



JFE BallastAce[®]

(Ballast Water Management System)

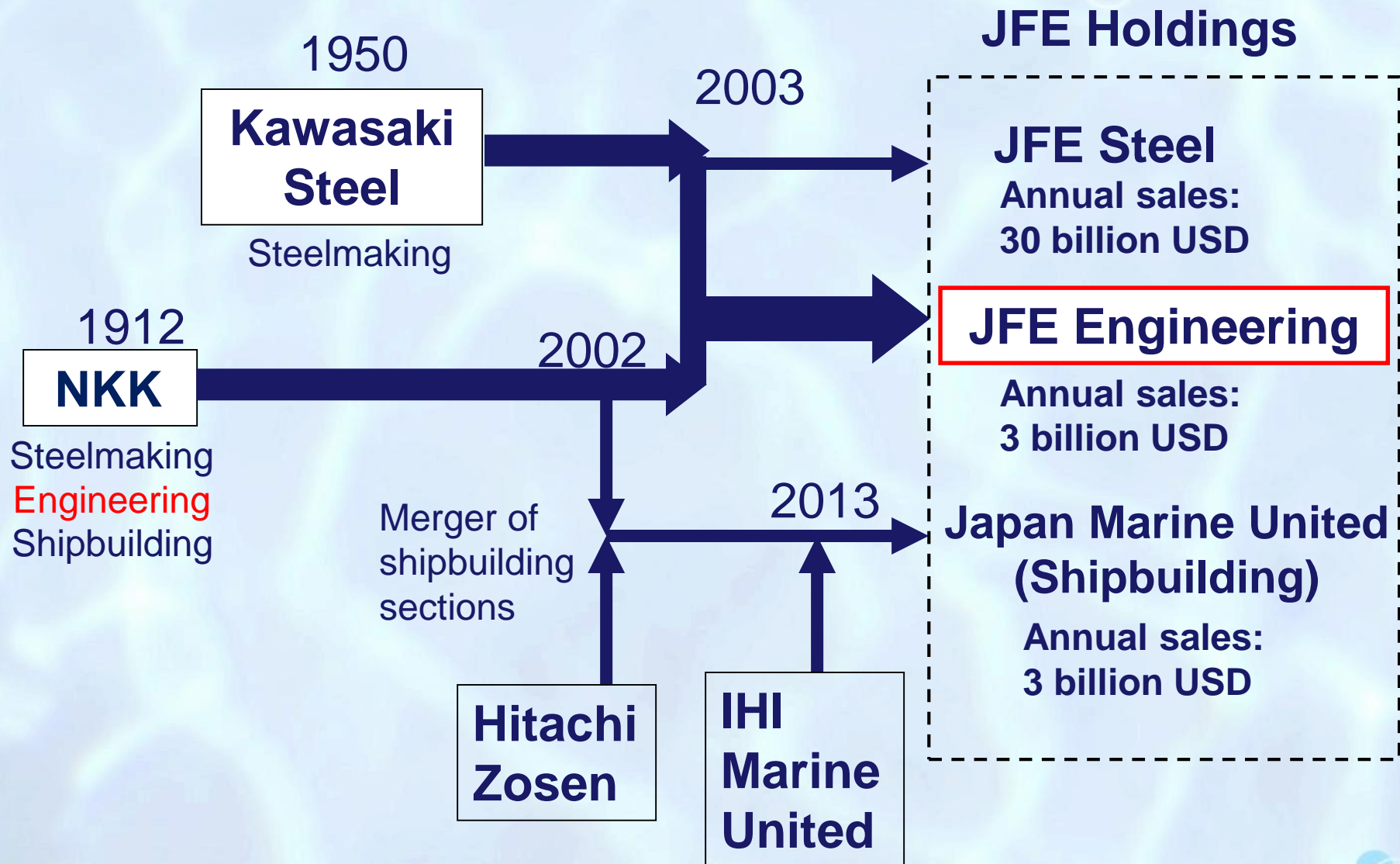
BWMS Division, JFE Engineering Corporation

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1. JFE Corporate History



2. Introduction of JFE BallastAce



2-1. Sales Record Reference

| | | |
|---|----------------|--|
| Delivered Total 283 ships | New ships | <ol style="list-style-type: none"> 1. Handy Size – Cape Size Bulk 2. Aframax Tanker 3. LPG Tanker 4. PCC etc. |
| | Existing ships | <ol style="list-style-type: none"> 1. NYK Line Cape Size Bulk ,PCC 2. MOL VLCC, Cape Size Bulk, PCC 3. “K” Line Handymax - Cape Size Bulk 4. Daiichi Chuo Kisen Over Panamax Bulk 5. PCC, Cruise Ship , Cement Carrier etc. |
| Sales order received Total 785 ships | New ships | <ol style="list-style-type: none"> 1. Handy Size – Cape Size Bulk 2. MR Tanker, Aframax Tanker , Suezmax Tanker, VLCC, LPG Tanker , PCC etc. |
| | Existing ships | <ol style="list-style-type: none"> 1. Container Ship 2. Suezmax Tanker, Product Tanker etc. |

Total 1068 ships



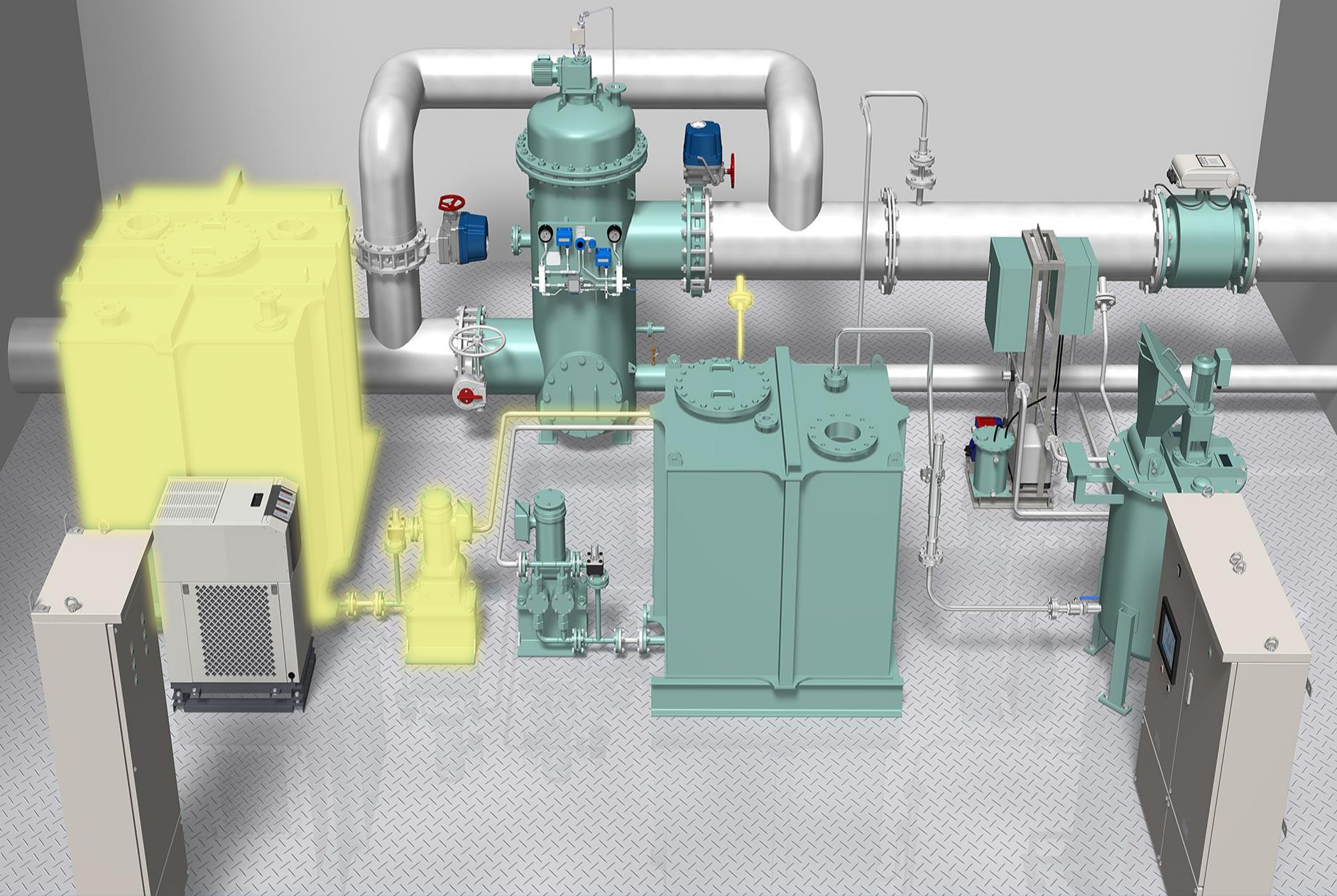
2-2. JFE's Conclusion

Filtration & Formulated Chemical Injection

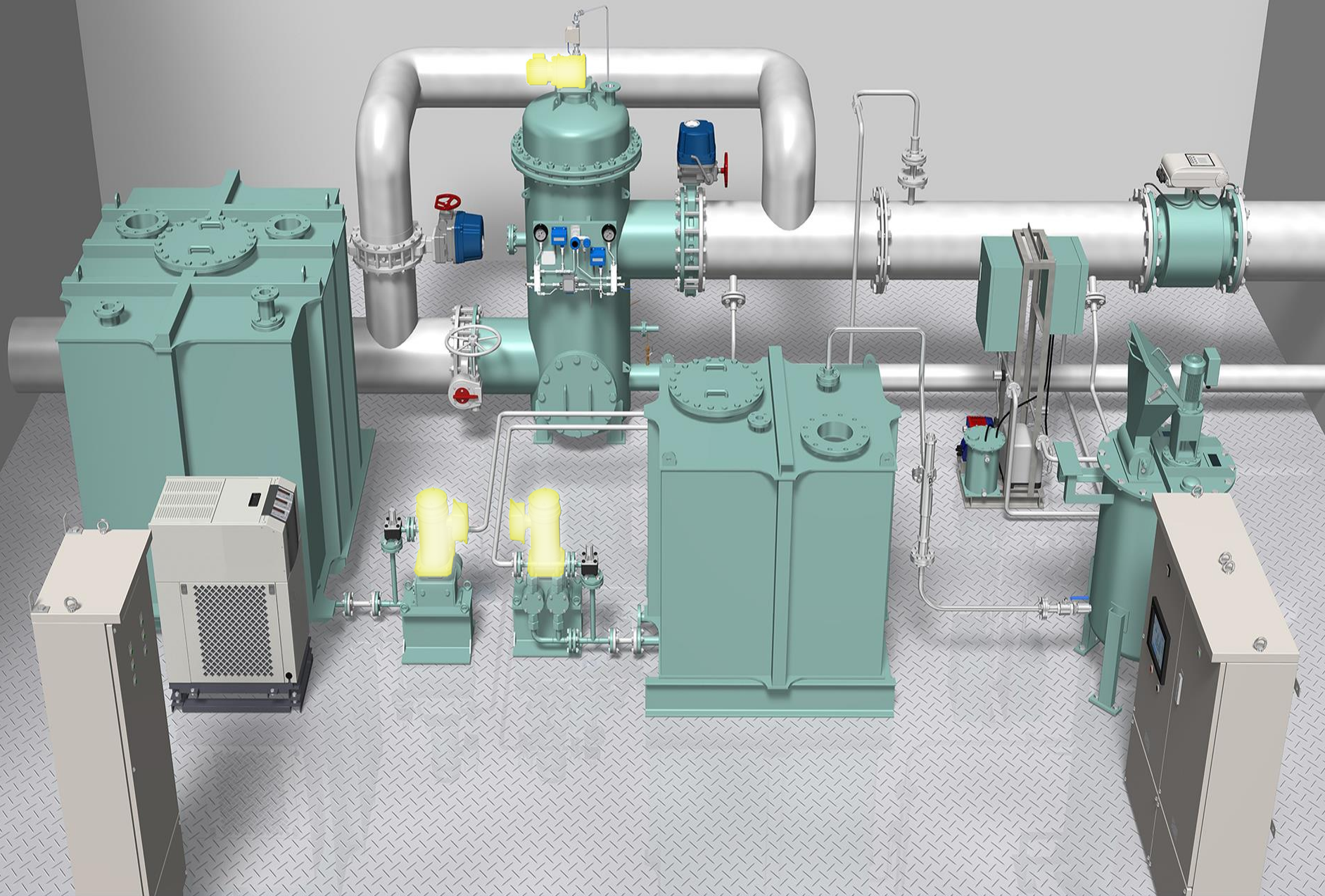
The true advantage for ship owners



2-3. Simple Configuration - *non generating components* -



2-4.Simple Configuration - *Limited number of drive parts -*



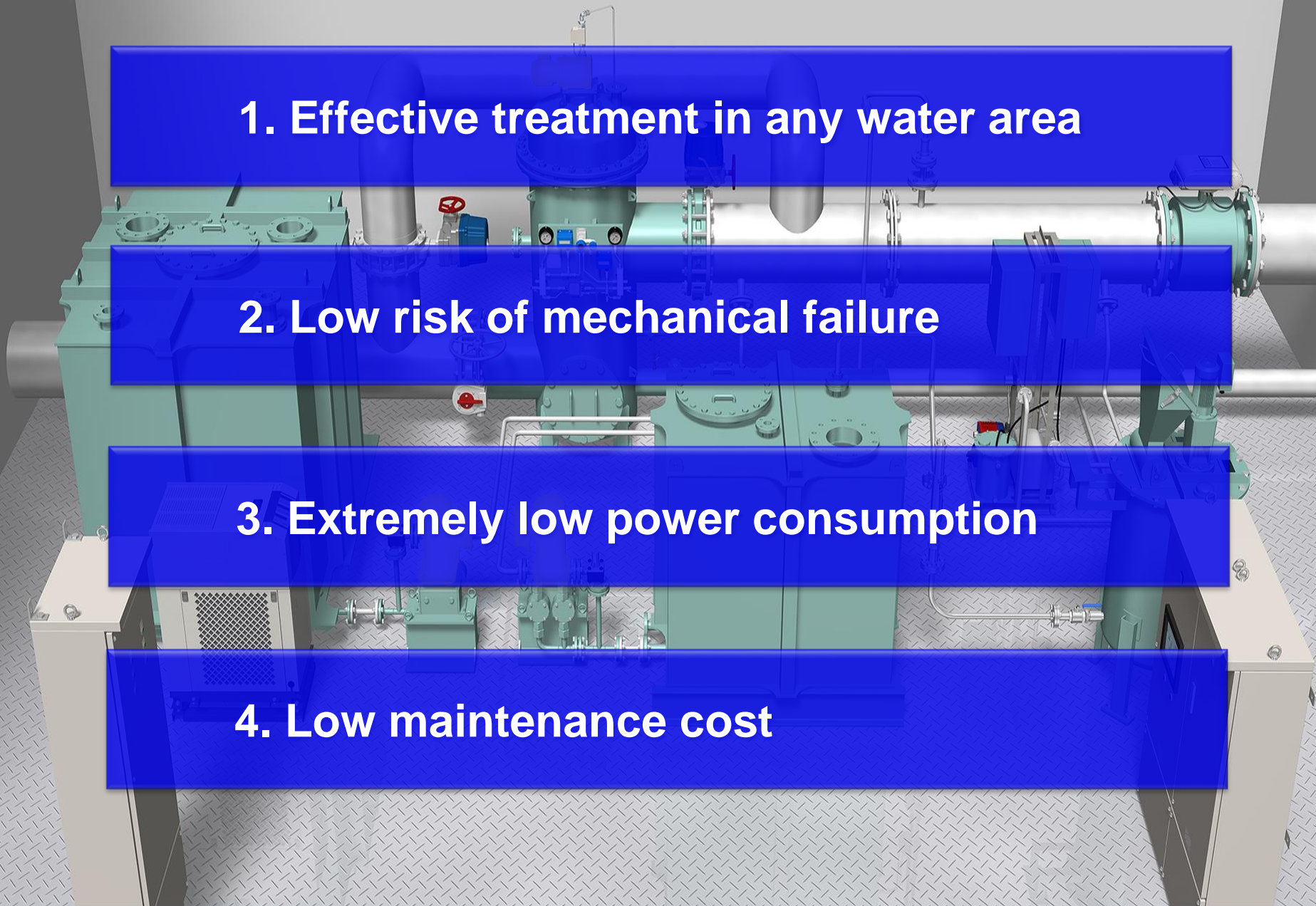
2-5.Simple Configuration - *Limited number of drive parts -*

1. Effective treatment in any water area

2. Low risk of mechanical failure

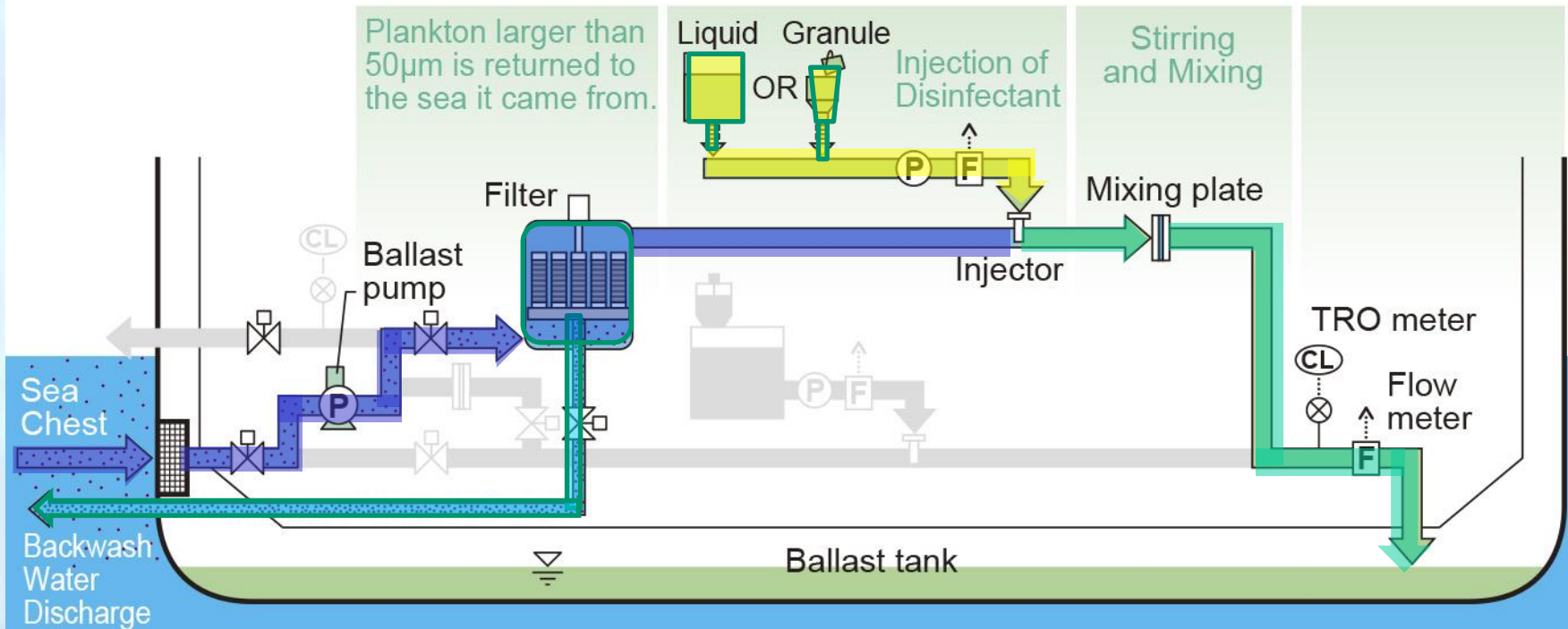
3. Extremely low power consumption

4. Low maintenance cost



2-6. Process overview (Ballasting / Disinfecting)

In Ballasting (Cargo Unloaded)



Liquid
TG Ballastcleaner®



200L/drum

or

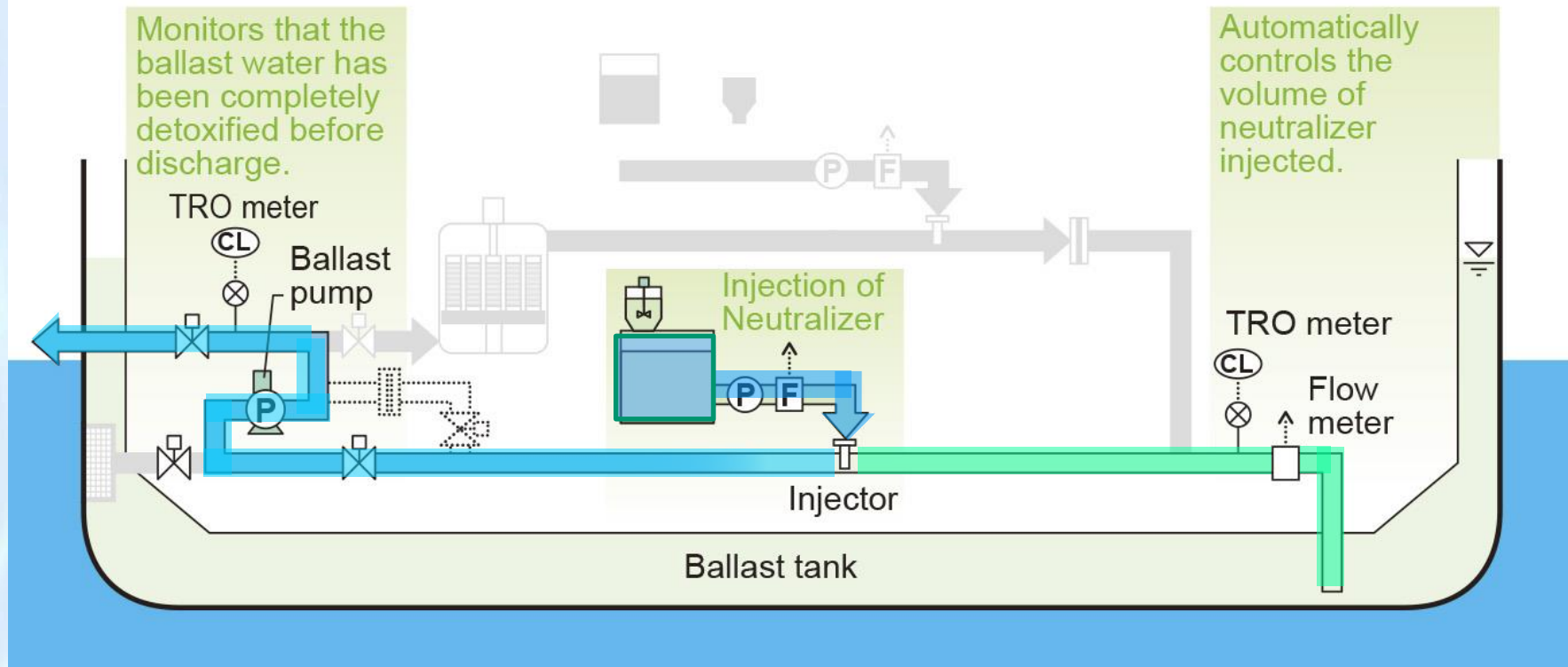
Granular
NEO-CHLOR MARINE®



25kg/drum

2-7. Process overview (De-ballasting / Neutralizing)

In De-Ballasting (Cargo Loaded)



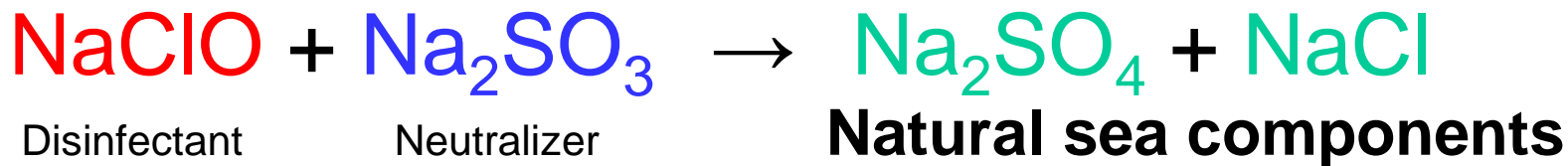
2-8. Chemical

Well established & widely used Chemicals

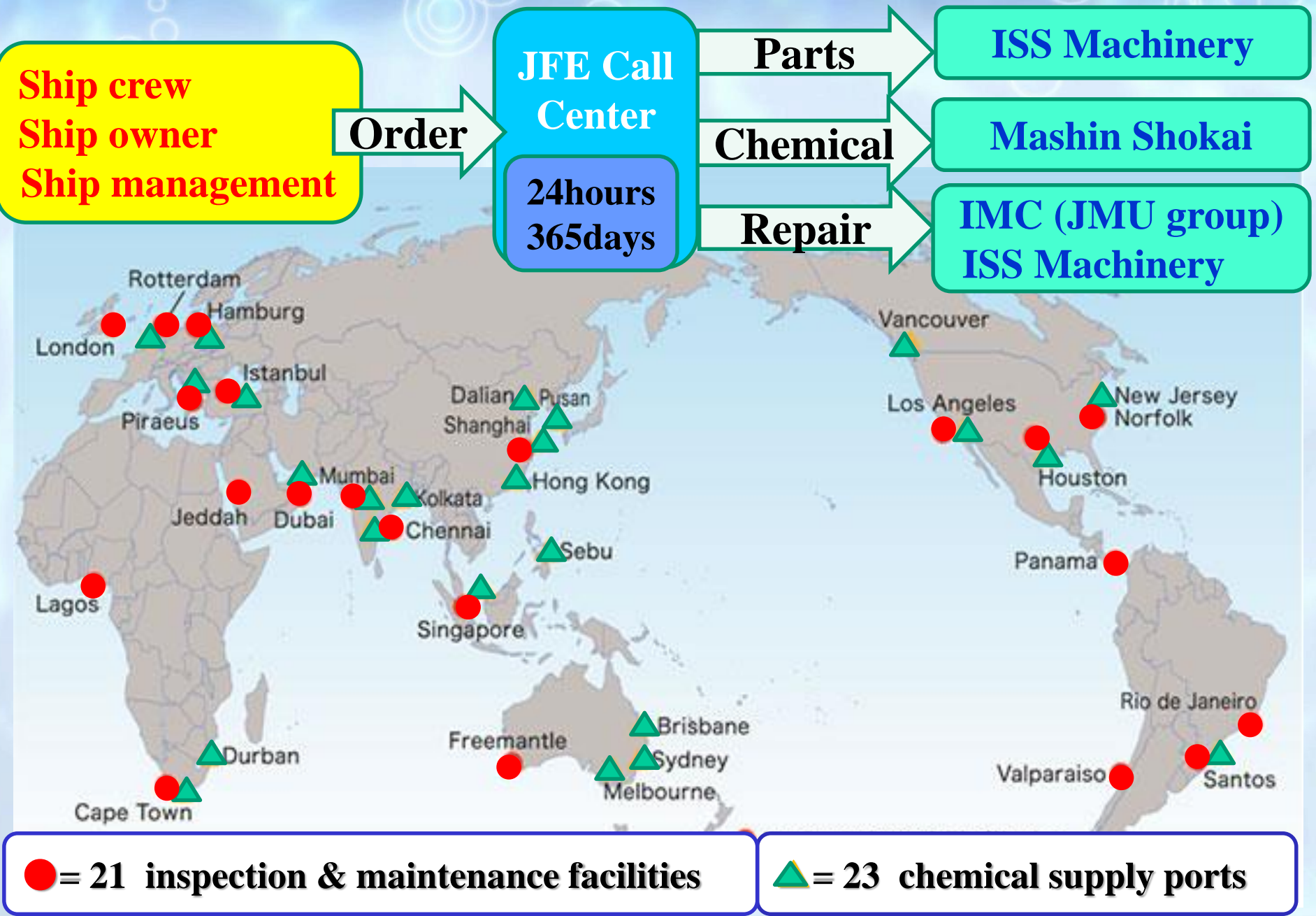
| Agent | Active substance |
|--------------------------------------|--|
| Disinfectant (Liquid or Granuler) | Sodium hypochlorite (NaClO) |
| Neutralizer | Sodium sulfite (Na ₂ SO ₃) |



What happens in neutralizing?



2-9. After-sales Service



2-10. After-sales Service

Training Center in Yokohama



3. Actions to USCG Type Approval



3. Actions to USCG Type Approval

| Actions | | Schedule |
|---------------------|----------------|------------------------------------|
| Letter of Intent | | Nov, 2014 |
| Land Based Test | Brackish Water | Oct, 2015 (successfully completed) |
| | Fresh Water | July, 2016 ~ |
| | Sea Water | July, 2016 ~ |
| Shipboard Test | | May, 2016 ~ |
| Environmental Test | | June, 2016 ~ |
| Application to USCG | | Nov, 2016 |



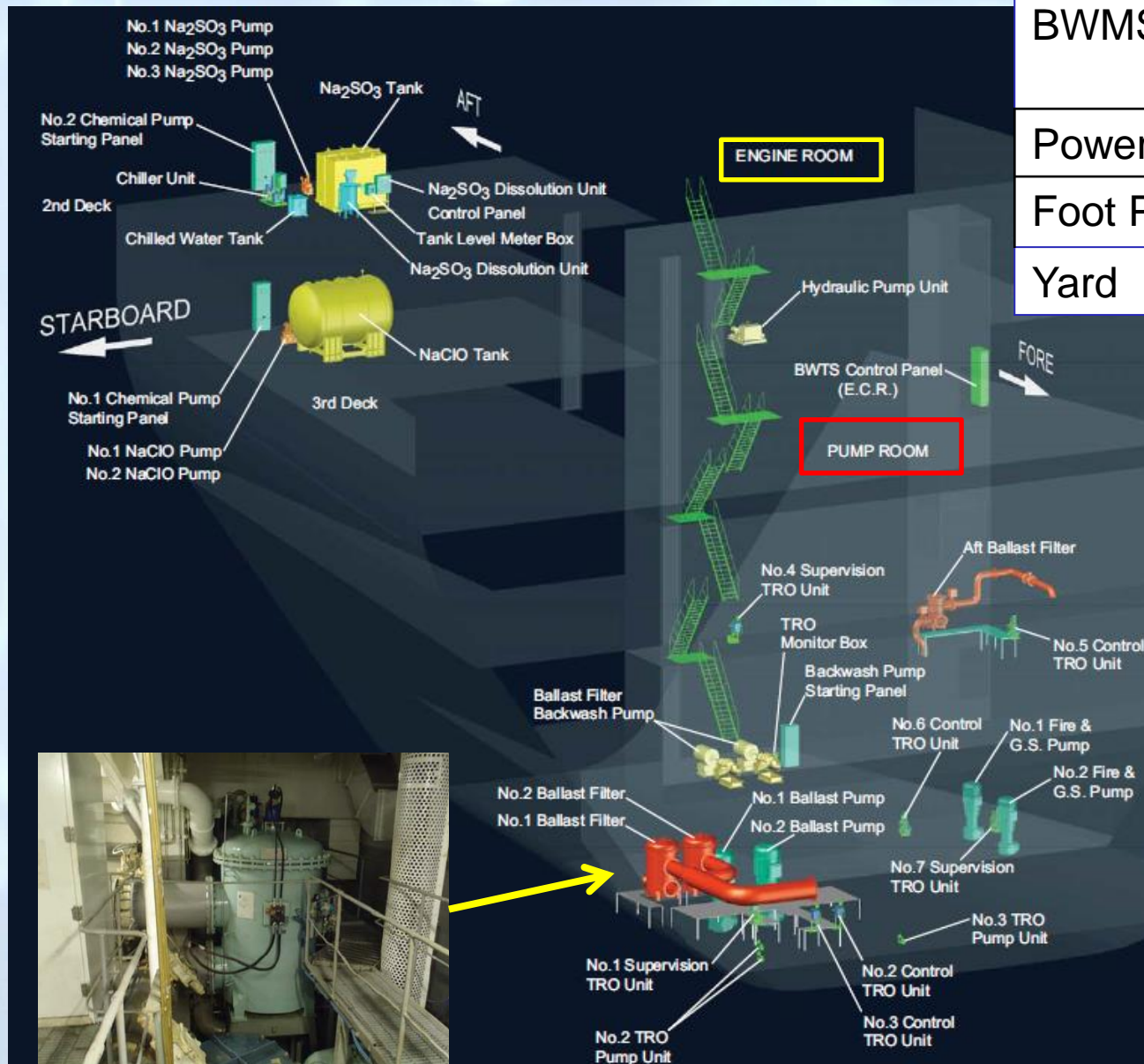
4. Installation Examples



4-1. Installation Example (1)

Retrofitting 300K DWT VLCC

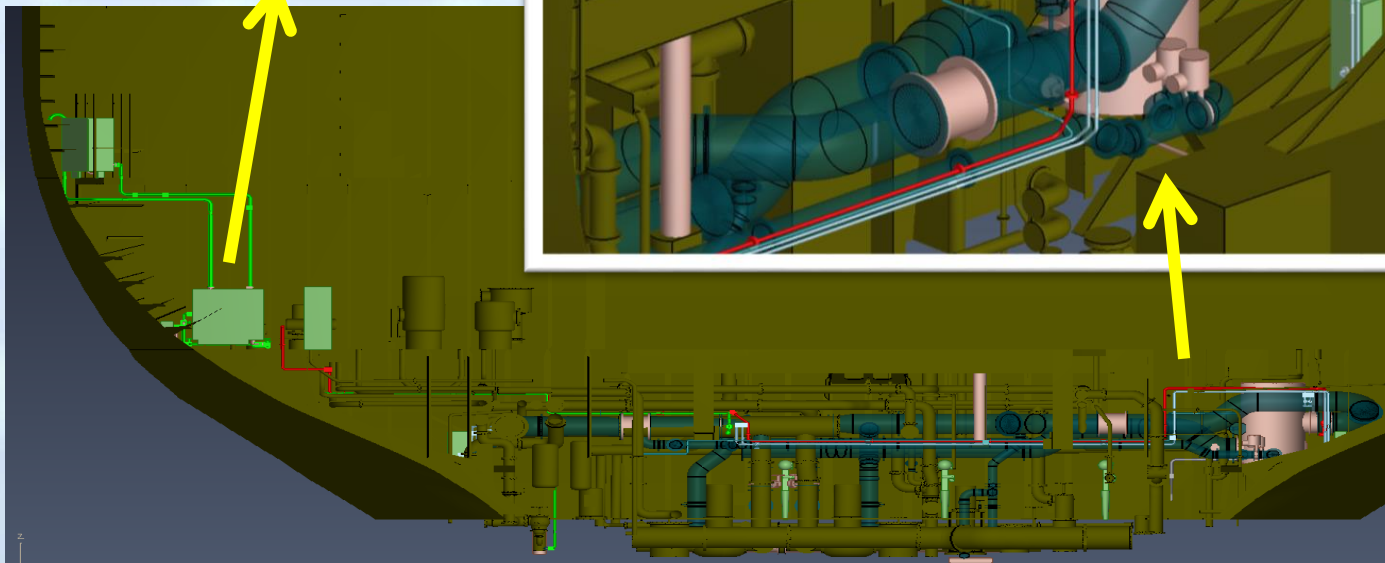
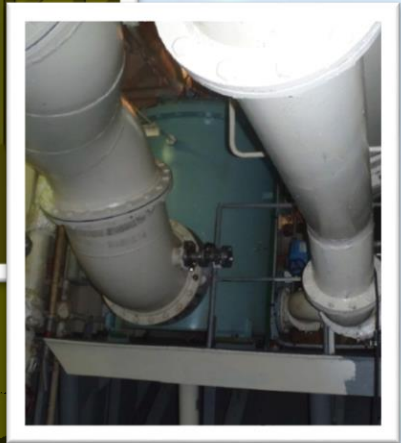
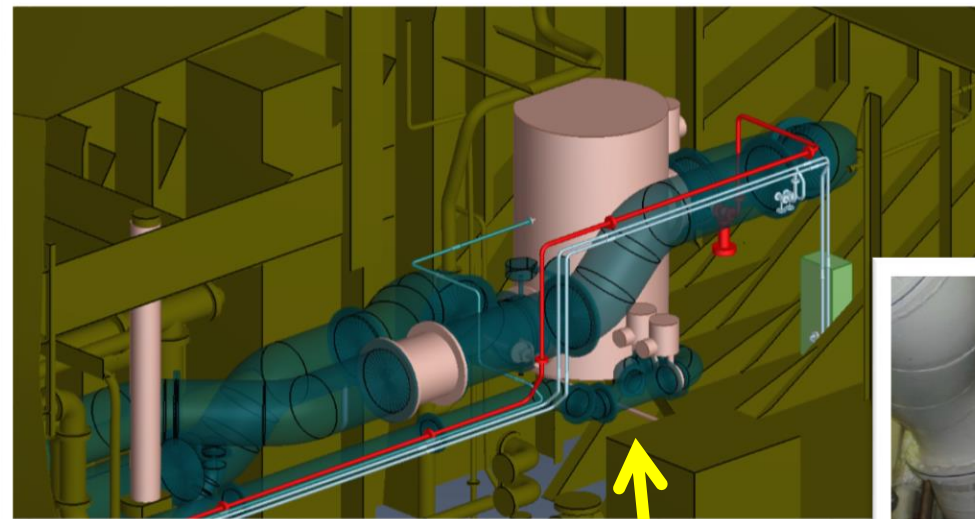
| Item | Specification |
|------------|---|
| BWMS | 3500m ³ /h × 2 + 350m ³ /h |
| Power | 10.6 kW |
| Foot Print | 25.9 m ² |
| Yard | Keppel Shipyard |



4-2. Installation Example (2)

Retrofitting 85K DWT BC

| Item | Specification |
|------------|---------------------------|
| BWMS | 3200m ³ /h × 1 |
| Power | 5.3 kW |
| Foot Print | 12.6m ² |
| Yard | HRDD (China) |



JFE BallastAce is

SIMPLE CONFIGURATION

- Low risk of mechanical failure.
- Low power consumption

EFFECTIVE TREATMENT

- Regardless of water area.

LOW COST

CHEMICALS

- Commonly used chemicals.
- No concern about effect on coatings.





JFE

Thank you for your attention!

