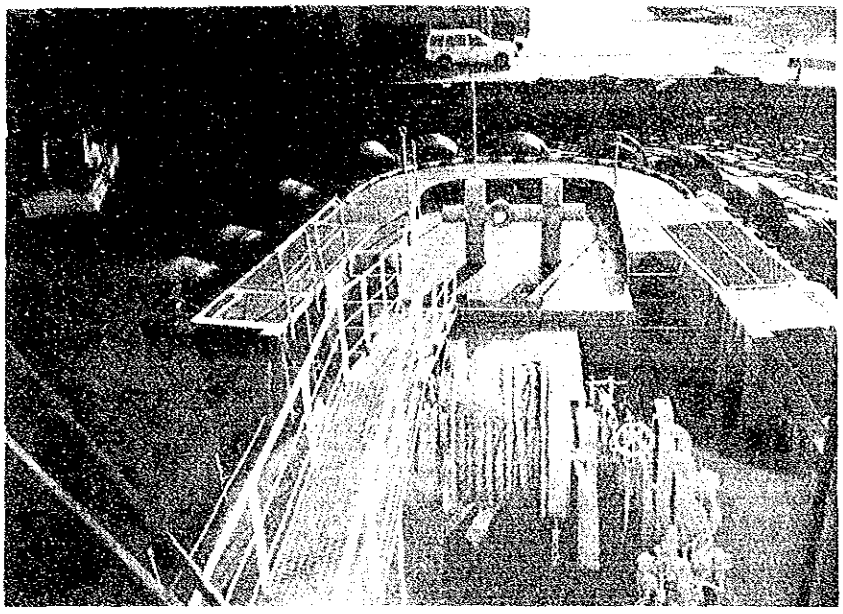
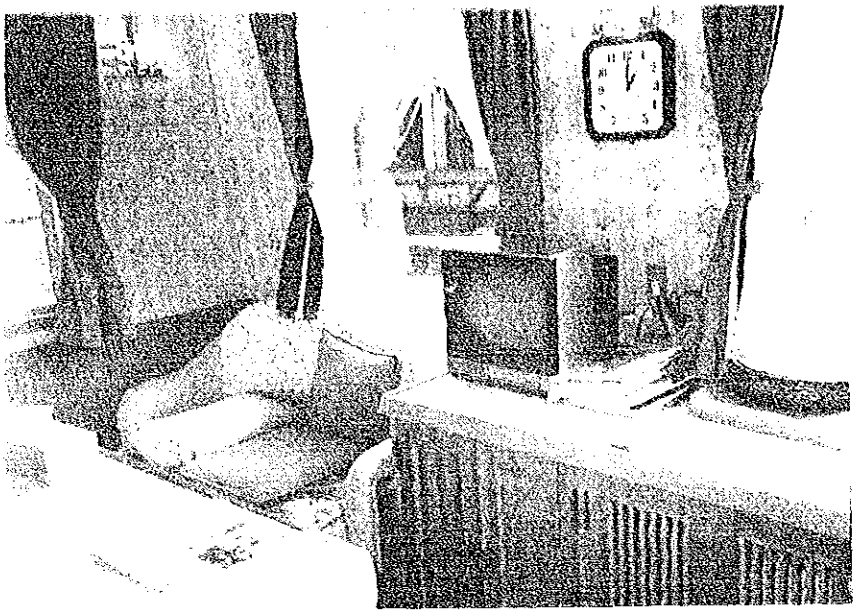


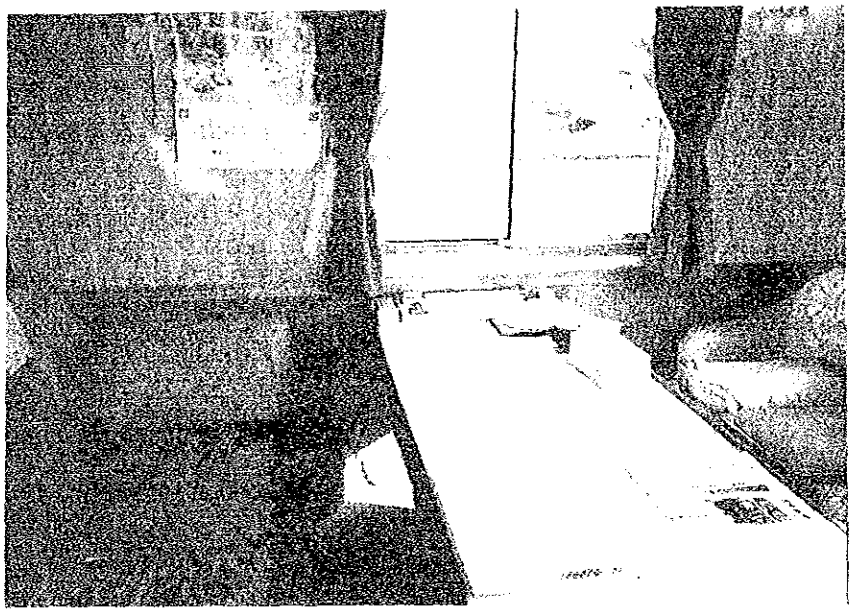
FORECASTLE OF URAGA MARU

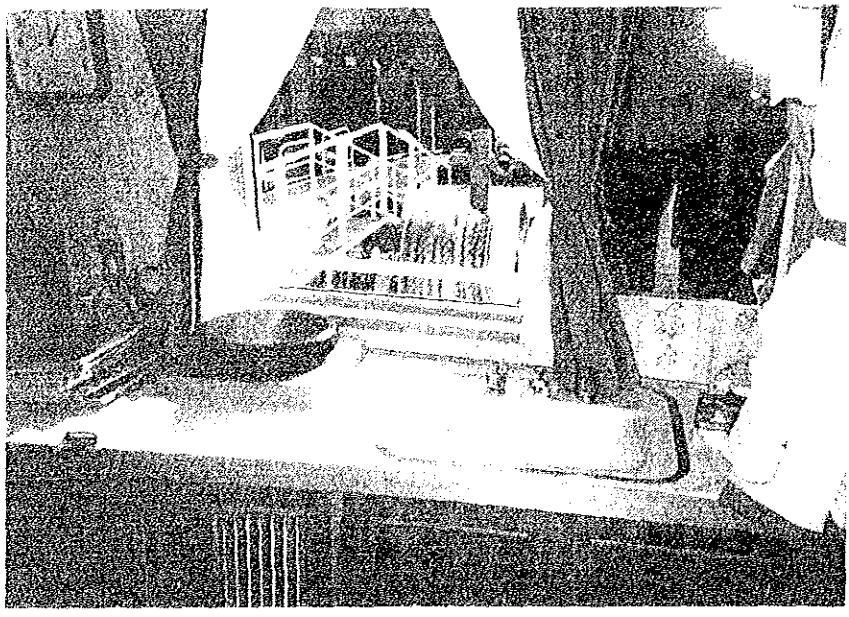
BRIDGE URAGA MARU

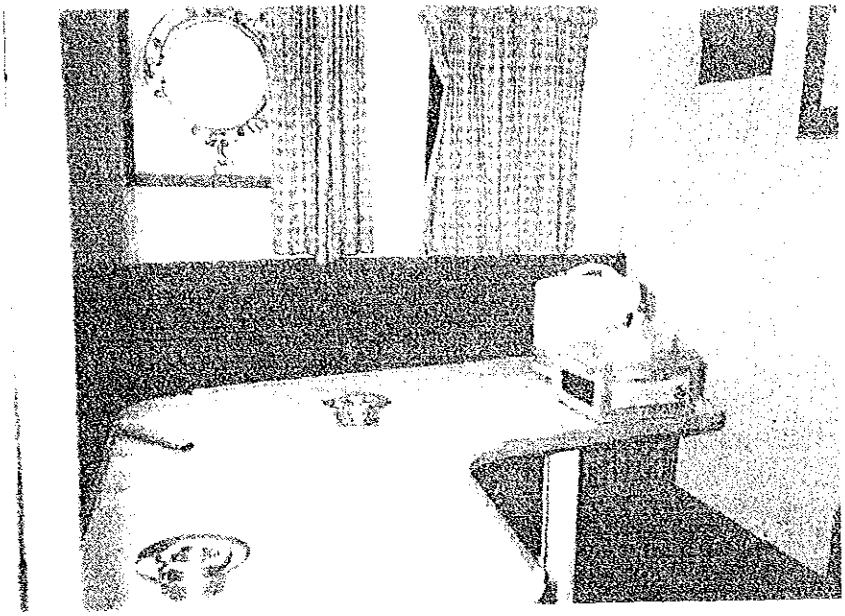
BRIDGE URAGA MARU

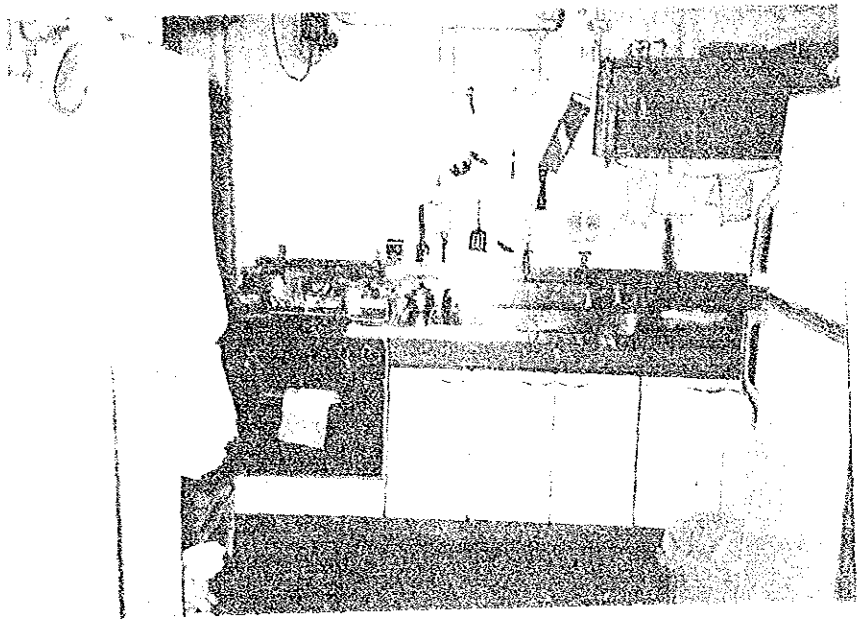
PILOT WAITING ROOM (1)

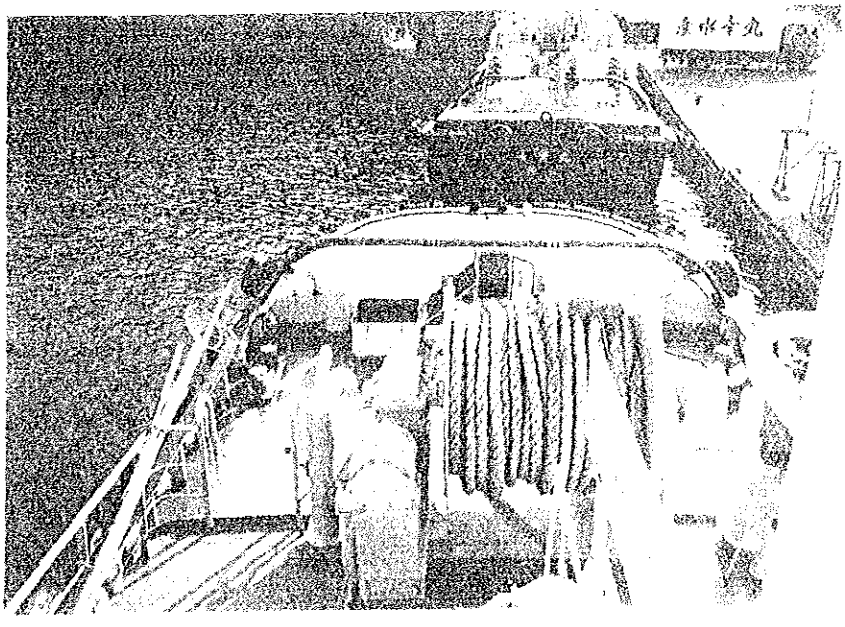












(3) Meteorological and Oceanographical observation record at Uraga Suido

The data was supplised during the study of the Tokyo Bay Pilot system by Toyo signal Station Co., and Yokohama Meteorological Observatory.

Table-2 Number of Windy days per Month (1977)

	Stormy (more than 10m/s)	southerly wind (more than 10m/s)
Jan.	25 days	1 day
Feb.	26 "	10 days
Mar.	25 "	9 "
Apr.	27 "	20 "
May	16 "	7 "
Jun.	20 "	7 "
Jul.	13 "	12 "
Aug.	23 "	10 "
Sep.	19 "	10 "
Oct.	21 "	5 "
Nov.	27 "	11 "
Dec.	24 "	7 "
Total:	266 days	109 days

Sources: Toyo Signal Station Co.

(4) How to embark inbound vessel

The entrance of Uraga Suido is open to the south, so in the stormy season in spring and in the typhoon season, southerly stormy winds are specially hazardous for pilots.

Generally, in rough weather pilots go out earlier than usual to meet inbound vessels on time, but the vessels are often late. So, pilots must wait a long-time on the small pilot boat which is struggling in the rough sea.

Generally pilots are not accustomed to the quick movement of small boats so almost all the pilots become sea-sick.

i) pilot boats meet the inbound vessel about 2 miles south of the Uraga Center buoy No.1

ii) tugs push their bows firmly to the lee-side of vessels

iii) the tug moves up and down about 2 meters

iv) before climbing up the pilot ladder, check the upper-most step (a) when the tug is going up

v) if the pilot puts his foot one step above the (a) step, he will be safe

vi) in-bound ship and the pilot boat which is firmly touching the ship's hull, move together on the Uraga Traffic Route at a speed of 3 - 4 kn, and when the pilots gets onboard safely, the pilot boat leaves the position

vii) in Uraga, the pilot boarding area is not wide enough to make the lee-side for the pilot boat, because generally various kinds of ships concentrate at the entrance of the Uraga Traffic Route almost at the same time especially in the morning and in the evening.

The following figure shows the pilot boarding and disembarking area of the Uraga Suido (Fig. 1), and the photos show the first stage of climbing up the pilot ladder at Uraga Suido.

viii) Generally tugs used in Uraga Bay for Pilots are fitted with a cycloidal propulsion system (z-peller or duck-peller) which can quite easily be maneuvered in all directions and also quite easily and safely be able to move alongside merchant vessels for the purpose of boarding pilots.

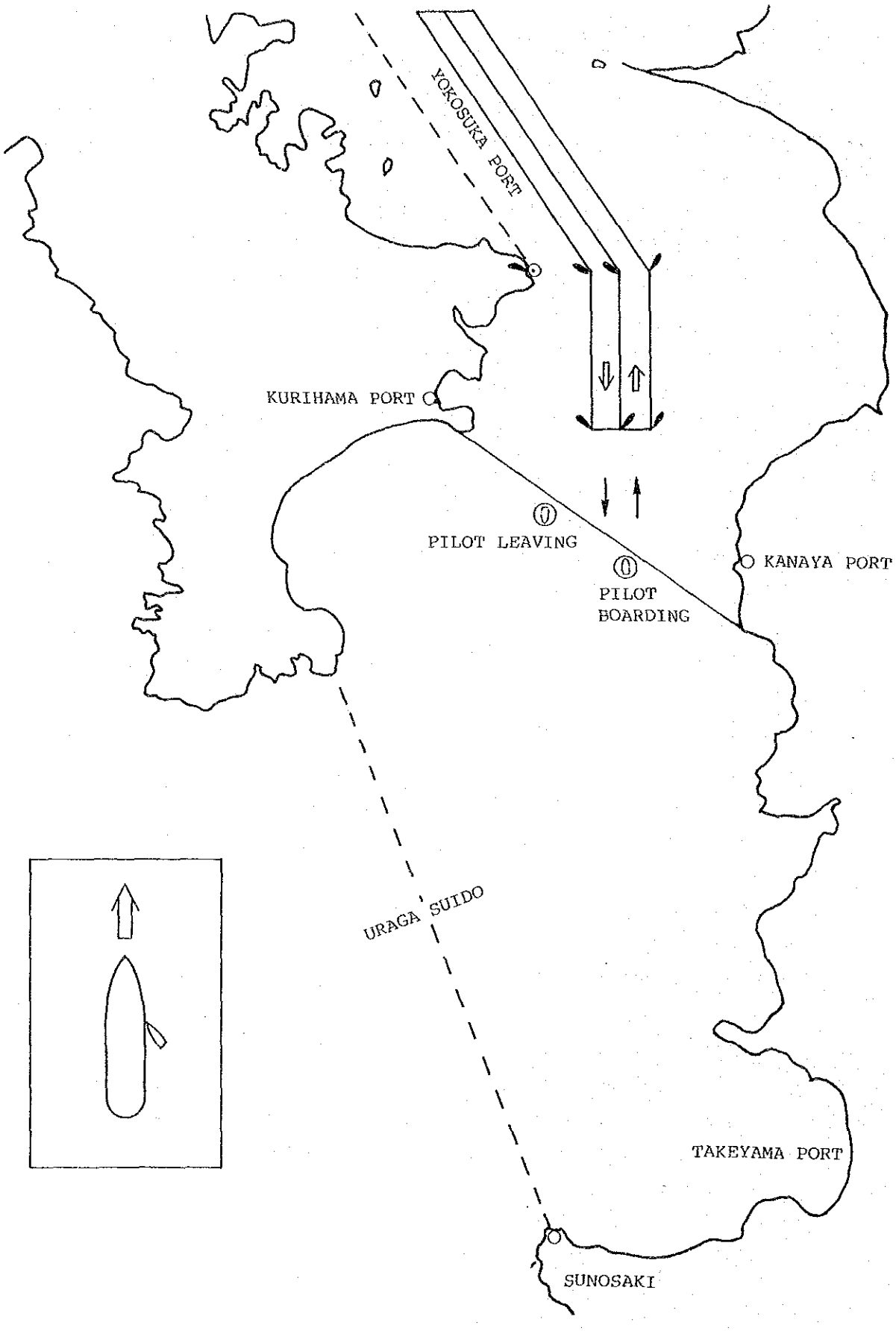
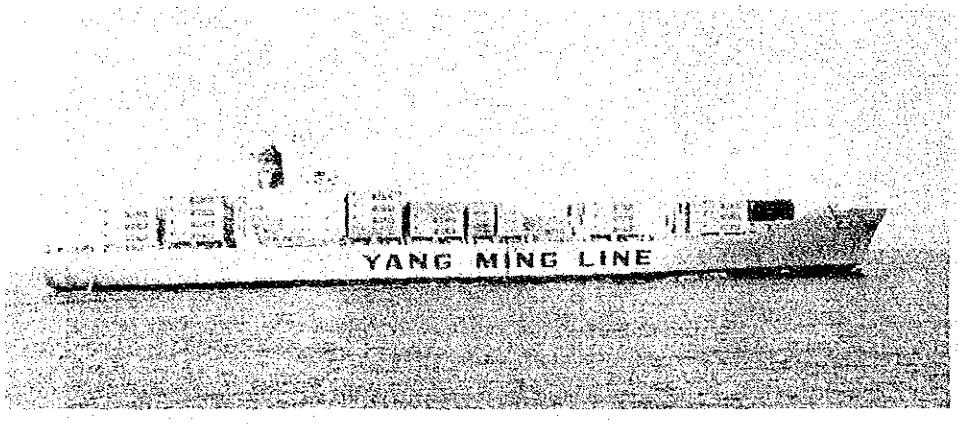
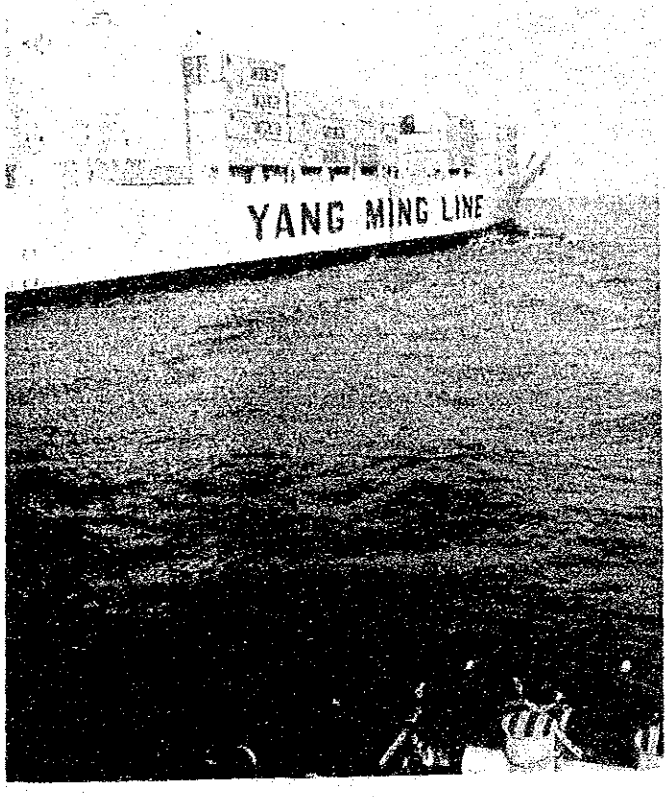


Fig. 1 Pilot Boading

EMBARGATION TO INBOUND VESSEL IN URAGA SUIDO

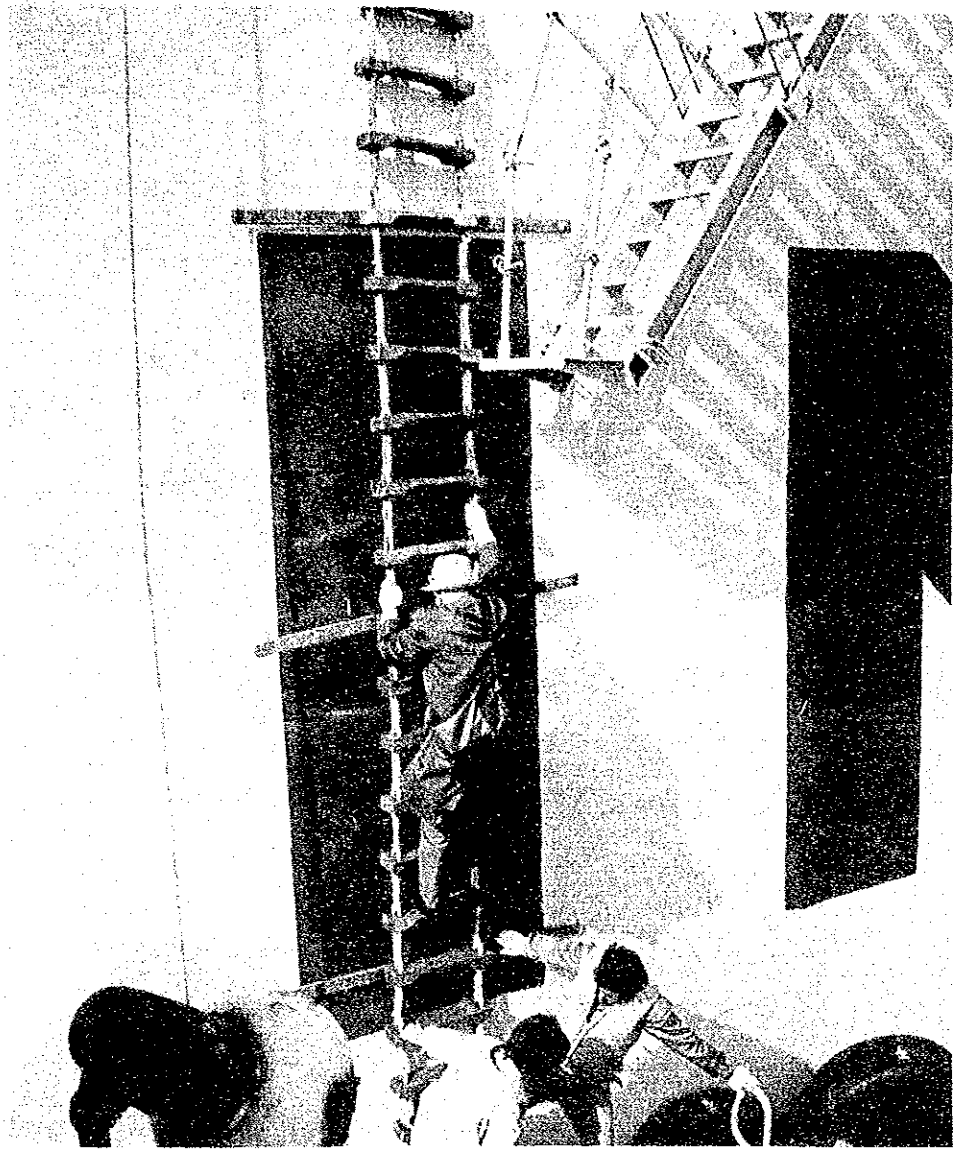
(1) INBOUND VESSEL (GA 30,730t, LOA 210m)
REDUCED SPEED AND PREPARING FOR PICKING UP A PILOT



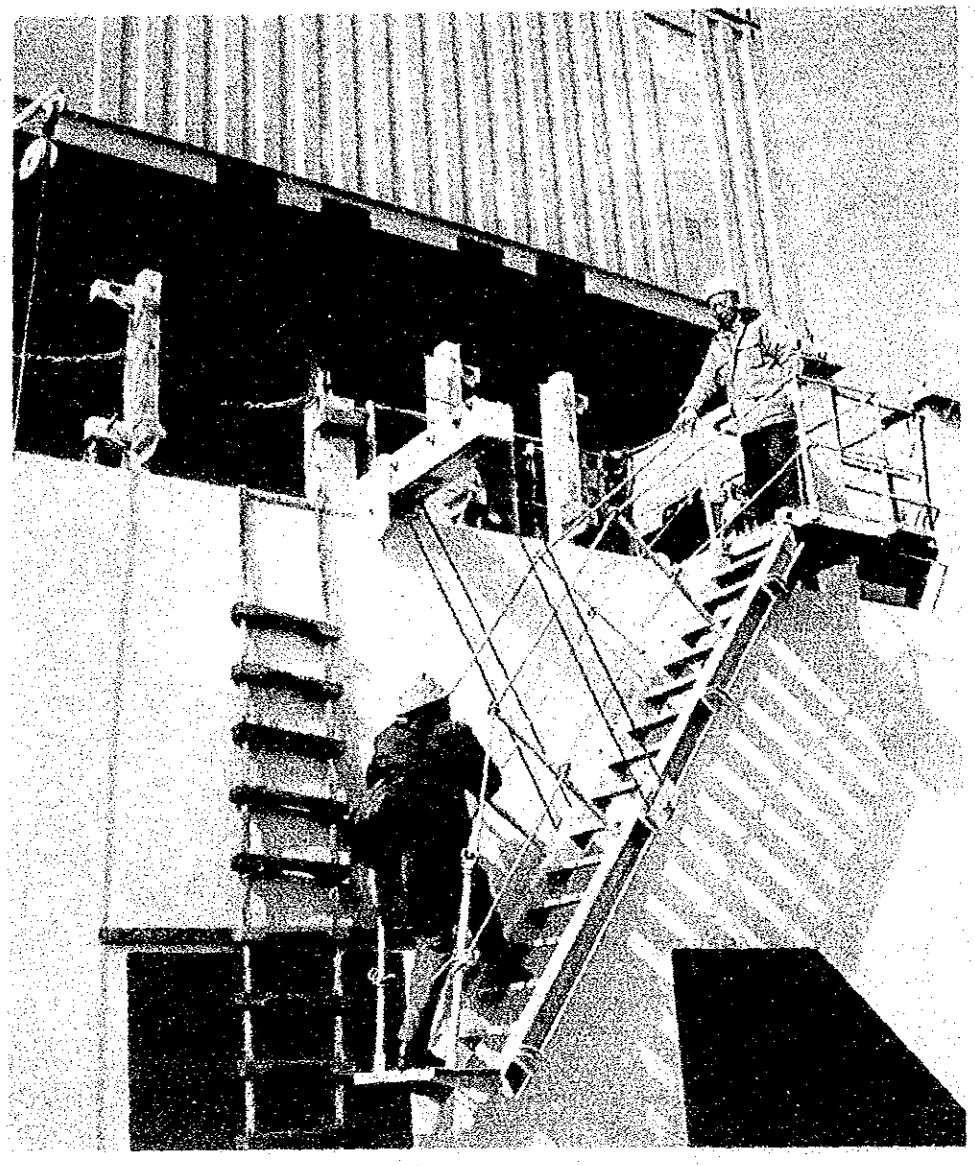


(2) TUG BOAT APPROACHING TO THE VESSEL FROM STARBOARD QUARTER

(3) PILOT BOAT NEARLY ALONGSIDE TO THE VESSEL



(4) PILOT CLIMBING UP PILOT LADDER
UNDER THE HELP OF BOAT-CREW



(5) PILOT SHIFT TO ACCOMODATION LADDER
FROM PILOT LADDER ON THE WAY

(5) Total Number of Transit Vessels in the main channel

According to the data of the JApan Maritime Safety Agency, the number of transit vessels in the Uraga Suido and Irago Suido are as follows:

ships/per day
Channel (Suido)

Year	Kind of Ship	Uraga	Irago
1984	Merchant	698	312
	Fishing	50	609
	Total	748	921
1985	Merchant	721	283
	Fishing	73	622
	Total	794	905

(6) Total Number of Transiting Vessels under control at Uraga Suido Traffic Control Route (1985)

(a)	Huge vessels ----------	8,870
(b)	Carrying dangerous cargo ----------	4,102
(c)	Towing long-large objects ----------	23
	Total per year	12,995
	per day	35.6 ships/day

(7) Crews of tug boats

Generally, there are 12 onboard (4 x 3 shifts) and 3 spare crew on the shore for each tug. For a new tug there are only 8 onboard.

The master and officers are licensed and have experience as masters of coastal routes.

(8) Restrictions for rough sea

The tugs can be used in waves up to 1.5m in height but are actually operating up to about 3m according to the conditions. The tugs only stop their operation 2-3 days per year.

(9) Stoppage standard of ferry-boat service

There is regular ferry-boat service between Kurihama and Kanaya, crossing the Uraga Suido.

The standard for stopping the ferry service is as follows:

	Port Area	Coastal Sea
Wind velocity	more than 12 m/s	more than 19 m/s
Wave height	more than 1.2 m	more than 2.5 m
Visibility	less than 500 m	less than 500 m

Generally the ferry company stops the service 3 - 5 times per month for partial or entire days.

B. Ise Wan (Bay)

Ise Bay is located near the middle of Honshu Island facing the Pacific Ocean and Irago Suido is the only route available for merchant vessels.

Irago pilots are stationed generally at Handa and it takes about 3 hours to board vessels.

(1) The Most frequent strong winds around the pilotage area are as follows:

i) During Winter
North - NE'ly monsoon and NW'ly terrible blows accompanied by depressions and cold fronts.

ii) During Spring to Summer
Due to passing over of developed depressions.

iii) Typhoon Season
Mostly during May to November

iv) Even under the worst conditions, pilotage services are stopped only 3-4 days in a year.
Generally, pilot services are continued up to a wind velocity of 15m/sec.

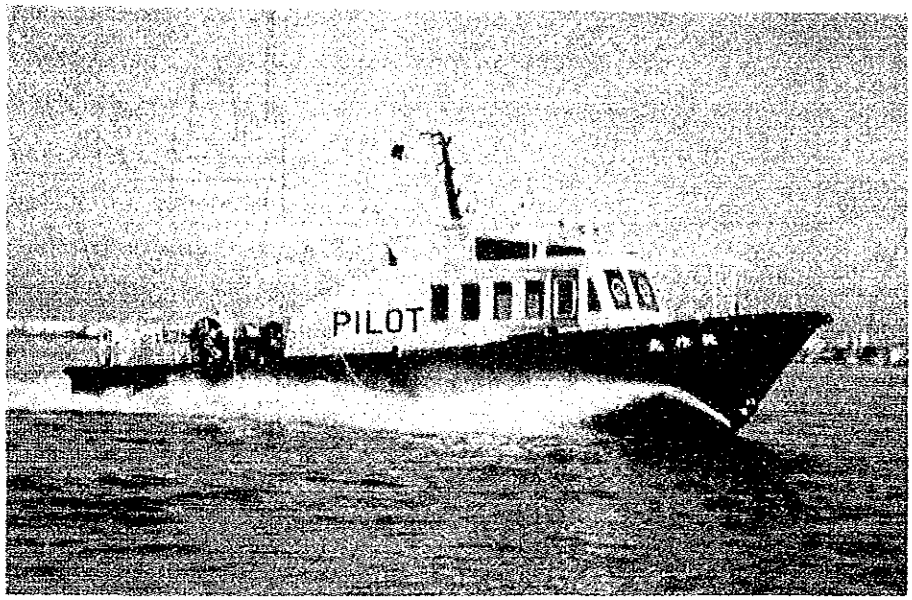
(2) Fishing Boat Type Pilot Boat

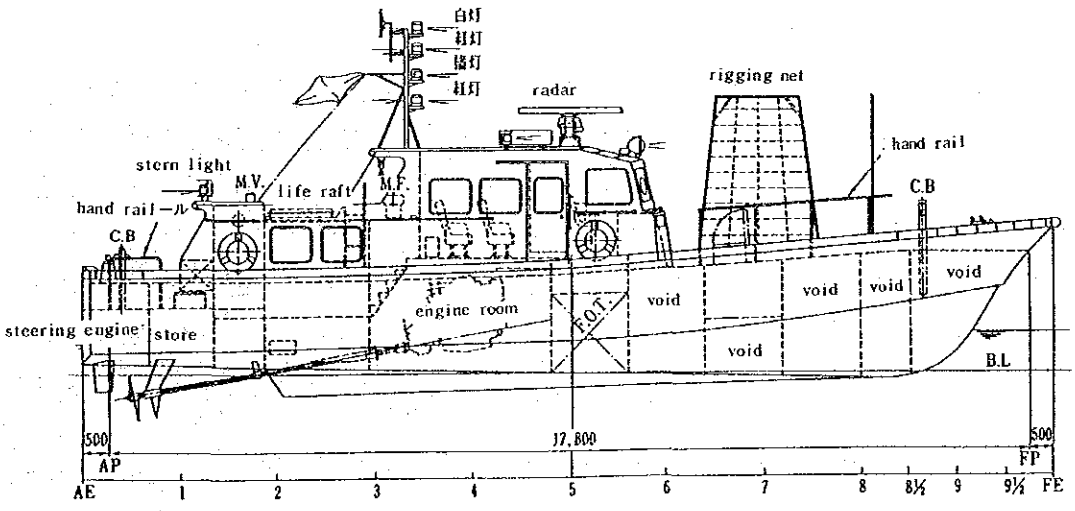
This type of pilot boat is specially modified from ships used for deep-sea fishery, so they have good sea-worthiness even in rough coastal seas.

The boats are equipped with special handrails, rigging nets and also bow rubber fenders for the safety of pilots and other Boats.

The same type of pilot boat is also used in Osaka Bay.

Following is a profile of a fishing boat type pilot boat.





Particulars of Pilot Boat

LOA: 18.8m B: 4.03m D: 1.83m

G/T: 19.0t HULL: FRP CAPACITY: 14 pns.

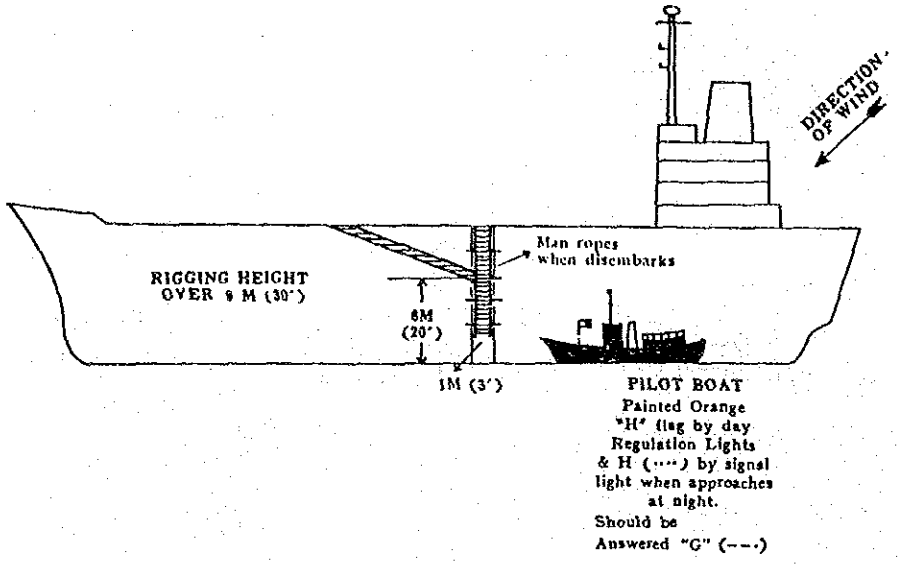
M.E: YANMAR-6 KHK-UT1.440 P.S.

2,000 RPM x 2

SPEED: MAX. 26.7 kn.

(3) Requirements and Rules

Concerning IRAGO-MIKAWA WAN PILOTS (Abstruct)



REQUIREMENTS

1. Pilot ladder: be fitted with spreaders in accordance with SOLAS CONVENTION Chapt. V Reg 17. on ship's lee side and kept clean in good order.
   The lowest rung is 1 meter above the water.
2. Man rope: 3-1/2 inches manilas to be rigged when pilot disembarks.
3. A ring buoy with a self igniting buoy should be provided.
4. Light: sufficiently illuminate the ladder at night.
5. Speed: Keep vessel head way at 3 to 4 knots.

REQUIRING IRAGO PILOT

1. Application

Please inform us of undermentioned items by agents

Inward vessel : 24 hours prior to ETA
Outward vessels: 12 hours prior to ETD
and also above time should be confirm 6 hours prior to ETA or ETD

(a) Ship's name
(b) Gross tonnage
(c) Deepest draft
(d) Length over all (in case of over 200 meters)
(e) ETA or ETD
(f) Last port of call and destination
(g) Berthing schedule
(h) Kind of cargo (dangerous cargo)
(i) Others (Quarantine, if any disorder of engine, radar, compass, VHF, etc.)

2. IRAGO MIKAWA WAN PILOT is available 24 hours a day, and the Pilot office is also operating the whole day (including on Sunday, holiday and by night).

3. BAY & HARBOUR through pilot service is carried out as follows.

(a) IRAGO SUIDO MOROZAKISUIDO KINUURA
(b) IRAGO SUIDO MIKAWA WAN TOYOHASHI
(c) IRAGO SUIDO MIKAWA WAN GAMAGORI
(d) IRAGO SUIDO MIKAWA WAN ATSUMI

4. TLX: 4563668 IRAGOP (via Choshi or Nagasaki Radio)
The message is passed from Radio Station to Pilot Office directly within 5 minutes, through 24 hours a day.

5. Cable Address: IRAGO PILOT HANDA
The message is passed from Radio Station to Pilot Office via telephone

Exchanges within 30 minutes, also through 24 hours a day.

6. VHF "IRAGO PILOT" (Ch. 16)

Pilot boats are equipped with VHF, but electric waves are not strong enough, therefore about 2 hours prior to arrival please advise of "ETA NO.1 BUOY" by one-sided talk.

7. IRAGO PILOTS

Are stationed generally at HANDA (KINUURA) and it takes about 3 hours to board vessels, therefore if ETA or ETD is amended, please advise Pilot Office as soon as possible by all means.

8. SUNDAY, HOLIDAY & at NIGHT

Master are requested to advise Pilot Office directly of ETA or any amendment of ETA by "TLX" or cable address.

Rules in Irago Suido Traffic Route

(1) Keeping out of the way of other vessels

a. Vessels other than those engaged in fishing or other operations entering, leaving or crossing the Traffic Route, should keep out of the way of other vessels navigating the Traffic Route.

b. Vessels engaged in fishing or other operations entering, leaving or crossing the Traffic Route or vessels staying still in the Traffic Route should keep out of the way of a huge vessel navigating the Traffic Route.

c. Vessels other than a huge vessel should keep out of the way of a huge vessel navigating the Traffic Route.

d. Vessels other than those mentioned in the items "a" through "c" of the above, should observe the rules stipulated in the Law for Preventing Collisions at Sea.

(2) Obligations to navigate the Traffic Route

Vessels of 50 meters or more which intend to navigate Irago Suido should navigate inside the Traffic Route.

(3) Restriction on speed of vessels

Vessels should not navigate at a speed exceeding 12 knots in the Traffic Route.

(4) Keep to the right

Vessels should navigate, as far as possible, in that portion of the Traffic Route which lies on the starboard side of the central line of such route.

(5) Signal to be given in overtaking other vessels

Vessels equipped with a whistle should give the following signals when they intend to overtake other vessel in the Traffic Route, however this shall not be applied to the case where overtaking signals prescribed in the Law for Preventing Collisions at Sea are given.

a. When intending to navigate on the starboard side of the other vessel, they should give one prolonged and one short blast in

succession on the whistle.

b. When intending to navigate on the portside, they should give one prolouged and two short blasts in succession on the whistle.

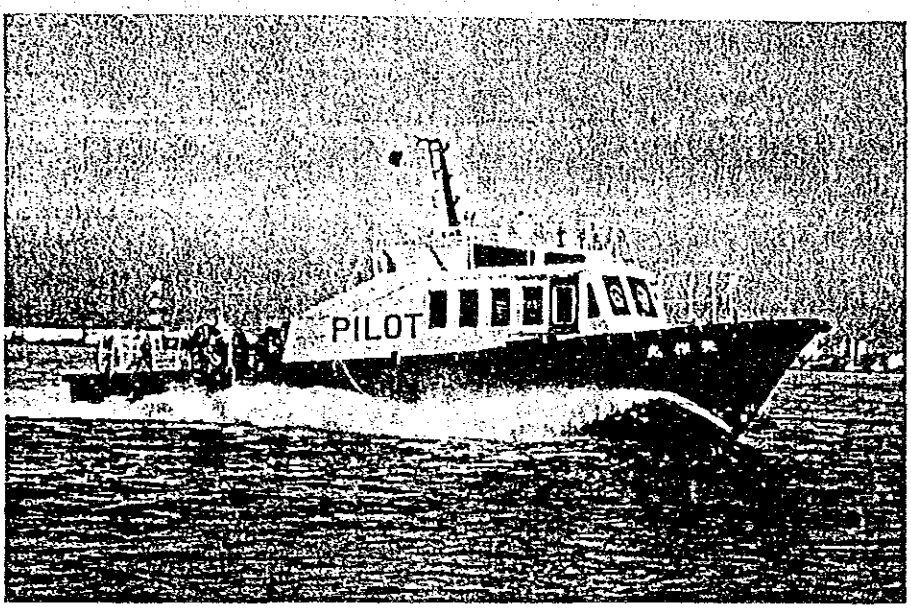
(6) Method of crossing the Traffic Route

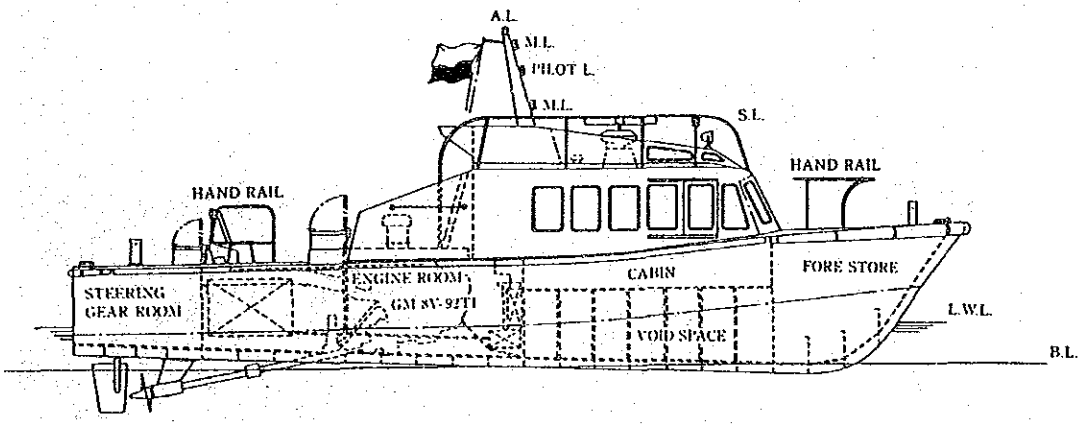
Vessels crossing the Traffic Route should cross promptly at an angle as close as possible to the right angle to the Traffic Route.

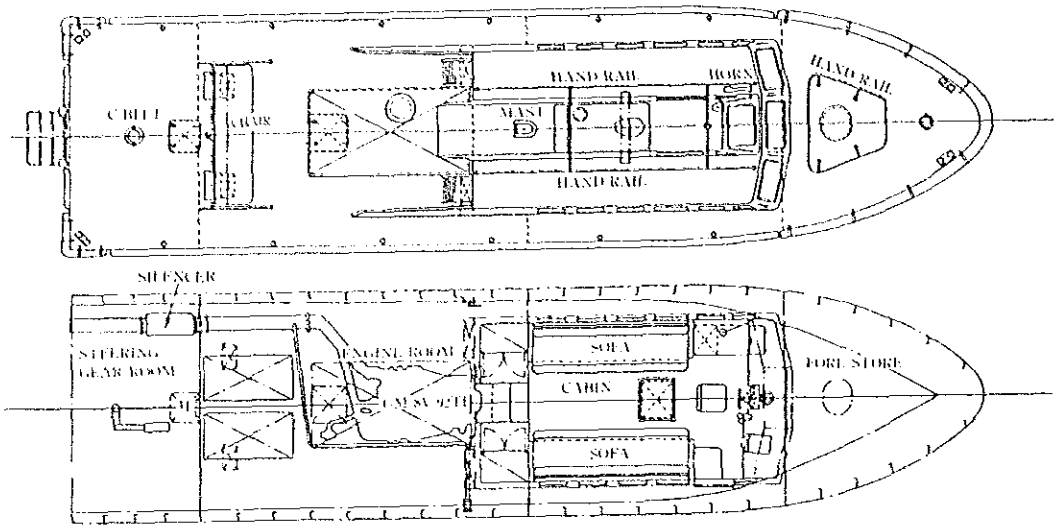
(4) Safeguards for pilots

(a) Small pilot boat

Handrails are arranged for the safety of pilots at the fore and aft decks and also on top of the cabin house.







Dimensions;

LOA: 14.35m B: 3.67m D: 1.79m

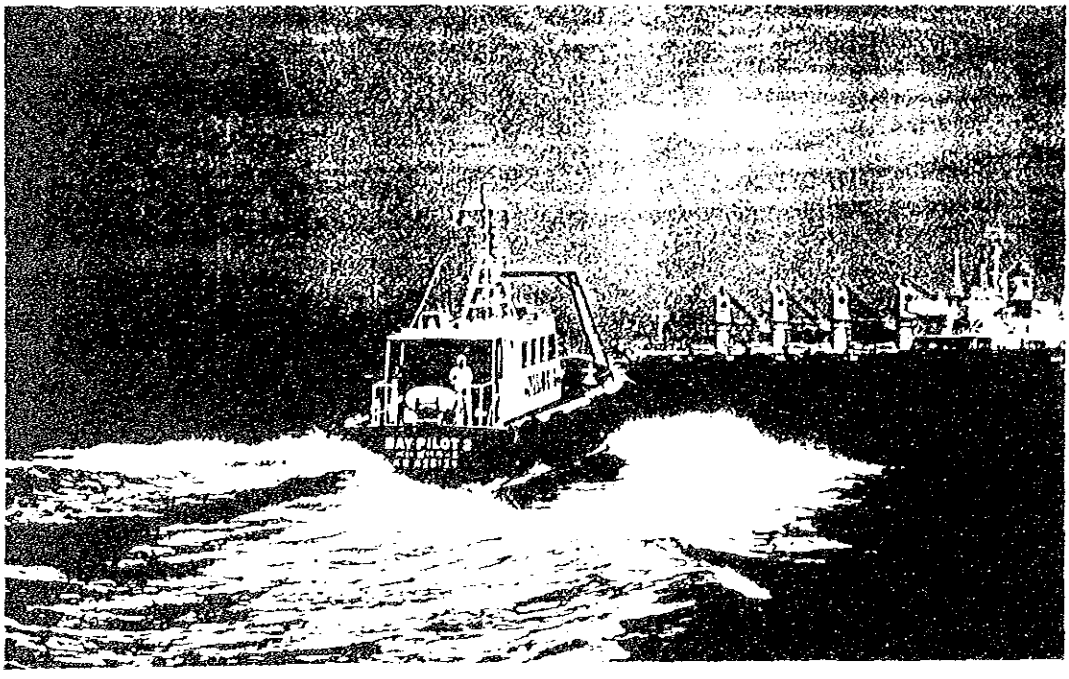
G/T: 13.0t Capacity: 14 persons

Main Engine: GM8V-92TI Type 2 cycle

Speed max.: 24.5 kts

(b) Small pilot boat

Besides a morning-glory flower type handrail either side; Rigging-net is also useful on both the port and the starboard sides.



10-4-2 Principal items of Pilot Boats

1. New York

(1) Pilot Boat New York

LOA: 182.6' B: 34' D: 12'

G/T: 779t N/T: 408t

Built: Marinette, Wisconsin, 1972

Hull: Steel Fuel: 30,000 gal.

Fresh Water 39,000 gal.

Twin Screw and two rudder

Diesel Engine 1,700 H.P. Speed Max. 15kn, equipped with Console Flume Stabilizer Crew capacity 17 Pilot Capacity 38 Generator 2, 200KVA, 440/110V AC, Aluminum operation boat 2 LOA: 24' GM3-53 Diesel Volvo Auto-drive.

2 sets of Hydro. davit (Controlled at Steering Room on the bridge and only 20 second)

2 sets of Radar-Kelvin Hughes 16V-Sperry MK 12

2 sets of VHF Radio and Receivers

2 sets of Single Side Band Radio

1 set UHF Radio, 1 ASR Teletype

Sperry Gyro Compass MK29

Raython Fathomster, Heating and Air Conditioning etc.

(2) Pilot Boat New Jersey

LOA: 192' B: 37' D: 15.9'

G/T 988t

Built: Pt, Pleasant, Virginia 1942 and Reconstructed in 1973

Hull: Steel Fuel: 33,000 gal.

Twin Screw Fresh water: 4[illegible],000 gal.

Main Engine: GM Diesel: 3,4[illegible] H.P.

Crew Capacity: 17 Pilot Capacity : 3[illegible]

3 sets of 150kw 280/115V D.C.

1 Aluminum operation boat 24'

1 Fiber glass operation boat 24'

2 sets of Hydro-davit

3-VHF Radio, 1AM SSB, 1UHF, 1ASR

Tele-type, 2 Echo Sounder, Range finder, Course recorder

Air condition etc.

(3) Smaller type

	Sandy Hook	Chapel Hill	Newark Bay
LOA	89'	64.6'	48'
B	19'	17'	14'
D	8.7'	8.3'	7'
F. Draft		4.1'	
G/T	98.81t	G/T 60	30.70t
N/T	67t		20.0t
Built	1953		1968
Hull	Wood	Corten Steel	Steel
F.O	2,000 gal	950 gal	
F.W	1,800 gal	100 gal	
Crew	8		
Pilot	18	40	
M.E	Diesel	2GM 12V 71N	Diesel GM-8V71
H.P	500	Twin Screw	227 HP
M.G.	2 sets	Speed 24 kn	
	10KW 110AC		
		Radar, VHF	
		Echo-Sounder	
		Air Condition	

They intended to replace station vessels with chapel type speed boat but they are now utilizing the advantages of both types of vessels.

NAME	LOA	G/T	SPEED	PILOT CAPACITY
NEW YORK	182.6'	779t		38
NEW JERSEY	192'	988t		26
SANDY HOOK	89'	99t		18
CHAPEL HILL	64.6'	abt 60t	24 kn	40

2. San Francisco

In San Francisco, the Bar Pilot Association keeps 2 pilot boats and pilot transport costs are included in pilotage charges.

To keep the Ocean pilot station, sailing boat station pilot vessels were replaced by smaller size pilot boats.

The Principal items of the pilot boats are as follows:

	LOA	Speed	Pilot Capacity
No.1	85'	13kn	10
No.2	65'	13kn	4

No.2 shall be replaced by a new vessel which is just the same type as No.1. The pilot boat generally stays at the pilot station for 4 days shifts.

3. Rotterdam

The pilot boats used by seapilots are owned and also operated by the Government of Holland.

The principal items of the pilot boats are as follows:

		LOA	Speed	Pilot Capacity
Spica Type Station Vessel	3	213'		ev. 24
Pilot launch	4	16'		
Pilot tender	4	75'	17.5kn	

2 Pilot Station Vessels are usually operating at pilot boarding areas and disembarking areas, and one is a stand-by which usually remains in port.

Generally station vessels are used in 2 - 4 month shifts according to the schedule.

One crew consists of about 22 men and generally they stay 2 weeks onboard and 2 weeks on-shore.

Several spare crews are prepared for each vessel.

Two pilot tender boats are usually on duty, one is a stand-by and the other one is under repair.

10-4-3 Navigation aids in the Lower Traffic Lane

Navigational lighted buoys are to be installed at suitable locations to show the line of the approach channel to the harbour, the entrance channel to the dredged area and the boundaries of the dredging and reclamation areas in the port, estuary, etc.

The type and shape of the buoys should be designed in accordance with the sea and weather conditions at site and the requirements of the clients.

In the case of the present pilotage system, pilots are well conversant with the conditions around their pilotage area, so the Indian Government shall be able to save the initial costs and also maintenance cost versus the new pilotage system.

However, from the viewpoint of safe navigation, navigation aids such as buoys and light-ships, etc. should be laid more effectively and carefully in the above fairway.

The following is just an example of a possible allocation. The actual locations should be decided based on a meeting of Indian experts.

(a) Light buoys

At least 3 buoys will be installed on the centerline and 2 buoys on the safety edges of the fairway and also 4 buoys for the tentative pilot boarding area.

These buoys should be fitted with radar reflectors.

(b) Lightships

Eastern Channel Lightship will be kept at the current position and will be utilized as the target by inbound vessels. Intermediate and lower Gasper Lightship will be transferred to the center line of the fairway as indicated in Fig. 10-4-1.

All lightships including Upper Gasper Lightship should be equipped with racons and radar reflectors.

(c) Anchorage

A safety anchorage will be set up at Sandheads and 4 light buoys will be installed to mark the boundaries of the anchorage.

(d) Special light buoys

The following light buoys seem to be available and suitable for the Sandheads area, because the same kinds of lighted buoys have been used already in Japanese coasts under similar meteorological conditions.

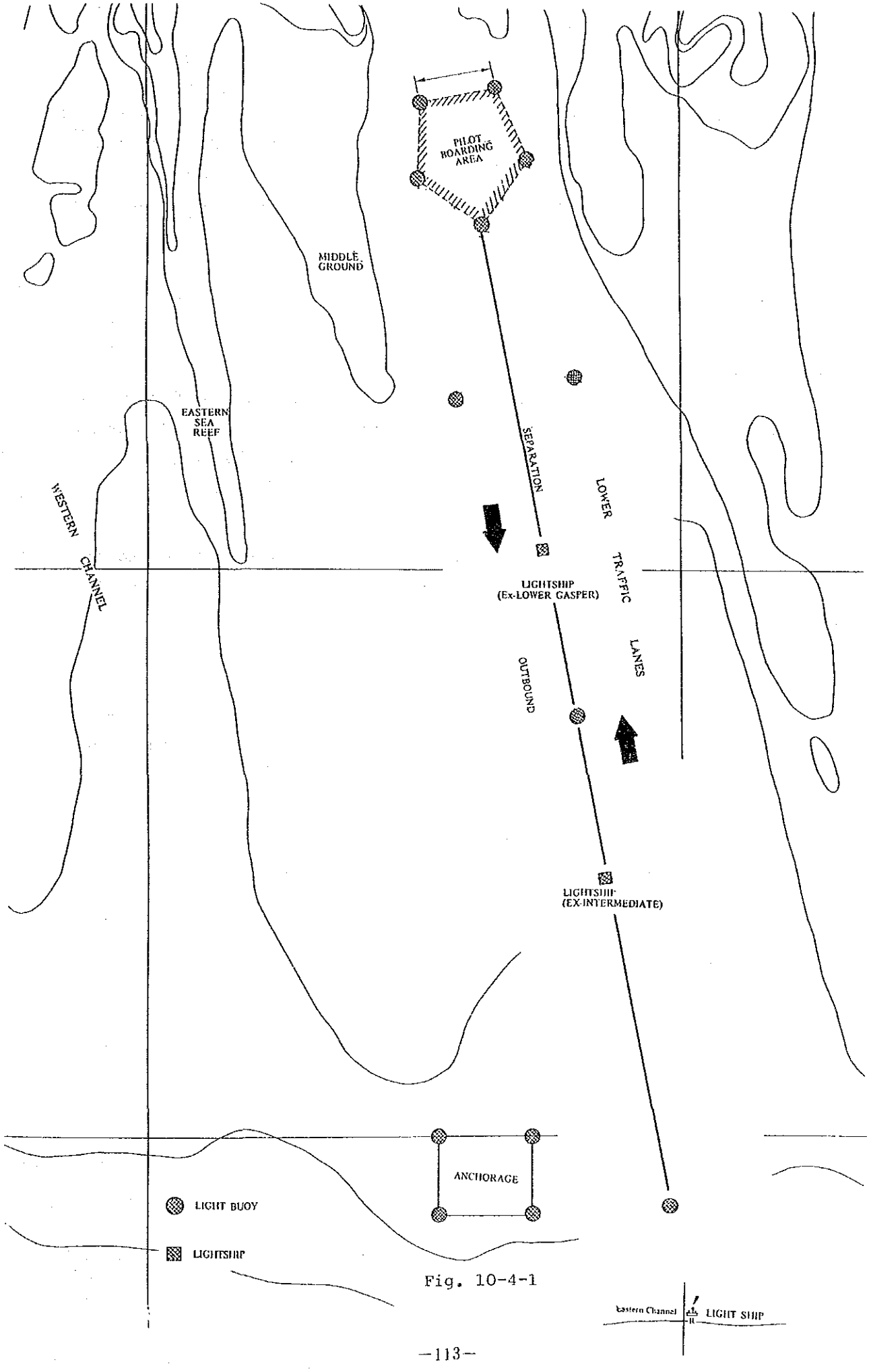

PILOT
BOARDING
AREA
MIDDLE
GROUND
EASTERN
SEA
REEF
WESTERN
CHANNEL
SEPARATION
LOWER
TRAFFIC
LANES
OUTBOUND
LIGHTSHIP
(Ex-LOWER GASPER)
LIGHTSHIP
(EX-INTERMEDIATE)
ANCHORAGE
LIGHT BUOY
LIGHTSHIP

Fig. 10-4-1

Eastern Channel
LIGHT SHIP

(1) Lighted buoy ZCB=series

The service of ZCB=series is locations subject to high currents exceeding 4 knots, in depth to 100 meters.

This range of buoys combine excellent stability characteristics with low resistance to current flow for reduced drag effect.

Lighted buoy consist of the following:

Lighted Buoy (ZCB=603D) - (1)

6.0 m dia. disk type aluminum alloy buoy complete with a 300 mm marine lantern, solar system, top mark, radar reflector, radar beacon and moorings composed of 42 mm dia. open link chain and a 20 ton cast iron sinker.

Lighted Buoy (ZLB=260)

2.6 m dia. tail type steel buoy complete with a 200 mm marine lantern, solar system, topmark, radar reflector and moorings composed of 32 mm dia. open link chain and a 8 ton cast iron sinker.

Lighted Buoy (ZCB=603D) - (2)

6.0 m dia. disk type aluminum alloy buoy complete with a 200 mm marine lantern, solar system, top mark, radar reflector, radar and moorings composed of 42 mm dia. open link chain and a 20 ton cast iron sinker.

(2) Design Condition

The lighted buoys are designed under following local conditions.

Water depth	:	30 m (LWL) -- 15 m (LWL)
Tidal height	:	5.0 m
Wave height	:	3.0 m
Current speed	:	3 kt. -- 5kt.
Wind velocity	:	60 m/s
Seabed	:	Silty Sand

(3) Technical Specifications

(3)-1 Lighted Buoy (ZCB-603D) - (1)

(3)-1-1 Buoy Body

Designation : ZCB-603D
Float Diameter : 6.0 m dia. (O.D)
Height of Buoy Body: approx. 6.93 m (Without Lantern)
Focal Plane Height : approx. 6.4 m (Without moorings)
Weight (Buoy only) : approx. 5.6 ton
Total Weight : approx. 5.8 ton
Total Buoyancy : approx. 31 ton
Main Material : Float and Tower : Corrosion-proof aluminum
Mooring Eye : Steel
Painting Color : White and red vertical stripe
Top mark : Red sphere.
Made of polyethylene foam coated with GRP
Radar Reflector: T type, made of corrosion-proof aluminum
Radar Beacon : for X and S band

(3)-1-2 Lighting Equipment

Lantern : ZL-300P (300 mm acrylic lens, corrosion-proof aluminum base)
Lamp : 12V, 40W Halogen lamp
Lampchanger : ZC-3, 6-place automatic type
Flasher : FT-12AP60, Solidstate preprogrammable plug-in timer board type including sunswitch circuit
Light Character: LFL. 10s (2.0 + 8.0)
Light Colour : White
Fixed Intensity: 2,760 cd
Effective Intensity: 2,500 cd
Range (at T=0.74): 11.0 N.M.

(3)-1-3 Power Source

Solar cell module : Type : ZK-36M220 (17V 22W)
Silicon photovoltaic cell with bird scarers
Charging Controller: Type : SVC14-10

Storage Battery : Type : MSE-300 (2V 300AH)
Battery Reserve period: 14 days
period

(3)-1-4 Moorings

Main Chain : 42 mm dia. Open link chain, 50 m length
JIS Grade 2
Swivel Piece : Suitable for 42 mm dia., 1 pc.
Anchor Shackle : Suitable for 42 mm dia., 2 pcs.
Joining Shackle: Suitable for 42 mm dia., 2 pcs.
Sinker : Made of Cast Iron, 20 tons, 1 pc.

(3)-2 Lighted Buoy (ZLB-260)

This type of buoy was designed to suit and to cover wide selection of locations such as exposed sea, semi-exposed sea inland sea, harbour, estuary, river, etc., and also to use as marking buoy of landfall, mid-channel, limit of well defined channel, boundary of dredging area, isolated danger, etc. and other specially required marking purposes.

Installable water depth is between 6 m to 130 m.

(3)-2-1 Buoy Body

Designation : ZLB-260
Float Diameter : 2.6 m dia. (I.D)
Height of Buoy Body: approx. 8.15 m (Without Lantern)
Focal Plane Height : approx. 4.7 m (Without moorings)
Weight (Buoy only) : approx. 5.1 ton
Total Weight : approx. 5.3 ton
Total Buoyancy : approx. 11.4 ton
Main Material : Steel
Painting Color : White and red vertical stripe
Top mark : Red sphere.
Made of polyethylene foam coated with GRP
Radar Reflector: T type, 8 pc. made of corrosion-proof aluminum

(3)-2-2 Lighting Equipment

Lantern : ZL-200P (200 mm acrylic lens, corrosion-proof

aluminum base)

Lamp : 12V, 1.15A Prefocused lamp

Lampchanger : ZC-2, 6-place automatic type

Flasher : FT-12AP60, Solidstate preprogrammable plug-in timer board type including sunswitch circuit

Light Character: As to planning

Light Colour : White

Fixed Intensity: 290 cd

Effective Intensity: 262 cd

Range (at T=0.74): 6.5 N.M.

(3)-2-3 Power Source

Solar cell module : Type : ZK-36M220 (17V 22W)
Silicon photovoltaic cell with bird scarers

Charging Controller: Type : SVC14-5A

Storage Battery : Type : MSE-300 (2V 300AH)

Battery Reserve period: 15 days

period

(3)-2-4 Moorings

Main Chain : 32 mm dia. Open link chain, 50 m length JIS Grade 2

Bridle Chain : 32 mm dia. Open link chain, 4.5 m length x 2 pcs., JIS Grade 2

Swivel Piece : Suitable for 32 mm dia.

Anchor Shackle : Suitable for 32 mm dia.

Joining Shackle: Suitable for 32 mm dia.

Sinker : Made of Cast Iron, 8 ton

(3)-3 Lighted Buoy (ZCB-603D) - (2)

(3)-3-1 Buoy Body

Designation : ZCB-603D

Float Diameter : 6.0 m dia. (O.D)

Height of Buoy Body: approx. 6.93 m (Without Lantern)

Focal Plane Height : approx. 6.3 m (Without moorings)

Weight (Buoy only) : approx. 5.6 ton

Total Weight : approx. 5.8 ton

Total Buoyancy : approx. 31 ton

Main Material : Float and Tower : Corrosion-proof aluminum

Mooring Eye : Steel

Painting Color : White and red vertical stripe

(Green) (Red)

Top mark : Red sphere.

(Conical shape) (Can shape)

Made of polyethylene foam coated with GRP.

Radar Reflector: T type, made of corrosion-proof aluminum

(3)-3-2 Lighting Equipment

Lantern : ZL-200P (200 mm acrylic lens, corrosion-proof aluminum base)

Lamp : 12V, 1.15A Prefocused lamp

Lampchanger : ZC-2, 6-place automatic type

Flasher : FT-12AP60, Solidstate preprogrammable plug-in timer board type including sunswitch circuit

Light Character: As to Planning

Light Colour : White (or Green or Red)

Fixed Intensity: 290 cd (or 71 cd)

Effective Intensity: 262 cd (or 54 cd)

Range (at T=0.74): 6.5 N.M. (or 4.5 N.M.)

(3)-3-3 Power Source

Solar cell module : Type : ZK-36M220 (17V 22W)

Silicon photovoltaic cell with bird scarers

Charging Controller: Type : SVC14-5A

Storage Battery : Type : MSE-100-6 (6V 100AH)

Battery Reserve period: As to Planning

(3)-3-4 Moorings

Main Chain : 42 mm dia. Open link chain, 30 m length

JIS Grade 2

Swivel Piece : Suitable for 42 mm dia.

Anchor Shackle : Suitable for 42 mm dia.

Joining Shackle: Suitable for 42 mm dia.

Sinker : Made of Cast Iron, 20 tons

(4) Painting Specification

(4)-1 Steel Part

(4)-1-1 Surface Treatment

Preparation Grade : Blast Cleaning

(4)-1-2 Paint System

Above water line : Epoxy Paint x 4 Coats

Below water line : Epoxy Paint x 4 Coats

(4)-2 Aluminum Part

(4)-2-1 Surface Treatment

Preparation Grade : Blashing

(4)-2-2 Paint System

Above water line : Epoxy Paint x 3 Coats
Polyurethane Paint x 2 Coats

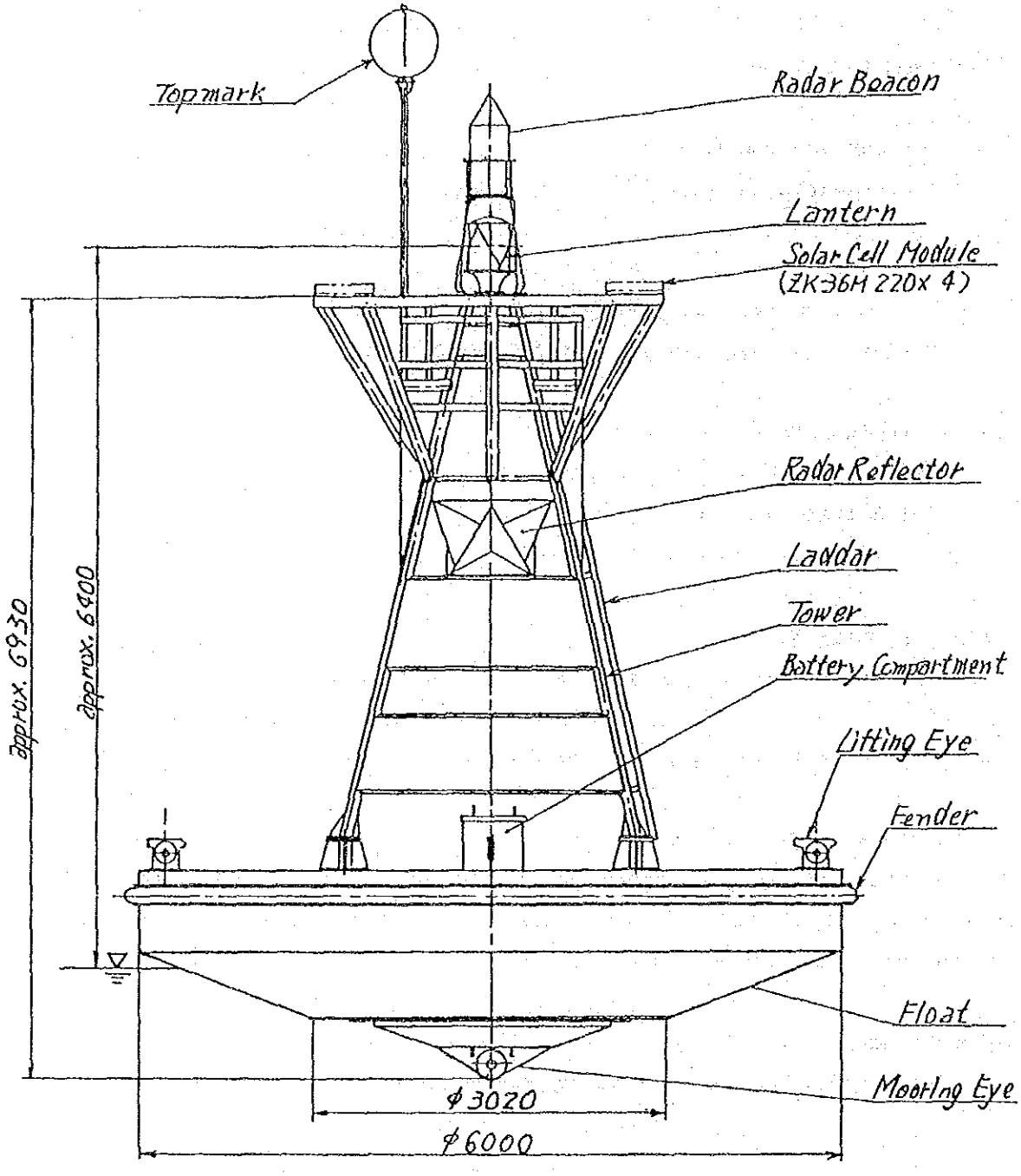
Below water line : Epoxy Paint x 5 Coats

(5) Maintenance Special Tools

Maintenance special tools such as spanner for ZL=300P and ZL=200P, toll set, T type spanner for battery compartment opening, hook spanner wrench for conduit plug and multimeter.

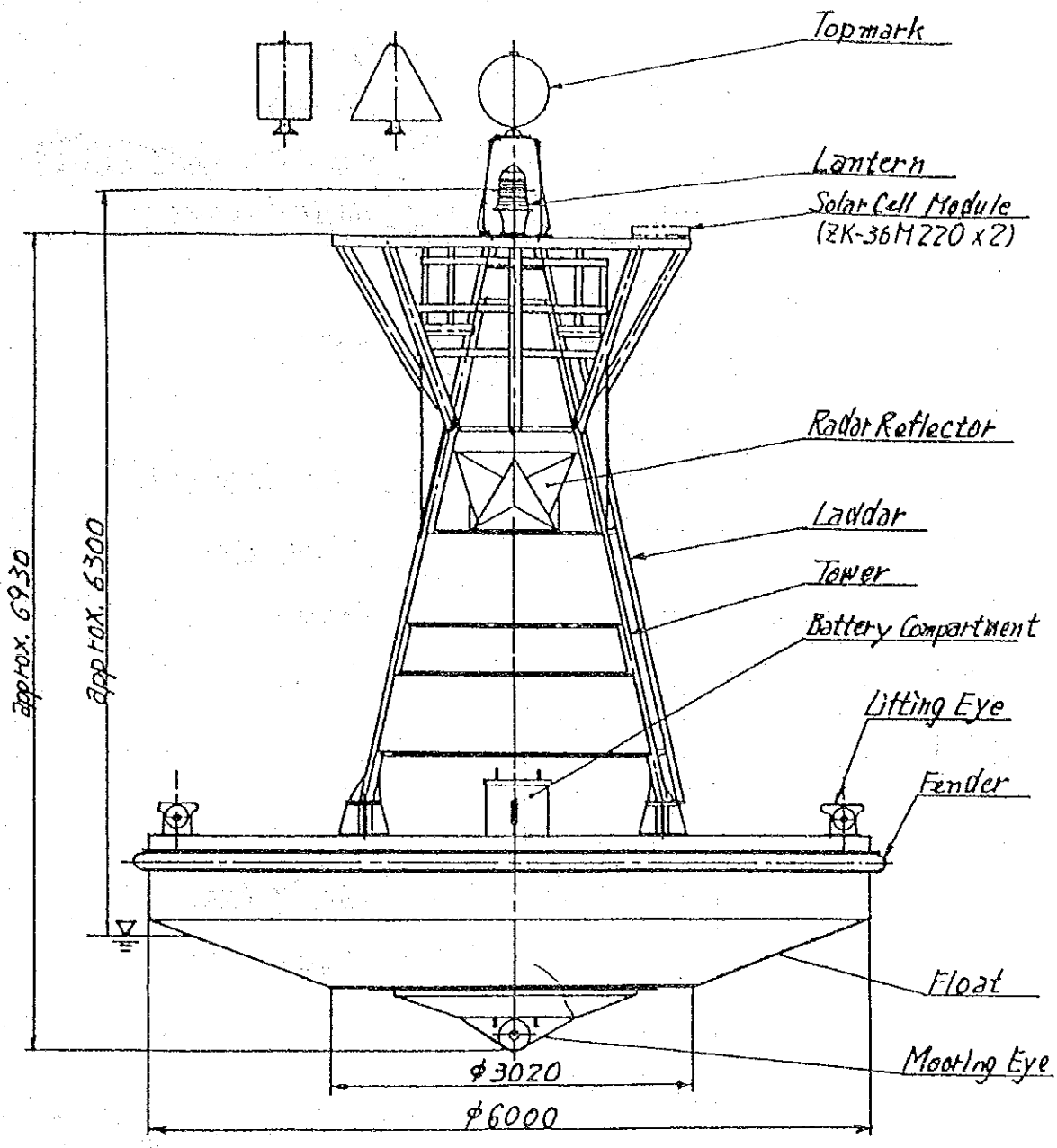
(6) Remarks

Specifications are subject to change on detail designing.



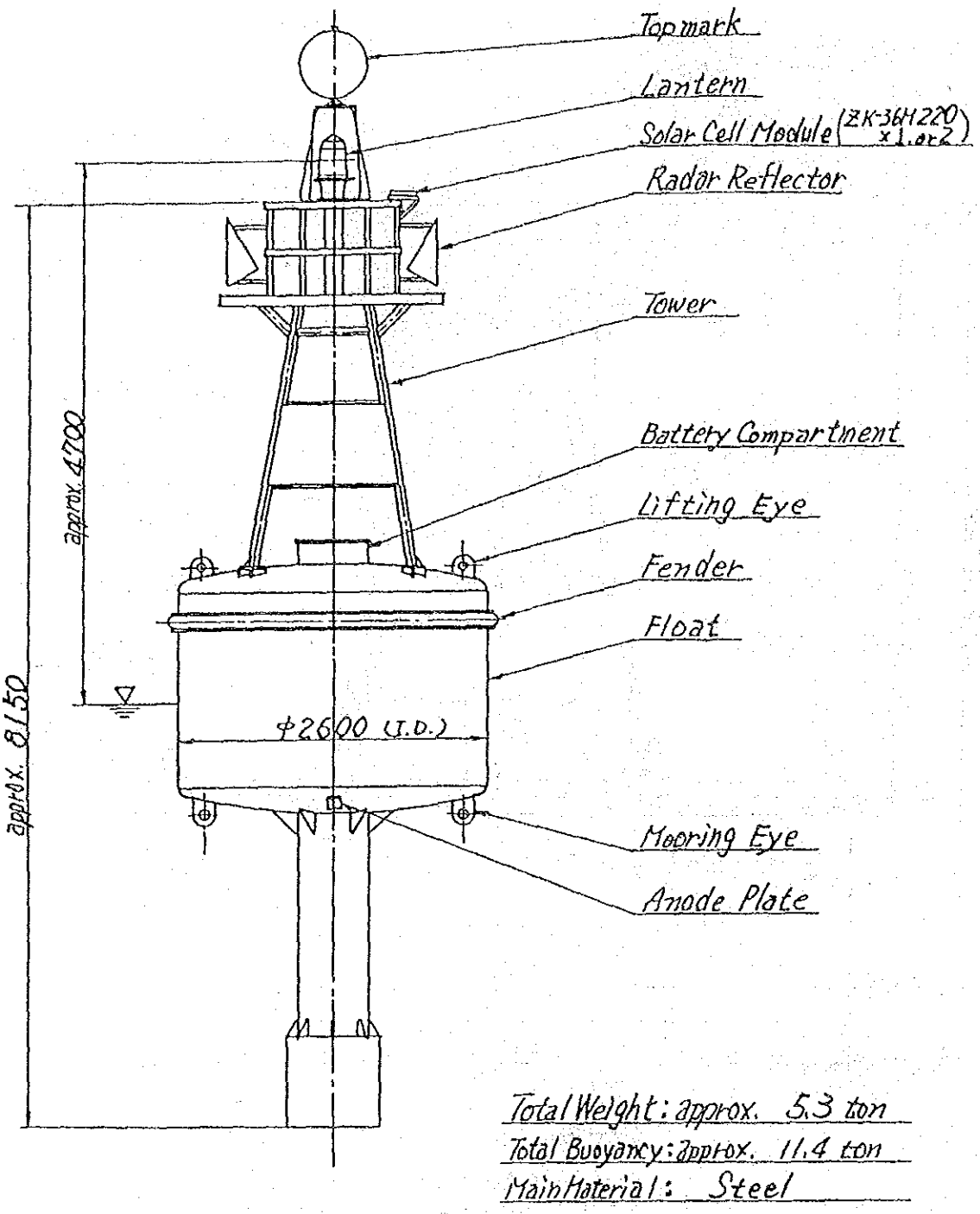
Total Weight : approx. 5.8 ton
Total Buoyancy : approx. 31 ton
Main Material : Tower and Float: Corrosion proof Aluminum Alloy
Mooring Eye: Steel

Lighted Buoy ZCB-603D - (1)

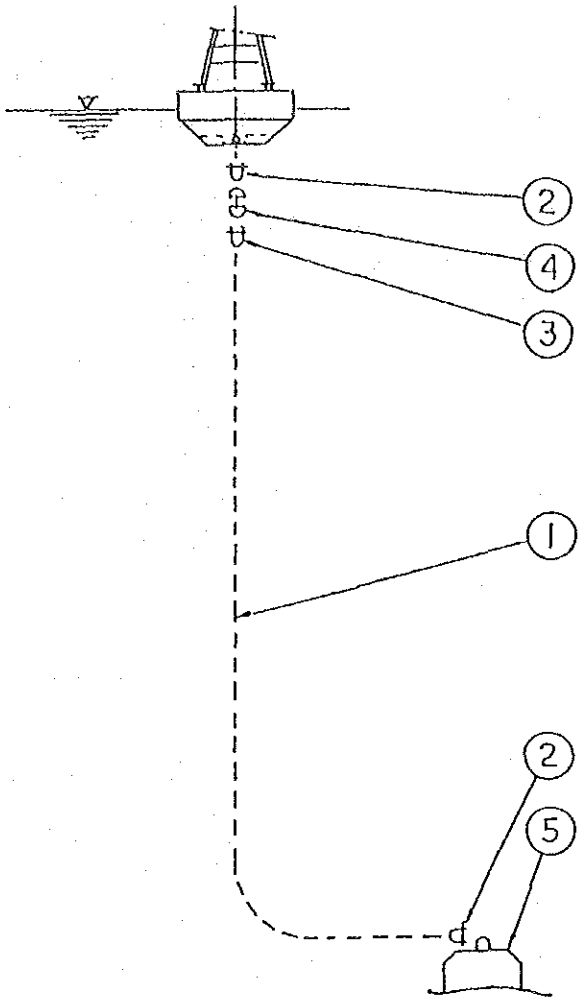


Total Weight ; approx. 5.8 ton
Total Buoyancy: approx. 31 ton
Main Material ; Tower and Float; Corrosion proof Aluminum Alloy
Mooring Eye; Steel.

Lighted Buoy ZCB-603D - (2)



Lighted Buoy ZLB-260



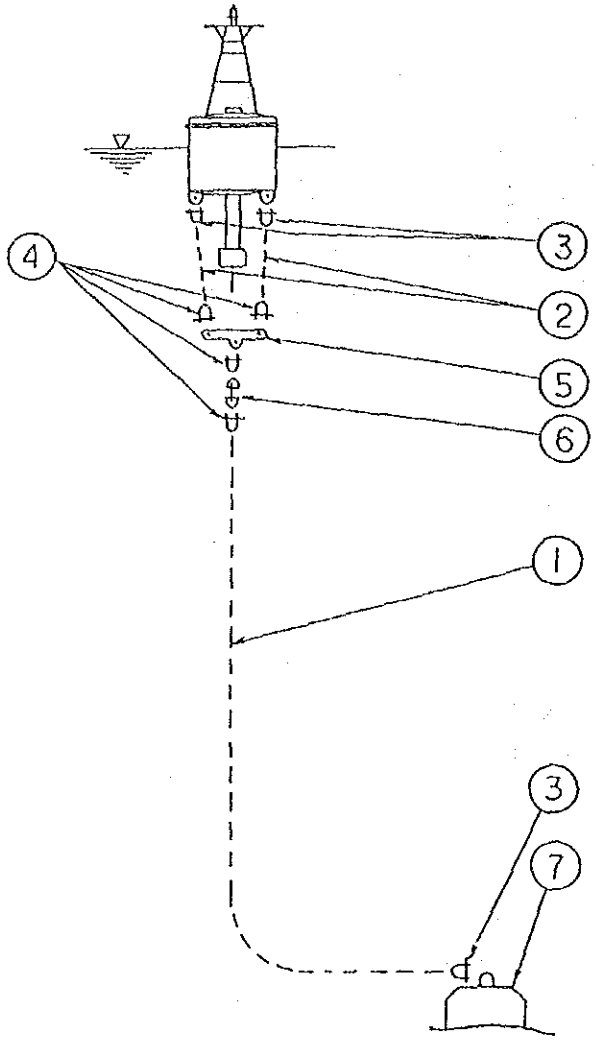
①	Main Chain
②	Anchor Shackle
③	Joining Shackle
④	Swivel Piece
⑤	Sinker

N.B.

1. Details of size and weight of mooring equipments are referred to the separate "Specifications"

2. The components of mooring equipments are made by JIS. Grade-2.

Moorings ZLB-V6



①	Main Chain
②	Bridle Chain
③	Anchor Shackle
④	Joining Shackle
⑤	Union Piece
⑥	Swivel Piece
⑦	Sinker

N. B.

1. Details of size and weight of mooring equipments are referred to the separate "Specifications".
2. The components of mooring equipments are made by JIS, Grade-2.

Moorings ZLB-T1

10-4-4 Radio Aids to Navigation

In general, radio aids are extremely accurate and reliable. They operate almost irrespective of ambient weather conditions.

The information produced by radio aids excludes at least some human errors. The principal radio aids to navigation used in port approaches to ensure accurate landfall are MF Radiobeacons, Racons, and VHF Radio Lighthouse.

(1) MF Radiobeacon

These beacons are sometimes operated in a group all working on the same frequency and strategically sited so as to give lines of position interacting at a wide angle to give an accurate fix.

Such beacons operate on a time sharing basis, transmitting in turn, typically one minute in six. These beacons normally have a range in the order of 50 miles.

(2) Radar Reflector

Safe radar navigation in coastal waters depends not only on a powerful shipborne radar but also requires radar aids that clearly mark the waterway or channel on the radar display.

Buoys or beacons usually constitute poor reflecting targets. To enhance their radar function these aids have to carry a radar "Payload" in the form of either a radar reflector or a radar beacon (racon).

Basically three parameters determine the radar performance of a target equipped with a radar reflector:

- the type of the reflector
- its size
- its height above water level.

(3) Radar Beacon (Racon)

A racon is a receiver-transmitter device which, when triggered by a vessels radar automatically returns a distinctive signal which can appear on the display of the triggering radar. The beacon signal may provide range, bearing and identification information.

A racon comprise three main components: a receiver, a transmitter and

an antenna common to both the receiver and transmitter.

The beacon receiver amplifies the radar pulses up to a level that triggers the beacon transmitter.

The transmitters might reply with a single pulse for each trigger but more usually the response consist of a series of coded pulses (Morse Code) for beacon identification.

Racons may only be mounted on fixed structures or floating aids, anchored at fixed positions, to serve as aids to navigation.

These racons normally have a useful range in order of 10 miles.

(4) VHF Radio Lighthouse

This is a device just coming into operational service designed specifically for smaller coasters, inshore fishing boats and pleasure crafts.

It provides bearing information for any ship within the coverage area equipped with a suitable VHF communications receiver.

(5) Other radio aids

Some ports, where channels are fairly narrow relative to the size of ships using them, are equipped with specialized radio aids.

These systems are usually designed for the port in question and the pilot takes the appropriate apparatus to the ship with him.

Two such systems are Decca Brown Box at Rotterdam and SAREA at Antifer /Le Havre.

Other very accurate radio aids are used for special purposes such as hydrophonic surveying and dredging.

Some systems such as Decca Hi-Fix or Toran give an accuracy within a few meters.

10-4-5 Operation of the pilot tug-boats

(1) The operation of the pilot tug-boats is basically under the control of the pilot station on Sagar Island.
Until establishment of the pilot station, one of the current pilot vessels which is anchoring at Sagar Road will control the tug-boats.

(2) Pilot tug boats normally stay and stand-by in the mooring basin or with the pilot vessel which is anchoring at Sagar Road.

(3) Normally one tug-boat is on duty and the other one on stand-by for the instruction of the pilot station or the pilot vessel.

(4) The pilot station or the pilot vessel always checks the transit schedule with the latest information of inbound and outbound vessels, and sends out pilots by tug-boat to meet the vessels at the pilot boarding area.

(5) Operators on duty at the pilot station or pilot vessel will be able to obtain information about inbound and outbound vessels such as speed, course, position and ETA and also operators will also be able to make sure whether the vessels are proceeding properly along the buoyed lane, etc.
Using VHF radio, operators will maintain contact with the masters of vessels and necessary information will be exchanged.

(6) According to traffic conditions two tugs shall be on duty at the same time.

(7) The actual handling of the tug-boats should be under the responsibility of a competent inland master as in Japan.

(8) The pilot boarding time and other orders should be given to the vessels by the pilot station regularly.

(9) In the stage of Plan-4, pilot tug-boats normally transport pilots in the smoother season.

10-5 Survey of channel users

A questionnaire survey was conducted with respondents including the River Pilots and Masters of vessels entering Calcutta and Haldia Port via Gasper Channel.

As a result 28 replies were received from Masters of vessels entering ports, and 9 replies from the River Pilots and interviews with the River Pilots.

Following is a summary of the questionnaire survey.

(a) Answers from Masters of Vessels

Table 10-5-1 Classification of Ship's Nationality

BANGLADESH	-- 1	SOUTH KOREA	-- 1
CYPRUS	-- 3	LIBERIA	-- 1
CHINA	-- 1	MALAYSIA	-- 2
EGYPT	-- 1	NORWAY	-- 1
GREEK	-- 3	PANAMA	-- 2
INDIA	--11	SOVIET	-- 1
TOTAL -- 28 Ships			

Table 10-5-2 Number of Ships by Type and Kind

G.T. / Kind	less than 3,000	3,001- 5,000	5,001- 10,000	more than 10,001	Total
General Cargo		3	4	2	9
Tanker				7	7
Bulk Carrier		1	1	4	6
Container	2		3		5
Passenger			1		1
Total	2	4	9	13	28

Table 10-5-3 Pre-berthing waiting

Time	No. of ships
0 hour ----- 6 hours	--- 11
6 hours ---- 12 hours	--- 5
12 hours --- 24 hours	--- 0
1 day ------ 2 days	--- 0
2 days ----- 3 days	--- 6
3 days ----- 5 days	--- 2
5 days ----- 10 days	--- 2
Total	26 ships

Pre-berthing waiting: shortage of pilot, wrong tide, poor weather condition, berth not available, etc.

Table 10-5-4 Condition of Navigation and Communication Aids

Navigation Aids		Communication	
Easy to catch light vessel	---15	Smooth	---20
Not easy	---12	Not as smooth	--- 6
Difficult	--- 1	Difficult	--- 2
Total	---28	Total	---28

The areas feared as dangerous

1) Wreck around No. 1 Gasper light buoy
2) Between No. 2 Middleton light buoy and No. 5 Middleton light buoy
3) Middleton Dumping Bank
4) Middle Ground Bank
5) No dangerous area up to Gasper Channel

Summary of Master's Comments

Following are the recommendations and requirements for the new pilotage system at Sandheads.

1) Pilot boarding area should be around Lower Gasper Light Vessel.
2) Large scale up-to-date chart should be published.
3) Establish another powerful light vessel or more light buoys between existing light vessels.
4) All existing light vessels should be equipped with RACON and all light

buoys should be fitted with a radar reflector.

5) Gasper Channel light buoys should be established in accordance with the IALA Standard and a pair buoy system fitted with radar reflectors.
6) Light buoys should be laid properly to indicate hazardous shallows on both sides of light vessels.
7) Establish a control station on Sagar Island to monitor all ship movements and give timely information as required.
8) Common Rules regarding safety of navigation should be applied for all passing vessels.
9) Fishing boats and trawlers to be chased away from navigation channels

Possibility of passing through Gasper Channel without the help of a River Pilot

1) Difficult --- 5
2) Until Lower Gasper Light Vessel --- 4
3) Possible provided navigation aids are improved --- 19

Total --- 28

(b) Answers from River Pilots

Table 10-5-5 Allocation of the working hours and vacations

	Monthly on duty	(days) Monthly off duty
1	full --- 1	nil --- 1
2	20 --- 2	10 --- 2
3	15 --- 1	depend on shipping movement --- 1
4	uncertain -- 1	uncertain -- 1 (turn system)
5	no answer -- 3	no answer -- 3
6	18 --- 22 -- 1	8 --- 12 --- 1
Total	9	9

Reference:

Port	on duty		off duty	
	days	%	days	%
San Francisco	245	67	120	33
New York		50		50
Rotterdam	203	56	162	44
London	232	64	133	36

Table 10-5-6 Dimensions of Gasper Channel

	Present	Required
Width	2,000 - 3,000 feet	3,000 - 6,000 feet
Curvature	25 degrees	25 degrees - straight
Depth	-7.0 - -7.6m	-7.5 - -8.0m or UKC(1 - 2.5m)
Ship's speed	10 knots	8.0 - 15.0 knots

Most Dangerous Areas in the Channel

(1) Between Upper Gasper Light Vessel and Lower Gasper Light Vessel
(2) Between Gasper No. 1 Light Buoy and Upper Gasper Light Vessel
(3) Near No. 1 Gasper Light Buoy
(4) Lankeswar wreck
(5) Shallow sand on both sides of the channel

Summary of the R. Pilot's Comments

(1) Large scale up-to-date navigational chart should be published and also emergency anchorage area to be well marked on the chart
(2) All existing light vessels should have equipped with RACON
(3) Navigation aids should be established to comply with the international standard
(4) Pair buoy system should be adopted to the Middleton Channel light buoys
(5) Traffic control and surveillance system should be established
(6) Powerful tug as per high international standard should be on stand-by round the clock
(7) Light buoys must be properly laid to indicate hazardous shallow on both sides of the channel from Sandheads
(8) Fishing grounds to be isolated from normal and regular navigation channel

(c) Result of interviews with River Pilots

(1) Length of the pilot vessel should be more than 300 feet

(2) Pilot waiting anchorage should remain the same, northern area of the Eastern Channel Light Vessel are not safe anchorage

(3) The area between Lower Gasper Light Vessel and Upper Gasper Light Vessel is normally rough with ground swells than the area near Eastern Channel Light Vessel in the SW monsoon season

(4) All existing light vessel should be equipped with RACON and also radar reflectors should be mounted on all light buoys.

(5) A new powerful light vessel should be placed between Eastern Channel Light Vessel and Intermediate Light Vessel

(6) The depth of the estuary is less than the chart datum, so entering vessels should keep enough UKC and moderate speed

(7) A navigation control tower should be established on Sagar Island for the new pilotage system

(8) Light buoys should be properly laid to indicate hazardous shallows on both sides

(9) Middleton dumping area should be dredged clearly

(10) Remove the Lankeswar wreck, etc.

(5) Analysis of Accidents

According to the data offered by CPT, there was only one grounding accident in the Gasper Channel and its approach area.

The ''DHANAJAYA''(432.25 GRT)bound to Haldia from Sandheads towing with dumb barge grounded South of Fredricks Island under the charge of a provisional pilot on 26 August, 1984.

Fortunately, due to the utmost careful maneuvering of masters and pilots there have been no accidents at all since 1984.

But the new type of pilotage system shall new traffic conditions around Gasper Light Vessel and this should prevent marine accidents.

So, it is necessary to consider the new system from the viewpoint of safe navigation.

Salient Points of Comments provided by DMD and Answers

Comments by DMD	Answers by JICA Team
1. Dated 18 - 3 - 1989	
(1) Plan 1 appears the cheapest in terms of cost.	° Yes, only in terms of initial investment cost; while in terms of overall cost, Plan 1 > Plan 4 > Plan 3
(2) ① Boarding is unsafe at Casper in S.W. monsoon season.	° Japanese experiences in the severe sea conditions ° Using modern maneuverable tug-boats ° local weather conditions unfamiliar to Team → ° Plan 4 as 1st stage .... new proposal ° Expert Group Meeting " ° Trial and D/D "
② Boarding to smaller ships is unsafe at Casper in S.W. monsoon season.	° under tug's conduct smaller ships pass through any time ° Trial and experiences to be accumulated through Plan 4 will resolve
③ Some damage to vessels and tug-boats are likely in the process of going alongside in adverse weather.	° not expected because of using modern maneuverable vessels ° Will be resolved by trial and experiences to the accumulated through Plan 4
(3) Refer to the letter by Pilot's Guild.	° Shri R.E. Mistry was incomplete agreement
2. Dated 7 - 1 - 1989	
[Regarding Plan I]	
(1) No advantage in shifting the pilot station to Gaspers, except reduction of the pilotage distance.	° Examples of other advantages; ① cheaper overall costs ② more flexibility to imbalance between inbound and outbound pilots by land (from Calcutta) or by boat (from Haldia) as required ③ more flexibility to deal with the peak period and possibly reducing the required number of pilots ④ welfare improvement of pilots by living in land ⑤ possibly safety improvement; however trial is required
(2) no proper anchorage for deep vessels available at Gasper.	° Should be checked for in case of emergency

Comments by DMD	Answers by JICA Team
(3) Compared to station vessels, tug boat type vessel is going to be much less, and will need replacement much earlier	° Even if so, overall cost is cheaper
(4) Station vessel system is more safe for pilots, the safety of the ships is ensured, and above all, it is more economical for the port.	° Station vessel system has been being replaced in other ports for the safety and economic reasons. ° To ensure this is also applicable (or not) to Calcutta/Haldia, further discussion by the Expert Group (of India who are familiar with local conditions) as well as trials are suggested in this Report ° Station vessel system proved to be least economical in terms of overall cost
[Regarding Plan II]	
(5) Plan II would be considerably expensive	° Unknown preliminant factor is only the dredging cost ° Detailed study should be carried out in future to examine this including possible countermeasures to minimise cost ° There is enough time for this because the proposed is a phasing programme
(6) The safety aspect would also be compromised in comparative relevance to the vessel being under the pilotage charge of pilot of our port.	° The enquiring result showed that maneuvering ships without pilots would be possible under installment of reliable navigation aids ° Required improvement of the channel (widening + deepening) and installment of electronical devices are proposed to ensure safety ° It is expected that further detailed discussion by Indian experts being familiar with local conditions shall be carried out before actual implementation
(7) Captain P.S. Barve objects plan?	° Commented that about the possibility of replacement of pilot station, CPT should carry out further experience and analysis

Comments by DMD	Answers by JICA Team
[Regarding Plan III]	
(8) Whereas boarding at Gasper during the FAIR WEATHER SEASON will not prove at all difficult, boarding during the MONSOON MONTHS at Gasper would be an entirely different proposition.	° Boarding/disembarkation is being carried out in seemingly similar sea conditions in the outer sea of Tokyo Bay (Refer 10-2) ° To compromise the possible difference in conditions between your experiences and yours, we proposed the phasing implementation begining Plan 4 proceeding Plan 3, and finally possibly Plan 2 ° Plan 4 does not contradict your comments and includes trials for Plan 3
(9) Serious damage to the tug boat type pilot vessels during the Monsoon months is envisaged. The safety of the pilots while boarding a vessel from a tug in rough weather conditions may prove a hazard.	° Tug boat we proposed in rudder propeller type which is far more maneuverable than tractor-type you are familiar with ° It is expected trials will prove this
(10) To expect the pilot boat to conduct a convoy of ships to cross Middleton is neither practical, feasible or a safe propositions and the possibility of a vessel getting set and running aground has to be considered.	° Under the condition of proper lay out of channel and navigation aids masters are possible to maneuver their vessels normally
(11) Overall costs of Plan III would be greater than the costs of the present station Vessel System	° It is found that the overall costs of Plan III is less than that of the present system
(12) It appears quite clear that Capt. Barve does not favour a tug-boat type pilot boat or a pilot station at Sayor. He has opined that shifting of the pilotage station to Gasper from Sandheads should be given a good try.	° It is good try to confirm the possibility of the shifting of the pilot station
(13) Regretfully, it is not perceived in what manner either system improves the efficiency of the pilotage service.	° Please refer 10 - 2 efficiency of the pilotage service
(14) It appears now that Shri Mistry has reservations about the effectiveness of pilot embarkation/disembarkation from Tug Type Pilot Vessels and specially so, near the Gasper area during the foul season.	° We note that "Shri R. E. Mistry was incomplete agreement with the viewpoint as stated above" as indicated in the letter from the Pilot's Guild. dated 6/1/89 ° It is recommended that the discussion will be held at the Expert Group Meeting

10-7 Records of Discussion and Comments of DMD of Calcutta Port Trust

RECORD NOTES OF DISCUSSIONS HELD IN THE ROOM OF THE DIRECTOR, MARINE DEPTT., AT 1000 HRS. ON 9.11.88 TO DISCUSS THE NAVIGATIONAL ASPECTS OF THE INTERIM REPORT-I, CHAPTER - 9, PRESENTED BY J.I.C.A., IN REGARD TO THE COMPREHENSIVE STUDY ON THE DEVELOPMENT OF CALCUTTA & HALDIA DOCK SYSTEMS OF CALCUTTA PORT TRUST.

P r e s e n t

J.I.C.A.	C.P.T.
1. Mr. H. Sasajima, Dy.Leader-Port Planning.	1. Capt. S. Sen, D.M.D.
2. Capt. M. Fujishiro, Nav. Expert.	2. Shri A.N. Biswas,C.H.E
	3. Capt.J.D. Bulsara, H.M.(R)
	4. Shri A.C. Dutta,R.S.
	5. Capt.R.M. Gangahar, M.M.O.H.
	6. Shri N. Mitra, Rep. of Director(P&R)

The following points were discussed and clarified to the Japanese Experts.

(1) Pilotage on the RIVER HUGLI is compulsory for all vessels of 200 tons N.R.T. & over.

(2) The traffic density to Calcutta/Haldia on the average is not more than 5 ships(inward) and 5 ships(outward) per day at present and it is doubtful that by 1994/95 this can treble itself Moreover, it was pointed out to the Japanese delegation that the outward and inward traffic usually do not meet at Middleton Bar. The proposal for traffic separation, therefore, is not tenable.

(3) The H.M.(P)/H.M.(R)/M.M.C.H. on behalf of the Director Marine Department are responsible for the enforcement of laws navigation, but for the demarcation of the channel/surveying etc. the respective sections of the Marine Dept. are entrusted for this(Page 245).

(4) The MMOH pointed out that sailing from Haldia Dock and H.O.J. on the flood tide at night may be acceptable with suitable navigational aids, but arrivals on the flood at night ar Not acceptable, since it will be necessary for the vessels to turn and snub around and this operation is dangerous at night and cannot be recommended(Page-253).

(5) The advantage of tying up a vessel on the flood tide at H.O.J. was explained to the Japanece Experts and as to why this practice is followed.

(6) The result of interviews with River Pilots as indicate on Page-263 of the report was discussed. It was pointed out that the Gasper Channel area was particularly unsuitable for boating with smaller boats as provided on the Pilot Vessels in the S.W. Monsoon Season as already pointed out by the pilots due to the heavy ground swell. The basing of Pilot Station at this area can, in view of the ground swell will cause serious damage to

the boats & hoisting gear of the pilot vessel. Manoeuvering difficulties also cannot be ruled out.

(7) It was pointed out that navigation of their ships by the Master's may pose certain problems at Upper Gasper/ Middleton areas, because of the cross-tides and narrow channel. Presently C.P.T. has a channel of 2000 feet width, but if the same is to be left to the Masters, a channel width of almost 6000 ft. has been suggested. This in itself could adversely affect drafts for Saugor/Haldia. This will involve in considerable extra dredging and subsequent demarcating of the channel with extra buoyage and regular surveys of the total area. This will also necessitate in the requirement of an additional despatch-vessel and survey vessels to maintain the channel.

(8) The three alternatives inregard to the basic policy of the new pilotage system was discussed in detail. It was agreed by all, that if at all there was a need to change the present pilotage pattern and adopt another system, the main criteria should be that the safety aspect in respect of the vessels as well as that of the pilots should be conducive to the conditions prevailing and the overall impact on the total economy of the project should be perceivable.

(9) The present Pilot Vessels are of length 33.5 mts., Breadth - 13.2 mts. Even if the Gasper Boarding Point is considered the size suggested for these station vessels are L-55 mts. with a B-12 mts. It will be necessary to get more particulars of these type of station vessels.

(10) It was pointed out that from suggestions made in the Interim Report-I, in regard to the pilotage systems, we could, consider certain modifications over this system. However, from the ship-master's point of view in homing their vessels at Sandheads in bad weather, there are always problems and the Eastern Channel light vessel is not a very good guide. Ship-masters, many a time, during the bad-weather season, have to obtain DF bearings from the pilot vessels and come to Sandheads on the reverse bearing. Therefore, it was suggested that the Eastern Channel light vessel be replaced by a Platform Beacon/ old oil rig superstructure, with a powerful light mounted on it and with adequate navigational facilities, such as, Radar, DF, Racon etc. A helipad could also be provided. (The presence of the pilot vessels at Sandheads nevertheless is a great boon to shipping as it is the pilot vessel which provides inward vessels with DF bearings).

(11) In all the three alternatives, it will be necessary to lay out considerable number of buoys and 3/4 light vessels. It will be a problem to overhaul and maintain these buoys, attend to the lights in bad weather and for the recovery of the buoys in case of emergency. The necessity of a buoy lifting vessel for this cannot be ruled out. New light vessels will also have to be acquired.

(12) It was agreed that with the acquisition of a modern pilot vessel, it may be possible to reduce the manning pattern to some extent, provided it has all the modern navigational equipments and a better boating facilities.

(13) It is also pointed out that during the periods when depressions are predominant(June to Aug.), Cyclone(April/May/Oct./Nov.) the Westerly set experienced at Sandheads is as much as 6 to 7 Kts. The Westerly Gales also blow at force 7-8 causing a considerable set to the Eastward. It is a moot point that the inward vessels without the aid of pilots would under such circumstances make it to the pilot vessel at Gasper Station without mishap.

(14) The navigation between Sagar Roads and Gasper independently by a Master of a ship would require tidal information as well as the under-keel clearance for the various seasons Naturally these informations will not be available aboard a ship for safe navigation. Every ship has to be necessarily supplied with the latest hydrographic chart of the navigational channel upstream of Gasper as well as the range co-efficients in the different seasons. It is only the pilot who can estimate the draft from these informations.

(15) The Japanese Experts were taken to see the pilot vessel by the H.M.(R) after the discussions in the D.M.D's room. It was also agreed to have another meeting with the Japanese Expert at 1400 hours on 10.11.88 at the office of the DMD for further review the matter.

C.H.E. 11-11-88

H.M.(R)

D.M.D. 11/11/88

M.M.O.H.

R.S. 11/11/88

SS:MN
11/11/88.

CAPT. FUJISHIRO
JICA

Record Notes of discussions held in the room of the D.M.D. at 1400 hrs. on 10.11.1988 to discuss the navigational aspects of the interim report - I, Chapter - 9, presented by J.I.C.A., in regard to the comprehensive study on the development of Calcutta and Haldia Dock Systems of Calcutta Port Trust.

Present

JICA	C.P.T.
Capt. M. Fujishiro	Capt. S.Sen, D. M. D.
	" J.D.Bulsara,HM(R)
	" A.C.Dutta, R.S.

In continuation of the discussion held on 9.11.88 further discussions were held on 10.11.88 to review the matter and following consensus were arrived at :-

1. "Station Vessel System"

It was agreed that the Station Vessel System, if adopted, may be based at "Eastern Channel" itself instead of shifting the same to Gasper Channel. This is with a view that the ground swell at Gasper Channel is far more severe than at Eastern Channel and boating is more difficult for the embarking of the pilots.

In the above system, a pilot vessel with slightly smaller dimensions than the present pilot vessel but with more modern and latest equipments will be necessary. A better system of lowering and hoisting of motor boats are also to be considered, which will require less man-power and greater safety margin for operation. A general arrangement plan for the pilot vessel and hoisting arrangements should be provided to the C.P.T. for examination. This was agreed to by Capt. Fujishiro.

2. Lower Middleton Channel System:

It was agreed to modify the proposal of shifting the present pilot station from Sandheads to a position between Intermediate and Lower Gasper. This system will afford more flexibility to the Masters of the Merchant vessels in/their manoeuvering vessels in the channel. This system will eliminate the use of motor boat, instead of which the Tractor Tug type vessels will be used for embarking/disembarking of pilots. After discussion, it was agreed that instead of having a shore establishment at Saugor one of the present pilot vessels may be anchored/moored at Saugor, which will provide accommodation and rest facilities to the pilots, to try out the scheme. If the scheme proves successful then the proposal of a shore station at Sagar with proper infrastructure may be considered. By/basing the Pilot Vessel at Sagar, cruising will not be necessary thus saving

considerable amount in fuel expenses. The pilots will be transported to and from the pilot vessel to the mechant vessels by means of the pilot tug.

Specification of the pilot tug will be provided to CPT for examination including the pilot embarking/disembarking arrangements. This was agreed to by Capt. M. Fujishiro.

It was also agreed that manned "Eastern Channel Light Vessel" may be replaced by a super-structure/oiling type platform equipped with necessary navigational aids such as radar, D.F. and an all round light such as on light house or light vessels. For this purpose, a 2nd hand oil rig may also be considered.

Considering the traffic density, it was felt that 4-mile wide channel as suggested by the Japanese Delegation at Lower Gasper is not necessary. This channel can be kept at the same width as at present with Fairway Channel buoys.

During the discussions, it was felt that to examine the scheme of introducing the tractor tug type boarding arrangements, which according to Capt. Fujishiro is in existence in Japan, A CPT team may be sent to Japan/to examine the same before considering the adoption of the system for the Port of Calcutta/Haldia. It was also suggested by the CPT Officersthat the Japanese Experts visit Gasper/Sandheads area during the Foul Weather Season to ascertain for themselves the prevailing conditions with particular reference to boating at Gasper and adequacy of channel dimensions for enabling Masters of Merchant vessel to navigate safely.

[during their foul weather period]

River Surveyor
[redacted] Harbour Master(R):Director,Marine De

11/11/88

CAPT. FUJISHIRO
JICA

CALCUTTA PORT TRUST

No..PR/256/VTMS/

Planning & Research Deptt.

Dated : 16.11.1988.

Salient Points of the Discussions held on 14.11.88 at 2P.M. in the room of Nautical Adviser to the Government of India,Ministry of Surface Transport

Present :-

Capt. P.S.Barve -Nautical Adviser to the Govt. of Ind . (MOST).

Mr. H.Sasajima - ¦
¦ Members JICA Team.
Capt. Fujoshira .¦

Mr. B.N.Putatunda- Deputy Director(P&R),CPT.

Major Points made by Capt.Barve were

(1) A trial for shifting the Pilot Vessel to a position near Gasper lightship could be carried out once the following preconditions were satisfied.

(a) Light ships were placed (maximum distance possible being 10 miles) in the upper Traffic Lane or buoys laid as recommended by Capt. Fujoshira or at least steps taken to aid the Masters of Incoming /Outgoing Vessels properly. (b) Communication (VHF) set up on Pilot Vessel be reinforced to enable it to establish contact with the vessels (inbound) waiting at Sandheads or an outbound Vessel till they cross Sandheads . Radar on board pilot vessel, desirably, should be functional.

(2) It would be desirable to carry out the following :-

(a) Position a competent Pilot on board the Pilot Vessel to aid the Master of the pilot vessel in keeping track or inbound and outbound vessesls.

(b) Study in advance the past records of the arrival pattern of inbound and outbound vessels to determine the frequency of instances where inbound and outbound deep drafted vessels crossed each other around Gasper Lightship. This would help project the demands of the situation on the Master of the Pilot Vessel and the probability of such events.

(3) It was clarified by Capt.Barve that :

(a) Notices to Mariners to be issued through shipping lines one month before the trial, would Suffice.

(b) However before issuing such notices, Capt.Barve should be informed.

(4) Other issues arising from the discussions are:

(a) The trial may continue till April,or possibly till May. Advantage should be taken of the trial period to

(i) Determine the arrival and departure pattern of Vessels and organize it better to make the task of Pilot embarkation / disembarkation easier.

(ii)Document the experience of stationing the Pilot Vessel around Gasper light vessel or explore the possibility,in due course,of having an anchorage point there for incoming Vessels.

(b) Trial of Pilot embarkation/disembarkation may be carried out meanwhile at the point under reference with existing tugs available at Haldia or with Tractor tugs obtained on short term loan from other Ports, if possible.

(c) The possibility of having a Radar station at Haldia alongwith Saugor with UHF link and a console on board the tractor tug was also suggested for consideration. It was agreed that Capt.Fujoshira would study these issues in details and gather information and evidence of tug boat system for Pilot embarkation/disembarkation at other foreign Ports and related conditions viz wave height,wind speed etc.

(d) Orientation of the Pilots may be achieved out by discussing with them the need for increased safety,which the current proposals promise.Presentation of evidence/video recording or live demonstration would greatly help.

(e) Feedback from the trials should be made vailable to Capt.Barve to decide on the future course of action.

Director(P&R)

A resume of discussions held with
Capt. P.S. Barve, Nautical Adviser,
Govt. of India and JICA.

(As recorded by Capt. Barve)

Capt. Fujishiro of JICA explained that the studies of a Calcutta Pilotage carried out at the instance of JICA indicated that

(i) the pilotage as a whole is rather long and is served by a pilot vessel at Sandheads which now needs replacement.

(ii) There is a possibility for shortening/improving this pilotage. Three alternatives were suggested:
The three alternatives are :

(a) Maintenance of the existing pilotage station at Sandheads with a new pilot vessel and better communication system.

(b) Shifting of the pilotage station to south of upper gasper light vessel and to create a traffic separation scheme between the Sandheads and the new pilot station. The pilot station shall be maintained by a tug which would be smaller vessel than the pilot vessel and very easily manoeuvrable. Communication also would be improved simultaneously.

(c) Establishment of a pilot station off Sagar island and to extend the lower traffic separation scheme to Sagar

Island by creating an upper traffic seperation scheme between lower gasper and Sagar Island. This scheme also includes a vessel traffic management services.

Capt. Fujishiro of JICA who was invited to act as consultants to the CPT has prepared the above scheme and the cost estimates for the same explained the alternatives in detail and all the pros and cons in relation thereto.

Taking into account the difficulty of navigation between upper gasper and Sagar Island and taking into account the cost of widening and deepening the channel it is my opinion that the scheme to establish pilot station at Sangor and the establishment of a upper traffic seperation scheme should not be adopted. Replacement of a pilot vessel by another pilot vessel as alternative one need not be considered at this may not be right step at this stage. It was however, stage till the scheme of establishing upper gasper pilot station is given a good try. Towards this CPT should carry out the following futher exercises/analysis namely:

.1 The Analysis should be made as to the possible bunching of ships at the proposed upper gasper pilotage station. If such a bunching is likely to arise study should also be made as to how it can be avoided taking into account that the vessel inward and outward bound have to cross the middleton bar on the top of the high water

.2 The establishment of good communication system should be looked into even for the trials particularly as the vessel are to arrive and anchor at sandhead and proceed up the traffic seperation scheme only when so ordered by the pilot vessel so that ships ships at Sandheads are able to pick up orders of the pilot vessel when at anchorage.

.3 The quality of anchorage at lower gasper pilot station should investigated by CPT vessels to identify emergency anchoring areas outside the channel.

In order to examine the feasibility of this alternative very thoroughly it was agreed that during fair weather the existing pilot vessel should try operations from the lower gasper pilot station on experimental basis with the following precautions

(i) The pilot vessel should carry on board an additional commander/Sr.Pilot to keep a good control only on the traffic moving in an out and to act as traffic controller This additional manning is necessary as pilot vessel commander has a very onerous task when dropping and taking up pilots and looking after the navigation of his own vessels. To require him to carry out traffic management services at the same time is not in the interest of safety.

(ii) In order to carry out the traffic management service the pilot vessel should be provided a good radar, preferably an ARPA. Even for the purposes of the trials this should be provided on a temporary basis.

(iii) A navigational channel between the sandheads and the upper gasper be lighted adequately. Even if the ~~and~~ same could not be lighted as shown in the draft plan it is suggested that it should atleast have a light vessel every 10 nautical miles equipped with a racon and radar reflector.

(iv) In order not to confuse the mariners approaching the port at sandheads a tug or a second pilot vessel should be placed in the normal pilotage position so that communications system between ships and the controlling pilot vessel at upper gasper pilot station can be established at all times. This is very important as the information with respect to change of pilot station take considerable time reach all ships and the CPT vessel at sandheads would be be able to provide guidance.

(v) In order to assist the experiment a properly prepared brochure should be circulated to all agents. This brochure should indicate correctly the communication system, the navigational aids provided upto the new pilotage station. The functions of the pilot station at Sandheads and the procedure that should be followed by vessel when they arrive. This brochure should also clearly indicate that the shifting of the pilot station northwards is for a definite period and as far as possible dates should be indicated.

(vi) During the experiments in case of failures of communication or navigational aids vessels should not be forced to use traffic seperation scheme and the pilotage station should be shifted to Sandheads.

The study of JICA shows that VTMS would be necessary only if the upper traffic seperation scheme is necessary. It is my opinion that consideration should be given to establishment of a VTMS in phases in any case the navigation on the middleton channel is a bottelneck and with the increasing sizes of the ships approaching Haldia it is necessary that this traffic be controlled form a shore station, I therefore propose the following phases of VTMS :-

Phase I :- The pilot vessel (wherever placed) should be provided with an Radar and ARPA with sufficient powers to receive signals from atleast 40 miles. Means should be available for processing the signals received on the ARPA/Radar for traffic management. Dedicated communication links should also be available directly to Calcutta and Haldia or to the Sagar Control Tower if established.

Phase II : A control tower should be established at Sagar Island with a VTMS radar, a micro processor and UHF link to the Headquarters and the pilot vessel.

Phase III: A VTMS radar at Haldia with UHF link between Sagar and Haldia.

Once a Sagar Island control is established all controls shall be exercised from Sagar Island only. In case of a failure of any of the control station possibility should be made available so that the other two stations can take charge if necessary.

Phase I should be established whether alternative I or II is adopted .Phase II or III shall no doubt depend on the future projections of traffic, analysis w.r.t bunching of ships in the Sagar/gasper area and the size of ships.

CALCUTTA PORT TRUST

No.4901/5937

Marine Department's Office
dated, the 22nd Nov.,1988.

The Director(P & R).

Sub: Comments on Interim Report-I by Japan International co-operation Agency(JICA).

Kindly refer to your letter No.PR/249/11/1568 *dated 12.11.88 whereby Record Notes of Discussion held with JICA on the 9th & 10th November'88 were forwarded to you (Copy enclosed).

*dt.9.11.88 and this office letter No.4901/5768

The Japanese Experts in Chapter 9-2, Page-265, have suggested three alternatives in regard to the Pilotage system which are as follows :

(1) Station Vessel System.
(2) Sagar Road System.
(3) Lower Middleton Channel System.

After considering all aspects as has been reflected in the Record Notes of discussion with the Japanese Experts on 9th Nov.'88 and 10th Nov.'88 respectively, it is my frank opinion that the plans(2) and (3) are impracticable and if CPT tries to implement these, the ultimate cost would far exceed the coststhat are likely to be incurred in replacing our present pilot-vessels with similar vessels, although we may consider slightly smaller but very modern and automated vessels specially in regard to their work-boat handling qualities.

The main reason why we had been thinking of replacing the Pilot Vessels has been that of reducing cost. But at the same time the safety aspects in regard to shipping and that of lives of people should-not-be-compromised.

The interim report on Page-266 clearly points out that "any new system will require an initial large investment and considerable running expenses and safety must be given top priority".

In all the three plans stated above, a very broad channel of almost 4 miles has been recommended with considerable number of buoys and light vessels. To maintain such a channal, buoys and infrastructure, the total investment will be considerable and probably a number of times more than the extra cost that is likely to be incurred in obtaining Station Pilot Vessels with the present base at Sandheads, itself. Subsequently for the maintenance of buoys, light vessels, considerable workshop facilities have to be built up and the need for another additional Despatch Vessel and a Survey Vessel cannot be ignored.

With our present Pilotage System we have been able to maintain a fairly efficient pilotage system with much less number of buoys and navigational aids, only because of the local knowledge of the pilots, that are well-trained and have adequate knowledge to handle situations in the prevailing conditions. The ship-Masters may not have this and for this an elaborate channel has been suggested.

The running costs of the Pilot Vessels are presently high because the Pilot Vessels are 25 years old but with the acquisition of new pilot vessels with fuel efficient engines, it is expected that for the first 10 years at least the maintenance cost of newer vessels will go down considerably. Problems start when the vessels

get old. Even with the Tug System as suggested in Plans(2) and (3), the machinery maintenance cost will be no less, since they are to be of similar horse power and will require to do much more steaming than what a Station Type Pilot Vessel would do. The Tug Type Vessel, if introduced, will require to go alongside vessel in rough weather conditions, will get bashed about a lot more and will therefore require more repairs. I can say without any doubts that the ultimate repair cost will be no less and the tug-type vessel will have to be replaced much earlier, because the maintenance will also be not done by Ship-board Engineers.

Therefore, I strongly feel that replacement of the present Pilot Vessels and Stationing them at Eastern Channel is the best alternative and it is only for this reason that this practice has prevailed over all other alternatives all these years. So it is a firm view of the Marine Department, taking the total economy of the Port in view that the existing system should continue with the acquisition of new Pilot Vessels in replacement of the present ones which will also bring down the maintenance cost and also with some reduced crew.

It is felt that the following points also need to be kept in mind while finalising the draft of the Master Plan for the development of Haldia and Calcutta Dock System :

(i) Chapter 9 - Para 9.1.3(vi), Page-258 :-

It is observed that the details of the existing crafts in our ~~fleet~~ fleet have not been incorporated in the report. In order to carry out the operational work of this department efficiently, it is necessary to have bare minimum number of crafts in commission at any given time which unfortunately has not been possible in the recent times due to frequent break-downs of old crafts, which are overdue for replacement and on account of prolonged lay up periods for repairs etc. Our minimum requirement of craft based on reasonable lay-up periods of the vessels was dealt in detail and later identified in the report prepared by Capt. D.K. Dutta, who was entrusted this work by C.P.T. after his retirement as D.M.D. Unless the lay up of the vessels can be curtailed, we will have no option but to have a larger fleet of craft of various descriptions so that a bare minimum number of such crafts are available for day to day operational work. The planned replacement programme for the 8th 5 year plan was proposed by this department as per this office letter No.208/319 dated 30.6.88(a copy of which is enclosed as Annexure-I for ready reference). It is reiterated that in view of age of the various crafts and their consequent break-downs, it is necessary to replace most of them at the earliest to obtain desired operational efficiency. However, in view of financial constraints, it may not be possible to do so, which will adversely affect the availability of operational crafts at any given time. It is, therefore considered relevant that a phased programme of replacement of various crafts is also incorporated in the Master Plan to be prepared by JICA. This office letter No.452 dated 29.8.88 is also relevant in this connection(Annexure-II)

(ii) Chapter 10, Para 10-1-4, Page-323 :

It is observed that JICA has proposed ear-marking Berths No.27,28 & 29 at K.P. Docks for the container vessels. It is pointed out that most of the container vessels visiting Calcutta are fitted with Variable Pitch Propellers ~~due to~~ which, due to the nature of their design, have to be kept moving at all times while the vessel is being transported within the docks. The vessels have to negotiate two dock cuttings before reaching the above-stated berths and K.P.D. is rather congested at present on account of barges and vessels moored at the mid-dock buoys. It is a common practice to stop the propellers of vessels in K.P. Docks while passing close to the barges or the dock cuttings to avoid any

accidental damage to the propellers or other crafts or underwater hydraulic pipes, which are passing at the bottom of the dock from one side to the other. Since with variable pitch propeller vessels, it xx would not be possible to stop the movement of the propellers, it is considered risky to berth such vessels at No.27, 28 & 29 K.P.D. This point may also be brought to the notice of JICA before finalising the Master Plan for this Port.

21/11/98

Director
Marine Department.

SS:MM
21/11

Encls: As stated.

No. 4901/5938

Cc.to: The H.M.(Port)/S.N.C. H.M.(R)/ - for information.

Director
Marine Department.

CALCUTTA PORT TRUST

Planning & Research Deptt.

No. PR/256/TMS. Dated : 18. 11.88.

Salient points of discussions held by Chairman,CPT at BPT Guest Ht 3 P.M.on 13.11.88(Sunday) with regarding possible alternatives to current system of stationing Pilot Vessels at Sandheads .

Present :-

Shri M.K.Kar Gupta, Chairman, CPT.

Capt.M.Fujishiro, Member, JICA Team.

Capt.R.E.Mistry,Retired Pilot,CPT.

Capt.B.S.Pavri, Retired Harbour Master(River),CPT.

Shri B.N.Putatunda,Deputy Director (P&R).

The major points which arose from the discussions are as follows : -

1) It is possible and desirable to carry out an experiment for stationing the Pilot Vessels around Gasper LightShip for embarkation disembarkation of Pilots.

2) For carrying out the trial proper marking of the upper traffic lane by positioning of light vessel/buoys, may be desirable.

3) To facilitate Pilot embarkation/disembarkation around Gasper light ship during monsoon season,when heavy swell occur. A powerful tug boat (tractor type) as specified by Capt.Fujishiro might be necessary. For additional safety the possibility of having appropriate fender installed on the tug boat might be considered.

4) Organisation of Pilot embarkation/disembarkation may be planned properly by following the established procedure of calling inward vessels of dep draft requirement first followed by outward vessel Normally the tug boat with Pilot would proceed from longer station (shore based/Stationary Pilot Vessel) to the embarkation /disembarkation point for coping up with the requirement of a few vessels at a time.

5) Vessels with less draft requirement but intending to enter the Port/leave it quickly viz., container vessels may be allowed to break the queue . If such a requirement necessitated deployment of tug boat with pilot exclusively for such vessels for Pilotage may be considered in due course.

Special rates & Tariff

6) Evidence relating to the manner in which embarkation/ disembarkation of Pilot was carried out in foreign Port under similar conditions may be gathered and presented before the Pilots . Documented evidence /Photographs /Video film might help.

Capt.Fujishiro agreed to collect necessary evidence.

7) On the basis of results obtained from the trial it was agreed that further experimentation would be carried out for shifting the Pilot Station further towards Sagar and establishment of navigational aids.

8) A comprehensive review of the requirement of floating craft for Calcutta/Haldia upto the year 2005 may be carried out by JICA as part of their Master Plan formulation . The possibility of replacing existing specialised crafts by multipurpose crafts may be considered to improve utilisation & reduce cost. The possibility of contracting out certain services may also be examined.

Director (P&R)

CHAPTER-III

Extract from the Report of Capt. E.F. Butts on alternative to Pilot vessel.

River Hooghly and Outer Estuary - Various navigational hazards - Major breakthrough in communication system - Infrastructural facilities of the Port - Shore Pilot Station at Sagar Island - Buoying approach channel from Intermediate Lightship upwards Embarking and Disembarking Pilots - Craft required - Small T-shaped jetty at Sagar Island sea front - Implementation of the change over from the old system to the new system.

Navigational hazards of R. Hooghly.

1. The River Hooghly leading to the Port of Calcutta is known for its various navigational hazards due to bends, bores, bars, strong tidal currents, shifting sands and so on. The 46 nautical mile channel from the seaward to Sagar Island being through open waters is exposed to heavy weather conditions during the South West Monsoon from March to mid-October every year. The North east Monsoon season thereafter upto the end of February brings in fair weather. In the NE Monsoon (Winter season) tides are weak and they do not rise to the same heights as in the South West Monsoon.

Winter fogs.

Thick fogs are encountered at night and in early mornings. The difficult approach to the port with seasonal fluctuations in depths and changes in channel calls for skilful pilotage.

Development of communication facilities.

2. The system of providing 2 Nos. Pilot vessels had to be adopted as there were not other suitable and economical means of communication between Calcutta and Sandheads for transporting Pilots from Calcutta. The roads were not developed and WT/RT/VHF communication facilities were much too inadequate to consider alternatives. However, with the development that has taken place over the last two decades, Sagar Island has become accessible by road in a matter of 3½ hours with only one crossing across the channel creek (on the eastern side of the island). Simultaneously, communication facilities have also developed tremendously to provide efficient communication between the Pilots and the Pilot Station through WT/VHF sets etc.

Infrastructural facilities of a port.

3. Efficiency of the port depends upon the infrastructural facilities and if such facilities are made commercially and economically viable for Shipowners, port will attract larger volume of cargoes (both import and export) through increase in ship calls. The Pilot vessel also provides an important infra-structural service facility for the shipping and any improvement in providing such a facility which may lead to greater efficiency, lower costs and reduction in time to provide the same service would help the Shipowners in carrying out the above operation at a much lower cost.

Establishment of a Shore Pilot Station in lieu of Pilot vessels.

The Consultant is firmly of the opinion that a comfortable Shore Station can be established on Sagar Island near the waterfront looking out to the open sea to the South. The rooms for Pilots at this Shore Station can be made air-conditioned, if required. This Shore Station should have radio communication net work together with Radar service for surveillance. This Shore Station can also be an observation point for meteorological readings for transmission to the Regional Meteorological Centre.

Buoying of channel at Sandheads to enable Master to navigate upto Upper Gasper Light-ship.

4. The Consultant further feels that the channel between the Eastern Channel Lightship and the Upper Gasper Lightship being quite deep, can be navigated safely by Masters of vessels provided that the channel is a double buoyed channel marking to its full width particularly from Intermediate Lightship to Upper Gasper Lightship.

Practice that was followed during World War II.

5. In the above connection, it will be pertinent to mention that during World War II when the Consultant Served in the British Merchant Navy, the Western channel was in use for shipping. As a safeguard against enemy action, the Pilot vessel had then moved up and took station above the Reef Lightship but below the Beaumont's Gut Lightship. Merchant Ship on their own came up passing Western channel Lightship and Reef Lightship under command of their Masters and if no Pilots were available at the Pilot Station, Masters anchored their vessels above the Reef Lightship. The Bengal Pilot Service (of the Central Government) was woefully short-handed. The Port of Singapore having fallen to the Japanese, the Pilots from there were deputed to Calcutta. The Singapore Pilots after a short period of training were allowed to take ships of light draft to Sagar anchorage negotiating the Eden channel at the end of which was the Eden Bar (and a tricky one too due to cross sets), before entering Sagar Roads.

Sandheads anchorage action for inward vessels re pilots.

6. Now coming back to the report, inward bound vessels if required to anchor due to no Pilots being available or due to any other cause should anchor in the vicinity of the Eastern channel Lightship i.e. 2 to 3 nautical miles to the west of her. Ships that are called up to embark Pilot, should steam up under charge of their Master, upto Gasper Light vessels where Pilots will meet such ship for the purpose of boarding them. Vessels steamming up or at anchor should keep in touch with the shore Pilot Station at Sagar by W/T watch for necessary instructions about supply of Pilots or for other important messages.

Action for Outward vessels.

7. For outward bound vessels, Pilots could disembark after passing No.4 or 5 Middleton Buoy and aligning the vessel on her suitable course and giving necessary instructions to the Masters. From Middleton crossing to Eastern channel lightship via Upper Gasper, Lower Gasper Lightship and Intermediate lightship will be an easy run and Masters of vessels will themselves be capable of doing the passage safely.

Craft required under the new system of supplying Pilots etc.

8. Craft to be used for the purpose of meeting vessels at Gasper Light vessels have necessarily to be of robust construction to withstand sea, swell and wind condition of the S.W. Monsoon. Two such craft would be required during the embarking and disembarking operation and they must always work in PAIRS. So that in the event of any breakdown the other can render assistance and if necessary bring her to Sagar. The most suitable type of craft will be small tug like craft with adequate freeboard and having a dormitory cum lounge accommodation for 4 Pilots on each such craft as the Pilots may have to wait for sometime before boarding steamers. In preference to the conventional Tugs, it would be better to have these craft fitted with cycloidal/azimuth propulsion systems since they can quite easily be manoeuvred in all directions ahead, astern, sideways and so on. Such craft will quite easily be able to go alongside merchant vessels for the purpose of embarking or disembarking Pilots. Craft with cycloidal/azimuth propulsion systems are being built by Indian Yards. These craft should have a speed of 12 knots at a draft not exceeding 13 ft. The design specifications could be worked out by the Trustees' New Construction Unit under direction of the Director, Marine Department. They should be equipped with VHF/Walkie Talkie sets, a small radar, an echo sounder and have adequate life saving and firefighting gear aboard. Fitting of spark arrestors is a "Must" for these craft. Embarkation of pilots should be on flood tide in South West monsoon. These craft, in addition to embarkation and disembarkation of Pilots, should be available for any other work in an emergency at short notice. As these craft will be operating south of Sagar Island they should be built under IRS Standards and registered under the Merchant Shipping Act. The manning pattern should be set by the Director, Marine Department in consultation with the Harbour Master (River) who will take full administrative and operational control of these craft after their commissioning. The operating personnel should live on board and there should be provision for relieving personnel.

Diesel oriented craft.

Cycloidal and azimuth propulsion system.

Design specifications.

various instruments life saving and firefighting gear.

Registered with MMD.

9. Provision will have to be made for laying up the above craft one at a time for annual survey, breakdown repairs etc. Two of the craft must never be laid up simultaneously. In view of this lay-up, a third craft will be necessary. Instead of having a third craft of similar type, a fast launch capable of going out to the open waters below Sagar Island (say upto 2

lay-up for surveys, breakdown repairs.

miles below lower Gasper Light vessel) could be thought of.

Built to IRS standards and registered with MMD.

She should have a speed of 14 to 15 knots. She should be structurally strong and built to IRS standards, and registered under the Merchant Shipping Act. She should further be equipped with a radar, a gyro an echo sounder, a VHF and Walkie Talkie sets. In addition to the accommodation for the Operating personnel, there should also be a built-in lounge with adjustable seats (as in air craft) for 4 Pilots in the launch. Such a launch could be gainfully deployed between Haldia and Sagar as also from Sagar to Lower Gasper Lightship and back. The draft of such a craft should be in the region of 8 to 9 feet. The craft must have adequate freeboad and be equipped with the necessary life saving and firefighting gear, a radar,

various equipment on boad.

a gyro, an echo sounder, VHF and Walkie Talkie sets. The launch should mostly be used South of Sagar Island in the NE monsoon which is the fair weather season in the Bay when the sea would be almost flat calm.

Manning of the craft.

10. For the purpose of officers/Engineers manning, Section 76 of the Merchant Shipping Act will be attracted as the above craft will be registered under the Merchant Shipping Act. Since the aforesaid craft will be used as mini Pilots vessels - Master Pilots (i.e. Grade II Pilots) by virtue of Government Notification issued in 1949 can be authorised to take charge of such craft. A copy of this Notification is given in Annexure B.

Day and Night signals of the Pilot vessel.

These mini Pilots vessels should during day and night show appropriate Day and Night signals of the Pilot vessel.

T-headed Jetty.

11. The shore Pilot station should have a small T.headed jetty with efficient fenders in close proximity connected by a suitable road. Because of the soil condition on the South coast line of Sagar Island, it has necessarily to be a bore pile jetty hence it will be costlier than a steel rail jetty. This jetty will be used by the craft attached to the Shore Pilot station.

A mooring buoy.

It would be advantageous to have in addition a mooring buoy (centre channel) with a rocker shackle attached to the buoy chain pendant. The buoy should be laid close to the jetty for the purpose of craft making fast to - particularly in the S.W. monsoon when high winds are prevalent and the craft get tossed about. The buoy can be laid by the Despatch vessel of Calcutta Port Trust.

Turbulence

12. This is to emphasise that in South West monsoon a considerable amount of swell rolls into Gasper channel and sometimes even into Sagar Roads. Turbulence is caused particularly when the wind and tide are in opposite directions i.e. due to wind whipping up the sea but such turbulence will considerably ease down when the wind and tide are from the same direction hence embarkation/disembarkation of Pilots

When to embark or disembark pilots.

should be preferred on flood tide particularly in the South West Monsoon. The North East is on the other hand the season of fair weather.

Stors collection at Haldia.

12.(i) The three craft referred to in previous paragraphs should lift their stores, dry rations, fresh provisions, bunkers, fresh water etc. at Haldia. As such, necessary arrangements would have to be made.

Minor repairs at Haldia.

(ii) Minor repairs, if cannot be carried out in the craft, may have to be attended at Haldia hence provision would have to be made for such repairs. For annual survey, major repairs etc. the craft should go to Calcutta.

Inter-changeable crew.

(iii) It will be advantageous to have crew who can be inter-changed between craft.

(iv) Manning should be done to the essential minimum consistent with safety.

13. The change over to the new system from the old system will necessarily have to be done in two phases, viz.,

First Phase

(a) Procurement of craft as mentioned in para 8 and 9.

Changeover to the new system in gradual stages.

(b) Marking the channel with buoys on both sides to the maximum width from Intermediate Lightship upwards up to Upper Gasper Lightship. Eastern channel Lightship is to be fitted with a Racon. Channel buoys as per above should be fitted with radar reflectors and they should be lighted. The light characteristics will be decided on by the Director, Marine Department in consultation with the Harbour Master (R) and the Superaintendent, Dredger and Despatch Service.

(c) Till the Sagar Island shore Building and the T-headed jetty are constructed, the existing Pilot vessels are to be retained and used as "House Boats" (being fully manned for any emergency) by having them anchored at the lower end of Sagar anchorage clear of all shipping. These Pilot vessels should continue to adhere to their programe of duties on the basis of 16 days out and 12 days in town or whatever may be decided by the Director, Marine Department and the Harbour Master (River).

N O T E

The first phase will give the Pilots and other operating personnel confidence through initial experience and they will be ready for the second phase changes when they come.

Second Phase

(d) After construction of the Shore Pilot station and the small T-headed jetty with efficient fenders at Sagar Island, the same can be manned by personnel on round the clock basis. The manning pattern is to be set by the Director, Marine Department in consultation with the Harbour Master (H). Pilot vessels thereafter not being required can be disposed of.

(e) All W/T equipment together with other equipment that will be required may be taken out of the Pilot vessels before their disposal.

(f) By introduction of the Second Phase a lot of staff would be rendered surplus if the manning of the craft and the shore station is done on the basis of the "Essential Minimum" consistent with safety. Needless to say due to the pressure of Labour Unions, CPT vessels and craft are heavily manned presently. A lot of staff will also be old and their riddance through natural attrition will not take several years.

Government of India,
Ministry of Commerce
New Delhi, the 24th December 1949.

Notification

No.67-M.I. (17)/49. In exercise of the power conferred by section 289c of the Indian Merchant Shipping Act, 1923 (XXI of 1923), the Central Government is placed to exempt Pilot vessels and survey vessels owned by the Commissioners for the Port of Calcutta from the recruitments of sub-Section (1) of Section II of the said Act subject to the following conditions namely :-

(i) Pilot vessels shall be in the charge of an Officer, Hooghly Pilot Service not below the rank of a Master Pilot.

(ii) Survey vessels shall be in the charge of River Surveyor and shall not proceed to sea beyond 10 miles from the present position of the Western channel light vessel or the 20 fathom line whichever distance is greater.

Sd/- H.C. SARIN
Deputy Director to the Govt. of India.

Cost of the Pilot vessels P.V."Sagar & P.V."Samudra"

i)	Cost of vessels	–	Rs. 1,69,08,917.99	Paid in Foreign currency including London agency charges.
ii)	Adjustment of liquidated damages	–	Rs. 83,820.70 p.	
iii)	Customs Duty on spares only	–	Rs. 2,62,249.54 p.	
iv)	Travelling expenses of the officers for going to U.K.	–	Rs. 29,952.19 p.	
v)	Miscellaneous Ex	–	Rs. 1,319.18 p.	
			Rs. 1,72,86,259.60 p.	
	After adjustment due to devaluation of the Rupee.		Rs. 97,19,225.00 p.	
	Total	=	Rs. 2,70,05,484.60 p.	

(Two crores, Seventy lakhs, five thousand four hundred & eighty four and paise sixty only)

Therefore of each vessel Rs.1,35,02,742.30 p.

(Rupees One crore thirty five lakhs two thousand seven hundred forty two and paise thirty only).

CHAPTER - IV

Weather in the Bay - Cyclones - Depressions - Westerly gales - North-Westers.

Seasonal winds are encountered in the Head Bay i.e. the South West Monsoon and the North East Monsoon. South West Monsoon is the rainy weather Season accompanied periodically by Cyclones, Depressions etc. Westerly gales are extremely few. Strong Southerly winds are encountered from March to mid October each year when a considerable amount of swell also runs up particularly during cyclone, depression etc. At Sandheads when the heavy sea swell conditions prevail, the Commander of the Pilot vessel on duty outside, in the interest of safety, may temporarily suspend boating operations i.e. embarking and disembarking of pilots on and from merchant ships till the weather moderates. The sea conditions may be very rough particularly when the wind and tide are in opposite directions but the sea eases when they are from the same direction. For this reason in South West monsoon boating should be done on the flood tide as far as possible.

2. The North East Monsoon prevails from mid-October to end February. This is the season of settled weather conditions. The sea then sometimes becomes a flat calm. Boating at Sandheads poses no problem.

3. Cyclone occur at the change of monsoons i.e. in May and October/November. In April and May South West Monsoon conditions are well established. In October/November the North East monsoon conditions drive the South West Monsoon from the Bay. A cyclone can form anywhere in the Bay and can travel any way. It has a steep gradient and a well-marked centre. It usually recurves. It can be followed by a "Secondary". Depressions occur particularly in June, July, August and September. They cover a wide area in the Bay and do not have a well-marked centre like a cyclone. They can cross the eastern coast any where between Cape Comorin and Midnapore usually travelling in the WNW to Westerly direction. Depressions may be followed by Westerly gales but they are very few.

4. If the depression crosses to the West of Sagar Island, the anchorage at Sagar will afford a safe anchoring berth from gale force or stronger winds in the NE to SE and ships may anchor with safety at Sagar Island. The Pilot vessel if she has to leave Sandheads Pilot Station under stress of weather due to Depressions, normally proceeds to Sagar Roads and waits there till weather moderates and then resumes her Sandheads Pilot Station duties.

5. The following instructions have been approved by the Director, Marine Department for the safety and security of shipping.

(i) Danger Signal V indicates that a storm of slight or moderate severity will probably cross the coast to the east of Sagar Island and West of Chittagong. Vessels may proceed to sea if the height of the barometer and state of sea and weather are such as to lead Masters and Pilot to infer that there is no danger. The wind at the mouth of the Hughli will probably haul from north east through north to north west or west.

(ii) Danger Signal VI indicates that a storm of slight or moderate severity will probably cross the coast to the West of Sagar Island and North of False Point. The wind at the mouth of the Hughli will probably veer from north east though east to south east or south. As these easterly wind will raise a heavy swell and produce a strong westerly set in the channel at the Sandheads, it is advisable that none but fast steamers in light trim should put to sea and those only if the weather appearances and state of the sea are not to unfavourable.

(iii) Danger Signal VII indicates the approach towards Sagar Roads of a storm of slight or moderate intensity. It is advisable that no vessels except fast steamers in light trim should put to sea until the wind direction and force, the state of weather and sea and the rise of the barometer indicate that the storm has either brokenup or passed inland. It should be remembered that cyclonic storm of small extent in the Bay of Bengal some times blow with hurricane force and raise a high sea near their centres.

(iv) Great Danger Signal VIII indicates that a storm of great intensity will cross the coast to the east of Sagar Island and West of Chittagong. It is advisable that sailing vessels, with or without steam, and deepladen or slow-steaming steam vessels, should not proceed to sea but remain in the river till the storm has reached the coast and passed inland. The wind at the mouth of the Hughli will probably haul from north-east through north to north west or West.

(v) Great Danger Signal IX indicates that a storm of great intensity will cross the coast to the West of Sagar Island and north of False Point. No vessels should go to sea, and Masters and Pilots of vessels outward bound should be guided by the appearance of the weather and height of the barometer in deciding whether it is advisable to proceed below Diamond Harbour or Mud Point. The wind at the mouth of the Hughli will probably veer from northeast through east to south east or south.

(vi) Great Danger Signal X indicates the approach of a storm of great intensity towards the mouth of the Hughli and Calcutta. Master and Pilots in charge of vessels are cautioned not to put to sea from Sagar Island, nor to proceed down from Diamond Harbour and they should make their vessels as snug and secure as possible. The Masters of vessels in the port should take the special precautions for safety laid down in the port rules.

There will probably be a storm wave and it should be carefully remembered that its height and destructive effect will depend quite as much upon the state and character of the tide when the cyclonic centre reaches the coast, as upon the depression at the centre or the intensity and extent of the storm.

North Westers

During the Summer Season (end of February to May) Bengal and Orissa are visited by a type of severe thunderstorm known as North Westers. These storms usually approach stations from N.W. The first sign of these storms is a low bank of dark clouds in the N.W., the upper outline of which has the appearance of an arch. It approaches at first slowly and then more and more rapidly and commences with the strong gust or squall which on land raises clouds of dust. There is frequently heavy thunder and lighting followed by down pour of rain driven by the strong wind. The winds blow with almost hurricane force and blow down trees apart from causing a lot of damage on houses and other properties. These storm are sometimes accompanied by hail. The greatest velocity recorded in these storms at Calcutta can be as much as 100 Kms. per hour. North Westers usually break out in the afternoon or evening and they rarely last more than 2 to 3 hours, and are usually followed by cool weather during the remainder of the night. The North Westers may give rise to a high sea in the N.W. angle of the Bay.

CHAPTER - V

Marine Officers' apprehension - Clarification - Conclusion.

Proposed new system - a radical change from the existing practice.

1. The alternative arrangement proposed in this report is a radical departure from the existing practice and if agreed to, should be brought about in two phases. The proposed scheme has, however, been viewed with concern by some Marine Officers whose muffled cry is "why disturb a system that has stood the test of time ?"

Marine Officers - a conservative lot of people.

2. Marine Officers are a conservative lot. They do not take kindly to rapid changes. They zealously hold on to the past practices including privileges enjoyed by them in spite of the fact that the contemplated change/changes may be beneficial to them. The should, therefore, examine amongst themselves the contemplated arrangement/scheme to ascertain the benefits that would accrue to the employer and themselves and then come but with their considered views in the matter.

Consultants' observation of marine operations in the port.

3. The Consultant has been a Marine Officer himself initially starting his career in the British Merchant Navy during World War II later drifting into the Bengal Pilot Service (Government of India), the Hooghly Pilot Service (Calcutta Port Commissioners) and Calcutta Pilot Service (Calcutta Port Trust) before joining the adnistrative ranks starting as the Marine Officer (Haldia) at Haldia (for eight years) followed by postings as Deputy Director, Marine Department II, Deputy Director, Marine Department I and finally Director, Marine Department, Calcutta Port Trust. During his forty two (42) years of hard dedicated service he had been very fortunate to observe every type of marine operation in the Calcutta Port.

Must not be a victim of parochialism.

4. His training combined with experience of more than four (4) decades has opened the door of his mind wide toward new possibilities. He simply cannot look at things in a parochial way and will not brush aside any new schems as being "impracticable" without weighing all the pros and cons. To do so will be like pursuing an ostrich-like policy.

Research and Development - Modernisation.

5. In the present age, the emphasis is on more and more research and development. The fruits of modernisation are manifold due to the break through in the technological field including rapid strides made in the management skills and various other sciences. An efficient Manager has to think continuously for innovation in the working methods. If such a managers' mind becomes fossilised he will be left behind in

the race. The Consultant cannot possibly subscribe to the view of the advocates of retrogression and reactionism that the "old order" cannot give way to the "New order" at any point of time.

Future of Pilot Vessels.

6. The reasons as to why the Calcutta Port Trust had perforce to maintain two costly Pilot vessels has already been dealt with in this report. Pilot vessels in several ports (particularly the UK, European ports etc.) have either been withdrawn or the extremely few in numbers that are left behind are on their way out if not presently, but will be so in the near future. In India, Bombay Port Trust has already done away with its sole Pilot vessel which used to be stationed at the entrance to Bombay Harbour. A reference to the Guide to Port Entry (a UK Publication) will bear out that tugs and suitable fast launches are currently being used for the purpose of embarking and disembarking Pilots in various ports of the world. It is not known if there has been in any other port Pilot Vessel of the size as the Calcutta Port Trust Pilot vessels. Such Pilot vessels apart from their high building costs have always been very expensive to run. If a suitable alternative arrangemen can be found without sacrificing operational efficiency and at the same time ensuring safety of personnel and craft including a significant reduction in avoidable expenditure to help the Port Exchequer - Why is the objection ? The above - mentioned craft will be operating in protected waters within view of Sagar Island Pilot Station by the naked eyes or the radar screen.

Guide to Port Entry gives information port by port.

Why objection

Financial position of Calcutta Port Trust.

7. Calcutta Port Trust is a quasi-Government Organisation. It provides services to the Shipping community, trade circles and so on. Due to shrinkage in trade it is presently handling a traffic of 4.50 million tons only in Calcutta Section (i.e. leaving aside Haldia's turn round). The income of Calcutta Port has dwindled considerably. There is still a lot of infructuos expenditure which can be curtailed by simplifying admistrative and operational procedures. The desideratum is to provide efficient services at reasonably economical costs to the Port Exchequer. It is, therefore, incumbent on Marine Officers with any sense of belonging to Calcutta Port Trust to do sustained thinking keeping this in view.

8. Some Marine Officers have put forward the plea that a considerable amount of ground swell rolls into Sagar Roads and that there is no suitable landing place at Sagar Island due to the strong South Westerly winds. On this the Consultant has necessarily to observe that it will not be quite correct to state that ground swell rolls in all the time. This may be true at the time of a depression or a cyclone or under conditions

Plea of ground swell.

prelude to a storm but such swell actually rolls in through Long Sand channel from the direction of Beanmonts Cut. That is why ship coming to Sagar Roads under cyclonic weather conditions are advised to anchor as high as possible preferably in Bedford channel. The number of instances of ground swell due to disturbed weather conditions as mentioned above can actually be counted on fingers.

Winds during South West Monsoon.

9. In South West Monsoon the direction of wind is mainly from the south West varying in force. The strong winds start in March and particularly get stronger towards late afternoons blowing like a strong sea breeze. The strength of the winds, however, abates in fury if in the meantime there is a north-wester. Wind force also gets reduced with the advent of rains. The rainy season lasts from the end of June to the middle of October. Thereafter with a month or so of sulting weather, the north east monsoon advances forcing the South West monsoon to retreat.

Period of S.W. monsoon.

Definitions of "wave" and "Swell".

10. Waves are local oscillation of the sea surface by wind then blowing. Swell is an undulation propagated from a distance and persisting after the generating force of the wind has ceased. Deep water waves have no motion of translation, but on reaching shallow waters their troughs are retarded, their crests break and rush forward with considerable force and form "breakers" on the coast.

No "Juhu" like or "PURI" like breakers.

11. The Eastern Channel as the chart will show is a protected channel between Middle Ground on the West and Sagar Sands on the east. Middleton crossing which takes a course of nearly $\frac{330°}{150°}$ is further protected passing between Upper Sagar Sand on the east and Lower Long Sand on the West. The effect of surf will be more pronounced on the South Coast of Sagar Island in the vicinity of SAND DUNE BEACON to the eastwards past Ganga Sagar Khal towards the channel creek. The effect will be much less if not negligible at the South Western Point of land of Sagar Island (vicinity of ruins of the old Lighthouse vide Plan 54 - Sagar Roads - in the Appendix). <u>There never are breakers of the magnitude as at Puri (Orissa) beach or Juhu (Bombay) beach</u>. In the absence of any landing facilities at Sagar Island the Consultant's preference will be for a T-headed jetty with a catwalk (length about - meters) to the shore at or near about the location where the effect of so called "breakers" etc. will hardly be discernible. In South West Monsoon there will however be some turbulence on the ebb tide due to the wind and tide being in opposite directions and the wind whipping up the crest of the ebb - flowing water. The jetty head should be in 4 to 4.5 metres depth. The berthing face of the jetty head has necessarily to be fitted with efficient fenders. The craft envisaged in this report

Provision for a T headed jetty with Catwalk joining the Shore.

Fenders of the jetty and the craft.

are likewise to be fitted with efficient fenders. Before taking the decision to construct the T-headed jetty, a technical feasibility report should, it is suggested, be procured by a reputable Consultancy Firm of Port and Harbour Installation Engineers. The Chief Hydraulic Engineer has assured the Consultant as to the suitability of the location from the hydraulic angle.

Technical feasibility report in respect of jetty.

Action to be taken to check fast lateral drift of craft.

12. The craft while going alongside in strong winds may use the offshore anchor, if necessary, to check and keep under control her lateral drift to the jetty. The anchor is a good friend and acts in this case as a brake. The craft with cycloidal/azimuth propulsion system with bow thrusters will be extremely versatile craft for the purpose of manoeuvring in comparison to the craft fitted with the conventional propulsion system.

In rough weather craft must not be allowed to stay alongside the jetty.

13. Under turbulent conditions the craft must not be allowed to stay at the jetty head to obviate damage to the jetty fenders and the fenders of the craft. The craft should either stay at anchor close inshore to the west of Sagar Island or make fast to the buoy mentioned earlier in this report. The buoy should be laid to the West of Sagar Island close inshore and in proximity to the jetty.

Benefits of the New Scheme

Replacement cost of the Pilot vessel.

14. The replacement cost of One Pilot vessel will be in the region of Rs.18 to 20 crores. The proposed alternative arrangement, if approved, can comfortably be effected within the same outlay.

Areas to be used for embarking pilots on inward bound ships.

15. The World Bank tankers and other large-sized vessels should, in the interest of safety, embark Pilots at least 1 nautical mile to the south of lower Gasper Light vessel, while others (i.e. vessels of smaller size and lighter draft) can safely embark Pilots between the Lower Gasper Light vessel and the Upper Gasper Light vessel. So the Pilots of inward bound vessels will be transported over a distance varying from 12 to nautical miles away from Sagar Island under the new system as against 48 nautical miles or so under the existing system.

Area where the Outward bound ships can be "boated".

16. The Outward bound vessels on the other hand should be "boated" on Middleton crossing; Pilots will be away only 4 to 5 miles South of Sagar Island. Pilotage is cut short by 26 to 27 miles by the alternative arrangement i.e. from the Eastern channel Lightship to the Lower Gasper Light vessel.

17. As per the proposed system, Pilots' availability will improve thereby improving operational turn round of ships and this will always be welcome by the Shipping Comunity and Trade Circles.