

mil. PJB 5249

M.V. "CORUCHE"

28th June, 1949.

This is to certify that W. Nicholson and Geo. Poddie, the undersigned Surveyors to this Society did at the request of Messrs. St. Lawrence Metal & Marine Works Ltd., Quebec, attend on board the Steel Single Screw Motor Vessel "CORUCHE", 1122.3 tons gross Register of Lisbon, on the 25th of January, 1949 and subsequent dates for the purpose of examining and supervising the re-alignment of the Engine and Shafting System of that Vessel.

This is a continuation of a Report of the particulars observed on the M.V. "CORUCHE" and already recorded on the Halifax Certificate dated January 25th, 1949.

With the screwshaft in place the vessel was refloated and towed to Halifax Shipyards on the 25th January, 1949.

The forward length of intermediate shafting was tested in place and found reasonably straight. This shaft was coupled to the thrust shaft and engine and all slowly rotated. The after end of this intermediate shaft and its flanged coupling forward threw 6/1000" and 9/1000" respectively. From the 23th January to the 1st February, 1949, continued attempts to refit the after S.K.F. coupling were unsuccessful as the outer sleeve could not be expanded sufficiently, apparently because of the damaged mating surfaces of the inner and outer sleeves.

The spare coupling was therefore fitted.

Continued attempts to fit the centre S.K.F. coupling were eventually abandoned and the spare coupling taken from the M.V. "COVILHA" and fitted satisfactory.

Before re-fitting the forward S.K.F. coupling, the two after lengths of intermediate shafting were rotated and the forward end of the centre intermediate shaft observed to throw 20/1000". The forward S.K.F. coupling was now fitted, care being taken to make due allowance for the .087" sag previously recorded. The forward intermediate shaft was now supported on a vee-block at the thrust bulkhead, and positioned from the 'witness' marks on that bulkhead.

Rotating the crank and thrust shafts, the distances between the coupling faces were gauged at 4 points for each 90° rotation and the measurements were as follows in thousandths of an inch.

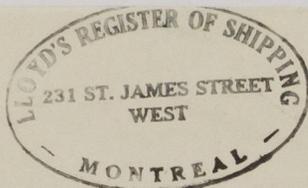
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Rotation	Top	Bottom	Port	Stbd.	Opening	
					Top	Stbd.
0°	45	30	36	39	15	3
90°	39	24	32	33	15	1
180°	42	24	32	34	18	2
270°	43	25	33	36	18	3
Average					16-1/2	2-1/2

The average opening on the top of 16 $\frac{1}{2}$ "/1000" indicated the forward end of the crankshaft required to be raised about .32". The position of the edges of the thrust coupling indicated that the after end of the thrust shaft required to be moved to port approximately 11/64" and lowered about 1/16" in relation to the intermediate shaft coupling.

Rotating the intermediate shaft, still disconnected from the thrust coupling and supported on a vee-block adjacent the thrust bulkhead, the shaft adjacent the forward S.K.F. coupling and the forward flanged coupling, threw 13/1000" and 5/1000" respectively.

The vee-block was placed about 3 feet forward of the forward S.K.F. bearing and when the shafting was rotated, the forward flanged coupling threw 20/1000".

A deflection gauge was placed between the webs of No. 6 crank and commencing with the crank just off bottom dead centre, the engine was rotated. Simultaneously dial indicators were recording the 'throw' on the crankshaft extension between the flywheel and after crank journal and on the thrust shaft in way of the after oil seal ring.

The readings which indicate that the engine shaft was low in relation with the thrust journal, are as follows in thousandths of an inch.

Approximate Angle Rotation	Aft Thrust	Crank Extension	Between No. 6 Webs
8	0	0	0
45°	+ 2	0	0
90°	+ 6	+ 1	+ 1/2
135°	+ 6	+ 2	+ 1

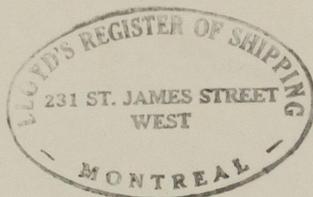
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(cont'd.)

Approximate Angle Rotation	Aft Thrust	Crank Extension	Between No. 6 Webs
180°	+ 4-1/2	+ 3	+ 2
225°	+ 3	+ 3	+ 2-1/2
270°	0	+ 3	+ 2
315°	-1-1/2	+ 2	+1-1/2
340° approx.	- 1	0	0

The fact that the connecting rod was in place during this examination prevented the full 360° rotation being obtained since the crank bearing fouled the deflection gauge.

The Main Engine and Thrust Block were moved bodily to bring the Engine and Thrust into good alignment with the located intermediate shaft coupling. Holes in Engine and Thrust seatings were welded up, redrilled and reamered, and new cast iron checks fitted. The final amounts of movement were as follows:-

For'd end of engine raised approx. 5/16" Port and Starboard.

" " " " moved to Port 9/32".

Aft end of engine and thrust block, moved 11/64" to Port.

" " " " " " " , lowered 1/16" approx.

Final readings taken on the vessel on the 19th February, 1949, after re-alignment of the intermediate shafting, thrust shaft and main engine were as follows:-

- (1) Between flanged couplings of forward intermediate shaft and thrust shaft, expressed in thousandths of an inch:-

Rotation:-	0°	90°	180°	270°	360°
Top	17	12	12	10	8
Bottom	17	11	12	12	10
Port	18	11	12	10	9.5
Starboard	17	11	13	11	9

Differences T & B:- Nil

1

Nil

2

2

" P & S:- 1

Nil

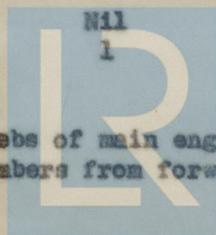
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1

0.5

- (2) Deflection readings between webs of main engine crankshaft, expressed in thousandths of an inch, numbers from forward:-

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	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Crank on Bott. Centre	0	0	0	0	0	0
" " Port Quarter	$-\frac{1}{2}$	$-\frac{1}{2}$	0	0	0	$-1\frac{1}{2}$
" " Top Centre	-1	-1	$-\frac{1}{2}$	$+\frac{1}{2}$	+1	-2
" " Stbd. Quarter	$-\frac{1}{2}$	$-\frac{1}{2}$	$+\frac{1}{2}$	+1	$+\frac{1}{2}$	-1

The Thrust Shaft was now recoupled to intermediate shaft. Rotating engine slowly, an indicator at the forward SKF coupling threw 16/1000". At 120 RPM, it threw up 20/1000".

Following a one hour dock trial at 120 RPM, on the 23rd of February, 1949, the vessel, in a light draft condition, underwent a full power sea trial. Strong wind and swell, vessel pitching.

The whipping of the shafting was observed to be very considerably less than during the original trials and at speeds up to 270 RPM was not serious. The forward SKF coupling 'whipped' as follows:-

At 120 - 250 RPM estimate whipping 1/64"

270 RPM " " 1/32"

When racing to 320 RPM " " 1/16"

With engine shut in to 240 RPM and racing to 280 RPM whipping up to 1/32".

The remaining couplings and shafts were whipping very slightly the amount was considered to be such as could be accepted.

NOTE: For comparison with the foregoing reading the following were observed during trials on 1st December 1948.

275 RPM ahead estimated whipping 3/64" at for'd SKF coupling.

282 RPM " " " 3/32" to 1/8" " "

300 RPM astern " " 1/8 " "

310 RPM ahead during steering trials,

short period. 3/16" max. estimated "

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The amount of whipping of the for'd SKF coupling, observed on the 13rd of February, 1949, when the engine raced to 320 RPM, due to the vessel pitching (estimated 1/16") was considered to be undesirable and it was found necessary to recommend that an additional SKF bearing be fitted to the shaft just aft of the forward SKF coupling, to reduce this whipping.

As delay was anticipated in obtaining and fitting the additional bearing, it was agreed, with the consent of the Owners, that the vessel proceed to Lisbon and operate with an engine speed not exceeding 270 RPM, until such time as the additional bearing could be fitted, at the first opportunity.

*For Geo. Paddie and self.*

*Geo. Nicholson.*

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