Modernizing Construction - From Construction to Production

How supply chains and project delivery are changing to leverage the benefits of industrialization and digitization
Modernizing Construction - From Construction to Production

Facilitator
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BP

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Senior Advisor
Engineering Management
Chevron
Introduction
Willie LeFever

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Other Industries Have Perfected Modern Production. So, When Will Construction?

Construction Users Roundtable (CURT) “The Voice 2019”

From That to This:
Modern Production Thinking
Examples (BP & Chevron)
Beyond Modern Production
Modern Production Thinking
Todd R. Zabelle

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Modern Production?
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Demand (Schedule)

Supply (Production System)

Dates

Should / Want Happen

Can / Will Happen

Rates
4 Verbs 5 Levers 3 Curves
Verbs

Design

Make

Transport

Build

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5 Levers

Cost, Time & Cash = Product Design + Process Design + Capacity + Inventory + Variability

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3 Curves

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Work-in-Process = Time!
Production System Digital Twin
Will Subsea be the next Blockbuster?
Energy Transition - From IOC to IEC

The Energy Transition is real and being driven by societal pressure to protect our planet.

- Spend x10 the capital in renewables by 2030
- Reduce daily production by 40% by 2030 with Net Zero Carbon by 2050 ambition
- Numerous governments making climate and emission reduction commitments
What does this mean for O&G?

**What is the role of O&G in the Energy Transition?**

Widely recognized that O&G will continue to be a major part of the world’s energy portfolio in 2050

Oil and gas production will help bp fund the energy transition

**What does this mean for Subsea Projects?**

If subsea projects do not radically transform, subsea will quickly become uncompetitive and will rapidly become the Blockbuster of the oil and gas industry.
Subsea Vision

20% reduction in Total Cost of Ownership
Subsea production system reliability >98%
Build contracts that align business goals

Improve Return on Investment
50% reduction in schedule for Define/Execute phase of subsea projects

Forecasting Accuracy
Cost accuracy within +/-2% for subsea projects minimizing time capital is employed before returns are realized
Productization
From ETO to CTO
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ETO: Project Specific

Components Stockable and Configurable to Field Requirements

CTO

Common Raw Materials, Functional Specs, ITP and QA

Operator Standards

Top Level Assemblies and Systems

Configurable Components and Subassemblies

XT blocks, Actuator, SCM, Choke, Sensor, Hub, ROV Bucket

Industry/Contractor Standards

Raw Materials and Functional Specs

Forging, Pipe, Nut, Bolt, Welding

P&O
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**BP Standardisation Overview**

- **10K HXT**
  - BP MD2 Awarded
    - Q1 2017
  - BP Matapal Awarded
    - Q1 2019
  - BP Herschel XT Awarded
    - Q1 2019
  - BP Configured XT design formalized
    - Jan 2020
  - BP Configured 10K G3S HXT

- **15K HXT**
  - BP MD2 XT Awarded
    - for Atoll development
    - Q2 2018
  - BP Isabela 2 Awarded
    - Q2 2018
  - BP Isabela 3 Awarded
    - Q3 2020
  - BP Configured 15K HXT

- **10K VMXT**
  - BP PAJ FEED
    - Q4 2018

**Alignment Phases**

**Phase 1 Alignment**
- 80% Standard

**Phase 2 Alignment**
- >90% Standard

**Q3 2021 Alignment**
- >95% Standard

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Blockers

Mindset - not how we have done it previously!

Timely technology forecasting and development

Funding
Standard Work
James E. Craig P.E.

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Library (BoP) of >2,000 Standard Work Processes and Growing!
Simultaneous Design of Product & Process
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Chevron Production Manager

Library of Standard Processes → Production Schedules → Production Planning → Work Execution

Actual outcome data
We own the data

Execution performance data is now digitally curated and ingested into the Chevron data lake four times daily

Data Lake keeps growing

- 350,000 tasks
- 10,000,000 hours
- 32,000 reasons tasks were not completed
Current Artificial Intelligence application

**Weather Impact:** Identifies the potential impact of wind to planned construction tasks in next 24hrs based on historical and forecast data

**Task Completion Forecast:** Predict early/ on-time/ late using an extreme gradient boosting algorithm

**Dewatering Truck Optimization:** Allocates capacity, identifies optimal timing, routing and sequence over multiple geographic locations
Planned Artificial Intelligence application

Automated Analytics Correlation: Identify relationships between analytics that we are not yet aware exist

Benchmarking, estimating and scheduling norms utilizing machine learning

And what’s in the basement – What we can’t talk about!
Beyond Modern Production
Todd R. Zabelle

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