



# Agenda

1. Introduction to AF Offshore Decom
2. The Decommissioning Mindset and EPRD Model
3. Alternative Decommissioning models
4. Vessel Market Overview and Resource Constraints
5. Lessons learned

An Introduction  
to who we are...

AF



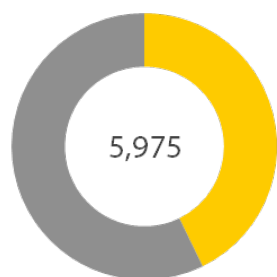
## Introduction to AF Gruppen



### About AF Gruppen

Established in 1985 and currently a leading contracting and industrial group with operations in Civil Engineering, Building, Property, Environment, Energy and Offshore

### Employees



■ Salary Employees ■ Skilled workers

### Results<sup>1</sup> (2022)

3,192

Turnover (USD million)

144

Operating profit (USD million)

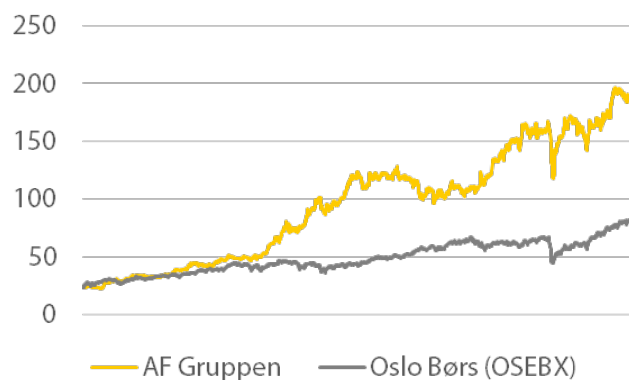
5%

Operating margin

### Geography



### Share price developments (AFG) last 10 years







# AF Group's Vision

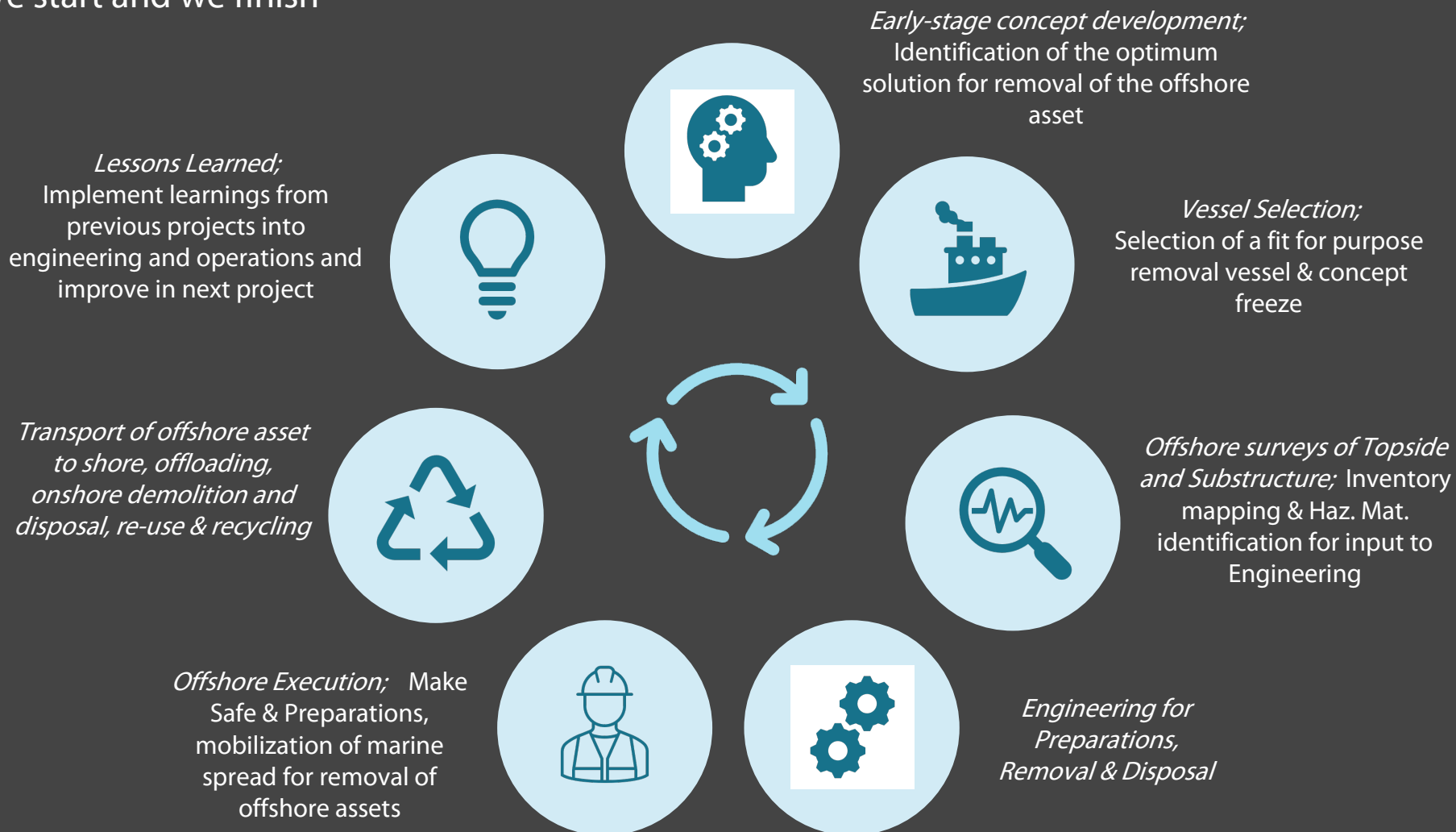
Clearing up the past,  
building for the future

## A strong culture based on distinct core values

- Reliability
- Freedom to exercise entrepreneurship and discipline in accordance with goals and requirements
- Thoroughness and hard work
- Persistence in achieving profitable growth
- Management through presence and involvement

# From Concept Development to Project Execution

We start and we finish



# Our Decommissioning Track Record

Ekofisk tank ConocoPhillips ('14-'08)	Indefield Shell ('07-'11)	Ekofisk Cat 1 & 2 ConocoPhillips ('08-'14)	Ekofisk 2/4W ConocoPhillips ('08-'10)	Kittiwake LB Venture Production ('08-'09)	H7 & B11 Equinor ('11-'16)	Ekofisk 2/4G Topsides BP ('15)
SBM-C Equinor/Deep Ocean ('12)	Murchison CNR ('14-'18)	Janice FPU Maersk ('16-'18)	Ekofisk Cat 3 ConocoPhillips ('17-'21)	LOGGS field Harbour Energy ('17-'24)	Huldra Equinor ('19)	Jotun HMC ('20)
Brent jacket Shell/HMC ('20)	Egreflav Marathon/TACA ('20-'22)	Dunneapha airfield ('18-'22)	Goldeneye HMC ('21-'22)	Cullw FUSC Shell ('22-'24)	Tor Ekofisk ConocoPhillips ('22-'2)	L7 field Total Energies ('22-'25)

EPRD (Engineering, Preparation, Removal & Disposal)

Disposal

### Our Track Record

- 97% Recycling rate for materials received for decommissioning
- ~ 400,000 Metric Tonnes dismantled and recycled
- 58 Number of installations recycled
- > 20,000 Metric Tonnes of hazardous waste removed from the waste cycle.

# 2 projects are the same





## Europe's most modern and environmentally sound facility for advanced offshore

- Site is ready for turbine assembly and suitable for heavy-duty cranes
- Onshore production and loading support load-out/in of 25,000 tonne vessel – option to build launch



Indoor storage area of 2,500 sqm

Membrane

40 m

Vatnsl



# The Decommissioning Mindset & EPRD Model





# What is EPRD and The Decommissioning Mindset?

*Engineering, Prepare, Remove and Dispose*

The short answer is that the EPRD contracting model with The Decommissioning mindset is what reduces offshore HLV and Marine spread days

## ■ HLV offshore days

- Standard offshore operation reference 1
- Well prepared EPRD project up to 0,5 efficiency

## ■ Examples Marine Spread

- Dunlin A
- H7/B11
- LOGGS



# Decommissioning is Not Simply Reverse Installation

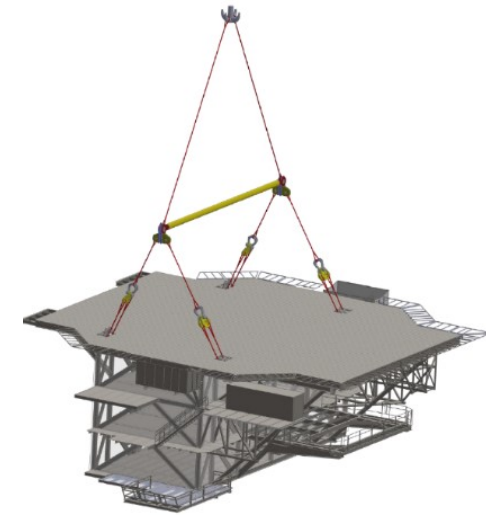
- Platform Make Safe & establish of utility systems for Hook down preparations
- Structural integrity issues on platforms after 20-30+ yrs in production, work with corroded structures
- Bespoke lift and removal solutions (*Piece Small/ Piece Medium/Single Lifts*)
- Control, handling & containment of hazardous materials
- Dropped objects prevention, securing of loose objects





# Decommissioning is Not Simply Reverse Installation

- Weight uncertainty
- Available documentation versus reality - unknown modifications & repairs
- Each platform is unique and requires bespoke solutions.
- Ability to manage risk related to safety, health exposure and environment
- Expect the unexpected and plan for it!



# The Decommissioning Mindset

## ■ Decommissioning VS. T&I:

- While T&I is basically follows the installation procedure that the operations were designed to, decommissioning is developing methods and designing a safe and efficient method to remove offshore platforms
- Structural integrity issues are the most common issue to be resolved
- Decommissioning is often a combination of methodologies with weight shedding, piece small and single lifts

## ■ Decom does not generate revenue:

- Decom costs need to be kept low as possible; thus, it is important to keep all viable options open where possible
- Optimise as many synergies as possible, which requires detailed engineering





# Alternative Decommissioning Models



# What are the Alternative Decommissioning Methodologies?

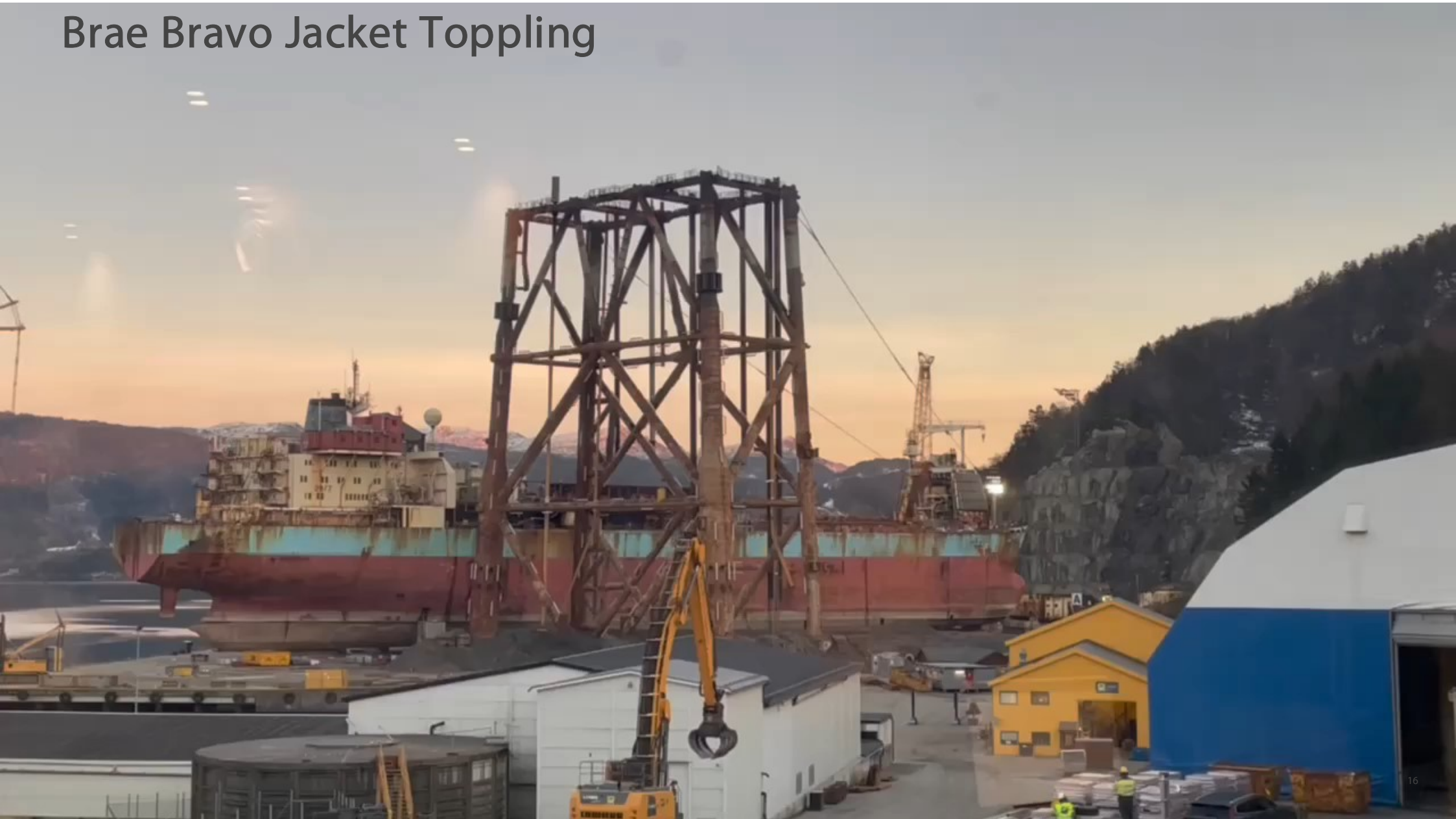
- Use of Explosives

- Brent A Jacket Toppling at Vats Yard - With a weight of approximately 6,300 metric tonnes at the moment of the toppling, this was the largest toppling to date in Vats.



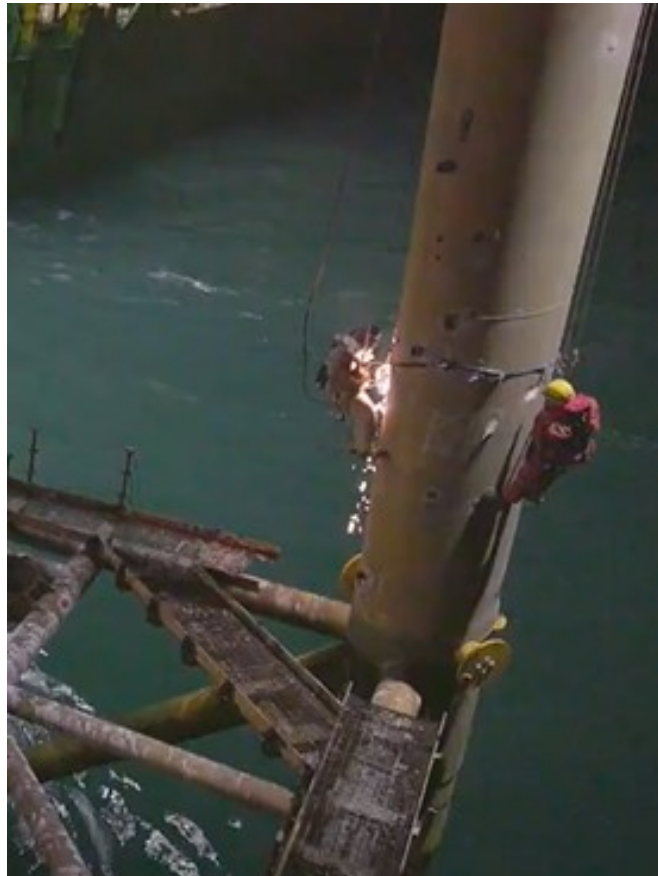


# Brae Bravo Jacket Toppling



# What are the Alternative Decommissioning Methodologies?

- Rope Access Technicians
- Multi Skilled Operators performing hot work via rope access
- Efficient access eliminating the need for timely installation of scaffolding
- Castelled cuts de-risking the operation, topside-jacket connection stabilized, avoiding the need for having people under suspended loads to perform “final cuts”

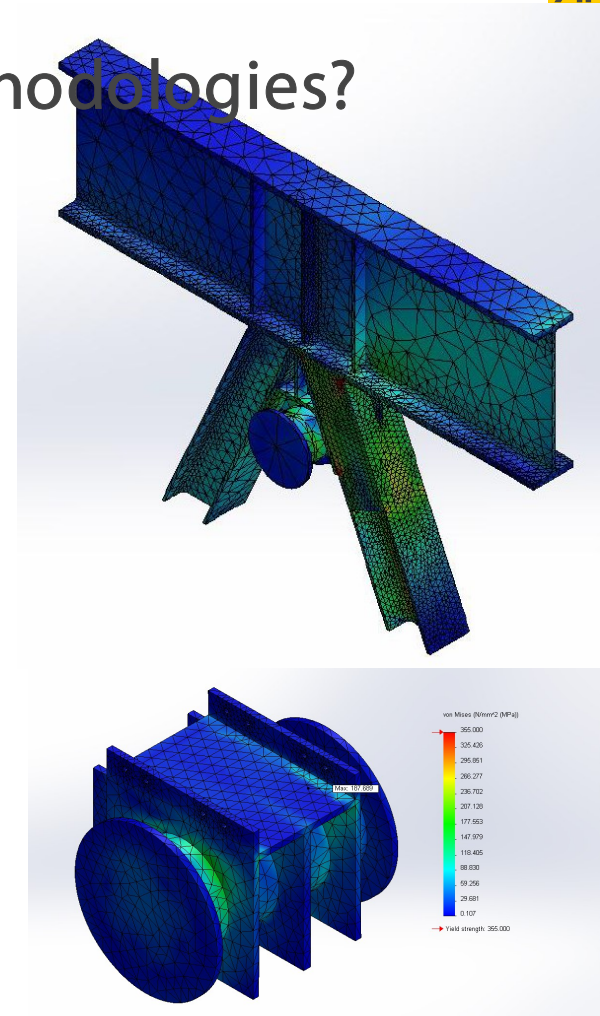


# What are the Alternative Decommissioning Methodologies?

## ■ Lifting Block Methodology

### Advantages:

- No Welding Required, Reduced time required to prepare lift points
- No pre-heating, No waiting for NDT
- No risk of failed NDT inspection
- Forces are not transferred to structure in tension (unlike in pad eyes), this means that that the concept is less sensible to material defects
- If any NDT of structure is required, it can be done on surveys in advance
- Work with preparing Lift points can (usually) be performed before other modules above are removed
- Lift point preparations can be done by MSO
- Installation is “low precision” work
- Documentation for lift points can be completed before going offshore





# What are the Alternative Decommissioning Methodologies?

- Lifting Block Methodology

## **Disadvantages:**

- Spreader bar is usually required
- Require compatible geometry



## What are the Alternative Decommissioning Methodologies?

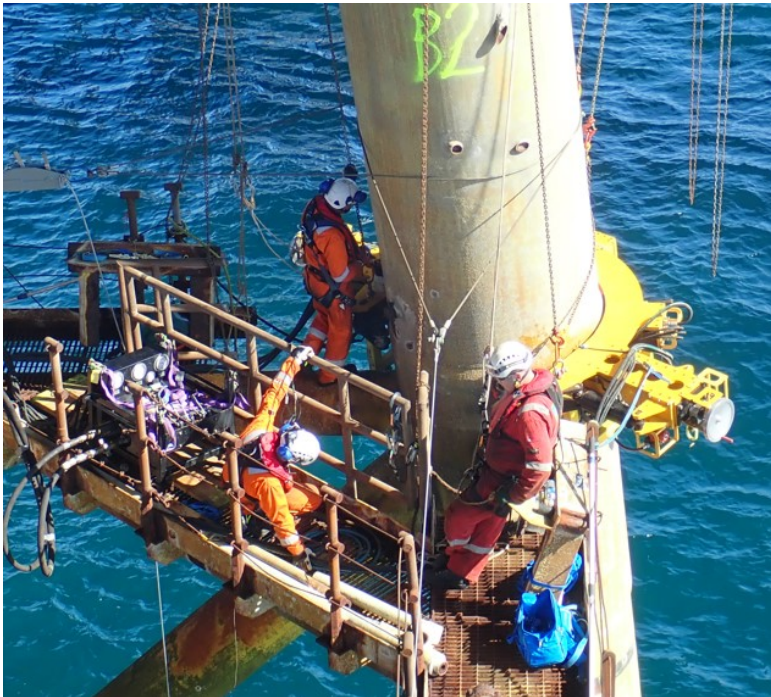
- Drilling and Pinning
  - Drill & Pin to replace the requirement for ILT's
  - Efficient pin drilling cold cut method
  - Dual drilling units on one single operation
  - Swing gate quick clamp
  - Similar Subsea drill and pin tools available
  - There are 4 lifting points on each extremity, in addition there are totally 4 other lifting points around the circle of the unit and 2 rearward lifting points on each extremity
- Pre-cut prior to mobilising the HLV
  - Structural assessment proven
  - ~50% legs readily cut (subject to engineering verifications/ in-place analysis)
  - Final cut planned
  - Reduce the number of activities on critical path





# What are the Alternative Decommissioning Methodologies?

- Drilling and Pinning



# What are the Alternative Decommissioning Methodologies?

## ■ Heavy Lift Rigging

- Simple pre rigged does the job fast and efficient.
- Complex HLR and equipment off critical path.
- Reducing weight of the HLR.

## ■ T&I design mindset

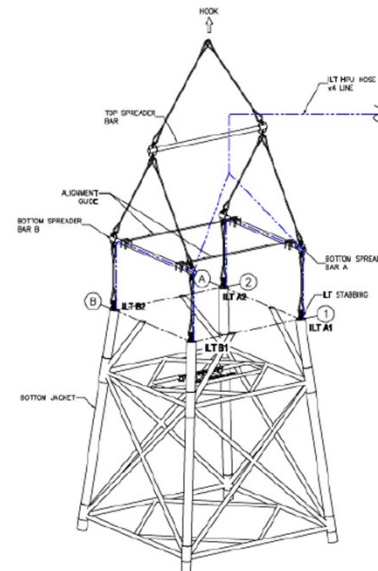
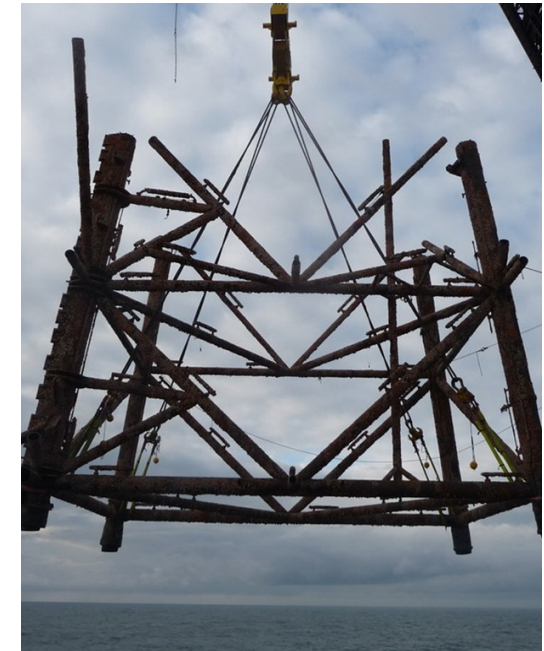


Fig. 3.4-5: Lifting Attachments for Set 7 Jacket Bottom Section (LT method)

## ■ Decom Mindset

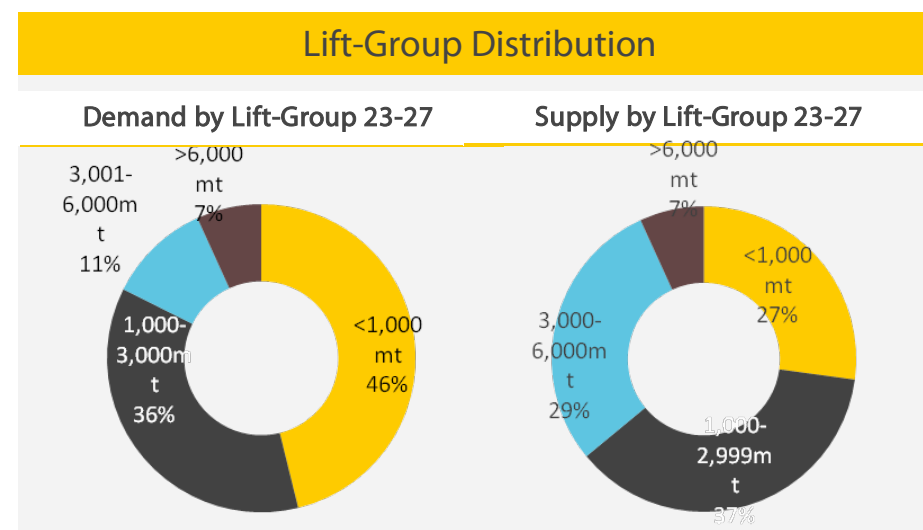
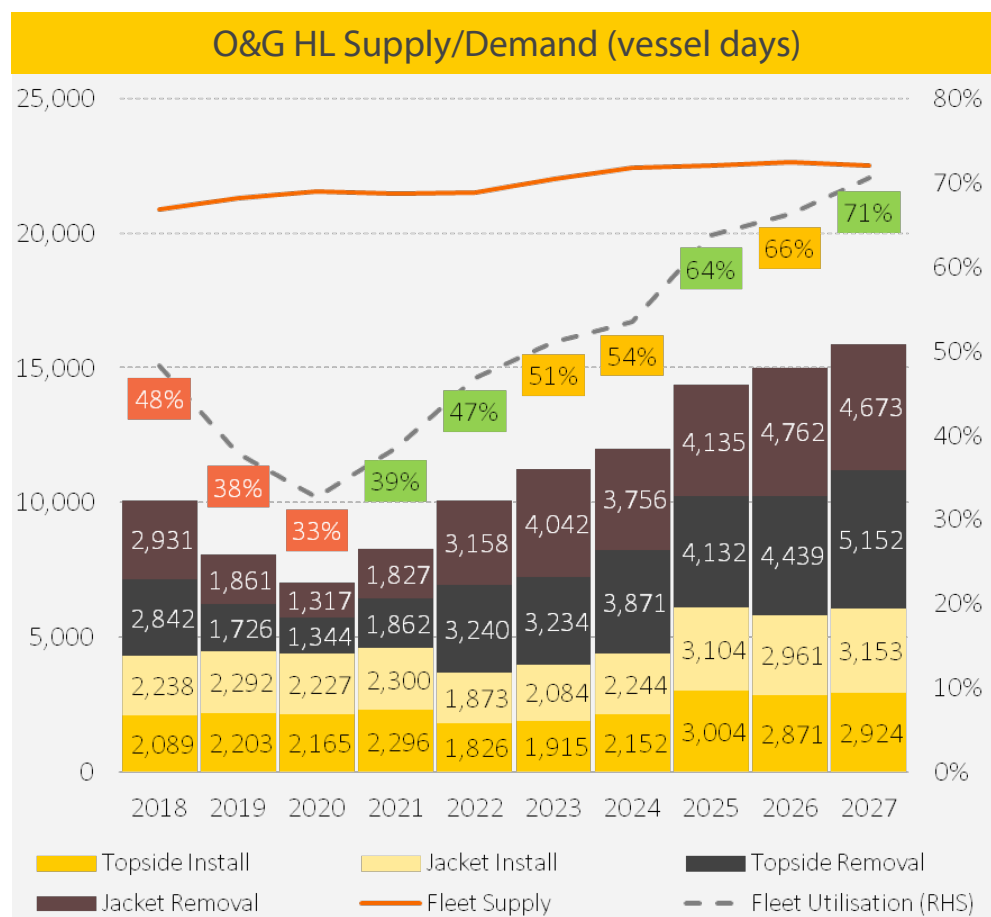


# Vessel Market Overview & Decom Resource Constraints



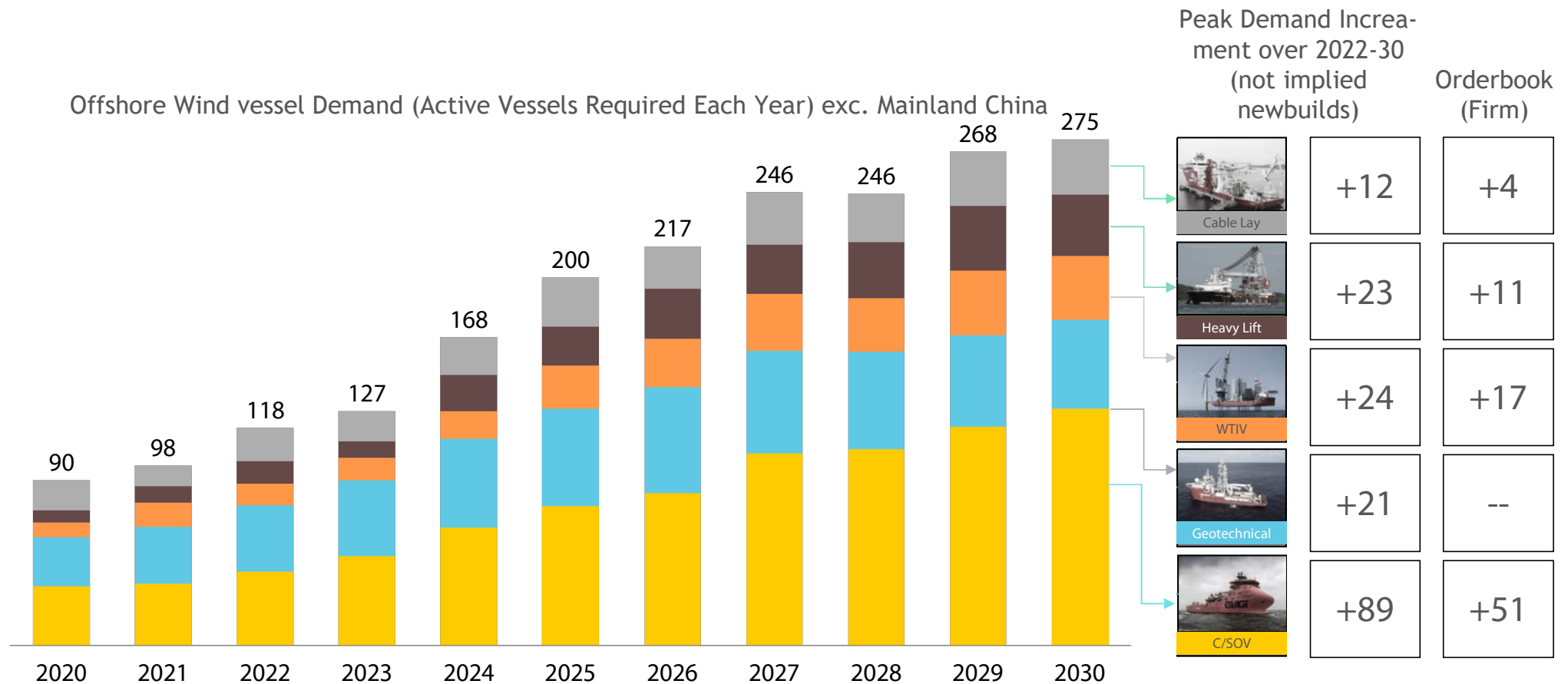


# O&G Offshore Heavy Lift Vessel Utilisation – Decom and Installation



# Offshore Wind Vessel | demand to increase by 180 over coming decade—more orders required

Offshore Wind vessel Demand (Active Vessels Required Each Year) exc. Mainland China



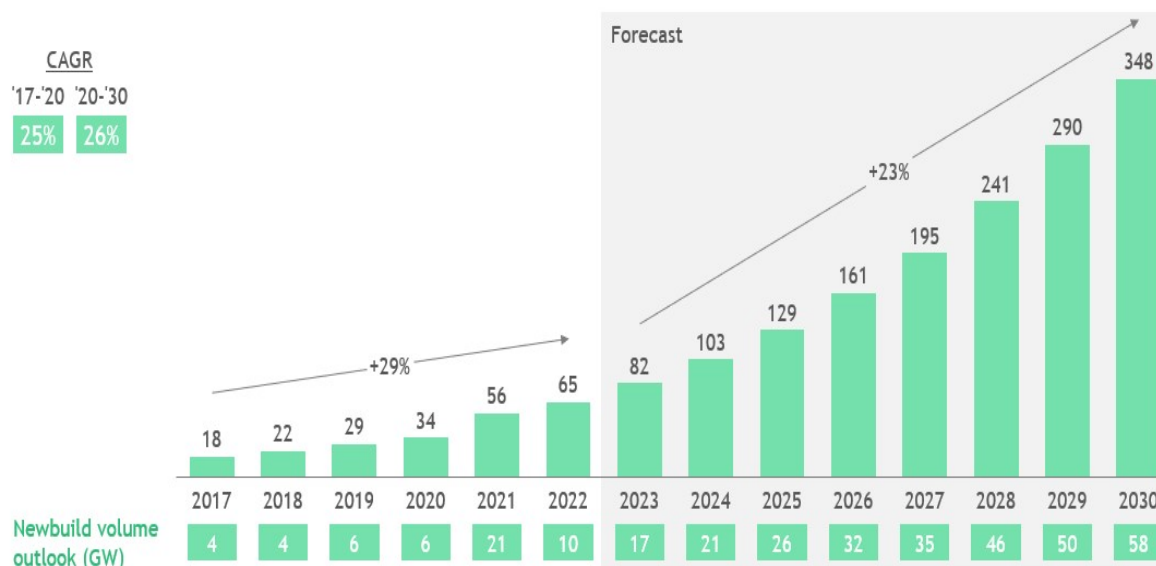


## Engineering and Preparation the swing producer to “fit for purpose”

- The forecast of the number of installed wind turbines is increasing however so is the size of these wind turbines (capacity in GW increasing).
- Close to 100% utilisation of >6000 tonne Vessels required by end of decade and the smaller capacity vessels will no longer be utilised.... What does this mean for Decom?

Offshore Wind | Installed capacity could grow by ~25% p.a. to 2030

Global historical & forecasted cumulative installed capacity, 2016-30 (GW)

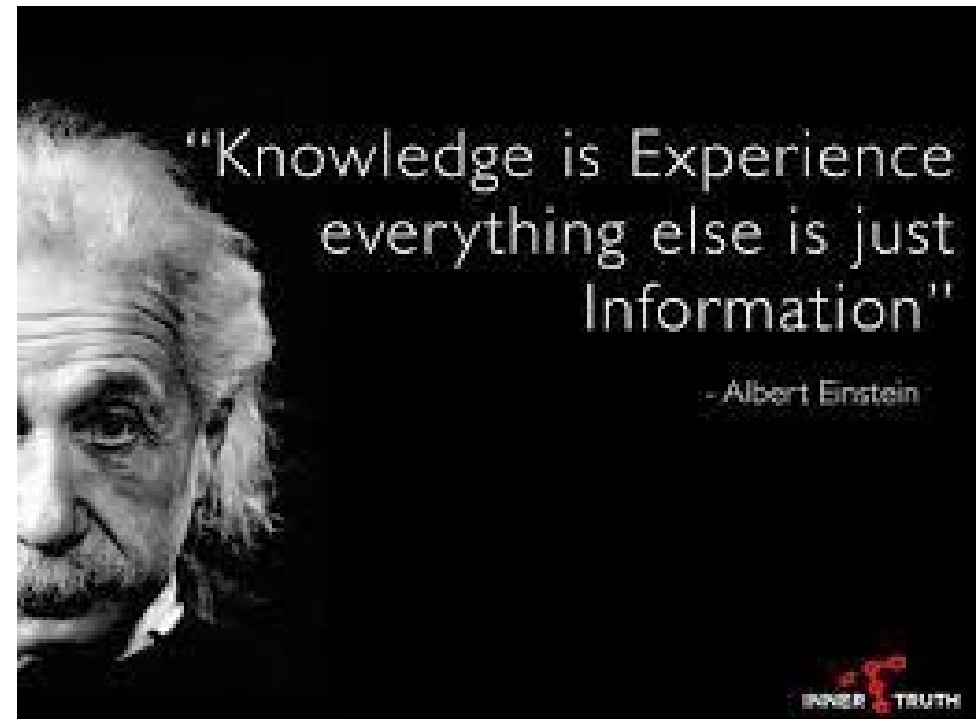


# Lessons Learned



## Experience is Valuable

- Companies/Contractors usually executing their 1st Decommissioning Project with little experience to base decisions on.
- Many teams disbanded after project completion and the value of experience is lost
- Few industry senior managers and leaders have any decommissioning planning, execution or field experience



## Engineering and Preparation: The swing producer of “fit for purpose”

Piece Small

Reversed Installation

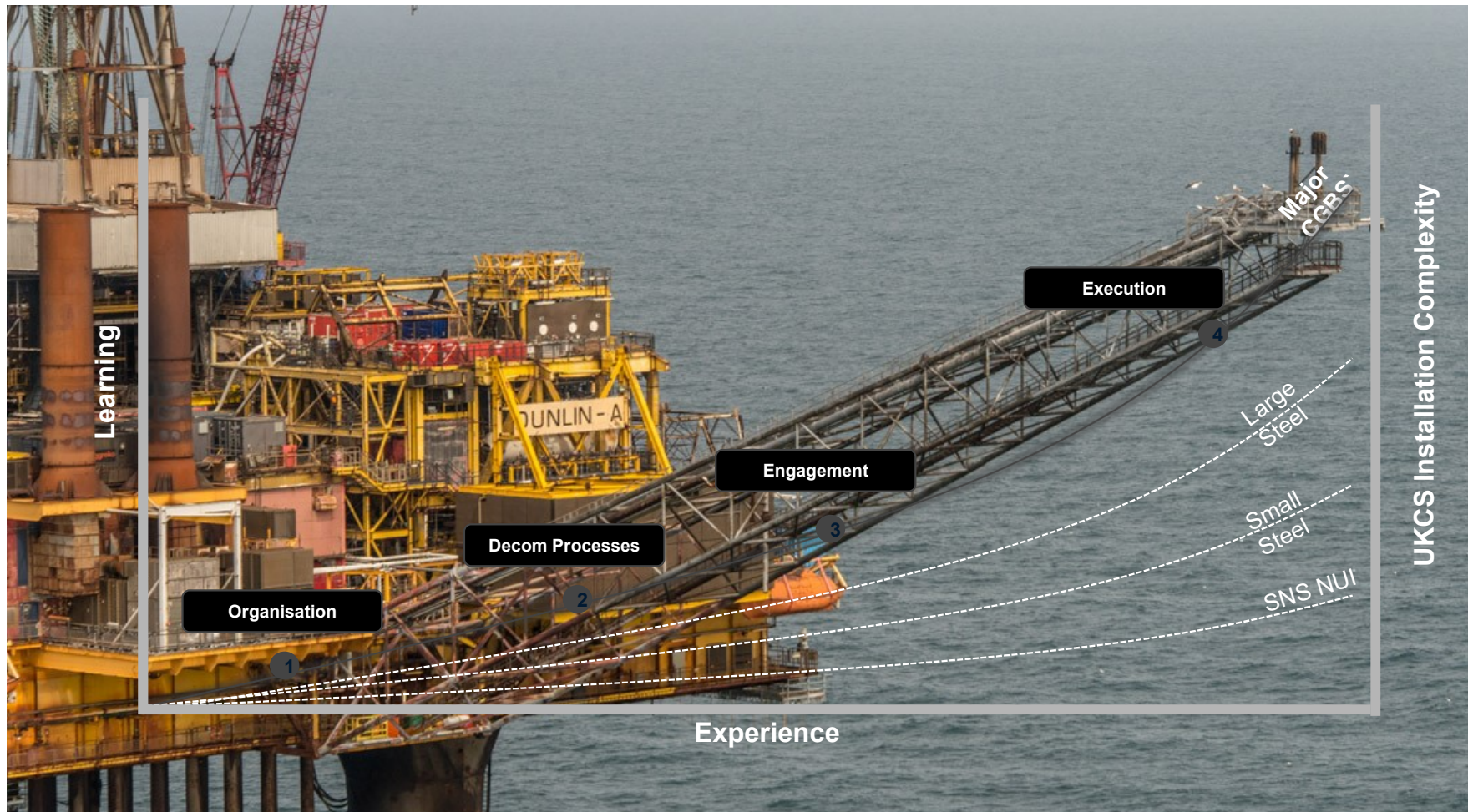
Hybrid Weight Shedding

Single Piece





# The Operator Learning Curve



# Why is The Operator Not Best Placed to be a Decommissioner?



Well P&A ≠ Drilling  
Demolition ≠ Fabrication  
Removal ≠ Installation  
Decommissioning ≠ E&P

## Key factors to consider...

- Forward Thinking – the need to reconsider your contracting strategy and assess current and future market dynamics. Would your decom plan created 5/10 years ago work in the current market...
- Decommissioning is always more complex than you may think and very much requires a fit for purpose solution on a case by case basis.
- Decommissioning isn't optional which many sometimes forget and requires significant investment of resources.
- Limited Resources:
  - ✓ Vessels - HLV are focused on 'bigger' and 'better' things leaving decommissioning market with a significant challenge. By 2025, <1 500 tonne vessels will be redundant from the wind installation market... Decommissioning has a huge opportunity to jump on this
  - ✓ Expertise - there are few companies in the market that are experts in decommissioning, thus many planned solutions do not work in reality of execution.
- Prioritise end of life planning!





# Thank you for listening

