

## SANDHAYAK CLASS A NEW CLASS OF INDIAN SURVEYING SHIP

by the Indian Naval Hydrographic Office<sup>(\*)</sup>

---

In 1973, the Government of India approved the acquisition of three new surveying ships as replacements for the three ageing surveying ships, *Investigator*, *Jamuna* and *Sutlej*. Consequently, INS *Sandhayak*, the first of the three new surveying ships designed by the Directorate of Naval Design, was built by the Garden Reach Shipbuilders and Engineers, Calcutta, and was commissioned on 26 February 1981. Two more ships of the Sandhayak Class, viz. *Nirdeshak* and *Nirupak*, are under construction and are expected to be commissioned in 1983 and 1984 respectively.



FIG. 1. — INS *Sandhayak* (photograph taken from helicopter).

(\*) Post Box No. 75, Dehra Dun 248001, India.

### Principal characteristics

Length overall .....	85.8 m
Moulded beam .....	12.8 m
Moulded depth .....	5.8 m
Maximum draught .....	3.5 m
Displacement, fully loaded .....	1 820 tons
Propulsion .....	2 GRSE/MAN, 8-cylinder diesel engines developing 1 660 HP each
Operating speed .....	15 knots
Fuel tank capacity .....	264 tons
Fresh water tank capacity .....	169 tons
Endurance .....	6 000 nautical miles
Complement.....	15 officers and 135 sailors

### Propulsion and power generation

The ship has twin screws, each of which is driven by 8-cylinder MAN designed engines manufactured in India by Garden Reach Shipbuilders and Engineers (GRSE). These engines provide the ship a maximum of 16.8 knots. However, the ship's economical speed is 15 knots at which the ship has an endurance of 6 000 nautical miles. The ship has an additional motor-driven, pitch-controlled propeller (PLEUGER) fitted on to the rudder, capable of independently developing a speed of up to 6 knots for manoeuvring in restricted waters. The rudder can be moved 65° on either side when 'Pleuger' is used to facilitate lateral movement of the stern. With the main propulsion in use, the rudder is restricted to 35° on either side. Pleuger cannot, however, be used simultaneously with the main propulsion.

All important auxiliaries of the main engines are engine driven and are not dependent on electric power.

The ship has five diesel generators, each capable of 250 kW of power. Normally two generators are used during sailing.

### Boats and deck equipment

The undermentioned boats are carried by the ship : —

- 4 survey motor boats each 9.4 m long and 2.9 m broad, with 60 HP diesel engines for use in shallow waters. The boats are fitted with Atlas DESO-10 echo sounders and are provided with Hi-Fix 6/Trisponder receivers
- 2 Gemini craft with outboard motors
- 5 non-powered boats for landing in surf, etc.

For survey work, the following deck equipment is fitted : —

- 1.75 ton crane
- 1 hydraulic oceanographic winch taking 6 000 m of 3.5 mm cable





FIG. 3. — View of the bridge showing the auto-pilot, engine controls, compass pelorus, etc.

- 1 Kemp hydrographic davit for using the above oceanographic winch wire
- 1 Plessey environmental portable oceanographic winch carrying 2 000 m of 3 mm wire
- 1 Lucas sounding machine with 6 000 m of 3.5 mm cable
- 4 gravity davits used for hoisting/lowering survey motor boats
- 4 sets of shallow-water breathing-apparatus-type diving equipment, including an air-compressor

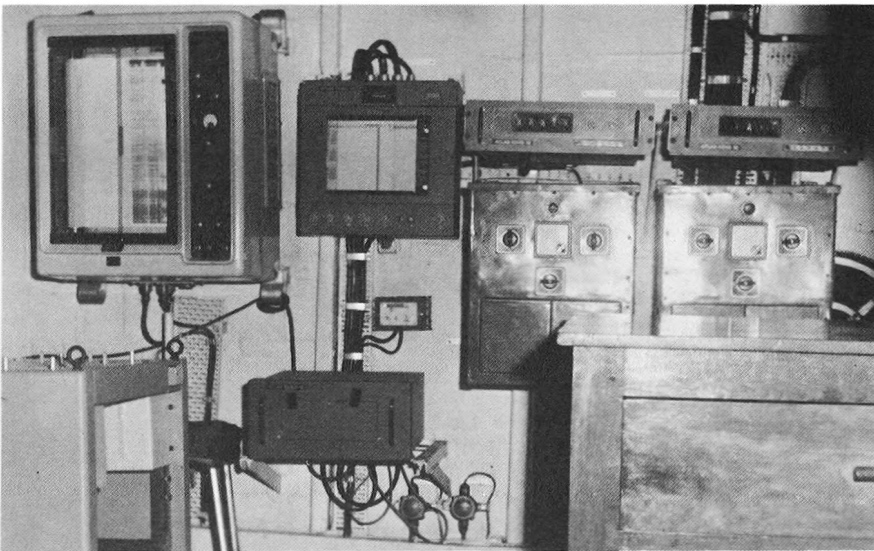


FIG. 4. — A portion of the plotting room showing satellite receiver, DESO-10 echo sounder, etc.

- 1 STD/SV winch which can measure parameters for computing sound velocity to 1 500 m.

### Navigational equipment

- |  |             |
|--|-------------|
| — 1 Autopilot with Mark IV twin gyro   | Anschutz    |
| — 1 Electromagnetic log  | Sagem       |
| — 1 Doppler sonar MX 610D  | Magnavox    |
| — 2 Deso-10 echo sounders with EDIG 10 digital readouts  | Krupp Atlas |
| — 1 radar AC 1629 with 16" anti-collision and 12" true motion displays and accurate ranging unit | Decca       |
| — 1 Receiver Mk 21 with track plotter 350T   | Decca       |
| — 1 Dual-channel satellite navigator MX-1107 interfaced with Doppler sonar 610D.                 | Magnavox    |

### Hydrographic/oceanographic equipment

- |   |                |
|---|----------------|
| — Distance measuring equipment MRA5             | Tellurometer   |
| — Distomat DI3S                                 | Wild           |
| — Satellite geo-receiver MX 1502B               | Magnavox       |
| — Hi-Fix 6 medium-range position fixing system  | Decca          |
| — Trisponder short range position fixing system | Del Norte      |
| — Acoustic command and control system           | N.B.A. Control |
| — Precision depth recorder 778BB                | Kelvin Hughes  |



FIG. 5. — Alouette helicopter used in surveying.

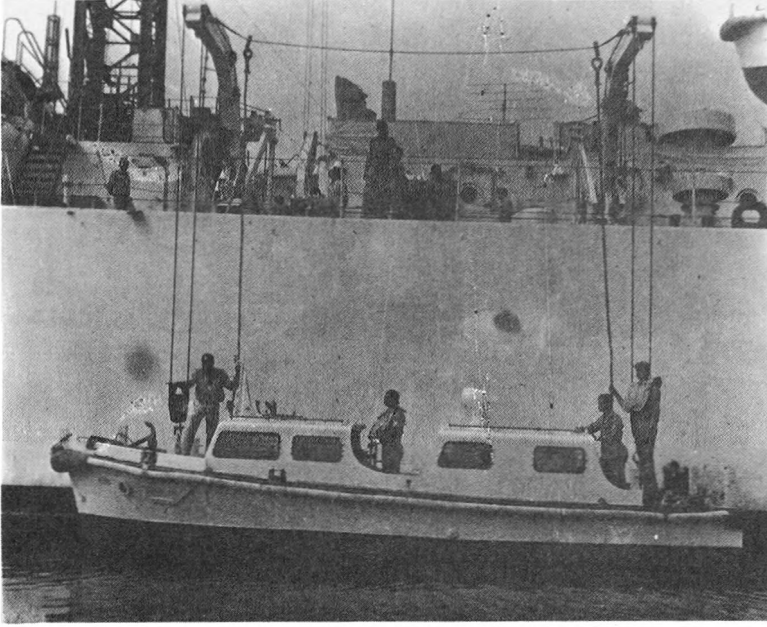


FIG. 6. — Survey motor boat being lowered.

— Side-scan sonar	EG & G
— Automatic tide recorder	N.B.A. Control
— Proton magnetometer	Geometrix
— Sea gravimeter	Askania
— XBT	ECIL, Hyderabad
— STD/SV system with 514D/513D	InterOcean
— Salinometer	Kahlsico
— Direct-reading current meter	Valeport

The chartroom is equipped with various types of calculators and mini-computers such as Keltron 2510, Bush 4640 and HP67.

An automated data logging system, now under development/trials, will soon be installed.

The ship is provided with an “Alouette” helicopter, MK3 type, manufactured by Hindustan Aeronautics Ltd, and a jeep for survey work.

### Communication equipment

— 1 HF TX transmitter	Bharat Electronics Ltd
— 2 HF/MF TX/RK 643/CJP2 transceivers	Redifon
— 1 VHF TX/RX P802G transceiver	Bharat Electronics Ltd
— 2 UHF/VHF TX/RK Mun 119 transceivers	Bharat Electronics Ltd
— 4 All-wave RX RS 512 receivers with FSK attachment	Bharat Electronics Ltd

— 1 RATT system	Hindustan Teleprinters
— 1 Reduced ICs (KMM outfit) with 11 remote positions	Bharat Electronics Ltd
— 1 MF/DF Telegon IV	Telefunken
— 10 Portable HF TX/RX LHP 202 transceivers	Bharat Electronics Ltd

### **Habitability**

The ship is fully air-conditioned. Fresh water can be distilled at the rate of 40 tons per day.

### **CONCLUSION**

INS *Sandhayak* is the first of the class of new surveying vessels built in India. She has been found good as a platform for hydrographic surveying tasks in the coastal waters around India. From the experience of her operation during the last two years, habitability conditions and general layout are being improved on the *Nirdeshak* and *Nirupak* which are under construction in the GRSE yard.