

Service Report

M/S MAUNALEI

MAN Energy Solutions China Co., Ltd.

PrimeServ Shanghai

9 November 2020



Author

Name: Liu xiaobo
 Department: CN-EATFC PrimeServ Center: PrimeServ Shanghai
 Job started: 2020-09-28 Job finished: 2020-10-25
 Report date: 2020-11-09 SAP identification no: DV97000119

Order / matter

Destination: COSCO Nantong Shipyard, China
 Participants: Liu Xiaobo, Yu Zheng
 Reason for visit: Supervised for CPP installation and commissioning

Customer

Name: MAN Diesel & Turbo SE Copenhagen Customer no:
 Requested by: Michael Tronsgaard Jensen
 Plant / vessel: M/S MAUNALEI
 IMO no: Plant no: P-21400
 Name of yard: COSCO Nantong Shipyard Hull no: MLE 711

Engine

Engine no: 7L70MC-C8.2-G1
 Engine type: G1
 Manufacturer:
 Operating time [h]:
 Start warranty period:
 End warranty period:
 Commissioning date:
 ECS version:
 Engine: main auxiliary engine
 Rotation direction: clockwise anticlockwise
 viewed from flywheel viewed from free end
 Power: 21770 [KW]
 Engine speed: 108 [rpm]

Turbocharger

Manufacturer:
 Turbocharger type:
 Turbocharger no:

Appendix

This service report consists of _____ pages, including all separate sheets.
 Operating values: yes no Measuring sheets: yes no
 Check lists: yes no Lubricant analysis: yes no
 yes no Report checked for completeness:

Spare Parts

Spare part order no:

Spare parts from MAN: yes no
 External workforce: yes no
 Workshop:

Operating conditions

Area of operation:
 Operating data on separate sheet? yes no
 Fuel specification: Heavy oil Diesel oil Gas oil Gas Biofuel
 Fuel viscosity: [cSt/50 °C]
 Lube oil consumption: [kg/day] [kg/h] [g/kWh]
 Bunker place:
 Lube oil brand:
 Mean load:

Summary and conclusion

As requested our MAN-Engineers Mr. Liu Xiaobo and Mr. Yu Zheng attended above mentioned vessel in COSCO Nantong Shipyard from 27 September to 07 November 2020. The reason for attendance was supervise for CPP installation and commissioning.



Work and checks carried out

Installation job 2020-09-28 to 2020-10-07**1,Shaft installation**

- Before MAN engineer onboard, shipyard already finished stern tube mounting and alignment job
- witnessed for shipyard welding the welding flange onto vessel hull boss
- carried out pressure test for all pipe work in the stern tube at present of owner and class
- inserted shaft after well cleaning of stern tube inside

2,Forward/aft stern tube seal

- shaft seal installation job was carried out by SKF service engineer

3, coupling flange and ODX

- cleaned shaft mounting area very well and then installed coupling according to MAN's instruction manual
- Coupling flange distance to mark on propeller shaft is 100 mm
- Pulled up to "A" distance is 384.5 mm, muff was moving 42.5 mm
- P Jack pressure was 190 bar, P1 Muff pressure was 200 bar, P2 Muff pressure was 1650 bar.

4,serv oil pipe

- connected servo oil pipe between ODX and coupling flange according to instruction book
- installed ODX after matching the 0 mark

5,intermediate shaft

- intermediate shaft installation job was done by sinpo, fitted bolts for flanges tightened according to our requirement
- intermediate shaft bearing final mounted and chock fast poured by sinpo

6,propeller blades mounting

- cleaned the blade flange and blades surface very well
- installed blades and tightened bolts according to our instruction manual

7,accessories for outside

- According to our propeller equipment drawing, guided yard people to installed accessories outside such as net cutter, protection guide...

Commissioning job 2020-10-09 to 2020-10-15, 2020-10-21 to 2020-10-25

- filled hub oil and pressure test submitted
- installed pitch feedback unit after well aligned, securing device mounted, pitch feedback ring alignment checked and adjusted to our limit 0.2mm
- tacho pick-up mounted
- hydraulic pipes for both high pressure and low pressure flushing carried out and flushing filter checked satisfactory after several replacement
- Power supply polarity checked and modified, LPCU system powered on
- interface with konsberg system checked and modified
- operated pitch in local by pushing ahead/astern solenoid valve, checked the safety pressure and re-adjusted operating pressure to 29bar
- pitched system to full mechanical ahead/astern position and leaking oil quantity measured
- transfer pump function for drain tank checked and modified
- alarm points checked and submitted to class

Sea trial job 2020-11-05 to 2020-11-07

-Since this vessel was not new-building ship, max engine load for crew operation was not same as 100% load in engine test bend, chief engineer want to use around 90% of engine design power as the max power for this ship, and remote control system was not MAN supply, supplied by Kongsberg

- For this vessel, they always use so called combinator mode which handle from stop to full ahead(0-80%pitch), pitch rate was 3%/Second from 0-70% pitch, 2%/S from 70% to 80%, and ME rpm kept 77rpm, from full ahead(80% pitch) to navigation ahead(100% pitch), load program setting was 1hr and rpm increase from 77-108rpm with pitch increase from 80%-100%, when handle moved from navigation ahead to stop, first load program down from navigation ahead to full ahead around 30 minutes, then same pitch rate from 80% pitch to zero pitch, from zero pitch to emergency astern(-100% pitch), use same pitch rate as ahead without load program, and rpm was 77 from 0 to -60%, 95 rpm from -60% to -80%, 104rpm from -80 to -100%

-CPP adjustment and trend view carried out according to our checklist and cooperated with remote system for other testing

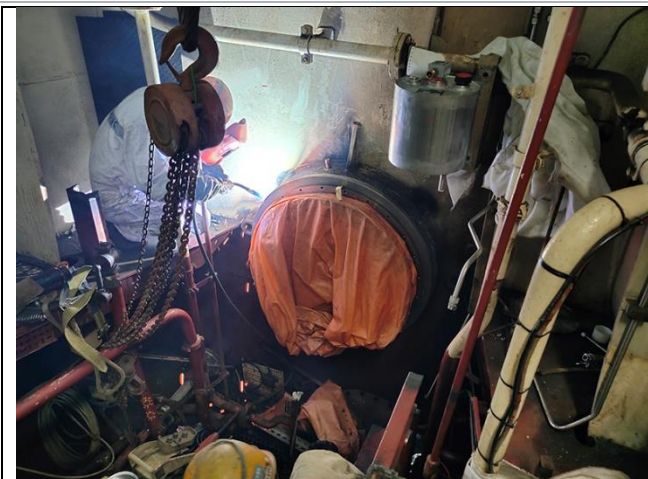
-ME running with 100% pitch ahead, ship speed was 22knots(GPS), ME charge air pressure was 2.5bar, and ME T/C speed was around 15000rpm

-ME running with -100% pitch astern, since ME rpm was very unsteady, so ME load can't be recorded, and according to chief engineer, they are satisfied with this engine full astern maneuvering ability since already tested in river

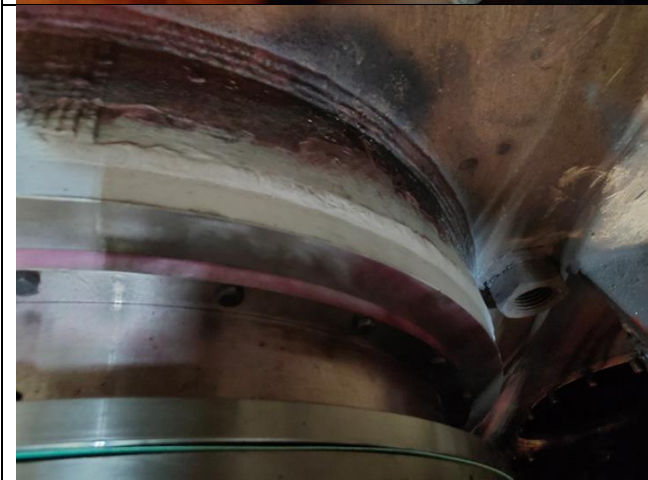
-During sea trial , found forward end cover has oil leakage, it was leaking from two half cover contacting surface, there has more 0.35mm gap between two part, loosened lower half cover round bolt, tried to tightened the alignment bolt to make gap small and to stop leakage, but unfortunately broken the bolt, so leakage still happens, and this leakage has to be fixed afterwards

Following pics were for the reference





Cross welded the welding flange onto hull boss.



Got dye-check for welding.



Cross tightened screws (Pos. 104) up to 340 Nm and lubrication with MOLYCOTE GN+.



Installed adaptor flange.



Assembled oil box and connected banjo couplings of after seal pipes with LOCTITE 572.



Connected banjo coupling of sampling pipe with LOCKTITE 572.



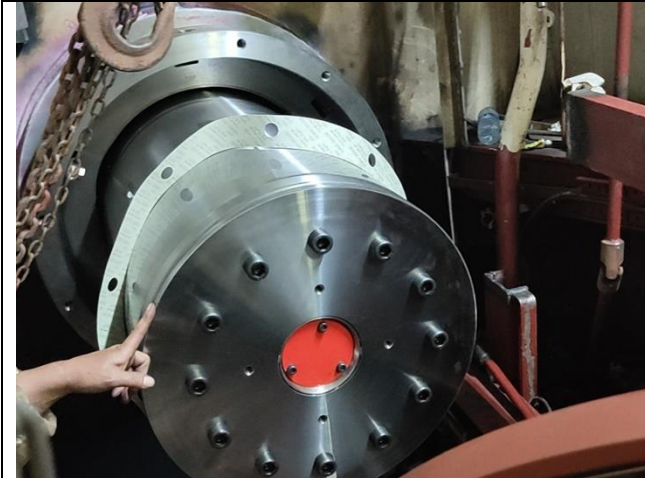
Fixed sampling pipe after side.



Mounted after stern tub seal onto propeller shaft supervised by SKF's engineer.



Well cleaned stern tub.



Mounted propeller shaft into stern tub until distance final position around 500 mm.



Mounted stern tub forward seal onto propeller shaft supervised by SKF's engineer.



Well cleaned coupling flange inside.



Lubricated coupling flange with lubrication oil.



Carefully moved coupling flange to position where is distance stamp on propeller shaft 100 mm.



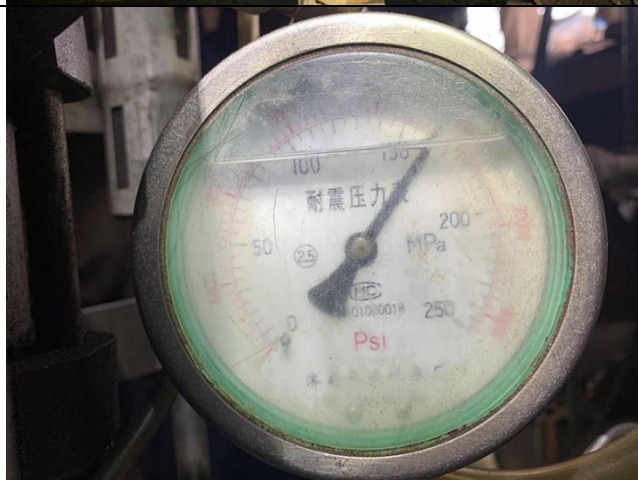
Connected high pressure and low pressure pumps, then pulled up muff coupling according MAN instruction.



Pulled up muff coupling to "A" distance 384.5 mm



P Jack final pressure was 190 bar.



P Muff pressure was from 200 bar raise up to 1650 bar.



Connected servo oil pipes of propeller shaft and OD shaft.
 Measured the GAP between flanges, the deviation of 3 point clearances were within 0.05mm.
 Security screws with locking wire.



Well cleaned blade foot.



Lifted up propeller blade above to propeller hub.





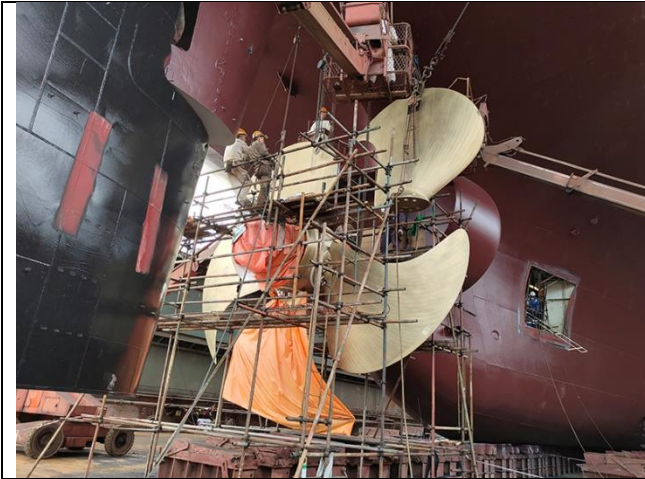
Well cleaned hub and blade flange.
Mounted seal ring and slide ring.
Add MOLYCOTE GN+ on slide ring contact surface.



Lubricated all thread and contact surface of blade screw with MOLYCOTE GN+



Cross pre-tightened blade screws up to 500 Nm.



Lifted last propeller blade up to propeller hub.



Cross tightened blade screws up to 500 Nm + 105 mm arc length 1st time.





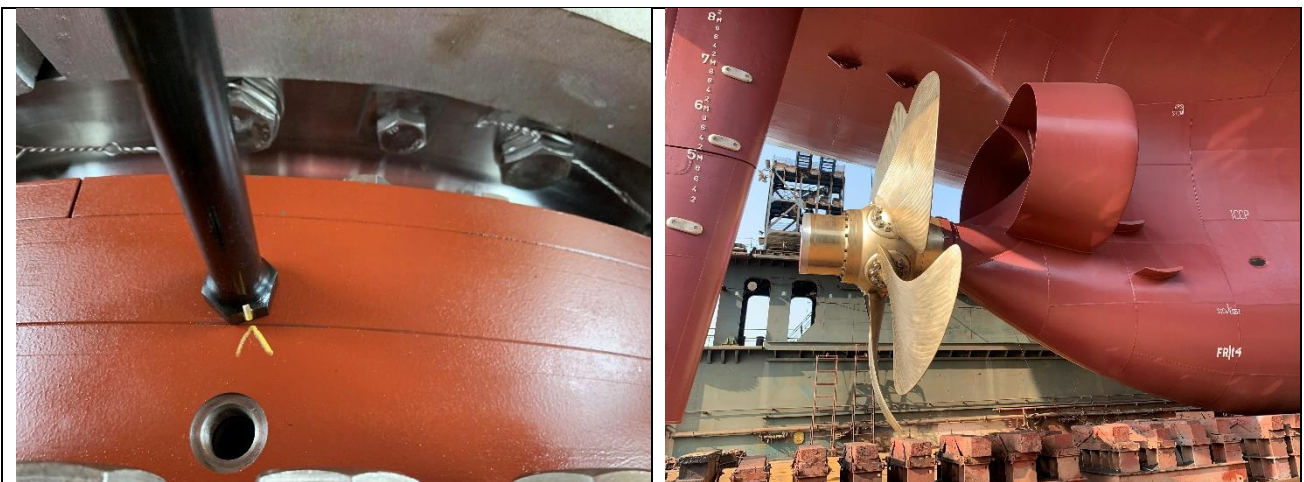
Completely loosened one screw, mounted dial gauge and adjusted to 0, retightened this screw up to elongation is 0.5 mm. This second tightening was repeated until all screws in the connection are tightened twice.



Filled hub oil and pressure tested



Flushing filters checked and replaced



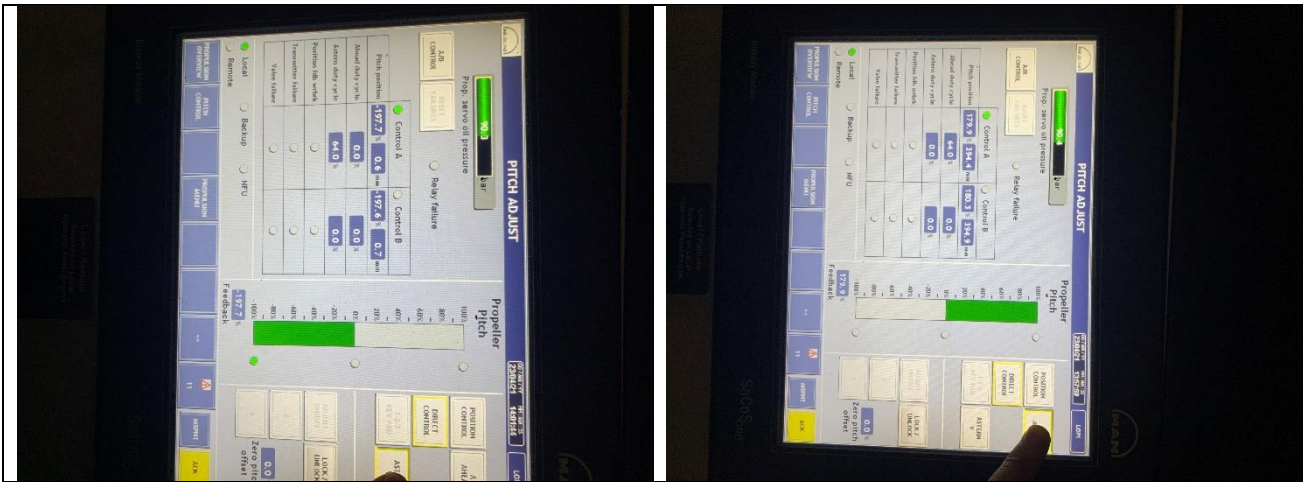
Wear down measured and final installation of shaft outside



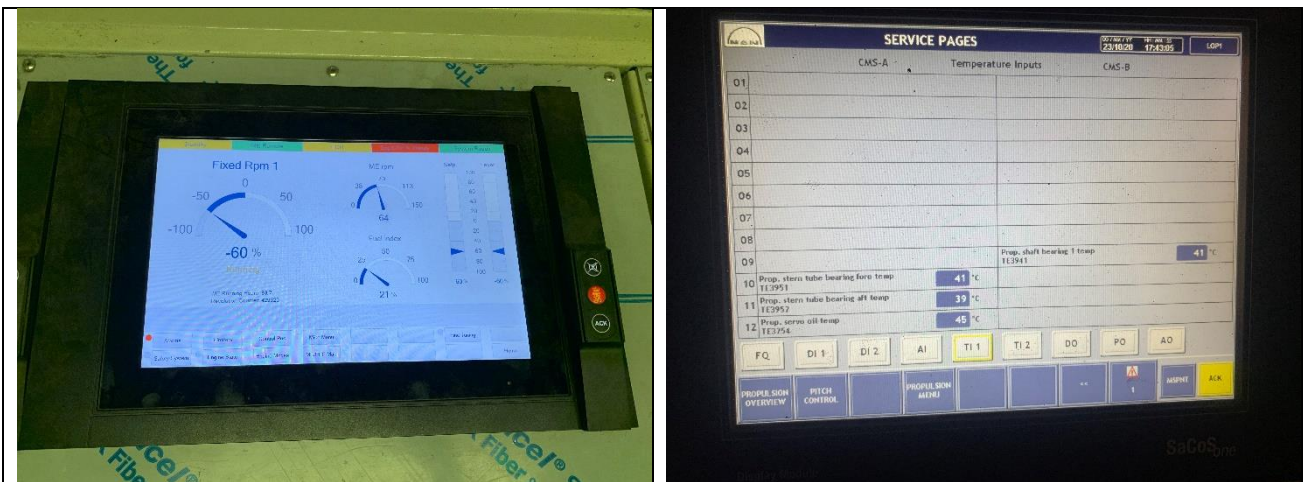
Intermediate shaft bearing cleaning condition checked



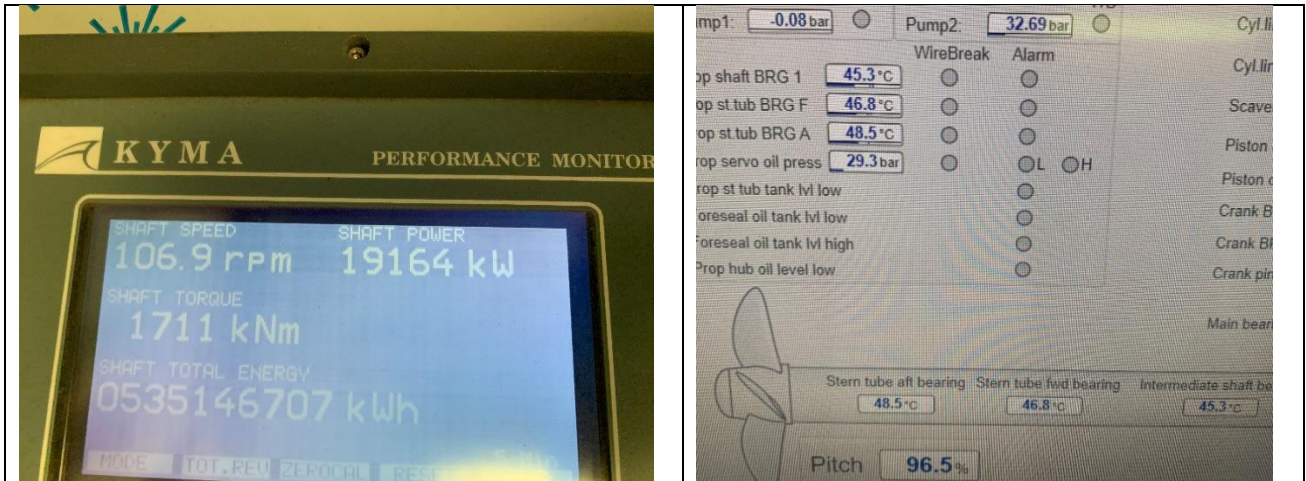
Feedback ring alignment checked and adjusted



Pitched to mechanical ahead and astern position



Pitch tested with ME running at different rpm



Engine running with 100% pitch ahead and shaft bearing



During -100% astern pitch testing, handle was moved from zero to emergency astern, ME rpm was hunting too much, Kongsberg engineer will test it with crew when he get feedback from HO since they are sailing together this voyage



Oil leaking from end cover contacting area



Gap between two parts was more than 0.35mm, and broken alignment bolt

Working schedule:

Mr Yuzheng 2020-09-28 to 2020-10-07

Mr liu xiaobo 2020-09-29 to 2020-10-07, 2020-10-09 to 2020-10-15, 2020-10-21 to 2020-10-25

2020-09-28

MDT Engineer Yu travelled to Nantong.

2020-09-29

MDT Engineer Yu got safety training and applied boarding pass.

Supervised for welded welding flange.

MDT Engineer Liu travelled to Nantong.

2020-09-30

MDT Engineer Liu got safety training and applied boarding pass.

Supervised for assembling adaptor flange and oil box.

Supervised for connecting pipes inside of stern tub and got pressure test.

Yard got dye-checking for welding flange.

Supervised for mounting propeller shaft into stern tub.

2020-10-01

Unpacked for coupling flange.

Yard moved coupling flange into engine room from storehouse.

Prepare work for coupling flange installation.

Meeting with shipyard for the pipe line of servo oil system.

2020-10-02

Supervised for mounting coupling flange onto position of propeller shaft.

Supervised for pulling up coupler flange to "A" distance.

2020-10-03

Supervised for turning blade flange to full ahead pitch and pushing out servo oil pipe.

Supervised for turning OD shaft and "0" stamp alignment with coupling flange.

Supervised for assembling servo oil pipes of propeller shaft and ODX.

Freeze fitting bolts with dry ice.

Supervised for connecting OD shaft and coupling flange.

2020-10-04

Supervised for moving propeller shaft to position and connecting M/E, intermediate shaft and OD shaft.

Supervised for turning blade flange to zero pitch position.
Supervised for mounting number 1 propeller onto hub and cross tighten 7 screws up to 500 Nm.

2020-10-05

Supervised for mounted all propeller blades.

2020-10-06

Supervised for tightening blade screws.

2020-10-07

Meeting with yard for filling hub oil, stern tub oil and stern tub sealing oil.
Travelled back to Shanghai.

Following work performed by MDT engineer Mr liuxiaobo

2020-10-09

Travelled from shanghai to nantong cosco shipyard

2020-10-10

Prepared and filled hub oil
Pushed and guided yard people to finish the electrical cabling

HPU pump starter wiring connection checked and motor insulation checked, powered on, high pressure pipes and flushing filter checked not satisfactory

2020-10-11

Guided yard people to connect the wirings
Filled transfer pump with oil and starter wiring connection checked, low pressure pipes started flushing
Guided yard people to fit securing device welding plate according to Man's manual
Pitch feedback arrangement changed sensor direction

2020-10-12

Continued flushing high and low pressure pipes, recovered pipes after flushing filters checked satisfactory
Hub oil pressure test and seal leakage test checked at present of DNV surveyor, shaft down wear down figure recorded
Pitch feedback arrangement positioned and secured, pitch test carried out

2020-10-13

Feedback ring alignment checked several times with different results, decided to check after undocking
Outstanding comments with DNV surveyor clarified and pitch operation demonstrated to surveyor
Auto start/stop function for HPU pump checked and modified, auto function for transfer pump checked

2020-10-14

Hard wire points with remote system checked and modified
Communication interface with Kongsberg set up but failed, troubleshooting for this issue
Shaft ready signal cables in LPCU modified
Feedback ring alignment checked again, due to other hot works in shaft area, not yet adjusted

2020-10-21

Travelled from shanghai to nantong cosoco shipyard
Boarding pass applied for
Meeting with shipyard for the items need to be finished before ME starting
Intermediate shaft bearing cleaning condition checked
Guided yard people to position the tacho console, oil tank level switch signal for LPCU checked

2020-10-22

Pitch operation test for LPCU carried out
Pitch feedback ring alignment checked and adjusted
Shaft tacho mounted and structure support adjusted



Signal with konsberg system checked and modified, troubleshooting for the NFU mode

2020-10-23

Prepared cpp system for shifting to anchor
 ME started and speed slowly increased to 108rpm at two minutes per one rpm interval
 Pitch operation carried out with 10% range
 Alarm points checked with DNV surveyor
 Perform some test with cpp system, cpp remote signal modified

2020-10-24

Temporary selector on LOP-P mounted and signal identified
 Prepared cpp system for operation, troubleshooting for transfer pump cabinet
 Lots of cpp function test carried out as different ME speed with max 80% pitch operation

2020-11-06

Vessel sailed out to zhoushan sea trial area
 Monitored all temp and pressure for CPP, found oil leaking from forward end cover of OD ring
 Adjusted zero pitch and 100% ahead/astern pitch according to actually engine load
 Maneuvering test and function test carried out
 Acceleration test and crash stop test carried out

2020-11-07

Tried to fix the oil leakage on OD ring cover but failed, and broken the alignment bolt
 Sea trial documents for vessel signed with master/CE and DNV surveyor

Findings, wear, problems, comments

Installed parts

Propeller blade

- F-230420-01 DNV-GL N141ZSRV 29-05-20 BLD N-2433 APH1259 P1 G-4778KG 8950.0KG/M SKEW=40 RH MAN ENERGY SOLUTIONS
- F-070320-01 DNV-GL N141ZA4D 29-05-20 BLD N-2433 APH1241 P2 G-4780KG 8955.2KG/M SKEW=40 RH MAN ENERGY SOLUTIONS
- F-100320-01 DNV-GL N141ZA4D 29-05-20 BLD N-2433 APH1241 P3 G-4755KG 8909.9KG/M SKEW=40 RH MAN ENERGY SOLUTIONS
- F-120320-01 DNV-GL N141ZA4D 29-05-20 BLD N-2433 APH1241 P4 G-4768KG 8934.7KG/M SKEW=40 RH MAN ENERGY SOLUTIONS
- F-130320-01 DNV-GL N141ZA4D 29-05-20 BLD N-2433 APH1241 P5 G-4803KG 8997.9KG/M SKEW=40 RH MAN ENERGY SOLUTIONS

Coupling flange

Coupling flange distance to mark on propeller shaft is 100 mm
 Pulled up to "A" distance is 384.5 mm, muff was moving 42.5 mm
 P Jack pressure was 190 bar, P1 Muff pressure was 200 bar, P2 Muff pressure was 1650 bar.

Potential benefits for customer

2020-10-27

Liu xiaobo

Date

Signature