

S U N D E R L A N D .

24th July, 1918.

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S.S. "WULSTY CASTLE"

Dear Sir,

In accordance with instructions contained in your letter of 19th April, I attended the official trials of the above vessel and beg to submit the following remarks for the information of the Committee.

The installation consists of two Ljungstrom Radial flow Turbines driving alternators, one turbine on each side of Engine Room with its pair of alternators one at each end of Turbine. These alternators are each 3 Phase, 60 Cycles, 650 volts and 625 Kilowatts. They supply current to two main motors geared on to main shaft (single screw) by helical gearing.

The speed of generating plant or turbine is 3600 R.P.M.

A manoeuvring cubicle is placed at forward end of engine room the lower part of this contains suitable arrangements for giving a variable fluid resistance and is manoeuvred by a hand wheel, the whole being balanced. This gives the necessary variable speeds. For going astern the reverse switch alters the 2 phases. *Reversal is obtained by electrical means & from full ahead to full astern occupies approx 15 secs*

The motors drive through flexible couplings on to two small double helical pinions situated on either side of main gear wheel; the main gear wheel and thrust is incorporated in the body of the gear case, the thrust itself being taken on 6 ahead and 6 astern pads of Mitchell type, the whole running in oil which is directly connected to motor and gear case system. There is forced lubrication throughout.

The feed pump to boilers is an electrically driven centrifugal pump working at 3500 R.P.M. and the bilges are pumped by means of an ordinary Tangye donkey pump. There is also a slow speed donkey feed pump steam driven for use in port or while manoeuvring.

There are separate centrifugal air and circulating pumps for each engine, the former being incorporated.



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in the Kinetic system consisting of a vertical centrifugal pump motor driven having 3 impellers extracting all the air from feed water in the float tank and water sealing the condenser. There is also an air extractor worked by steam jet.

Steam is supplied by two ordinary marine type boilers working at a pressure of 220 lbs per sq. inch. Forced draught is fitted on the Howden system, the draught being taken in trunks from the alternators at about 60 Faht.

The trials took place on various dates from the 29th April.

Some difficulty was experienced during these trials in obtaining the necessary vacuum on condensers of both engines there being evidently an air leak or a number of small air leaks which were difficult to find. It became necessary to rejoin practically all pipes connected to the condensers after which satisfactory vacuum was obtained.

Later on during the trials trouble was experienced in the fluid resistance cones in the manoeuvring cubicle. These were of cast iron and it was found that they were corroding to some extent and it was necessary to renew them and to fit cones made of aluminium. This caused considerable delay.

In the first place both starboard and Port sets were run for some time on the atmosphere without load the object being to dry out any moisture in the windings and to try lubrication system.

After this the starboard Turbo alternator was run on the starboard motor the shafting being disconnected from the propeller and held to prevent rotation; this enabled full amperes to be put on windings for drying motor. The same proceeding was followed for the Port motor the Port Turbo alternator being run on Port motor disconnected from main shafting.

The starboard Turbo alternator was then run on condenser with air and circulating pumps working.

From dead cold to full speed with  $28\frac{1}{2}$ " vacuum took about 9 minutes including warming up. At 1800 R.P.M. the fields of both alternators are excited and at 2100 R.P.M. the circulating pump and air pump begin to rotate and shortly create vacuum thus



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automatically closing the atmospheric exhaust valve. After this the whole plant was brought up to full speed and run for some 2 hours. The Port set was similarly dealt with.

The starboard Turbo alternator was then run with port auxiliaries i.e. air and circulating pumps, and the same test was made with Port Turbo alternator running with Starboard auxiliaries both with satisfactory results.

Another trial which was made consisted of the Starboard Turbo alternator condensing with its own air pump, but circulated by ballast pump a vacuum of 27" being obtained.

Both motors were then run full speed 714 R.P.M. at full volts, 650, in order to test forced lubrication system.

After this the main shaft was coupled up and trials took place with the manoeuvring gear.

Both Starboard and Port Turbo alternators were separately tried for ahead and astern working of propeller, the complete reversal taking 15 seconds.

Subsequently both Turbo alternators were used for driving propeller ahead and astern through the manoeuvring gear with satisfactory results.

The centrifugal boiler feed pump has also been tried against full boiler pressure and appeared to work satisfactorily.

Both engines were run for some hours with shaft coupled up at about 70 shaft revolutions per minute and appeared to be satisfactory, the vessel subsequently leaving for her voyage.

I am, Dear Sir,

Yours faithfully,

G. A. H. H. H.

The Secretary,

London.



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