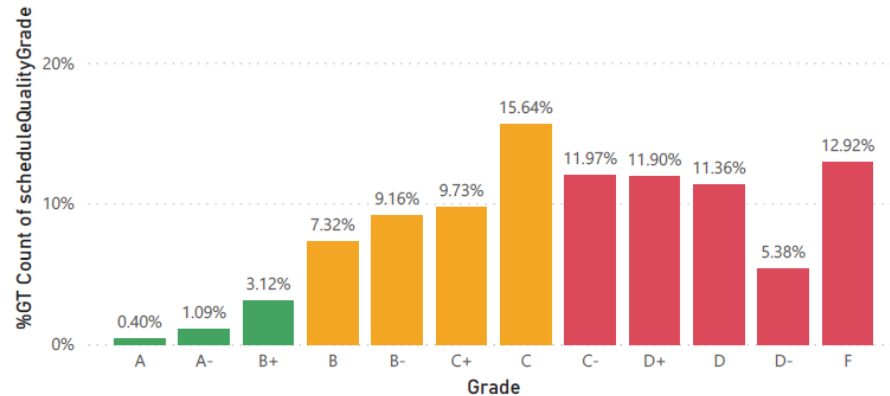
Schedule Quality Grade (0-25%)



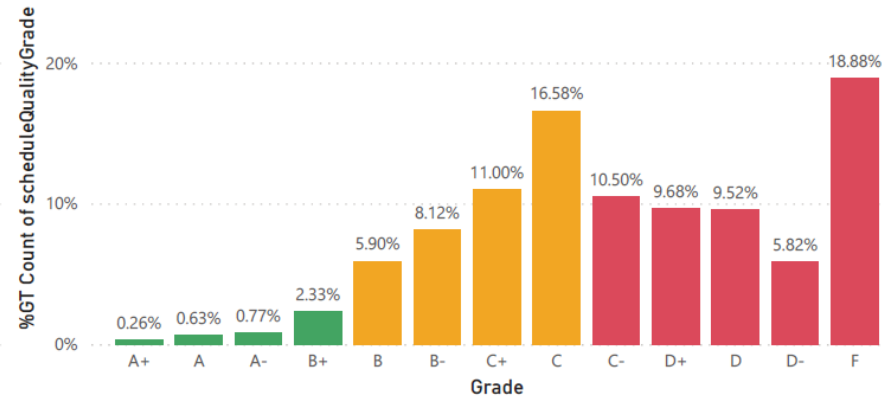
Schedule Quality Grade (25-50%)



Schedule Quality Grade (50-75%)



Schedule Quality Grade (75-100%)

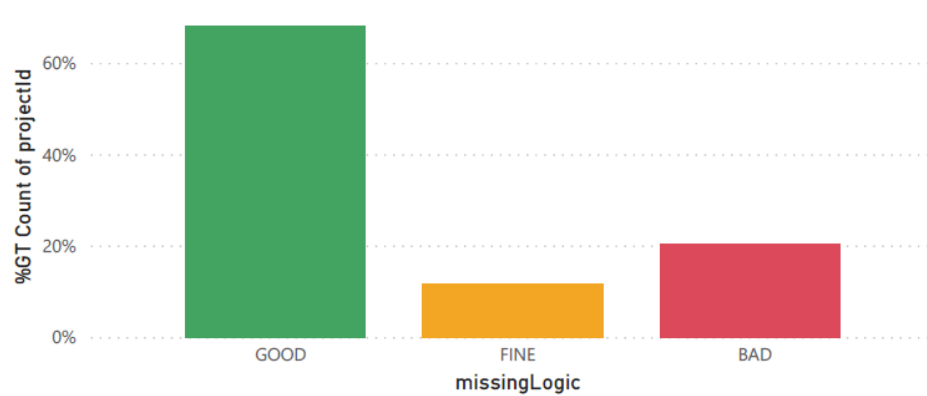


## Key Insights

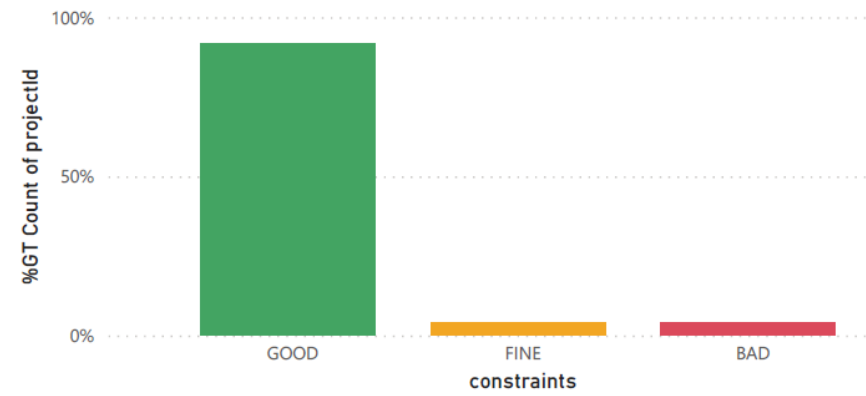
- 88% of Baseline are considered medium to high risk from Quality perspective (using DCMA Metrics as a reference)
- Schedule Quality has a tendency to erode as time progresses
- 29% of Early Schedules are high risk versus 58% of schedules in the last quarter of the project

# Baseline Schedule Risk Issues

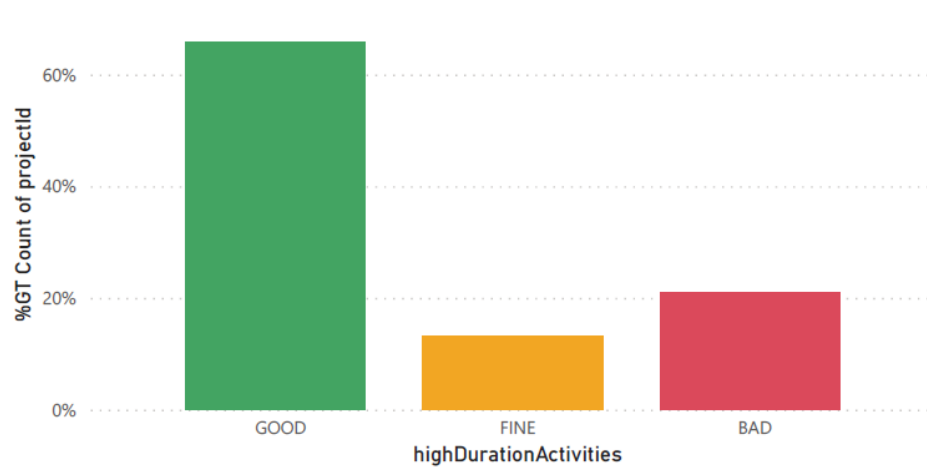
Missing Logic



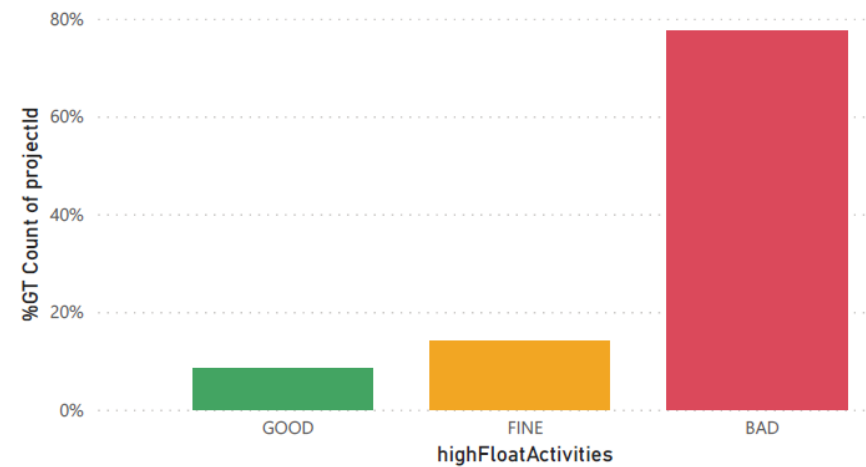
Constraints



High Duration Activities



High Float Activities

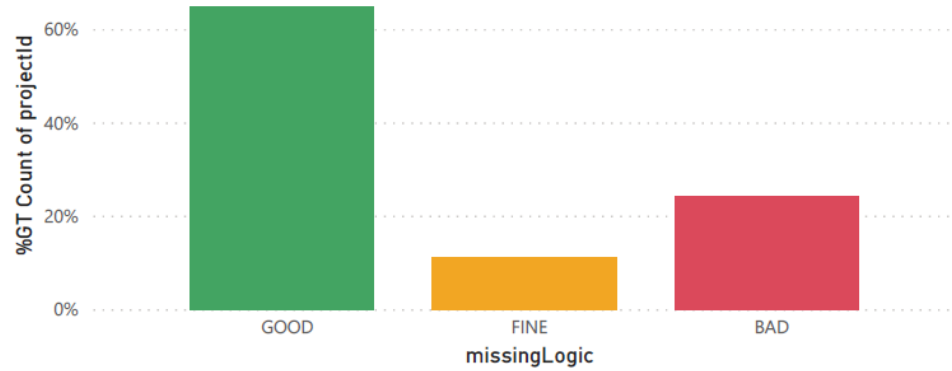


## Key Insights

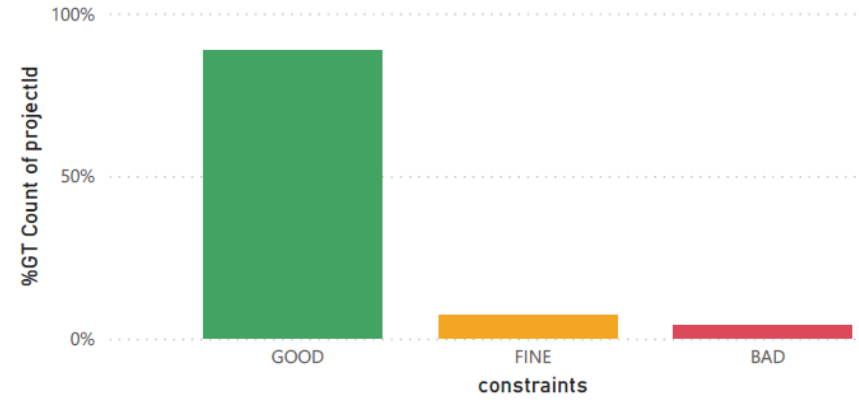
- Excessive amounts of Missing Logic exists in approximately 30% of Baseline Schedules
- Excessive Amounts of high duration activities exists in approximately 35% of Baseline Schedules
- 80% of schedules have incomplete logic, resulting in high amounts of float.

# Update Schedules Risk Issues

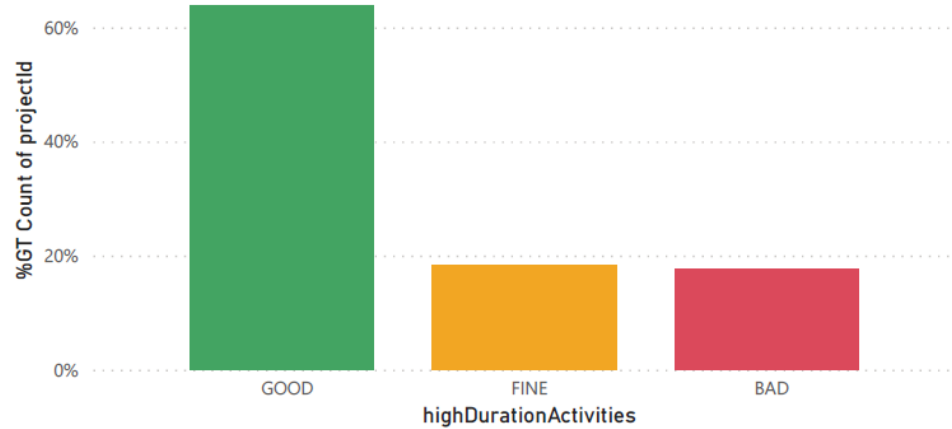
Missing Logic



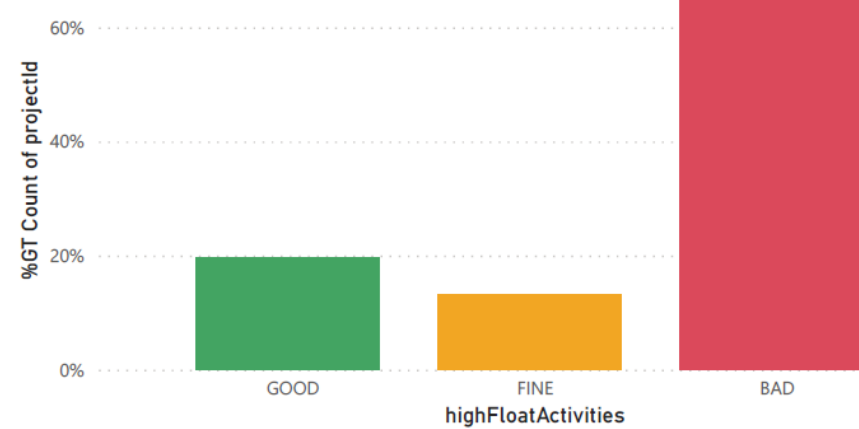
Constraints



High Duration Activities



High Float Activities



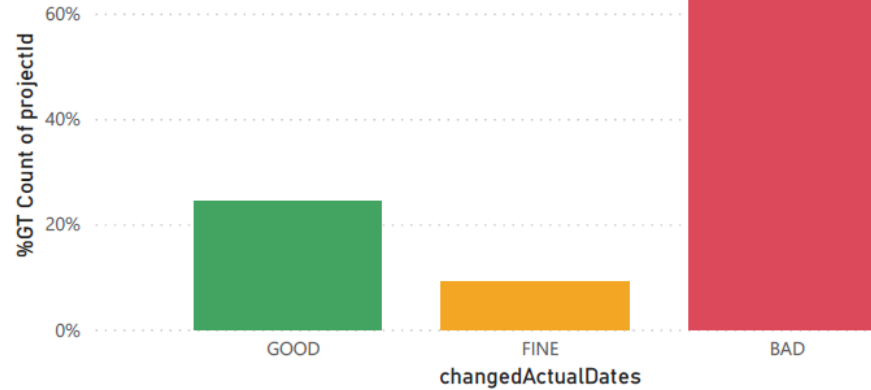
## Key Insights

- Schedules with excessive amounts of Missing Logic Increases as projects progress indicating logic removal is correlated to decrease in average schedule quality over time.
- Schedules with excessive amounts of high durations Increases as projects progress
- Incomplete Logic Continues to be a problem

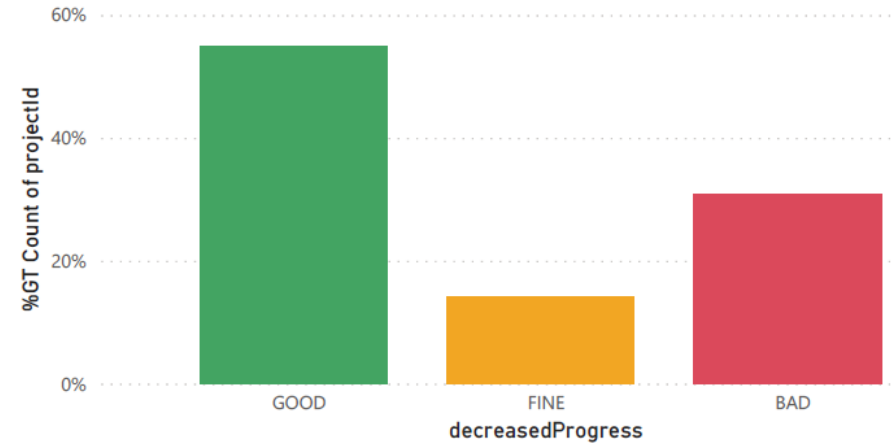
# Update Schedules Risk Issues (cont.)



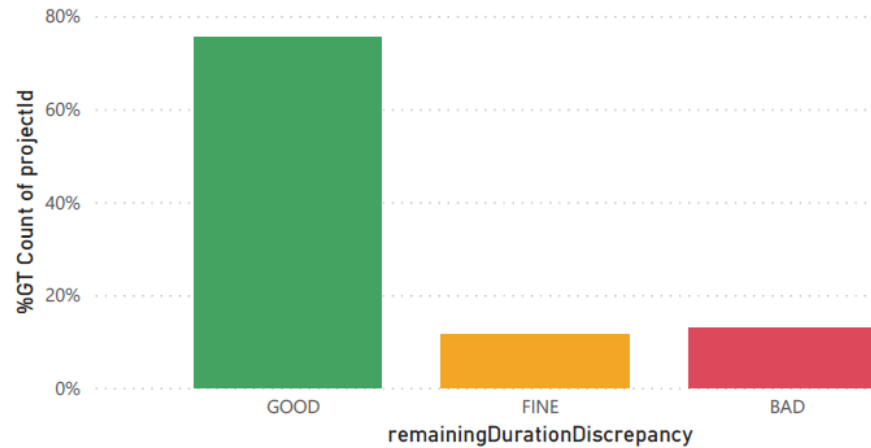
Changed Actual Dates



Decreased Progress



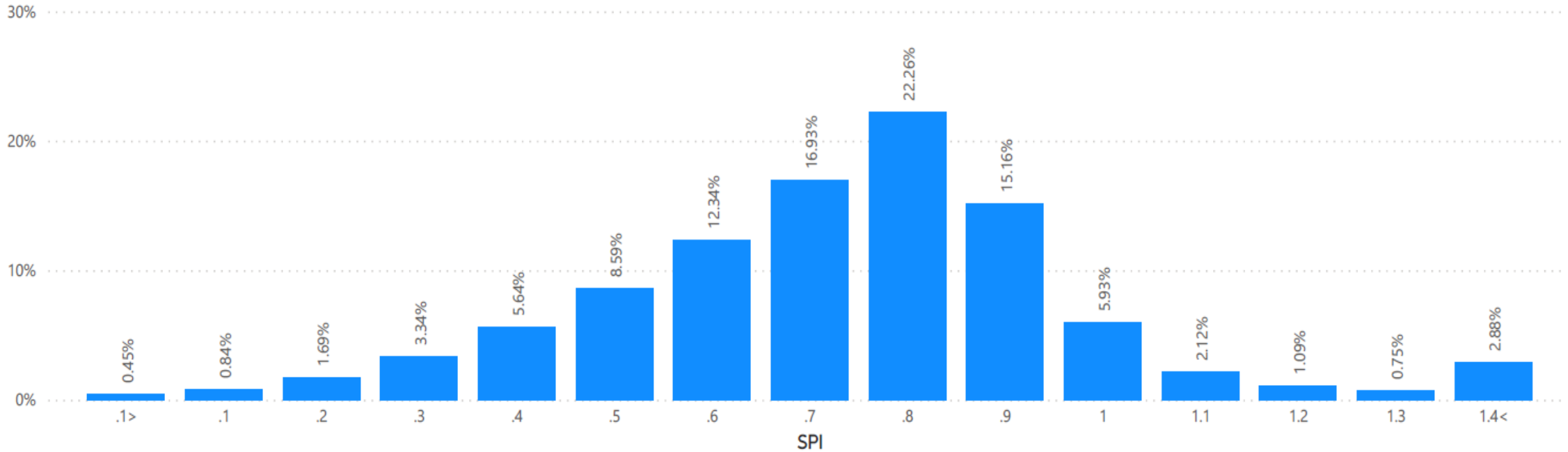
Remaining Duration Discrepancy



## Key Insights

- Schedule updates appear to contain excessive amounts of changes related to actual start dates and percent completes.
- It appears that accuracy of information isn't necessarily a priority

# Schedule Performance Index



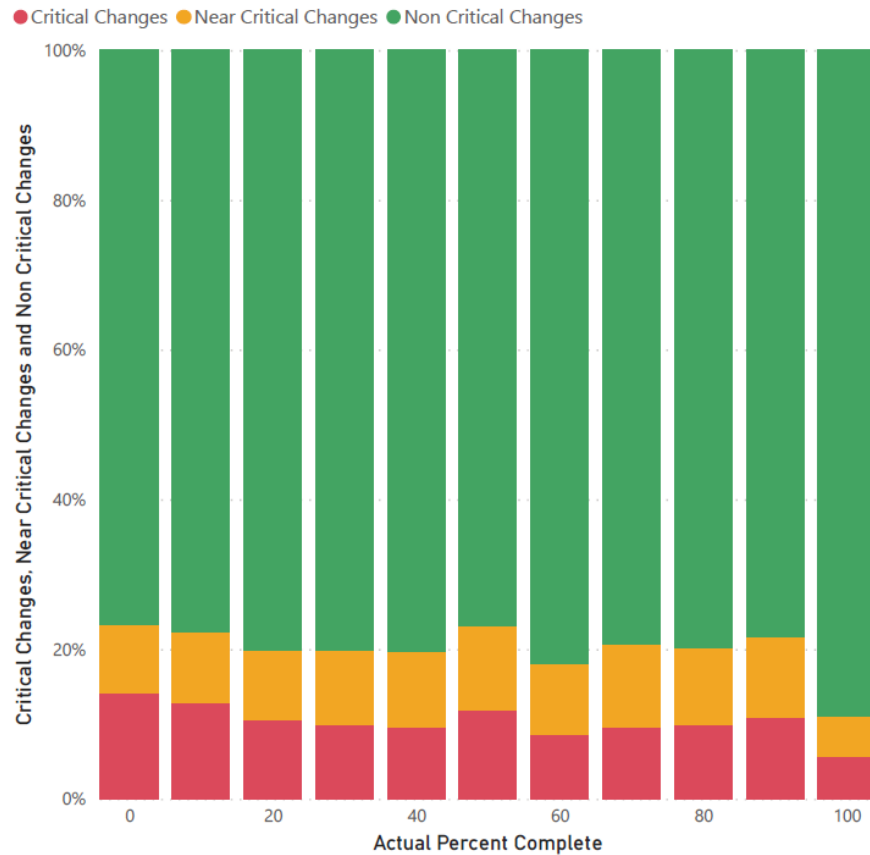
## Key Insights

- 13% of projects are achieving or exceeding planned progress over time at any given point of time
- Less than 70% of projects are achieving better than 90% of planned performance, based on EV over time.
- Multiple issues can contribute to this, including managing with poor quality schedules, over-optimism, and planning fallacy

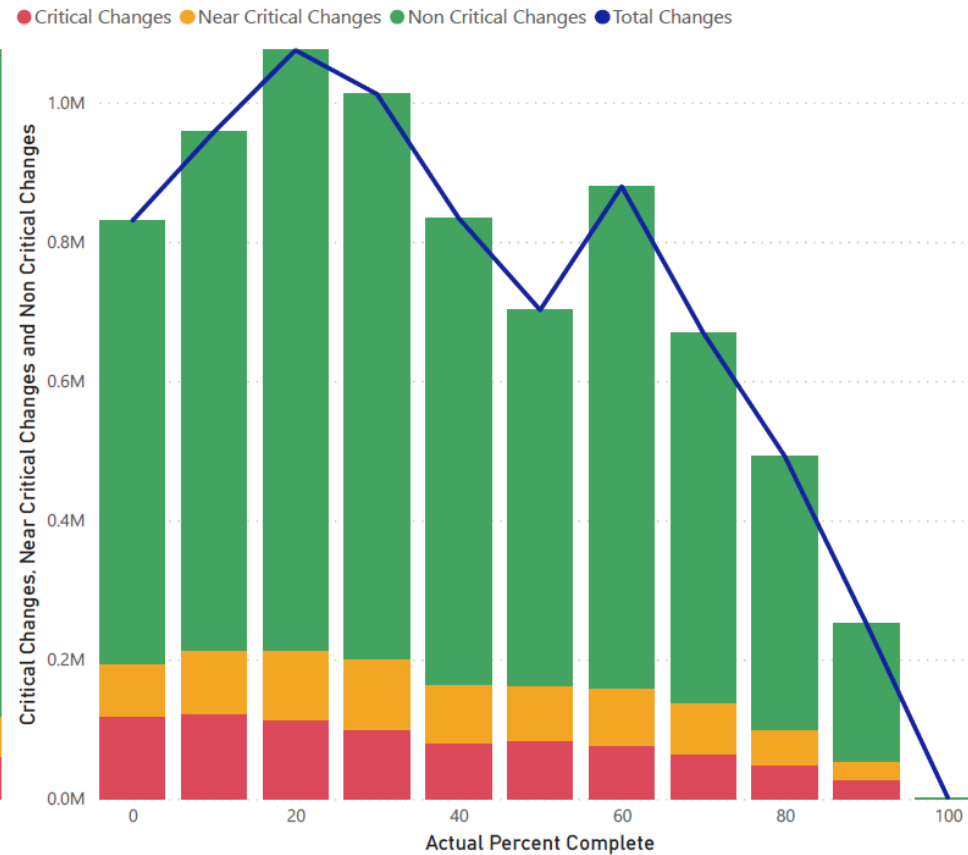


# Analysis of Schedule Changes

Changes by Percent



Changes by Total



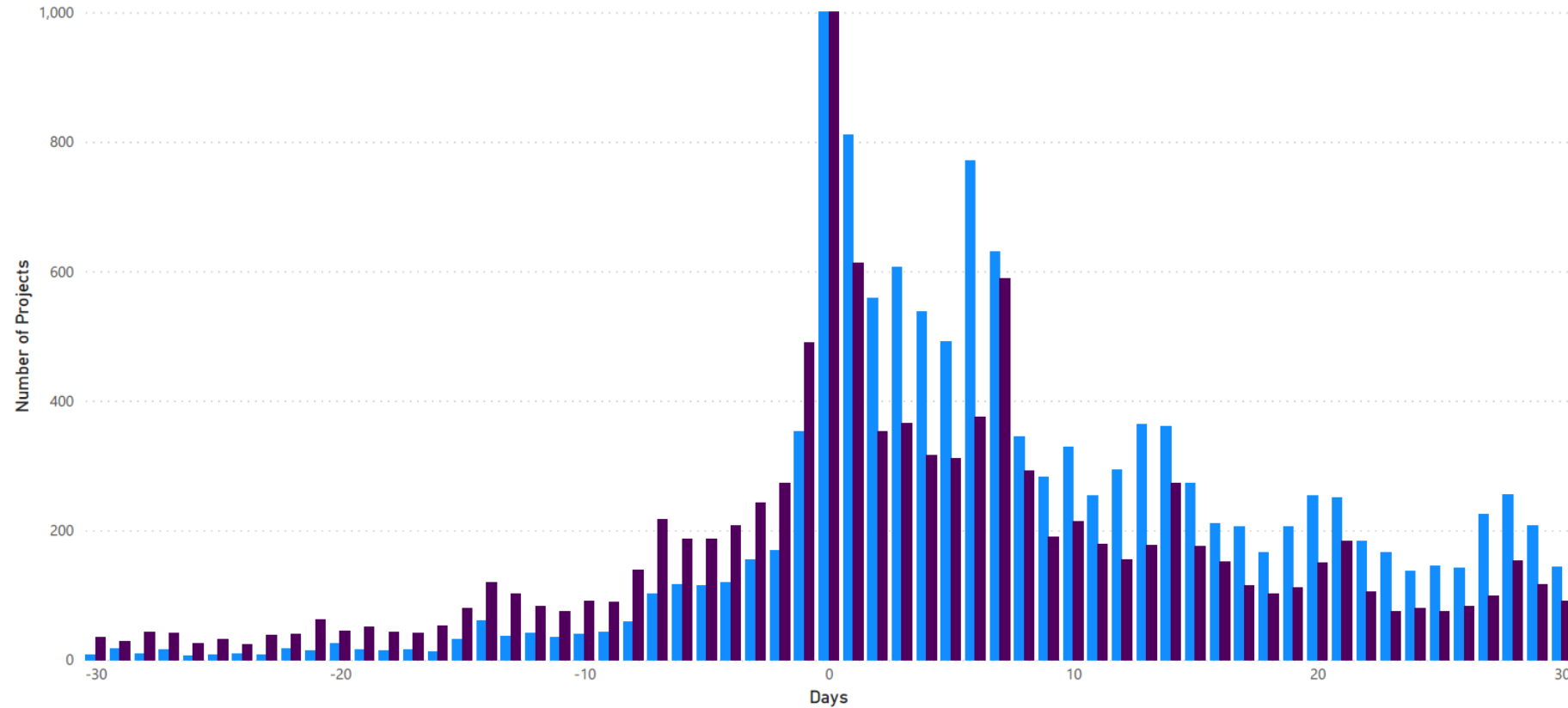
## Key Insights

- On Average, approximately 20% of changes are critical or near critical and is consistent throughout construction
- It appears more “changes” are occurring in the earlier stages of the projects as opposed to later stages.
- There is a correlations to number of changes based on number of remaining activities

# Critical Path Delay vs. End Date Variance

Critical Path Delay vs End Date Variance

Attribute criticalPathDelay endDateVariance

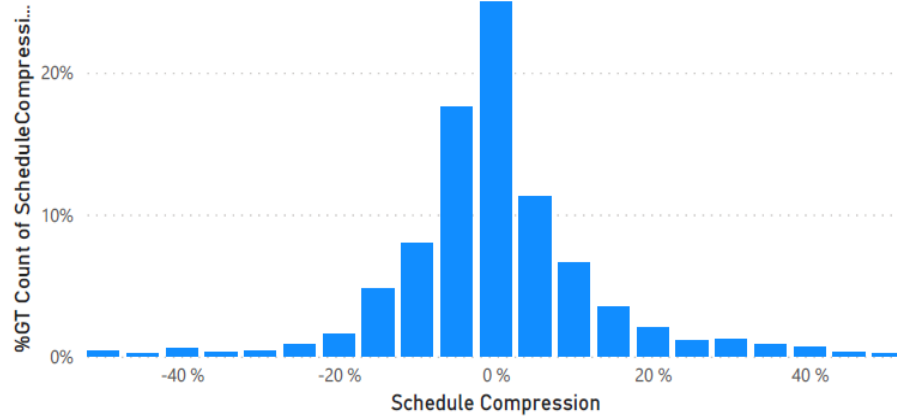


## Key Insights

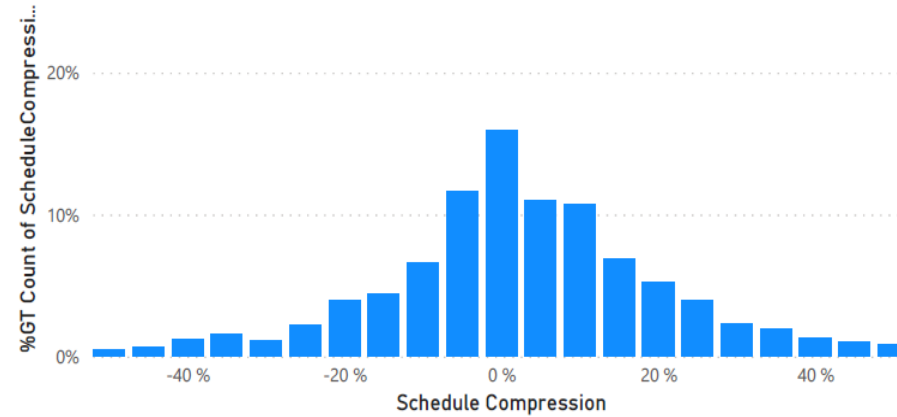
- It appears there are more window periods showing higher amounts of delay than end date variance
- There are more period of end date recovery than critical path recovery
- This data shows that the status quo is to suffer more delays and then attempt to recover

# Schedule Compression

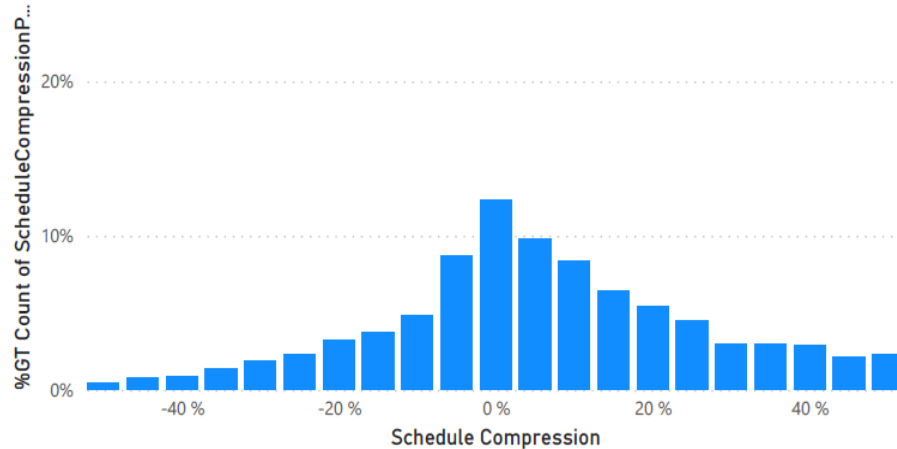
Schedule Compression for Schedules 0-25% Complete



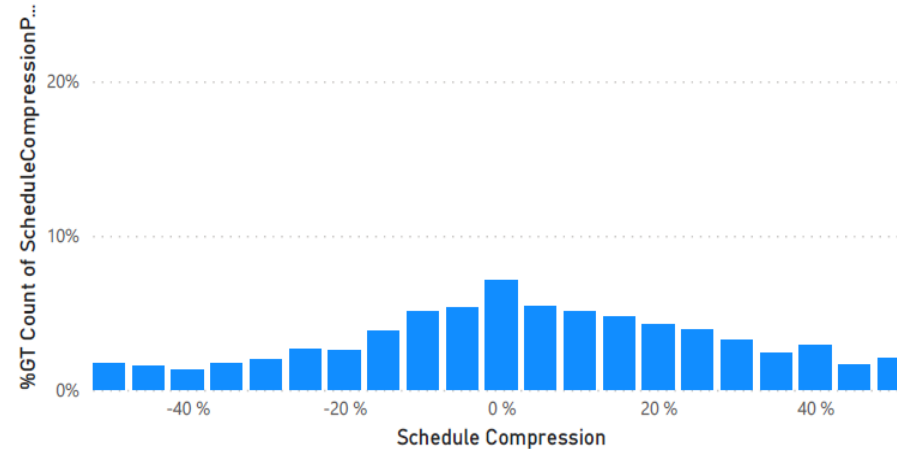
Schedule Compression for Schedules 25-50% Complete



Schedule Compression for Schedules 50-75% Complete



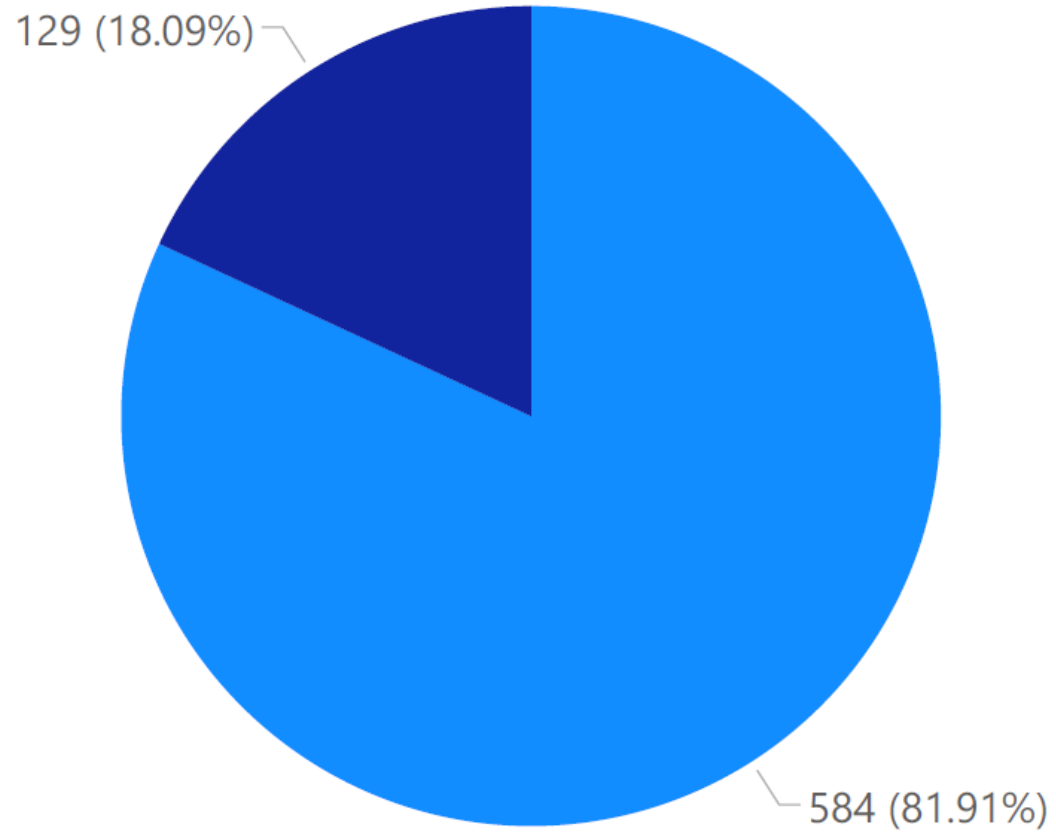
Schedule Compression for Schedules 75-100% Complete



## Key Insights

- Projects appear to be equally compressed v decompressed in the early stages of a project (0-25%)
- Compression appears to be more common in the 25-50% and 50-75% percent complete project.
- Projects appear to be equally compressed v decompressed in the later stages of a project (75-100%)

# Delayed Projects (Greater than 50% Complete)



# Summary of Findings



- A large percentage of baseline schedules are overly optimistic
- A large percentage of schedules are likely showing an erroneous critical path
- Critical path delays occur throughout the entire construction lifecycle and the typical response is to compress (the already overly optimistic schedules)
- Rebaselines are common after projects are 75% complete and typically push the end date out.
- It's not surprising that there are rampant overruns, claims and disputes in commercial construction.

# How can we improve?



- Admit there is a problem.
- Set standards on schedule quality, educate PM's and Supers on best practices and hold them accountable
- Consider way more “crew logic” in baselines
- Create achievable schedules and watch EV and SPI closely
- Look closely at progress over time, study compression and use it as a tool to make decisions
- Make sure critical path delays are understood in real time and always make sure that the “response” is achievable
- Create an environment of visibility of progress, performance & risk and use it to constructively inform PMs and Supers – using DATA



# THANK YOU