



Service Report

MAN PrimeServ

P-21400 VBS1810-5

Matson

PrimeServ Frederikshavn

28-08-2022

Author

Name: Ivan Lund
 Department: Propeller design PrimeServ Center: PrimeServ Frederikshavn
 Job started: 17-08-2022 Job finished:
 Report Date: 28-08-2022 SAP identification No: 32307240

Order/Matter

Destination: Portlang Oregon US
 Participants:
 Reason for visit: Damage on two propeller blades [Ticket: 181981]

Customer

Name: Matson Customer No:
 Requested by: PAA
 Plant/Vessel: P-21400 VBS1810-5
 IMO No: 9273686 Plant No: P-21400
 Name of Yard: Hull No:

Engine/Equipment

Engine/Equipment No:
 Engine/Equipment Type:
 Manufacturer:
 Operating time [h]:
 Gas Mode [h]:
 Engine: main auxiliary main auxiliary main auxiliary main auxiliary main auxiliary

Rotation direction:
 viewed from CS
 viewed from CCS cw ccw cw ccw cw ccw cw ccw cw ccw

Start warranty period:
 End warranty period:
 Commissioning date: Power: [KW]
 ECS Version: Engine speed: [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
 Checklists: 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

At diving inspection in Portland, one blade was found cracked on the aft side near blade screws no 7 to 4.

The vessel was dry-docked for repair of the damage blades.

At dry-dock.

On propeller blade 4# the crack was too big for repair and the blade was replaced with the spare blade.

On propeller blade 2# the crack was only around blade screw 7 and 6 and it was decided to repair this blade by grinding to bottom of crack and weld it up again, as DNV approved welding in zone A with load restriction and as temporally solution to keep the vessel in operation.

During the trail from Portland to Tacoma pitch and engine load were monitored, the pitch performance was recorded and it showed no abnormalities.

There was some observations of high stern tube oil system temperature.

Governor control parameters and stability.

And pitch combinatory curves.

This we will comment in separate report.

1. Work and checks carried out

At diving inspection in Portland, one blade was found cracked on the aft side near blade screws 7 to 4. The vessel was dry-docked for repair of the damage blades.

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On propeller blade 4# the crack was too big for repair and the blade was replaced with the spare blade.

On propeller blade 2# the crack was only around blade screw 7 and 6 and it was decided to repair this blade by grinding to bottom of crack and weld it up again, as DNV approved welding in zone A with load restriction and as temporarily solution to keep the vessel in operation.

At the same time it was decided to make a dummy blade foot flange in the event of running with only 4 blades became necessary.

The remaining 3 propeller blades was lifter and checked for cracks around blade screw 7-6, no cracks were found.

All blade screws was checked for cracks, all was found without failures.

The four blades was re installed with new blade seals and tighten.

The torque for releasing the blade screws was recorded and it indicated that the tightening were correct.

Blade 2# was welded according to WPS MAN.001.CU3.

After welding and cooling the blade was brought to Wester Machine Work to be machined according to drawing 2212061-2 with **Ø6 rounding on the 4 aft blade screws holes.**

For achieving a clean surfaces, approx. 5 mm was machined off the blade foot.

The four blade screw hole on the aft side were machined with **radius 6 for stress relieve.**

As the blade screws holes depth was reduced 4mm, a 4,6mm washer was added to the 7 blade screws to compensate.

As the WMW only had a horizontal drilling machine, the marching of the blade foot became quiet complicated and time consuming, it was therefore decided to machine the blade foot without the 1 offset for blade seal and compensate with a 1mm shims between blade foot and flange.

The machining of the blade foot ended up with – 5mm for having a clean face for the blade seal.

The complete machining was witnessed by MAN.

When installing the blade after machining, the bottom of the trailing edge was in contact with the propeller hub so the blade was lifted for hand marching.

As there were claims on ahead thrust in zero pitch and the lever was set to 6% astern for obtaining zero thrust.

Pitch feedback system was checked and found with some slack in feedback rollers, this was adjusted.

Feedback unit cover was removed for inside inspection and found in good conditions.

Feedback cables was hanging loose and it was reattached to the cable tray.

We recommend to visually inspect the feedback regularly and lubricate both rollers feedback disk.

In the SaCos control the zero pitch offset limit was raised from +/- 3% to 6% and crew was instructed how to adjust the zero pitch offset.

After assembling propeller, oil was filled and pitch movement test, no signs of oil leakage.

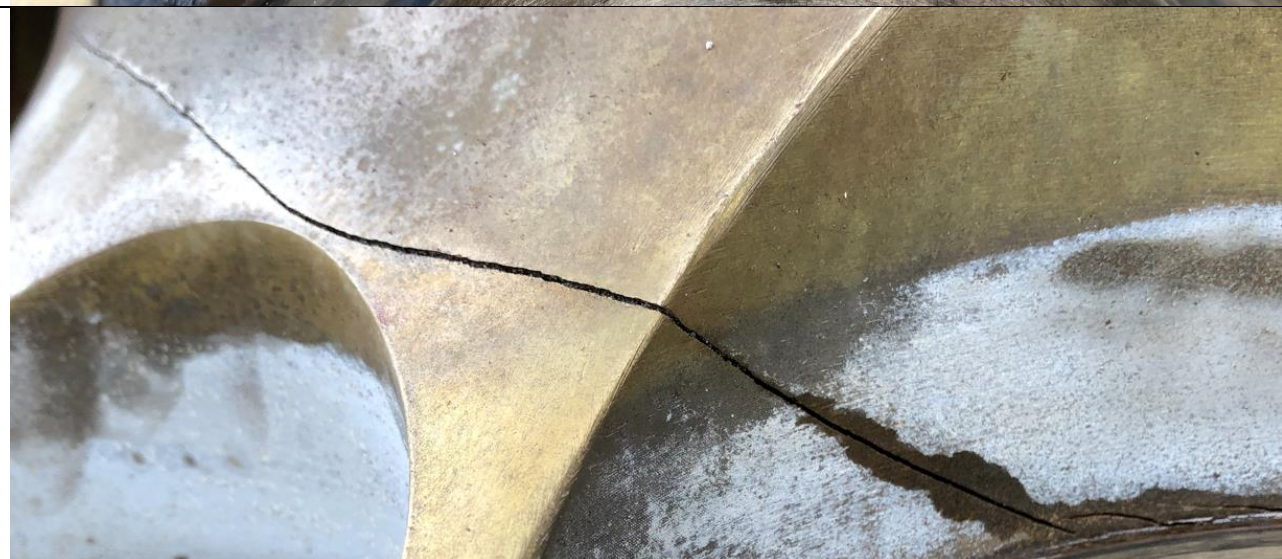
During the sea trail from Portland to Tacoma pitch and engine load were monitored, the pitch performance was recorded and it showed no abnormalities.

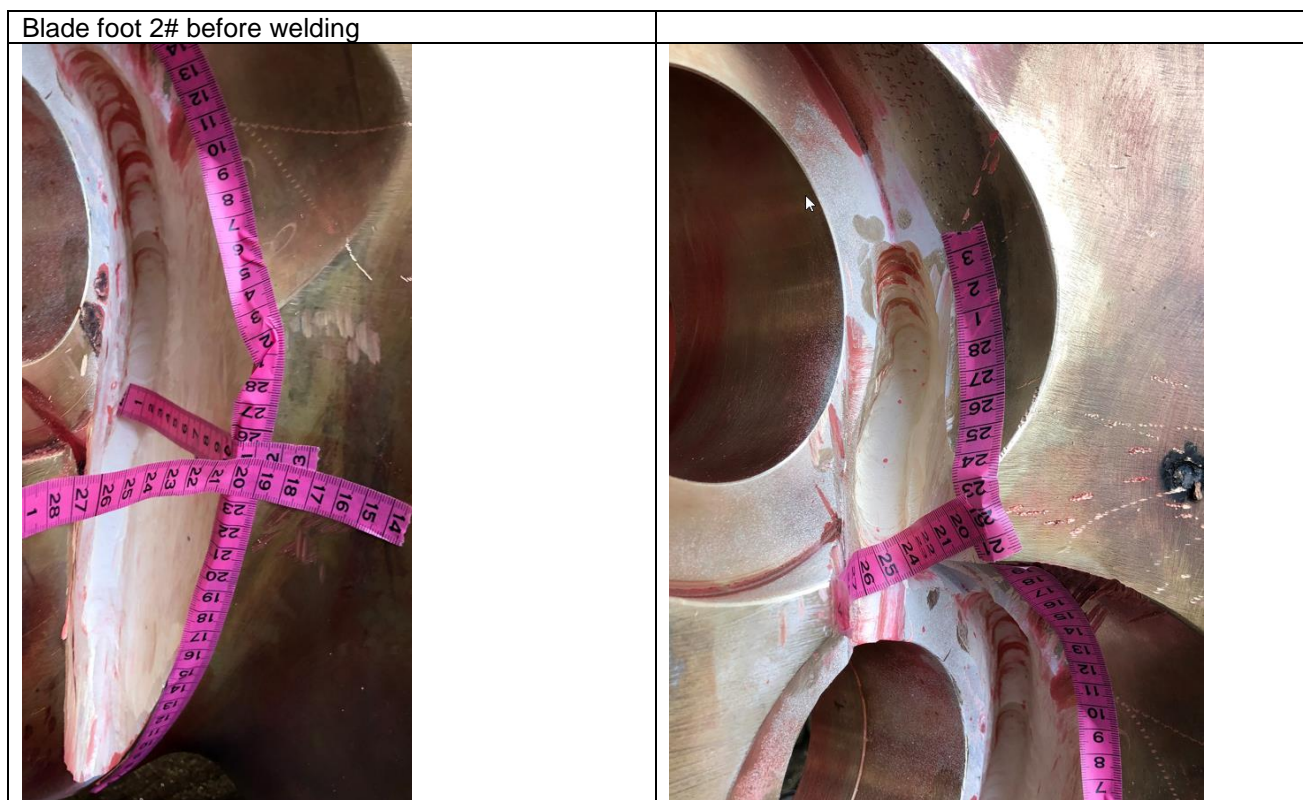
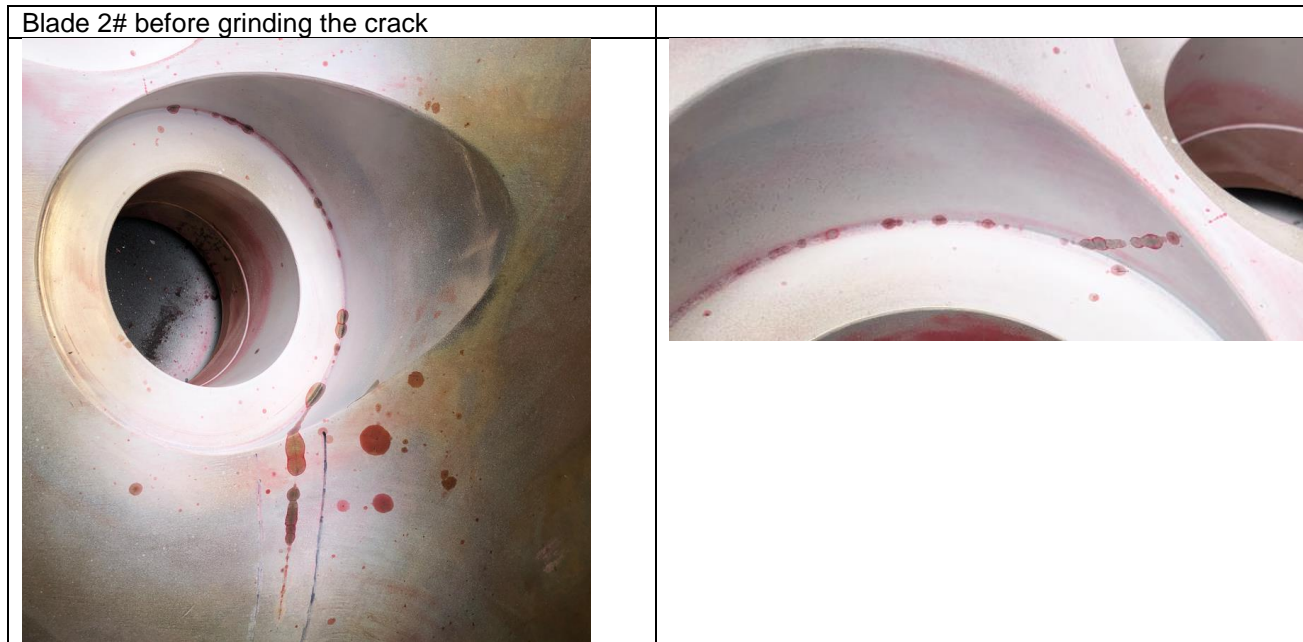
2. Findings, wear, problems, comments

Blade screw holes marking



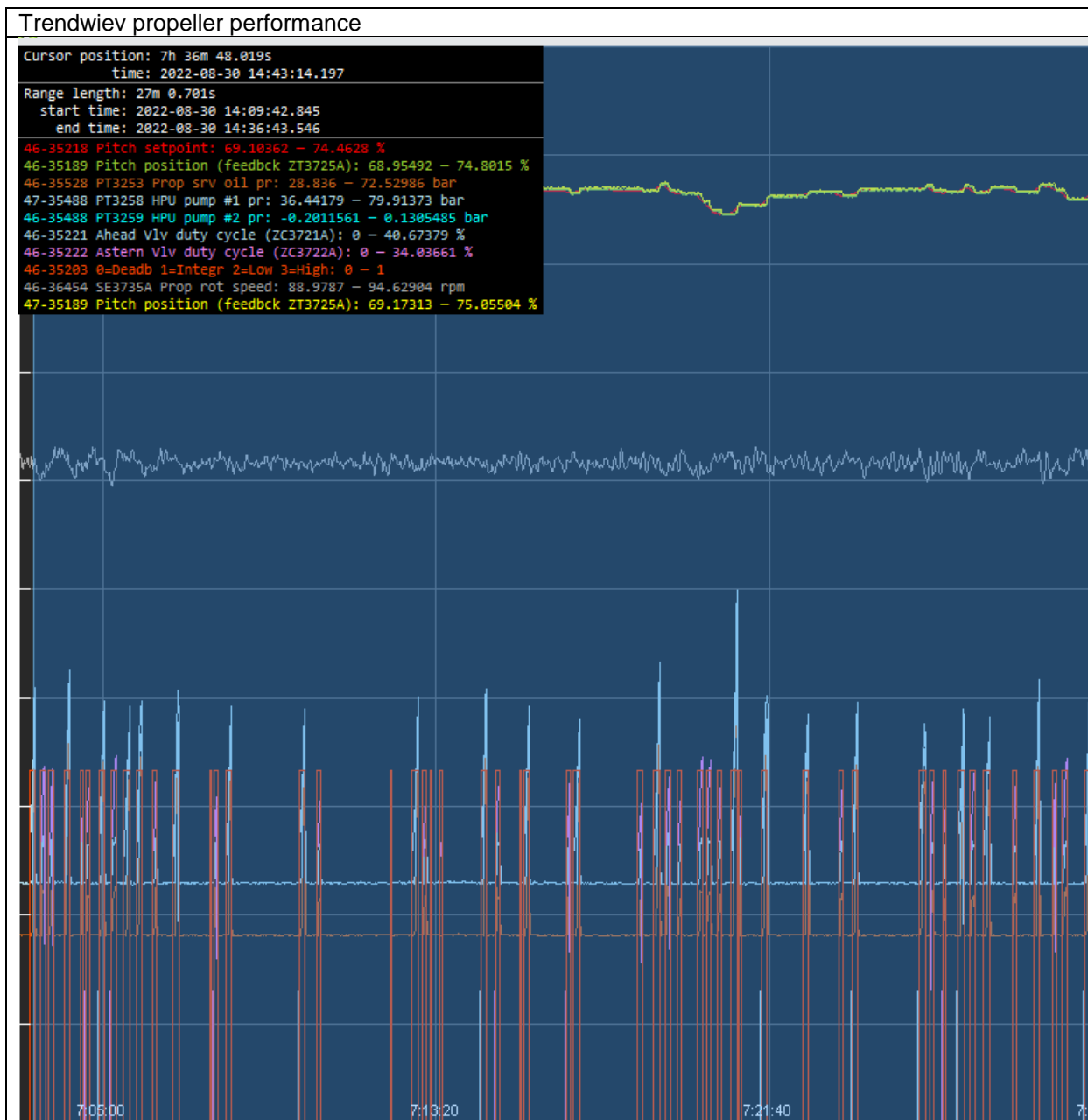
Blade 4#





Blade 2# screws holes 6 - 7 after machining and with radius 3mm.





3. Work and checks not carried out

4. Installed parts

5. Delivery of parts, damaged parts and samples drawn

6. Potential benefits for customer



Date

Signature