Dutch Infra Who Owns the Schedule Buffers?



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Introduction to The Netherlands





The Dutch are a little Crazy



- Water from 2 sides; North Sea and River Delta
- 26% area is below sea-level with our largest cities
- My house is -7 meters (23 feet) below
- Construction projects always have a relationship with (ground)water and protection





Dutch Infra Organisations



Rijkswaterstaat (Ministry of Infrastructure and Environment)Dunes, Dikes, Waterways and Roads



Rijkswaterstaat Ministerie van Infrastructuur en Milieu

ProRail
 Railway Infrastructure, Stations and Signals

ProRail

Hoogheemraadschappen (Local Water Management)Maintain Local Water Levels, Environment and Protection



Hollands Noorderkwartier



Schedule Related Project Controls Methods Used

- Critical Path Method Scheduling
- Risman (Risk Management)
- Schedule Risk Analysis
- Buffer (Contingency) Management
- Lean Scheduling (Last Planner)
- Time / Space Visualisation
- 4D Planning
- Building Information Management (BIM)
- Earned Value Management



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Primaned and PROCON Professionals



Project Controls | Consultancy | 30+ years | 50 People | Primavera | Safran

Our mission is to be the trusted partner in improving project management tools & techniques so that projects create maximal value for industrial and technical organizations.

| Consultancy | Project Controls Staffing | Primaned Academy | Tools | Data |
|-------------|------------------------------|---------------------|-------|------|
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Large Infra Projects Building Organisation





- Owner has a Phase Approach and starts contracting in the 'Planning' Phase

- Different Contractual Forms can be used:
 - Design & Construct, DBM(O), DBFM(O), etc.
 - Depending on size, complexity, requirements and Life Cycle



- Collaboration between Owner and Contractor(s) starts during contracting

- How to implement schedule and buffer management?

Scheduling and Determining Contingency Buffers



- Main / Decision Milestones
- Network Schedule
- Best Scheduling Practices
- Robust and Dynamic Schedule



- Risk Identification, Assessment and Mapping
 - Uncertainties
 - Risks (Known Unknowns)
 - Linked to the schedule
 - "Unknown Unknowns" to be handled by Owner

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Scheduling and Determining Contingency Buffers

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INITIAL CALCULATION OF BUFFERS

- Perform Schedule Risk Analysis
- Risk and Uncertainty (+ some Mitigation)
- Analyse P85 (chance of hitting a date)
- Buffer \rightarrow Deterministic vs P85



Getting a feasible schedule by Adding Buffers



- Buffers (schedule contingencies) are place in multiple places
- Contractor is responsible for buffer proposal
- Adding float / mid-buffers creates a more feasible schedule



- Contractor is responsible for managing and giving insight into their buffers
- Owner adds buffer to end of project and to Major Critical Milestones

Execution Phase Progress and Update Cycle



- Mutual Agreement on initial baseline
- Progress Collection and Reporting Drumbeat
 - Monthly to Owner
 - Bi-weekly within Project Team (Contractors)
- Buffer Monitoring and Analysis
- Baseline Change Control
- Reporting contains
 - Schedule update, Deliverables, Registers ...
 - Buffer Incursion Register





Governance and Reporting on Buffer Utilisation



| Contractor Buffer | Original Dur | Remaining Dur | Utilisation | Critical <5d | Proximity of buffer end | F | leasons of Usage | | | | | |
|---------------------|-----------------|------------------|-------------------|-----------------|----------------------------|--|--------------------|--|--|--|--|--|
| Phase A - Object A | 20 | 4 | 80% | | 40 | Delayed because of bad weather. | | | | | | |
| Phase A - Object B | 30 | 10 | 67 <mark>%</mark> | 0 | 60 | Delayed becaus | e of bad weather. | | | | | |
| Phase A - Object C | 20 | 5 | 75% | 0 | 80 | Delayed because of late delivery of steel. | | | | | | |
| Turn-over Moment A | 10 | 10 | 0% | | 90 | | | | | | | |
| Tunnel - Object A | 15 | 10 | 33% | | 120 | | | | | | | |
| Tunnel - Object B | 15 | 15 | 0% | | 200 | | | | | | | |
| Tunnel - Section A | 40 | 35 | 13% | | 240 | | | | | | | |
| Tunnel - Section B | 40 | 40 | 0% | 0 | 320 | | - Ruffer Incursion | | | | | |
| Fly-over - Object A | 30 | 30 | 0% | 0 | 150 | | | | | | | |
| Fly-over - Object B | 30 | 30 | 0% | | 195 | | - Utilisation o | | | | | |
| Turn-over Moment B | 10 | 10 | 0% | | 380 | | - Mandatory | | | | | |



Register

- of Contractor Buffers
- to Report to Owner
 - Durations and Indicators
 - Reasons
- Owner will not act upon Contractor Buffers, only monitor
- Required to mitigate if buffer is used > 14 days.
- Owner will collaborate to mitigate
- Owner buffer usage using Change Process
- Changes / Major Risk Events lead to Buffer Re-analysis

Who owns the Schedule Buffers Conclusions



- Transparency in Governance
- Mutual risk-aware collaboration, because owner thinks along with contractor to solve and prevent issues
- Increase in (schedule) feasibility
- Incentive for better project administration / registration
- Collaborative and Proactive approach





Primaned BV

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www.primaned.com info@primaned.com +31 (0)10 44 25 177



FB 522

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