

COPY.

Lloyd's Register of Shipping.



Port SAN FRANCISCO

SAN FRANCISCO RPT. A/C No. 8664

JANUARY 30th, 1946

SURVEY FEE	\$ <u>40.00</u>
EXPENSES	\$ <u>6.00</u>
	\$ <u> </u>
TOTAL	\$ <u>46.00</u>

APPLIED FOR 1-30-46

This is to Certify that

H. N. CLEGG

the undersigned Surveyor to this Society did at the request of the United States War Shipping Administration, San Francisco, California, Owners of the Motor Vessel

"IMPERIAL"

7279 tons gross register of the U.S.A. (port of registry not documented), make survey of vessel for the purpose of ascertaining the nature and extent of damage to the No. 1 cylinder unit of the main engine.

The damage is stated to have occurred December 20th, 1945 while the vessel was on a voyage from San Francisco, California to Seattle, Washington and to have been caused by the piston rod breaking at the small diameter end of the taper in way of the engine crosshead.

For full particulars see Engine Room Log Books of vessel. Log Books examined.

The following are copies of statements by the Master and Chief Engineer of the Vessel:

"After leaving San Francisco for Seattle, Washington on 20 December 1945 at 2208 G.C.T. while eight (8) miles due West of Cape Mendocino, California, the piston rod in #1 cylinder broke, totally disabling the Ship's main engine. The wind at the time was SE force 7 with moderately rough sea. This wind had the tendency to blow the ship off shore. An S.O.S. was sent out immediately and at 0020 G.C.T., 21 December 1945 the "BEAVER VICTORY" arrived and stood by. At 0130 G.C.T., the U.S.C.G. "SHAWNEE" arrived and stood by until 0810 G.C.T. before being able to get a tow line aboard on account of rough sea. At 2230 G.C.T. 21 December the Army Tug #815 arrived and stood by. At 2355 G.C.T. the Navy Tug #82 arrived and attempted to give us a towing hauser but bad weather and darkness prevented it. At 0100 G.C.T., 22 December the tow line to the "SHAWNEE" parted

This Certificate is issued upon the terms of the Rules and Regulations of the Society, which provide that:—

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U.S.A.T. M.V. "IMPERIAL"

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and the "IMPERIAL" drifted in a very heavy sea and swell with the wind blowing between force 10-11 until 1657 G.C.T. 22 December when we got a towing wire fast from the Navy Tug #82, but due to the bad weather the tug could just hold the ship up making little or no progress. At 0358 G.C.T. 23 December 1945, the Ship's engine room force were able to effect sufficient repairs to enable them to turn over our main engine slow ahead and we started toward San Francisco. At 2349 G.C.T. 23 December the Navy Tug #82 stopped with engine trouble. At 0022 G.C.T. 24 December Tug resumed towing. At 1933 G.C.T. 24 December arrived back in San Francisco.

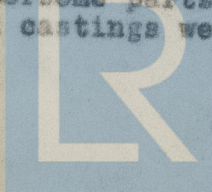
At no time during this part of the voyage was there any panic or undue excitement among the 580 troops and crew. The entire engine room force should be commended for promptness in which they completed temporary repairs giving sufficient propulsion power to greatly assist tug and improve steerage way."

(Signed) LEWIS V. BEAULIEU,
Master.

"Main Engine Stopped 1410 hr., due to #1 cylinder, #1 cylinder totally demolished, damages so extensive as to completely disable Engine. Cause as yet undetermined. Cooling water manifold broken in between cylinders #3 and #4 pushed approximately one foot out of line, rupturing lines and connections to #2 and #3 cylinders. #1 Top Liner raised completely out of frame with up and down motion of piston, totally demolishing supporting and appended castings, piston rings, ripping loose all fuel lines and lube lines, all four stay-bolts were stretched, upper exhaust valve push rods stretched and bent; exhaust manifold pushed out of line, cooling oil transfer bonnet from telescopic tube to rod demolished as was piston rod crankcase stuffing box. The gusher of lube oil from a 2-1/2" telescopic tube line combined with the release of hot cooling jacket waters rendered the isolating work of #1 cylinder and closer immediate inspection difficult and hazardous. This coupled with the reluctance of immediate securing of water and oil pumps in an endeavor to keep other cylinder liners and pistons from damage by cracking from the intense heat. Pumps were momentarily secured, broken lines wrapped and isolated where possible and pumps re-started, a great deal of the heat was dissipated but a great deal of oil was lost to bilges thru the 2-1/2" line of #1 cylinder which could not be plugged very readily due to nature of its construction. It appears from a rather close visual examination that the cooling of other cylinders without damage was successful. Dismantling of heavy pieces on which rigging was necessary discontinued about midnight due to heavy seas and unusual pitching and tossing of ship; work of dismantling light fixtures, checking and preparation for operation was continued with reduced crew. Rested crew members were returned to work following morning and work continued.

After pulling #1 piston we found that piston rod had broken off flat with bottom nut, piston came up driving up head causing damage to the box casing and all other parts connected thereon.

On the afternoon of the 21st of December 1945 the Coast Guard Shawnee succeeded in bringing ship too, thus stabilizing ship sufficiently there by the heavy cumbersome parts could be handled and secured. Top liner and appended castings were removed, piston



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was raised on chain blocks sufficiently to clear lower exhaust valve and secured suspended, scavenger belt, lower liner and complete lower liner assembly which showed no evidence of having moved accident was left in place as was upper cylinder frame which served the purpose of a securing frame by drawing up on the stay-bolts thus permitting the use of complete crankcase assembly of connecting rod, cross head shoe, eccentric rods, lower exhaust valve yoke, and exhaust valve as crank balance on #1 crank, which on a close examination showed no defects in bearings, the lubricator lines from effected cylinder were out and used for cross head lubrication as purely a safety factor which depends on splash for lubrication. All lines; lube, air, fuel, water and etc. that were ruptured were soft patched or where removable removed and blanked, exhaust and scavenger manifold blanked thus completely isolating #1 cylinder, top and bottom. Main Engine cooling jacket pump was turned on at 0730 hr. and Steam applied, water allowed to circulate and heat up while other examinations and preparations continued. All liners, piston rings, jackets, bearings, and etc. were given another examination under cooling water pressure of 35 lbs. (5 lbs. over operation pressure) and lube oil pressure of 16 to 20 lbs. (or 2 lbs. above normal operating pressures), test proved visually satisfactory.

Ship was under tow of Navy Tug NT #82 by this time but making very little head way due to gale. Everything appearing normal, Standby was directed from Engine Room at 1510 hr. with Slow Ahead approximately 10 minutes later. Engine was test run (time unrecorded). Everything appeared operationally satisfactory with exception of an abnormal clatter in blower chain which had on investigation a loose adjustment nut on chain. Engine was stopped and chain given a thorough inspection. Slow Ahead was directed from Engine Room 2004 hr. and ship proceeded on way towards port under tow of Navy Tug NT #82 assisted by ship's own Engine.

There appeared a periodic clatter in aft blower chain which on final analysis proved to be caused by critical speed of blower due to nature of flexible drive and one of cylinder creating a fluctuating pressure in manifold. The fact that an over-riding of the critical speed in question would have over-rode the speed of towing tug, Engine was confined to a subnormal low speed; ship was stopped and maneuvered on her own power at sea during a momentary stoppage of towing tug, also maneuvered on her own power in berthing assisted by tugs. It is believed that ship was capable of taking care of herself under any conditions from the moment her own Engine was placed in operation although an appreciated advantage was taken of fact that she was under tow to give her Engine added surety of operation.

In conclusion it can be I believe be sincerely stated that the accident can be attributed to no fault or negligence on the part of operating personnel or Mr. Francis M. Trainor, Ship's Third Asst. Engineer who was Engineer on watch at time of accident; that the Engine received normal operational inspection at both ends of Voyage by First Assistant Engineer and Chief Engineer; that Engine was inspected by First Engineer approximately one-half hour prior to accident and appeared normal."

(Signed) JAMES LITTELL,

Chief Engineer

(Signed) JOSEPH M. ZOLDAK (Actg. Chief)

First Asst. Engineer

ATTENDING AT THIS SURVEY:

Mr. D. P. Helland, Rep. War Shipping Administration.
 Mr. G. F. Folsom, Rep. War Shipping Administration.
 Mr. J. Littell, Chief Engineer of "Imperial".
 Mr. H. N. Clegg, Rep. Lloyd's Register of Shipping.

On January 15th, 1946 and subsequent dates, while the vessel was lying afloat at the Army Base, Outer Harbor, Oakland, California, the undersigned Surveyor made examinations:-

NO. 1 CYLINDER UNIT OF THE MAIN ENGINE

(Two Stroke Cycle Double Acting Type)

FOUND

RECOMMENDED

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| <p>1- (a) Upper exhaust belt casting (cast iron) cracked and broken.</p> <p>(b) Water connection elbow, located between exhaust belt and exhaust manifold cracked and broken.</p> <p>2- Upper exhaust piston broken in way of piston grooves.</p> <p>3- Upper exhaust liner cracked and broken at base flange.</p> <p>4- Top cylinder cover (cast steel) cracked in a vertical direction at outer wall.</p> <p>5- Upper cylinder water jacket (cast iron) cracked and broken at top bolt circle in way of cylinder cover landing face.</p> <p>6- Scavenge air duct (cast iron) located between, and fastened to upper and lower cylinder jackets, started from fastenings.</p> <p>7- (a) Cast steel upper piston indented at upper end.</p> <p>(b) Piston rings chipped and part broken.</p> | <p>(a) Supply pattern, cast and machine one (1) new exhaust belt casting.</p> <p>(b) To be renewed.</p> <p>Supply pattern, cast and machine to correct dimensions, one (1) exhaust piston.</p> <p>Supply pattern, cast and machine to correct dimensions one (1) exhaust liner.</p> <p>Supply pattern, cast and machine to correct dimensions one (1) top cylinder cover.</p> <p>Supply pattern, cast and machine to correct dimensions one (1) water jacket cylinder.</p> <p>(a) Air duct to be removed from engine.</p> <p>(b) Test parts and fittings and prove in good order.</p> <p>(c) Damaged parts to be renewed as specified by all interested parties.</p> <p>(a) Piston to be tested as directed and proved tight.</p> <p>(b) Piston to be ground smooth.</p> <p>(c) Check dimensions and prove fits correct.</p> <p>(d) Supply and fit new rings to piston.</p> |
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FOUND

RECOMMENDED

8- (a) Cast steel lower piston broken in way of ring grooves.

(b) Piston rings chipped and cracked.

9- (a) Forged steel piston rod broken clear through at lower end of taper adjacent to last thread at crosshead connection.

(b) Upper and lower forged steel piston rod nuts distorted and threads galled.

Note: Nuts are located at upper and lower end of taper.

10- Cast iron jacket cover, which surrounds piston rod and forms part of the piston cooling system, serrated and galled.

11- Bottom bell casting, located and attached to the lower face of the upper cylinder jacket, cracked and broken.

12- Piston rod packing in way of lower exhaust valve galled and serrated.

13- Piston rod oil sea packing, located at upper part of crank case, galled and serrated.

14- Oil cooling telescope piping, brackets and connections bent, cracked and broken.

15- Four (4) forged steel engine frame stay rods, stretched and distorted.

16- Two (2) forged steel exhaust piston push rods, stretched and distorted.

17- Cast iron outlet (8") for discharge of cooling water, located above the main engine, cracked and broken.

(a) Supply one (1) new piston.

(b) Supply new piston rings.

(a) Supply one (1) new forged steel piston rod of approved steel as directed.

(b) Supply one (1) upper and one (1) lower forged steel piston rod nuts of approved steel.

Supply pattern, cast and machine one cast iron cover for piston rod. Supply necessary fastenings.

Supply pattern, cast and machine one (1) new bottom bell for cylinder jacket.

Packing to be examined and parts renewed as directed.

Packing to be examined and parts renewed as directed.

Telescope piping arrangements to be renewed.

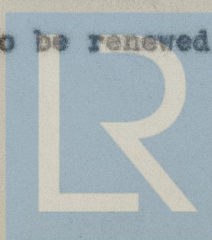
(a) Supply four (4) new rods of approved steel as directed.

(b) Nuts and fastenings to be checked and renewed as found necessary.

(a) Supply two (2) new rods of approved steel as directed.

(b) Nuts and fastenings to be checked and renewed as found necessary.

To be renewed.



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FURTHER RECOMMENDED:

- 18- Examine bottom exhaust piston and liner for possible fractures.
- 19- Fuel valves, air starting valve, relief valve and fuel block to be dismantled, overhauled and placed in good operating condition.
- 20- Indicator gear, cooling water connections, fuel oil, lubricating oil and drain piping to be tested and repaired or renewed as found necessary.
- 21- Starting air pipe to be repaired and tested as required.
- 22- Thermometers and pyrometers to be checked for truth.
- 23- Engine crosshead pins, bearings and fastenings to be checked.
- 24- Crankshaft pin, bearing and fastenings to be checked.
- 25- Check manufacturers witness marks in way of journal pins and webs of the No. 1 cylinder in order to ascertain if the crankshaft journal pins have moved in the webs.
- 26- Check lubricating oil quills and piping to liners.
- 27- Examine top and bottom cylinder liners for possible cracks.
- 28- Upon completion of repairs and assembling of engine unit, the main engine is to be subjected to dock and bay trials to the satisfaction of all parties concerned.

Recommend that this engine be repaired before vessel proceeds on voyage.

Survey started January 15th, 1946.

Survey completed January 21st, 1946.

(SIGNED) H. N. CLEGG

SURVEYOR TO LLOYD'S REGISTER OF SHIPPING



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