

Hamburg, 19th August, 1937.

Re. SS ZEMBRA now OSLEBSHAUSEN.

With reference to the Classing Letter, dated 6.8.37. and previous correspondence on the failure of the starboard main boiler I ebg to report as follows.

To meet the requirements of the German Boiler Regulations the Official of the Bremisches Amt (representing the local Authorities) requested that the main boilers be tested with an hydraulic pressure of $1.5 \times p + 3.5 \text{ kg/cm}^2 = 25.25 \text{ kg/cm}^2$. When the pressure had reached 22.5 kg/cm^2 the shell plate and both end plates fractured. A set of photographs showing the defects is attached hereto. These photographs were taken whilst the boiler was already removed from board and was lying at the quay of the Yard of Messrs. Fried. Krupp Germaniawerft A.G. at Kiel. From an examination of the fractures of the material, as far as could be ascertained, it appeared that these were showing clean surfaces without any ~~sign~~ signs of previous cracks. At my request samples ~~had~~ ^{were} ~~been~~ prepared from the material of the shell plating showing the following results of tests:-

STARBOARD MAIN BOILER

	648 mm ²	656 mm ²	672 mm ²	607 mm ²	664 mm ²	
Area of sample	648 mm ²	656 mm ²	672 mm ²	607 mm ²	664 mm ²	
Gauge length	200 mm					
<u>Elastic limit</u>	20.7/22.8	22	21.8	23.-	24.-	kg/mm ²
<u>Tensile strength</u>	35.8	34.5	34.2	39.1	41.1	"
Elongation	28.25	27.5	28.-	21.75	24.75	
Bend test						
ld cold	92	180	180	-	-	
er temp	38	62.5	71.5	-	-	
	2.41/1.80	2.48/1.69	2.18/1.69			mkg/cm ²
	1	2	3	4	5	
transverse test piece adjacent to						
thwise	"	"	"	"	"	



- No.3 sample = lengthwise test piece away from crack
- No.4 sample = lengthwise, normalized.
- No.5 sample = transverse, normalized.

In view of these results of the tests of the starboard main boiler, it has been arranged that test pieces should also be prepared of the shell of the port boiler before starting with the hydraulic test. These results are as follows:-

PORT MAIN BOILER

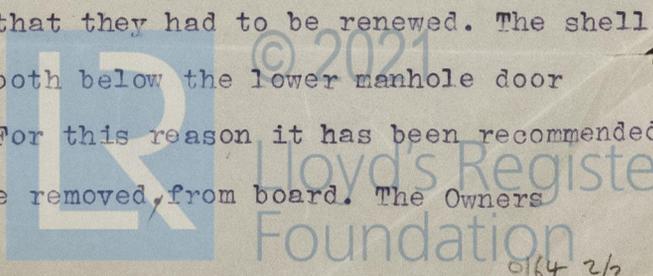
		lengthwise	transverse	transv.normalized
Gauged length	mm	200	200	200
Section	mm ²	685	663	503
Elastic limit	kg/mm ²	17.4	20.3	23.4
Tensile strength	"	31.5 ²⁰	33.5 ^{21.3}	35.- ^{22.2}
Elongation	%	27.5	30.5	23.75
Bend tests				
cold	degr.	180 closed	180 closed	-
temper	degr.	180 "	180 "	-
Impact test	mkg/cm ²	12.1 3.44	8.6 9.85	-

Chemical Analysis:-	C	Si	Mn	P	S
Starboard boiler	.27	.00	.40	.048	.021
Port boiler	.18	.00	.40	.037	.020

A table showing a set of micro-photographs is also attached hereto, the magnification is 100 x.

As ^athe result of the above investigations the Bremisches Amt came to the conclusion that the main boilers are no longer fit for further service and should be replaced by new-ones. In the meantime these have been contracted with Messrs. Fried.Krupp Germaniawerft A.G. of Kiel. The new boilers will be ready in about 6 months time. The vessel is now laid up at Kiel.

The donkey boiler has been examined by the Undersigned and it was found that the heads of about 450 rivets of the circumferential at their lower part and about 50 screw stays were deteriorated to such an extent that they had to be renewed. The shell at end plate, both below the lower manhole door was wasted. For this reason it has been recommended that it should be removed from board. The Owners



agreed to this proposal and the donkey boiler is now removed from board.

J. A. Minkoff

Enclosure:- 5 photographs.
1 table with micro-photographs.



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