Tele: 248306

सम्मिश्र जांच दल/ Composite Trials Team
द्वारा नेवी कार्यालय/ c/o Navy Office
मुख्यालय/ Headquarter
अन्डमान एवं निकोबार कमान/
Andaman & Nicobar Command
पोर्ट ब्लेयर/ Port Blair - 744 102

CTT/300/03/10/TECH

13 Jun 23

The Commander - in - Chief
{for CTO (Marine)/ CTO(ML)}
Headquarters
Andaman & Nicobar Command
Port Blair – 744 102

FULL LOAD TRIALS OF DA NO. 2 (250 KW) - *IN* LCU L 52

1. Refer to HQANC fax ANC/42000/EG/10/03 CTT dated 09 Jun 23.

2. **Background**. Full load Trials view change of Governor on DA No 2 were undertaken onboard *IN* LCU L-52 on 10 Jun 23. DA was loaded up to 100% (250 kW) on load bank and sustained for a duration of two hours. A detailed report w.r.t engineering and performance trial is placed at **Enclosure I** and that concerning electrical trials placed at **Enclosure II.**

3. **Performance Parameters**. The salient parameters are as follows: -

Ser	Parameter	Range	Actual Value	Remarks
(a)	Lub Oil Presssure	3.5 – 5.0 bar	2.6	SAT
(b)	Lub Oil Temperature	70 - 102 °C	102°C	
(c)	Fresh Water Temperature	55 – 90 °C	85°C	
(d)	Exhaust Temperature	575 °C	572°C	

4. **Vibration Analysis**. Vibration trials of DA No 2 was undertaken at 60% and 100% of rated load. Vibration was found to be within permissible limits.

5. Observations are as follows:-

(a) **Engineering**.

(i) In house report indicates DA parameters available in remote mode. However during trials by CTT, the same was not available in MCR view IPMS system non ops.

(ii) Sea water leakage from alternator cooling line.

(iii) DA Foundation rusted .

(iv) Expansion tank over flow line not connected.

(v) SPM in yellow zone at 60% (NDE), and 100% (DE) load.

(b) **Electrical**.

(i) In house report indicates Governor droop at 0.91 %, However during trials by CTT, droop was sat at 0.99 %.

(ii) DE found in Yellow Zone at 100% load.

(iii) Unattended paralleling not offered by SS.

(iv) All meters and breakers of MSB not calibrated.

(v) Reverse power relay of MSB not calibrated.

6. Variation of droop setting value in the in-house trial and CTT trials puts a question mark on veracity of trials being undertaken by SS. The same may be viewed with concern.

7. **Recommendations**. In view of the above, following is recommended:-

(a) Liquidation of defects/ observations mentioned at para 5.

(b) Ship be adviced to undertake calibration of switchboard meters and reverse power relay at the earliest prior exploitation of DA.

(c) DA be cleared for exploitation upto 100% of rated load for independent operation.

12/06

(एस सी विलियम/ S C William)
कमांडर/ Commander
प्रभारी अधिकारी/ Officer-in-Charge

Encl : - As above

Copy to : -

The Naval Component Commander
{for SSO (Tech)}
c/o Navy Office
Port Blair – 744 102

The Commanding officer
IN LCU L52
c/o Navy Office
Port Blair – 744 102

Enclosure I to CTT (PBR) letter
CTT/300/03/10 dated 13 Jun 23

LOAD TRIAL OF DA NO. 2 (250 KW) - *IN* LCU L 52

1. Trial Inspector : (a) Jitendra ERA III
   (b) Sanjay Yadav LME
2. Date and Time : 10 Jun 23 (1200-1600 hrs)
3. Equipment used for trials : (a) SPM T-30
   (b) Temperature Gun
   (c) Thermal imager
4. Details of trials are as follows:-

(a) **Safety Device Checks**.

Ser	Description	Unit	Design Value	DA 2 (250 KW)
(i)	Low LO Pr Alarm	Kg/cm²	1.2	1.3
(ii)	Low LO Pr Trip	Kg/cm²	0.8	0.9
(iii)	High FW temp Alarm	°C	90(+/-) 2	91
(iv)	High FW temp Trip	°C	96 (+/-) 2	97
(v)	High LO temp Alarm	°C	120	120
(vi)	Over speed Trip	RPM	1650	1650
(vii)	Crash stop Local	--	Ops/ Non-ops	Ops
(viii)	Crash stop Remote	--	Ops/ Non-ops	Ops
(ix)	Exhaust tempreture Alarm	°C	570	575

(b) **Performance Parameters at 100% Load**.

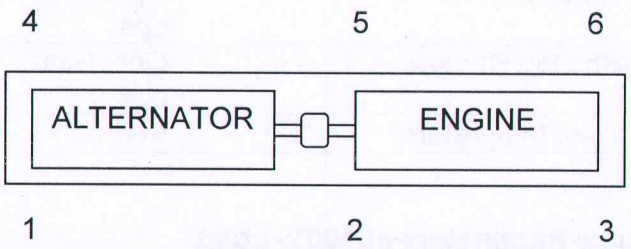
DA2				
Ser.	Description	Unit	Design values	Parameters recorded at 250 KW (100% rated load)
				250 KW DA 2
(i)	Max sustained Load	KW	250	249
(ii)	RPM	RPM	1500	1487
(iii)	Lub oil Pressure	Kg/cm²	1.5 to 5.5	2.6
(iv)	Sea water Pressure	Kg/cm²	0.5 to 1.5	1.4

DA2				
Ser.	Description	Unit	Design values	Parameters recorded at 250 KW (100% rated load)
				250 KW DA 2
(v)	Lub oil Temperature	°C	84 to 116	102
(vi)	Fresh water Temperature	°C	70 to 96	85
(vii)	Exhaust Temperature	°C	570	572

(c) **Vibration Trials**. Vibration trials of DA was undertaken at load 150 KW (60% of rated load) and 250 KW (100% of rated load). Overall vibration readings of DA at monitoring points found within permissible limit and is **SAT**. The details of trials are as follows:-

Ser	Description	250 KW DA 2						Remarks (Limit 16 mm/sec)
		At 60 % load (150 KW)			At 100% load (250KW)			
		H	V	A	H	V	A	
(i)	Engine FE	5.9	3.4	4.8	8.5	5.8	7.1	SAT
(ii)	Engine DE	4.8	6.7	3.2	7.7	9.8	4.6	
(iii)	Alternator DE	6.7	5.3	5.8	9.4	8.8	9.9	
(iv)	Alternator FE	6.0	3.9	3.7	7.7	6.3	6.1	

(d) **Attenuation checks**.



Position	DA 2					
	150 KW (60 % load)					
	1	2	3	4	5	6
Top	6.8	4.4	13.6	6.3	5.6	10.4
Bottom	1.5	0.3	1.8	1.5	0.8	1.1
Atten.	77.9	93.1	86.7	76.1	85.7	89.4
Remarks	SAT					

Position	250KW (100 % load)					
	1	2	3	4	5	6
Top	8.9	6.7	12.4	8.8	9.3	12.6
Bottom	2.6	0.4	2.3	2.5	0.6	2.2
Atten.	70.8	94.0	81.4	71.3	93.5	82.5
Remarks	SAT					

(e) **SPM Readings**.

DA2				
Ser.	**Description**	**0% Load dbm/ dbc**	**60 % Load dbm/ dbc**	**100 % Load dbm/ dbc**
(a)	Alternator Driven End	17/9	17/9	**21/8**
(b)	Alternator Free End	17/7	**23/6**	19/7

Enclosure II to CTT (PBR) letter
CTT/300/03/10 dated 13 Jun 23

ELECTRICAL TRIALS OF DA NO. 2 – *IN* LCU L 52

1. **Trials Presented by / Authority**.

(a)	Trial Inspector	:	V B Naidu, LEM(P)
(b)	Presented by	:	SS / NSRY(PBR)
(c)	Trials date	:	10 Jun 23
(d)	Reference	:	ANCO (Tech) Art 0810 (f)
(e)	File Reference	:	CTT/300/03/10

2. **Test Equipment Used**.

(a) Power Quality Analyzer Fluke 435
(b) 500 V Megger
(c) Tong Tester
(d) Switchboard Panel Mounted meters
(e) SPM T-30

3. **Protective Devices**.

(a)	Over Voltage Trip	:	Sat
(b)	Reverse Power Relay	:	**UNSAT**
(c)	Under Voltage Relay	:	Sat

4. **Paralleling Trials**.

(a)	Unattended Paralleling	:	Not offered
(b)	Attended Paralleling	:	Sat

5. **Observations**.

(a)	Governor droop	:	Sat (0.99%)
(b)	Governor checks	:	Sat
(c)	AVR checks	:	NA
(d)	M load trials	:	NA

6. **Parameters of the Generating Set**.

(a) **Engine**.

(i)	Engine	:	Cummins
(ii)	Type	:	NT855 DM1
(iii)	Maker's Name/Serial No	:	Not Provided
(iv)	Speed (R.P.M)	:	1500

(b) **Alternator**.

(i)	Maker's Name	:	ELMOT
(ii)	Maker's Type /Serial No	:	Not Provided by SS.
(iii)	Full Load Output	:	250 KW
(iv)	Volts	:	415 V
(v)	Amps	:	425 Amps (At Unity PF)
(vi)	Speed (RPM)	:	1500

(c) **Governor**.

(i)	Maker's Name	:	ELMOT
(ii)	Maker's Type/Serial No	:	18268455
(iii)	Type	:	Electronic

(d) **Automatic Voltage Regulator**.

(i)	Maker's Name	:	STEAMFORD
(ii)	Type /Serial No	:	E-00023212

(e) **Generator Supply Breaker**.

(i)	Maker's Name	:	SCHNEIDER
(ii)	Capacity	:	800A
(iii)	Maker's Type / Serial No	:	HH13314

7. **Parameters Recorded**.

(a) **Insulation Resistance**.

(i)	Cold	-	07 MΩ
(ii)	Hot	-	09 MΩ

(b) **Temperature Rise**.

(i) Ambient temperature at Start – 37^{0}C

(ii) Temperature rise after two hours of running at Full load – 41^{0}C

(iii) Cooler (water cooled) – effective

(c) **SPM Readings**.

Load	DE	Colour	NDE	Colour	Remarks
0 %	dbm/dbc = 17/9	Green	dbm/dbc = 17/7	Green	
100 %	dbm/dbc = **21/8**	**Yellow**	dbm/dbc = 19/7	Green	

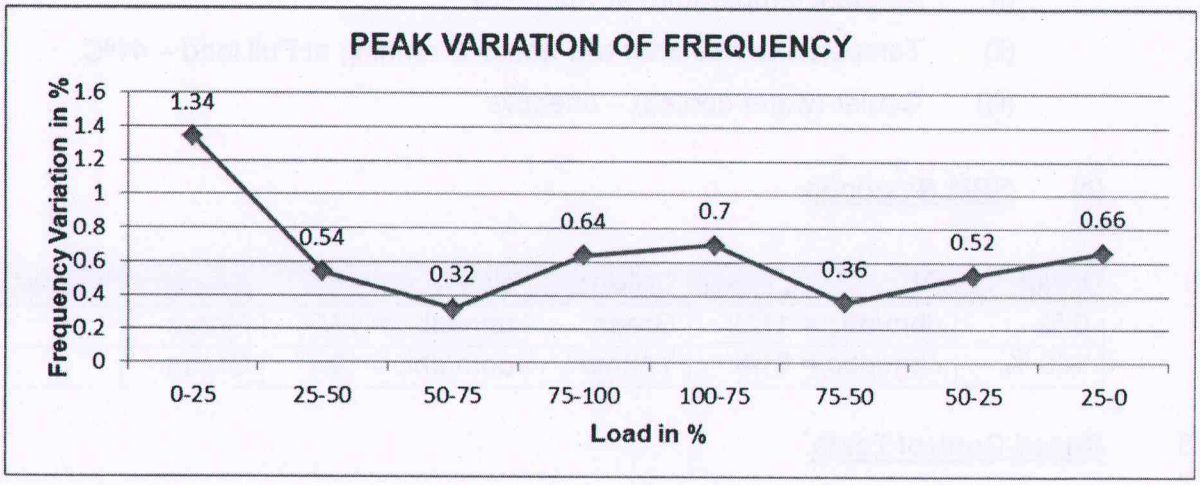
8. **Speed Control Tests**.

(a) **Steady State Tests**. (Set frequency at 50 Hz at 50 % Load)

Load%	Initial Speed (Hz)	Final Speed (Hz)	Governor droop(at 100 % load)	Permitted limits
50	--	Set frequency at 50 Hz	$\frac{(NI-N2)x100}{N}$	Between 0.875% to 1% (for electronic governor)
0-25	50.32	50.11	NA	
25-50	50.11	49.99		
50-75	49.99	49.92		
75-100	49.92	49.82		
100-0	**49.82**	**50.32**	**0.99%**	

(b) **Transient Tests**.

Load %		Initial Speed (Hz)	Momentary speed (Hz)	Final Speed (Hz)	% Peak = Initial-momentary / Nominal		Time of recovery (in sec)	
Initial	To				Observed	Permitted	Observed	Permitted
0	25	50.28	49.61	50.08	1.34	3.5	2	2
25	50	50.08	49.81	49.96	0.54		2	
50	75	49.96	49.80	49.89	0.32		2	
75	100	49.89	49.57	49.76	0.64		2	
100	75	49.76	50.11	49.93	0.70		2	
75	50	49.93	50.11	50.00	0.36		2	
50	25	50.00	50.26	50.11	0.52		2	
25	0	50.11	50.44	50.28	0.66		2	



For Machine Charged With Turbo Charged Engine.

Load %		Initial Speed (Hz)	Momentary speed (Hz)	Final Speed (Hz)	% Peak = Initial - Final / Nominal		Remarks
Initial	To				Observed	Permitted	
0	70	50.28	48.16	49.92	4.18	5 %	Sat
100	0	49.76	51.83	50.28	4.14	5 %	Sat

(c) **Governor Range**. (This is undertaken by varying the frequency using the frequency control knob / lever provided for the alternator on switchboards).

Load %	Achieved frequency	Permitted	Remarks
0	50.32	49.50 – 50.50	Sat
100	49.82		Sat

(d) **Rate affected by Governor Motor**.

Load %	Rate Hz/s		Permitted	Remarks
	Up	Down		
0	0.05	0.06	Between 0.05 to 0.07 Hz per sec for Electronic Governors	Sat
100	0.06	0.07		Sat