Project Control for Owners' Small Project Portfolios

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Project Controls EXPO
Washington, DC - USA

Agenda

- Introduction
- Background
- The Impacts on Project Controls
- Where Does the Industry Go from Here? The Next Steps
- Conclusion

Introduction

Introduction

- Perspective: Owner organizations in chemical/hydrocarbon process industry
  - ‘Small’ projects = capital spending of ~ $5M or less
- Effective Project Control has huge value keeping large projects on track to achieve cost/schedule objectives
- Many project managers think large project tools/techniques are overkill in multiple small project environment
  - Variations **can** provide transparency & keep small projects/overall portfolios on target

Background

Background

PC environment for small projects prior to March 2020

- Site-based staff collected project status data & updated systems developed for site-based environments
  - Successful if resources were experienced & tools maintained
- Limited analysis of data & communication of deviations/recommendations
- Took weeks to compile (from independent systems) into reports
  - Snapshot was 3 - 4 weeks old when published – not best approach

Background

PC environment for small projects prior to March 2020

- Time-crunched Owners didn't put effort in front-end engineering/planning
  - Leads to poor baseline setting/unrealistic expectations
- Contractors used reporting to protect against potential disputes/claims
  - Often caused by ill-defined contract language
- Owner's small project environment - most obtained assets through acquisition – use legacy PM & PC control processes
  - Inconsistencies in project data & interpretation
  - Integrated system for all plant sites not value-added

Background

PC environment for small projects from 2020 -2023

- Industry not immune to impacts of COVID pandemic
  - Many capital budgets withdrawn
  - Projects suspended or cancelled
  - Some progressed with skeletal, quarantined crews
  - Others shifted business focus
  - Modified processes used to achieve revised goals
  - Capital budgets shifted and reevaluated monthly

Background

Prior to March 2020 | 2020-2023 | Future

PC environment for small projects from 2020 -2023

- Early 2020: Capital project funding forecasted to be next big wave of US petrochemical projects
  - But probable shortage of engineering & construction resources
- Pre-pandemic: Materials & equipment already seeing price increases/delivery delays
- Projects that continued dealt with health/safety protocols:
  - Sequester some construction teams in place
  - Rely on remote working
  - Require longer workdays
  - Temperature checks/Covid testing, etc.

Background

Prior to March 2020 | 2020-2023 | Future

PC environment for small projects from 2020 -2023

- Pandemic hit - Waves of positive COVID testing, hospitalizations, illnesses & deaths. The world was in turmoil.
- Resulted in:
  - Quarantining
  - Shutdowns of businesses
  - Travel restrictions
  - Virtual meetings/planning sessions
  - Speculations of future
  - Constantly changing business priorities

Background

PC environment of the future

- In 2023 - industry experiencing project environments like pre-pandemic times
- VUCA (Volatility, Uncertainty, Complexity, & Ambiguity) - introduced in 1980s, but still prevalent today

Construction in a VUCA World

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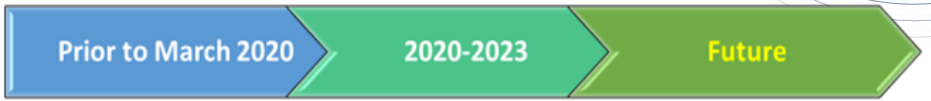
Background

PC environment of the future

- Part of capital project workforce may not return/remain in industry
  - Forecasted post-pandemic conditions will further impact workforce
    - Remote working will affect future planning/engineering/estimating/PM environments
    - Remaining personnel likely to work in hybrid environment
- Current state impacted by:
  - Potential recession
  - Ongoing war in Ukraine
  - Higher interest rates
  - Inflation
  - Continued supply chain issues, etc.

Background



PC environment of the future

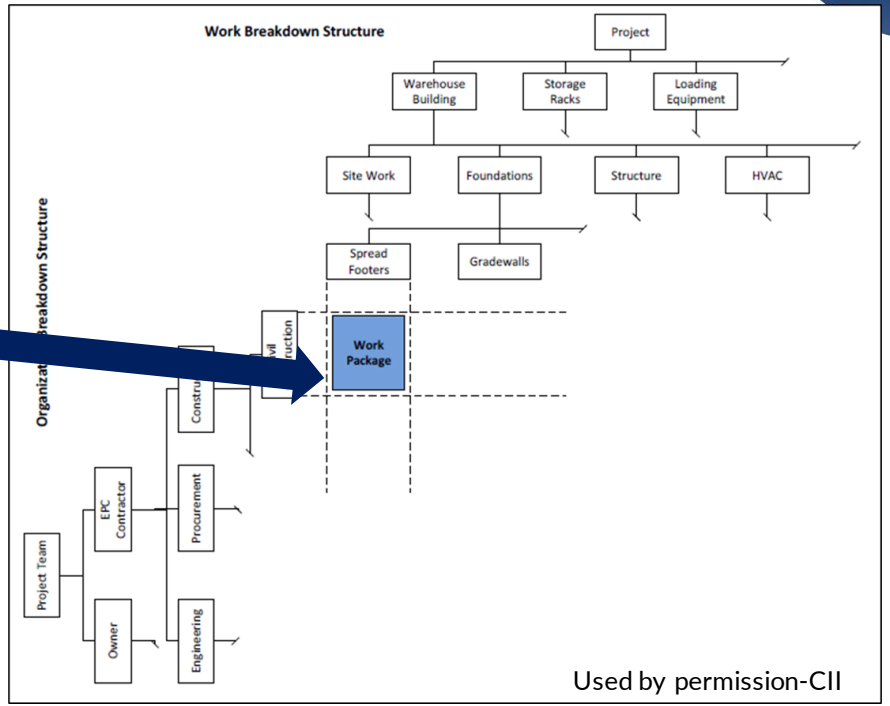
- Projects being planned in new initiatives - plastic recycling, renewable energy, all colors of hydrogen, carbon reduction & capture, etc.
  - Trend is to drive profitability across existing operating facilities
- Advancements in how projects are planned/delivered across EPC & commissioning/start-up process
- Advanced Work Packaging (AWP) has driven stronger link between engineering and construction practices
  - With focus on ‘construction driven engineering’

Key Elements of Advanced Work Packaging

Focus on clearly defined/unrestrained Work Packages issued to craftsmen:

- Establish Construction Plan as basis of priorities
- Develop coding structure that carries WBS to AWP level
- Use work packaging for estimating, scheduling, cost control, etc.
- Execute Engineering and Procurement in accordance with package-based priorities
- Facilitate process for clearing work package constraints
- Track progress and productivity by Work Package

Scope Definition: What is Advanced Work Packaging?



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AWP uses Modeling technology to provide work package visualization and project control "PLANNED vs ACTUAL"

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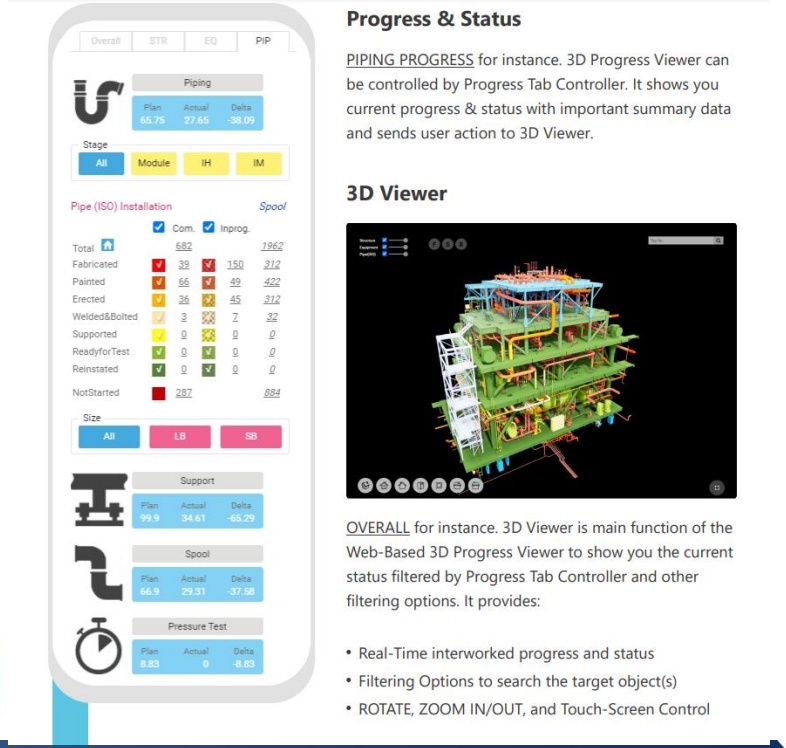
Background

PC environment of the future

- Commitment to digitizing various packages for better baseline setting
  - Modifying how projects are planned/executed also has implications for how small & large projects are controlled
- Digital Performance Management (DPM) will have larger role in monitoring/managing projects through execution
  - Digital twin technology
  - 4D & 5D design systems (tying schedule & risk to traditional 3D models)
  - Use of robotics and drones for quantity surveying support
  - Etc.

Project Control Benefits



Progress & Status

PIPING PROGRESS for instance. 3D Progress Viewer can be controlled by Progress Tab Controller. It shows you current progress & status with important summary data and sends user action to 3D Viewer.

3D Viewer

OVERALL for instance. 3D Viewer is main function of the Web-Based 3D Progress Viewer to show you the current status filtered by Progress Tab Controller and other filtering options. It provides:

- Real-Time interworked progress and status
- Filtering Options to search the target object(s)
- ROTATE, ZOOM IN/OUT, and Touch-Screen Control

Example from Jin Graphics Systems

Digital Tracking…

- Graphically represents vast amounts of data
- Allows for better real-time analytics
- Allows user to focus on a very particular piece of information
  - Ability to call up any component & drill down to level needed
- Reduces need for multiple spreadsheets, multiple conversations, etc.
- Improves quality of decision making
- Improves speed of decision making

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The Impacts on Project Controls

The Impacts on Project Controls

- Obvious that Project Controls of past 50 years will be different in the next 20 years
  - How will the remote work force be addressed?
  - How will existing/developing technology be utilized?
  - Will PC resource skill set requirements change in this ‘new normal’ world?
- So, what has changed?
  - Tools and systems are more robust/quicker to process data & produce reports

The Impacts on Project Controls

The Streamlined Approach for Small Projects

- Small projects can't acquire/retain level of resources that large- mega-scale projects can
  - Often use plant-based personnel that have competing responsibilities
  - Operations & maintenance takes precedence over capital projects
  - Lack time/attention needed to conduct projects efficiently/effectively

The Impacts on Project Controls

The Streamlined Approach for Small Projects

Means & Methods to Improve Small Cap & Turnaround Performance

- ‘Bundling’ small projects in process unit/area
- Consolidate implementation of estimating, planning, and execution similar to lean manufacturing
  - i.e., Construction/maintenance crews can be more productive by moving from one job area to another, performing repetitive tasks

The Impacts on Project Controls

The Streamlined Approach for Small Projects

Means and Methods to Improve Small Cap & Turnaround Performance

- Many small-project PC personnel may lack estimating/PC expertise needed to address issues
  - Can lead to cost/schedule impacts
  - Not easy to correct - short time frames and project dynamics
- Must operate in environment where safety concerns and production interruptions cannot be tolerated
  - Requires skilled PC expert w/knowledge beyond a single specialty

The Impacts on Project Controls

The Streamlined Approach for Small Projects

Means and Methods to Improve Small Cap & Turnaround Performance

- Standardizing procedures, techniques, and tools is key
  - Simplified templates/procedures developed or modified from large project applications
  - Promotes learning curve for those unfamiliar with PM & PC roles
- Many PC engineers are good with numbers, analysis, trending, forecasting, etc.
  - Don't always have good communication skills which causes rifts between PC resource & project team

The Impacts on Project Controls

The Streamlined Approach for Small Projects

Means and Methods to Improve Small Cap & Turnaround Performance

- Project controls needs to provide data & analysis, good or bad, in a constructive way
  - Emphasize what's working & target opportunities to correct bad
  - PC should communicate this in healthy, positive, constructive environment: provide options for how to bring project back on track in non-demeaning manner

Where Does the Industry Go from Here? The Next Steps

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- Cross-training of personnel necessary to support multiple projects working concurrently
  - Basic training in proven methods & software packages
  - Existing PM software includes capability to refine data from various sources and create dashboards
    - Project personnel can use to identify trends/start corrective measures
  - Don’t underestimate need for project communication and other soft skills training

Where Does the Industry Go from Here? The Next Steps

- Key is reliance on intelligent software & distillation of data into meaningful information that users can interpret
  - Software developers claim products minimize resource limitations through Artificial Intelligence (AI), Machine Learning (ML), data mining and multiple source interaction/integration
    - Have vendors demonstrate capabilities 'live' prior to selection
    - Must understand data inputs needed to optimize use of AI and ML

Where Does the Industry Go from Here? The Next Steps

- Effective option - partnership with third-party organizations specializing in project planning/control
  - Most have more in-depth understanding of software capabilities/effective application
  - Service can be outsourced well, due to benefit of unbiased support
  - External support needs to provide transparent information/details to owner project team for quality & timely decisions
  - Owner must define desired level of transparency and adjust support accordingly. It's not one size fits all!

Where Does the Industry Go from Here? The Next Steps

- Organizations w/emergent, small-project capital programs are transitioning PC functions from seconded resources to in-house employees
  - In-plant personnel need to share knowledge of local requirements & conditions & can benefit from third party's project management/control expertise
  - Can take 1 - 3 yrs., depending on size/complexity of portfolio
  - Others are totally outsourcing function to support unbiased transparency that company needs

Conclusion

Conclusion

- Large projects face more risk in varying economic conditions than small projects/turnarounds
- Small cap work & turnarounds are necessary for sustaining existing facility's profitably
- Resource limitations likely to continue to be serious concern in future
- Cross-training geared toward developing multi-faceted skill sets (esp. in PM & PC), is key factor to mitigating resourcing issues

Conclusion

- Knowledge of planning, risk management, and proficiency with AI and ML software helps develop successful, well-rounded PC professionals
- Organizations must streamline level of reporting detail required for small cap projects – templates/dashboards that force consistency across entire portfolio
- Need to develop databases to enhance estimates, schedules, set realistic baselines, and develop metrics for prompt project decision making
- Third parties specializing in PM/PC are excellent solution
  - Can ‘jump start’ an organization toward self-sufficiency

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THANK YOU

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