



台灣國際造船股份有限公司
CSBC CORPORATION, TAIWAN

裝備與機艙佈置圖說明

設計處輪機設計課 蔡俊傑

110年10月15日





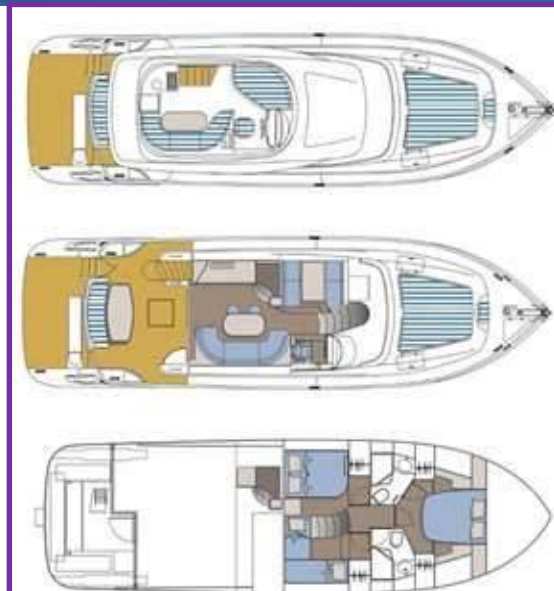
授課內容

- 機艙佈置說明
- 裝備介紹





◎佈置=為一個有限空間構思一個好方案



Seaworthy and efficient hull lines

- Optimized hull form
- Minimum power required and fuel consumption
- Efficient rudder and step design
- Very good manoeuvrability and excellent course stability

Crew comfort

- Spacious and well designed accommodation for maximum crew comfort
- Accommodation for 25 persons

Efficient cargo handling

- 4 sets of level lifting cargo cranes provided for grab operation
- Cargo crane SWL of 36 tonnes
- End-folding, double skin, hydraulically operated cargo hold hatch covers

Easy and fast cargo discharge and hold cleaning

- Double side and arranged cargo hold bulkheads provide flush holds to create easy and fast discharge and cleaning
- Wide hatches for easy cargo spotting
- Permanent cargo hold lighting

Environmentally friendly

- Low emission machinery
- Heavy fuel oil stored in deep tanks in single tiers with collection towards ship side to minimise risk of oil spill

Maintenance friendly

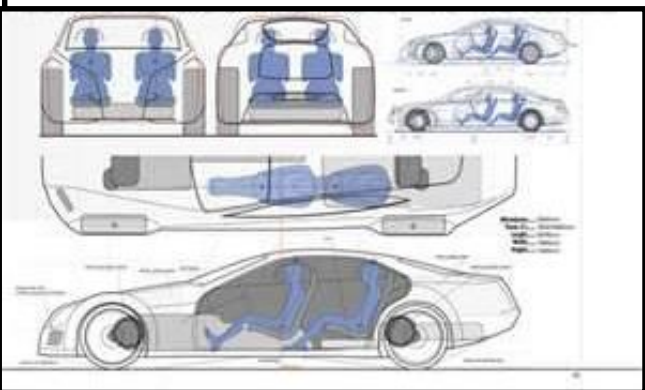
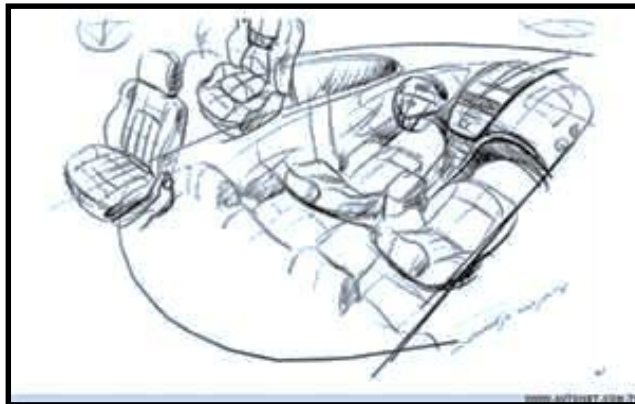
- Permanent access for survey of steel structure
- Ballast piping and valves arranged in double bottom pipe duct for easy access and maintenance
- Servo-pneumatically arranged in wing tank pipe duct to minimise maintenance and risk of cargo damage
- 2 coat epoxy paint system in ballast tanks

Wide range of cargo

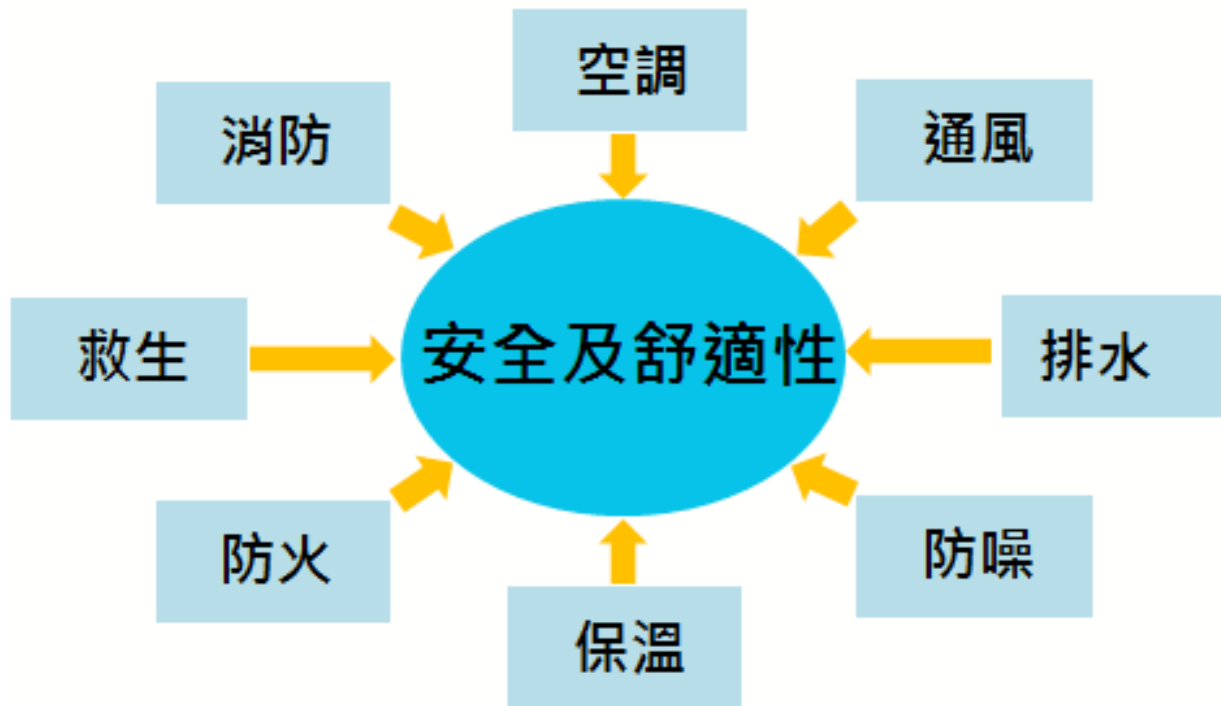
- All typical bulk cargoes
- Engine room bulkhead PFD insulated
- Insulated steel coil loading (2 tier of 25 tonnes per coil in all cargo holds)

Safety

- Double hull provide a secondary barrier against accidental water ingress
- Concavities provide green water protection and reserve buoyancy
- Protected portside passage to forecabin
- Multi-tier and transverse bulkheads arranged to withstand cargo hold flooding

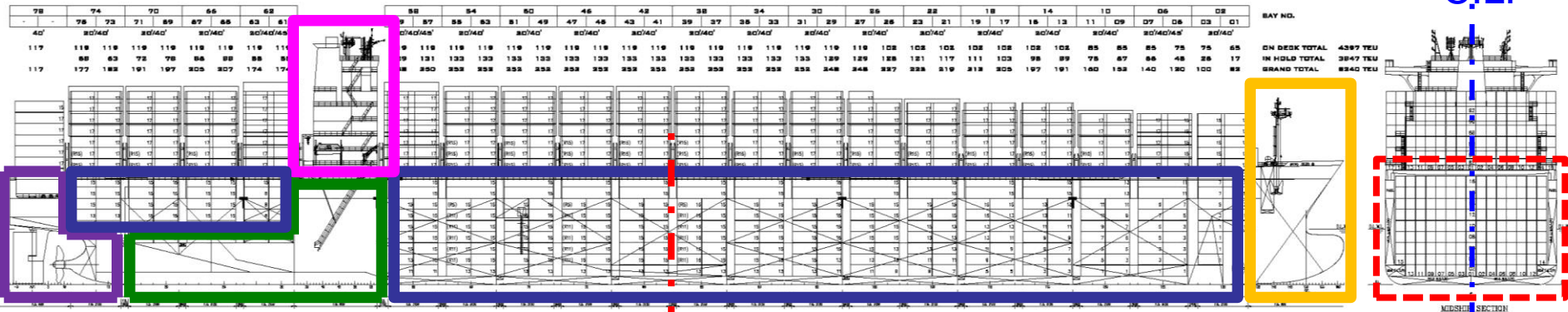






最終都是為了符合**建造規範&法規**

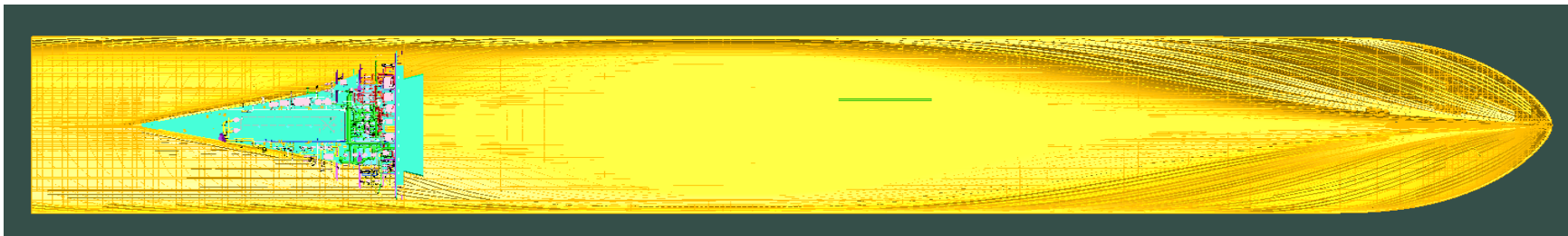
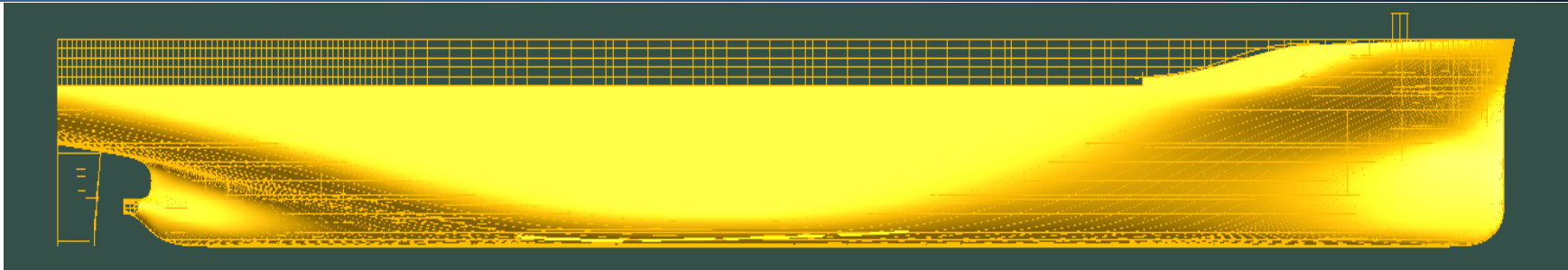




舢剖面
(Midship
Section)

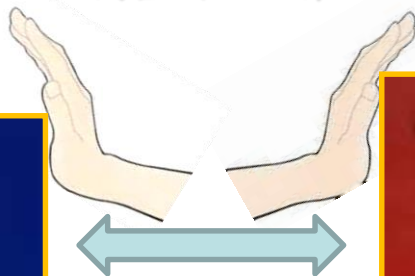
➤ 船體部位：

- 船艏 – Bow/Fore End Const. (錨機, 絞纜機)
- 貨艙 – Cargo Hold Const. (貨/油艙, 艙口蓋, 隔艙壁)
- 機艙 – Engine Room Const. (主機, 發電機, 輔機, 軸)
- 船艉 – Stern/After End Const. (舵機, 絞纜機, 螺槳)
- 住艙/上構 – Deck House/Acc. Const. (駕駛台, 煙囪)
- 船舢剖面 – Midship (船體中央/平行舢體)



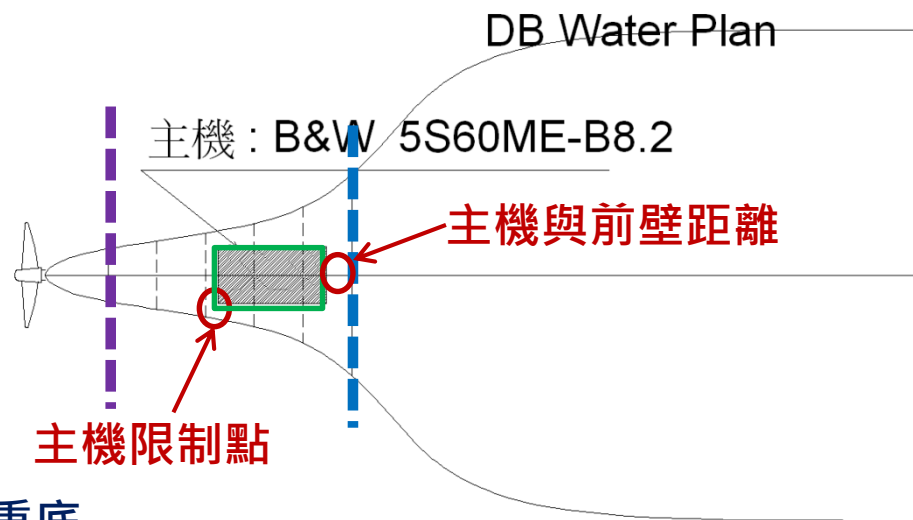
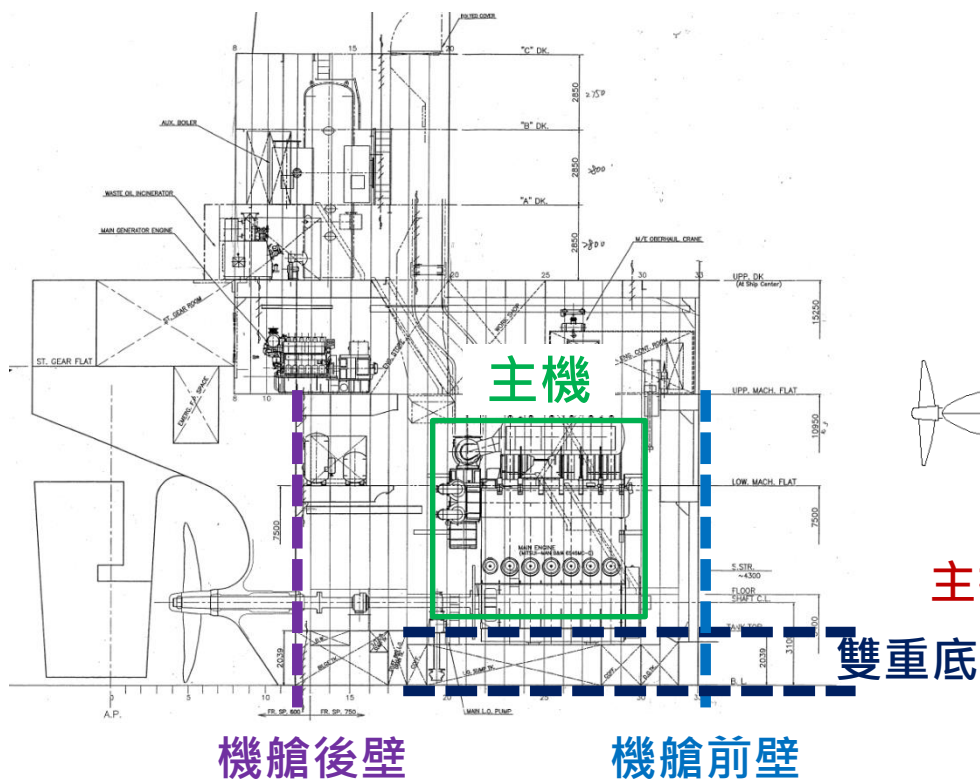


- 油水艙管路是否會互相穿越?(保養、洩漏)
- FWT是否與油艙相鄰?





機艙長度是否已符合艙間佈置所需?



DB Water Plan

主機：B&W 5S60ME-B8.2

主機與前壁距離

主機限制點

雙重底

機艙後壁

機艙前壁

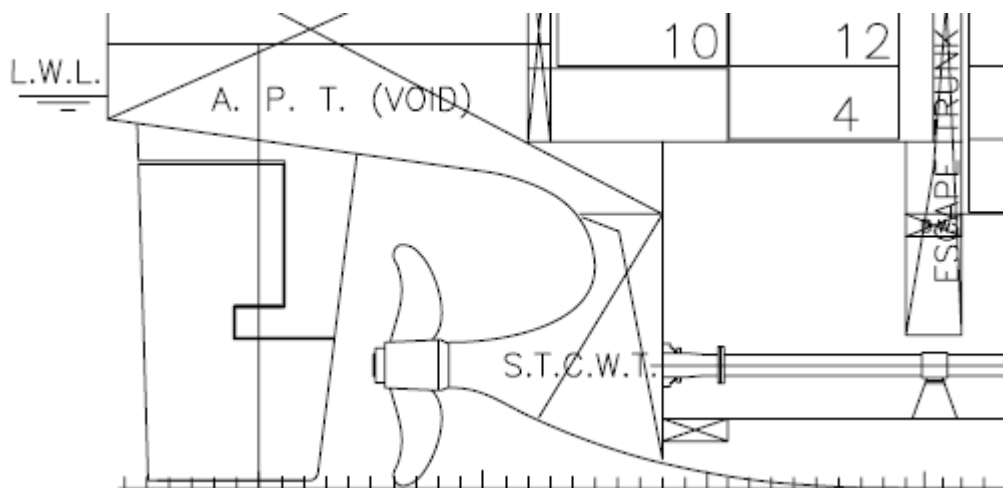




- 機艙區佈置(續)

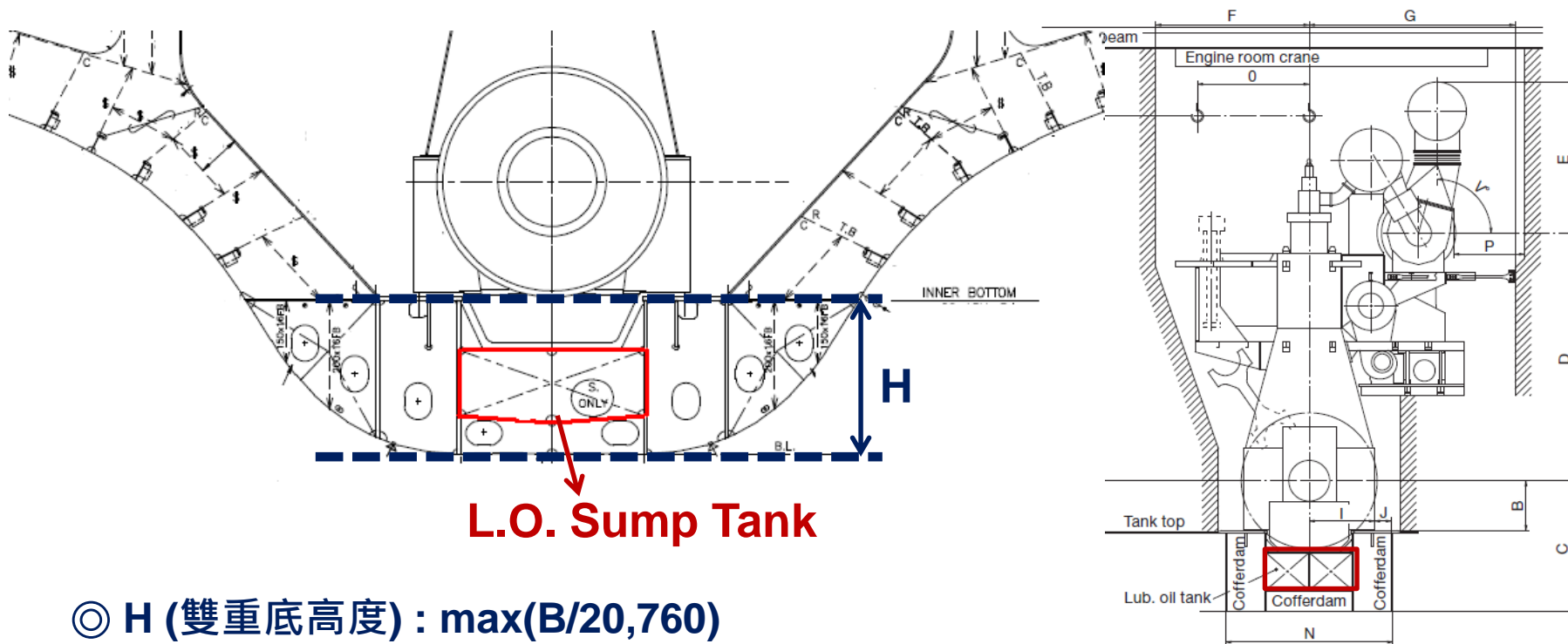
軸心高是否可符合輪設課佈置所需?

→ 影響螺槳尺寸&高度&沒水率、船體振動





• 機艙區雙重底高度是否可符合法規佈置要求？



L.O. Sump Tank

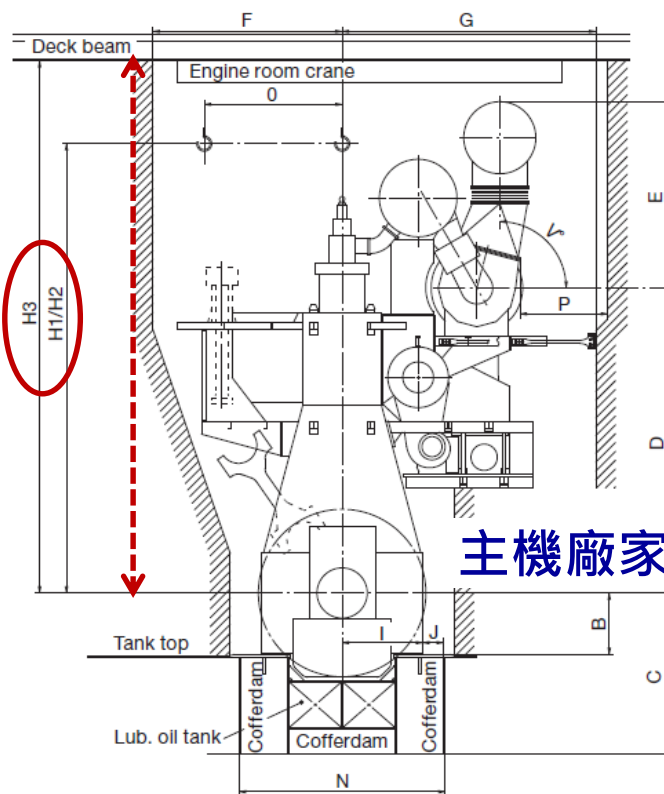
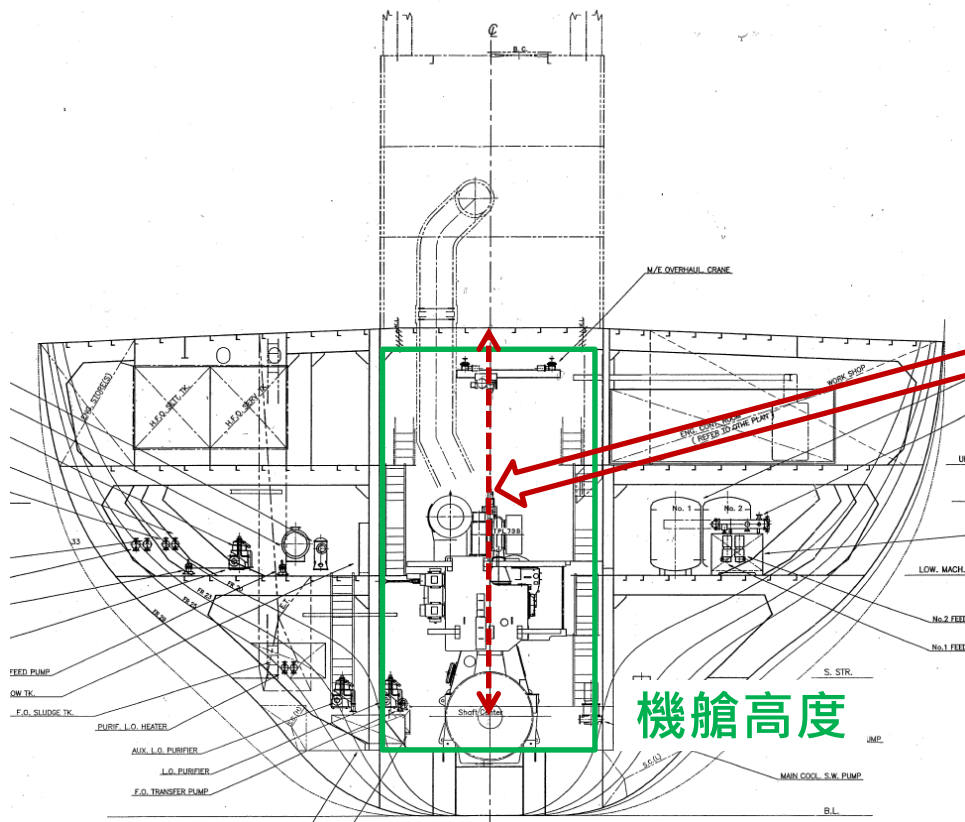
◎ H (雙重底高度) : $\max(B/20, 760)$

◎ L.O. Sump Tank (滑油底殼櫃) : $\max(B/40, 500)$

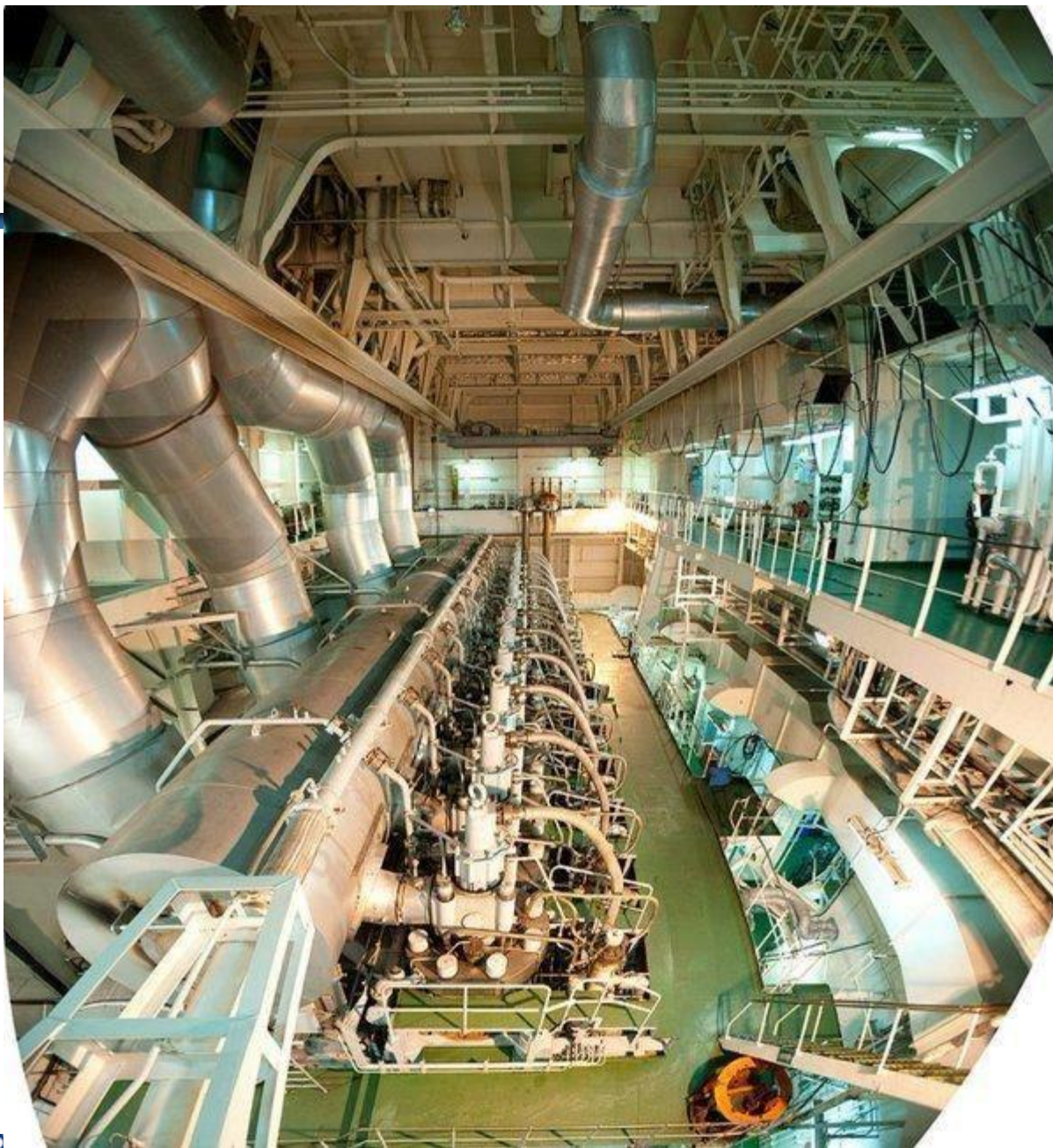


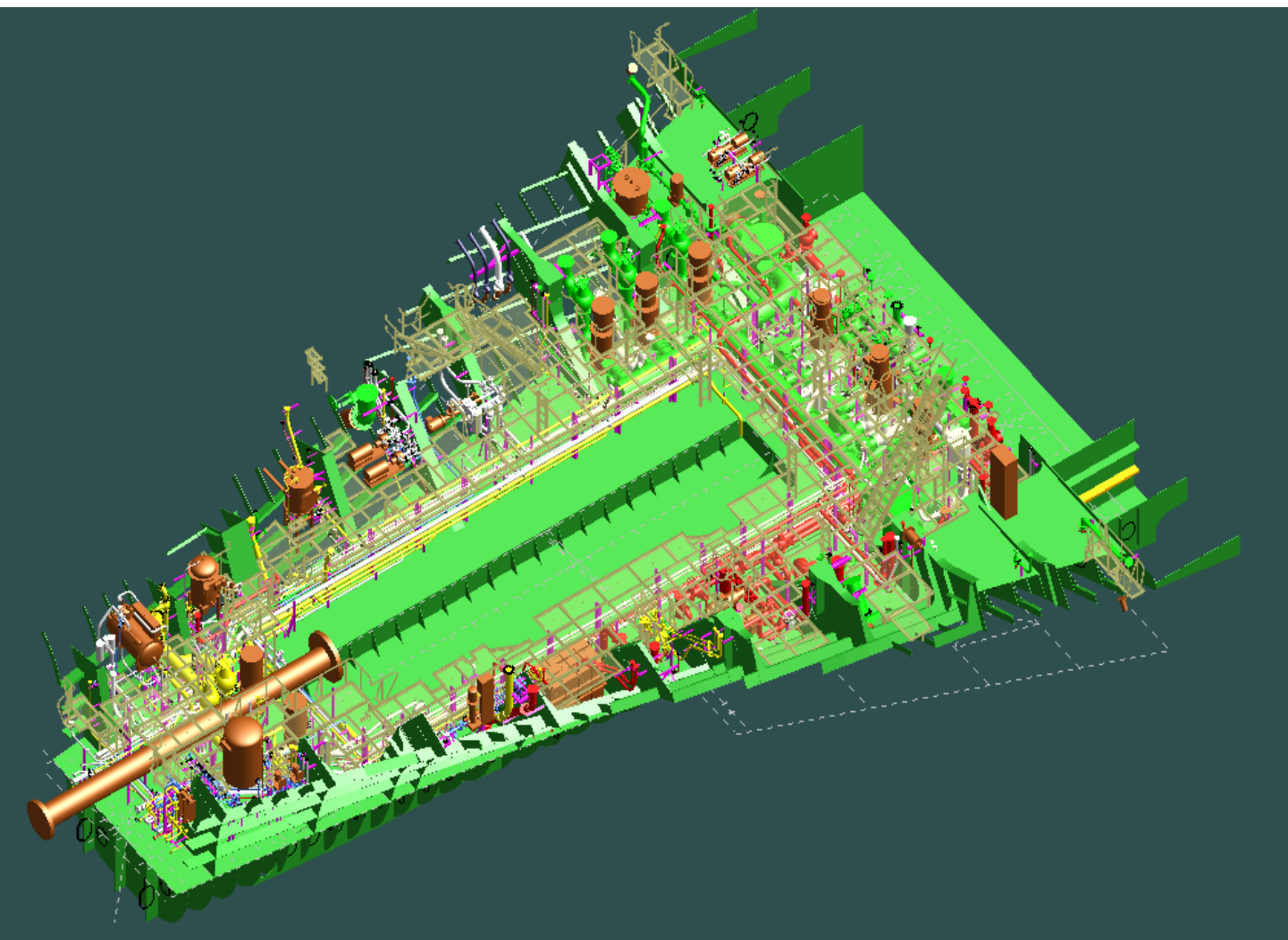


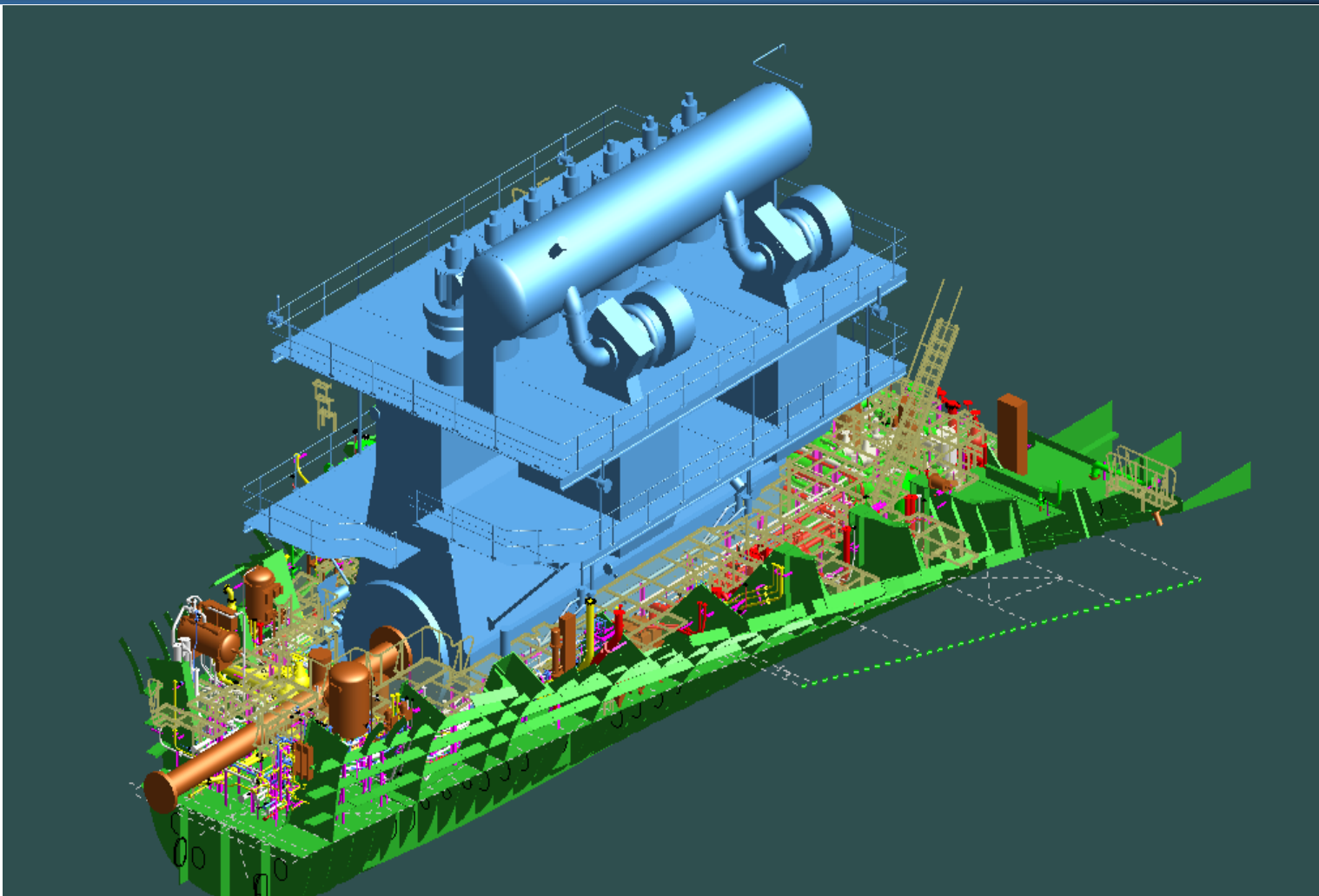
• 機艙高度是否可符合主機吊裝所需？

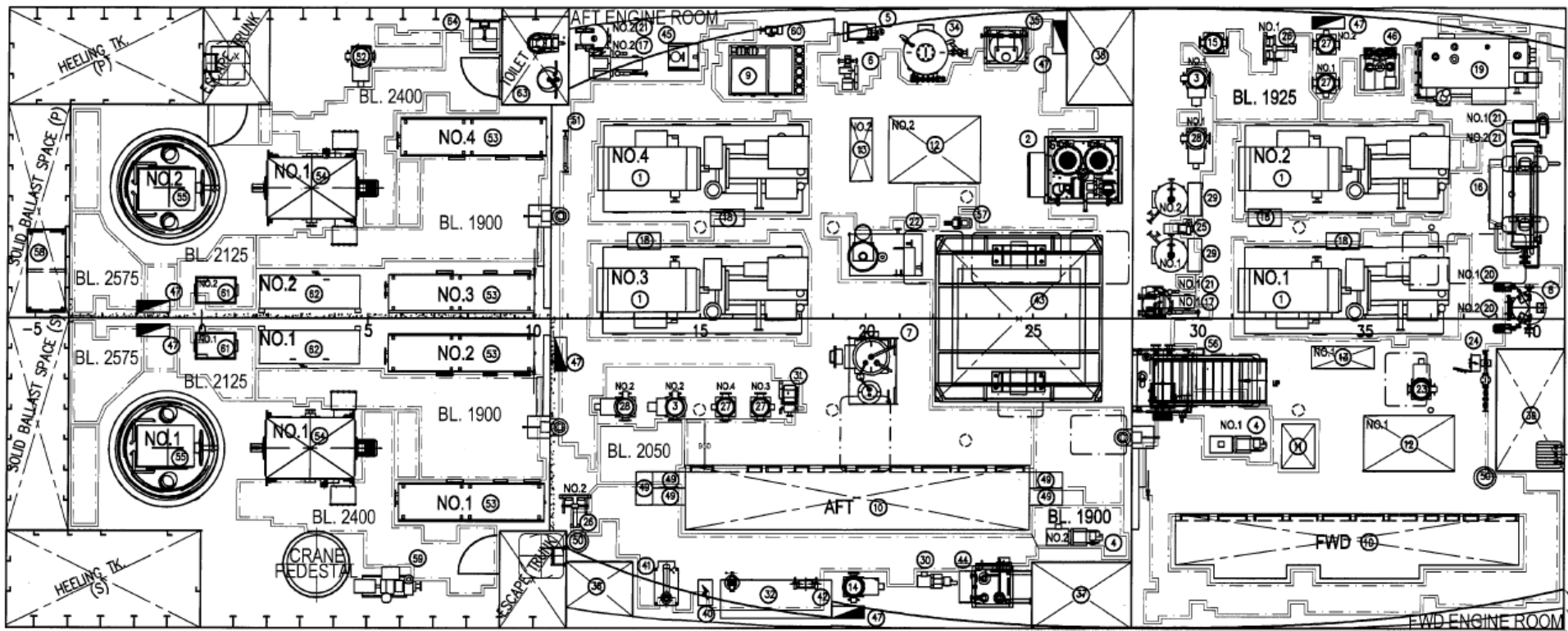


主機廠家圖











結論

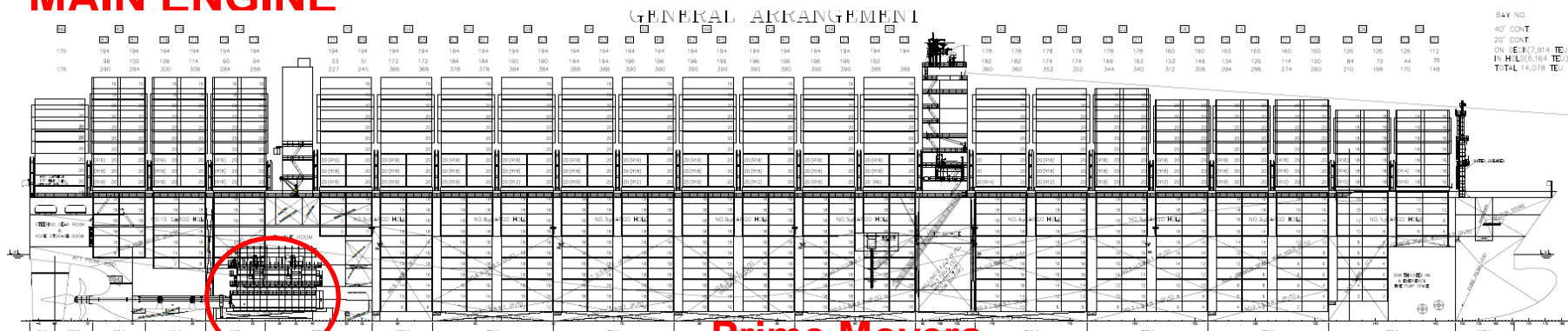
- GA=為你的船上空間構思一個好方案!
- 機器設備都要有「舒服的床位」。
- 油混在水裡就是災難。(注意你的油艙!)
- 船舶是一座小型社區，機艙就是社區的發電廠!

- Design for application! Design for manufacture!



裝備介紹

MAIN ENGINE



Prime Movers

1 Diesel Engines

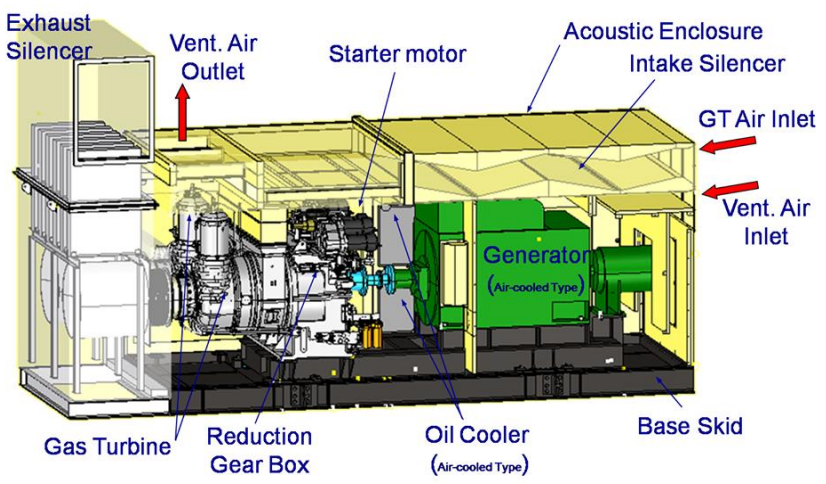
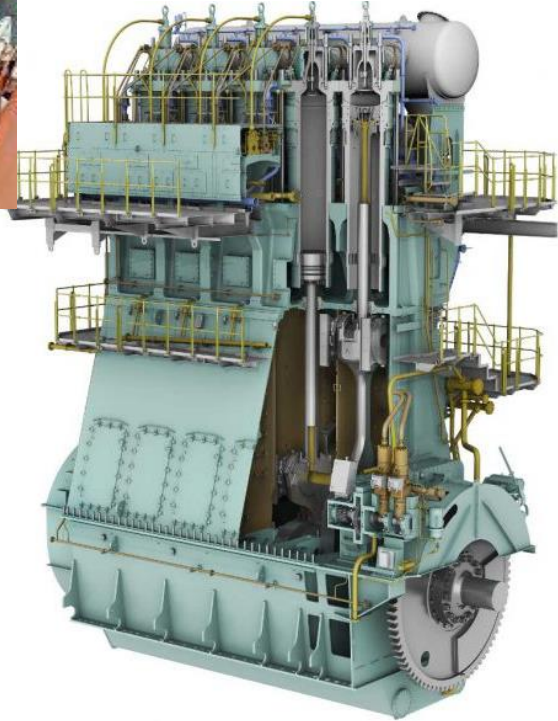
NMCR: Nominal Maximum Continuous Rating
SMCR: Specified Maximum Continuous Rating
NCR: Normal Continuous Rating

2 Gas Turbines

3 Steam Turbines

MC/MC-C Engine } MAN
ME/ME-C Engine }
RTA Engine } WINGD
Flex Engine }

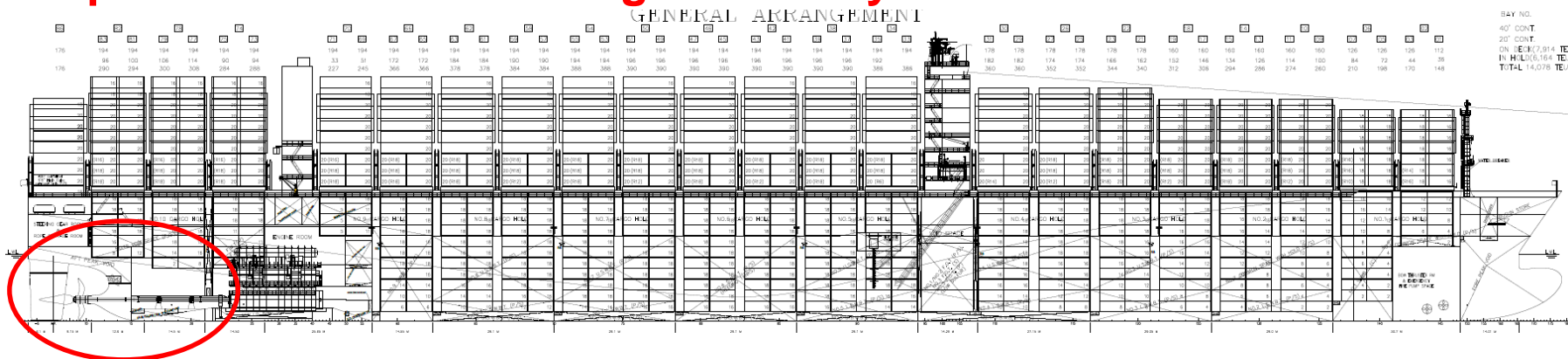






裝備介紹

Propulsion and Maneuvering Machinery



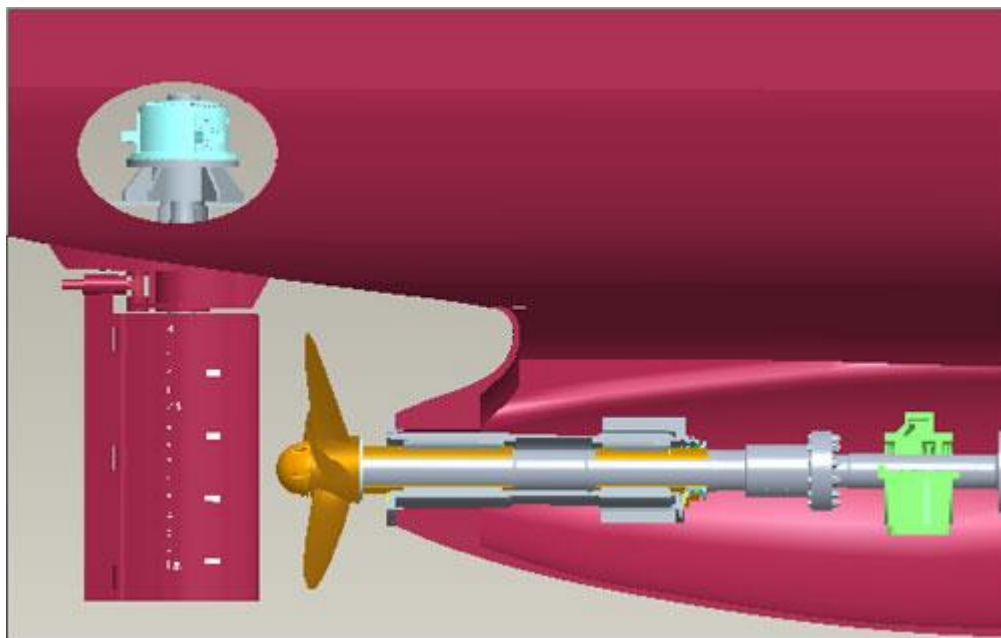
- 1 Propulsion Shafting
- 2 Propellers – FPP, CPP, SRP(Steering Rudder Propeller), VSP(Voith Schneider Propeller)
- 3 Steering Gears
- 4 Thrusters and Dynamic Positioning Sys.





裝備介紹

Propulsion shafting

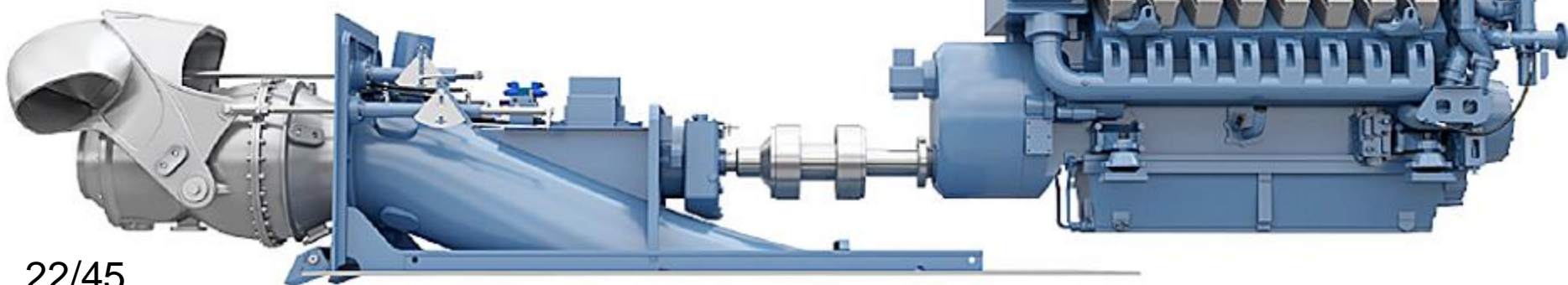


Voith Schneider propeller





Water jet Propulsion System

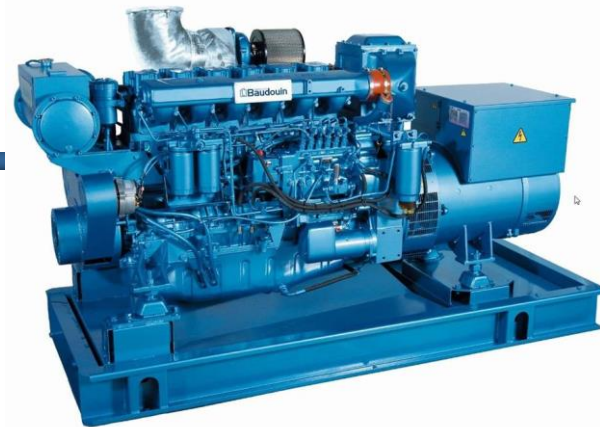
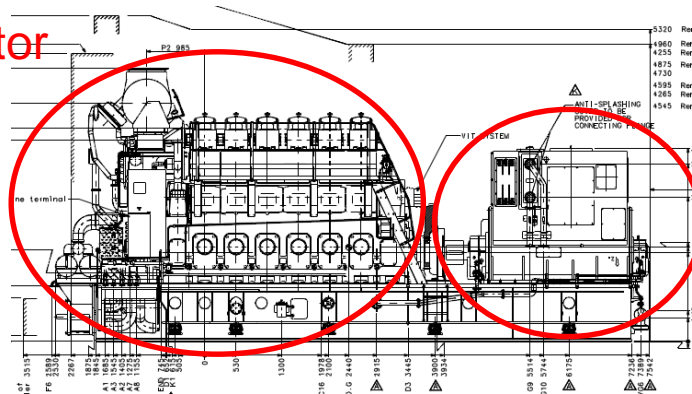




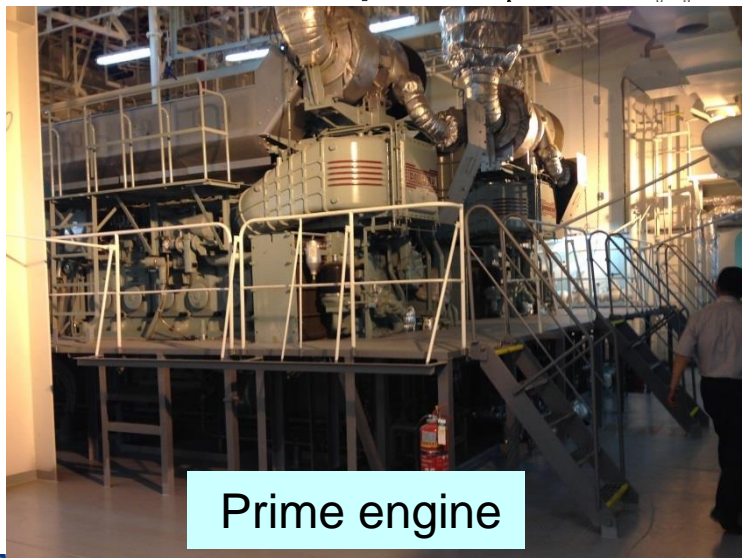
裝備介紹

GENERATOR

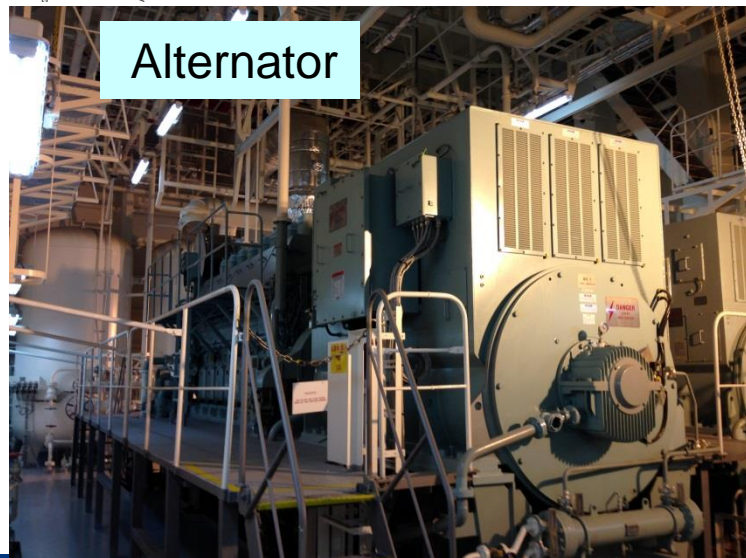
1. Main diesel generator
2. Shaft generator
3. Emergency diesel generator



- >Primary Essential Services
- >Secondary Essential Services
- >Dead Ship Condition
- >Blackout



Prime engine



Alternator





裝備介紹



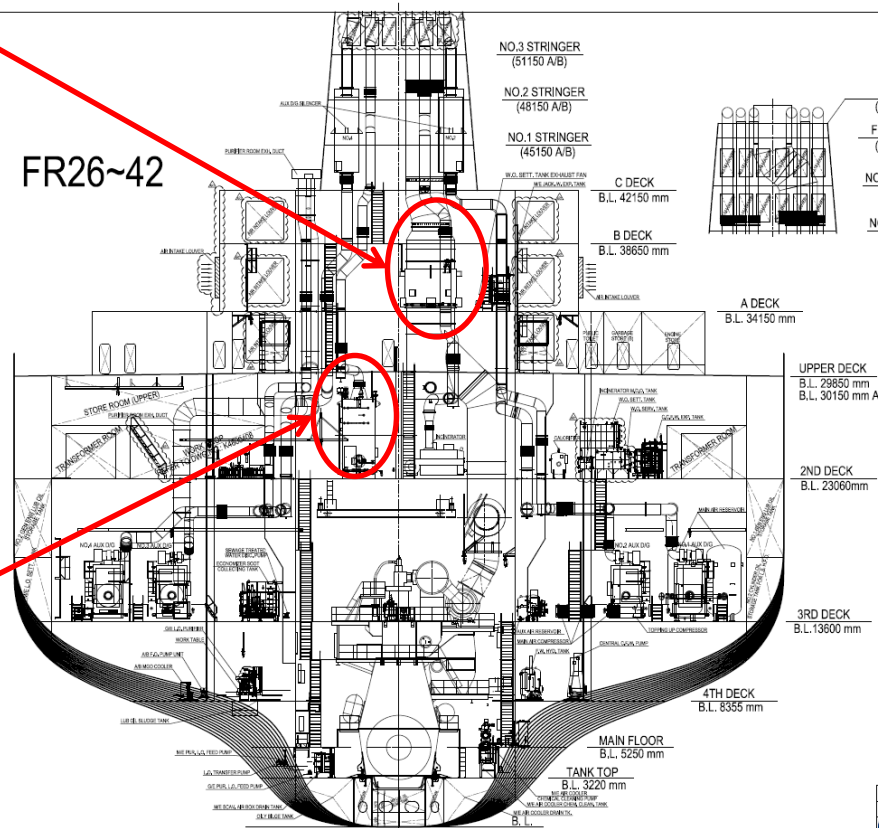
AUXILIARY BOILER



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EXHAUST GAS ECONOMIZER

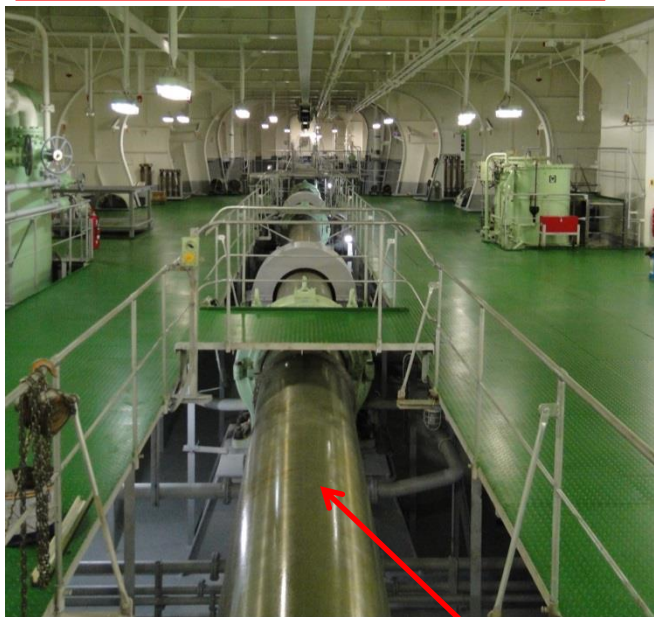
FR26~42



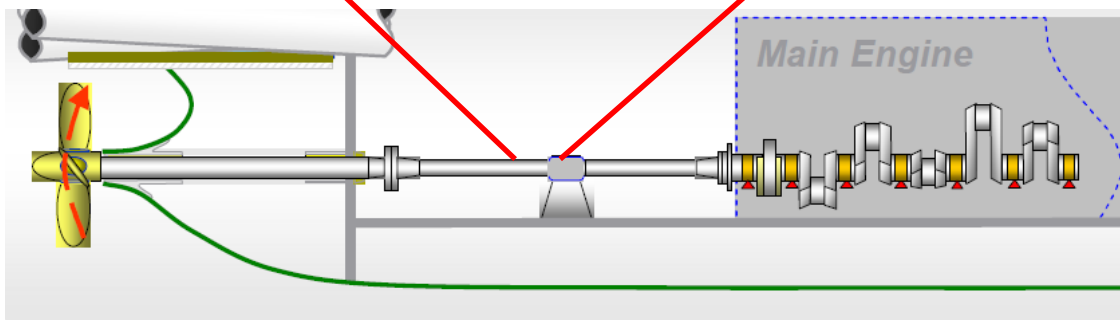


裝備介紹

INTERMEDIATE SHAFT



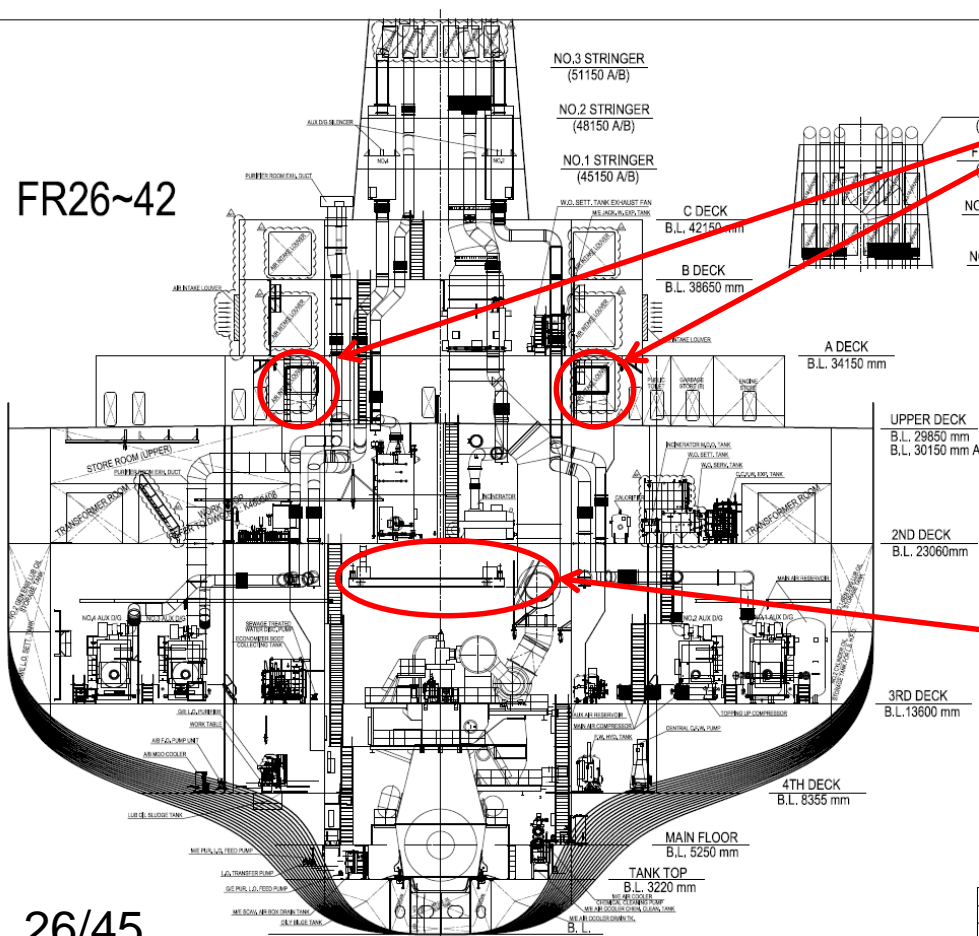
INTERMEDIATE SHAFT BEARING





裝備介紹

FR26~42



ENGINE ROOM VENTILATING FAN



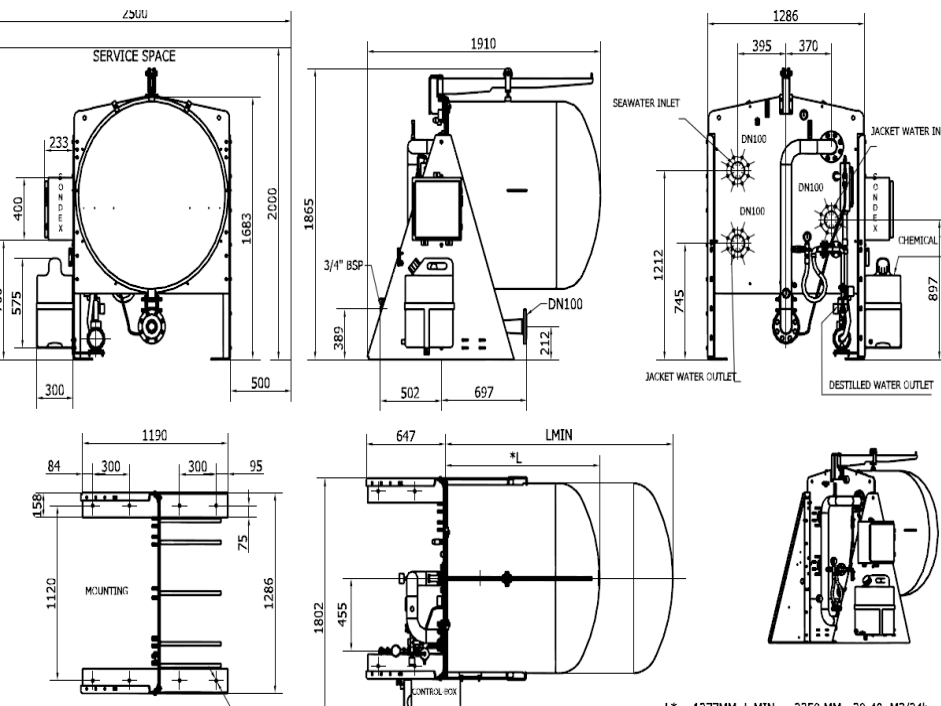
OVERHEAD CRANE





裝備介紹

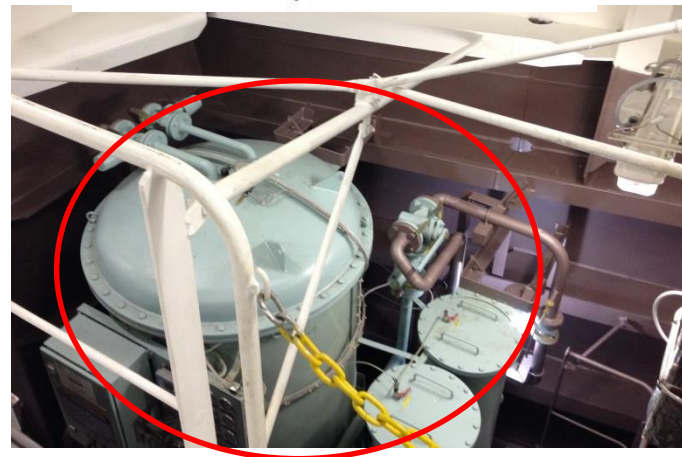
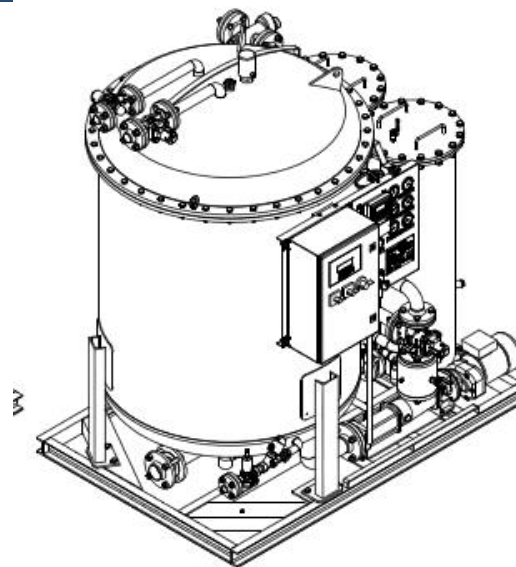
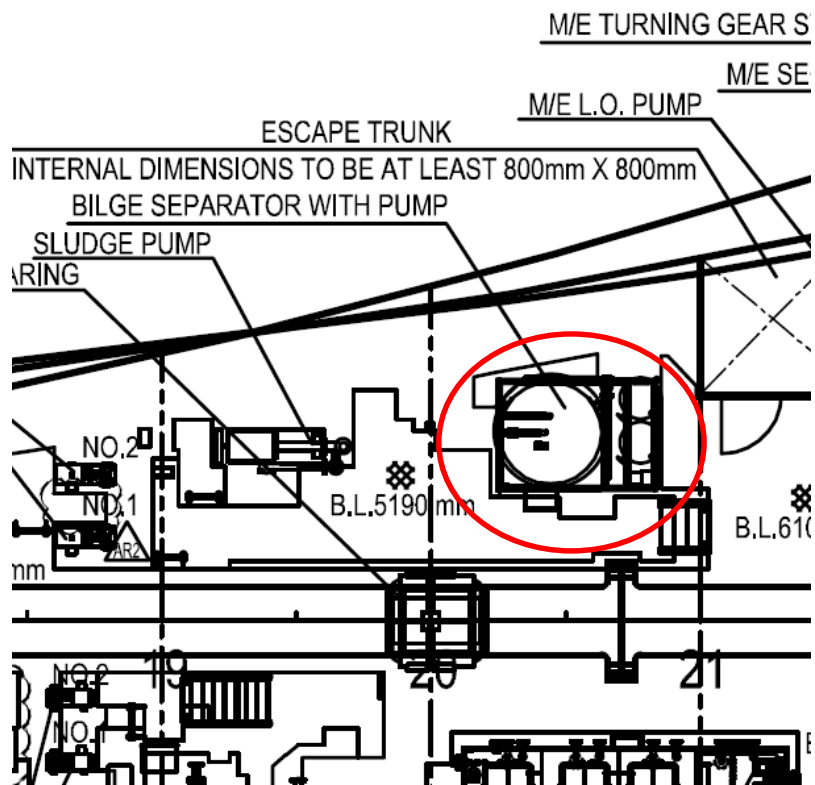
FRESH WATER GENERATOR





裝備介紹

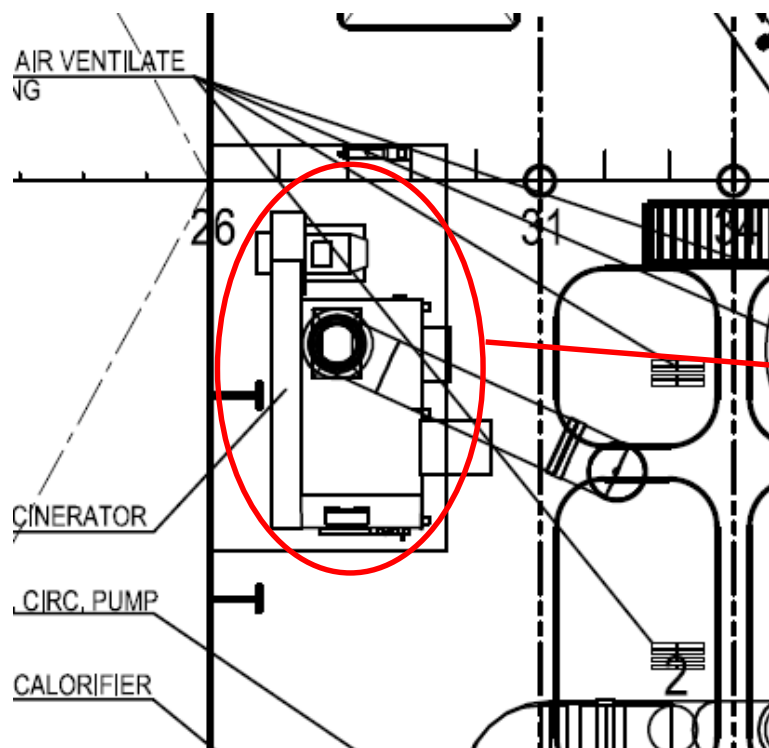
BILGE SEPARATOR





裝備介紹

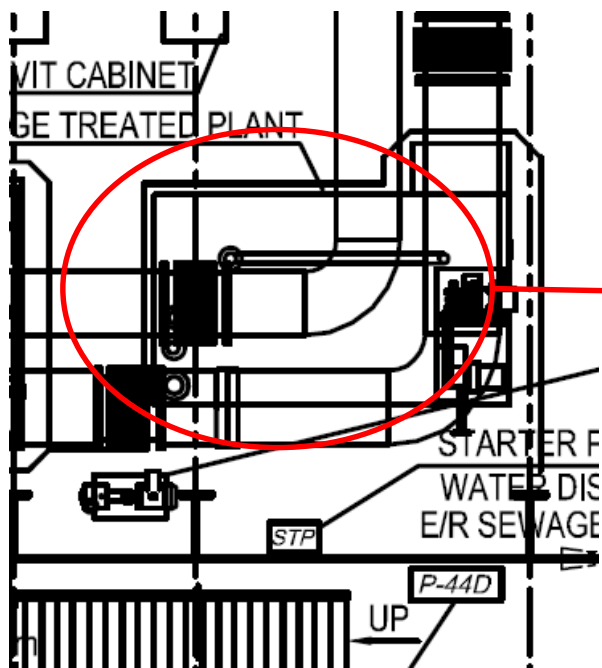
INCINERATOR





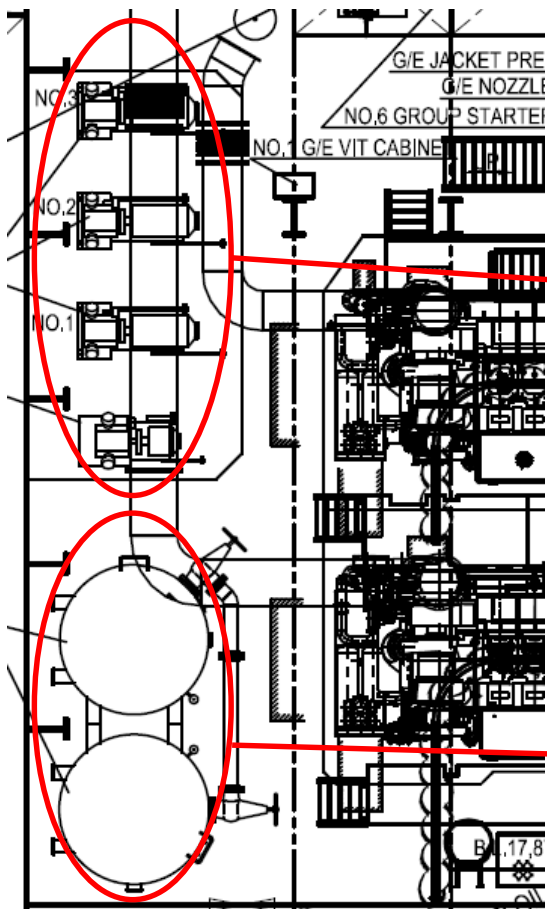
裝備介紹

SEWAGE TREATMENT PLANT





裝備介紹



AIR COMPRESSORS

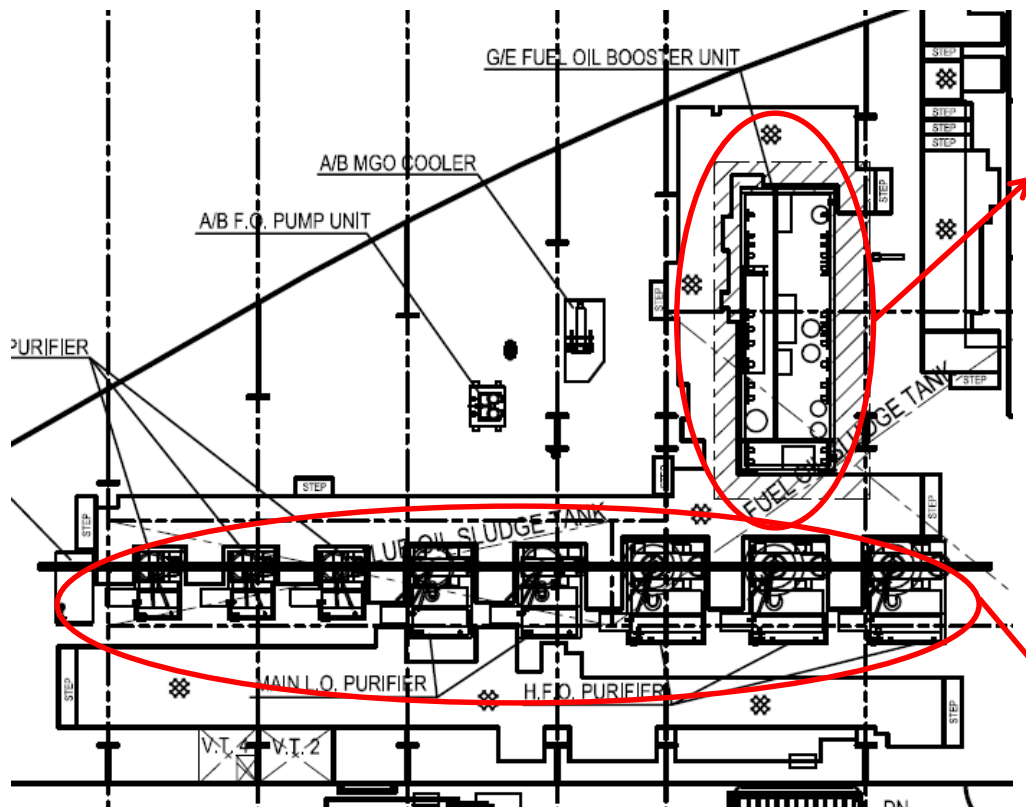


AIR RESERVOIR

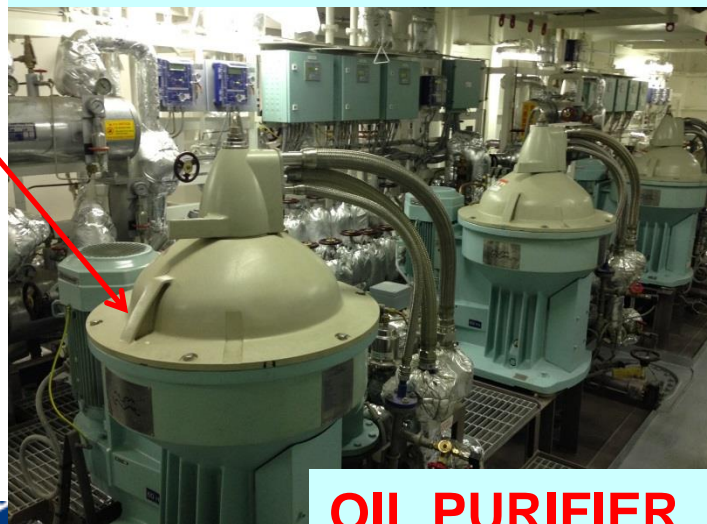




裝備介紹



FUEL OIL BOOSTER UNIT



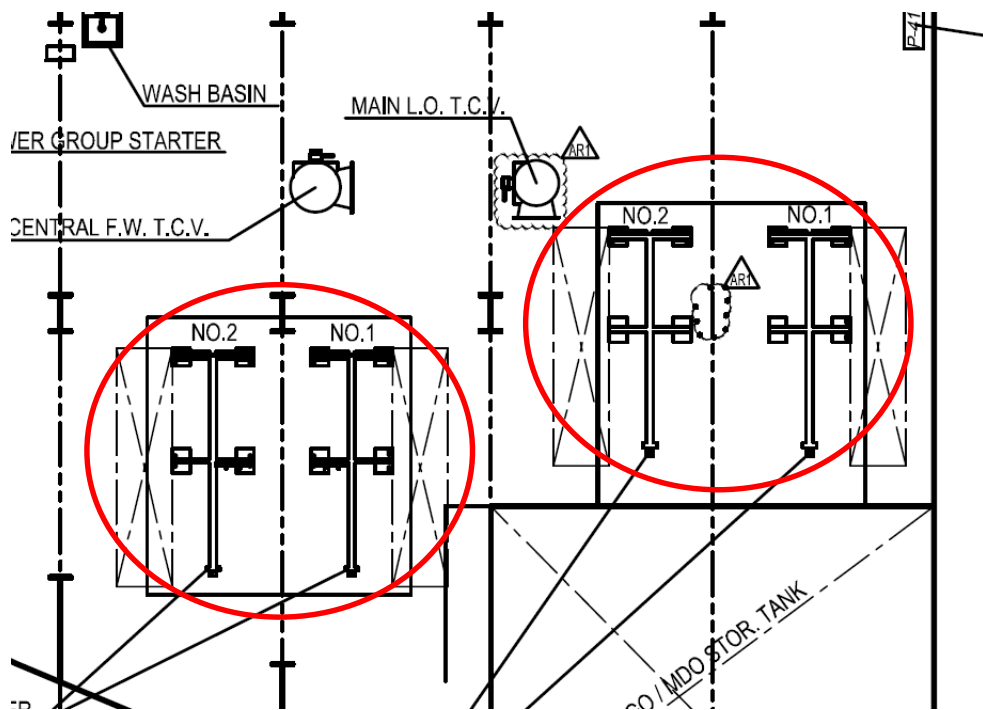
OIL PURIFIER





裝備介紹

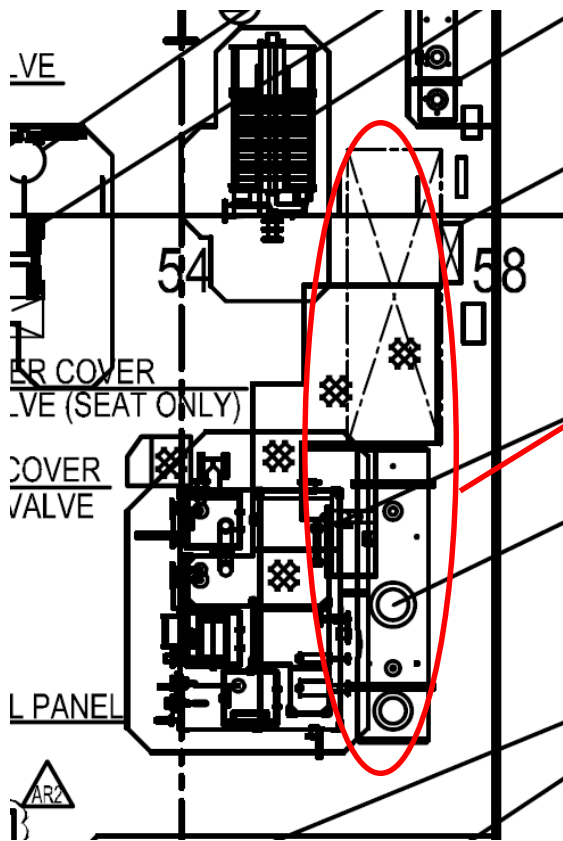
PLATE TYPE HEAT EXCHANGER





裝備介紹

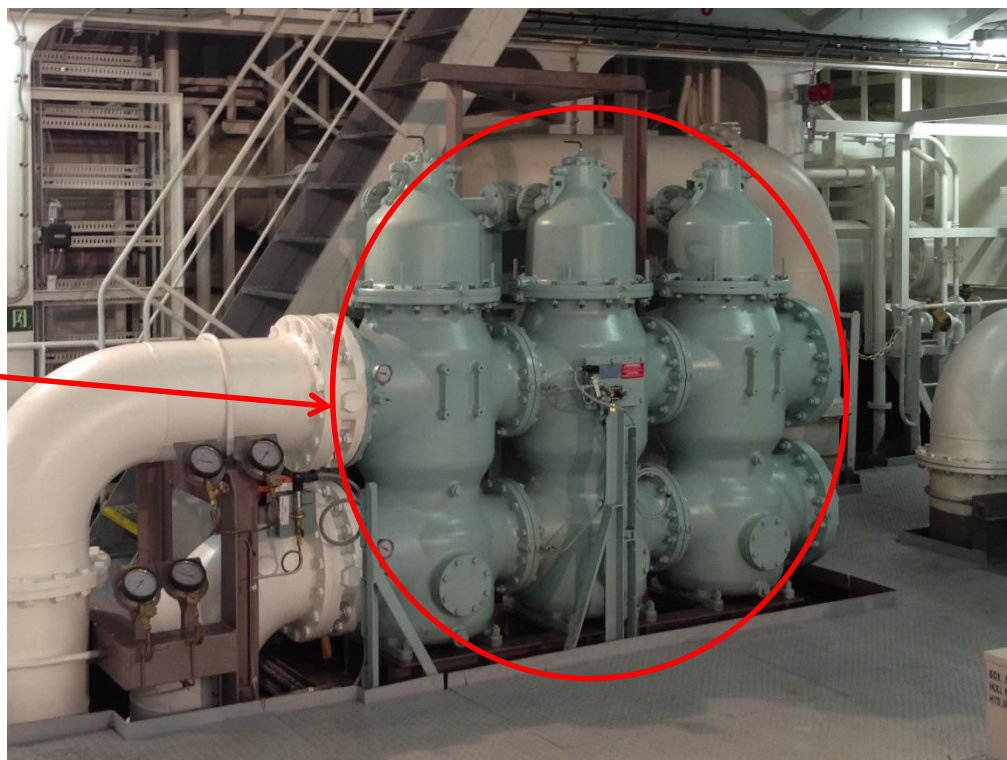
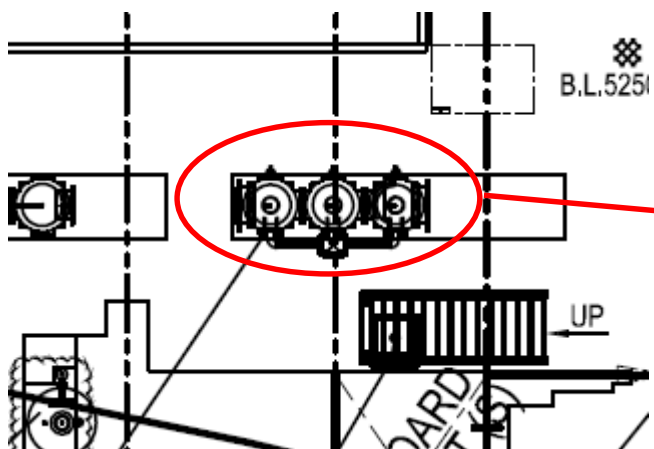
SHELL AND TUBE TYPE HEAT EXCHANGER





裝備介紹

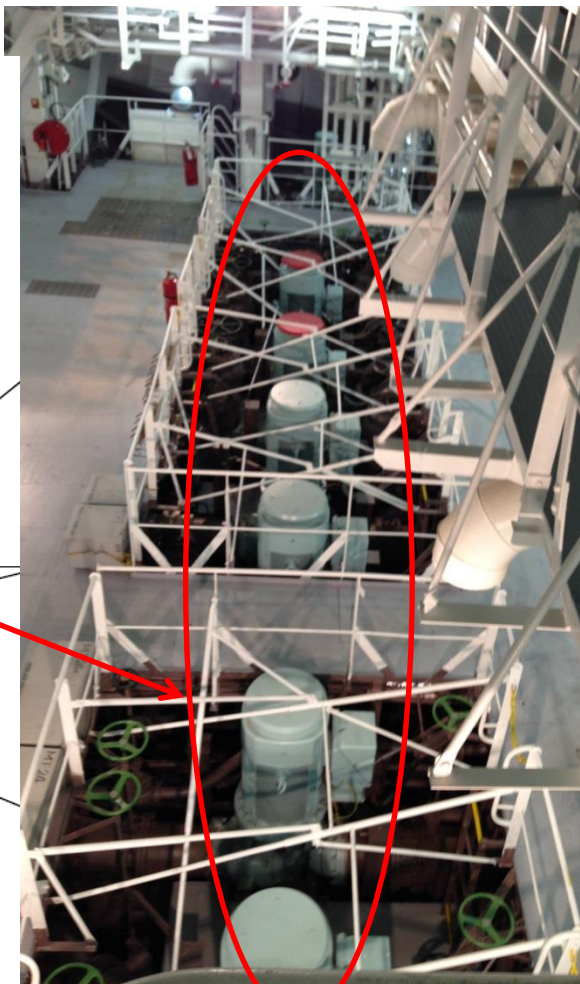
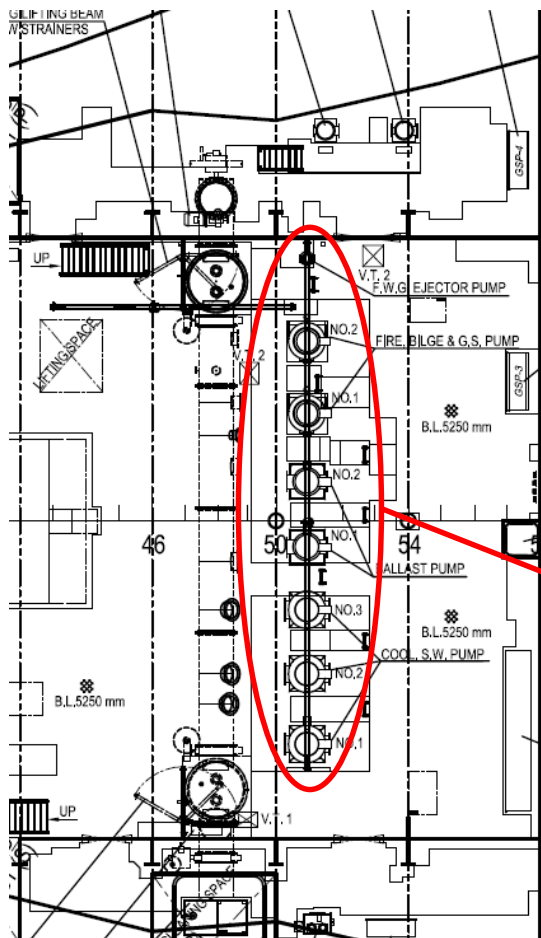
AUTO BACKWASH STRAINER





裝備介紹

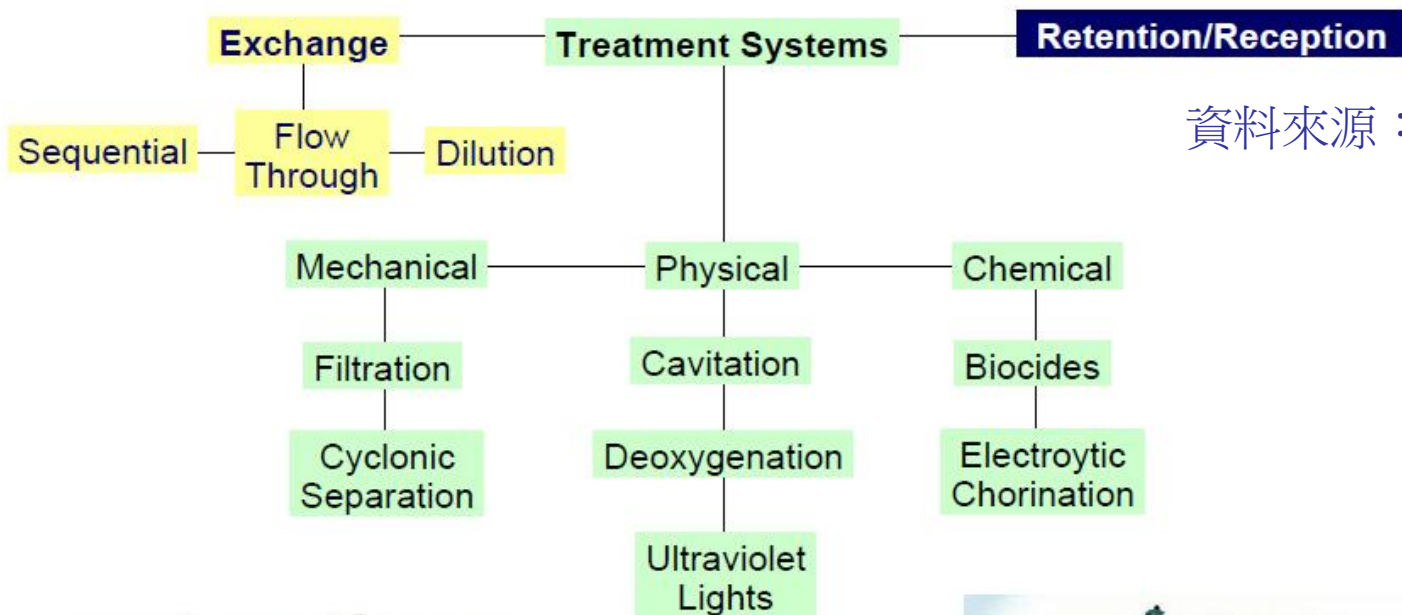
PUMPS





裝備介紹

壓載水處理方式



資料來源：ABS

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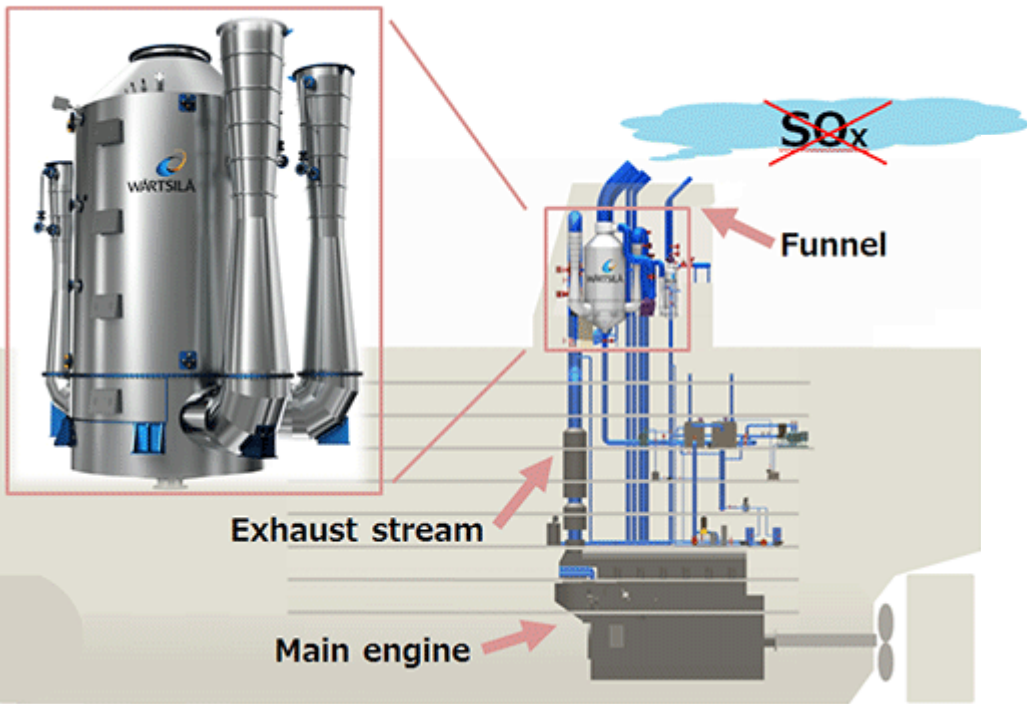




裝備介紹

SOx Scrubber unit

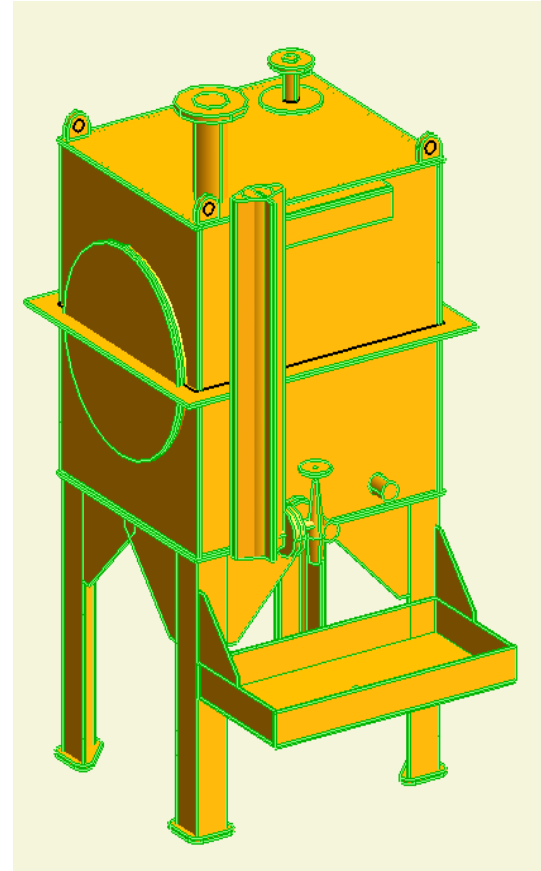
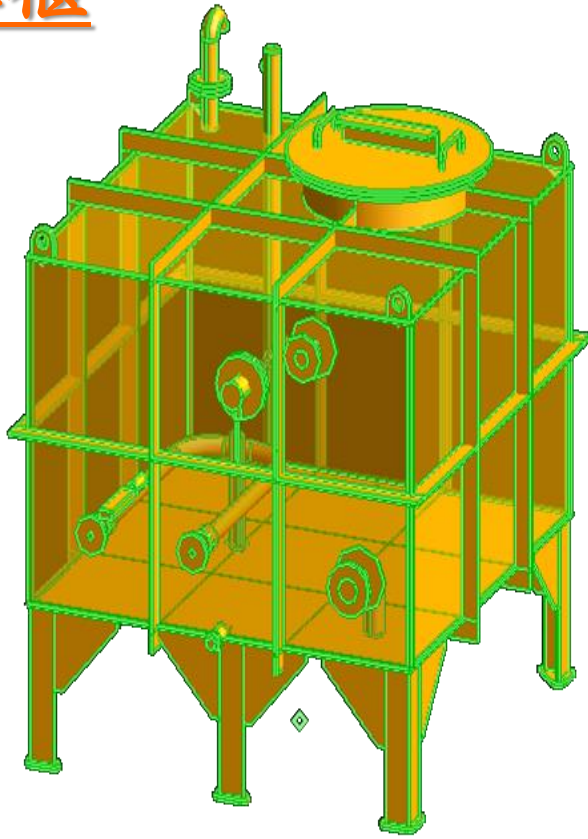
SOx scrubber main unit





裝備介紹

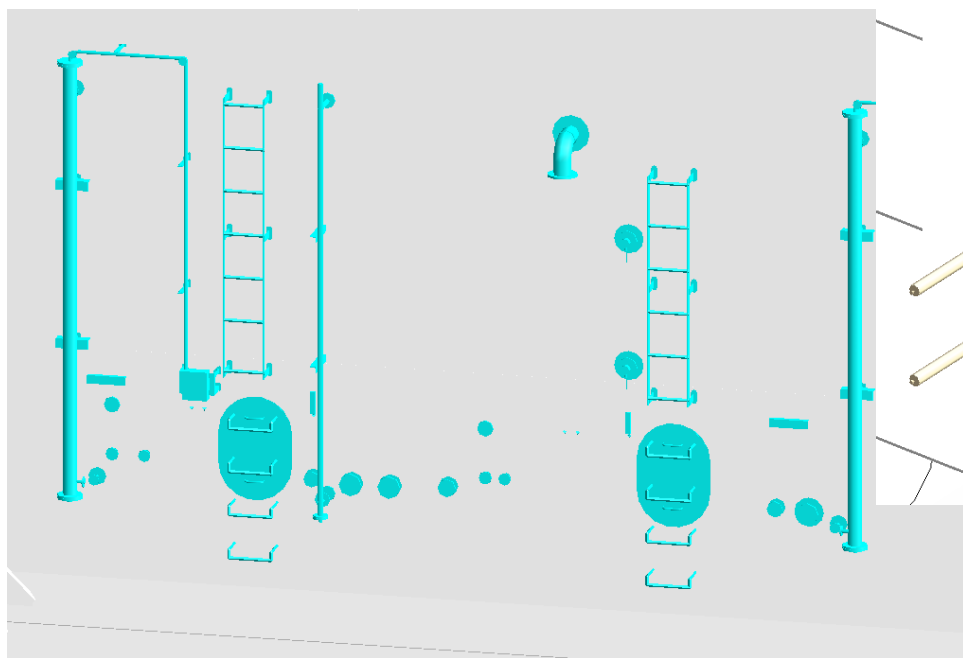
獨立櫃



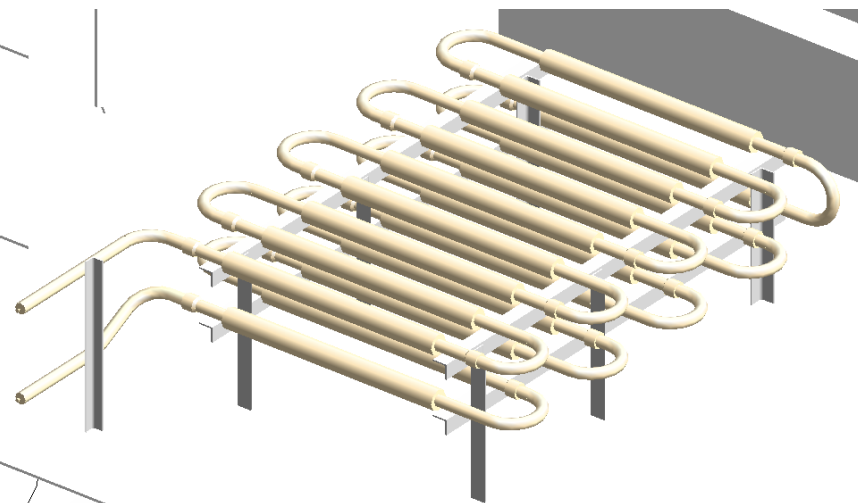


裝備介紹

船體櫃



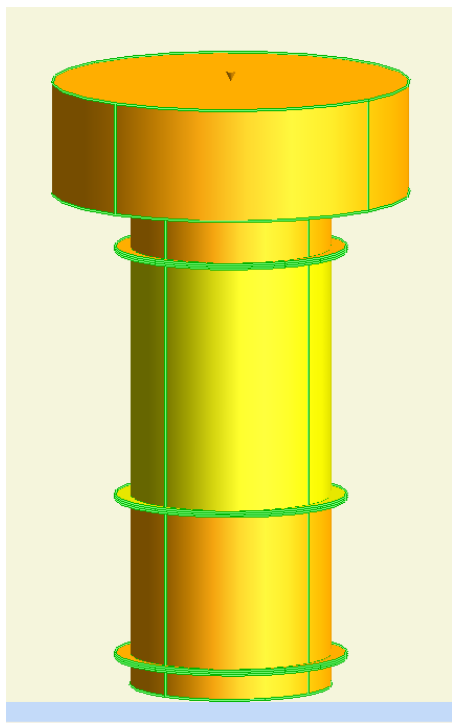
加熱管



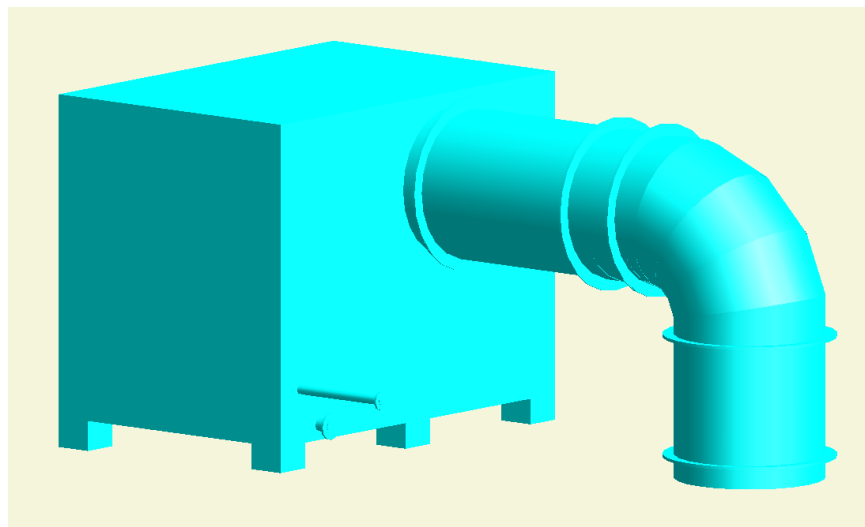


裝備介紹

蕈形通風口 (mushroom)

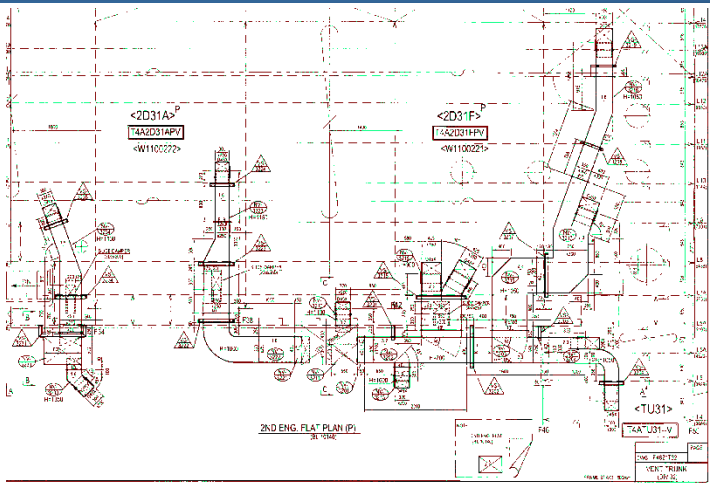


空氣清洗裝置 (air washer)

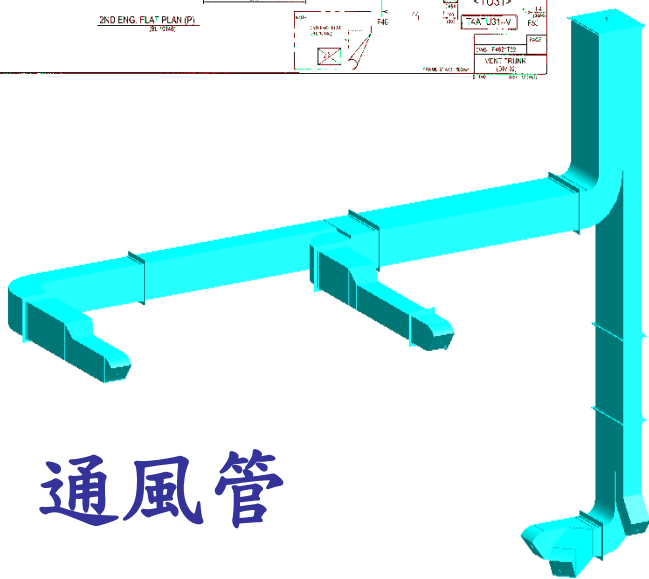




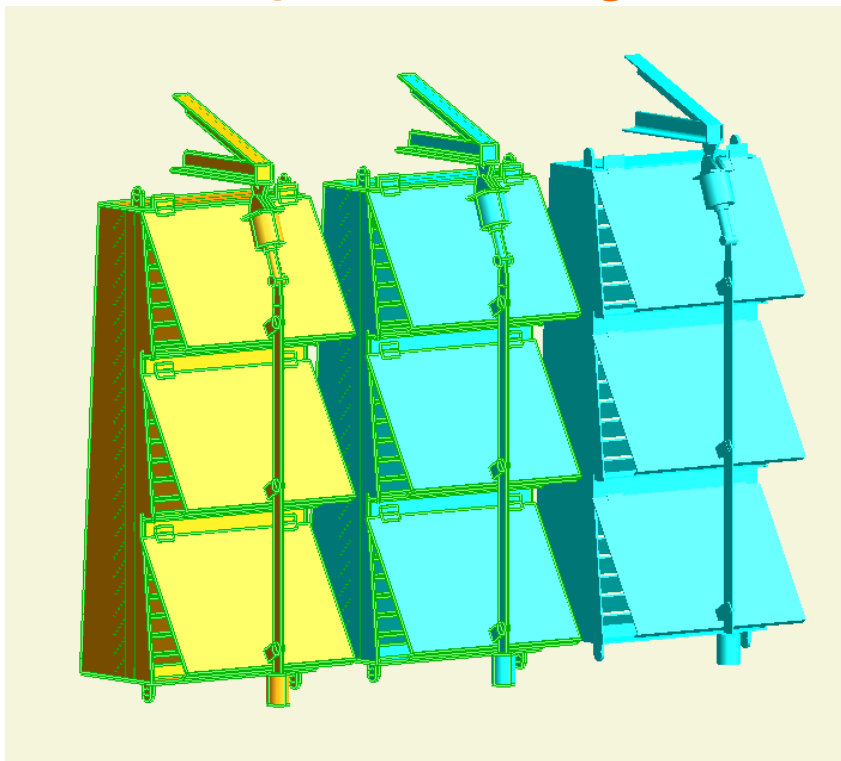
裝備介紹



通風進排氣關閉裝置 (vent damper closing device)



通風管





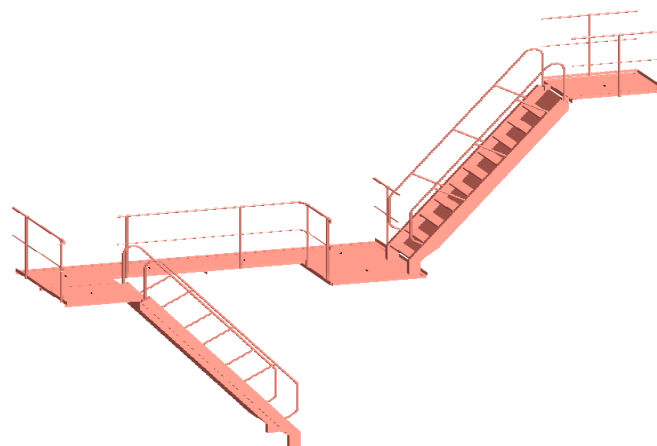
裝備介紹

交通裝置

規劃機艙人員通行、逃生路線及各裝備的維修保養之空間。

機艙交通裝置設計，大致可分為：

- 踏板設計
- 斜梯/直梯設計
- 人孔(manhole)設計
- 欄杆(handrail)設計



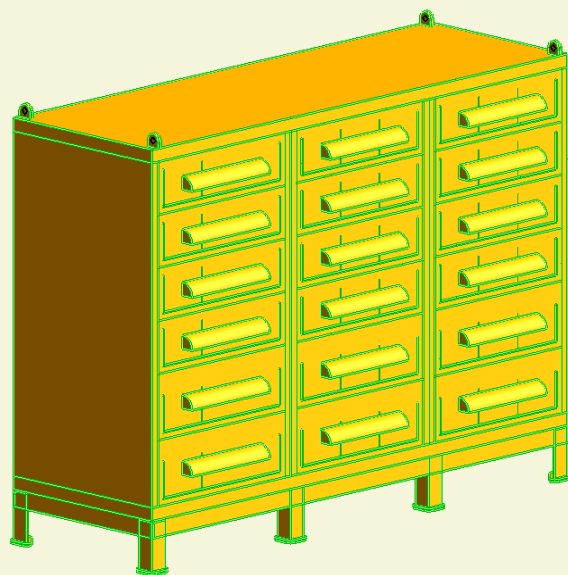
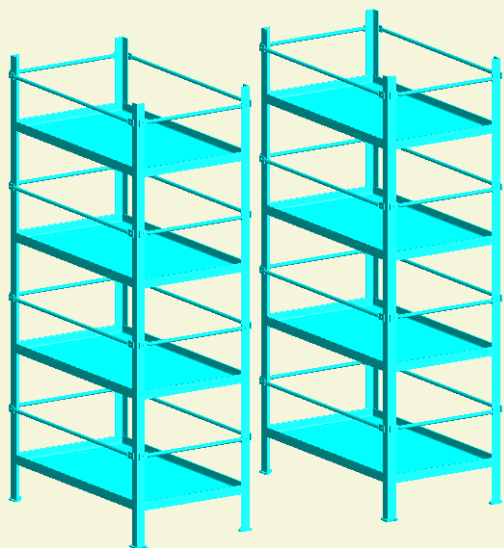


裝備介紹

• 機艙工作間和儲藏間的艙品

架子(SHELF)

櫃子(CABINET)



櫃子(CABINET)

