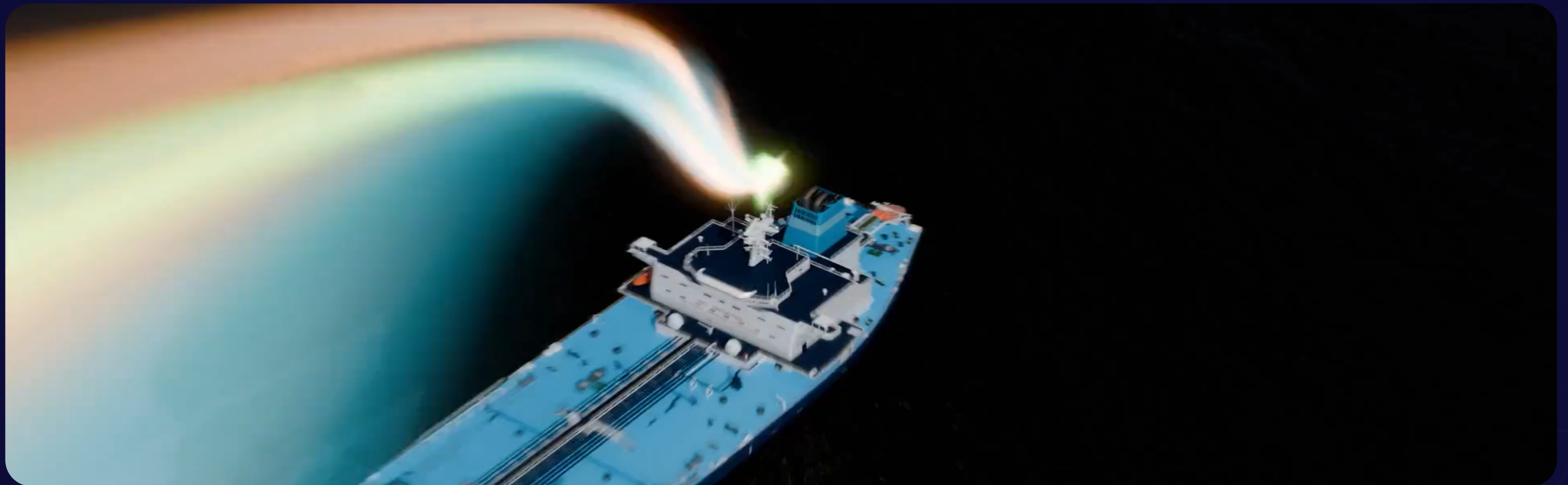# MARFLEX Electric Driven Cargo Pump Systems

We help make liquid cargo operations safer, more efficient and more profitable
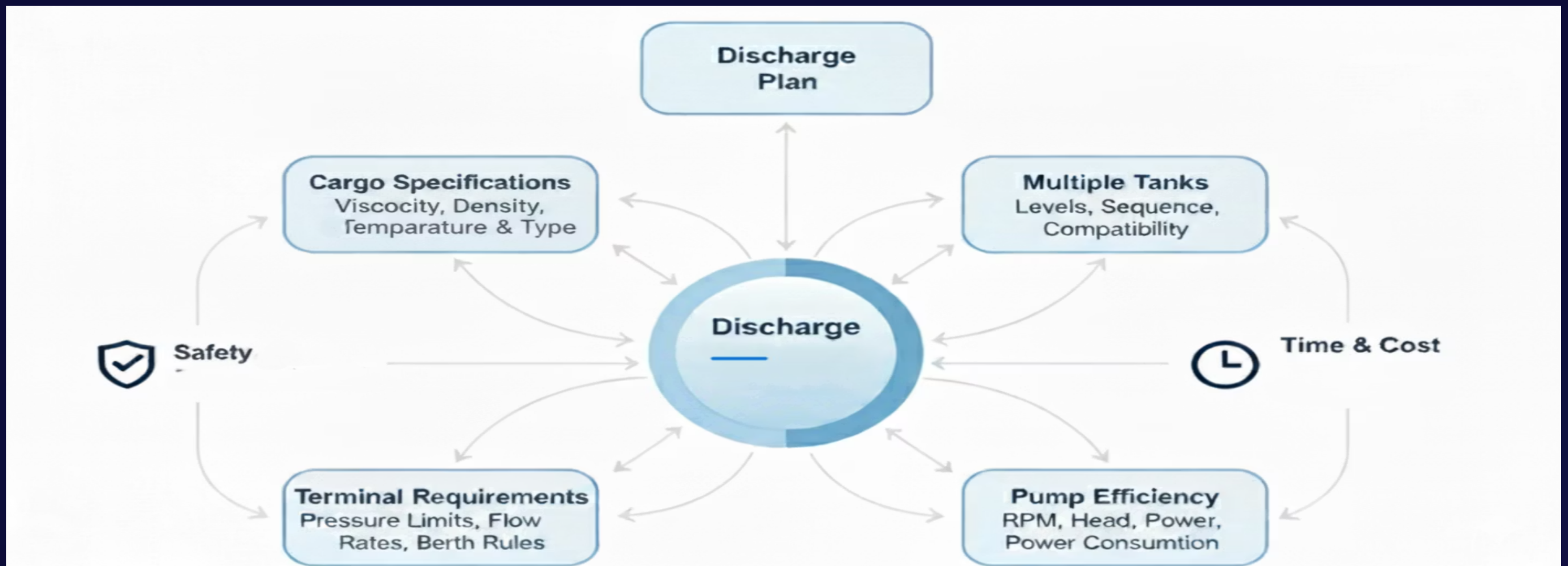
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Tanker Efficiency & Safety
Electrification of cargo pumping

Jasper van de Kant
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Cargo pumping is complex and critical

SAFETY = (Equipment + Process + Crew) = EFFICIENCY

Deepwell Pumps:

**Electric Driven
Deepwell Pump**

Key characteristics:

- Easy Installation: One pump per tank or pair.

- In tank, single-stage centrifugal.

- Variable speed drive for precise duty
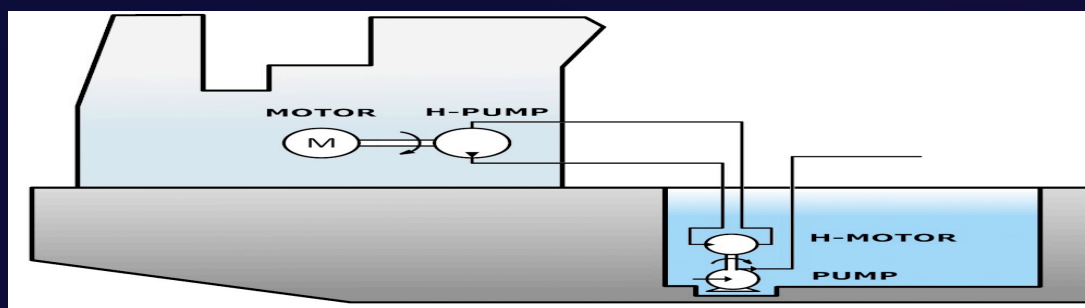
Versatility Across Operations:

- For all oil & chemical tankers IMO Type 1, 2, & 3 cargoes

- Methanol fuel transfer.

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Cargo Pumping: Main difference is the drive

Legacy Hydraulic Systems: Solution is not sustainable

- Diesel or indirect electric power
- Significant noise pollution
- Substantial energy losses
- Complex high-pressure mechanical systems

Electric Systems: Smart, Clean, Efficient

- Direct electric drive, shore power compatible
- **Over 15% energy savings** vs. hydraulic
- Compact, quiet operation, no auxiliary equipment
- Integrated software for intelligent optimization
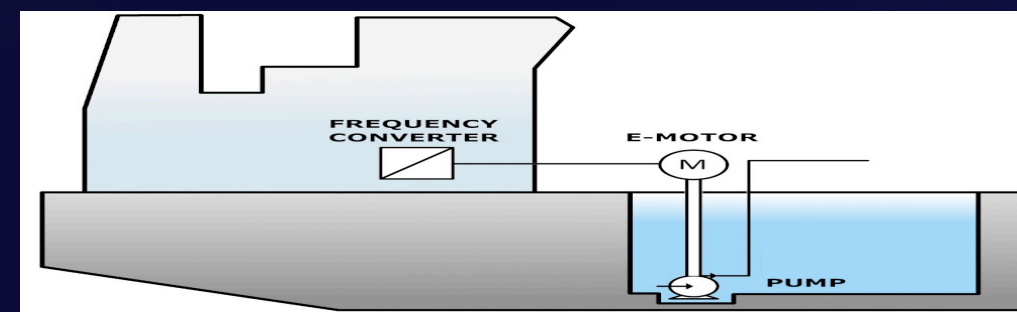
Seamless Transition: Familiar Operation

Crews prefer electric drive for ease of use and improved working conditions.

Maximize efficiency

1. Select equipment with reduced energy consumption

2. Help the crew to avoid damage and inefficiencies

3. Increase operational efficiency

Electrification is key in this transition

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Key considerations to specify a drive system

1. Avoid Matrix specifications and choose more drives

2. More drives is more flexibility and more redundancy

3. Simplicity reduces risk of failure and is easier to fix in case of failure

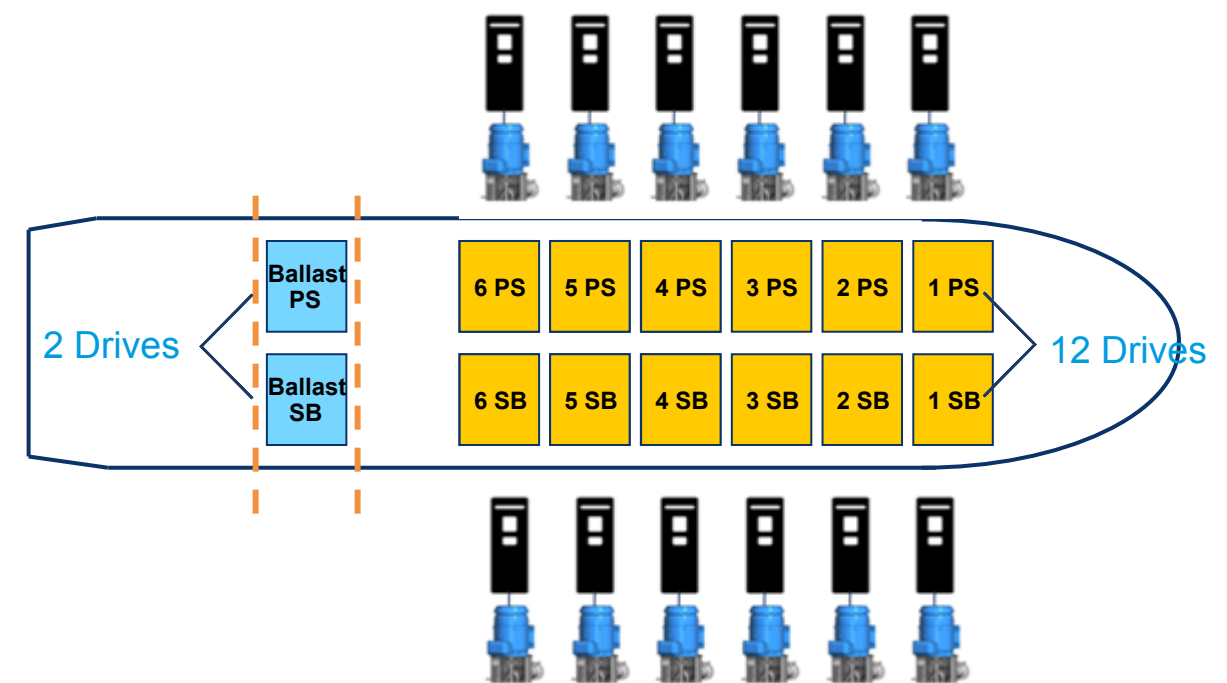4. Footprint, weight, cooling requirement, energy consumption, cost

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Drive system configurations – Simplify your system – Remove the matrix

Conventional Matrix – Portside & Starboard
Total 6+2 drives
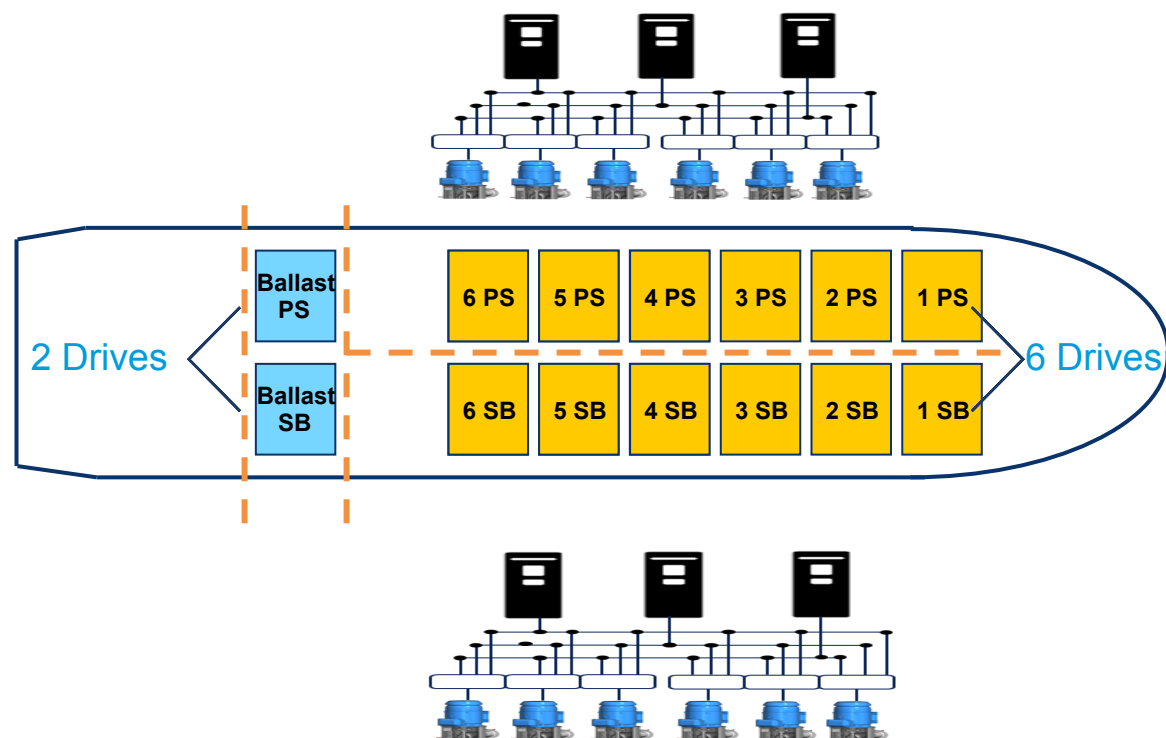
Full Drive Sysem
Total 12+2 Drives + one spare drive

Full Drive Systems: Tailored Configurations for Optimal Performance

Matrix Drive System
(6 Drives)

Standard industrial cabinets

Full Drive System
(6 Drives)

Frame-mounted design

Full Drive System
(16 Drives)

Compact back-to-back frame

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Unlock efficiency with Electric Cargo Pumps

Streamlined Design & Performance

Simplified architecture, easy to operate and maintain, most energy efficient and future proof solution

Shipyard Advantages: Faster Installation & More Space

Lower installation costs, increased cargo capacity, faster build process

Commercial Appeal & Sustainability

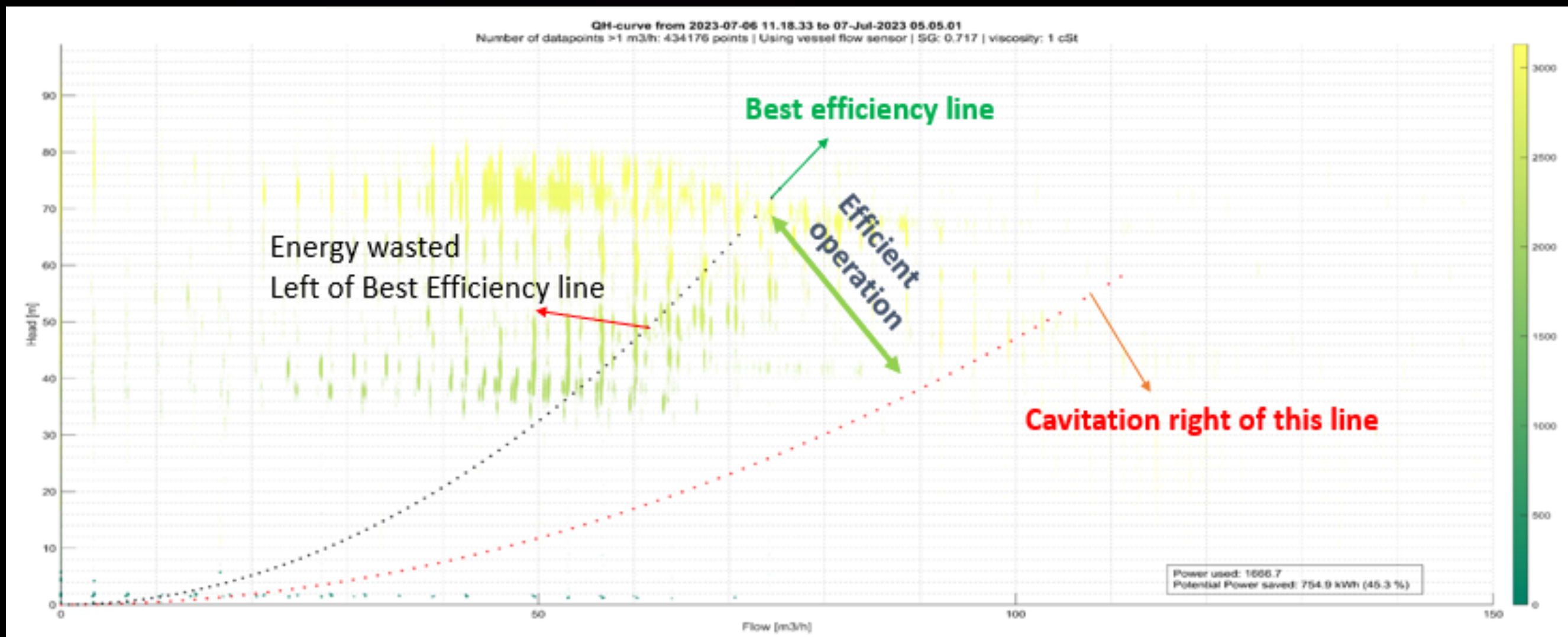Enhanced fleet appeal, reduced OPEX, meets IMO targets

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What is the Best efficient discharge?

Pump perspective

- The ideal combination of: Pump speed & Pressure

Operational perspective:

- Minimal energy consumption or fastest discharge
- Operational flexibility & plannability

Assessing Tanker Discharge Efficiency:
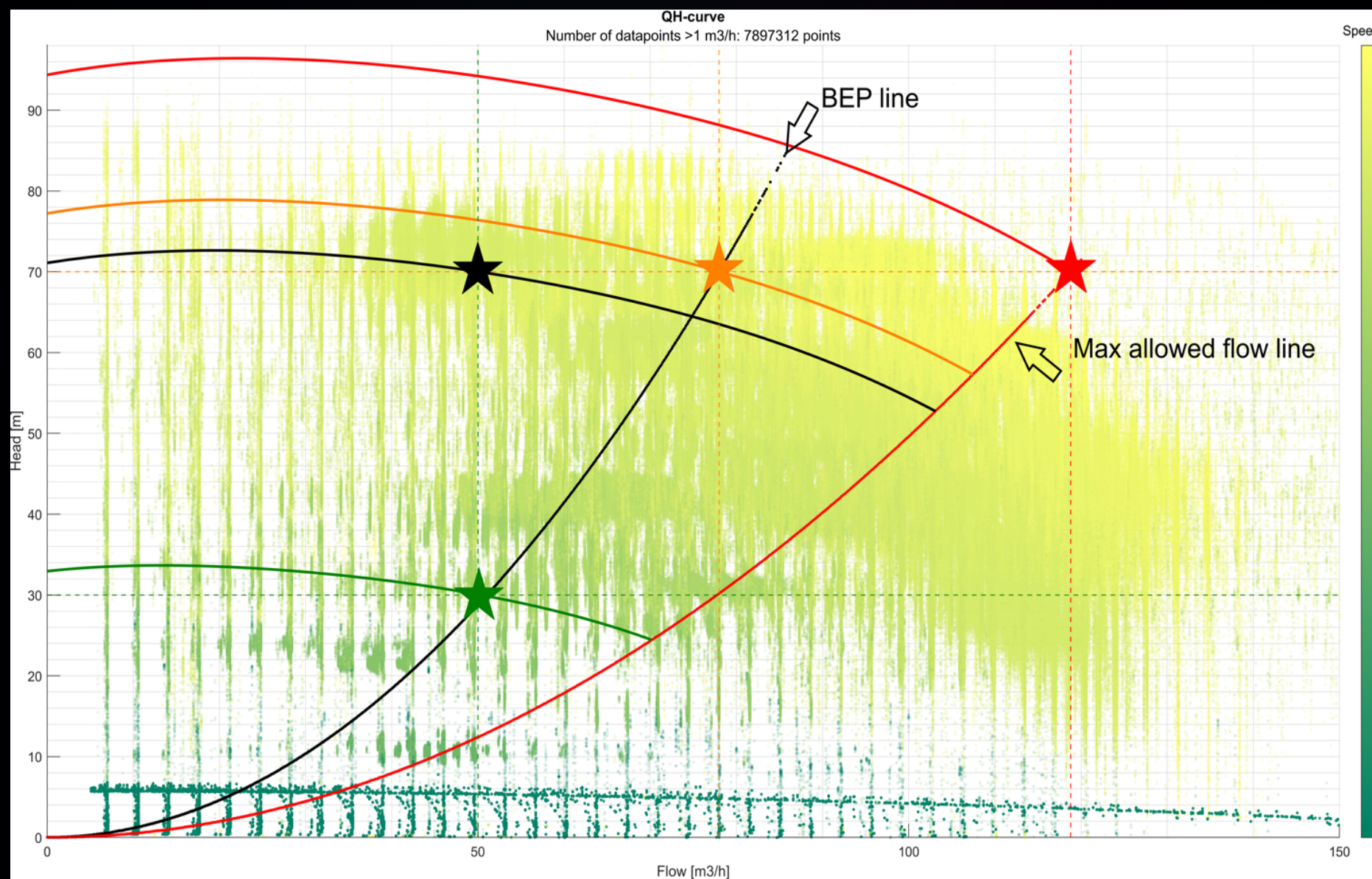
How effcient is an average tanker discharge?

20% ?   40% ?   80%?

Assessing Tanker Discharge Efficiency:
Hughe room for improvement

Just **22% of tanker discharges** are truly efficient. A Staggering 78% Lost Potential

The remaining **78%** is lost to wasted energy (**45%**) and critical issues such as cavitation (**33%**)
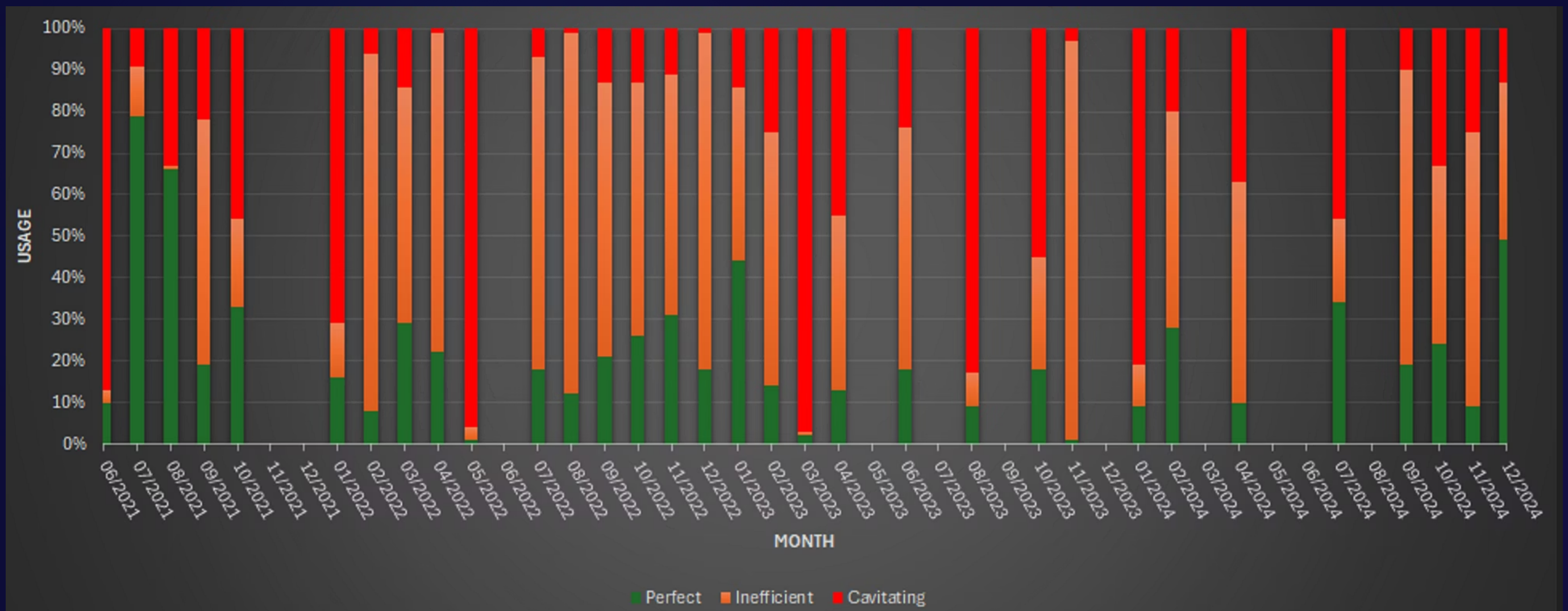
Cavitation: A Critical Threat to Pump Integrity and Safety

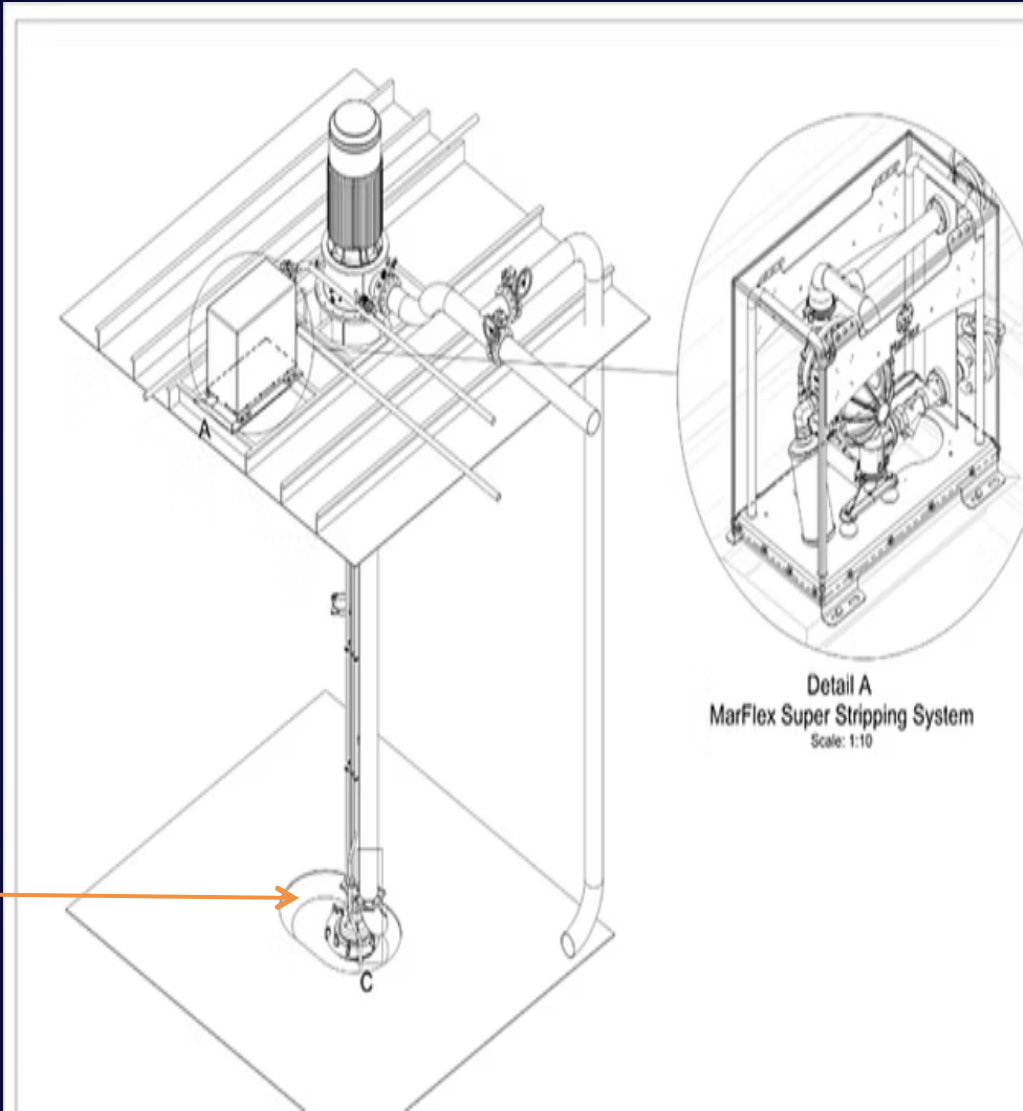Severe cavitation erosion (3.5 cm wide, 8-9 mm deep)

Cavitation damage on tank top surface

Deep cavitation erosion (7-8 mm)

Detail A
MarFlex Super Stripping System
Scale: 1:10

Prevent Cavitation: Enhance Safety and Efficiency
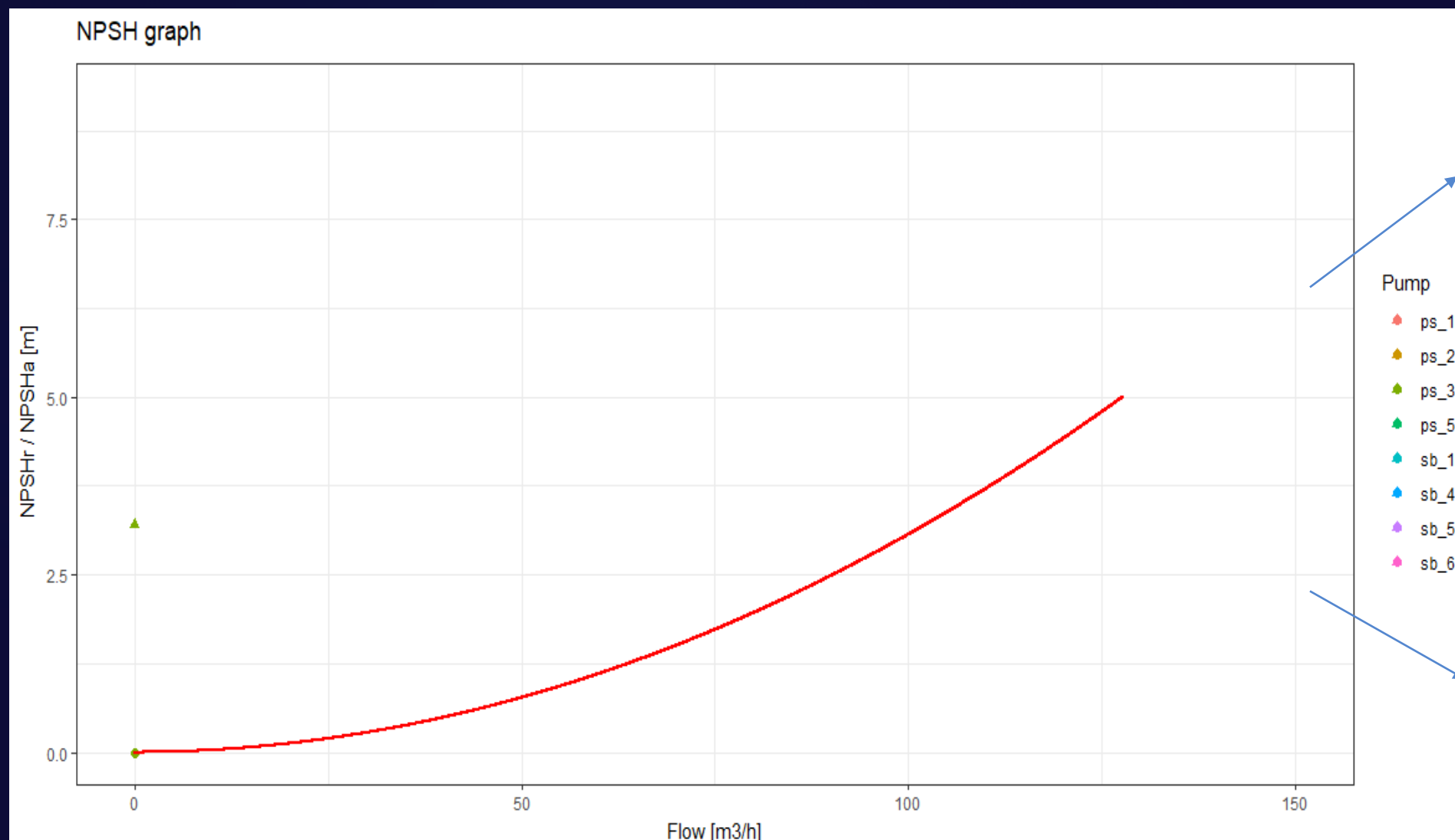
System keeps track of available pump prepressure (NPSHa).

The NPSHa should always stay at least 0.5m above the NPSHr as a safety measure

System keeps track of required pump prepressure (NPSHr) and automatically lowers speed and adjusts valve position when needed to prevent cavitation
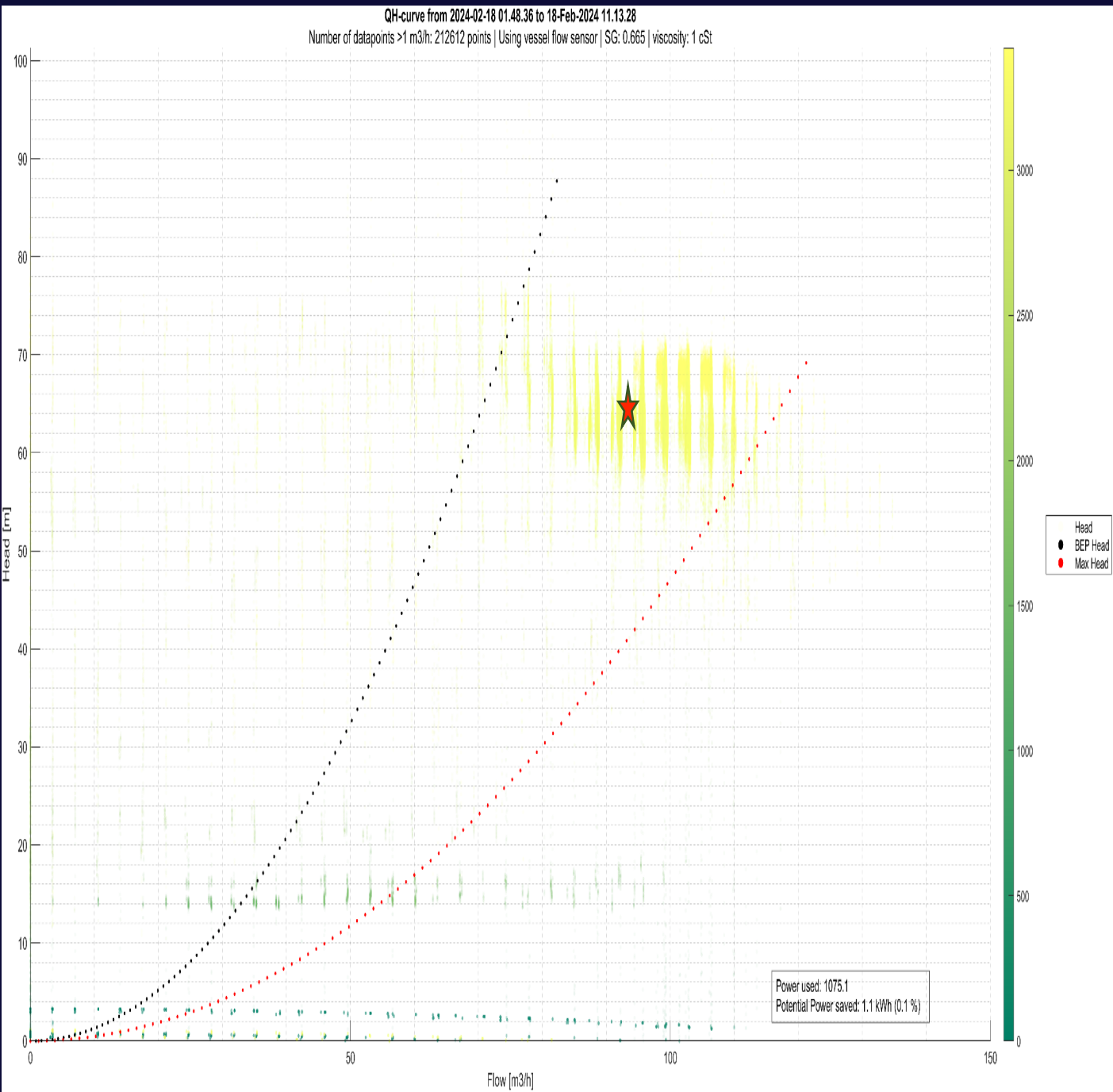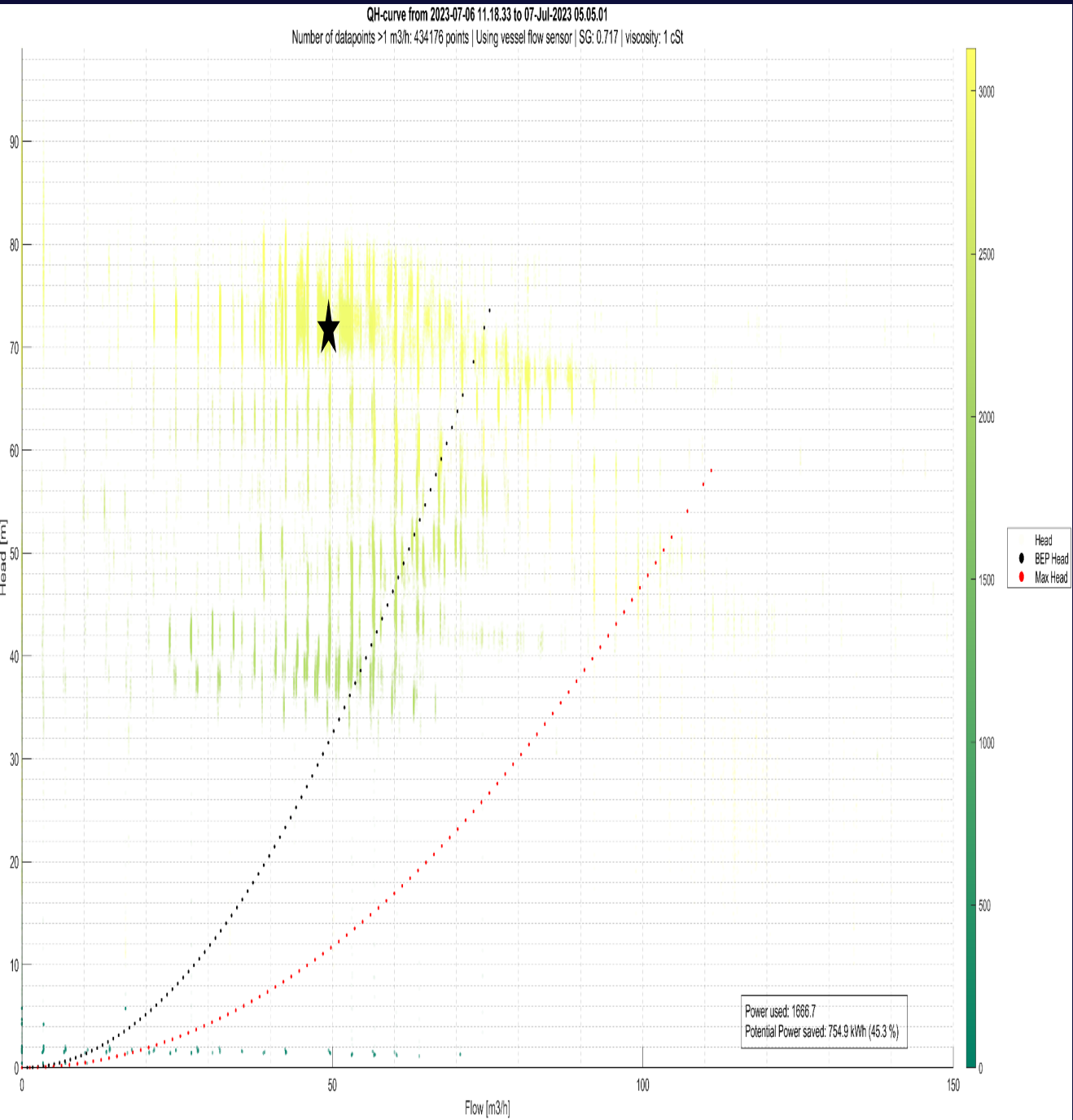
- With Smart Pumping Enhanced on Feb 18th, 2024
- Actual total saving 45,3 – 0,1 = 45,2 %

Impossible for a crew to do it right, unless we add technology

MarFlex Smart Pump technology
Capture best efficiency on board. Avoid damage

Electric Deepwell Pumps: Maximize Efficiency

Transition to Sustainable Power for Peak Performance

- **Unparalleled Efficiency:** Optimize operations and reduce energy consumption.

- **Regulatory Compliance:** Meet and exceed all environmental standards.

- **Enhanced Safety:** Improve workplace safety with reliable electric systems.

DNV: Strategies for Energy Optimization

To significantly boost cargo handling energy efficiency, DNV recommends a thorough assessment of current operations. This identifies key improvement areas for targeted upgrades. Implement practical solutions like variable   for pumps and cranes, and advanced insulation and heat recovery   for cargo heating and cooling.

Crucially, advanced monitoring and control systems enable real-time energy optimization. Digital tools and data analytics provide deeper insights into consumption, highlight best practices, and accurately measure efficiency.

Given diverse cargo operations, consult experts early to pinpoint optimal technologies and strategies. Regular crew training on energy-efficient practices is essential for sustained improvement.

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Electrify Your Cargo Operations: Maximize Efficiency & Profit

- **Streamlined Design**: Lighter systems, flexible layouts.

- **Rapid Installation**: Plug-and-play for faster commissioning.

- **Increased Cargo Capacity**: Compact design frees up valuable space.

- **Boosted Revenue**: Higher profitability from superior efficiency and optimized space.

- **Reduced OPEX**: Eliminate hydraulic oil, cut parts, lower maintenance.

- **Intelligent Control: Advanced efficiency management and optimal use.**

- **Sustainable advantage**: Future proof, meet IMO targets, enhance charter appeal.

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Thank you

www.marflex.com

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