



C. G. S. Wm J. Stewart

THE C.G.S. "Wm J. STEWART" TWIN-SCREW HYDROGRAPHIC SURVEY STEAMER

for the
CANADIAN HYDROGRAPHIC SERVICE
(PACIFIC COAST DIVISION).

The Bureau has obtained by courtesy of the Canadian Hydrographic Service the following description of the C. G. S. *Wm J. Stewart*, T. S. hydrographic survey steamer to Hydrographic Canadian Service.

The contract entered into between the Department of Marine, Ottawa, and the Collingwood Shipyards Limited, Collingwood, Ontario, for the construction of the above vessel, was completed last July by the handing over to the Department, at Victoria, B. C., of this vessel, after a delivery voyage of 8,070 nautical miles from the port of departure.

This vessel, the newest unit of the Canadian hydrographic fleet, will be employed in the work of extending the charting of the coasts of British Columbia, Vancouver island and the Queen Charlottes. It has been especially designed and equipped for deep-sea work to depths of 2000 fathoms, found on this coast at distances of between 200 and 300 miles off the shore, in order to outline the contours of the ocean bed and provide navigational charts in the interests of both trans-Pacific and coastwise shipping.

The leading dimensions of the vessel are as follows:

Length overall.....	228 feet.
Length between perpendiculars.....	214 feet.
Breadth moulded.....	36 feet.
Depth moulded	23 feet 6 inches.
Mean draft loaded on trial	11 feet 7 inches.
Speed on trial.....	12 knots.
Horsepower.....	1300
Complement, about.....	66 persons.

GENERAL DESCRIPTION.

The vessel has been designed with a straight stem raking forward, cruiser stern, and nine watertight bulkheads. The watertight subdivision of the vessel is very complete, as in addition to the above-mentioned bulkheads there are other watertight longitudinal and transverse bulkheads throughout the vessel completing the system.

The upper deck is of wood framed with steel plates, tie plates and stringer plates.

The main deck is a complete deck of steel, sheathed with corticene. A steel lower deck forward and aft of the machinery and boiler spaces is also fitted and similarly sheathed.

The coal bunkers which are of 300 tons capacity are arranged in the wings abreast the boilers. This tonnage will enable the vessel under cruising conditions to have a large steaming radius.

Accommodation is provided in the ship for a total complement of 66 persons, comprising Hydrographic Survey Staff Officers, Ship's Officers and crew.

The accommodation for the Officer Commanding is situated at the after end of the Staff accommodation, on the main deck, and includes a day cabin, sleeping cabin, and private bathroom.

The Staff accommodation and dining saloon are arranged forward on the main and lower decks directly underneath the chartroom and bridges.

The Hydrographers' chartroom is placed at the fore end of a deckhouse, situated forward on the upper deck, and is equipped with a complete outfit of scientific gear for navigating purposes and Hydrographic work. The office of the Officer Commanding opens off the chartroom. A smoking room and entrance, with washroom adjoining, occupies the after end of the deckhouse.

The accommodation for the other Officers, including the ship's engineers, is arranged on the main deck abreast the engine room, and aft of the Staff accommodation on the lower deck forward. The deck and engine room crews and supernumeraries are housed aft of watertight bulkhead No 18 on the main deck.

Store rooms for the accommodation of special survey equipments, charts, electrical gear, buoys, carpenter and boatswain's outfit, gasoline, stewards and cooks, have been provided in location to meet the service requirements.

A complete system of steam heating has been installed throughout the vessel, the various compartments being heated by wall radiators.

A system of mechanical ventilation is provided to ventilate the Staff quarters and Officers' accommodation on the main and lower decks, and also the engine room. Motor driven supply and exhaust fans capable of supplying air at atmospheric temperature have been installed at suitable stations.

The galley and pantries are furnished with a high class equipment for the service requirements, and are situated abaft the staff accommodation on the main deck about amidships.

An electrically equipped laundry is provided aft on the main deck and drying rooms for the staff and crew have been arranged in the forward end of the boiler casing. The drying rooms are also mechanically ventilated.

Cold storage chambers, cork insulated, and finished in J. D. enamel are situated aft on the lower deck and a liberal subdivision has been allowed for the storage and preservation of fresh provisions for the ship's complement. The refrigerating plant, which is installed in the engine room, comprises one twin cylinder enclosed type ammonia compressor, directly connected to an electric motor, the chambers being cooled by the direct expansion system.

An efficient service of fresh water (hot and cold) has been arranged for, also a similar service of salt water for sanitary purposes, the washing of decks and fire purposes.

The accommodation throughout is of a high standard and every provision is made for the comfort of the ship's complement during the lengthy periods that a ship of this type will remain on survey work.

A well equipped workshop is arranged on a flat at the after end of the engine room, provided with one 18 inch by 32 inch by 10 feet quick-change gear laths, one bench-type belt-driven grinder, one shaper and one portable electric drill, etc... The above-mentioned equipment is driven by an electric motor of the universal type.

STRUCTURAL ARRANGEMENTS.

The vessel is built of steel throughout. The structural castings, namely, stern post, stern tubes and shaft brackets are of cast steel. The rudder is of the single plate type and the keel of flat plate construction.

The main frames are 5 ½ inches by 3 inches by .32 inch bulb angle, spaced 24 inches apart, and web frames 14 inches by .32 inch are fitted approximately 10 feet apart throughout the vessel's length.

The inner bottom, which extends from the forward boiler room bulkhead to the chain locker bulkhead and under the machinery space, is used for reserve boiler feed water, water ballast and domestic fresh water. Solid floors are fitted on every frame forward and aft of the double bottom space and on every fourth frame in way of the double bottom, elsewhere bracket floors are fitted.

The main and lower decks, as stated above, are completely steel plated and the upper and boat decks and bridges framed with tie plates and stringers. All the main transverse and longitudinal bulkheads are constructed to the classification requirements, those bounding the bunkers being made oil-tight. Bilge keels are provided for a length of about 100 feet amidships.

EQUIPMENT.

The radio installation is very complete, the following equipment being provided and installed on board:

- 1 main transmitter rated at 500 watt output;
- 1 long wave receiver;
- 1 radio telephone transmitter and receiver;
- 2 portable radio telephone sets for use by surveyors in maintaining communication with the ship when in detached survey;
- 1 radio direction finder, and
- 2 broadcast receivers.

The above equipment is installed in a large deckhouse situated on the upper deck abaft amidships.

The new vessel is equipped with the usual magnetic compasses and in addition a master gyro compass is fitted on the lower deck forward, with repeaters in the wheelhouse and navigating bridge, and wireless room for radio goniometer.

In addition to the regular wire sounding machine and submarine sentry, fitted aft on the upper deck, an Echo Sounding Machine of the latest British Admiralty design will be installed capable of sounding and accurately recording depths of from 8 fathoms to 2000 fathoms, the recording instruments being installed in the chartroom.

A searchlight of the high intensity type having a range of 5 miles is fitted and operated from a platform on the fore mast.

An automatic telephone system has been installed throughout the vessel in place of the usual arrangement of voice tubes. Communication has been established in all parts of the ship for convenience during hydrographic operations.

The steering gear engine which is of the vertical double steam cylinder type, is fitted on the after engine room bulkhead, and connected up to the rudder crosshead through shafting, gearing, etc..., a steering pedestal being fitted in the wheelhouse, navigating bridge, and aft on the upper deck.

One powerful steam and hand reversing capstan is fitted on the after upper deck for mooring purposes.

The anchors and cables are all in excess of the British Corporation rules, to comply with the special work in which this vessel will be engaged. The anchors are operated by a horizontal steam windlass, situated forward on the upper deck.

The usual standard repeating and telltale telegraphs are fitted to establish communication between the bridge and the engine room.

The life boats and life saving equipment are all in accordance with the requirements of the Canadian Board of Steamship Inspection.

Four gasoline launches 26 feet 8 inches by 7 feet 1 inch by 5 feet 0 inches, 2 life boats 25 feet 0 inches by 7 feet 9 inches by 5 feet 1 ½ inches, three dinghies 16 feet by 5 feet 2 inches by 2 feet, 1 dinghy 20 feet by 5 feet 6 inches by 2 feet 3 inches, and four 18 foot dories are also supplied to further assist in the Hydrographic Survey work. WELIN-McLAUGHLIN automatic type davits along with a powerful boat hoisting winch operated by steam have been installed for handling the launches and lifeboats, etc...

PROPELLING MACHINERY.

The main propelling units consist of two sets of triple expansion engines of the direct acting, surface condensing type. When the engines are developing full power the speed of the propellers is 150 revolutions per minute. A speed control governor is fitted to each engine, the total power developed being sufficient to drive the ship during a 10 hour trial at a speed of 12 knots. The thrust of the propellers is transmitted to the vessel through MICHELL thrust bearings, of the single collar type, fitted to the propeller shaft immediately aft of the main engines.

An independent condenser, uniflux shape, of the two flow type, is provided for each main engine. The condensers are built up of steel plate with end flanges of cast steel, all galvanised, with rolled naval bronze tube plates. The condenser tubes are of A.E. Cupro-nickel 5/4 inch diameter. The engine room auxiliaries consist of duplicate independent air pumps, duplicate centrifugal pumps for circulating the condensers, two main feed pumps with float tank and one auxiliary feed pump of the vertical simplex type for the main boilers. The ballast, general service, sanitary, bilge, hot and cold fresh, and salt water service pumps are of the vertical type, all being steam driven inde-

pendent units. One electrically operated submersible bilge pump has been installed in the engine room.

The boiler feed water will pass through a gravity filter, a multiflow surface feed water heater and a enclosed filter before entering the boilers at 220-230° F.

An evaporator and distilling condenser, both of the vertical type and of ample capacity to meet the requirements of the service, have been installed.

Steam will be supplied by two Scotch type single ended coal fired boilers, constructed for a pressure of 190 pounds per square inch (gauge), each boiler having three corrugated furnaces of the withdrawable type.

The furnaces are arranged to burn British Columbia coal, being equipped with the HOWDEN system of forced draught.

The draught fan drawing the heated air from the engine room discharges through multitubular preheaters fitted in the uptakes, prior to reaching the furnaces.

A pyrometer is fitted at the base of the funnel for recording the temperature of the escaping gases.

Provision has been made for all steam pipes and the radiating surfaces of the machinery and boilers being lagged with efficient non-conducting materials.

An ash ejector is fitted in the stokehold and arranged to discharge above the load line of the vessel.

The electric generating plant comprises two steam driven sets of direct-coupled engines and dynamos, each of 20 kilowatt capacity. These units and the main switchboard are installed in the engine room.

One 5 kilowatt gasoline motor driven generator is installed in the deckhouse aft, on the upper deck, for port and emergency use.

The propellers are of the solid type, made from manganese bronze.

The stern tubes bearings are lined with lignum.

