

經濟部國營會所屬各機關出國報告書

出國計畫報告名稱：HNO.750 發電機測試

服務機關：中國造船股份有限公司

系統識別號：C09000799

出國人員：盧峰文 工程師 艤裝工廠

出國地區：韓國

出國類別：其他

出國期間：民國 89 年 10 月 30 日 民國 89 年 11 月 03 日

資料最後修改者帳號：313410000A

壹、前言：

為配合本公司新造船隻編號 750，向韓國釜山雙龍重工公司採購發電機 3 部，本公司品保委請本人前往韓國與船東、船級協會（DNV 丹麥）會同參加測試檢驗；期能提早發現問題要求廠家改善，並而提升品質，避免日後裝備組裝後在測量運轉使用過程發生問題，及早預防使得將來發電機運轉測試工作順利。

船東 LEMOS 公司提供發電機廠家—SSANG YONG HEAVY INDUSTRIES CO. LTD.，同時在三處造船均使用該廠家之 D/G，另二處造船分別於三星及現代造船公司，使用同樣發電機，此次奉派前往參加測試檢驗並會同 DNV 及船東 LEMOS 公司三方面依據設計組與船東、廠家所簽定之採購規範執行測試檢驗，使得能對本次測試檢驗工作順利；並對以後增建的新船有所助益。

貳、過程概述：

- 一、 750/751 系列船發電機系統均使用該公司 D/G 三部並聯運轉供給船上供電系統使用。
- 二、 依本公司設計與採購組於 750 船所定之採購規範執行檢驗，其測試依下列順序執行：
 1. MAIN SPECIFICATION.
 2. ENGINE LOAD TEST(1),(2),(3),(4).
 3. PROTECTIVE DEVICE & REMOTE CONTROL TEST.
 4. GENERATOR TEST : (1)LOAD TEST.
(2)LOAD CHARACTERSTIC TEST.
(3)GOVERNOR TEST.
(4)PARALLEL RUNNING TEST.
 5. CALCULATION OF FUEL OIL CONSUMPTION.
 6. ENGINE CHARACTERISTIC CURVES.

1. MAIN SPECIFICATION

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ENGINE NO. : SB6L23-2303

TEST DATE. : 2003-10-31

MAIN DATA FOR DIESEL ENGINE	ENGINE MODEL	6L23/30H	
	NO. OF CYLINDER	6	ea
	CYCLE	4-STROKE	
	DIAMETER OF CYLINDER	225	mm
	STROKE OF PISTON	300	mm
	RATED OUT PUT	790 / 1075	kW / BHP
	RATED SPEED	720	rpm
	EXPLOSION PRESSURE	132	bar
	B.M.E.P	18.4	bar
	COMPRESSION RATIO	13 : 1	
	ROTATION DIRECTION	C.W	VIEW FROM FLYWHEEL
MAIN DATA FOR ALTERNATOR	MAKE	HYUNDAI HEAVY INDUSTRIES CO., LTD	
	TYPE	HFC5 506-14K	
	SERIAL NO	00-CRAL115-01	
	CAPACITY	925 kVA	
	EFFICIENCY, COS ϕ = 1.0, 25%/50%/75%/100%/110%	93.4%/95.8%/96.1%/95.9%/95.7%	
	VOLTAGE	450 V	
	CURRENT	1186.78 A	
	FREQUENCY	60 Hz	
	POWER FACTOR	0.8	
MAIN DATA FOR TURBOCHARGER	MAKE	SSANGYONG-MAN B&W	
	TYPE	NR15	
	SPECIFICATION	R184	
	SERIAL NO	SAD317	
MAIN DATA FOR GOVERNOR	MAKE	WOODWARD	
	TYPE	UG80	
	DESIGN NO	8525-797	
	SERIAL NO	12344883	
	SERVO MOTOR	DC 24 V	
	SHUT DOWN	DC 24 V	
ACCESSORIES	AIR COOLER	SERIAL NO. :	DH672230-A
	L.O COOLER	SERIAL NO. :	DECC045-1
	L.O PUMP	SERIAL NO. :	HH0003-17
	F.W PUMP	SERIAL NO. :	HH010-7
FUEL OIL	NAME	MARINE DIESEL OIL	
	SPECIFIC GRAVITY	0.8724 (@15/4°C API 28.3)	
	VISCOSITY	12.6 (CST @ 40.0 °C)	
	L.C.V	10130	kcal/Kg
LUB. OIL FOR ENGINE & T/C	NAME	DAPHNE MARINE OIL SX - 30	
	SPECIFIC GRAVITY	0.8904 (@ 15/4 °C)	
	VISCOSITY	99.5 (CST @ 40°C)	
LUB. OIL FOR GOVERNOR	NAME	DN SUPER HYDRAULIC FLUID 68	
	SPECIFIC GRAVITY	0.8730 (@15/4°C)	
	VISCOSITY	66.890 (CST @ 40°C)	

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2. ENGINE LOAD TEST SHEET (1)

P/B

ENGINE NO. : SBB23-2303

TEST DATE : 2000-10-31

LOAD	%	25 %	50 %	75 %	100 %	100 %	110 %	REMARK
TIME OF RECORDING	Min	30	30	30	30	30	30	
ENGINE SPEED	rpm	720	720	720	720	720	720	
GENERATOR SPEED	rpm	720	720	720	720	720	720	
ENGINE OUTPUT	BHP	269	538	806	1075	1075	1183	
EFFICIENCY OF GENERATOR	PF=1.0	93.4	95.8	96.1	95.9	95.9	95.7	
GENERATOR OUTPUT	kW	185	379	570	758	758	832	
TURBOCHARGER SPEED	X1000	21.3	33.3	41.8	48.2	48.2	50.8	
GOVERNOR POSITION	FUEL	2.7	4.0	5.3	6.7	6.7	7.3	
AMBIENT TEMPERATURE	°C	16	1.7	18	20	20	20	
ATMOSPHERIC PRESSURE	mbar	1022	1022	1022	1022	1022	1021	
FUEL OIL CONSUMPTION	MEASURING TIME	Min/Sec	5'30''	6'28''	6'30''	6'28''	5'47''	
	CONSUMPTION	kg/Hr	47.6	80.9	120.8	161.9	161.9	181.0
	CONSUMPTION(ISO)	g/bhp-h	175.6	150.0	147.0	147.0	147.0	149.2
COOLING WATER PRESSURE	H/T WATER	bar	2.10	2.10	2.10	2.10	2.10	
	L/T WATER	bar	1.4	1.4	1.4	1.4	1.4	
		bar						
BOOST AIR PRESSURE	bar	0.30	0.90	1.60	2.20	2.20	2.40	
FUEL OIL PRESSURE ENGINE INLET	bar	7.0	7.0	7.0	7.0	7.0	7.0	
LUB. OIL PRESSURE	PUMP OUTLET	bar	5.7	4.9	4.8	4.8	4.8	4.8
	ENGINE INLET	bar	5.40	4.60	4.50	4.50	4.50	4.50
	TURBOCHARGER	bar	1.80	1.80	1.60	1.70	1.70	1.70
RACK POSITION OF FUEL OIL INJECTION PUMP	1	mm	10.0	14.5	19.0	24.0	24.0	26.0
	2	mm	10.0	14.5	19.0	24.0	24.0	26.0
	3	mm	10.0	14.5	19.0	24.0	24.0	26.0
	4	mm	10.0	14.5	19.0	24.0	24.0	26.0
	5	mm	10.0	14.5	19.0	24.0	24.0	26.0
	6	mm	10.0	14.5	19.0	24.0	24.0	26.0
	7	mm						
	8	mm						
	9	mm						
	Mean	mm	10.0	14.5	19.0	24.0	24.0	26.0
MAX. FIRING PRESSURE	1	bar	65.0	91.0	113.0	133.0	133.0	138.0
	2	bar	65.0	91.0	113.0	133.0	133.0	138.0
	3	bar	65.0	90.0	113.0	132.0	132.0	138.0
	4	bar	65.0	91.0	114.0	133.0	133.0	139.0
	5	bar	65.0	90.0	113.0	132.0	132.0	139.0
	6	bar	65.0	90.0	112.0	133.0	133.0	138.0
	7	bar						
	8	bar						
	9	bar						
	Mean	bar	65.0	90.5	113.0	132.7	132.7	138.7

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3. ENGINE LOAD TEST SHEET (2)

P7B

ENGINE NO. : S86L23-2303

TEST DATE : 2000-10-31

LOAD		%	25 %	50 %	75 %	100 %	100 %	110 %	REMARK	
COOLING WATER TEMPERATURE	AIR COOLER Inlet	°C	30	30	31	32	32	32		
	AIR COOLER Outlet	°C	30	32	34	36	36	38		
	L.O COOLER OUTLET	°C	30	34	36	38	38	38		
	ENGINE INLET	°C	70	72	72	72	72	72		
	ENGINE OUTLET	°C	73	74	74	74	74	74		
	CYLINDER OUTLET	1	°C	73	76	76	76	76	76	
		2	°C	73	77	77	77	77	78	
		3	°C	73	77	77	78	78	78	
		4	°C	72	76	76	76	76	76	
		5	°C	72	76	76	77	77	78	
		6	°C	72	76	76	76	78	78	
		7	°C							
		8	°C							
9		°C								
Mean		°C	72.5	76.3	76.3	77.0	77.0	77.3		
EXHAUST-GAS TEMPERATURE	CYLINDER OUTLET	1	°C	230	240	260	295	295	320	
		2	°C	235	250	285	305	305	325	
		3	°C	235	245	280	305	305	330	
		4	°C	240	250	270	305	305	330	
		5	°C	235	250	285	305	305	330	
		6	°C	225	250	270	310	310	340	
		7	°C							
		8	°C							
		9	°C							
		Mean	°C	233.3	247.5	265.0	304.2	304.2	329.2	
	T/C INLET	°C								
	T/C OUTLET	°C	260	270	285	290	290	300		
	T/C EXHAUST GAS BACK PRESSURE	mmHg	5	22	38	56	58	74		
BOOST AIR TEMPERATURE	COOLER INLET	°C	40	84	130	172	172	182		
	COOLER OUTLET	°C	31	35	38	42	42	43		
	DIFF. PRESSURE	mmHg								
	FUEL OIL TEMP / ENGINE INLET	°C	22	28	34	38	38	40		
	GENERATOR BEARING TEMP	°C	24	32	38	38	38	39		
LUB. OIL TEMPERATURE	COOLER INLET	°C	50	60	61	61	61	61		
	COOLER OUTLET	°C	46	52	53	50	50	50		
GENERATOR WINDING TEMP	R	°C								
	S	°C								
	T	°C								

4. ENGINE LOAD TEST SHEET (3)

ENGINE NO. : S86L23-2303

TEST DATE : 2000-10-31

PKS

STARTING TEST BY MANUAL START												공기탱크 용량 AIR Tank Capacity	: 200	× 18t.	실온온도 Room Temp.	: 19	°C	압력 Unit	: Kg/cm	Bar
INITIAL	1	2	3	4	5	6	7	8	9	10	11	12								
26.0	23.0	20.0	18.0	16.0	14.0	12.0	10.0	8.0	6.0	FAIL	-	-								
13	14	15	16	17	18	19	20	21	22	23	24	25								
-	-	-	-	-	-	-	-	-	-	-	-	-								
운전종료후 각 부위 배어링 온도												BEARING TEMPERATURE (AFTER RUNNING)				단위 Unit	°C			
배어링번호 No. of Bearing		1	2	3	4	5	6	7	8	9	10									
주축배어링 Main Bearing		64	63	64	64	64	62	62												
크랭크핀 Crank Pin BRG.		63	64	64	63	62	63													
윤활유온도 Lub. Oil Temp.		63°C																		
크랭크 축 변형(온전전) CRANK SHAFT DEFLECTION (COLD CONDITION)												온도 Temp	: 23		°C	단위 Unit	: 1/100mm			
<p>동작이유측정서부리판 Wear Free Flywheel</p>	CYL. NO.	1	2	3	4	5	6	7	8	9	기준									
	EB	0.0	0.0	0.0	0.0	0.0	0.0					STANDARD								
	E	0.0	0.5	0.0	0.0	0.0	1.0					Vert Deft								
	T	0.5	1.5	1.5	0.5	0.5	2.0					Cyl. 1-5								
	C	0.0	1.0	1.0	0.0	0.0	0.5					± 3.0								
CB	0.0	0.5	0.5	0.0	0.0	0.0						Cyl. 6								
												± 4.0								
													Hor Deft							
													Cyl. 1-6							
													± 5.0							
크랭크 축 변형(온전후) CRANK SHAFT DEFLECTION (HOT CONDITION)												온도 Temp	: 64		°C	단위 Unit	: 1/100mm			
<p>동작이유측정서부리판 Wear Free Flywheel</p>	CYL. NO.	1	2	3	4	5	6	7	8	9										
	EB	0.0	0.0	0.0	0.0	0.0	0.0													
	E	-0.5	-0.5	-1.0	-1.0	-0.5	-1.5													
	T	-1.0	-1.0	-1.5	-2.0	-1.0	-3.0													
	C	-1.0	-1.0	-1.0	-1.0	-0.5	-2.0													
CB	-0.5	-0.5	-0.5	0.0	0.0	-1.0														
연료분사 펌프 조정. FUEL OIL INJECTION PUMP SETTING																				
실린더번호 (CYL. NO.)	1	2	3	4	5	6	7	8	9	10										
"X"거리/DISTANCE "X"	8.10	7.92	7.83	7.88	8.03	7.71														
캠리드 / CAM LEAD	9.00	9.00	9.00	9.00	9.00	9.00														
FUEL INJECTION TIMING	11.20	11.00	11.50	10.60	10.90	11.10														
조속기 시험 GOVERNOR TEST																				
동작조건 SETTING	100% → 0%	0% → 50%	50% → 100%																	
720 rpm	768 rpm	740 rpm	718 rpm	736 rpm	703 rpm	720 rpm														
CAM GEAR POSITION																				
-2.33																				
조속기 조정 GOVERNOR SETTING																				
형식 / TYPE	U68D		엔진정지위치/RACK POSITION OF ENG. STOP						4 mm											
속도감하 / SPEED DROOP	55		최대레크위치/RACK POSITION OF MAXIMUM						26.0 mm											
속도보정 / COMPENSATION	0		시동레크한계/RACK LIMIT FOR STARTING						17 mm											
보정밸브조정/NEEDLE VALVE SETTINGS	360° OPEN		조속기링크길이/LENGTH OF GOVERNOR LINK						317 mm											

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5. 경보장치 및 원격 조정 장치 시험 성적표
5. PROTECTIVE DEVICE & REMOTE CONTROL TEST SHEET

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ENGINE NO. S86L23-2303

TEST DATE : 2000-10-31

경보 장치 시험. ALARM TEST				
NO.	시험항목 / TEST ITEM	기준 / STANDARD	조정 / SETTING	비고 / REMARK
1	윤활유필터압력강하/L.O DIFF. PRESS ACROSS FILTER	1.5 bar	1.40 bar	
2	윤활유프라이밍수위낮음/L.O PRIMING LEVEL LOW	CHECK	O.K	
3	연료고압관누유과다/F.O LEAKAGE TANK HIGH LEVEL	CHECK	O.K	
4	윤활유탱크수위낮음/L.O SUMP TANK LOW LEVEL	CHECK	O.K	
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				

자동 정지장치 시험 / TRIP TEST				
NO.	시험항목 / TEST ITEM	기준 / STANDARD	조정 / SETTING	비고 / REMARK
1	기관윤활유압력저하 / ENGINE LUB. OIL PRESS	3.5 bar	3.50 bar	
2	기관냉각수온도상승/ENGINE F.W(H/T)HIGH TEMP	95 ℃	92 ℃	
3	기관회전수상승 / ENGINE OVER SPEED(ELECTRIC)	815 rpm	814 rpm	
3	기관회전수상승 / ENGINE OVER SPEED(MECHANICAL)	max.828 rpm	822 rpm	
4				
5				
6				

6. 발전기 시험 성적표
6. GENERATOR TEST SHEET

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GEN. NO.: 00-ORAL115-01 ENGINE NO. : SB6L23-2303 TEST DATE : 2000-10-31

부하시험 LOAD TEST				
부하 / LOAD (%)	주파수/FREQUENCY(Hz)	출력 / OUTPUT (kW)	전압 / VOLTAGE (V)	전류 / CURRENT (A)
25	60.0	185	450	237
50	60.0	370	450	475
75	60.0	555	450	712
100	60.0	740	450	948
110	60.0	814	450	1044

부하특성시험 LOAD CHARACTERSTIC TEST												
부하율 / LOAD RATE	%	100	75	50	25	0	25	50	75	100	110	100
부하 / LOAD	kW	740	555	370	185	0	185	370	555	740	814	740
전압 / VOLTAGE	V	450	450	450	450	450	450	450	450	450	450	450
주파수/FREQUENCY	Hz	60.0	60.6	61.1	61.6	62.2	61.6	61.1	60.6	60.0	59.7	60.0

1 Hz 변동시간 (TIME OF 1 Hz CHANGE) 에어갭측정 (CHECK OF GENERATOR AIR GAP)

	주파수/FREQUENCY	시간/TIME	에어갭측정 (CHECK OF GENERATOR AIR GAP)			
상승 UP	59 → 60	8.5 SEC.		A =	1.90	mm
	60 → 61	8.5 SEC.		B =	1.90	mm
하강 DOWN	61 → 60	8.4 SEC.		C =	1.90	mm
	60 → 59	8.5 SEC.		D =	1.90	mm

조속기 시험 GOVERNOR TEST.

부하 LOAD	항목 ITEM	조금 BEFORE	순간 INSTANT	공공 STABILITY	변동율 % VARIATION RATE		소요시간 TIME
					순간/INSTANT	공공/STABILITY	
100 → 0	주파수/FREQUENCY (Hz)	60.0	64.0	62.4	6.7	4.0	1.8SEC
	전압/VOLTAGE (V)	450	481	451	6.9	0.2	
	회전수/SPEED (rpm)	720	768	749	6.7	4.0	
0 → 50	주파수/FREQUENCY (Hz)	62.4	58.8	61.3	4.3	1.8	1.8SEC
	전압/VOLTAGE (V)	451	440	451	2.4	0.0	
	회전수/SPEED (rpm)	748	718	736	4.3	1.8	
50 → 100	주파수/FREQUENCY (Hz)	61.3	58.8	60.0	4.5	2.2	1.8SEC
	전압/VOLTAGE (V)	451	448	450	1.1	0.2	
	회전수/SPEED (rpm)	736	703	720	4.5	2.2	
	주파수/FREQUENCY (Hz)						
	전압/VOLTAGE (V)						
	회전수/SPEED (rpm)						

병렬 운전시험 PARALLEL RUNNING TEST.

	부하 / LOAD	%	75	100	75	50	20	50	75	100	75
발전기 번호	VOLTAGE	V	450	450	450	450	450	450	450	450	450
GENERATOR NO.	FREQUENCY	Hz	60.0	59.4	60.0	60.5	61.2	60.5	60.0	59.4	60.0
NO. 1 GENERATOR	출력/OUTPUT	kW	555	740	555	370	148	370	555	740	555
NO. 3 GENERATOR	출력/OUTPUT	kW	555	737	554	370	145	368	557	736	555
NO. GENERATOR	출력/OUTPUT	kW									
NO. GENERATOR	출력/OUTPUT	kW									
NO. GENERATOR	출력/OUTPUT	kW									

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Calculation Sheet of Fuel oil Consumption

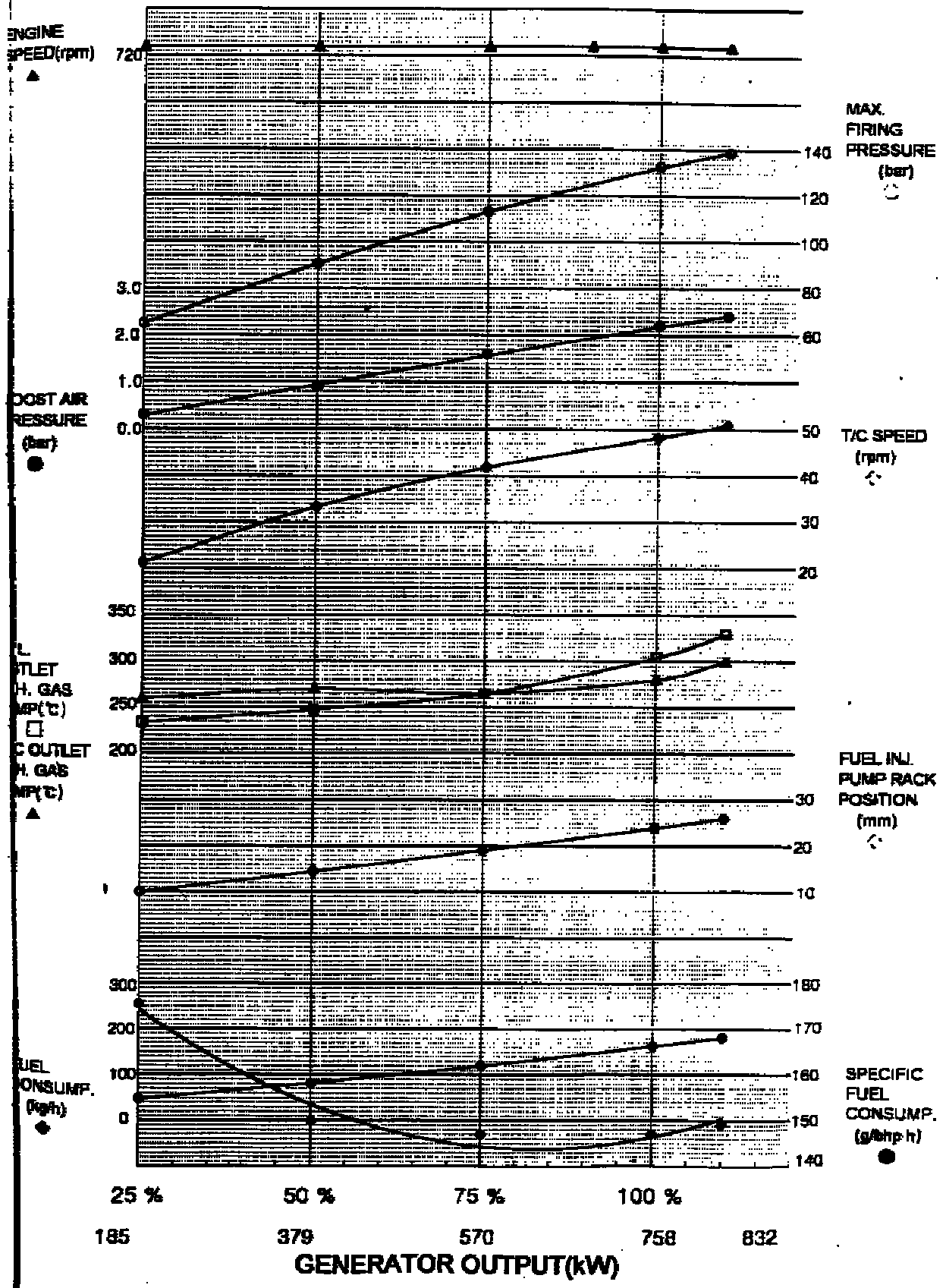
Date	2000/10/31						
Ship Owner	LEMOS						
Ship Yard	CSBC-KAO						
Ship No.	H-750						
Engine Model	6L23/30H						
Engine No.	SB6L23-2303						
Engine Output	1075 BHP						
Engine Speed	720 rpm						
Fuel Oil Specific Gravity at 15 °C	0.8724						
Fuel Oil Lower Calorific Value	10130 Kcal/Kg						
Engine Load (%)							
	25%	50%	75%	N/A	100%	100%	110%
Engine Output (BHP)							
	269 BHP	538 BHP	806 BHP	N/A	1075 BHP	1075 BHP	1183 BHP
Measuring Quantity (ℓ), AL							
	5 ℓ	10 ℓ	15 ℓ	N/A	20 ℓ	20 ℓ	20 ℓ
Measuring Time (Sec), B							
	330 Sec	388 Sec	390 Sec	N/A	388 Sec	388 Sec	347 Sec
Specific Fuel Oil Consumption (Measured, kg/Hr), B4=(ALXSGX3600)/B							
	47.6	80.9	120.8	N/A	161.9	161.9	181.0
Specific Fuel Oil Consumption (Measured, g/PS-h), B3=(ALXSGX3600X1000)/(BxPS)							
	177.1	150.6	149.9	N/A	150.6	150.6	153.1
Ambient Temperature (°C), T1							
	16 °C	17 °C	18 °C	N/A	20 °C	20 °C	20 °C
Charge Air Coolant Temperature (°C), T2							
	30 °C	30 °C	31 °C	N/A	32 °C	32 °C	32 °C
Ambient Pressure (mbar), P							
	1022 mbar	1022 mbar	1022 mbar	N/A	1022 mbar	1022 mbar	1021 mbar
Fuel Oil temperature (°C), T3							
	22 °C	28 °C	34 °C	N/A	38 °C	38 °C	40 °C
Conversion Factor by Ambient Temperature, T1F=0.006X(T1-25)/10							
	-0.00540	-0.01398	-0.00420	N/A	-0.00300	-0.00300	-0.00300
Conversion Factor by Boost Air Temperature, T2F=0.007X(T2-25)/10							
	0.00350	0.00350	0.00420	N/A	0.00490	0.00490	0.00490
Conversion Factor by Fuel Oil Temperature, T3F=1.0108-(0.00072X T3)							
	0.99496	0.99064	0.98632	N/A	0.98344	0.98344	0.982
Conversion Factor by Ambient Pressure, PF=0.0007X(P-1000)/10							
	0.00154	0.00154	0.00154	N/A	0.00154	0.00154	0.00147
Conversion Factor by Lower Calorific Value, HF=(H-10200)/10200							
	-0.008863	-0.008863	-0.008863	-0.008863	-0.008863	-0.008863	-0.008863
Total Conversion Factor, TCF=T1F+T2F-PF-HF							
	0.00342	-0.00516	0.00532	N/A	0.00722	0.00722	0.00729
Measured Value of F.O Consumption Converted Fuel Oil Temperature (g/BHP-h), B2=B3XT3F							
	176.2	149.2	147.8	N/A	148.1	148.1	150.3
Converted Value of F.O Consumption Based on ISO (g/PS-h), B1=B2/(1+TCF)							
	175.6	150.0	147.0	N/A	147.0	147.0	149.2
Guarantee of Fuel Oil Consumption (100% Load)					149.57 g/BHP-h		

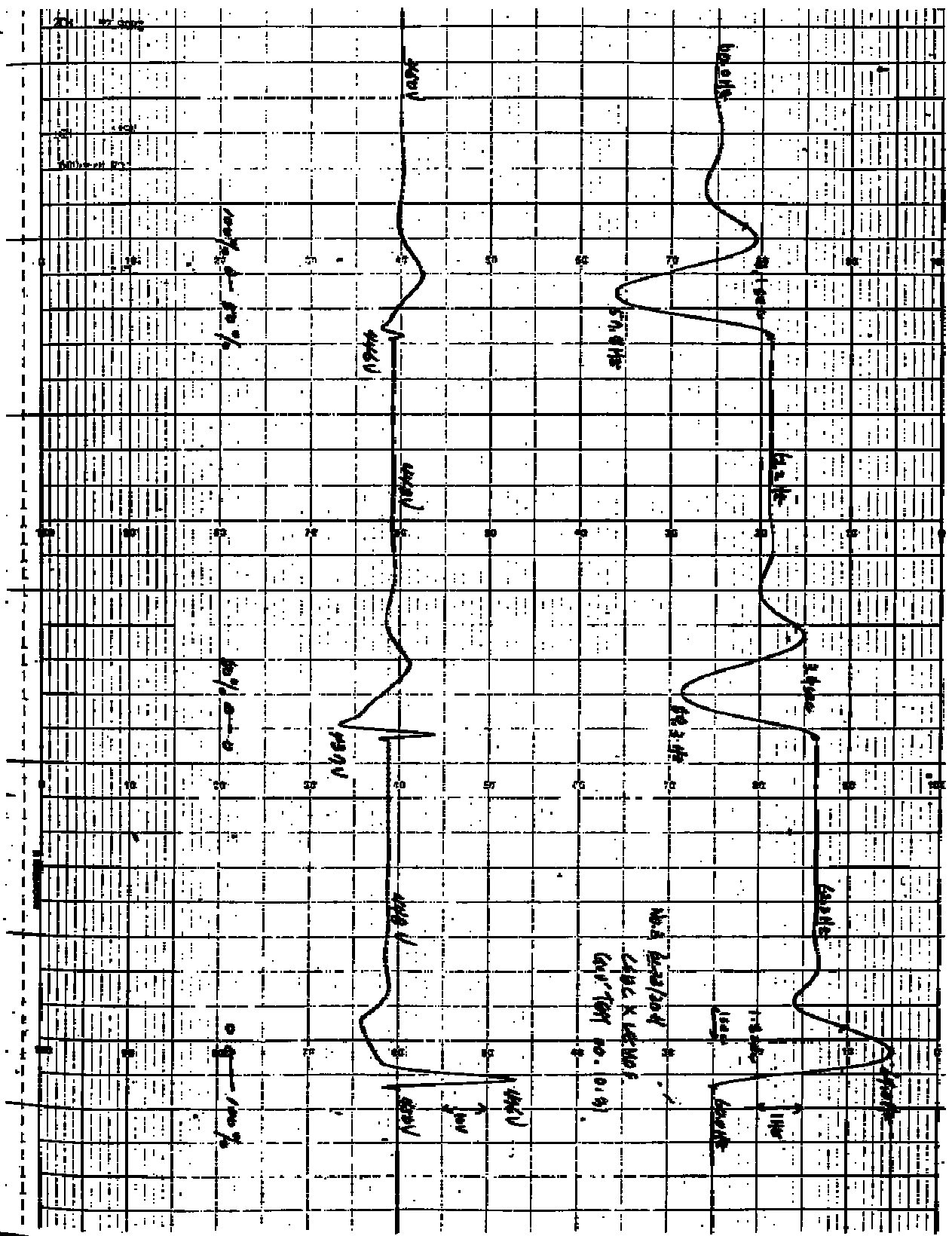
Sang yong Heavy Industries Co., Ltd.

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ENGINE NO. SB6L23-2303 CHARACTERISTIC CURVES

DATE 2000-10-31





參、 CSBC 要求修改事項：

WITH REFERENCE TO ELECTRICAL & MACHINERY DEPT. WE ARE PLEASED ANSWER FOR COMMENTS AS FOLLOWS :

1. THE CAUTION PLATE WILL BE FITTED ON GENERATOR INSTRUCTION DRAWING.
2. POWER SOURCE WILL BE CHANGED TO DC24V (3-4A RATING).
3. PRE-EXCITING DC POWER : THAT THE GENERATION HAS BEEN IN STOP FOR LONG TIME (MORE THAN 6 MONTHS) USE + F1(P) & -F2(N) TERMINAL FOR DC12V, 3-4A CONFIRM PLEASE.
4. TECHNICAL CIRCULAR TO LICENSEE FOR DIESEL ENGINES WITH MARPOL 73/78 ANNEX V1 REGULATION 13 MANDATORY CODE NOXEMISSION.
5. THE CABLE CONNECTION TERMINALS WITH COMPRESSION SOLDNESS LUG ARE TO BE PROVIDED & FITTED BY MAKER.
6. RECTIFIER WITH TOGGLE SWITCH. OF PRE-EXCITING DC POWER SUPPLY MUST BE PROVIDED BY MAKER & INSTALLED & FITTED ON OUR M.S.B.
7. THE INTERLOCK FOR H.F.O. SUPPLY PUMP AND CIRCULATION PUMP TO BE PROVIDED BY MAKER FOR SAFETY REASON.
8. THE SUPPORT OF DOWNWARD HULL CABLE WAY TO BE INSTALLED ON BODY OF GENERATOR, SO THAT WILL MAKE SHIPYARD CONVENIENTLY TO INSTALL DOWNWARD HULL PART CABLEWAY (MAKE BRACKET).
9. CABLE GLANDS FITTIED.
10. GOVERNOR TEST : LOAD VARIATION OF GOVERNOR TEST WITH RECORD ARE TO BE INCLUDED THREE(3) GENERATOR SETS & SHOWN ON YOUR DRAWING.

肆、心得：

- 1.充分去了解發電機製造過程分引擎及發電機兩部份製裝過程，以及發電機運轉並聯控制負荷分配系統等功能很容易達成測試目的。
- 2.測試中發現廠家所使用之負荷裝備與本公司交驗船東時所做發電機負荷 TANK 不同，該廠家所使用之 D/G LOAD 採用電阻式加冷卻系統，而本公司採用的是水電阻 LOAD WATER TANK 做為 D/G LOAD 裝備，不過仔細思考因場地環境及成本因素而不同，但只要交驗功能正常足夠使用負荷功能，正確而又船東能接受即可。

伍、結論與建議：

- 1.該廠家是高雄廠第一次使用主發電機於於船上供電，據說基隆廠已經使用 10 艘船了，若設計人員與採購人員密切溝通，將可減少後續船之成本。
- 2.採購與設計人員決定廠家之前也應考慮廠家於問題發生時的服務品質，要提供本公司及時的服務，才不會讓公司因而受損。