

INTERACTIVE DESIGN PLATFORM

Interactive Design Platform

WEDA Dredging Summit & Expo 2022



C-JOB

DEDICATED NAVAL ARCHITECTS

Overview

- Introduction
- About C-Job Naval Architects
- Why create the Interactive Design Platform?
- What is the Interactive Design Platform?
- How does it work?
- Continued development

About the Author

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- Project manager and Concept Design Lead
- MSc Marine Technology, Delft University of Technology



About C-Job Naval Architects

Dedicated & independent Naval architects

Our drive:

“A sustainable marine sector within one generation”

Our method:

Tailored solutions, co-created with our clients

Our scope:

Projects from initial phase to production phase

Full – scope projects as well as partial projects

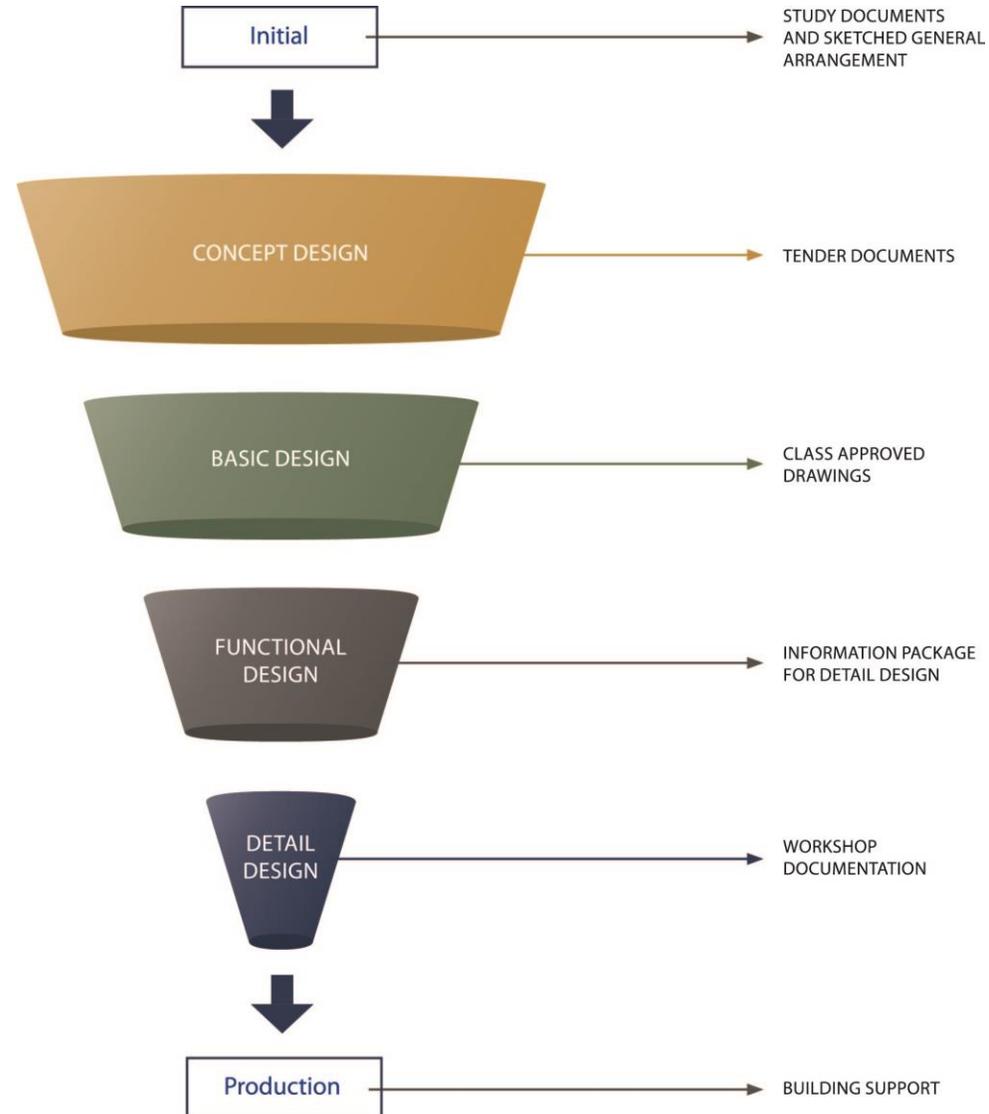


Independent design and engineering company

- Serving ship owners and shipyards worldwide
- 7 offices:
 - Houston
 - Hoofddorp
 - Rotterdam
 - Heerenveen
 - Nikolayev
 - Athens
 - Gdansk
- > 180 in-house engineers employed



C-Job Design Funnel



INTERACTIVE DESIGN PLATFORM



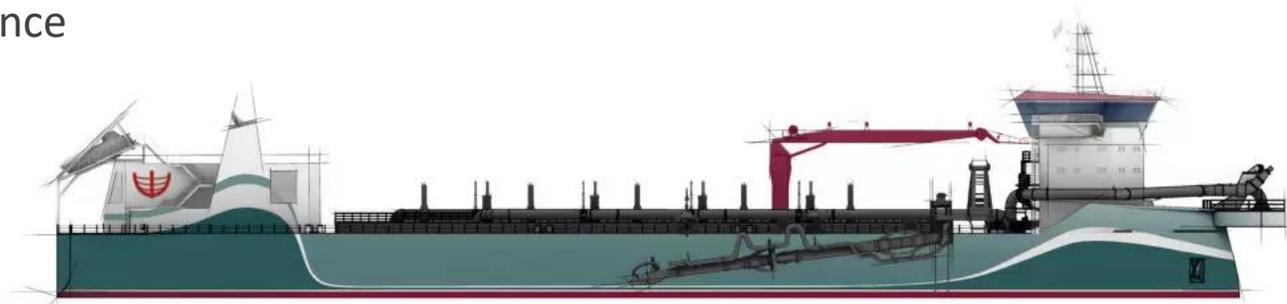
Interactive Design Platform

Why create the Interactive Design Platform?

- Translating design requirements in a proof of concept
- Outcomes initial design:
 - Design Parameter Study
 - Sketch General Arrangement

Traditional (hand-work) Design Parameter Study:

- Reference Selection
- Defining the design variations
- Iterations of design variables
- Selection of solution based on trends and experience

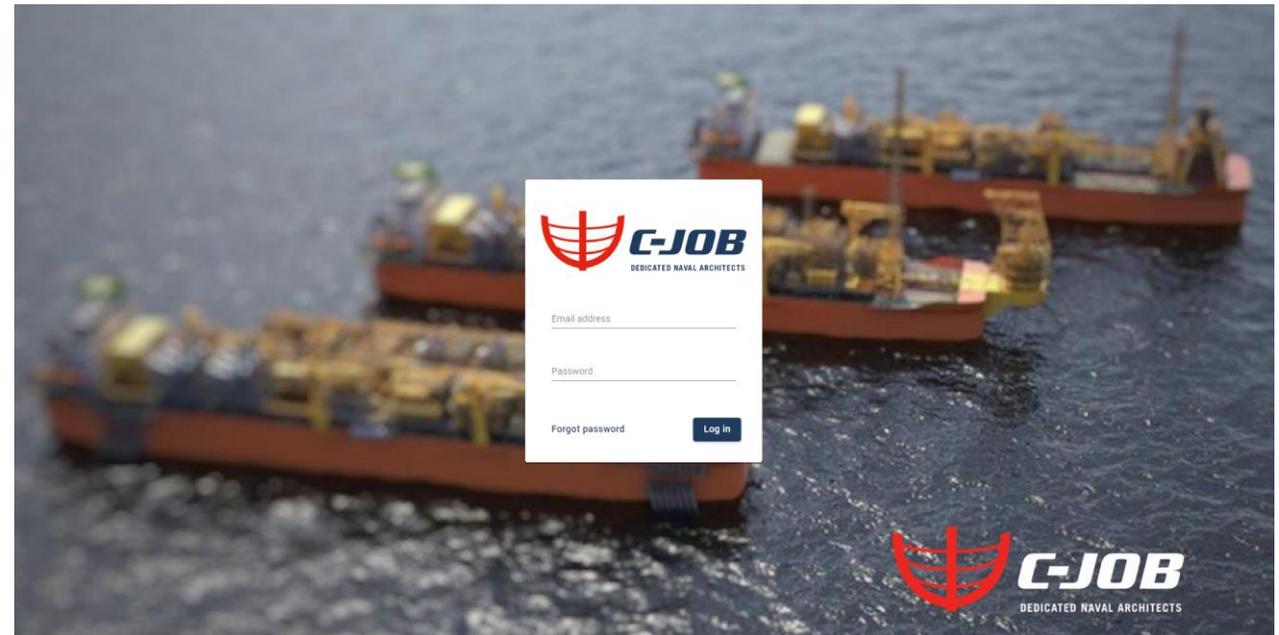


What is the Interactive Design Platform?

Online interactive platform

Developed for:

- Early design stage of TSHD's
- Empowering customers
- Close cooperation
- Optimizing towards operational deployment
- Assess impact of design requirements
- Support decision-making
- Address gap between standard and one-off



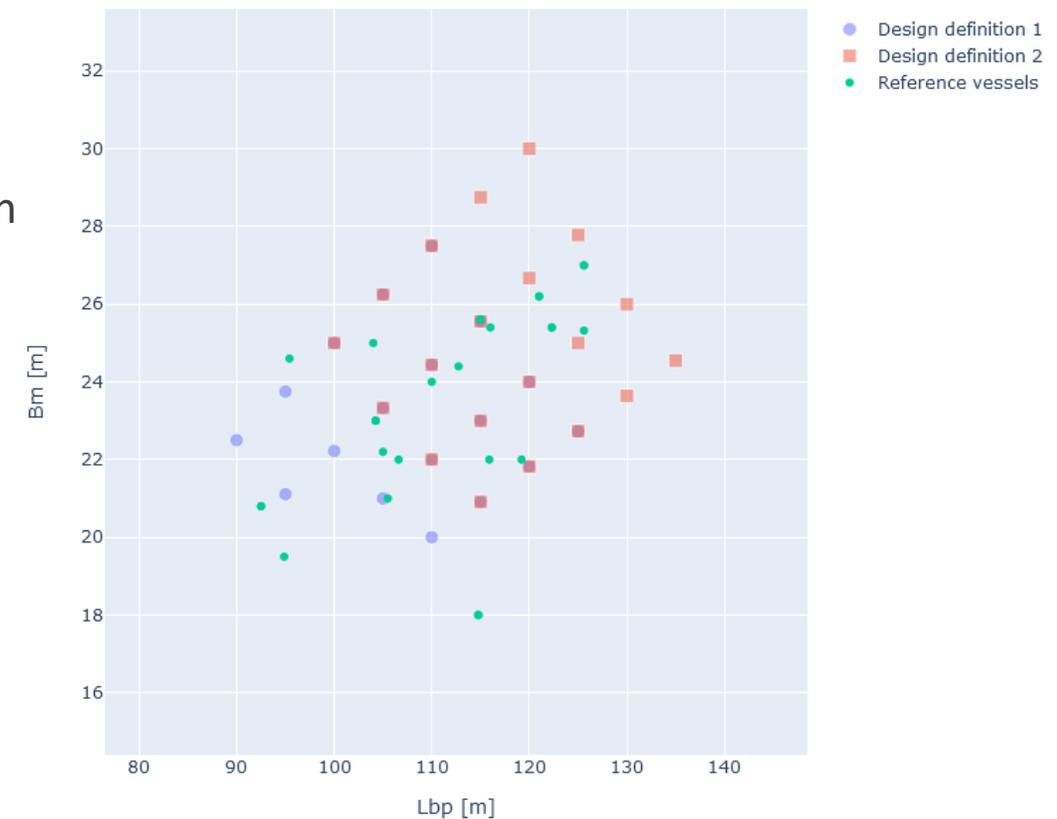
It delivers **higher accuracy, more control** and **more flexibility** than traditional methods

How does the Interactive Design Platform work? - input

Definition of Design Space:

- Design objectives (payload, speed, etc.)
- Parameter constrains (breadth, draught, etc.)
- Power Installed (dredge, jet, etc.)
- Optional (water density, correction, margin)

Design
Definition



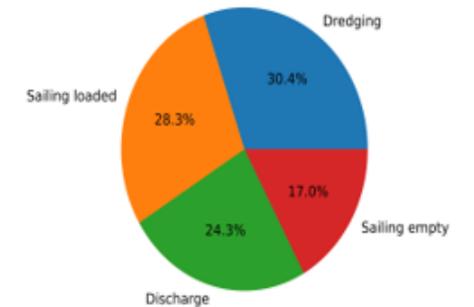
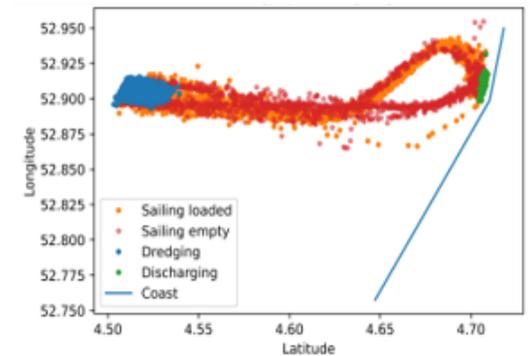
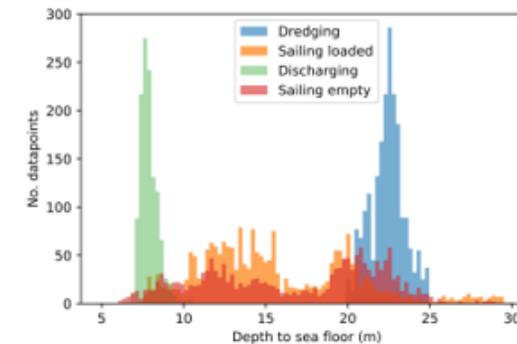
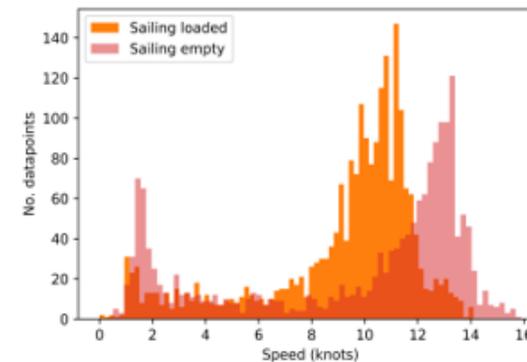
How does the Interactive Design Platform work? - input

The platform has initially been optimized for dredger designs

Input values include:

- Dredging materials
 - Dredging depth
 - Sailing distance between dredging and discharge site
 - Discharge methods
-
- Alternative energy sources

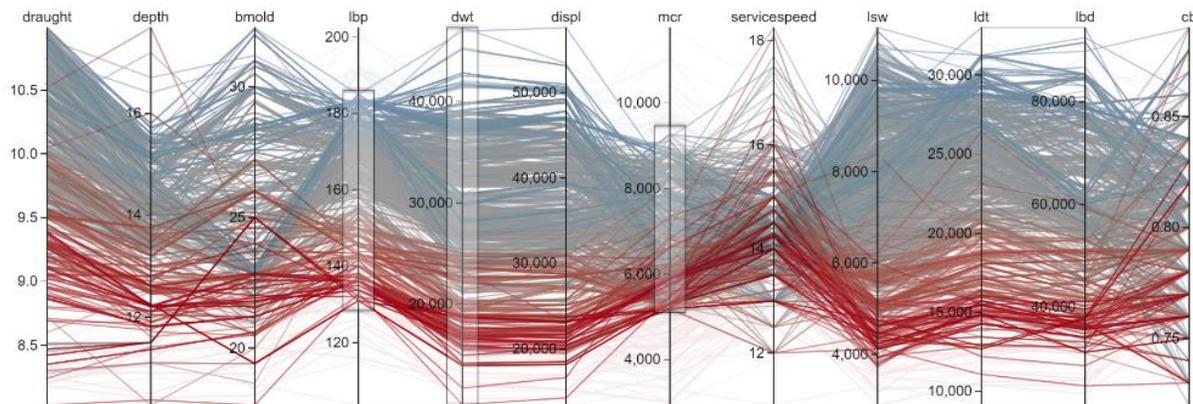
Operational scenarios



How does the Interactive Design Platform work? - input

Reference Selection

- C-Job's Maritime Intelligence Tool
- Over 170,000 ships (over 500 TSHD's)
- Making informed decisions



PARALLEL COORDINATES PLOT SHOW VESSEL MARKET TRENDS

Worksp... c-job-tshd-design-param... TSHD Parametric Desi... 21.501 M TSH... Matthys Dijkman

General Design definitions Load Factors

Input Reference Selection

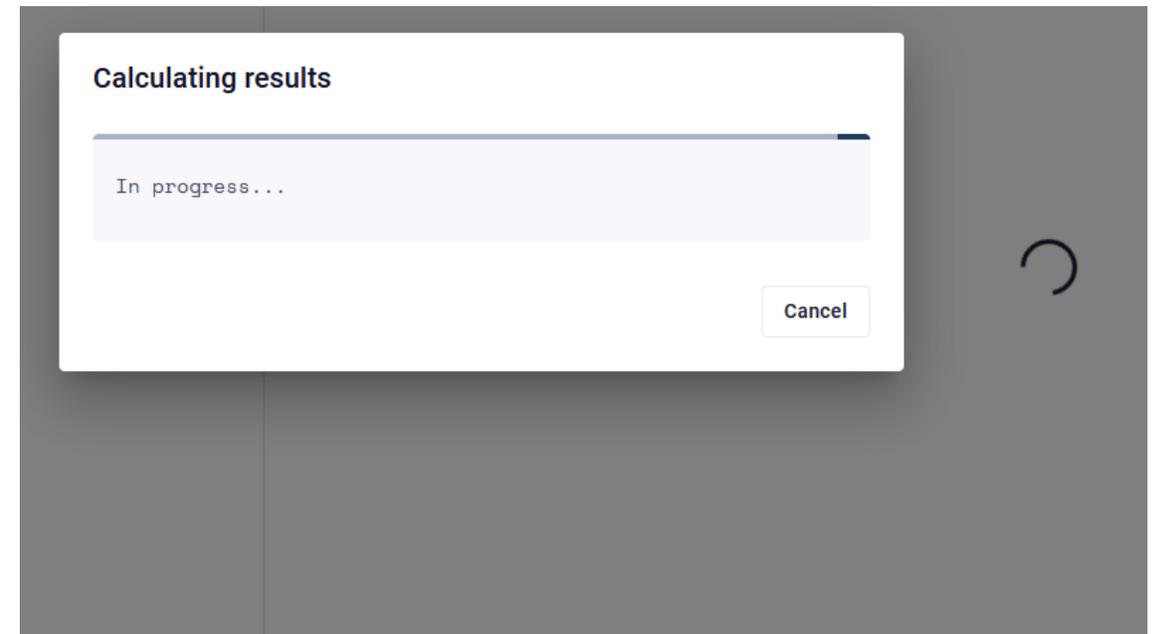
Current Name	Year Built	Owner	IMO Number	Flag
AL-IDRISI	2012	Dredging and Maritime Management S.A.	9572707	Luxeml
ARTEVELDE balder r	2009 2011	DEME rohde nielsen a/s	9501954 9578232	Belgiun denma
CHARLEMAGNE	2002	Dredging International NV	9243289	Luxeml
CRESTWAY	2008	Baggermaatschap Boskalis BV	9420332	Cyprus
cristoforo colombo	1994	jan de nul nv	9055929	belgiun
dci dredge xix	2012	dredging corp india ltd	9612399	india
guang zhou hao	1994	cccc guangzhou dredging co ltd	9056820	china p republi
hwa way	2012	hwa chi construction co ltd	9633824	chinese
ilembe	2015	transnet national ports	9741891	south a
MARIEKE	2006	Dredging International NV	9360714	Luxeml

Paramet...	Values
1 Length min.	
2 max.	
3 Breadth min.	
4 max.	
5 Draught min.	
6 max.	
7 Hopper volum min.	5000
8 max.	8000
9 Deadweight min.	
10 max.	
11 Year Built min.	1990
12 max.	

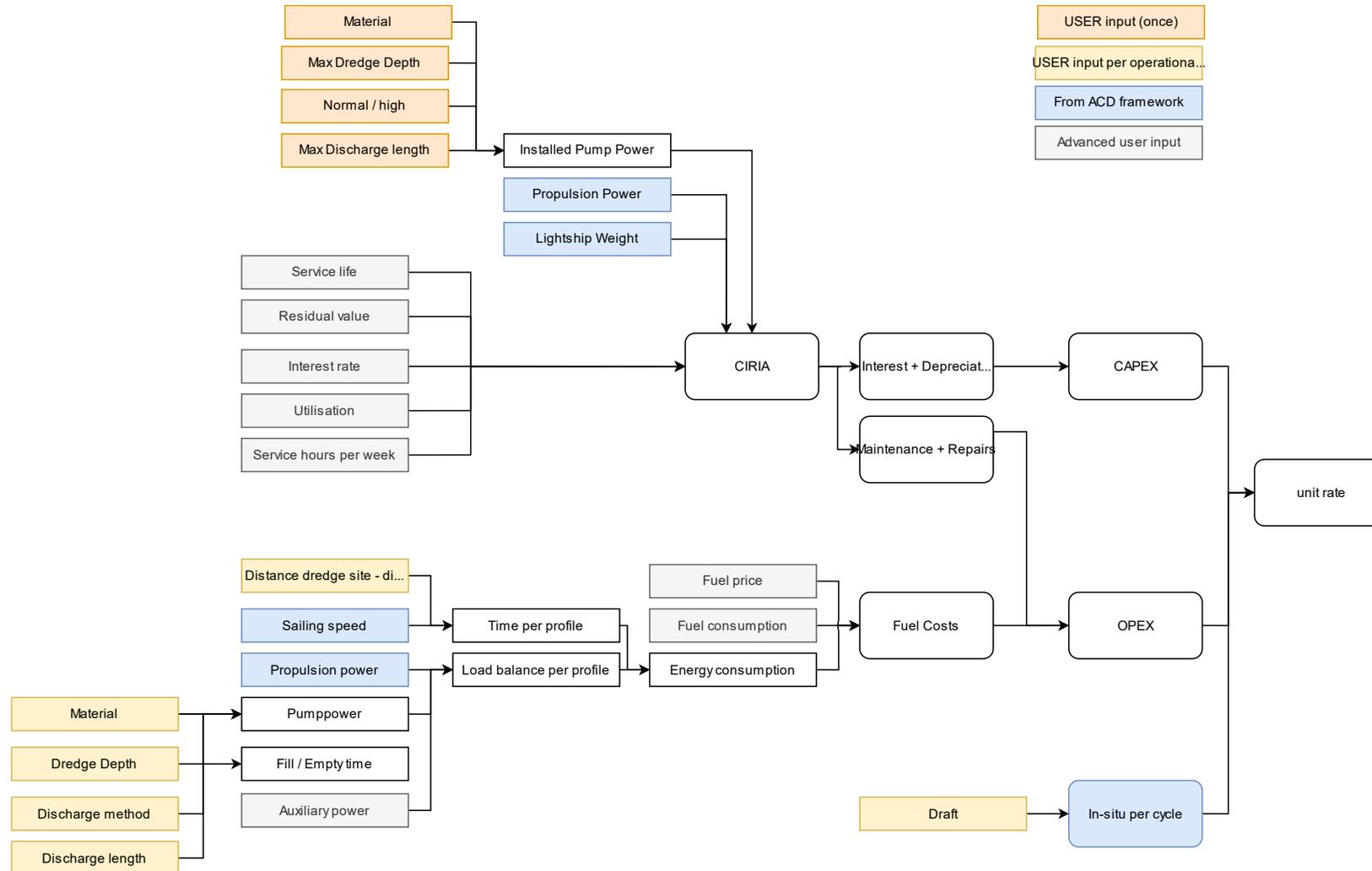
How does the Interactive Design Platform work? - calculation

Each run of the Interactive Design Platform (following values input) will assess **multiple** design variations on various operational scenarios

- main particulars are determined, and performance is calculated.

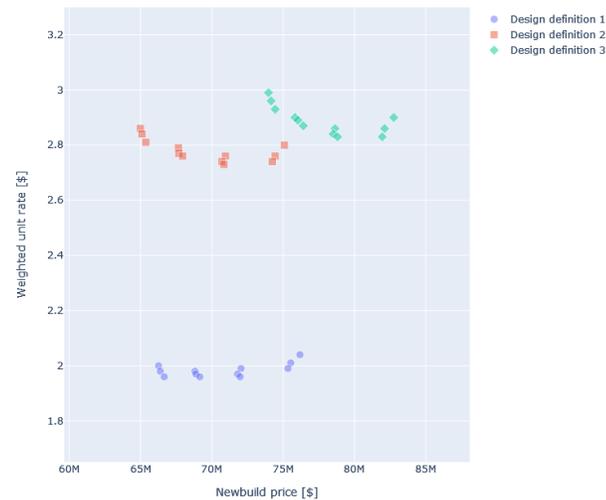


How does the Interactive Design Platform work? - method

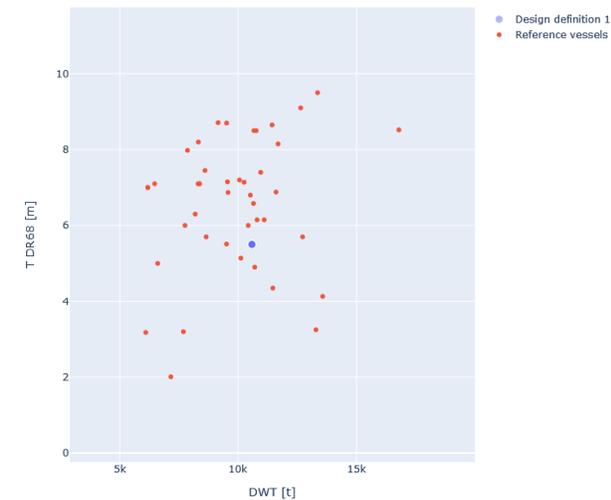


How does the Interactive Design Platform work? - results

Weighted unit rate over newbuild price



DWT over Dredging draught



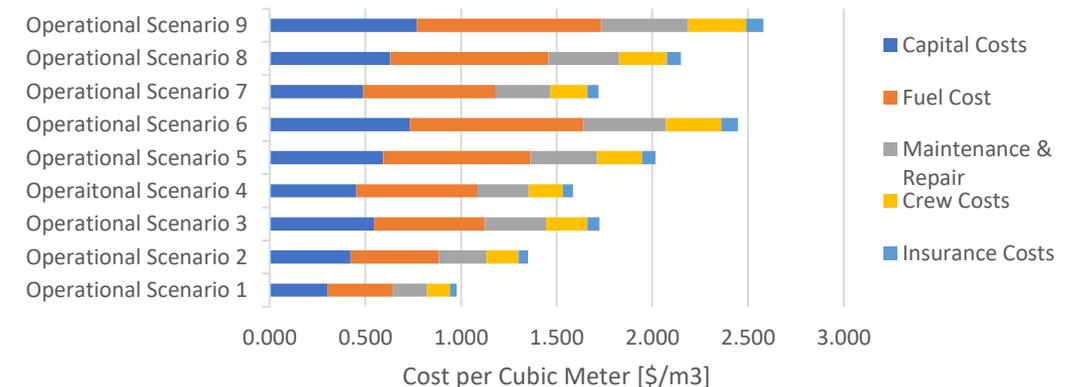
- Estimated costs per cubic metre (CCM) of dredged material.
- Comparison to reference vessels.
- Different Design Definitions to determine how a change in the effects the optimal variation.
- Overview Report - expert view at core of the design process
- Post-processing – market study

How does the Interactive Design Platform work? – post processing

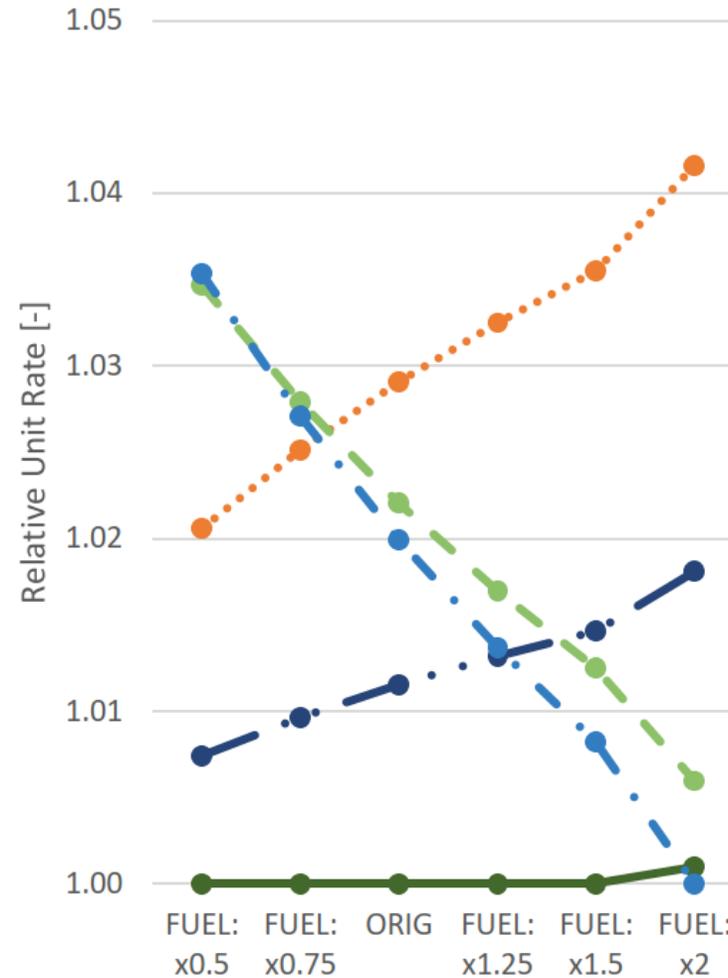
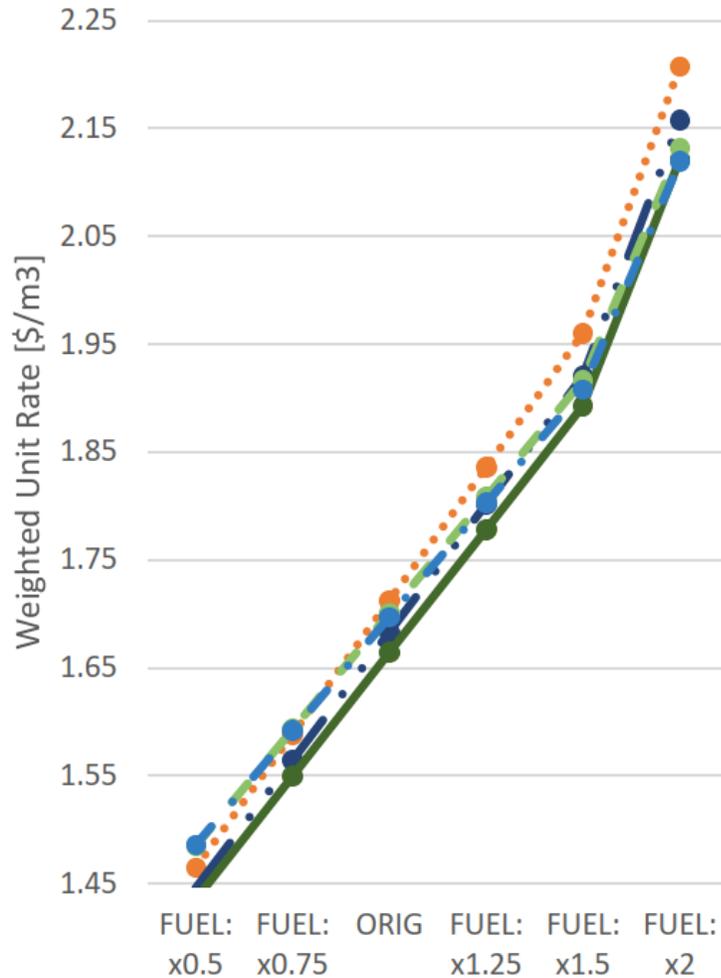
Processing the outcomes:

- Sensitivity Analysis
- The **optimal set of main particulars** (design variation) for various fuel scenarios.
 - Determining exactly where the **tipping point** occurs.
- Competitiveness analysis new design with dredging fleet.
- Comparison between dredge equipment configurations.

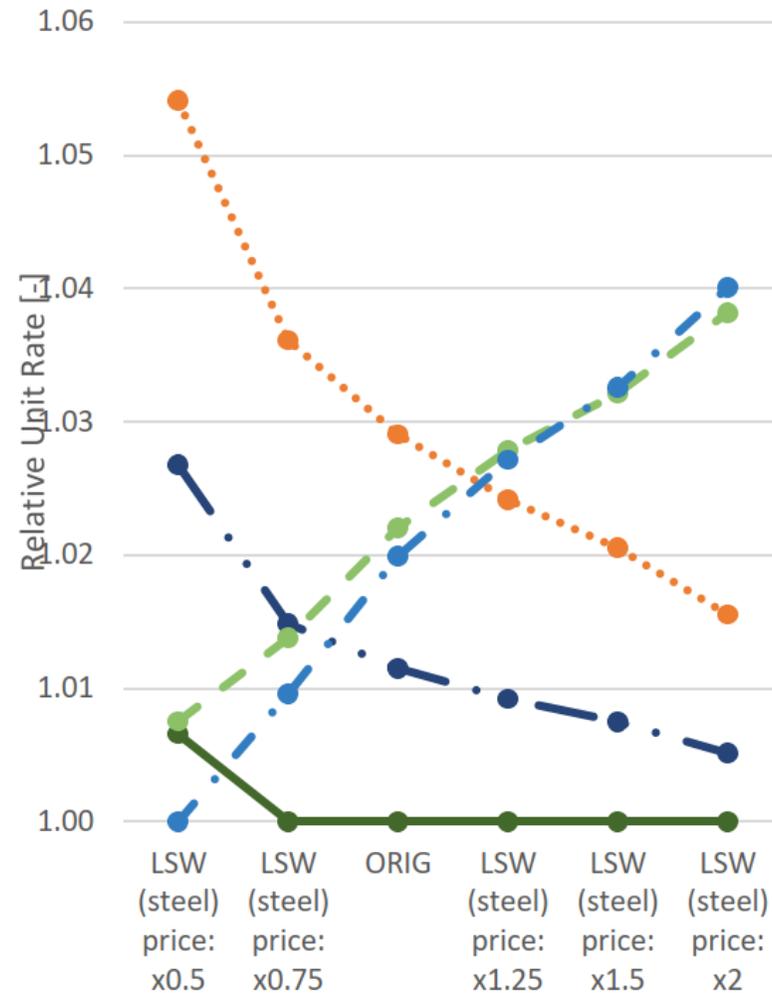
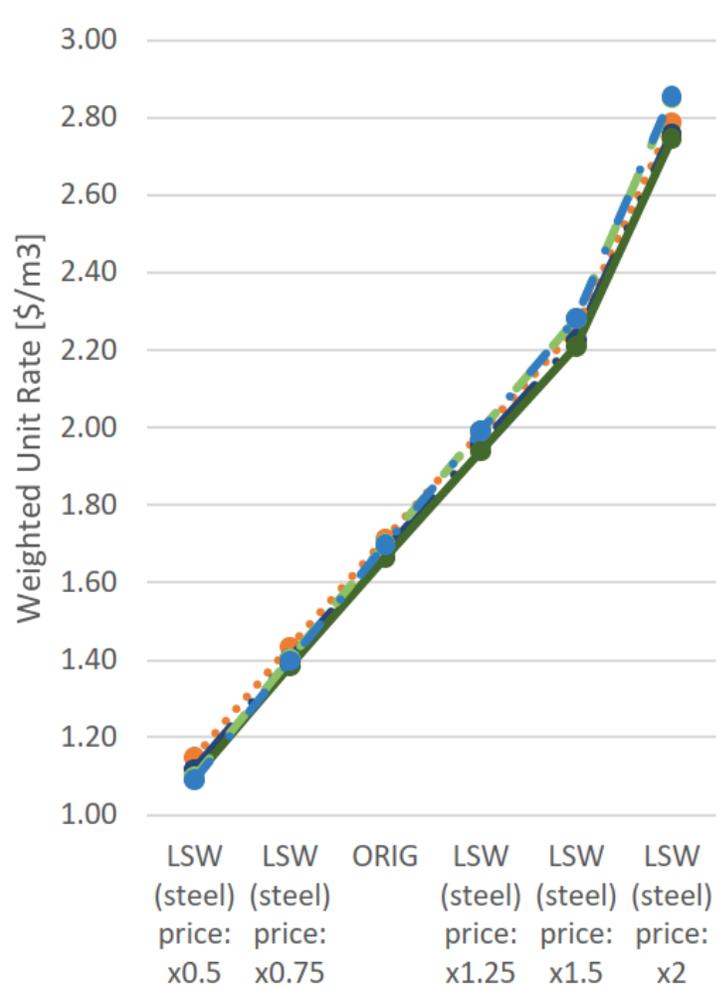
Design Parameter Study



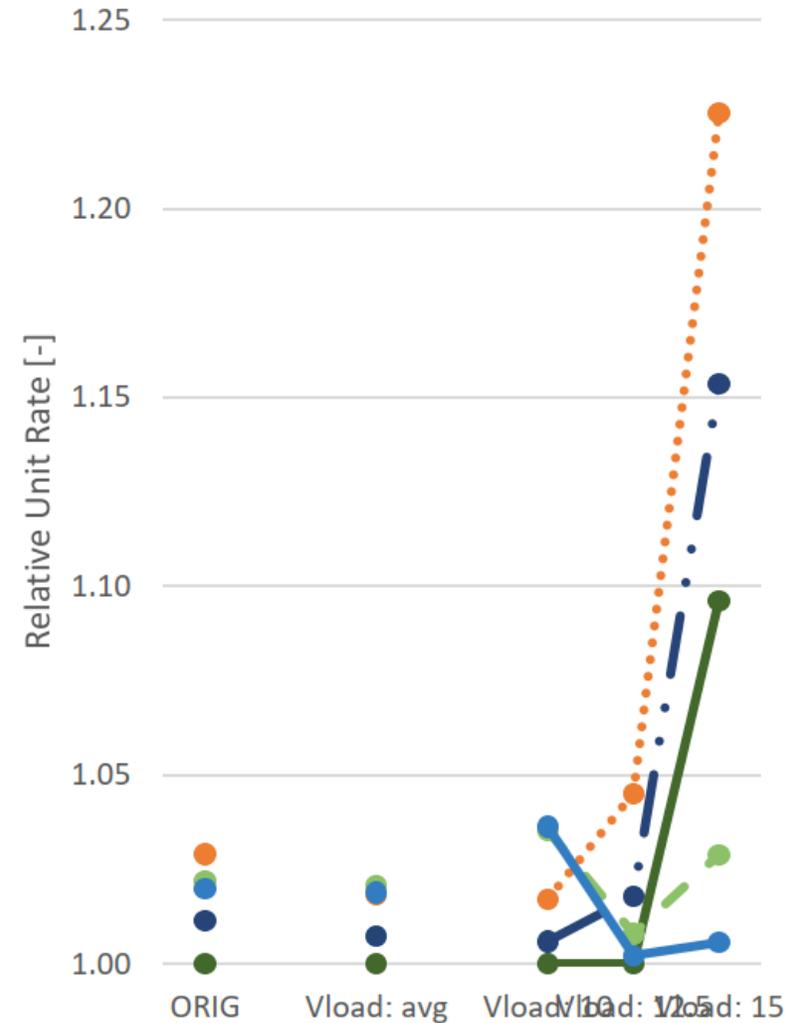
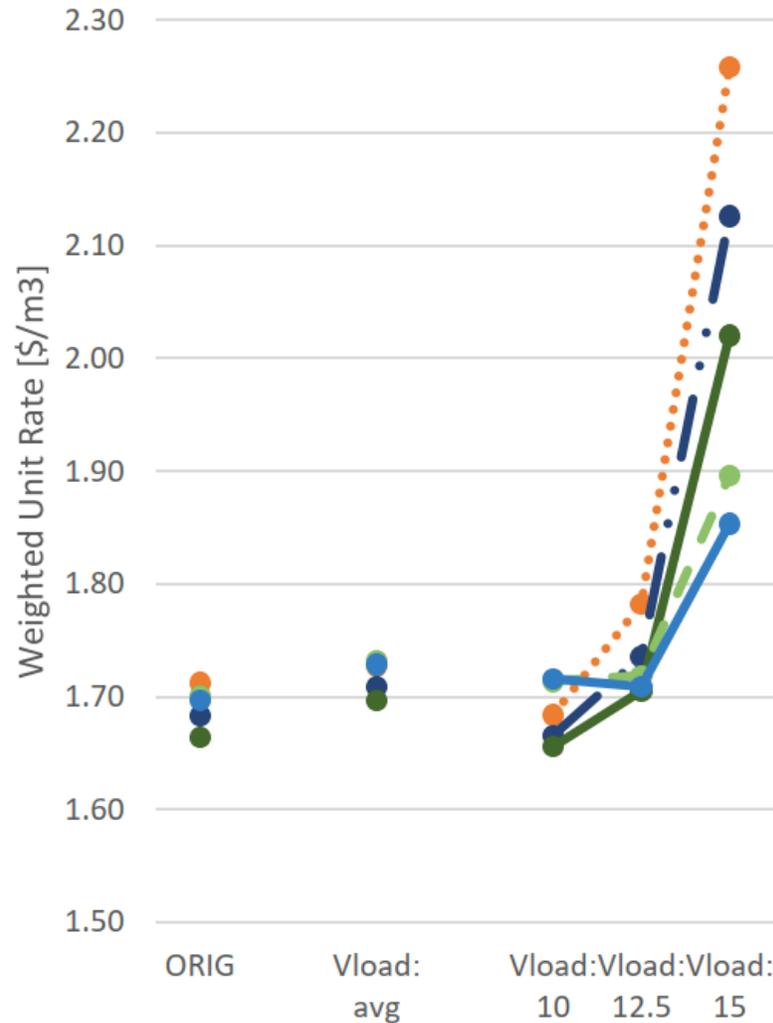
How does the Interactive Design Platform work? – post processing



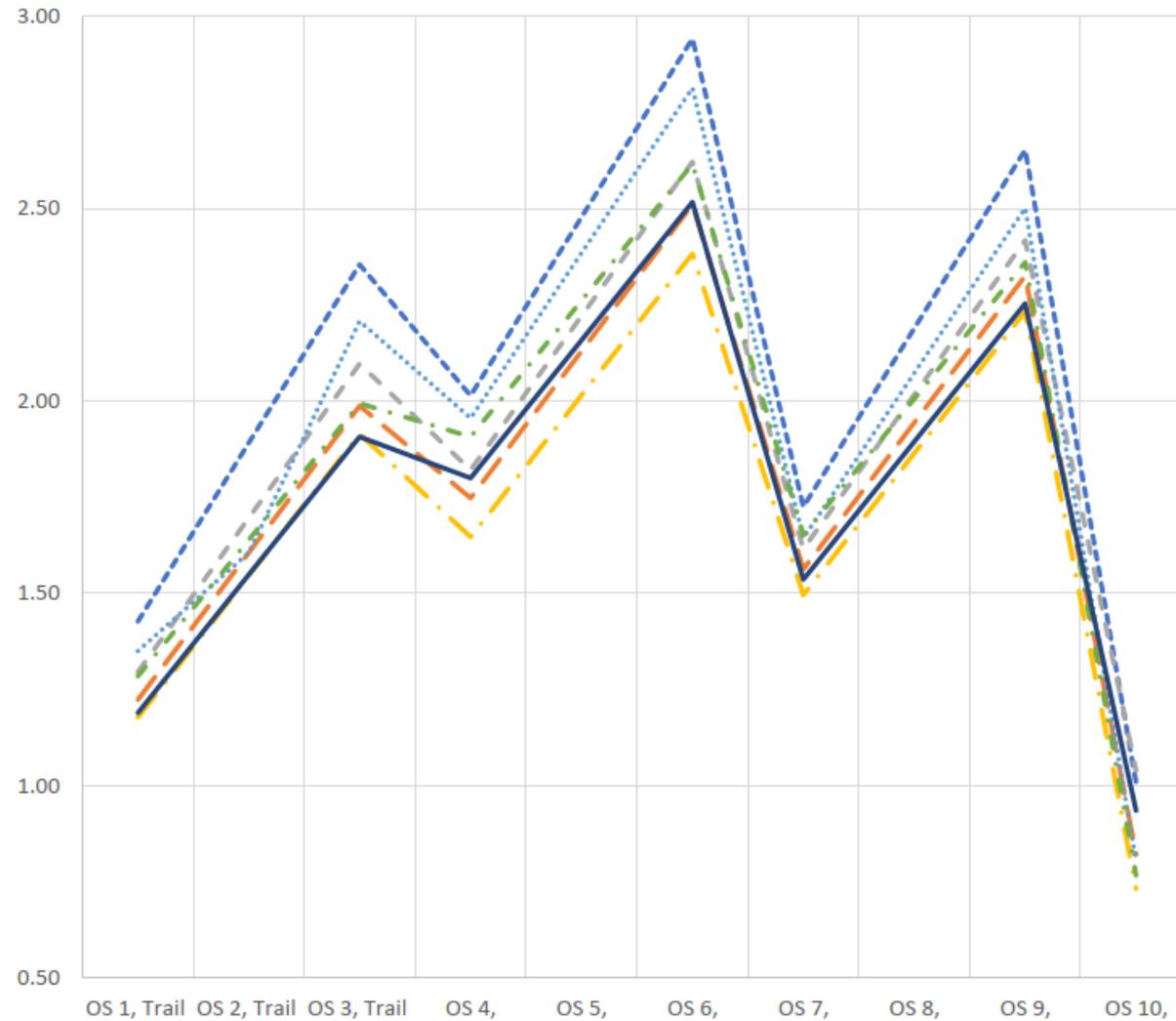
How does the Interactive Design Platform work? – post processing



How does the Interactive Design Platform work? – post processing



How does the Interactive Design Platform work? – post processing



Continuous Development



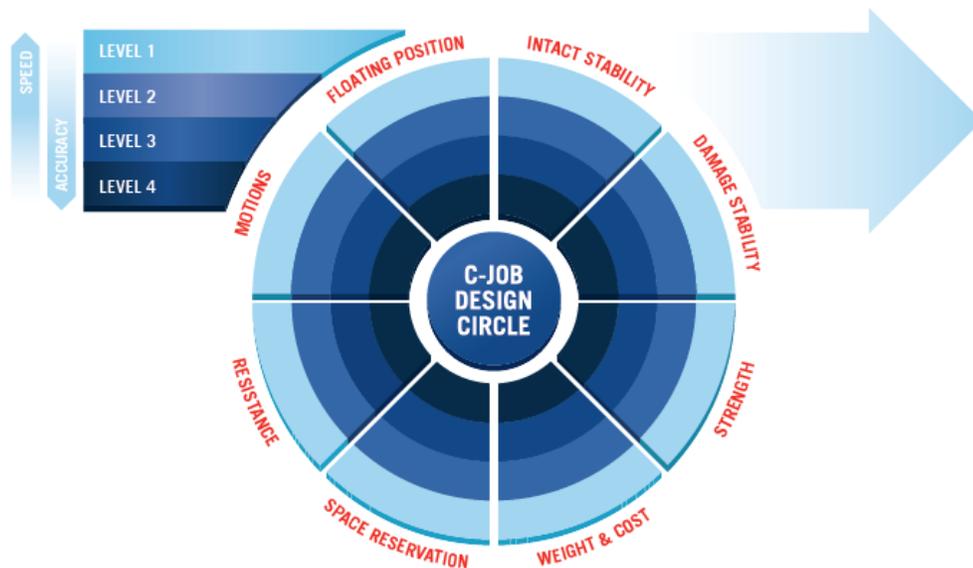
C-Job TSHD series includes nine different models, three of each of the three main classes of dredgers

- Hopper capacities are 20-40,000m³ for capital dredging
 - Hopper capacities are 5-15,000m³ for multi-purpose dredging
 - Hopper capacities are 1.5-7,000m³ for maintenance dredging
-
- The platform can be adapted for any class of vessel, using any set of variables
 - Data-driven interactive model

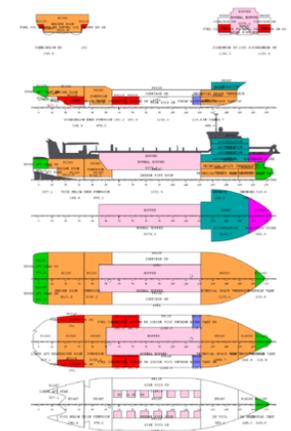
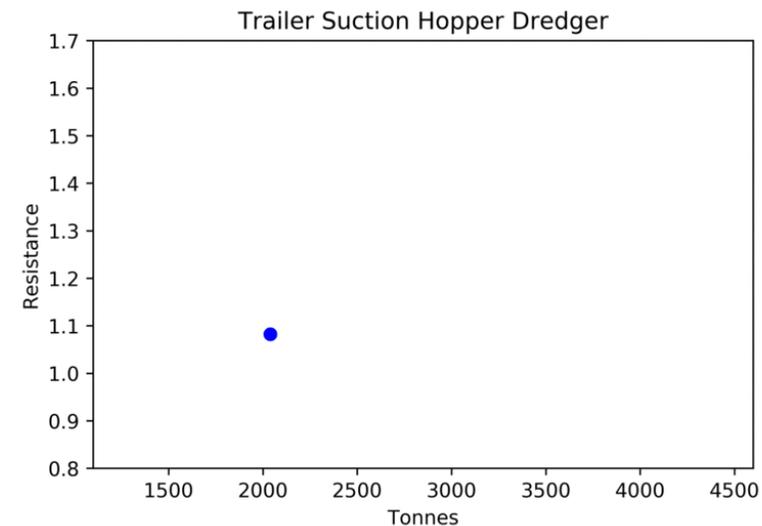
Continuous Development

Further expanding the data-drive approach:

- Implementation Dredge Performance Calculations
- Link towards C-Job Accelerated Concept Design



Accelerated Concept Design



Questions?

For more information, please contact:

C-Job Naval Architects

Matthys Dijkman

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Or visit us at booth #12



 **Houston**

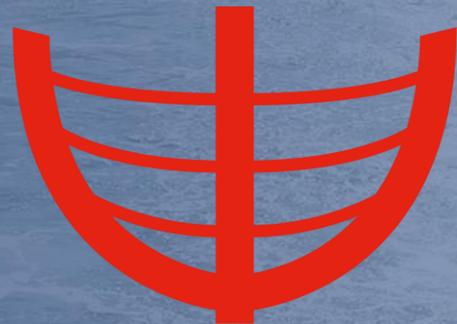
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