OKTO

Service Report

MAIN ENGINE CYLINDER LUBRICATOR OVERHAUL

M/T SPRING

SPRING HOLDING

15 August 2020

OKTO

PLANT/VESSEL DETAILS

Vessel/plant	: SPRING	**Engine Builder**	: MITSUI MAN B&W
IMO	: 9378873	**Engine Type**	: 7S60MC
Customer	: SPRING HOLDING	**Engine no**	: 3209
Period	: 14-15.08.2022	**Running hours**	
Location	:SEFINE SHIPYARD-TURKEY		
Reason for visit	:Main Engine Cylinder Lubricator Overhaul		
Author	: Cengiz KUTUKCU		

1. SUMMARY

As requested, our service team consist of two service engineer and one technician has attended to vessel to carry out main engine cylinder lubricator overhaul while vessel docked at Sefine Shipyard / YALOVA.

- Both lubricators overhauled with owner supplied spare parts.
- General condition of O-rings, seals, gaskets, and check valve balls found in very poor condition, all replaced with new parts.
- Zero stroke adjustment of individual units done.
- Feed rates adjusted according to engine maker recommendation (1.1 g/kwh)
- Timing of the lubricators has checked and confirmed proper adjustment.
- Heating elements checked and confirmed proper functioning. Resistance of heating elements measured about 360 Ohm.
- Final timing measured 298° for NO:1 lubricator and 347° for NO:7 lubricator which comply with instruction manual.

Before dismantling the lubricator, initial feed rates measured as below, average consumption calculates as 1,144 g/kWh at 95 rpm while individual cylinders slightly different.

INITIAL PUMP STROKES_FEED RATES

1	2	3	4	5	6	7
2,13	2,14	1,54	1,69	2,12	2,20	2,07
2,02	1,83	1,71	1,89	2,52	2,71	2,18
1,66	1,79	2,01	1,90	2,73	2,37	1,69
2,15	2,06	1,92	2,02	3,24	2,68	2,56
2,00	1,83	1,80	2,02	2,79	2,47	1,98
2,12	3,06	2,83	2,01	2,55	2,56	2,28
CONSUMPTION FOR INDIVIDUAL CYLINDER BASED ON ABOVE ADJUSTMENT g/kWh						
1,053	1,108	1,030	1,006	1,391	1,307	1,113

After overhaul, feed rates adjusted as below which is according to engine maker's recommendation. (1,178 g/kWh @95 rpm)

7S60MC CYLINDER OIL FEED RATE (DOSAGE)

DATE	26.08.2022		MCR	14280	kWh @	105 RPM
Part Load %	70			9993	kWh @	93 RPM

Cylinder	7	pcs.	Volumetric efficiency:	0,9	
Diameter	6,0	mm	Density value:	0,92	
Oil inlets	6	pcs	**Max Recommended feed rate**	2,00	g/kWh
Engine	93	rpm	**Basic Setting**	1,10	g/kWh
Lubricator r	1,0	*Eng. rpm	**Min Recommended feed rate**	0,70	g/kWh

REMARKS:

INITIAL PUMP STROKES_FEED RATES

1	2	3	4	5	6	7
2,10	2,10	2,10	2,10	2,10	2,10	2,10
2,10	2,10	2,10	2,10	2,10	2,10	2,10
2,10	2,10	2,10	2,10	2,10	2,10	2,10
2,10	2,10	2,10	2,10	2,10	2,10	2,10
2,10	2,10	2,10	2,10	2,10	2,10	2,10
2,10	2,10	2,10	2,10	2,10	2,10	2,10
CONSUMPTION FOR INDIVIDUAL CYLINDERS BASED ON ABOVE ADJUSTMENT g/kWh						
1,153	1,153	1,153	1,153	1,153	1,153	1,153

2.PICTURES


www.oktotr.com


www.oktotr.com


www.oktotr.com

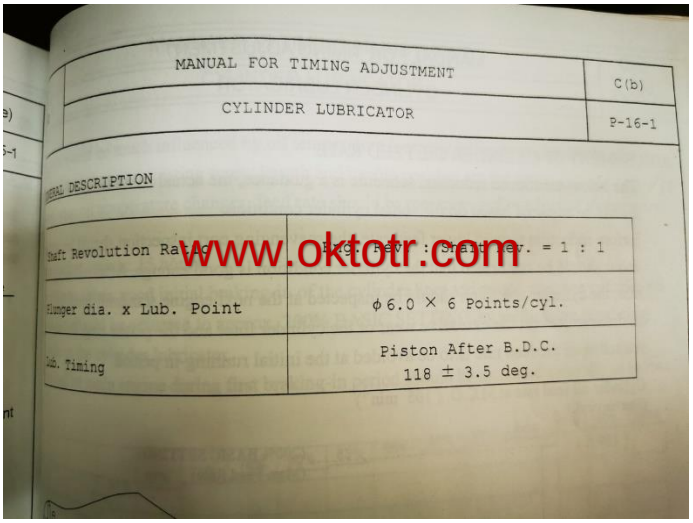

LUBRI TOR
ORDER NO.
TUBES
TYPE
DRWG.NO.
FAX:+45-98-571387
BEFORE UPSTART - PLEASE READ THE ENTIRE MANUAL
DONT REMOVE COVERS WHILE LUBRICATOR IS
WORKING. IT MAY CAUSE DAMAGE TO PERSONS
www.oktotr.com


www.oktotr.com


www.oktotr.com

OKTO ENGINEERING
Orta mah. Erk sok. Aslı Nemutlu San. Sit No7/6 Tuzla/İst
www.oktotr.com / e-mail: info@oktotr.com

OKTO ENGINEERING
Orta mah. Erk sok. Aslı Nemutlu San. Sit No7/6 Tuzla/İst
www.oktotr.com / e-mail: info@oktotr.com



MANUAL FOR TIMING ADJUSTMENT | C(b)

CYLINDER LUBRICATOR | P-16-1

GENERAL DESCRIPTION

Shaft Revolution Ratio	Crankshaft : Camshaft Gear = 1 : 1
Plunger dia. x Lub. Point	ϕ6.0 × 6 Points/cyl.
Lub. Timing	Piston After B.D.C. 118 ± 3.5 deg.

OKTO ENGINEERING

Orta mah. Erk sok. Aslı Nemutlu San. Sit No7/6 Tuzla/İst

www.oktotr.com / e-mail: info@oktotr.com

3.PROOF OF FEED RATE CALCULATION

Lubricator piston diameter	: 6.0 mm
Lubricator rpm/Engine rpm	: 1/1 (It can be 1/2 on some vessels, pay attention!!!)
Number of lubricators for 1 cylinder	: 6
Engine power at 93 rpm	: 9993 kw/h (Based on shop test)
Oil Density	: 0.92 g/cm3
Volumetric efficiency	: 0.9

Based on above:
Area of 1 piston= $(\pi x D^2)/4=(3.14x6^2)/4=$**28.26 mm²**
Stroke 2,1 mm ,Volume of 1 piston, at 1 stroke = Areax Stroke=28.26x=59,346 mm³

$$\text{Consumption for one cyl= FOR PER CYL} = \frac{\text{VOLUME x NUMBER OF LUBRICATOR x RPM x 60 x EFFICIENCY}}{1\,000\,000} = \text{LTR/HR}$$

Consumption for one cyl= (59,346x6x93x60x0.9)/1000000= **1.788 ltr/hr** for per cylinder
1.788xdensity=1.826x0.92=1.644 kg/hr=1644 g/hr (**Consumption for one cylinder per hour)**
Engine power for one cylinder= 9993/7= 1427 KW

Consumption for 1 kW=1644/1427=1.152 gr/kwh
Above calculation based on 93 rpm and adjustment arm at minimum position.

4.CONCLUSION and RECOMMENDATION

- Since lubricators has no auto LCD arrangement, lubricator adjustment arm to be positioned to manoeuvring position before manoeuvrings.
- Feed rate adjustment done about 1.1 g/kWh, same can be reduced more step by step based on scavenge inspection results.
- If any cylinder liner replaced or piston overhaul carried out, running in procedures to be followed as described by engine maker.
- Lubricator heaters to be switch on while stop and to be switched off while engine is running.