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The CAN Technology

Presented

to

AADE
AMERICAN ASSOCIATION of DRILLING ENGINEERS

"The Industry forum for Drilling practices and technology"

''Deepwater and Emerging Technologies Study Group Meeting, October 27, 2016''

www.neodrill.no

Agenda

- The CAN Technology
  - What is a CAN
  - What does it look like
  - How does it work
  - Main CAN options
- Solutions for Single Satellite Development Wells

What is a CAN?

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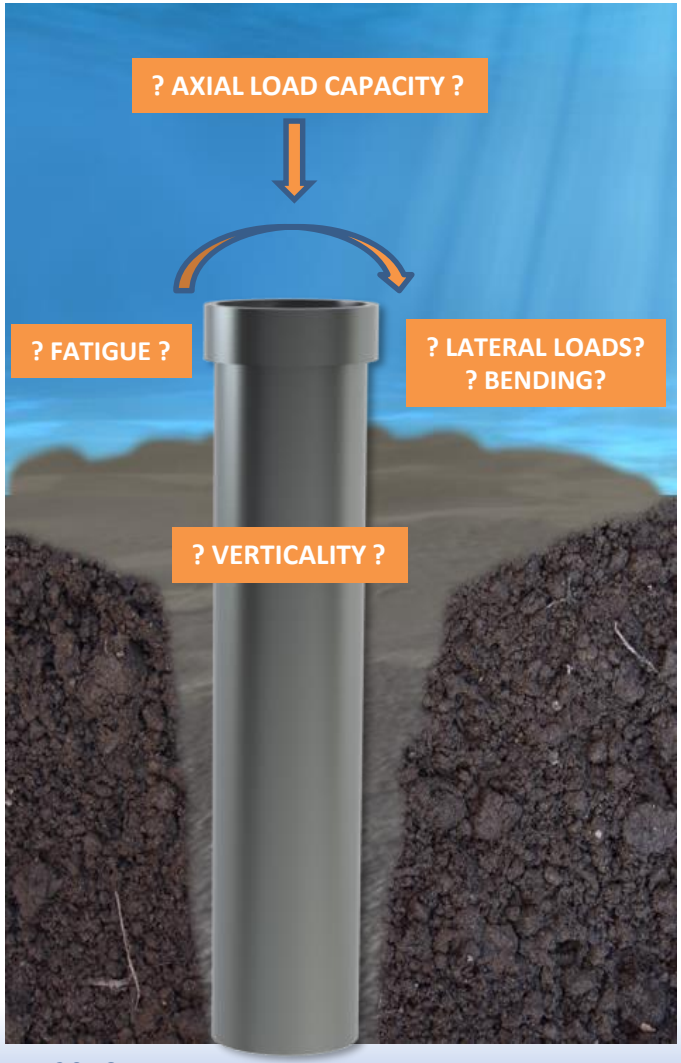
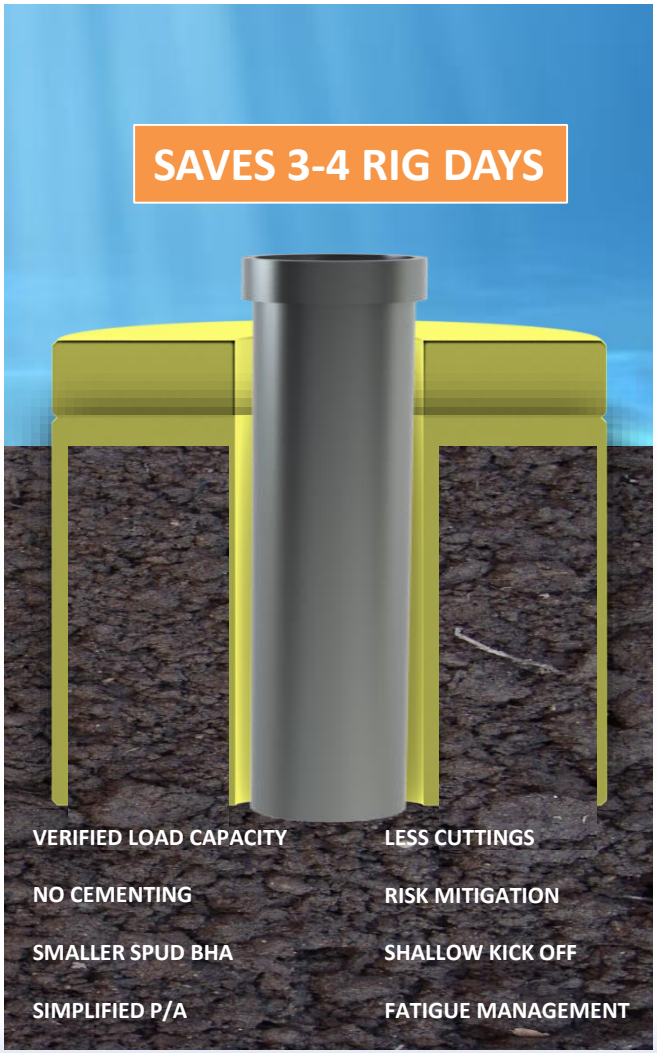
- CAN = **C**onductor **A**nchor **N**ode
- A pre-rig installed well foundation
- The CAN may replace the conventional conductor

CAN – A better Top-hole Well Construction Method

Conductor: Rig installed



CAN: Vessel installed



CAN *Installation*

- Vessel requirements
  - DP
  - AHC Crane ≥ 150 ton
  - Work ROV
  - Surveying services
- Location time < 24 Hrs
- Multiple CAN installation/ recovery campaign will significantly improve cost efficiency

Conductor Jetting Process

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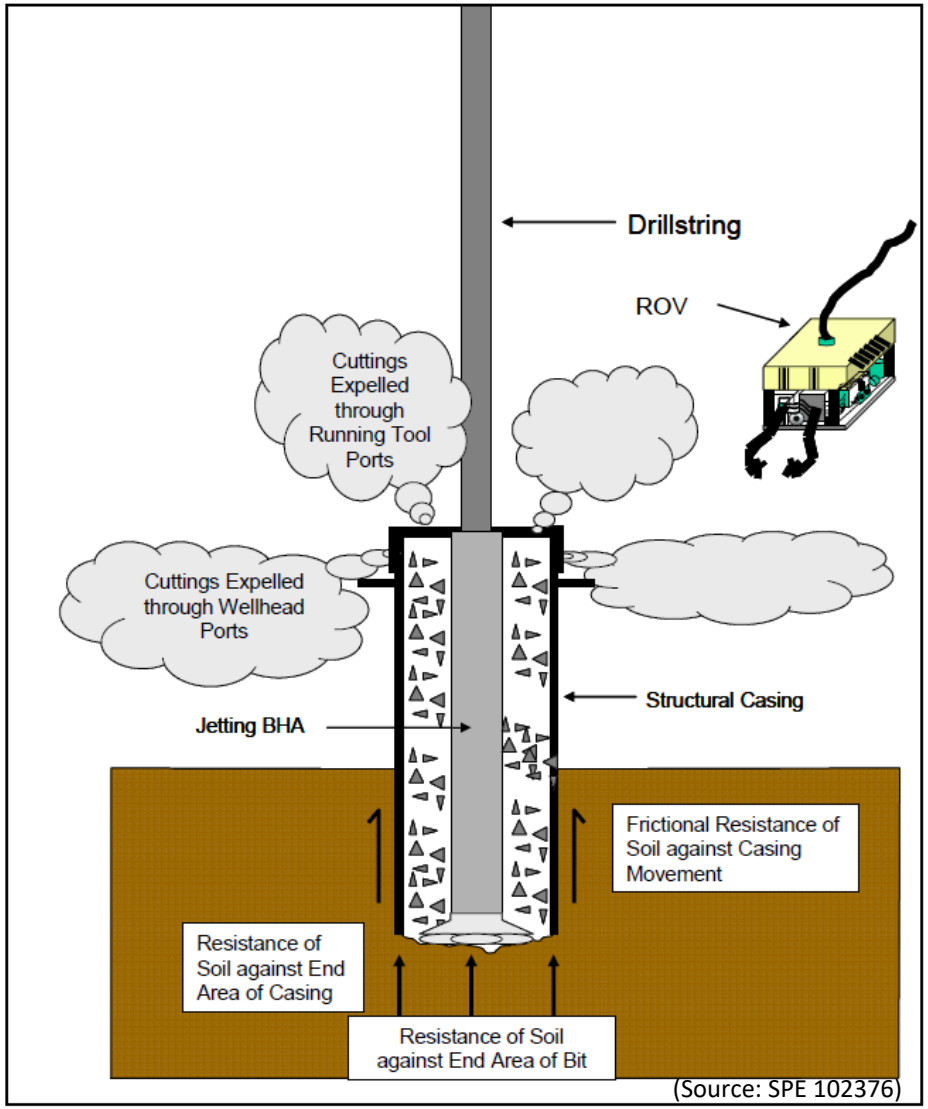

(Source: SPE 102376)

DESIGN WEIGHT TO SUPPORT

Casing	Wt/Ft	Length	Air Wt	Buoyed Wt
(inches)	(lb/ft)	(ft)	(lbs)	(lbs)
36" (est)	553	285	157,605	136,912
20"	133	2000	266,000	231,075
LP Wellhead	NA	NA	28,800	25,019
HP Wellhead	NA	NA	8,700	7,558
MudMat	NA	NA	12,000	10,424
BOP Stack	NA	NA	257,000	223,256
LMRP	NA	NA	228,000	198,064
			Total Weigh	**832,308**

(Source: SPE 102376)

Conductor load capacity requirement:
<u>830 000 lbs = 400 mT</u>

△P = 1,5 Bar for 6m (18') CAN Diameter

P&A / CAN recovery:
(If needed)

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- Casing cutting:
  - CAN-basic:
    Conductor & Surface Casing
  - CAN-ductor:
    Surface casing only
- ROV pump out CAN
- Vessel retrieve CAN
- Prepare CAN for next job
  => CAN is fully reusable!

CAN Main Options (I)

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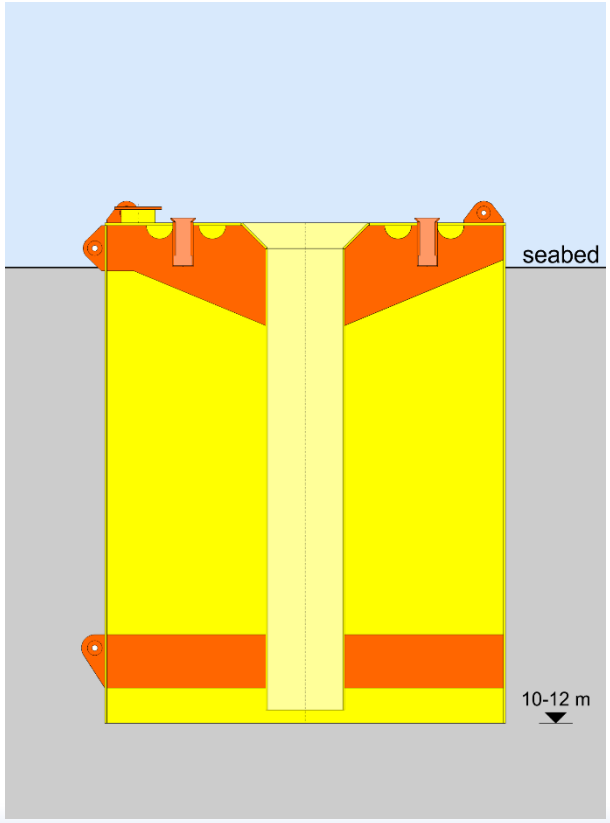
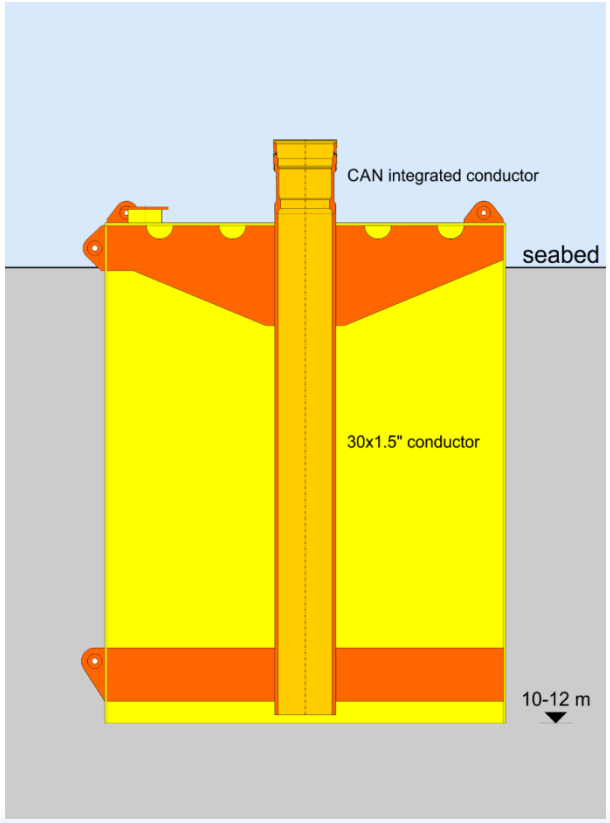
1. **CAN** (Problem solver)
   - Very soft seabeds
   - Conductor jetting



2. **CAN-ductor** (Cost Cutter)
   - Conductor Pre-installed in CAN in the workshop

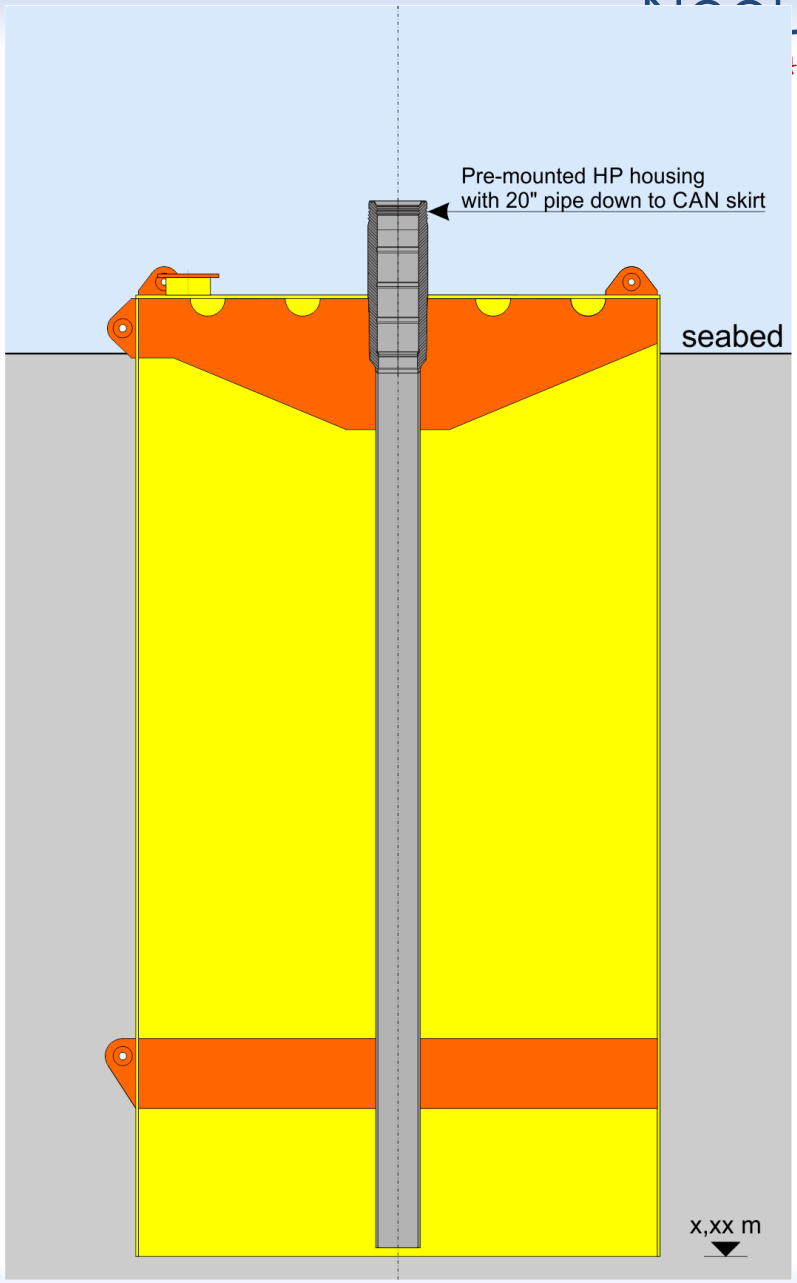


CAN Main Options (II)

3. *'CAN-slender'*

Benefits:

- Drill slender wells with standard rigs
- No 30'' & 20'' sections
- No top-hole cementing
- 17 ½'' Spud BHA (returns to seabed)



Example CAN-ductor Design

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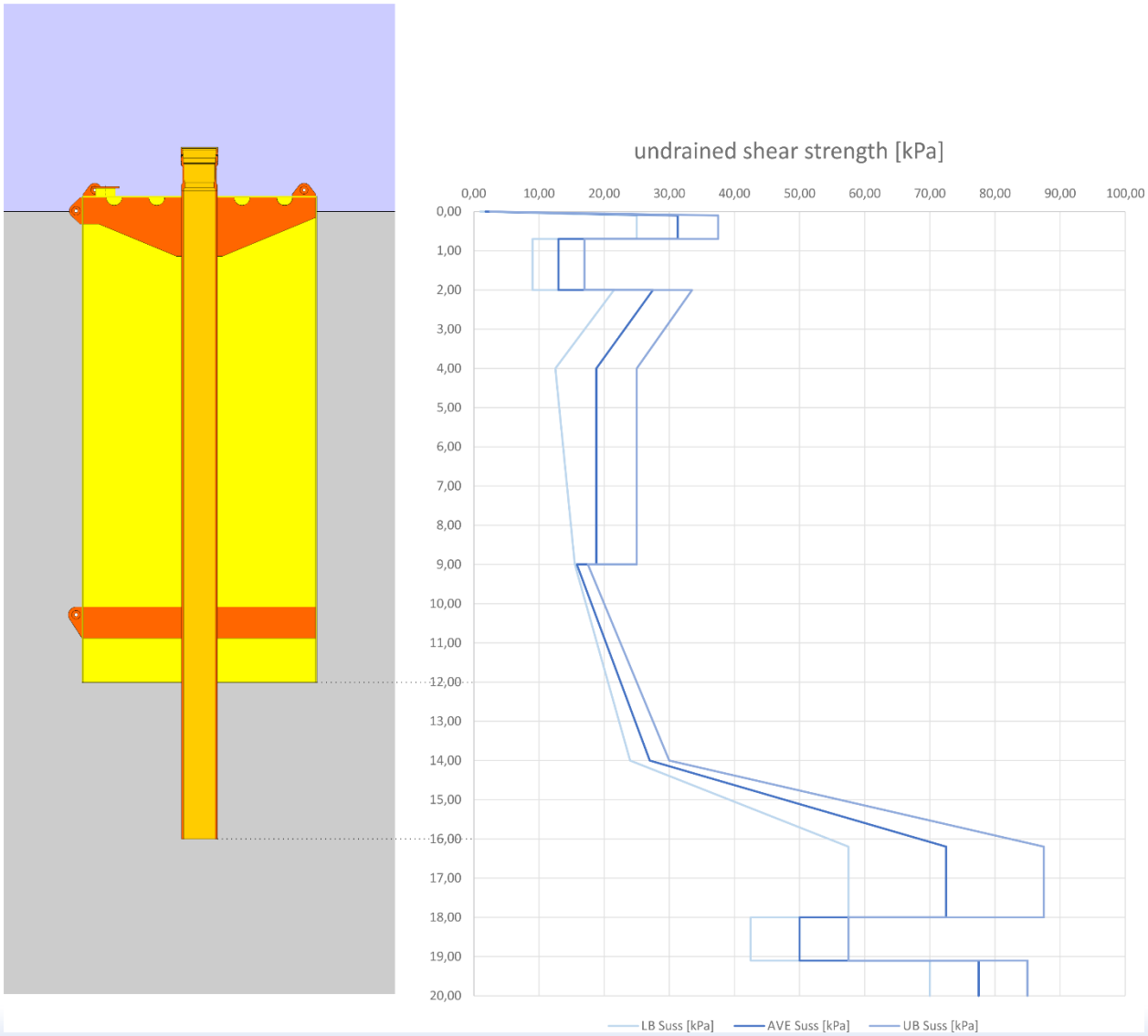

Track Record

- 15 CAN installations for
  - Exploration wells
  - Production wells
- Water Depth
  - Shallowest: WD 125 m
  - Deepest: WD 1 444 m
- CAN technology users:

Statoil

Eni

Lundin Norway

centrica

REPSOL

DETNORSKE

Endeavour

OMV

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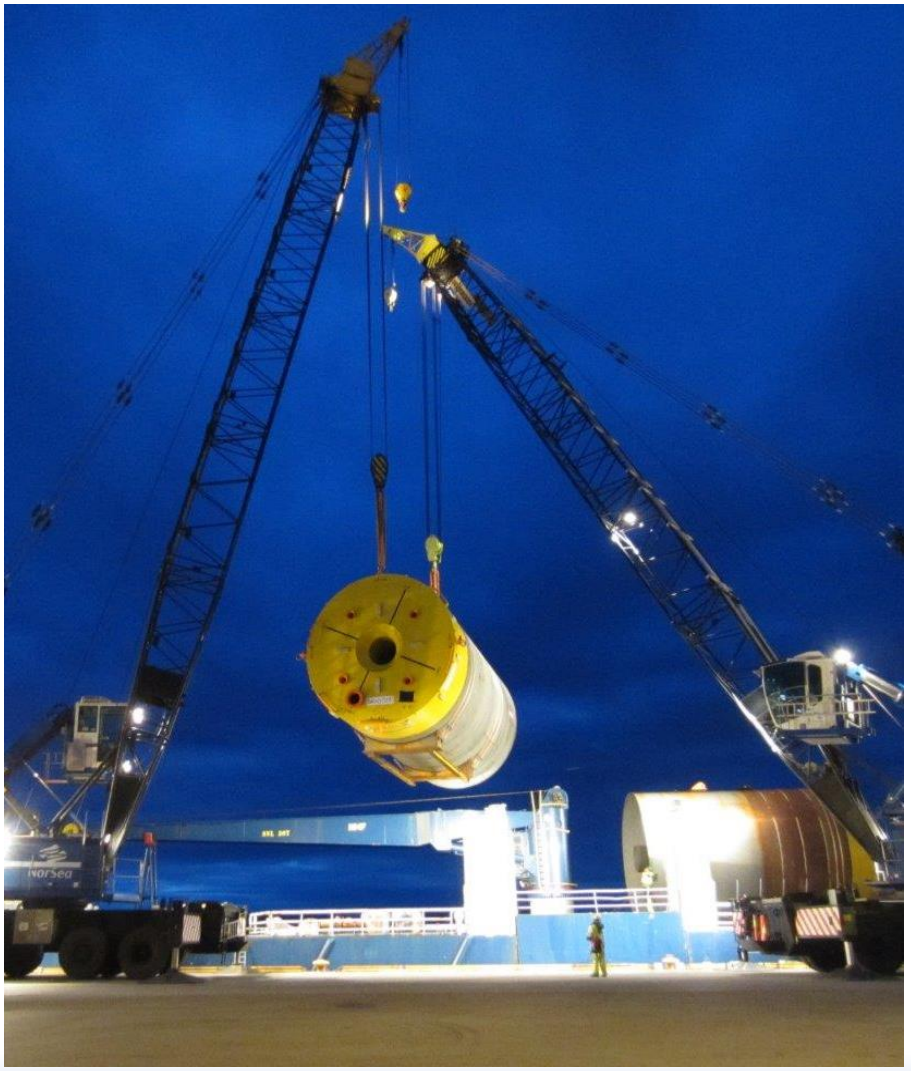
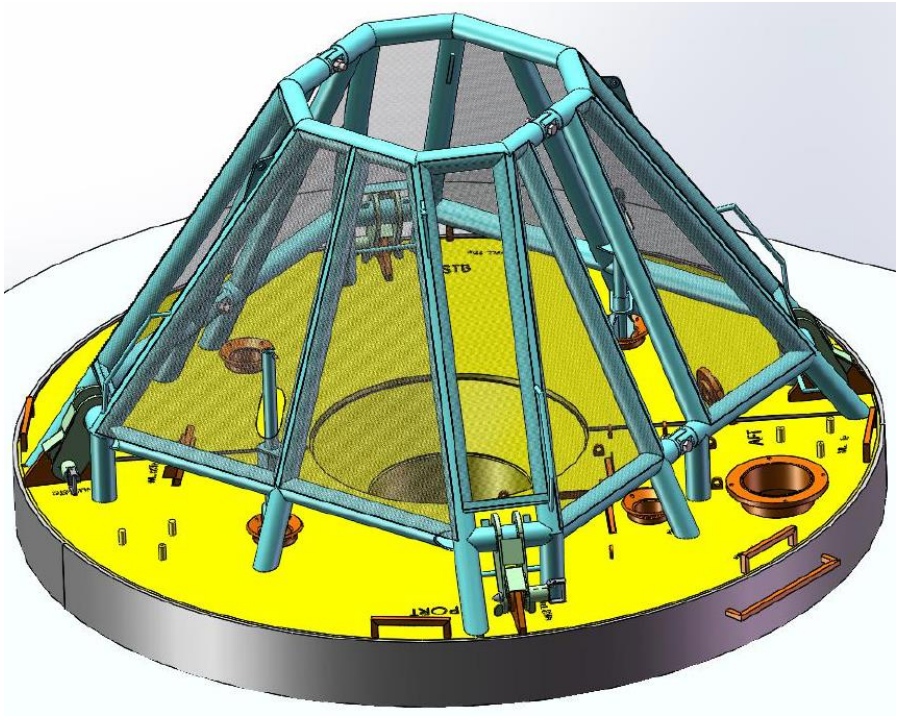
Summary

- The CAN Technology offers significant cost savings for
  - Exploration wells
  - Development wells
- CAN gives higher operational and *accidental* load capacities
- CAN reduces environmental footprint (cuttings & cement)
- Risk Mitigation (ALARP)
- Fatigue management/control
- *"Instant production"* enabler
- Proven Technology
- BAP (Best Available Practice)





BACK-UP SLIDES

CAN + Conductor Jetting:

Example: Centrica Ivory

- Water depth 1444m
- Application: Safe jetting
- Soft seabed – conductor support needed

CAN/Jetting Snapshots (Ivory):

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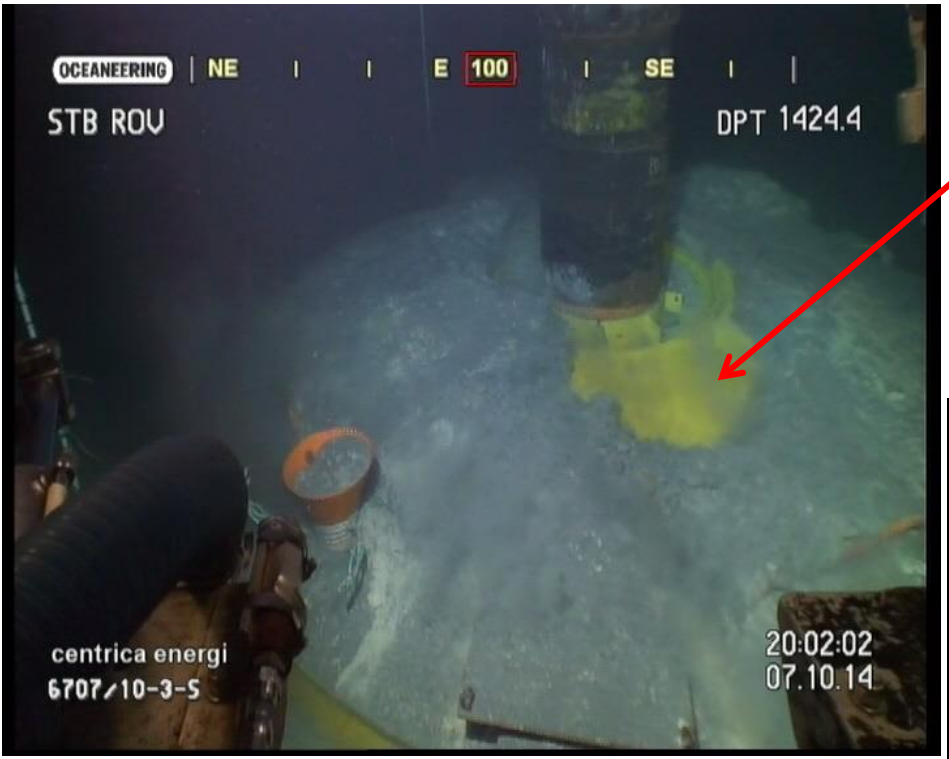

CAN top after jetting completed

Conductor Hanger landed in CAN

CAN Contributions:

- Engineered load capacities:
  - Operational (axial & lateral)
  - Accidental (bending & fatigue)
- Shorter conductor
- Drill-ahead without conductor ‘soaking’
- Saves rig time
- Risk mitigation

CAN-ductor Well Reference

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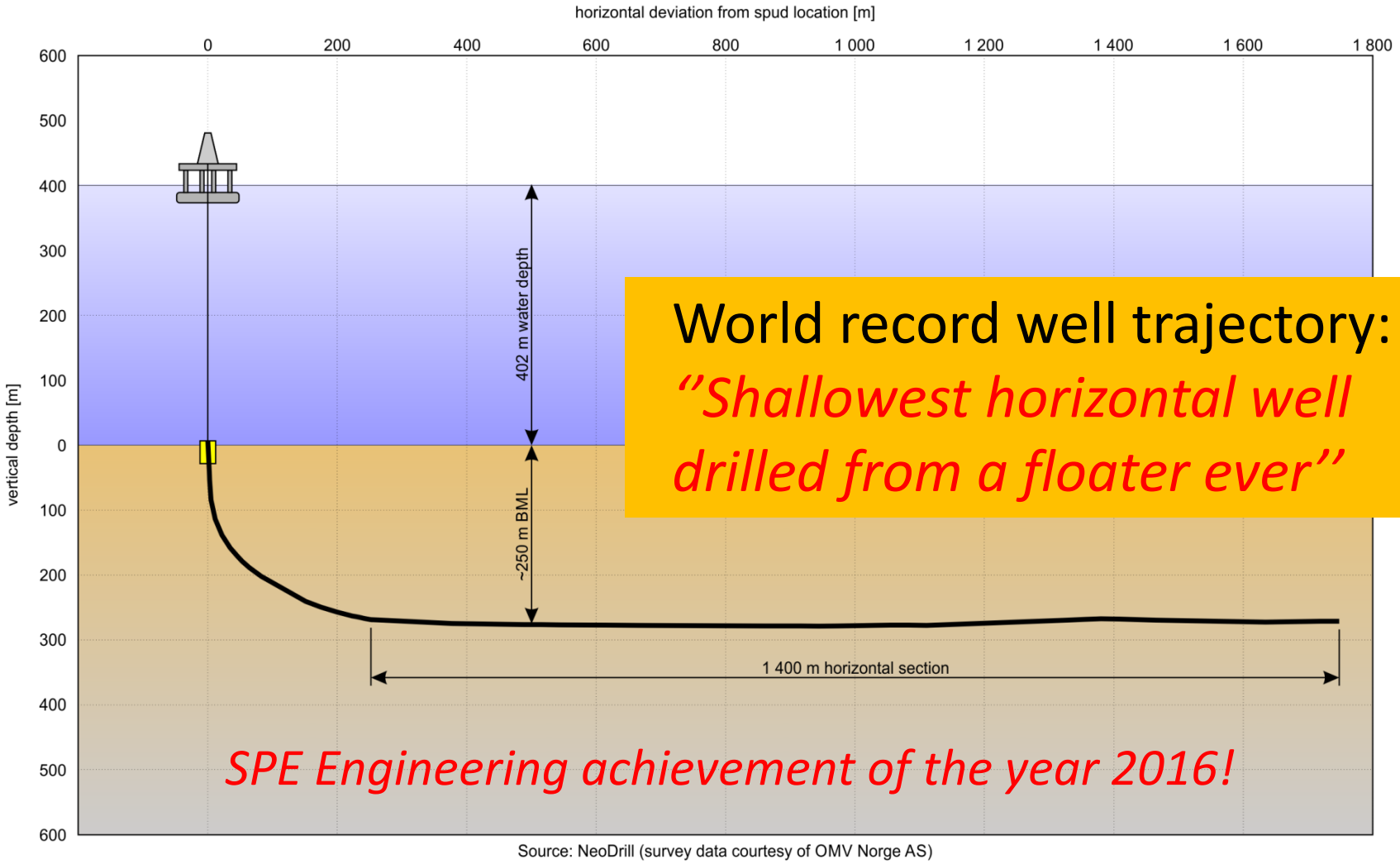
- OMV Wisting Well Objectives:
  - Risk mitigation
  - Save 3-4 rig days
  - Test drilling capabilities:
    - Very shallow kick-off
    - Shallow horizontal section
    - Easy P&A
- Achievements:
  - Saved rig time:
    - Drilling
    - P&A: Cut Surface casing only
  - Field development capability demonstrated (CAN-ductor)

Well Trajectory - Wisting Central II



World record well trajectory:
"Shallowest horizontal well drilled from a floater ever"

SPE Engineering achievement of the year 2016!

Source: NeoDrill (survey data courtesy of OMV Norge AS)

CAN-integrator

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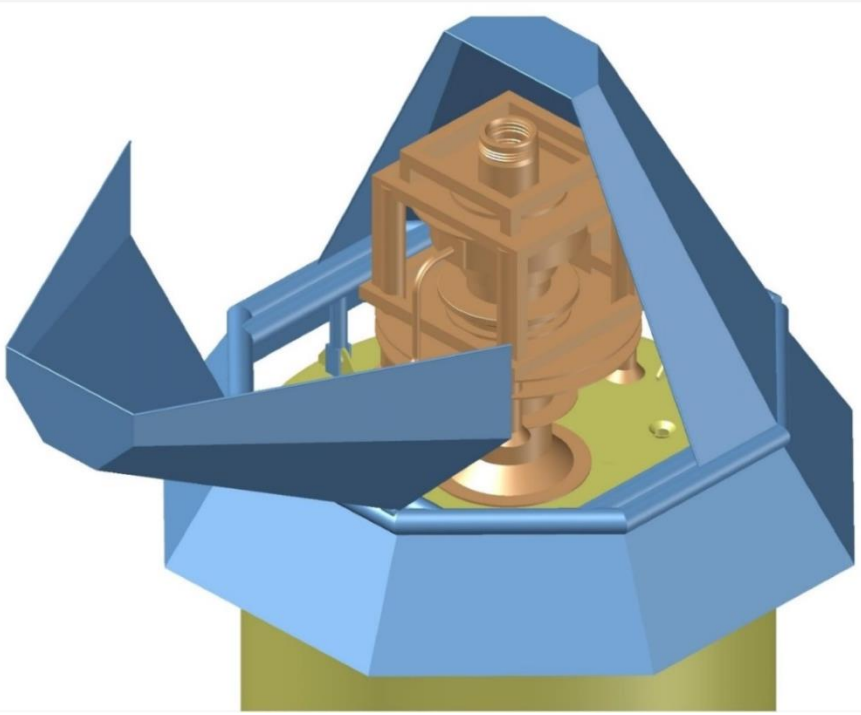
Integrates Well Construction & Production System installation operations

Aims:

1. ***Save well construction costs***
2. ***'Instant production'***



Major Operator has embraced the CAN technology:

Statoil Cap-X™

New solution enabling subsea standardisation

Footprint reduced to 1/4 of regular satellites

Enables Pre-rig "Plug & Play" on the seabed!