

105 學年度 國立基隆高級海事職業學校 航運概論



中鋼運通公司
周佐竺/資深經理

航運講座 / 機艙設備介紹與運用

Emergency generator engine set
(緊急發電機)

Emergency air compressor
(緊急空壓機)

Emergency air reservoir
(緊急空氣瓶)

Bilge separator unit
(油水分離器)

Sewage treatment plant
(衛生水處理器)

Incinerator (焚化爐)

Anti-fouling system (M.G.P.S.)
(海生物防止裝置)

Main Air compressor (主空壓機)

Plate type heat exchanger
(板式熱交換器)

Fresh water generator (造水機)

Aux. boiler (輔助鍋爐)

Exhaust gas economizer
(節熱器)

機艙設備

介紹 **Purifier (heavy fuel oil purifier, lubricating oil purifier)**
(燃油及滑油淨油機)

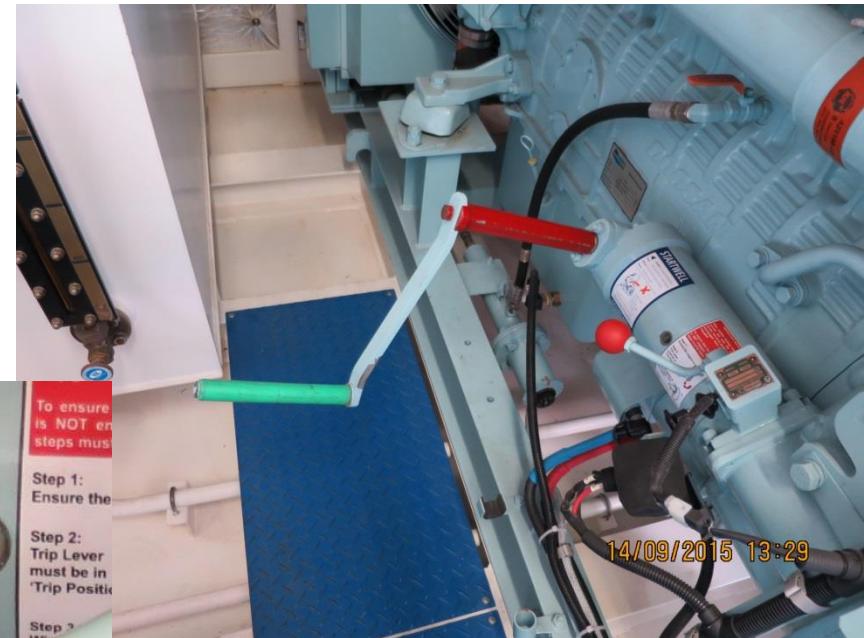
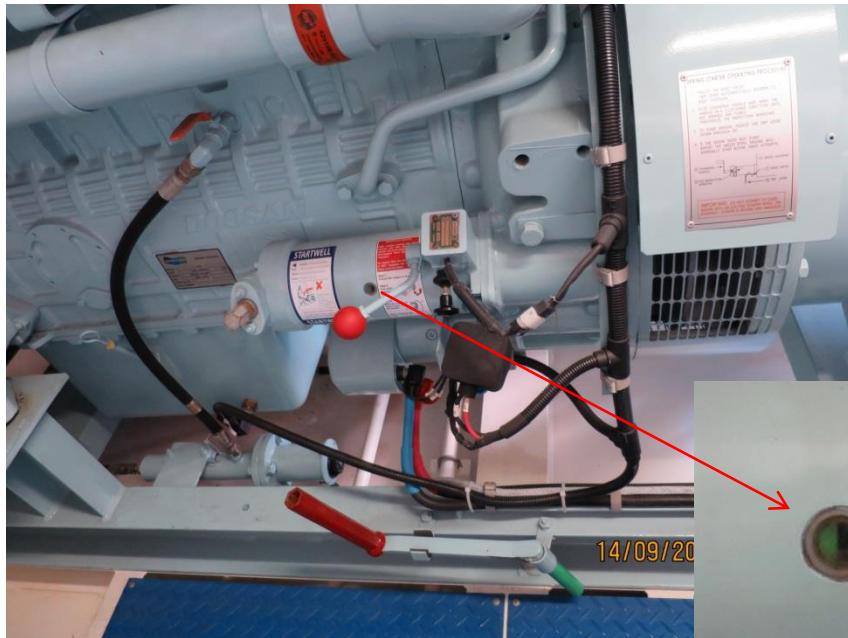
Main diesel generator engine set
(主發電機)

Main diesel engine set
(主機)

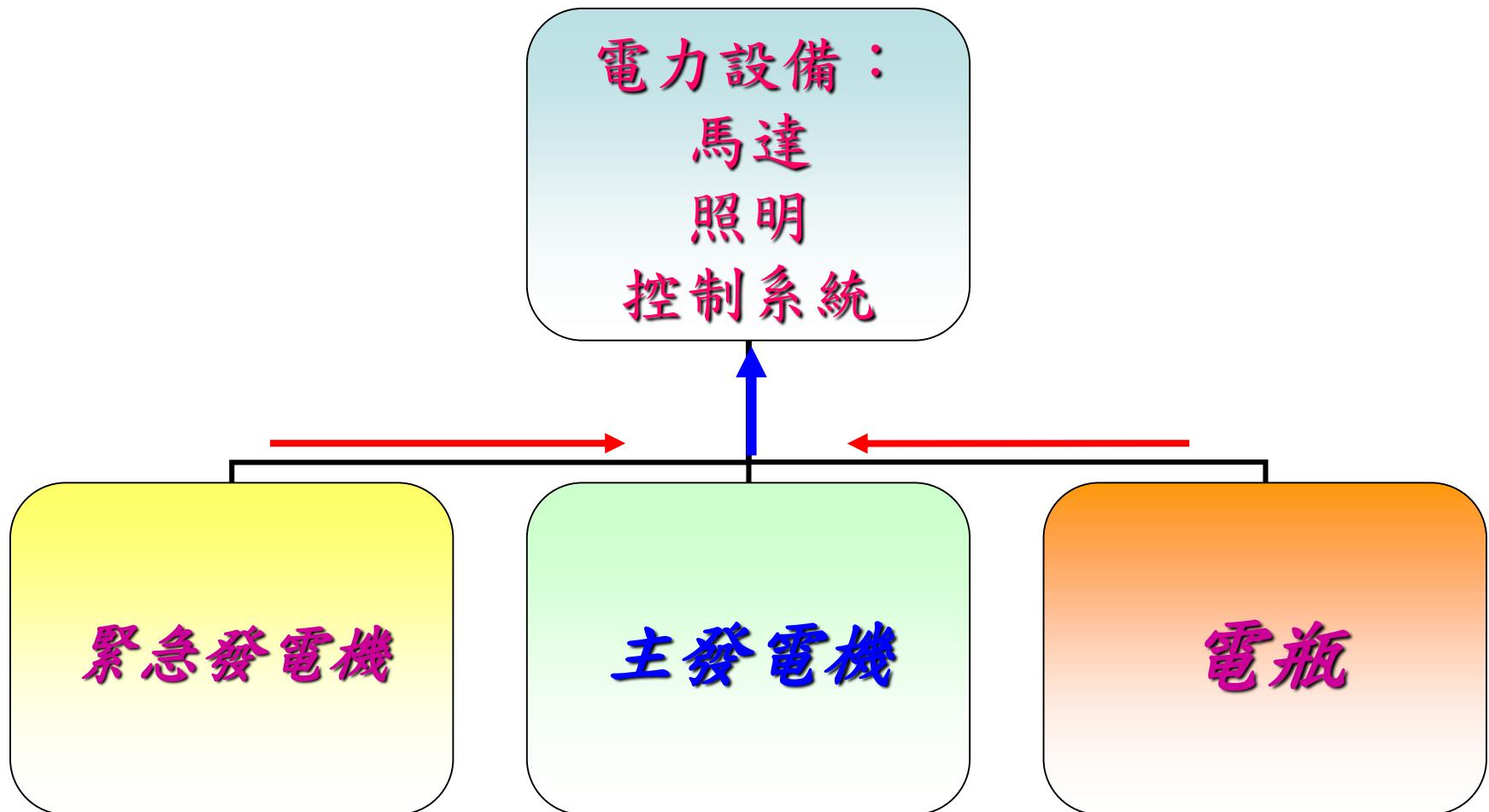
Emergency generator engine set (緊急發電機)



Emergency generator engine set (緊急發電機) 手動液壓裝置

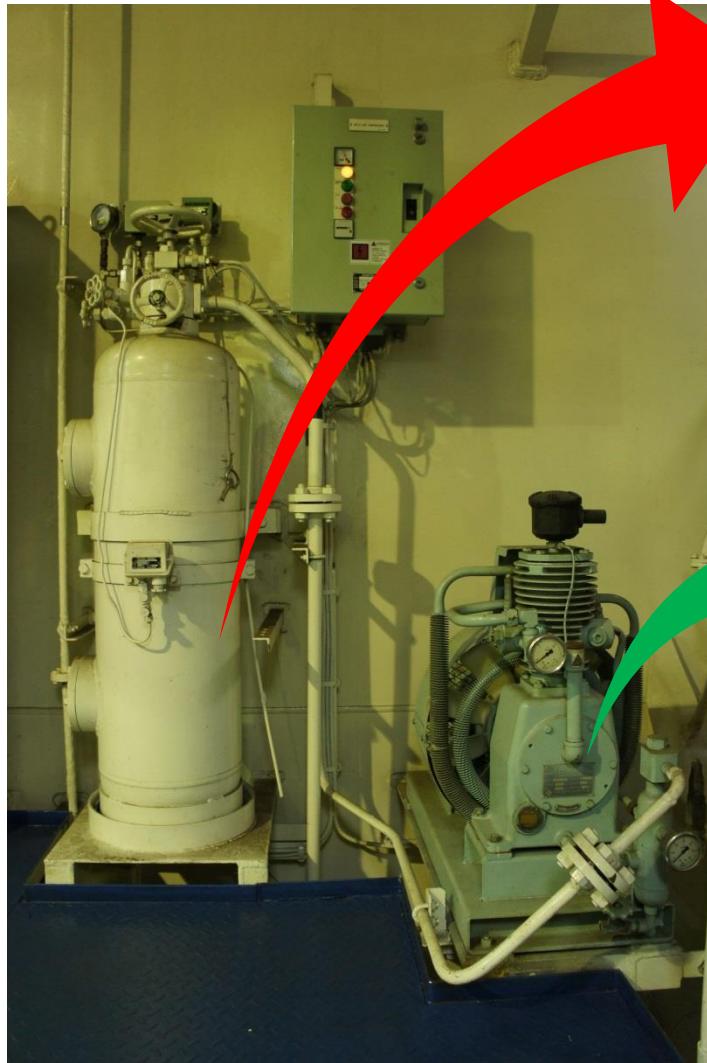


船舶電力來源



Emergency air compressor

(緊急空壓機)



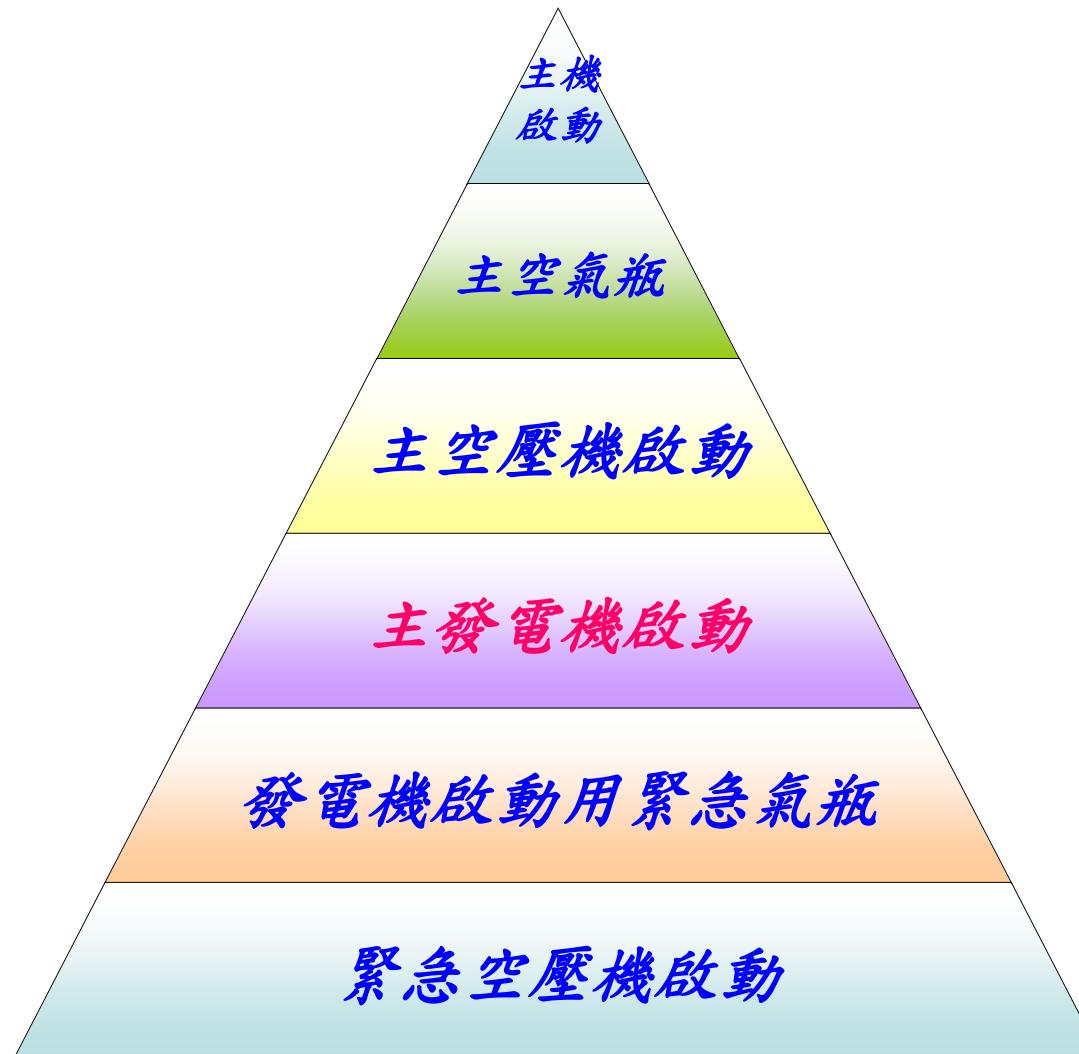
Emergency air reservoir

(緊急空氣瓶)

Emergency air compressor

(緊急空壓機)

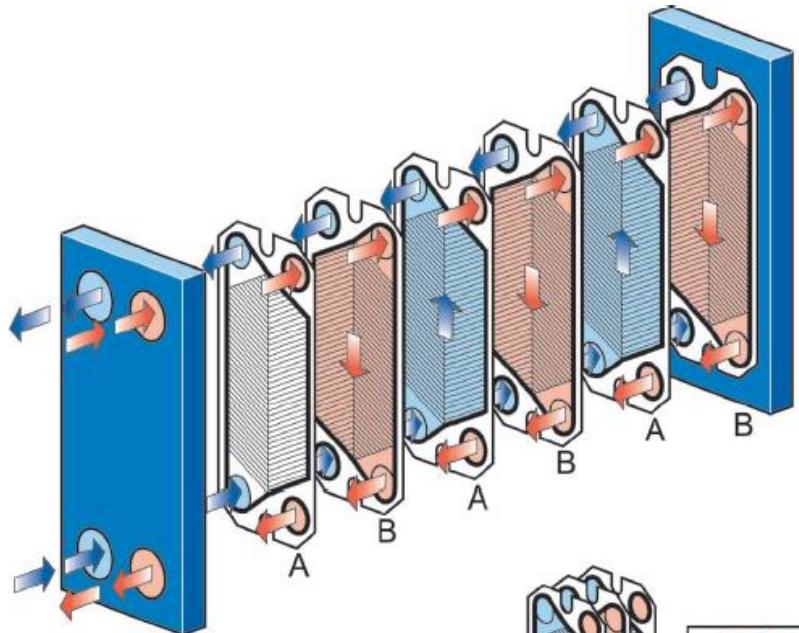
Dead ship 啟動



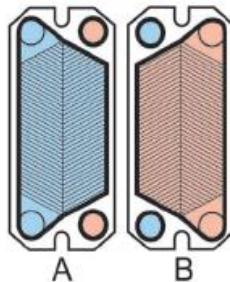
Main Air compressor (主空壓機)



Plate type heat exchanger (板式熱交換器)



The A-plate is a plate hanging with the chevron pointing downwards.



The B-plate is a plate hanging with the chevron pointing upwards.



鈦金屬材料

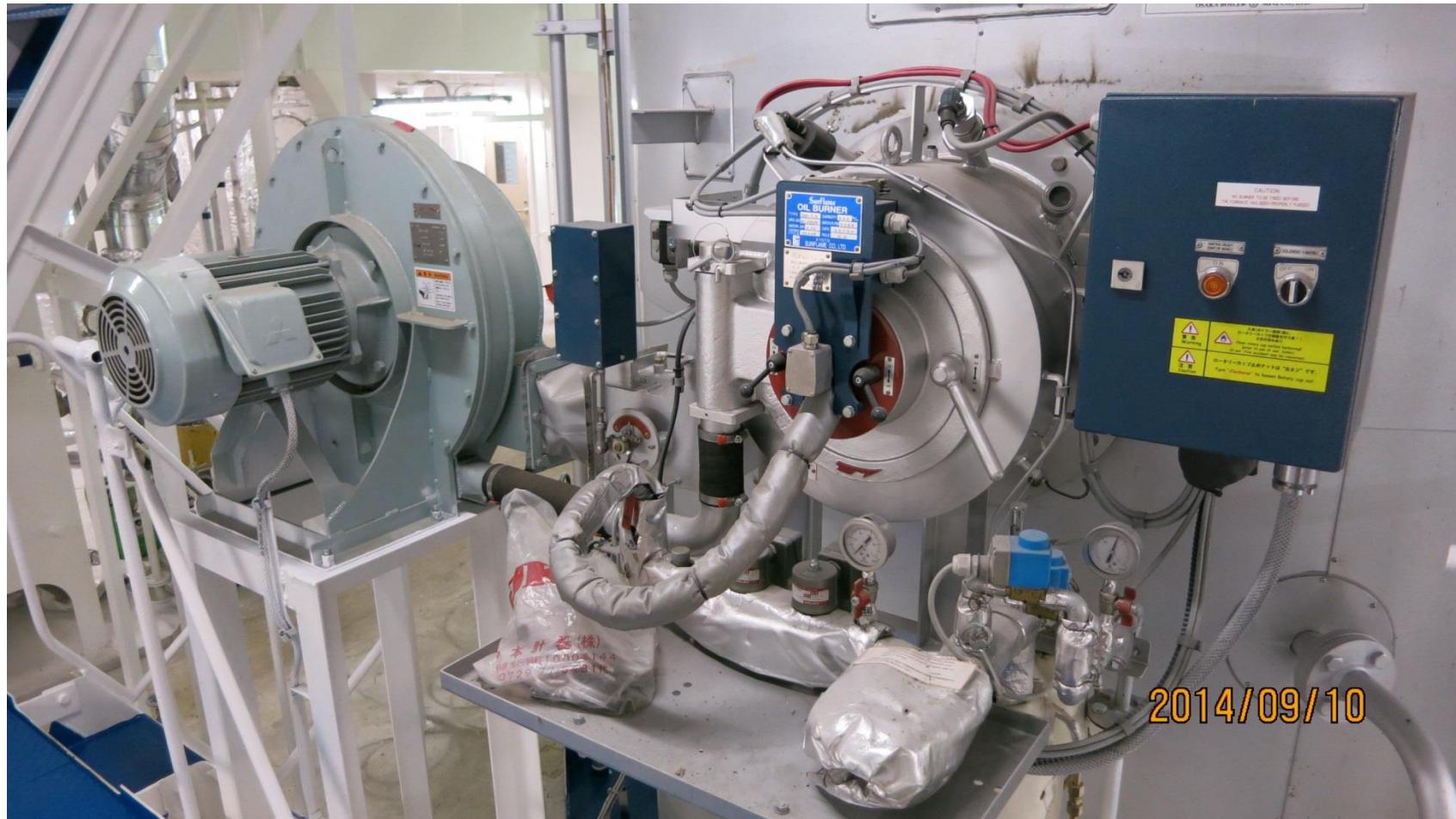
Fresh water generator (造水機)



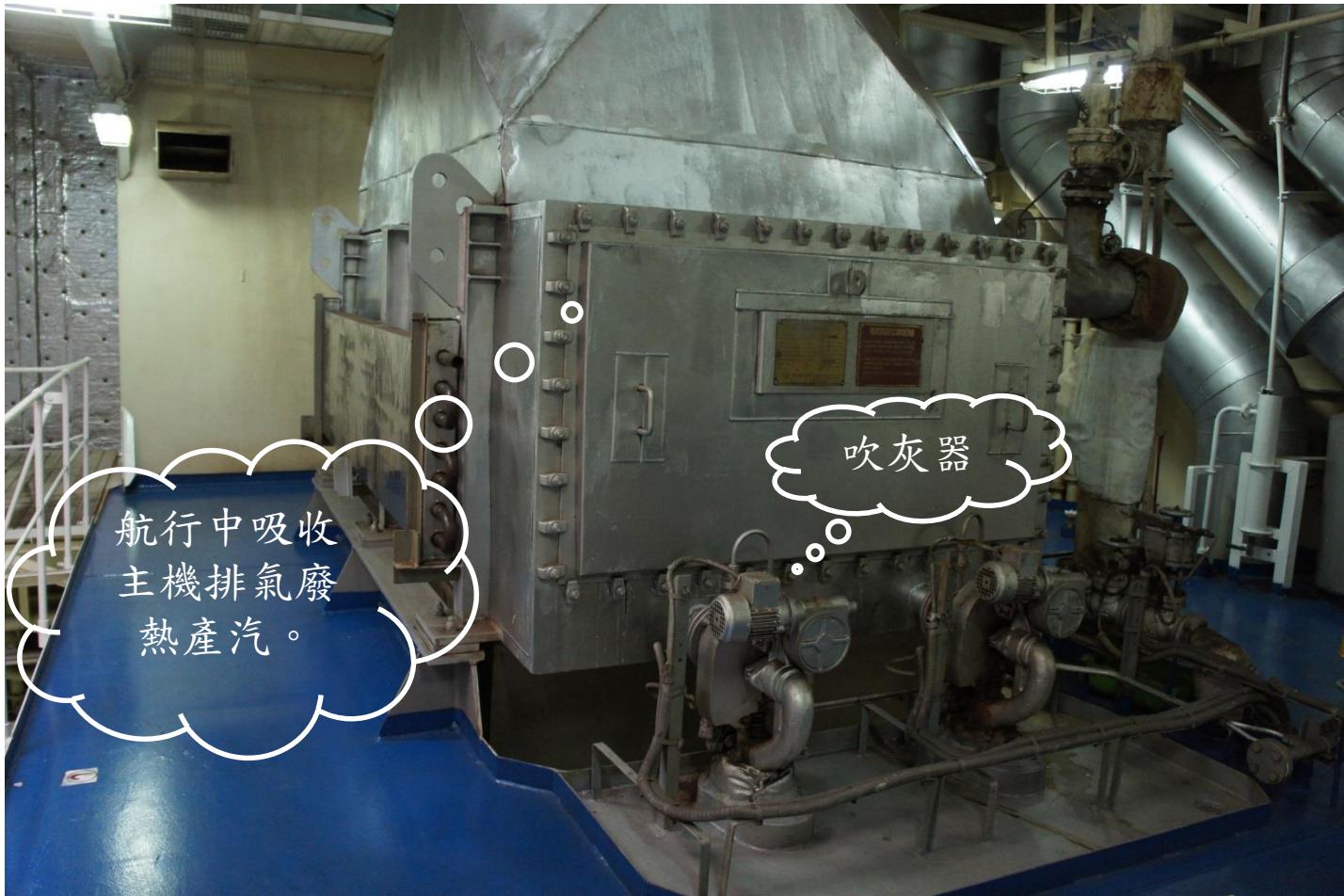
Aux. boiler (輔助鍋爐)



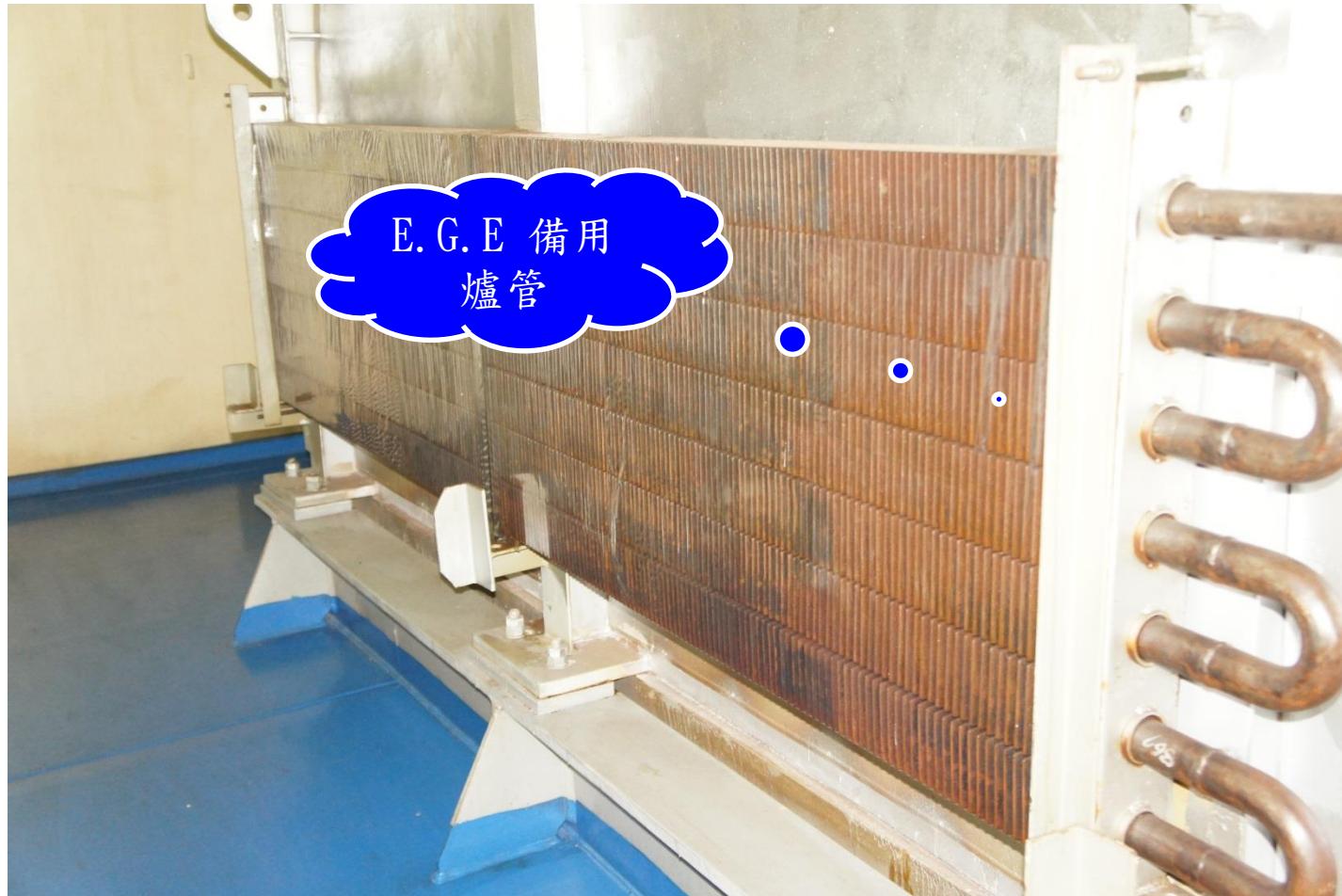
Aux. boiler (輔助鍋爐)



Exhaust gas economizer (節熱器)



Exhaust gas economizer (節熱器)



Bilge separator unit (油水分離器)



處理機艙艙底水
(Bilge Water)
的設備

Bilge separator unit (油水分離器15ppm sensor)

船底水經油水
分離器後，再
經過這個15ppm
sensor 檢測

法規要求
內部記錄
要保留18
個月



Bilge Tank / Well Sounding pipe



Sewage treatment plant (衛生水處理器)



近岸航行及靠
碼頭時，處理
生活污水的設
備

Incinerator (焚化爐)



Anti-fouling system (M.G.P.S.) (海生物防止裝置)



Heavy fuel oil purifier (燃油淨油機)



操作淨油機時要依淨油溫度、淨油量及燃油比重等三個條件，選擇適當的比重盤。

Lbricating oil purifier 滑油淨油機)



操作淨油機時要依淨油溫度、淨油量及燃油比重等三個條件，選擇適當的比重盤

Gravity Discs(比重盤)

- 選擇基本原則：
 - 比重越大內徑越小。
 - 比重越小內徑越大。
-
- 選擇不當時的現象：
 - **Leakage oil (跑油)** 造成過多燃油消耗。
 - 淨油功能降低(形成駁油泵效應)

Gravity Discs(比重盤)



外觀



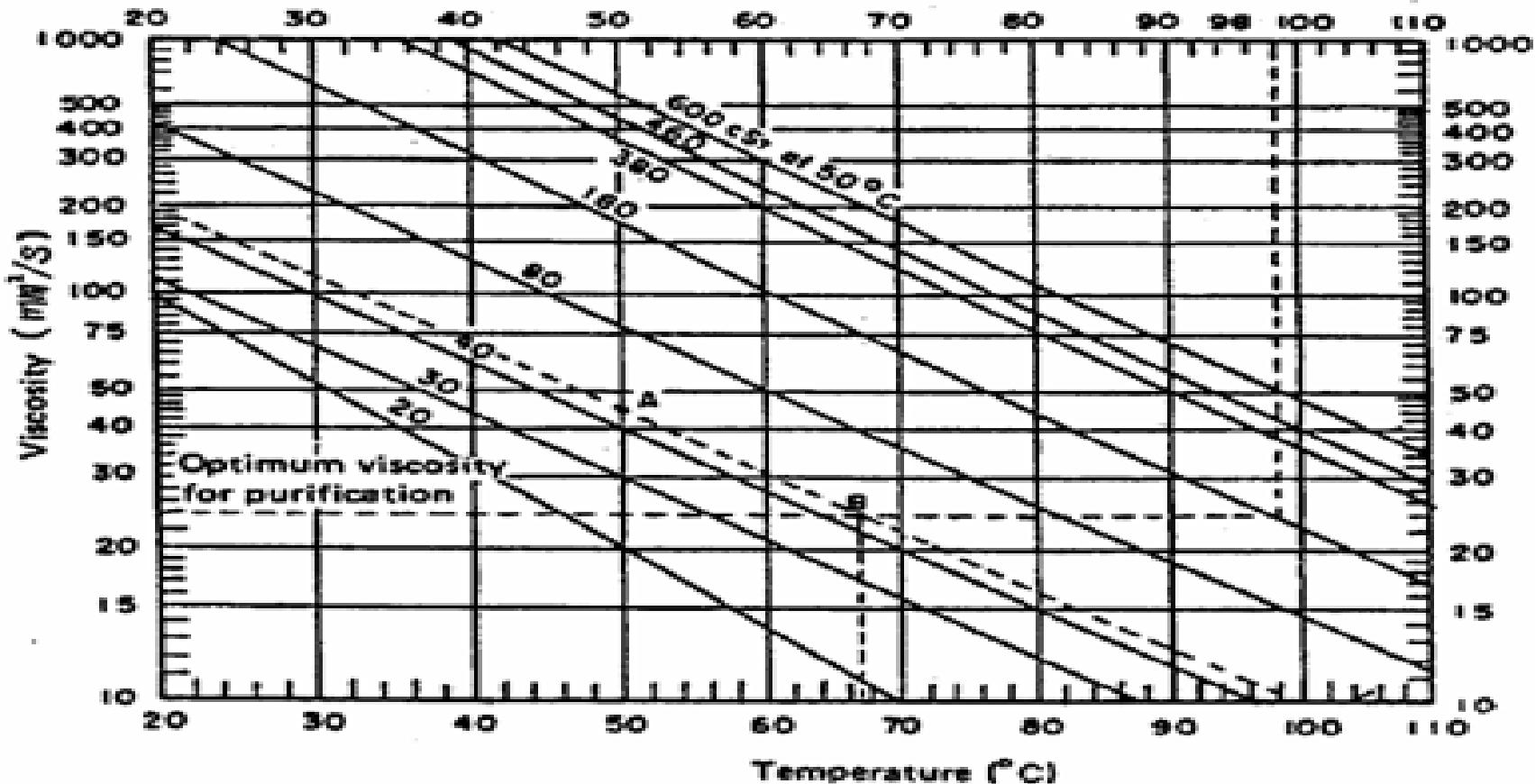
內徑尺寸

淨油條件

	Oil type	Treating temperature (°C)
A heavy oil	14 mm ² /sec at 40°C	40
C heavy oil	180~700 mm ² /sec at 50°C	98
Lubricating oil	100 mm ² /sec at 40°C (SAE#30)	74~90
	150 mm ² /sec at 40°C (SAE#40)	83~95

淨油機操作條件限定

黏度-溫度對照表



Viscosity(黏度) :
單位 : cSt (centistokes)

Gravity Discs List (比重盤清單)

Table 6-5 Gravity discs for purifier operation

Model	Inside diameter of gravity disc										
	64	65	66.5	68.5	71.5	74	78	79			
SJ10G/GH	64	65	66.5	68.5	71.5	74	78	79			
SJ20G/GH	64	65	66.5	68.5	71.5	75	77	78	82	83	
SJ30G/GH	65	66.5	68.5	71.5	75	79	82	86	90		
SJ50G/GH	86.5	88.5	91	94	98	103	107.5	113	115		
SJ60G/GH	86	88.5	91	94	98	103	106.5	110.5	115		
SJ70G/GH	87.5	91	94	98	103	107.5	113	119	122		
SJ100G/GH	113	116	120	124	129	136	140.5	142	150	153	
SJ120G/GH	113	116	120	124	129	136	140.5	142	146.5	150	153
SJ150G/GH	114	118	122	127	134	142	145.5	146.5	153	160	

(mm)

Table 6-7 Gravity discs for clarifier operation

Model	Gravity disc symbol
SJ10G, SJ20G, SJ30G	40
SJ50G, SJ60G, SJ70G	54
SJ100G, SJ120G, SJ150G	68

Bunker Delivery Note (BDN)



台灣中油股份有限公司

CPC CORPORATION, TAIWAN

國際海運燃油交貨記錄

INTERNATIONAL BUNKER OIL DELIVERY RECORD

COPY

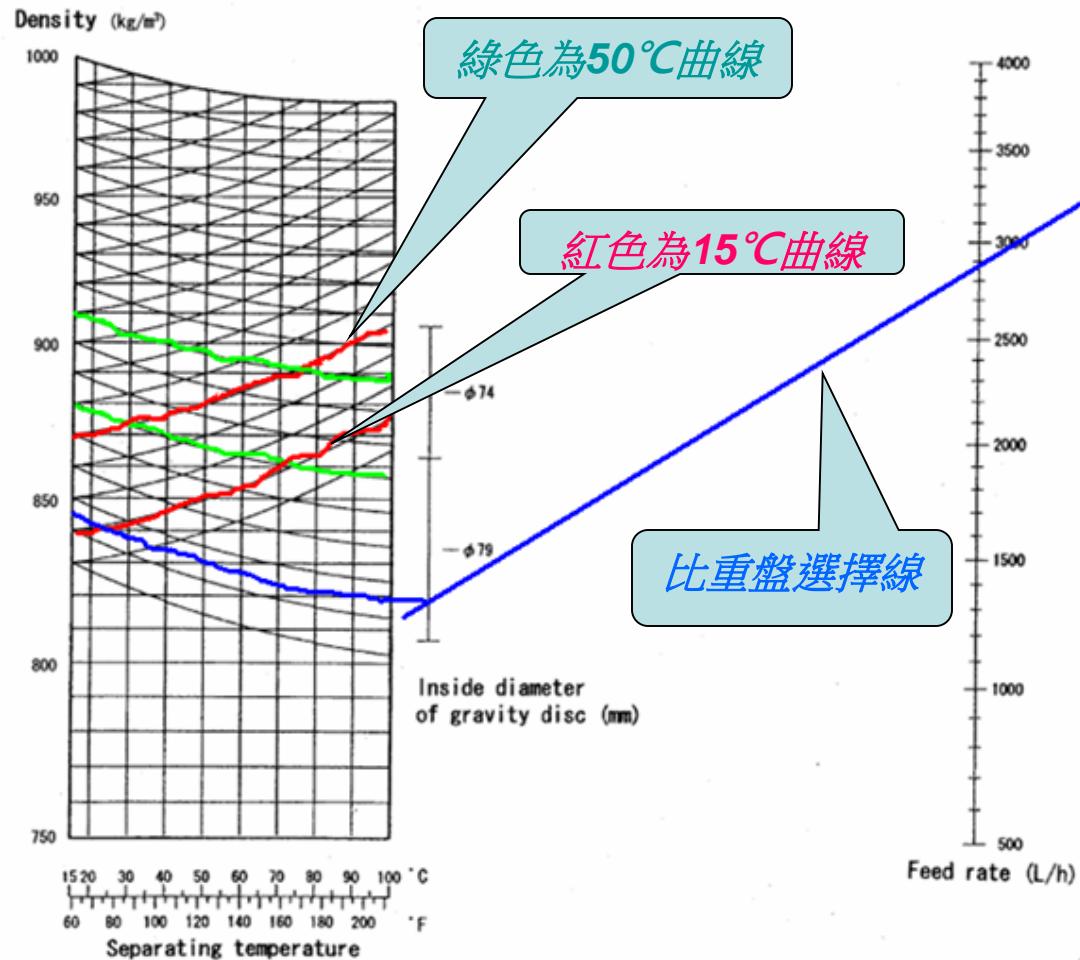
DELIVERED FOR: MARUBENI PETROLEUM CO.LTD. ORDER NO: 263795 PORT: Taichung
 DELIVERED TO: CHINA STEEL DEVELOPER PRODUCT M.D.O. M.D.O. CARGO LOADED AT: Wharf
 DELIVERING LIGHTER: Taichung FUEL DEPOT CHUNG YI NO.1 BUNKER PERMIT NO: 0605 DATE OF DELIVERY: SEP/24/2013
 I.M.O. NO: 9171424 The fuel oil supplied is in conformity with regulation 14(l) and regulation 18(l) of MARPOL 73/78 Annex VI

FLOW METER READING/TANK GAUGE		GROSS KILO LITERS DELIVERED	TEMPERATURE °F	CORRECTION FACTOR	NET KILO LITERS DELIVERED AT 60°F
Before Pumping	47878.00				
After Pumping	47917.11	35.97	86.0	0.9879	35.530
Gross Barrels:	226.24	223.48		METRIC TONS	30.000
Net Barrels at 60°F:				中鋼連通股份有限公司	
A.P.I GRAVITY at 60°F	35.7	3.58	RECEIVED QUANTITY IN GOOD ORDER AND CONDITION		
SPECIFIC GRAVITY at 60°F	0.8463		M.V. CHINA STEEL DEVELOPER		
VISCOSITY CENTISTOKES at 104°F(40°C) (Marine Gas Oil, Marine Diesel Oil)			CHINA STEEL EXPRESS CORPORATION		
VISCOSITY CENTISTOKES at 122°F(50°C) (Intermediate Marine Fuels, Bunker C)			We hereby certify that cargo oil is delivered by P.D. flow meter regularly regulated every other six months, and that our barge crew doesn't partake of ship's any hospitality.		
Sulfur Content, wt. %	0.145		BY		
Flash Point PM, °C	78.0		FOR THE		
Water	Water Content		CPC CORPORATION, TAIWAN		
Water & Sediment		<0.005	REMARK: SAMPLE NO:		
PUMPING	START	1628		2762	27564
	FINISH	1147			27447

備註
175x270mm

Gravity Discs(比重盤)

SELECTION NOMOGRAM OF GRAVITY DISC,
[Model SJ10G/GH (Fuel Oil: A Heavy Oil)]



燃油比重及熱值換算

- 燃油比重溫度修正計算式：

$$Ra = R15 \times [1 - 0.00068(Ta - T15)]$$

註： Ra ：溫度 $a^{\circ}\text{C}$ 的燃油比重；

$R15$ ： 15°C 的燃油比重；

Ta ：溫度 $a^{\circ}\text{C}$ ； $T15$ ： 15°C 。

- 燃油低熱值計算：

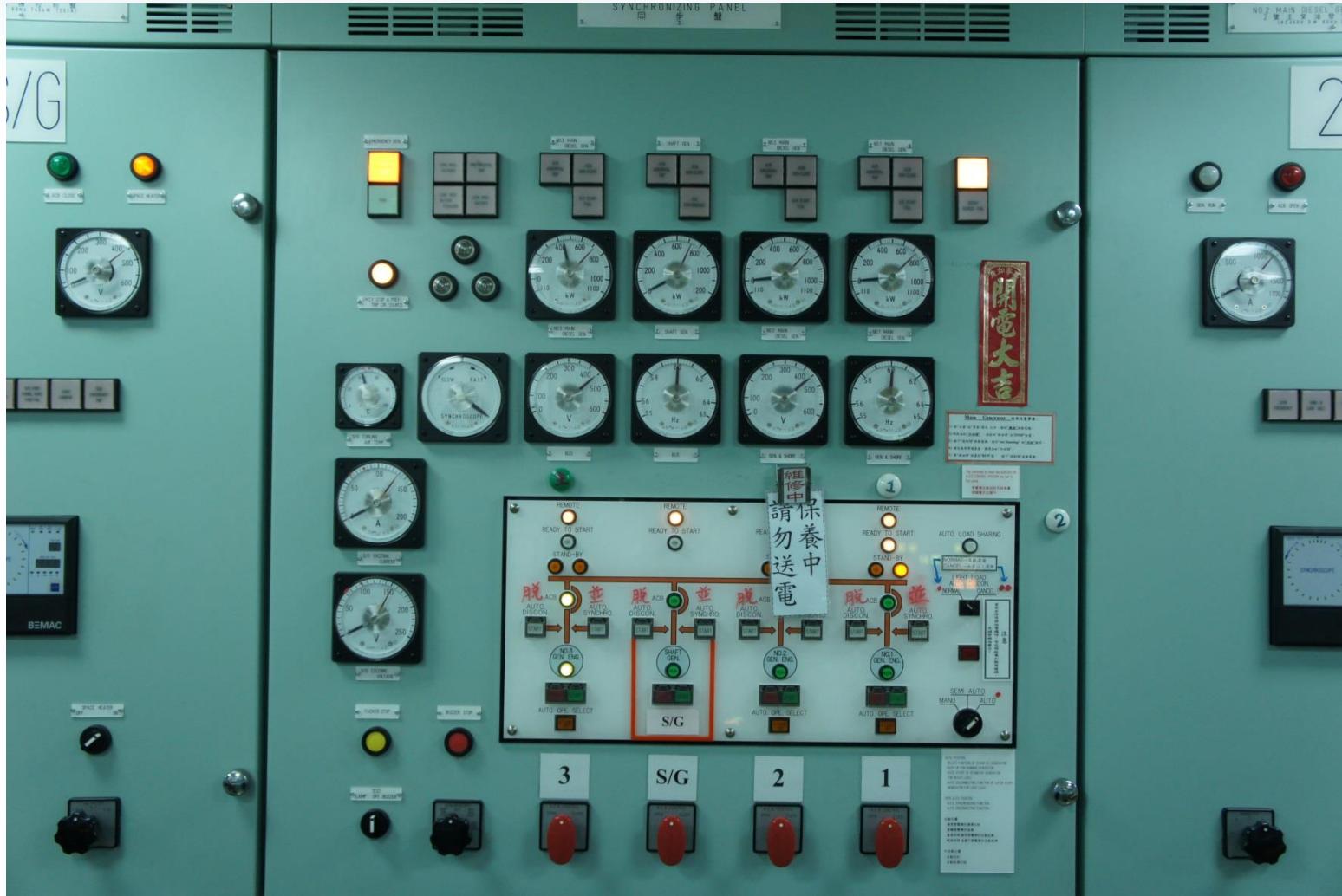
$$Lcv = (5.551 - R15) \times 2160 - (S\% \times 65)$$

註： $S\%$ ：含硫量(加油單據上的記錄)。

Main diesel generator engine set (主發電機)



Main diesel generator engine set (主發電機)



Main diesel generator engine set (主發電機)



Main diesel generator engine set (主發電機)



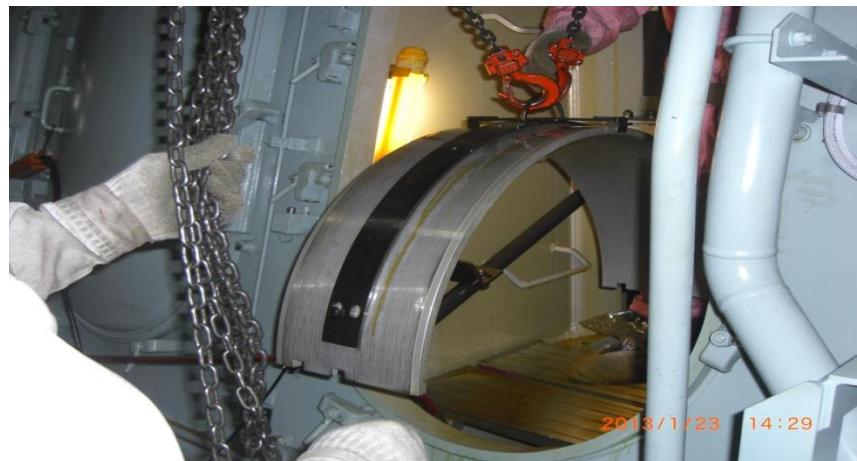
Main diesel engine set (主機)



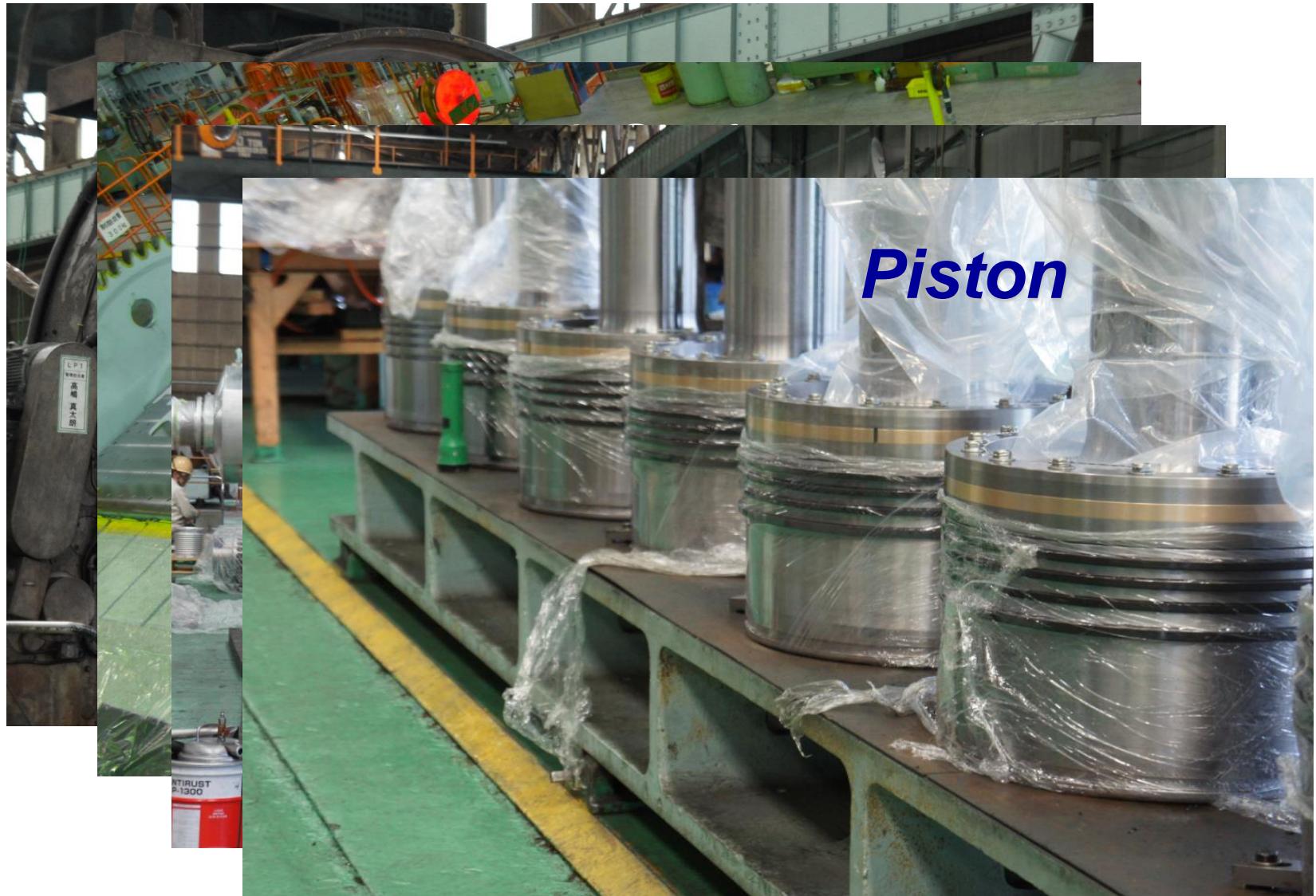
Main Bearing(主軸承拆檢)



Main Bearing(主軸承拆檢)



Crank Shaft (曲拐軸) 、Cylinder Liner (氣缸套) Piston (活塞)



Crank Shaft (曲拐軸) 、Cylinder Liner (氣缸套) Piston (活塞)



Main engine control console

(主機控制檯)



Main engine control console (主機控制檯)



Main engine monitor system (主機監控系統)



END

Thank you for your listening

