

Poop deck to navigation bridge deck	2.40 metres
Navigation bridge deck to wheelhouse top	2.30 metres

3. TONNAGE & CAPACITY

Gross tonnage	about	1,000 tons
Deadweight	about	410 tons
Capacity :		
Cargo hold, bale	about	450 cubic metres
Fuel oil tanks	about	40 cubic metres
Fresh water tanks	about	65 cubic metres
Water ballast tanks	about	210 cubic metres

4. SPEED & ENDURANCE

Max. speed on trial, 1/4 load condition, clean bottom & calm sea, at max. continuous output of main engines	about	15 knots
Speed on service, full load condition, at 85% output of main engines, incl. 15% power margin	about	13.5 knots
Endurance, full load condition, at service speed defined above	about	1,300 nautical miles

5. SHIP'S COMPLEMENT & PASSENGERS

Ship's complement :

Officers	12
Petty officers	3
Subordinates	20
Sum	<u>35</u>

Passengers :

Cabin class	34
Tourist class (Reclining seats)	74
Economy class (Settees)	<u>302</u>
Sum	410
Grand total	445

6. DECK MACHINERY

Windlass	1 set
Hydraulic motor driven, horizontal type, with 2 sprocket wheels & 2 warping ends 5 t x 9 m/min	
Capstan	1 set
Electric motor driven, vertical type 3 t x 15 m/min x 11 KW	
Steering gear	1 set
Electro-hydraulic, twin-rudder parallel steering type, with 2 hydraulic pump units About 5 t-m x 2.2 KW	
Cargo hoisting winch	2 sets
Hydraulic motor driven, horizontal type 3 t x 30 m/min	
Boom luffing winch	2 sets
Hydraulic motor driven, horizontal type 3 t x 30 m/min	
Boom slewing winch	2 sets
Hydraulic motor driven, horizontal type 3 t x 30 m/min	
Boat winch	1 set
Electric motor driven, horizontal type 1 t x 15 m/min x 3.7 KW	
Electric hoist	2 sets
Electric motor driven, suspended type 500 kg x 20 m/min x 3.7 KW	
Lift	1 set
Electric motor driven, push-button control 60 kg x 30 m/min	

7. CREW'S ACCOMMODATION

Living rooms :

Captain	Single-berthed cabin, with private lavatory
Chief engineer	Single-berthed cabin, with private lavatory
Other officers	2-berthed cabin
Petty officers	3-berthed cabin
Subordinates	4- or 6-berthed cabin
Mess room	Officers' mess room seating 12 persons; Crew's mess room seating 12 persons
Sanitary spaces	Officers' lavatory with 1-WC & 1-shower; Crew's lavatory with 3-WC's & 3-showers; Laundry with electric washing machine

8. PASSENGERS' ACCOMMODATION

Cabin class, special	2-berthed cabin with private lavatory
Cabin class	4-berthed cabin with 2 double-tier sofa-beds (upper tier being foldable)
Tourist class	Common passenger space with reclining chairs, back of each chair having foldable table on its backside
Economy class	Common passenger spaces with upholstered settees with backs having foldable tables on backsides
Mess room	Separate mess room for cabin class passengers, seating 20 persons
Sanitary spaces	Cabin class passengers' lavatory (gents) incl. showers & WC's; Cabin class passengers' lavatory (ladies) incl. showers & WC's; Tourist & economy class passengers' WC rooms (gents); Tourist & economy class passengers' WC rooms (ladies)

9. COMMISSARY SPACES & KIOSK

Galley	1 - Common galley with electric cooking equip- ment capable of serving food for officers, crew, all cabin class passengers & 10% of tourist & economy class passengers
Pantry	1 - Pantry for cabin class passengers' mess room
Kiosk	1 - Kiosk, selling food for tourist & economy class passengers & other general articles

10. JOINER WORK & FURNITURE

Joiner work :

Steel wall lining	Marine plywood of 9 mm. with plastic overlay
Overhead ceiling	Marine plywood of 5.5 mm. with plastic overlay
Wooden partitions	Chip-board of 22 mm. with plastic overlay
Insulation	Glass wool insulation for steel walls & deck-heads exposed to weather & engine room

Deck covering :

Officers' cabins	Plastic tiling on latex deck composition
Crew's cabins	Latex deck composition
Officers' mess room	Plastic tiling on latex deck composition
Crew's mess room	Plastic tiling on latex deck composition
Cabin class passengers' cabins & mess room	Plastic tiling on latex deck composition
Tourist class passengers' space	Latex deck composition
Economy class passengers' spaces	Latex deck composition
Passageways	Latex deck composition
Wheelhouse	Plastic tiling on latex deck composition
Exposed portion of poop deck	Latex deck composition
Other exposed deck	Bare steel, coated with deck paint
Sanitary spaces	Mosaic tile on cement bed
Galley	Grooved tile on cement bed

Beds :

Officers & crew	Wooden bed
Cabin class, special	Wooden bed
Cabin class	Sofa-bed, double-tier, upper tier being folded down to form sofa back in the daytime

Tourist & economy class passengers' seats :

Tourist class	Reclining chair, reclining back having foldable table on its backside
Economy class	Settee, steel-framed, upholstered, back having foldable table on its backside

Upholstery :

Bed mattress	Cover of textile-fabric & stuffing of polyurethane foam for cabin class, special; Cover of vinyl-leather & stuffing of polyurethane foam for cabin class, officers & crew.
Sofa-bed	Cover of textile-fabric & stuffing of polyurethane foam.
Sofa	Cover of textile-fabric & stuffing of polyurethane foam for captain & chief engineer; Cover of vinyl-leather & stuffing of polyurethane foam for other officers.
Chair, seat & back	Wooden framed chair with seat & back covered with textile-fabric & stuffed with polyurethane foam for cabin class, special; Reclining chair with seat & back covered with vinyl-leather & stuffed with polyurethane foam for tourist class; Steel-framed settee with seat covered with vinyl-leather & stuffed with polyurethane foam & back of plywood for economy class; Steel revolving chair with seat & back covered with vinyl-leather & stuffed with polyurethane foam for officers & petty officers
Curtain	Synthetic fibre textile

11. CARGO HOLDS & CARGO GEAR

Cargo holds :

No. of compartments	2 compartments
Bottom ceiling	Close wooden ceiling
Side sparring	Open wooden sparring on shell sides

Cargo hatches :

No. of hatches	2
Hatch cover	Hinged folding steel hatch cover, operated by wire ropes from derrick boom

Derrick booms :

No. of booms	2 (one for each hatch)
Capacity of boom	5 tons
Type of cargo work	Double-topping, single swing-boom system

Winches :

Type	Hydraulic winch, horizontal type
Cargo hoisting winch	2 sets - 3 t x 30 m/min
Boom luffing winch	2 sets - 3 t x 30 m/min
Boom slewing winch	2 sets - 3 t x 30 m/min

12. VENTILATION & AIR - CONDITIONING

Classification :

Officers' cabins & mess room	Air-conditioning
Crew's cabins & mess room	Air-conditioning
Cabin class passengers' cabins & mess room	Air-conditioning
Tourist class passengers' space	Mechanical supply ventilation
Economy class passengers' spaces	Mechanical supply ventilation
Wheelhouse	Cooled air supply
Galley	Mechanical supply & exhaust ventilation
Sanitary spaces	Mechanical exhaust ventilation
Dry provision store	Mechanical exhaust ventilation
Engine room	Mechanical supply & exhaust ventilation
Steering gear room	Natural ventilation
Stores	Natural ventilation
Cargo holds	Natural ventilation

Air-conditioning system :

Design condition : -

	<u>Outside</u>	<u>Inside</u>
Air temperature	35°C	27°C
Relative humidity	80 %	50 %
Type of system	Centralized air-conditioning system, electric motor driven, sea water cooled, automatically controlled.	
Air ducting	Insulated ducting of galvanized thin steel sheet, with air supply ports of diffuser or pankah-louvre type.	

Rates of air-change in mechanically ventilated spaces :

Tourist class passengers' space	30 times per hour
Economy class passengers' spaces	40 times per hour
Galley	Supply : 30 times per hour Exhaust : 45 times per hour
Sanitary spaces	20 times per hour
Dry provision store	5 times per hour

13. REFRIGERATING SYSTEM

Refrigerating plant	Electric motor driven, R-12 direct expansion type, automatically controlled, with a stand-by compressor
Temperature	Lobby + 5°C Vegetable store + 3°C Meat store -10°C

14. BOAT & LIFE SAVING APPLIANCES

Boat	1 - FRP motor dinghy, 6.5 metres in length
Boat davit	1 - Radial davit, with electric motor driven boat winch
Inflatable liferaft	18 - Inflatable liferaft in container, 25 persons each
Lifebuoy	8 - Lifebuoy
Lifejacket	445 - Lifejacket for adult 45 - Lifejacket for infant

15. FIRE DETECTING & EXTINGUISHING SYSTEMS & APPLIANCES

Fire detecting system Smoke tube fire detector for officers' living quarter, crew's living quarter, passengers' spaces, galley, cargo holds & engine room.

Fire-extinguishing systems & appliances :

Officers' & crew's living quarter	Hydrants & portable fire extinguishers
Passengers' spaces	Hydrants & portable fire extinguishers
Cargo holds	Carbon dioxide fire smothering system
Engine room	Carbon dioxide fire smothering system, hydrants & portable fire extinguishers
Store spaces	Hydrants & portable fire extinguishers

16. DECK & OUTBOARD FITTINGS

Accommodation ladder	2 - Light alloy made, feathering type, about 2.5 metres in length & 600 mm in width
Awning	1 - Removable vinylon canvas awning over poop deck aft

Windows	Light alloy framed, fixed or hinged-up rectangular windows for wheelhouse; Light alloy framed, side-hinged rectangular windows for cabin class passengers' cabins; Light alloy framed side scuttles for officers' cabins & mess room, tourist & economy class passengers' spaces, sanitary spaces, etc. above main deck level.
Fendering	Hollow half-round steel fender along main deck side line on each side

17. ANCHORS, CHAIN CABLES & ROPES

Bower anchor, stockless, 1,020 kg	3
Bower anchor cable, welded stud link chain cable, NK Grade 2, 28 mm dia. x 192.5 m & 165 m in length	2 lines
Towline, flexible steel wire rope (6 x 24), 22.4 mm dia. x 130 m in length	1 line
Mooring line, vinylon rope 34 mm dia. x 140 m in length	3 lines

PART 2. M A C H I N E R Y

1. MAIN ENGINES

No. of sets	2 sets
Type	Vertical, four stroke cycle, single acting, airless injection, trunk piston, supercharged, uni-directional, marine diesel engine with reverse/reduction gear
Max. continuous output	1,000 PS at 800 - 1,100 RPM (engine revolution)
Cooling system	Indirect cooling by fresh water
Starting system	Compressed air starting
Control system	Remote control from wheelhouse for engine speed & ahead/astern, Direct manual control for starting & stopping
Attachments	Cooling fresh water pump 1 set Lubricating oil pump (engine) 1 set Fuel oil supply pump 1 set Reverse/reduction gear with pump 1 set Exhaust turbo-supercharger 1 set Intermediate air cooler 1 set
Fuel oil	Diesel oil

2. SHAFTING & PROPELLERS

No. of shaft lines	2 lines
Intermediate shaft	Solid shaft of forged steel
Propeller shaft	Solid shaft of forged steel with bronze sleeves & rubber covering between sleeves
Stern tube	Cast iron or fabricated steel stern tube with rubber bearings
Propeller	4- or 3-bladed solid propeller of manganese bronze

3. DIESEL GENERATOR SETS

No. of sets	2 sets
Diesel engine prime mover :	
Type	Vertical, four stroke cycle, single acting, airless injection, trunk piston, supercharged, diesel engine
Max. continuous output	330 PS at 1,000 RPM
Cooling system	Indirect fresh water cooling
Starting system	Compressed air starting

Generator :

Type	Drip-proof, self-ventilated, self-excited, marine A.C. generator
Phase & frequency	3-phase, 50 Hz
Voltage	405 V
Rated output	275 KVA (220 KW), continuous
Insulation	Class B

4. AUXILIARY MACHINERY & EQUIPMENT IN ENGINE ROOM

- Main air compressor 1 set
Electric motor driven, vertical, double stage, sea water cooled, reciprocating air compressor, automatically started & stopped
18 m³/h (piston displacement) x 30 kg/cm² x 3.7 KW x 1,000 RPM
- Auxiliary air compressor 1 set
Diesel driven, vertical, double stage, sea water cooled, reciprocating air compressor, hand started
10 m³/h x 30 kg/cm² x 3.5 PS
- Cooling sea water pump 2 sets
Electric motor driven, vertical or horizontal, centrifugal pump
Capacity as per engine maker's standard specification, each pump serving for two main engines simultaneously
- Auxiliary cooling fresh water pump 1 set
Electric motor driven, horizontal, centrifugal pump
Capacity as per engine maker's standard specification
- Auxiliary lubricating oil pump (main engine) 1 set
Electric motor driven, horizontal, gear pump
Capacity as per engine maker's standard specification
- Auxiliary fuel oil supply pump 1 set
Electric motor driven, horizontal, gear pump
Capacity as per engine maker's standard specification
- Auxiliary lubricating oil pump (reverse/reduction gear) 1 set
Electric motor driven, horizontal, gear pump
Capacity as per gear maker's standard specification
- Cooling sea water for auxiliary machinery 1 set
Electric motor driven, horizontal, centrifugal pump
75 m³/h x 30 m x 15 KW x 1,500 RPM

Main fuel oil transfer pump 1 set
 Electric motor driven, horizontal, gear pump, automatically started & stopped
 5 m³/h x 2.5 kg/cm² x 1.5 KW x 1,000 RPM

Auxiliary fuel oil transfer pump 1 set
 Electric motor driven, horizontal, gear pump, automatically started & stopped
 2 m³/h x 2.5 kg/cm² x 0.75 KW x 1,500 RPM

Fire, general service & auxiliary cooling sea water pump for auxiliary machinery 1 set
 Electric motor driven, horizontal, self-priming, centrifugal pump
 80/40 m³/h x 30/55 m x 15 KW x 1,500 RPM

Fire, bilge & ballast pump 1 set
 Electric motor driven, horizontal, self-priming, centrifugal pump
 60/30 m³/h x 30/55 m x 11 KW x 1,500 RPM

Bilge pump 1 set
 Electric motor driven, vertical, piston pump
 1 m³/h x 20 m x 0.4 KW x 1,000 RPM

Fresh water pump 2 sets
 Electric motor driven, horizontal, centrifugal or Wesco pump, automatically started & stopped
 5 m³/h x 25 m x 1.5 KW x 3,000 RPM

Sanitary/refrigerator cooling sea water pump 1 set
 Electric motor driven, horizontal, centrifugal pump
 30 m³/h x 25 m x 5.5 KW x 1,500 RPM

Fuel oil purifier 1 set
 Electric motor driven, centrifugal separator, with suction & discharge pumps
 700 ltr/h x 1.5 KW x 1,500 RPM

Lubricating oil purifier 1 set
 Electric motor driven, centrifugal separator, with suction & discharge pumps
 700 ltr/h x 1.5 KW x 1,500 RPM

Engine room ventilating fan 2 sets
 Electric motor driven, vertical, axial-flow, reversible fan
 180 m³/min x 25 mm aq x 2.2 KW x 1,500 RPM

Oily bilge water separator 1 set
 1 m³/h, oil content of 100 ppm

lubricating oil filter for generator engine . 2 sets
 By-pass filtering, oil filter with renewable elements

Main air reservoir . 2 sets
 Welded, cylindrical type
 Capacity as per engine maker's standard specification for twin-engines

Auxiliary air reservoir . 1 set
 Welded, cylindrical type
 About 60 - 80 ltr x 30 kg/cm²

5. CONTROL & ALARM SYSTEMS

Main engine control . Local manual control for starting & stopping,
 Remote control for engine speed & ahead-astern

Alarms :

Main engines	Cooling fresh water high temperature Lubricating oil low pressure
Reverse/reduction gear	Lubricating oil low pressure
Generator engines	Cooling fresh water high temperature Lubricating oil low pressure Overspeed (emergency stop)
Main air reservoirs	Low pressure
Engine room tanks	Low level alarms as necessary

PART 3. ELECTRICAL INSTALLATIONS

1. PRIMARY ELECTRIC POWER SOURCES

Main generator 2 sets
Diesel driven, drip-proof, self-ventilated, self-excited, marine
A.C. generator
275 KVA x 405 V x 3-phase x 50 Hz x 1,000 RPM

Shore connection box 1 set
Wall-mounted, drip-proof type, with phase sequence indicator
A.C. 400 V x 120 A x 3-phase x 50 Hz

2. SECONDARY ELECTRIC POWER SOURCES

Transformer 4 sets
Drip-proof, self-cooled, dry, marine type
25 KVA x 400/235 V x single-phase x 50 Hz

Storage battery for general use 2 sets
Lead-acid, marine storage battery
400 AH x 24 V

Storage battery for radio use 1 set
Lead-acid, marine storage battery
200 AH x 24 V

Rectifier 1 set
Silicon rectifier, with transformer
AC 400 V / DC 32 V x 60 ampere

3. SWITCHBOARDS

Main switchboard 1 set
Self-supported, drip-proof, dead-front type

Battery charging & discharging switchboard 1 set
Self-supported, drip-proof, dead-front type

4. ELECTRIC LIGHTING

Officers' cabins	Fluorescent lamps with globes
Crew's cabins	Fluorescent lamps with globes
Officers' & crew's mess rooms	Fluorescent lamps with globes
Cabin class passengers' cabins & mess room	Fluorescent lamps with globes
Tourist class passengers' space	Fluorescent lamps with globes
Economy class passengers' spaces	Fluorescent lamps with globes
Interior passageways	Fluorescent lamps with or without globes
Galley	Incandescent lamps with globes
Sanitary spaces	Fluorescent or incandescent lamps with globes
Stores	Incandescent lamps with protective globes
Engine room	Fluorescent & incandescent lamps with globes
Weather deck passageways	Incandescent lamps with protective globes
Cargo lamps	4 - 500 W fixed incandescent flood lamps 8 - 200 W portable incandescent lamps
Flood-light projector	6 - 500 W incandescent lamps 4 - 400 W mercurial lamps
Searchlight	1 - 3 KW directional searchlight
Funnel mark projector	2 - 500 W fixed incandescent flood lamps
Gangway lamps	4 - 300 W incandescent flood lamps

5. INBOARD COMMUNICATION SYSTEMS & APPLIANCES

Public address system	1 set
50 W output, incorporating talk-backs from bow & stern, radio broadcasting receiver & record or cassette tape player	
Automatic exchanging telephone	1 set
10-point telephone set	
Battery telephone, direct call	2 sets
Wheelhouse to engine room	
Wheelhouse to steering gear room	
Signal bell with reply	3 sets
Wheelhouse to engine room	
Wheelhouse to steering gear room	
Engine room to fuel filling stations	

Call buzzer system	3 sets
Officers' use,	
Cabin class passengers' use	
Call from engine room to chief engineer	

Alarm systems :

General alarm system	1 set
Refrigerated chamber alarm system	1 set
Steering gear alarm system	1 set
Engineer's alarm system	1 set
Smoke tube fire detector system	1 set
Manually operated fire alarm system	1 set

Remote indication systems :

Main engine revolution indicator system	1 set
Helm angle indicator system	1 set

6. NAVIGATION AIDES

Gyroscopic compass & auto-pilot system	1 set
Marine radar, 40-mile range 10" screen	2 sets
Echo sounder	1 set
Electro-magnetic log or Doppler log	1 set
Anemometer & anemoscope	1 set
Electric clear-view screen, 30 cm dia.	2 sets
Time controller for air hown & motor siren	1 set
Motor siren	1 set

7. RADIO COMMUNICATION EQUIPMENT

SSB radio-telephone transceiver, 100 W output	1 set
VHF radio-telephone transceiver, 20 W outout	1 set

G. T. 700 TONS PASSENGER & CARGO VESSEL

OUTLINE SPECIFICATION

PART 1. H U L L

1. GENERAL DESCRIPTION

The vessel shall be a high speed, triple-screw, passenger and cargo boat intended for transportation of passengers and minor quantity of general cargo along the coast of Tanzania.

The main hull structure shall be constructed of steel, while the astern portion of the cabin deck and the deckhouses above this deck shall be constructed of sea water resisting light alloy. High tensible steel shall be used for shall plating and other structural members as may be considered necessary. The vessel shall be designed, constructed and fitted out under the special survey by and to the classification requirements of internationally recognized ship classification society to obtain its highest class for the coasting service.

2. PRINCIPAL DIMENSIONS

Length, overall	about	60.00 metres
Length between perpendiculars		55.00 metres
Breadth, moulded		9.00 metres
Depth, moulded		4.00 metres
Load draught, moulded, designed		2.50 metres
Tween-deck hights:		
Main deck to cabin deck		2.25 metres
Cabin deck to navigation bridge deck		2.25 metres
Navigation bridge deck to wheelhouse top		2.20 metres

3. TONNAGE & CAPACITY

Gross tonnage	about	700 tons
Deadweight	about	130 tons
Capacity:		
Cargo hold	about	35 cubic metres
Fuel oil tanks	about	58 cubic metres
Fresh water tank	about	28 cubic metres

4. SPEED & ENDURANCE

Max. speed on trial, 1/4 load condition, clean bottom & calm sea, at max. continuous output of main engines	about	knots
Speed on service, full load condition, at 85% output of main engines, incl. 15% power margin	about	22 knots
Endurance, full load condition, at service speed defined above	about	700 nautical miles

5. SHIP'S COMPLEMENT & PASSENGERS

Ship's complement :

Officers	10
Petty officers	3
Subordinates	18
Sum	31

Passengers :

Cabin class A	4
Cabin class B	16
Cabin class C	28
Tourist class A	186
Tourist class B	84
Sum	318
Grand total	349

6. DECK MACHINERY

Windlass	1 set
Electric motor driven, horizontal type, with 2 sprocket wheels & 2 warping ends 4 t x 9 m/min x 11 KW	
Capstan	1 set
Electric motor driven, vertical type 3 t x 15 m/min x 11 KW	
Steering gear	1 set
Electro-hydraulic, twin-rudder parallel steering type, with 2 hydraulic pump units 7.5 t-m x 3.7 KW	
Boat/cargo winch	1 set
Electric motor driven, horizontal type 1 t x 18 m/min x 5.5 KW	

Electric hoist 1 set

Electric motor driven, suspended type
500 kg x 20 m/min x 3.7 KW

7. CREW'S ACCOMMODATION

Living rooms :

Captain	Single-berthed cabin
Chief engineer	Single-berthed cabin
Other officers	2-berthed cabin
Petty officer	3-berthed cabin
Subordinates	Dormitories, 10-berthed & 8-berthed
Mess rooms	Officers' mess room seating 10 persons Crew's mess room seating 21 persons
Sanitary spaces	Officers' lavatory with 1-WC & 1-shower Crew's lavatory with 2-WCs & 2-showers

8. PASSENGERS' ACCOMMODATION

Cabin class A	2-berthed cabin with private lavatory comprising washbasin, WC & shower
Cabin class B	4-berthed cabin with 2-double tier sofa-bed (upper tier being foldable), 1 table & 2 chairs
Cabin class C	14-berthed cabin with 7 double-tier sofa-bed (upper tier being foldable)
Tourist class A	Common passenger spaces with reclining chairs, back of each chair having foldable table on its backside
Tourist class B	Common passenger space with upholstered settees with backs having foldable tables on backsides
Mess room	Separate mess room for cabin class passengers, seating 24 persons
Sanitary spaces	Cabin class passengers' lavatory (gents) incl. shower & WCs, Cabin class passengers' lavatory (ladies) incl. shower & WCs, Tourist class passengers' WC rooms (gents), Tourist class passengers' WC rooms (ladies)

9. COMMISSARY SPACES & KIOSK

Galley	1 - Common galley with electric cooking equipment capable of serving food for officers, crew, all cabin class passengers & 10% of tourist class passengers
Pantry	1 - Pantry for cabin class passengers' mess room
Kiosk	1 - Kiosk, selling food for tourist class passengers & other general articles

10. JOINER WORK & FURNITURE

Joiner work :

Steel wall lining	Marine plywood of 5.5 mm, with plastic overlay
Overhead ceiling	Marine plywood of 3 mm, with plastic overlay
Wooden partitions	Marine plywood of 19 mm, with plastic overlay
Insulation	Glass wool insulation for metallic walls & deckheads exposed to weather & engine room

Deck covering :

Officers' cabins	Latex deck composition
Crew's cabins	Latex deck composition
Cabin class passengers' cabins & mess room	Plastic tiling on latex deck composition
Tourist class passengers' spaces	Latex deck composition
Passages	Latex deck composition
Sanitary spaces	Mosaic tile on cement bed
Galley	Grooved tile on cement bed

Beds :

Officers	Wooden bed
Crew	Sofa-bed, double-tier, upper tier being folded down to form sofa back in the daytime
Cabin class A	Wooden bed, single-tier
Cabin class B & C	Sofa-bed, double-tier, upper tier being folded down to form sofa back in the daytime

Tourist class passengers' chairs & settees :

Chairs (A-class spaces)	Reclining chair, with seat & back covered with vinyl-leather & stuffed with polyurethane foam, reclining back having foldable table on its back
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Settees
(B-class spaces)

Frames of steel pipe & seat & back covered with vinyl-leather & stuffed with polyurethane foam, back having foldable tables on its backside

Upholstery :

Bed mattress

Cover of moquette & stuffing of polyurethane foam for Cabin class A,
Cover of vinyl-leather & stuffing of polyurethane foam for Cabin class B & C, officers & crew.

Sofa-bed

Cover of vinyl-leather & stuffing of polyurethane foam.

Sofa

Cover of vinyl-leather & stuffing of polyurethane foam.

Chair seat & back

Cover of moquette & stuffing of polyurethane foam for Cabin class A,
Cover of vinyl-leather & stuffing of polyurethane foam for Cabin class B, Tourist classes, officers & crew.

Curtain

Synthetic fibre textile.

11. CARGO HOLD & CARGO GEAR

Cargo hold :

No. of compartment	1 compartment
Bottom ceiling	Close wooden ceiling
Side sparring	None

Cargo hatch :

No. of hatch	1
Hatch cover	Light alloy hatch cover of pontoon type, with 2 sheets of vinylon canvas tarpaulin

Cargo/boat davit :

Type	Radial davit with electric winch, 0.9 ton
No. of davit	1 set

12. VENTILATION & AIR - CONDITIONING

Classification :

Officers' cabins & mess room	Air-conditioning
Crew's dormitories & mess room	Air-conditioning
Cabin class passengers' cabins & mess room	Air-conditioning

Tourist class passengers' spaces	Mechanical supply ventilation
Wheelhouse	Cooled air supply
Galley	Mechanical supply & exhaust ventilation
Sanitary spaces	Mechanical exhaust ventilation
Dry provision store	Mechanical exhaust ventilation
Engine room	Mechanical supply & exhaust ventilation

Air-conditioning system:

Design conditions:-

	<u>Outside</u>	<u>Inside</u>
Air temperature	35°C	27°C
Relative humidity	80%	50%
Type of system	Centralized air-conditioning system, electric motor driven, sea water cooled, automatically controlled.	
Air ducting	Insulated ducting of galvanized thin steel sheet, with air supply ports of diffuser or pankah-louvre type.	

Rates of air-change in mechanically ventilated spaces:

Tourist class passengers' spaces	30 times per hour
Galley	Supply : 30 times per hour Exhaust : 45 times per hour
Sanitary spaces	20 times per hour
Dry provision store	5 times per hour

13. BOAT & LIFE SAVING APPLIANCES

Boat	1 - FRP motor dinghy, 6.5 metre in length 1 - FRP hydro jet boat, 20 passengers
Boat davit	1 - Radial davit, with electrically driven winch, commonly used for cargoing
Inflatable liferaft	14 - Inflatable liferaft in container, 25 persons, each
Lifebuoy	8 - Lifebuoy
Lifejacket	349 - Lifejacket for adult 32 - Lifejacket for infant

14. FIRE - EXTINGUISHING SYSTEMS & APPLIANCES

Fire detecting system Smoke tube fire detector for officers' living quarter, crew's living quarter, passengers' spaces, galley, cargo hold & engine room.

Fire fighting systems & appliances :

Officers' & crew's quarters	Hydrants & portable fire extinguishers
Passengers' spaces	Hydrants & portable fire extinguishers
Cargo hold	Hydrants
Store spaces	Hydrants & portable fire extinguishers
Engine room	Hydrants & portable fire extinguishers

15. ANCHORS, CHAIN CABLES & ROPES

Bower anchor, stockless, 900 kg	3
Bower anchor cable, welded stud link chain cable, NK Grade 2, 26 mm. dia. x 192.5 m. & 165 m. in length	2 lines
Towline, flexible wire rope (6 x 24), 20 mm. dia. x 180 m. in length	1 line
Mooring line, vinylon rope, 34 mm. dia. x 140 m. in length	3 lines

PART 2. MACHINERY

1. MAIN ENGINES

No. of sets	3 sets
Type	Vee-type, four stroke cycle, single acting, airless injection, trunk piston, supercharged, marine diesel engine with reverse/reduction gear
Max. continuous output	3,290 PS at 1,200 - 1,500 RPM
Cooling system	Indirect fresh water cooling
Starting system	Compressed air starting
Control system	Remote control from wheelhouse for engine speed & ahead/astern, Direct manual control for starting & stopping
Attachments	Cooling sea water pump 1 set Cooling fresh water pump 1 set Lubricating oil pump 1 set Fuel oil supply pump 1 set Exhaust turbo-supercharger 2 sets Intermediate air cooler 2 sets Reverse/reduction gear with L.O. pump & cooler 1 set

2. SHAFTING & PROPELLERS

No. of shaft lines	3 lines
Intermediate shaft	Solid shaft of forged steel
Propeller shaft	Solid shaft of forged steel with bronze sleeves & rubber covering between sleeves
Stern tube	Fabricated steel stern tube with rubber bearing
Shaft bracket	Cast and/or fabricated steel shaft bracket with rubber bearing
Propeller	Four-bladed solid propeller of manganese bronze

3. DIESEL GENERATOR SETS

No. of sets	2 sets
Diesel engine prime mover :	
Type	Vertical, four stroke cycle, single acting, airless injection, trunk piston, diesel engine
Max. cont. output	300 PS at 1,500 RPM
Cooling system	Indirect fresh water cooling
Starting system	Compressed air starting

Generator :

Type	Drip-proof, self-ventilated, self-excited, marine A.C. generator
Phase & frequency	3-phase, 50 Hz
Voltage	405 V
Rated output	250 KVA (200 KW), continuous
Insulation	Class B

4. AUXILIARY MACHINERY & EQUIPMENT IN ENGINE ROOM

Main air compressor	1 set
Electric motor driven, vertical, double stage, sea water cooled, reciprocating air compressor, automatically started & stopped 18 m ³ /h (piston displacement) x 30 kg/cm ² x 3.7 KW x 1,000 RPM	
Auxiliary air compressor	1 set
Diesel driven, vertical, double stage, sea water cooled, reciprocating air compressor, manually started 10 m ³ /h x 30 kg/cm ² x 3.5 PS	
Auxiliary lubricating oil pump	1 set
Electric motor driven, vertical, gear pump Capacity as per engine maker's standard specification	
Auxiliary fuel oil supply pump	1 set
Electric motor driven, horizontal, gear pump Capacity as per engine maker's standard specification	
Auxiliary lubricating oil pump for reverse/reduction gear	1 set
Electric motor driven, horizontal, gear pump Capacity as per gear maker's standard specification	
Cooling sea water pump for auxiliary machinery	1 set
Electric motor driven, horizontal, centrifugal pump 75 m ³ /h x 30 m x 15 KW x 1,500 RPM	
Fuel oil transfer pump	1 set
Electric motor driven, horizontal, gear pump, automatically started & stopped 5 m ³ /h x 2.5 kg/cm ² x 1.5 KW x 1,000 RPM	
Fire, general service & auxiliary cooling sea water pump	1 set
Electric motor driven, vertical, self-priming, centrifugal pump 105 m ³ /h x 30 m x 19 KW x 1,500 RPM	
Fire, bilge, ballast & auxiliary cooling fresh water pump	1 set
Electric motor driven, vertical, self-priming, centrifugal pump 90 m ³ /h x 40 m x 19 KW x 1,500 RPM	

Bilge pump	1 set
Electric motor driven, vertical, piston pump 1 m ³ /h x 20 m x 0.4 KW x 1,000 RPM	
Fresh water pump	2 sets
Electric motor driven, horizontal, centrifugal or Wesco pump, automatically started & stopped 5 m ³ /h x 25 m x 1.5 KW x 3,000 RPM	
Fuel oil purifier	2 sets
Electric motor driven, centrifugal separator, with suction & discharge pumps, automatic sludge discharge control 3,000 ltr/h x 5.5 KW x 1,500 RPM	
Lubricating oil purifier	1 set
Electric motor driven, centrifugal separator, with suction & discharge pumps, automatic sludge discharge control 2,000 ltr/h x 3.7 KW x 1,500 RPM	
Engine room ventilating fan	4 sets
Electric motor driven, vertical, axial-flow, reversible fan 300 m ³ /min x 25 mm aq x 3.7 KW x 1,500 RPM	
Oily bilge water separator	1 set
1 m ³ /h, as per IMO standards	
Lubricating oil filter for auxiliary engine	1 set
Forced circulated, oil filter with renewable elements	
Main air reservoir	2 sets
Welded, cylindrical type Capacity as per engine maker's standard specification	
Auxiliary air reservoir	1 set
Welded, cylindrical type About 100 ltr x 30 kg/cm ²	

5. CONTROL & ALARM SYSTEMS

Main engine control	Local manual control for starting & stopping Remote control for engine speed & ahead/astern
Alarms :	
Main engines	Cooling fresh water high temperature Lubricating oil low pressure
Reverse/reduction gear	Lubricating oil low pressure
Generator engines	Cooling fresh water high temperature Lubricating oil low pressure
Main air reservoirs	Low pressure
Engine room tanks	Low level alarms as necessary

PART 3. ELECTRICAL INSTALLATIONS

1. PRIMARY ELECTRIC POWER SOURCES

Main generator	2 sets
Diesel driven, drip-proof, self-ventilated, self-excited, marine A.C. generator 250 KVA x 405 V x 3-phase x 50 Hz	
Shore connection box	1 set
Wall-mounted, drip-proof type, with phase sequence indicator A.C. 400 V x 120 A x 3-phase x 50 Hz	

2. SECONDARY ELECTRIC POWER SOURCES

Transformer	4 sets
Drip-proof, self-cooled, dry, marine type 20 KVA x 400/235 V x single-phase x 50 Hz	
Storage battery for general use	2 sets
Lead-acid, marine storage battery 300 AH x 24 V	
Storage battery for radio use	1 set
Lead-acid, marine storage battery 200 AH x 24 V	
Rectifier	1 set
Silicon rectifier, with transformer AC 400 V / DC 32 V x 50 Ampere	

3. SWITCHBOARDS

Main switchboard	1 set
Self-supported, drip-proof, dead-front type	
Battery charging & discharging switchboard	1 set
Self-supported, drip-proof, dead-front type	

4. ELECTRIC LIGHTING

Officers' cabins	Fluorescent lamps with globes
Crew's dormitories	Fluorescent lamps with globes
Officers' & crew's mess rooms	Fluorescent lamps with globes
Cabin class passengers' cabins	Fluorescent lamps with globes
Tourist class passengers' spaces	Fluorescent lamps with globes
Cabin class passengers' mess room	Fluorescent lamps with globes
Inboard passageways	Fluorescent lamps with or without globes
Galley	Incandescent lamps with globes
Sanitary spaces	Fluorescent or incandescent lamps with globes
Stores	Incandescent lamps with protective globes
Engine room	Fluorescent & incandescent lamps with globes
Weather deck lamps	Incandescent lamps with protective globes
Flood light projectors	6 - 500 W incandescent lamps 4 - 400 W mercurial lamps
Searchlight	1 - 3 KW directional searchlight
Gangway lamps	4 - 300 W incandescent flood lamps

5. INBOARD COMMUNICATION SYSTEMS & APPLIANCES

Public address system	1 set
30 W output, incorporating talk-backs from bow & stern, radio broadcasting receiver & record or cassette tape player	
Automatic exchanging telephone	1 set
12-point telephone set	
Battery telephone, direct call	2 sets
Wheelhouse to engine room	
Wheelhouse to steering gear room	
Signal bell with reply	3 sets
Wheelhouse to engine room	
Wheelhouse to steering gear room	
Engine room to fuel filling stations	
Call buzzer system	3 sets
Officers' use,	
Cabin class passengers' use,	
Call from engine room to chief engineer	

Alarm systems :

General alarm system	1 set
Refrigerating chamber alarm system	1 set
Steering gear alarm system	1 set
Engineer's alarm system	1 set
Smoke tube fire detecting system	1 set

Remote indication systems :

Engine revolution indicator system	2 sets
Helm angle indicator system	1 set

6. NAVIGATION AIDS

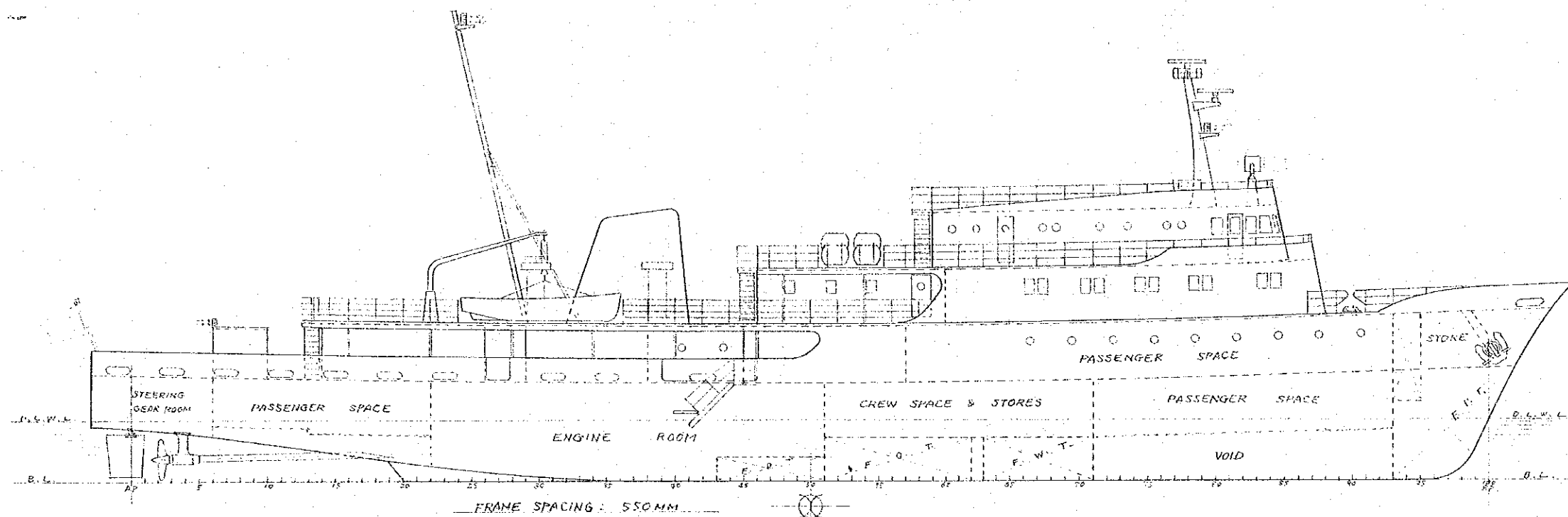
Cyrosopic compass & auto-pilot system	1 set
Marine radar, 40 miles range, 10" screen	2 sets
Echo sounder	1 set
Electro-magnetic log or Doppler log	1 set
Anemometer	1 set
Electric clear-view screen, 30 cm. dia.	2 sets

7. RADIO COMMUNICATION EQUIPMENT

SSB radio-telephone transceiver, 100 W output	1 set
VHF radio-telephone transceiver, 20 W output	1 set

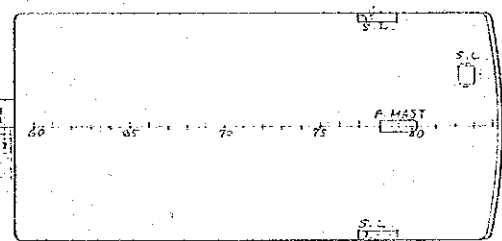
G. T. 580 TONS PASSENGER & CARGO VESSEL

O U T L I N E S P E C I F I C A T I O N

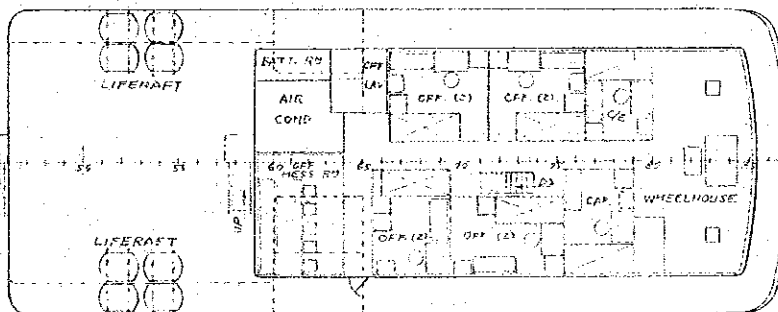


PRINCIPAL
 LENGTH, O.A.
 LENGTH, B.P.
 BREADTH, M_W
 DEPTH, M_D
 LOAD DRAUGHT
 GROSS TONNAGE
 MAIN ENGINES
 TRIAL SPEED
 SERVICE SPEED
 CREW
 PASSENGERS:

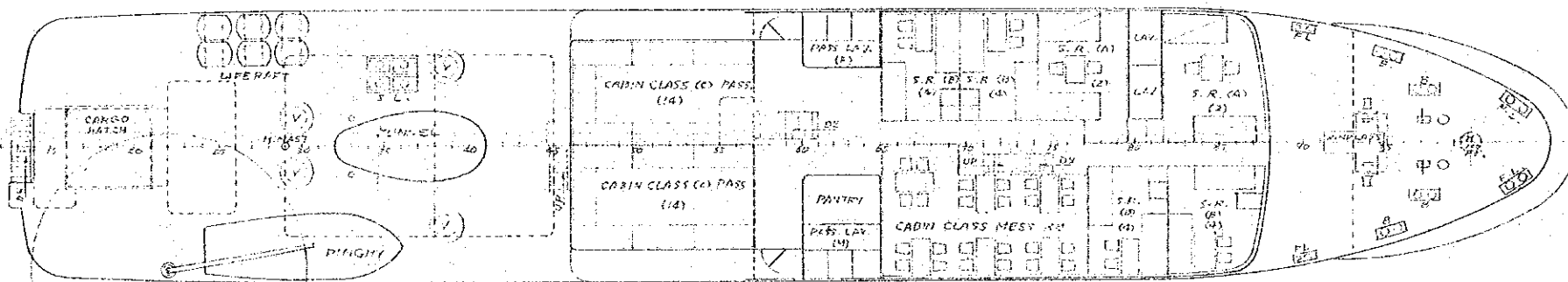
WHEELHOUSE TOP



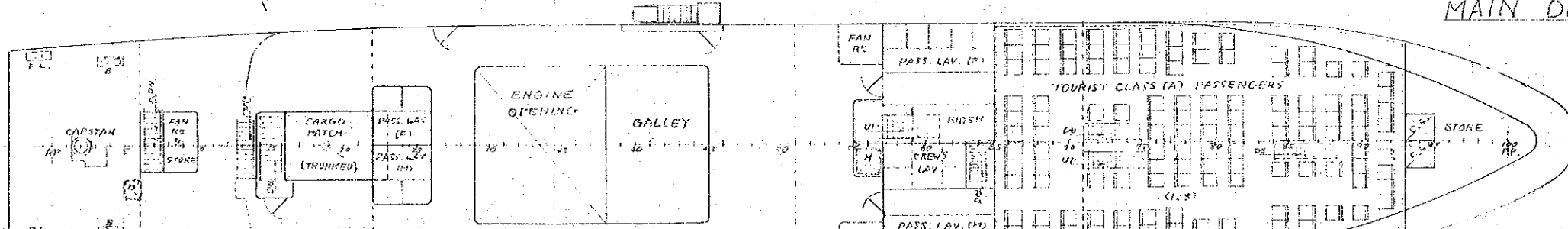
NAVIGATION BRIDGE DECK

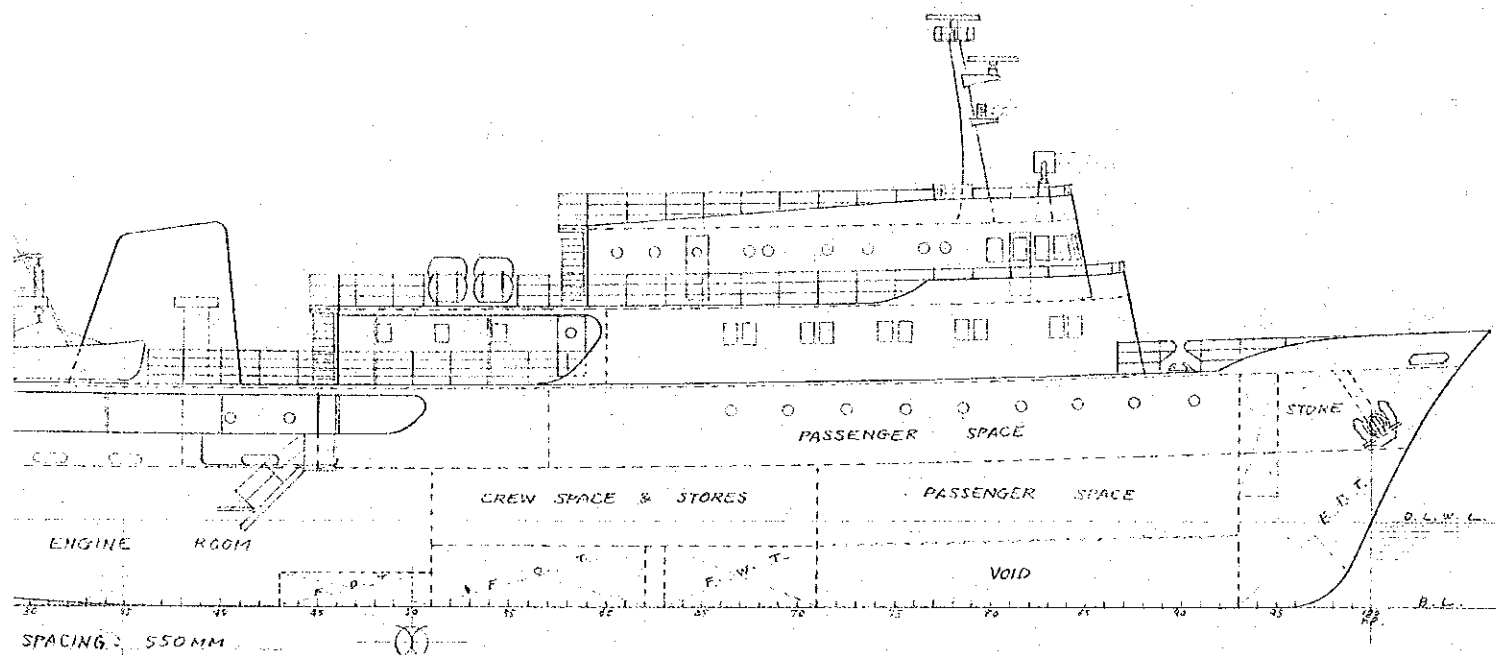


CABIN DECK



MAIN DECK

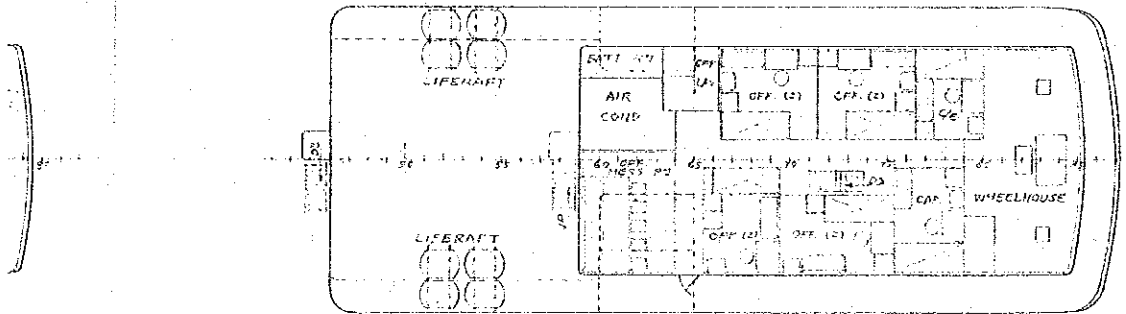




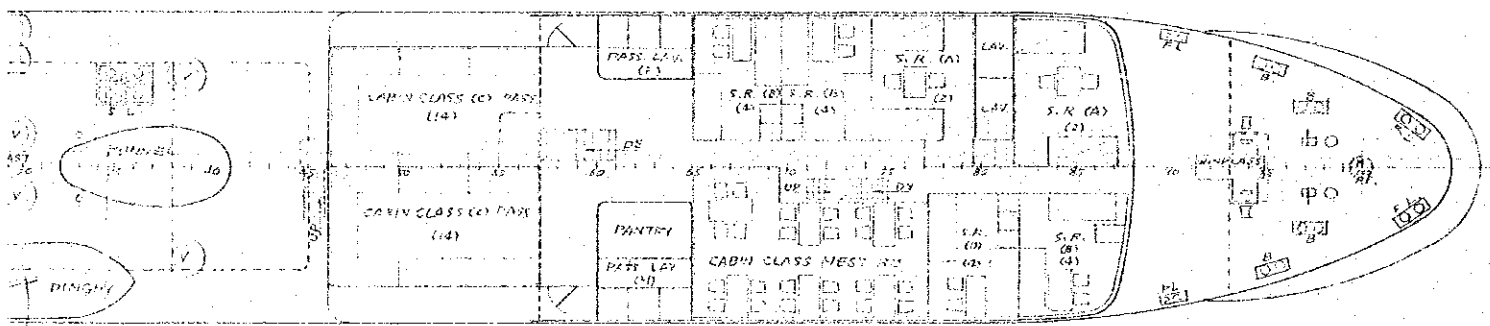
PRINCIPAL PARTICULARS

LENGTH, O.A.	ABT.	60 ^m 00
LENGTH, B.P.		55 ^m 00
BREADTH, M ^o		9 ^m 00
DEPTH, M ^o		4 ^m 00
LOAD DRAUGHT, M ^o , DESIGNED		2 ^m 50
GROSS TONNAGE	ABT.	700 ^T
MAIN ENGINES		3,290 PS x 3 SETS
TRIAL SPEED	ABT.	25 KNOTS
SERVICE SPEED	ABT.	22 KNOTS
CREW		31
PASSENGERS:	CABIN CLASS	A 4
	B	16
	C	28
	TOURIST CLASS	A 186
	B	84
	TOTAL	318

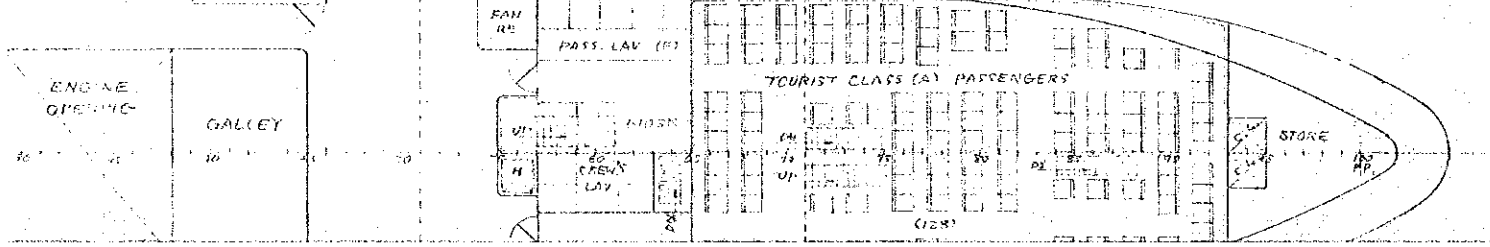
NAVIGATION BRIDGE DECK

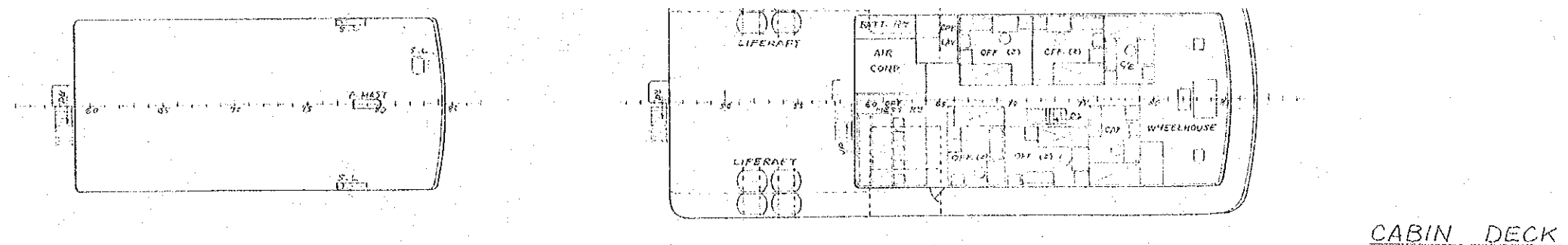


CABIN DECK

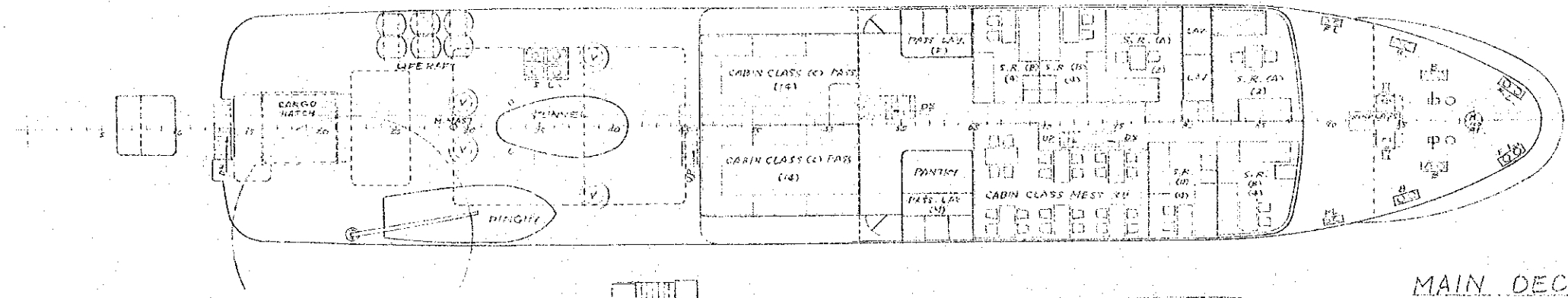


MAIN DECK

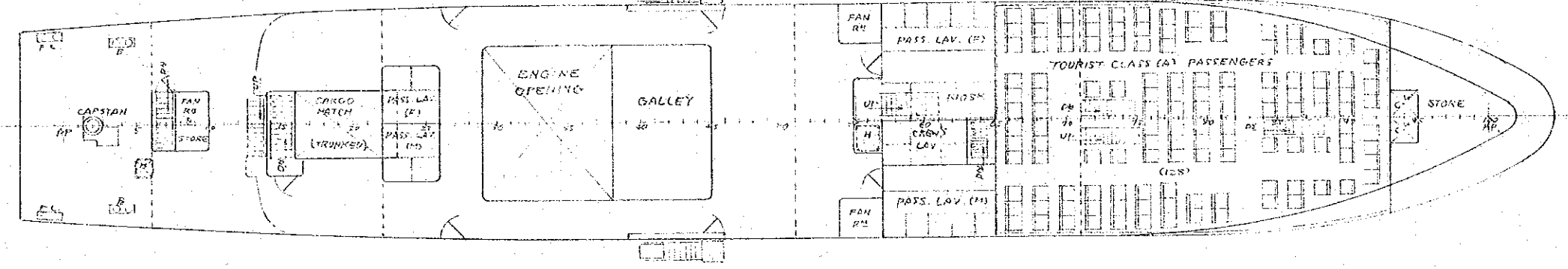




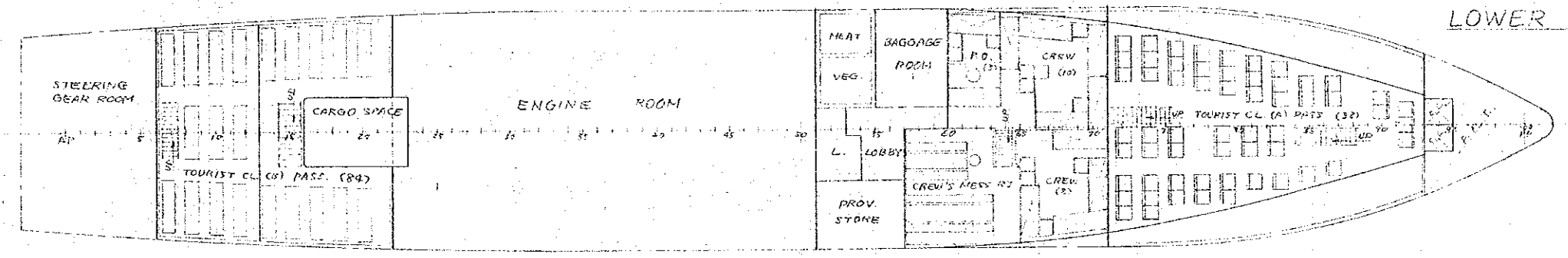
CABIN DECK



MAIN DECK



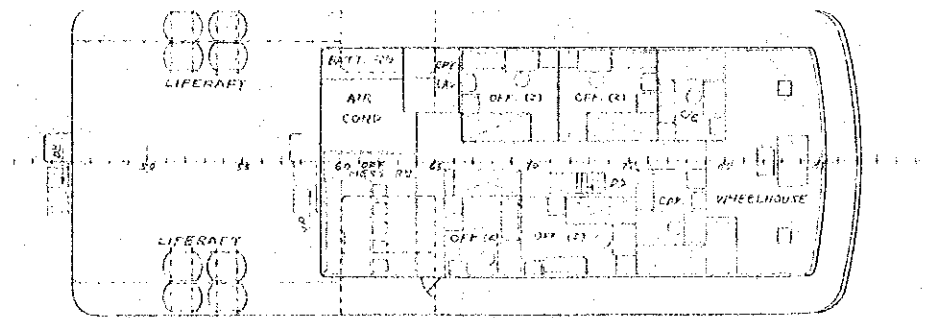
LOWER DECK



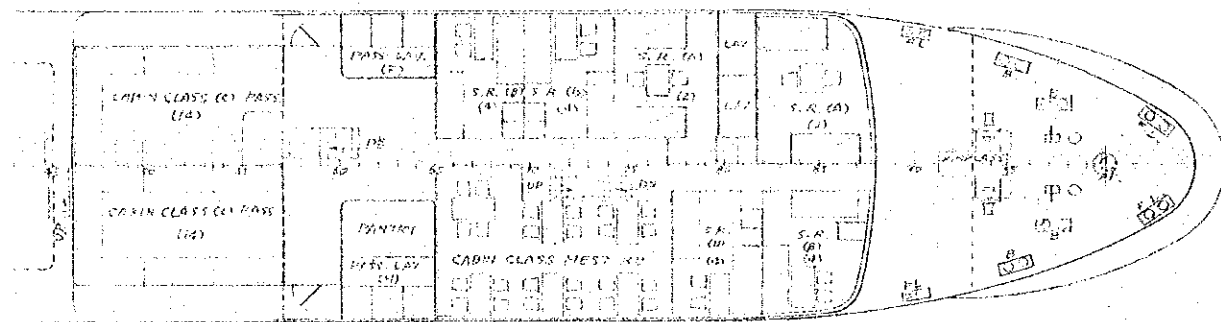
BOTTOM

G.T. 7

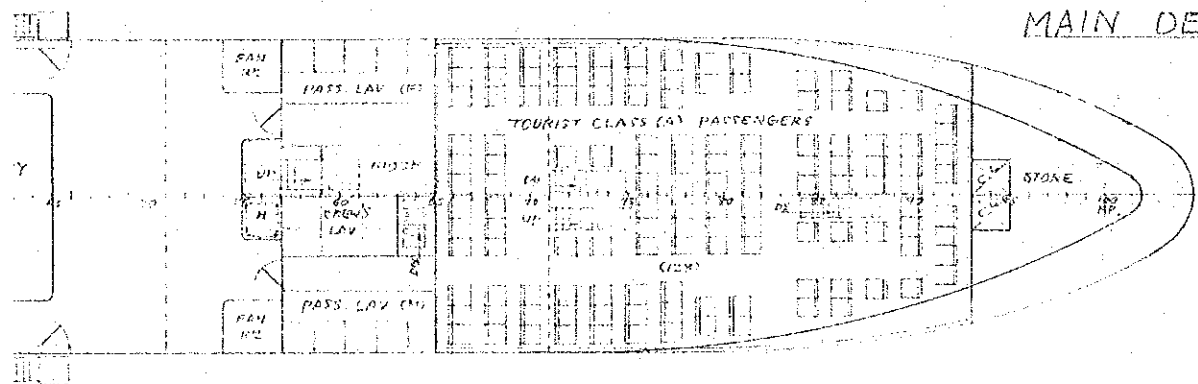
6



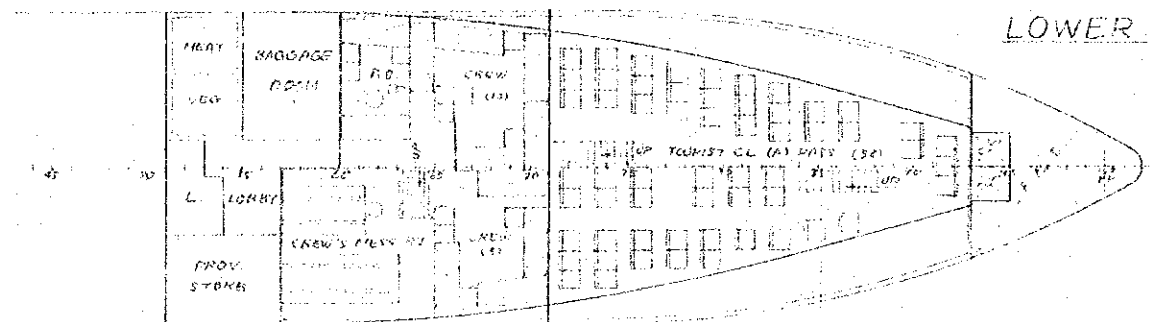
CABIN DECK



MAIN DECK



LOWER DECK

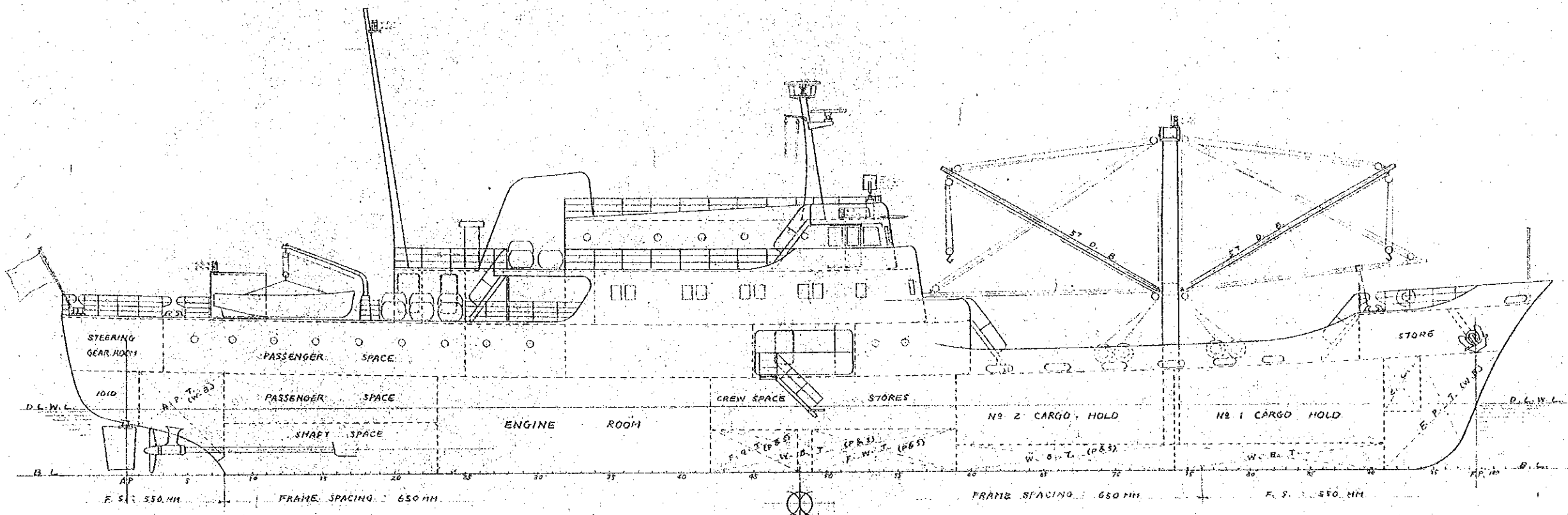


BOTTOM

G.T. 700 T. PASSENGER & CARGO BOAT

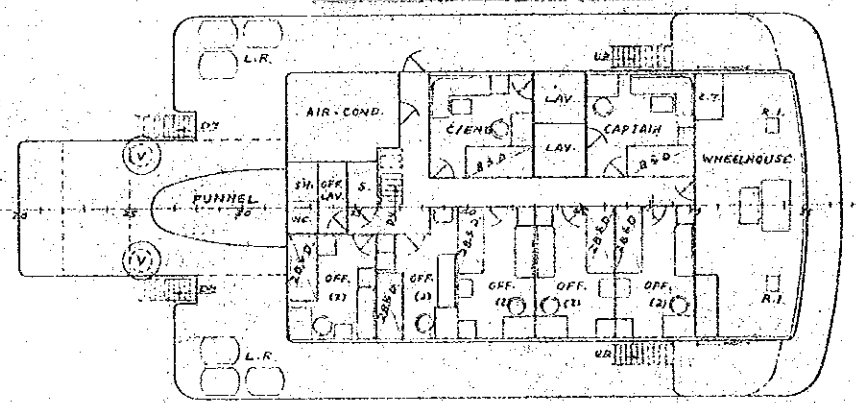
GENERAL ARRANGEMENT

1/150

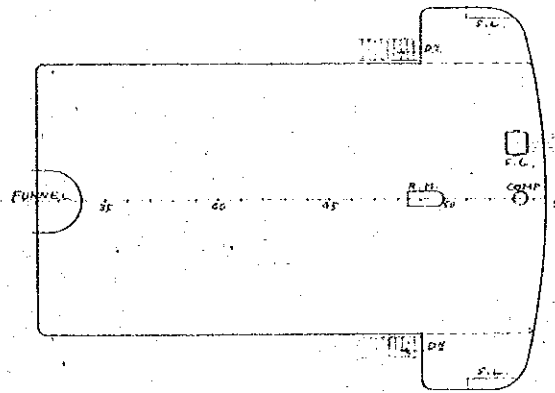


PRINC
LENGTH, O.
LENGTH, B.
BREADTH, M.
DEPTH, M.
LOAD DRAUGHT
GROSS TONN.
DEADWEIGHT
MAIN ENGINE
TRIAL SPEED
SERVICE SPEED
CREW
PASSENGER

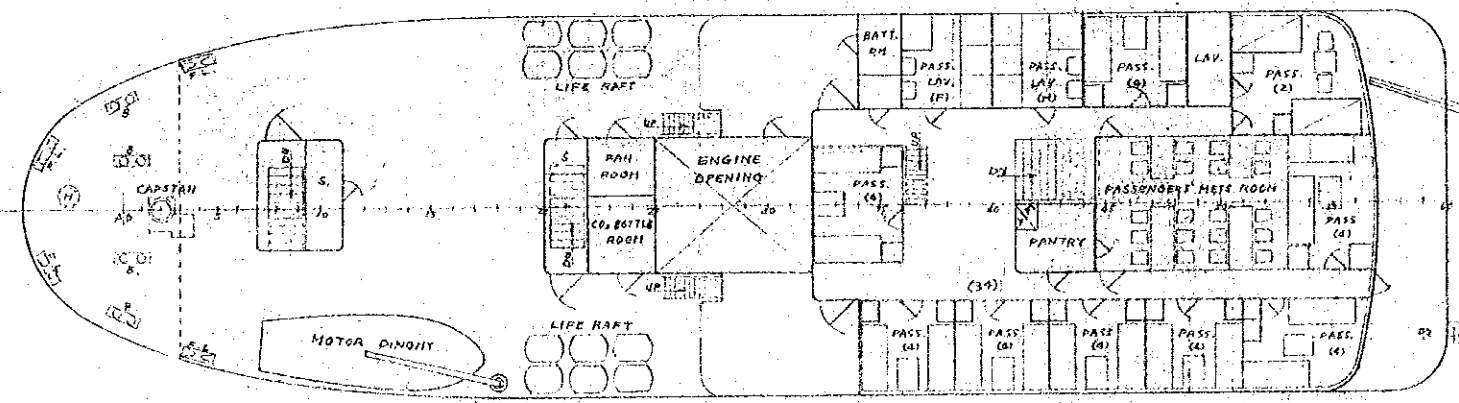
NAV. BRIDGE DECK



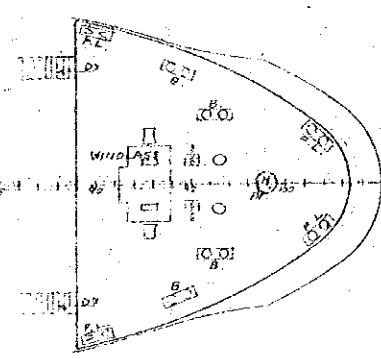
WHEELHOUSE TOP



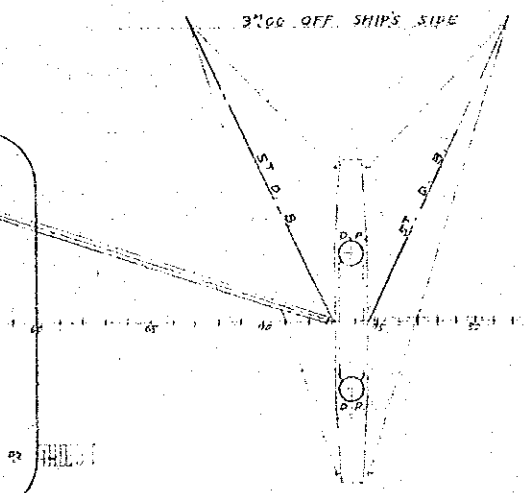
POOP DECK

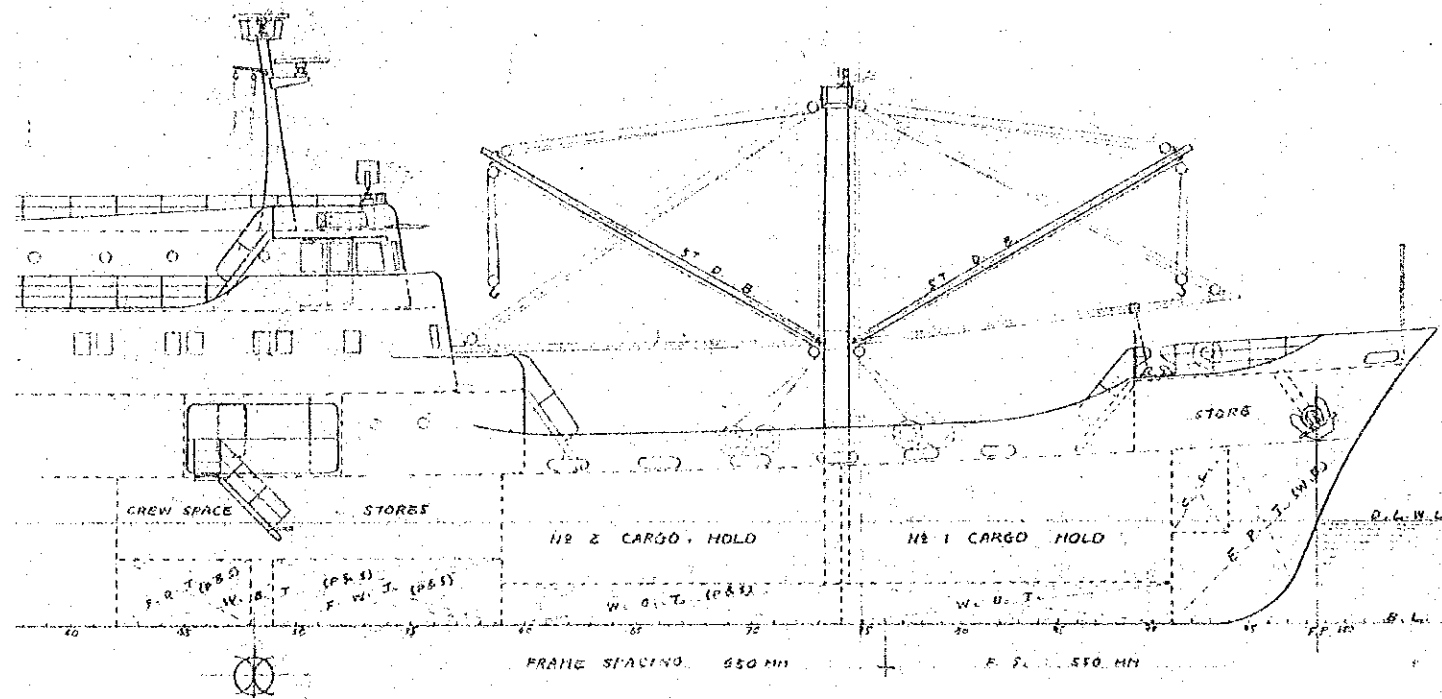


FORECASTLE DECK



3° 00' OFF SHIP'S SIDE

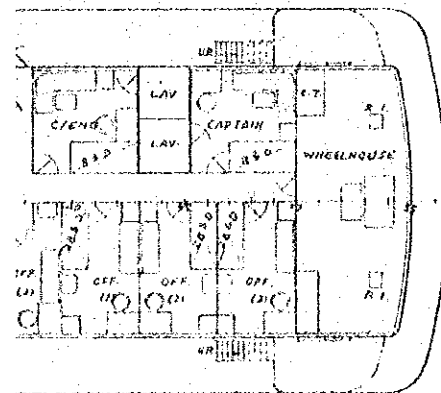




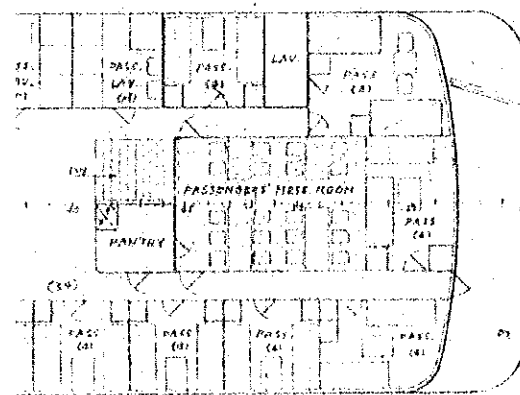
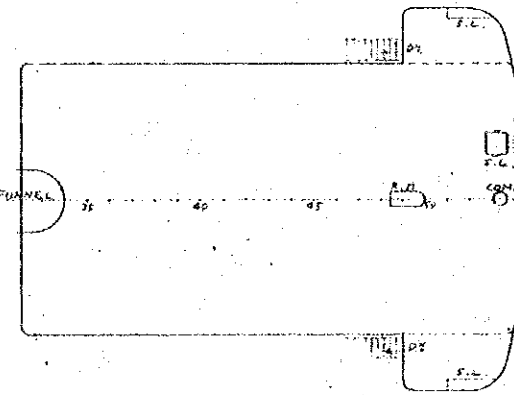
PRINCIPAL PARTICULARS

LENGTH, O.A.	ABT.	67'30"
LENGTH B.P.		61'00"
BREADTH, MLD		11'00"
DEPTH, MLD		4'30"
LOAD DRAUGHT, MLD DESIGNED		3'00"
GROSS TONNAGE	ABT.	1,000 ^T
DEADWEIGHT	ABT.	410 ^T
MAIN ENGINES		1,000 ^{PS} x 2 SETS
TRIAL SPEED	ABT.	15 KNOTS
SERVICE SPEED	ABT.	13.5 KNOTS
CREW		35
PASSENGERS, CABIN CLASS		34
TOURIST CLASS		74
ECONOMY CLASS		302
TOTAL		410

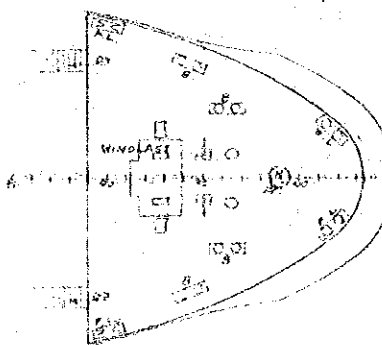
BRIDGE DECK



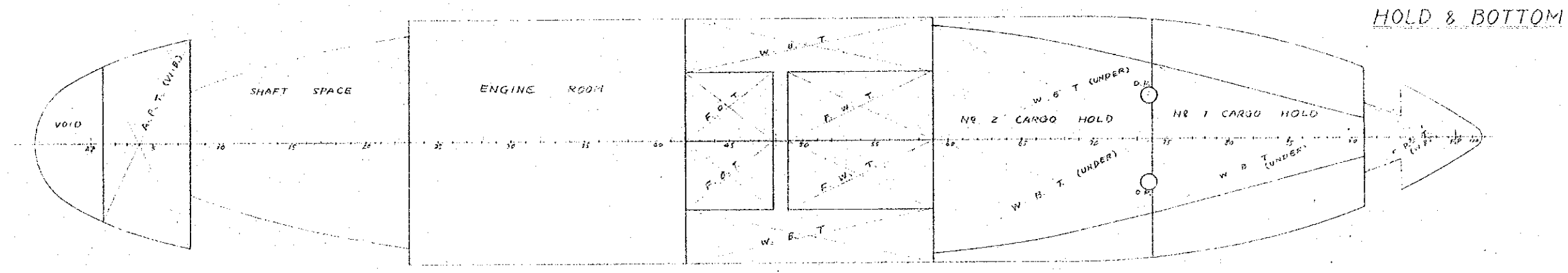
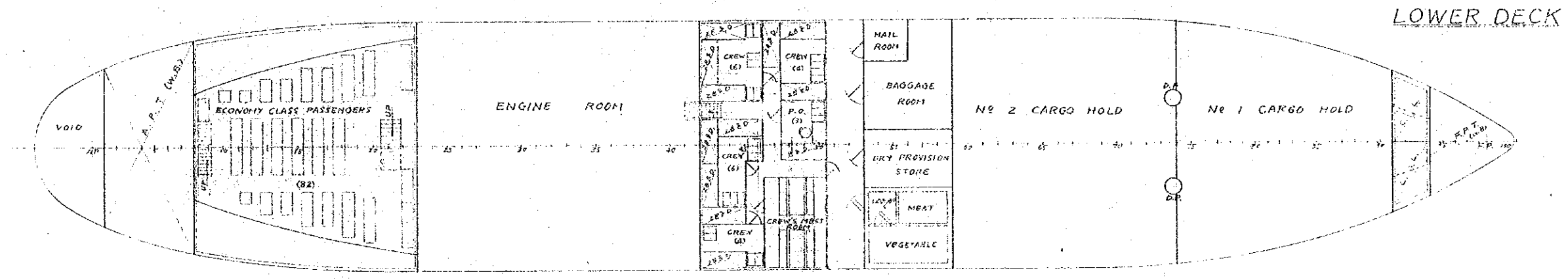
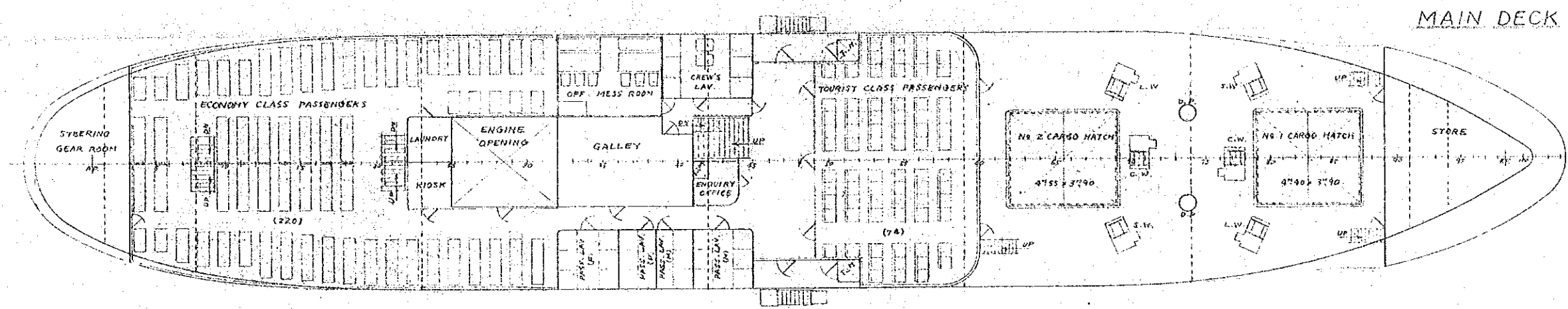
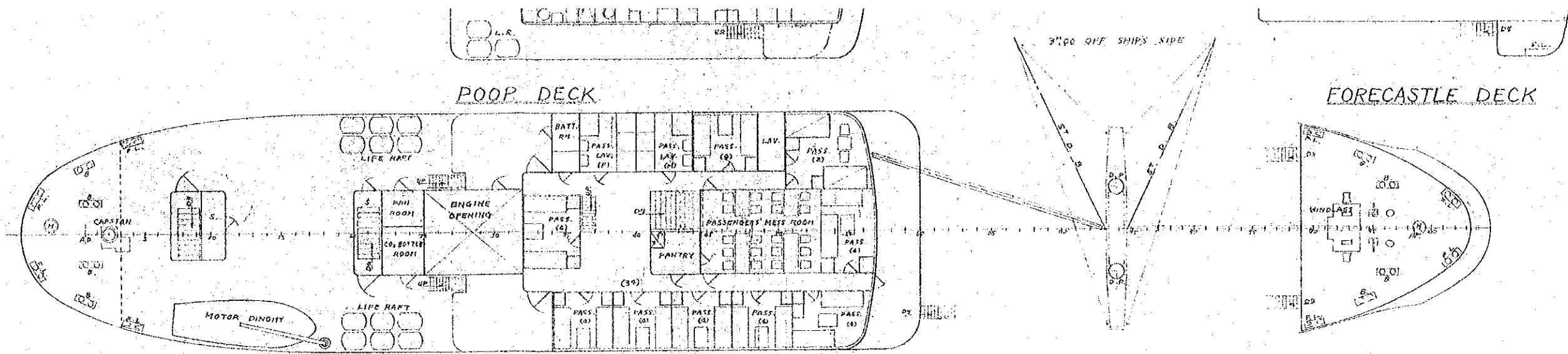
WHEELHOUSE TOP



FORECASTLE DECK



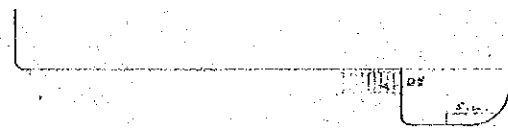
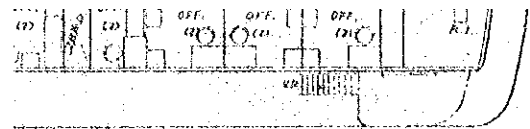
3"60 OFF SHIP'S SIDE



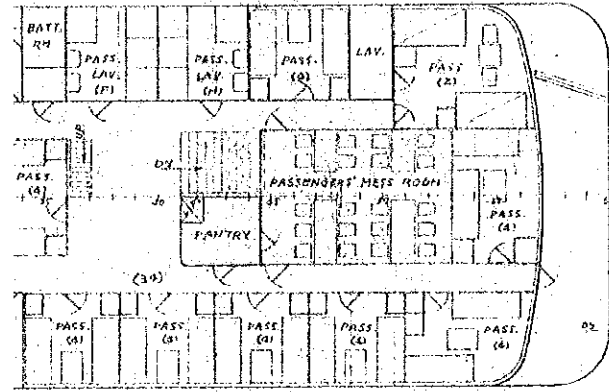
GT. 1.0

G1

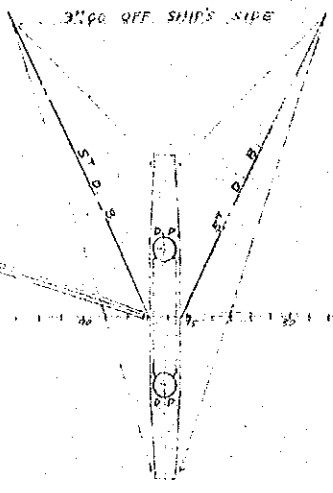
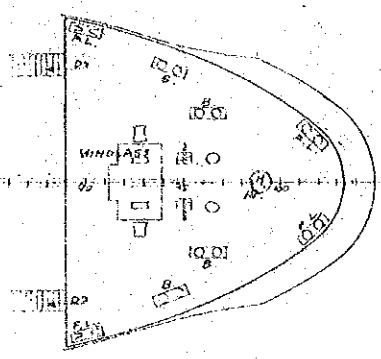
SCALE



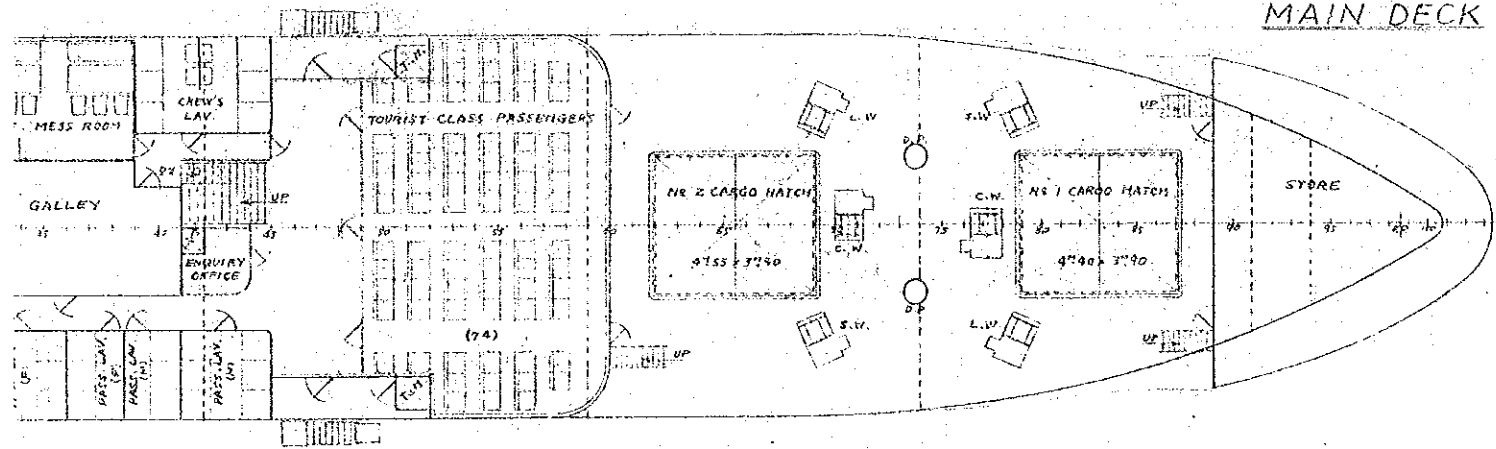
DECK



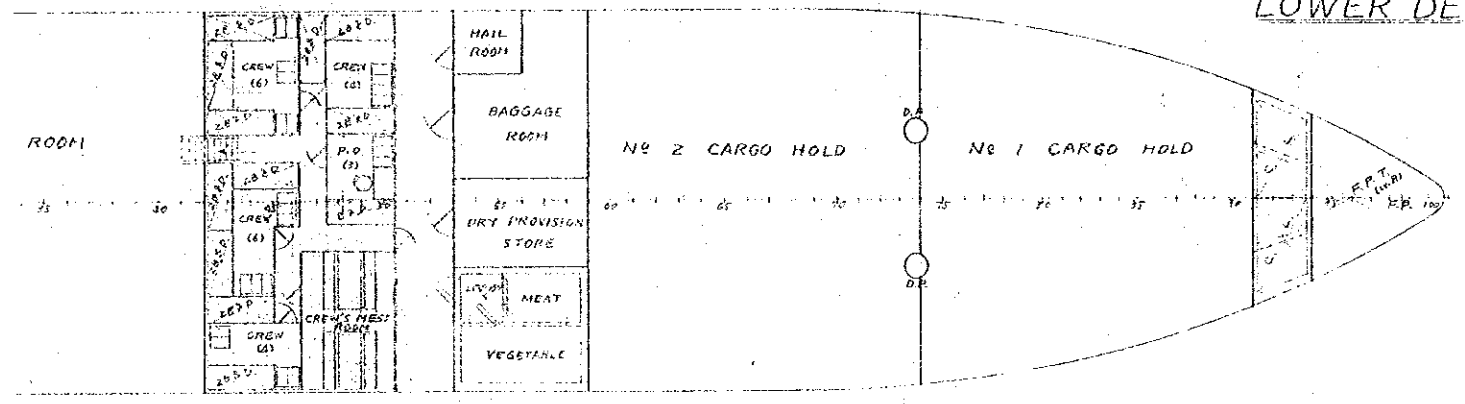
FORECASTLE DECK



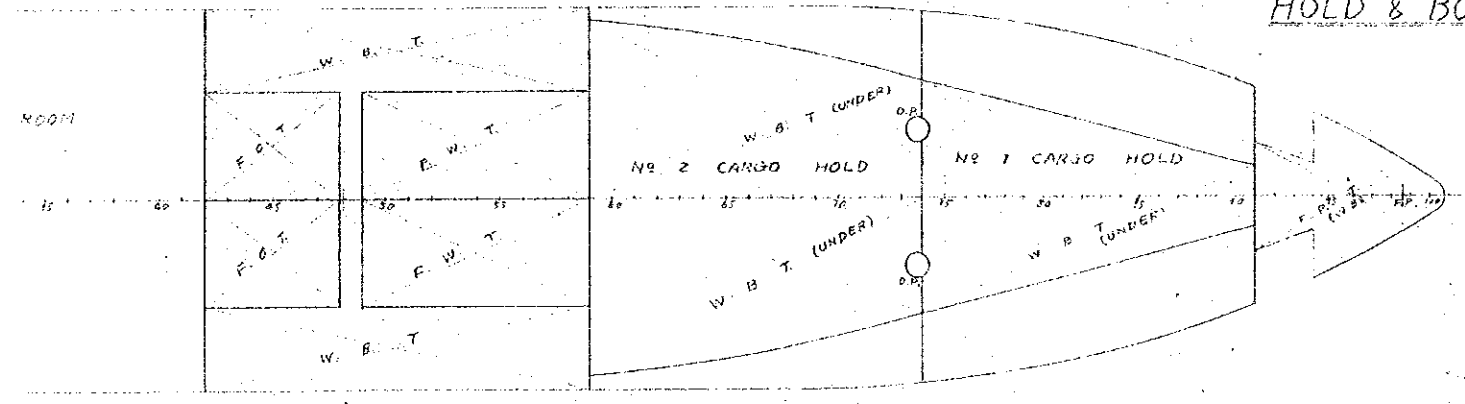
MAIN DECK



LOWER DECK



HOLD & BOTTOM



G.T. 1,000 T. PASSENGER CUM CARGO BOAT

GENERAL ARRANGEMENT

SCALE 1/150

PART 1. H U L L

1. GENERAL DESCRIPTIONS

The vessel shall be a twin-screw, passenger and cargo boat intended for transportation of passengers and general cargo along the coast of Tanzania.

The vessel shall be designed, constructed and fitted out under the special survey by and to the classification requirements of internationally recognized ship classification society to obtain its highest class for the coasting service.

2. PRINCIPAL DIMENSIONS

Length, overall	about	49.90 metres
Length between perpendiculars		45.50 metres
Breadth, moulded		9.00 metres
Depth, moulded		3.50 metres
Load draught, moulded, designed		2.50 metres
Tween-deck heights:		
Main deck to cabin deck		2.25 metres
Cabin deck to navigation bridge deck		2.25 metres
Navigation bridge deck to wheelhouse top		2.20 metres

3. TONNAGE & CAPACITY

Gross tonnage	about	580 tons
Deadweight	about	145 tons
Capacity:		
Cargo hold	about	75 cubic metres
Fuel oil tanks	about	21 cubic metres
Fresh water tanks	about	48 cubic metres
Water ballast tanks	about	24 cubic metres

4. SPEED & ENDURANCE

Max. speed on trial, 1/4 load condition, clean bottom & calm sea, at max. continuous output of main engines	about	13.5 knots
Speed on service, full load condition, at 85% output of main engines, incl. 15% power margin	about	12.3 knots
Endurance, full load condition, at service speed defined above	about	1,300 nautical miles

5. SHIP'S COMPLEMENT & PASSENGERS

Ship's complement :

Officers	8
Petty officers	3
Subordinates	14
Sum	25

Passengers :

Cabin class A	2
Cabin class B	16
Cabin class C	22
Tourist class A	198
Tourist class B	74
Sum	312
Grand total	337

6. DECK MACHINERY

Winchlass	1 set
Electric motor driven, horizontal type, with 2 sprocket wheels & 2 warping ends 3 t x 2 m/min x 11 KW	
Capstan	1 set
Electric motor driven, vertical type 2 t x 15 m/min x 7.5 KW	
Steering gear	1 set
Electro-hydraulic, twin-rudder parallel steering type, with 2 hydraulic pump units 3 t-m x 1.5 KW	
Cargo winch	2 sets
Electric motor driven, horizontal type 2 t x 25 m/min x 15 KW	

Boat winch	1 set
Electric motor driven, horizontal type 1 t x 15 m/min	
Electric hoist	1 set
Electric motor driven, suspended type 500 kg x 20 m/min x 3.7 KW	

7. CREW'S ACCOMMODATION

Living rooms :

Captain	Single-berthed cabin
Chief engineer	Single-berthed cabin
Other officers	2-berthed cabin
Petty officers	3-berthed cabin
Subordinates	Dormitory with mess tables
Mess rooms	Officers' mess room seating 8 persons
Sanitary spaces	Officers' lavatory with 1-WC & 1-shower Crew's lavatory with 2-WCs & 1-shower

8. PASSENGERS' ACCOMMODATION

Cabin class A	2-berthed cabin with private lavatory comprising washbasin, WC & shower
Cabin class B	4-berthed cabin with 2 double-tier sofa-bed (upper tier being foldable), 1 table & 2 chairs
Cabin class C	10- or 12-berthed cabin with 5 or 6 double-tier sofa-bed (upper tier being foldable)
Tourist class A	Common passenger space with reclining chairs, back of each chair having foldable table on its backside
Tourist class B	Common passenger spaces with upholstered settees with backs having foldable tables on backsides
Mess room	Separate mess room for cabin class passengers, seating 20 persons
Sanitary spaces	Cabin class passengers' lavatory (gents) incl. showers & WCs, Cabin class passengers' lavatory (ladies) incl. showers & WCs, Tourist class passengers' WC room (gents), Tourist class passengers' WC room (ladies)

9. COMMISSARY SPACES & KIOSK

Galley	1 - Common galley with electric cooking equipment, capable of serving food for officers, crew, all cabin class passengers & 10% of tourist class passengers
Pantry	1 - Pantry for cabin class passengers' mess room
Kiosk	1 - Kiosk, selling food for tourist class passengers & other general articles

10. JOINER WORK & FURNITURE

Joiner work :

Steel wall lining	Marine plywood of 9 mm. with plastic overlay
Overhead ceiling	Marine plywood of 5.5 mm. with plastic overlay
Wooden partitions	Marine plywood of 10 mm. with plastic overlay
Insulation	Glass wool insulation for steel walls & deck-heads exposed to weather & engine room

Deck covering :

Officers' cabins	Plastic tiling on latex deck composition
Crew's cabins	Latex deck composition
Cabin class passengers' cabins & mess room	Plastic tiling on latex deck composition
Tourist class passengers' spaces	Latex deck composition
Passages	Latex deck composition
Sanitary spaces	Mosaic tile on cement bed
Galley	Grooved tile on cement bed

Beds :

Officers & crew	Wooden bed
Cabin class A	Wooden bed, single-tier
Cabin class B & C	Sofa-bed, double-tier, upper tier being folded down to form sofa back in the daytime

Tourist class passengers' chairs & settees :

Chairs (A-class spaces)	Reclining chair, with seat & back covered with vinyl-leather & stuffed with polyurethane foam, reclining back having foldable table on its backside
-------------------------	---

Settees (B-class spaces) Frames of steel pipe & seat & back covered with vinyl-leather & stuffed with polyurethane foam, back having foldable tables on its backside

Upholstery :

Bed mattress	Cover of moquette & stuffing of polyurethane foam for Cabin class A, Cover of vinyl-leather & stuffing of polyurethane foam for Cabin class B & C, officers & crew
Sofa-bed	Cover of vinyl-leather & stuffing of polyurethane foam
Sofa	Cover of vinyl-leather & stuffing of polyurethane foam
Chair seat & back	Cover of moquette & stuffing of polyurethane foam for Cabin class A, Cover of vinyl-leather & stuffing of polyurethane foam for Cabin class B, Tourist classes, officers & crew
Curtain	Synthetic fibre textile

11. CARGO HOLD & CARGO GEAR

Cargo hold :

No. of compartment	1 compartment
Bottom ceiling	Close wooden ceiling
Side sparring	Open wooden sparring on shell sides

Cargo hatch :

No. of hatch	1
Hatch cover	Hinged folding steel hatch cover, operated by wire ropes from derrick boom

Derrick booms :

No. of booms	2
Capacity of boom	3 tons
Type of cargo work	Married-fall system for cargo up to 2 tons, Swing-boom sy stem for cargo up to 3 tons

Cargo winches :

No. of winches	2 sets
Type	Electric motor driven, horizontal type, with 1 wire drum & 1 warping end
Capacity	2 t x 25 m/min x 15 KW

12. VENTILATION & AIR - CONDITIONING

Classification :

Officers' cabins & mess room	Air-conditioning
Crew's cabins & mess room	Air-conditioning
Cabin class passengers' cabins & mess room	Air-conditioning
Tourist class passengers' spaces	Mechanical supply ventilation
Wheelhouse	Cooled air supply
Galley	Mechanical supply & exhaust ventilation
Sanitary spaces	Mechanical exhaust ventilation
Dry provision store	Mechanical exhaust ventilation
Cargo hold	Natural ventilation
Engine room	Mechanical supply & exhaust ventilation

Air-conditioning system :

Design conditions : -

	<u>Outside</u>	<u>Inside</u>
Air temperature	35°C	27°C
Relative humidity	80 %	50 %
Type of system	Centralized air-conditioning system, electric motor driven, sea water cooled, automatically controlled.	
Air ducting	Insulated ducting of galvanized thin steel sheet, with air supply ports of diffuser or pankah-louvre type.	

Rates of air-change in mechanically ventilated spaces :

Tourist class passenger spaces	30 times per hour
Galley	Supply : 30 times per hour Exhaust : 45 times per hour
Sanitary spaces	20 times per hour
Dry provision store	5 times per hour

13. BOAT & LIFE SAVING APPLIANCES

Boat	1 - FRP motor dinghy, 6.5 metres in length
	1 - FRP Tydro jet boat, 20 passengers
Boat david	1 - Radial davit, with electrically boat winch
Inflatable liferaft	14 - Inflatable liferaft in container, 25 persons, each
Lifebuoy	8 - Lifebuoy
Lifejacket	337 - Lifejacket for adult 32 - Lifejacket for infant

14. FIRE - EXTINGUISHING SYSTEMS & APPLIANCES

Fire detecting system	Smoke tube fire detector for officers' living quarter, crew's living quarter, passengers' spaces, galley, cargo hold & engine room.
Fire fighting systems & appliances:	
Officers' & crew's living quarters	Hydrants & portable fire extinguishers
Passenger's spaces	Hydrants & portable fire extinguishers
Cargo hold	Hydrants
Store spaces	Hydrants & portable fire extinguishers
Engine room	Hydrants & portable fire extinguishers

15. ANCHORS, CHAIN CABLES & ROPES

Bower anchor, stockless, 660 kg	3
Bower anchor cable, welded stud link chain cable, NK Grage 2, 22 mm. dia x 165 m & 137.5 m in length	2 lines
Towline, flexible steel wire rope (6 x 24), 18 mm. dia. x 180 m	1 line
Mooring line, vinylon rope, 32 mm. dia. x 120 m in length	lines

PART 2. M A C H I N E R Y

1. MAIN ENGINES

No. of sets.	2 sets
Type	Vertical, four stroke cycle, single acting, airless injection, trunk piston, supercharged, uni-directional, marine diesel engine with reverse/reduction gear
Max. continuous output	400 PS at 750 - 1,200 RPM
Cooling system	Indirect fresh water cooling
Starting system	Compressed air starting
Control system	Remote control from wheelhouse for ahead/astern & speed control Direct manual control for starting & stopping
Attachments	Cooling fresh water pump 1 set Lubricating oil pump 1 set Fuel oil supply pump 1 set Exhaust turbo-supercharger 1 set Intermediate air cooler 1 set Reverse/reduction gear 1 set

2. SHAFTING & PROPELLERS

No. of shaft lines	2 lines
Intermediate shaft	Hollow shaft of forged steel
Propeller shaft	Hollow shaft of forged steel with bronze sleeves & rubber covering between sleeves
Stern tube	Cast iron or fabricated steel stern tube with rubber bearings
Propeller	Three for four bladed solid propeller of manganese bronze

3. DIESEL GENERATOR SETS

No. of sets	2 sets
Diesel engine prime mover:	
Type	Vertical, four stroke cycle, single acting, airless injection, trunk piston, diesel engine
Max. continuous output	180 PS at 1,500 RPM

Cooling system	Indirect fresh water cooling
Starting system	Compressed air starting

Generator :

Type	Drip-proof, self-ventilated, self-excited, marine A.C. generator
Phase & frequency	3-phase, 50 Hz
Voltage	405 V
Rated output	150 KVA (120 KW), continuous
Insulation	Class B

4. AUXILIARY MACHINERY & EQUIPMENT IN ENGINE ROOM

Main air compressor 1 set

Electric motor driven, vertical, double stage, sea water cooled, reciprocating air compressor, automatically started & stopped
18 m³/h (piston displacement) x 30 kg/cm² x 3.7 KW x 1,000 RPM

Auxiliary air compressor 1 set

Diesel driven, vertical, double stage, sea water cooled, reciprocating air compressor, manually started
10 m³/h x 30 kg/cm² x 3.5 PS

Cooling sea water pump 2 sets

Electric motor driven, horizontal, centrifugal pump
Capacity as per engine maker's standard specification, each pump serving for two main engines simultaneously

Auxiliary lubricating oil pump 1 set

Electric motor driven, horizontal, gear pump
Capacity as per engine maker's standard specification

Auxiliary fuel oil supply pump 1 set

Electric motor driven, horizontal, gear pump
Capacity as per engine maker's standard specification

Auxiliary lubricating oil pump for reverse/reduction gear 1 set

Electric motor driven, horizontal, gear pump
Capacity as per engine maker's standard specification

Cooling sea water pump for auxiliary machinery 1 set

Electric motor driven, horizontal, centrifugal pump
50 m³/h x 25 m x 7.5 KW x 1,500 RPM

Fuel oil transfer pump 1 set
 Electric motor driven, horizontal, gear pump, automatically started & stopped
 3 m³/h x 2.5 kg/cm² x 0.75 KW x 1,000 RPM

Fire, general service & auxiliary cooling sea water pump for auxiliaries 1 set
 Electric motor driven, horizontal, self-priming, centrifugal pump
 50 m³/h x 30 m x 7.5 KW x 1,500 RPM

Fire, bilge, ballast & auxiliary cooling fresh water pump 1 set
 Electric motor driven, horizontal, self-priming, centrifugal pump
 25 m³/h x 30 m x 5.5 KW x 1,500 RPM

Bilge pump 1 set
 Electric motor driven, vertical, piston pump
 1 m³/h x 20 m x 0.4 KW x 1,000 RPM

Fresh water pump 2 sets
 Electric motor driven, horizontal, centrifugal or Wesco pump, automatically started & stopped
 3 m³/h x 25 m x 0.75 KW x 3,000 RPM

Fuel oil purifier 1 set
 Electric motor driven, centrifugal separator, with suction & discharge pumps, automatic sludge discharge control
 700 ltr/h x 1.5 KW x 1,500 RPM

Engine room ventilating fan 2 sets
 Electric motor driven, vertical, axial-flow, reversible fan
 120 m³/min x 25 mm dia x 1.5 KW x 1,500 RPM

Oily bilge water separator 1 set
 1 m³/h, as per ISCC standards

Lubricating oil filter for main engine 2 sets
 Forced circulated, oil filter with renewable elements

Lubricating oil filter for auxiliary engine 2 sets
 Forced circulated, oil filter with renewable elements

Air reservoir 2 sets
 Welded, cylindrical type
 Capacity as per engine maker's standard specification

5. CONTROL & ALRM SYSTEMS

Main engine control	Local manual control for starting & stopping Remote control for engine speed & ahead/astern
Alarm:	
Main engines	Cooling fresh water high temperature Lubricating oil low pressure
Reverse/reduction gear	Lubricating oil low pressure
Generator engines	Cooling fresh water high temperature Lubricating oil low pressure Overspeed (emergency stop)
Air reservoirs	Low pressure
Engine room tanks	Low level alarms as necessary

PART 3. ELECTRICAL INSTALLATIONS

1. PRIMARY ELECTRIC POWER SOURCES

Main generator	2 sets
Diesel driven, drip-proof, self-ventilated, self-excited, marine A.C. generator 150 KVA x 405 V x 3-phase x 50 Hz	
Shore connection box	1 set
Wall-mounted, drip-proof type, with phase sequence indicator A.C. 400 V x 60 A x 3-phase x 50 Hz	

2. SECONDARY ELECTRIC POWER SOURCES

Transformer	4 sets
Drip-proof, self-cooled, dry, marine type 20 KVA x 400/235 V x single-phase x 50 Hz	
Storage battery for general use	2 sets
Lead-acid, marine storage battery 300 AH x 24 V	
Storage battery for radio use	1 set
Lead-acid, marine storage battery 200 AH x 24 V	
Rectifier	1 set
Silicon rectifier, with transformer AC 400 V / DC 32 V x 50 Ampere	

3. SWITCHBOARDS

Main switchboard	1 set
Self-supported, drip-proof, dead-front type	
Battery charging & discharging switchboard	1 set
Self-supported, drip-proof, dead-front type	

4. ELECTRIC LIGHTING

Officers' cabins	Fluorescent lamps with globes
Crew's dormitory	Fluorescent lamps with globes
Officers' mess room	Fluorescent lamps with globes
Cabin class passengers' cabins	Fluorescent lamps with globes
Tourist class passengers' spaces	Fluorescent lamps with globes
Cabin class passengers' mess room	Fluorescent lamps with globes
Inboard passageways	Fluorescent lamps with or without globes
Galley	Incandescent lamps with globes
Sanitary spaces	Fluorescent or incandescent lamps with globes
Stores	Incandescent lamps with protective globes
Engine room	Fluorescent & incandescent lamps with globes
Weather deck lamps	Incandescent lamps with protective globes
Cargo lamps	2 - 500 W fixed incandescent flood lamps 4 - 200 W portable incandescent lamps
Flood-lamp projectors	4 - 500 W incandescent lamps 2 - 300 W incandescent lamps
Searchlight	1 - 2 KW directional searchlight
Gangway lamps	2 - 300 W incandescent flood lamps

5. INBOARD COMMUNICATION SYSTEMS & APPLIANCES

Public address system	1 set
30 W output, incorporating talk-backs from bow & stern, radio broadcasting receiver & record or cassette tape player	
Battery telephone, direct call	4 sets
Wheelhouse to engine room	
Wheelhouse to steering gear room	
Wheelhouse to captain's cabin	
Engine room to chief engineer's cabin	
Signal bell with reply	3 sets
Wheelhouse to engine room	
Wheelhouse to steering gear room	
Engine room to fuel filling stations	
Call buzzer system	2 sets
Officers' use,	
Cabin class passengers' use	

Alarm systems :

General alarm system	1 set
Steering gear alarm system	1 set
Engineer's alarm system	1 set
Smoke tube fire detecting system	1 set

Remote indication systems :

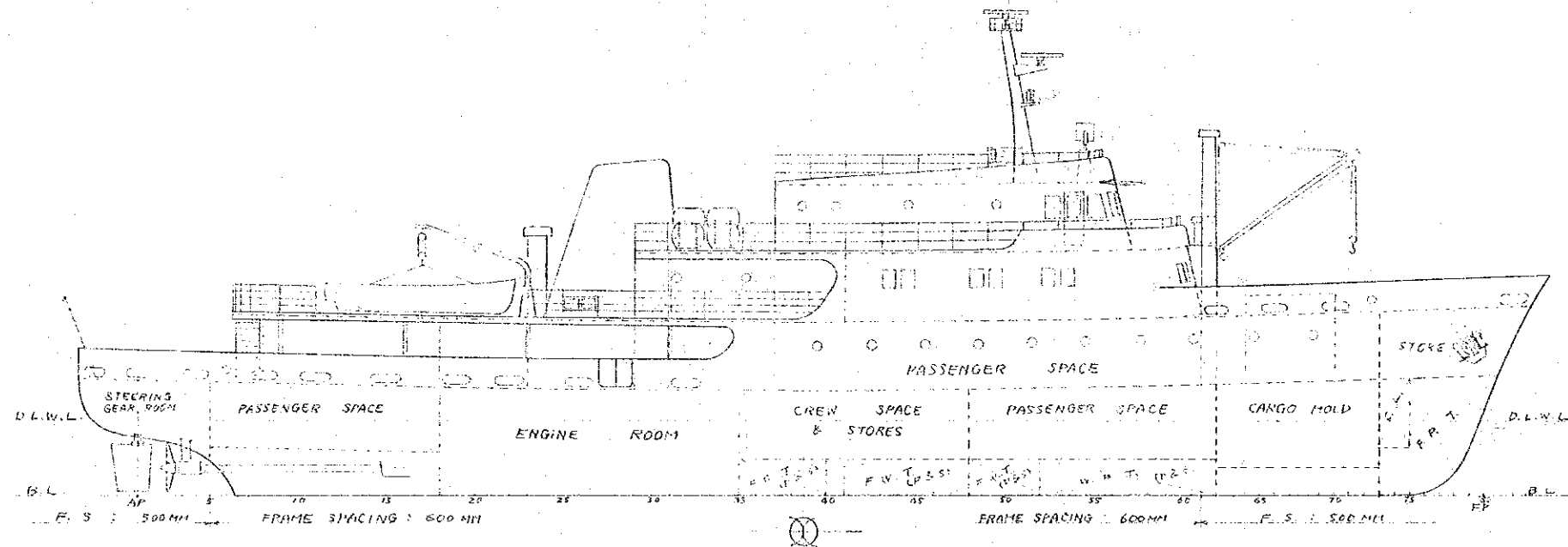
Engine revolution indicator system	2 sets
Heim angle indicator system	1 set

6. NAVIGATION AIDS

Gyroscopic compass & auto-pilot system	1 set
Marine radar, 40 miles range, 7" screen	2 sets
Echo sounder	1 set
Electro-magnetic log or Doppler log	1 set
Anemometer	1 set
Electric clear-view screen, 30 cm. dia.	2 sets

7. RADIO COMMUNICATION EQUIPMENT

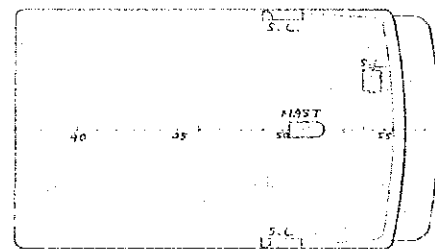
SSB radio-telephone transceiver, 100 W output	1 set
VHF radio-telephone transceiver, 20 W output	1 set



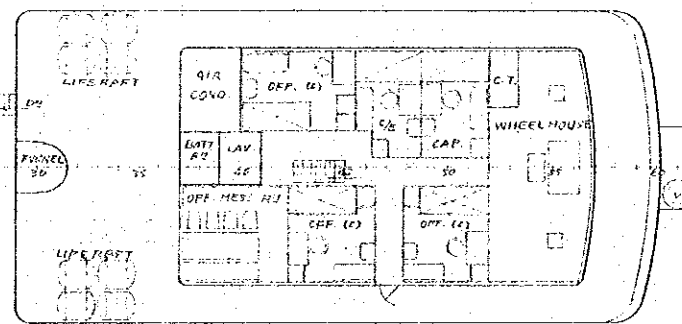
PRINCIPAL PARTICULARS

LENGTH O.A.	ABT.	49 ^m 90
LENGTH B.P.		45 ^m 50
BREADTH MLD		9 ^m 00
DEPTH MLD		3 ^m 50
LOAD DRAUGHT MLD DESIGNED		2 ^m 50
GROSS TONNAGE	ABT.	580 ^T
MAIN ENGINES		400 ^{PS} x 2 ^{SETS}
TRIAL SPEED	ABT.	13.5 ^{KNOTS}
SERVICE SPEED	ABT.	12.3 ^{KNOTS}
CREW		25
PASSENGERS:	CABIN CLASS	
	A	2
	B	16
	C	22
	TOURIST CLASS A	198
	B	74
	TOTAL	312

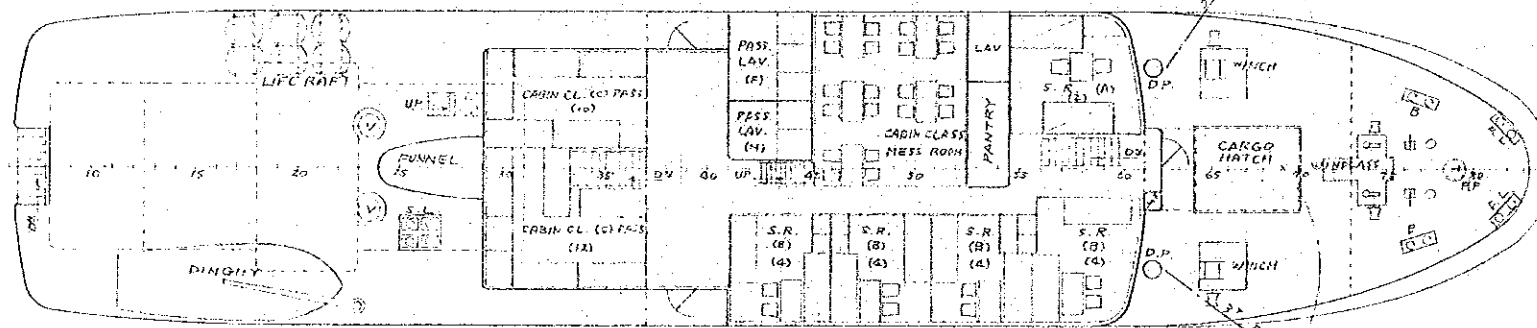
WHEELHOUSE TOP



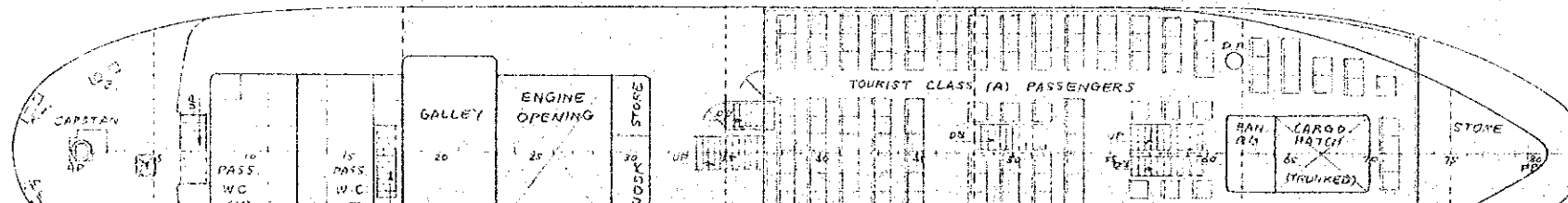
NAVIGATION BRIDGE DECK



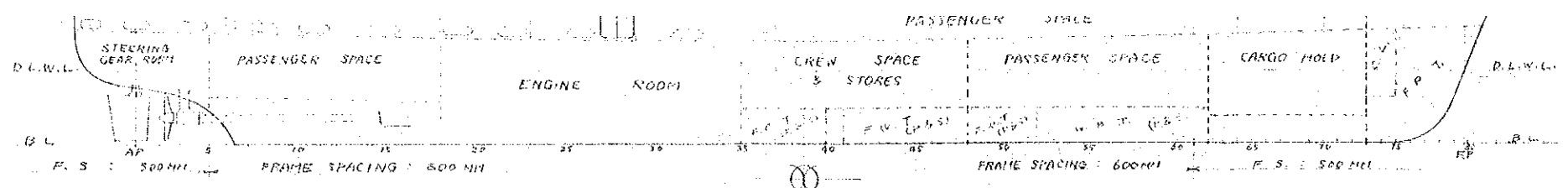
CABIN DECK



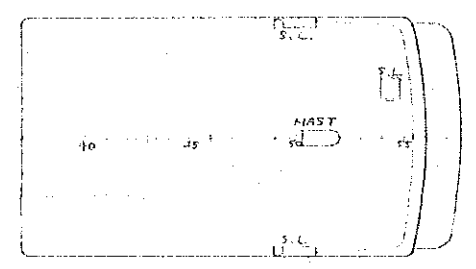
MAIN DECK



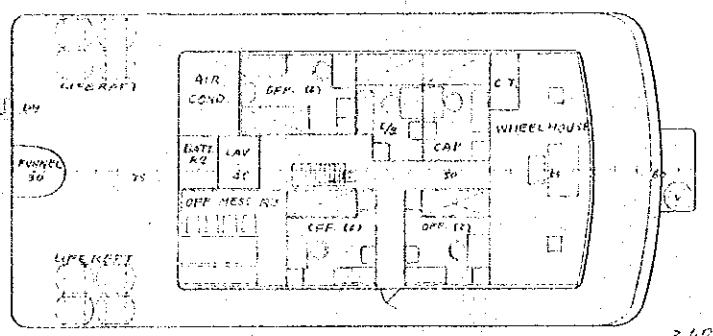
TOURIST CLASS A	198
" " " " B	74
TOTAL	312



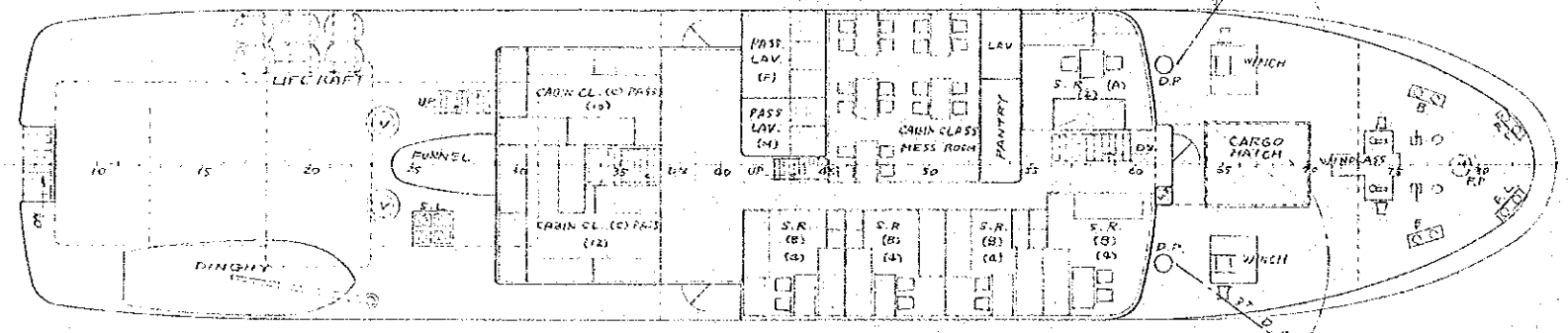
WHEELHOUSE TOP



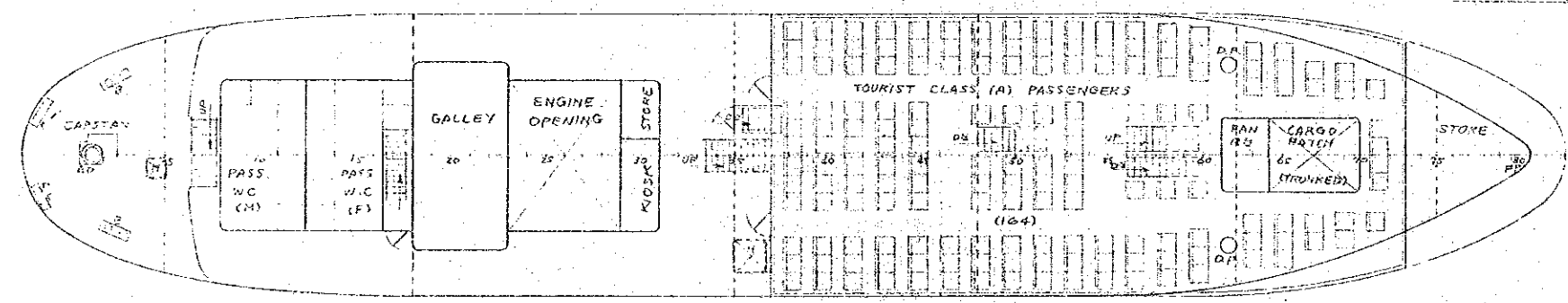
NAVIGATION BRIDGE DECK



CABIN DECK

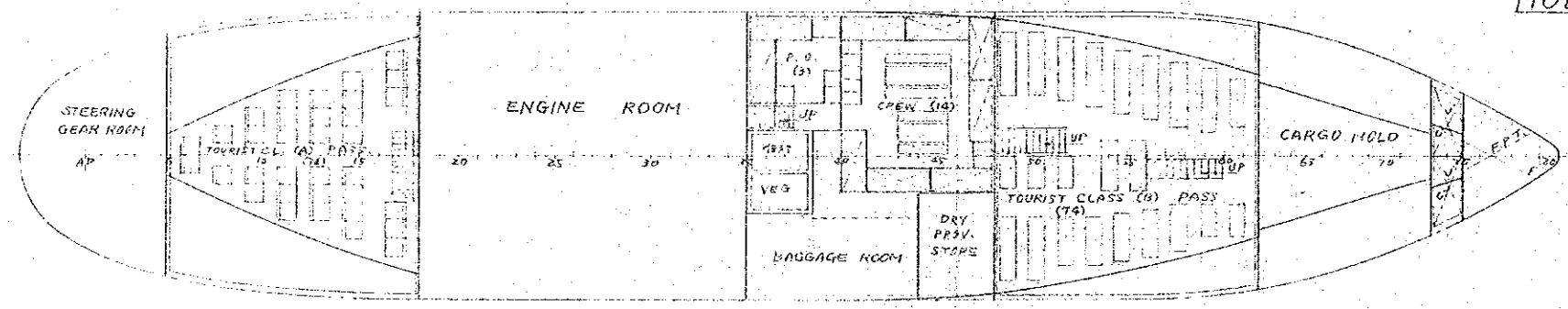


MAIN DECK



G.T. 580 T. PASSENGER & CARGO BOAT

HOLD



GENERAL ARRANGEMENT

1/150

1. OPERATION AND MANAGEMENT

1) Booking and Ticketing Systems

ar es Salaam Terminal and all other branches should adopt a standardized booking and ticketing system for simplifying the office work. A model of this system is shown below as a practical example.

Ticketing is commenced seven days in advance of the day of departure. The intending passengers visit the ticket office to fill in the boarding application.

The subscription closes on the day of departure, one hour in advance the scheduled time of departure. After closing, the number of boarding passengers is to be informed to the purser for confirmation. For canceling the ticket, the intending passenger must pay a cancellation fee of 20% of the fare until 3 days in advance of the day of departure and 40% until the day before the day of departure. On the day of departure, repayment is not possible.

The forms of boarding application are stocked in sufficient numbers at the booking counters of the head office, branches, terminals and travel-agents so that the intending passengers can fill in the applications at convenient places other than the ticketing counters and, accordingly, congestion of the ticketing counters may be avoided.

The boarding application consists of three carbonless copying sheets, the first sheet for reserve at the terminal, the second sheet for ship's use and utilizable for the list of passengers on board and the third sheet for head-office use and utilizable for

accounting and statistical summarizing. A sample of model of boarding application is shown below.

No. (Serial)	Date of application	
Name	Date of birth	M. F.
Present address		
Date of boarding	Trip No.	
Destination		
Class 1st choice	2nd choice	

Passenger No.
(To be filled in at terminal).

Remarks: The applicant should fill in the underlined portions in BLOCK LETTERS.

Three superposed sheets should be of different colours.

The boarding cards are sold in the order of reception of applications. The boarding cards are of rolled, carbonless, two-sheet copying type mountable on a cash-register, and one sheet is cut off for use as boarding ticket and another sheet for reserve for summing up.

If cash-registers are not used, the tickets need not be of rolled type, but typewriting or hand-writing will be very troublesome.

A sample of model of boarding ticket is shown below.

BOARDING TICKET		Example
Date of Sale	O O O O O	90115 (Jan. 15, 1979)
Passenger No.	O O O O O	00531
Class	X X X O O	CB (Cabin class C)
Destination Code	X X O O O	MTW (Mtwara)
Day of Boarding	O O O O O	90120 (Jan. 20, 1979)
Fare	X X O O O	(In 3 figures)

2) Passenger Handling

An improper procedure of handling boarding and unboarding passengers will adversely affect on the maintenance of sailing schedule, due care and over-all considerations are required in determining this procedure. An example of this procedure is shown below.

The embarkation of passengers should preferably be commenced two hours before the parture and finished 30 minutes before it as far as possible.

A clerk in charge of passenger handling is stationed at the boarding gangway to check the boarding tickets.

Immediately after the commencement of boarding, the list of boarding passengers is checked. The copies of boarding applications will be utilized as the list of passengers.

On unboarding, boarding tickets are collected at the gangway and the corresponding passengers are struck off the list.

When the number of unboarding and boarding passengers is comparatively small, simultaneous boarding and unboarding may not cause any confusion, but, when a great number of passengers are boarding and/or unboarding, they should be done separately.

2. CREW

1) Manning Scale of New Ship

The complement of the new ship under project should be determined with due consideration for the following conditions.

- (1) Personnel for operation
 - a) Personnel for stand-by station
 - b) Personnel for sea watch
 - c) Personnel for port watch
 - d) Personnel for cargoing
 - e) Personnel for maintenance work
 - f) Personnel for clerical work
- (2) Personnel for passenger service
 - a) Personnel for clerical work relating to boarding and unboarding of passengers
 - b) Personnel for reception and handling of passengers on board
 - c) Personnel for food supply for passengers
 - d) Personnel for keeping safety of passengers

The above mentioned personnel for various duties are greatly superposed.

A model of manning scale of the proposed vessel is shown below:

Case: Medium speed passenger-cum-cargo vessel
Gross tonnage : about 1,050 tons
Speed : 14 - 15 knots
Passenger capacity: 500 - 520 persons

Deck Department:

master

1

Chief officer	1
2nd officer	1
3rd officer	1
Boatswain	1
Able seaman	3
Ordinary seaman or deck boy	3

Engine Department:

Chief engineer	1
1st engineer	1
2nd engineer	1
3rd engineer	1
No.1 oiler	1
Oiler	3
Wiper	1

Steward Department:

Purser	1
Chief steward	1
Chief cook	1
2nd cook	1
Steward	3
Junior cook	1
Mess-man	2
Sweeper	2

2) Stations and Duties

Simple explanations on these stations and duties are given below.

(1) Stand-by Station

Bridge:-

Master Command

3rd officer Assistance to master, communication
1-Able seaman Steering

Forecastle deck:-

Chief officer Command at the bow
Boatswain Anchoring and mooring

Quarter deck:-

2nd officer Command at the stern
2-Able seamen Mooring
1-Ordinary seaman Mooring

Engine room:-

Chief engineer Command of engine department
Engineer on watch Maneuring of engine
No.1 oiler
Oiler
Wiper

(2) Sea watch

The sea watch is to be in three shifts, namely:

(0000 - 0400	(0400 - 0800	(0800 - 1200
(1200 - 1600	(1600 - 2000	(2000 - 2400

Bridge:

1 - Officer on watch
1 - Able seaman on watch

Engine room:

1 - Engineer on watch
1 - Oiler on watch

Communication:

As the vessel is destined to coastal services, no particular

radio-operator is on board. The master or the officer on watch will operate the VHF and SSB transceivers for communication.

(3) Port Watch

When the ship stays in port more than 24 hours, the sea watch is to be changed-over to the port watch consisting of three 8-hours' shifts. When necessary, the duration of shift may be suitably modified. If the stay does not exceed 24 hours, the sea watch is to be maintained also in port.

Port watch on deck:

- 1 - Officer on watch
- 1 - Able or ordinary seaman

Port watch in engine room:

- 1 - Engineer on watch
- 1 - Oiler

(4) Stations for Cargo Work

- Chief officer Supervision of cargo work
- Officer on watch Assistance to chief officer and watch duty
- Boatswain Deck works
- 1 - Able seaman on watch .. Watch duty
- 3 - Ordinary seamen Deck works

(5) Maintenance Works

Routine maintenance works in both deck and engine departments, except emergency ones, are normally carried out by day workers.

Maintenance works of deck department:

To be carried out by three ordinary seamen under the command

of the boatswain by the order of the chief officer.

Maintenance works of engine department:

To be carried out by two oiler and/or wiper under the command of the No.1 oiler by the order of the 1st engineer.

(6) Personnel Charged with Passenger Handling

The passenger handling is conducted by the chief steward, 3 stewards and 2 sweepers under the command of the purser.

As these members must be on continuous duty while the passengers are on board, suitable shifts should be arranged so that no over-work may occur.

(7) Galley Service

The chief cook, 2nd cook and junior cook must prepare food for passengers in addition to food for the crew and, accordingly, are liable to overwork. As regards the meals for passengers, however, they should be limited within simple ones such as sandwiches and no special order is to be accepted excepted there from the cabin class passengers. For tourist class passengers, the supply of food should be limited within the extent of selling drinks and simple snacks at the Kiosk. Otherwise, increase of cooks and mess-men will be necessary resulting in increase of personnel expenses.

The partry service for the ship's crew is to be conducted by two mess-men.

(8) Emergency Station

A station bill for fire fighting, collision, man overboard and abandon-ship is to be prepared. The content of this station bill should be made well known to the crew members, who also are to be trained at least once a month so that they can meet the need

in an emergency, particularly, ample measure should be taken for the safety of passengers and suitable training of passengers may be needed at times.

3. PORT INFORMATIONS

The conditions of ports including port facilities, namely, the port informations, of the Ports of Pan es Salaam, Mafia, Kilwa, Lindi, Mtwara, Tanga and Zanzibar are explained in this section.

1) Port of Dar es Salaam

This port is located at Lat, $06^{\circ}-50'S$, and Long, $39^{\circ}-17'E$, and the entrance port of the city developed from old time as the capital of the United Republic of Tanzania. The Port of Dar es Salaam is an international trade port well-known from oil time.

a) Approaching course and marks for Approach

To approach in line with Ras Ragoni leading lights bearing $193^{\circ}T$, the entrance of the port is a narrow channel of 0.2 mile in width between North and South Reeves. Though there is no particular problem in entry and departure, special attention should be paid to these reeves.

At the point at 013° , about 0.25 mile from the outer leading light (QK, Fl.), the course should be altered to the true course (T. Co.) 234° to attain the point at 0° , 0.2 mile from the Singal Station, and then a suitable course may be taken to the Berth in the Inner Harbour.

b) Quarantine Anchorage

The quarantine anchorage is located at the point about 5 miles distant from and to the west of inner makatumbe in the Outer Harbour, (Ref. Fig. APP-(a))

c) Berth

A pier of 2,013 metres in total length for ocean-going vessels is provided along the southern side of the inner harbour. This pier has eleven berths for mooring alongside ocean-going

Fig. APP-(b)

TCSL Terminal DSM

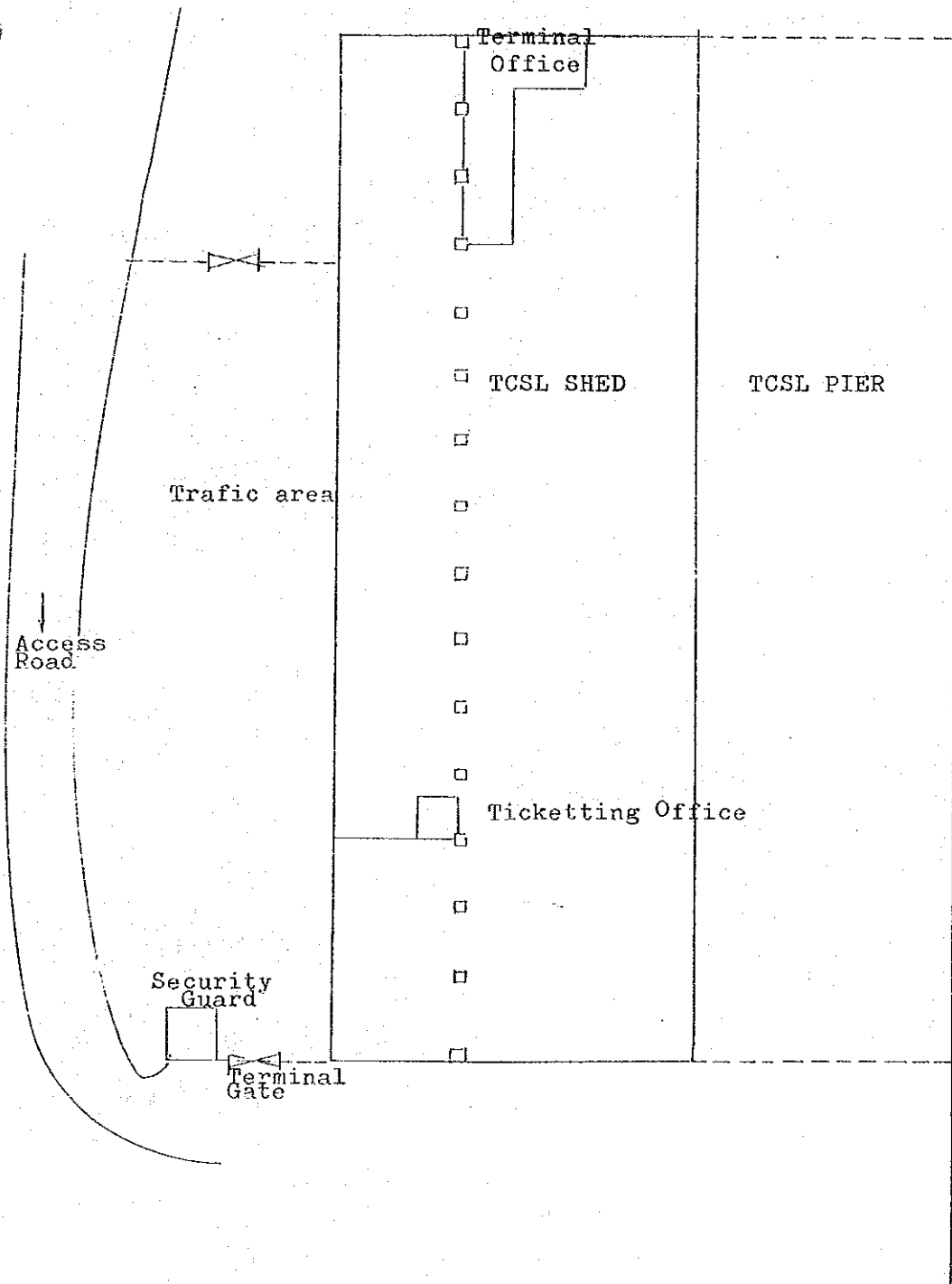
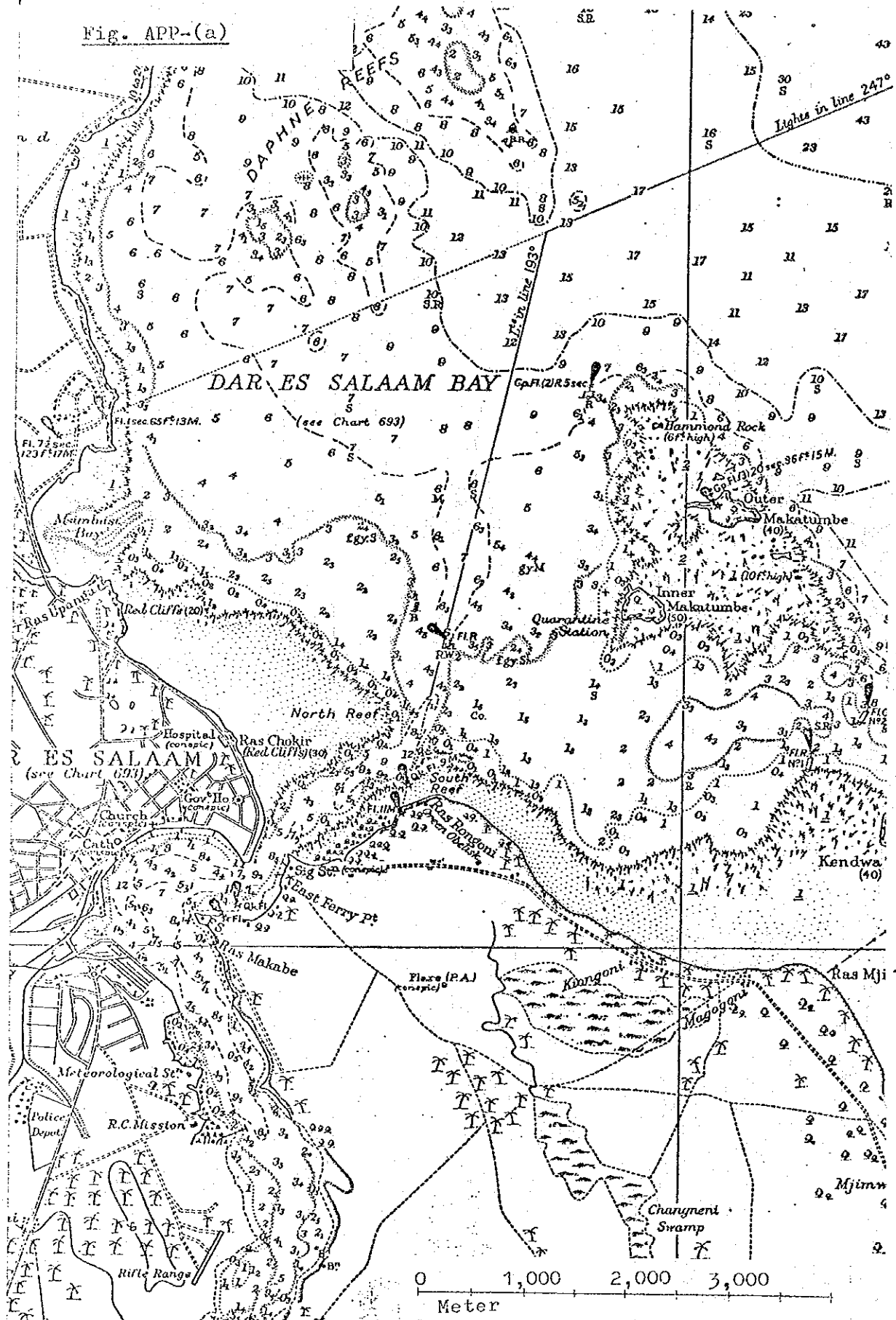


Fig. APP-(a)



vessels, In addition, there are mooring buoys capable of mooring 8 vessels, A to H.

Berths for domestic service vessels are located along the northern side, and TCSL has only one pier of about 100 metres in length for exclusive use as shown in Fig. APP-(b). The western side of this pier is used as a dhow berth, and M/V Mtwara and M/V Lindi, which are in service at present, use alternately a berth of about 60 metres in length in the eastern side.

Under these circumstances, an insufficiency of berth capacity is anticipated at the time of introduction of the new vessel and it will be necessary to give priority to the regular service passenger-cum-cargo vessel for the use of the present berth or to assure another suitable berth.

d) Port Facilities

The facilities of the pier for exclusive use of TCSL are explained here and all descriptions relating to the facilities such as pier, sheds, cranes, etc. for ocean-going vessels are omitted. The arrangement of TCSL terminal is shown in Fig. APP-(b).

The shed has a sufficient area as a cargo handling facility and, therefore, no trouble is expected in cargo works at the present stage. Several fork-lifts are operated in this terminal. All cargoes are palletized and, therefore, the cargo handling work is comparatively smooth at present.

Passenger handling facilities are far from satisfactory. There is a small ticketing office having an area of about 4 square metres at the right-side corner just inside the terminal gate and two clerks are working here. There is no waiting room for passengers and the space around the ticketing office is always

crowded with passengers. The number of passengers here around often attains 150 and overflow into the goods yard and warehouse where cargo handling work is in progress. This means a very dangerous condition needing urgent counter-measure. Nevertheless, there is no space sufficient for a passengers' waiting room.

e) Terminal Personnel

The cargo superintendent is the manager in chief responsible for the operation of terminal. He is assisted by the Assistant Cargo Superintendent and the Shipping Superintendent and has 3 Foremen, 15 dockers, 4 Booking clerks (incl. 2 clerks charged with passengers), 3 Freight clerks, 1 Cashier, 7 Terminal operators, 12 Gate keepers, 5 Mechanics and 6 Carpenters, 59 persons in total.

f) Stevedores

The cargo work is carried out in the following three shifts:

1st Shift: 0700 - 1500

2nd Shift: 1500 - 2200

3rd Shift: 2200 - 0700

The efficiency of cargo work is at such a level that 70 to 100 tons of palletized cargo can be handled per hour. Loading and unloading are possible within 24 hours if cargo is ready, but 2 to 3 days are normally needed for waiting. On the average, about 1,100 tons of cargo is handled here per week.

A gang of stevedores consists of 36 persons comprising foremen, winchmen, fork-lift operators.

g) Supply

Supply of fuel oil, lubricating oil, fresh water and provisions is possible in the Port of Dar es Salaam.

g) Restrictions

Entry, departure and shifting berths of tankers and ships laden with explosives are forbidden from the sunset to sunrise. No particular restriction is formed for other ships.

i) Congestion

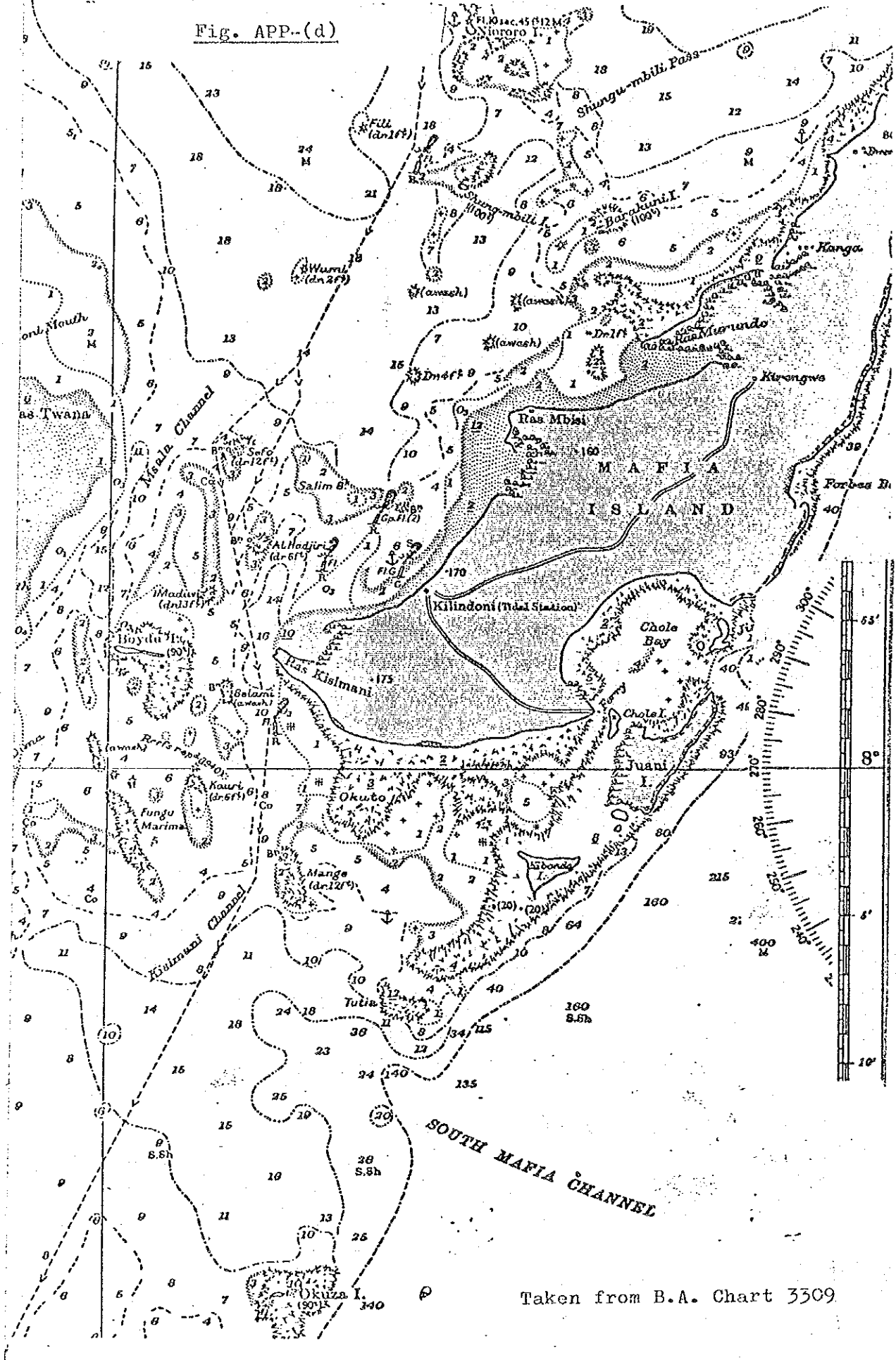
In recent years, the increase of calling ships due to rapid growth of cargo destined to Zambia, has caused a chronic congestion, and, in the ordinary cases, waiting for one to two months is necessary.

Such a congestion was caused for such various reasons that the cargo handling schedules have been seriously disturbed by ships entering without previous informations, in addition to the rapid increase of cargo quantity, and the efficiency of cargo handling has been lowered because of non-standardized forms of cargo, and repair and maintenance of cargo handling facilities, such as shore crews, is not possible because of lack of spare parts. For these reasons, the Harbour Authority Los formulated a policy to give priority of earlier entry to ships having unitized cargo or palletized cargo.

2) Mafia Island

The Port of Kilindoni (07°-54'S, 39°-75,S'E) is located on the west side of Mafia Island and Chole Bay (07°-56'S, 39°-95'E) in the east side facing to the Indian Ocean. The main port employed at present is Kilindoni. Both have no particular port facility, while most of population of the island are concentrated in Kilindoni and its environs. This fact is supposed to be derived partly from the fact that entry to the port of Kilmadoni is much easier than Chole Bay. The port in formations relating to Kilindoni are explained in details here, and Chole Bay will be briefly referred to at the last stage.

Fig. APP-(d)



Taken from B.A. Chart 3509

a) Approaching Course and Marks for Approach

There are two routes for entry into Kilindoni -- westbound route and eastbound (ocean-side) route.

There are so many shals in the westbound route and all light buoys are out of action, and, therefore, navigation in the night-time is dangerous.

In the eastbound route, there are many shoals to the south of Ras Kisimani and light buoys are out of action, and, therefore, approach is practicable only after the sunrise.

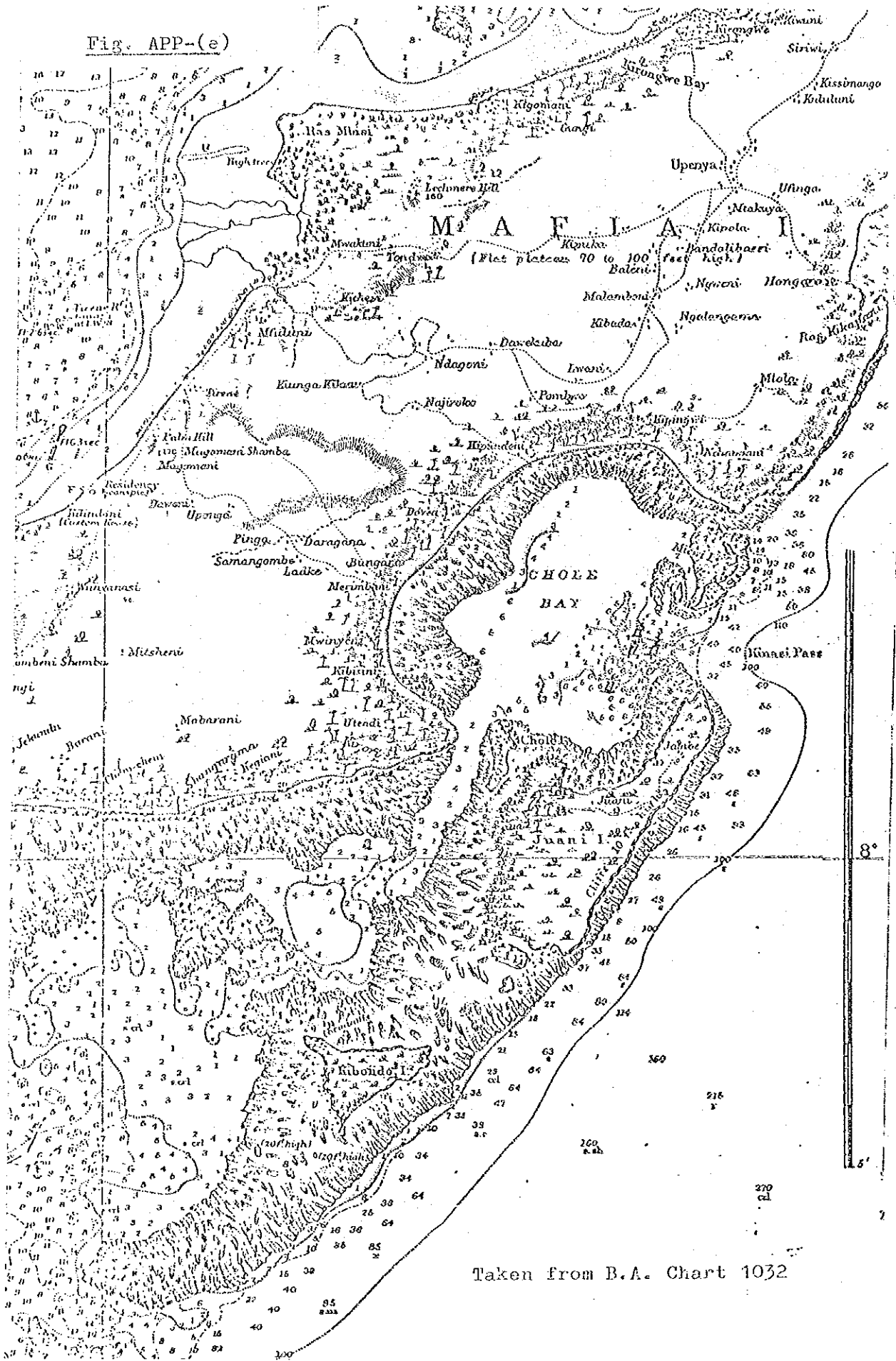
When approaching southwards from north via westbound route, after lying right abeam of the beacon on Sofo, 1.5 miles distant therefrom, bearing 96° , the course should be changed to 140° to enter the beathing course. After having passed the point of lying abeam of the buoy in NNE of Ras Kisimani and 2.6 miles distant therefrom, a suitable course around the north of the buoy (Ge Fl. (2) 6 sec., out of action) located in the west of Tirene Reef to approach the anchorage. The building of Kilindoni Custom-House is clearly visible from this point.

When taking the northbound route through Kisiomani channel, after having passed the buoy, looking it to starboard, located in the south of Ras Kisimani, 2.5 miles distant therefrom, the course is changed to 348° , and then, after having passed Ras Kisimani, the buoy at 2.6 miles and in NNE of Ras Kisimani is attained and the course same as the southbound route is taken for anchorage. (Refer to Fig. APP-(d)).

b) Anchorage

Anchorage is located in 325° and 1.5 mile of the Custom-Office. The waterdepth is about 7-8 fathoms. Buoys are provided near this

Fig. APP-(e)



Taken from B.A. Chart 1032

anchorage.

c) Berth

There is no berth other than this anchorage and all ships except small dhows must lie at anchor for cargo handling and boarding and unboarding of passengers. The area in the range of about one mile from shore is very shallow and cannot be approached. The sea bottom is of sand-mud in the range of one mile from shore and of sand in the area of anchorage. (Ref. Fig. APP- e))

d) Port Facilities

There is no port facility other than the Custom-House. What is the greatest problem is that the water depth in the range of about 200 metres from shore is as small as 50 cm. and even sampans (small boat with outboard engine for about 10 persons) cannot enter into this shallow range. Therefore, all passengers must walk in water with their knees submerged until they can embark the sampans, which will transport to the vessel.

Similar inconvenience is experienced for cargo handling. During high tide, cargo is laden in carnoes and small barges which are to be anchored in the offing.

The inconvenient communication between between ships and shore is the largest reason for the passengers' discontent.

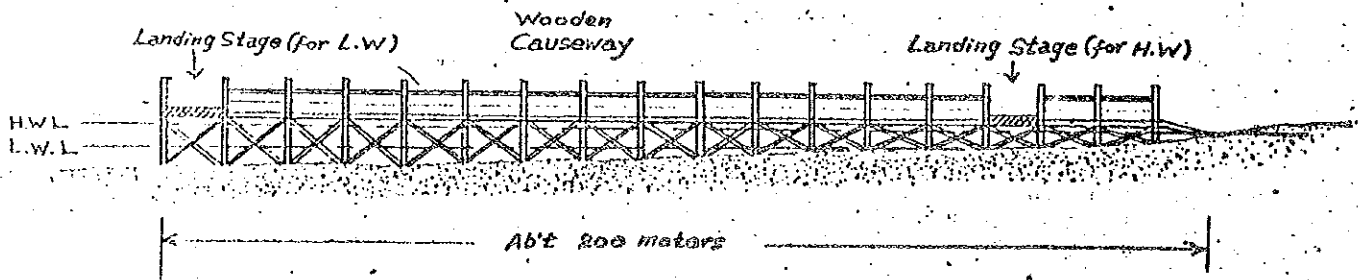
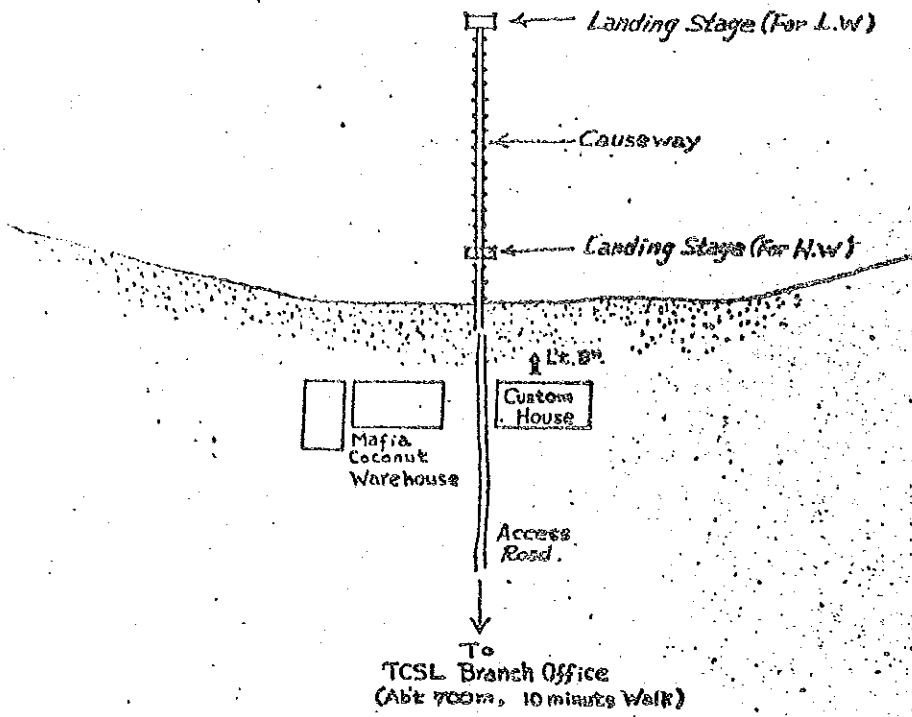
Another reason is the fact that the people have no vessel calling periodically the port.

The people of the island are waiting for a periodical service vessel and a suitable facility for boarding and unboarding.

If a vessel calls here periodically and the port facility is

Fig. APP-(e')

ROUGH SKETCH OF MAFIA CAUSEWAY



completed, a prominent increase of foreign tourists will be anticipated. The mafia Island Lodge is located in Utendi facing to Chole Bay, which is a picturesque coast.

As is clear from the existing circumstances mentioned above, what is most urgent for this port is the construction of a causeway and, considering the economy of cost and time and the effectiveness of facility, a wooden causeway is proposed here. This is a causeway extending at right angle from shore for a distance of northward tide in this port is about 1-1/2 knot and the southward one about 1/2 knot, and the causeway must be designed with due consideration for the tidal flow. Storms are few throughout the year. For the outline of the causeway, Fig. APP-(e') is to be referred to.

e) Branch Personnel

The Mafia Branch of TCSL is located in Kilindoni, and managed by two members, Branch Manager (officer in charge) and Assistant Clerk, the latter being charged with passenger service including booking and ticketing.

f) Stevedores

Cargo handling by one gang is possible. Though the working time is same as that of Dar es Salaam, the normal quantity of cargo needs only about 3 hours. The capacity of cargo handling is about 30 tons per hour.

g) Supply

Supply of fuel oil, lubricating oil, fresh water, provisions, etc. is impossible.

h) Restricitons

In spite of many reeves, shoals and banks in and around the

approaching course and the harbour area, only a small number of navigation aids is found and, further, most of them are out of action. Accordingly, entry, departure and shifting berth in the night-time are very dangerous, and the entry and departure must take place in the daytime (0600 - 1800).

i) Chole Bay

The coast around Utendi facing to Indian Ocean, which is about 14 Km. distant from Kilindoni, is a very beautiful coast. Here is Mafia Island Lodge visited by foreign tourists and this district is expected to become a promising tourists' resort.

The norwegian Report contains a plan of developing this picturesque Chole Bay as a promising harbour.

Though this bay, facing to Indian Ocean, may have several aspects of developing as a native good harbour in the future, entry of ships is very dangerous under the present undeveloped circumstances. The navigable waterway of Kinasi Pass, the course of approach, is only about 200 metres wide and has very complicated hends surrounded by reeves and, nevertheless, there are no evident marks for approach nor leading pst. Though there are four buoys as shown in Fig. APP-(e), approach guided by these fern buoys seems difficult.

Tide is also rapid and attains about 3 knots in and out, and any mistake in laying course will directly lead to the danger of stranding. Further, construction of pier will cause considerable difficulties and need an enormous cost.

For developing the chole Bay as an important harbour, it is necessary to install new light-house, leading lights and buoys, and these marks must always be well maintained so that they may

always be sufficiently effective. Further, there are big problems relating to the cost for the construction of a pier and the plan will have to rely upon the development project in the future.

3) Port of Kilwa

The port of Kilwa is located at $08^{\circ}-56'S.$ and $39^{\circ}-30.5'E.$ and a good port having sufficient water depth.

a) Approaching Course and Marks for Approach.

Fig. APP-(f) is to be referred to.

To approach in line with two beacons of Ras Rongazi bearing 286° . After having passed Balozzi Spit, to approach to the jetty on the west side of Ras Rongazi. The route has sufficient water depth and the course is not complicated, and entry is easy. As the beacons are not lit at present, entry in the night-time is difficult, but it may be possible by radar navigation.

b) Anchorage

The area is 210° and at 0.6 mile of the jetty is most suitable for anchorage. The sea bottom is mud assuring good holding and the water depth is about 20 metres.

c) Berth and Port Facilities

As is shown in Fig. APP-(g), this port has a causeway of about 85 metres in length and about 7 metres in width and, in addition, mooring buoys. Schooners and dhows can be directly moored to both sides of the causeway, while M/V Mtwara, M/V Lindi or larger ships line alongside the end of the causeway and mooring lines taken to the mooring buoys and bitts. The water depth at the end of causeway is about 10 metres.

With the exception of the Custom-House located near the shore,

there is found no building such as passengers' waiting room, warehouse, cargo storage, etc., and cargoes are directly transported by trucks to the ship's side and laden on board by the workers' hand.

d) Branch Personnel and Passenger Handling

The branch is managed by a Branch Manager (Officer in charge) and a checker, the latter being in charge with passenger handling. Booking is commenced one week before the date of entry of the ship. There are always about 200 intending passengers, while normally about 50 passengers to Dar es Salaam can be on board and the remaining 150 persons remain registered as waiting passengers. Though this method offers no material solution to the problem that waiting passengers are always increasing, there is no effective method of solution.

e) Stevedores

Cargo handling is possible. One gang is composed of 24 members, and its daily cargo handling capacity corresponds to about 50 tons of loading cargo or about 120 tons of discharging cargo.

f) Supply

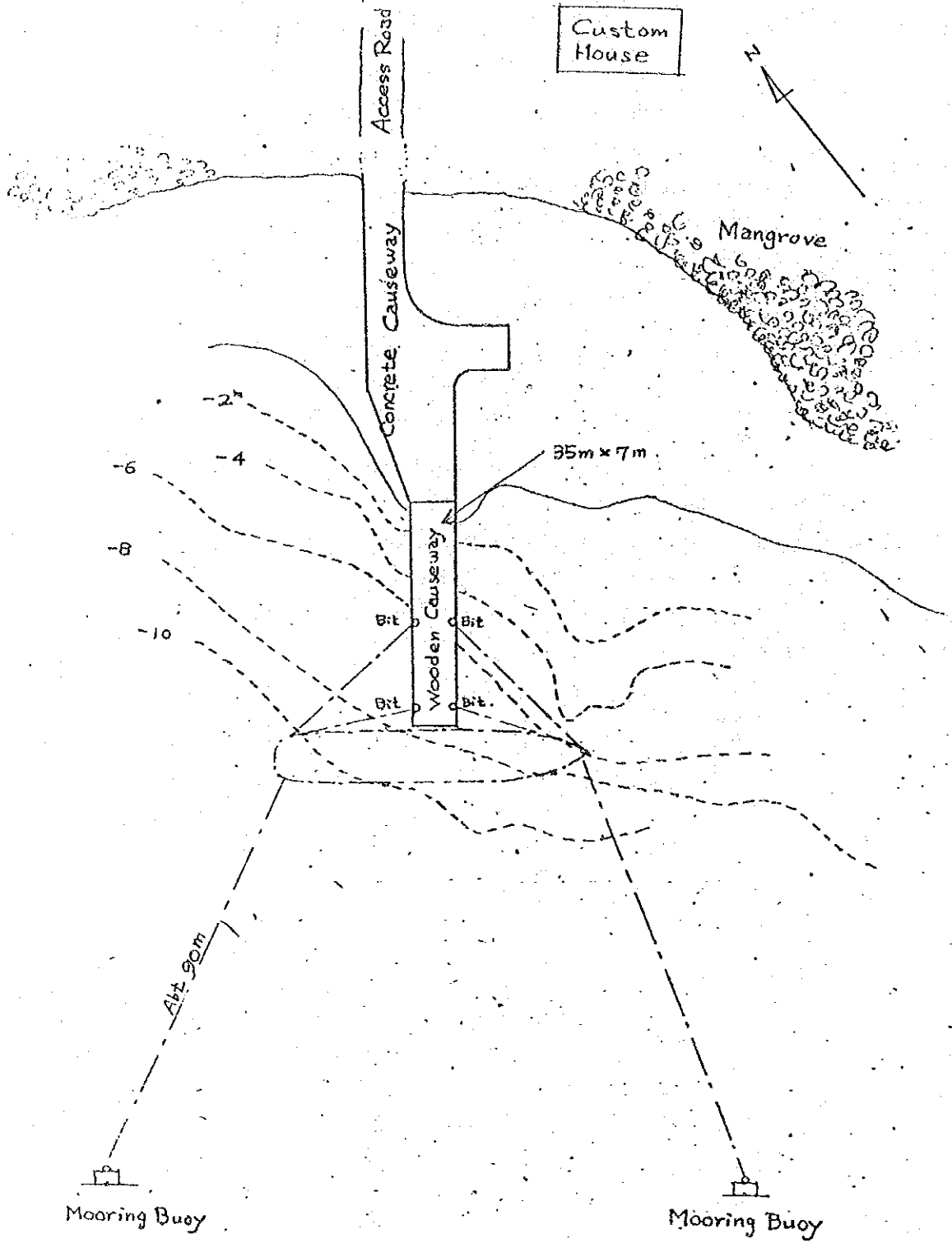
Supply of fresh water only is possible, while its daily capacity of supply is only about 10 tons. This supply system is mainly applied for schooners.

g) Restrictions

Entry and departure are permitted from the sunrise to sunset only, because those in the night-time are difficult. Entry in the night-time will be possible if light houses or light beacons are installed at the north end of Balozzi Spit and the south end of

Fig. APP-(g)

JETTY, KILWA



By Courtesy of Bertlin and Partners
Amended according to text.

Ras Rangozi, and the present beacons are restored, as is shown in the Morwegian Report.

Well-trained captain or navigator may be capable of performing entry or departure in the night-time through utilization of radar.

4) Port of Lindi

Lindi, located at $09^{\circ}-59.5'S.$ and $39^{\circ}-43.5'E.$, is one of the important ports in the southern coast of Tanzania.

a) Approaching Course and Marks for Approach

To approach first in line with two light beacons (out of action) in the north shore and WNW of Lindi city bearing 240° and alter course after having past No.2 buoy. Then, to approach in line with two beacons (without light) at the east end and south end of Fungu Mbaohiwonaki bearing 201° . From the area near No.2 buoy, the jetty and warehouse are clearly visible.

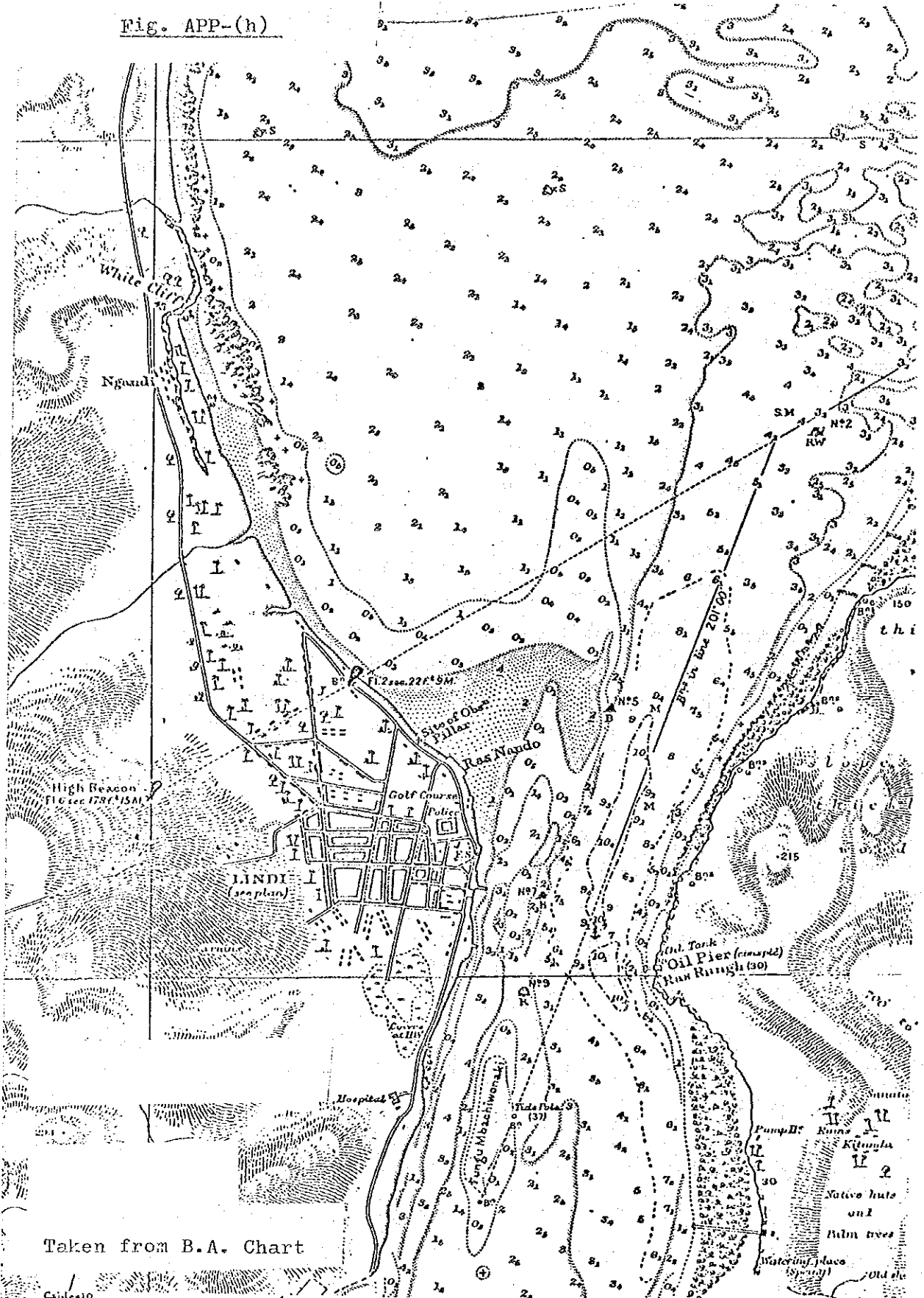
At the entrance of approaching route, water depth is as small as about 4.5 metres in the low tide and the ship should be run at a slow speed or dead-slow. Ships having drafts deeper than 4 metres are liable to touch bottom and, accordingly, they should enter or clear the port in high tide.

The route from No.2 buoy to the anchorage has water depth of about 8-18 metres and has no anxiety for navigation. (Ref. Fig. APP-(h)).

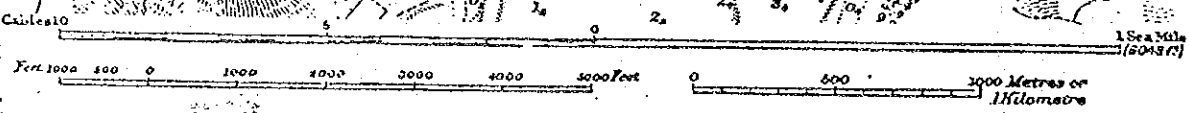
b) Anchorage

The area at 0.15 mile and in 300° bearing of Oil pier at Ras Rungh on the apposite is suitable for anchorage. The depth in this area is 15-16 metres and the bottom is of mud or mud-sand.

Fig. APP-(h)



Taken from B.A. Chart



c) Berth

This port has a small jetty in spite of large movement of cargo and passengers. As is shown in Fig. APP-Oj), a causeway is extended on the extension of the road from Gate. The causeway has a width of about 4 metres and has a jetty of 14 metres in length and 7.5 metres in width. When the tide is low, the water depth at the end of jetty is only 3 metres and, therefore, M/V Lindi cannot lie alongside the jetty in low tide and need to wait high water.

A more serious problem is the depth of course for approaching the jetty from the anchorage. As is shown in Fig. APP-(i), the water depth at the point 70 metres distant from and in front of the jetty is only 30 cm., and, therefore, 200 trifling mistake of operation will be permitted.

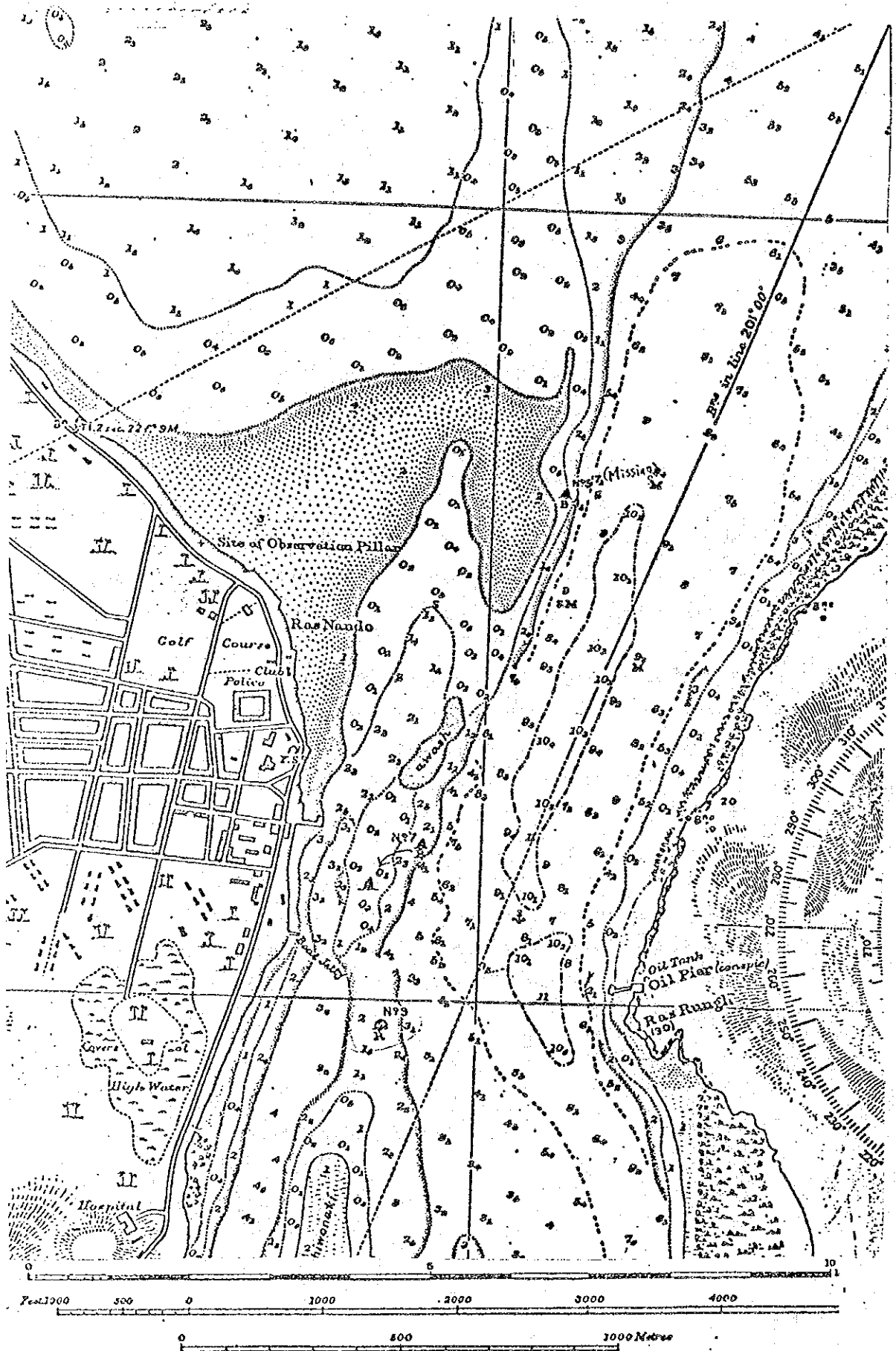
When going from the anchorage to the jetty, a very difficult course must be selected -- to approach first to No.9 buoy located in 162° of jetty and 500 metres distant therefrom, to turn and then go northwards along the shore to the jetty. Particular care is needed for operation.

When cargo handling is not necessary and passengers must be handled, it may be necessary to consider transport of passengers by a sampan from/to the vessel lying at anchor in the anchorage. This method involves a merit that the influence of tide can be neglected.

d) Port Facilities

This port has sufficient sheds and cargo handling areas, while the jetty and causeway are so narrow, as is shown in Fig. APP-(j), that the fork lift for handling cargo cannot turn round. Now, only one fork-lift is in operation and the conditions of the

Fig. APP-(i)



jetty will not permit simultaneous operation of two fork-lift.

For this reason, a plan of expansion of jetty is under progress. This plan will extend the length of jetty to more than 60 metres and the breadth to 20 metres, and, in addition, double the width of causeway. After the completion of this project, the efficiency of cargo handling will be remarkably improved and berthing also made much easier.

However, the port facilities cannot be efficiently utilized as far as the route from the anchorage to the jetty is not dredged, and this plan of dredging should be promoted in the near future.

e) Branch Personnel

The Branch Office is located in the central quarter of the city and supported by nine office members -- 1 Branch manager, 1 Secretary, 2 Claim & Freightage Officers, 2 Shipping & Booking Officers, 1 Cashier, 1 Freight Clerk and 1 Handy man. In addition, there are disposed in the terminal 2 Foremen, 2 Clerks and 3 Security Officers, and the total of Branch members is 16 persons.

f) Passenger Handling

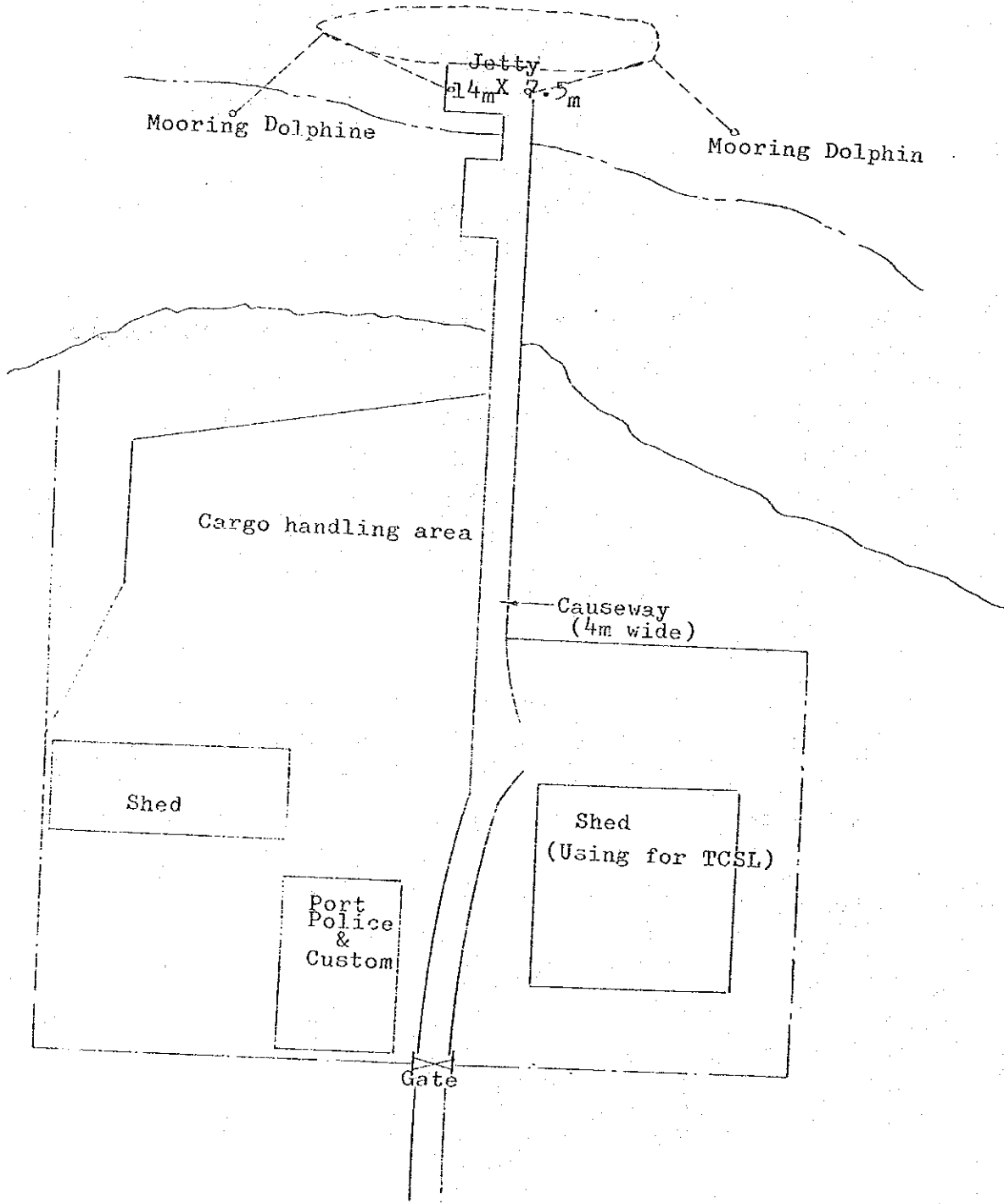
As the terminal has no passenger facility such as waiting room, the intending passengers must directly visit the Branch Office for booking, and one of the Shipping and Booking Officers is in charge of passenger handling. The booking system was modified since May 18th, 1978 so that all intending passengers may be booked in serial order in a list and tickets issued according to this order.

The boarding tickets are handed to passengers on the boarding days (once a week on the average).

The days of sailing are publicly noticed on a blackboard in

Fig. APP-(j)

JETTY AT LINDI TERMINAL



front of the office and, in addition, telephone inquiries about the sailing schedule are available.

Though the number of boarding passengers is about 100 on an average, there are always many waiting passengers who might wait for a long time (more than 2 weeks). Most of passengers are destined to Dar es Salaam and only few passengers are going to Mtwara via southbound services. There is a good highway between Lindi and Mtwara, which is utilized for bus transport of most passengers.

g) Stevedores

Stevedores are employed from Tanzania Cargo Handling Services when necessary, and this temporary employment is always possible.

The cargo handling work is performed in three shifts in the same manner as in Dar es Salaam. When the ship lies at anchor separated from the jetty due to low tide, however, cargo work is not practicable.

One gang is composed of 15 members and capable of loading or unloading 30 tons of cargo per hour, if cargoes are palletized. As for cattle handling, unloading of about 900 heads of cattle can be unloaded within 4 hours.

h) Supply

Supply of fuel oil, lubricating oil, fresh water and provisions is impossible in this port.

i) Restrictions

Entry is impossible from 1800 to 0600. In addition, berthing is often impossible when tide is low.

5) Port of Mtwara

The Port of Mtwara is located at 10°-16'S and 40°-12'E. It is the southernmost port of the coast of the United Republic of Tanzania and the largest port in the Southern Coasted Area playing as the entrance of cargo transportation route to the southern inland district.

a) Approaching Course and Marks for Approach

After having passed the west side of Shangani Shoal, to take course in line with two light beacons bearing 154° and, after passed No.1 course buoy (the buoy at the east end of Mwomba Shangani), to approach in line with two light beacons (out of action) at Msemo Spit and Ras Jandori respectively bearing 1890. Then, to change course to 215° at the point abeam (270°) of the signal station and, after passed the point abeam of the beacon (Qk, F1) at the southern end of Msemo Spit, to go to the quai via various courses. From the area around this beacon, port facilities such as sheds and quay are easily visible. All beacons are painted white and visible from fairly afar.

b) Anchorage

Anchorage is possible at any point in the range of 300 metres radius around the point in front of and 500 metres distant from the quay (075° and 0.55 mile of Ras Jandani Beacon). The water depth is about 22 - 27 metres and the bottom formed of mud. No good anchorage is found outside the port. For a) and b) above, Fig. APP-(k) and Fig. APP-(k') are to be referred to.

c) Berth

As is shown in Fig. APP-(1), the port has a Deep Water Quay of 378 metres in length, where ships having a maximum draught of 9.7 metres (24 feet) can lie alongside. The range of about 320

Fig.-APP-(k)

Taken from B.A. Chart 691

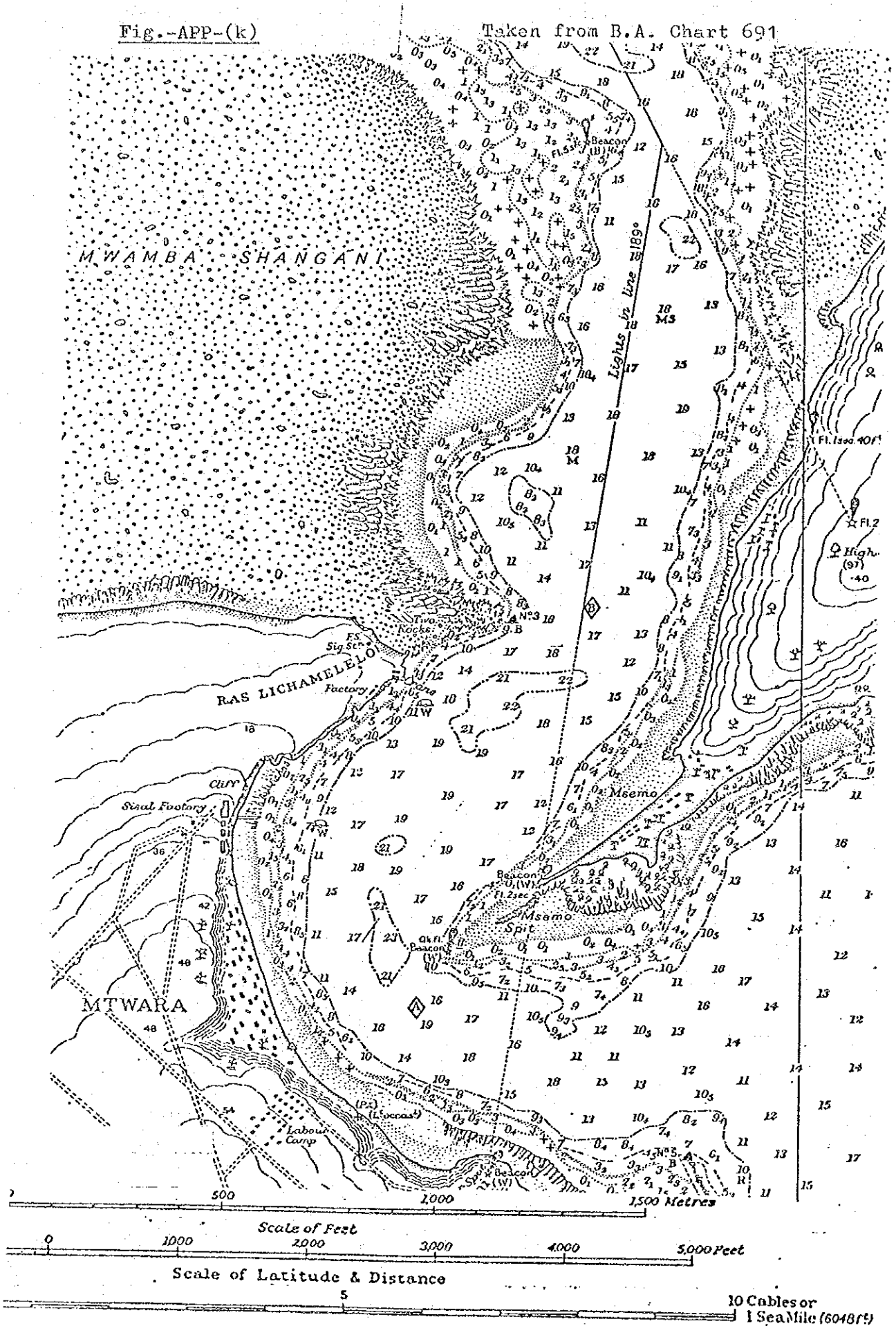
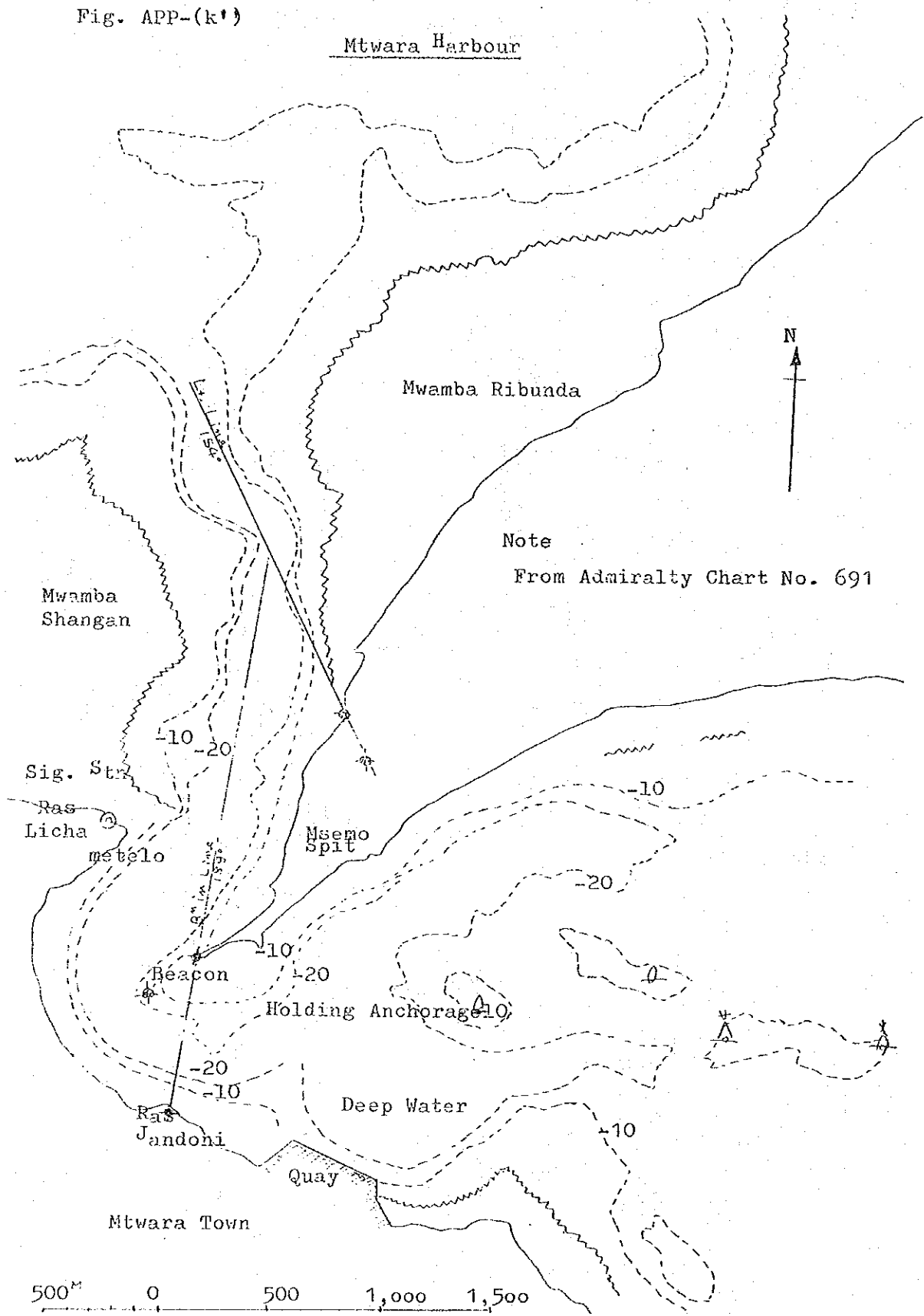


Fig. APP-(k')



metres from its eastern end is used for ocean going vessels and the length allocated to TCSL is only 60 metres from the western end. When no ocean going vessel lie alongside the pier (though the number of calling ocean going vessels is not small), the berth for them is also available.

d) Port Facilities

The quay has four sheds, and No.1 shed is used by TCSL, No.2 and No.3 sheds are used for overseas use. The TCSL shed has an area of about 1,800 square metres, which area is quite sufficient for cargo handling.

The port has no shore crane and the ship's cargo gear must be used for cargo handling. There is no passenger facility such as passengers' waiting room. Communication with the signal station is possible by means of VHF 12 or 16 channels.

e) Pilots and Tugboats

The use of pilots is compulsory for ocean-going vessels. However, pilots do not always stay in this port and they must be brought from Dar es Salaam by aircraft when necessary. Therefore, pilots must be ordered as early as possible. The pilot boat comes the point about 0.5 miles in north of Shangani Shoal Buoy.

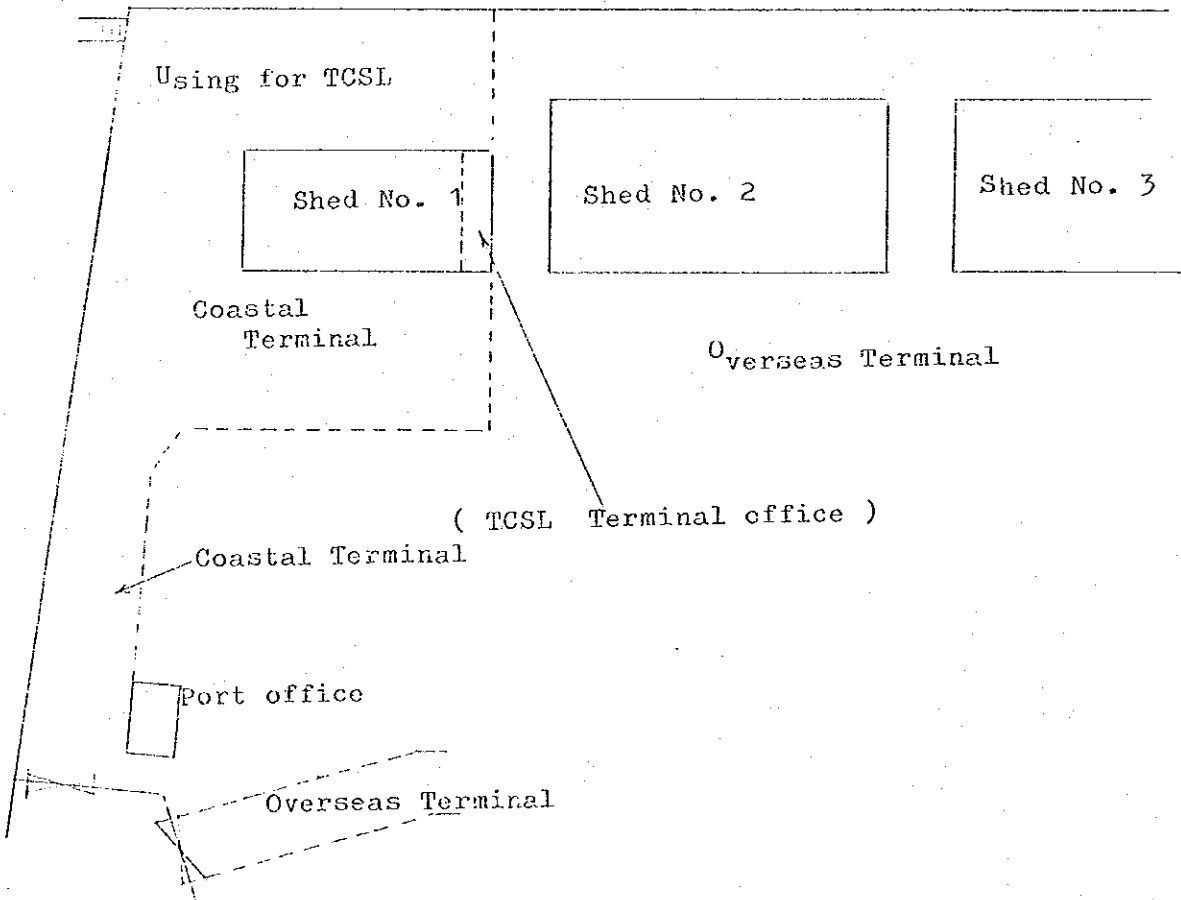
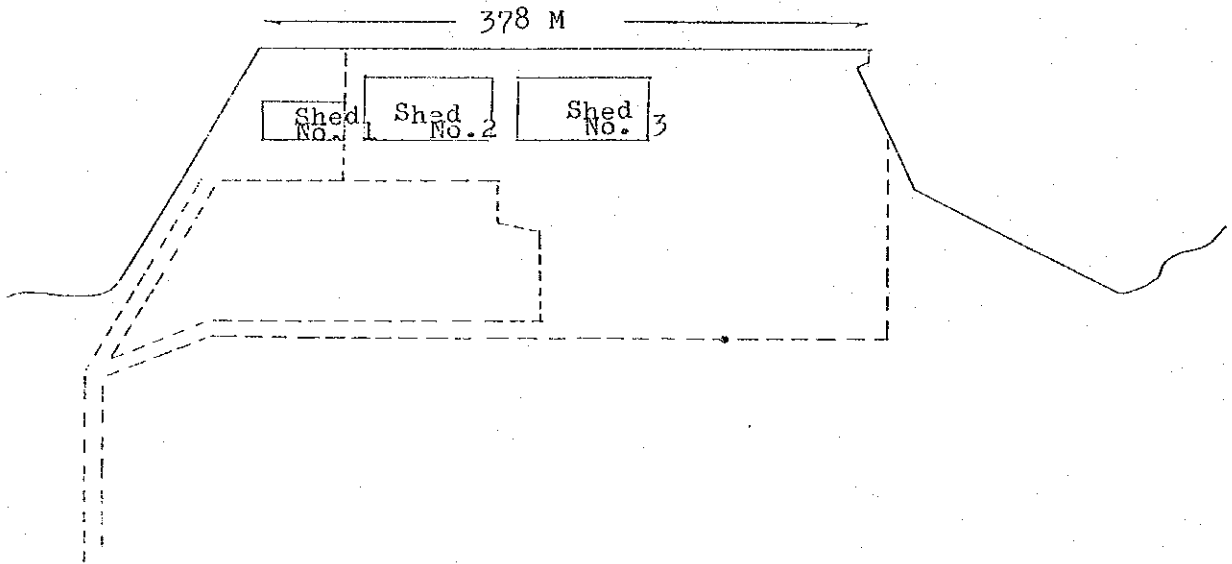
The tugboats come to the Signal Station to assist berthing. These pilots and tugboats are for service for ocean-going vessels and not for domestic service vessels.

f) Branch Personnel

The Branch consist of 23 members -- 1 Branch Manager, 1 Supervisor, 2 Terminal Foremen, 1 Freight Clerk, 1 Casher, 1 Booking Clerk, 1 Typist, 6 Security Guards, 4 Terminal Checkers, 3 Terminal Operators and 2 Fork-lift Drivers. The main office is

Fig. APP-(1)

DEEP WATER QUAY Mtwara



located in the harbour common building and, in addition, a local office in the Terminal.

g) Passenger Handling

There are many intending passengers in this port and the vessel of direct service to Dar es Salaam (150 passengers) is always full.

In the rainy season, the number of waiting passengers often attains to 400, according to the Branch manager.

The sailing schedule is publicly noticed in front of the Branch Office. M/V Mtwara calls this port once a week on an average and the booking is commenced 4 or 5 days in advance of the day of entry. The intending passengers submit applications at the counter of the Branch Office, which is closed as soon as the number of application has attained the ship's capacity (150 passengers) and, accordingly, those who could not get seats in the previous voyage cannot always get seats in the next voyage. Branch manager says that, if booking by serial number of order is adapted, the waiting passengers will increase endlessly and he is obliged to adapt the closing system.

Reception of boarding passengers are made on the day of departure.

h) Stevedoring

Labourers are employed from Tanzania Cargo Handling Services when necessary. The use of two gangs is possible in this port. Each gang consists of 20 members and its cargo handling capacity is about 40 tons both for loading and unloading.

i) Supply

Supply of fuel oil, lubricating oil, fresh water and

provisions is impossible in this port.

j) Restrictions

Most of lighthouses, leading beacons and buoys are out of action and, accordingly, entry and departure in the night-time are difficult. Officially, entry is permitted until 2200, and entry from 2200 to 0600 is forbidden.

6) Port of Tonga

The Port of Tonga is located at $05^{\circ}-04'S$, and $39^{\circ}-08'E$, and has a long history of development as a foreign trade port.

a) Approaching Course and Marks for Approach

To pass Ship Channel in line with leading lights at the east end of Ulingo Island bearing 319° and change course to portside at the point in 021° , 0.7 mile of the light beacon at the NE end of Niule and follow course in line of two leading lights of Las Kanone bearing 266° . After lying abeam the lighthouse of Ulengo Reef, to enter into Tonga Bay bearing 277° . All lighthouses, light beacons and light buoys in this port area are normally lit and, therefore, entry in the night-time is possible. Fig. APP-(m) is to be referred to.

b) Anchorage and Berths

Though this port has good wharves, all of them are lighterage whoevers because of extremely small water depth.

As are shown in Fig. APP-(n), 12 anchorages are appointed in the Inner Harbour and the Outer Harbour, and ocean-going vessel lie at and or here for cargo working, which is carried out by means of 29 lighters.

Fig. APP -(m)

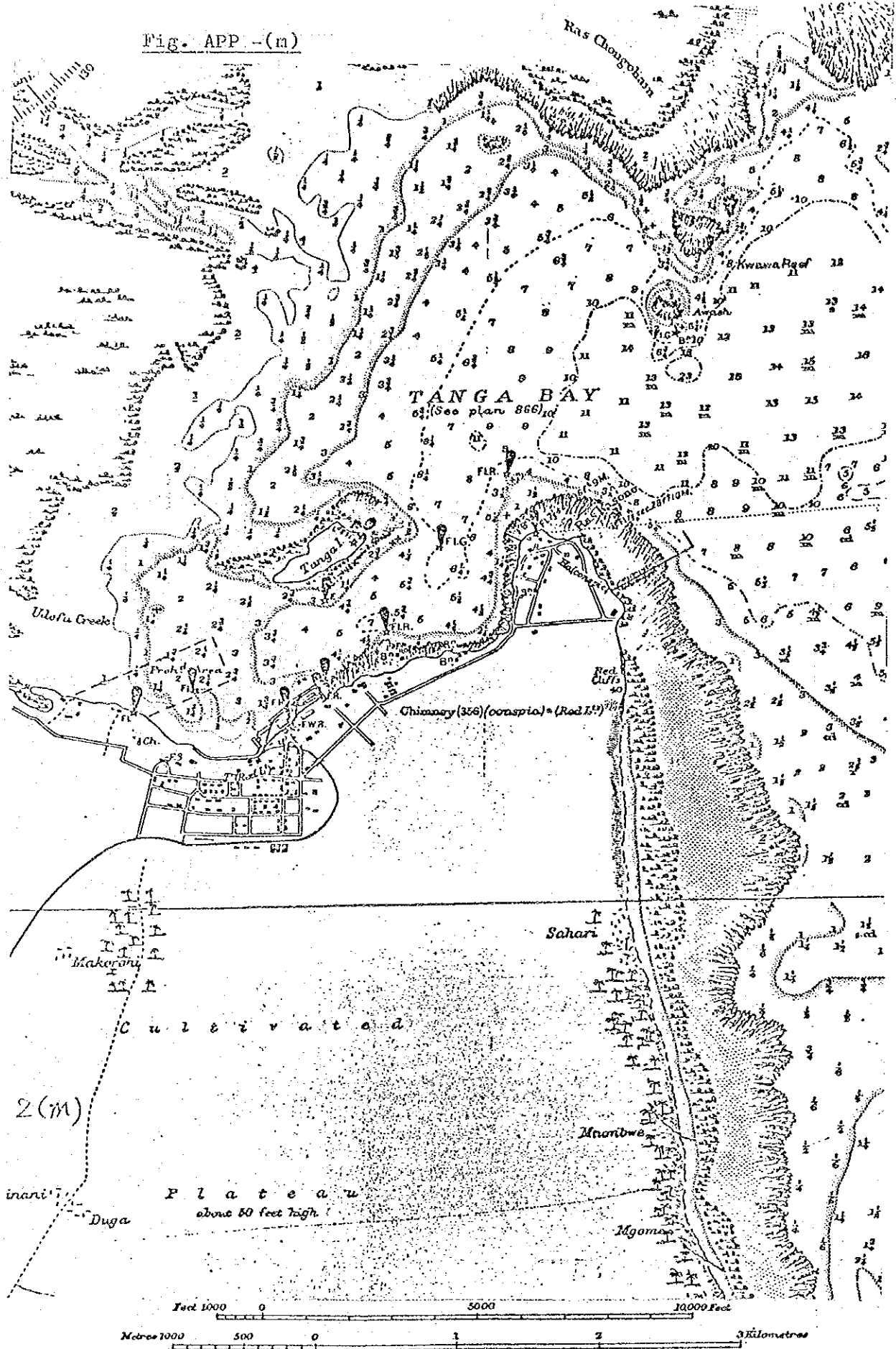
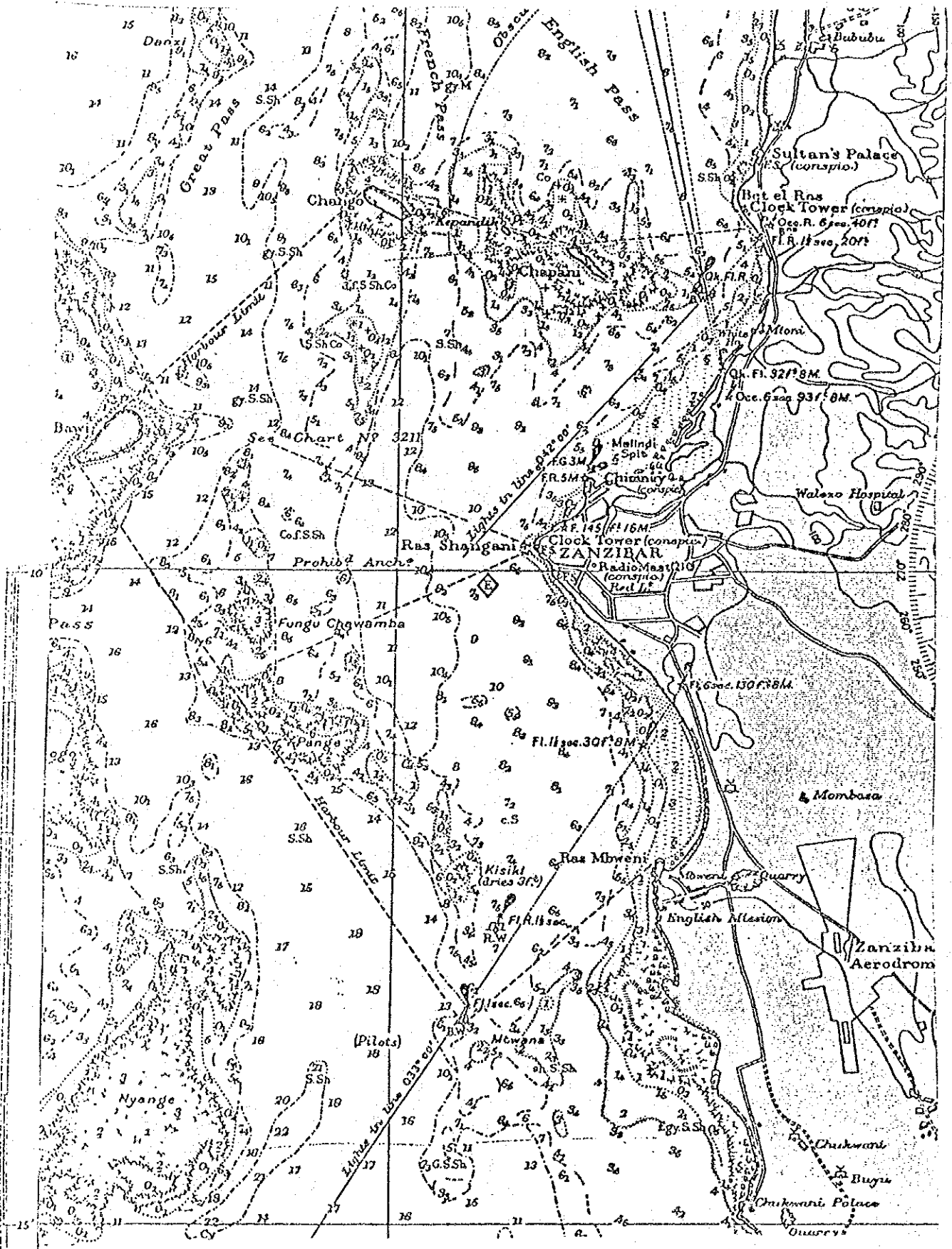


Fig. APP-(p)



In addition, the fertilizer mill has, for exclusive use, a fertilizer berth, which has a very long causeway and capable of mooring alongside a cargo vessel of 10,000 DWT at the end jetty.

M/V Lindi and M/V Mtwara of TCSL call this port once a month only on an average, and most of fertilizer for domestic use is transported from this berth by schooners.

c) Port Facilities

Fig. APP-(o) is to be referred to.

As the cargo working is carried out by lighters in this port, there are eight gantry cranes on the wharves. These cranes are well maintained and working efficiently.

Further, in order to comply with the general containerization, four gantry cranes are being constructed according to the 7-year plan started in 1975, and the berths are being expanded and improved in parallel. After completion of this expansion plan, the cargo handling quantity will be remarkably increased.

As passenger handling facility, there is a Customs Passenger Terminal at the northern end of the berth. This Terminal has a baggage inspection office and a passengers' waiting room, the latter being connected with the sampan embarkation station by a pontoon landing stage, and, accordingly, can fulfil satisfactory function as a passenger handling facility.

d) Branch Personnel

The TCSL Branch in this port has two members -- 1 Acting Officer in charge and 1 Tally Clerk. As M/V Mtwara and M/V Lindi call this port once a month only and, in addition, a good highway communicates Tonga and Dar es Salaan, all passengers utilize busses and no handling of domestic passengers is needed.

The most important cargo handled by TCSL in this port is fertilizer, which is transported for the most part by schooners.

e) Stevedoring

Simultaneous work of 6 gangs is possible. Each gang consists of 8 members, 4 on the berth and 4 on board. The cargo handling capacity of one gang is about 10 tons per hour. The time of cargo working is same as in Dar es Salaam.

f) Supply

Supply of lubricating oil only is possible here.

g) Restrictions

There is no restriction, i.e., lighthouses, light buoys and other nautical aids are in normal operation and entry in the night-time is possible.

7) Port of Zanzibar

The Port of Zanzibar is located at 06°-09'S, 39°-11'E. This is the only international trade port of Zanzibar Island and famous as the port of shipment of clove.

a) Approaching Course and Marks for Approach

When going from Dar es Salaam to Zanzibar, to go northwards through Southern Pass and take the entry course in line leading lights (Fl. 6 sec.)(Fl. 1-1/2 sec.) bearing 330°. To change course to 345° at the point in 270°, 0.7 mile of Ras Mbweni and, after lying abeam Ras Shangani, to enter the berthing course via various courses.

When approaching via southbound route from English Pass, to pass the light buoy of Seagull Shoal on the starboard side

and take course in line with two leading lights, Qk, Fl, and Occ. 6 sec., bearing 168°, and, after passing the light buoy (Qk, Fl.) in east of Chapani Island on the starboard side, to change course to 222° to enter the berthing course.

In both northbound and southbound courses, the clock tower in the seaside street of Zanzibar City is easily visible approaching the harbour. Fig. APP-(p) is to be referred to.

b) Anchorage

The range of 600 metres radius around the point in 290° of and 0.7 mile from the lighthouse at the north end of Zanzibar wharf is suitable as anchorage. Anchoring is possible even in other areas. The water depth is about 18 metres.

c) Berth

As are shown in Fig. APP-(q) and Fig. APP-(r), five travelling cranes are working on the berth of 242 metres in length. There are an export shed and an import shed, in addition to a store for clove.

In addition to this berth for ocean-going ship use, a dhow wharf is provided in the Inner Harbour for use for smaller domestic service vessels. The port has no passenger facility.

d) Other Items

The Harbour Authority of this port is the Ministry of Shipping and Harbours, which holds commands of all affairs relating to the harbour and ships.

There is no restriction regarding entry and departure. For vessels needing pilotage, however, entry and departure are impossible in the night-time because pilots can be on board from sunrise to sunset only.

Fig. APP-(.)

TANGA LIGHTER WHARE

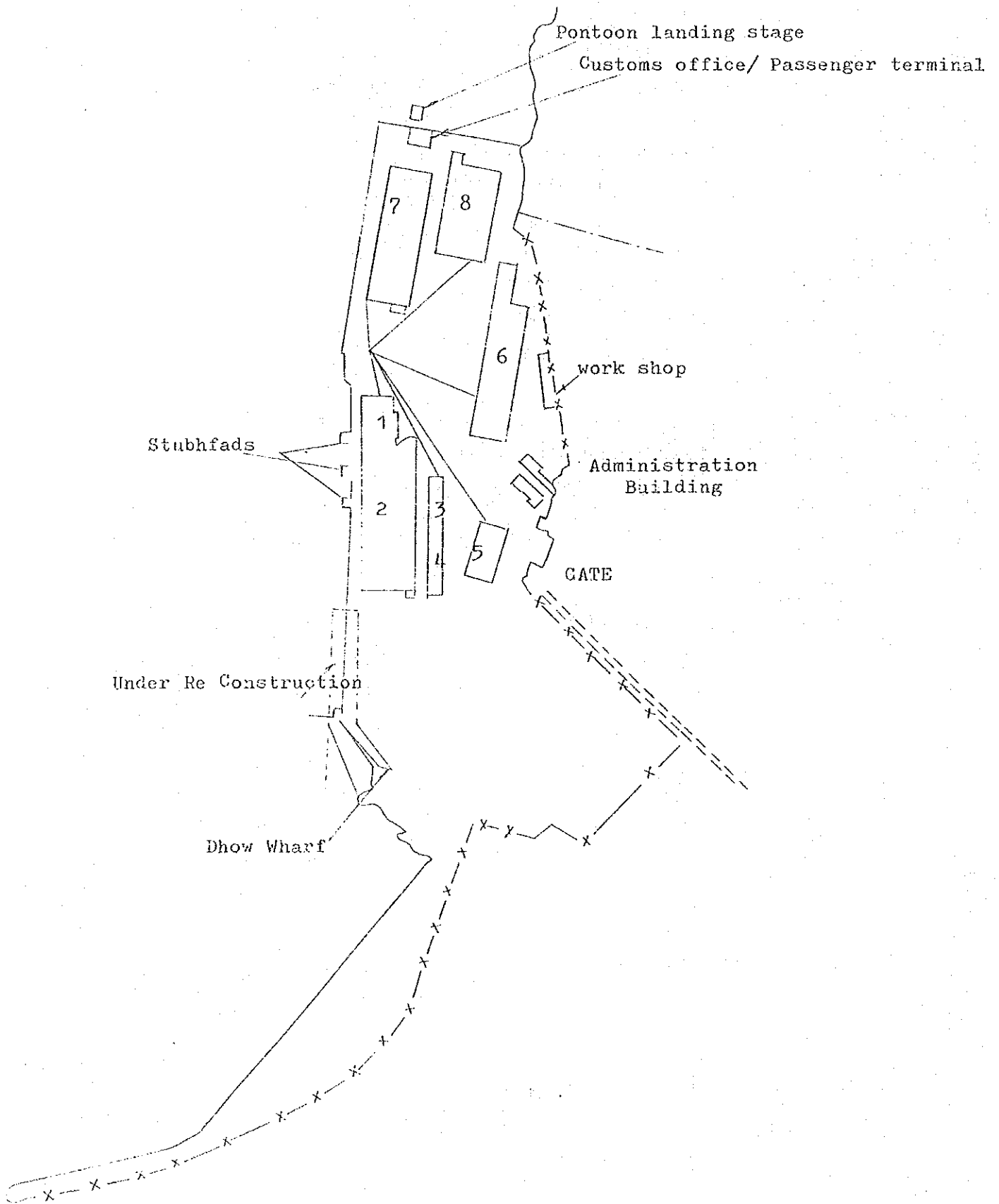
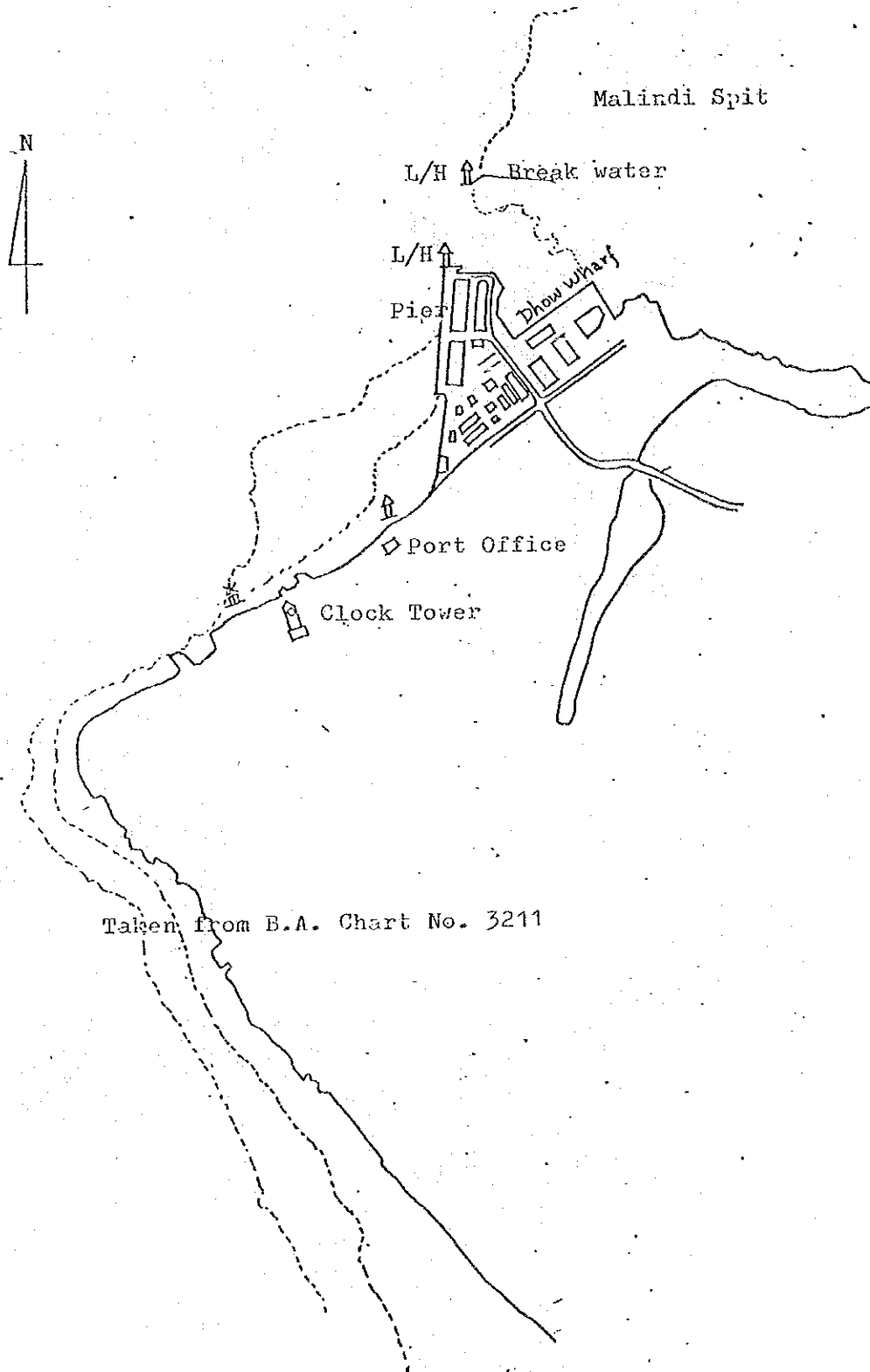


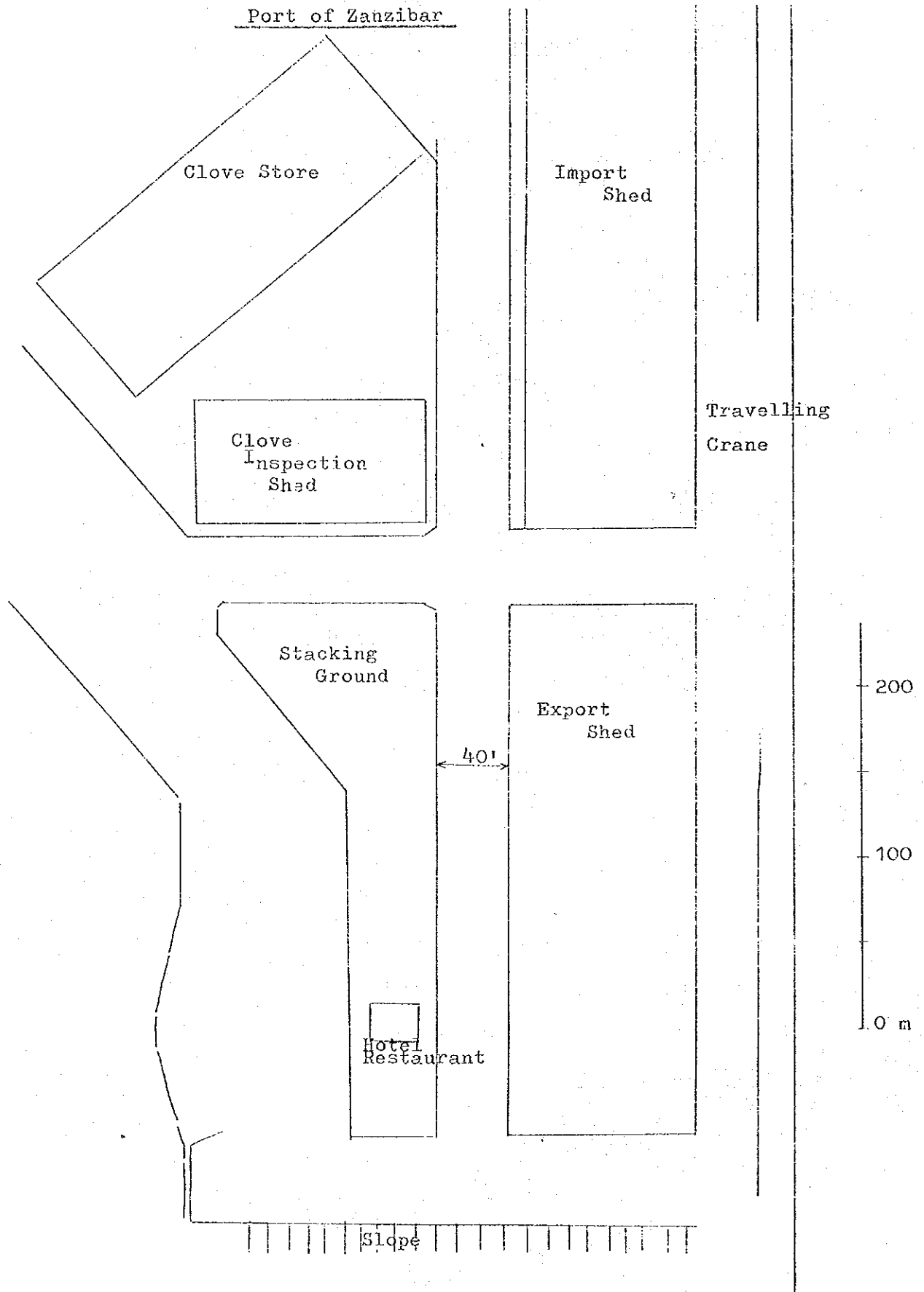
Fig. APP-(q)

ZANZIBAR HARBOUR



Taken from B.A. Chart No. 3211

Fig. APP- (r)



JICA