



# Barge-Supported Jack-Up Leg Lift

MOP Conference  
22/04/2026

# SEMAR



# Semar at a glance

- Established in 1980 as Structural Engineering AS
- Offices: Lysaker (HQ) and Kristiansund
- Started as a small consultancy company with focus on float-over operations and has grown into multidisciplinary company with strong focus on marine operations across oil & gas, offshore wind, decommissioning
- 30+ employees, engineers and master mariners
- Bridging the gap between theory and practice in marine operations



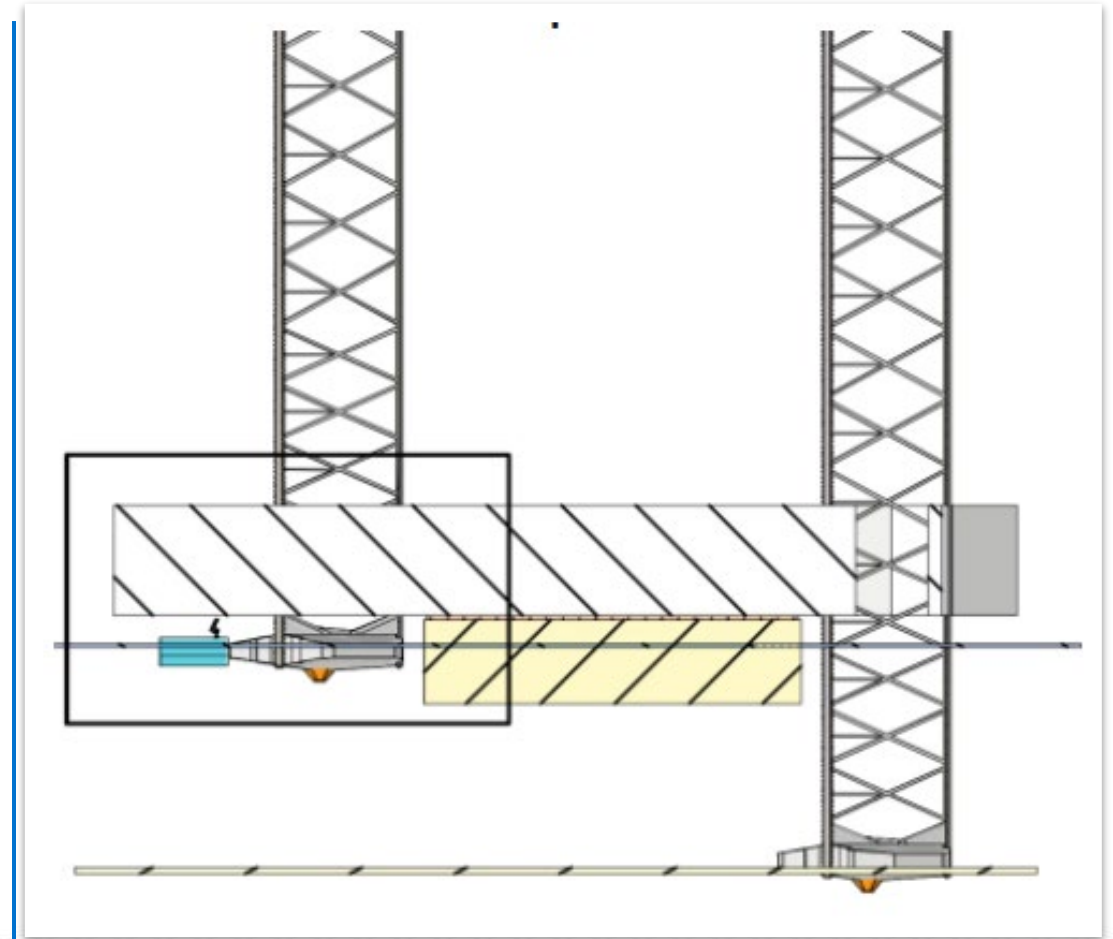
# Project reference: CWE at Windport, Mandal

- Crossway Eagle (CWE) is an accommodation jack-up with capacity of 354 PoB
- Operated by Macro Offshore
- 10-year Special Periodic Survey (SPS) before charter on Empire Wind Project (USA)
- Part of planned SPS scope:  
**Dry inspection / repair / anode replacement on spudcans required**
- Windport / GOT contracted by Macro Offshore for SPS scope



# Project motivation

- Develop attractive alternative to dry-docking:
  - Cost reduction
  - Flexible wrt. schedule and location
- Possible to lift the legs one by one by supporting the hull with a barge
- Comparable operation successfully completed in 2024



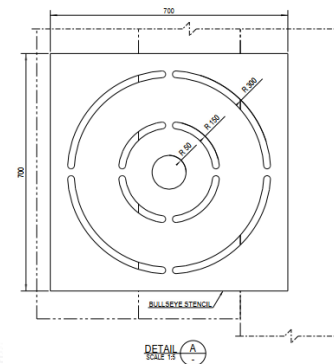
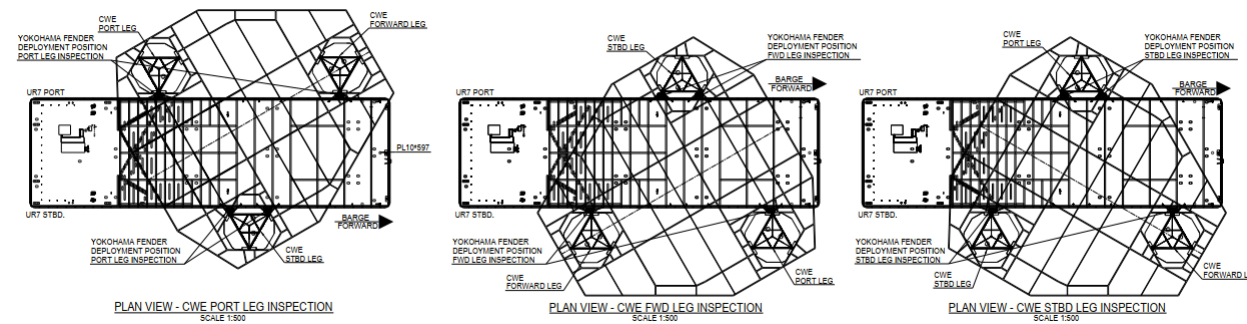
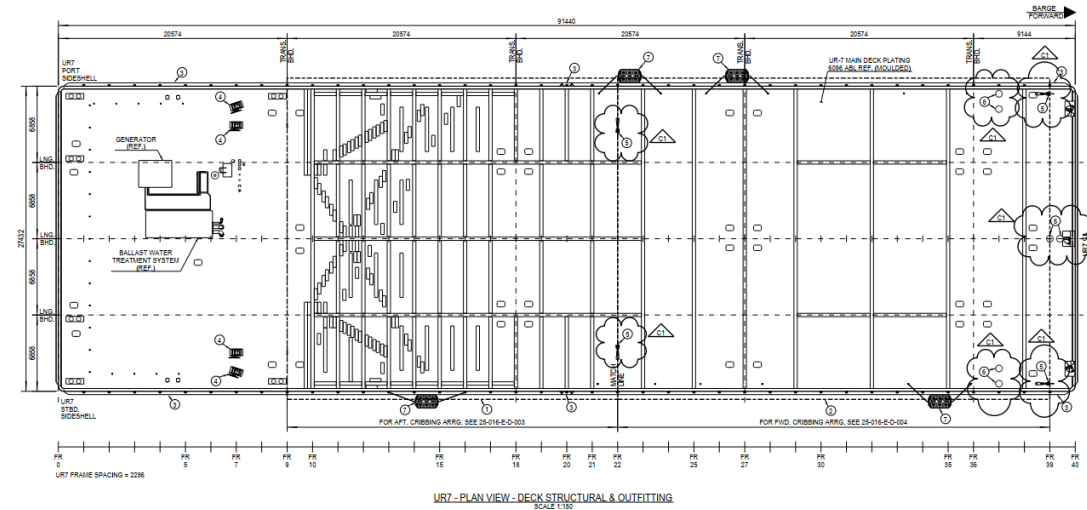
# Technical focus

- Minimum size barge required for stability:  
“Standard North Sea Barge” (300ft)
- Maximum width of barge to fit between the legs:  
“Standard North Sea Barge” (300ft)
- Need different barge position for each lift of the legs
- Minimize “interference” on the SPS scope. I.e. efficient execution of the operation and no barge reconfigurations between the operations



# Barge layout

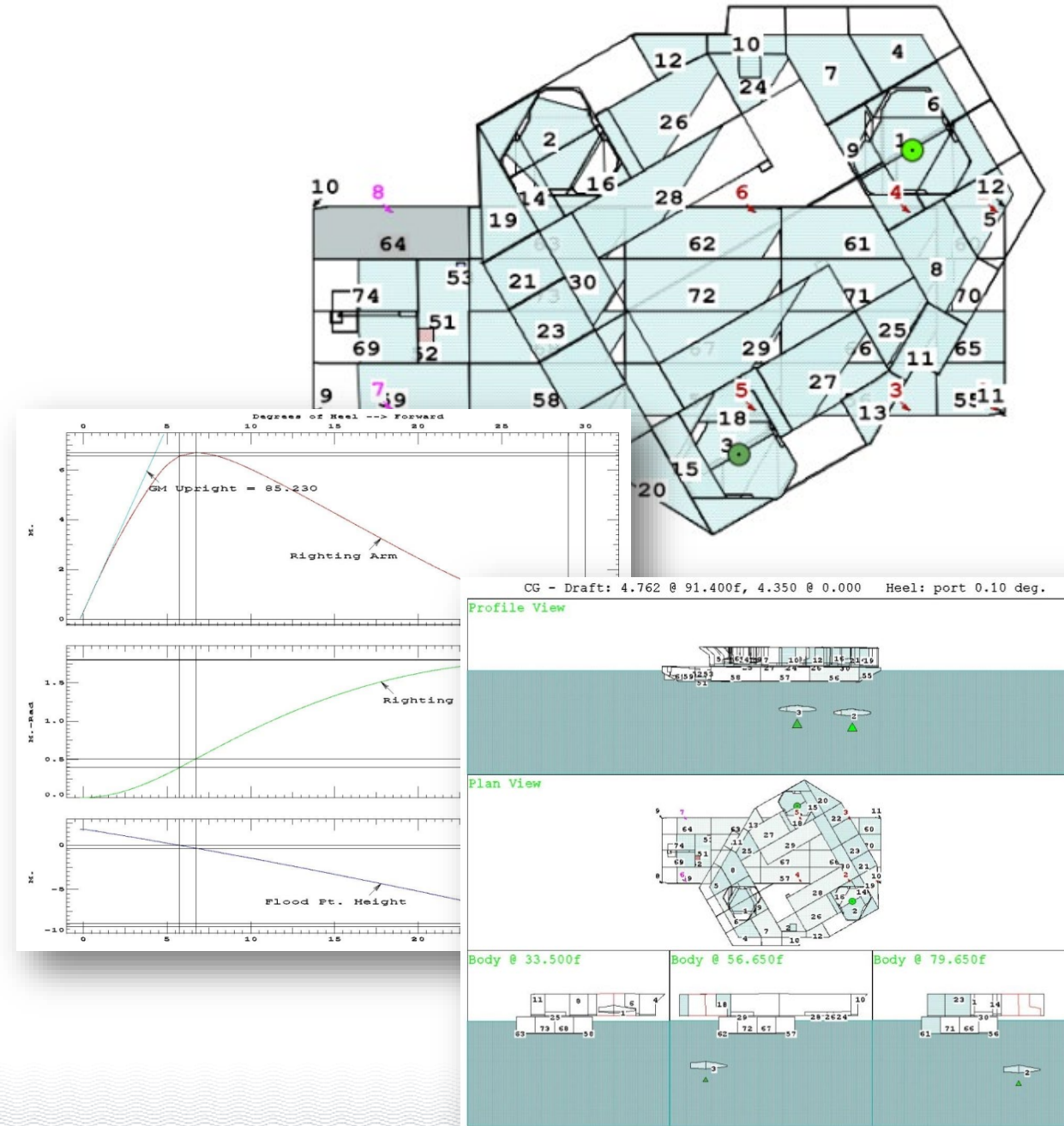
- One cribbing layout for all three positions
- Barge handling with two tugs
- Manual winches to adjust and maintain barge position during jacking
- No steel guides or stoppers needed
  - Bull-eye marking for positioning
  - +/- 30cm positioning accuracy
- Wooden fender installed on barge side shell to allow for sliding along jack-up legs
- Yokohama fenders installed between barge and legs when barge in position



# Engineering

## Stability

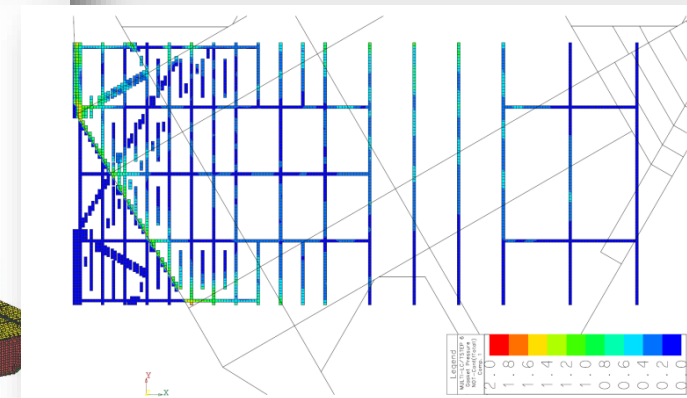
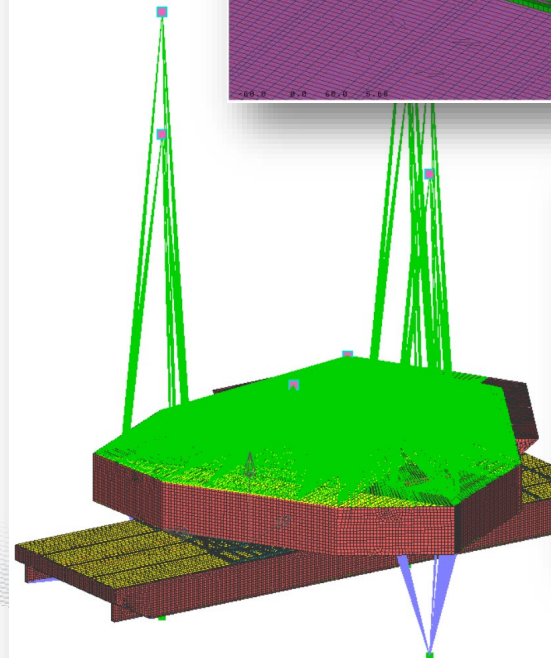
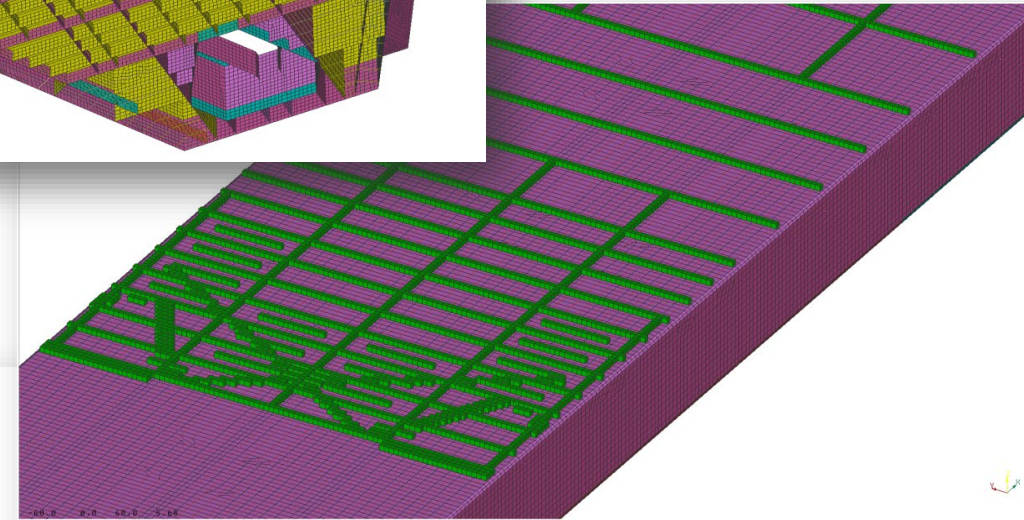
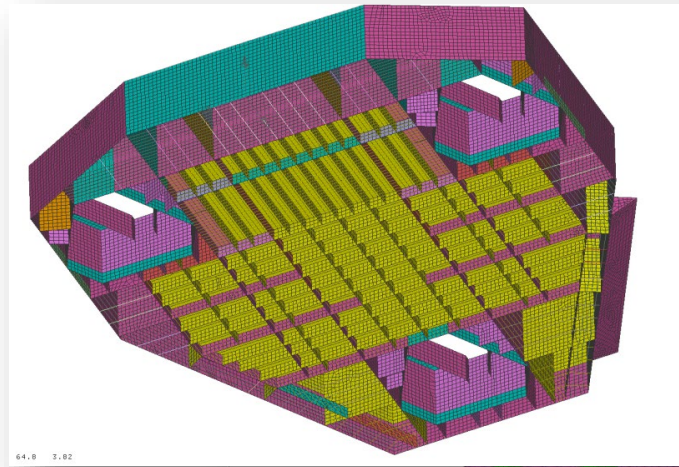
- Combined hydrostatic model of Jack-up and Barge established in AutoShip ModelMaker
- Grounded stability analyses run in the program GHS (General Hydrostatics) combined with in-house scripts
- All intact and damage stability criteria met in accordance with DNV-ST-N001 and Flag State requirements, applicable for marine operations and barges
- Forces on gravel bed checked towards capacities approved in Site Specific Assessment (SSA)
- Tide compensation by jacking in case of tide variation exceeding +/- 30cm



# Engineering

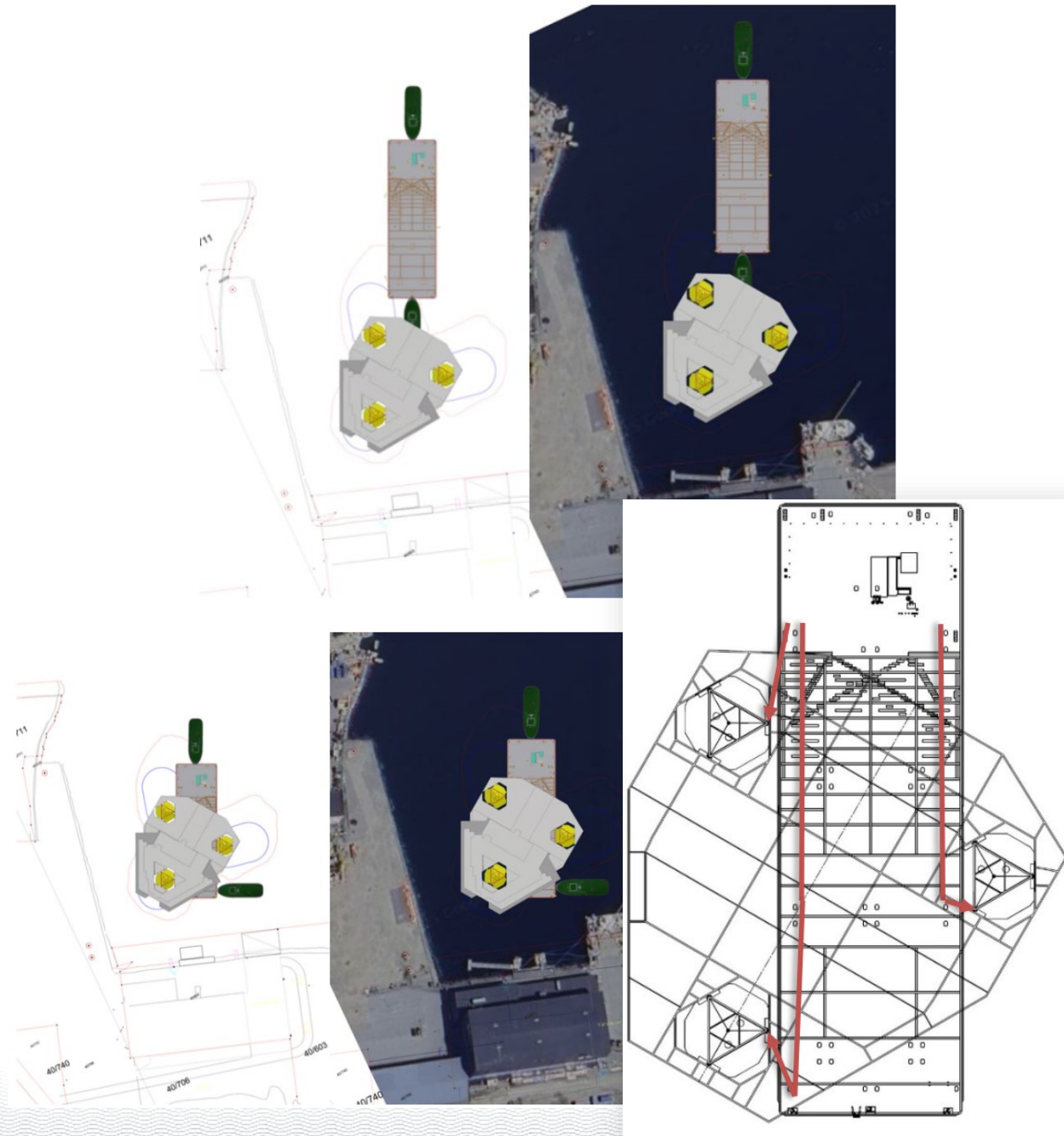
## Structural

- Global Finite Element Model established including all main structure in jack-up, barge and the cribbing
- Stresses and buckling usage factors verified in all main structure
- Cribbing pressure verified taking into account deflections of jack-up and the barge
- Spudcan reactions reported in stability assessments confirmed by structural analyses considering the deflections



# Procedure

- Marine Operations Procedure
  - Overall procedure defining roles, responsibilities and lines of communication
  - Barge handling
  
- Jacking Procedure:
  - Jack-up ballast plan
  - Barge ballast plan
  - Jacking operation (load transfer)



# Semar operations team

3 persons per operation

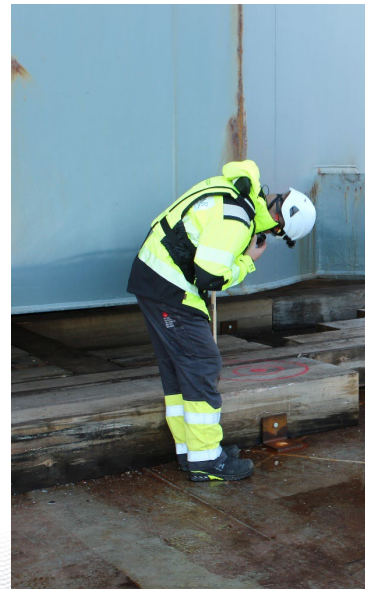
## ↔ Tow Master

- Tugs (2x)
- Workboat
- Barge Deck Crew

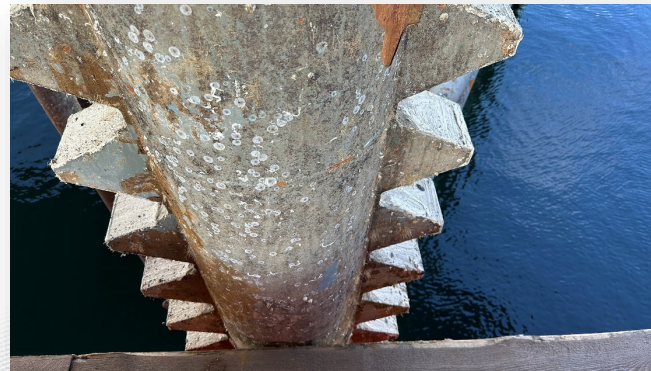
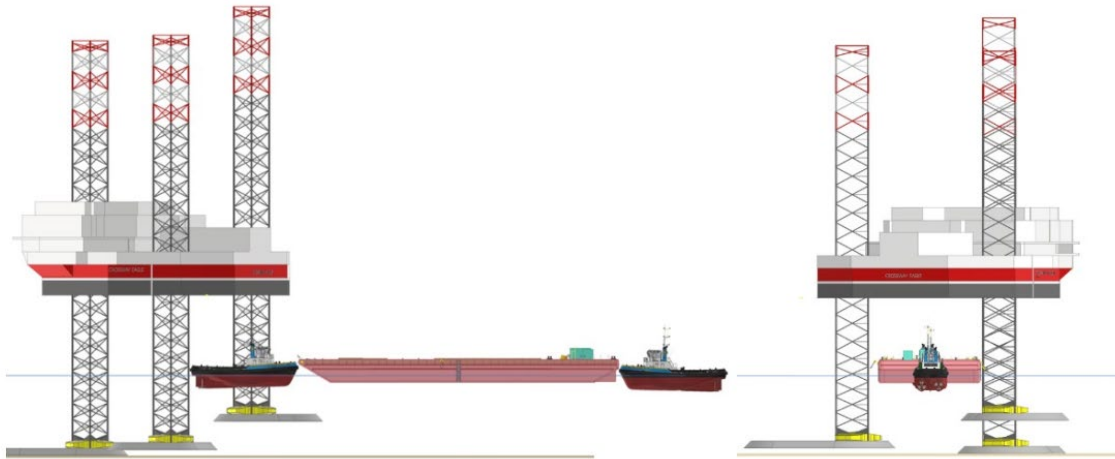


## ↕ Load Transfer Manager (x2)

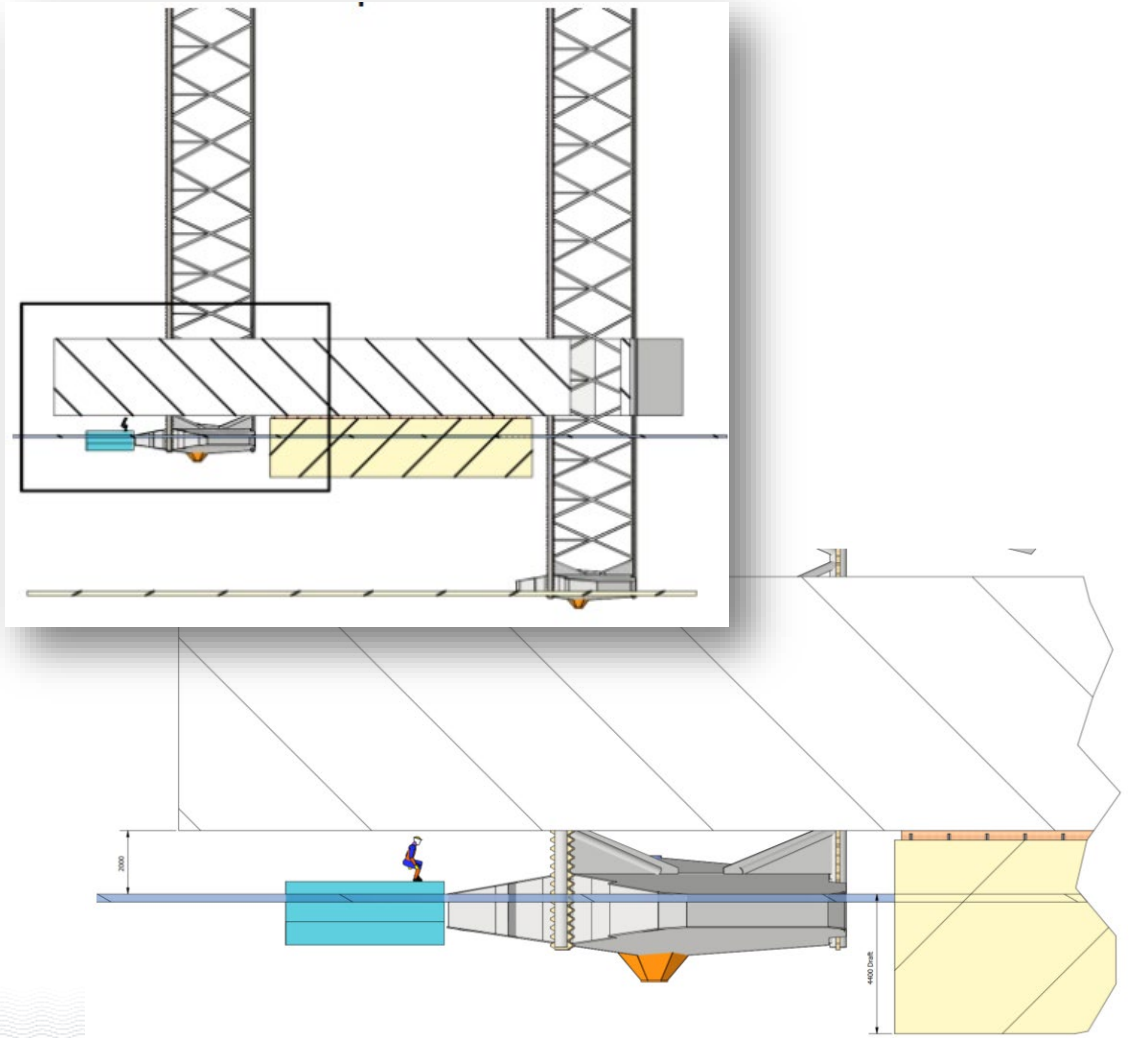
- CWE jacking
- CWE ballasting
- Barge ballasting



# Barge maneuvering



# Jacking down and lifting leg



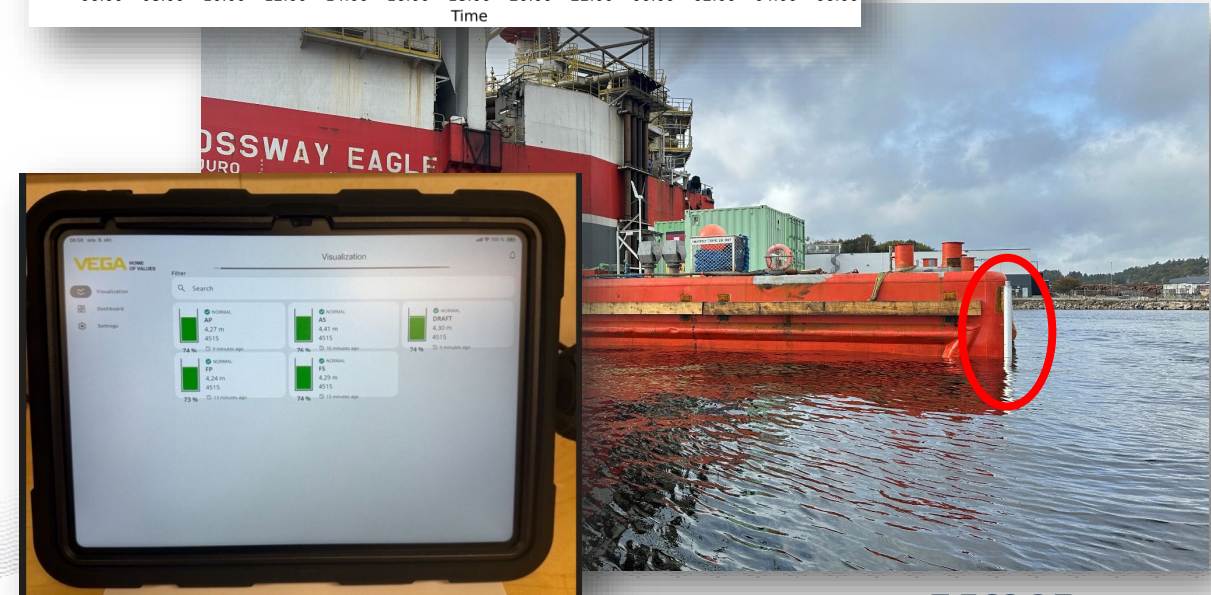
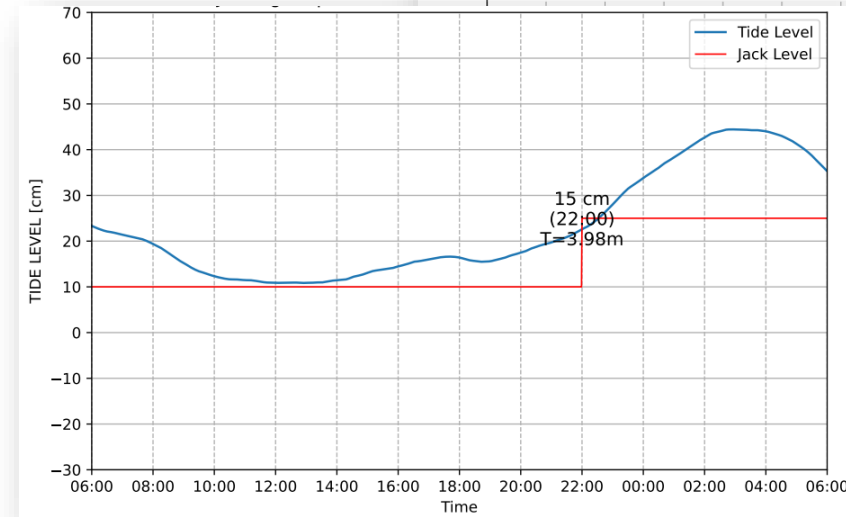
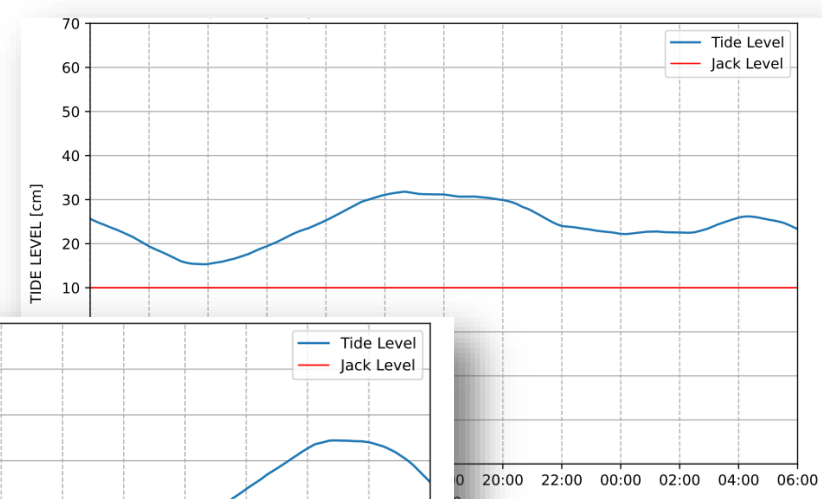
# Schedule per operation

Example 2<sup>nd</sup> operation

	Planned Start	Planned Finish	Planned Duration	Actual Duration	Description
<b>DAY 1</b>	14.00.00	14.15.00	15min	145min	Jack Barge Even keel
	14.15.00	15.15.00	60min		Lower leg 20m and touch ground leg S
	15.15.00	15.45.00	30min	10min	Jack Up to 3m Barge Draft
	15.45.00	17.45.00	120min	150min	Re-ballast Barge
	17.45.00	18.15.00	30min	10min	Jack to 20% load on barge
	<b>SUM</b>			4h15min	5h15min
<b>DAY 2</b>	05.00.00	06.00.00	60min	70min	Connecting Tugs
	06.00.00	06.30.00	30min	20min	Jack to 2m clear., insp. for dropped obj.
	06.30.00	07.30.00	60min	60min	Jack to 20m airgap
	07.30.00	09.00.00	90min	60min	Take Barge out
	09.00.00	11.00.00	120min	225min	Dump Ballast Water CWE
	11.00.00	14.30.00	210min	75min	Take Barge in
	14.30.00	15.30.00	60min	60min	Jack down to 2m barge clearance
	15.30.00	16.00.00	30min	10min	Jack down to 20 cm barge clearance
	16.00.00	17.00.00	60min	30min	Jack down to 20% load on barge, handover, release tugs
	17.00.00	17.15.00	15min	5min	Jack down to 3m
	17.15.00	19.15.00	120min	135min	Ballast barge
	19.15.00	20.15.00	60min	15min	Jack down to liftoff leg P
20.15.00	21.15.00	60min	60min	Lift leg all the way up 22m	
<b>SUM</b>			16h15min	14h25min	

# Back-office support between operations

- Semar team demob. after each barge operation
- Tide forecasts automatically monitored and jacking forecasts issued every morning
- Barge draft automatically monitored by Vega draft sensors mounted on each barge corner
- Automatic notifications programmed in the Vega software
- Vega draft readings available to jack-up crew via iPad onboard CWE



Was it stable?

YES!



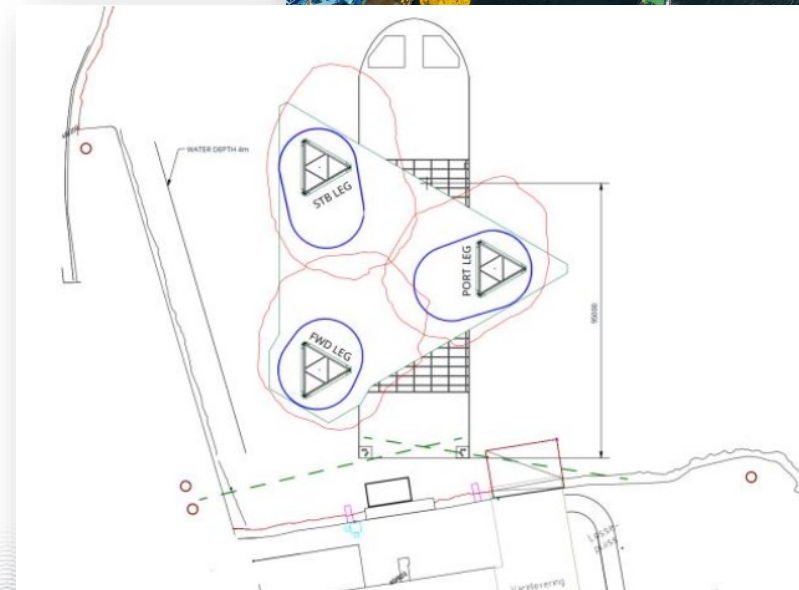
# Other applications – Repeatable and scalable

Larger three-legged jack-ups and four-legged jack-ups

- Four-legged Jack-up supported by barge to lift diagonal legs  
Semar / Westcon 2024



- Method ready for future CJ70 operation





# Thank you to the partners in the project

Macro Offshore – Rig Manager and SPS Project Lead

Windport / GOT – SPS Contractor and SEMAR Client

Ugland – Barge Supply

FARMAR – Tug Supply

Global Maritime – MWS



# Thank you

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