

Rpt. 4b

Date of writing report 8th January, 1958 Received London Port of Vancouver, B.C. No. 10246
Survey held at Victoria, B.C. No. of visits In shops } 15 First date 27th July, 1955 Last date 16th December, 1957
On vessel

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. Name Steel Twin Screw RCN Water Boat "YSW 220" Gross tons 112
Owners Department of National Defence, Naval Service Managers - Port of Registry Naval Ship, not registered
Hull built at Victoria, B.C. By Victoria Machinery Depot Co. Ltd. Yard No. 60 23B362 (Port) When 57 12
Main Engines made at Peoria, Ill. USA By Caterpillar Tractor Co. Eng. No. 23B363 (Stbd.) When 54 12
Gearing made at Harden Conn. USA By Snow & Nabstedt Gear Corporation
Donkey boilers made at - By - Blr. Nos. - When -
Machinery installed at Victoria, B.C. By Victoria Machinery Depot Co. Ltd. When 57.12
(Sub-contractors for Geo. W. Crothers Ltd., Toronto, Ontario)
Particulars of restricted service of ship, if limited for classification For Government Service on West Coast of Canada.

Particulars of vegetable or similar cargo oil notation, if required -
Is ship to be classed for navigation in ice? No Is ship intended to carry petroleum in bulk? No
Is refrigerating machinery fitted? No If so, is it for cargo purposes? - Type of refrigerant -
Is the refrigerating machinery compartment isolated from the propelling machinery space? - Is the refrigerated cargo installation intended to be classed? -

The following particulars should be given as fully and as clearly as possible. Where the answer is "No" or "None", say so! Ticks and other signs of doubtful meaning are not to be used. Where the wording is not applicable to the installation, a black line may be inserted. If the main engines have been constructed at another port and are covered by a separate report, the particulars given in that report need not be repeated below, but the port and report number should be stated.

No. of main engines Two No. of propellers Two Brief description of propulsion system Trunk piston solid injection each engine direct coupled to reverse and reduction gear 3:1
MAIN RECIPROCATING ENGINES. Licence Name and Type No. Caterpillar Model D-337
See Cleveland Rpt. 1831

No. of cylinders per engine 6 Dia. of cylinders 5-1/8" strokes 4 6" 2 or 4 stroke cycle Four Single or double acting Single
Maximum approved BHP per engine 200 max. at 1760 max. RPM of engine and 3 = 587 max. 533 service RPM of propeller.
Corresponding MIP Set for 150 (For DA engines give MIP top & bottom) Maximum cylinder pressure 1600 Machinery numeral 5 = 80
Are the cylinders arranged in Vee or other special formation? No, in line If so, number of crankshafts per engine -

TWO STROKE ENGINES. Is the engine of opposed piston type? - If so, how are upper pistons connected to crankshaft? -
Is the exhaust discharged through ports in the cylinders or through valve(s) in the cylinder covers? - No. and type of mechanically driven scavenge pumps or blowers per engine and how driven -
No. of exhaust gas driven scavenge blowers per engine - Where exhaust gas driven blowers only are fitted, can the engine operate with one blower out of action? -
If a stand-by or emergency pump or blower is fitted, state how driven - No. of scavenge air coolers - Scavenge air pressure at full power - Are scavenge manifold explosion relief valves fitted? -

FOUR STROKE ENGINES. Is the engine supercharged? Yes Are the undersides of the pistons arranged as supercharge pumps? No No. of exhaust gas driven blowers per engine one No. of supercharge air coolers per engine - Supercharge air pressure 6 lbs. Can engine operate without supercharger? Yes

TWO & FOUR STROKE ENGINES-GENERAL. No. of valves per cylinder: Fuel 1 Inlet 1 Exhaust 1 Starting - Safety under 6" dia.
Material of cylinder covers cast iron Material of piston crowns Alum. alloy Is the engine equipped to operate on heavy fuel oil? No

Cooling medium for :-Cylinders F.W. Pistons oil Fuel valves - Overall diameter of piston rod for double acting engines -
Is the rod fitted with a sleeve? No Is welded construction employed for: Bedplate? No Frames? No Entablature? No Is the crankcase separated from the underside of pistons? No Is the engine of crosshead or trunk piston type? trunk Total internal volume of crankcase - No. and total area of explosion relief devices open vent, guarded Are flame guards or traps fitted to relief devices? - Is the crankcase readily accessible? Yes If not, must the engine be removed for overhaul of bearings, etc? Yes Is the engine secured directly to the tank top or to a built-up seating? built up seat ing How is the engine started? Battery
Can the engine be directly reversed? No If not, how is reversing obtained? Reverse Gear
Has the engine been tested working in the shop? Yes How long at full power? Cleveland Cert. C-9426 & C-9427

CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system Mtl. 6th April 1955
for working propeller see Remarks for spare propeller - Is a governor fitted? Yes Is a torsional vibration damper or detector fitted to the shafting? Yes
Where positioned? fore end Type Viscons No. of main bearings 7 Are main bearings of ball or roller type? No Distance between inner edges of bearings in way of crank(s) 5-1/4" Distance between centre lines of side cranks or eccentrics of opposed piston engines -

Crankshaft type: Built, semi-built, solid. (State which) Solid
Diameter of journals 4-1/4" Diameter of crankpins 3-3/8" Breadth of webs at mid-throw 5-3/4" Axial thickness of webs 1-5/16"
If shrunk, radial thickness around eyeholes - Are dowel pins fitted? - Crankshaft material Journals } Steel Webs }
Diameter of flywheel - Weight - Are balance weights fitted? - Total weight - Radius of gyration -
Diameter of flywheel shaft - Material - Minimum approved tensile strength -
Flywheel shaft: separate, integral with crankshaft, integral with thrustshaft. (State which) Integral with crankcase.

MAIN GAS TURBINES. Name and Type No.

No. of sets of turbines..... Open or closed cycle..... BHP per set..... at..... RPM of output shaft.....

How is drive transmitted to propeller shaft?

ARRANGEMENT OF TURBINES. HP drives..... at..... RPM HP gas inlet temperature..... pressure.....
 (A small diagram should be attached showing gas cycle.)
 IP drives..... at..... RPM IP gas inlet temperature..... pressure.....
 LP drives..... at..... RPM LP gas inlet temperature..... pressure.....

No. of air compressors per set..... Centrifugal or axial flow type?..... Material of turbine blades..... Material of compressor blades.....
 No. of air coolers per set..... No. of heat exchangers per set..... How are turbines started?.....

How is reversing effected?..... Are the turbines operated in conjunction with free piston gas generators?.....

Total No. of free piston gas generators..... Diameter of working pistons..... Diameter of compressor pistons..... No. of double strokes.....
 minute at full power..... Gas delivery pressure..... Gas delivery temperature..... Have the turbines and attached equipment been tested work in the shop?..... How long at full power?.....

ELECTRIC PROPULSION (Reciprocating engines or gas turbines. Electrical particulars to be reported on Form 4d.)

No. of generators..... KW per generator..... at..... RPM AC or DC?..... Position.....

No. of propulsion motors..... SHP per motor..... at..... RPM Position.....

How is power obtained for excitation of generators?..... Motors?.....

REDUCTION GEARING (Reciprocating engines or gas turbines. A small line sketch should be attached showing arrangement of gearing.)

Is gearing of single or double helical type? double..... If single, position of gear thrust bearing?..... Is gearing of epicyclic type? No.....

PCD of pinions: First reduction..... Second reduction..... PCD of wheels: First reduction..... Main.....
 Cleveland Rpt. No. 1831..... Material of pinions..... Tensile strength..... Material of wheel rims..... Tensile strength.....

Are gear teeth surface hardened?..... How are teeth finished?..... Diameter of pinion journals..... Wheel.....
 journals..... Are the wheels of welded construction?..... Is gearcase of welded construction? Cast..... Has the wheel/gearcase been heat treated on complete.....

Where is the propeller thrust bearing located? Double ball bearing inside red gear case..... Are gear bearings of ball or roller type? roller for ball for t.....

CLUTCHES, FLEXIBLE COUPLINGS, ETC. If a clutch or other flexible connection is fitted between engine/turbine and gearing or between engine and line shafting give description and, for clutches, state how operated. Snow Nabstedt hydraulic clutch (125 lbs. max. pressure).....

Can the main engine be used for purposes other than propulsion when declutched? Yes..... If so, what? Battery charging, both engines, Port engine drives auxiliary fire and bilge pump.....

STRAIGHT SHAFTING. Diameter of thrustshaft in gear box..... Material..... Minimum approved tensile strength.....

Shaft separate or integral with crank or wheel shaft? In gear box..... Diameter of intermediate shaft None..... Material.....

Minimum approved tensile strength..... Diameter of screwshaft cone at large end 3-7/16"..... Is screwshaft fitted with a continuous liner? No. 2 line screw.....

Diameter of tube shaft. (If these are separate shafts) None..... Is tube shaft fitted with a continuous liner in way of stern tube No..... Thickness of screw/tube shaft line.....

bearings 1 1/2" aft., Thickness between bearings uniform..... Material of screw/tube shaft Manganese Bronze minimum approved tensile strength 65000.....

Is an approved oil gland fitted? No..... If so, state type..... ASTM B 138 A half hard..... Length of bearing next to and supporting propeller 18".....

Material of bearing Ryertex..... In multiple screw vessels is the liner between stern tube and A bracket continuous? No..... If not, is the exposed length of shafting between liners readily visible in dry dock? not exposed.....

PROPELLER. Diameter of propeller 3.2 ft. Pitch 2.62 ft. Built up or solid solid..... Projected area.....

No. of blades 3 Blade thickness at top of root fillet 1.256" Blade material Manganese bronze Moment of inertia of dry propeller.....

If propeller is of special design, state type Gawn type..... Is propeller of reversible pitch type? No..... If so, is it of approved design?.....

State method of control..... Material of spare propeller Manganese bronze Moment of inertia.....

AIR COMPRESSORS & RECEIVERS. No. of main engine driven compressors per engine None Can they be declutched?.....

No. of independently driven air compressors. (State capacity, prime mover, position in ship, and Port and No. of certificate) None.....

No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) None.....

How are receivers first charged?..... Maximum working pressure of starting air system..... Are the safety devices in accordance with the Rules?.....

Has the starting of the main engines been tested and found satisfactory? Yes.....

COOLERS. No. of main engine fresh water coolers one heat exchanger one each engine and one each reduction gearing.....

OIL FUEL TANKS. No. and position of oil fuel settling or service tanks not forming part of hull structure one 80 gals. daily service tank, end E.R.

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) one fire and bilge pump belt driven by port ME timing gear.....

One SW and one FW pump each engine.....

INDEPENDENT PUMPS

Name below essential pumps, state position and how driven. Give capacity of bilge pumps.

General Service ER Stbd. (150 IGPM at 15 lbs.)
 Aft. Elect. Motor driven
 Fire and Bilge, ER port side
 Port ME driven 75 IGPM at 15 lbs.
 Emergency fire and bilge on deck port side aft. Hand

Fuel Transfer Starboard side ER. Hand
 FW Cargo Tanks
 FW Cargo Pumps

Service for which each pump is connected to be marked thus X

	SUCTION										DELIVERY					over board
	Bilge Main	Bilge Direct	Ballast Main	Oil Fuel	Fresh Water Cooling	Sea	Feed Tanks	Lub. Oil	Boiler Feed	Salt Water Cooling	Fresh Water Cooling	Oil Fuel Tanks	Fire Main	Lub. Oil	Piston Cooling	
General Service ER Stbd.	X	X	X			X				X			X			X
Aft. Elect. Motor driven (150 IGPM at 15 lbs.)																
Fire and Bilge, ER port side	X	X				X							X			X
Port ME driven 75 IGPM at 15 lbs.																
Emergency fire and bilge on deck port side aft. Hand						X							X			X
Fuel Transfer Starboard side ER. Hand																
FW Cargo Tanks																
FW Cargo Pumps													X			X

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room one 2" each side Fore Hold, one 2" fore peak, one 1-1/2"

Windlass controller comp. (inside fwd. ballast tank), one 2" after stores, one 1-1/2" after chain locker and steering gear comp.

No. and size connected to main bilge line in main engine room one 2" each side forward In tunnel.....

In aux. engine room..... Size and position of direct bilge suction in machinery spaces Two 2" in centre after end.....

Size and position of emergency bilge suction in machinery spaces one 2" each side from ME SW pump.....

Is the bilge or ballast system fitted with means for separating oily water on the overboard discharge side? No..... Do the piping arrangements comply with the Rules including special requirements for ships carrying petroleum in bulk, cargo oil or classed for navigation in ice? (Strike out words not applicable). Yes.....

STEAM & OIL ENGINE AUXILIARIES

Position of each	Type	Made by	Port and No. of Rpt. or Cert.	Driven Machinery (For electric generators, state output)
Port side ER	Oil Engine	R.H. Shephard Co. Inc.	Inspected under jurisdiction of	15 KW generator
Stbd. side ER	Oil Engine	Hanover, Pa.	Royal Canadian Naval Authorities	15 KW generator
				Makers Boque Electric Co. of Canada, Montreal P.Q.

Is electric current used for essential services at sea? Yes..... If so, state the minimum No. and capacity of generators required in order that the ship may operate at sea..... one 15 KW.....

Is an electric generator driven by Main Engine? No.....

STEAM INSTALLATION. No. of donkey boilers burning oil fuel..... W.P. Type.....

Position.....

Is a superheater fitted?..... Are these boilers also heated by exhaust gas?..... No. of donkey boilers heated by exhaust gas only?..... W.P.

Type..... Position..... Can the exhaust heated boilers deliver steam directly to the steam range or do they operate only as economisers in conjunction with oil fired boilers?.....

Port and No. of report on donkey boilers.....

Is steam essential for operation of the ship at sea?..... Are any steam pipes over 3 ins. bore?..... If so, what is their material?.....

For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules?..... No. of oil burning pressure.....

No. of steam condensers..... No. of Evaporators.....

STEERING GEAR. (State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars) Hand hydraulic.....

Have the Rule Requirements for fire extinguishing arrangements been complied with? Yes..... Brief description of arrangements Four 50 lb. CO2 bottles starboard side machinery space with remote control and two hand extinguishers in Machinery Space.....

Has the spare gear required by the Rules been supplied? Yes..... Has all the machinery been tried under full working conditions and found satisfactory? Yes..... Date and duration of full power sea trials of main engines 2 hrs. acceptance trail 16.12.57 after full Naval trials.....

Does this machinery installation contain any features of a novel or experimental nature? (Give particulars) No.....

The foregoing description of the main engine and installation is correct and the particulars are as approved for torsional vibration characteristics (Strike out words not applicable).....

VICTORIA MACHINERY DEPOT CO., LTD.
 Lloyd's Register
 0034 2/3

GENERAL REMARKS

State if the machinery has been constructed and/or installed under special survey in accordance with the Rules, approved plans and Secretary's letters. State quality of materials and workmanship and recommendations for classification, including any special notation to be assigned. Where existing machinery is submitted for classification the circumstances should be explained as fully as possible.

The main engine and gears were built and tested under the inspection of the Cleveland Survey on the mass production system to approved plans as described in Cleveland Certificates Nos. C 9426 and C 9427 and Rpt. 4b (Clv. 1831). The two auxiliary oil engines were built under the jurisdiction of the Royal Canadian Naval Authorities. The machinery was installed on board and tested under Special Survey in accordance with the Rules, approved plans and Montreal letters. The materials and workmanship are good. The whole installation has been satisfactorily tested under full working conditions on sea trials. This installation was carried out under the survey of the Royal Canadian Naval Overseers also. The torsional vibration characteristics of the main machinery have been examined in conjunction with the Engine Builders calculations and approved for an engine service speed of 1600 RPM (propeller 533 RPM) also for maximum speed of 1760 RPM (propeller 587 RPM). No excessive gear hammer was noted in the reduction gears at low speeds, and the idling speed was adjusted to 600 RPM. Torsiograph recordings were made on Sister Ship "YSF 216" and have been submitted to Naval Headquarters Ottawa where they may be made available to the Society if required. The fore hold bilge suction pipes pass through the water cargo tanks but non-return valves at the ends were not fitted and it was recommended these be fitted as a classification requirement. (Please see follower)

Robert Rennie
Engineer Surveyor to Lloyd's Register of Shipping

PARTICULARS OF IDENTIFICATION MARKS (Including Port of origin) of important Forgings and Castings. (Copies of certificates should be forwarded with report.)

RODS

CRANKSHAFT OR ROTORSHAFT

FLYWHEEL SHAFT

THRUSTSHAFT

GEARING

INTERMEDIATE SHAFTS

SCREW AND PUMP SHAFTS LLOYD'S No. 20625 VCR. 18.7.55 JAS. ditto No. 20626 (Certs. attached)

PROPELLERS C 1783 LLOYD'S SEA. 513 17th June, 1955 ELM. ditto C 1776 SEA 514

OTHER IMPORTANT ITEMS

Is the installation a duplicate of a previous case? Yes If so, state name of vessel Ammunition Lighters YSF 216, YSF 218.

Date of approval of plans for crankshaft 31.3.53 Straight shafting Gearing Clutch

Separate oil fuel tanks 17.11.54 Montreal Cleveland Pumping arrangements 14.9.54 Montreal Oil fuel arrangements 14.9.54

Cargo oil pumping arrangements - Air receivers - Donkey boilers -

Dates of examination of principal parts:-

Fitting of stern tube 3.8.55 Fitting of propeller 17.8.55 Completion of sea connections 1.11.57 Alignment of crank shaft in main bearings Cleveland

Engine checks & bolts 6.11.57 Alignment of gearing Cleveland Alignment of straight shafting 6.11.57 Testing of pumping arrangements

Oil fuel lines 16.12.57 Donkey boiler supports - Steering machinery 16.12.57 Windlass 16.12.57

Date of Committee TUESDAY 22 APR 1958 Installation Special Survey Fee \$355.00

Decision See Rpt. 1.

Expenses 50.00

Date when A/c rendered 17th December

Rpt. 4b

Port of Vancouver, B.C.

Continuation of Report No. 10246

dated 8th January, 1958

on the

"YSW 220"

FORWARDED HEREWITH:-

Yarrows Ltd. as fitted plans Nos.:-

M 1 Rev.8 - Machinery Arrangement.

M 3 Rev.8 - Fuel Oil Piping.

M 5 Rev.3 - Raw Water Cooling Piping.

YSW M 36 - Bilge, Ballast and Fireman Piping.

M 14 Rev.7 - Stern Tube & Shafting.

M 40 Rev.3 - Cargo Water Piping.

Copies Vcr. Certs. Nos. 20625 and 20626 - Screwshafts and Couplings, Seattle Certificate 18.6.55 - Propellers.

Interim Certificate Bl.

The machinery of this ship is eligible in my opinion to be classed with Notation LMC 12.57. Oil Engines made 1950, fitted 1957, Screwshafts B, subject to non-return valves being fitted to bilge suction in Fore Hold.

Robert Rennie

ROBERT RENNIE

SURVEYOR TO LLOYD'S REGISTER