

# Modern design of Trailing Suction Hopper Dredges



WEDA Dredging Summit & Expo 2014  
Erik van der Blom  
IHC Holland BV

**The technology innovator.**

From large ...



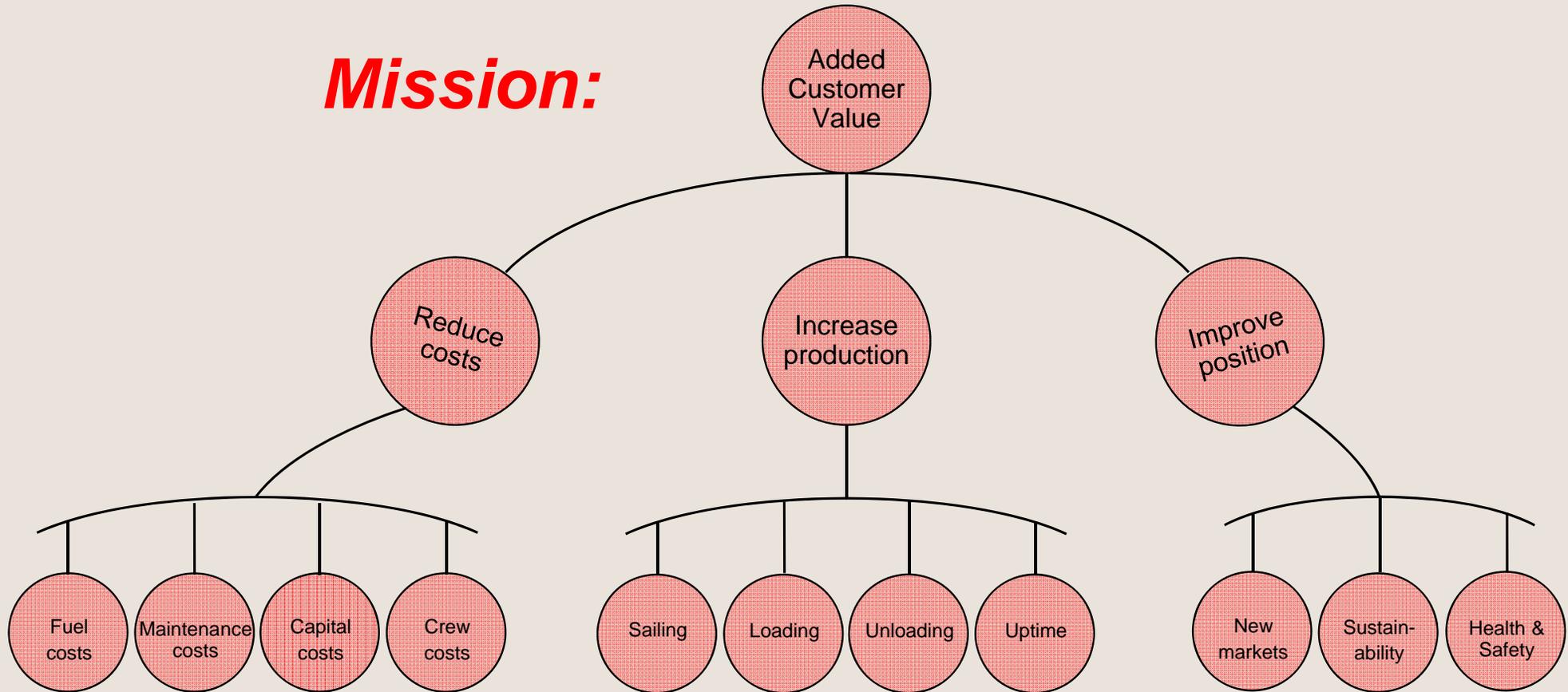
to small ...



and in between ...

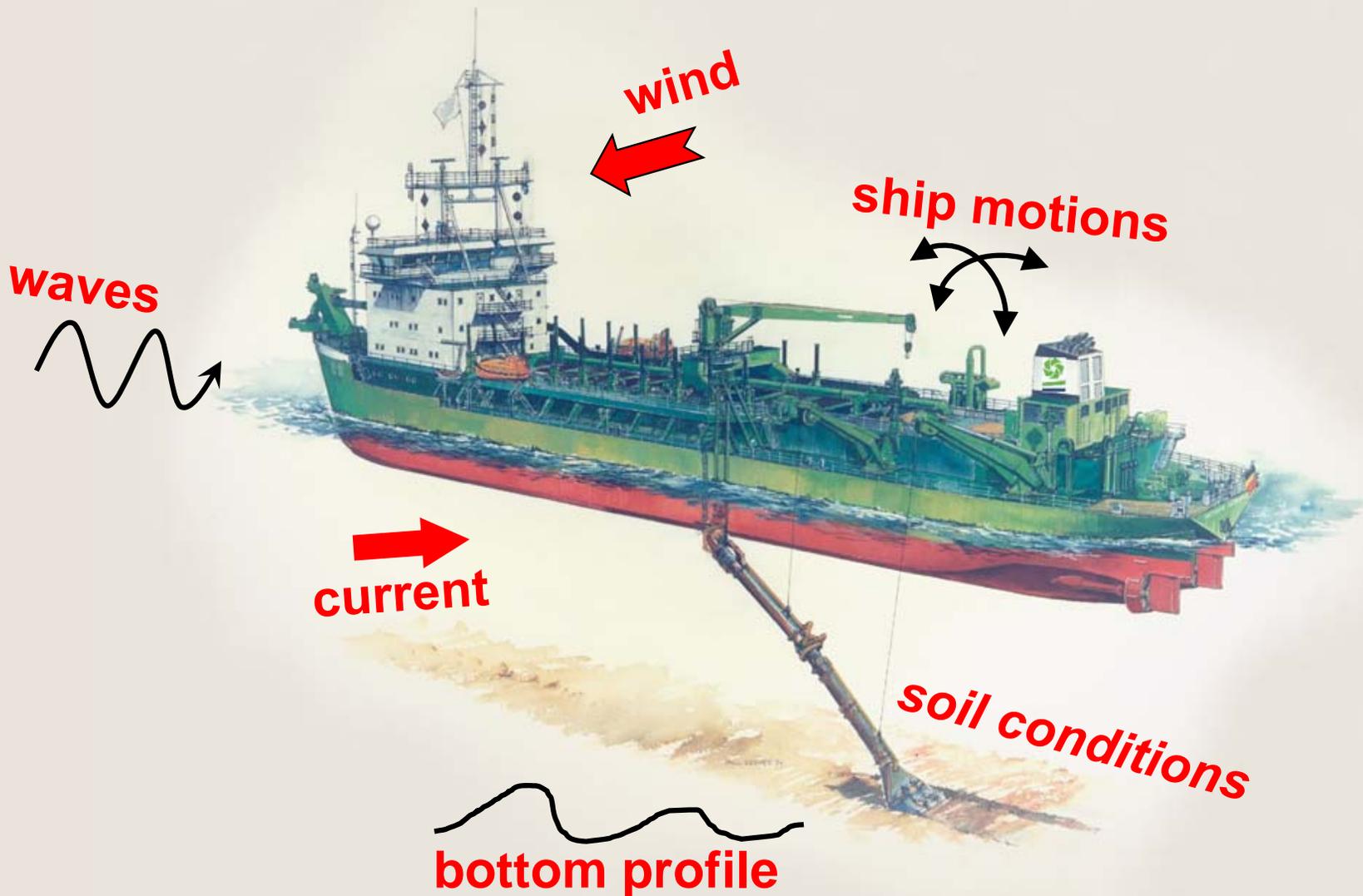


## *Mission:*

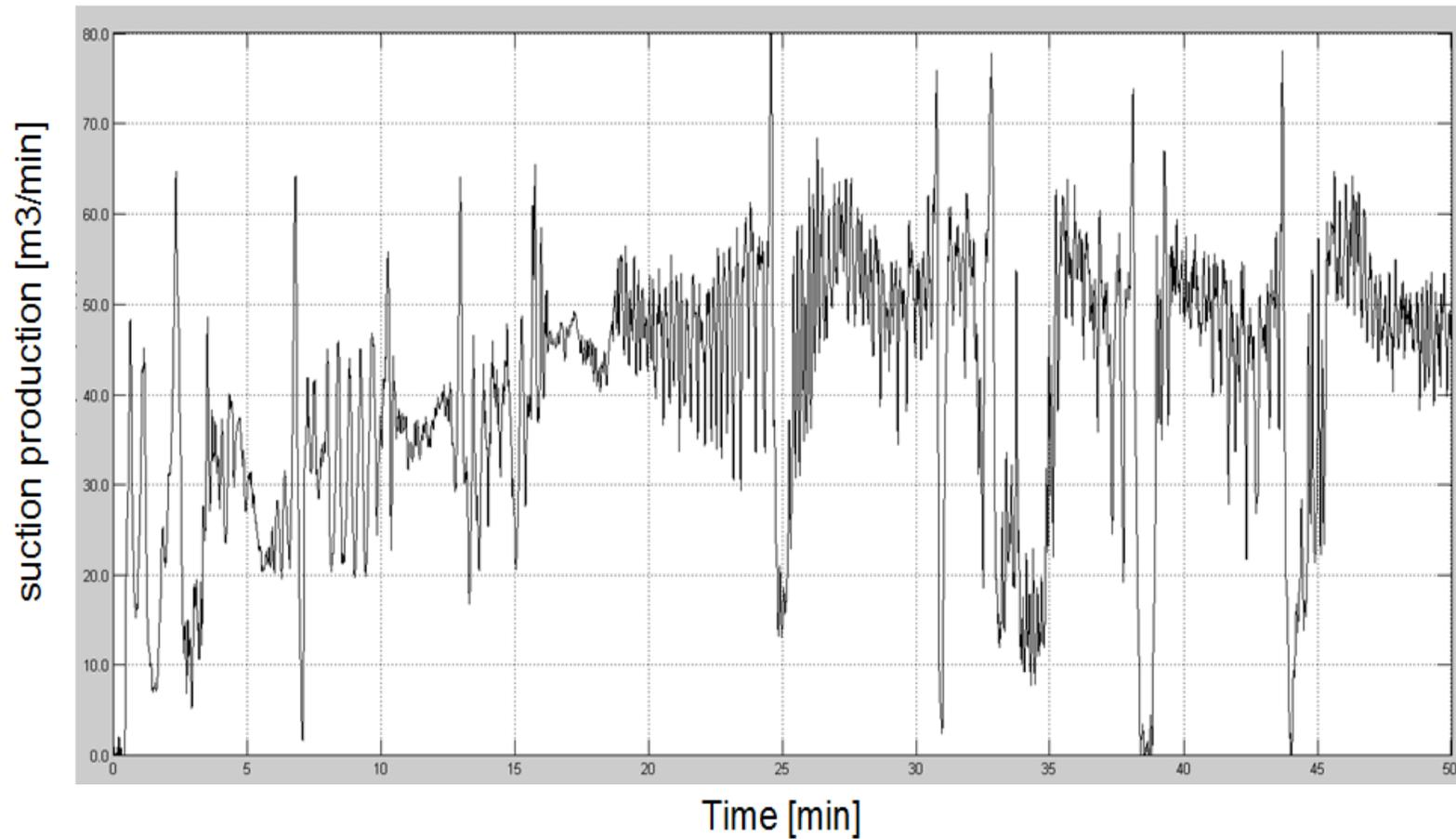


1. The impact of automation
2. Increase uptime
3. Standardization and modularization
4. Future developments:
  - LNG
  - Computational Fluid Dynamics
  - Ergonomics
5. Conclusions

The need for automation...

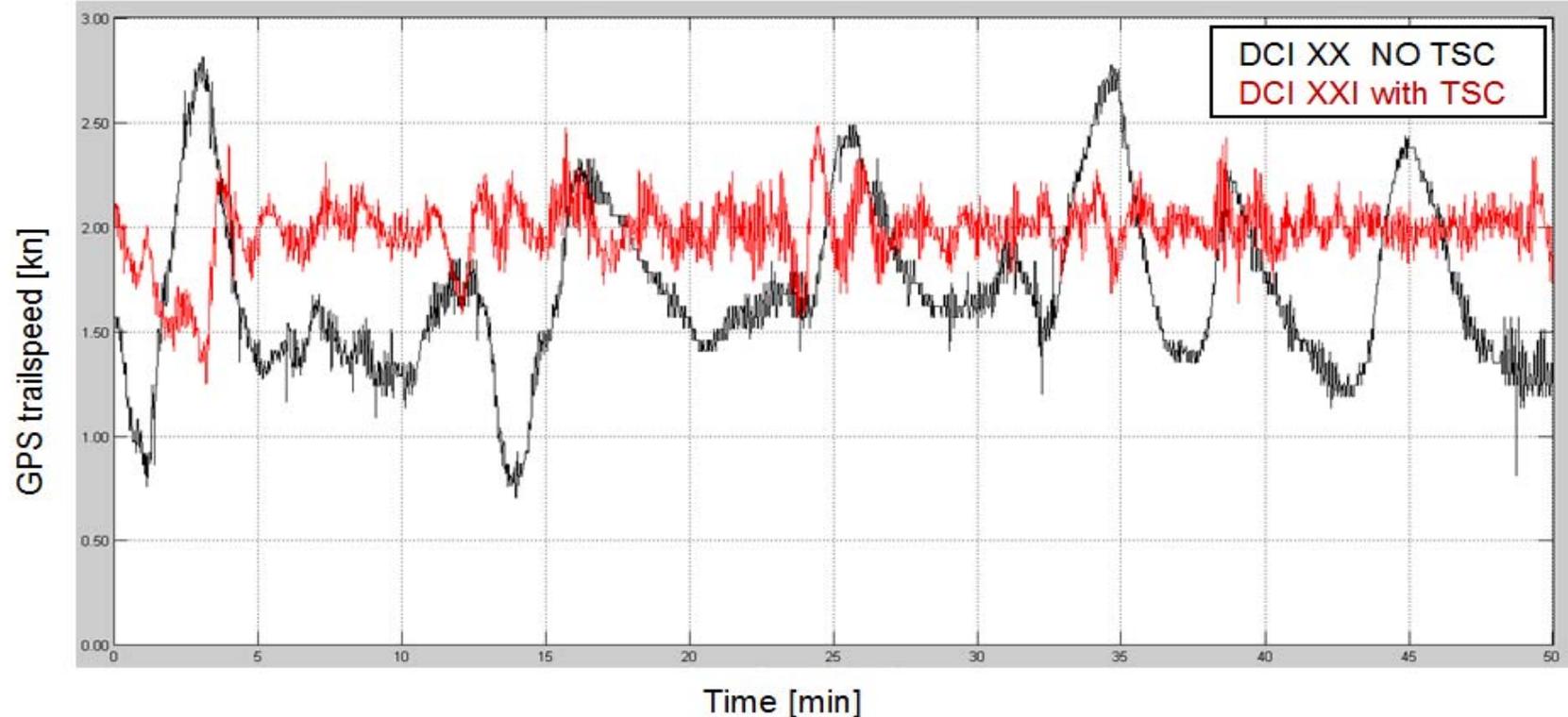


The need for automation...



## Trailspeed Controller

- Maintains ship speed at constant level
- Constant ship speed essential for steady dredging process
- Improves safety, steersman can concentrate on marine traffic



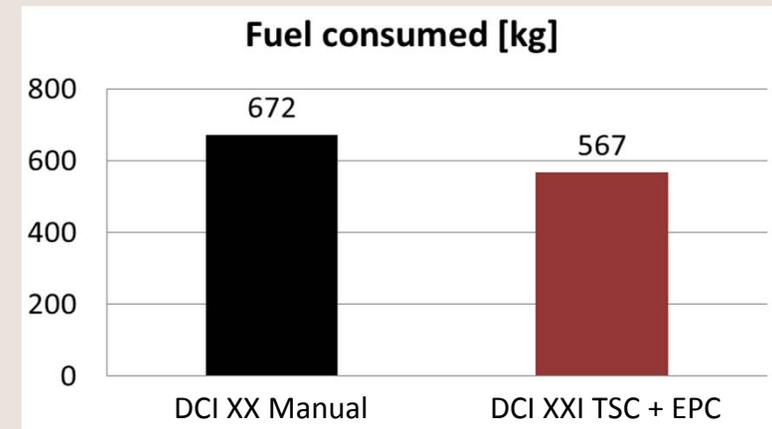
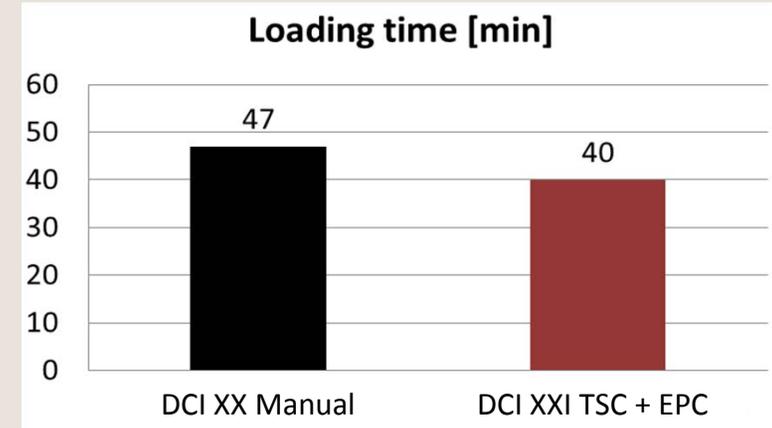
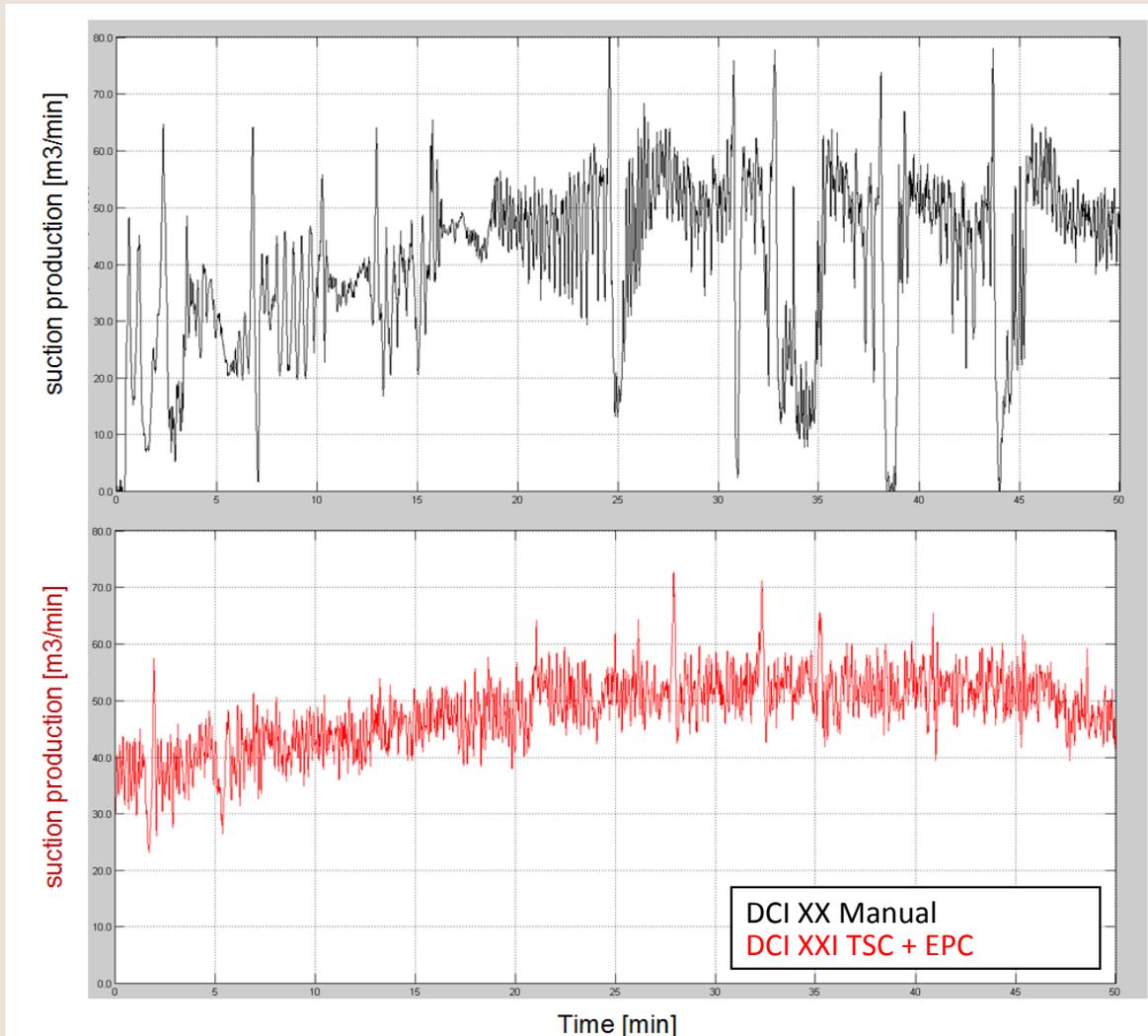
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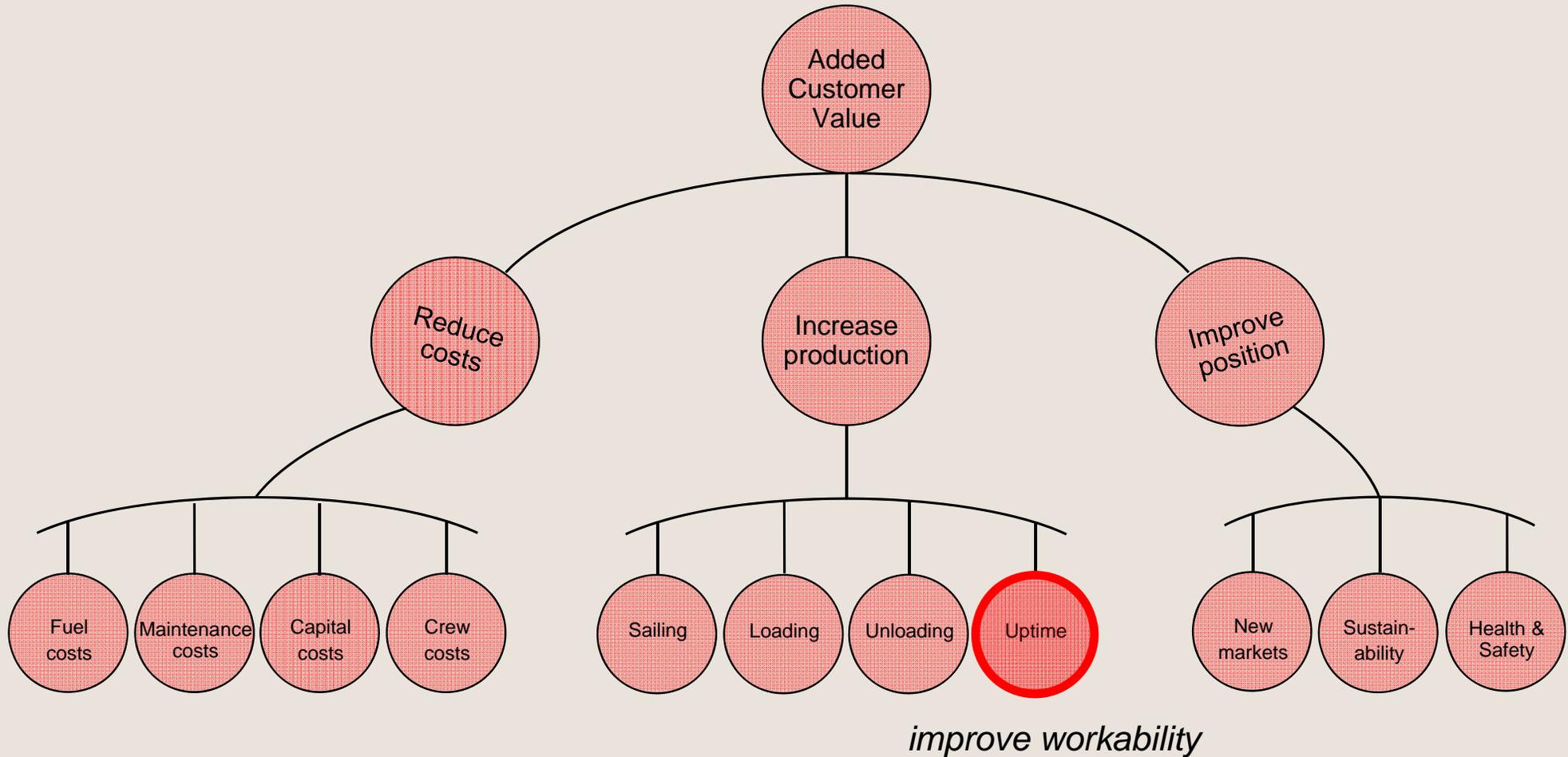
## Eco Pump Controller

- Prevent pump from cavitation
- Actively controls pump speed to optimize production and fuel consumption

## The impact of automation...

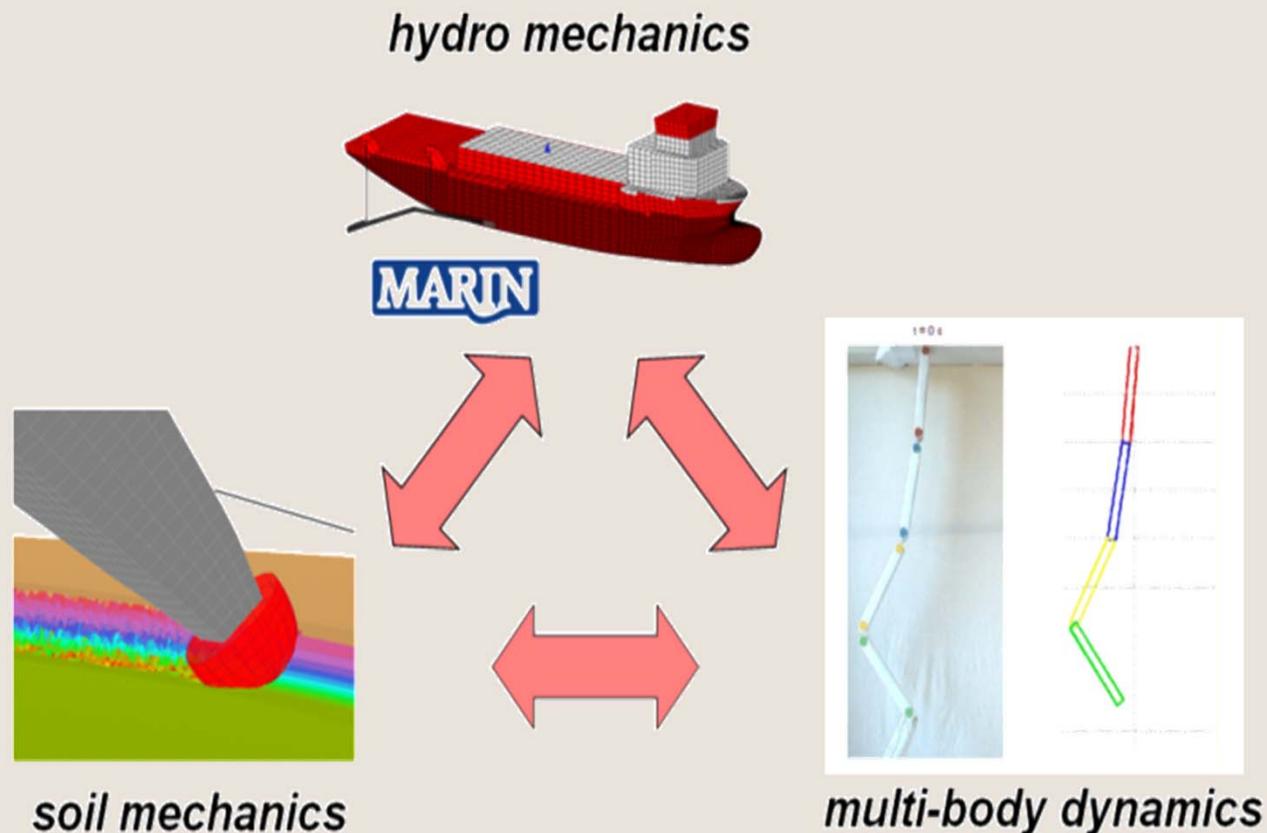


# Increase uptime



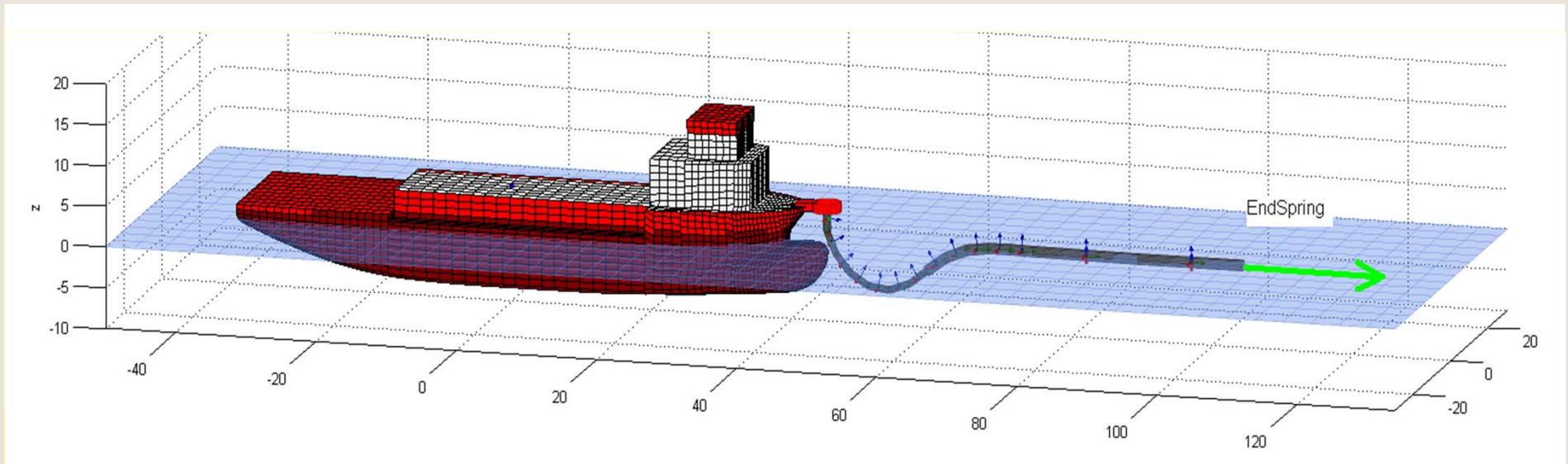
Improve workability:

- Workability of TSHD often limited by wave climate
- Development of DODO software

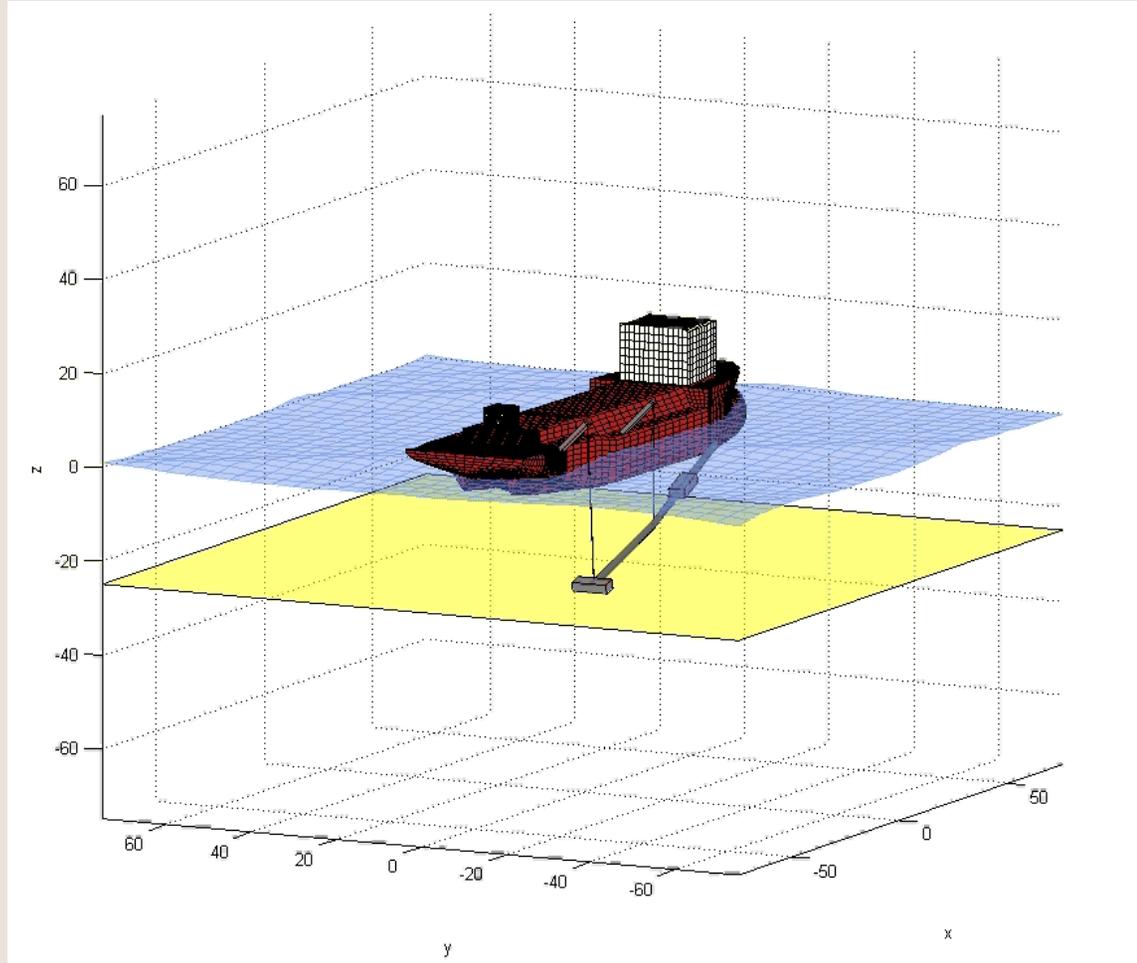


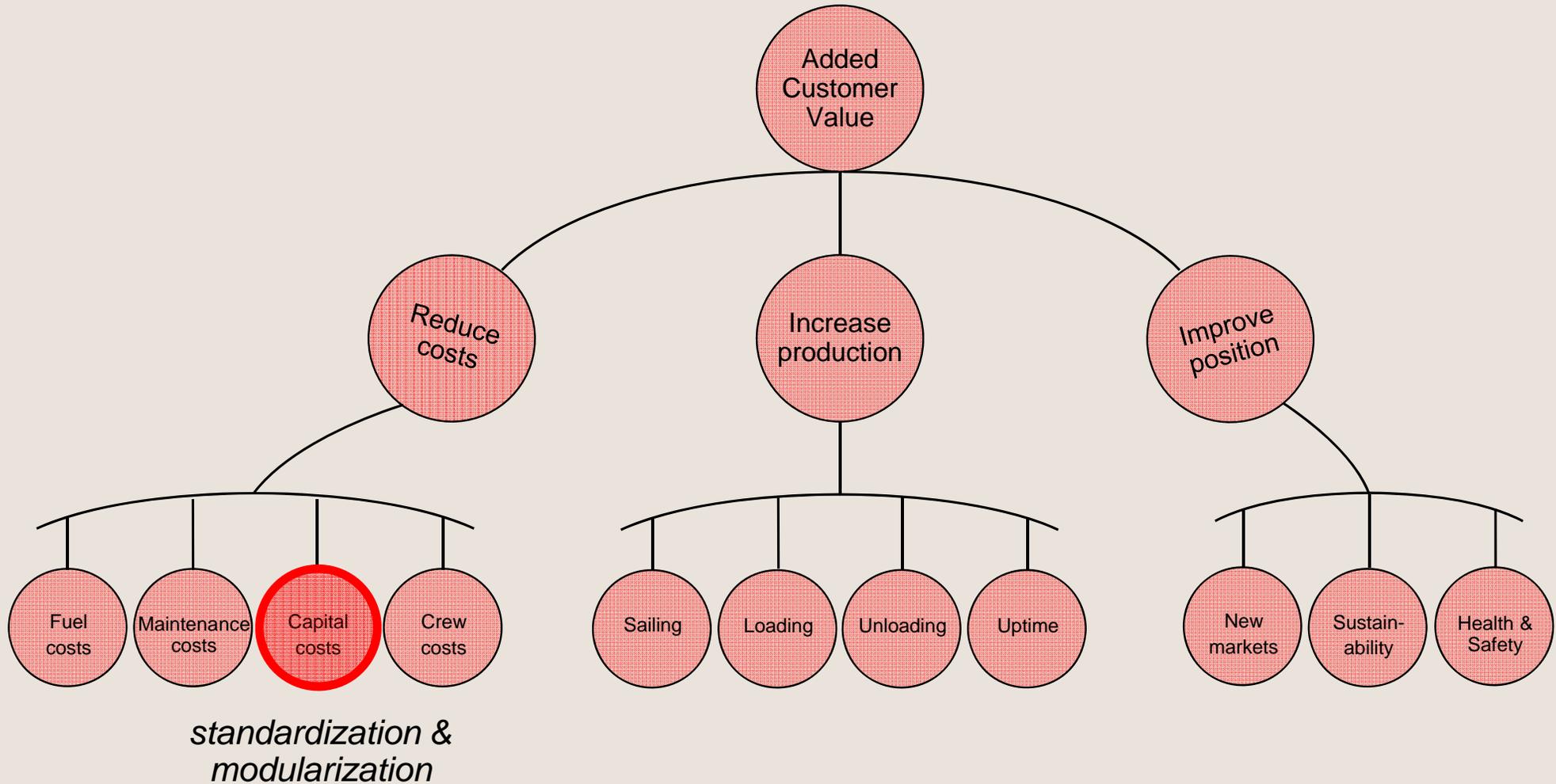
Improve workability:

- Workability of TSHD often limited by wave climate
- Development of DODO software
- Predict workability and determine safe settings
- Optimize designs for maximum workability



# Increase uptime



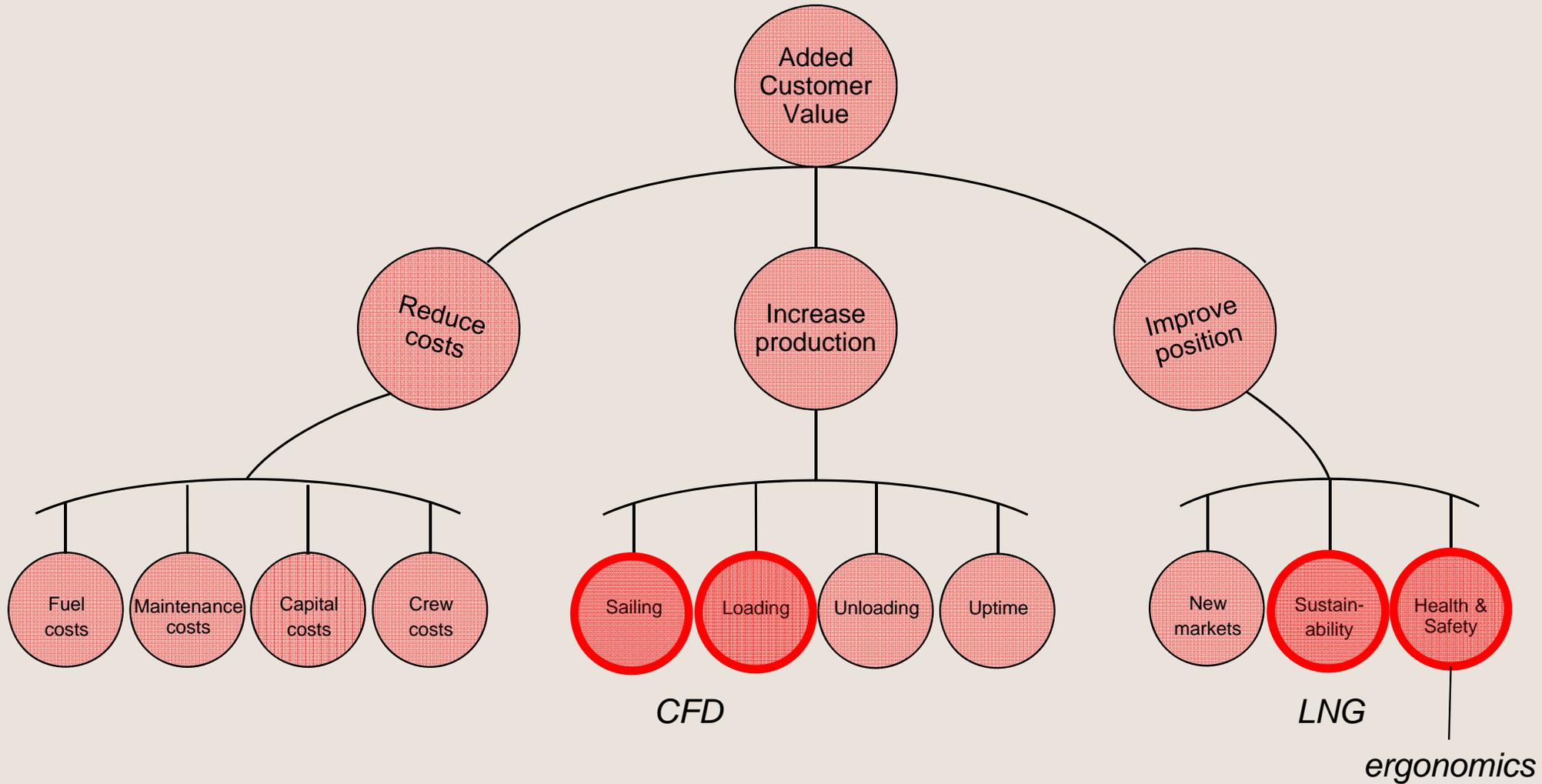


- Series of TSHD's with broad operational range
- Available in hopper volumes of 2000, 4000 and 8000 m<sup>3</sup>
- Integrated design with high level of automation
- Expand functionality with option packages

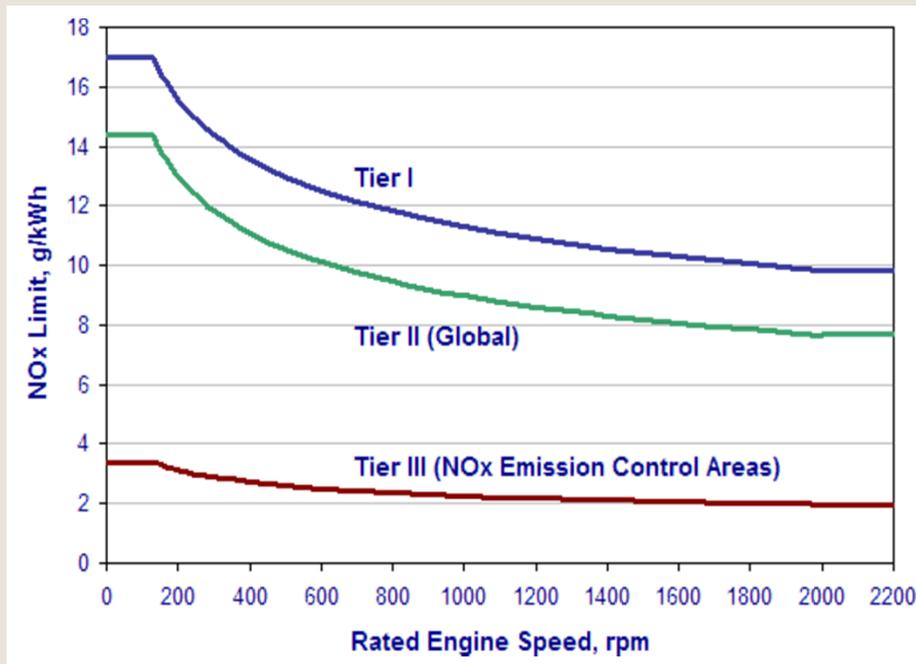


- Budget range of TSHD's
- Three types: 1300, 2300 and 3300 m<sup>3</sup>
- Basic design, focussed on sand mining
- Available 'off the shelf'

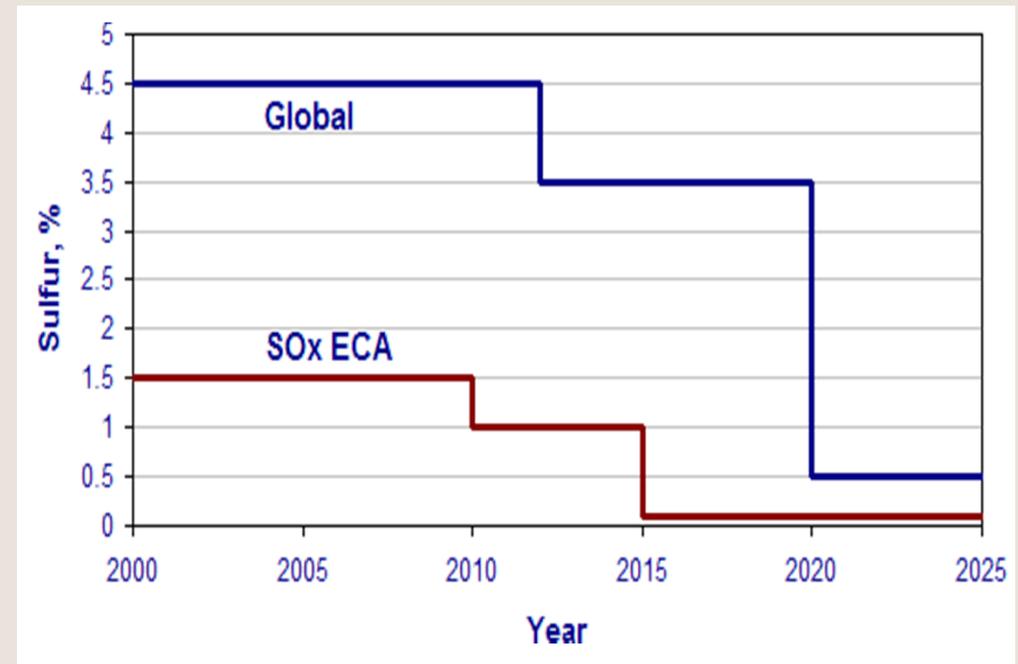




- Fuel costs approx. 25-30% of operational costs
- Increasing fuel prices
- Upcoming emission regulations (SO<sub>x</sub>, NO<sub>x</sub>, EEDI)



*NOx emissions*



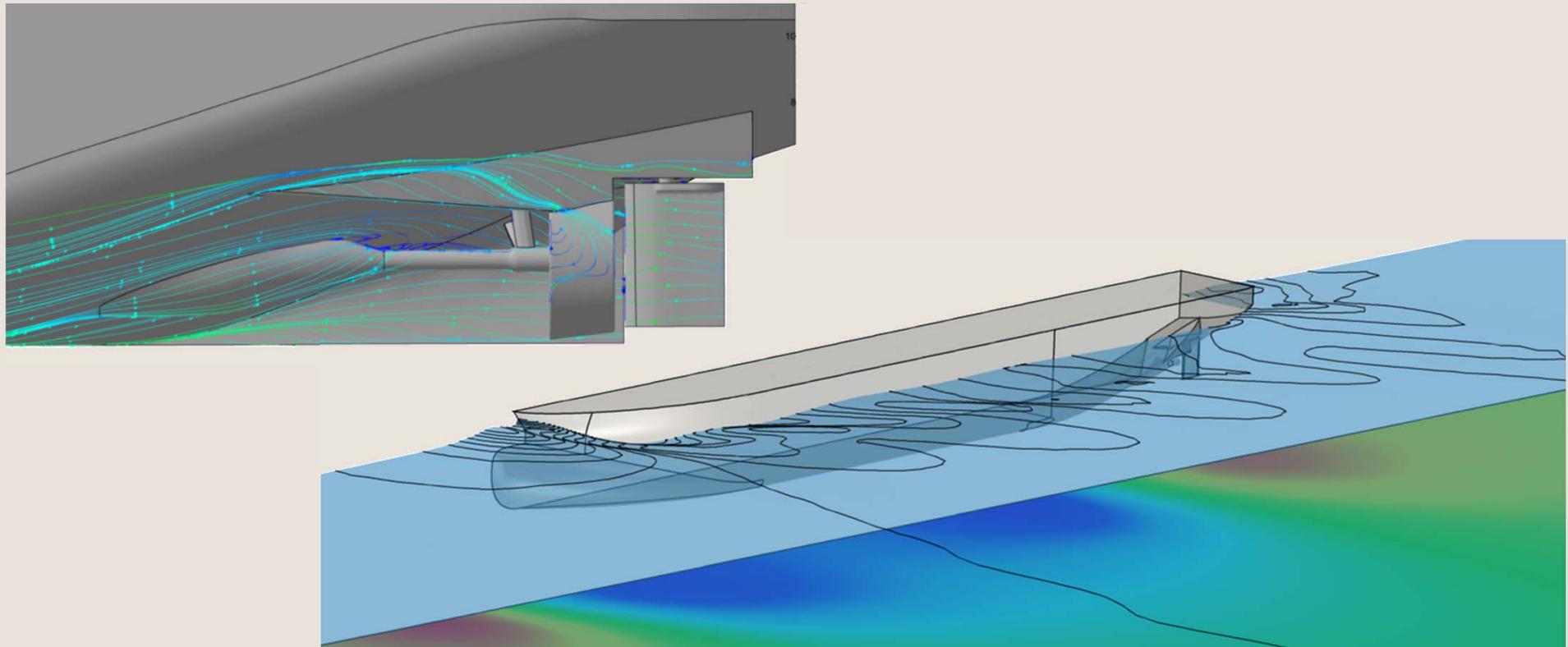
*SOx emissions*

- LNG reduces gas emissions (SO<sub>x</sub> by 99%, NO<sub>x</sub> by 85% compared to HFO)
- Solution to comply to IMO TIER 3 emission regulations

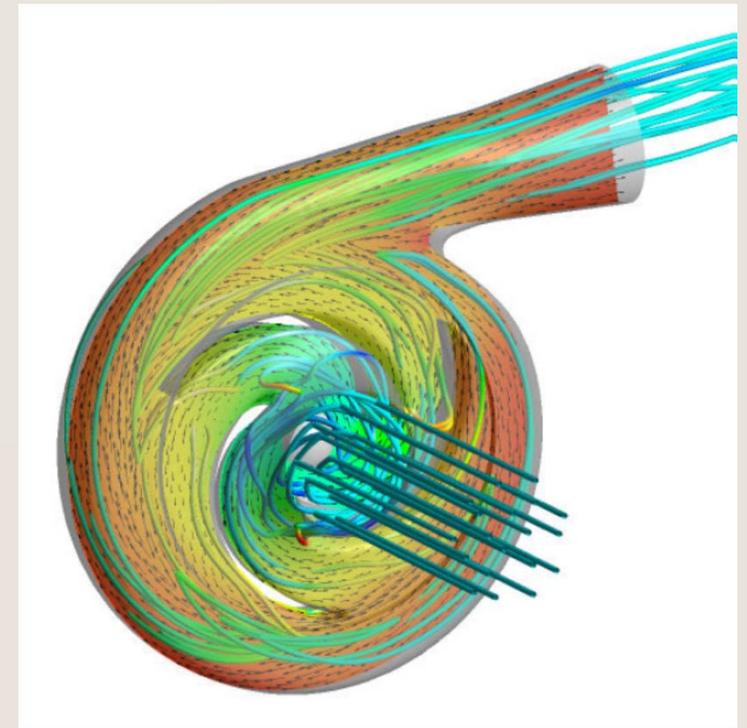
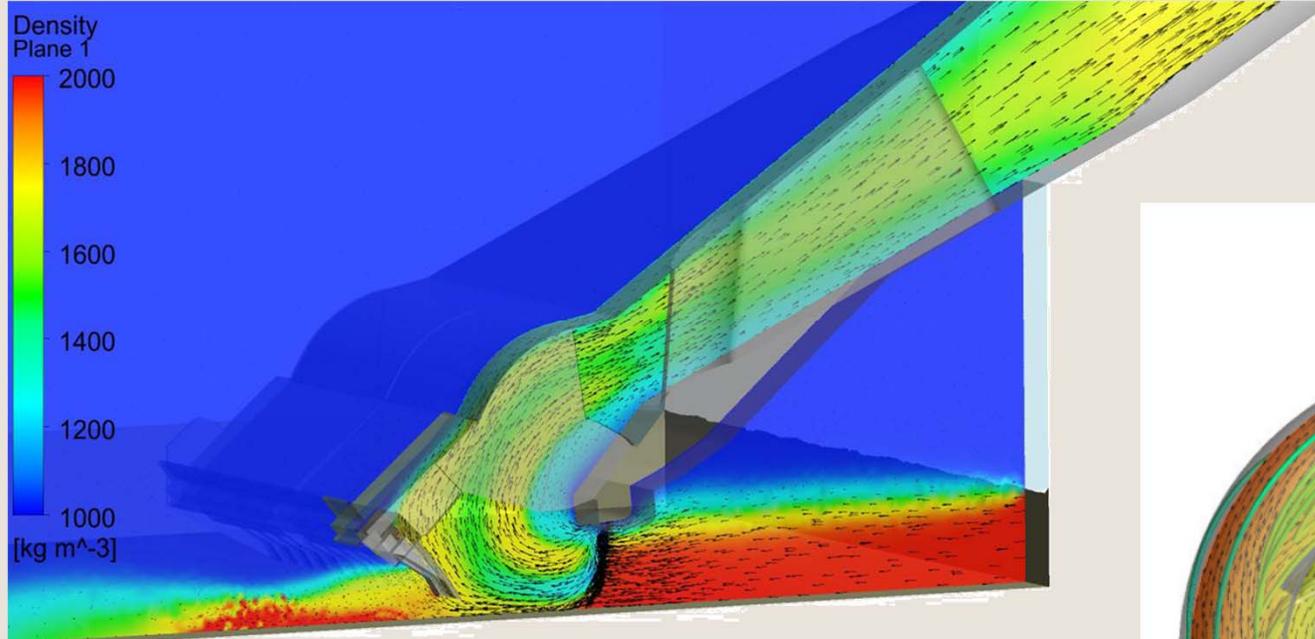


Hull shape development:

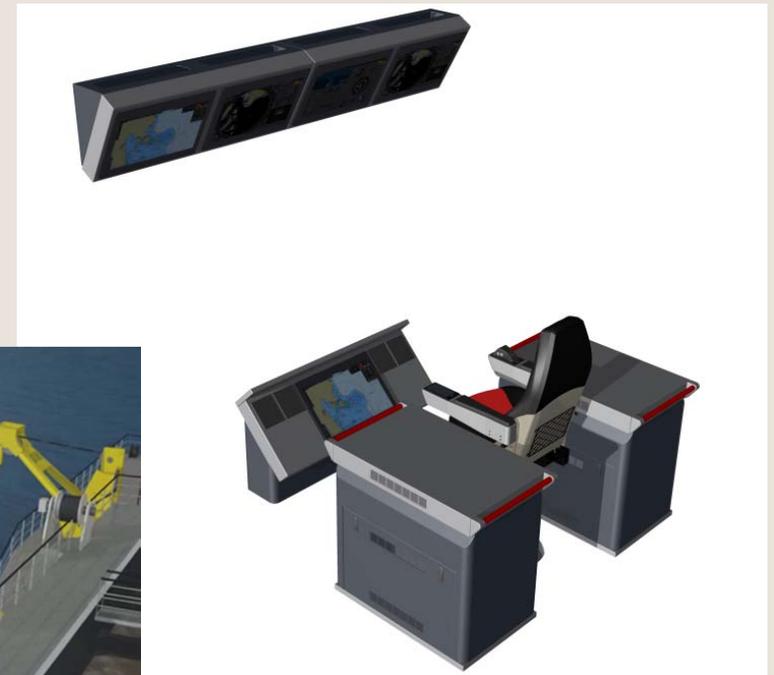
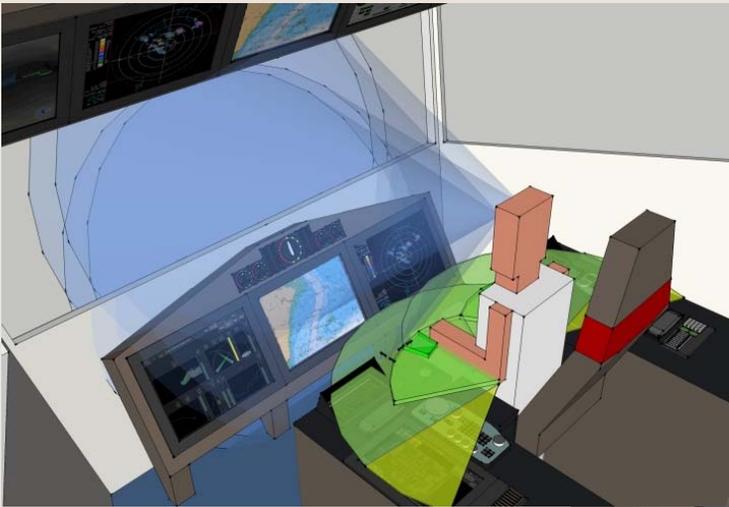
- Application of CFD in hydrodynamic design process
- Hull shapes optimized for low resistance and optimal manoeuvrability
- Develop expertise in shallow water performance



- CFD for dredge pump design
- Development of 2 phase CFD
- Design of new generation dredge components



- Ergonomic bridge with optimal viewlines
- Design of ergonomic consoles and control chairs
- Improves health & safety



- Intelligent automation reduces variations and disturbances, leading to higher production and lower fuel consumption
- Increase uptime by improving workability
- New series of TSHD's for shorter lead times and lower capital costs
- Continuous focus on R&D to create added customer value and to tackle upcoming challenges

*Thank you for your attention!*

