

An aerial photograph of a large offshore oil platform, likely a jack-up rig, situated in the middle of a deep blue ocean. The platform has a complex network of yellow and grey steel structures, including cranes, ladders, and various equipment. Two large, white cylindrical storage tanks are visible on the deck. The platform is supported by three large, white legs with red-painted lower sections, which are partially submerged in the water. The sky is a clear, deep blue.

Chevron



human energy

Engineering PPM journey

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The opportunity

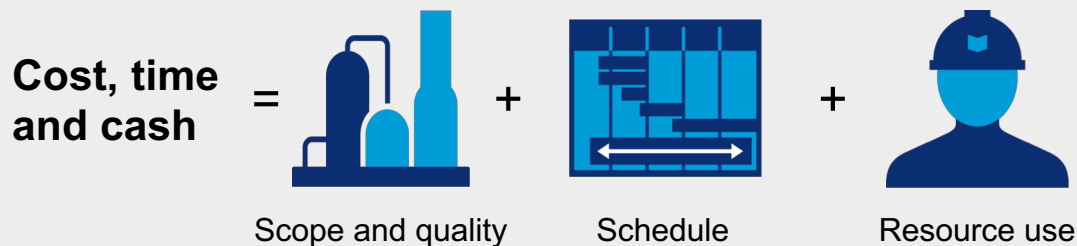
Engineering has experienced late delivery, cost overruns and rework (quality) due to current approach to managing work which facilitates low reliability, high variability and lack of predictable outcomes.

- Complex projects with long durations
- Lack of clarity on engineering work processes
 - How the work gets done
 - Interfaces/multi-geographical areas
 - Transient work force
- Contracting strategies designed to shield from risk mean relinquishing control
- Lack of understanding of sources of variability i.e., bottlenecks to getting work done
- Earn and burn mentality
 - Is the “right” work being executed?
 - Resource allocation
- Work not synchronized in an integrated production system

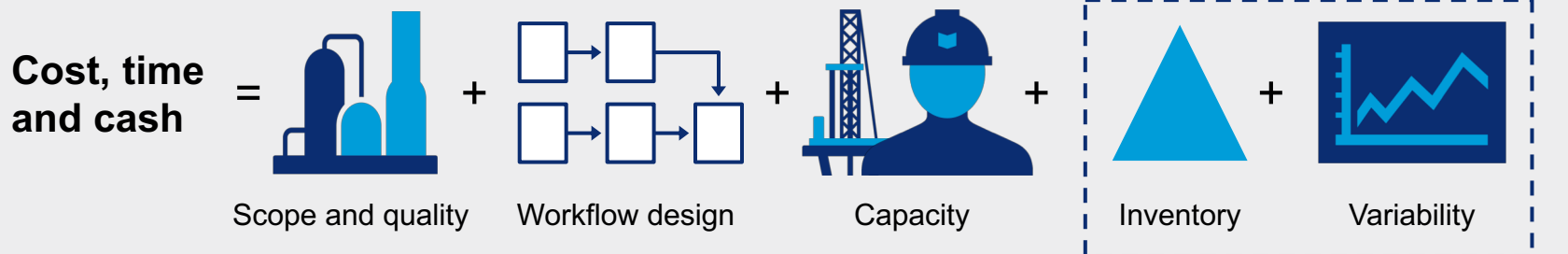


Project Production Management

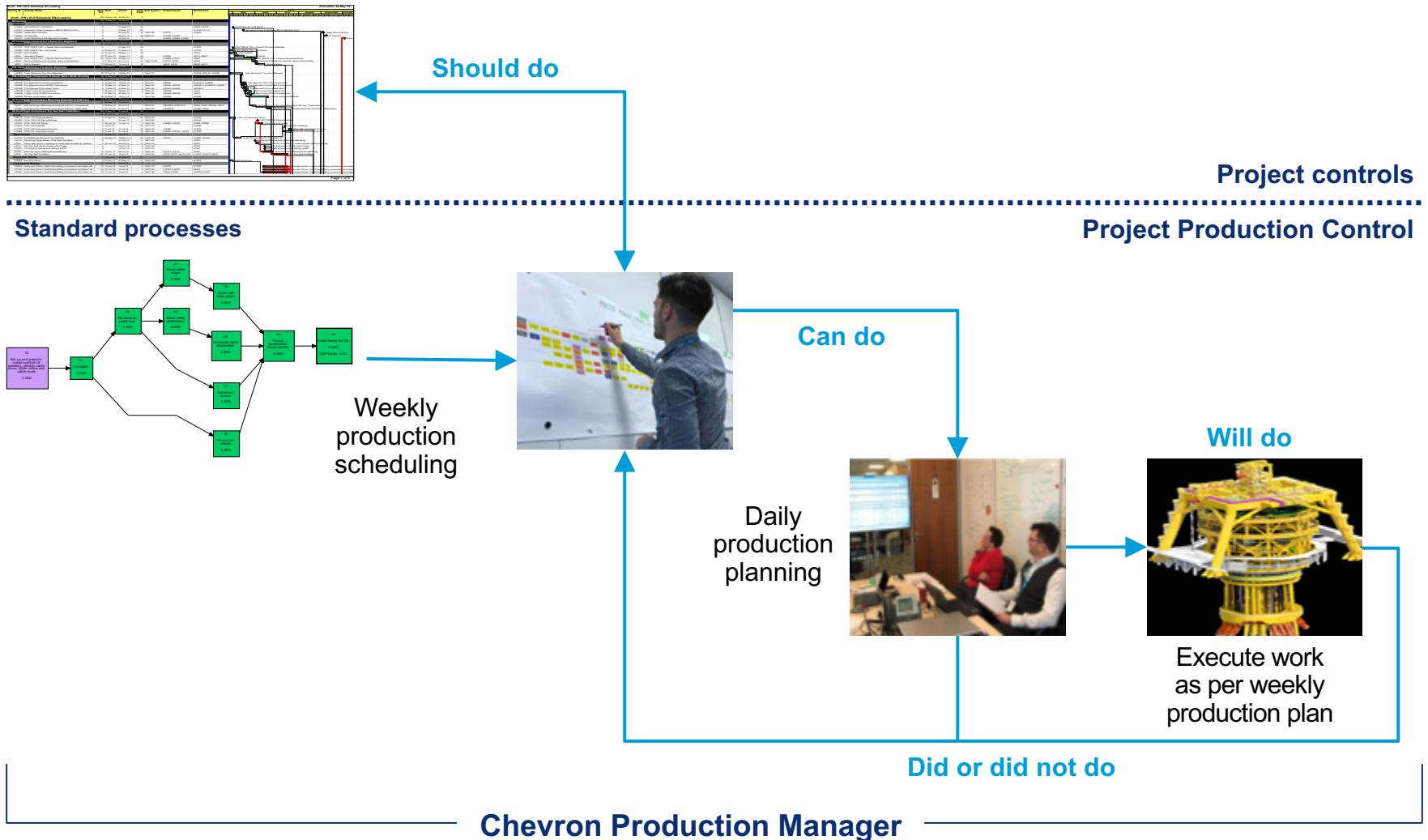
Traditional project management



Project Production Management

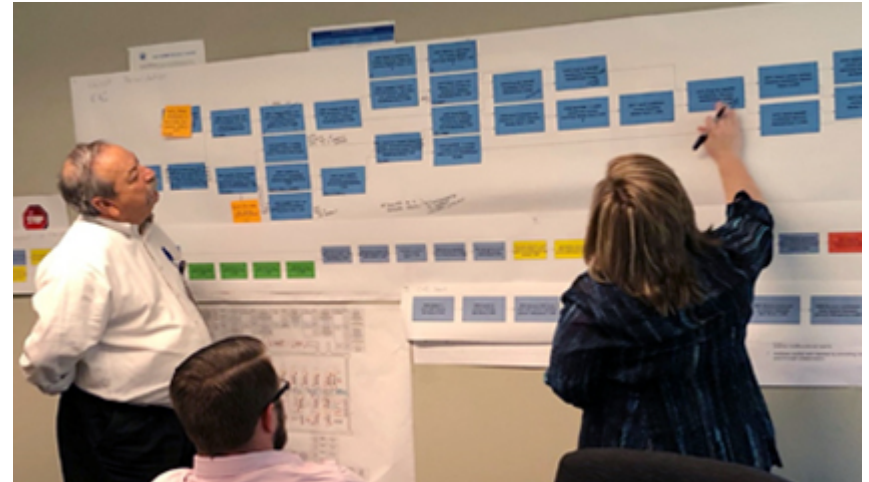


Project Production Control approach



Deployed PPC in Front End Engineering Design and detailed design

- Mapping of the work process allows clarity to all involved; disciplines, work locations, interfaces
 - Design progression
 - Batch size of deliverables
 - Vendor data
- Knowledge work is different from craft work
 - Knowledge work – the tool supports the worker
 - Craft work – the worker supports the tool



- Front End Engineering Design (FEED) is different from detailed design
 - FEED is dynamic
 - Production engineering
 - Engineering integrity

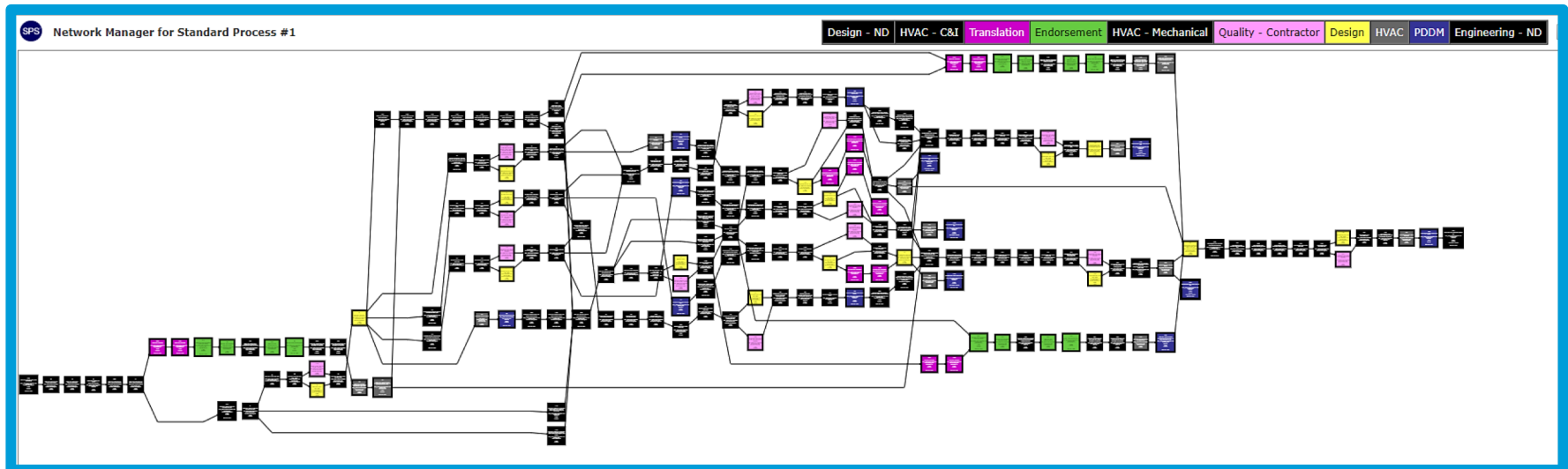
HVAC controls and instrumentation layout

Standard process

Engineering thought it was a seven step process

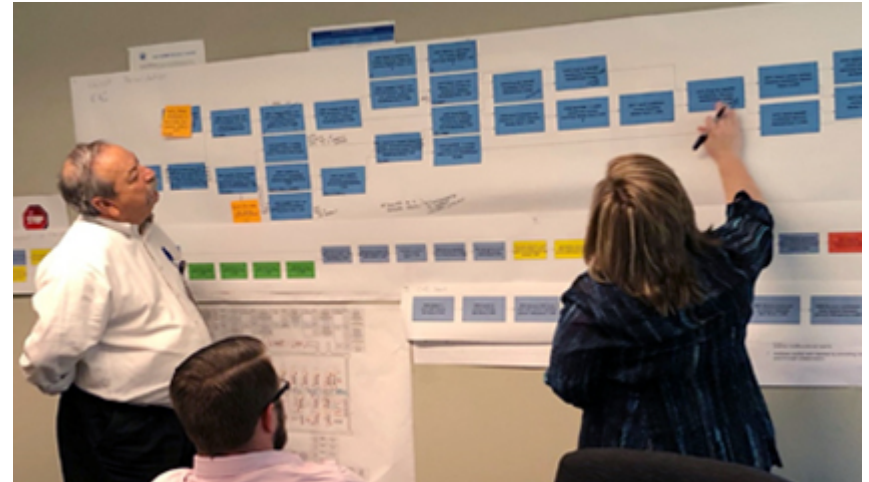
Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
PLC data available (FB-area)	Wiring PLC vendor data into SPI (ND)	Assign template (ND)	Generate layout, perform self-check, do the checking and issue for FB/HO review (ND)	FB/HO to do the review and send back to ND (FB-area)	Incorporate FB/HO review. Comments if any and send final copy to PDDM for issue (ND)	Issue on POL (ND-area and PDDM)

Actual after production planning – 200



Deployed PPC in Front End Engineering Design and detailed design

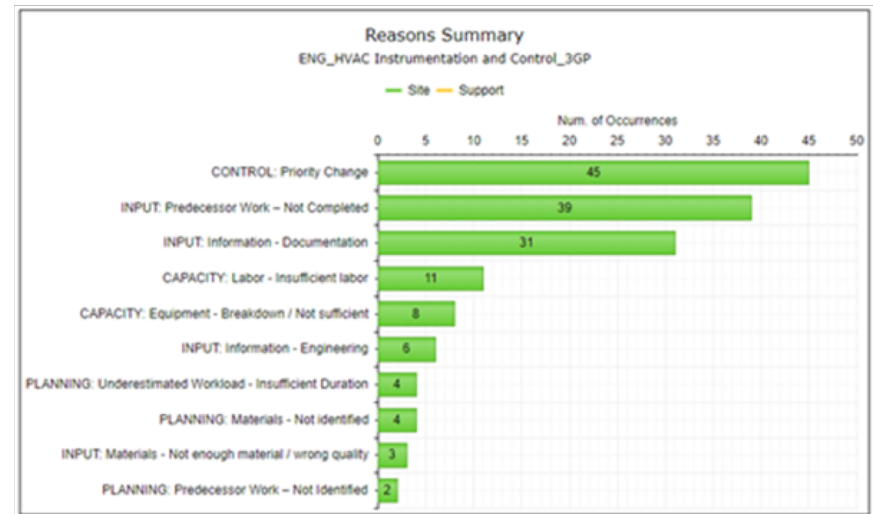
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Changes how we do the work

- Places planning in the hands of people doing the work
- One tool/data set – eliminates the need for trackers (shadow systems)
- Provides immediate visibility to variability within the engineering work process
 - Focus on analytics
 - Increases morale and trust



What we have achieved

- Integrated, collaboratively agreed standard processes and alignment on work execution
- Focuses the team on the “right” work to advance the project
 - Deliverable delivery
 - Resource planning
- Performance dashboard incorporating PPC analytics
 - Enabled management to rapidly understand areas of concern for immediate action
- Cycle time reduction through optimization

Module	Sealift	LRM Finish	Forecast Finish	06-Nov-18	03-Nov-18	27-Oct-18	20-Oct-18	13-Oct-18	06-Oct-18
47M257	Sealift 02	07-Dec-18	05-Dec-18	2	2	2	-3	-3	8
47M251	Sealift 02	20-Dec-18	16-Nov-18	24	24	29	34	39	6
47M258	Sealift 02	22-Jan-19	02-Jan-19	14	14	19	24	29	39
47M252	Sealift 02	18-Feb-19	19-Dec-18	43	43	48	53	63	13
47M261	Sealift 03	01-Apr-19	02-Apr-19	-1	-1	-1	-1	-1	-1
47M262	Sealift 03	02-May-19	23-Apr-19	7	7	7	7	7	7
47M267	Sealift 03	06-May-19	07-May-19	-1	-1	-1	-1	-1	-1
47M268	Sealift 03	01-Jul-19	09-Jul-19	-6	-6	-6	-6	-6	-6

	SV Average Wdays	CR Trend Av. %	Index Actual/LRM	Score
PROCESS	23	+ 88	1.12	7
MECH SWIVEL	-1	+ 88	1.07	7
MECH HANDLING	0	+ 81	1.04	6
CIVIL	-5	- 94	0.96	6
NAVAL	-16	+ 92	1.04	6
INSTRUMENTATION	-6	- 91	1.04	5
PIPING	-35	+ 92	0.91	5
STR UPPER TURRET	-18	- 74	1.05	4
ELECTRICAL	-51	+ 89	0.78	4
MECHANICAL	-51	- 73	0.95	3
HSE	-102	+ 62	0.91	3
STR LOWER TURRET	-122	- 73	0.92	3
MARINE	-78	+ 72	0.69	2
Overall	-27	- 84	0.98	4



What we learned

- PPC implementations require dedicated staffing e.g., advanced users, site coordinator, implementation engineers, etc. (depending on deployment model).
- Engineering firms are entrenched in Era 2 model which focuses on reporting and forecasting progress, not about true control of work.
- Ensuring your contractors understand why PPC is being deployed:
 - “Those that are involved in creating the solution are more likely to support it.”



What we learned

- Educate, train, execute and validate
 - Methodical on-boarding process
 - All office locations
- Encourage and continuous improvement culture
- Schedule Management of Change
- Lack of understanding of true capacity needs and allocation
- What do you need to stop doing by implementing PPC
 - Weekly engineering reports
 - Traditional project controls reports



Leadership is essential

**Owner and
contractor
leadership have
a role to play**

Communicate the key roles of a leader

- Create a vision
- Enable effective work environment
- Provide support

Establish the culture

- Visibility is good
- “Red” lights are good
- No blame



The future

Projects modeled as a production system during project definition

- Concurrent Engineering
 - Designing how the work gets done
- Target value design
- Integrated with our supply chain
- Integrated platform for execution
 - Design modelling
 - PPM integrated execution tools
- Keep the end in mind

“We cannot solve our problems with the same thinking we used when we created them.” – Albert Einstein



Closing

- **PPM enables the breaking down of project complexity.**
- **Leadership is key.**
- **It will take perseverance to change our industry.**

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