

# REPORT ON STEAM TURBINE MACHINERY.

Received at London Office

29 JAN 1945

Date of writing Report 4th Jan. 1945 When handed in at Local Office 5th Jan. 1945. Port of MIDDLESBROUGH.  
No. in Survey held at MIDDLESBROUGH. Date, First Survey 18th August, Last Survey 20th Dec. 1944.  
Reg. Book. on the s.s. "WAVE EMPEROR". (Number of Visits 47.) Tons { Gross 8196.  
Net 4566.

Built at Haverton Hill-on-Tees. By whom built Furness Shipbuilding Co. Ltd. Yard No. 361 When built 1944  
Engines made at West Hartlepool. By whom made Richardsons Westgarth & Co. Ltd. Engine No. 2743 When made 1944  
Boilers made at -do- By whom made -do- Boiler No. 2743 When made 1944  
Shaft Horse Power at Full Power 6800 Owners The Admiralty. Port belonging to LONDON.  
Nom. Horse Power as per Rule 1210 Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted Yes

TEAM TURBINE ENGINES, &c.—Description of Engines No. of Turbines Ahead Astern  
Direct coupled, single or double reduction geared to propelling shafts. No. of primary pinions to each set of reduction gearing, direct coupled to phase  
periods per second, Alternating Current Generator rated Kilowatts Volts at revolutions per minute; for supplying power for driving  
Propelling Motors. Propelling Motors, Type  
rated Kilowatts Volts at revolutions per minute. Direct coupled, single or double reduction geared to propelling shafts.

## ARTICULARS OF TURBINE BLADING.

	H. P.			I. P.			L. P.			ASTERN.		
	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.
1ST EXPANSION												
2ND												
3RD												
4TH												
5TH												
6TH												
7TH												
8TH												

Shaft Horse Power at each turbine Revolutions per minute, at full power, of each Turbine Shaft 1st reduction wheel  
main shaft Pitch Circle Diameter, 1st pinion 2nd pinion 1st reduction wheel main wheel  
Width of Face, 1st reduction wheel main wheel Distance between centres of pinion and wheel faces and the centre of the adjacent bearings,  
1st pinion 2nd pinion 1st reduction wheel main wheel Flexible Pinion Shafts, diameter 1st 2nd  
Pinion Shafts, diameter at bearings External 1st 2nd diameter at bottom of teeth of pinion 1st 2nd  
Wheel Shafts, diameter at bearings, 1st main diameter at wheel shroud, 1st main.  
Generator Shafts, diameter at bearings Propelling Motor Shafts, diameter at bearings  
Main Shafting, diameter of Tunnel Shafting as per rule as fitted diameter of Thrust Shafting as per rule as fitted  
diameter of Screw Shaft as per rule as fitted Is the screw shaft fitted with a continuous liner the whole length of the stern tube Is the after end of the liner  
made watertight in the propeller boss If the liner is in more than one length are the joints burned If the liner does not fit tightly at the  
part between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive If two liners are fitted, is the  
shaft lapped or protected between the liners Is an approved appliance fitted at the after end of the shaft to permit of it being efficiently  
lubricated Length of Stern Bush Diameter of Propeller  
Pitch of Propeller No. of Blades State whether Moveable Total Surface square feet. If Single Screw, are  
arrangements made so that steam can be led direct to the L.P. Turbine, and either the H.P. or I.P. Turbine can exhaust direct to the Condenser  
No. of Turbines fitted with astern wheels Total number of power driven Main and Auxiliary Pumps  
No. and size of Feed Pumps How driven No. and size of Pumps connected to the Main Bilge Line  
How driven No. and size of Ballast Pumps No. and size of Lubricating Oil Pumps, including  
Spare Pump Are two independent means arranged for circulating water through the Oil Cooler No. and size of suction  
connected to both Main Bilge Pumps and Auxiliary Bilge Pumps;—In Engine and Boiler Room and in Holds, &c.  
No. and size of Main Water Circulating Pump Bilge Suctions No. and size of Donkey Pump Direct Suctions  
to the Engine Room Bilges Are all the bilge suction pipes in holds and tunnel well fitted with strum-boxes  
Are the Bilge Suctions in the Machinery Space led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges  
Are all connections with the sea direct on the skin of the ship Are they Valves or Cocks  
Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates Are the Discharge Pipes above or below the deep water line  
Are they each fitted with a Discharge Valve always accessible on the plating of the vessel Are the Blow Off Cocks fitted with a spigot and brass covering plate  
What pipes are carried through the bunkers How are they protected  
Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times  
Is the arrangement of valves and their connections such as to prevent the possibility of water passing from the sea or from water tanks into the cargo or machinery spaces, or from one  
compartment to another Is the Screw Shaft Tunnel watertight Is it fitted with a watertight door worked from

BOILERS, &c.—(Letter for record ) Total Heating Surface of Boilers  
Is Forced Draft fitted No. and Description of Boilers Working Pressure



See Hartlepool Report No. 18588

## Is a Donkey Boiler fitted?

Yes

If so, is a report now forwarded? See Middlesbrough Rpts Nos. 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 9

**Plans.** *Are approved plans forwarded herewith for Shafting* ..... *Main Boilers* ..... *Auxiliary Boilers* ..... *Donkey Boilers* .....  
(If not state date of approval)

**Spare Gear.** State the articles supplied:— As per rule requirements (see also attached list).

*Manufacturer.*

Dates of Survey while building		1944.	Aug. 18, 31,	Sept. 4, 6, 11, 12, 13,	18, 19, 20, 21, 22, 27,	Oct. 2, 5, 9, 11, 16, 17, 20, 24,	26, 27, 30,	Nov. 1, 2, 3, 6, 8, 10, 13, 14, 16, 17, 20, 23, 28, 30,	Dec. 4, 5, 6, 7, 8, 11, 12, 19,	20.
During progress of work in shops - -	{									
During erection on board vessel - - -	{									
Total No. of visits		47.								

Dates of Examination of principal parts—		Casings	Rotors	Blading	Gearing
Wheel shaft	—	Thrust shaft	—	Tunnel shafts	27.10.44.
				Screw shaft	22.9.44.
				Propeller	22.9.44.
Stern tube	13.9.44.	Engine and boiler seatings	11.10.44.	24.10.44.	Engines holding down bolts
					14.11.44.

Completion of pumping arrangements	20.12.44.	Boilers fired	6.11.44.	Engines tried under steam	12.12.44.
			Port Blr.	Drum	Spt. P. = $\frac{8}{8}$
					S = 11/32

Main boiler safety valves adjusted 11/18 & 28/12/44 Thickness of adjusting washers starboard " " 25/64" " " 5/16" " 9/32

Material and tensile strength of Rotor shaft	Identification Mark on Do.
<p>1. Material of Rotor shaft</p>	<p>1. Identification Mark on Do.</p>
<p>2. Tensile strength of Rotor shaft</p>	<p>2. Identification Mark on Do.</p>

Material and tensile strength of Flexible Pinion Shaft..... Identification Mark on Do.

Material and tensile strength of Pinion shaft	Identification Mark on Do.
<p>Material: <u>SAE 52100</u></p> <p>Tensile strength: <u>180,000 psi</u></p>	

Material and tensile strength of 1st Reduction Wheel Shaft	Identification Mark on Do.
<p>  </p>	<p>  </p>

Material of Wheel shaft..... Identification Mark on Do..... Material of Thrust shaft..... Identification Mark on Do.....

Tunnel shafts		Screw shafts	
Material of Tunnel shafts	Identification Marks on Do.	Material of Screw shafts	Identification Marks on Do.

Material of Steam Pipes..... Test pressure..... Date of test.....

Is an installation fitted for burning oil fuel Yes Is the flash point of the oil to be used over 150°F. Yes

Have the requirements of the Rules for carrying and burning oil fuel been complied with..... Yes

Is this machinery a duplicate of a previous case Yes If so, state name of vessel "Empire Protector"

General Remarks (State quality of workmanship, opinions as to class, &c. These engines and boilers were fitted on board)

*(Certificate (if required) to be sent to.....  
 site on or below the space for Committee's Minute.)*

*The Surveyors are requested not to write on or below the space for Committee's Minute.*

The amount of Entry Fee	...	£	:	:	} When applied for,
Special LMC	...	£	26-1 - 6	:	
Donkey Boiler Fee	...	£	:	:	} When received,
Supervision					
Travelling Expenses (if any)		£	6-10- 4	:	19.....

*C. Roman Stuart*  
Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute

FRI. 26 JAN 1945

Assigned + LMC 12,44 F.D. C.L. 2 W.T.B. 490lb (Sph. 475lb)  
FITTER FOR DIA FUEL. 12,44 FLASH POINT ABOVE 160° F. 2 DB 180lb.

FITTED FOR OIL FUEL. **12.44** FLASH POINT ABOVE 160° F.

2 D.B. 1806.

note for S.R.L.

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