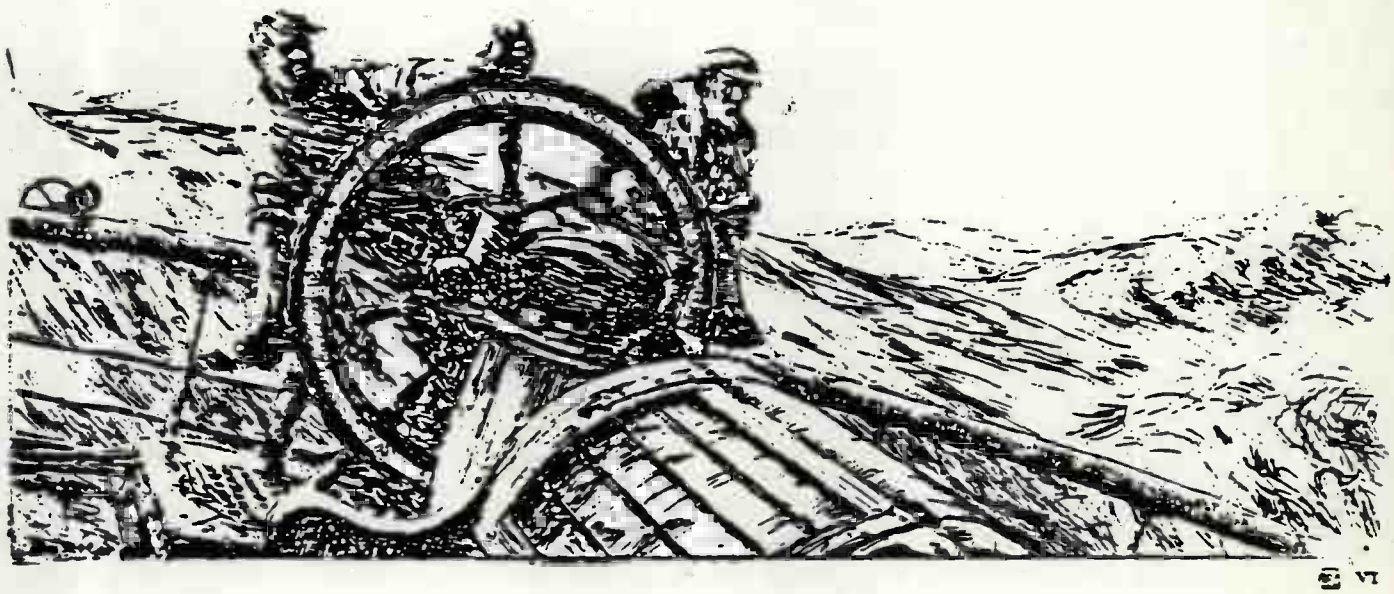


DRAWINGS
O

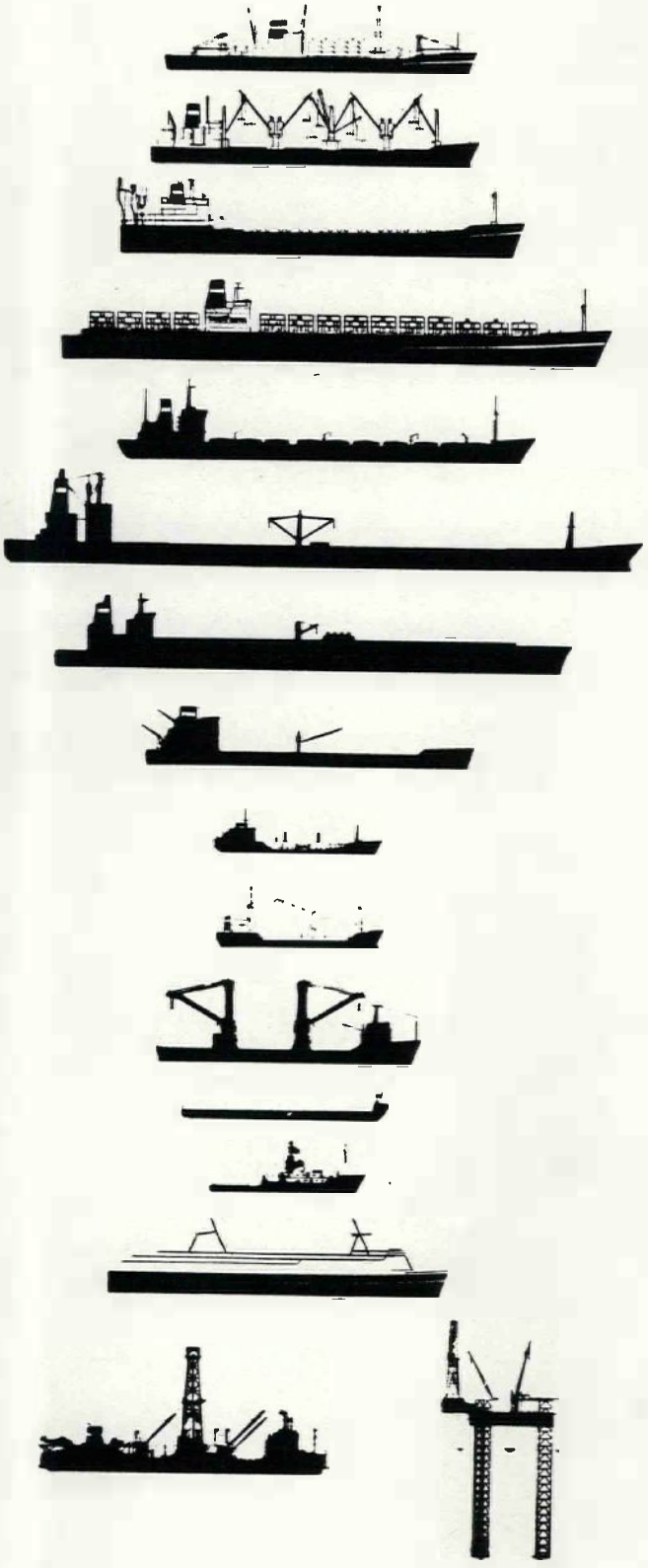
33 YEARS SHIP-DESIGN
NEDLLOYD NEWBUILDING DEPT

3 OCT 1985

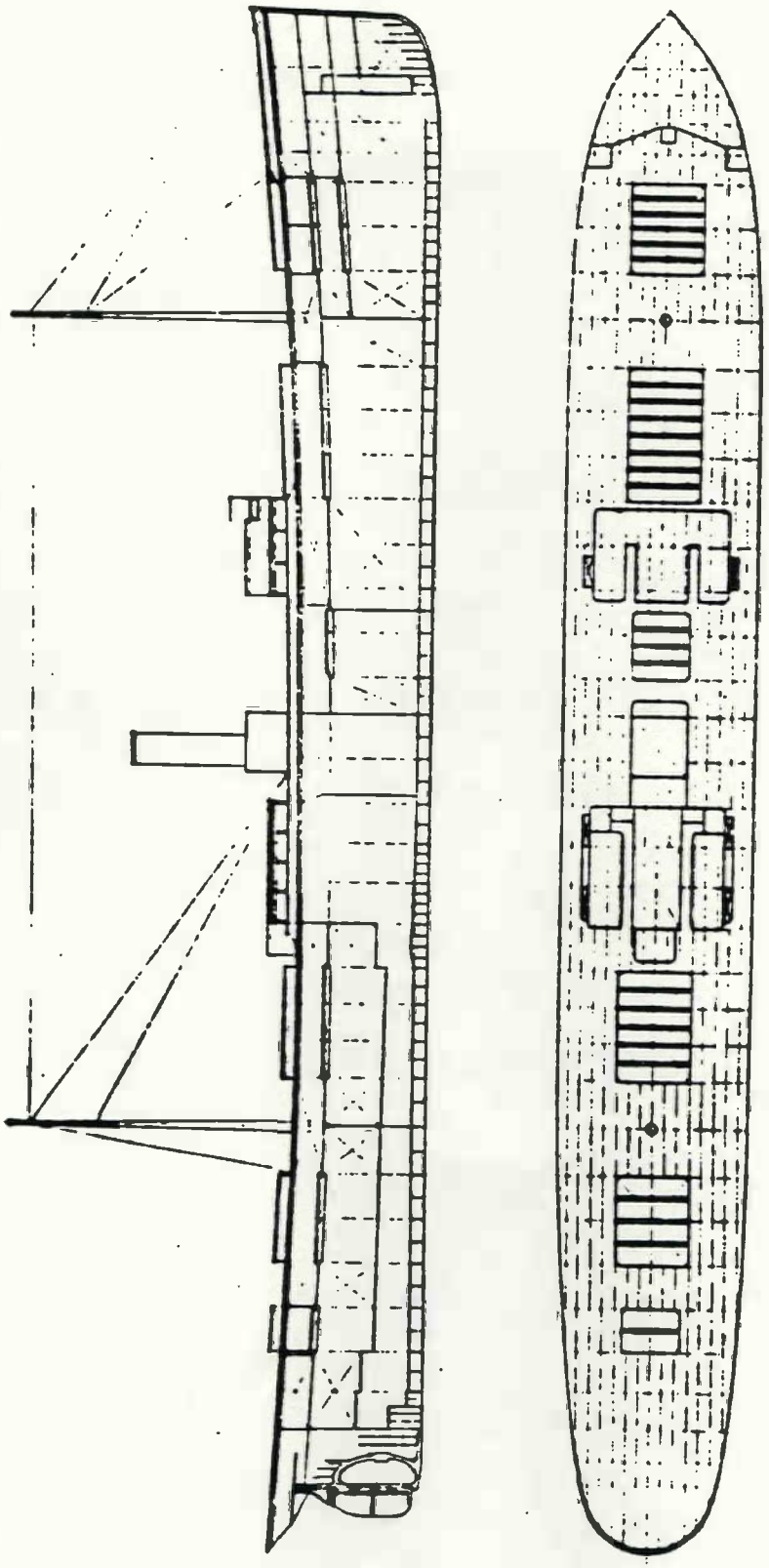
E. VOSSNACK
R.K. HANSEN
AND COLLEAGUES

CONTENTS

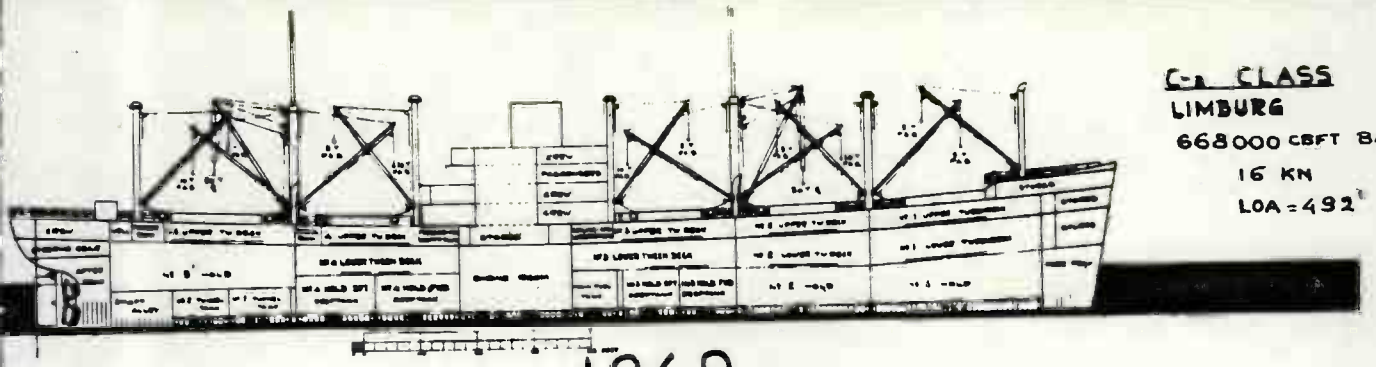
NEDLLOYD VLOOT
JAN 1985



TYPEN	AANTAL	DWT
LIJNVRACHTSCHEPEN	23	281.460
MULTI-PURPOSE SCHEPEN	14	245.955
RO/RO SCHEPEN	4	103.399
CONTAINERSCHEPEN	13	470.663
BULKCARRIERS	9	330.744
TANKERS	1	276.046
GASTANKERS (LPG) (LNG)	1 1	40.635 78.556
PRODUKTENTANKERS	8	281.072
CHEMICALIËNTANKERS	5	12.601
COASTERS	5	12.572
ZWAAR TRANSPORT SCHEPEN	4	25.957
AFZINKBARE PONTON	1	11.500
SLEEPBOTEN	1	810
VEERSCHEPEN	2	6.562
BOORSCHEPEN	2	23.255
JACK-UP RIGS	3	8.180
TOTAAL	97	2.209.967

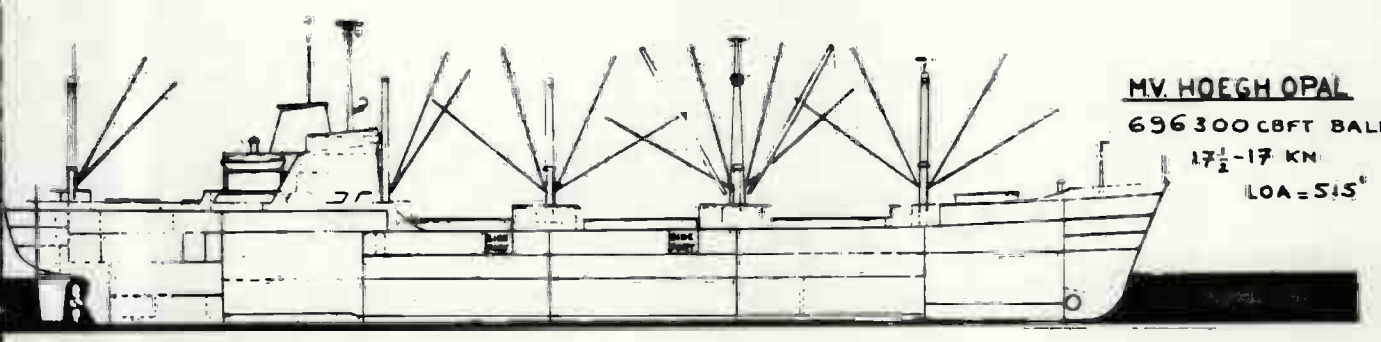


1913

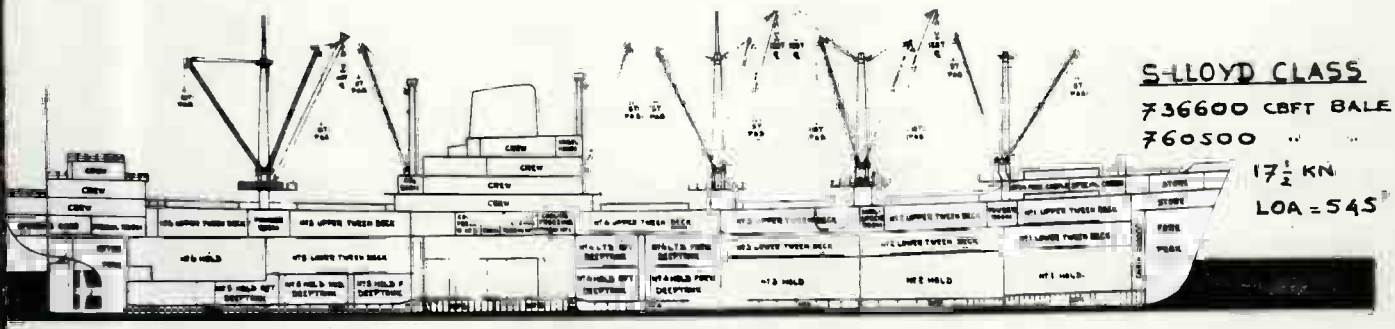


C-2 CLASS
LIMBURG
668000 CBFT BALE
16 KN
LOA = 492'

1948

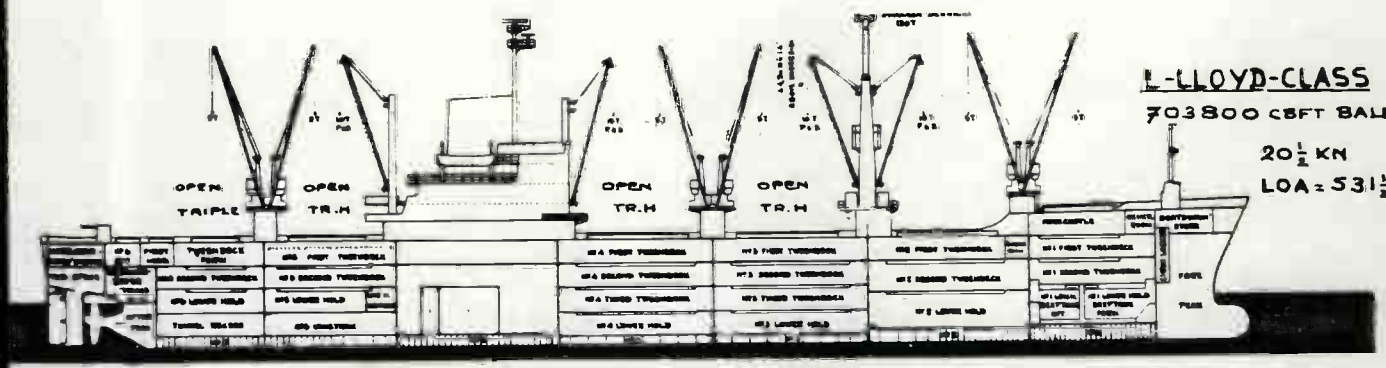


MV. HOEGH OPAL
696300 CBFT BALE
17½-17 KN
LOA = 515'



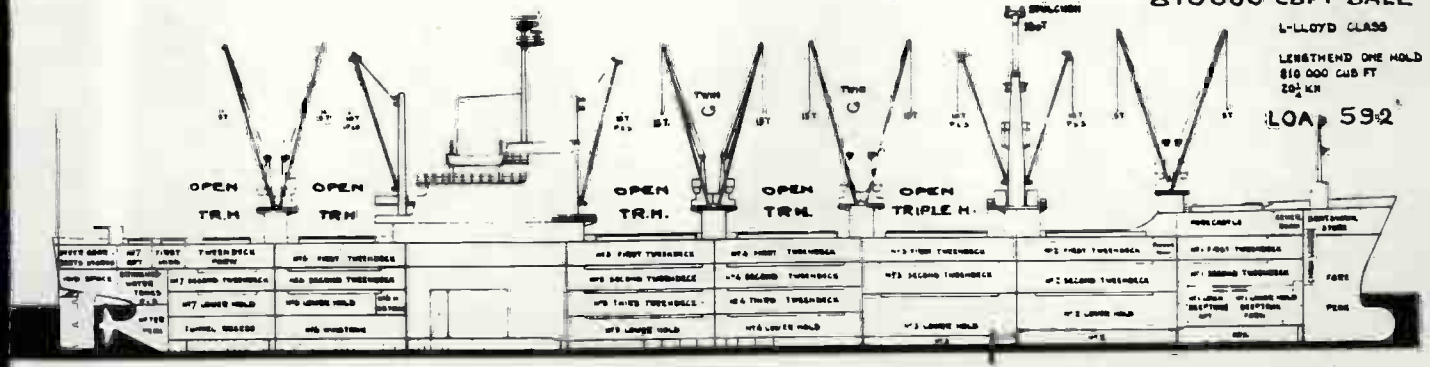
S-LLOYD CLASS
736600 CBFT BALE
760500 " "
17½ KN
LOA = 545'

1958



L-LLOYD-CLASS
703800 CBFT BALE
20½ KN
LOA = 531½'

1967



WHEN BUILDING NOW
810000 CBFT BALE
L-LLOYD CLASS
LENGTHEND ONE HOLD
810 000 CUB FT
20½ KN
LOA 592'

AT THAT TIME WE PROPOSED THIS FOR THE FUTURE

1642

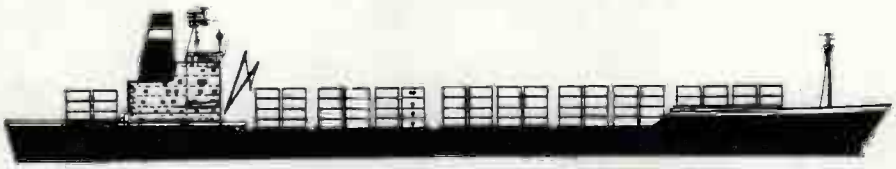
FLUITSCHIP ZEEHAEN — PINASSCHIP HEEMSKERCK

ABEL TASMAN'S ONTDEKKINGSREIZEN VAN AUTRALIE

1967 "W-KERK" KLASSE AUSTRALIË - EUROPA UNIT LOAD - SERVICE

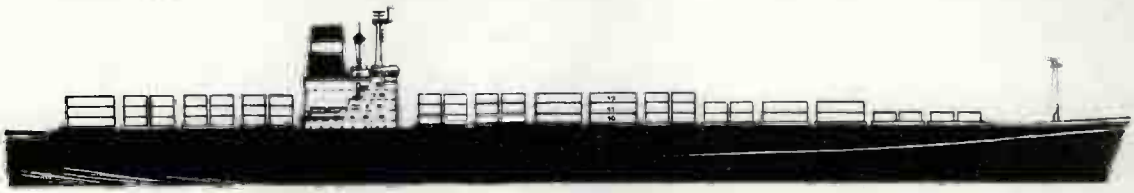
~ 650.000 CUBFT 17000 BHP 21 KN

1971 SS "ABEL TASMAN" AUSTRALIË - EUROPA CONTAINER SERVICE



1677 TEU 32000 SHP 22 KN

1972 SS "NEDLLOYD DEJIMA" FAR EAST - EUROPA CONTAINER SERVICE



2952 TEU 81000 SHP 26 KN

BIG JUMP :

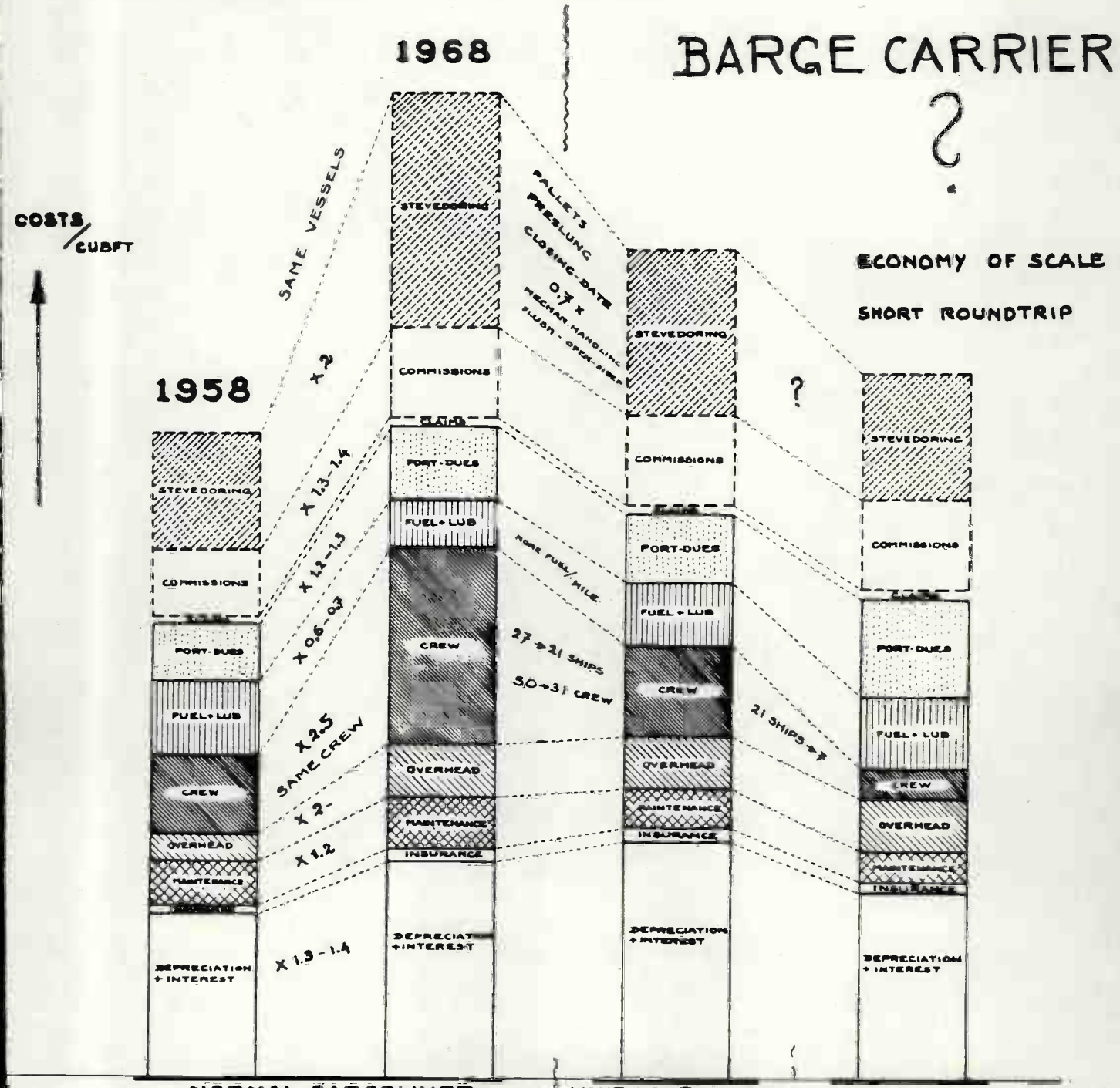
1971 FAST CARGOLINER SUITABLE FOR PALLETS AND UNITLOADS

1968 FULL CELLULAR CONTAINER VESSEL GEARLESS

ECONOMY OF SCALE - FAST TURNAROUND - HIGH PRODUCTIVITY

DEVELOPMENT OF TRANSPORT-"COSTS" / PER CUBFT

FOR A CARGOLINER-SERVICE

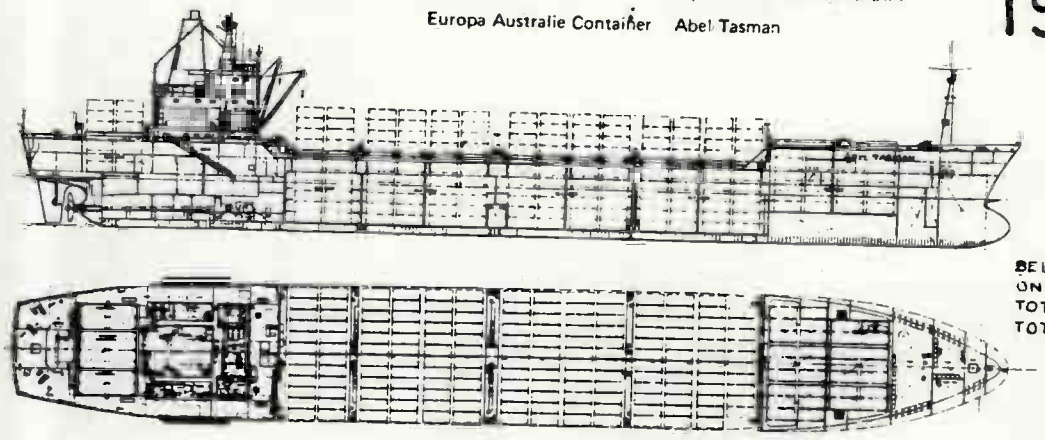


	NORMAL CARGOLINER 27 SHIPS	UNIT-LOAD LINER 21 SHIPS	BARGE-CONTAINER 7 SHIPS
	13½ mill — 18 mill	8.5½ mill	59 mill incl. lighters/barge
SERVICE SPEED	18½ Kn 10.000 SHP DIESEL	20½ Kn 16.000 SHP DIESEL	21½ Kn 32.000 SHP TURBINE
SHIP CAPACITY	610.000 CUBFT 11% LOST SPACE	700.000 CUBFT 22% LOST SPACE	1.400.000 CUBFT 24% LOST SPACE
CARGO VOLUME	545.000 CUBFT	545.000 CUBFT	1.065.000 CUBFT
CARGO PER ROUNDTRIP	1.090.000 CUBFT	1.090.000 CUBFT	2.130.000 CUBFT
ROUNDTRIP	AT SEA 43 DAYS SAILING in PORT 5 .. IN PORT 56 .. 110 DAYS	AT SEA 44 DAYS SAILING in PORT 5 .. IN PORT 37 .. 86 DAYS	AT SEA 42 DAYS SAILING in PORT 5 .. IN PORT 9 .. 56 DAYS
ROUNDTRIPS / SHIP / YEAR	3,3 x	4,3 x	6,5 x
TOTAL ROUNDTRIPS / YEAR	90 SAILINGS	90 SAILINGS	46 SAILINGS
TOTAL CARGO TRANSPORTED / YEAR	98 MILL CUBFT	98 MILL CUBFT	98 MILL CUBFT

225.9 × 210.0 × 30.5 × 16.4 × 10.6 DESIGN-DRAFT

Europa Australie Container Abel Tasman

1971



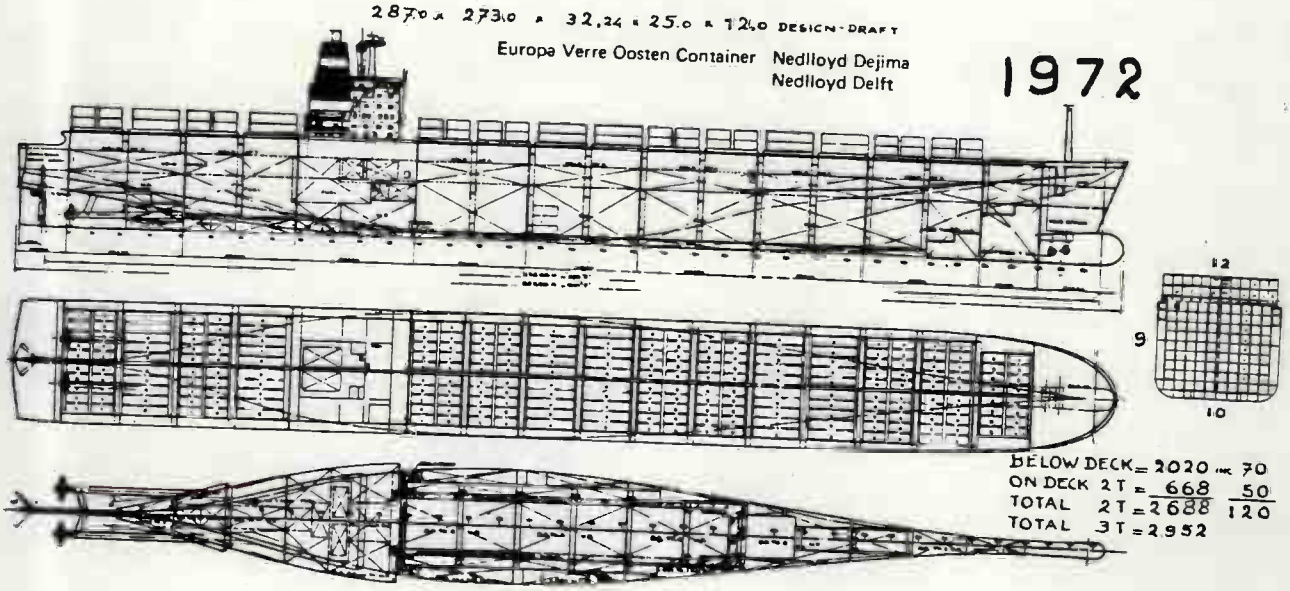
	TEU	REF.
BELOW DECK =	861	100
ON DECK 3 T =	598	20
TOTAL 3 T =	1459	
TOTAL 4 T =	1677	

287.0 × 273.0 × 32.24 × 25.0 × 12.0 DESIGN-DRAFT

Europa Verre Oosten Container Nedlloyd Dejima

Nedlloyd Delft

1972



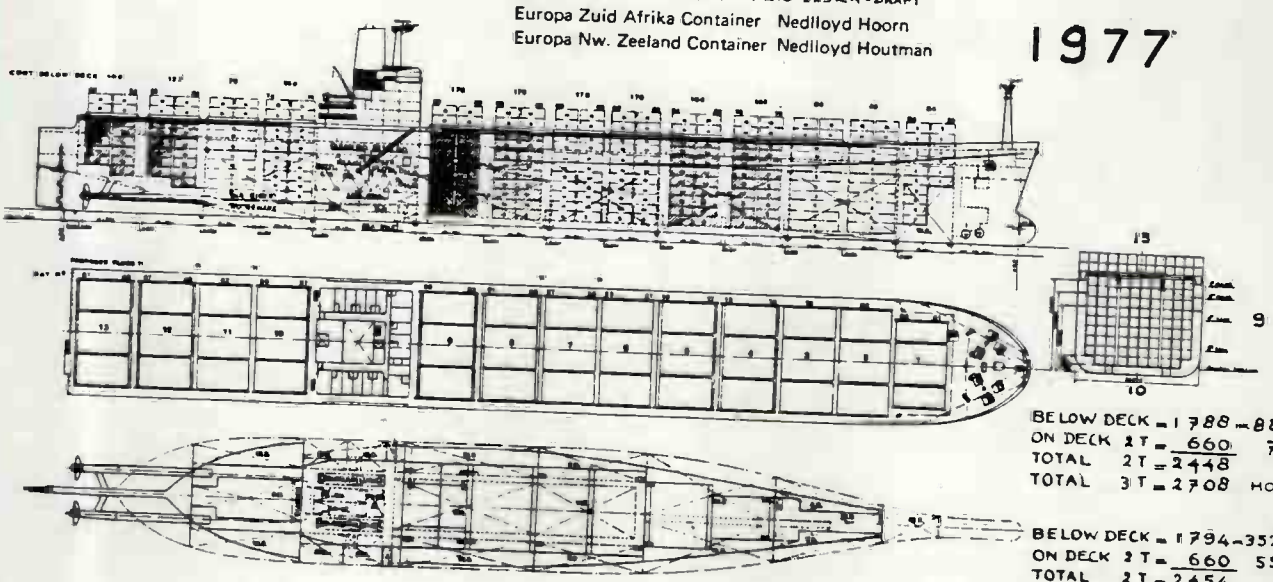
BELOW DECK =	2020	70
ON DECK 2 T =	668	50
TOTAL 2 T =	2688	120
TOTAL 3 T =	2952	

258.5 × 247.0 × 32.26 × 24.15 × 12.0 DESIGN-DRAFT

Europa Zuid Afrika Container Nedlloyd Hoorn

Europa Nw. Zeeland Container Nedlloyd Houtman

1977



BELOW DECK =	1788	886	D
ON DECK 2 T =	660	77	
TOTAL 2 T =	2448		
TOTAL 3 T =	2708		HOORN

BELOW DECK =	1794	352	D
ON DECK 2 T =	660	55	
TOTAL 2 T =	2454		
TOTAL 3 T =	2714		HOUTM.

PICTURE OF ROUNDTRIP C_3-VESSEL

USA w.c. → INDIA PAKIST. ARABG. ⇒ USA wc

6 MONTH'S = ROUNDTRIP

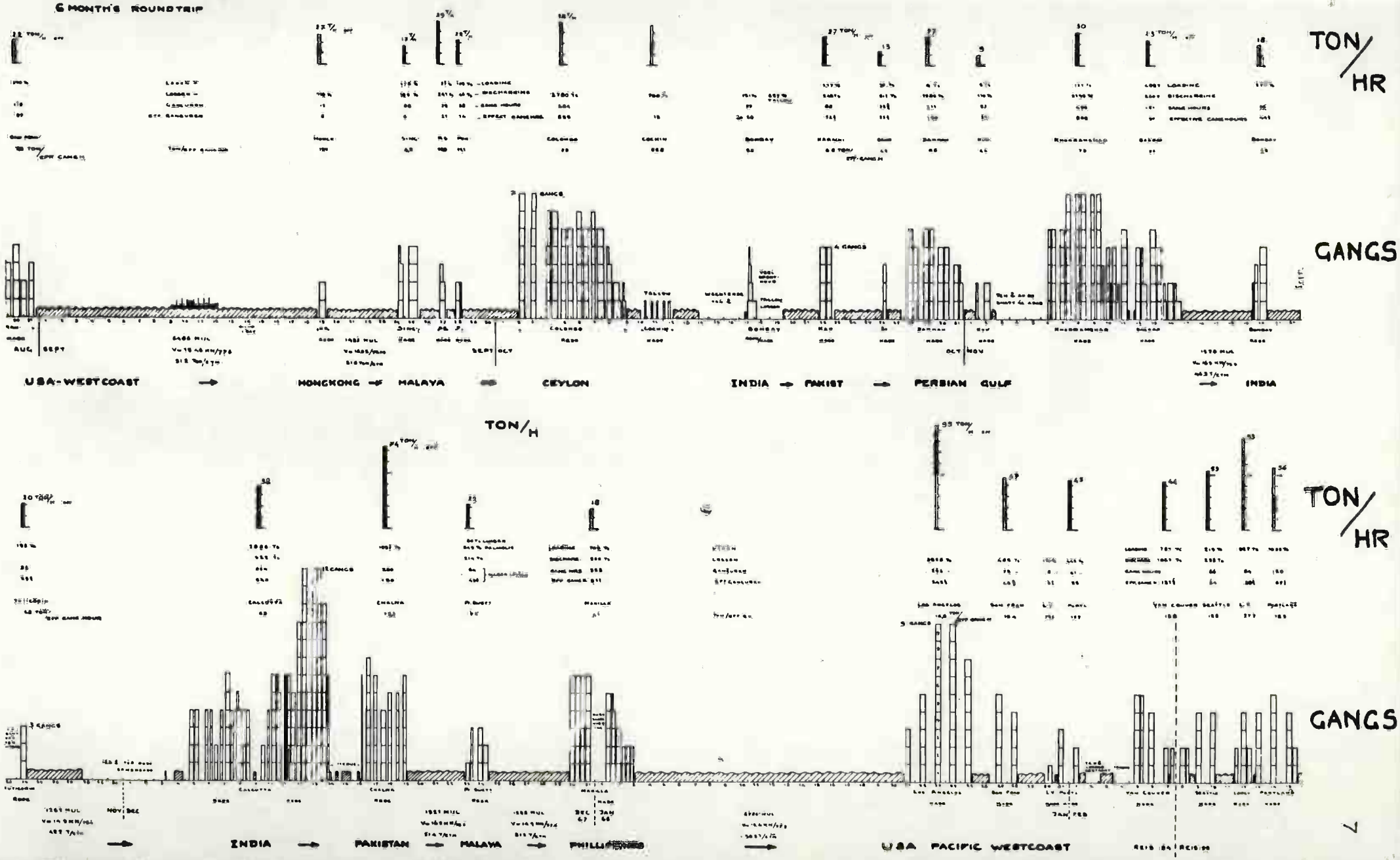
LOADING - DISCHARGING 1968

CONVENTIONAL

SS LIMBURG

VOYAGE 33/34 SEPT'67 → FEBR'68

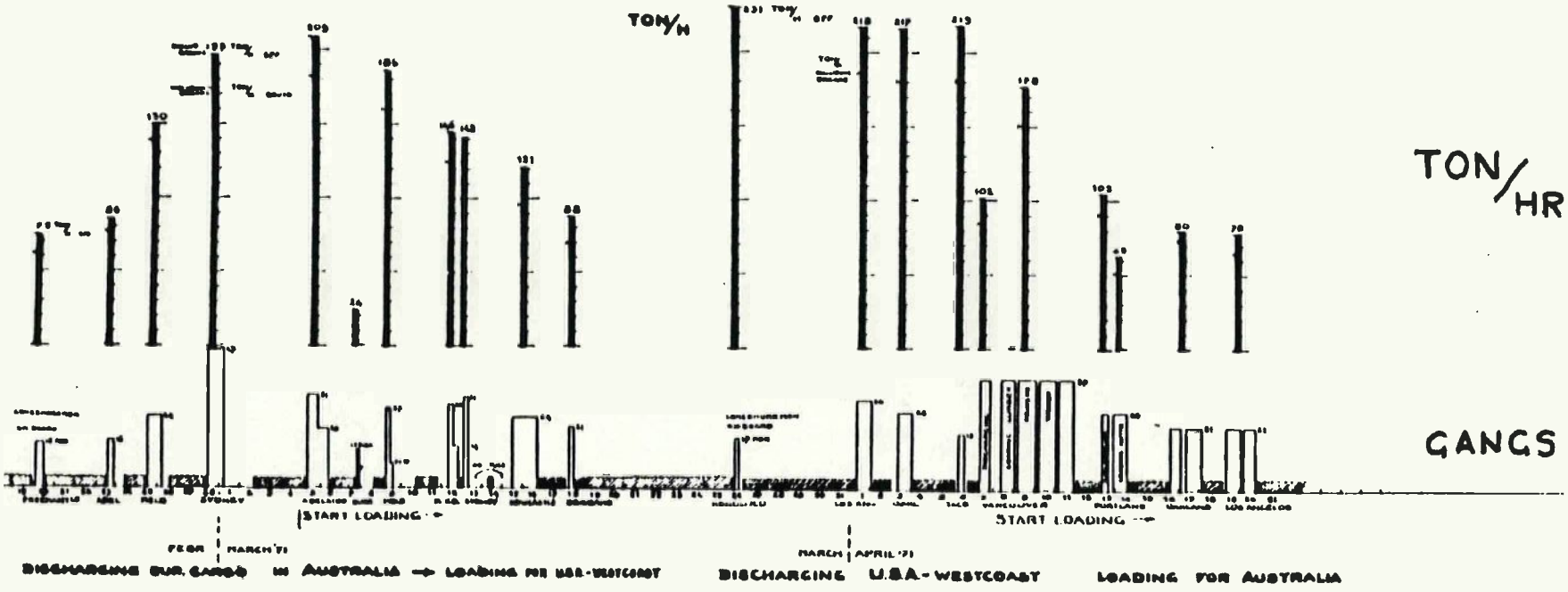
6 MONTH'S ROUNDTRIP



PICTURE OF ROUNDTRIP M S PARALLA

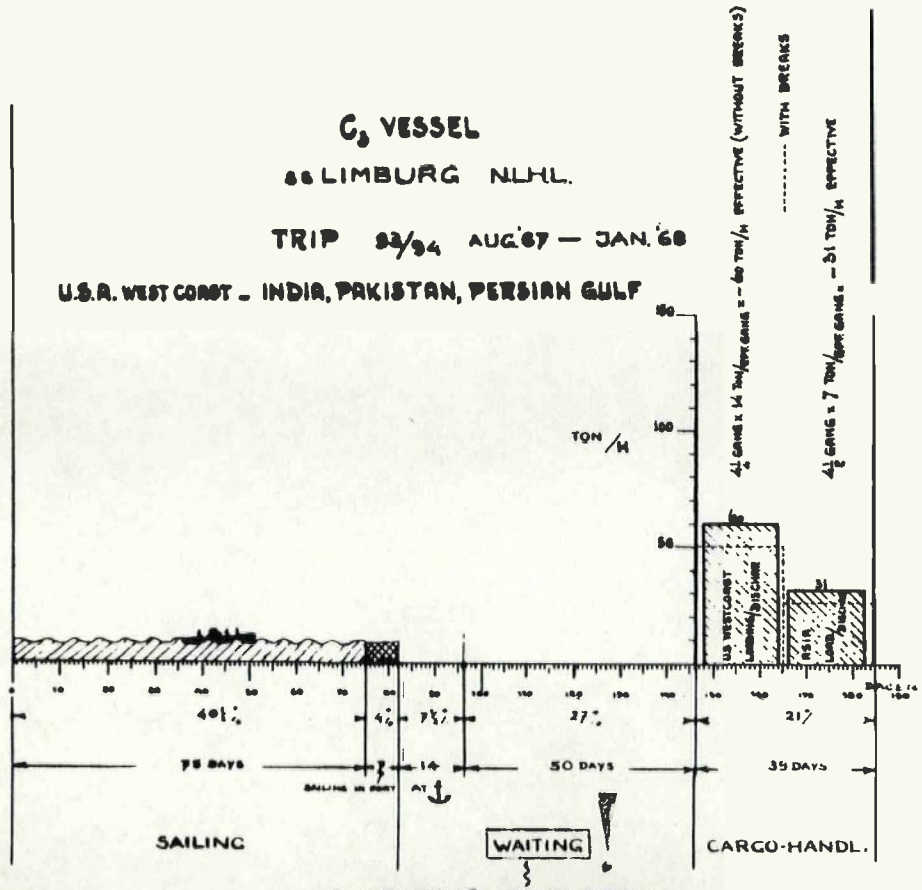
USA w.c. → AUSTRALIA → USA w.c.
65 DAYS ROUNDTRIP

LOADING - DISCHARGING 1971
RO-RO

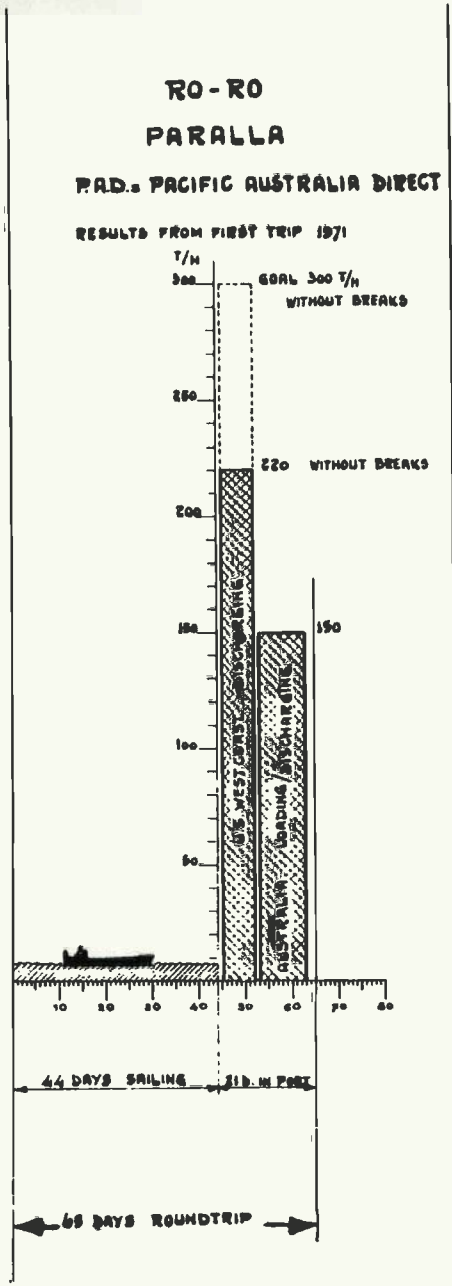


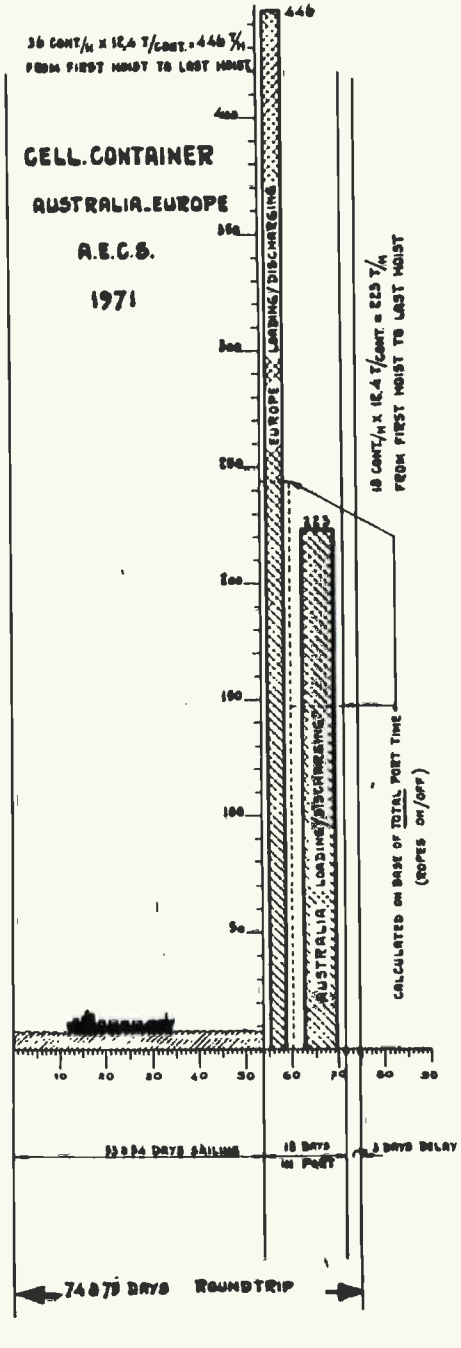
REDUCTION OF ROUNDTRIP

SPEED UP CARGO HANDLING



here is the SECRET





- A fast turnaround is the first requirement in attaining efficiency. (see table I)

---- Many conventional liners stay in port about 3 days per call on average. Altogether port stay takes 50 percent of roundtrip time. During this time only 20% is used for cargo handling and 30% waiting. Cranes, hatchcovers, etc. have hardly any effect in speeding up cargo handling as long as many small loads are handled in many successive steps. Also, labour problems might arise easily , they are very common in the conventional handling sector.

---- Cellular container vessels and roro vessels stay in port less than 1 day per call on average, altogether their port stay takes just 22%-28% of roundtrip time. Being less vulnerable to labour problems because of the high degree of mechanization, one might speak of a reliable "Round-The-Clock" service.

table I:

ROUND VOYAGE TIME ANALYSIS - MODERN VERSUS CONVENTIONAL

Vessel type & NAME		AT SEA Roundvoy miles/Sea days	IN PORT Port days/Number of ports
Cellular container NEDLLOYD DELFT	Europe/Far East & v.v. 70 days (100 % = Round)	24.859' / 54 days = 460 miles/day(19.2 kn) (...77 % at sea)	16 days / 16 ports = 1 day/port (... 23 % in port)
Roro/container NEDLLOYD ROTTERDAM	U.S.A./N.East Gulf & v.v. 67 days (100 % = Round)	22.715' / 49 days = 463 miles/day(19.3 kn) (...73 % at sea)	18 days / 18 ports = 1 day/port (...27 % in port)
Conventional Cargo-Liner (1972-built) NEDLLOYD NAGOYA	Far East/Southern Africa /South America E.C. & v.v. 121 days (= 100 %)	27.139' / 63 days = 430 miles/day(17.9 kn) (...52 % at sea)	58 days / 22 ports = 2.6 days/port (...48 % in port)
Conventional Cargo-Liner (1968-built) NEDLLOYD AUCKLAND	Australia/Southern Africa & v.v....76 days Round (= 100%)	15.417' / 37 days = 416 miles/day(17.3 kn) (...49 % at sea)	39 days / 9 ports = 4.3 days/port (. . 51 % in port)

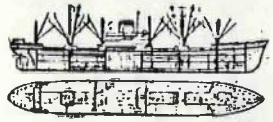
MODERN : CONVENTIONAL

We see that port stays for conventional systems are 2½ - 3 times larger than for cellular/roro systems.

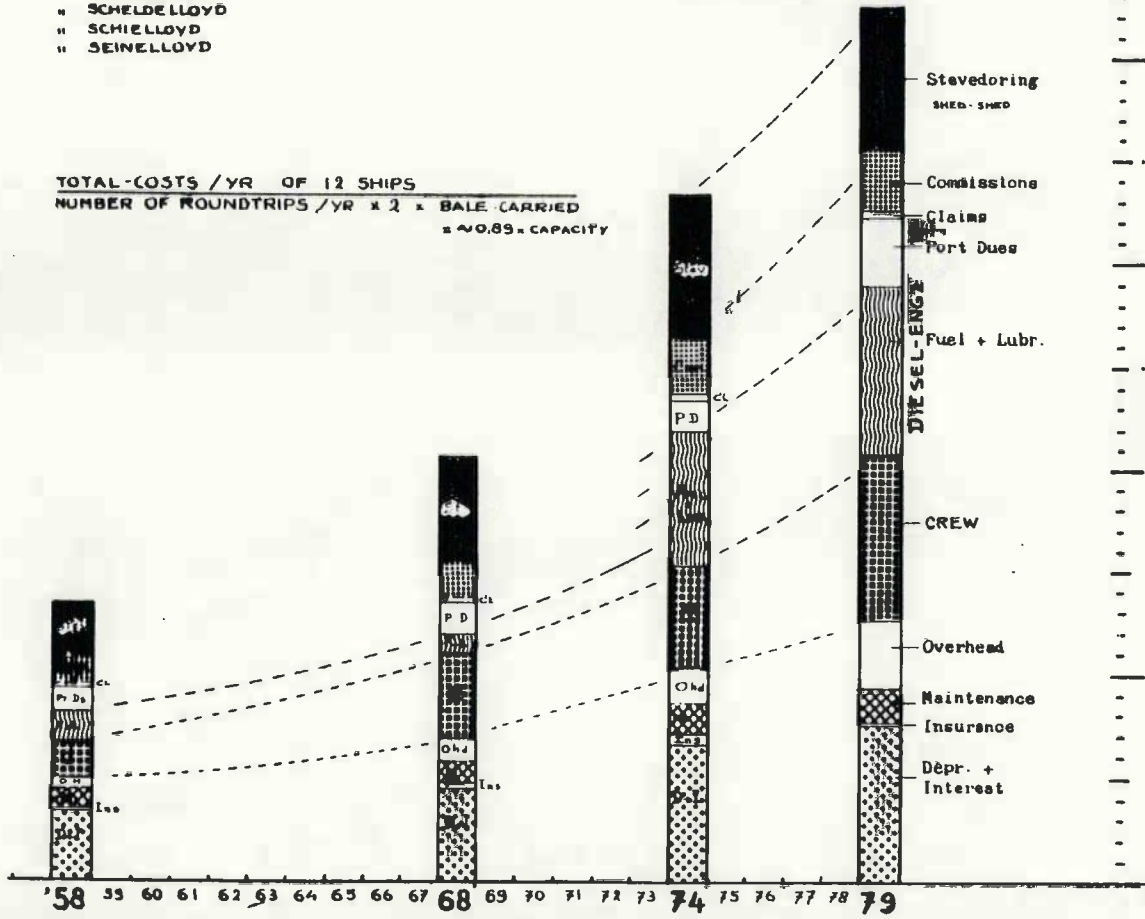
TRANSPORTCOSTS / CU. FT EUROPE ⇄ FAR EAST

12 CONVENTIONAL CARGOLINERS
37 MILL CU.FT/YR

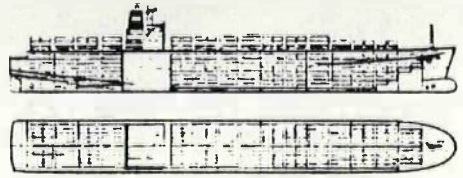
"N - WISSE KERK"
" WAALE KERK
" WESTERKERK
" WILLEMSKERK
" ZUIDERKERK
" ZAANKERK
" BALONG
" NEDER RIJN
" NEDER RHONE
" SCHELDE LLOYD
" SCHIE LLOYD
" SEINE LLOYD



TOTAL-COSTS / YR OF 12 SHIPS
NUMBER OF ROUNDTRIPS / YR x 2 x BALE CARRIED
≈ 0.89 = CAPACITY

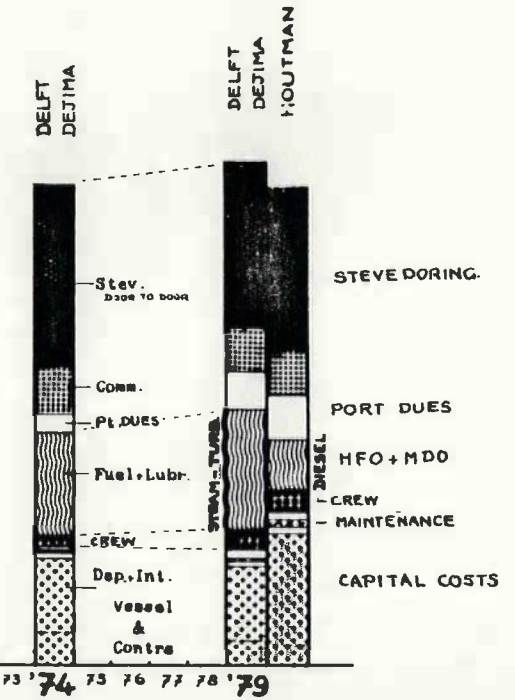


2 CELLULAR CONTAINER SHIPS
48 MILL CU.FT/YR



"N DEJIMA"
"N DELFT"

BALE-CARRIED = 2600 TEU x 0.73
= < 2 TIERS

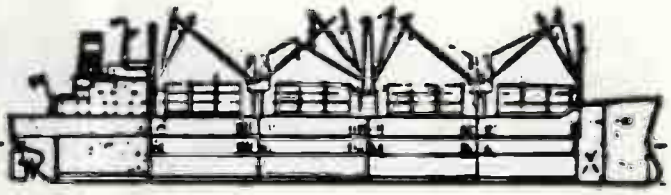


B.A. DEPT
1979

Selected typical liner vessel of Nedlloyd.

Conventional G/C liner

1978



Container-"friendly" General Cargo liner

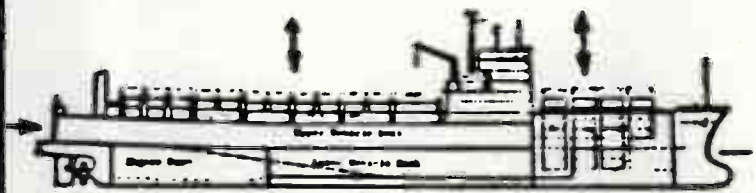
MPC

Cellular Containership for area trade

A BAKER'S CART

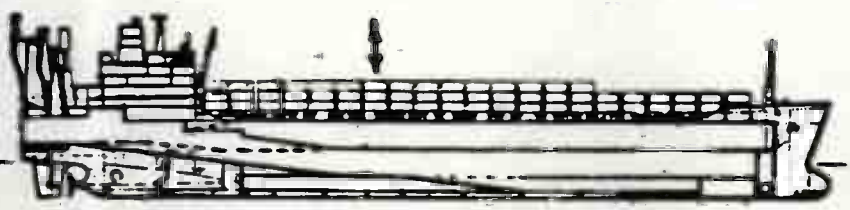
Cellular Containership for trunkline trade

CELL



HYBRID

Combined cellular container & Roro carrier "ANRO"



Roro & container carrier

CON-RO

A PENCIL-CASE

CONTAINER TERMINAL

MOVES/HR MOVES/CALL

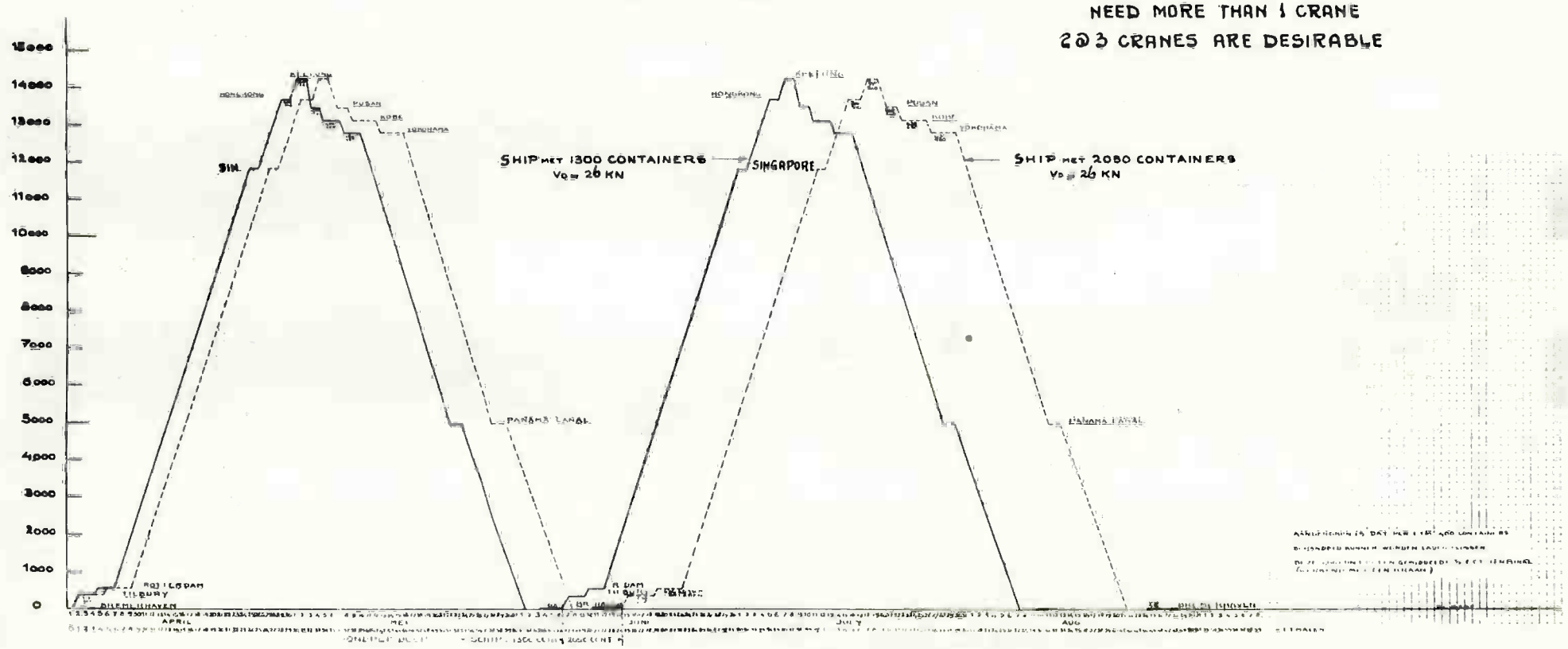
EXAMPLE OF A SCHEDULE OF A CONTAINER SERVICE

——— SHIP: 1300 CONTAINERS, V_o = 26 KN , ROUNDTRIP = 66 DAYS (2 SPARE) 1 CRANE

-------- SHIP: 2050 CONTAINERS, V_o = 26 KN " = 74 " " 1 CRANE ← ?

FIG WAS DRAWN IN 1970

IT IS CLEARLY SHOWN THAT LARGE SHIPS
NEED MORE THAN 1 CRANE
2 @ 3 CRANES ARE DESIRABLE

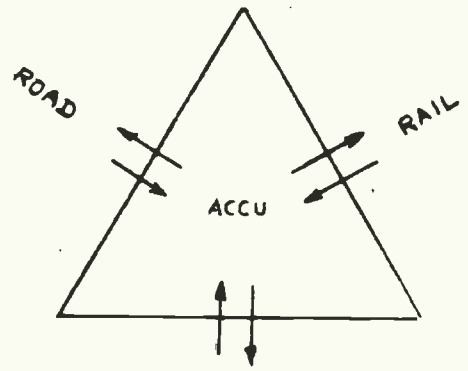


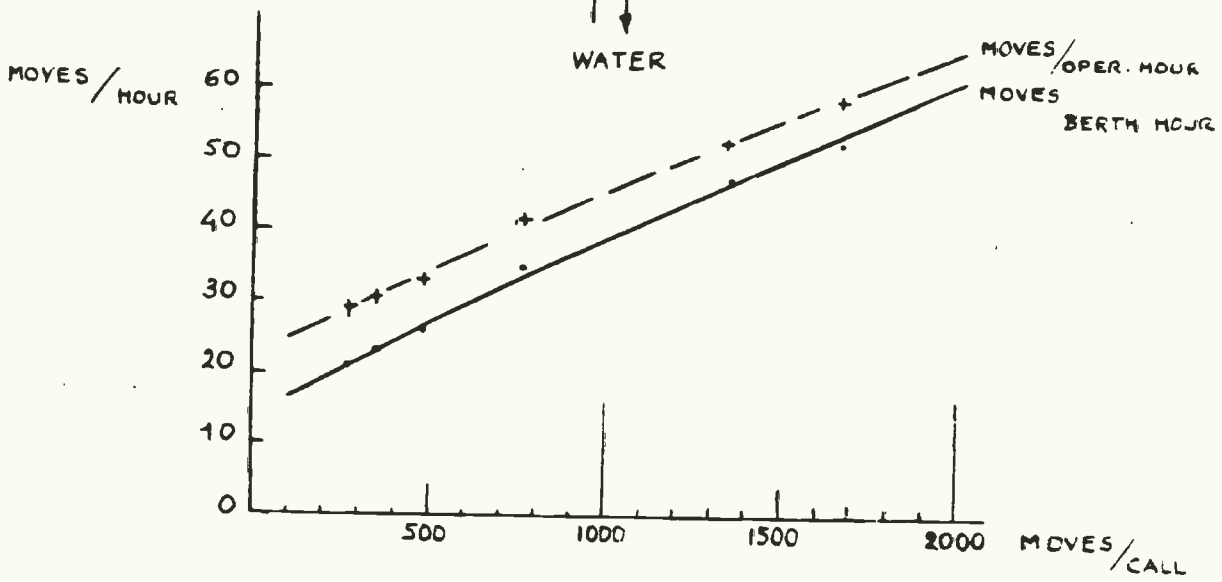
IN 1970 WE WERE OF THE OPINION THAT THE LARGER VESSEL WOULD NEED A LONGER PORTSTAY

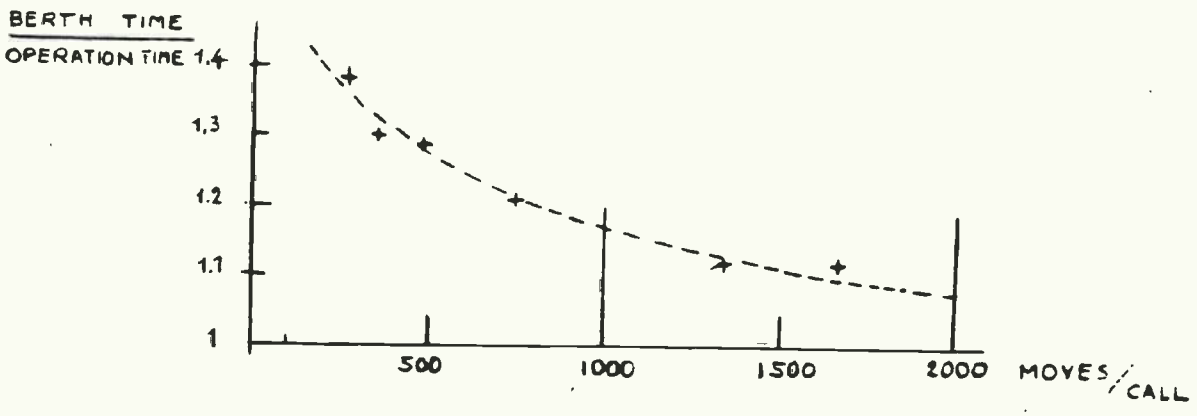
IN 1981 IT HAS BEEN PROVED THAT THE LARGER VESSEL NEARLY NEEDED ANY EXTRA HOURS AT A "WELL-ORGANIZED" TERMINAL

CONTAINER TERMINAL ECT

CONNECTING TRANSPORT CHAIN





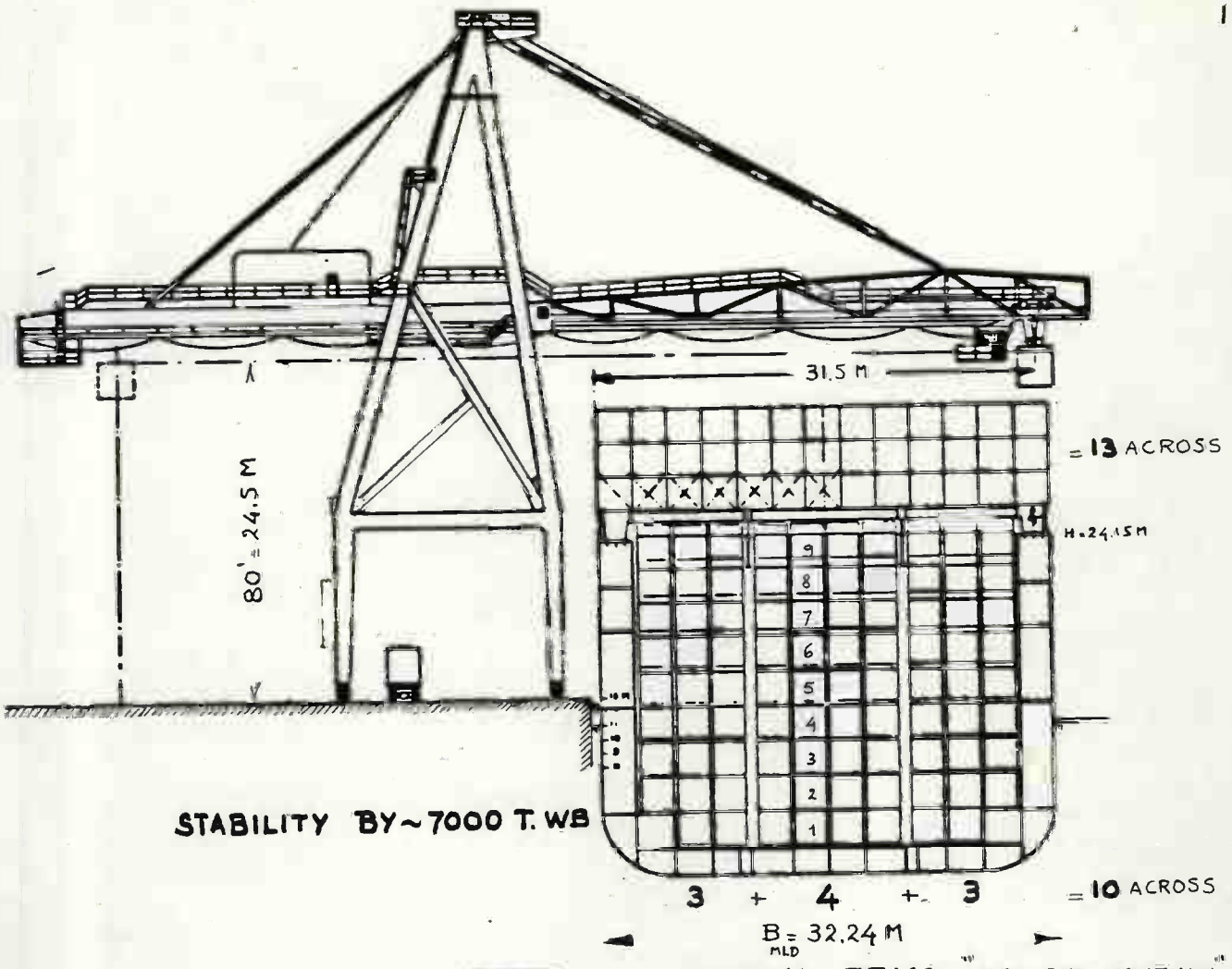


GOAL : PORT-STAY ≤ 24-32 HRS

$$\frac{\text{BERTH-TIME}}{\text{OPERATION-TIME}} > 1$$ HOW TO IMPROVE?

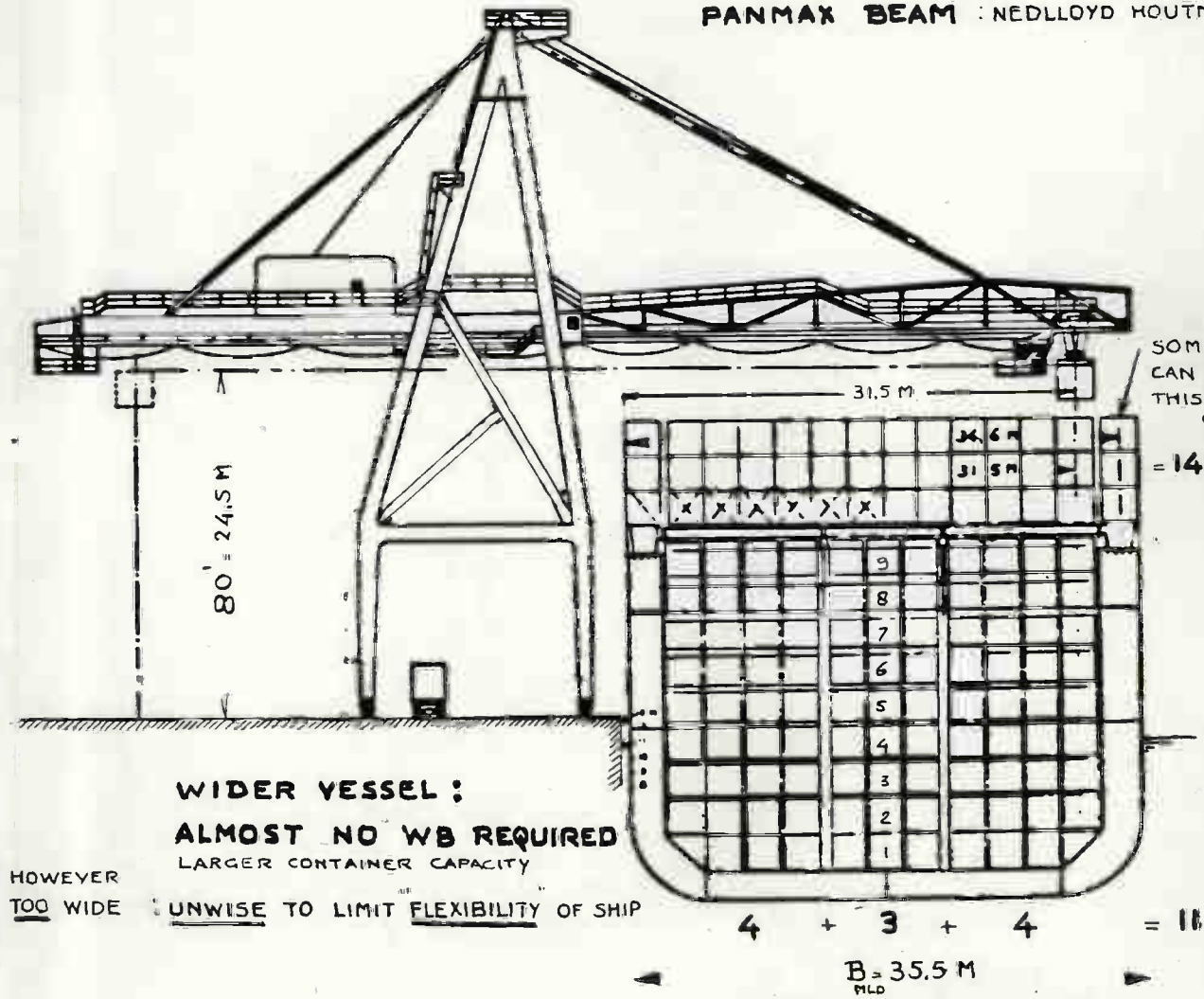
INFLUENCING ELEMENTS

- SAFETY MARGIN BY ORDERING IN ADVANCE : PILOTS TUGS
- SHIP TO BE IN NEXT PORT AT FIXED TIME
- TIDAL CONDITIONS
- NO CRANES AVAILABLE AT ARRIVAL (RUSH-HOURS)
- WAITING FOR CARGO "LAST MINUTE CONTAINER" (LATE ARRIVAL OF FEEDER)
- SHIFTING - HATCHCOVER HANDLING - LASHING
- "OFF-STANDARD" CARGO
  - HEAVY LIFT
  - REEFER
  - DANGEROUS
  - "COPPER IN BULK"
- REPAIR - MAINTENANCE TO SHIPS ENGINES + EQUIPM.
- BUNKERS PROVISIONS SPARES



STABILITY BY ~ 7000 T. WB

PANMAX BEAM : "NEDLLOYD HOUTMAN"



WIDER VESSEL :

ALMOST NO WB REQUIRED

LARGER CONTAINER CAPACITY

HOWEVER TOO WIDE : UNWISE TO LIMIT FLEXIBILITY OF SHIP

OVERSIZE PAN-CANAL

PORTS WITH RESTRICTIONS :

LENGTH -	DRAFT -	TERMINAL CRANES
LIMITED	LIMITED	LACKING

PORTS WITH RESTRICTIONS

PORTS WITH RESTRICTIVE FACILITIES

1985

(CONTAINERISATION - INTERNATIONAL)

	Restrictions to the ship: LOA	DRAFT	CRANE
SOUTH-AMERICA WESTCOAST			
BUENAVENTURA	210 M	30' → 35'	1x20T FLOATING
GUAYAQUIL	210	31' → 35'	1x 40T.
CALLAO	210	34'	NO CRANE
ANTOFAGASTA SWELL	210	30'	1x35T 1x20T
SAN. ANTONIO. SWELL	210	30'	2x60T
MIDDLE EAST			
AQUABA			2x 40T.
LIMMASOL			2x 40T
AQUABA			NO CRANE
BEIRUT			NO CRANE
LATTAKIA			NO CRANE
WEST AFRICA			
DAKAR	NO RESTR	33'	1x60T FLOATING
FREETOWN	NO RESTR	32'	25 T MOBILE
MONROVIA	200	30'	40 T MOBILE
ABIDJAN	200	37½'	2x IN FUTURE
TEMA	205	32½'	
LOMÉ	200	31'	
APAPA	200	34'	2 NOT ACTIVE
PORT HARCOURT	210	30'	FUTURE
DOUALA	200	28'	
LIBRE VILLE	190	30'	
P. NOIRE	200	34'	35 T MOBILE
MATADI	182	25'	
LUANDA			25 T MOBILE
LOBITO			
WALVISBAY	192	31'	
MID AMERICA			
CALDERA COSTA RICA		36'	?
P. CORTES-HONDURAS		33'	2x 45T GANTRY
KINGSTON-JAMAICA			4 x 40T GANTRY
PUERTO PRINCE			
CURACAO			1x 40T GANTRY
TRINIDAD			2x 40T GANTRY
PUERTO RICO			200T MOBILE
BARBADOS			NOT YET
SANTO DOMINGO			90T MOBILE

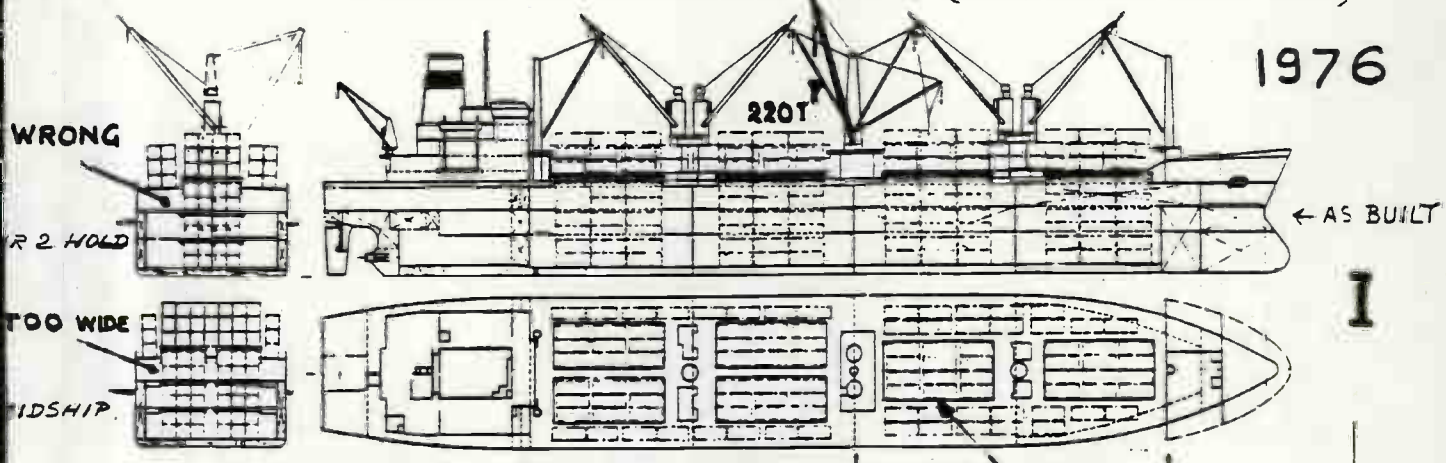
	Restrictions to the ship: LOA	DRAFT	CRANE	
SOUTH AMERICA EAST-COAST				
RECIFE	220 M	31'	1x25 T.	100T FLOATING
SALVADOR	NO RESTR	30'	1x65T MOBILE	100T FLOATING
RIO DE JANEIRO	NO RESTR	31'	2x40T	200T+250T FLOATING
SANTOS	272.	32'	1x 35 T 2x 30½ T	
PARANAGUA	NO RESTR	37'	1x30T GANTRY 1x100T MOBILE	100T FLOATING
SAO FRANCISCO	230	28'	NO CRANE	
RIO GRANDE DO SUL	NO RESTR	37'	2x35T GANTRY	
MONTEVIDEO.	NO RESTR.	28' F&W	2x40 T	80T+ 200T FLOATING
BUENOS AIRES	270	27' F&W	4x35 T GANTRY	
EAST AFRICA				
MOMBASA	190	36'	3x40T GANTRY	
ZANZIBAR			NO CRANE	
DAR ES SALAM	192	33'	NO CRANE	120 T FLOATING
NACALA	190	45'	1x20T	
BEIRA	180	32'		
MAPUTO	NO RESTR	40'	4x20T	
INDIA - CEYLON				
BOMBAY	BEAM 93'	29-30'	1x40T GANTRY	
COCHIN	168	30'	NO CRANE	
TRINCOMALEE	180	32'	NO CRANE	
COLOMBO	244	36'	1x30½T GANTRY	60T. FLOATING
MADRAS	229	42'	2x40T GANTRY	
VISAKAPHATMAN	168	33'	50 T MOBILE.	150 T FLOATING
KARACHI			NO CRANE	
INDONESIA				
SURABAJA	210	31'	NO CRANE	150 T. FLOATING.
DJAKARTA	NO RESTR	32'-33'	50 T MOBILE. 3x50T GANTRY	150 T FLOATING
NEW ZEALAND				
TAURANGA	225	30'-35'	40T CRANE.	

CHANGE-OVER - PERIOD FROM BREAKBULK + UNITLOADS → CONTAINERS

HOW TO ADAPT THE SHIPS ?

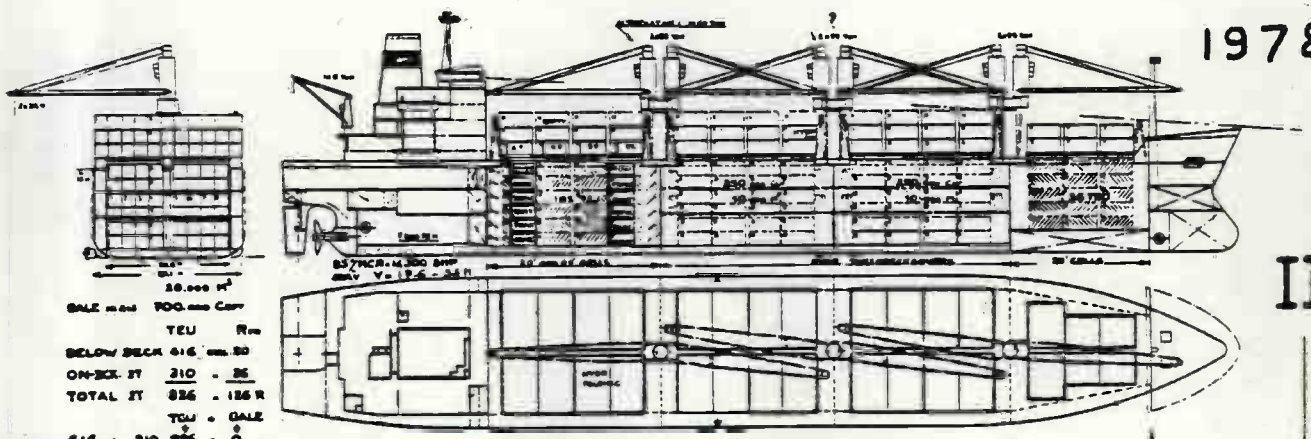
HOW TO ADAPT THE MPC?

MULTI-PURPOSE "NEDLLOYD-BA" 1976 (WITH DERRICKS & CRANES)



TWIN HATCH RIGHT	SINGLE HATCH WRONG: REDUCTION OF CONTR. CAP.

"BA" OPEN HATCH + CRANES ← RE-DESIGNED

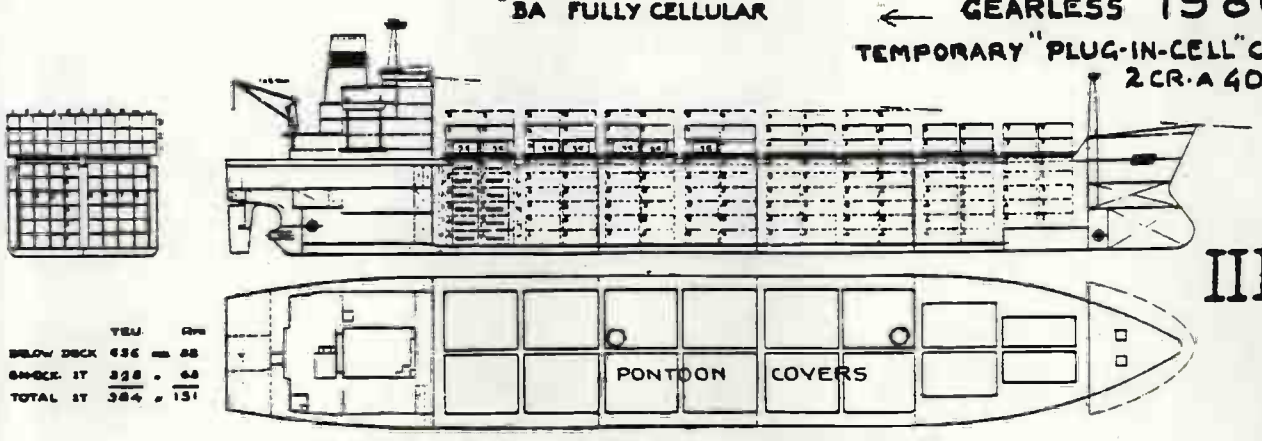


CELLS	2 TWEENDECKS	CELLS

~ 15 % MORE EXPENSIVE THAN

"BA" FULLY CELLULAR ← "GEARLESS" 1980

TEMPORARY "PLUG-IN-CELL" CRANES 2 CR-A 40 TON



	Utilization max. Breakbulk	max. Containers
(I) As built, 1979 (greatly CONVENTIONAL)	36,000 M3 + 318 TEU	676 TEU.
(II) Possible alternative (MORE BOX cap.)	20,000 M3 + 492 TEU	926 TEU.
(III) As FULL BOX carrier (but GEARLESS)		984 TEU, and HEAVIER BOXES.

1979 FAR EAST ⇄ W. AFRICA PROPOSAL:

4 MONTH'S ROUNTRIP

(STR. M/S AGULHAS)

	MILES	PORT DAYS
YOKOHAMA	208	1
NAGOYA	234	1
KOBE	925	1
KEELUNG	471	1
HONGKONG	1459	1
SINGAPORE	5610	1
CAPE	1830	
MATADI	774	1
DOUALA	211	2
P HARCOURT	321	4
APAPA	146	6
LONE	203	3
TEMA	157	7
ABIDJAN	470	3
MONROVIA	258	6
FREETOWN	461	2
BANJUL	104	2
DAKAR	2300	3
FETOWN P.N RANGE	1136	2
WALVISBAY	6322	2
SINGAPORE	1459	1
HONGKONG	471	1
KEELUNG	925	1
YOKOHAMA	26455	52
	988	

22 PORTS 52 DAYS IN PORT

$\frac{26455'}{24 \times 16\frac{1}{4}} = \frac{26455'}{390'/DAY} = 68$ DAYS AT SEA

120 DAYS

ROUNDTRIP

4 SHIPS SERVICE MONTHLY

3 MONTH'S ROUNDTRIP

BY 3 MULTIPURPOSE CONTAINER-V

	MILES	PORT DAYS
YOKOHAMA	208	1
NAGOYA	234	1
KOBE	862	1
BUSAN	719	1
KEELUNG	471	1
HONGKONG	1.459	1
SINGAPORE	5.610	1
CAPE	2575	
APAPA/LAGOS	477	8
ABIDJAN	258	5
TEMA	2600	5
CAPE	5610	
SINGAPORE	1459	1
HONGKONG	471	1
KEELUNG	925	1
YOKOHAMA	23,438	30

15 PORTS 30 DAYS IN PORT

$\frac{23438'}{24 \times 16\frac{1}{2}} = \frac{23438'}{396'/DAY} =$ 60 DAYS AT SEA

30 DAYS

ROUNDTRIP

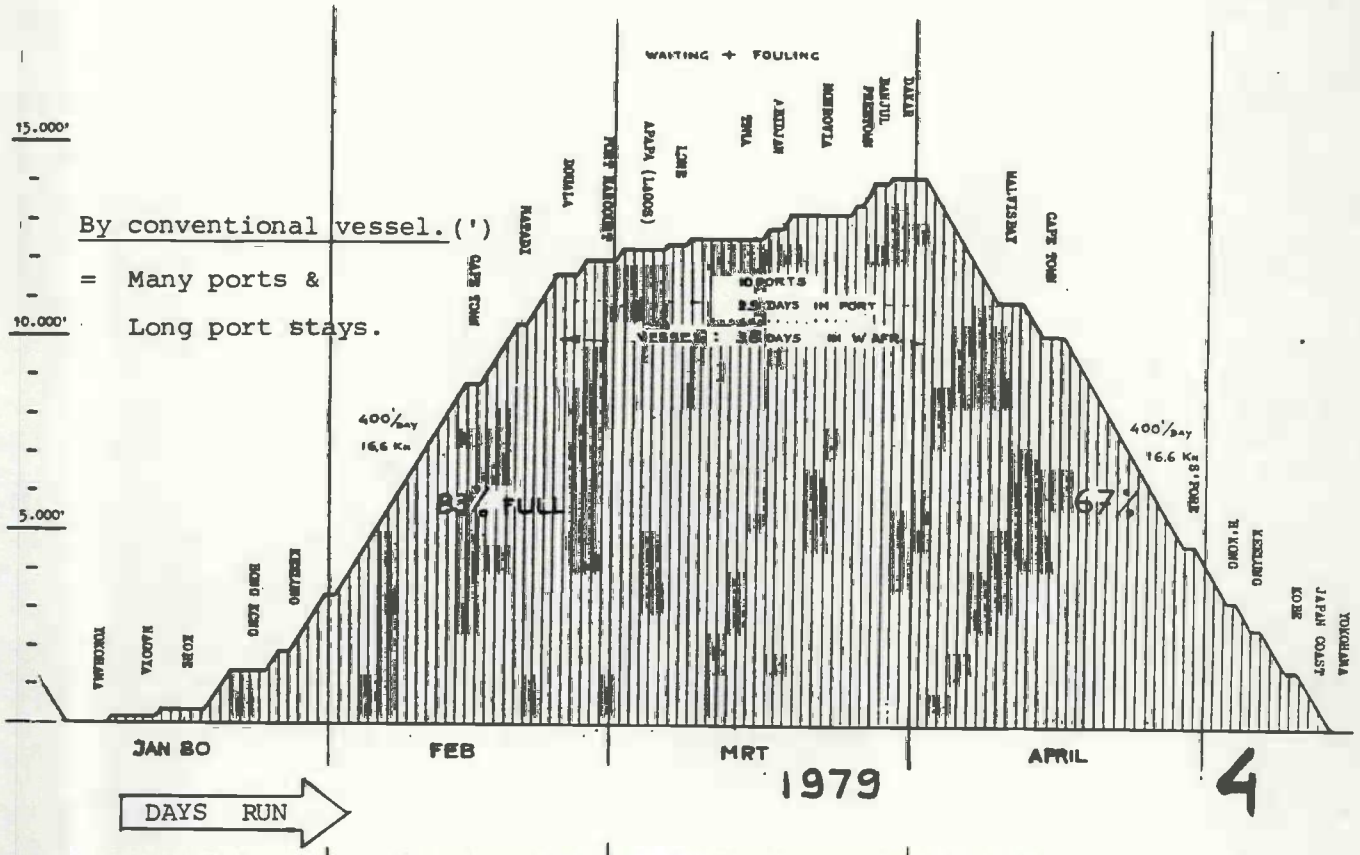
3 SHIPS SERVICE MONTHLY

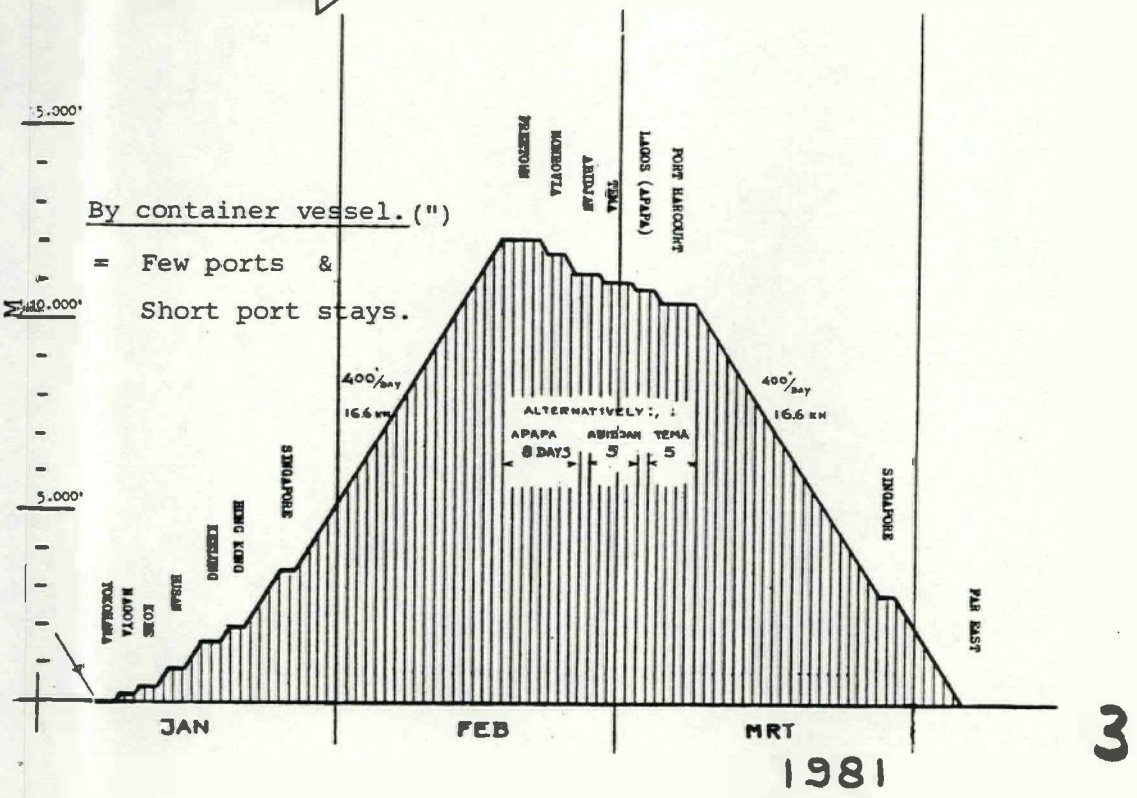
(a) Voyage duration is too long.
This is caused by the low cargo handling output in West African ports resulting in too long portstays.

(b) Too many ports are called at where freight of tonnage landed and/or taken in is insufficient to cover the calling costs - direct and/or indirect.

REDUCTION OF ROUNDTRIP TIME ----- EXAMPLE .

(As an example the Far East - West Africa &vv run is taken)





(Top figure) Monthly calls by CONVENTIONAL liners ... 4 ships x 120 days each.

(Bottom fig.) Monthly calls by CONTAINER liners ..... 3 ships x 90 days each.

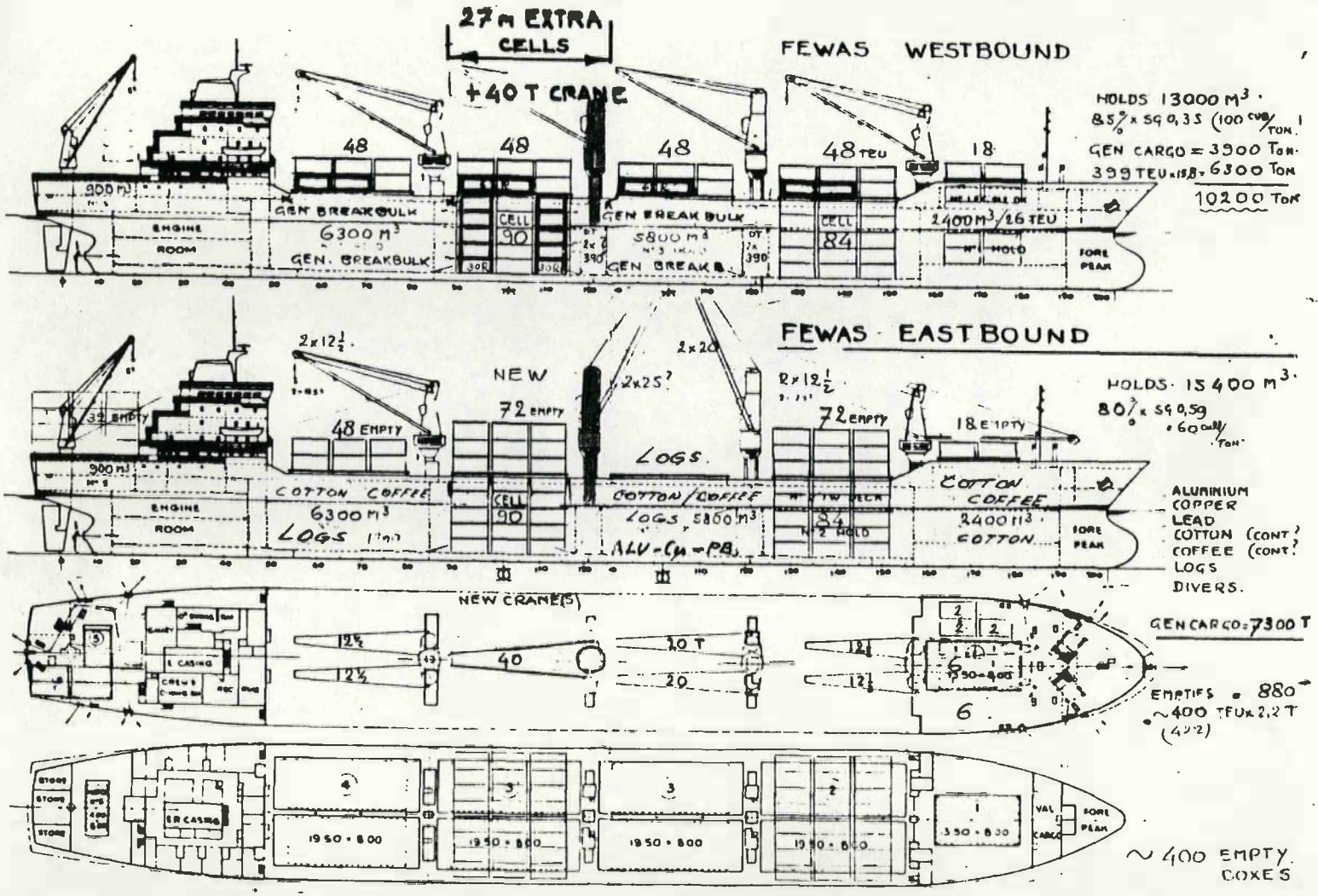
(') m.s. Nedlloyd Agulhas. (") Project.

HISTORY OF ADAPTION OF MARINDUS-VESSELS TO FAR EAST ⇄ W.AFRICA TRADE

(STANDARD TYP 75' ST LAURENCE BEAM)

CONTAINERS →

← EMPTIES + BREAKBULK



AS REQUIRED

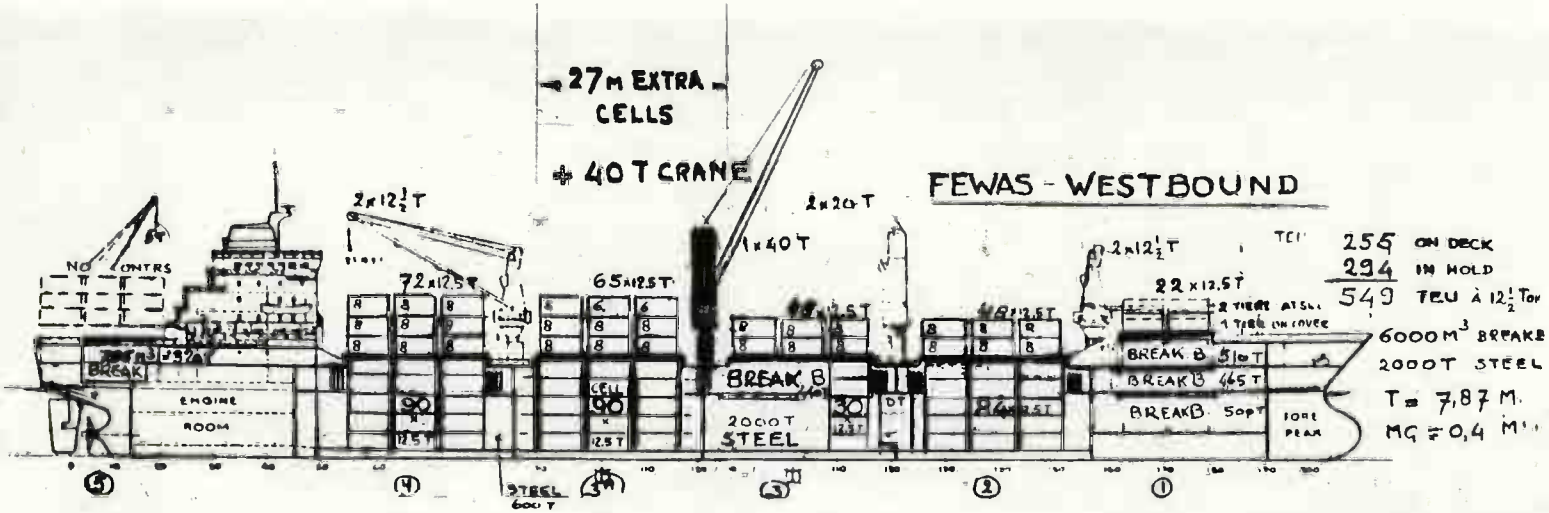
DEC 1979:

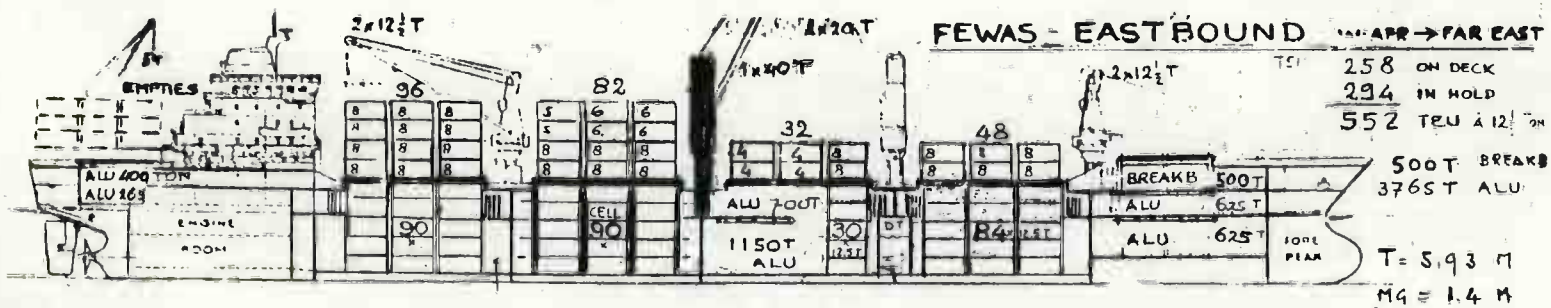
FAR EAST → W-AFRICA

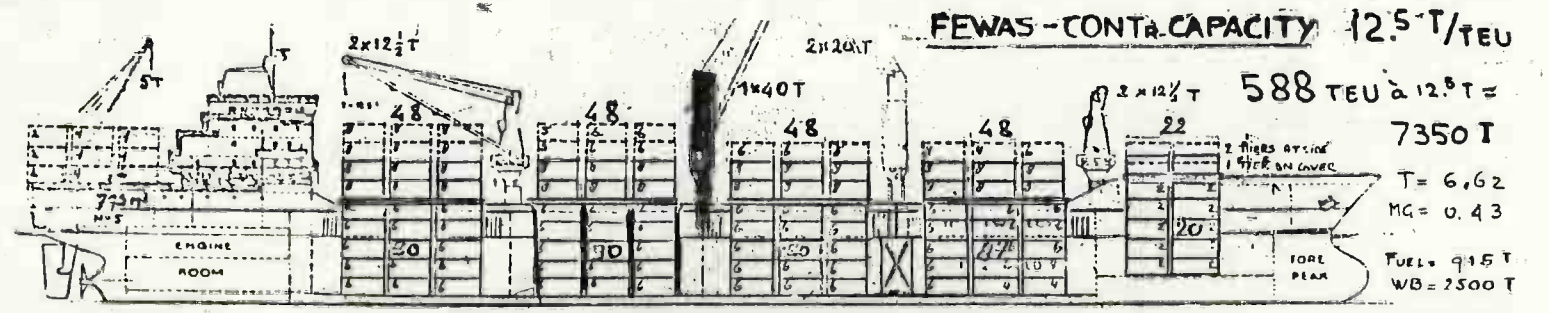
400 TEU + BREAKBULK

W.AFRICA → FAR EAST

400 EMPTIES + BREAKBULK







AS REQUIRED
AUG 1980:

FAR EAST → W. AFRICA

550 TEU + STEEL + BR.BULK

W. AFRICA → FAR EAST

550 EMPTIES + ALUMINIUM INGOT.

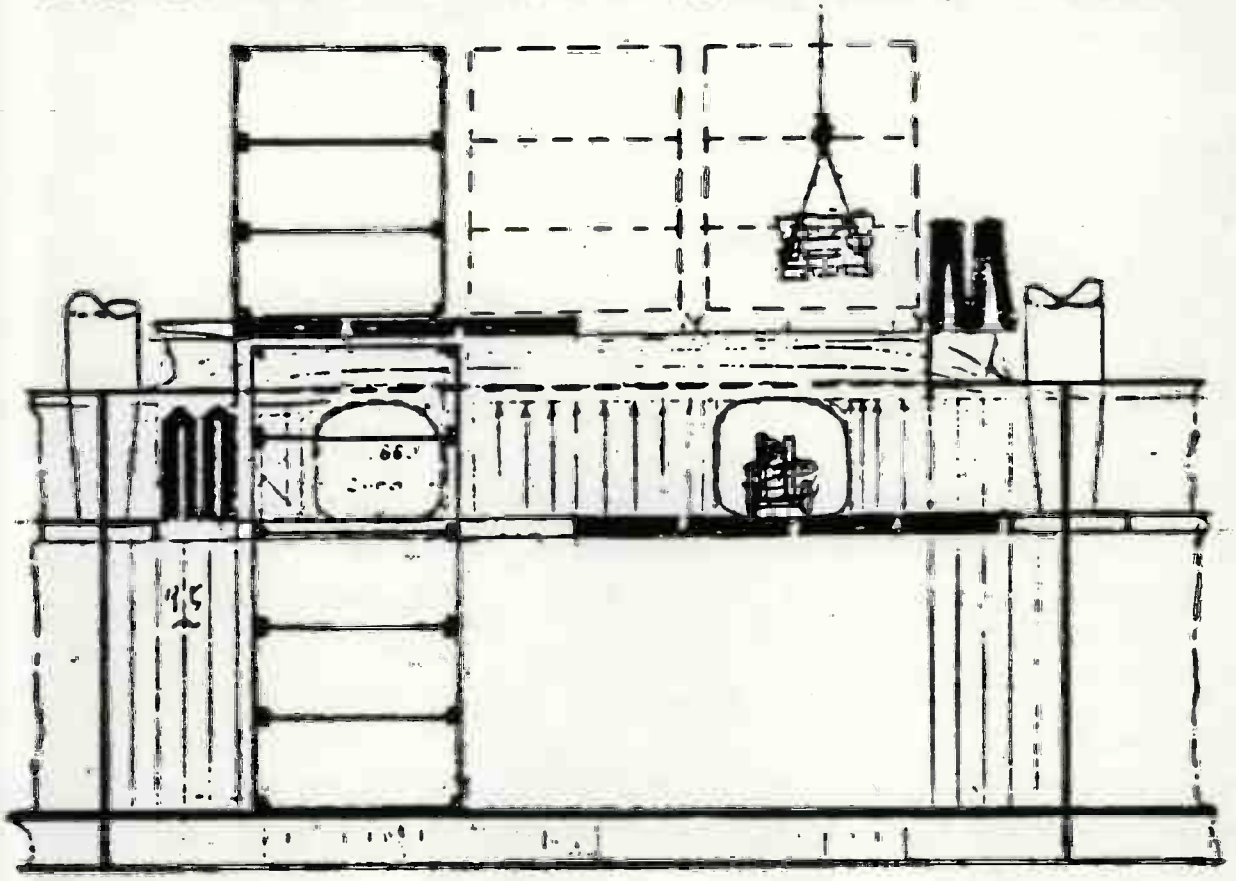
AS REQUIRED
NOV 1980:

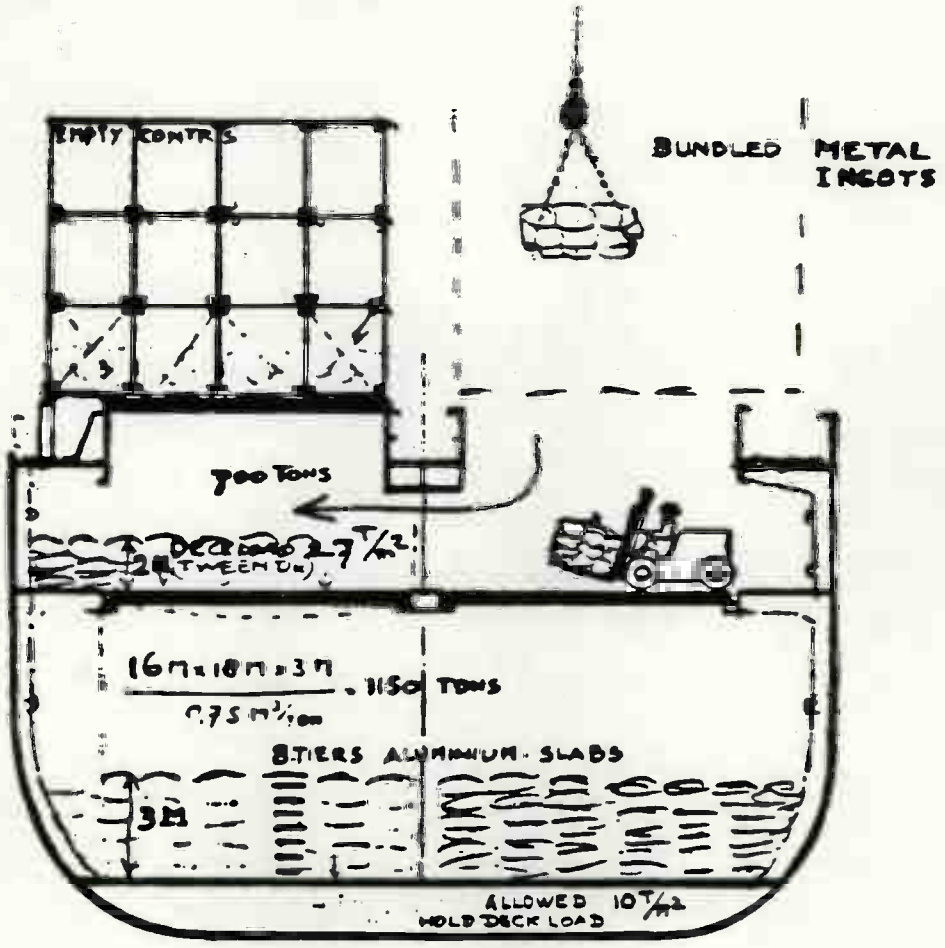
588 TEU - 12½ Ton OR EVEN MORE !

CONTAINERS ONLY

END OF THE STORY

MULTI PURPOSE_CLUMSY ING





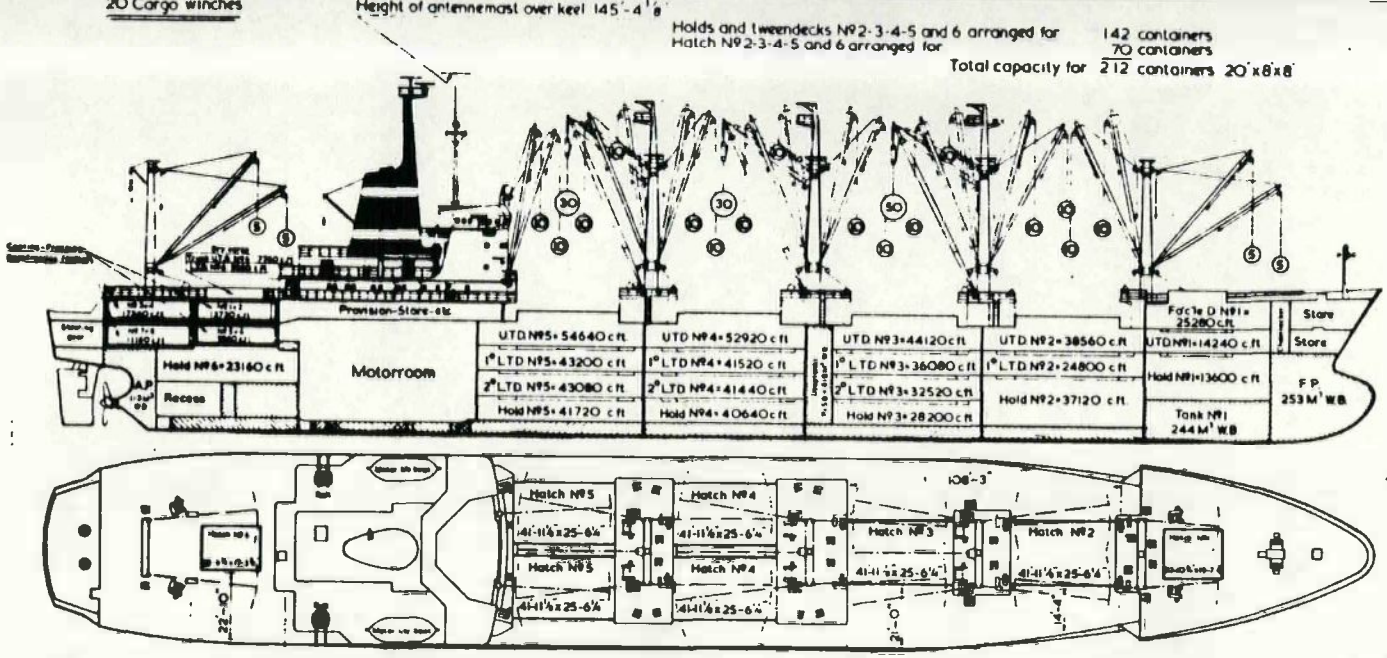
HOLD 4

TD 700
LH 1150
+
= 1850 TON
ALUMINIUM SLABS

LOADING BREAKBULK AT WESTCOAST-OF AFRICA

EMPTY CONTAINERS ARE TO REMAIN ON COVERS

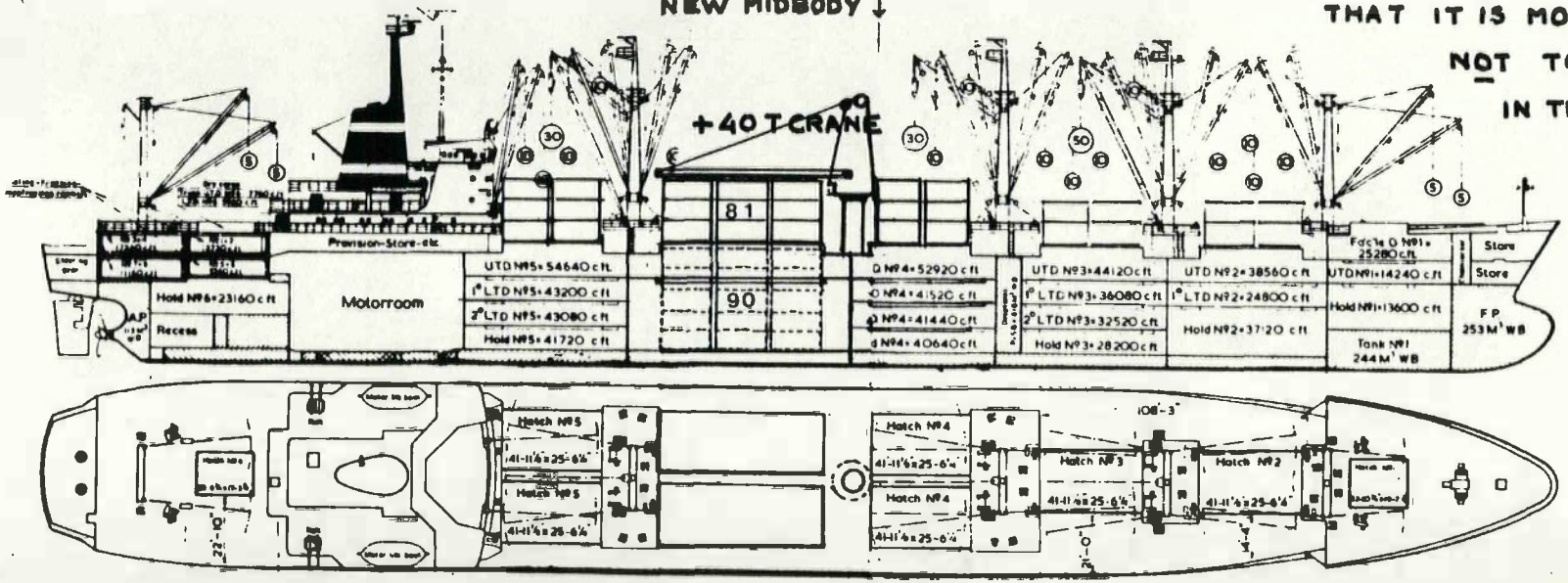
~1982



ms ALKMAAR/AMERSFOORT

NEW MIDBODY

WE LEARNED FROM EXPERIENCE,
THAT IT IS MORE SUITABLE
NOT TO PROVIDE CELLS
IN THE NEW MIDBODY



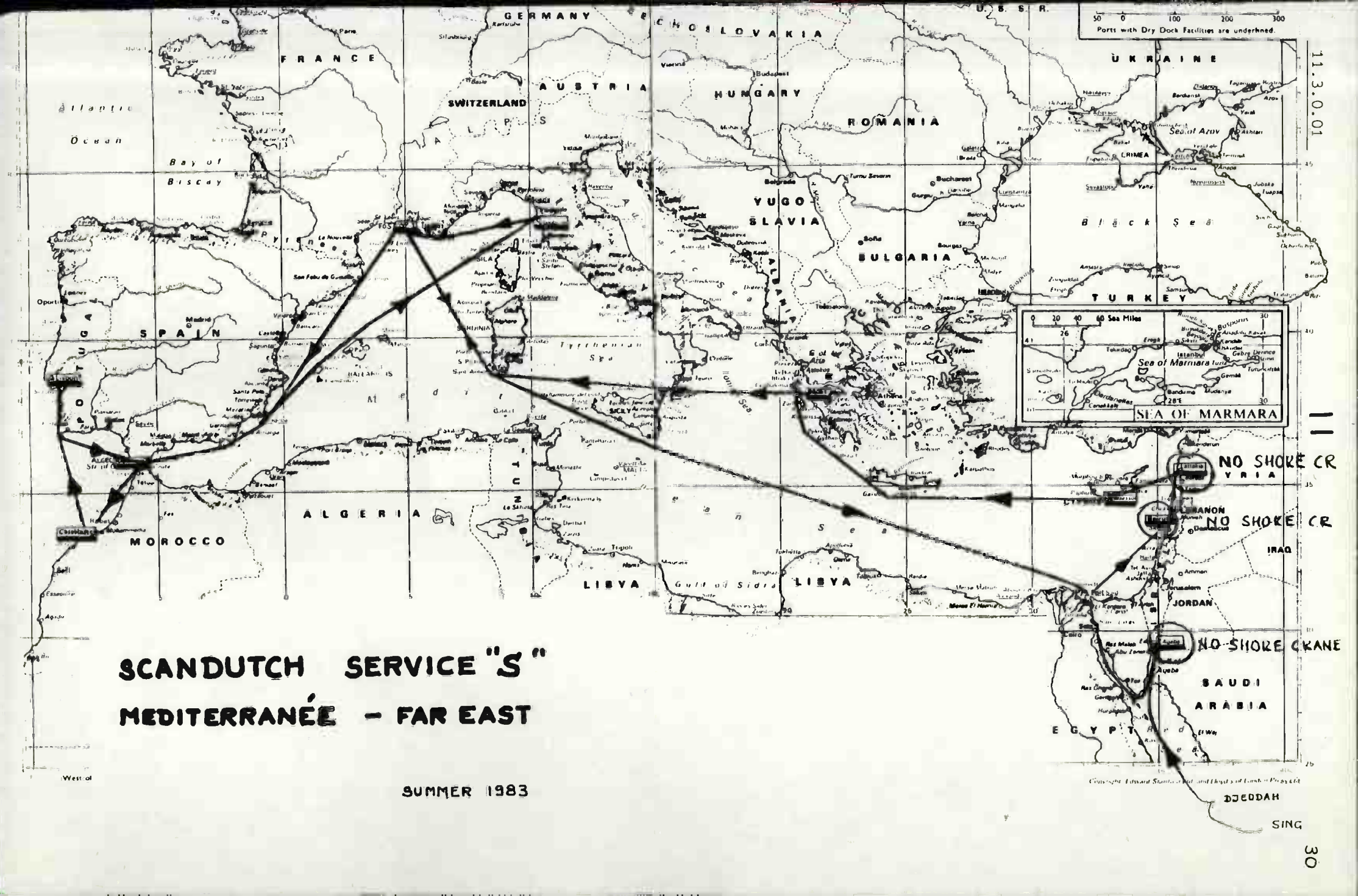
+ 26,4 m

=171 teu extra

COMPARISON IN CONTAINER SERVICE

SMALL-CONTAINERSHIP GEARED

OPEN-BULKCARRIER GEARED

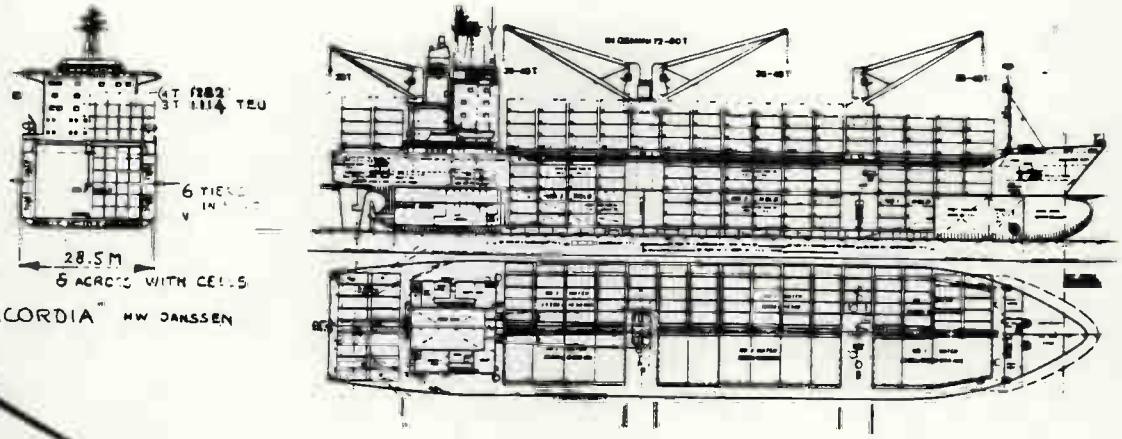

Ports with Dry Dock Facilities are underlined.
11.3.0.01
SEA OF MARMARA
NO SMOKE CR
NO SMOKE CR
NO SMOKE CRANE
SCANDUTCH SERVICE "S"
MEDITERRANÉE - FAR EAST
SUMMER 1983
DJEDDAH
SING
30

COMPARISON BETWEEN : SMALLER-SIZE CONTR. "CONCORDIA"

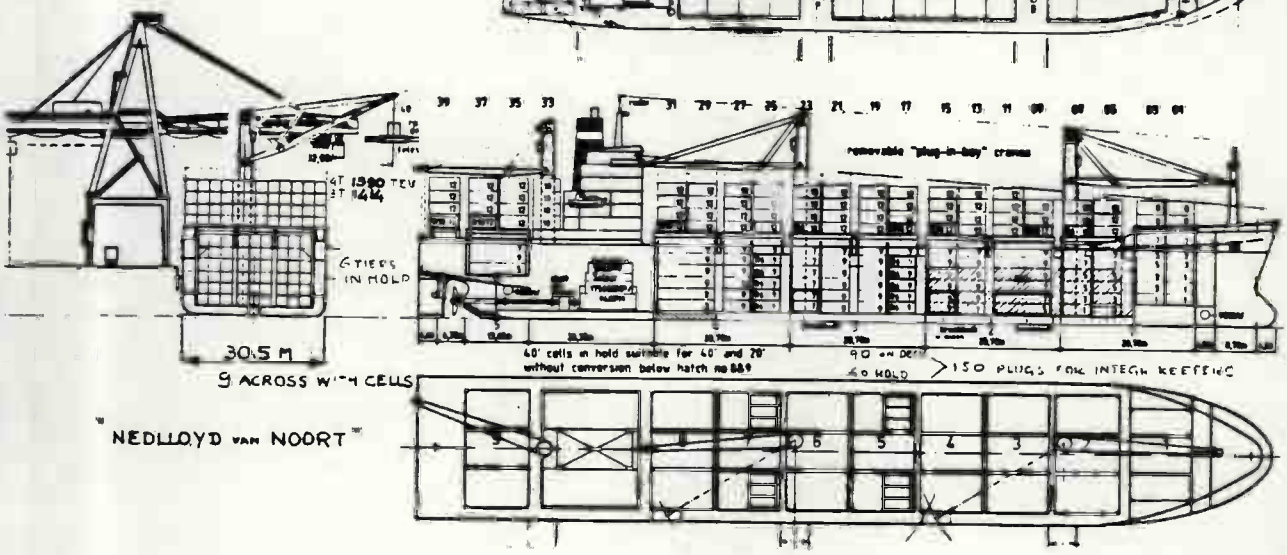
LARGER-WIDER : "NEDL. V. NOORT"

OPEN-BULK CARRIER : "WOENSDRECHT"

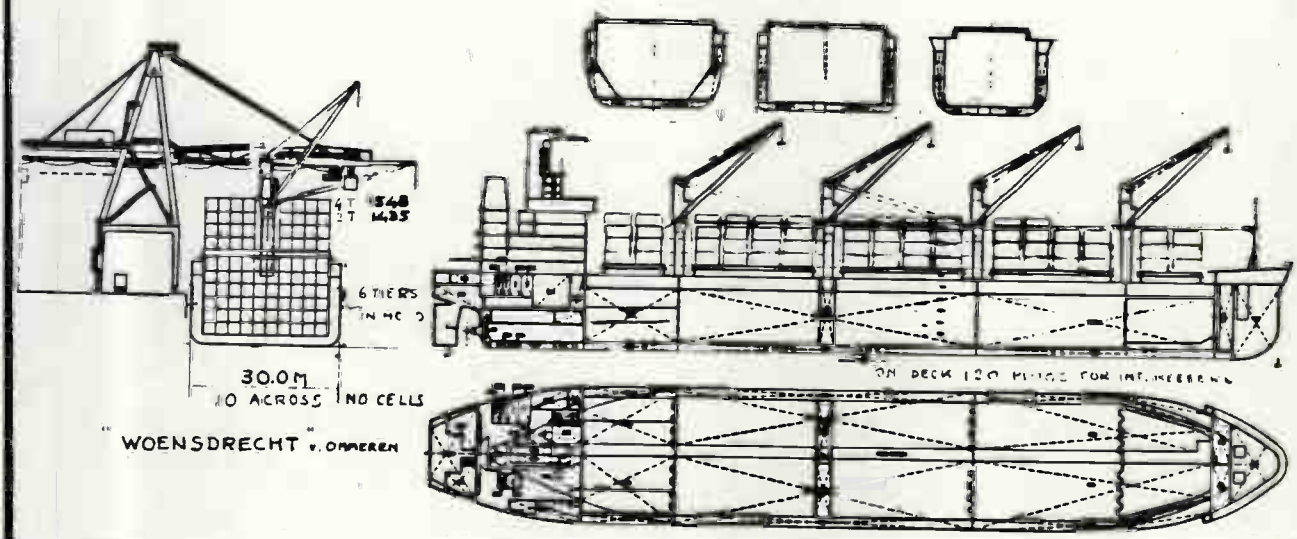
SCANDUTCH MEDIT-FAR EAST SERVICE 3 MONTHS ROUNDTRIP 1983



"CONCORDIA" HW DANSSEN



"NEDLLOYD VAN NOORT"



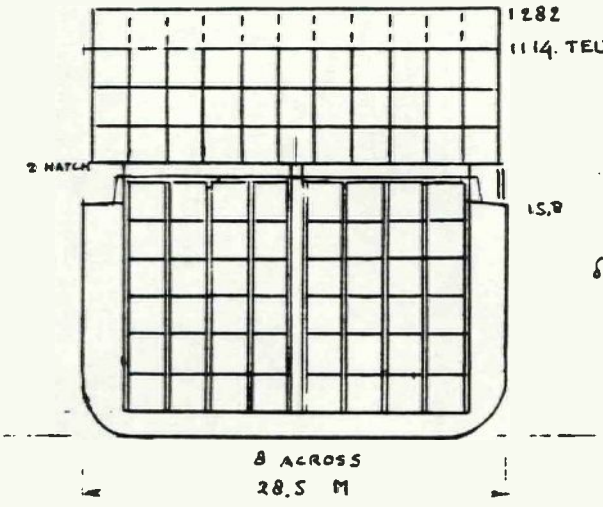
"WOENSDRECHT" v. OMMEREN

3 TYPES OF VESSELS IN COMPETITION

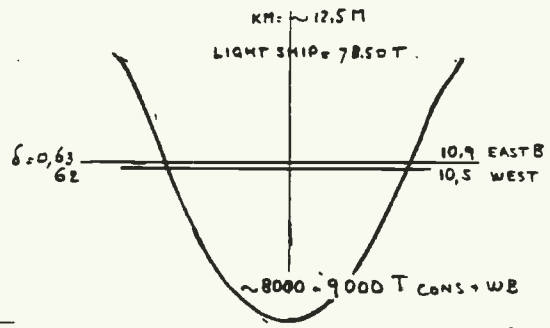
13-9-82

COMPARISON ON SHIPS' MAIN PARTICULARS

NAME	CONCORDIA CORONA	NEDLLOYD v NOORT " v DIEMEN	WOENSDRECHT
OWNER	JANSSEN GERMANY	NEDLLOYD	v OMMEREN
YARD	THYSSEN NORSEE EMDEN	VD GIESSEN KR. 1/D YSSEL	GÖTAWERKEN LANDSKR.
DELIVERY	DEC 82	APRIL 84 JULY 84	82
CLASS	G.L. 100A 4 E + MC AUT CONTAINERVESSEL	BV + I-3/3 E HAUTE MER CONTAINERVESSEL AUT	BV + I-3/3 E BULK ORE DEEP SEA-GLACE I- AUT-MS
BRT / NRT	17750 - 10834	ESTIM. 22700 - 13500	26171 - 16914
L_{OA}	166.04	182.50	186.54
L_{PP}	152,60	174.00	180.00
B	28.50	30,50	30.00
H	15,80	16,20	16,80
T SCANTL	11.61	11,00	11.86
DW	MAX 25,412 T	28407 T	41.800 T
LIGHT SHIP	7850 T	11000 T	11 200 T
DISPL.	33262 T	38407 T	53.000 T
BLOCKCOEFF.	.642	.642	.806
3 TIERS	1125 TEU	1414 TEU	1435 TEU
4 TIERS	1282	1590	1548
REEFER P.	DECK 101	DECK 90 HOLD 60	DECK 150
		SPACE FOR BREAKBULK IN HOLDS	
M.E.	B+W 5 L80 GFCA 15400 BHP / 106 RPM	SULZER 5RLB 90 17500 BHP / 94 DERATED 19000 " / 94 MAXIMUM	B+W 4 L90 GFCA 13850 BHP / 96 RPM
SHAFTGEN	790 KW	SIEM 1300 KW MAX	—
AUXIL.	WARTS 821 KW / 720 RPM	SWD 1500 KW / 720 RPM	WARTS 724 KW / 720 RPM.
	" 821	1500	724
	" 821	700	724
	DEUTZ 96 KW / 1800 "	160 KW / 1800 "	SCANIA 162 KW / 1800
$\frac{D^{2/3} \cdot V^3}{TON/DAY}$	120 - 125	120 - 125	AS BULKCARRIER 119 11,8M. AS CONTR 100 9,2M. " 80 7,5M.

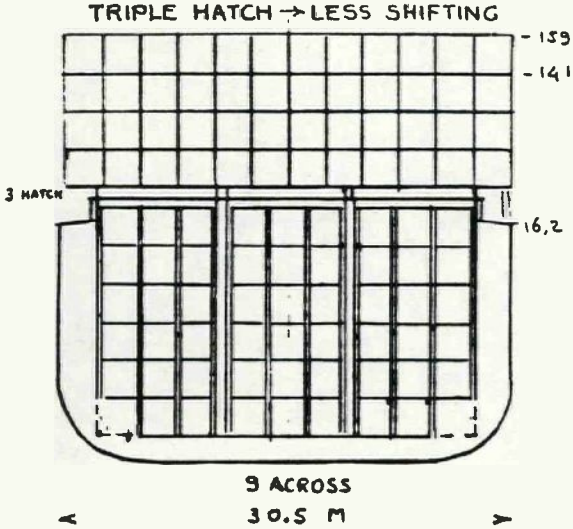


"CONCORDIA" 17 KN - 37½ T/D
INCL SGEN

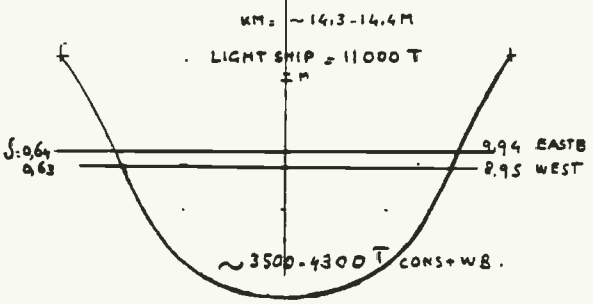


TEU CAPACITY IS LIMITED BY STABILITY

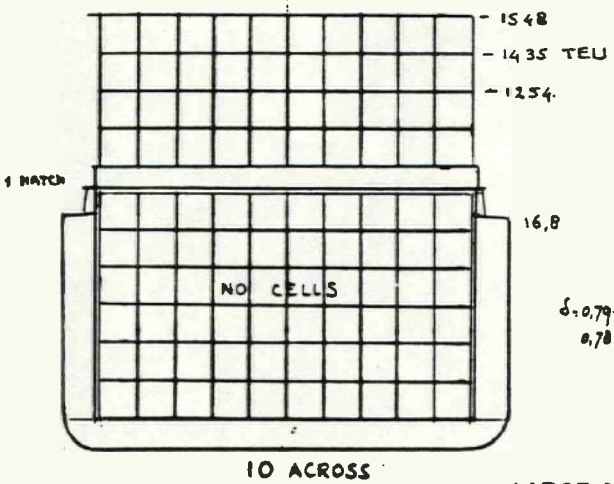
TRIPLE HATCH → LESS SHIFTING



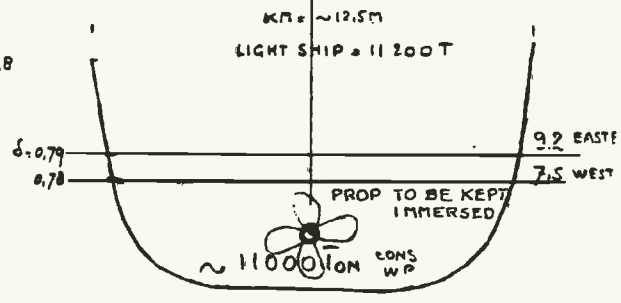
" " " NEDLLOYD V. NOORT " 16.3 KN - 34 T/D
- SGEN 2,5 / 31.5



LARGER BREADTH : LARGER CAPACITY
LESS W.B.



" " " WOENSDRECHT " 15 KN - 43½ T/D



LARGE AMOUNT OF WB; RATHER HIGH FUEL CONSUMP.

Comparing Ship Designs.

ncordia :
- Well designed containervessel, used to her maximum. Good hull form, rather fine : blockcoefficient 062-063. Low fuel consumption : 17,15 kn - 39 T/day incl. shaft-generator.
- However, beam is too small for larger carrying capacity.
- Sailing with heavy containers (14,2 ton p.teu) Eastbound, homogeneously loaded. The vessel needs a large amount of waterballast to give her sufficient stability (KM = abt 12,5 m) 1125 Teu x 14,2 Ton is about her maximum Eastbound 1228 Teu x 9,5 Ton is about het maximum Westbound.
- The cellguides are rather weak because of the removability and sometimes deformation and "cell-jamming" did occur.
- The Concordia and Corona got a forecastle which has improved seaworthiness in comparison to Balandra, Barbarossa (Nedlloyd Van Diemen) which ships did not have the fo'cstle.

ënsdrecht:
- This ship is designed as bulkcarrier and therefore her blockcoëfficient is rather large : 0,78 - 0,80. Because of her fat underwaterbody she is floating as a bubble on the water if loaded with a small cargoweight.
- To improve seaworthiness and avoid propeller racing and slamming in a rough sea, she needs large amounts of waterballast to get the hull sufficiently deep in the water.. (Westbound condition)
- Moreover she also needs waterballast for improving stability because of the fact that the metacenter of the fullbody vessel is rather low, KM = 12,5 m. (Eastbound condition).
- Analysing the service results the conclusion is that for the relatively small container weight and large amount of waterballast Woensdrecht has a rather high fuel consumption, 15,65 kn - 44 T/day, excl. auxiliaries WHICH RUN ON D.O.
- Eastbound : light ship = 11200 T
  cons + WB = 10807 T
  cargo = 18293 T = 1163 Teu x 15,7 Ton
  Draft = 9,2 m - displ. = 40300 T

  Westbound : light ship = 11200 T
  cons + WB = 11311 T
  cargo = 9889 T = 971 Teu x 9,9 T +240T BREAKB.
  Draft = 7,5 m - displ. = 32400 T

  Conclusion : The vessel is too blunt for the container service.

Van Noort : - This vessel is designed with a wide beam (30,5 m) and a rather fine hull: BLOCKCOEFF. = 0.62-0.64

- The metacenter above keel KM = 14,3 - 14,4 m is rather high and allows for relatively large deckloads.

- Her most economical draft lies between 8,5 and 10 meter. Above 10 meter (> 20.000 ton cargo) she needs extra waterballast and will require an increased amount of fuel oil (V shaped hull).

- For a larger amount of heavy containers, homogeneously loaded, a larger vessel is more suitable. ("Nedlloyd-Clarence" type): B. 32.24 M

NEDLLOYD V. NOORT ROUNDTRIP

16.5 KN 34,0 (M.E) + 2.9 (SHAFTG.) = 36.9 T/DAY

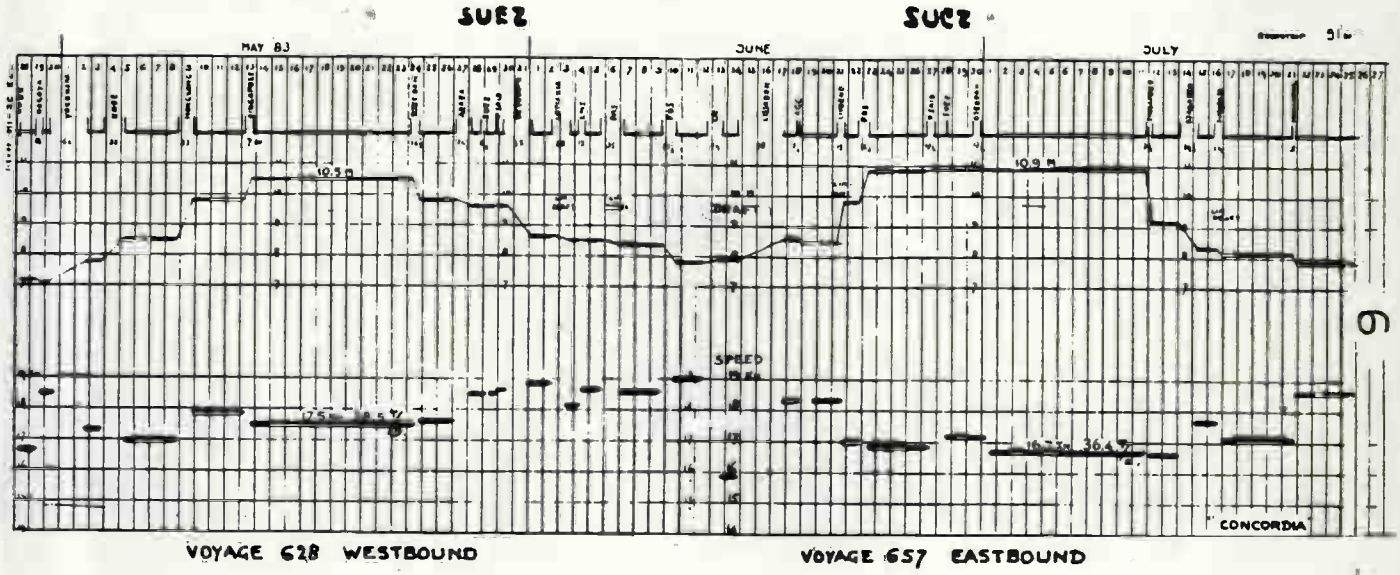
Optimal loading conditions:

Eastbound	Light ship	= 11000 T	
	Cons + WB	= 3438	
	Cargo	= 20249	= 1426 Teu x 14,2 T/Teu
Draft = 9,94m –	Displ.	34687 T	GM = 0,46 m.

Westbound	Light Ship	= 11000 T	
	Cons + WB	= 4278	
	Cargo	= 15105	= 1590 Teu x 9,5 T/Teu
Draft = 8,95m –	Displ.	30383 T	GM = 0,58 m.

20-9-83

FAR EAST MEDITERRANÉE FAR EAST



VOYAGE 628 WESTBOUND VOYAGE 657 EASTBOUND

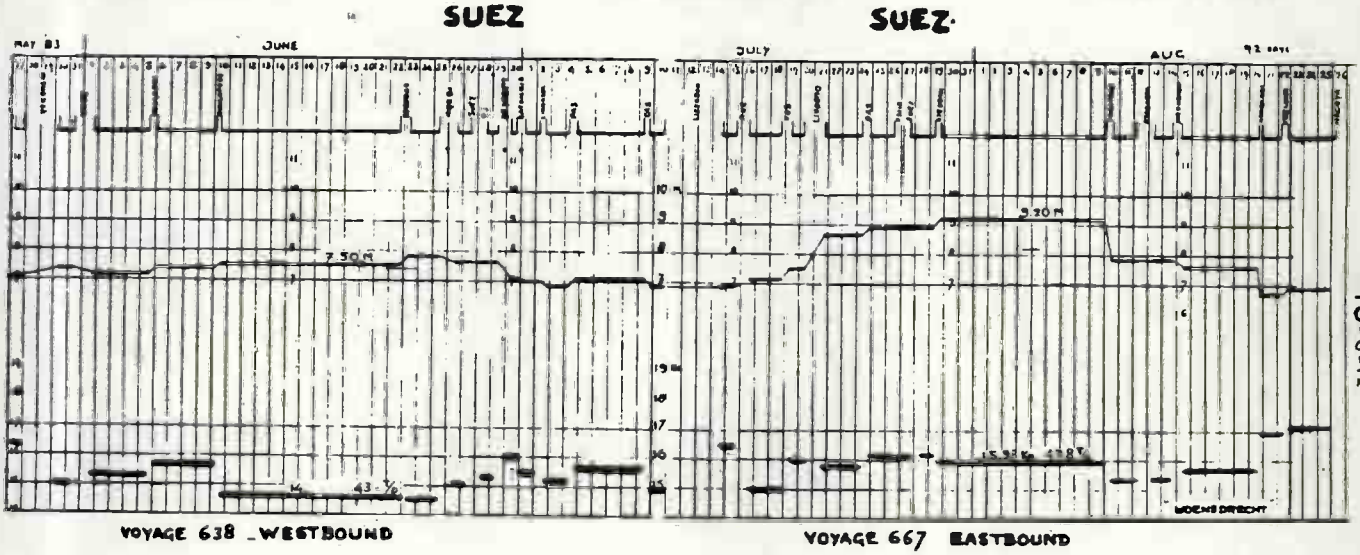
6.3.03

"CONCORDIA"

CONTAINER VESSEL

GEARED

FAR EAST MEDITERRANÉE FAR EAST



VOYAGE 638 _WESTBOUND VOYAGE 667 EASTBOUND

10-8-12

LESS DRAFT/ LESS SPEED/HIGHER FUEL CONSUMPTION

"WOENSDRECHT"

"OPEN" BULKCARRIER

GEARED

PORT STAY

"CONCORDIA" MAY JUNE JULY '83

	KOBE ?			
	NAGOYA	8 HR		
	YOKOHAMA	64		
	KOBE	32		
	HONGKONG	23		
	SINGAPORE	7		
	DJEDDAH	14½	MOVES	
NO GANTRY	AQABA	24½	2x 150 BOX	
	SUEZ	8½		
NO —	BEYROUTH	45	2x 150 BOX	
NO —	LATTAKIA	28	2x 200 BOX	
	LIMASOL	12		
	PAS. PIRAEUS	35		
	FOS. MARS.	21½		
	CASABLANCA	24		
	LISSABON	78		
	ALGECIRAS	5½		
	LIVORNO (LEGHORN)	15		
	FOS.	16½		
	P. SAID	17½		
	DJEDDAH	17½		
	SINGAPORE	7½		
	DJAKARTA	29½		
NO —	SURABAJA	14	2x100	
	HONGKONG	5		
	NAGOYA	25		

IN PORT ——— $\frac{552 \text{ HR}}{24}$ = 23 DAYS / 24 PORTS ~ 1 DAY / PER PORT

AT SEA WB. 665 HRS — 11.378 / 12.069 / 23.447 ≙ 17,15 KN
EB 701½
AT SEA ——— 1366½ = 1366½ = 57 DAYS AT SEA

ANCHOR ← 94
MAN. MAN. ← 117 ⟩ = 211 = 9 DAYS MAN.
1577½

LOST HOURS ? ≙ 56½ = 2 ?
ROUNDTRIP 91 x 24 = 2186 = 91 DAYS

PORTSTAY

"WOENSDRECHT" JUNE JULY AUG '83

	YOKOHAMA	56 HR
	KOBE	35
	HONGKONG	11
	SINGAPORE	6
	DJEDDAH	15
—	AQABA	28½
—	BEYROUTH	23½
—	LATTAKIA	13
	LIMASOL	10
	PAS	15
	CASABLANCA	9
	LISSABON	101
	ALGECIRAS	18
	FOS.	18½
	LIVORNO	41½
	PAS. PIRAEUS	14½
	DJEDDAH	6
	SINGAPORE	12
	DJAKARTA	32
—	SURABAJA	12
	HONGKONG	7½
	KEELUNG	18½
	NAGOYA	32½

$\frac{300}{24 \text{ à } 28 \text{ HR}}$ = 12 à 10 MOVES/HR.

$\frac{300}{45 - 73\frac{1}{2} \text{ HR}}$ = 7 - 13 MOVES/HR

$\frac{400}{28 - 13 \text{ HR}}$ = 14 - 31 MOVES/HR

$\frac{200}{14}$ = 14 - 15 MOVES/HR

IN PORT ——— $\frac{539}{24}$ = 22½ DAYS / 23 PORTS ~ 1 DAY PER PORT ! NO CELLS

AT SEA WB 746 HRS — 11 428 / 11 880 / 23 308 ≙ 15,65 KN
EB 745
AT SEA ——— 1491 = 1491 = 62 DAYS AT SEA

ANCHOR 66
MAN. MAN. 75 ⟩ = 141 = 6 DAYS
1632

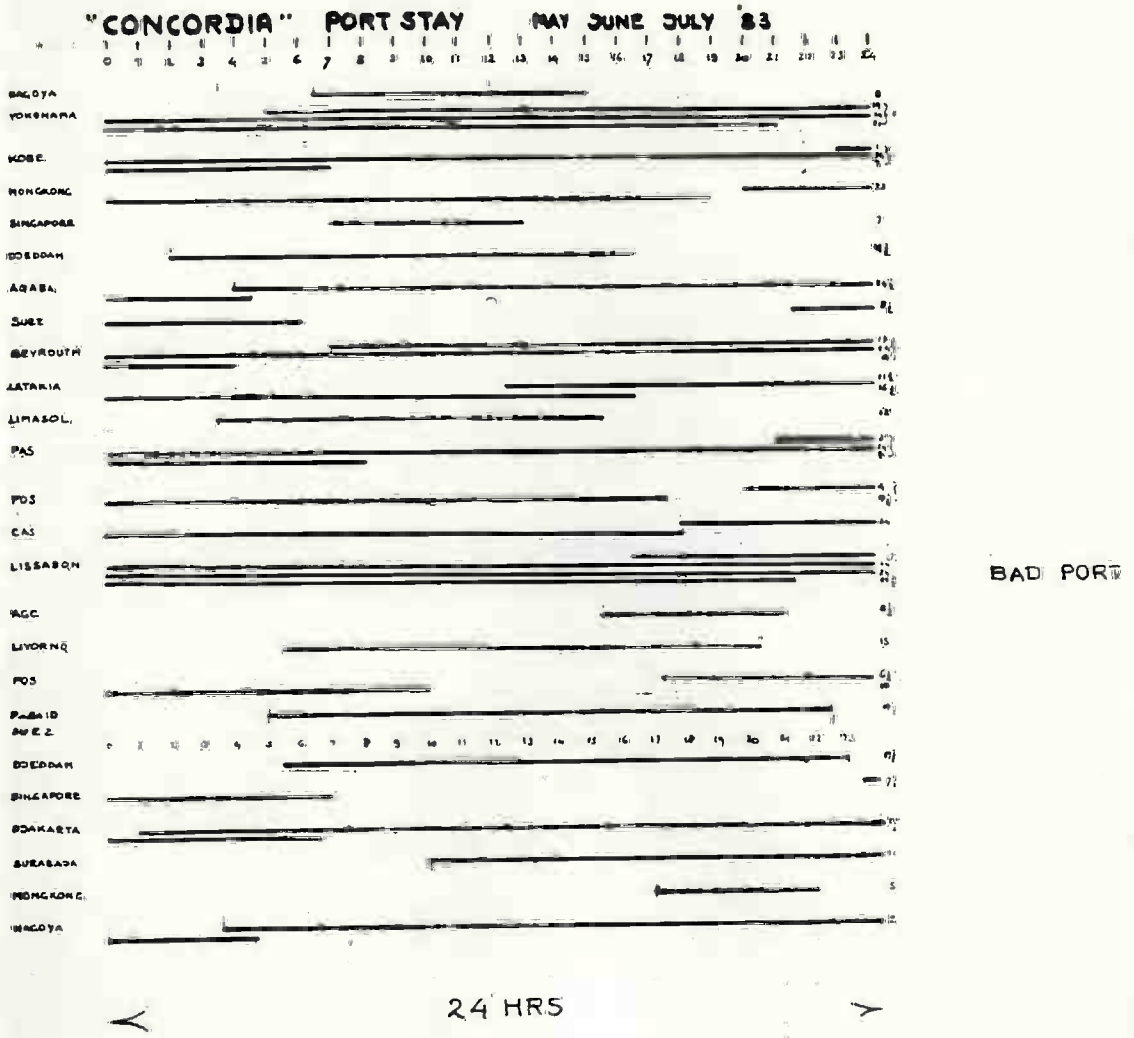
LOST HOURS = 15 = ½
91 x 24 = 2186 = 91 DAYS

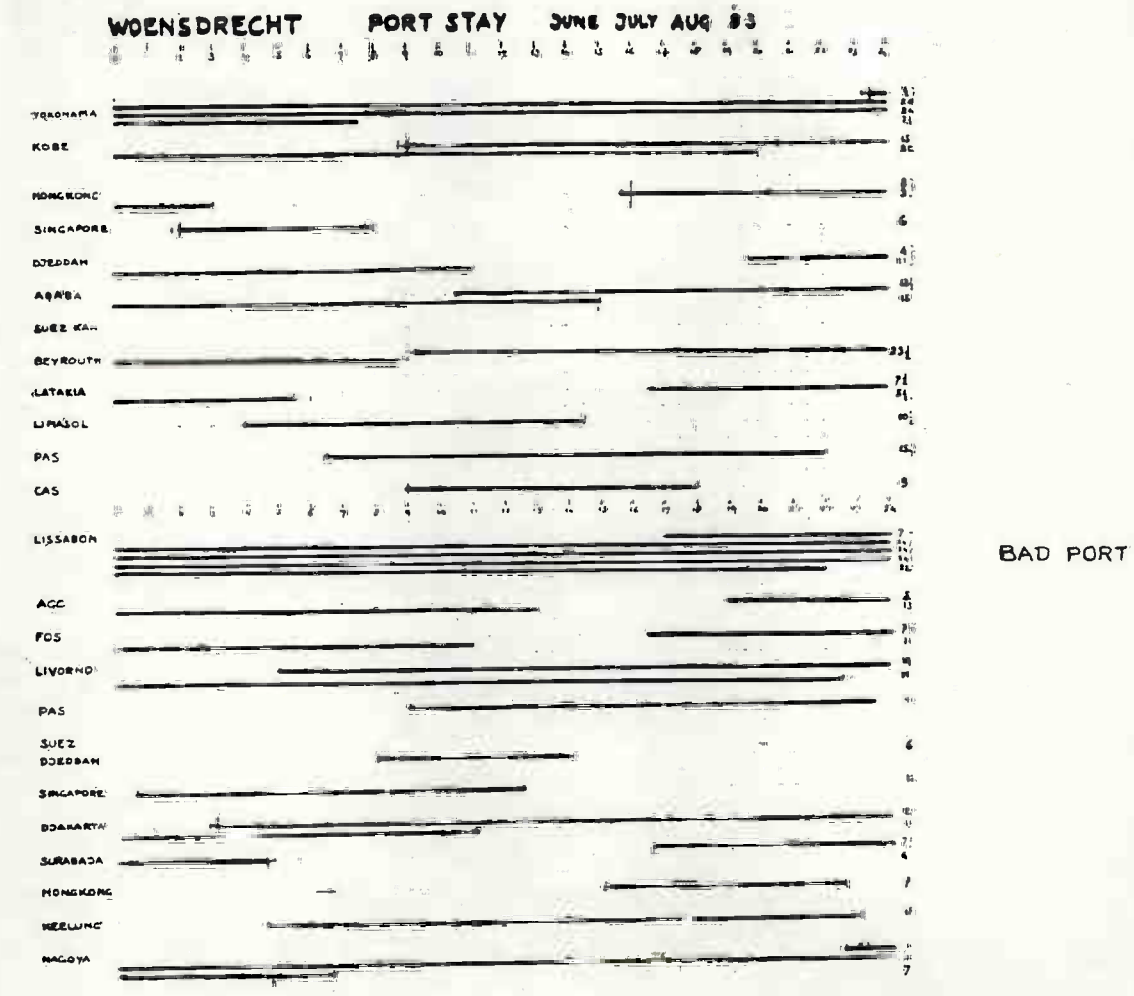
SHORE CONTAINER CRANE GANTRY

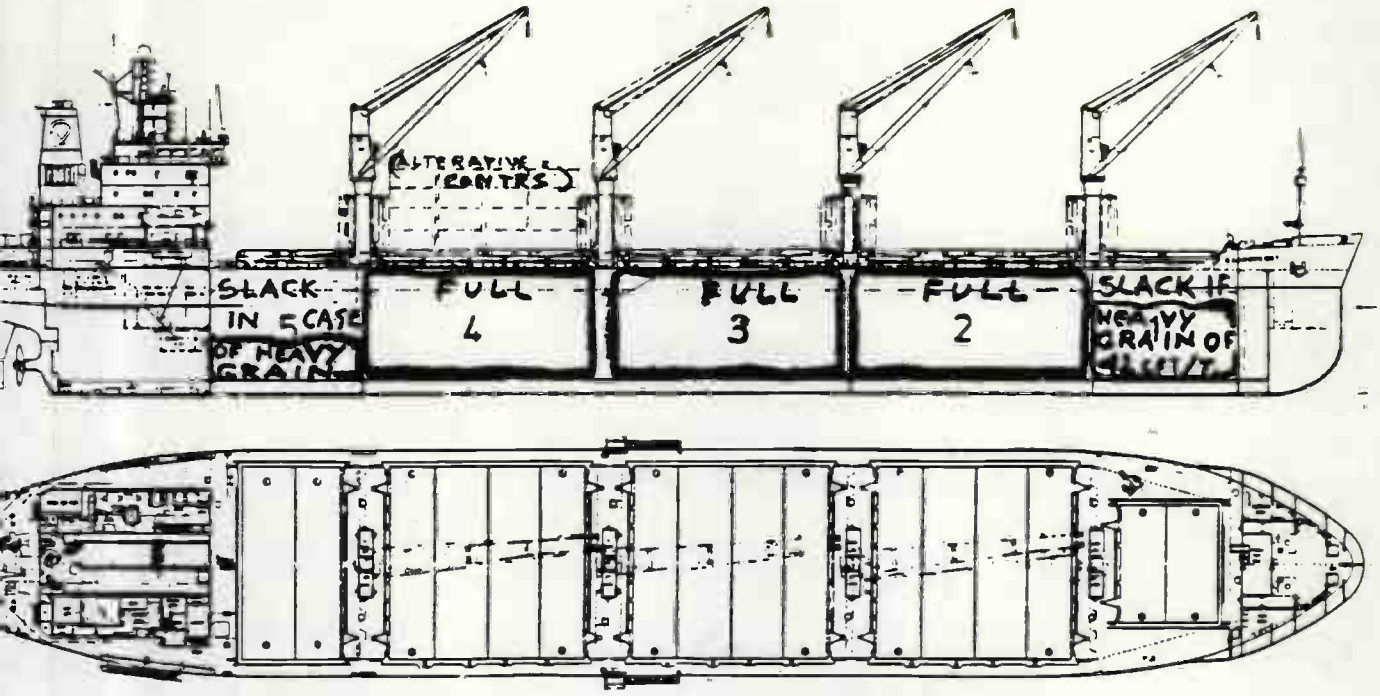
YOK	yes
KOY	yes
HKG	yes
SIN	yes
JED	yes
AQJ	NO MOBILE CRANES 3x45T 3x20T 1x70T. PERMANENT CONTR. BERTH UNDER CONSTR. 2 CONTR GANTRIES 1985
BEY	NO MOBILE CRANE OF INSUFFICIENT OUTREACH CONTR. GANTRIES PLANNED ONLY
LAT	NO FLOATING CRANE 32T CONSTRUCTION OF SPEC. CONTR. BERTH IS UNDERWAY 1x35T
LMS	(YES) 4x45:60T 20x 3-16T NEW CONTR-TERMINAL READY 1983
PAS	yes
FOS	yes
CAS	yes — CONTR GANTRY SOMETIMES NOT AVAILABLE
LIS	yes — POOR PERFORMANCE
AGC	yes
LIV	yes — CONTAINER GANTRY SOMETIMES NOT AVAILABLE
PAS	yes
SIN	yes
JKT	yes ? MOBILE CRANES 1x25T 14x 2,10T 5x 30T
SUB	NO FLOATING CRANE 50T
HKG	yes
KEE	yes
NGO	yes

— 4 PORTS LACKING SHORE C. CRANE
ON 22 CALLS

1 ROUNDTRIP
MEDIT — FAR EAST
3 MONTHS

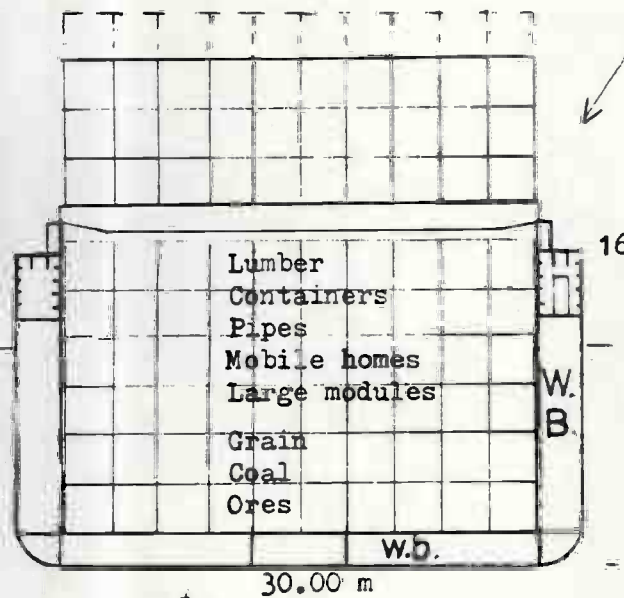

"CONCORDIA" PORT STAY MAY JUNE JULY '83
NAGOYA
YOKOHAMA
KOBE
HONGKONG
SINGAPORE
DJEDDAH
AQABA
SUEZ
BEYROUTH
LATAKIA
LIMASOL
PAS
FOS
CAS
LISSABON
AGC
LIVORNO
FOS
PASSED SUEZ
DJEDDAH
SINGAPORE
DJAKARTA
SURABAJA
HONGKONG
NAGOYA
BAD PORT
24 HRS

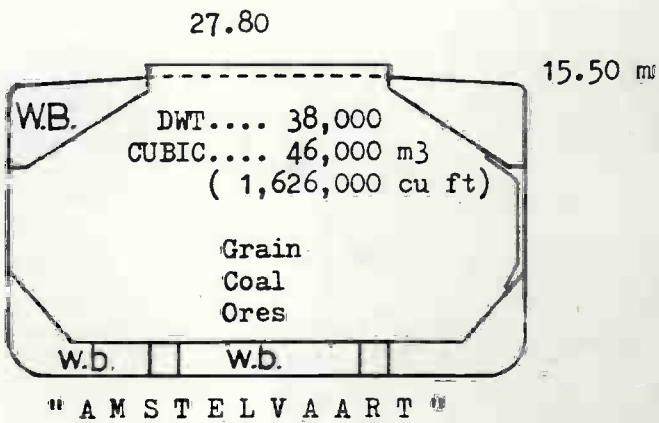

WOENSDRECHT PORT STAY JUNE JULY AUG '83
YOKOHAMA
KOBE
HONGKONG
SINGAPORE
DJEDDAH
AQABA
SUEZ KAN
BEYROUTH
LATAKIA
LIMASOL
PAS
CAS
LISSABON
AGC
FOS
LIVORNO
PAS
SUEZ
DJEDDAH
SINGAPORE
DJAKARTA
SURABAJA
HONGKONG
KEELUNG
NAGOYA
BAD PORT



"W A A R D R E C H T" = "O p e n" bulkcarrier.

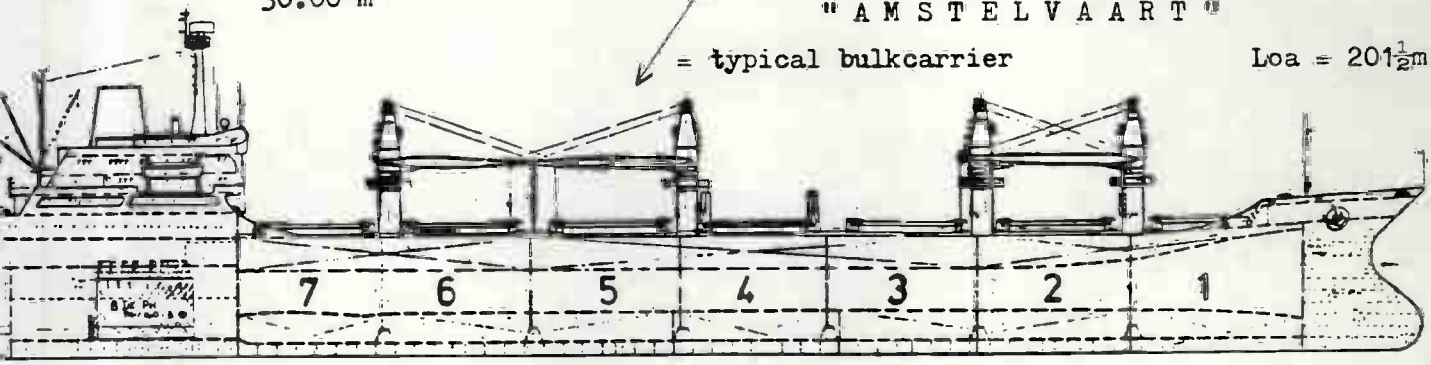
MORE FLEXIBLE

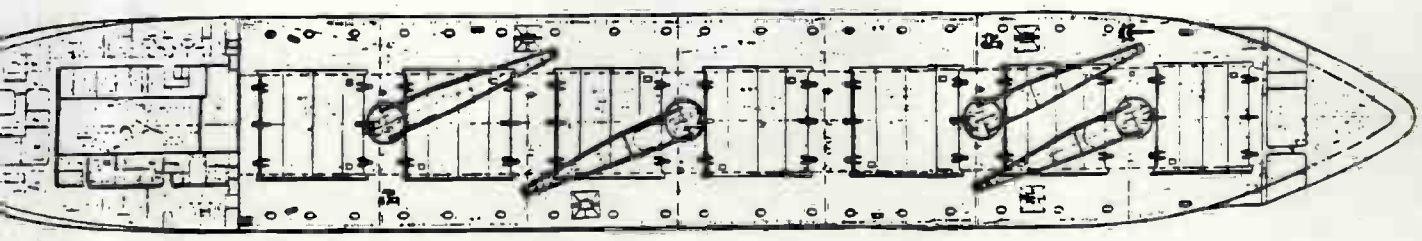




"A M S T E L V A A R T"

= typical bulkcarrier Loa = 201½m





AME	AMSTELVAART	MIJDRECHT	WAARDRECHT	SWAN ARROW	HOEGH-MASLOT	PROJECT
OMPANY	NEOLL BULK	N. ONNEREN	V. ONNEREN	JEBSEN	HÖEGH	CANADIAN TT.
YARD	VARNA	GÖTAWERKEN	GÖTAWERKEN	MITSUI	KAWASAKI	DESIGN HERBERT
ELIVERY	'81	'78	'82	'77	'77	83
LASS	LR	BV ICE	BV ICE	NV	NV	
OA M	201,56	191,38	186,54	182,00	200,50	199,00
PP	187,70	185,00	180,00	174,00	190,00	192,00
MLD	27,80	PAN 32,23	30,00	29,00	30,80	29,76
MLD	15,50	16,05	16,80	16,10	15,70	→ 14,80
SCANTL	11,18	11,33	11,86	11,59	11,57	→ 10,50
	0,806	0,783	0,807	9824	0,826	0,776
ISPL TON	48200	54.250	53.000	49.407	57.363	47.683
GHT SHIP t/m^3	10.200 $11\frac{7}{2}$	9.650 $9\frac{1}{2}$	11.200 $11\frac{9}{2}$	10.794 $12\frac{7}{2}$	12.300 $12\frac{7}{2}$	12.416 $14\frac{4}{2}$
EADWEIGHT	38.000	44.600	41.800	38.613	45,063	35.267
ONSUM	1.500	1.500	1.500	1500	1.500	1.500
ARGO	36.500	43.100	40.300	37113	43 563	33.767
	m^3					
UBIC GRAIN	1.626.000	2.114.380 m^3	1.835.060	1.472 000	1.770.552	1.625.000
	46.000 m^3	58.873	51.680	41.800	50.000	46.050
ft/TON	$44\frac{1}{2}$	49	$45\frac{1}{2}$	$39\frac{1}{2}$	$40\frac{1}{2}$	48
ONTRS IN HOLD		772	892			1012
" ON DECK		3T 586	656			620
		1358	1548			1632
			116			60
			1664			1692
.B. CAPACITY	19.000 m^3	18.737 m^3	16.713 m^3			14.000 m^3
F.OIL	207.4 "	2 087 m^3	1.685 m^3			2050 T
AIN ENGINE	B+W 8K74	B+W 7K67GF	B+W 4L90	B+W 7K74EF	MAN 6K52 79/120	B+W 5L70MCE
P /RPM	13700/120	11.900/140	13850/96 GFCA	13100/124	15200/145	12.250/95
N/DAY	48 T/DAY		40T/DAY	46.1 T/DAY		39 T/DAY
	15.1 Kn		15 Kn	14.5 Kn	15,3	15.-
OP		ø 5400	ø 6800			ø 6800
ESELGEN		680 KW	725 KW 720 RPM	1000 KW		830 KW
		680 "	725 "	1000 1000 RPM		830
		908 "	725 "	1000		1000
	4 JIBCRANES	4 JIBCRANES	2 GANTRIES	2 GANTRIES	2 GANTRIES	
	25T/30M	36T/30m	25T	30T	40T	
						EXCL LOWER P.

← OPEN BULK CARRIERS →

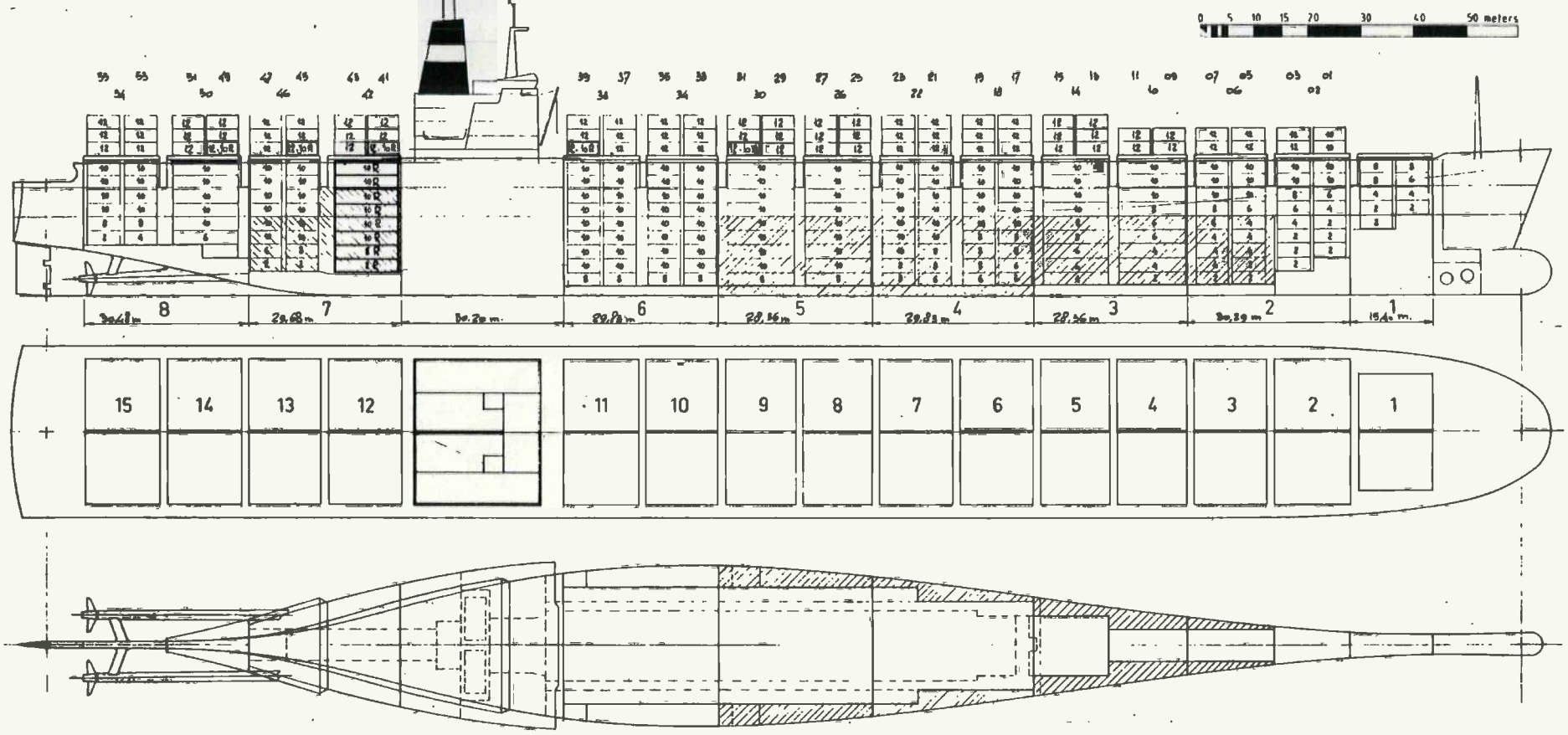
CELLULAR CONTAINER VESSELS
DIMENSIONS AND DRAWINGS

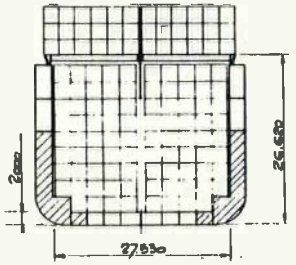
Nedlloyd AUG. '85	NEDLL. DELFT NEDLL. DEJIMA	NEDLL. HOORN	NEDLL. HOUTMAN	NEDLL CLARENCE	NEDLL. CLEMENT	NEDLL. COLOMBO
YARD	BREMER VULKAN	RSV A'DAM-R'DAM	RSV A'DAM-R'DAM	HYUNDAI(HOR)	HYUNDAI(HOR)	MITSUBISHI(OI
YEAR OF DEL.	1973	1979	1977	1983	1983	1982
CLASS	LLOYD'S	LLOYD'S	LLOYD'S	LLOYD'S	LLOYD'S	LLOYD'S
C_B ($L_{o.a} \times B \times D \times C_B = L.S.$)	106,8	112,8	110,7	114,3	117,8	100,6
LCG OG FWD TRANSOM	119,62-41.7%Lbp	107,96-41.8%Lbp	107.96-41.8%Lbp	87,91-41.9%Lbp	88.83-42.3%Lbp	88.85-42.3%Lbp
KG OG ABOVE KEEL	13,38-53.5%D	13,59-56,3%D	13.59-56%D	12.39-65.9%D	12.84-68.1%D	12.81-67.4%D
LCG FWD A.P.-C_B	113.62-0.623	101.96-0.669	101.96-0.669	84.31-0.658	85.23-0.658	80.75-0.611
$L_{o.a}$ (IN M.)	287.02	258.50	268.50	210.00	210.00	211.19
$L_{p.p.}$	273.00	247.00	247.00	202.00	202.00	195.00
$B_{mld.}$	32.24	32.24	32.24	32.24	32.24	32.20
$D_{mld.}$	25.00	24.15	24.15	18.80	18.80	19.00
DRAFT (SCANTLING)	12.72	13.03	13.03	12.02	12.02	11.63
DISP. (IN TON à 1000 kg)	71683	71343	71343	52895	52895	45843
L. SHIP	24699	22706	22281	14544	14998	13002
DEADW.	46984	48637	49062	38351	37897	32841
MAIN ENGINE	SULZER	SULZER	SULZER	B&W	B&W	SULZER
TYPE	2 x 8RND90M	2x8RND90M	2x8RND90M	6L90GBE	6L90GBE	6RLA90
MCR / RPM	2 x 25440/112	2x25440/112	2x25440/112	23800/97	23800/97	20400/90
SHAFT GEN.	—	—	—	1270 kW	1270 kW	—
AUX. ENGINES	2 x 900 kW/900 3 x 1200 kW/600	4x1100kW/900	4 x 1100kW/900	2x1300 kW/600 1x800 kW/720 1x180 kW/1800	2x1300kW/600 1x800 kW/720 1x180 kW/1800	1x1100kW/720 2x900kW/ - 1x330 kW/1800
REAL LOGS OF SHIP TYPICAL SERVICE COND. DRAFT / SPEED / T/DAY (EXCL. SHAFT GEN.)	10.80/20.5/110.5	10.65/19.0/89.9	10.53/20.5/111.0	8.10/13.5/42.5	8.30/13.8/45.5	8.80/16.8/38.5
	MAX. CONTAINER CAPACITY SPACE WISE					
HOLD (TIER x WIDTH)	2020 (9x10)	1788 (9x10)	1794 (9x10)	1150 (7x10)	1150 (7x10)	1014 (7x10)
DECK (TIER x WIDTH)	932 (3x12)	920 (3x13)	920 (3x13)	1074 (4x12)	1074 (4x13)	945 (4x13)
TOTAL	2952	2708	2714	2224	2224	1959
DUCTED REEFER IN HOLD (CONAIR SYST)	—	886x20'	362x20'	—	116x40'	—
INT. REEFER DECK 20'-40' PLUGS	50	77	77	99	99	88
INT. REEFER HOLD 20' OR 40' PLUGS	70x40' WATER-COOLED	—	—	88x20'	64x20'	130x20
	TYPICAL LOADING CONDITION (12.7 T/TEU HOMOGENEOUS)					
DRAFT (IN M.)	12.35	11.85	11.93	11.66	11.74	10.48
DISP. (IN TON à 1000 KG)	68826	62946	63928	50808	51262	39865
L. SHIP	24699	22081	22081	14544	14998	13002
DEADW.	44127	40865	41847	36264	36264	26863
CONS + W.B.	9989	9699	10335	8019	8019	3333
TEU DECK	8282 - 668 TEU	8382 - 660 TEU	8738 - 688 TEU	13640 - 1074 TEU	13640 - 1074 TEU	10450 - 823 TEU
TEU HOLD	25654 - 2020 TEU	22784 - 1794 TEU	22784 - 1794 TEU	14605 - 1150 TEU	14605 - 1150 TEU	12880 - 1014 TEU
TOTAL TEU	2688 TEU	2454 TEU	2482 TEU	2224 TEU	2224 TEU	1837 TEU
KM (IN M.)	14.89	15.10	15.11	15.06	15.07	15.28
KG	14.46	14.59	14.66	14.47	14.48	14.92
MG	0.43	0.51	0.45	0.59	0.59	0.36
MG' CORR.	0.40	0.43	0.41	0.51	0.51	0.29
T/TEU (HOMOGENEOUS)	12.7	12.7	12.7	12.7	12.7	12.7
OG HOLD y ARM x 0.93 BOX 8-8.5 TT x 0.45 DRAFT / SPEED / TON/DAY (EXCL. S.C. 12% SEA MARGIN)	12.35/20.5/120	11.85/20.5/112.7	11.93/20.5/113.2	11.66/18.0/61.8	11.74/18.0/62.6	10.48/18.0/53.5

Nedlloyd AUG 85	NEDLL. TASMAN	NEDLL ZEELANDIA	NEDLL. HOLLANDIA	NEDLL VAN NECK	NEDLL VAN NOORT NEDLL VAN DIEMEN
YARD	V.D. GIESSEN (HOL)	V.D. GIESSEN (HOL)	GDANSK (POL)	V.D. GIESSEN (HOL)	V.D. GIESSEN (HOL)
YEAR OF DEL.	1971	1980	1977	1983	1984
CLASS	GERM. LLOYD	LLOYD'S	LLOYD'S	BUR. VERITAS	BUR. VERITAS
C_G ($L_{OA} \times B \times D \times C_G = L.S$)	125.7	115.6	116.4	118.7 (UNGEARED)	120.1
LCG ⊖G FWD TRANSOM	99.16 - 43.9% L_{OA}	85.54 - 41.5% L_{OA}	86.42 - 42.4% L_{OA}	73.30 - 40.1% L_{OA}	73.96 - 40.4% L_{OA}
KG ⊖G ABOVE BASE	11.78 - 71.8% D	12.65 - 67.5% D	12.49 - 66.4% D	11.29 - 69.7% D	11.64 - 71.9% D
LCG FWD A.P. - C_B	92.92 - 0.624	78.54 - 0.615	82.22 - 0.603	69.30 - 0.663	69.96 - 0.663
L_{OA} (IN M.)	225.87	205.95	203.95	182.73	182.50
$L_{P.P.}$	210.00	192.00	193.10	174.00	174.00
$B_{MLD.}$	30.50	30.80	30.80	30.50	30.50
$D_{MLD.}$	16.40	18.75	18.80	16.20	16.20
DRAFT (SCANTLING)	11.58	10.02	10.03	11.27	11.27
DISP. (IN TON & 1000 M³)	47550	37428	36972	40760	40760
L. SHIP	14200	13750	13740	10720	10830
DEADW.	33350	23678	23232	30040	29930
MAIN ENGINE TYPE	2 x FOSTER WEELER (BOILERS) AP 32/110 TURBINE (STAL LAVAL)	SULZER 9 RND 90 M	SULZER 10 RND 90	SULZER 5 RLB 90	SULZER 5 RLB 90
MCR / RPM	22700/90	30150/122	29000/122	20000/102	20.000/102
SHAFT GEN.	—	—	—	1300 kW	1300 kW
AUX. ENGINES	4 x 860 kW/720 1 x 1600 kW/1800	4 x 960 kW/720 1 x 700 kW/1800	4 x 960 kW/720 1 x 700 kW/1800	2 x 1500 kW/720 1 x 700 kW/720 1 x 160 kW/1800	2 x 1500 kW/720 1 x 700 kW/720 1 x 160 kW/1800
REAL LOGS OF SHIP TYPICAL SERVICE COND. DRAFT / SPEED / T/DAY (EXCL. SHAFT GEN.)	8.82/17.9/84.0	7.95/19.8/63.0	8.85/17.3/54.5	8.30/18.1/42.0	8.20/16.0/29.6
MAX. CONTAINER CAPACITY SPACE WISE					
HOLD (TIER x WIDTH)	861 (6 x 9)	918 (7 x 9)	828 (7 x 9)	784 (6 x 9)	760 (6 x 9)
DECK (TIER x WIDTH)	816 (4 x 12)	682 (4 x 11)	680 (4 x 10)	852 (4 x 12)	846 (4 x 12)
TOTAL	1677	1600	1508	1636	1606
DUCTED REEFER IN HOLD (CONAIR SYST)	100 x 20'	183 x 40'	120 x 40'	—	—
INT. REEFER DECK 20' 40' PLUGS	40	126	126	90	90
INT. REEFER HOLD 20' OR 40' PLUGS	—	—	—	60 x 20'	60 x 20'
TYPICAL LOADING CONDITION (12.7 T/TEU HOMOGENEOUS)					
DRAFT (IN M.)	10.58	10.02	10.03	10.48	10.37
DISP. (IN TON & 1000 KG)	42638	33428	36972	37062	36559
L. SHIP	14200	13420	13410	10720	10830
DEADW.	28438	24008	23562	26342	25729
CONS + W.B.	8043 T	5593	5706	5564	5435
TEU DECK	8560 - 674 TEU	6751 - 530 TEU	6706 - 528 TEU	10820 - 852 TEU	10744 - 846 TEU
TEU HOLD	10935 - 861 TEU	11684 - 920 TEU	11150 - 878 TEU	9957 - 784 TEU	9550 - 752 TEU
TOTAL TEU	1535 TEU	1450 TEU	1406 TEU	1636 TEU	1598 TEU
KM (IN M.)	12.88	14.01	13.12	14.37	14.37
KG	12.42	13.22	12.77	13.90	13.80
MG	0.46	0.79	0.35	0.47	0.57
MG' CORR.	0.41	0.67	0.30	0.40	0.50
T/TEU (HOMOGENEOUS)	12.7	12.7	12.7	12.7	12.7
⊖G HOLD T ARM x 0.93 BOX 8-8 ST x 0.45 DRAFT / SPEED / T/DAY (EXCL. S.G. 12% SEA MARGIN)	10.58/18.0/82.4	10.02/18.0/64.4	HSVA-TANK 10.03/18.0/57.7	10.48/18.0/57.9	10.37/18.0/55.6

Nedlloyd AUG'85	NEDLL. ROUEN NEDLL. ROSARIO	NEDLL. ROTTERDAM NEDLL. ROCHESTER	NEDLL. BAHREIN NEDLL. BALTIMORE NEDLL. BANGKOK NEDLL. BARCELONA	NEDLL. LEUVE NEDLL. LINGE NEDLL. LOIRE	NEDLL. SANTOS NEDLL. SEOUL NEDLL. SINGAPORE NEDLL. SAN JUAN
YARD	NKK-TSU	RSV-BOTLEK	VD GIESSEN (HOL)	SHIMUZU NKK	NAKSKOV (DENMARK)
YEAR OF DEL.	1978/1979	1978/1979	1978 (BAR: '79)	1966/1967/1967	1975
CLASS	LLOYD'S.	LLOYD'S	BUR. VERITAS	LLOYD'S	LLOYD'S
C_B ($L_{OA} \times B \times D \times C_B = L.S$)	115.9	115.4	133.1	175.6	130.1
LCG ⊙G TWD TRANSOM	83.41 – 39.3% L_{OA}	80.94 – 41.2% L_{OA}	75.34 – 43.5% L_{OA}	71.46 – 44.1% L_{OA}	70.48 – 41.3% L_{OA}
KG ⊙G ABOVE KEEL	13.28 – 65.1% D	14.52 – 62.5% D	11.88 – 74.3% D	8.98 – 64.1% D	10.73 – 72.8% D
LCG TWD A.P. – C_B	7541 – 0.640	72.94 – 0.612	72.14 – 0.695	67.31 – 0.645	66.28 – 0.636
L_{OA} (IN M.)	212.10	196.50	173.02	162.00	170.70
L_{PP}	198.80	183.20	165.00	150.00	163.20
B_{MLD}	32.24	32.24	27.10	23.70	25.91
D_{MLD}	20.40	23.25	16.00	14.00	14.73
DRAFT (SCANTLING)	10.72	10.72	10.18	9.60	9.36
DISP. (IN TON à 1000 KG)	45193	39813	32485	22629	25860
L.SHIP	16170	16997	9985	9475/9438/9448	8476
DEADW.	29023	22816	22500	13145/13191/13181	17384
MAIN ENGINE	SULZER	SULZER	SULZER	STORK	B&W
TYPE	8 RND 90 M	8 RND 90 M	7 RND 76 M	SW 6x90/170	6 K 90 GF
MCR / RPM	25440/112	25440/112	16800/122	17000 SHP/115	20500/114
SHAFT GEN.	—	—	—	—	—
AUX. ENGINES	4 x 1500 KW/600	4 x 1500 KW/720	3 x 700 KW/720	3 x 675 KW/600	3 x 756 KW/600
REAL LOGS OF SHIP TYPICAL SERVICE COND. DRAFT / SPEED / T/DAY (EXCL. SHAFT GEN)	8.28/17.8/56.0	8.95/18.3/60.0	7.68/15.6/28.9	7.81/33.0/17.3	6.72/39.0/16.8
	MAX. CONTAINER CAPACITY SPACE WISE				
HOLD (TIER x WIDTH)	811 (2x2TRx–)	746 (1x2TR,2x1TRx)	358 (6x6)	189 (5x7)	304 (–)
DECK (TIER x WIDTH)	902 (4x13)	571 (3x11)	318 (3x9)	190 (3x9)	330 (3x9)
TOTAL	1713	1317	676	379	634
DUCTED REEFER IN HOLD (CONAIR SYST)	—	—	—	—	—
INT. REEFER DECK 20'-40' PLUGS	100	95	48	—	13 (1x25)
INT. REEFER HOLD 20' OR 40' PLUGS	—	—	—	—	—
	TYPICAL LOADING CONDITION				
DRAFT (IN M.)	10.72	10.72	8.19	8.97	7.27
DISP. (IN TON à 1000 KG)	45193	39813	25448	20825	19391
L.SHIP	16170	17249	9985	9438	8612
DEADW.	29023	22564	15463	11387	10780
CONS + W.B.	6303	5158	7313	3087	4450
LOAD DECK	12737	11877	3138	1677	3241
LOAD HOLD	9983	5519	5012	6623	3089
KM (IN M.)	15.41	15.61	11.15	10.02	10.51
KG	14.41	14.47	10.30	8.53	9.98
MG	1.00	1.14	0.85	1.45	0.53
MG' CORR.	0.89	1.06	0.56	1.13	0.33
T/TEU	VAR.	VAR.	HOLDS: 14 T/TEU DECK: TR1:14, TR2:10 (676 TEU) TR3:5	308 TEU à 10T	624 TEU à 10T.
CARGO	CONT + TRAILERS	CONT + TRAILERS		BREAKB. + CONT.	CONT.

NedLloyd ALIG. '85	NEDLL. MANILLA NEDLL. MARSEILLES	SAF. MILDURA	NEDLL. ALKMAAR NEDLL. AMERSFOORT	NEDLL. NAGOYA NEDLL. NAGASAKI NEDLL. NAPIER NEDLL. NASSAU	NEDLL. NILE NEDLL. NIGER	NEDLL. MADRAS
YARD	MARINE IND. SOREL	SHIMIZU NKK	HDW HAMBURG	K.M. GIESSEN DE SCHELDE	BREMER VULKAN	MARINE IND. SOREL
YEAR OF DEL.	1979	1968	1970	1972 (NAGOYA 1971)	1971/1972	1979
CLASS	LLOYD'S	LLOYD'S	A.B.S.	BUR. VERITAS	GERM. LLOYD	LLOYDS
C_B (L$_{OA}$xBxDxC_B=L.S.)	136.5	178.3	161.5	161.2	128.2	136.5
LCG OG TWD TRANSOM	84.67 - 45.2% L$_{OA}$	72.37 - 44.7% L$_{OA}$	81.47 - 42.6% L$_{OA}$	68.85 - 41.7% L$_{OA}$	60.63 - 43.4% L$_{OA}$	84.67 - 45.1% L$_{OA}$
KG OG ABOVE KEEL	9.58 - 72.6% D	8.77 - 62.6% D	8.65 - 63.6% D	10.30 - 78.0% D	9.02 - 73.1% D	9.58 - 72.6% D
LCG FWD A.P. - C_B	79.17 - 0.723	69.12 - 0.659	76.97 - 0.644	64.35 - 0.630	55.98 - 0.737	79.17 - 0.723
L$_{OA}$ (IN M.)	187.15	162.00	191,4.0	165.07	139.57	187.15
L.P.P.	173.75	150.00	181.40	156.10	132.00	173.75
B$_{MLD}$	22.80	23.70	23.60	24.00	21.00	22.80
D$_{MLD}$	13.20	14.00	13.60	13.20	12.30	13.20
DRAFT (SCANTLING)	8.37	10.37	9.52	8.88	8.11	8.37
DISP. (IN TONS à 1000 kg)	24627	24975	26921	21530	17022	24627
L. SHIP	7686	9585	9931/9921	8430	4620	7686
DEADW.	16941	15390	17011/17061	13100	12402	16941
MAIN ENGINE	M.A.N.	STORK	FIAT	SULZER	M.A.N.	M.A.N.
TYPE	14V32/55	SW 6x90/170	9085(1600)	7RND90	K62 70/105E	14V32/55
MCR / RPM	14000/430	17000 SHP/115	20000 SHP/125	20000/122	8400/140	14000/430
SHAFT GEN.	—	—	—	700 kW	—	—
AUX. ENGINES	3x600 kW/900	2x390 kW/900 3x375 kW/600	3x650kW/1600	2x600 kW/720	3x320kW/1200	3x600kW/900
REAL LOGS OF SHIP TYPICAL SERVICE COND. DRAFT / SPEED / T/DAY (EXCL. SHAFT GEN.)	6.73/15.1/26.6	7.80/16.6/313	7.48/16.6/40.1	7.46/17.1/40.2	7.04/14.6/21.3	6.25/15.0/32
	MAX. CONTAINER CAPACITY SPACE WISE					
HOLD (TIER x WIDTH)	376 (5x6)	280 (5x7)	256 (5x6)	279 (-)	96 (-)	376 (5x6)
DECK (TIER x WIDTH)	364/376(4x8)	222 (3x9)	275 (3x8)	141 (-)	70 (-)	339 (5x8)
TOTAL	740/752	502	531	420	166	715
DUCTED REEFER IN HOLD (CONAIR SYST)	—	—	—	—	—	—
INT. REEFER DECK 20'-40' PLUGS	24	42	26	—	12	24
INT. REEFER HOLD 20 OR 40' PLUGS	60	94	—	—	—	60
	TYPICAL LOADING CONDITION					
DRAFT (IN M.)	8.37	9.83	8.62	8.55	8.11	8.37
DISP. (IN TON à 1000 kg)	24627	23414	23995	20579	17022	24627
L. SHIP	7700	9585	9931	8565	4620	7700
DEADW.	16927	13829	14064	12014	12402	16927
CONS + W.B.	3970	3551	2572	4104	1298	3970
LOAD DECK	2304	3187	2514	2241	—	2304
LOAD HOLD	10653	7091	8918	5669	11104	10653
KM (IN M.)	9.43	10.29	9.61	9.71	8.66	9.43
KG	8.92	9.17	9.12	9.07	7.65	8.92
MG	0.51	1.18	0.49	0.64	1.01	0.51
MG' COR.	0.35	0.87	0.39	0.44	0.97	0.35
T/TEU	408 & 16T	VAR.	HOLD 16T/TEU DECK 14T/TEU	HOLD 279 @ 20T DECK 141 @ 15T 420 TEU	HOM. LOAD	408 & 16T.
CARGO	BREAKB. + CONT	BREAKB. + CONT	BREAKB. + CONT		BREAK BULK	BREAKB. + CONT





SHAFT GENERATOR NONE	
max — kW	
normal — kW x 1.36 / 0.88 = — HP	
x — g/SHP.h x 24 = — t/day	

DIESEL GENERATORS	
Generator I	900 kW - 900 RPM
Generator II	900 kW - 900 RPM
Generator III	1200 kW - 600 RPM
GENERATOR IV	1200 kW - 600 RPM
GENERATOR V	1200 kW - 600 RPM
Normal electr load at sea 1250 kW	
- Diesel gen = 7.3	ton/day (IFO)
- Shaft gen = —	ton/day (HFO)
Norm elec load idle in port 880 kW	
- Diesel gen = 5.1	ton/day (IFO)
- Boiler = 1.5	ton/day (HFO)
Extra for reefers 20 **	
Box x kW/box x HP/kW x g/HP.h x hr	
50 x 7½ x 1.36 / 0.9 x 160 x 24	
= 2.2	ton/day (IFO)

THRUSTERS	
Bowthruster 2 x 736	kW, 2 x 1000 HP
Sternthruster —	kW, — HP
Rudder max angle 35° (45° up to 16 kn)	
Stabilisers DENNY-BROWN-AEG	

MAIN ENGINE 2 x MAN/SULZER 8RND90M	
MCR	2 x 25440 HP - 112 RPM
85% MCR (service)	2 x 21620 HP - 106 RPM
Fuel for main eng	HFO, 500 c St - 50°C
Fuel for aux. eng	IFO - 100 c St - 50°C
HFO = 108 x MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial = 1.045	
C_2 = sea margin = 1.12 (service allow.)	
Spec. fuel consumption = 153½ g/SHP.h	
HFO = 108 x MDO	

Fuel consumption in ton/day

Draft in meters	Speed in knots												
	17	17½	18	18½	19	19½	20	20½	21	21½	22	22½	23
9.-	71	76	81	86	92	97½	103½	109½	116	122	129	135	142
9.5	72½	77½	82½	88	93½	99	105	111	117½	124	131	138	145½
10.-	73	78	83	88	94	99½	106	112	118	125	132	139	146
10.5	74½	79½	84½	90	95	101	107½	113½	120	126½	134	141	148½
11.-	76	81	86½	92	98	104	110	116	122½	129	136½	144	151
11.5	77	82½	88	93½	99½	106	112½	118½	125	132	139½	146½	154
12.-	78½	84	89½	95½	101½	107½	114	120½	127½	134½	142	149½	157½
12.5	80	85½	91½	97½	103½	110	116½	123½	130½	137½	145	153	161

2 x 21620 HP x 153½ x 24 = 159 T/D

TYPICAL LOADING CONDITION		
Draft	12.35 m	
Displacement	68826 ton	
Light ship	24699 ton	**)
Deadweight	44127 ton	
FO+DO+Lub+Dr.w.+ +Prov+Stores	6300 ton	
Water Ballast	3659 ton	
	34138 ton	
TEU x T/TEU		
Hold 2020 x 12.7 =	25654 ton	
Deck 668 x 12.7 =	8484 ton	
Empties — x — =	— ton	
2688 x 12.7 =	34138 ton	
Centr.grav hold = arm x 0.93		
box 8.5 ft x 0.45		
FO	4525 ton	
DO + IFO	980 ton	
Lub Oil	270 ton	
Fresh Water	315 ton	
Sev tanks	— ton	
Crew+prov+stores	200 ton	
	6300 ton	
KM	14.89 m	
KG	14.46 m	
GM	0.43 m	
Free surface correction	0.03 m	
GM	0.40 m	

MAX TEU CAPACITY SPACE WISE	
Hold 2020 of which 434 - 40 = 43%	
Deck 334 1st tier	
334 2nd tier	
264 3rd tier	
TOTAL DECK 932	
— 4th tier	
TOTAL 2532	

CAPACITY	
Water ballast	15478 m3
Fresh water	315 m3
Heavy Fuel Oil	9223 m3
Diesel Oil + IFO	2559 m3
Lubricating Oil	385 m3

PRINCIPAL DIMENSIONS	
Length over all	287.02 m
Length betw. perpend.	273.00 m
Breadth mld	32.24 m
Depth mld	25.00 m
Draft scantling	12.74 m
Displacement	79683 ton
Light ship	24699 ton
Deadweight	46984 ton

INTEGRAL REEFERS	
Reeferpoints on deck	50
Reeferpoints in hold	70
DECK 20'-40' — 7.5 kW	
HOLD 40' — 7.5 kW	
VENTILATION - 0.3 M³/SEC PER BOX	
HATCH Nº 12 (WATERCOOLING)	
RECEPTACLES - 440V - 3Ph. 32 Amp	

Hatch rows	15 x 2
Max weight of covers =	30 ton
Number of hatches 11 fwd of deckh	
4 aft " "	
40' cells in hatch no 4-5-8-9-12-16	
40 box below deck	364
Max stackload on covers	
20' stack 30 ton	
40' stack 60 ton	
TWO OR MORE TIERS OF DECK-CONTAINERS TO BE LASHED BY rods + turnbuckles	

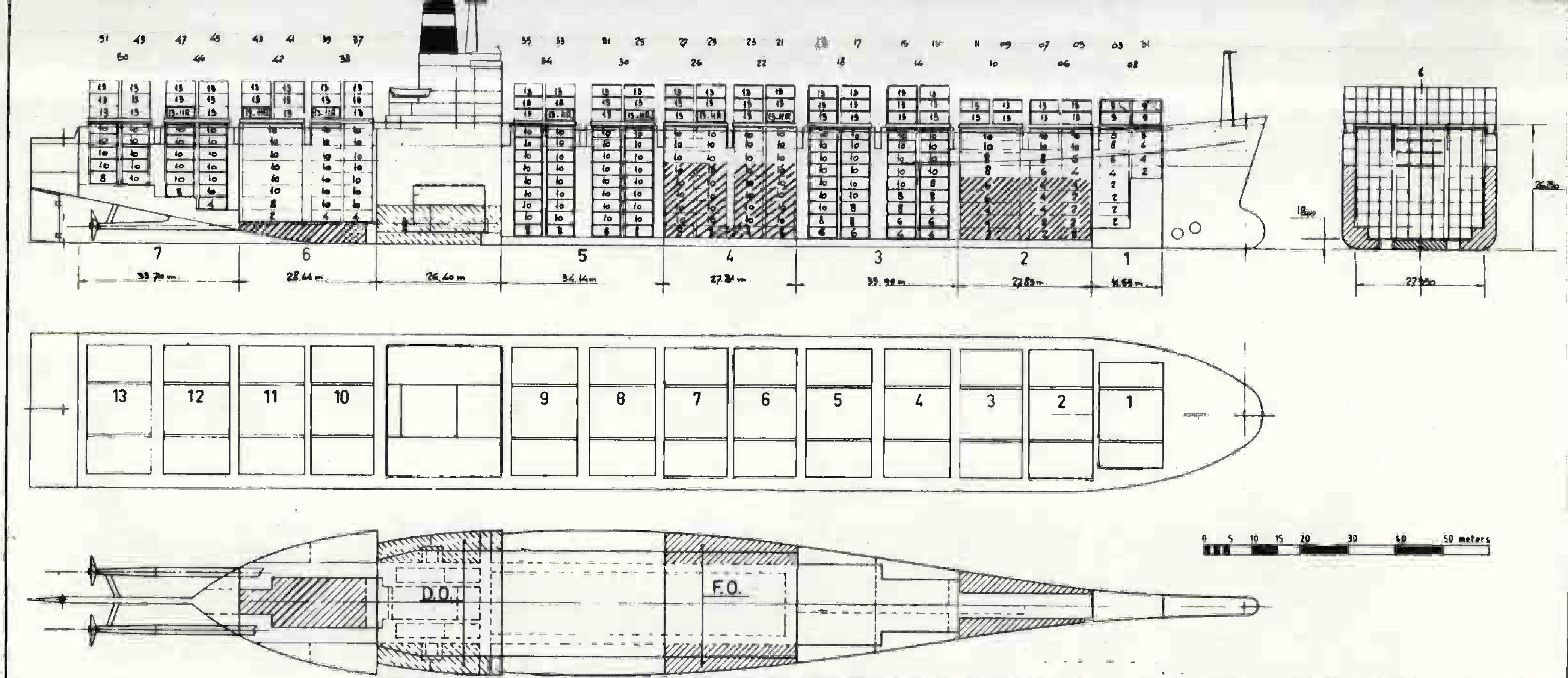
*) MAIN ENGINES NEDLLOYD DEJIMA: 2 x IHI, SULZER 8 RND 90M

**) LIGHT WEIGHT NEDLLOYD DEJIMA: 24694 TON.

Nedlloyd Fleet Services
Newbuilding Department

Name NEDLLOYD DEJIMA.
NEDLLOYD DELFT

Delivery date APRIL - SEPT 1979
Yard BREMER VULKAN - GERMANY
Class LRS ✠ 100 A1 + LMC + - UMS
RE-ENGINED APRIL '82 - NOV '81.



Hatch rows	3 x 13
Max weight of covers =	30 ton
Number of hatches	9 fwd of deckh
	4 aft " "
40' cells in hatch no	3 - 11
40' box below deck	128
Max. stackload on covers	
20' stack	60 ton
40' stack	80 ton
Max stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by rods + turnbuckles	

REEFERS	
Reeferpoints on deck	77 INTEGR
Reeferpoints in hold	— —
20' - 40' —	15 kW
RECEPTACLES - 440 V - 3Ph - 32 Amp	
PORTHOLE CONT. HOLD 3-5-7 -	
- 886 BOX (20' x 8'-6 CONT)	
DUCT SYSTEM : CONAIR	
CIRCULATION : 30/60 AIRCH/HOUR	

SHAFT GENERATOR NONE	
max — kW	
normal — kW x $\frac{1.36}{0.85}$ = — HP	
x — g/SHP.h x 24 = — t/day	

DIESEL GENERATORS	
Generator I	1100 kW - 900 RPM
Generator II	1100 kW - 900 RPM
Generator III	1100 kW - 900 RPM
GENERATOR IV	1100 kW - 900 RPM
Normal electr load at sea	1250 kW
- Diesel gen = 23	ton/day (IFO)
- Shaft gen = —	ton/day (HFO)
Norm. elec load idle in port:	880 kW
- Diesel gen = 5.1	ton/day (IFO)
- Boiler = 1.5	ton/day (HFO)
Extra for reefers	20 FT.
Box x kW/box x HP/kW x g/HP hr x hr =	
50 x 7½ x 1.36/0.9 = 160 x 24 =	
= 2.2	ton/day (IFO)

THRUSTERS	
Bowthruster	2 x 736 kW, 2 x 1000 HP
Sternthruster	— kW, — HP
Rudder max angle	35° (45° up to 16 kn)
Stabilisers	DENNY - BROWN - AEG

MAIN ENGINE 2 x SULZER [illegible]/90M	
MCR	2 x 25440 HP - 112 RPM
85% MCR	2 x 21620 HP - 106 RPM
Fuel for main eng	HFO - 500 cSt - 50°C
Fuel for aux eng	IFO - 30 cSt - 50°C
HFO = 1.08 x MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial =	1.045
C_2 = sea margin =	1.12
Spec fuel consumption =	153½ g/SHP.h
HFO = 1.08 x MDO	

Fuel consumption in ton/day

Draft in meters \ Speed in knots	18	18½	19	19½	20	20½	21	21½	22	22½	23
9	[illegible]	[illegible]	[illegible]	91	96	[illegible]	107	113	[illegible]	[illegible]	135
9.5	76	[illegible]	85	90	96	[illegible]	[illegible]	[illegible]	121	129	138
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	116	123	[illegible]	141
10.5	[illegible]	[illegible]	[illegible]	91	97	105	113	[illegible]	[illegible]	[illegible]	145
11	72	79	[illegible]	[illegible]	100	107	114	[illegible]	[illegible]	[illegible]	[illegible]
11.5	73	80	[illegible]	95	[illegible]	110	117	125	[illegible]	[illegible]	[illegible]
12	76	83	91	99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	152	[illegible]
12.5	80	[illegible]	[illegible]	106	[illegible]	[illegible]	[illegible]	[illegible]	150	[illegible]	—

2 x 21.620 HP x 153½ x 24 = 159 T/D

TYPICAL LOADING CONDITION	
Draft	12.07 m
Displacement	64585 ton
Light ship	22.906 ton
Deadweight	41 679 ton
FO + DO + Lub + Dr.w. + Prov. + Stores	6200 ton
Water Ballast	4135 ton
	31 344 ton
TEU x T/TEU	
Hold 1788 x 12.7 =	22708 ton
Deck 680 x 12.7 =	8636 ton
Empties — x — =	— ton
2468 x 12.7 =	31.344 ton
Centr grav hold = arm x 0.93	
box 8.5 ft x 0.45	
FO	4525 ton
DO + IFO	975 ton
Lub Oil	300 ton
Fresh Water	200 ton
Sew tanks	— ton
Crew + prov + stores	200 ton
	6200 ton
KM	15.11 m
KG	14.66 m
GM	0.45 m
Free surface correction	0.04 m
GM'	0.41 m

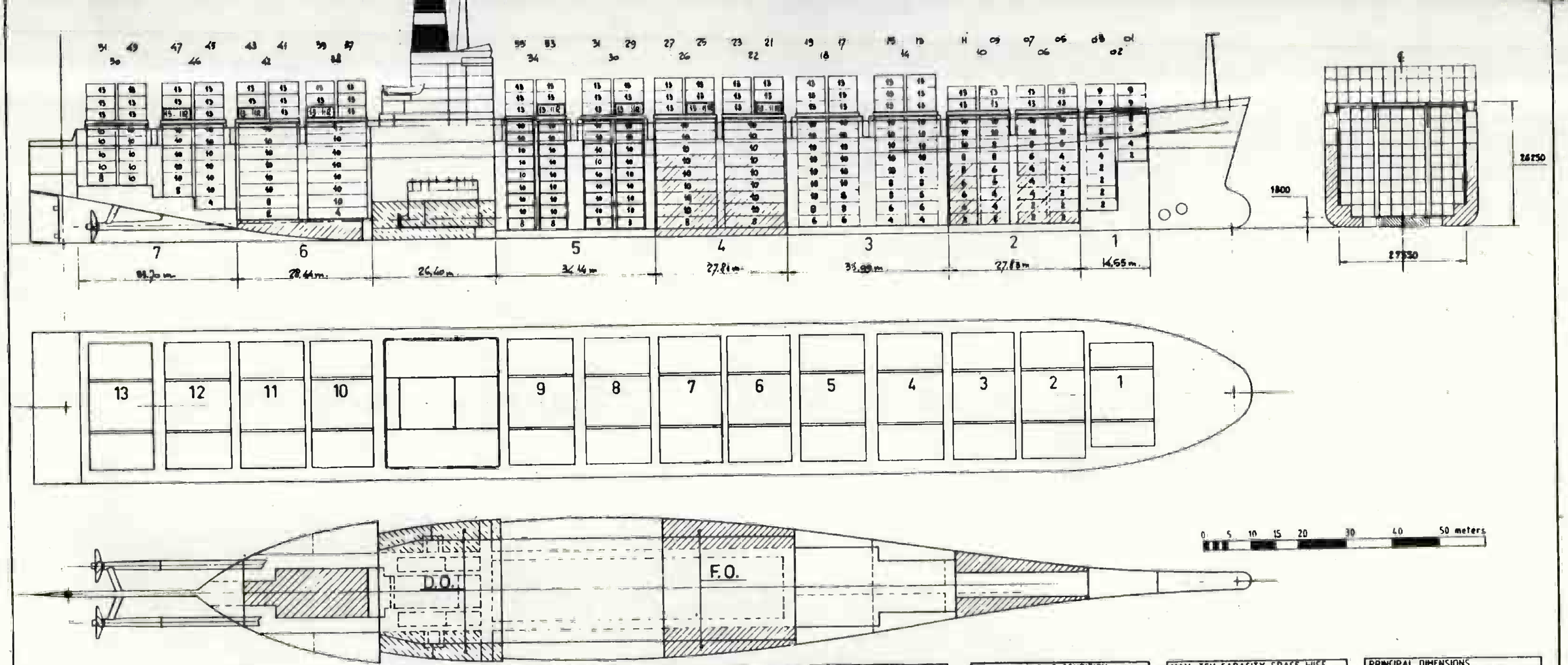
MAX TEU CAPACITY SPACE WISE		
Hold 1788 of which 128 - 40 ft = 14 %		
Deck 330 1st tier		
330 2nd tier		
260 3rd tier		
TOTAL 2708	TOTAL DECK	920
4th tier		—
TOTAL 2708	TOTAL DECK	920

CAPACITY	
Water ballast	12705 m3
Fresh water	339 m3
Heavy Fuel Oil	6403 m3
DIESEL OIL	283 m3
I.F.O.	864 m3
LUBRICATING OIL	663 m3

PRINCIPAL DIMENSIONS	
Length over all	257.67 m
Length betw perpend	247.00 m
Breadth mld	32.26 m
Depth mld	24.15 m
Draft scantling	13.03 m
Displacement	71343 ton
Light ship	22906 ton
Deadweight	48437 ton

Nedlloyd Fleet Services
Newbuilding Department

Name NEDLLOYD HOORN
SUPERCHARGED
Delivery date JAN 1979
Yard RSV - ROZENBURG - HOLLAND
Class LRS ✠ 100 A 1 + LMC + RMC - UMS



Hatch rows	3×13
Max. weight of covers =	30 ton
Number of hatches 9 fwd of deckh	
4 aft " "	
40' cells in hatch no. 6-7-10-11	
40' box below deck	320
Max stackload on covers	
20' stack 40 ton	
40' stack 80 ton	
Max stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by rods + turnbuckles	

REEFERS	
Reeferpoints on deck	77 INTEGR.
Reeferpoints in hold	—
20'- 40'- 15 kW	
RECEPTACLES 440V-3Ph-32 Amp	
PORTHOLE CONT HOLD 5	
– 352 Box (20'×8'-CONT)	
DUCT SYSTEM: CONAIR	
CIRCULATION 30/60 AIRCH/HOUR.	

SHAFT GENERATOR NONE	
max — kW	
normal — kW × 1.36/0.9 = — HP	
× — g/SHP.h × 24 = — t/day	

DIESEL GENERATORS		
Generator I	1100	kW - 900 RPM
Generator II	1100	kW - 900 RPM
Generator III	1100	kW - 900 RPM
Generator IV	1100	kW - 900 RPM
Normal electr load at sea		1250 kW
- Diesel gen. =	7,3	ton/day(IFO)
- Shaft gen. =	—	ton/day(HFO)
Norm. elec. load idle in port		880 kW
- Diesel gen. =	5,1	ton/day(IFO)
- Boiler =	1,5	ton/day(HFO)
Extra for reefers 20 FT		
Box × kW/box × HP/kW × g/HP.hr × hr		
50 × 7/8 × 1.36/0,9 × 160 × 24		
=	2,2	ton/day(IFO)

THRUSTERS	
Bowthruster 2× 736 kW, 2× 1000 HP	
Sternthruster — kW — HP	
Rudder max angle 35° (45° UP TO 16 KN)	
Stabilisers	DENNY-BROWN-AEG

MAIN ENGINE 2× SCHELDE/SULZER 8RND90M	
MCR	2× 25.440 HP - 112 RPM
85% MCR Serv. Allow.	2× 21.620 HP - 106 RPM
Fuel for main eng	HFO - 500cSt - 50°C
Fuel for aux. eng	IFO - 500cSt - 50°C
HFO = 108 × MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
$SHP_{service} = SHP_{tank} \times C_1 \times C_2$	
C_1 = margin for trial = 1,043	
C_2 = sea margin = 1.12	
Spec fuel consumption = 153 g/SHP.h	
HFO = 1.08 × MDO	

Fuel consumption in ton/day

Draft in m \ Speed in kn	18	18½	19	19½	20	20½	21	21½	22	22½	23
9.-	[illegible]	[illegible]	86½	91	96	101½	107	113	119	124½	135
9.5	76	80½	85	90	96	102½	108	114½	121	129	137
10.-	73½	79	82½	90	96½	[illegible]	[illegible]	116	123	132	141
10.5	72½	[illegible]	[illegible]	91	98	105	113	[illegible]	126	135	145
11.-	72	79	[illegible]	92½	100	107	114	120½	[illegible]	139½	150
11.5	73	80	87½	95	102½	110	117	125	[illegible]	[illegible]	[illegible]
12.-	76	83	91	99	106½	114	122	[illegible]	[illegible]	152	[illegible]
12.5	80	87½	95½	104	111½	119½	[illegible]	138½	150	[illegible]	

2× 21.620 HP × 153/2 × 24 = 159 T/D

TYPICAL LOADING CONDITION		
Draft	11.93	m
Displacement	63938	ton
Light ship	22.081	ton
Deadweight	41.857	ton
FO+DO+Lub+Dr.w.+ +Prov.+Stores	6200	ton
Water Ballast	4135	ton
	10.335	ton
TEU × T/TEU		
Hold 1794 × 12,7 =	22784	ton
Deck 688 × 12.7 =	8738	ton
Empties — × — =	—	ton
2482 × 12.7 =	31,522	ton
Centr grav hold = arm × 0,93		
box 8,5 ft × 0,45		
FO	4525	ton
DO + IFO	975	ton
Lub Oil	300	ton
Fresh Water	200	ton
Sev tanks	—	ton
Crew+prov+stores	200	ton
	6200	ton
KM	15.11	m
KG	14.66	m
GM	0.45	m
Free surface correction	0,04	m
G'M	0.41	m

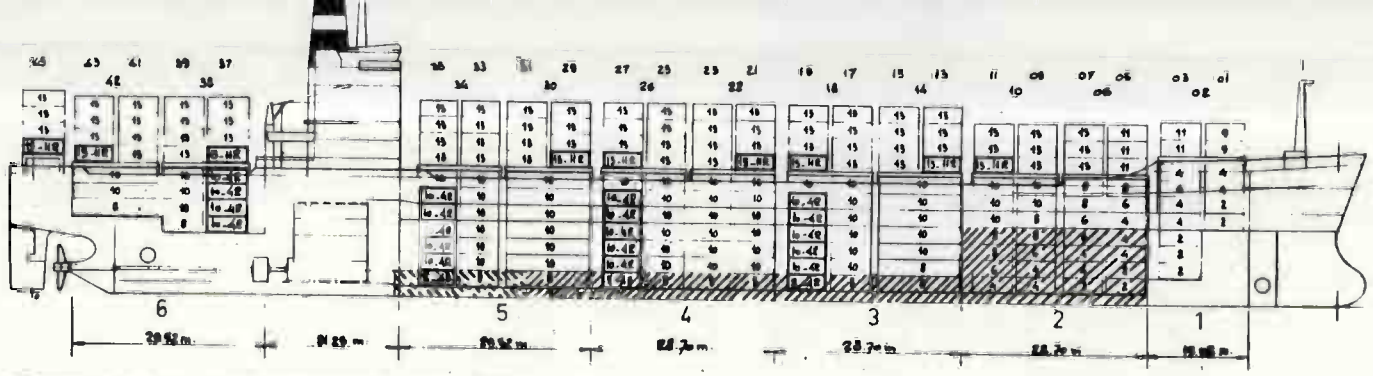
MAX TEU CAPACITY SPACE WISE		
Hold 1794 of which 320 - 40ft = 36 %		
Deck 330 1st tier		
330 2nd tier		
260 3rd tier		
TOTAL 2714	TOTAL DECK	920
4th tier		—
TOTAL 2714	TOTAL DECK	920

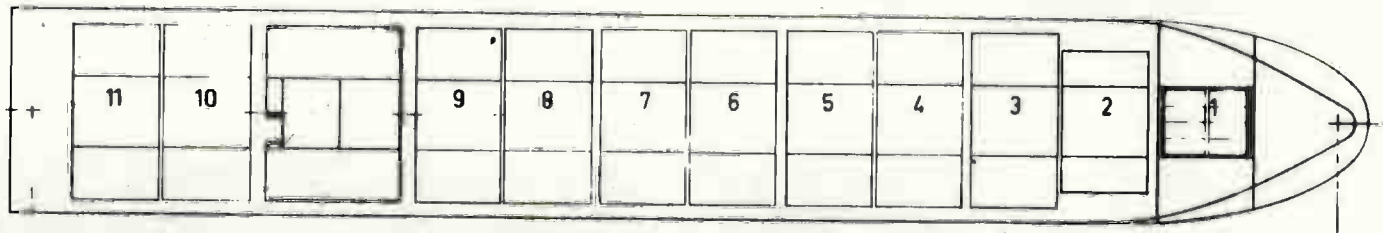
CAPACITY	
Water ballast	12,765 m3
Fresh water	339 m3
Heavy Fuel Oil	6403 m3
DIESEL OIL	283 m3
I.F.O	864 m3
LUBRICATING OIL	663 m3

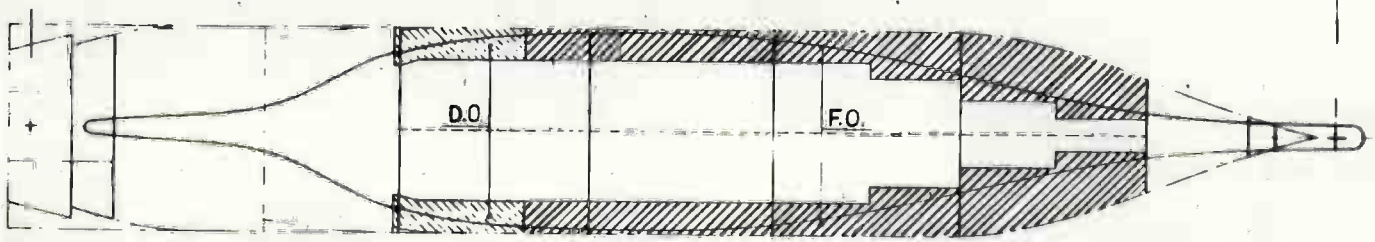
PRINCIPAL DIMENSIONS	
Length over all	257.67 m
Length betw perpend	247.00 m
Breadth mld	32.26 m
Depth mld	24.15 m
Draft scantling	13,03 m
Displacement	71 343 ton
Light ship	22.081 ton
Deadweight	49 262 ton

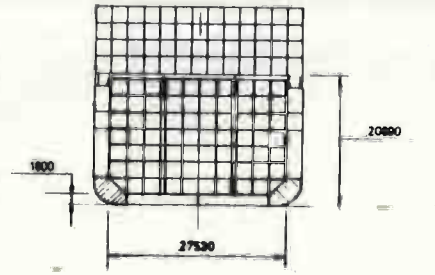
Nedlloyd Fleet Services
Newbuilding Department

Name	NEDLLOYD HOUTMAN SUPERCHARGED
Delivery date	NOV 1977
Yard	RSV. ROOZENBURG-HOLLAND
Class	LRS ✠ 100 A 1 + LMC + RMC + UMS









Hatch rows	1×1 + 10×3
Max weight of covers =	27 ton
Number of hatches 9 fwd of deckh	
2 aft	" "
40' cells in hatch no 4-8-11	
40' box below deck	160
Max stackload on covers	
20' stack 60 ton	
40' stack 90 ton	
Max stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by	
rods + turnbuckles	

INTEGRAL REEFERS	
Reeferpoints on deck : 99	
Reeferpoints in hold : 88	
- DECK 20-40' — 10 kW	
- HOLD 20' — 7.5 kW	
VENTILATION	M³/SEC.PER Box
HATCH Nº	5-7-9-10
RECEPTACLES	440V-3Ph-32A-4p

SHAFT GENERATOR	
max 1270 kW	
normal 600 kW × 1.36/0.69 = 1000 HP	
× 141 g/SHP.h × 24 = 3,4 T/day	

DIESEL GENERATORS	
Generator I	1700 kW- 600RPM
Generator II	800 kW- 720RPM
Generator III	1700 kW- 600RPM
Emergency gen	180 kW-1800RPM

Normal electr load at sea	600 kW
- Diesel gen. =	3.5 ton/day(IFO)
- Shaft gen =	3,4 ton/day(HFO)
Norm. elec.load idle in port	500 kW
- Diesel gen =	2,9 ton/day(IFO)
- Boiler =	1 ton/day(HFO)
Extra for reefers	20 FT
Box × kW/box × HP/kW × g/HP.hr × hr	
50 × 7/2 × 1.36/0.69 × 160 × 24 =	2.2 ton/day(IFO)

THRUSTERS		
Bowthruster	1200 kW =	1630 HP
Sternthruster	1200 kW =	1630 HP
Rudder max angle: 35°(45° up to 12 Kn)		
stabilisers NONE		

MAIN ENGINE B&W HYUNDAI 6L90GBE	
MCR	23800 HP- 97 RPM
85%MCR Sea Allow.	20230 HP- 97 RPM
Fuel for main eng	HFO - 600cSt-50°C
Fuel for aux eng	IFO - 180cSt-50°C
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP tank × C_1 × C_2	
C_1 = margin for trial = 1.05	
C_2 = sea margin = 1.12 Sea Allow.	
Spec fuel consumption = 141 g/SHP.h	
HFO = 108 × MDO	

Fuel consumption in ton/day

Draft in meters \ Speed in knots	17	17½	18	18½	19	19½	20
7.5	37½	40½	44	47½	51½	55½	60
8-	38	41½	45	48½	52½	57	64½
8.5	39	42½	46	50	54	58½	65½
9-	40½	44	47½	51½	56	61	66½
9.5	42	45½	49½	53½	58	64	70½
10-	43½	47½	51½	56	61	67½	75½
10.5	45½	49½	53½	58½	64	71½	81
11-	47½	51½	56½	62	68½	76½	87
11.5	49½	54½	60	66½	74½	84½	-
12-	52	57½	64½	73	82½	-	-

20230 HP × 141 × 24 = 68½ T/D

TYPICAL LOADING CONDITION	
Draft	11,66 m
Displacement	50808 ton
Light ship	14544 ton
Deadweight	36264 ton
FO+DO+Lub+Dr.w.+Prov.+Stores	5375 ton
Water Ballast	2644 ton
	28245 ton
TEU x T/ TEU	
Hold 1150 x 12,7 =	14605 ton
Deck 1074 x 12,7 =	13640 ton
Empties — x — =	— ton
2224 x 12,7 =	28245 ton
Centr grav hold = arm x 0,93	
box 8,5 ft x 0,45	
FO	3695 ton
DO	413 ton
Lub Oil	218 ton
Fresh Water	831 ton
Sev tanks	- ton
Crew+prov+stores	218 ton
	5375 ton
KM	15,06 m
KG	14,47 m
GM	0,59 m
Free surface correction	0,08 m
GM'	0,51 m

MAX TEU CAPACITY SPACE WISE			
Hold 1150 of which 160-40ft = 28 %			
Deck 271-1st tier			
291-2nd tier			
291-3rd tier			
TOTAL 2003	TOTAL UNDER	853	
221-4th tier			
TOTAL 2224	TOTAL UNDER	1074	

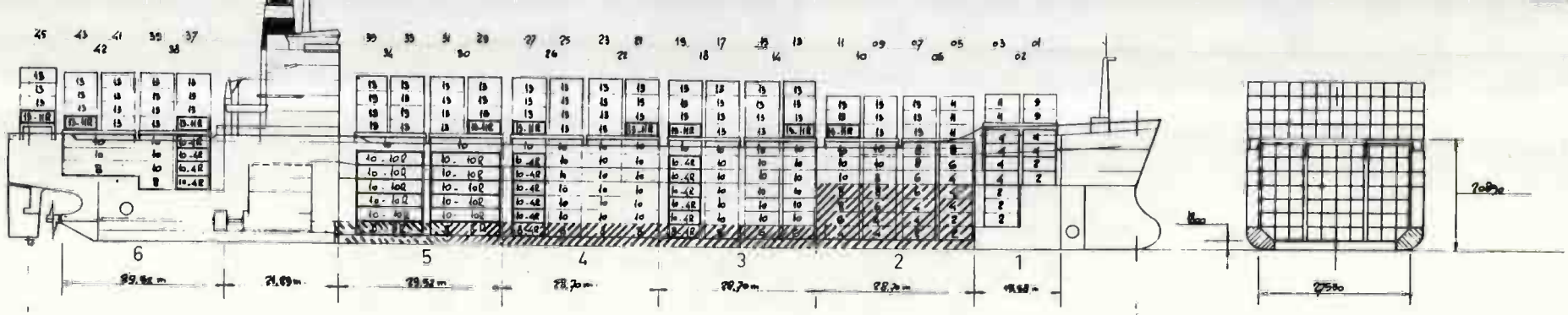
CAPACITY	
Water ballast	10480 m3
Fresh water	300 m3
Heavy Fuel Oil	4000 m3
Diesel Oil	490 m3
Lubricating Oil	230 m3

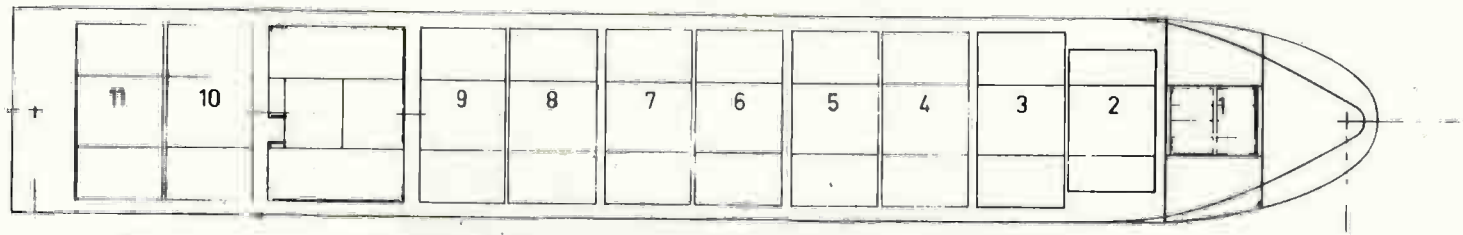
PRINCIPAL DIMENSIONS		
Length over all	210,00	m
Length betw perpend	202,00	m
Breadth mld	32,24	m
Depth mld	18,80	m
Draft scantling	12,02	m
Displacement	52895	TON
Light ship	14544	TON
Deadweight	38351	TON

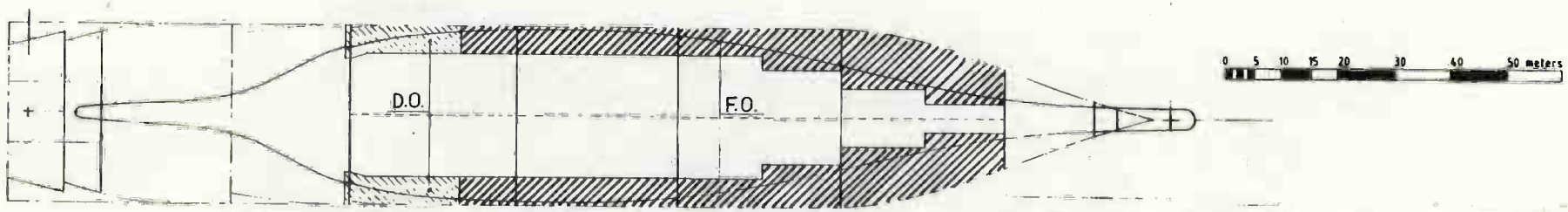
Nedlloyd Fleet Services
Newbuilding Department

Name **NEDLLOYD CLARENCE**

Delivery date SEPT. 1985
Yard HYUNDAI H.I - ULSAN-KOREA
Class LRS + 100A1-CONT SHIP + LMC+UMS







Hatch rows 1x1 + 1o = 3	
Max. weight of covers =	27 ton
Number of hatches 9 fwd of deckh	
2 aft " "	
40' cells in hatch no 8-9	
40' box below deck	64
Max. stackload on covers	
20' stack 60 ton	
40' stack 90 ton	
Max. stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by	
rods + turnbuckles	

REEFERS	
Reeferpoints on deck	98 INTEGR
Reeferpoints in hold	64 — —
- DECK 20'-40' — 10 kW	
- HOLD 20' — 7.5 kW	
VENTILAT ca 1 M³/SEC PER Box	
HATCH N° 5, 7, 10	
RECEPTACLES 440V - 3Ph - 32 Amp	
PORTHOLE CONT HOLD V — 116	
DUCT SYSTEM : CONAIR	
CIRCULATION 60/80 AIRCH/HOUR	

SHAFT GENERATOR	
max 1270 kW	
normal 600 kW x $\frac{1.36}{0.98}$ = 1000 HP	
x 141 g/SHP.h x 24 = 3.4 T/day	
DIESEL GENERATORS	
Generator I 1200 kW - 600 RPM	
Generator II 800 kW - 720 RPM	
Generator III 1200 kW - 600 RPM	
Emergency gen 180 kW - 1800 RPM	
Normal electr load at sea 600 kW	
- Diesel gen = 3.5 ton/day (IFO)	
- Shaft gen = 3.4 ton/day (HFO)	
Norm. elec. load idle in port 500 kW	
- Diesel gen = 2.9 ton/day (IFO)	
- Boiler = 1 ton/day (HFO)	
Extra for reefers 20 FT	
Box x kW/box x HP/kW x g/HP.hr x hrs	
$50 \times 7\frac{1}{2} \times \frac{1.36}{0.9} \times 160 \times 24$	
= 2.2 ton/day (IFO)	

THRUSTERS	
Bowthruster	1200 kW, 1630 HP
Sternthruster	1200 kW, 1630 HP
Rudder max angle 35° (45° up to 12 kn)	
Stabilisers	none

MAIN ENGINE B&W-HYUNDAI 6L90GBE	
MCR	23 800 HP - 97 RPM
85%MCR Serv. Allow.	20 230 HP - 97 RPM
Fuel for main eng HFO - 600 cSt - 50°C	
Fuel for aux eng IFO - 180 cSt - 50°C	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial = 1.05	
C_2 = sea margin = 1.12 (serv. allow.)	
Spec. fuel consumption = 141 g/SHP.h	
HFO = 108 x MDO	

Fuel consumption in ton/day

Draft in m \ Speed in kn	17	17½	18	18½	19	19½	20
25	39½	40½	44	47½	50½	55½	60
8-	38	41½	45	48½	52½	57	61½
8.5	39	42½	46	50	54	58½	63½
9-	40½	44	47½	51½	56	61	66½
9.5	42	45½	49½	53½	58	64	70½
10-	43½	47½	50½	56	61	67½	73½
10.5	45½	49½	53½	58½	64	71½	81
11-	47½	51½	56½	62	68½	76½	87
11.5	49½	53½	60	66½	73½	84½	—
12	52	57½	64½	73	82½	—	—

20230 HP x 141 x 24 = 68½ T/D

TYPICAL LOADING CONDITION		
Draft	11.74	m
Displacement	51 262	ton
Light ship	14 998	ton
Deadweight	36 264	ton
FO+DO+Lub+Dr.w.+ +Prov+Stores	5375	ton
Water Ballast	2646	ton
	28 245	ton
TEU x T/TEU		
Hold 1150 x 12.7 =	14 605	ton
Deck 1074 x 12.7 =	13 640	ton
Empties — x — =	—	ton
2224 x 12.7 =	28 245	ton
Centr grav hold = arm x 0.93		
box 8.5 ft x 0.45		
F.O.	3695	ton
D.O.	443	ton
Lub. Oil	215	ton
Fresh Water	831	ton
Sev. tanks	—	ton
Crew+prov+stores	218	ton
	5375	ton
KM	15.07	m
KG	14.48	m
GM	0.59	m
Free surface correction	0.08	m
GM	0.51	m

MAX TEU CAPACITY SPACE WISE			
Hold 1150 of which 164 - 40ft = 29 %			
Deck 671 1st tier			
291 2nd tier			
291 3rd tier			
total 2003	total deck	853	
221 4th tier			
total 2224	total O/D	1074	

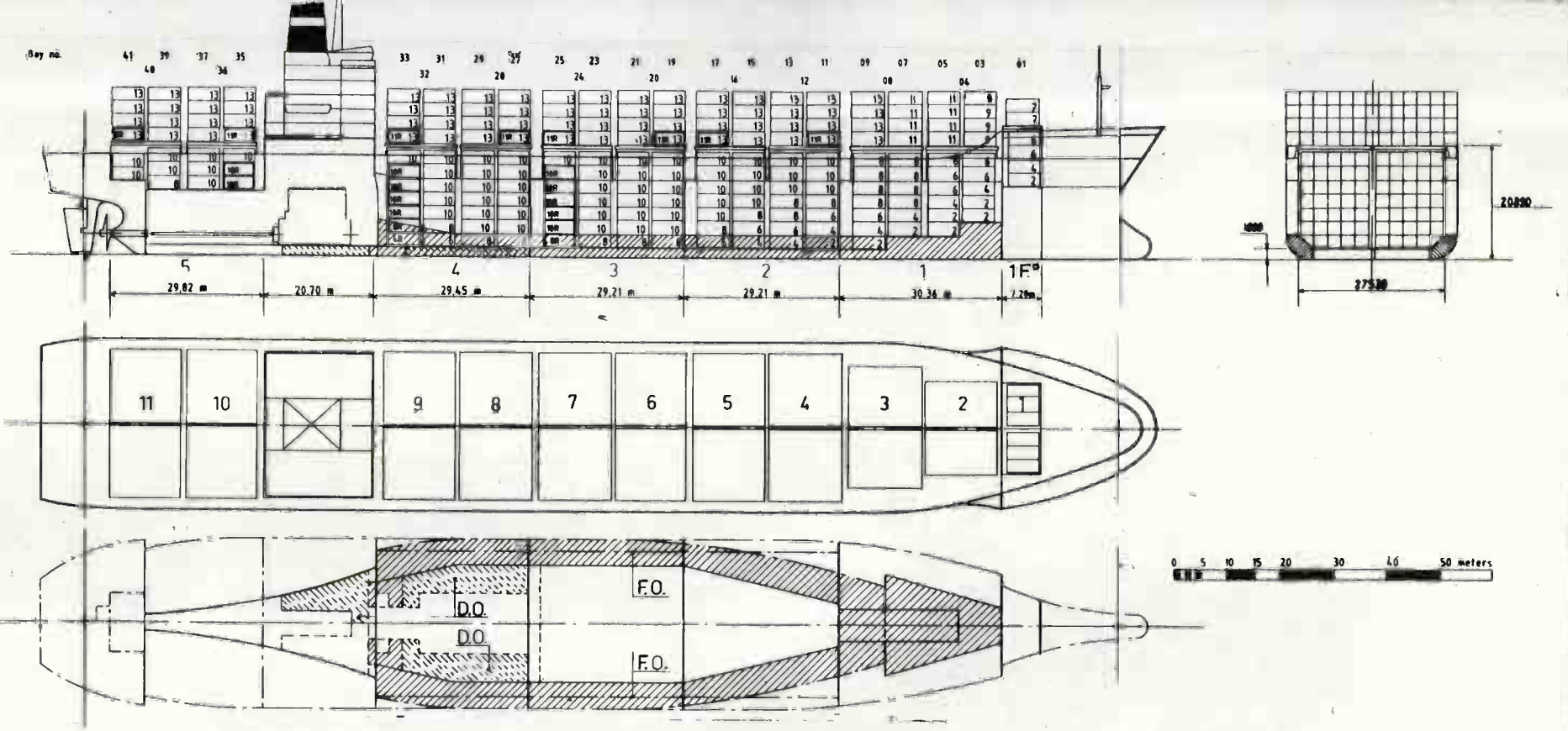
CAPACITY	
Water ballast	10480 m³
Fresh water	300 m³
Heavy Fuel Oil	4000 m³
DIESEL OIL	490 m³
LUBRICATING OIL	250 m³

PRINCIPAL DIMENSIONS	
Length over all	210.00 m
Length betw. perpend	200.00 m
Breadth mld	32.24 m
Depth mld	18.80 m
Draft scantling	12.02 m
Displacement	52 895 ton
Light ship	14 998 ton
Deadweight	37.897 ton

Nedlloyd Fleet Services
Newbuilding Department

Name NEDLLOYD CLEMENT

Delivery date DEC 1983
Yard HYUNDAI HI - ULSAN - KOREA
Class LRS ✠ 100A1 - CONT. SHIP + LMC + UMS



Hatch rows	11x2
Max. weight of covers =	30 ton
Number of hatches 9 fwd of deckh	2 aft " "
40' cells in hatch no.	—
40' box below deck	—
Max. stackload on covers	
20' stack 60 ton	
40' stack 60 ton	
Max. stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by	
rods + turnbuckles	

INTEGRAL REEFERS	
Reeferpoints on deck	88
Reeferpoints in hold	130
DECK 20'-40' —	12 kW
HOLD 20' —	9 kW
VENTILATION 1M³/SEC PER BOX	
HATCH Nº 7-9	
RECEPTACLES 440V - 3Ph - 32Amp	

SHAFT GENERATOR NONE	
max — kW	
normal — kW x $\frac{1.36}{0.82}$ = —	HP
x — g/SHP.h x 24 = —	t/day

DIESEL GENERATORS		
Generator I	1100	kW - 720 RPM
Generator II	900	kW - 720 RPM
Generator III	900	kW - 720 RPM
GENERATOR IV	900	kW - 720 RPM
EMERG GEN.	120	kW 1800 RPM
Normal electr load at sea 600 kW		
- Diesel gen. = 3,5		ton/day (1FO)
- Shaft gen. = —		ton/day (HFO)
Norm elec. load idle in port 500 kW		
- Diesel gen. = 2,9		ton/day (1FO)
- Boiler = 1		ton/day (HFO)
Extra for reefers 20 FT		
Box x kW/box x HP/kW x g/HP.hr x hr		
$50 \times 7\frac{1}{2} \times \frac{1.36}{0.9} \times 160 \times 24$		
= 2.2		ton/day (1FO)

THRUSTERS NONE		
Bowthruster	— kW,	— HP
Sternthruster	— kW,	— HP
Rudder max angle 35°		
Stabilisers NONE		

MAIN ENGINE MITS/SULZER 6RLA90	
MCR	20600 HP - 90 RPM
85%MCR Spec. allow	17260 HP - 90 RPM
Fuel for main eng	HFO - 500cSt. 50°
Fuel for aux eng	IFO - 180cSt. 50°
HFO = 108 x MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial = 1,05	
C_2 = sea margin = 1,12	Spec. allow
Spec. fuel consumption = 149 g/SHP h	
HFO = 108 x MDO	

Fuel consumption in ton/day

Draft in m	Speed in kn 15	15½	16	16½	17	17½	18	18½	19
8.5	28	30½	33½	36	39	42	45	49	52½
9.-	28	30½	33½	36½	39½	42½	46	50	54
9.5	29	31½	34½	37½	41	44	47½	52	56½
10.-	30	32½	36	39	42½	46	50	54½	59½
10.5	31½	34½	38	41	45	48½	53	58	64
11.-	33½	37	40	43½	47½	52	57	63	69
11.5	36	39½	43	47	51	56	62½	69½	—

17340 HP x 149 x 24 = 62 t/o.

TYPICAL LOADING CONDITION		
Draft	11.56	m
Displacement	45 540	ton
Light ship	13 002	ton
Deadweight	32 508	ton
FO+DO+Lub+Dr.w.+ +Prov.+Stores	4485	ton
Water Ballast	2813	ton
	25.210	ton
TEU x T/TEU		
Hold 1014 x 12.7 =	12 88₀	ton
Deck 971 x 12.7 =	12330	ton
Empties — x — =	—	ton
1985 x 12,7 =	25.240	ton
Centr.grav. hold : arm x	0,93	
box 8,5 ft x	0,45	

FO	3120 ton
DO	505 ton
Lub Oil	200 ton
Fresh Water	460 ton
Sev. tanks	— ton
Crew+prov.+stores	200 ton
	4485 ton
KM	15.35 m
KG	14.68 m
GM	0.67 m
Free surface correction	0.13 m
GM'	0.54 m

MAX TEU CAPACITY SPACE WISE			
Hold 1014 of which 0 -40ft = 0 %			
Deck 259 1st tier			
259 2nd tier			
252 3rd tier			
TOTAL 1784		TOTAL Reefer	770
252 4th tier			
TOTAL 2036		TOTAL Reefer	1022

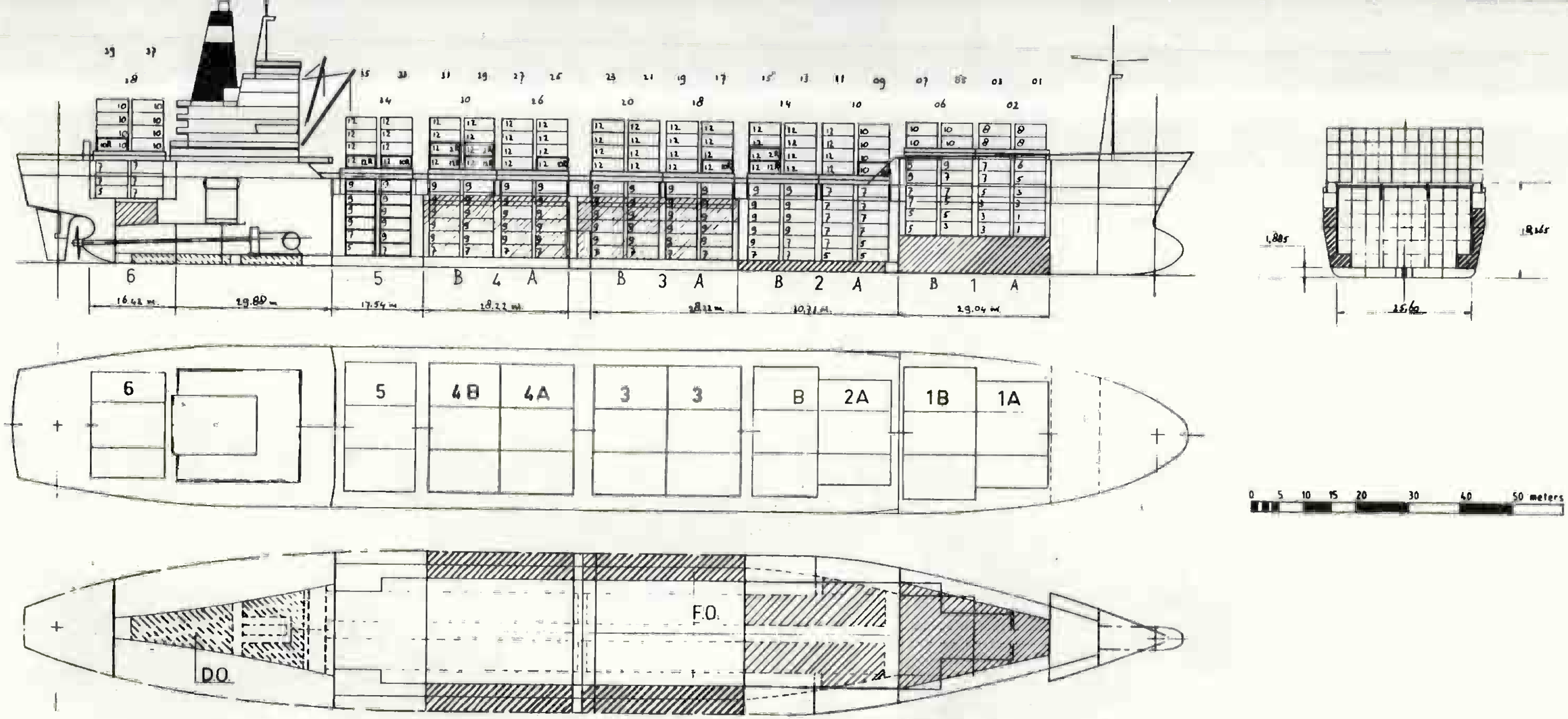
CAPACITY		
Water Ballast	2464	m³
Fresh water	460	m³
Heavy Fuel Oil	3594	m³
DIESEL OIL	611	m³
LUBRICATING OIL	206	m³

PRINCIPAL DIMENSIONS		
Length over all	211.19	m
Length betw. perpend	195.00	m
Breadth mld	32.20	m
Depth mld	19.00	m
Draft scantling	11.63	m
Displacement	45 843	ton
Light ship	13 002	ton
Deadweight	32 841	ton

Nedlloyd Fleet Services
Newbuilding Department

Name NEDLLOYD COLOMBO

Delivery date OCT 1982
Yard MITSUBISHI HI - KOBE - JAPAN
Class LRS ✚ 100 A1 CONT SHIP + LMC + UMS



Hatch rows 3 x 10	
Max. weight of covers =	30 ton
Number of hatches	9 fwd of deckh
	1 aft
Hatchcoverfittings suited for twistlocks	
Max stackload if twistlocks only	40t
If stackload exceeds 40t lash by rods + turnbuckles	

PERMISSIBLE LOAD FOR EACH CONTAINERPLACE ON TOP OF NR 2 TO NR. 6 HATCH :

FOR 20' CONTAINER = 80 TS.

FOR 40' CONTAINER = 120 TS

ON TOP OF NR 2 TO NR 6 HATCH
FOR 35' CONTAINER = 90 TS
ON TOP OF NR 1 HATCH
FOR 20' CONTAINER = 25 TS
FOR 40' CONTAINER = 37 TS

REEFERS		
Reeferpoints on deck	104	INTEGO
Reeferpoints in hold	—	—
20' - 40' — 5.5 - 7.5 KW		
RECEPTACLES 440 - 3Ph. 32Amp		
POSSIBILITY FOR PORTHOLE CONT.:		
PORTHOLE CONT HOLD #5	100	Box
" " "	—	—
(20' 8')	TOTAL 100	BOX
DUCT SYSTEM : GRENCO (BRINE)		
CIRCULATION : 30/60 AIRCH/HOUR		

SHAFT GENERATOR	NONE
max	— kW
normal	kW x $\frac{1.36}{0.85}$ = HP
x	g/SHP.h x 24 = t/day

DIESEL GENERATORS		
Generator I	860	kW - 720 RPM
Generator II	860	kW - 720 RPM
Generator III (turbo)	1600	kW - 1800 RPM
Emergency gen	120	kW - 1800 RPM
Normal electr load at sea ~1000 kW		
- MDF diesel gen	11	t/day
- MBF turbo gen	10	t/day
Idle in port ~600 kW	MDF 5-6	t/day
Boilers :	MBF 15-20	t/day

Extra for reefers
Box x kW/box x HP/kW x
x g/HP.h x h = 104 x 7½ x 1.36/0.8
x 127 x 24 x 10⁻⁶ = 3.8 t/day

THRUSTERS	NONE	
Bowthruster	— kW	HP
Sternthruster	— kW	HP
Rudder max angle 35°		
Stabilisers SIEMENS ELECTROTIN		

MAIN ENGINE

1 TURBINE, STAL LAVAL TYPE AP. 32/110
MAX OUPUT 32 150 SHP (METRIC)
2 BOILER, FOSTER WEELER TYPE E S D III.
46,5/56,- t/h EACH, 64,36 ata/510° C

MCR	22700 HP - 90	RPM
NORMAL LOAD	21000 HP - 90	RPM
Fuel for main eng (BOILER)	HFO - 600 Cst. 50°C	
Fuel for aux eng	MDO 14 Cst. 20°C	

Fuel consumption in ton/day

Draft in meters \ Speed in knots	16	16½	17	17½	18	18½	19	19½	20
8.5	74½	72	72½	80½	81½	[illegible]	92	96	[illegible]
9.-	70	73	76	79½	83	[illegible]	90½	94½	99
9.5	67	70½	74	77½	81½	85	89½	94	99
10.-	65½	69	73	77	81	85½	90	95	[illegible]
10.5	66	69½	71½	77½	82	87	92	97½	103
11.-	67½	71½	75½	80	84½	89½	96	101	107½
11.5	71	74½	79	84	88½	94	100	106	113

22700 HP x 210 x 24 x 10⁻⁶ T/D

TYPICAL LOADING CONDITION		
Draft	10,58	m
Displacement	42638	ton
Light ship	14200	ton
Deadweight	28438	ton
FO + DO + Lub + Dr.w. + Prov. + Stores	7139	ton
Water Ballast	1804	ton
	19495	ton
TEU x T/TEU		
Hold 861 x 12.7 =	10935	ton
Deck 674 x 12.7 =	8560	ton
Empties — x — =	—	ton
1535 x =	19495	ton
Centr grav hold = arm x 0.93		
box 8 ft x 0.45		
FO	6160	ton
DO	363	ton
Lub Oil	88	ton
Fresh Water	460	ton
Sev tanks	18	ton
Crew + prov + stores	60	ton
	7139	ton
KM	12.88	m
KG	12.42	m
GM	0.46	m
Free surface correction	0.05	m
GM	0.41	m

MAX. TEU CAPACITY SPACE WISE			
Hold 861	of which 314 - 40 ft = 73%		
Deck 222	1st tier 104 - 35 ft = 24%		
222	2nd tier		
186	3rd tier		
TOTAL 630		TOTAL DECK	630
186	4th tier		186
TOTAL 1677		TOTAL DECK	816

CONTAINER ARRANGEMENT

ON DECK 20/40'	ON DECK 20/35/40'	IN HOLD 35'	IN HOLD 40'
1A + 1B 5 + 6	2A + 2B + 3A + 3B + 4A + 4B	3A + 4A	1A + 1B + 2A + 2B + 3B + 4B + 5 + 6

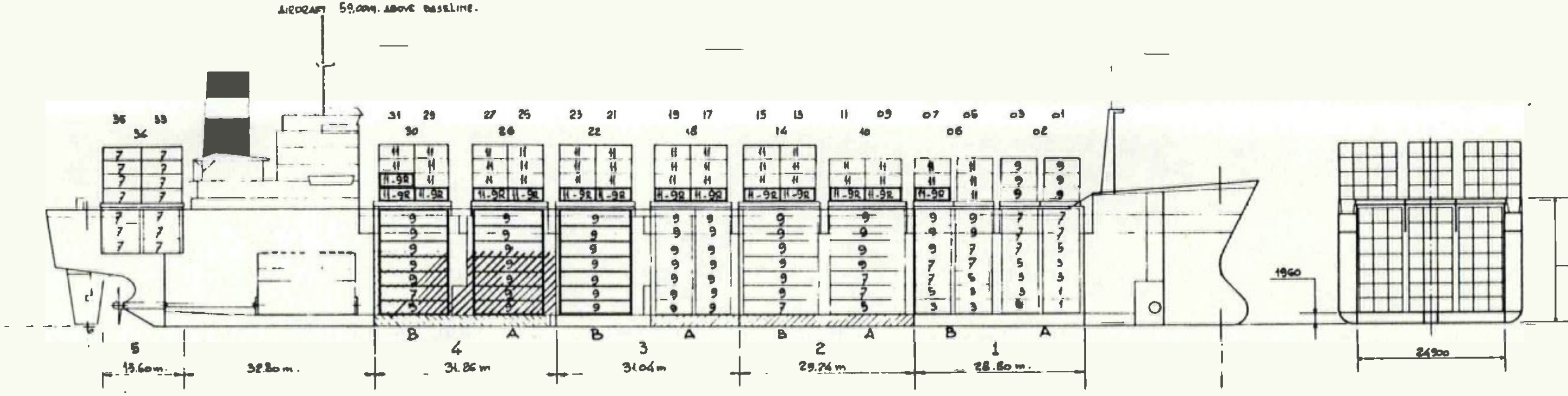
CAPACITY	
Water ballast	8058.5 m³
Fresh water	460.0
Heavy Fuel Oil	6473.9 m³
Diesel Oil	421.6 m³
Lubricating Oil	97.9 m³
DIRTY WATER	22.5 m³

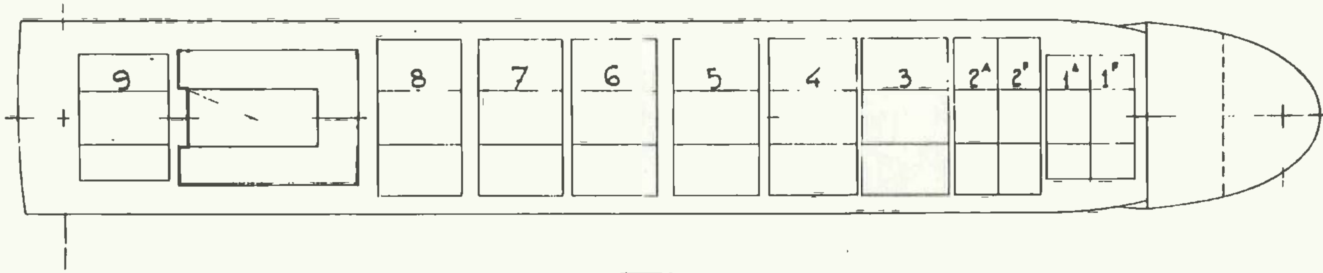
PRINCIPAL DIMENSIONS	
Length over all	225,87 m
Length betw perpend	210.00 m
Breadth mld	30.50 m
Depth mld	16.40 m
Draft scantling	11.58 m
Displacement	47550 ton
Light ship	14200 ton
Deadweight	33350 ton

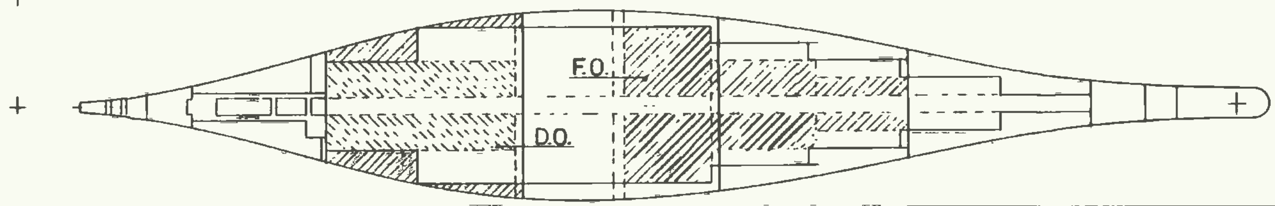
Nedlloyd Fleet Services
Newbuilding Department

Name "NEDLLOYD TASMAN"

Delivery date 1971
Yard GIESSEN - DE NOORD HOLLAND
Class G L ✠ 100 A4E + MC 16/24 + KAZ







Hatch rows	3×9
Max weight of covers =	30 ton
Number of hatches 8 fwd of deckh	
1 aft " "	
40' cells in hatch no 3-4-6-7-8	
40' box below deck	299
Max. stackload on covers	
20' stack 60,9 ton	
40' stack 91,5 ton	
Max stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by rods + turnbuckles	

REEFERS	
Reeferpoints on deck 126	INTEGR.
Reeferpoints in hold	—
20'-40' — 15 kW	
RECEPTACLES 440-3Ph-32Amp.	
PORTHOLE CONT. HOLD 3B - 57	BOX
" " " 4A - 63	"
" " " 4B - 63	"
TOTAL 183	BOX
DUCT SYSTEM	CONAIR
CIRCULATION	40/80 AIRCH./HOUR

SHAFT GENERATOR: NONE	
max — kW	
normal — kW × 1.36/0.98 = — HP	
— × — g/SHP.h × 24 = — T/day	

DIESEL GENERATORS		
Generator I	960	kW-720 RPM
Generator II	960	kW-720 RPM
Generator III	960	kW-720 RPM
GENERATOR IV	960	kW-720 RPM
EMERG. GEN	100	kW-1800 RPM
Normal electr load at sea		700 kW
- Diesel gen	= 4.1	ton/day(MDO)
- Shaft gen	= —	ton/day(HFO)
Norm elec. load idle in port		600 kW
- Diesel gen	= 3.5	ton/day(MDO)
- Boiler	= 1.0	ton/day(HFO)
Extra for reefers	20 FT	
Box × kW/box × HP/kW × g/HP.h × h		
50 × 7½ × 1.36/0.9 × 160 × 24	= 2.2	ton/day(MDO)

THRUSTERS		
Bowthruster	880 kW,	1200 HP
Sternthruster	— kW,	— HP
Rudder max angle	35°	
Stabilisers	DENNY-BROWN. AEG	

MAIN ENGINE SCHELDE-SULZER 9RND90M	
MCR	30150 HP - 122 RPM
85%MCR Serv. Allow.	25630 HP - 122 RPM
Fuel for main eng	HFO - 380 cSt at 50°C
Fuel for aux eng	MDO
HFO = 108 × MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
$SHP_{service}$ = $SHP_{TRIAL} \times C_2$	
NSMB - FROUDE	
I_2 = sea margin = 1.12	Serv. allow.
Spec fuel consumption = 161 g/SHP.h	
HFO = 108 × MDO	

Fuel consumption in ton/day

Draft in m \ Speed in kn	17½	18	18½	19	19½	20	20½	21	21½
7.5	53½	54½	57½	60½	64	68½	74½	81	88½
8	52	54	57	60½	64	69	75	82	90
8.5	52½	55	58	62	66	71	77½	84½	93
9	54	57½	60	64	69	74	80½	88½	97½
9.5	57½	60	60½	67½	72½	78½	85½	94	103½
10	62	64½	67½	71½	77½	84	91½	100	110½
10.5	67	69½	73	77	82½	90	98½	107½	119

25630 HP × 161 × 24 = 99 T/D

TYPICAL LOADING CONDITION	
Draft	10.021 m
Displacement	37428 ton
Light ship	13420 ton
Deadweight	24008 ton
FO+DO+Lub+Dr.w.+Prov+Stores	4641 ton
Water Ballast	9321 ton
	18415 ton
TEU × T/TEU	
Hold 920 × 12.7 =	11684 ton
Deck 530 × 12.7 =	6731 ton
Empties — × — =	— ton
1450 × 12.7 =	18415 ton
Centr grav hold = arm × 0.93	
box 8.5 ft × 0.45	
FO	3494 ton
DO	424 ton
Lub Oil	164 ton
Fresh Water	359 ton
Sev tanks	— ton
Crew+prov+stores	200 ton
	4641 ton
KM	14.01 m
KG	13.22 m
GM	0.79 m
Free surface correction	0.12 m
GM'	0.67 m

MAX TEU CAPACITY SPACE WISE			
Hold	918 of which 299-40ft = 65 %		
Deck	186 1st tier		
	186 2nd tier		
	186 3rd tier		
TOTAL	1476	TOTAL DECK	558
	124 4th tier		
TOTAL	1600	TOTAL DECK	682

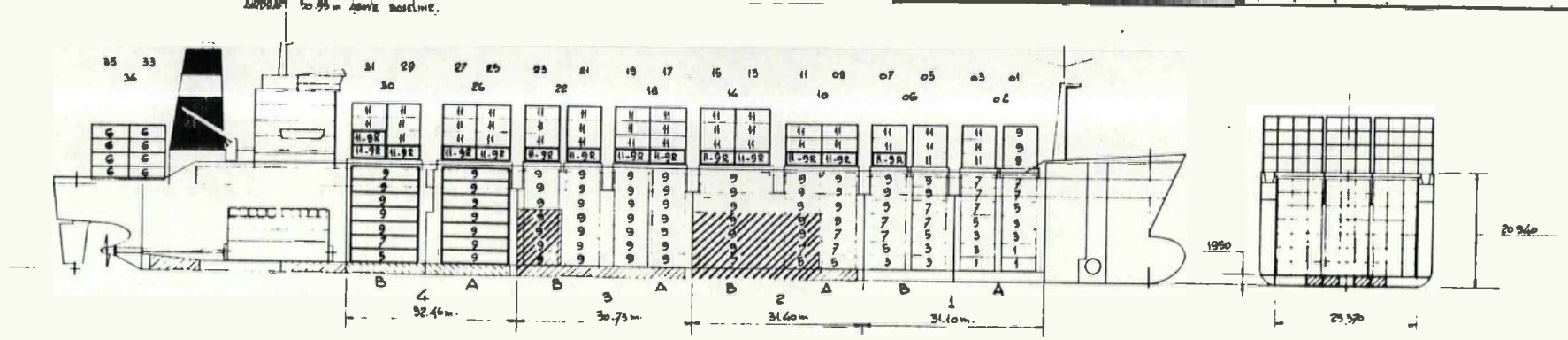
CAPACITY		
Water ballast	9514	m^3
Fresh water	306	m^3
Heavy Fuel Oil	3678	m^3
INTERM FUEL OIL	511	m^3
DIESEL OIL	493	m^3
LUBRICATING OIL	206	m^3

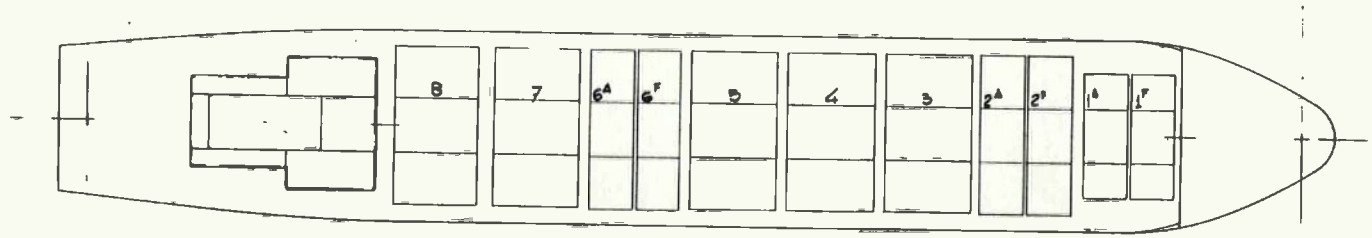
NOTE:

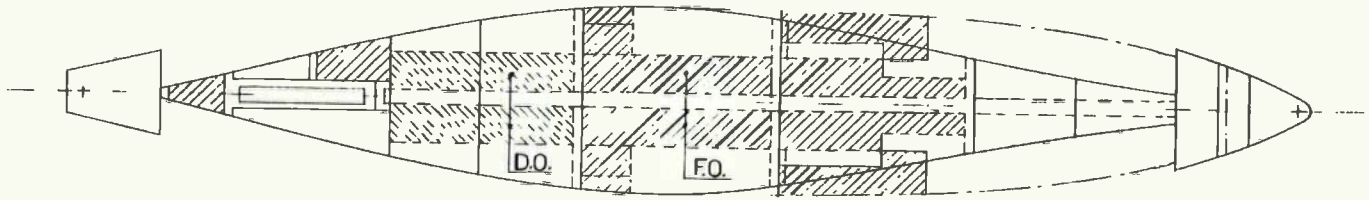
TRIM AND STABILITY CAN BE IMPROVED AND CARGO-DEADWEIGHT INCREASED BY CHANGING THE DESTINATION OF WT Nº 1F AND WT Nº 4F FROM WB. INTO H.F.O AND REVERSE.

PRINCIPAL DIMENSIONS	
Length over all	205.955 m
Length betw perpend	192.000 m
Breadth mld	30.800 m
Depth mld	18.750 m
Draft scantling	10.021 m
Displacement	37428 ton
Light ship	13420 ton
Deadweight	24008 ton

Nedlloyd Fleet Services — Newbuilding Department	
Name	"NEDLLOYD ZEELANDIA"
Delivery date	AUG 1980
Yard	V/d GIESSEN-DE NOORD, HOLLAND
Class	LRS ✠ 100A1 CONT SHIP + LMC + UMS + RMC







Hatch rows	3×8
Max weight of covers =	30 ton
Number of hatches 8 fwd of deckh	
— aft	"
40' cells in hatch no	4-7-8
40' box below deck	181
Max stackload on covers	
20' stack 42 ton	
40' stack 63 ton	
Max stackload if twistlocks only 40t	
If stackload exceeds 40t lash by	
rods + turnbuckles	

REEFERS	
Reeferpoints on deck 126	INTEGR.
Reeferpoints in hold	—
20'-40'	198 kW
RECEPTACLES 440-3Ph. 32Amp.	
POOTHOLE CONT HOLD 4- 63 Box	
" " " 48- 57 "	
TOTAL 120 Box	
DUCT SYSTEM: CONAIR.	
CIRCULATION: 40/80 AIRCH./HOUR	

SHAFT GENERATOR NONE	
max —	kW
normal — kW × 1.36 / 0.88 =	— HP
— × — g/SHP.h × 24 =	— t/day

DIESEL GENERATORS	
Generator I	960 kW - 720 RPM
Generator II	960 kW - 720 RPM
Generator III	960 kW - 720 RPM
GENERATOR IV	960 kW - 720 RPM
EMERG GEN	100 kW - 1800 RPM
Normal electr load at sea 700 kW	
- Diesel gen = 4.1	ton/day (MDO)
- Shaft gen = —	ton/day (HFO)
Norm. elec. load idle in port 600 kW	
- Diesel gen = 3.5	ton/day (MDO)
- Boiler = 1.0	ton/day (HFO)
Extra for reefers — 20	m³
Box × kW/box × HP/kW × g/HP.hr × hr	
50 × 7½ × 1.36 / 0.88 × 160 × 24	
= 2.2	ton/day (MDO)

THRUSTERS	
Bowthruster	880 kW, 1200 HP
Sternthruster	— kW, — HP
Rudder max angle 35°	
Stabilisers DENNY-BROWN-AEG	

MAIN ENGINE CEGIELSKI/SULZER 6RND 68	
MCR	29000 HP - 122 RPM
85% MCR Sea Allow	24650 HP - 116 RPM
Fuel for main eng	HFO. 380 c St - 50 °C
Fuel for aux eng	MDO
HFO = 1.08 × MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP trial × C2	
HSVA - TESTS	
C2 = sea margin —	= 1.12 × Sea Allow
Spec fuel consumption = 166 g/SHP.h	
HFO = 1.08 × MDO	

Fuel consumption in ton/day

Draft m	Speed in kn 17½	18	18½	19	19½	20	20½	21	21½
7.5	63	65½	68½	72	76	81	86	92	97½
8.-	60	62	64½	67½	72½	77	82½	88½	94½
8.5	56½	58½	60½	65	69	74	79½	84½	91½
9.-	54	56½	59½	63	67½	72½	79	86	93
9.5	53	55	59	64	69	75	82	90	97½
10.-	54½	57½	63	69½	76	83½	91½	100	111
10.5									

24650 HP × 166 × 24 = 98 t/h

TYPICAL LOADING CONDITION		
Draft	10.028 m	
Displacement	36.972 ton	
Light ship	13.410 ton	
Deadweight	23.562 ton	
FO+DO+Lub+Dr.w.+ Prov+Stores	4.708 ton	
Water Ballast	998 ton	
	17856 ton	
TEU × T/TEU		
Hold 878 × 12.7 =	11.150 ton	
Deck 528 × 12.7 =	6.706 ton	
Empties — × — =	— ton	
1406 × 12.7 =	17856 ton	
Centr grav hold = arm × 0.93		
box 8.5 ft × 0.45		
FO	3295 ton	
DO	630 ton	
Lub Oil	105 ton	
Fresh Water	440 ton	
Sev Tanks	38 ton	
Crew+prov+stores	200 ton	
	4708 ton	
KM	13.12 m	
KG	12.77 m	
GM	0.35 m	
Free surface correction	0.05 m	

MAX TEU CAPACITY SPACE WISE			
Hold 878 of which 181-40 ft = 41%			
Deck 186 1st tier			
186 2nd tier			
186 3rd tier			
TOTAL 1436	TOTAL DECK	558	
122 4th tier		122	
TOTAL 1558	TOTAL HOLD	680	

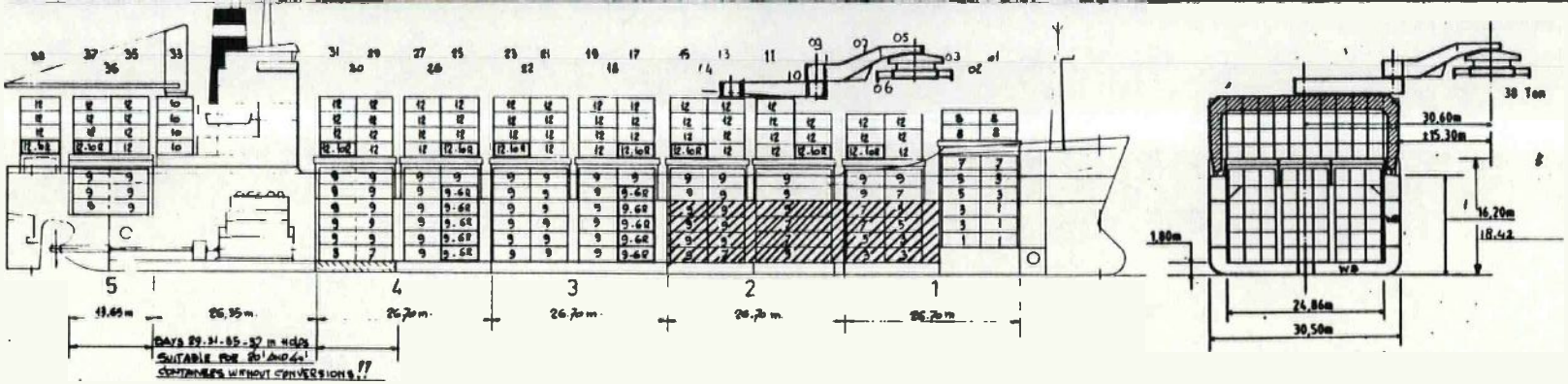
CAPACITY	
Water ballast	7955 m³
Fresh water	418 m³
Heavy Fuel Oil	3499 m³
DIESEL OIL	733 m³
LUBRICATING OIL	157 m³

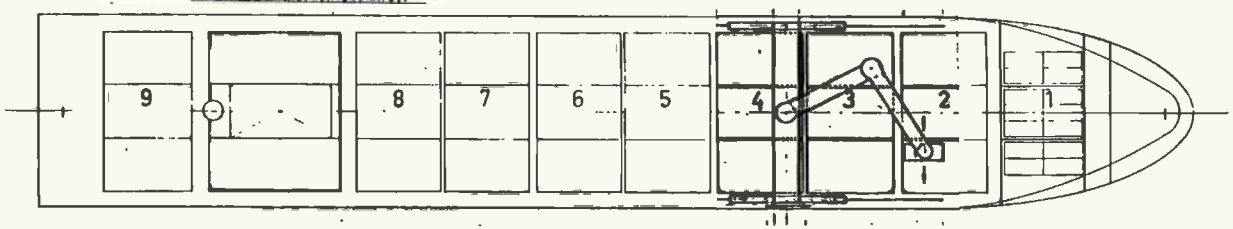
PRINCIPAL DIMENSIONS	
Length over all	203.95 m
Length betw perpend	193.10 m
Breadth mld	30.80 m
Depth mld	18.80 m
Draft scantling	10.09 m
Displacement	36.972 ton
Light ship	13.410 ton
Deadweight	23562 ton

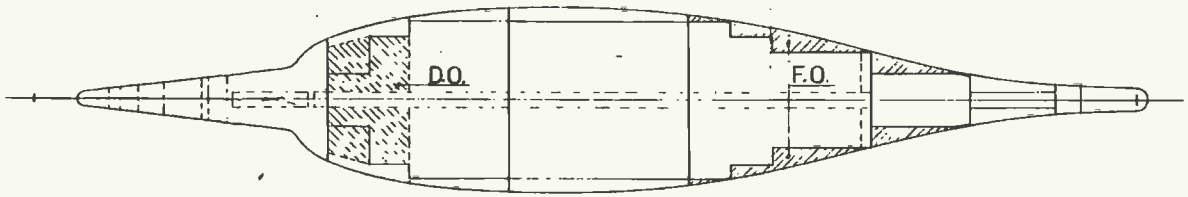
Nedlloyd Fleet Services
Newbuilding Department

Name "NEDLLOYD HOLLANDIA"

Delivery date APRIL 1977
Yard IM LENINA - GDANSK. POLAND
Class LRS ✠ 100A1 - CONT SHIP + LMC + UMS + RMC.







0 5 10 15 20 30 40 50 meters

Hatch rows	9 x 3
Max weight of covers =	19 ton
Number of hatches	8 fwd of deckh
	1 aft " "
40' cells in hatch no.	3-8-9
40' box below deck	117
Max stackload on covers	
20' stack	66 ton
40' stack	90 ton
Max stackload if twistlocks only 40'	
If stackload exceeds 40': lash by	
	rods + turnbuckles

INTEGRAL REEFERS	
Reeferpoints on deck	90
Reeferpoints in hold	60
DECK 20'-40'	9.5 KW
HOLD 20'	6.5 KW
VENTILATION 1 M³/SEC PER BOX	
HATCH 5-7	
RECEPTACLES 440V-3 Ph-32 Amp	

SHAFT GENERATOR	
max	1300 kW
normal	600 kW x 1.36 = 1000 HP
	x 143 g/SHP.h x 24 = 3.4 t/day

DIESEL GENERATORS		
Generator I	1500 kW	720 RPM
Generator II	1500 kW	720 RPM
Generator III	700 kW	720 RPM
Emergency gen.	160 kW	800 RPM

Normal electr load at sea	600 kW
- Diesel gen. =	3.5 ton/day(IFO)
- Shaft gen. =	3.4 ton/day(HFO)
Norm. elec. load idle in port	450 kW
- Diesel gen. =	2.9 ton/day(IFO)
- Boiler =	1.0 ton/day(HFO)
Extra for reefers	20 FT
Box x kW/box x HP/kW x g/HP.hr x hr:	
50 x 7/8 x 1.36/0.8 x 160 x 24	
= 22 ton/day(IFO)	

THRUSTERS		
Bowthruster	900 kW,	1220 HP
Sternthruster	900 kW,	1220 HP
Rudder max angle 35° (45° up to 12m)		
Stabilisers	NONE	

MAIN ENGINE SCHELDE/SULZER 5 RLB 90	
MCR	20.000 HP - 102 RPM
85%MCR Service Allow.	17.000 HP - 102 RPM
Fuel for main eng	HFO - 600 cSt. 50°C
Fuel for aux. eng	IFO - 100 cSt. 50°C
HFO = 1.08 x MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial =	1.05
C_2 = sea margin =	1.12 Service Allow.
Spec. fuel consumption =	143 g/SHP.h
HFO = 1.08 x MDO	

Fuel consumption in ton/day

Draft m \ Speed in kn	14	14½	15	15½	16	16½	17	17½	18	18½	19
8.-	21	23	25	27½	30	32½	35	37½	40	43	47
8.5	21½	23½	25½	28	27	33	35½	38	41	44	48
9.-	22	24	26½	29	31½	34	37	39½	42½	46	50
9.5	23	25	27½	30	32½	35½	38½	41½	45	50	54½
10.-	24	26½	28½	31½	34	37	40	43	47	51	55½
10.6	26	28	32	35	38	41½	45	48½	53	58	63

17.000 HP x 143 = 24 - 58 % %

TYPICAL LOADING CONDITION		
Draft	10.48	m
Displacement	37.062	ton
Light ship	10.720	ton
Deadweight	26.342	ton
FO+DO+Lub+Dr.w.+ +Prov+Stores	3505	ton
Water Ballast	2060	ton
	20777	ton
TEU x T/ TEU		
Hold 784 x 12.7 =	9957	ton
Deck 852 x 12.7 =	10820	ton
Empties — x — =	—	ton
1636 x 12.7 =	20.777	ton
Centr grav hold = arm x	0.95	
box 8.5 ft x	0.45	

FO	2509	ton
DO	344	ton
Lub Oil	113	ton
Fresh Water	372	ton
Sev. tanks	—	ton
Crew+prov+stores	200	ton
	3505	ton
KM	14.37	m
KG	13.90	m
GM	0.47	m
Free surface correction	0.07	m
GM	0.40	m

MAX. TEU CAPACITY SPACE WISE			
Hold	784	of which 117 - 40 ft = 30 %	
Deck	214	1st tier	
	230	2nd tier	
	230	3rd tier	
TOTAL	4458	TOTAL DECK	674
	178	4th tier	
TOTAL	1636	TOTAL DECK	852

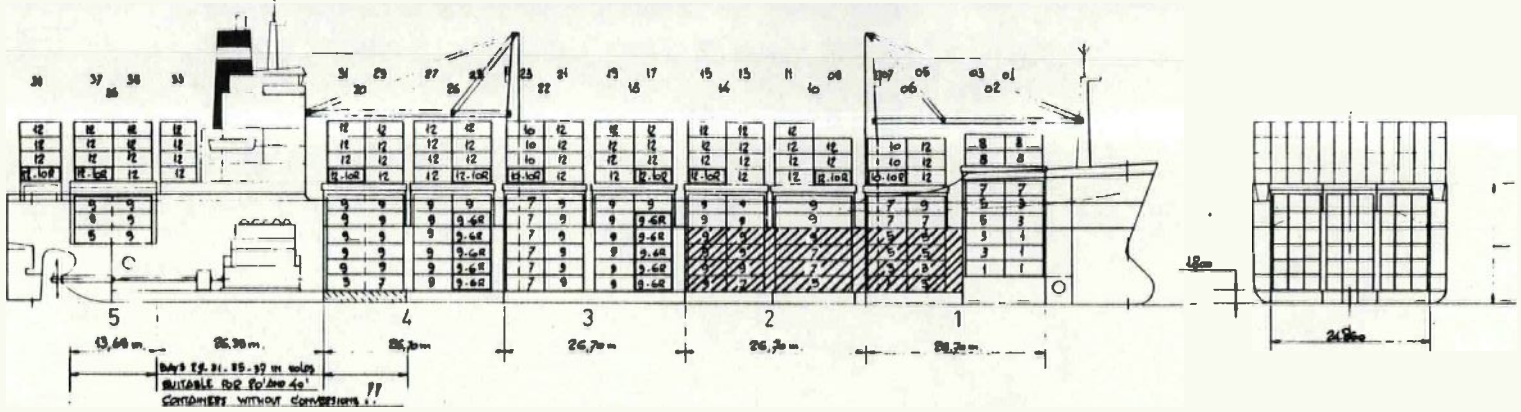
CAPACITY		
Water ballast	7874	m3
Fresh water	411	m3
Heavy Fuel Oil	2883	m3
Diesel Oil	366	m3
Lubricating Oil	281	m3

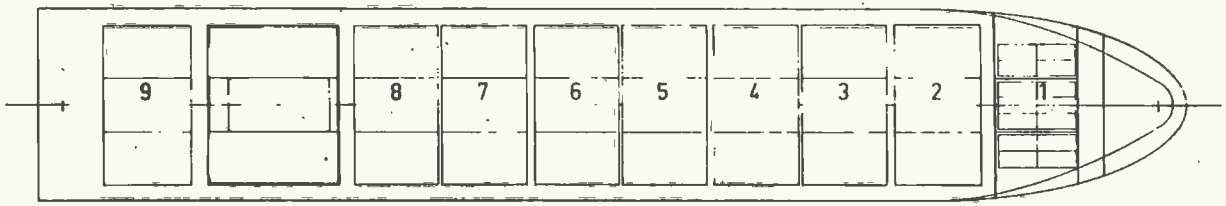
PRINCIPAL DIMENSIONS		
Length over all	182.73	m
Length betw. perpend	174.00	m
Breadth mid	30.50	m
Depth mid	16.20	m
Draft scantling	11.27	m
Displacement	40.760	ton
Light ship	10.720	ton
Deadweight	30.040	ton

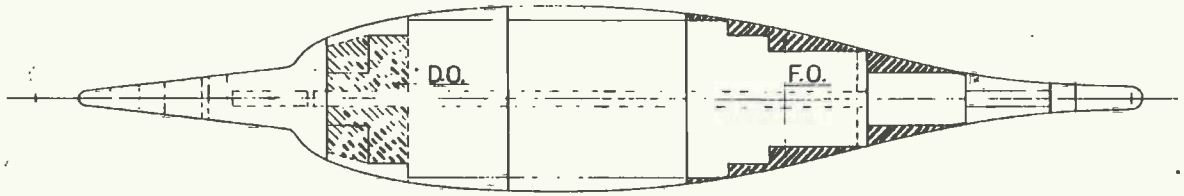
Nedlloyd Fleet Services
Newbuilding Department

Name NEDLLOYD van NECK.

Delivery date DEC 1983
Yard ½ G.N. - KAMPEN ½ IJSSEL
Class BV ✠ I - 3/3 E - CONT. HAUTE MER AUT.







0 5 10 15 20 30 40 50 meters

Hatch rows	9 x 3
Max weight of covers =	49 ton
Number of hatches	8 fwd of deckh.
	1 aft " "
40' cells in hatch no.	3-8-9
40' box below deck	117
Max stackload on covers	
20' stack	60 ton
40' stack	90 ton
Max stackload if twistlocks only 40t	
If stackload exceeds 40t: lash by	
rods + turnbuckles	

INTEGRAL REEFERS	
Reeferpoints on deck	90
Reeferpoints in hold	60
DECK: 20'-40'-	9.5 kW
HOLD: 20' -	6.5 kW
VENTILATION: 1 M³/SEC PER BOX	
HATCH - 5-7	
RECEPTACLES 440 V. 3 Ph. 32 Amp.	

SHAFT GENERATOR	
max 1300 kW	
normal 600 kW x $\frac{1.36}{0.88}$ =	1000 HP
x 143 g/SHP.h x 24 =	3,4 t/day

DIESEL GENERATORS		
Generator I	1500 kW	720 RPM
Generator II	1500 kW	720 RPM
Generator III	700 kW	720 RPM
EMERG. GEN.	160 kW	1800 RPM

Normal electr load at sea	600 kW
- Diesel gen. =	3,5 ton/day(IFO)
- Shaft gen. =	3,4 ton/day(HFO)
Norm. elec. load idle in port	450 kW
- Diesel gen. =	2,9 ton/day(IFO)
- Boiler =	1,0 ton/day(HFO)
Extra for reefers	20 FT
Box x kW/box x HP/kW x g/HP.hr x hr	
$\frac{30 \times 7\frac{1}{2} \times 1.36}{0.9} \times 160 \times 24$	
=	2.2 ton/day(IFO)

THRUSTERS		
Bowthruster	900 kW	1220 HP
Sternthruster	900 kW	1220 HP
Rudder max angle	35° (45° up to 12 kn)	
Stabilisers	NONE	

MAIN ENGINE SOELOE/SULZER 5RLB90	
MCR	20.000 HP - 102 RPM
85%MCR $^{serv.}_{allow.}$	17.000 HP - 102 RPM
Fuel for main eng.	HFO - 600 c St. 50°C
Fuel for aux. eng.	IFO - 100 c St. 50°C
HFO = 100 x MDO	
Heavy Fuel Oil consumption excl shaft generator in tons/day	
SHP $_{service}$ = SHP $_{tank}$ x C_1 x C_2	
C_1 = margin for trial =	1.06
C_2 = sea margin =	1.12 $^{serv.}_{allow.}$
Spec. fuel consumption =	143 g/SHP.h
HFO = 100 x MDO	

Fuel consumption in ton/day

Draft m	Speed in kn 4	5	6	7	8	9	10	11	12	13	14	15
8.-	21	23	25	27½	30	32½	35	37½	40	43	47	
8.5	21½	23½	25½	27	30½	33	35½	38	41	44	48	
9.-	22	24	26½	28½	31½	35½	37	39	42½	46	50½	
9.5	23	25	27½	30	32½	35½	38½	42½	45½	50	54½	
10.-	24	26½	29	31½	34½	38½	42	45½	50	55	60	
10.6	26	29	32	35	39	43	47½	53	58½	64	-	

17000 HP x 143 x 24 = 58,2 %

TYPICAL LOADING CONDITION		
Draft	10.43	m
Displacement	36.791	ton
Light ship	10.830	ton
Deadweight	25.961	ton
FO+DO+Lub+Dr.w.+Prov.+Stores	3505	ton
Water Ballast	2060	ton
	20396	ton
TEU x t/TEU		
Hold 760 x 12.7 =	9652	ton
Deck 846 x 12.7 =	10.744	ton
Empties — x — =	—	ton
1606 x 12.7 =	20396	ton
Centr.grav. hold = arm x	0,93	
box 8,5 ft x	0,45	

FO	2509	ton
DO	311	ton
Lub. Oil	113	ton
Fresh Water	372	ton
Sev. tanks	—	ton
Crew+prov+stores	200	ton
	3505	ton
KM	14.37	m
KG	13.99	m
GM	0.38	m
Free surface correction	0.07	m
GM'	0,31	m

MAX. TEU CAPACITY SPACE WISE			
Hold 760 of which 117 - 40 ft = 31 %			
Deck 212 1st tier			
228 2nd tier			
228 3rd tier			
TOTAL 1428		TOTAL REEFER	668
178 4th tier			
TOTAL 1606		TOTAL DECK	846

CAPACITY		
Water ballast	7874	m³
Fresh water	411	m³
Heavy Fuel Oil	2883	m³
Diesel Oil	366	m³
Lubricating Oil	281	m³

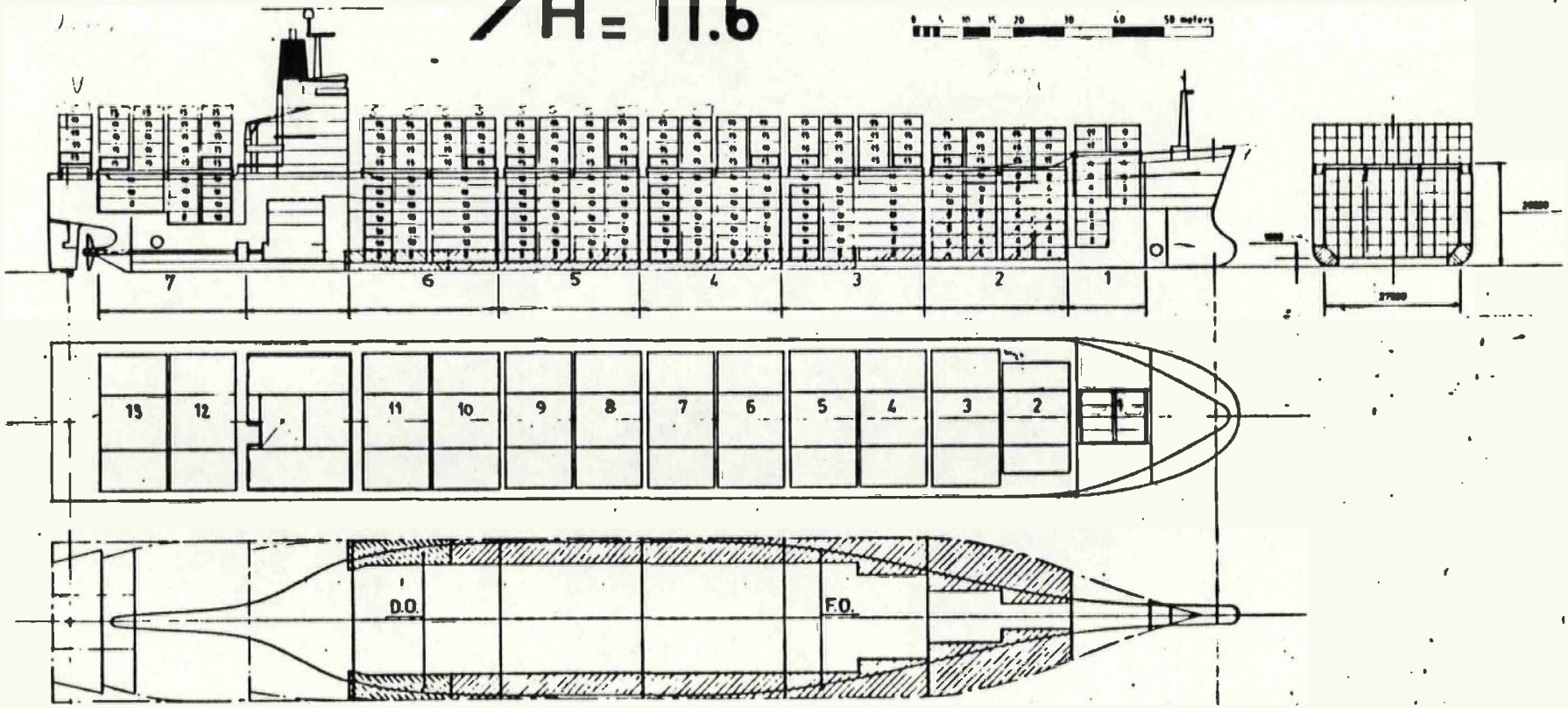
PRINCIPAL DIMENSIONS		
Length over all	182,50	m
Length betw. perpend.	174,00	m
Breadth mld	30.50	m
Depth mld	16.20	m
Draft scantling	11.27	m
Displacement	40.760	ton
Light ship	10.830	ton
Deadweight	29.930	ton

Nedlloyd Fleet Services
Newbuilding Department

Name NEDLLOYD VAN NOORT
NEDLLOYD VAN DIEMEN

Delivery date APRIL - JULY 1986.
Yard ½ G-M-KRIMPEN ½ 999EL
Class BV ✠ I - 3/3 E - CONT HAUTE MER ΔUT.

L/H = 11.6



EVERGREEN - TYPE

DEVELOPED FROM

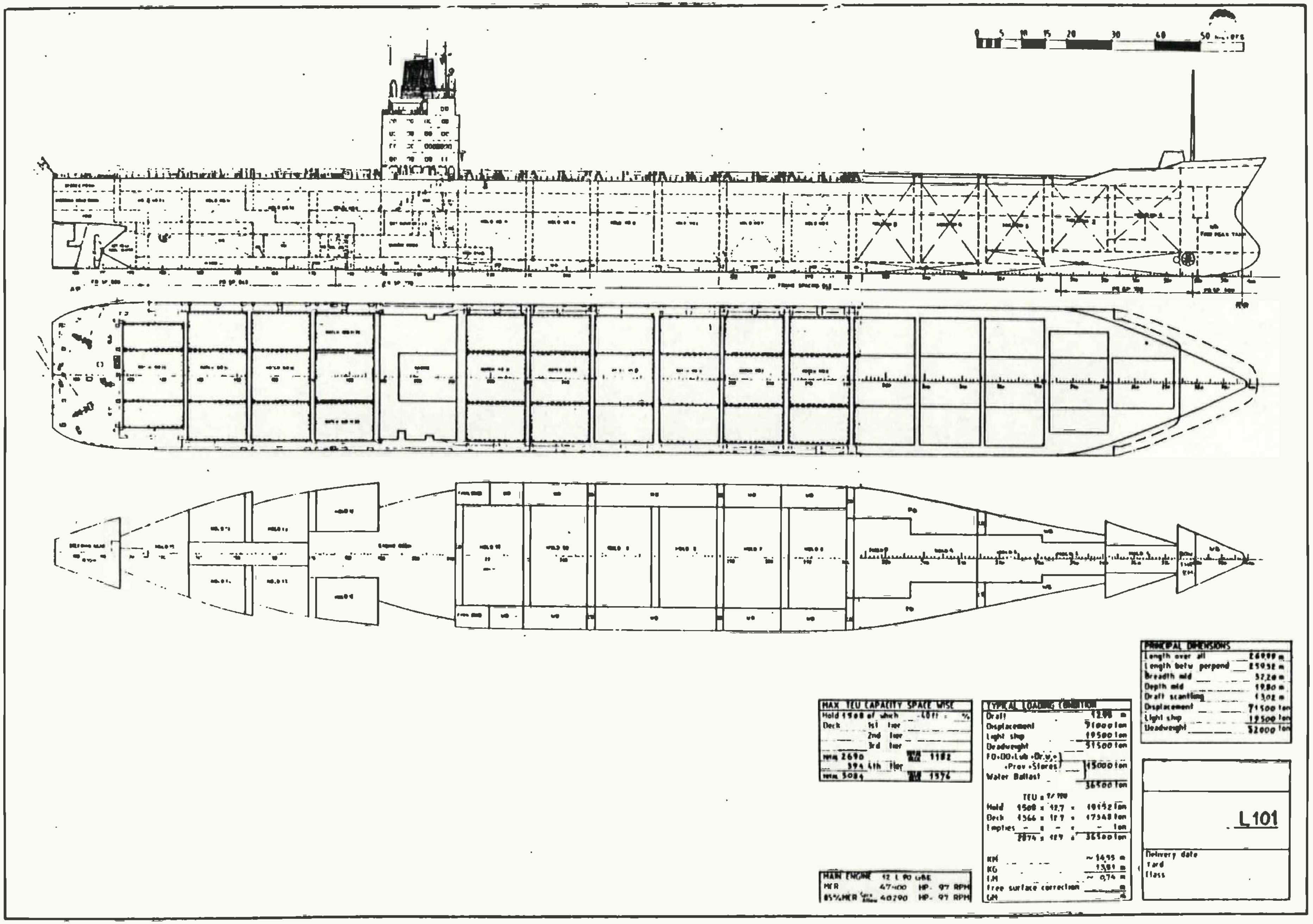
NL CLARENCE + 2 HATCHES

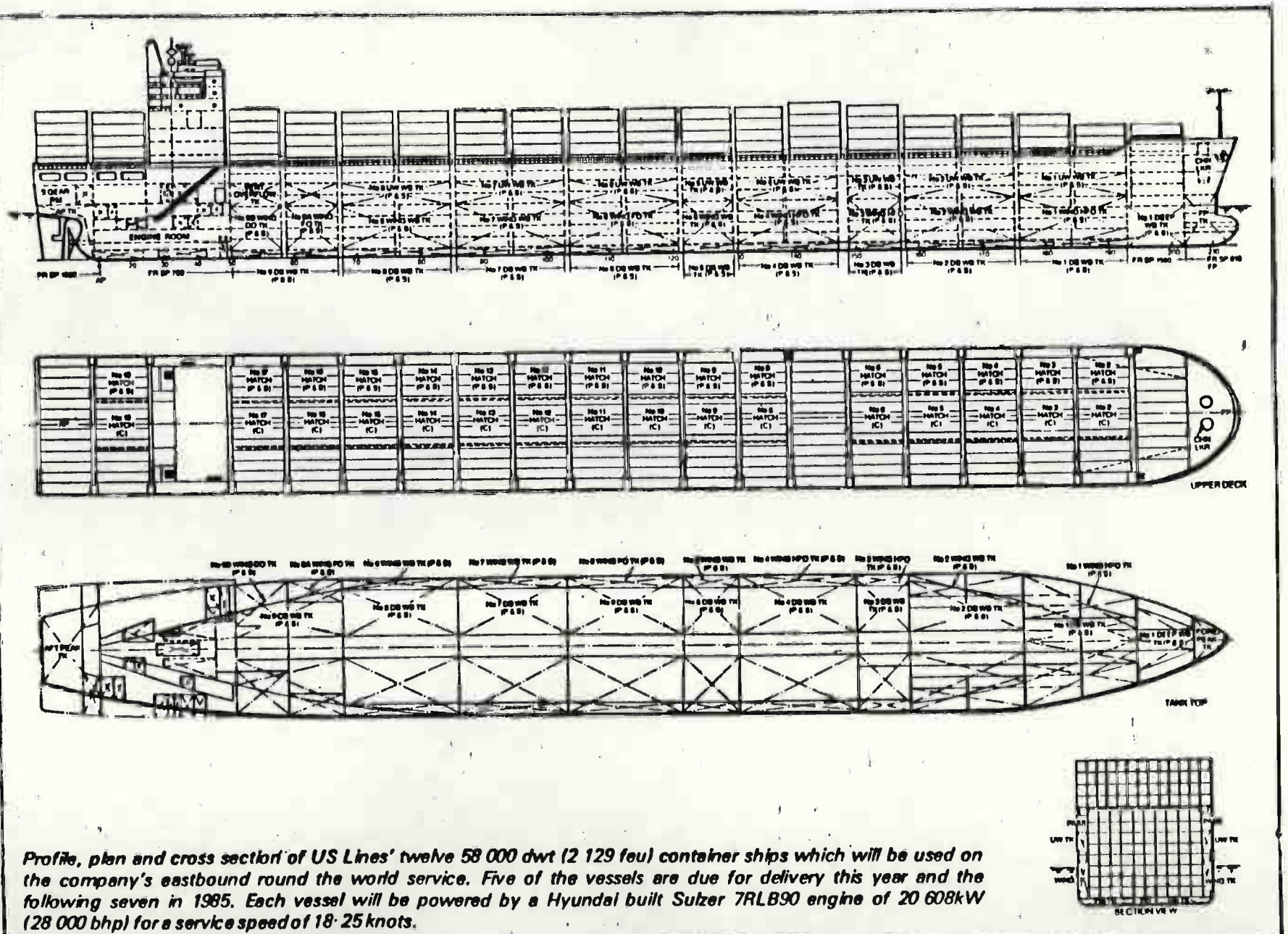
Loa = 230.5 m
Lpp = 216,32 m
B = 32,20 m
H = 18,65 m
T$_M$ = 11,60 m
DW = 42700 Tons

SPACE WISE :

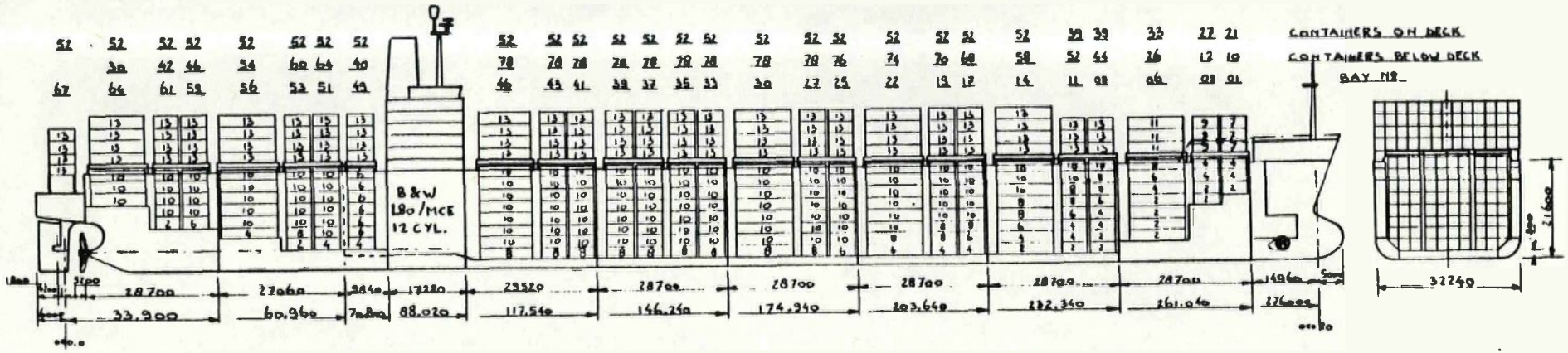
2224 + 4 x 120 = 2704 TEU

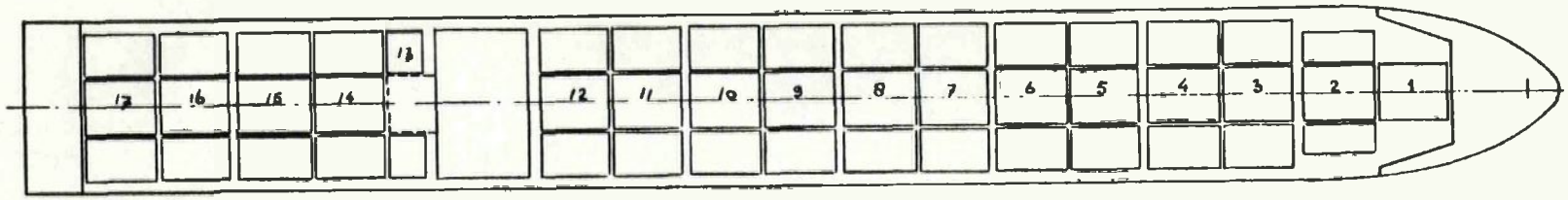
PUBLICATION : 2748 TEU

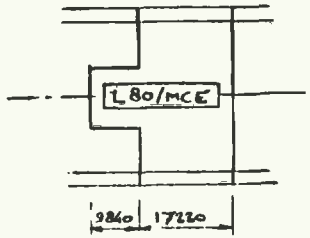

0 5 10 15 20 30 40 50 meters
MAX TEU CAPACITY SPACE WISE
Hold 1508 of which
Deck 1st tier
2nd tier
3rd tier
2690
394 4th tier
5084
1182
1576
MAIN ENGINE 12 L 90 GBE
MCR 47400 HP. 97 RPM
85%MCR 40290 HP. 97 RPM
TYPICAL LOADING CONDITION
Draft 12.98 m
Displacement 71000 ton
Light ship 19500 ton
Deadweight 51500 ton
FO+DO+Lub+Dr.w.+Prov+Stores 15000 ton
Water Ballast
36500 ton
Hold 1508 x 12.7 = 19152 ton
Deck 1366 x 12.7 = 17348 ton
Empties
36500 ton
KM ~ 14.95 m
KG 13.81 m
LM ~ 0.74 m
Free surface correction m
GM
PRINCIPAL DIMENSIONS
Length over all 269.99 m
Length betw perpend 259.32 m
Breadth mld 37.20 m
Depth mld 19.80 m
Draft scantling 13.02 m
Displacement 71500 ton
Light ship 19500 ton
Deadweight 52000 ton
L101
Delivery date
Yard
Class



Profile, plan and cross section of US Lines' twelve 58 000 dwt (2 129 feu) container ships which will be used on the company's eastbound round the world service. Five of the vessels are due for delivery this year and the following seven in 1985. Each vessel will be powered by a Hyundai built Sulzer 7RLB90 engine of 20 608kW (28 000 bhp) for a service speed of 18·25 knots.







CONTAINER CAPACITY

WITH 3 TIERS ON DECK	3210 T.E.U.
WITH 4 TIERS ON DECK	3574 T.E.U.

	20'	40'	
IN HOLD	1130	358	= 41.3 %
ON DECK (3 TIERS)	750	247	= 41.6 %
TOTAL (3 TIERS)	1880	665	= 41.4 %
TOTAL (4 TIERS)	2088	743	= 41.6 %

PRINCIPAL PARTICULARS

LAA	287.00 M.
LPP	277.80 M.
LOA B.B.	276.00 M.
B MLD	32.24 M.
H	21.60 M.

MAIN ENGINE B&W 12 L80/MCE

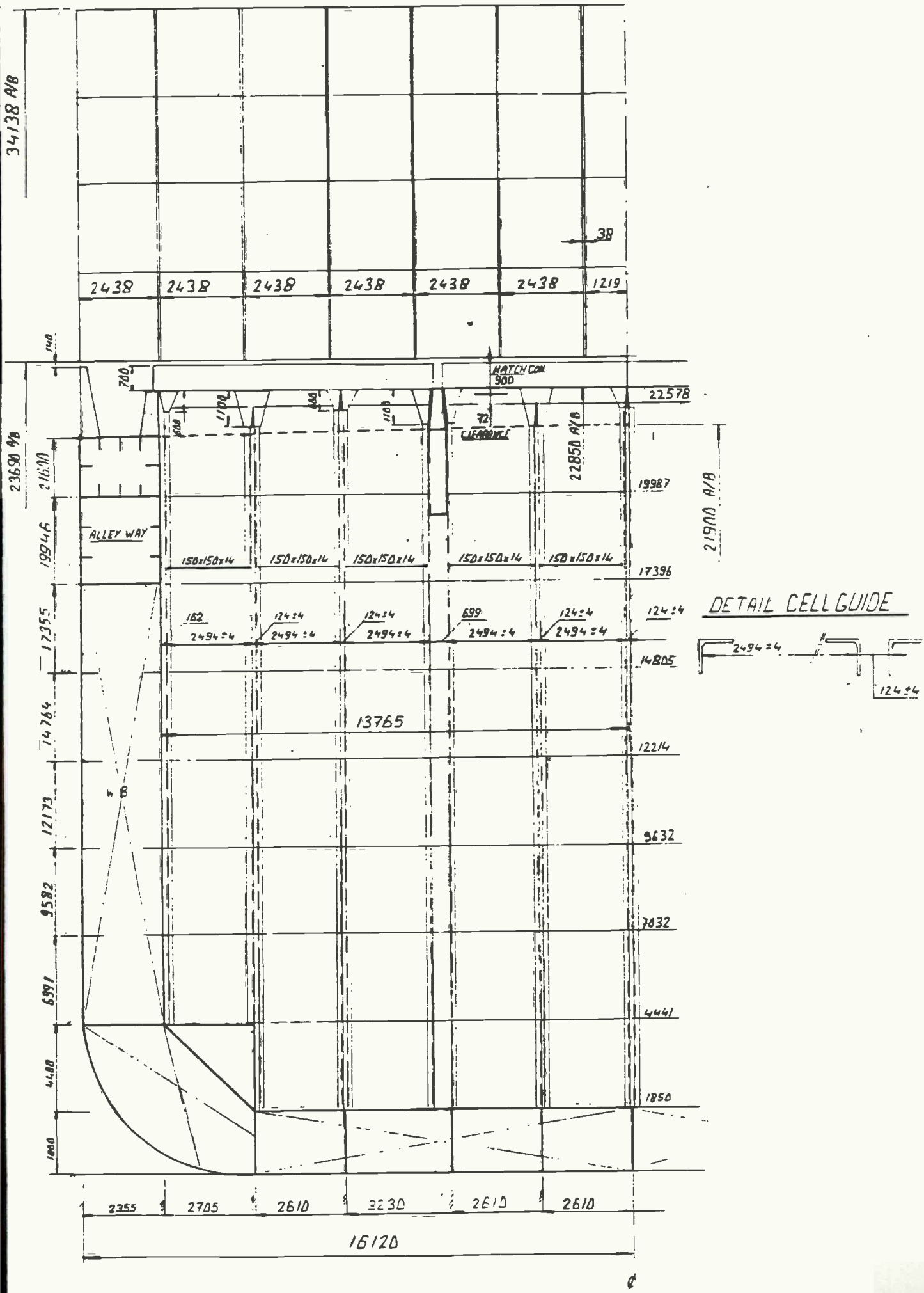
Nedlloyd Fleet Services
Newbuilding Department

NEDLLOYD PANMAX
10 ACROSS - 8 HIGH

Drawn
Date MAY 1984
Scale
No
Sheets
Revision
Sheet No
Copyrights reserved

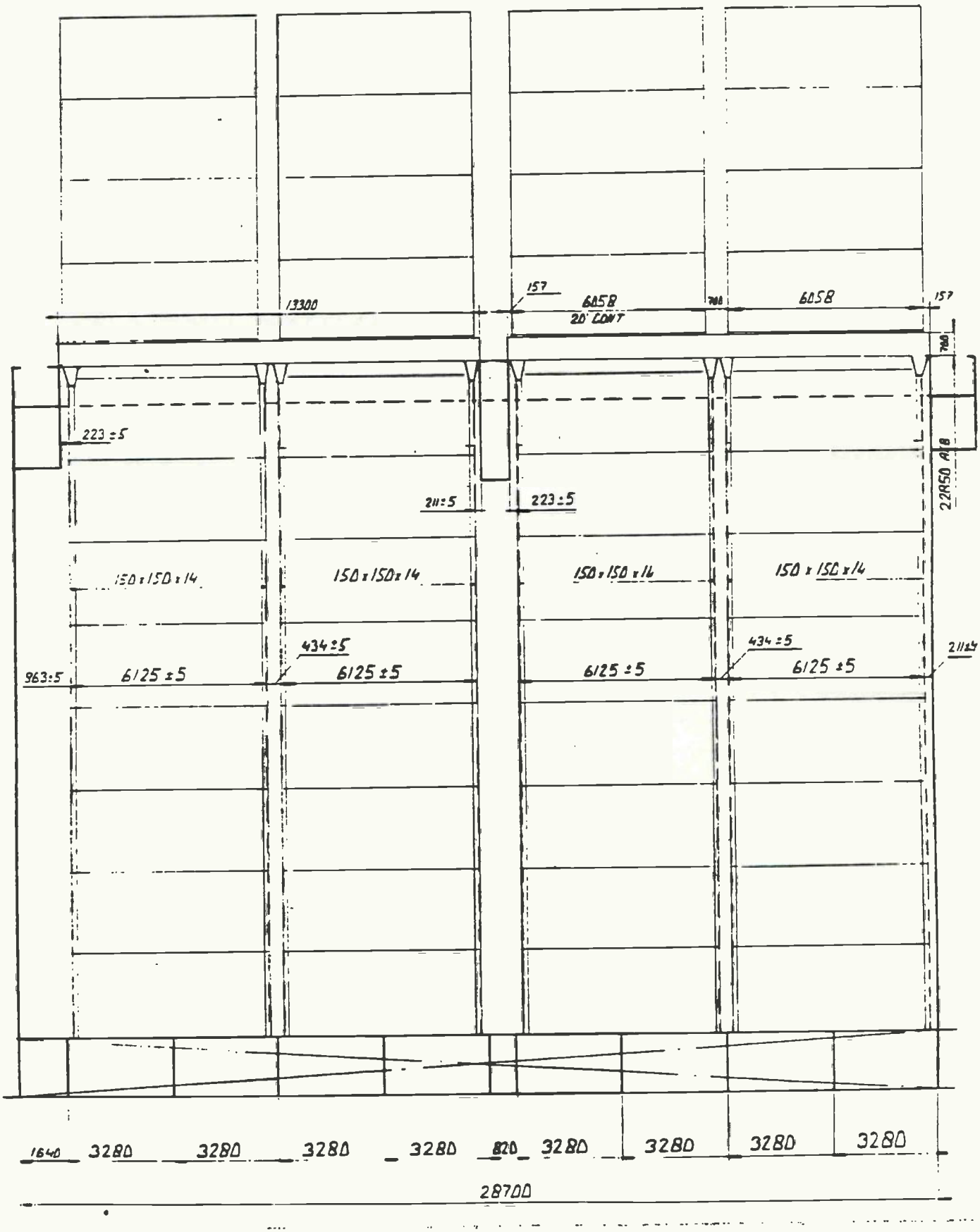
MIDSHIP SECTION

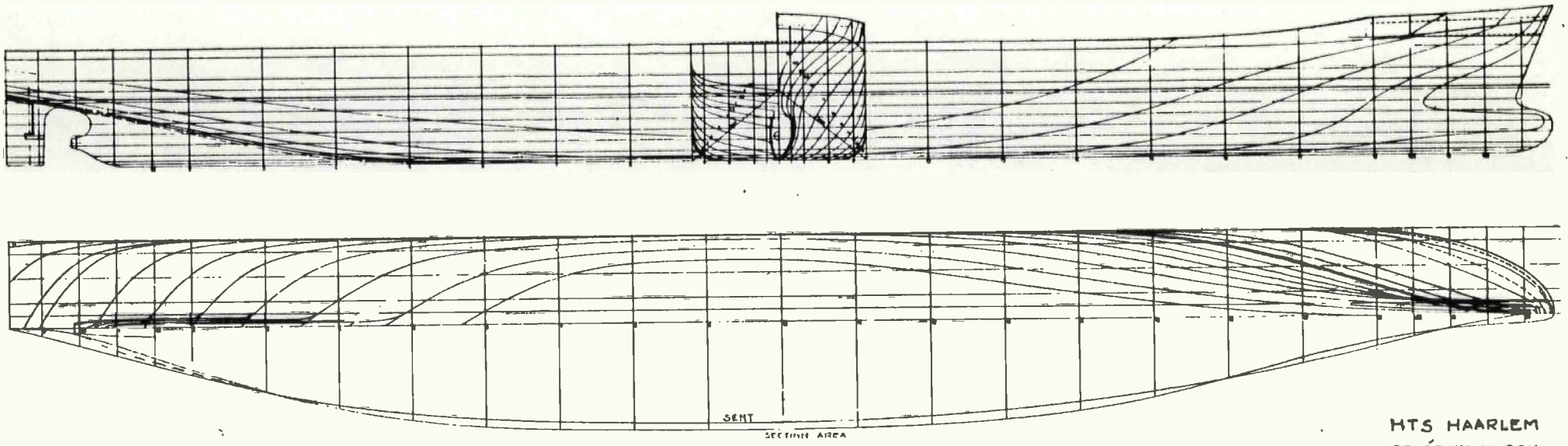
NEDLLOYD PANMAX 10 ACROSS – 8 H. MAY '84



LONGITUDINAL SECTION

NEDLLOYD PANMAX 10 ACROSS _ 8 H MAY '84





HTS HAARLEM
RENÉE V/D KOOGH
DEC '84

~3600 TEU CONTAINER 20.5 KN "PANMAX" SINGLE SCREW
"MEAN" SERVICE DERIVED FROM MODEL 5915c

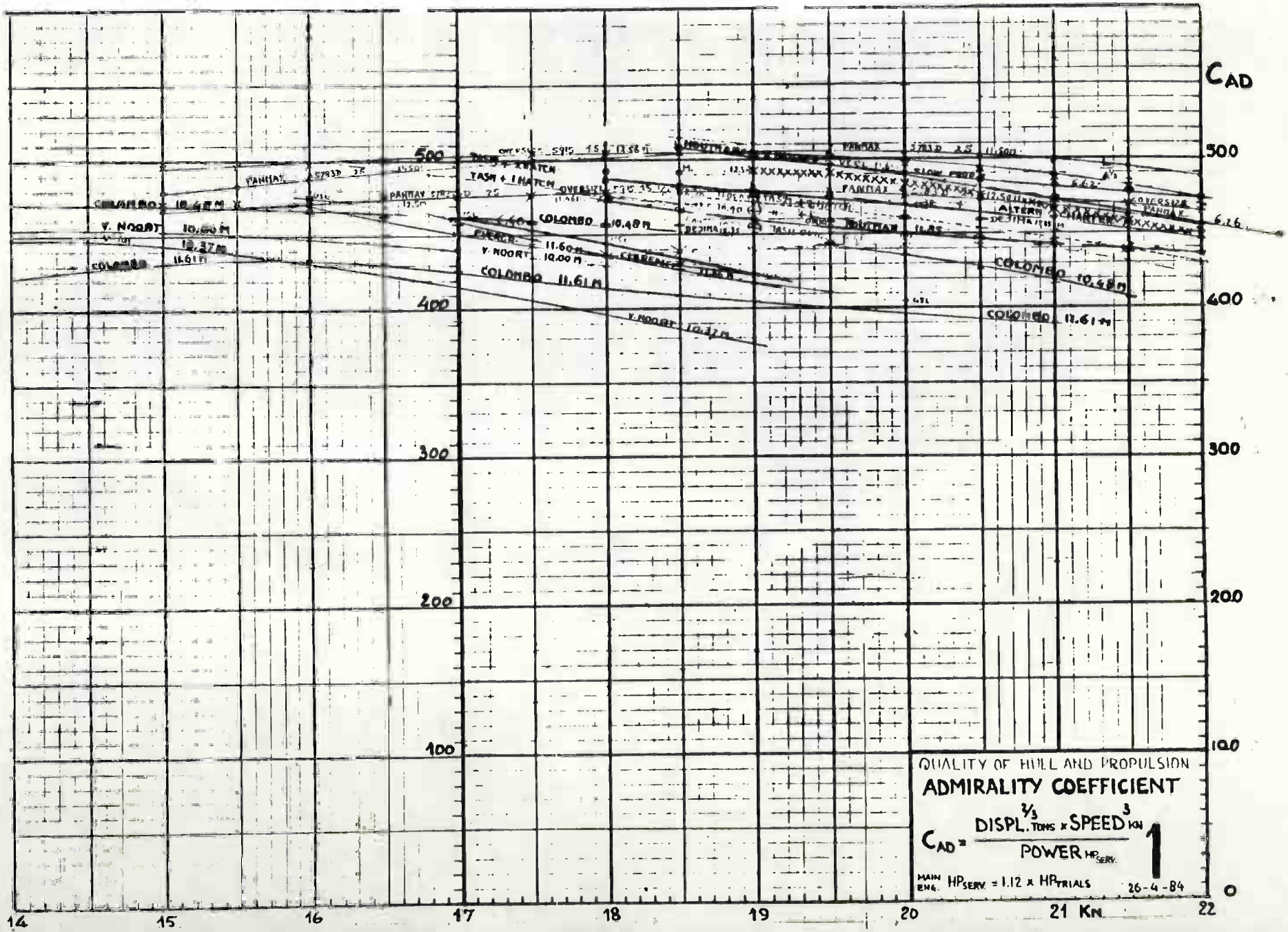
LOA.	=	287.70 M		
LO.20	=	276.00	δ = 0.666	} 0.977
B	=	32.24	φ = 0.682	
H	=	21.60	ϑ = 0.854	
T	=	12.50 →	DISPL = 74.148 M³	
			" = 76 000 TON (1025)	
F	=	AFT OF 10 -5.93M	= 2.15% $L_{0.20}$	

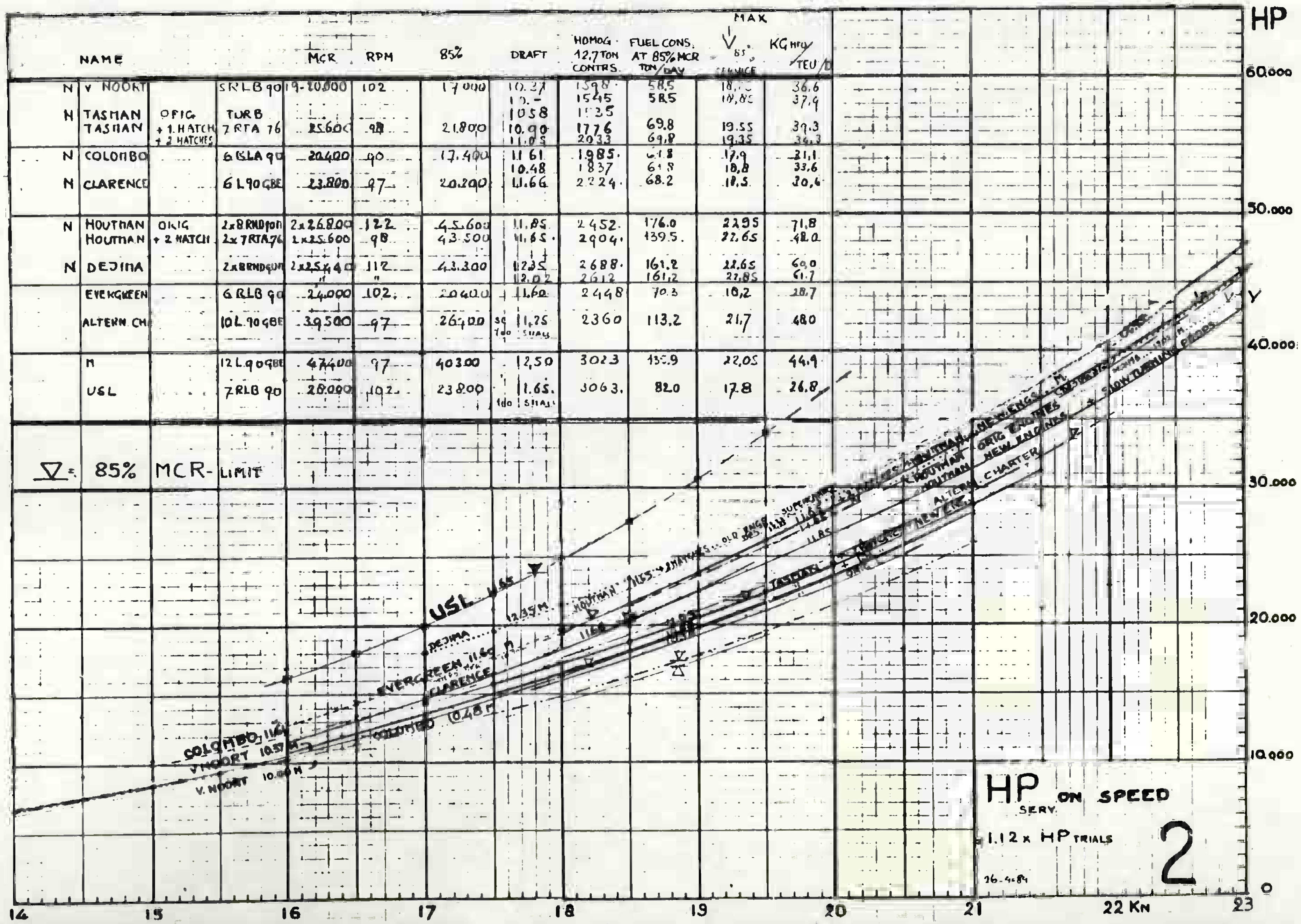
REALISTIC CONTAINER CAPACITY STABILITY-WISE

12.7 TON/TEU HOMOGENEOUS 0.4-0.6 M GM

CORRESPONDING FUEL CONSUMPTION

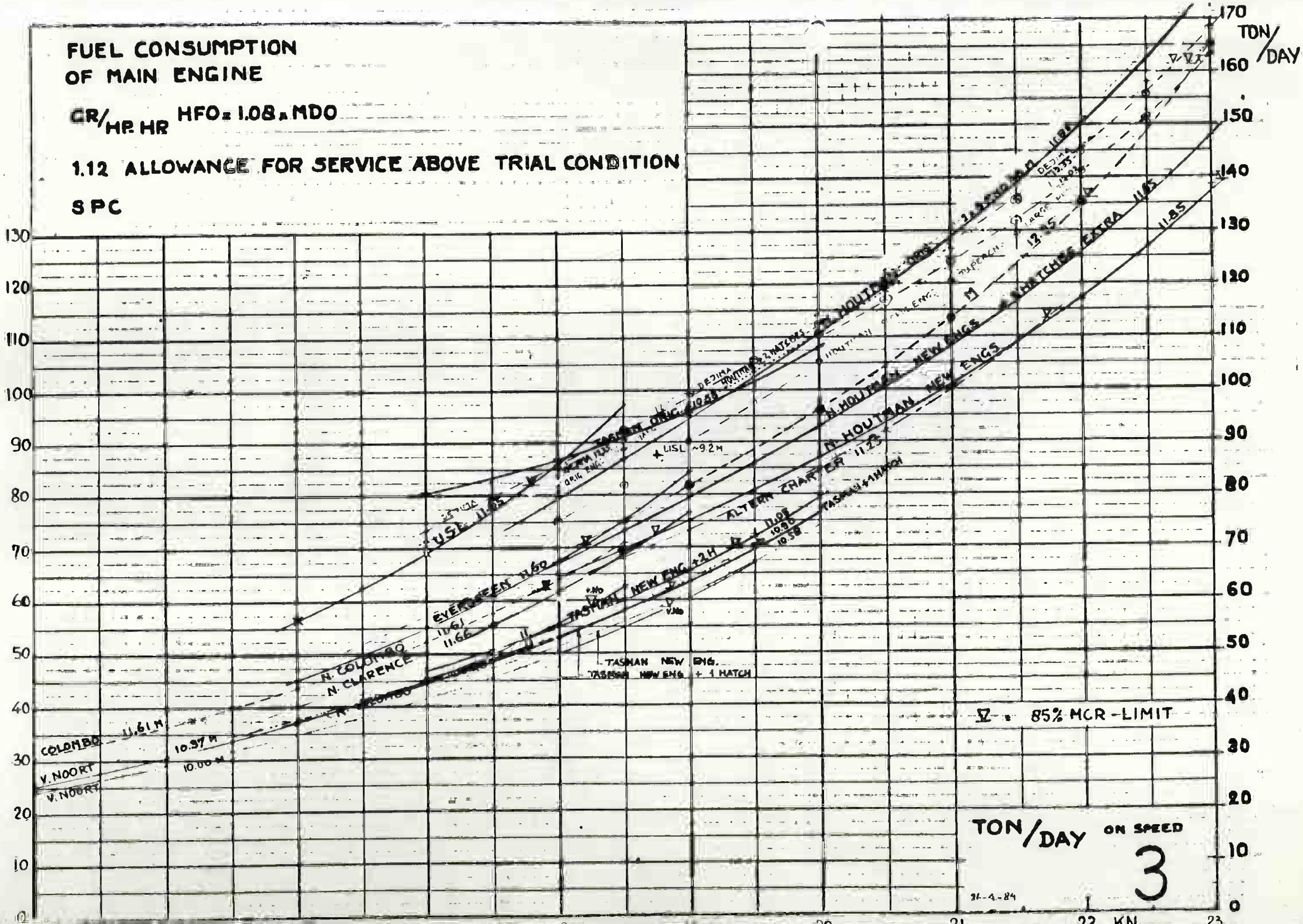
TONNAGE DUES / D.O.EXP PER TEU

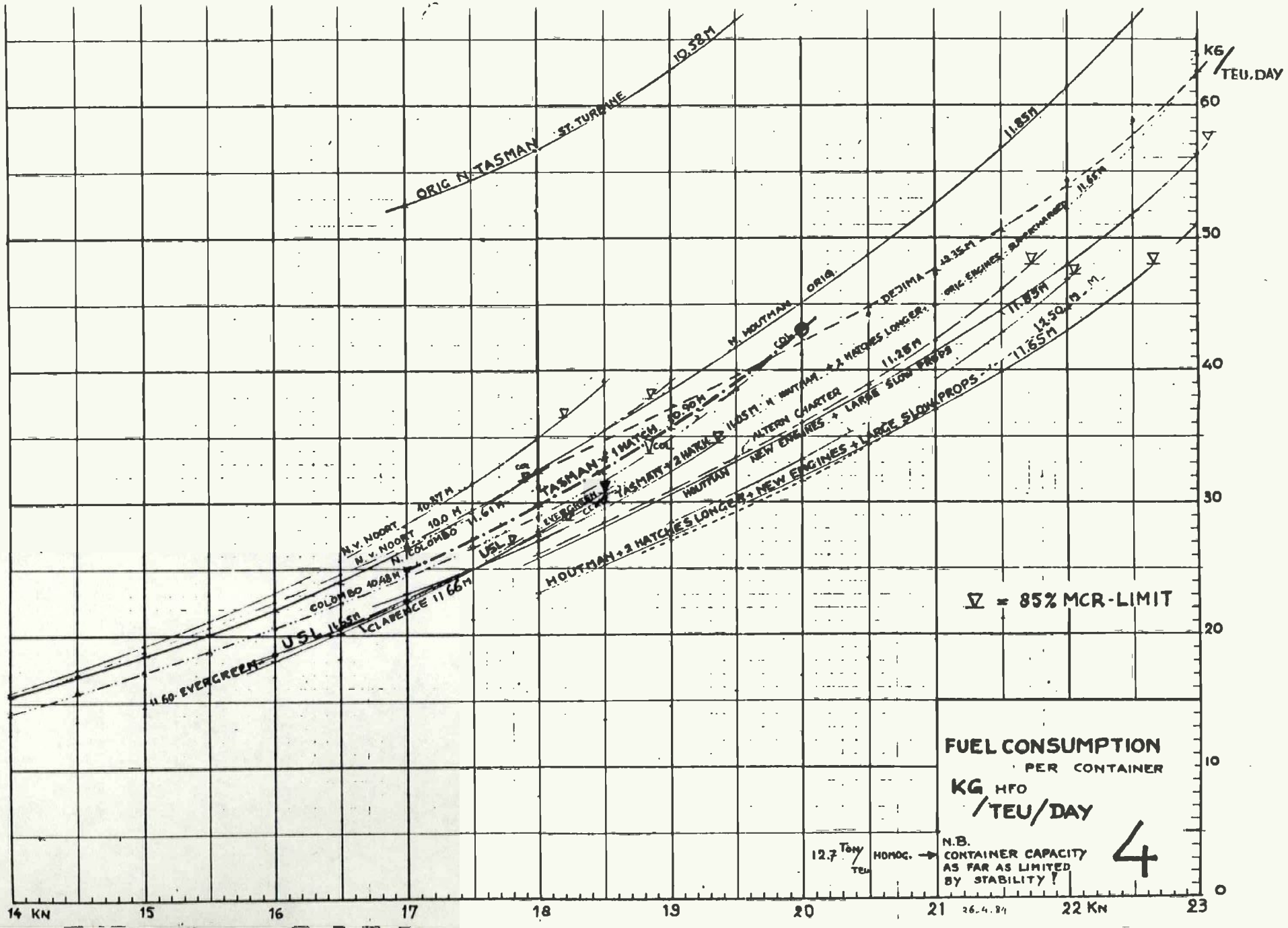

C AD
500
400
300
200
100
0
14
15
16
17
18
19
20
21 KN
22
PANDIAN
COLOMBO 10.48 M
V. NOORT 10.00 M
COLOMBO 11.61 M
V. NOORT 10.37 M
QUALITY OF HULL AND PROPULSION
ADMIRALITY COEFFICIENT
$C_{AD} = \frac{DISPL._{TONS}^{2/3} \times SPEED_{KN}^{3}}{POWER_{HP_{SERV.}}}$
MAIN ENG. $HP_{SERV.} = 1.12 \times HP_{TRIALS}$
26-4-84

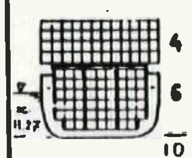
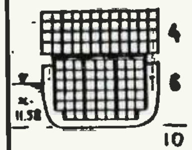
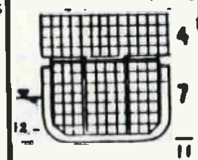
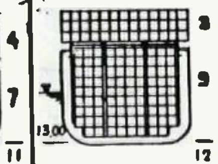
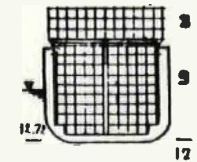


	NAME			MCR	RPM	85%	DRAFT	HOMOG. 12,7 TON CONTRS.	FUEL CONS. AT 85% MCR TON/DAY	MAX V_{85} SERVICE	KG HFO/TEU/D
N	V NOORT		5RLB 90	19-20.000	102	17000	10.37 10.-	1598 1545	58.5 58.5	18,.. 18,85	36.6 37.9
N	TASMAN TASMAN	ORIG + 1 HATCH + 2 HATCHES	TURB 7 RTA 76	25600	98	21800	10.58 10.90 11.05	1535 1776 2033	69.8 69.8	19.55 19.35	39.3 34.3
N	COLOMBO		6 KSLA 90	20400	90	17.400	11.61 10.48	1985 1837	61.8 61.8	17.9 18.8	31.1 33.6
N	CLARENCE		6 L90 GBE	23800	97	20200	11.66	2224	68.2	18.5	30.6
N	HOUTMAN HOUTMAN	ORIG + 2 HATCH	2x8 RND90 2x 7RTA76	2x26800 2x25600	122 98	45600 43500	11.85 11.65	2452 2904	176.0 139.5	22.95 22.65	71.8 48.0
N	DEJIMA		2x 8RND90M	2x25440	112	43.300	12.35 12.02	2688 2612	161.2 161.2	22.65 22.85	60.0 61.7
	EVERGREEN		6 RLB 90	24000	102	20400	11.60	2448	70.3	18.2	28.7
	ALTERN. CH		10 L 90 GBE	39500	97	26400	sg 11.25 1do shaft	2360	113.2	21.7	48.0
	N		12 L 90 GBE	47400	97	40300	12.50	3023	135.9	22.05	44.9
	USL		7 RLB 90	28000	102	23800	11.65 1do shaft	3063	82.0	17.8	26.8

∇ = 85% MCR-LIMIT

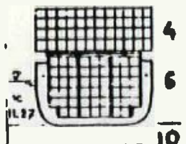
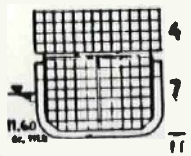
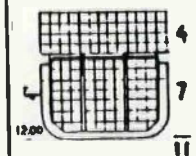
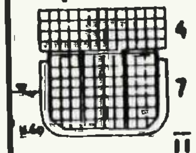
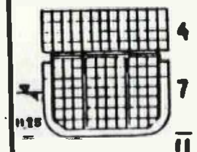
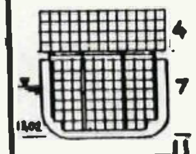
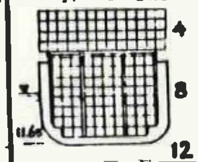

FUEL CONSUMPTION
OF MAIN ENGINE
GR/HP. HR HFO = 1.08 x MDO
1.12 ALLOWANCE FOR SERVICE ABOVE TRIAL CONDITION
SPC
TON/DAY
∇ = 85% MCR-LIMIT
TON/DAY ON SPEED
3
KN
COLOMBO 11.61 M
10.37 M
10.00 M
V. NOORT
V. NOORT
N. COLOMBO
N. CLARENCE
EVERGREEN 11.60
11.61
11.66
USL 11.65
USL ~9.2 M
TASMAN NEW ENG. + 2H
TASMAN NEW ENG.
TASMAN NEW ENG. + 1 HATCH
ALTERN. CHARTER
N. HOUTMAN 11.23
N. HOUTMAN NEW ENGS
N. HOUTMAN NEW ENGS
EXTRA 11.85
11.85
12.35
31-4-84


KG / TEU.DAY
ORIG N. TASMAN ST. TURBINE
10.58 M
N.V. NOORT 10.87 M
N.V. NOORT 10.0 M
M. COLOMBO 11.61 M
COLOMBO 10.48 M
USL 11.65 M
CLARENCE 11.66 M
11.60 EVERGREEN
M. HOUTMAN ORIG.
TASMAN + 1 HATCH 10.90 M
EVERGREEN
TASMAN + 2 HATCH @ 11.05 M M. HOUTMAN + 2 HATCHES LONGER
HOUTMAN NEW ENGINES + LARGE SLOW PROPS
HOUTMAN + 2 HATCHES LONGER + NEW ENGINES + LARGE SLOW PROPS
DEJIMA + 12.25 M
ORIG. ENGINES SUPERCHARGED
11.85 M
11.25 M
ALTERN CHARTER
11.85 M
12.50 M
11.65 M
▽ = 85% MCR-LIMIT
FUEL CONSUMPTION
PER CONTAINER
KG HFO
/TEU/DAY
4
12.7 Tonn/TEU HOMOG.
N.B.
CONTAINER CAPACITY
AS FAR AS LIMITED
BY STABILITY !
14 KN
15
16
17
18
19
20
21
22 KN
23
0
10
20
30
40
50
60
26.4.84

	N. van NOORT	"NEDLLOYD TASMAN"			"N.CLARENCE"	"NEDLLOYD HOUTMAN"		"NEDLLOYD DEJIMA"	
ENGINE MCR/RPM	5 RLB 90 19000 MCR/98 CAN BE INCREASED TO 20000 MCR/102	ST.TURB IMPROVED 198? PROPELLER ⌀ 7400 ~30 RPM ORIGINAL LENGTH	7RTA 76 25.600 MCR/98 LENGTHENED + 14.11 M EXTRA 1 HATCH	7RTA 76 25.600 MCR/98 LENGTHENED + 29.05 M EXTRA 2 HATCHES	6L90GBE 23800 MCR/97	ORIGINAL 2 × 8RND90 M 2 × 26.800 MCR/122 ORIG. PROP.	2 NEW ENGINES 2 × 7RTA 76 2 × 25600 MCR/98 + 29.06 M EXTRA 2 HATCHES	LESS DRAFT	2 × 8RND 90 M 2 × 25.440 MCR/112 DEEP
DIMENSIONS	Loa = 182.5 M Lpp = 174.0 Bmld 30.5 H = 16.2  11.27	Loa = 225.87 M Lpp = 210.– Bmld = 30.50 H = 16.40  11.58	Loa = 239.38 M Lpp = 224.11 " Bmld = 30.50. H = 16.40. 11.58	Loa = 254.92 M Lpp = 239.05 " Bmld = 30.50. H = 16.40. + BOXGIRDERS 11.58	Loa = 210.– M ~ Lpp = 202.– " Bmld 32.24. H = 18.80.  12.–	Loa = 250.5 M Lpp = 247.– . Bmld 32.26. H = 24.15.  13.00	Loa = 287.65 M Lpp = 276.06 . B = 32.26 . H = 24.15 .		Loa = 287.– M Lpp = 273 . . Bmld 32.24 . H = 25.00 .  12.71
SPACE WISE	IN HOLD 732 TEU ON DECK AT 846 TEU TOTAL SPACE 1598 TEU	IN HOLD 861 TEU ON DECK 814 TEU TOTAL SPACE 1675 TEU	965 TEU 946 TEU +236 = 1911 TEU INCL. 36 ON ...	1069 TEU 1042 TEU +436 = 2111 TEU INCL. 26 ON ...	1150 TEU 1074 TOTAL SPACE 2224 TEU	1794 TEU 920 TOTAL SPACE 2714 TEU	2140 TEU 1076 +502 = 3216 TEU		2020 TEU 932 TOTAL SPACE 2952 TEU
TYP. LOADING CONDITION CONTR. WEIGHT	T.LOAD.COND. 10.37 M δ = 0.647 DISPL. = 36559 T L.S. = 10830 DW. = 25729 CONS.+WB = 5435 20294 T	T.LOAD.COND. 10.58 M δ 0.613 DISPL 42638 T LIGHT S 14200 DW 28438 CONS+WB 8943 19495 T	T.LOAD.COND. 10.90 M δ 0.637 DISPL 48744 T LIGHTS 15970 DW 32774 CONS.WB 10218 22556 T	T.LOAD.COND. 11.05 M δ 0658 DISPL 54464 T LIGHTS 17300 DW 37164 CONS.WB 11345 25819 T	T.LOAD.COND. 11,66 M δ 0.651 DISPL 50.808 LS 14.544 DW 36.264 CONS+WB 8.019 28.245 T	T.LOAD.COND. 11.85 M δ 0.649 DISPL 62946 T LS 22081 DW 40865 CONS+WB 9699 31.166 T	T.LOAD.COND. 11.65 M δ 0680 DISPL 72520 T LS 24.360 DW 48.160 CONS+WB 11.279 36.881 T	T.LOAD.COND. 12.02 M δ 0.611 DISPL 66441 T LS 24.699 DW 41742 T CONS+WB 8570 33172 T	T.LOAD.COND. 12.35 M δ 0.616 DISPL 68826 T LS 24.699 DW 44.127 T CONS+WB 9.989 34.138 T
HOM. LOAD 12.7 TON/TEU ⊙ HOLD = 93% ARM ⊙ BOX = 45% H	TON/TEU 752 × 12.7 = 9550 T 846 × 12.7 = 10744 1598 × 12.7 = 20294 T TEU	TON/TEU 861 × 12.7 = 10935 674 × 12.7 = 8560 1535 × 12.7 = 19495 TEU	TON/TEU 965 × 12.7 = 12256 811 × 12.7 = 10300 1776 × 12.7 = 22556 T TEU	TON/TEU 1069 × 12.7 = 13576 964 × 12.7 = 12243 2033 × 12.7 = 25819 TEU	TON/TEU 1150 × 12.7 = 14.605 1074 × 12.7 = 13.640 2224 × 12.7 = 28.245 TEU	TON/TEU H. 1792 × 11.7 = 22784 T D 660 × 12.7 = 8382 T 2452 × 11.7 = 31.166 T TEU	TON/TEU 2140 × 12.7 = 27.178 T 764 × 12.7 = 9.703 T 2904 × 12.7 = 36.881 T TEU	TON/TEU 2020 × 12.7 = 25.654 592 × 12.7 = 7518 2612 × 12.7 = 33.172 TEU	TON/TEU 2020 × 12.7 = 25.654 668 × 12.7 = 8.484 2688 × 12.7 = 34.183 TEU
STABILITY	KM = 14.37 KG = 13.80 GM = 0.57 - 0.07 = 0.50	KM = 12.88 M KG = 12.42 GM = 0.46 - 0.05 = 0.41	KM = 12.94 M KG = 12.40 GM = 0.44 - 0.05 = 0.39	KM = 12.97 M KG = 12.52 GM = 0.45 - 0.05 = 0.40	KM = 15.06 11.66 M KG = 14.55 GM: 0.51 - 0.08 = 0.43	KM = 13.10 M 11.85 M KG = 14.39 GM = 0,51 - 0,08 = 0,43	KM = 14.89 11.65 M KG = 14.43 GM = 0.46 - 0,06 = 0,40	KM = 14.82 12.02 KG = 14.39 GM = 0.43 - 0.03 = 0.40	KM = 14.89 12.35 M KG = 14.46 GM = 0.43 - 0,03 = 0,40
FUEL CONSUMPTION EXCL. SHAFT GEN.	14 – 25.0 – 15.6 15 – 30.4 – 19.1 16 – 37.2 – 23.3 17 – 45.1 – 28.2 18 (16000 HP) – 55.6 – 34.8 KN – TON/DAY – KG/TEU,DAY	KN – TON/DAY – KG/TEU,DAY 17 – 80.5 – 52.4 18 (16000 HP) – 87.– – 56.7 19 – 96.– – 61.5 20 – 108.5 – 70.7 21 – 124.0 – 80.8	KN – TON/DAY – KG/TEU,DAY 16 – 36.8 – 20.7 17 – 44.3 – 24.9 18 (16000 HP) – 52.7 – 29.7 19 – 62.9 – 35.4 20 – 76.3 – 43.0 21 – –	KN – TON/DAY – KG/TEU,DAY 17 – 47.0 – 23.1 18 (17200 HP) – 55.1 – 27.1 19 – 63.6 – 32.3 20 – 79.8 – 39.3 21 – –	KN – TON/DAY – KG/TEU,DAY 16 – 40.1 – 18.0 17 – 50.0 – 22.5 18 (18000 HP) – 61.8 – 27.8 19 – 76.8 – 34.5 20 – – 21 – –	KN TON/DAY KG/TEU,DAY 17 18 79.5 32.4 19 – 95.0 – 38.7 20 (21000 HP) – 110.5 – 45.1 21 – 129 – 52.6 22 – 150 – 61.2 23 – 176.5 – 72.0	KN TON/DAY KG/TEU,DAY 17 18 – 67.1 23.1 19 – 79.7 – 27.4 20 (21900 HP) – 93.0 – 32.0 21 – 107.6 – 37.0 22 – 125.0 – 43.0 23 – 148.0 – 51.0	KN TON/DAY KG/TEU,DAY 17 18 – 84.8 – 32.4 19 – 97.6 – 37.3 20 (21100) 110.2 – 42.2 21 – 124.0 47.5 22 – 140.8 – 53.9 23 – 163.0 – 62.4	KN TON/DAY KG/TEU,DAY 17 18 – 85.9 – 32.0 19 – 99.2 – 36.5 20 (21200 HP) – 112.2 – 41.9 21 – 126.8 – 47.2 22 – 145.0 – 54.0 23 – 168.5 – 62.7
AT 85% MCR →	V = 18.25 KN 85% = 20.000 = 143.5 = 24 = 58.5 T/D 17000 HP	ST.TURB. 220 gr/hphr	V = 19.55 85% = 25.600 = 133.6 = 24 = 69.8 T/D 21750 HP	V = 19.35 85% = 25.600 = 133.6 = 24 = 69.8 T/D 21.750 HP	90% = 23800 = 141.3 = 24 = 72.6 T/D V = 18.75 85% = 23800 = 140.5 = 24 = 68.2 T/D V = 18.5 20200 HP	V = 23– 85% = 2 × 26800 = 161 = 24 = 176 T/D 2 × 22800 HP	V = 22.45 85% = 2 × 25600 = 133.6 = 24 = 139.5 T/D 2 × 21.750 HP	V = 22.9 85% = 2 × 25440 = 155.4 = 24 = 161.2 T/D 2 × 21600 HP	V = 22.7 85% = 2 × 25440 = 155.4 = 24 = 161.2 T/D 2 × 21600 HP

26-4-'84

5

	"NEDLLOYD van NOORT"		"NEDLLOYD COLOMBO"		NL CLARENCE	EVERGREEN	ALTERNATIVE CHARTER	L101	USL
ENGINE MCR/RPM	LESS DRAFT	5 RLB 90 20.000/102 DEEP !	LESS DRAFT	6 RLA 90 20400/90 DEEP !	6 L 90 GBE 23.800/97	6 LRB 90 24.000/102 ESTIMATION	10 L 90 GBE TELEX SCANDUTCH 4-2-'84 39500/97 ESTIMATION	12 L 90 GBE 47.400/97	7 RLB 90 28.000/102
DIMENSIONS		L_{oa} = 182.5 M L_{pp} = 174,00 M B_{mld} = 30.50 M H = 16,20 M  4 / 6 / 10		L_{oa} = 211.19 M L_{pp} = 195.00 M B_{mld} = 32.20 M H = 19.00 M  4 / 7 / 11	L_{oa} = 240,00 M ~ L_{pp} = 202,00 M B = 32,24 M H = 18,80 M  4 / 7 / 11	L_{oa} = 230.50 M L_{pp} = 216.32 M B_{mld} = 32.20 M H = 18.65 M  4 / 7 / 11	L_{oa} = 260.00 M ~ L_{pp} = 248.— M B_{mld} = 32.20 M H = 18.90 M  4 / 7 / 11	L_{oa} = 270.0 M L_{pp} = 259.32 M B_{mld} = 32.20 M H = 19.80 M  4 / 7 / 11	L_{oa} = 290.0 M L_{pp} = 279.00 M B_{mld} = 32.22 M H = 21.50 M  4 / 8 / 12
SPACE WISE		IN HOLD = 752 TEU ON DECK = 846 TEU TOTAL = 1598 TEU		IN HOLD = 1014 TEU ON DECK = 971 TEU TOTAL = 1985 TEU	IN HOLD = 1150 TEU ON DECK = 1074 TEU TOTAL = 2224 TEU	IN HOLD = 1286 TEU ON DECK = 1178 TEU TOTAL = 2464 TEU QUOTED 2748 "	IN HOLD = 1422 TEU ON DECK = ~1178 TEU TOTAL = 2600 TEU	IN HOLD = 1508 TEU ON DECK 4T. = 1576 TEU TOTAL = 3084 TEU	10 TON/TEU HOM. LOAD. IN HOLD = 2214 TEU ON DECK = 1758 TEU TOTAL = 3972 TEU QUOTED 4258 TEU
TYP. LOADING CONDITION	DRAFT = 10.— M δ = 0.640 DISPL. = 34852 T L.S. = 10830 T DW = 24022 T CONS.+WB. = 4401 T 19621 T	DRAFT = 10.37 M δ = 0.647 DISPL. = 36559 T L.S. = 10830 T DW = 25729 T CONS.+WB. = 5435 T CONTR. 20294 T	DRAFT = 10.48 M δ = 0.596 DISPL. = 39865 T L.S. = 13002 T DW = 26863 T CONS.+WB. = 3533 T 23330 T	DRAFT SC. MAX = 11.61 M δ = 0.611 DISPL. = 45760 T L.S. = 13002 T DW = 32758 T CONS.+WB. = 7548 T 25210 T	DRAFT = 11,66 M δ = 0,651 DISPL. = 50808 T L.S. = 14544 T DW = 36264 T CONS.+WB. = 8019 T 28245 T	DRAFT (SC.) = 11.60 M δ = 0.677 DISPL. = 56180 T L.S. = 15800 T DW = 40380 T CONS.+WB. = 9280 T 31100 T ?	DRAFT (SC.) = 11.25 M δ = 0.610 DISPL. ≅ 56300 T L.S. = 18300 T DW = 38000 T CONS.+WB. = 8000 T 30.000 T ?	DRAFT = 12.50 M δ = 0.646 DISPL. = 69.400 T L.S. = 20.000 T DW = 49.400 T CONS.+WB. = 11.000 T 38.400 T	DRAFT (SC.) = 11.65 M δ = 0.768 DISPL. = 82600 T L.S. = 23100 T DW = 59500 T CONS.+WB. = 20600 T 38.900 T
CONTR. WEIGHT HOM. LOAD 12.7 TON/TEU ⊙ HOLD = 93 % ARM ⊙ BOX = 45 % H	TEU × TON/TEU 752 × 12.7 = 9550 T 793 × 12.7 = 10071 T 1545 × 12.7 = 19621 T	TEU × TON/TEU 752 × 12.7 = 9550 T 846 × 12.7 = 10744 T 1598 × 12.7 = 20294 T	TEU × TON/TEU 1014 × 12.7 = 12880 T 823 × 12.7 = 10450 T 1837 × 12.7 = 23330 T	TEU × TON/TEU 1014 × 12.7 = 12880 T 971 × 12.7 = 12330 T 1985 × 12.7 = 25210 T	TEU × TON/TEU 1150 × 12.7 = 14605 T 1074 × 12.7 = 13640 T 2224 × 12.7 = 28245 T	TEU × TON/TEU 1286 × 12.7 = 16340 T 1162 × 12.7 = 14760 T 2448 × 12.7 = 31100 T	TEU × TON/TEU 1422 × 12.7 = 18070 T 938 × 12.7 = 11930 T 2360 × 12.7 = 30000 T	TEU × TON/TEU 1508 × 12.7 = 19152 T 1515 × 12.7 = 19248 T 3023 × 12.7 = 38400 T	TEU × TON/TEU 2214 × 10.- = 22140 T 1674 × 10.- = 16760 T 3890 × 10.- = 38000 T 3063 × 12.7
STABILITY	KM = 14.37 M KG = 13.80 GM = 0.57-0.07 = 0.50	KM = 14.37 M KG = 13.80 M GM = 0.57-0.07 = 0.50	KM = 15.28 M KG = 14.92 GM = 0.36-0.07 = 0.29	KM = 15.35 M KG = 14.98 GM = 0.37-0.06 = 0.31	KM = 15.06 M KG = 14.55 M GM = 0,51-0,08 = 0,43	KM = KG = GM = } UNKNOWN	KM = KG = GM = } UNKNOWN	KM = M ~ KG = M GM = ABB 0.55 M	KM = 13.9 M ~ KG = 13.3 M GM = 0.6 M
FUEL CONSUMPTION EXCL. SHAFT GEN.	14 24.0 15.5 15 29.1 18.8 16 - 34.8 - 22.5 17 - 41.5 - 26.9 18 MCR - 50.0 - 32.4 19 - 60.5 - 39.2 KN - TON/DAY - KG/TEU, DAY	14 - 25.0 - 15.6 15 - 30.4 - 19.1 16 - 37.2 - 23.3 17 - 45.1 - 28.2 18 MCR - 55.6 - 34.8 19 -	KN - T/DAY - KG/TEU, DAY 16 - 37.7 - 20.5 17 - 44.9 - 24.4 18 MCR - 53.0 28.8 19 - 63.7 34.7	KN - T/DAY - KG/TEU, DAY 16 - 43.5 - 21.9 17 - 52.3 - 26.3 18 17990 HP 64.1 - 32.3 19 -	KN - T/DAY - KG/TEU, DAY 16 - 40.1 - 18.0 17 - 50.0 - 22.5 18 18400 HP 61.8 - 27.8 19 - 76.8 - 34.5 V. 18.7 KN 90% = 21800 = 141.3 × 24 : 74.6 T/D	KN - T/DAY - KG/TEU, DAY 16 - 45.1 - 18.4 17 - 55.3 - 22.6 18 18600 HP 67.4 - 27.4 19 - 84.0 - 34.3	KN - T/DAY - KG/TEU, DAY 16 - - 17 - - 18 - 61.9 - 26.2 19 - 72.6 - 30.8 20 - 85.0 - 36.0 21 - 99.6 - 42.2 22 - 119.1 - 50.5 35600 V. 22.0 KN 90% = 39500 × 141.3 × 24 = 120.6 %	KN - T/DAY - KG/TEU, DAY 16 - - 17 - - 18 - - 19 - 81.8 - 27.1 20 23800 HP 95.6 - 31.6 21 - 113.1 - 37.4 22 - 134.8 - 44.6 23 KN - IS IMPOSSIBLE AT 11.5 M	KN - T/DAY - KG/TEU, DAY 16 - 57 - 18.6 17 - 69 - 22.5 18 24800 HP 85½ - 28.0 19 - 25200 V = 18.1 KN 90% = 28000 × 144.4 × 24 = 87.1 %
AT 85% MCR. →	V = 18.85 KN 58.5 %	17000 V = 18.25 KN 85% = 20000 × 143.5 × 24 = 58.5 %	V. 18.8 61.8 %	17340 V. 17.9 85% = 20400 × 148.5 × 24 = 61.8 T/D	20200 V. 18.5 85% = 23800 × 140.5 × 24 = 68.2 %	20400 V. 18.2 85% = 24000 × 143.5 × 24 = 70.3 %	33600 V. 21.7 KN 85% = 39500 × 140.5 × 24 = 113.2 %	40300 V. 22.0 85% = 47400 × 140.5 × 24 = 135.9 T/D	23800 V. 17.8 85% = 28000 × 143.5 × 24 = 82.- T/D

26-4-'84

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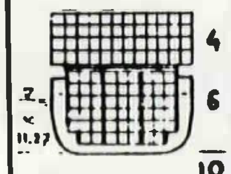
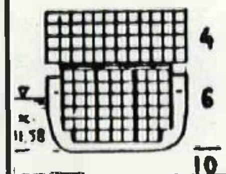
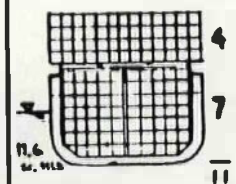
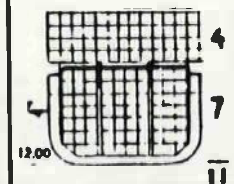
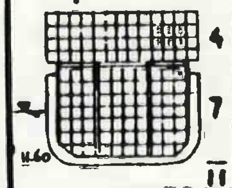
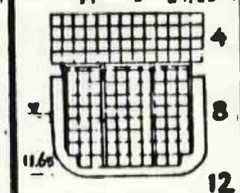
FUEL COSTS PER TEU (18 Kn)

77 DAYS ROUNDTRIP 4.65 ROUNDTR/YR
57 x 18 x 24 = 24620 MILES

AT SEA 57 DAYS x 4.65 = 265 DAYS AT SEA P.YR.
IN PORT 20 " " = 93 DAYS IN PORT "
77 " 358

	NL VAN NOORT	NL TASMAN	→ LENGTHENED 1 HATCH	NL COLOMBO	NL CLARENCE	EVERGREEN	USL
	5 RLB 90	ST. TURB	7 RTA 76	6 RLA 90	6 L 90 GBE	6 LRB 90	7 RLB 90
	20.000/102 LESS DRAFT	ORIG.	25.600/98	20400/90 LESS DRAFT	23.800/97	24.000/102	28.000/102
	L_{oa} = 182.5 M, L_{pp} = 174,00 M, B_{mld} = 30,50 M, H = 16,20 M	L_{oa} = 225.87 M, L_{pp} = 210.— M, B_{mld} = 30.50 M, H = 16.40 M	L_{oa} = 239.98 M, L_{pp} = 224.11 M	L_{oa} = 211.19 M, L_{pp} = 195.00 M, B_{mld} = 32.20 M, H = 19.00 M	L_{oa} = 210,00 M, ~ L_{pp} = 202,00 M, B = 32,24 M, H = 18,80 M	L_{oa} = 230.50 M, L_{pp} = 216.32 M, B_{mld} = 32.20 M, H = 18.65 M	L_{oa} = 290.0 M, L_{pp} = 279.00 M, B_{mld} = 32.22 M, H = 21.50 M
	 4 / 6 / 10; 11.27	 4 / 6 / 10; 11.58		 4 / 7 / 11; 11.6	 4 / 7 / 11; 12.00	 4 / 7 / 11; 11.60	 4 / 8 / 12; 11.65
	IN HOLD = 752 TEU, ON DECK = 846 TEU, TOTAL = 1598 TEU	IN HOLD = 861 TEU, ON DECK = 814 TEU, TOTAL = 1675 TEU	IN HOLD = 965 TEU, ON DECK = 946 TEU, TOTAL = 1911 TEU (+ 236 TEU SPACE)	IN HOLD = 1014 TEU, ON DECK = 971 TEU, TOTAL = 1985 TEU	IN HOLD = 1150 TEU, ON DECK = 1074 TEU, TOTAL = 2224 TEU	IN HOLD = 1286 TEU, ON DECK = 1178 TEU, TOTAL = 2464 TEU	10 TON/TEU HOM. LOAD: IN HOLD = 2214 TEU, ON DECK = 1758 TEU, TOTAL = 3972 TEU
TYPICAL LOADING COND. CONTRS = 12.7 T/TEU HOM.	1545 TEU 10.02 M	1535 TEU 10.58 M	1776 TEU 10.90 M	1837 TEU 10,48 M	2224 TEU 11.66 M	2448 TEU 11,60 M	3063 EQUIV 11.65
FUEL AT SEA ME	50.0 T/D x 265 x 172 = 2.280.000	87.0 T/D x 265 x 172 = 3.966.000	52 T/D x 265 x 172 = 2.370.000	53.0 T/D x 265 x 172 = 2.417.000	61.8 T/D x 265 x 172 = 2.818.000	67.4 T/D x 265 x 172 = 3.070.000	85.5 T/D x 265 x 172 = 3.895.000
FUEL AT SEA DG.	540 KW x 1,5 x 146 x 24 x 265 x 172 = 128.000 (↓ 0,7?)	TURBOGEN. = 0	630 KW x 1,5 x 175 x 24 x 265 x 184 = 194.000 (↓ 0,7 =)	560 KW x 1,5 x 175 x 24 x 265 x 184 = 172.000 (0,7 =)	600 KW x 1,5 x 145 x 24 x 265 x 172 = 143.000	600 KW x 1,5 x 175 x 24 x 265 x 184 = 184.000	660 KW x 1,5 x 175 x 24 x 265 x 184 = 203.000
FUEL IN PORT D.G.	978 KW x 1,5 x 175 x 24 x 93 x 184 = 41.000	441 x 1,5 x 175 x 24 x 93 x 184 = 47.000	441 KW x 1,5 x 175 x 24 x 93 x 184 = 47.000	392 KW x 1,5 x 175 x 24 x 93 x 184 = 42.000	420 KW x 1,5 x 175 x 24 x 93 x 184 = 45.000	420 KW x 1,5 x 175 x 24 x 93 x 184 = 45.000	462 KW x 1,5 x 175 x 24 x 93 x 184 = 50.000
FUEL IN PORT BOIL.	1,0 T/D x 93 x 184 = 17.000	1,1 T/D x 93 x 184 = 19.000	1,1 T/D x 93 x 184 = 19.000	1,1 T/D x 93 x 184 = 19.000	1,2 T/D x 93 x 184 = 21.000	1,2 T/D x 93 x 184 = 21.000	1,3 T/D x 93 x 184 = 22.000
TOTAL FUEL COSTS/YR	2.466.000	4.032.000	2.630.000	2.650.000	3.027.000	3.320.000	4.170.000
TEU TRANSPORTED/YR	1545 x 4.65 x 2 x 0,9 = 12.930	1535 x 4.65 x 2 x 0,9 = 12850	1776 x 4.65 x 2 x 0,9 = 14.860	1837 x 4.65 x 2 x 0.9 = 15.380	2224 x 4.65 x 2 x 0.9 = 18.620	2448 x 4.65 x 2 x 0,9 = 20.480	3063 x 4.65 x 2 x 0.9 = 25.630
FUEL COSTS/TEU USD/TEU	191	314	177	172	162½	162	162½

INVESTMENTS: MILL USD
RE ENGINING + IFO 10.5
LENGTHENING 1120 T x 1.3 = 1.6
200 TEU x 8000 USD/TEU
CONTRS ON POOP ~ 0.1
CHANGE HATCHCOVER FITTINGS ~ 0.1
ESTIM 12.3
27-2-84

HFO = 172 USD/T
IFO = 184 "

26-4-84

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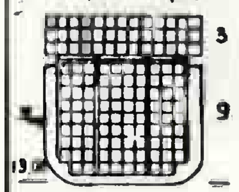
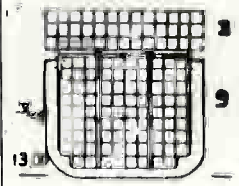
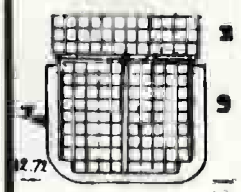
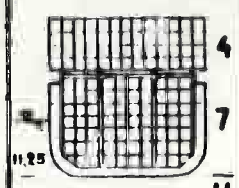
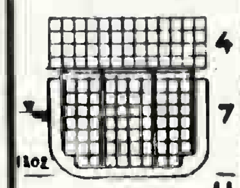
FUEL COSTS PER TEU (20½ Kn)

70 DAYS ROUNDTRIP 5.12 ROUNDTR/YR

AT SEA 50 DAYS x 5.12 = 256 DAYS P. YR
IN PORT 20 " = 102 " " "
70 358

	ORIGINAL	"NEDLLOYD HOUTMAN" SUPERCHARGED	SUPERCH. AS DEJIMA	2 NEW ENGINES	N. DEJIMA "DELFT"	ALTERNATIVE CHARTER	L 101
	2 x 8 RND 90 M 2 x 26800 MCR/122 ORIG PROP	2 x 8 RND 90 M 2 x 25.440 MCR/112 NEW PROP	2 x 8 RND 90 M 2 x 25.440 MCR/112 NEW PROP EXTRA 2 HATCHES	2 x 7 RTA 76 2 x 25600 MCR/98 + 29.06 M EXTRA 2 HATCHES	2 x 8 RND 90 M 2 x 25.440 MCR/112	10 L 90 GBE TELEX SCANDUTCH 1-2-84 39500/97	12 L 90 GBE 47.400/97
	Loa = 258.5 M Lpp = 247.– M Bmo = 32.26 " H = 24.15 "	Loa = 258.5 M Lpp = 247.– " Bmo = 32.26 " H = 24.15 "	Loa = 287.65 M Lpp = 276.06 " Bmo = 32.26 " H = 24.15 "	Loa = 287.65 M Lpp = 276.06 " B = 32.26 " H = 24.15 "	Loa = 287.– M Lpp = 273 " Bmo = 32.24 " H = 25.00 "	Loa = 260.00 M ~ Lpp = 248.– M Bmo = 32.20 M H = 18.90 M	Loa = 270.0 M Lpp = 259.32 M Bmo = 32.20 M H = 19.80 M
		 3 / 9 / 13 / 12	 3 / 9 / 13 / 12		 3 / 9 / 12.72 / 12	 4 / 7 / 11.25 / 11	 4 / 7 / 11.02 / 11
12.7 T/TEU HOM.	1794 TEU 920 " 2714 TEU	SPACE WISE 1794 TEU 910 " TOTAL SPACE 2714 TEU	SPACE WISE + 346 2140 TEU + 156 1076 " TOTAL SPACE 3216 TEU	SPACE WISE 2140 TEU 1076 " = 3216 TEU	SPACE WISE 2020 TEU 932 " TOTAL SPACE 2952 TEU	IN HOLD = 1422 TEU ON DECK = ~1178 TEU TOTAL = 2600 TEU	IN HOLD = 1508 TEU ON DECK 4T = 1576 TEU TOTAL = 3084 TEU
◄ TYPICAL LOAD.	2452 TEU 11.85 M	2452 TEU 11.85 M	2904 TEU 11.65 M	2904 TEU 11.65 M	2688 TEU 12.35 M	2360 TEU 11.25 M	3023 TEU 12.50 M
M.E. HFO AT SEA	119.5 T/D x 256 x 172 = 5.261.000	119.5 T/D x 256 x 172 x 0.92 (SUPERCH) = 4.841.000	121.1 T/D x 256 x 172 = 5.332.000	100.– T/D x 256 x 172 = 4.403.000	118.5 T/D x 256 x 172 = 5.218.000	91.9 T/D x 256 x 172 = 4047000	104.0 T/D x 256 x 172 = 4.579.000 (NORMAL HATCHES)
AUX. IFO AT SEA	1200 kW x 1.5 x 175 x 24 x 256 x 184 = 356.000	1200 kW x 1.5 x 175 x 24 x 256 x 184 = 356 000	1200 kW x 1.5 x 175 x 24 x 256 x 184 = 356 000	1200 kW x 1.5 x 175 x 24 x 256 x 184 = 356.000	1250 kW x 1.5 x 175 x 24 x 256 x 184 = 371 000	810 kW x 1.5 x 175 x 24 x 256 x 184 = 240.000	910 kW x 1.5 x 175 x 24 x 256 x 184 = 270.000
AUX. IFO IN PORT	840 kW x 1.5 x 175 x 24 x 102 x 184 = 99.000	840 kW x 1.5 x 175 x 24 x 102 x 184 = 99.000	840 kW x 1.5 x 175 x 24 x 102 x 184 = 99000	840 kW x 1.5 x 175 x 24 x 102 x 184 = 99.000	840 kW x 1.5 x 175 x 24 x 102 x 184 = 103 000	560 kW x 1.5 x 175 x 24 x 102 x 184 = 67000	637 kW x 1.5 x 175 x 24 x 102 x 184 = 75.000
BOILER IFO	1.5 T/D x 102 x 184 = 28.000	1.5 T/D x 102 x 184 = 28 000	1.5 T/D x 102 x 184 = 28 000	1.5 T/D x 102 x 184 = 28 000	1.5 T/D x 102 x 184 = 28 00	1.4 T/D x 102 x 184 = 26000	1.5 T/D x 102 x 184 = 28 000
TOTAL FUEL/YR.	5.745.000	5.326.000	5.815 000	4.886.000	5.720.000	4.380 000	4.953 000
CONTR. TRANSP./YR.	2452 x 5.12 x 2 x 0.9 = 22.598	2452 x 5.12 x 2 x 0.9 = 22.598	2904 x 5.12 x 2 x 0.9 = 26763	2904 x 5.12 x 2 x 0.9 = 26763	2688 x 5.12 x 2 x 0.9 = 24773	2360 x 5.12 x 2 x 0.9 = 21750	[illegible] x 5.12 x 2 x 0.9 = 27860
HFO: 172 USD/T IFO: 184 "	254	236 INVESTM. SUPERCHARGING 1.0 + IFO 0.1 + PROPS 0.2 MILL USD 1.3	217 INVESTMENTS: MILL USD SUPERCHARGING 1.0 + IFO 0.1 + PROPS 0.2 LENGTHENING 1280 T x 1.3 MILL/.. = 3.– 507 TEU . 40' .. CELL CONV. 10–40' 0.1 CONTRS ON POOP 0.1 ~ 4.5 ESTIM	183 INVESTMENTS: MILL USD RE-ENGINENING 12.5 + IFO 0.1 + PROPS 0.2 LENGTHENING 1280 T x 1.3 MILL/.. = 3.– CELL CONV. 10–40' 0.1 CONTRS ON POOP 0.1 ~ 16 – ESTIM	231	201	178

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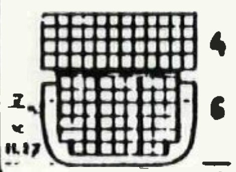
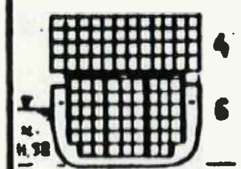
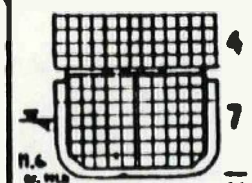
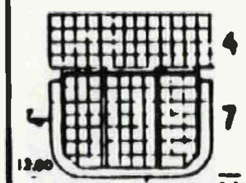
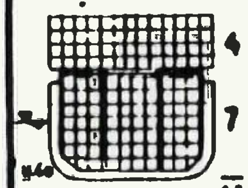
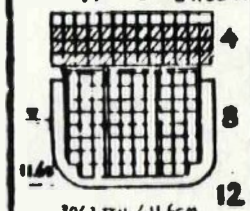
71-2

TRANSPORT COSTS PER TEU (18 KN)

77 DAYS ROUNDTRIP 4.65 ROUNDTR/YR
57 x 18 x 24 = 24620 MILES

AT SEA 57 DAYS x 4.65 = 265 DAYS AT SEA P.YR.
IN PORT 20 " x " = 93 DAYS IN PORT "
77 " 358

	NL VAN NOORT	NL TASMAN	→ LENGTHENED 1 HATCH	NL COLOMBO	NL CLARENCE	EVERGREEN	USL
	5 RLB 90 20.000/102 LESS DRAFT.	ST. TURB ORIG	7 RTA 76 25.600/98	6 RLA 90 20400/90 LESS DRAFT.	6 L 90 GBE 23.800/97	6 LRB 90 24.000/102	7 RLB 90 28.000/102
	L_{oa} = 182.5 M L_{pp} = 174,00 M B_{mo} = 30,50 M H = 16,20 M	L_{oa} = 225.87 M L_{pp} = 210.– M B_{mo} = 30.50 M H = 16.40 M	L_{oa} = 239.98 M L_{pp} = 224.11 M	L_{oa} = 211.19 M L_{pp} = 195.00 M B_{mo} = 32.20 M H = 19.00 M	L_{oa} = 240,00 M ~ L_{pp} = 202,00 M B = 32,24 M H = 18,80 M	L_{oa} = 230.50 M L_{pp} = 216.32 M B_{mo} = 32.20 M H = 18.65 M	L_{oa} = 290.0 M L_{pp} = 279.00 M B_{mo} = 32.22 M H = 21.50 M
	 11.27 4 6 10	 11.38 4 6 10		 11.6 4 7 11	 12.00 4 7 11	 11.60 4 7 11	 11.60 4 8 12
	1545 TEU/10.02M		1776 TEU/10.90M	1837 TEU/10.48M	2224 TEU/11.66M	2448 TEU/11.60M	3063 TEU/11.65M
LIGHTSHIP x USD/KG	10880T x 1,7 = 18.4		13970T · 1,7 = 27.1	13002T · 1,7 = 22.1	14544T · 1,7 = 24.7	15800T · 1,7 = 26.9	23100T · 1,7 = 39.3
EXTRA POWER	0		0	0	0	0	0
BOW / STERNTHRUST	0.6		0	0	2x 0.7		
SHAFTGEN	0.4		0	0	0.5		
INTEGRALS 100P: 0.4	150P 0.6		200P 0.8	200P 0.8	200P 0.8	200P 0.8	200P 0.8
SHIPS PRICE	NEWBL. FAR EAST 20.0		AS NEWBUILDING F.E 27.9	22.9	26.7	27.7	40.1
PRICE/TEU EFF.	12800 USD/TEU		15700 USD/TEU	12300 USD/TEU	12000 USD/TEU	11300 USD/TEU	13100 USD/TEU.
CAPITAL COST/D ANNUITY 10%/22	0,1 x 20,0 = 2,00 mil/yr x 1/365 = 5480		0,1 x 27,9 = 2,79 mil/yr x 1/365 = 6240	0,1 x 22,9 = 2,29 mil/yr x 1/365 = 6.270	0,1 x 26,7 = 2,67 mil/yr x 1/365 = 7.320	0,1 x 27,7 = 2,77 mil/yr x 1/365 = 7590	0,1 x 40,1 = 4,01 mil/yr x 1/365 = 10990
DAILY OPERATING EXP	4.850	STEAM 5.170	4850	4850	4.850	3400	7300
MANAGEMENT/D	700	700	700	700	700	500	1000
RUNNING COST	5.550	5.870	5550	5.550	5550	3900	8300
RUNNING COST/YR. FREE CAP	USD 2.026.000 - 136	2.143.000 - 167	2.026.000 - 136	2.026.000 - 132	2.026.000 - 109	1.424.000 - 70	USD 3.030.000 - 118 USD/TEU
	33000 BRT LASH 52.000 - 4	27610 BRT	30000 BRT	31700 BRT	32600 BRT LASH 75.000 - 4	34400 BRT LASH 82.000 - 4	51400 BRT
TONNAGE DUES "NU" (METEIP. 9,9 x BRT)	4.65 T/yr x 227.700/yr 1.058.000 - 82	4.65 T/yr x 273.200/yr 1.272.000 - 99	4.65 T/yr x 297.000/yr 1.382.000 = 93	4.65 T/yr x 313500 1.458.000 - 95	4.65 T/yr x 342800 1.501.000 - 80	4.65 T/yr x 340.000 1.581.000 - 77	4.65 T/yr x 508.600 2.366.000 - 92
FUEL COSTS/YR.	2.466.000 - 181	4.032.000 - 316	2.630.000 - 177	2.650.000 - 172	3.027.000 - 163	3.320.000 - 162	4.170.000 - 163
	5.602.000 - 423	7.447.000 = 580	6.038.000 - 406	6.134.000 - 399	6.629.000 - 356	6.407.000 - 313	9.566.000 - 373
CAPITAL COSTS/YR	2000.000 - 155			2.290.000 - 149	2.670.000 - 143	2.770.000 - 185	4.010.000 - 157
ANN. (25 YRS - AGE) à 10%	TOTAL 7.602.000 - 588 USD/TEU			8.424.000 - 548	9.299.000 - 499	9.177.000 - 448	13.576.000 - 530 USD/TEU
CONTRS TRANSPORTED/Y	4.65 x 2 x 0.9 x 1545 = 12.930 TEU/YR	4.65 x 2 x 0.9 x 1535 = 12.850 TEU/YR	4.65 x 2 x 0.9 x 1776 = 14.860 TEU/YR	4.65 x 2 x 0.9 x 1837 = 15.380 TEU/YR	4.65 x 2 x 0.9 x 2224 = 18.620 TEU/YR	4.65 x 2 x 0.9 x 2448 = 20.480 TEU/YR	4.65 x 1.8 x 3063 = 25.630 TEU/YR

TRANSPORT COSTS
USD/TEU
ROUNDTR. 77
18 KN
4.65 RTR
9
9-5-84

TRANSPORT COSTS PER TEU — 20½ KN — 70 DAYS ROUNDTRIP — 5.12 ROUNDTR/YR

AT SEA 50 DAYS × 5.12 = 256 DAYS P. YR
IN PORT 20 " = 102 " " "
70 358

ORIGINAL	SUPERCHARGED	"NEDLLOYD HOUTMAN" SUPERCH. AS DEJIMA	"NEDLLOYD HOUTMAN" 2 NEW ENGINES	N. DEJIMA "DELFT"	ALTERNATIVE CHARTER	MAERSK L101
2×8 RND 90 M 2×26800 MCR/122 ORIG PROP	2×8RND90 M 2×25440 MCR/112 NEW PROP	2×8RND90 M 2×25440 MCR/112 NEW PROP EXTRA 2 HATCHES	2×7RTA 76 2×25600 MCR/98 + 29.06 M EXTRA 2 HATCHES	2×8 RND 90 M 2×25.440 MCR/112	10 L 90 GBE 39500/97	12 L 90 GBE 47.400/97
L_{OA} = 258.5 L_{PP} = 247 - B_{MLD} = 32.26 H = 24.15	L_{OA} = 258.5 M L_{PP} = 247 - " B_{MLD} = 32.26 " H = 24.15 "	L_{OA} = 287.65 M L_{PP} = 276.06 " B_{MLD} = 32.26 " H = 24.15 "	L_{OA} = 287.65 M L_{PP} = 276.06 " B = 32.26 " H = 24.15 "	L_{OA} = 287 - M L_{PP} = 273 - " B_{MLD} = 32.24 " H = 25.00 "	L_{OA} = 260.00 M ~ L_{PP} = 248. - M B_{MLD} = 32.20 M H = 18.90 M	L_{OA} = 270.0 M L_{PP} = 259.32 M B_{MLD} = 32.20 M H = 19.80 M
2452 TEU/11.85 M	2452 TEU, 11.85 M 12	2904 TEU/11.65 M 12	2904 TEU/11.65 M	2688 TEU 12.35 M 12	2360 TEU 11.25 M 11	3023 TEU, 12.50 M 11
			24.360 T × 1.7 = 41.4 1.2 2× 0.7 2× 0.8 0.7 NEWBUILD, FAREAST 44.8 MILL 13400 USD/TEU	24.699 T × 1.7 = 42 - 1.2 2× 0.7 2× 0.8 0.7 45.4 16900 USD/TEU	18.300 T × 1.7 = 31.1 0 2× 0.7 1× 0.5 0.7 33.0 14000 USD/TEU	20.000 T × 1.7 = 34.0 1 BOW THRUSTER 1.4 REEFERPLUGS 0.7 36.1 ~ 12000 USD/TEU
	IN CASE SHIP SHOULD BE BUILT NOW : IN FAR EAST.		0.1 × 50.9 × 5.09 MILL/YR × 1/365 = 13 950 USD	0.1 × 51.6 × 5.16 MILL/YR × 1/365 = 14.140 USD	0.1 × 33.0 = 3.30 MILL/YR × 1/365 = 9040 USD	0.1 × 36.1 = 3.61 MILL/YR × 1/365 = 9 900 USD
TWIN SCREW 6.100 700 6.800	TWIN SCREW 6.100 700 6.800	6100 700 6.800	TWIN SCREW 6100 700 6.800	TWIN SCREW 6.100 700 6.800	SINGLE SCREW 4.850 700 5.550	SINGLE SCREW 4.850 700 5.550
2.482.000 × 115	USD 2.482.000 × 115	2.482.000 × 93	2.482.000 × 93	2.482.000 × 100	2.026.000 × 93	MILL USD 2.026.000 = 73 EXTRA LASH. ATE 125.000 = 4
2.664.000 × 123	5.13×9.9 × 52562 BRT 2.664.000 × 123	5.12×9.9 × 57000 BRT 2.889.000 × 108	5.12×9.9 × 57000 BRT 2.889.000 × 108	5.12×9.9 × 58618 BRT 2.964.000 × 120	17×9.9 × 40.000 BRT 2.023.000 × 93	17×9.9 × 44.000 BRT 2.225.000 × 80
5.745.000 × 254	5.326.000 × 236	5.816.000 = 217	4.887.000 = 182	5.720.000 × 231	4.380.000 × 202	4.953.000 × 178
10.891.000 × 482 USD/TEU	10.472.000 × 464 USD/TEU	11.187.000 418	10.258.000 = 383	11.166.000 × 451	8.429.000 × 388	MILL USD 9.329.000 × 335 USD/TEU
	CONVERSION COST = 1.3 MILUSD (25 YR − AGE) × 10% ANNUITY				3.300.000 151	3.610.000 × 129
					11.729.000 539	MILL USD 12.939.000 464 TOTAL/YR.
CONTRS TRANSP. 22.598 TEU/YR	5.12×2×0.9×2452 = 22.598 TEU/YR	5.12×2×0.9×2904 = 26.763 TEU/YR	5.12×2×0.9×2904 = 26.763 TEU/YR	5.12×2×0.9×2688 = 24.773 TEU/YR	5.12×2×0.9×2360 = 21.750 TEU/YR	5.12×2×0.9×3023 = 27.860 TEU/YR

BRT = $L_{OA} B H \times 0.266$ APPROX

TYPICAL LOADING
12.7 TON/TEU HOMOG.
LIGHTSHIP = USD/KG = STAND PRICE
EXTRA FOR 2 SCREW
THRUSTERS
SHAFTGEN.
REEFERPLUGS
SHIPS PRICE PER TEU.

DAILY OPER. EXPENSES
MANAGEMENT
RUNNING COST/DAY.

- RUNNING COST/YR
- EXTRA LASHING/YR
- TONNAGE DUES/YR = 9.9 × BRT × 5.12 TRIPS/YR
- FUEL COSTS/YR.

USD/TEU

CAPITAL COSTS/YR

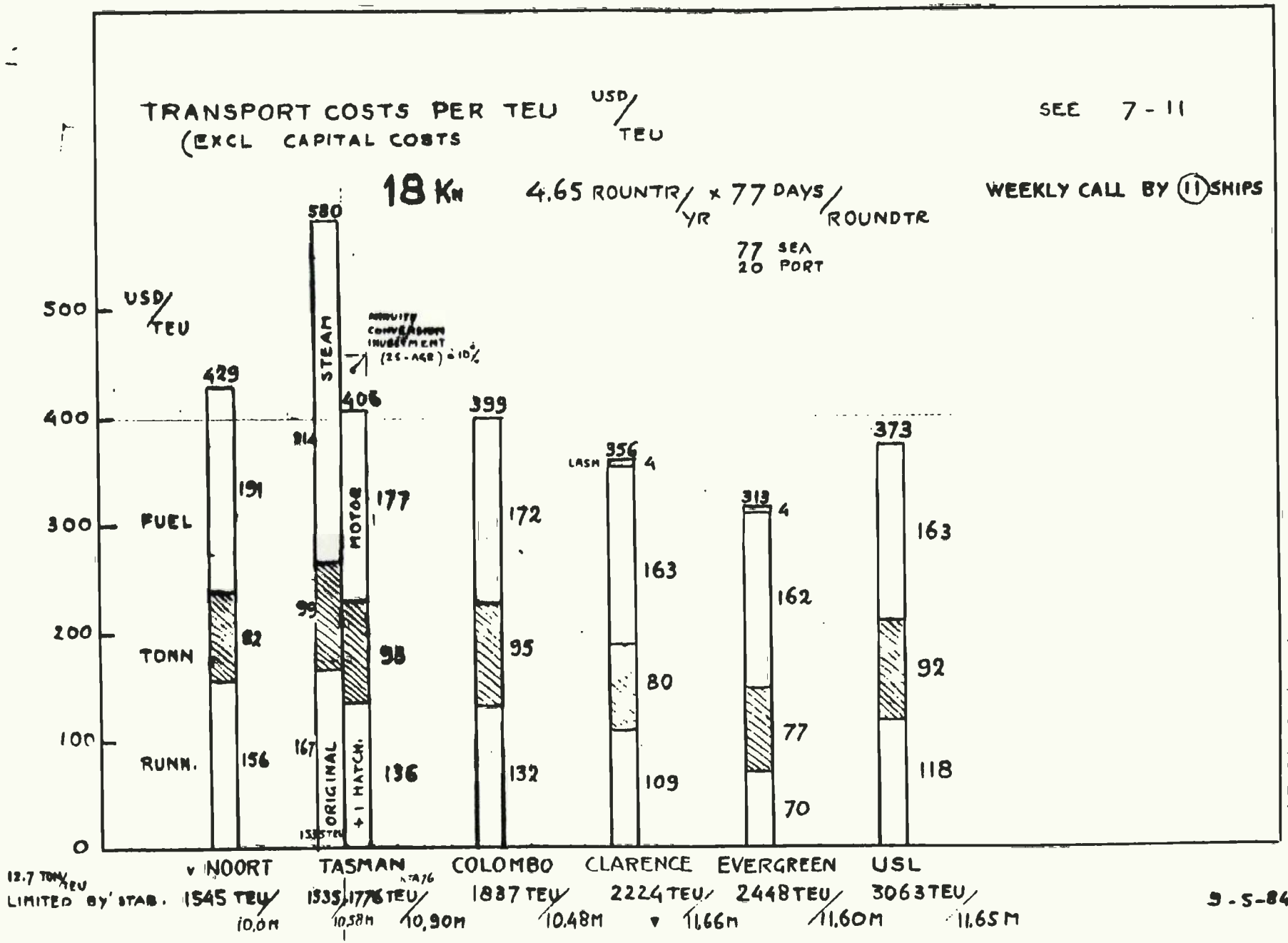
TOTAL/YR.

72-2

10

TRANSPORT COSTS 20½ KN 5.12 RTR/YR

3-5 M


TRANSPORT COSTS PER TEU USD/TEU
(EXCL CAPITAL COSTS
SEE 7 - 11
18 Kn
4.65 ROUNTR/YR x 77 DAYS/ROUNDTR
77 SEA
20 PORT
WEEKLY CALL BY (11) SHIPS
USD/TEU
500
400
300
200
100
0
FUEL
TONN
RUNN.
429
191
82
156
580
STEAM
406
MOTOR
177
98
136
ORIGINAL
+1 HATCH.
99
167
914
399
172
95
132
356
LASH
4
163
80
109
313
4
162
77
70
373
163
92
118
12.7 TONN/TEU
LIMITED BY STAB.
V NOORT 1545 TEU/10,0M
TASMAN 1335-1776 TEU/10,58M
1887 TEU/10,90M
COLOMBO 1887 TEU/10.48M
CLARENCE 2224 TEU/11,66M
EVERGREEN 2448 TEU/11,60M
USL 3063 TEU/11,65M
9-5-84
CORRECTED 9-5-84

TRANSPORT COSTS PER TEU (EXCL CAPITAL COSTS)

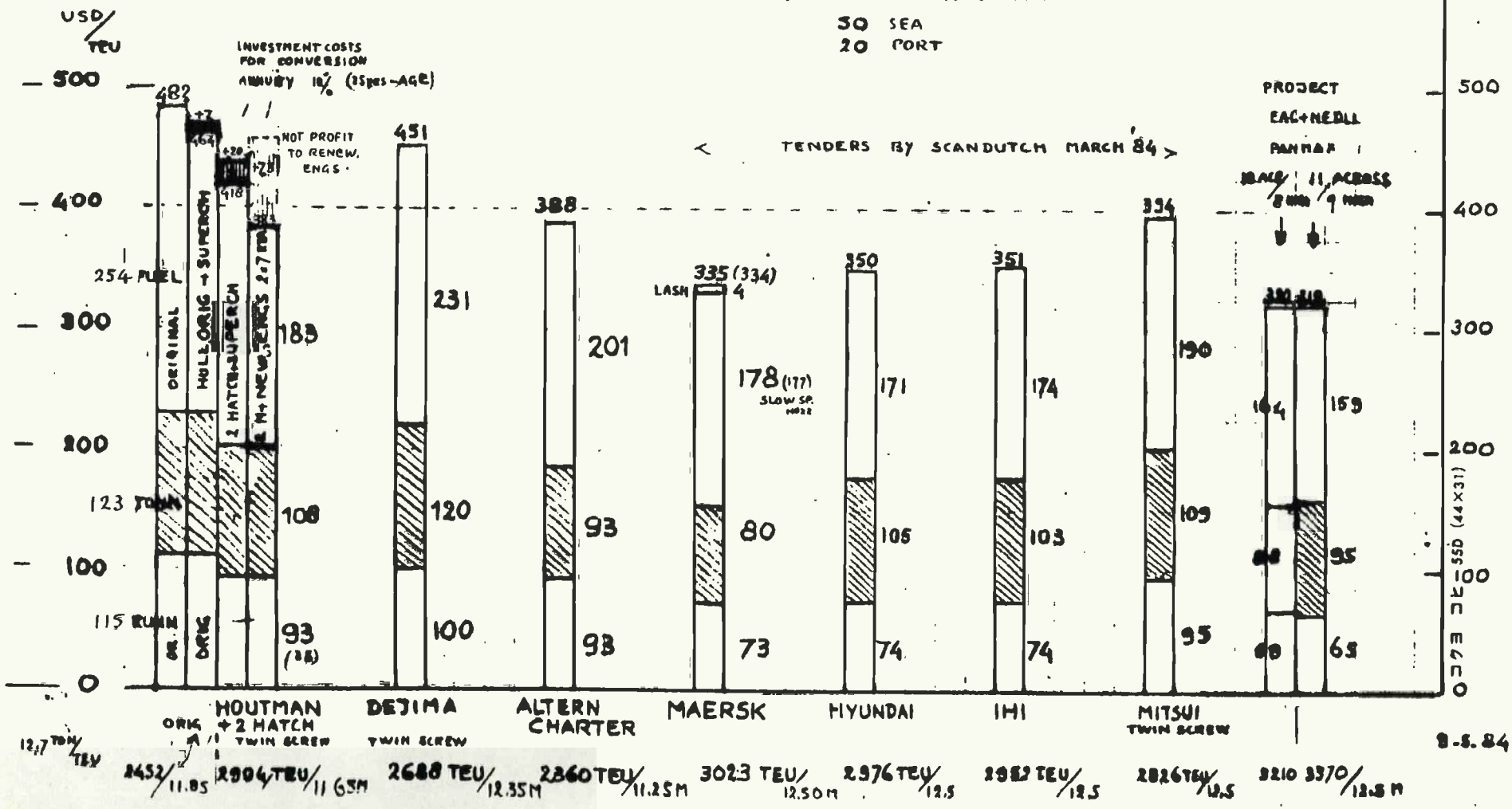
USD/TEU

SEE 12 AND 14.

20½ KN

5,12 ROUNTR/YR x 70 DAYS/ROUNTR.

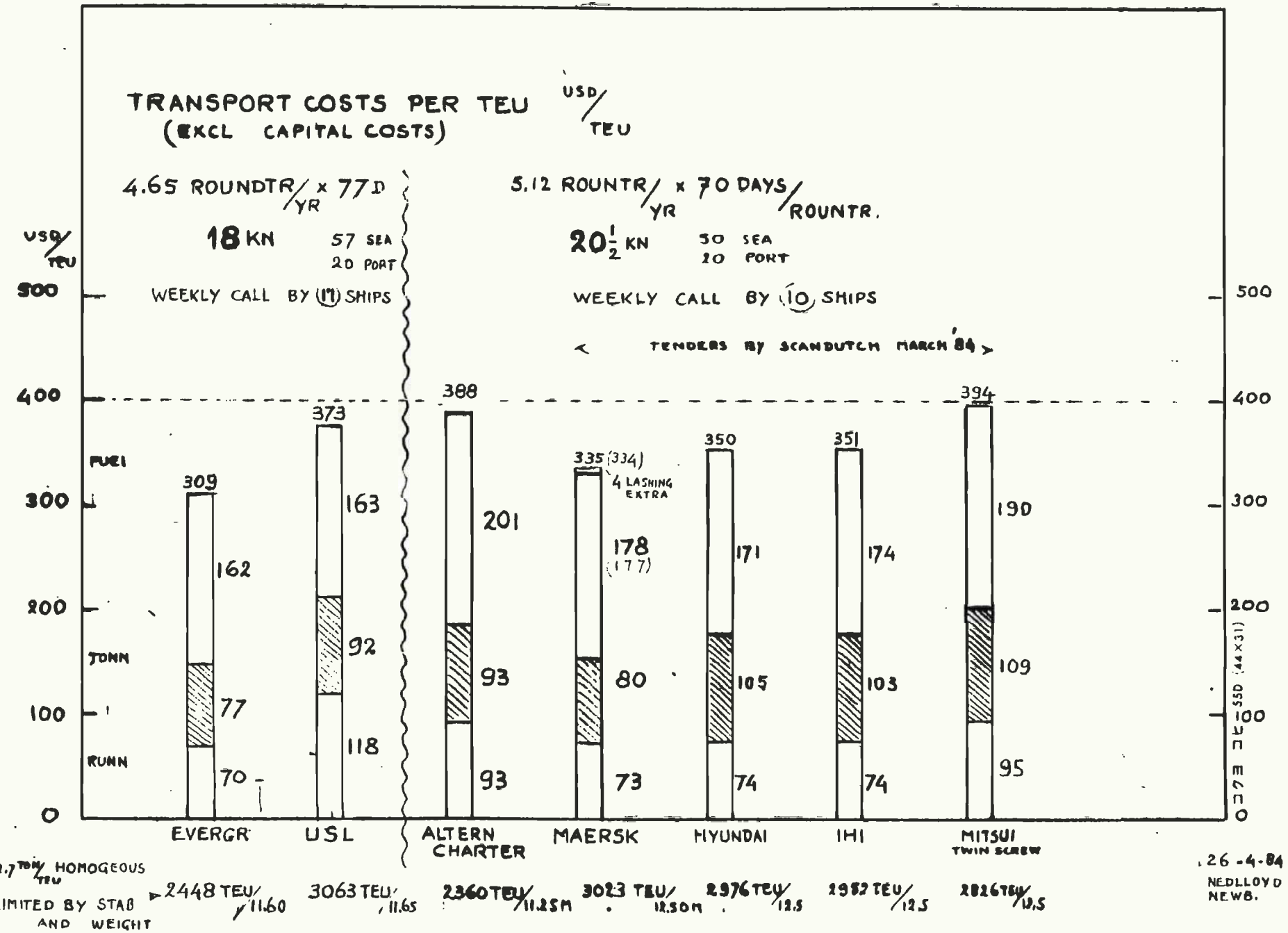
30 SEA
20 PORT



CORRECTED 9-5-84.

12

13-2



CORRECTED 9-5-84

13

TRANSPORTCOSTS PER TEU

EXCL. CAPITAL COSTS

41

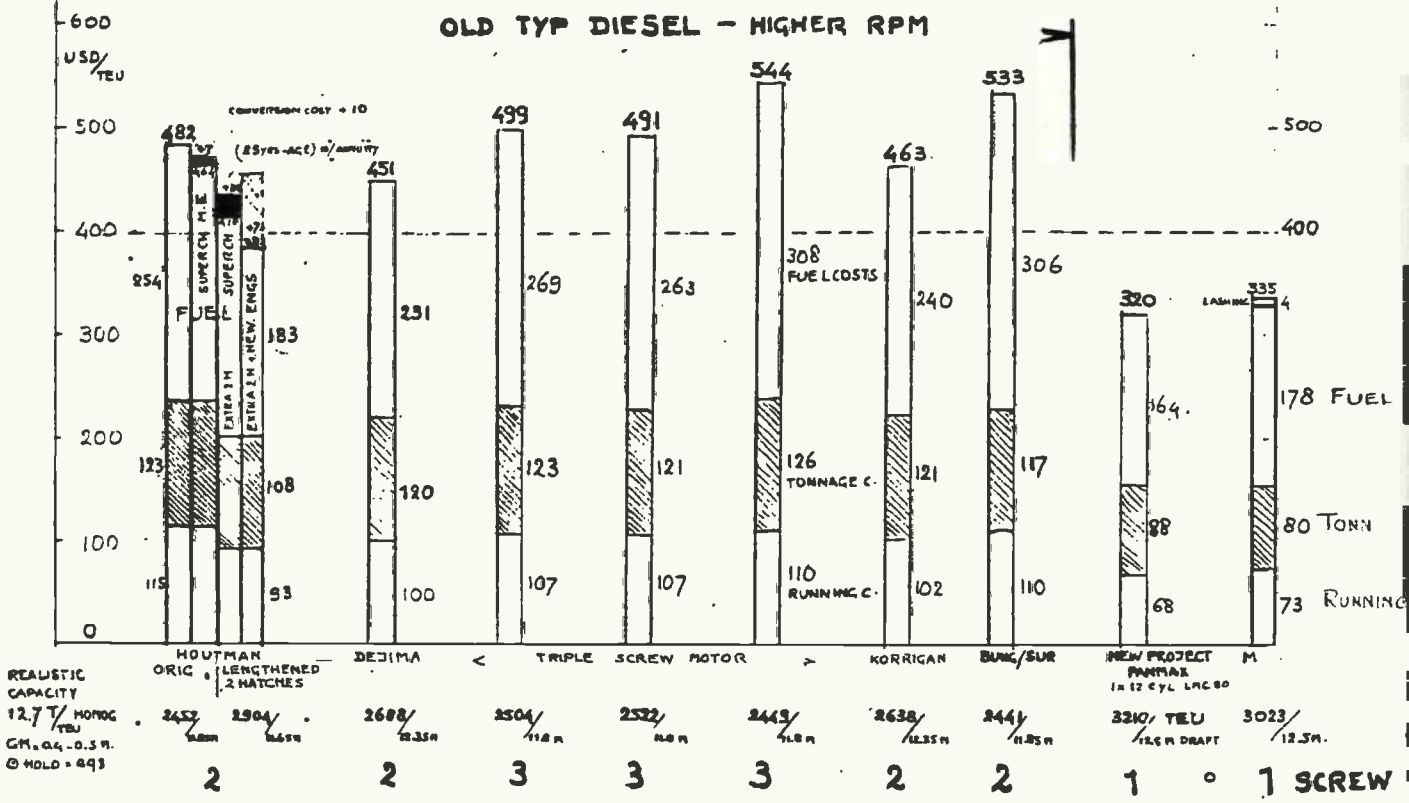
20.5 KN. SERVICE

70 DAYS ROUNDTRIP < 50 AT SEA / 20 IN PORT

5.12 ROUNDTR/YR.

TRANSPORT COSTS IN USD/TEU

OLD TYP DIESEL – HIGHER RPM



MODERN SINGLE SCREW - SLOW TURNING - LONGIT. SCAV. - SUPERCH. DIESEL

TRANSPORT COSTS PER TEU (EXCL CAPITAL COSTS) USD/TEU

4.65 ROUNDTR/YR x 77 D

18 KN 57 SEA 20 PORT

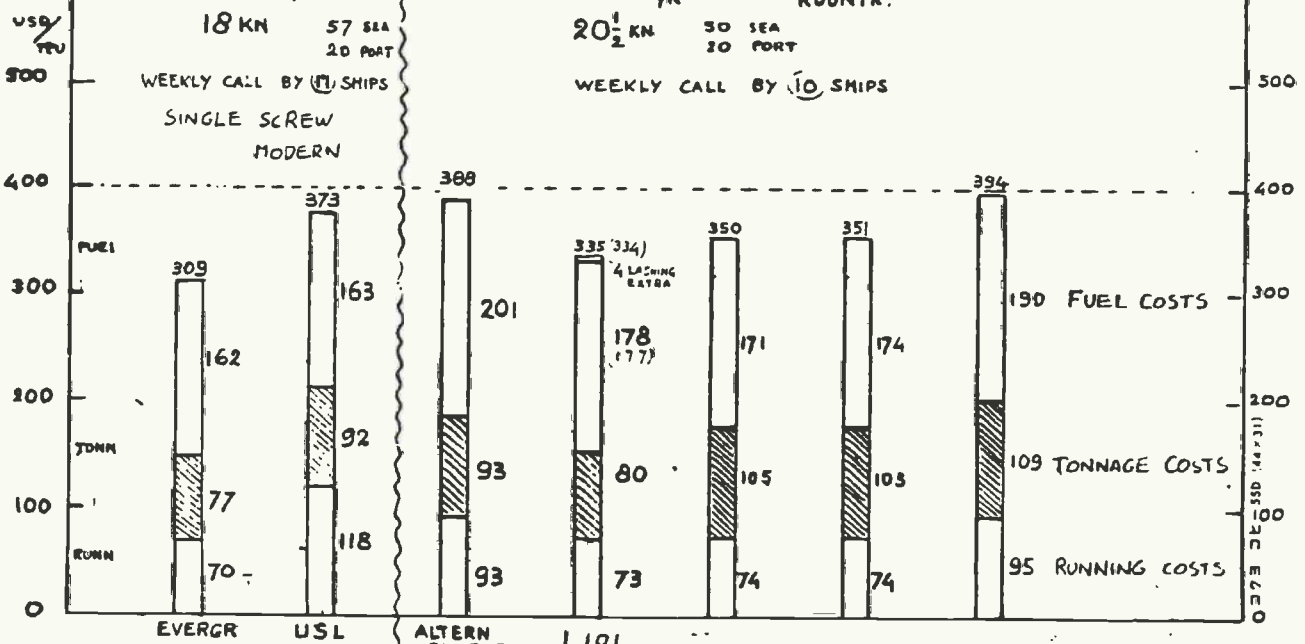
WEEKLY CALL BY (11) SHIPS

SINGLE SCREW MODERN

5.12 ROUNTR/YR x 70 DAYS/ROUNTR.

20½ KN 50 SEA 20 PORT

WEEKLY CALL BY (10) SHIPS



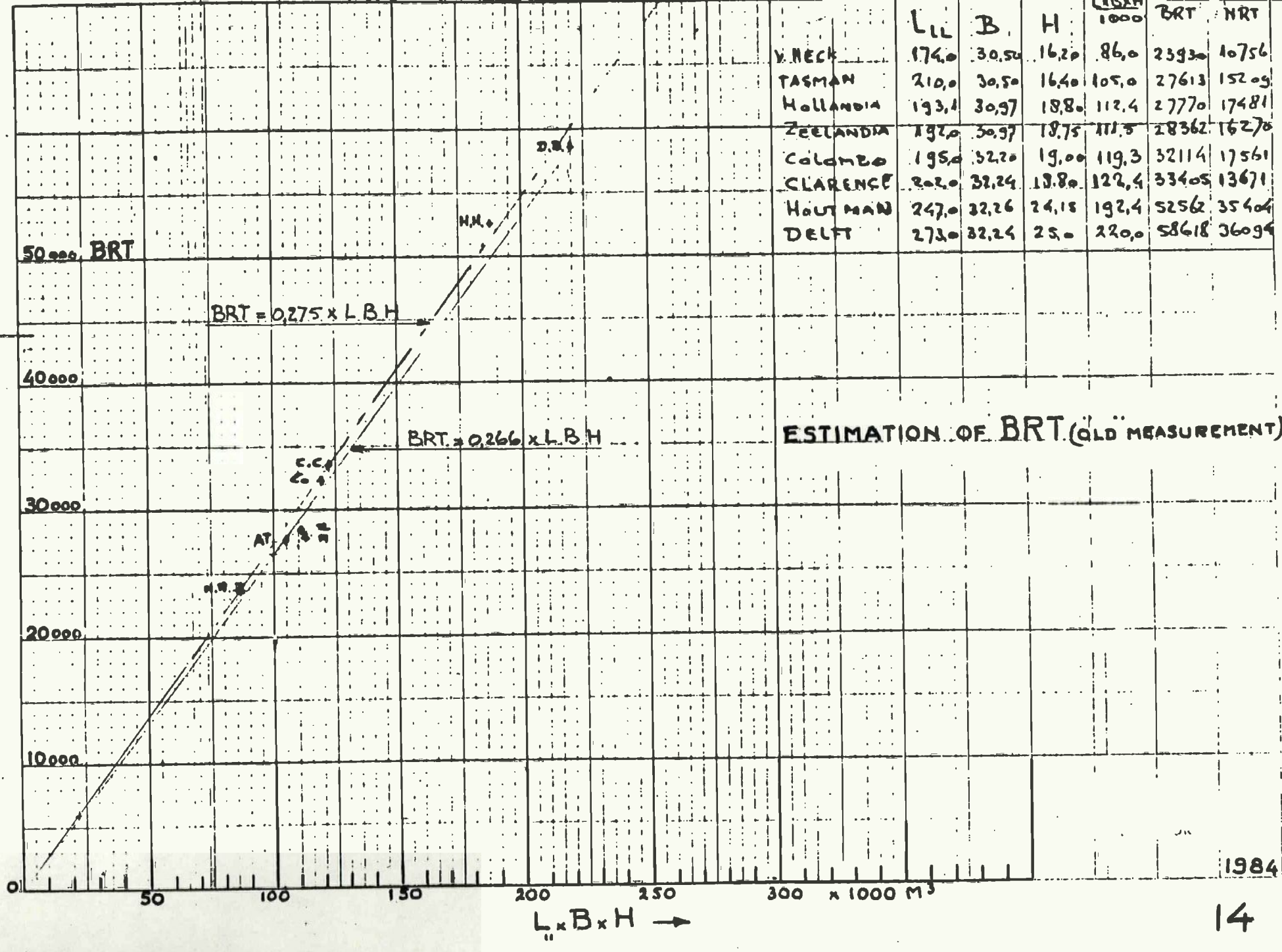
12.7 T/TEU HOMOGEOUS

LIMITED BY STAB AND WEIGHT

2448 TEU/11.60 3063 TEU/11.65 2360 TEU/11.25M 3023 TEU/12.50M 2576 TEU/12.5 2957 TEU/12.5 2826 TEU/12.5

26-4-84 NEDLLOYD NEWB.

CORRECTED 9-5-'84



	L_{LL}	B	H	$\frac{L_{LL}BH}{1000}$	BRT	NRT
V. NECK	174,0	30,50	16,20	86,0	23930	10756
TASMAN	210,0	30,50	16,40	105,0	27613	15209
Hollandia	193,1	30,97	18,80	112,4	27770	17481
Zeelandia	192,0	30,97	18,75	111,5	28362	16270
Colombo	195,0	32,20	19,00	119,3	32114	17561
CLARENCE	202,0	32,24	18,80	122,4	33405	13671
HOUTMAN	247,0	32,26	24,18	192,4	52562	35404
DELFT	272,0	32,24	25,0	220,0	58618	36095

ESTIMATION OF BRT (OLD MEASUREMENT)

1984

74-1

PORT EXPENSES/CANAL DUES

7-5-'84

	PORTS \ SHIPS	DELFT DEJIMA HOUTMAN KORRIGAN	SELANDIA JUTLANDIA NIHON TOYAMA
EAST BOUND	GOTHENBURG	13.200	10.778
	HAMBURG	28.200	27.221
	BREMERHAVEN	26.200	20.800
	ROTTERDAM	23.700	22.200
	LE HAVRE	11.700	10.900
	MARSEILLE-FOS	16.800	16.600
	SUEZ CANAL	136.300	117.100
	JEDDAH	2.400 x¾	2.200 x¾
	PORT KELANG	5.100 x¼	4.700 x¼
	SINGAPORE	16.700	15.200
	HONG KONG	4.500	4.100
	BUSAN	14.000	12.500
WEST BOUND	KOBE	10.300	9.500
	NAGOYA	14.100	10.400
	TOKYO	20.100	18.400
	SHIMIZU	14.100	13.100
	HONGKONG	4.600	4.200
	SINGAPORE	13.100	12.100
	PORT KELANG	5.100 x¼	4.700 x¼
	JEDDAH	2.400	2.200
	SUEZ CANAL	136.300	117.100
	FOS SUR MER	16.800	16.600
	ROTTERDAM	20.800	19.400
	HAMBURG	31.500	30.200
	GOTHENBURG	—	—
TOTAL USD/TRIP		579.800	522.199
5.12 TRIP/YEAR: USD/YR		2.969.000	2.673.659

SUEZ CANAL PER TRANSIT US:

SELANDIA, JUTLANDIA	117.100 *
NIHON	120.100
TOYAMA	114.300
KORRIGAN	133.800
DELFT, DEJIMA	136.300 *
BUNGAPARNAS, SURIA	130.400
HOUTMAN, HOORN	130.300

RATIO $\left[\frac{\text{TOTAL USD/TR}}{\text{BRT}}\right]$

DELFT: $\frac{579800}{58618} = 9,9$

SELANDIA: $\frac{522199}{49890} = 10,3$

DAILY OPERATING EXPENSES.

	SINGLE SCREW	TWIN SCREW.
MANNING, ~	3000	3200
RADIO	200	200
INSUR.	700	950
R+M.	700	1100
LUB.	250	650
	4850 USD/DAY.	6100 USD/DAY.

TONNAGE DUES.

70 DAYS ROUNDTRIP. EUROPE - FAR EAST THROUGH SUEZ CANAL.

23 PORTS / ROUNDTRIP

TONN. DUES / ROUNDTRIP = 9.9 × BRT USD

(BRT = L B H × 0,266. APPROX.)

APR 1984

MADE IN 1983

USD/KG LIGHTWEIGHT

SIMPLE METHOD TO ESTMATE SHIPS PRICE
NEWBUILDING AT DATE OF CONTRACT

KOREA/JAPAN.

LIGHTWEIGHT x MANHR/KG x DFL/MANHR = COST

LIGHTWEIGHT x DFL/KG = MARKET PRICE

1 USD = 2,62 GLD

EXAMPLE : 1 JAN 83 — 10,000 TON x 5,76 DFL/KG = 57,6 MILL DFL x 1/2,62 = 22... MILL USD
(MILL OWNERS INVENTORY) (2,2 USD/KG)

SHIP TYP :	VLCC	BULK	CONT	PROD	PROD CHEM	CHEM	SMALL CHEM TANKER ST.STEEL TANKS
MULTIPL. FACTOR FOR COMPLEXITY :	0,75	0,80	1,00 (RORO)	1,03	1,08	1,12	~2

18-3-83
1 USD = 2,62 GLD

1-12-83
1 USD = 2,41 GLD

8% inflation curve

4% inflation curve

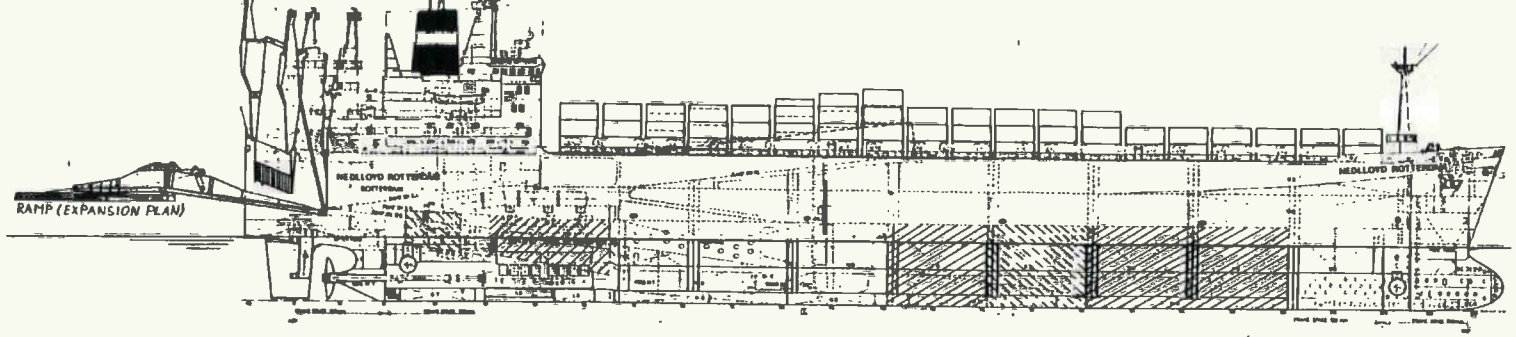
~60-65% = MATERIAL COST

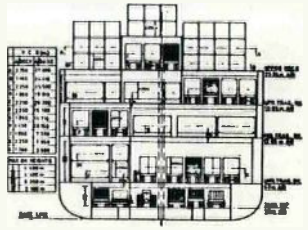
'64 '65 '66 '67 '68 '69 '70 '71 '72 '73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90

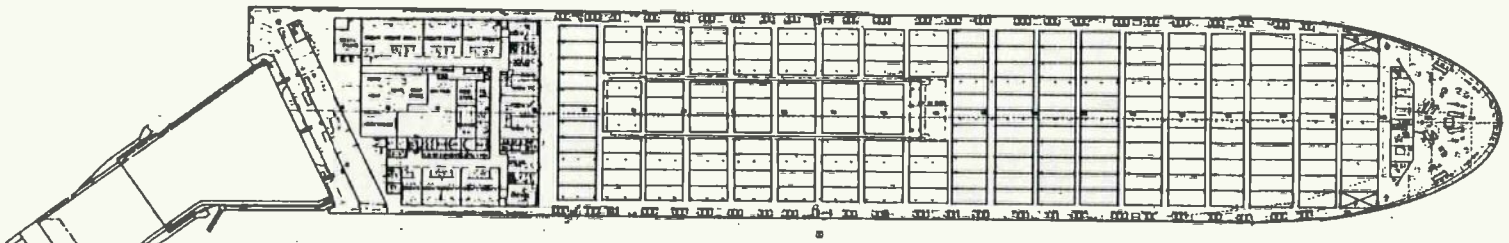
0 1 2 3 4 5 6 7

77

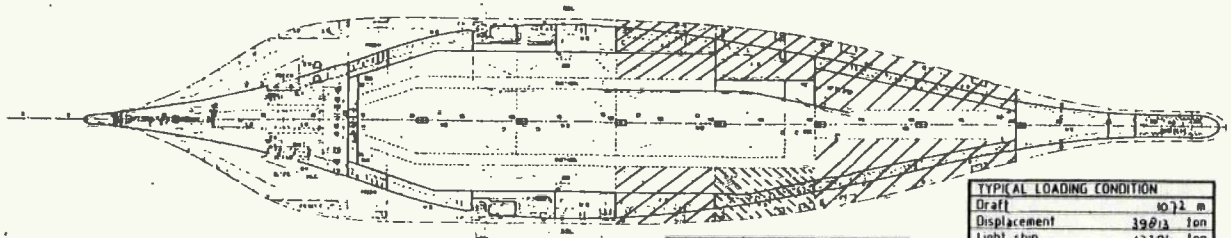
CONTAINER-RORO VESSELS







0 5 10 15 20 30 40 50 meters



MDO. BUNKERS

HFO. BUNKERS

MAX. TEU CAPACITY SPACE WISE			
Hold 746			
L.T.D. 332	of which 32-40ft = 43 %		
Deck 196 1st tier	196		
198 2nd tier	198		
TOTAL 1140	TOTAL DECK	394	
173 3 th tier		177	
TOTAL 1313	TOTAL HOLD	571	

PRINCIPAL DIMENSIONS 'ROCHESTER'		
Length over all	196.50	m
Length betw. perpend.	183.20	m
Breadth mld	31.24	m
Depth mld	23.25	m
Draft scantling	10.72	m
Displacement	29813	ton
Light ship	17294	ton
Deadweight	11519	ton

CAPACITY		
Water ballast	7880.6	m3
Fresh water	692.6	m3
Heavy Fuel Oil	4310	m3
Diesel Oil	869.1	m3
Lubricating Oil	268.2	m3
DIRTY WATER	118	m3

PRINCIPAL DIMENSIONS 'ROTTERDAM'		
Length over all	196.50	m
Length betw perpend	183.20	m
Breadth mld	31.24	m
Depth mld	23.25	m
Draft scantling	10.72	m
Displacement	29813	ton
Light ship	17249	ton
Deadweight	22564	ton

NUMBER OF TRAILERS					
tanktop 35	l.t.d. 60	m.t.d. 35	u.t.d. 103	upper deck 81	total 335
CARGO DECK AREA					m²
GRAIN CAPACITY					
BALE CAPACITY					63060 m3
LANE LENGTH					
441	736	945	1198	1033	4473 m

INTEGRAL REEFERS
Reeferpoints on deck 95
Reeferpoints in hold NONE
20' 8.0 kW, 40' 10.5 kW
RECEPTABLES 440 V, 32 Amp, 3 ph, 60 Hz

SHAFT GENERATOR			
max. — kW			
normal kW x 1.36 / 0.85	=	HP	
x g/SHP.h x 24	=	— t/day	

DIESEL GENERATORS	
Generator I	1500 kW - 720 RPM
Generator II	1500 kW - 720 RPM
Generator III - IV	1500 kW - 720 RPM
Emergency gen.	520 kW - 1800 RPM

Normal electr. load at sea: 900 kW	
- Diesel gen.	= 5.5 ton/day (MDO)
- Shaft gen.	= — ton/day (HFO)
Norm. elect. load idle in port: 900 kW	
- Diesel gen.	= 5.5 ton/day (MDO)
- Boiler	= 1.0 ton/day (MDO)
Extra for reefers	
Box x kW/box x HP/kW x g/HP.hr x hr/t	
95 x 8 x 1.36 x 190 x 24 / 10⁶	
= 4.3 ton/day (MDO)	

THRUSTERS		
Bowthruster	1180 kW, 1600 HP	
Sternthruster	1180 kW, 1600 HP	
Rudder max angle 35°		
Stabilisers DENNY BROWN AEG GYROTIN STABILISERS		

MAIN ENGINE SULZER 8RND90M	
MCR 25400	HP - 112 RPM
85%MCR spec. allow. 21590	HP - 106 RPM
Fuel for main eng. HFO: 500 CST-50°C	
Fuel for aux. eng MDO: MAX 13 CST-40°C	
HFO = 108 x MDO	
Heavy Fuel Oil consumption excl. shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial = 1,045	
C_2 = sea margin = 1,12 spec. allow.	
Spec. fuel consumption = 144 g/SHP.h at 10200 kcal/kg	
HFO = 108 x MDO	

RND 90 M SUPERCHARGED 25440 HP/112 RPM
NEW HIGHLY SKEWED PROP Ø 6800

Fuel consumption in ton/day

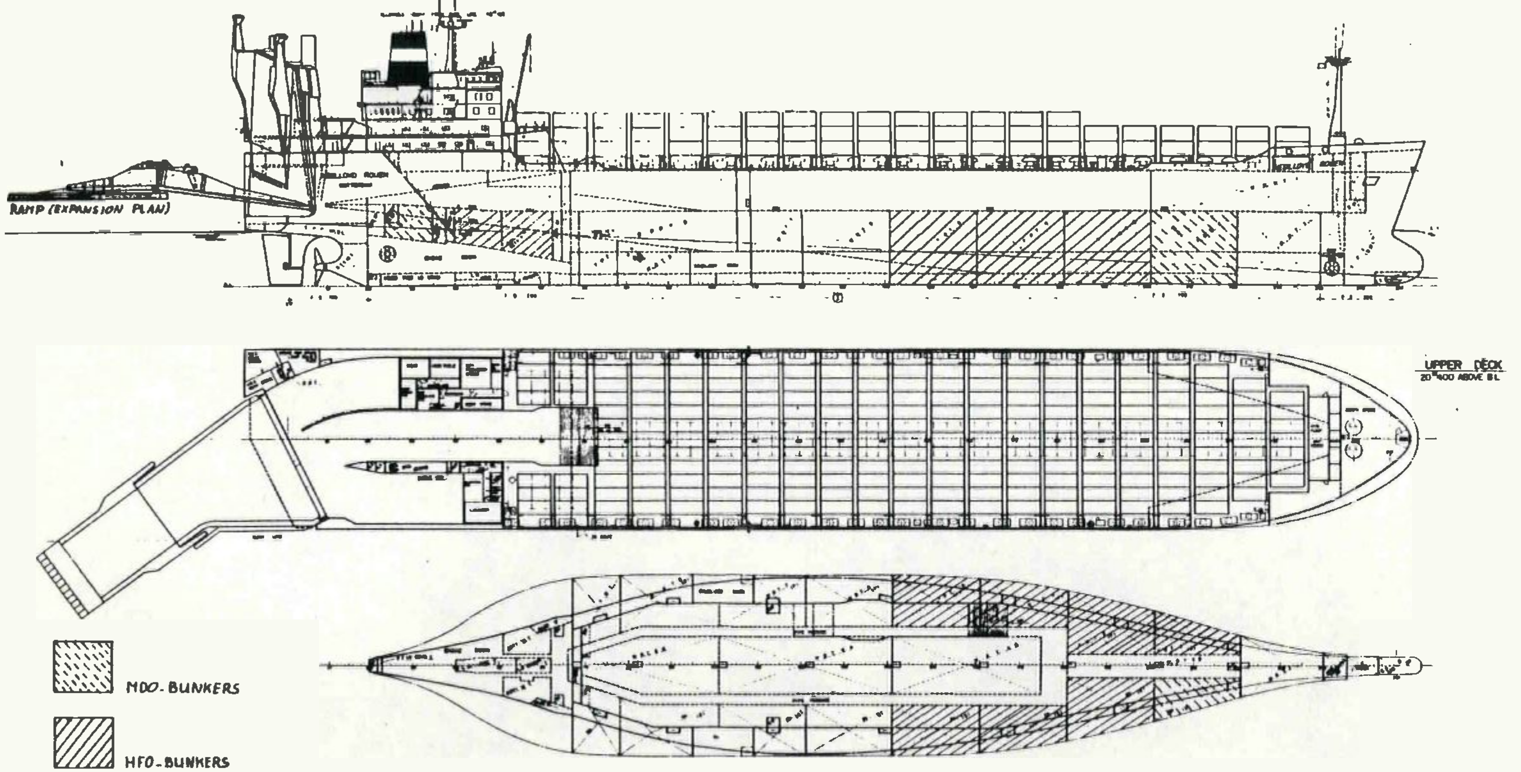
Draft in m \ Speed in kn	16	16.5	17	17.5	18	18.5	19	19.5	20
8	43	48	51	54	57	61	64	68	71
8.5	43	47	50	53	57	61	64	67	71
9	42	46	50	53	57	61	64	67	71
9.5	41	45	50	53	57	61	64	67	71
10	41	44	50	53	57	61	64	67	71
10.5	41	45	50	53	57	61	64	67	71

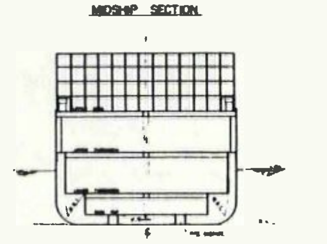
TYPICAL LOADING CONDITION		
Draft	10.72	m
Displacement	29813	ton
Light ship	17294	ton
Deadweight	22519	ton
FO+DO+Lub+Dr.w.+ +Prov.+Stores	4964	ton
Water Ballast	280	ton
	5244	ton
TEU x T/TEU		
Hold 806 x 12.7	= 10235	ton
Deck 483 x 12.7	= 6134	ton
Empties — x	= —	ton
1289 x 12.7	= 16369	ton
TRAILERS x T/TRAILER		
Hold 35 x 25.9	= 906	ton
Deck — x	= —	ton
35 x 25.9	= 906	ton
FO	4104.0	ton
DO	320.0	ton
Lub Oil	170.0	ton
Fresh Water	230.0	ton
Sev. tanks	—	ton
Crew+prov+stores (INCL IN DWT)	—	ton
	4964.0	ton
KM	15.65	m
KG	14.84	m
GM	0.81	m
Free surface correction	0.08	m
GM'	0.73	m

Nedlloyd Fleet Services
Newbuilding Department

NAME NEDLLOYD ROTTERDAM
NEDLLOYD ROCHESTER

Delivery date DEC. 1978 / APRIL 1979
Yard VEROLME DOCW B SHIPBUILDING CO.
Class LR ✠ 100 A1 ✠ 1 MC; UMS 1





NUMBER OF TRAILERS				
tanktop	l.t.d	u.t.d.	upper deck	total
38	71	100	91	300
CARGO DECK AREA				
1991	3176	4930	3651	13748 m²
GRAIN CAPACITY				
8595	23266	38868		70729 m3
BALE CAPACITY				
7826	22257	37207		67290 m3
LANE LENGTH				
510	948	1332	1176	3966 m

DIMENSIONS CARGO ACCESS						
ITEM	LOCATION	BREADTH	HEIGHT	SLOPE	AXLE LOAD	WHEEL LOAD
Stern ramp	u.t.d. aft	12 m.		7.5°	58 T	14 T
Stern door	u.t.d. aft	25 m.	7 m.			
S.B. G.T door	u.t.d	9.05 m.	6.33 m.			
P.S. G.T door	u.t.d	9.04 m.	6.7 m.			
W.T casing dr.	upperdeck	9.10 m.	6.45 m.			
G.T rampcover	l.t.d	5.60 m.			58 T	14 T
FIXEDRAMP	to upperdeck	9.0 m		7.125°	58 T	14 T
	to u.t.d.			5.27°		
	to l.t.d.			7.125°		
	to tanktop	5.89 m.				

SHAFT GENERATOR NONE	
max – kW	
normal kW x $\frac{1.36}{0.85}$ = HP	
x g/SHP.h x 24 = – t/day	
DIESEL GENERATORS	
Generator I	1500 kW-600RPM
Generator II	1500 kW-600RPM
Generator III+IV	1500 kW-600RPM
Emergency gen.	510 kW-1800RPM
Normal electr. load at sea	800 kW
- Diesel gen.	= 5.0 ton/day(IFO)
- Shaft gen.	= – ton/day(HFO)
Norm. elec. load idle in port	800 kW
- Diesel gen.	= 5.0 ton/day(IFO)
- Boiler	= 1.0 ton/day(HFO)
Extra for reefers 20 FT	
Box x kW/box x HP/kW x g/HP.hr x hrs	
100 x 8 x 1.36 x 190 x 24	
	= 5.0 ton/day(IFO)

MAIN ENGINE SULZER 8 RND 90 M	
MCR	25400 HP - 112 RPM
85% MCR Serv. Allow.	21590 HP - 106 RPM
Fuel for main eng.	HFO 500 cSt - 50°C
Fuel for aux. eng.	IFO ~ 180 cSt (bought ...)
HFO = 1.08 x MDO	
Heavy Fuel Oil consumption excl. shaft generator in tons/day	
SHP service = SHP tank x C_1 x C_2	
C_1 = margin for trial	= 1.045
C_2 = sea margin	= 1.12 serv. allow.
Spec. fuel consumption	= 144 g/SHP.h
at 10200 kcal/kg	
HFO = 1.08 x MDO	

8 RND 90 M SUPERCHARGED 25440 HP/112
NEW HIGHLY SKEWED PROP ...

Fuel consumption in ton/day									
Draft in m \ Speed in kn	16	16½	17	17½	18	18½	19	19½	20
8.	43	48	51	54	57½	61	64	68½	73
8.5	43	47	50½	51½	57½	61	64½	69½	75
9.	42½	46½	50	53½	57½	61½	66	71½	77½
9.5	42½	46	50	54	58	62½	67½	73½	80
10.	42½	46½	50½	54½	59	64	69½	76	[illegible]
10.5	41½	47½	52	56	60½	66½	72½	79½	87½

TYPICAL LOADING CONDITION	
Draft	10.72 m
Displacement	45193 ton
Light ship	15975 ton
Deadweight	29218 ton
FO+DO+Lub.+Dr.w.+ +Prov.+Stores	5647 ton
Water Ballast	861 ton
	6489 ton
TEU x T/TEU (8'-6" cont.)	
Hold 833 x 13.92 =	11597.4 ton
Deck 717 x 13.92 =	9982.5 ton
Empties – x =	– ton
1550 x 13.92 =	21579.9 ton
TRAILERS x T/TRAILER	
Hold 38 x 30 =	1140.0 ton
Deck – x =	– ton
38 x 30 =	1140 ton
F.O.	4240.7 ton
D.O.	1299 ton
Lub. Oil	ton
Fresh Water	516.5 ton
Sev. tanks (incl. lub oil)	551.0 ton
Crew+prov+stores	50 ton
	5647.0 ton
KM	15.42 m
KG	14.33 m
GM	1.09 m
Free surface correction	0.11 m
GM'	0.98 m

MAX TEU CAPACITY SPACE WISE		
Hold 833	of which 104-40ft = 25 %	
Deck 215	1st tier	
251	2nd tier	
251	3rd tier	
TOTAL 1550		TOTAL DECK 717
185	4th tier	185
TOTAL 1735		TOTAL DECK 902

CAPACITY	
Water ballast	9610.8 m3
Fresh water	516.5 m3
Heavy Fuel Oil	4096.3 m3
Diesel Oil	812.4 m3
Lubricating Oil	278.1 m3
Dirty Water	102.7 m³

PRINCIPAL DIMENSIONS (NEDLLOYD ROSARIO)	
Length over all	212.10 m
Length betw. perpend.	198.80 m
Breadth mld	32.24 m
Depth mld	20.40 m
Draft scantling	10.72 m
Displacement	45193 ton
Light ship	16095 ton
Deadweight	29098 ton

PRINCIPAL DIMENSIONS (NEDLLOYD ROUEN)	
Length over all	212.10 m
Length betw. perpend.	198.80 m
Breadth mld	32.24 m
Depth mld	20.40 m
Draft scantling	10.72 m
Displacement	45193 ton
Light ship	15975 ton
Deadweight	29218 ton

INTEGRAL REEFERS
Reeferpoints on deck 100
Reeferpoints in hold [illegible]
20' 8 kW 40' 11.5 kW
Receptacles 440V 3PH 32Amp 60Hz

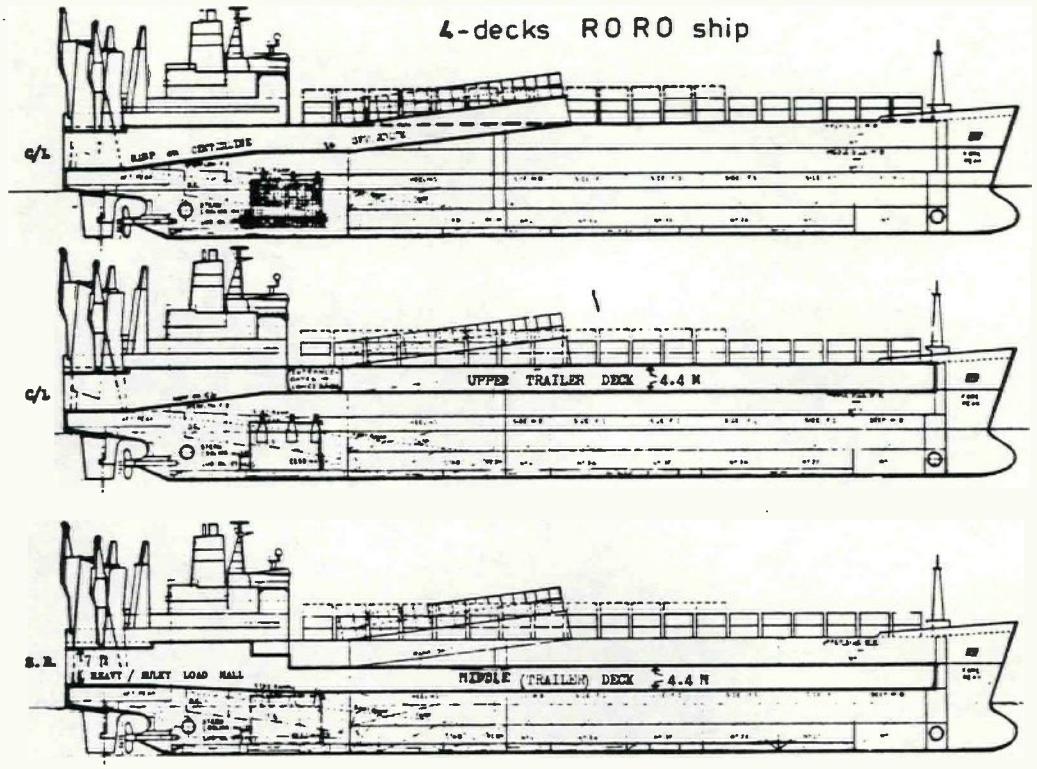
THRUSTERS
Bowthruster 1180 kW, 1600 HP
Sternthruster 1180 kW, 1600 HP

Rudder max. angle 35°
Stabilisers Sperry Gyrofin System
440V - 60Hz - 3PH

Nedlloyd Fleet Services
Newbuilding Department

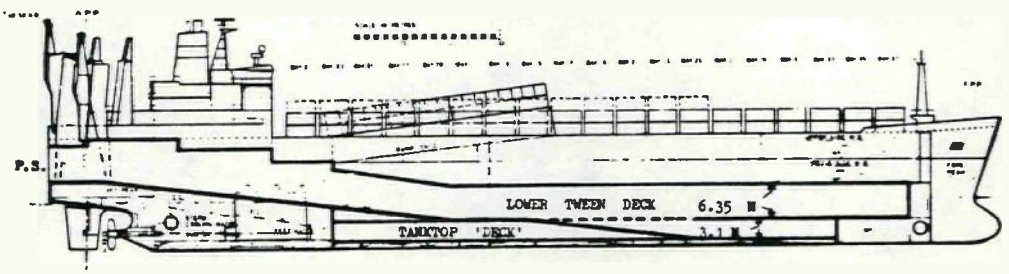
Name NEDLLOYD ROUEN
NEDLLOYD ROSARIO

Delivery date Oct 1978 – Jan 1979
Yard Nippon Kokan Kabushiki (NKK)
Class L R S ✠ 100 A1 ✠ LMC + UMS2

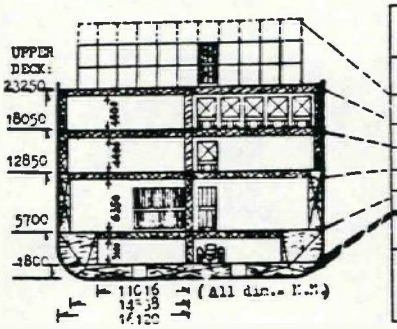


196.5 · 183.2 · 32.24 · 23.45 · 10.0 DESIGN DRAFT

NEDLLOYD ROTTERDAM
NEDLLOYD ROCHESTER



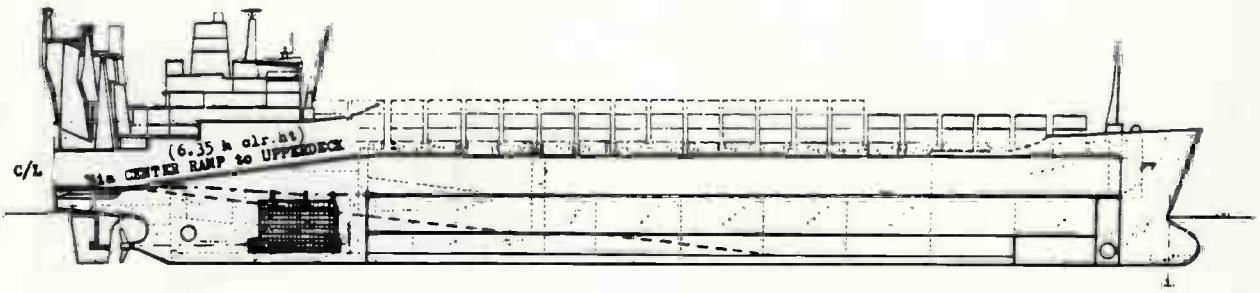
Midship's Cross Section ← 4 - DECKS RORO → CARGO CAPACITIES

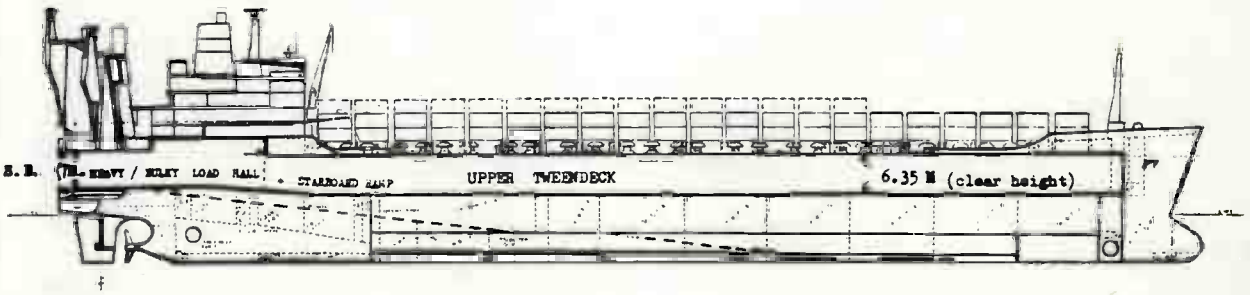


4 - DECKS RO-RO	CARGO CONDITION ALTERNATIVES 1		2		3		4	
Position in ship	Running metres à 12.6 m	Units	Units	TEU	Units	TEU	Units	TEU
Upperdeck incl ramp	1.011	= 82	-	177 [1] 294 [2]	-	177 [1] 294 [2]	-	177 [1] 294 [2]
Upper trailerdeck	1.298	= 103	103	-	103	-	-	230 [3]
Middle trailerdeck	945	= 75	75	-	75	-	-	165 [3]
Lower tween deck incl. ramp	756	= 60	60	-	-	332	-	332
Tanktop hold	441	= 35	35	-	35	-	35	-
Total	4.473 m	= 355 units	273 units	+ 571 TEU	213 units	+ 903 TEU	35 units	+ 1217 TEU

[3] The upper- and middle trailerdecks are not intended for containers.
[1] 1/3 tier
[2] 1/2 tiers

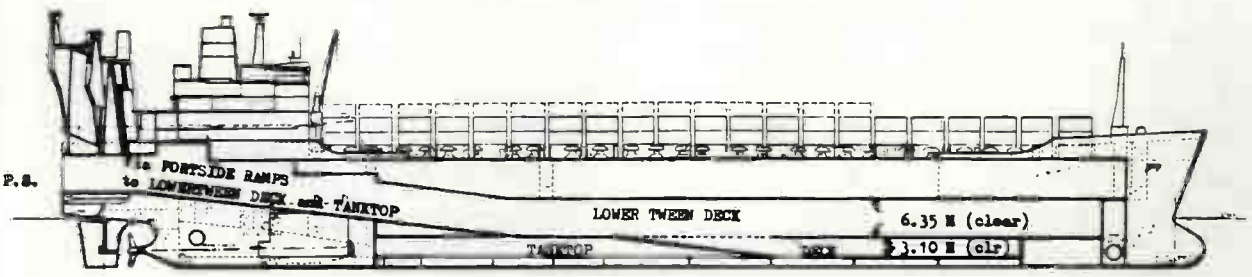
3-decks R O R O ship



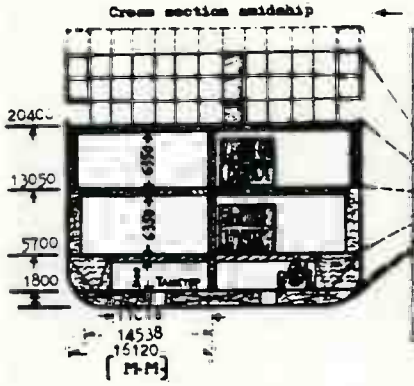


212,1 x 198,8 m. 32.24 x 20,4 m 10.0 DESIGN-DRAFT

NEDLLOYD ROUEN
NEDLLOYD ROSARIO



Cross section amidship ← 3 - DECKS RORO → CARGO CAPACITIES



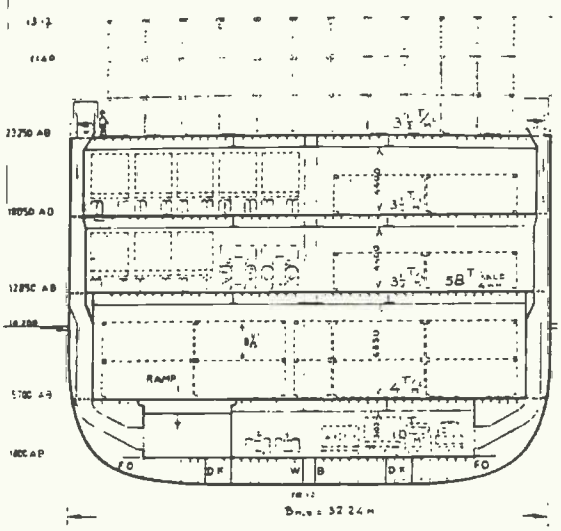
3 - DECKS RO-RO	CARGO CONDITION ALTERNATIVES 1	2	3	4	5
Position in ship	Running metres / Units à 12,6 m	Units / TEU	Units / TEU	Units / TEU	Units / TEU
Upperdeck incl. ramp	1,176 = 91	- / 185[1] 717[2]	- / 185[1] 717[2]	- / 185[1] 717[2]	- / 185[1] 717[2]
Upper tweendeck incl. ramp S.B.	1.332 = 100	100 / -	100 / -	- / 463	- / 463
Lower tweendeck incl. ramp P.S.	948 = 71	71 / -	- / 350	71 / -	- / 350
Tanktop hold	510 = 38	38 / -	38 / -	38 / -	38 / -
Total	3.966 = 300 m Units	209 + 902 Units / TEU	138 + 1260 Units / TEU	109 + 1366 Units / TEU	38 + 1713 Units / TEU

1) on tier
2) 3 tiers

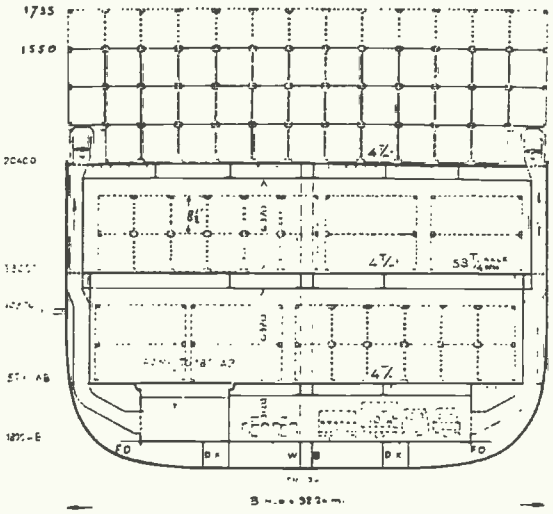
Main particulars - and differences.

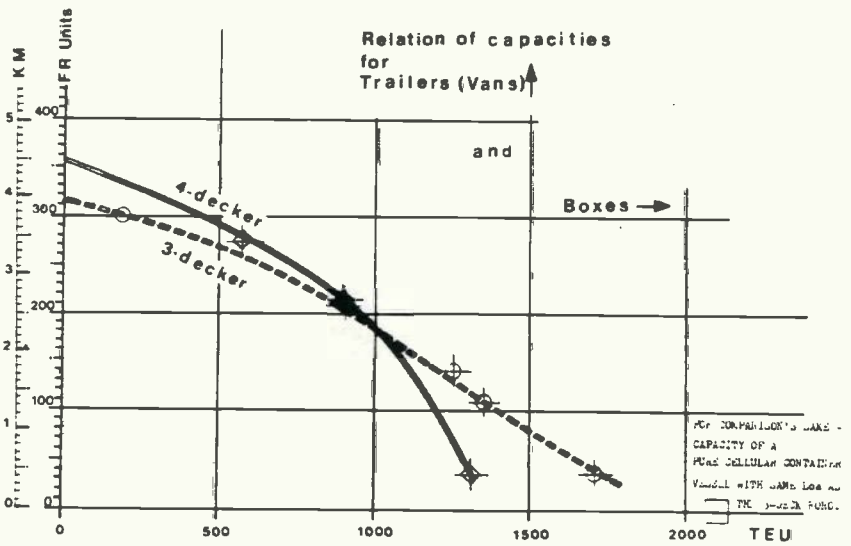
Vessels' names.	Nedlloyd Rotterdam Nedlloyd Rochester			Nedlloyd Rouen Nedlloyd Rosario		
Number of decks	4 decks			3 decks		
Permissible deck loads and clear heights						
Upperdeck · containers	Max. 3 tiers			Max 4 tiers		
stackloads	20' = 40 T/stack 40' = 80 T stack			20' = 60 T/stack 40' = 80 T stack		
	Ton 4W axle	Ton/m²		Ton 4W axle	Ton/m²	
specific load	58—65 T	3½ T		58—65 T	4 T	
	Ton axle	Ton/m²	Height (M M.)	Ton axle	Ton/m²	Height (M M)
Upperbetween dk (15½ mm)	58—65 T	3½ T	4400 (cl)			
Webs-girders (each deck)			780 ÷ 25			950 ÷ 25
Freeboard deck (15½ mm)	58—65 T	3½ T	4400 (cl)	58—65 T	4 T	6350 (clr)
Lowest tweendeck (15½ mm)	58—65 T	4 T	6350 (cl)	58—65 T	4 T	6350 (clr)
Tanktop deck	58—65 T	10 T	3100 (cl)	58—65 T	10 T	3100 (clr)
Spacing longitudinals	586 mm					
Spacing of webs	3 x 780 = 2340 mm					
Width of ventilation ducts	a number of 1560 mm and a number of 2340 mm					

4 DECK RORO



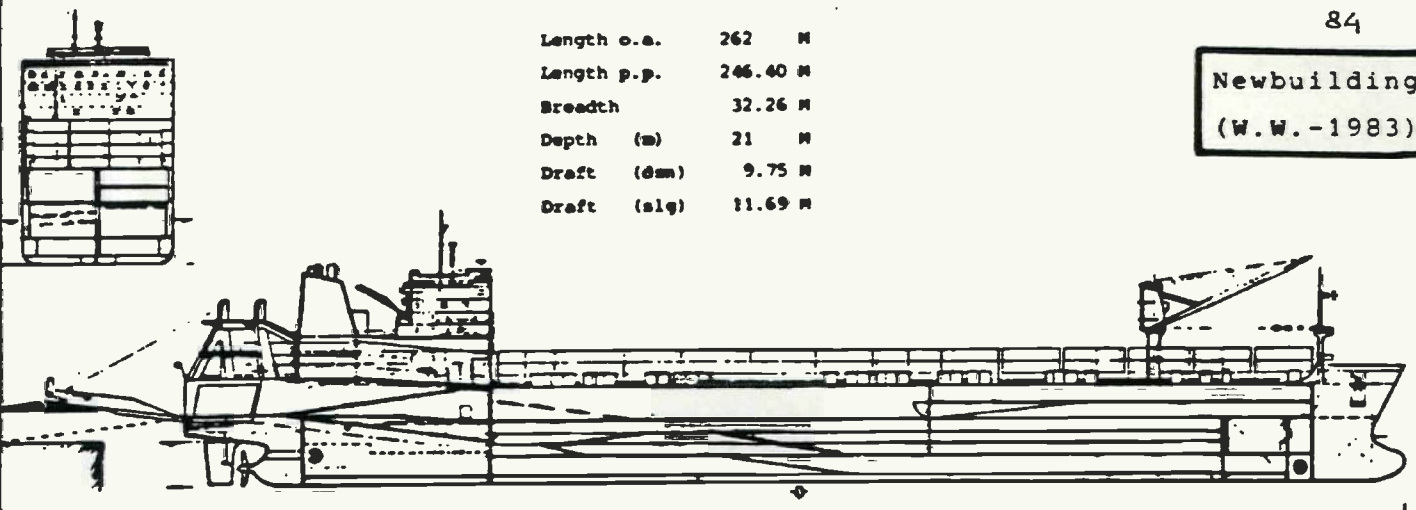
3-DECK RORO

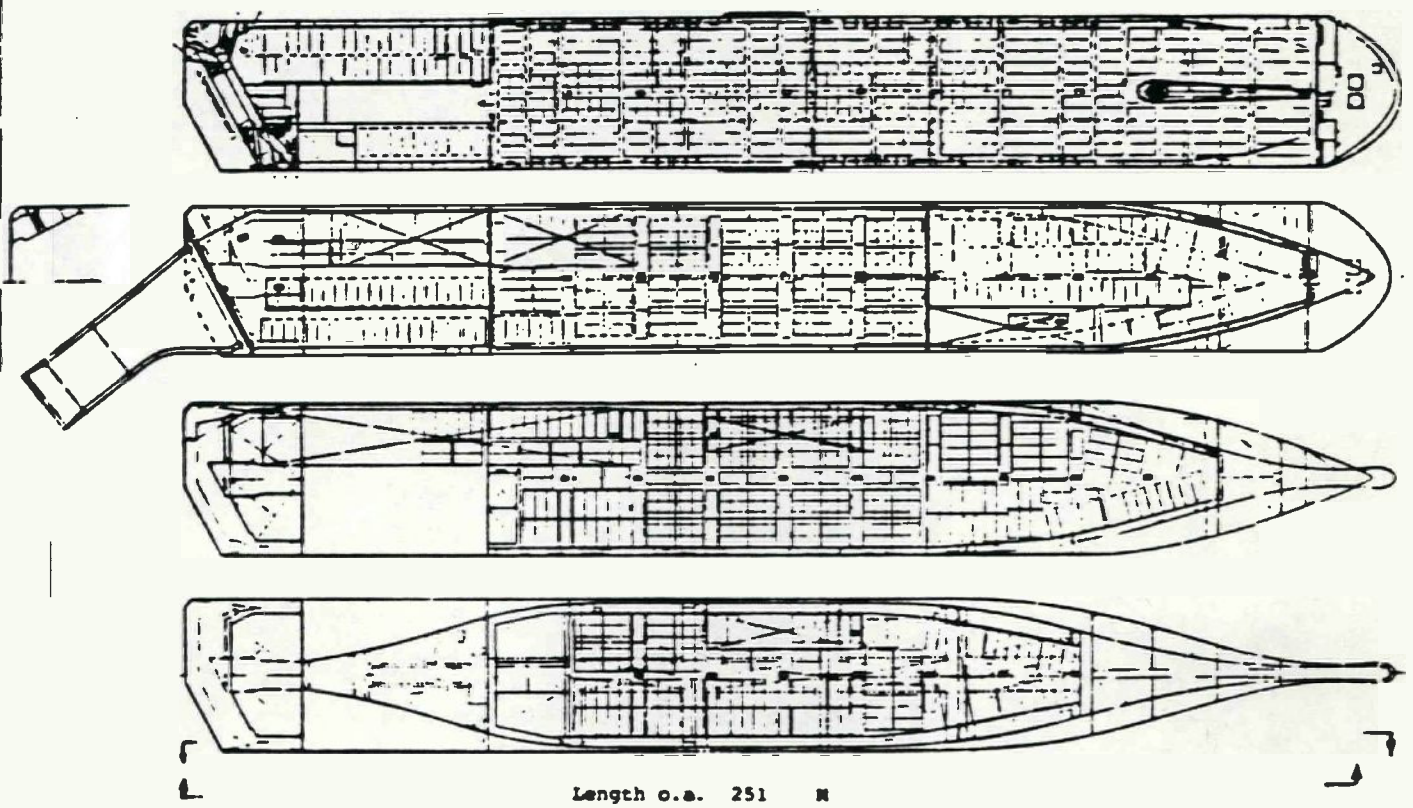




Newbuilding
(W.W.-1983)

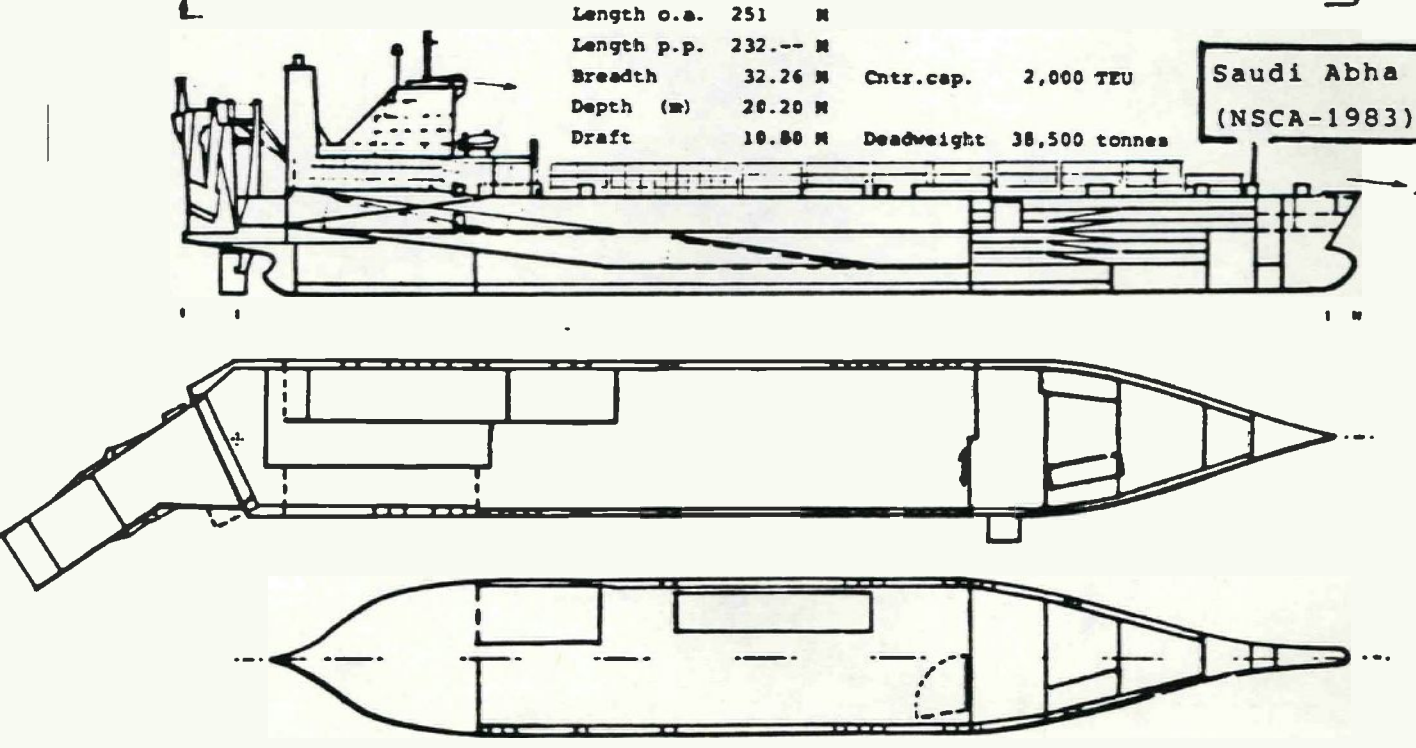
Length o.a.	262	M
Length p.p.	246.40	M
Breadth	32.26	M
Depth (m)	21	M
Draft (dsm)	9.75	M
Draft (slg)	11.69	M



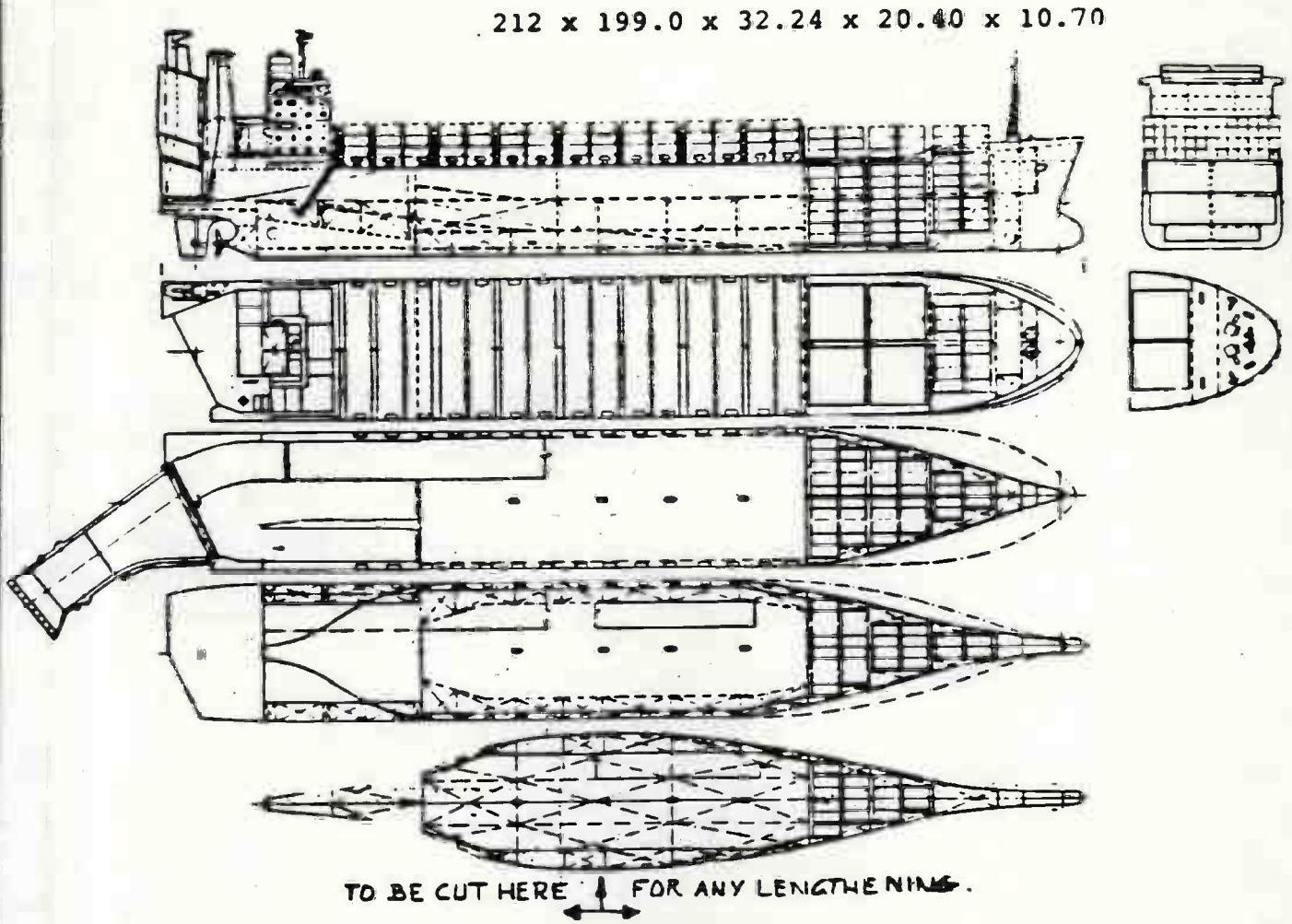


Saudi Abha
(NSCA-1983)

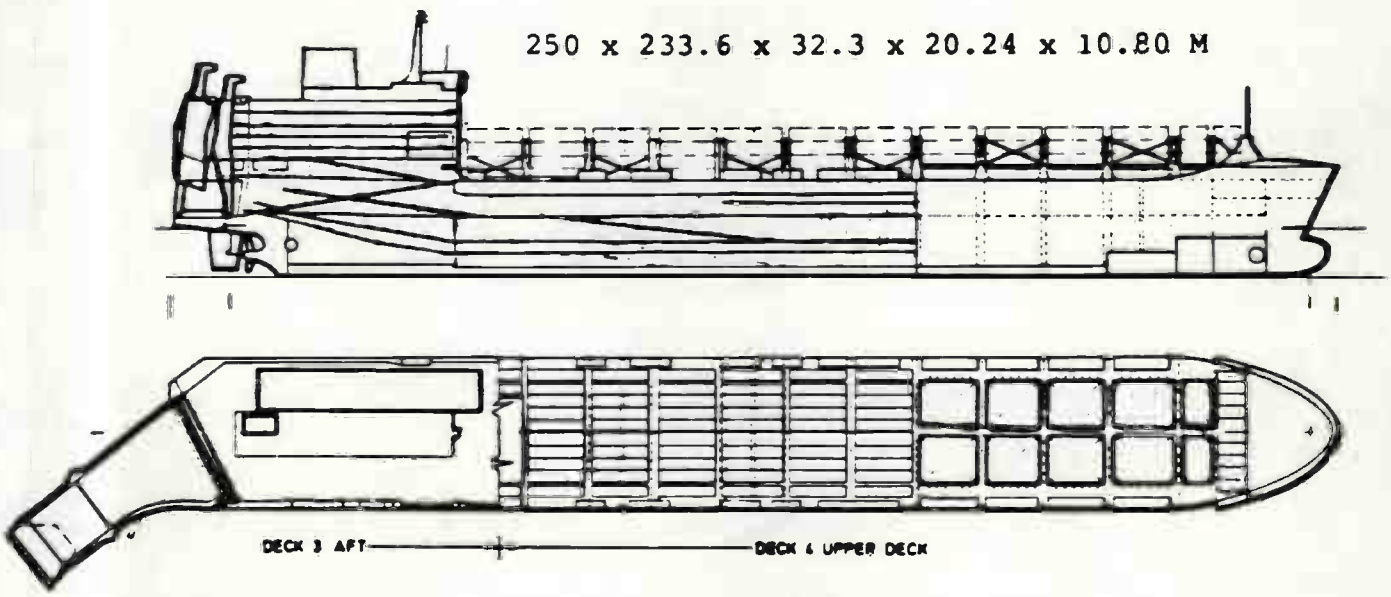
Length o.a.	251	M	
Length p.p.	232.--	M	
Breadth	32.26	M	Cntr.cap. 2,000 TEU
Depth (m)	20.20	M	
Draft	10.80	M	Deadweight 38,500 tonnes



Two examples of modern roro carriers.



Ro/Lo design. Nedlloyd Rouen/Rosario type, if provided with cells in the foreship.



Ro/Lo newbuilding. General arrangement of the ACL third generation hybrid ro-ro.

Provided with cells in the foreship underdeck and with cell guide structures above deck and

- what's new - above the cellular hatches.

FUEL CONSUMTION IN SERVICE

DERIVED FROM TANKTESTS

SERVICE ALLOWANCE (SPC) , SPECIFIC FUEL CONSUMPTION

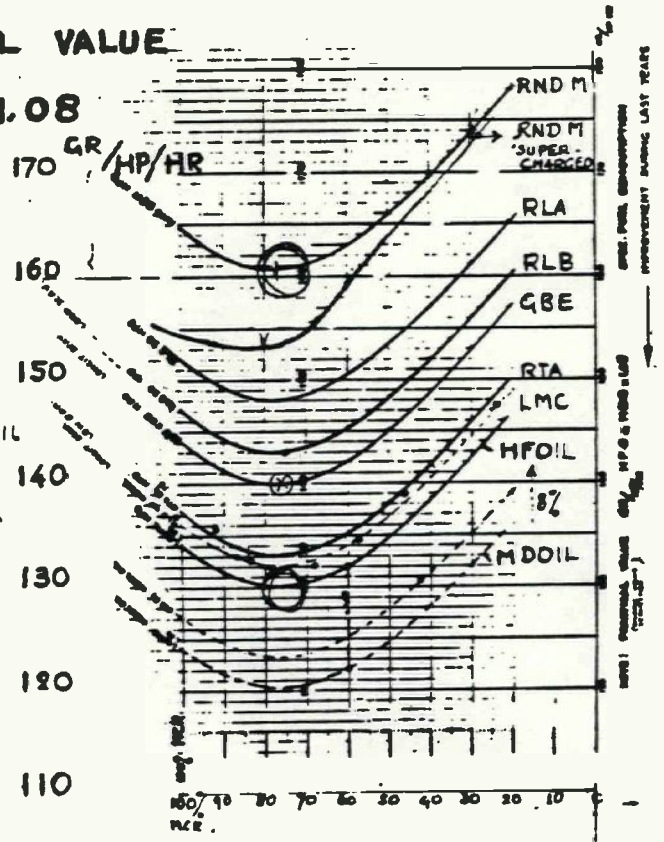
1.12 x TRIALS HFO=DO x 1.08 GR/HP HR

SPEC. FUEL CONSUMPTION HFO

PRACTICAL VALUE

= M.D.O x 1.08

ENG-MAKER



FOR DETAIL NEXT PAGE

TRIALS @ 4CYL RTA AVANTI HFO

100 90 80 70 60 50 40 30 20 10 0

100% MCR 50%

— 100% - 1978

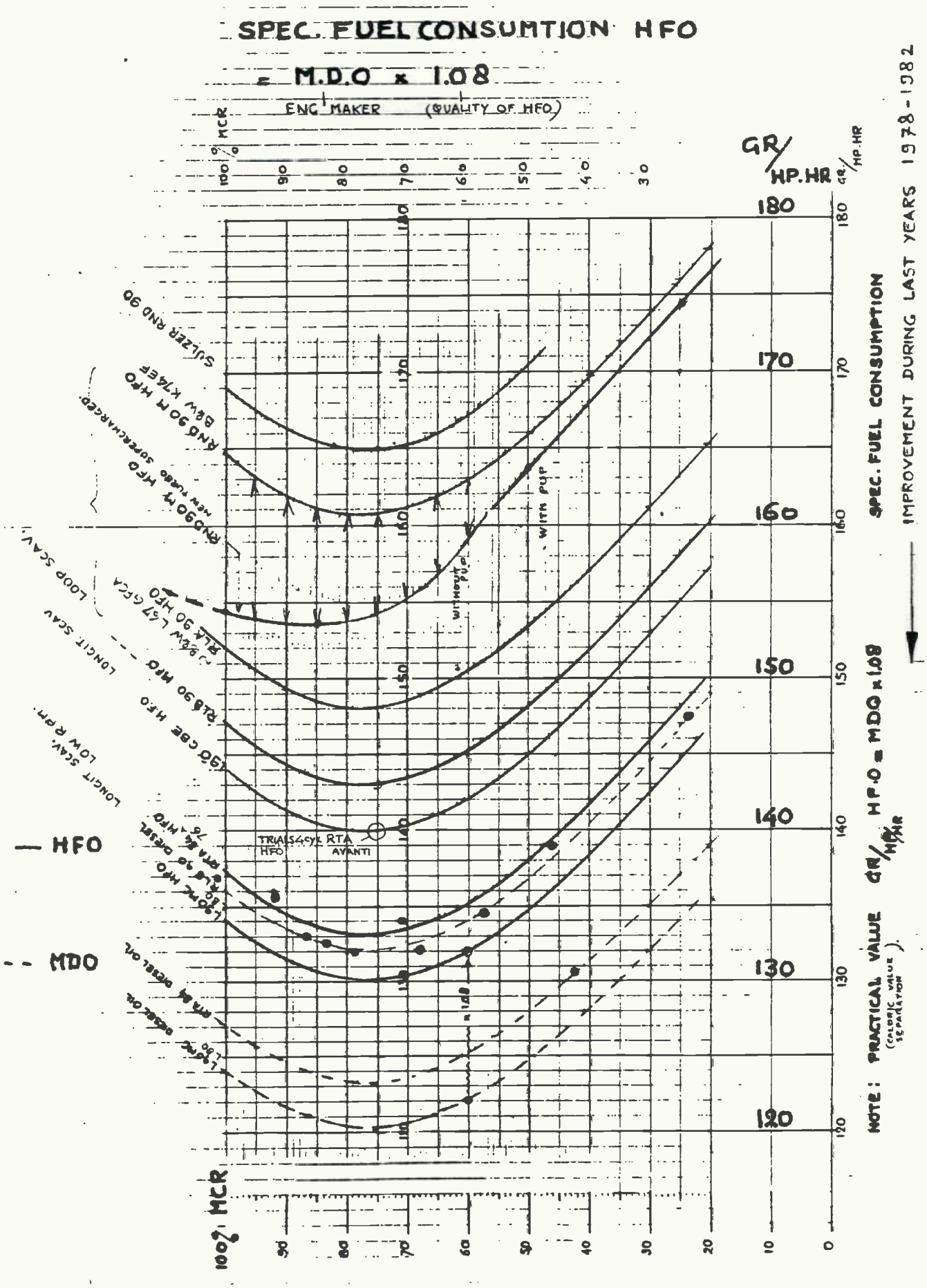
— 81% - 1982

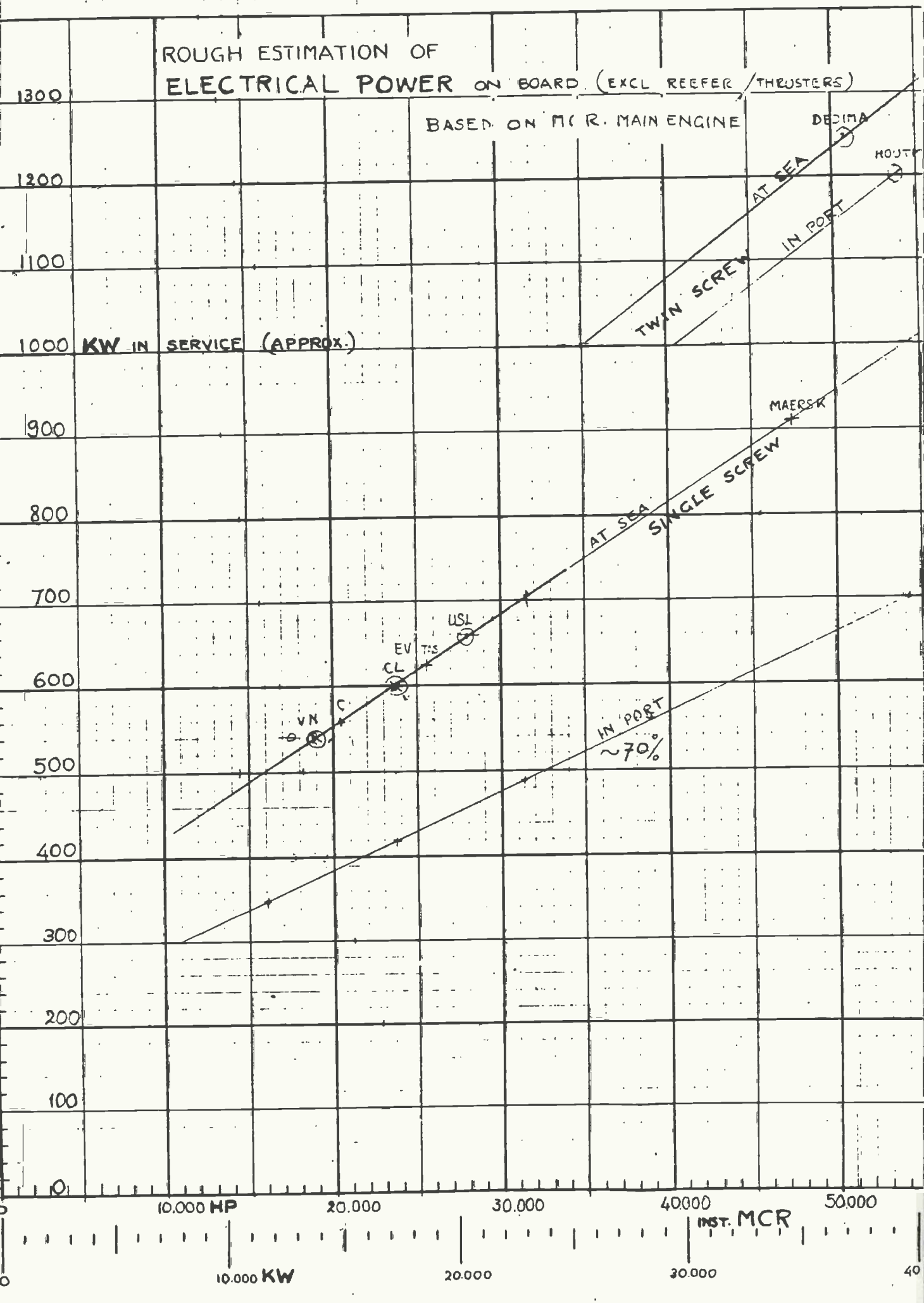
IMPROVEMENT BY:
LONGER STROKE.
HIGHER COMPRESSION
HIGHER SUPERCHARGING
LONGITUDINAL SCAVENGING
— LOWER RPM.
(WHICH ALLOWS FOR HIGHER PROPELLER EFF ADDITIONALLY)
IN CASE LARGER PROP Ø CAN BE FITTED IN APERTU

B-W SULZER.

NEW TYP: LMC / RTA.
SLOW-TURNING-DIESEL

REDUCTION OF SPECIFIC FUEL-CONS.
1978 — 1982


SPEC. FUEL CONSUMTION HFO
= M.D.O x 1.08
ENG MAKER
(QUALITY OF HFO)
% MCR
GR/HP.HR
SPEC. FUEL CONSUMPTION
IMPROVEMENT DURING LAST YEARS 1978-1982
— HFO
-- MDO
NOTE: PRACTICAL VALUE GR/HP.H HFO = MDO x 1.08
TRIALS 4 CYL RTA HFO AVANTI
WITHOUT PUMP
WITH PUMP
SULZER RND 90
RND 90 M HFO BSW K74EF
RND 90 M HFO NEW TYPE SUPERCHARGER
RLB 90 HFO
RLB 90 MFO
RTA 84 HFO
RTA 84 DIESEL OIL
LONG. DIESEL OIL
LONGIT SCAV. LOW RPM
LOOP SCAV.


ROUGH ESTIMATION OF
ELECTRICAL POWER ON BOARD (EXCL REEFER / THRUSTERS)
BASED ON M(R. MAIN ENGINE
1300
1200
1100
1000 KW IN SERVICE (APPROX.)
900
800
700
600
500
400
300
200
100
0
DECIMA
HOUTE
AT SEA
TWIN SCREW
IN PORT
MAERSK
AT SEA
SINGLE SCREW
IN PORT
~70%
USL
EV
T.S.
CL
C
VN
10.000 HP
20.000
30.000
40.000
50.000
INST. MCR
10.000 KW
20.000
30.000

EXAMPLE OF HOW TO CALCULATE:

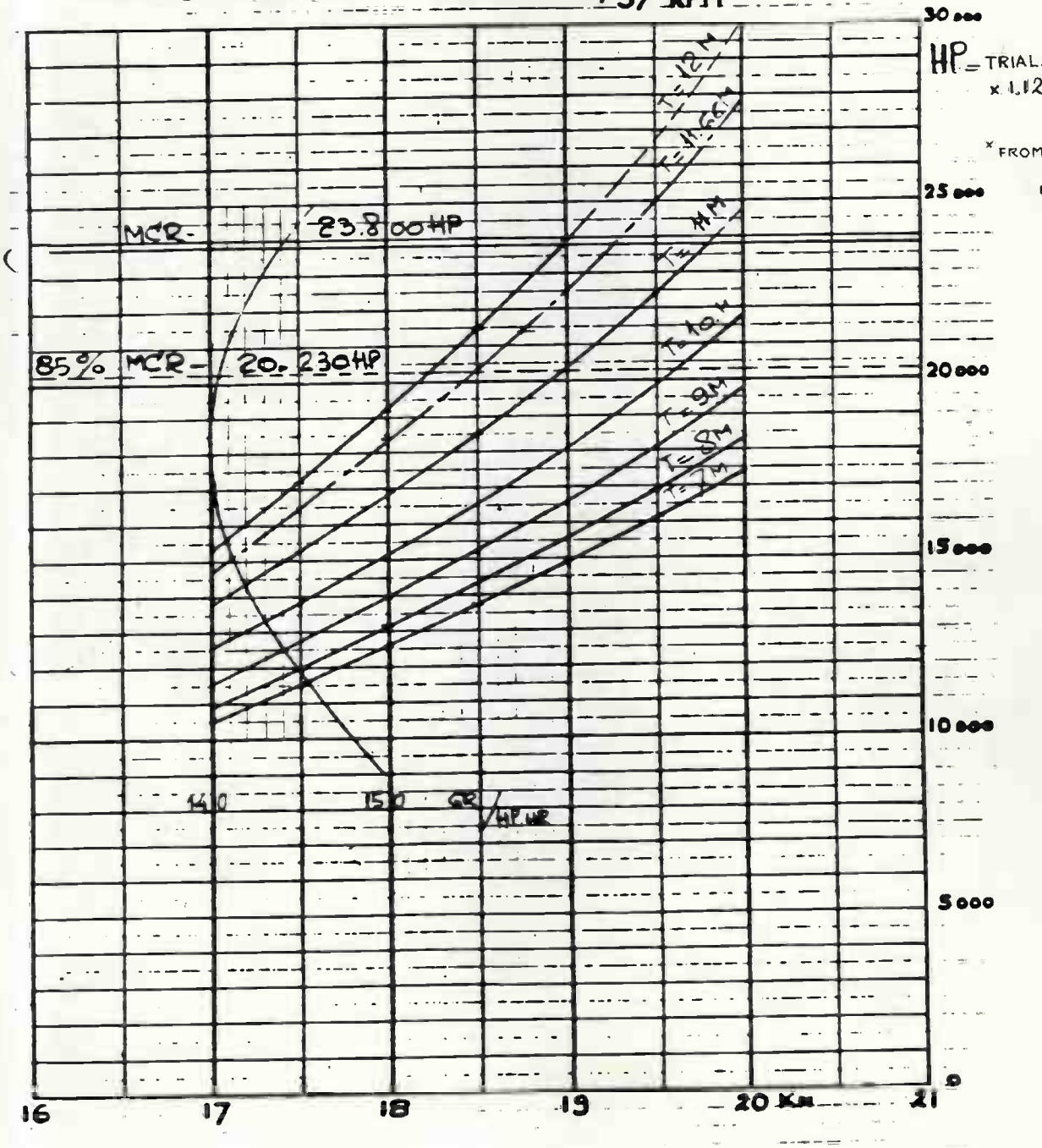
HP IN SERVICE "NEDLLOYD CLARENCE"
CLEMENT

PILOT-PILOT

1.12 ALLOWANCE ABOVE TRIAL CONDITIONS

SPC

B+W 6 L90 CBE 23.800 MCR/97 RPM



* FROM NSMB-TANK WAGENINGEN MODEL 5901

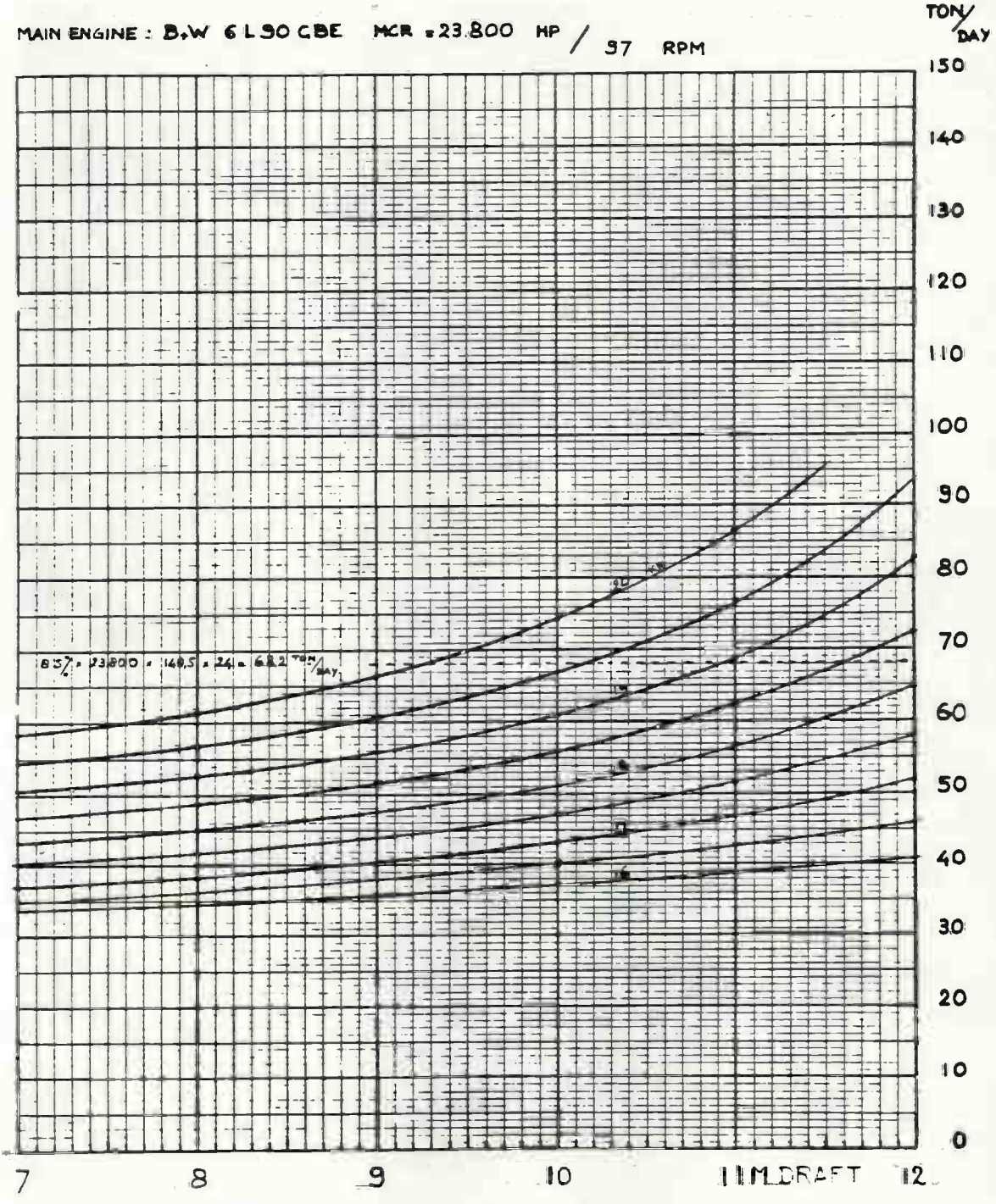
FUEL CONSUMPTION OF MAIN ENGINE

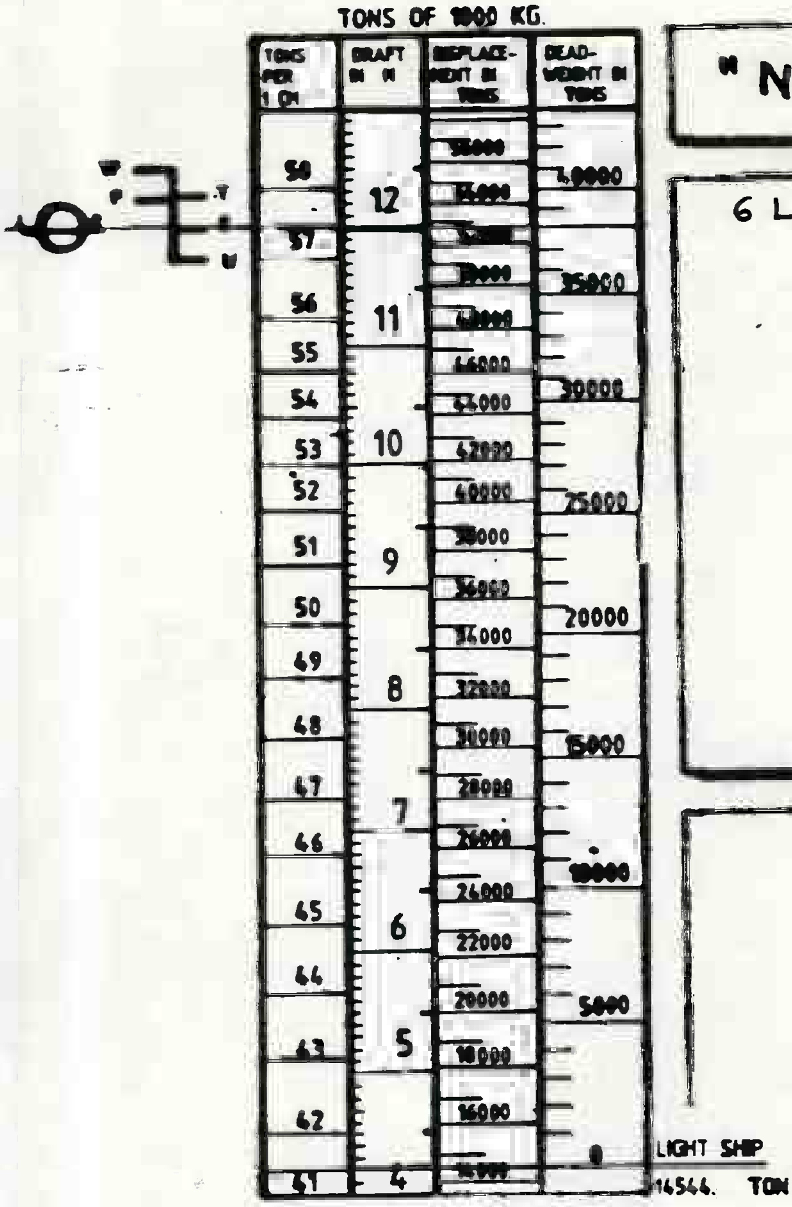
NEDLL. CLARENCE-CLEMENT

GR/HP. HR HFO = 1.08 x MDO

1.12 ALLOWANCE FOR SERVICE ABOVE TRIAL CONDITIONS

MAIN ENGINE : B.W 6 L 90 CBE MCR = 23.800 HP / 97 RPM





"NEDLLOYD CLARENCE"

6 L 90 CBE B+W 23.800 HP 97 RPM

85% MCR

$0{,}85 \times 23800 = 20230\ HP \times 140{,}5\ g/_{HPh} \times 24 = 68{,}3\ T/_{D}$

Fuel consumption in ton/day

Draft in m	Kn 16	16½	17	17½	18	18½	19	19½	20
7	33½	35	37	40	43	47	50½	54½	58½
7½	34	35½	37½	41	44	47½	51½	55½	60
8	34½	36	38	42	45	48½	52½	57	61½
8½	35	37	39	43	46	50	54	58½	63½
9	35½	38	40½	44	47½	51½	56	60½	66½
9½	36¼	39	42	45½	49	53½	58	63½	70
10	37	40	43	47	51	56	61	67	74½
10½	38	41½	45	49	53½	59	64½	71	80
11	39	43	47	51½	56½	62½	69	76½	86½
11½	40	44½	49	54½	60	67	74½	84	
12	41	46	52	58	65	72½	82½		

FUEL CONSUMPTION IN SERVICE

>1000 MILES, PILOT - PILOT

CHECKING REAL SERVICE - ALLOWANCE

TRIAL - SERVICE ALLOWANCE

FUEL : HFO = MDO = 1.08

CORR SEPT 85

6V

* = VESSEL TOO SHORT PERIOD OUT OF DRYDOCK FOR GOOD FIGURES

VESSEL	MEAN SERVICE CONDITIONS OVER MORE THAN 1000 MILES: PERIOD MONTHS OUT OF DOCK	SPEED [KN]	DISPL / DRAFT [T] [M]	TOTAL FUEL CONS. — SHAFT GENERATOR	PERFORM. COEFF. DISPL^⅔ SPEED / FUEL CONS	CALCULATED FUEL CONS. BASED ON TANKTESTS 12% TRIAL-SERV. ALLOW THEOR. FUEL CONS.	ALLOWANCE ON TRIAL-SERV.	BLAST IN DRYDOCK +	PROP BL
NLL. DELFT	SCAND. BUNK '83	20.5	55830 / 10.90	Ton/DAY = 111.0	113	Ton/DAY = 111.0	12%	SPC	4
DEJIMA	3½ SL. '83	20.5	55770 / 10.80	111.0	113	110.5	11½%	SPC	4
⊗ HOUTMAN	" '83	20.5	54200 / 10.53	110.0	112	111.0	11%	SPC	3
HOORN	29-7-83 / 3-3-84 } 22	19.0	54813 / 10.65	89.4	111	89.9	11%	SPC	3
CLARENCE	7-10-83 / 31-10-84 } 13	17.5	33000 / 8.30	43.0 - 2.5 = 40.5	136	42.5	7%	SPC	4
CLEMENT	20-12-83 / 17-3-85 } 15	17.8	35000 / 8.70	45.0 - 2.5 = 42.5	142	45.5	5%	SPC	4
COLOMBO	18-10-84 / 3-5-85 } 5	16.8	31600 / 8.80	37.2	128	38.5	8%	SEMI	4
HOLLANDIA	20-7-84 / 5-4-85 } 8	17.3	31820 / 8.85	61.7	84	54.5	27%	SPC + 6BL ❀	
ZEELANDIA	9-7-84 / 24-3-85 } 8½	19.8	27970 / 7.95	75.8	94	67.0	27%	SPC + 6BL ❀	
V. NECK	4-12-83 / 4-3-85 } 15	18.1	27500 / 8.30	44.0 - 2.5 = 41.5	130	42.0	11%	SPC	4
V. NOORT	10-4-84 / 21-3-85 } 11	16.3	26500 / 8.10	34.0 - 2.5 = 31.5	122	31.5	12%	SPC	4
V. DIEMEN	24-7-84 / 11-3-85 } 7½	16.0	27000 / 8.20	32.5 - 2.5 = 30.0	123	29.5	14%	SPC	4
NLL. ROCHESTER	31-1-85 / 15-4-85 } 2½	19.5	31380 / 8.95	68.9	107	68.5	13%	SPC	4
ROTTERDAM	14-2-85 / 15-4-85 } 2	18.3	31421 / 8.95	58.2	105	57.5	13%	SPC	4
* ROSARIO	28-2-85 / 8-4-85 } 1½	18.8	31490 / 8.10	66.2	100	64.5	15%	SPC	4
ROUEN	7-2-85 / 2-4-85 } 2	17.8	32370 / 8.28	55.4	104	56.0	11%	SPC	4

94

3-5-85

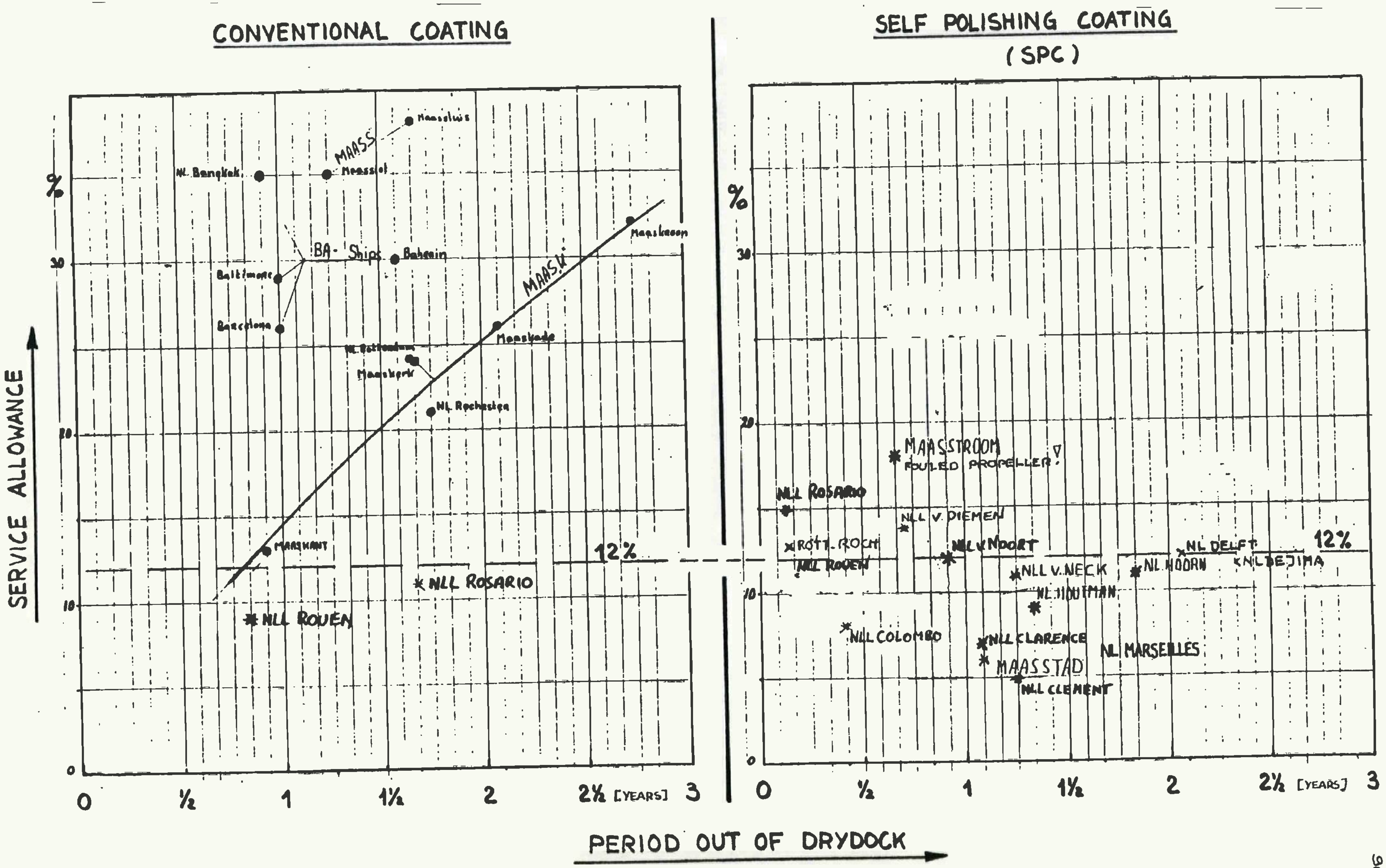
COMPARISON OF PERFORMANCES < BEFORE MODIFICATION / DRYDOCK
AFTER " / "

Corr. Sept '85

VESSEL	CONDITIONS	SPEED	DISPL (T) / DRAFT (M)	FUEL CONS. (TON/DAY)	CALCULATED FUEL CONS BASED ON TANKTESTS (TON/DAY)	TRIAL-SERVICE ALLOWANCE	
NEDLLOYD ROCHESTER BRNO 30 M	ORIG. MAIN ENGINE + ORIG. PROPELLER + CONVENTIONAL PAINT	18.4 KN	30311 / 8.74	67.3	61 –	23 %	BEFORE
	SUPERCH. ENGINE + HIGH SKEWED PROP + BLAST + SPC	19.5 KN	31380 / 8.95	68.9	68.5	13 %	AFTER MODIFICATION
NEDLLOYD ROTTERDAM BRNO 30 M	ORIG. MAIN ENGINE + ORIG. PROPELLER + CONVENTIONAL PAINT	18.4 KN	30059 / 8.69	68.8	61 –	26 %	BEFORE
	SUPERCH. ENGINE + HIGH SKEWED PROP. + BLAST + SPC	18.3 KN	31421 / 8.95	58.2	57.5	13 %	AFTER MODIFICATION
NEDLLOYD ZEELANDIA BRNO 30 M	CONVENTIONAL PAINT	18.4 KN	30013 / 8.40	72.2	57.4	41 %	BEFORE BLAST + SPC
	BLAST + SPC	19.8 KN	27970 / 7.95	75.8	67.0	27 %	AFTER SOME IMPROVEMENT STILL BAD PERFORMANCE PROBABLY 6 BL PROP

95

? CAUSE 6 BL PROP



CONVENTIONAL COATING
SELF POLISHING COATING
(SPC)
SERVICE ALLOWANCE
%
0
10
20
30
PERIOD OUT OF DRYDOCK
0
½
1
1½
2
2½ [YEARS]
3
12%
MAASS
Maassluis
Maassluis
NL Bangkok
BA - Ships
Bahrain
Baltimore
Barcelona
NL Rotterdam
Maaskerk
Maaskade
MAAS IV
Maaskoon
NL Rochester
MARSHANT
NLL ROSARIO
NLL ROUEN
MAASSTROOM
FOULED PROPELLER !
NLL ROSARIO
NLL V. DIEMEN
ROTT. ROCH
NLL ROUEN
NLL V NOORT
NLL V. NECK
NL HOUTMAN
NL HOORN
NL DELFT
KNL DEJIMA
NLL COLOMBO
NLL CLARENCE
MAASSTAD
NLL CLEMENT
NL MARSEILLES

Influence of hull-roughness on power and speed.

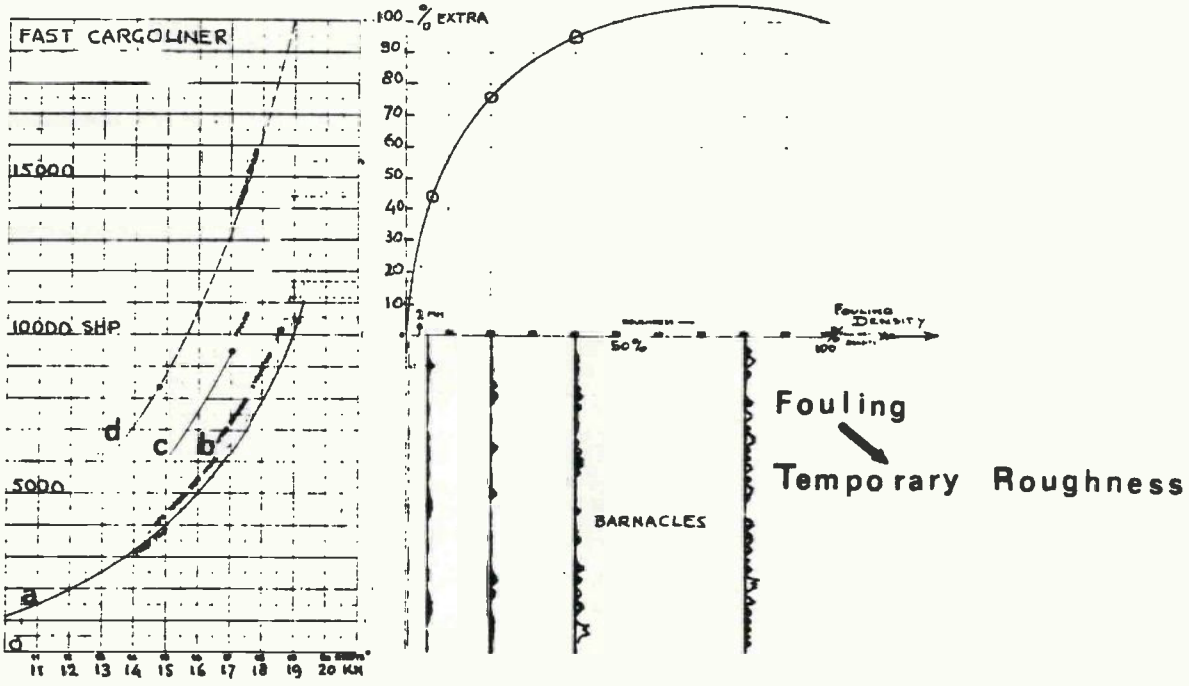
Diagram shows the speed/hp curve of a fast cargo liner under various conditions:

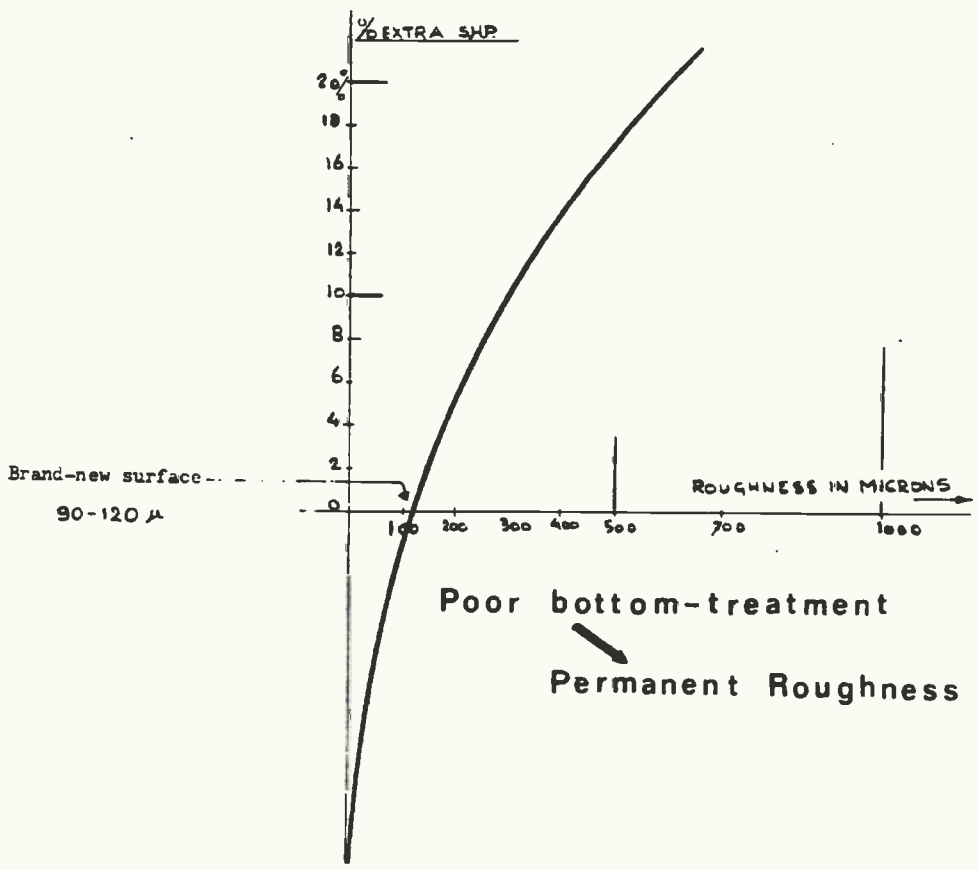
a) Brand new on first trip (SHP often below tank testing prognosis) ROUGHNESS: 90 - 120 MICRON

b) 3-5 years old, after leaving drydock – freshly painted: 12-17% more SHP (½ knot less speed, if torque of diesel engine is maintained) CONVENTIONAL SYSTEM

c) With 5% fouling density of barnacles: 40-45% more SHP (2 knots less speed if torque of diesel engine is maintained) (EXH TEMP)

d) With 50% fouling density of barnacles: 90-100% more SHP (4 knots less speed if torque of diesel engine is maintained).





INFLUENCE OF SHELL EXTERIOR (ANTIFOULING PAINT) CONDITION ON A SHIP'S SPEED PERFORMANCE.

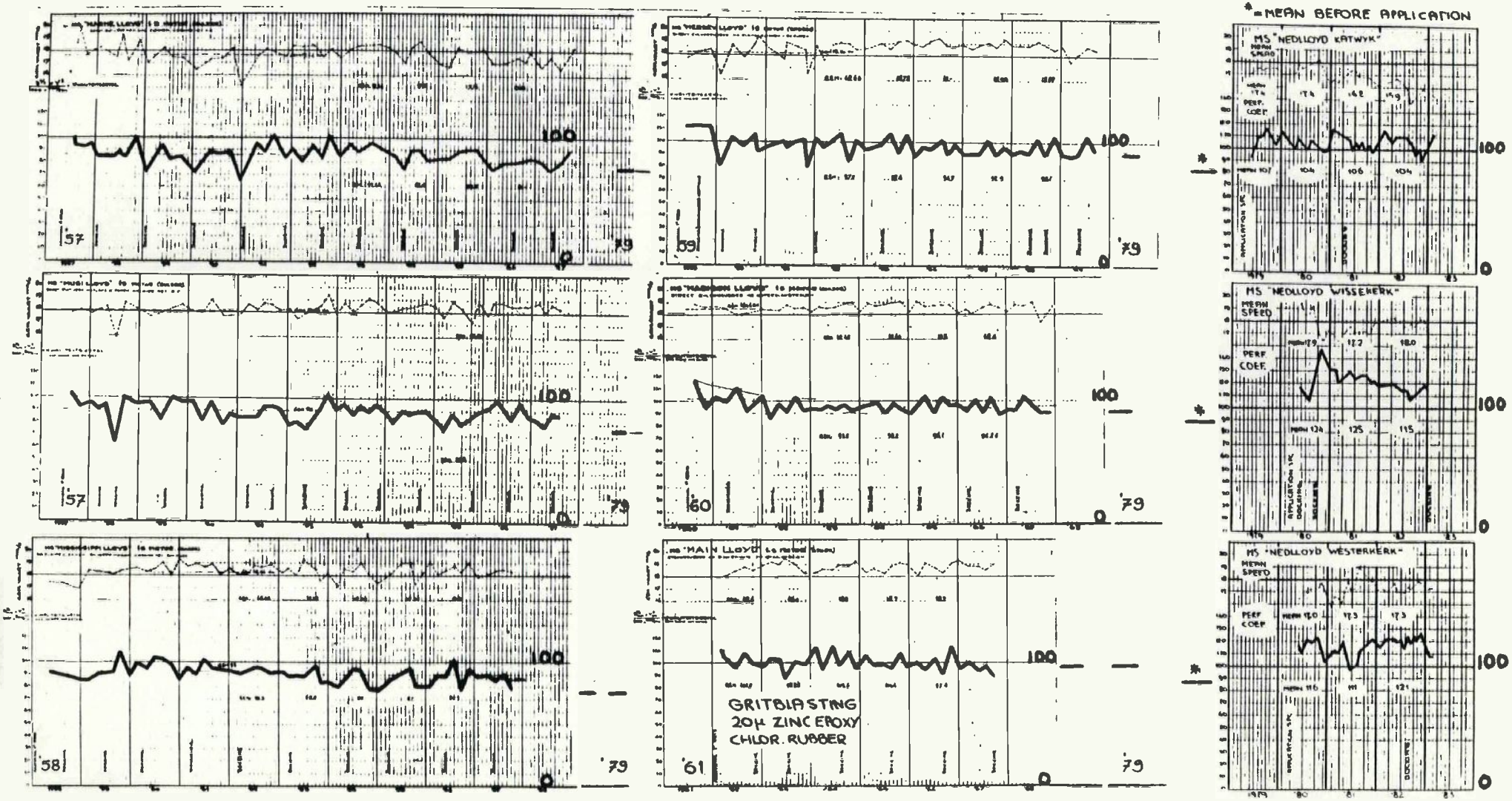
PERFORMANCE-COËFF = $\frac{D^{2/3} \cdot V^3}{\text{Ton/day} \cdot 1000}$ OF 6 "M-LLOYD" SHIPS OVER ~20 YEARS

DISTANCE > 1200 MILES
D - TON = DISPL. MEAN
V - KN = PILOT-PILOT
TON/DAY = FUEL CONS. H.OIL 3500 SEC ~164 T/SHIP.HR

CONVENTIONAL ALU-BITUMEN + SUPERTROP

CHLORINATED RUBBER

SELF POLISHING COPOLYMER



100 → 85 → 75 IN 20 YRS

MEAN

110 → 94 → 90 IN 20 YRS

MEAN

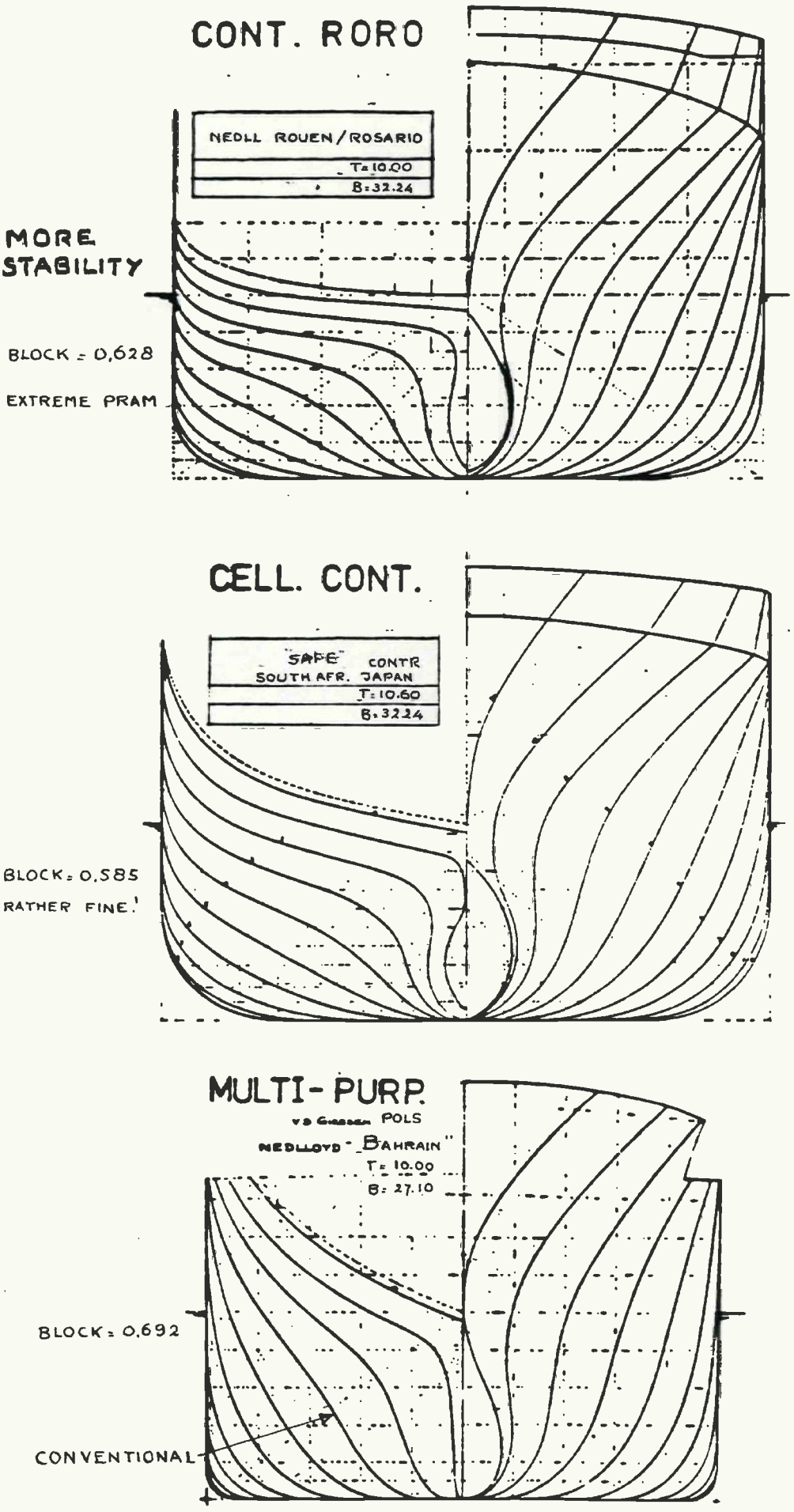
~ 10% SAVING IN FUEL BY CHLOR. RUBBER

20-30% BY SPC

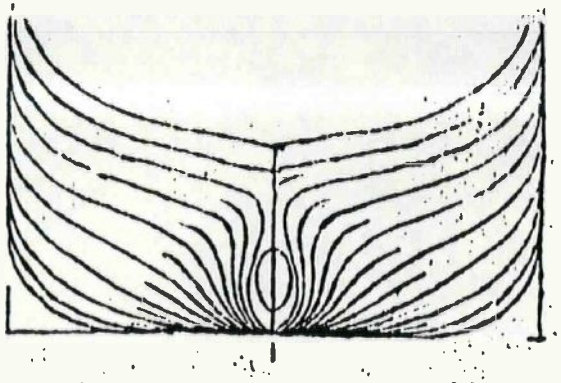
CHANGING HULLFORM :

FROM  TO  AFTERBODY

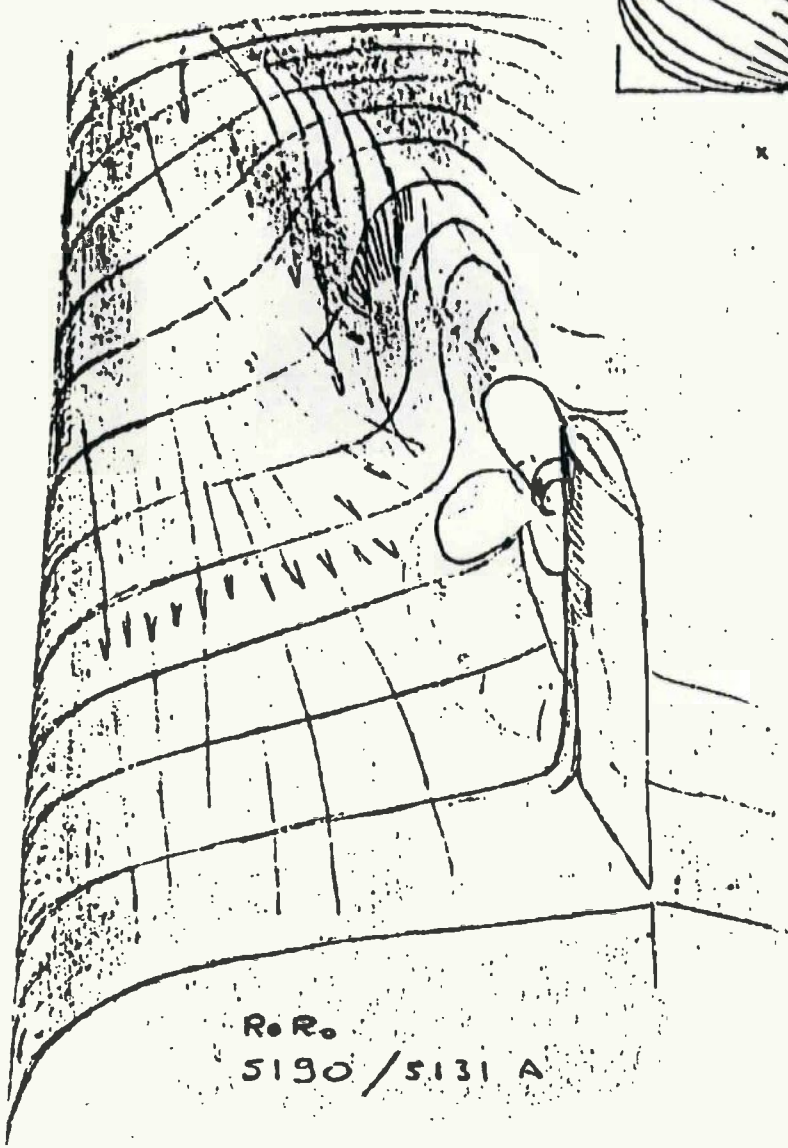
EXTRA STABILITY
IMPROVED FLOW TO PROPELLER



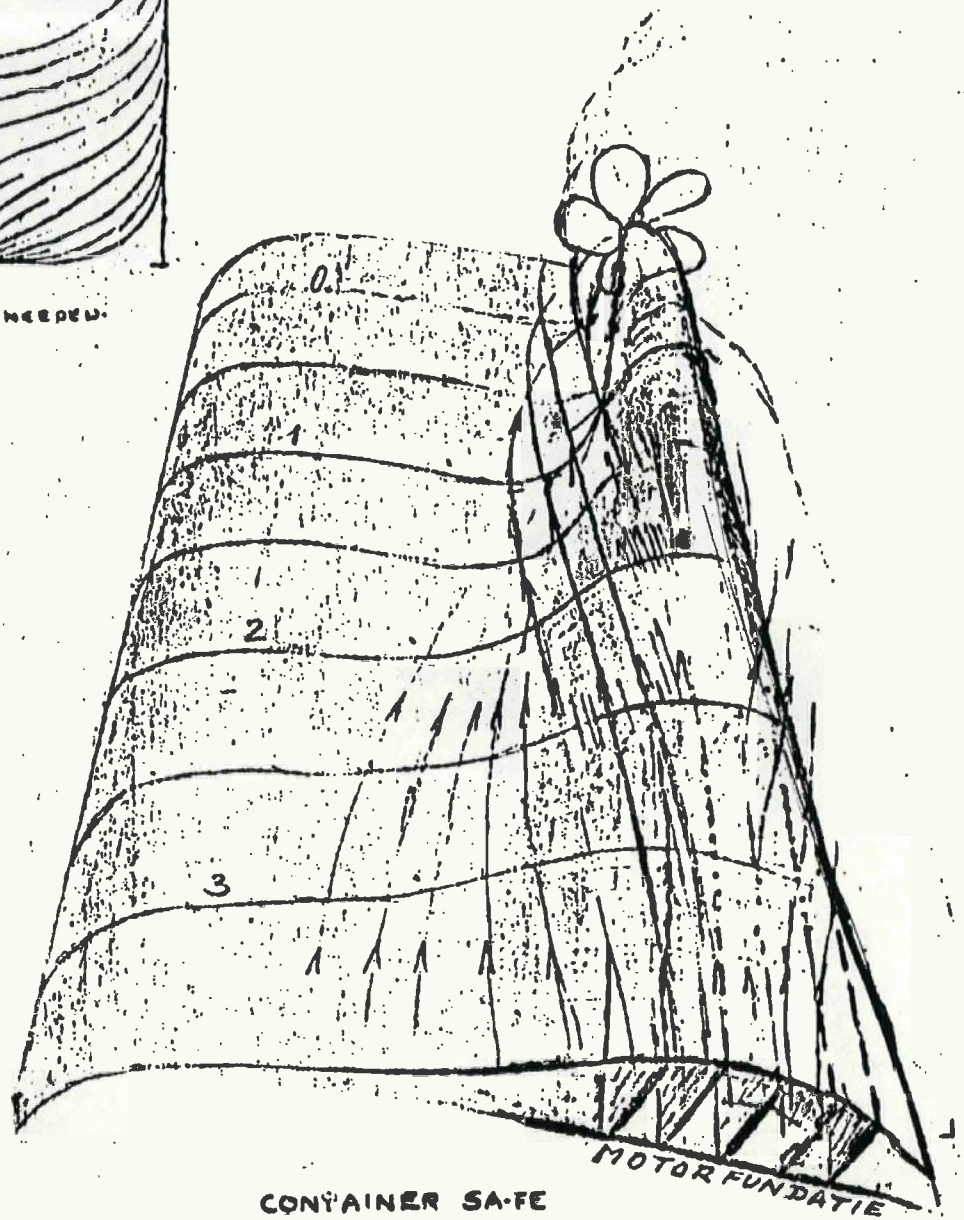
DEVELOPMENT OF NARROW FULL BODY TO WIDER V PRAM
TO CREATE MORE STABILITY FOR DECK-CARGO



X STERN BULB NEEDED.



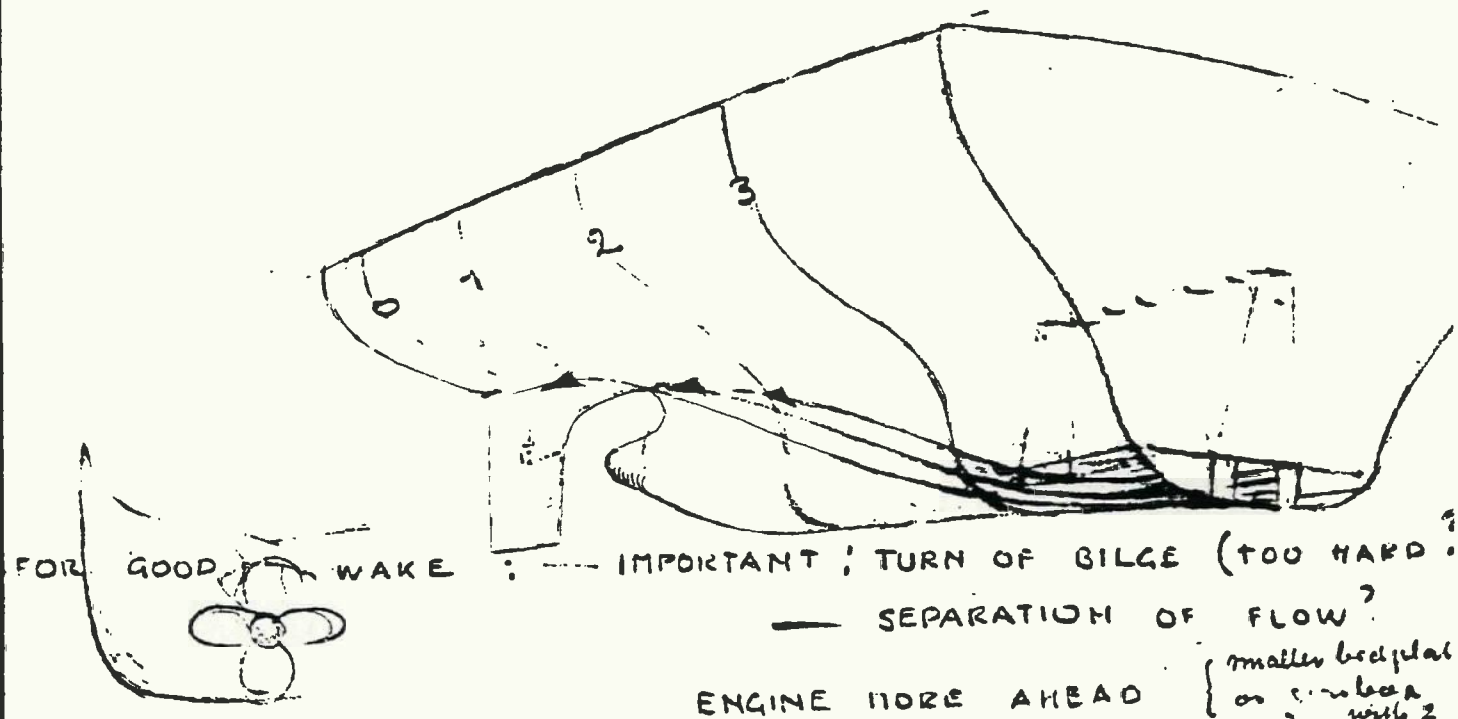
R.R.
5190/5131 A



CONTAINER SA-FE
5163

GONDOLA

engine. support)

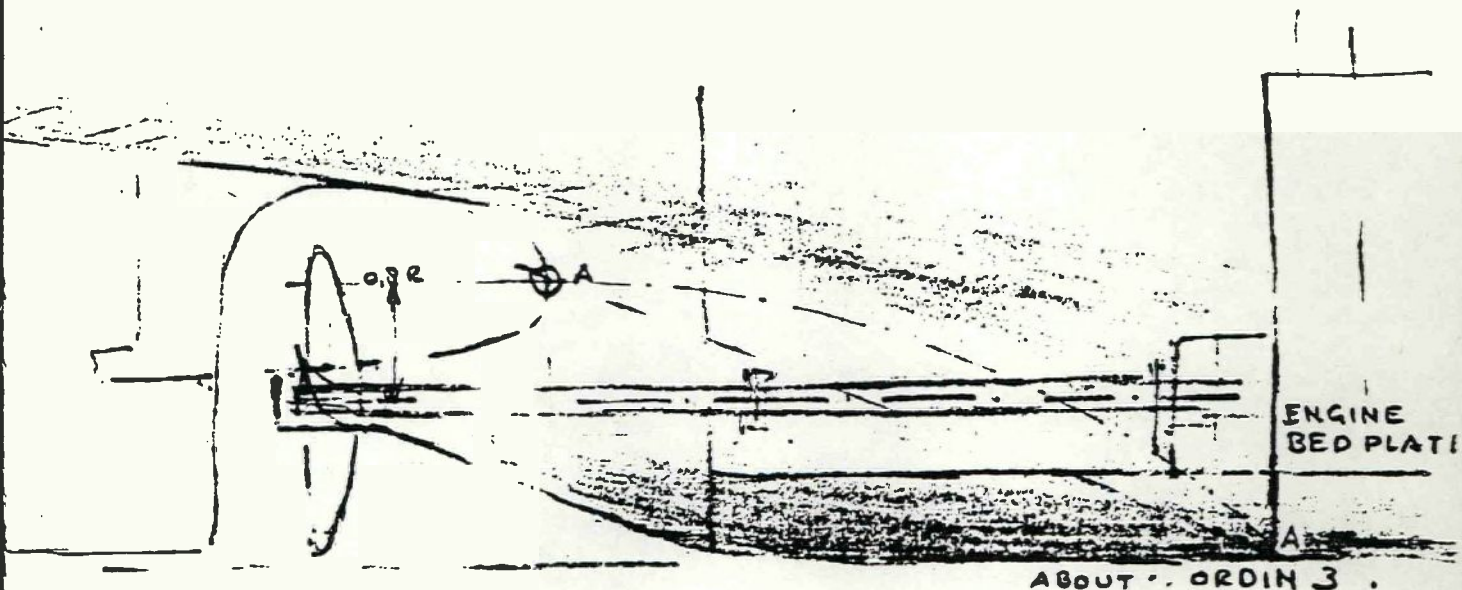


FOR GOOD WAKE : — IMPORTANT ; TURN OF BILGE (TOO HARD ?

— SEPARATION OF FLOW ?

ENGINE MORE AHEAD { smaller bedplate or sunken with 2 medium.

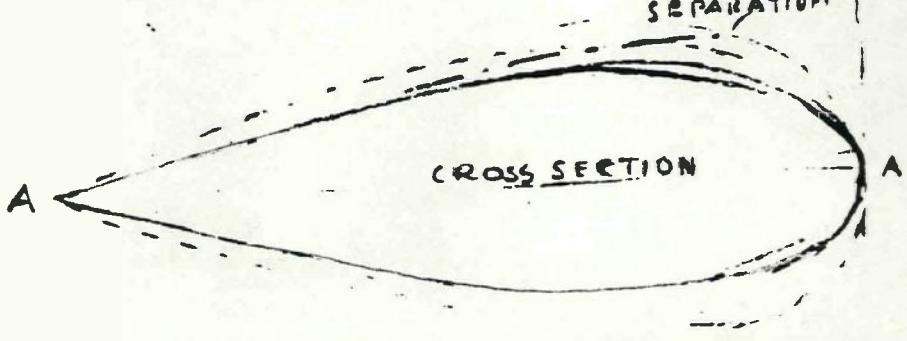
LOSS OF CARGO SPACE.



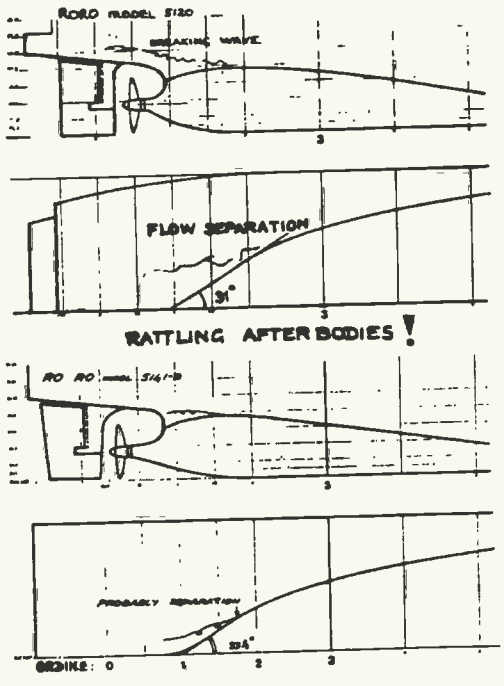
PROPOSAL

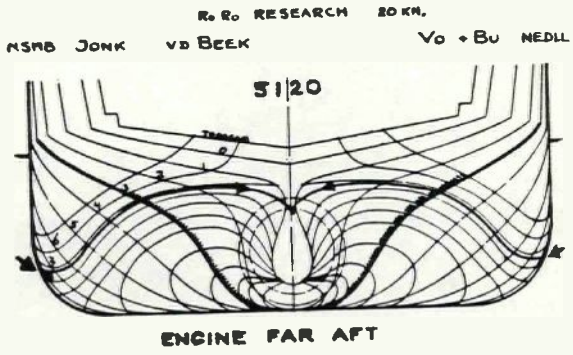
TO ANALYSE SEVERAL VESSELS.

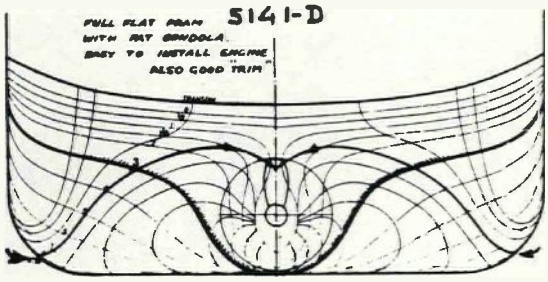
STANDARD LENGTH

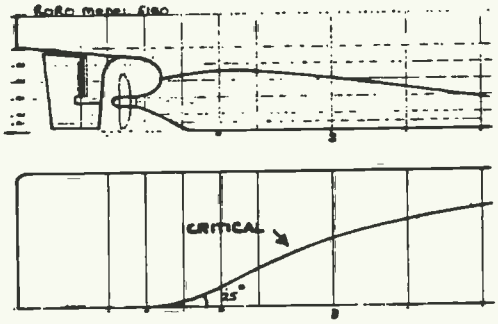


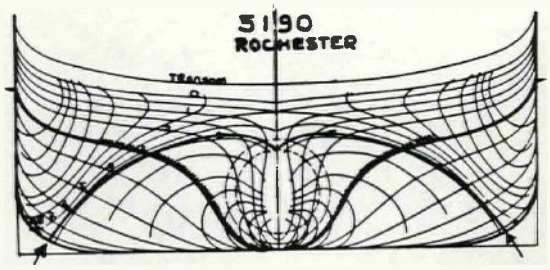
JAN V.D. BEEK NSMB : INFLUENCE OF ORDIN 3 ON FLOWLINES TOWARD PROPELLER



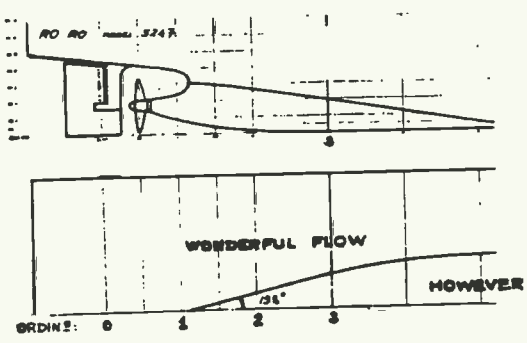


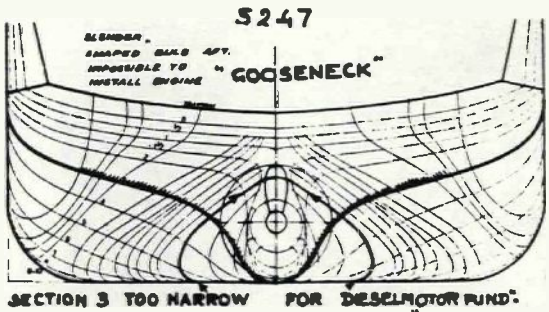






FLOW LINE TOWARDS PROPELLER TIP IN 12 O'CLOCK POSITION IS STRONGLY INFLUENCED BY THE FULLNESS OF THE FOOT OF SECTIONS 3 AND 4, JUST AT AFT-END OF ENGINE!



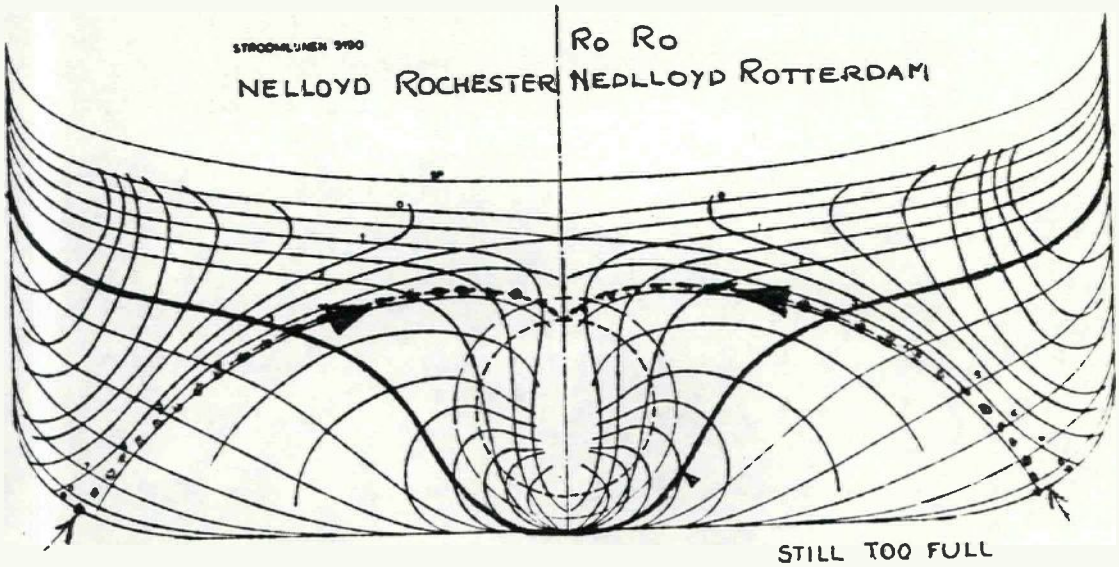


THE DIFFICULT COMPROMISE:

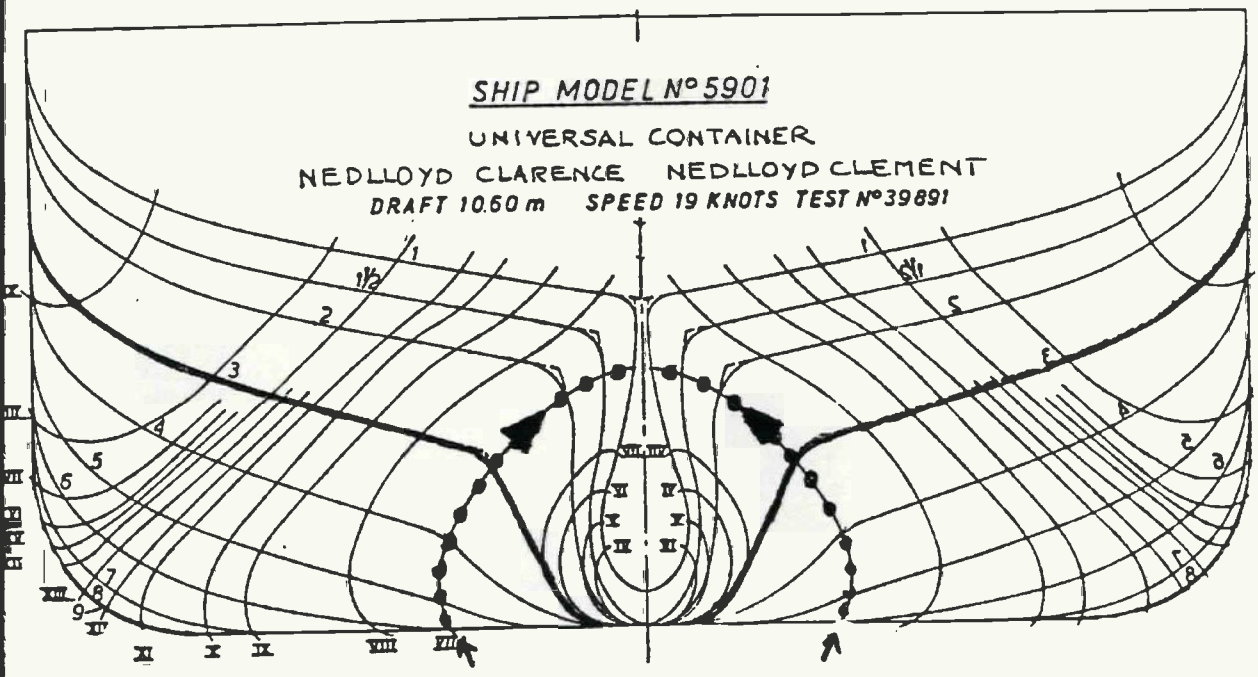
GONDOLA AHEAD OF PROPELLER MORE SLENDER:
BETTER FLOW TO PROPELLER, LESS VIBRATIONS

HOWEVER: DIESELMOTOR MUST MOVE IN FORWARD DIRECTION,
LOSS OF SPACE IN HULL

MODEL 5190

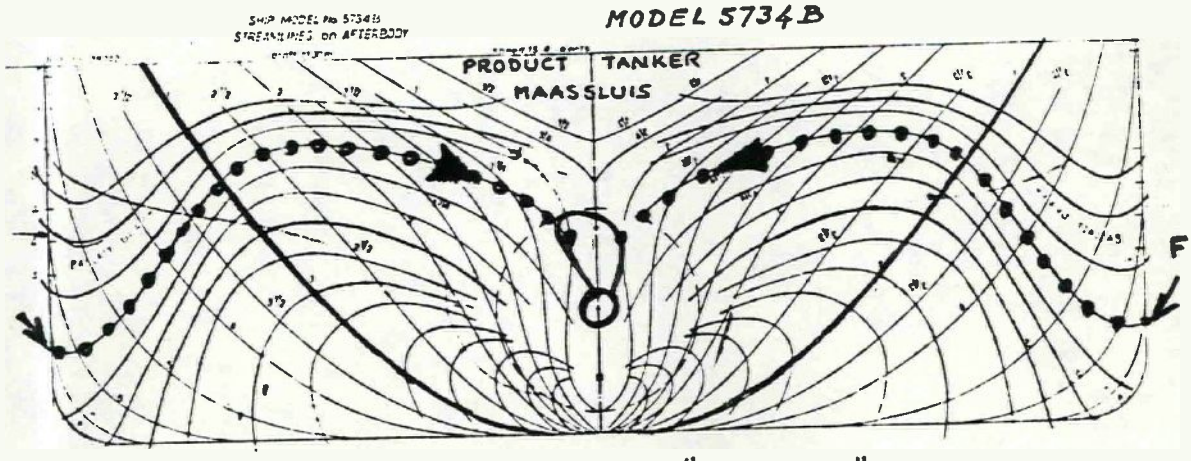


STILL TOO FULL



FINE LINED PRAM

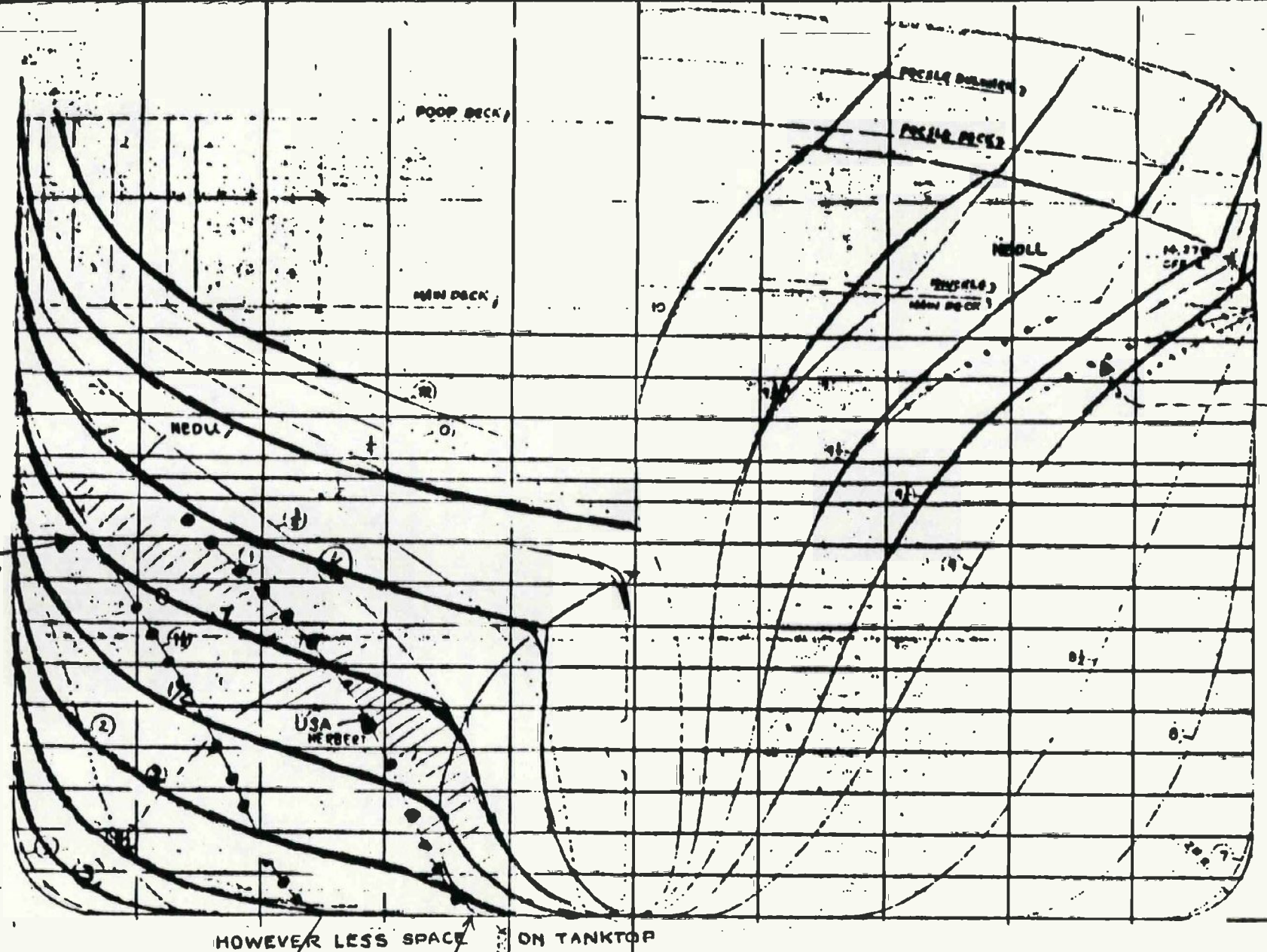
MODEL 5734 B



FULL BODY

38 000 DWT PRODUCT TANKER "MAASSLUIS"

FLOWLINES TOWARDS PROPELLER-TIP IN TOP-POSITION.
12 O'CLOCK

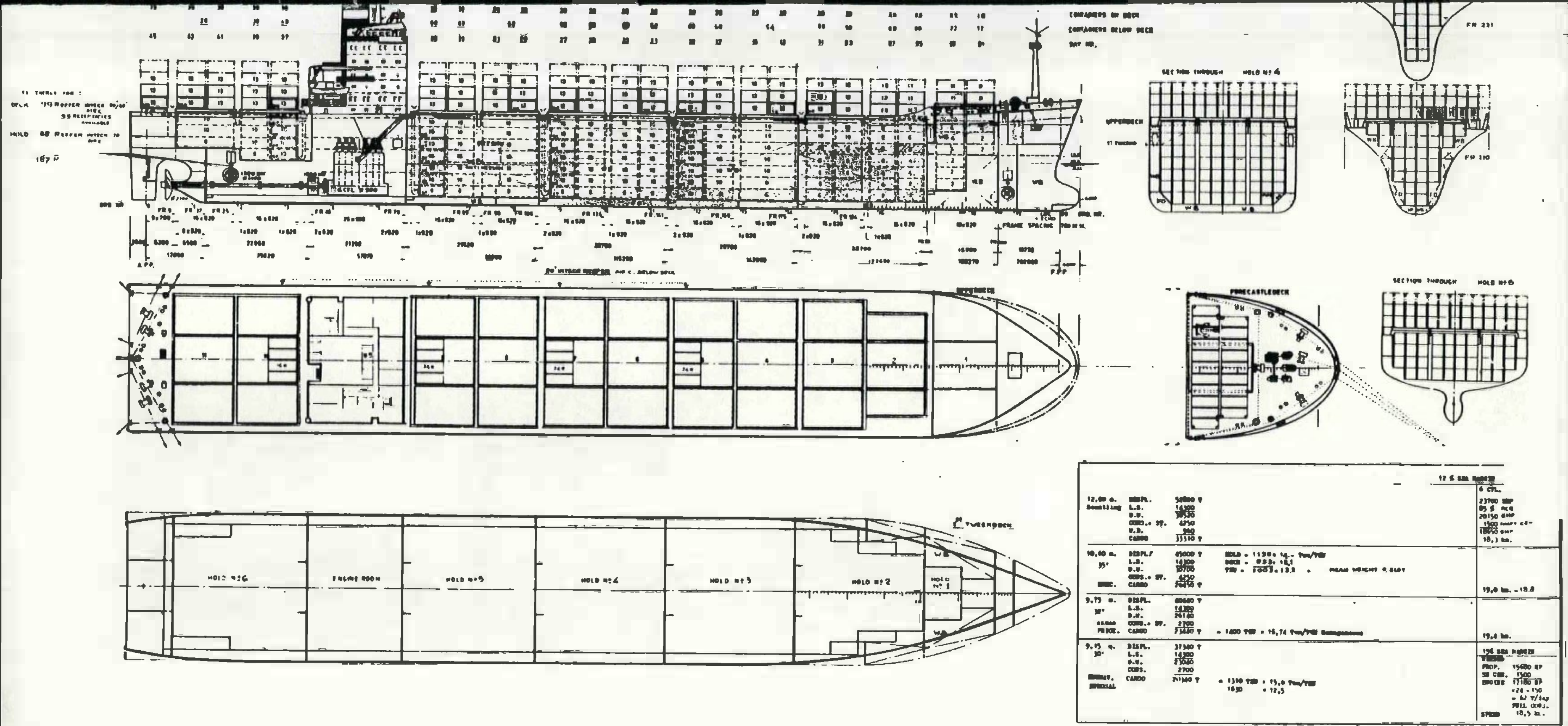


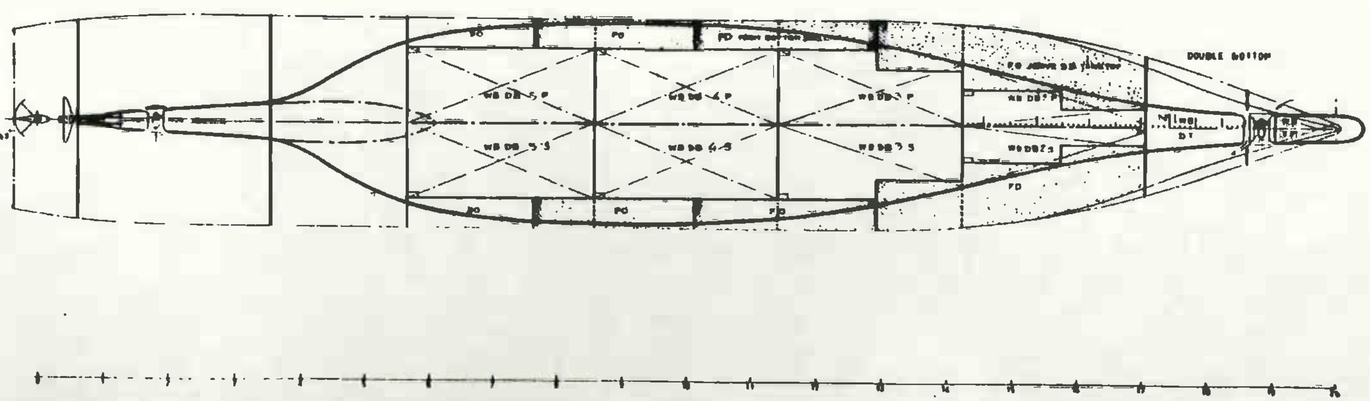
AFTERBODY SHAPE DIFFERENCE IN OPINION!

USA LUMBER CARRIER

UNIVERSAL CONTAINER SHIP "UNCO"

HULLFORM -AFTERBODY-ENGINE FOUND.
"NEDLLOYD-CLARENCE" /- CLEMENT"





Container capacity below deck

40' = 160 contrs = 320 TEU = 28%
20' = = 830 TEU = 72%

below deck 1150 TEU 100%

CONTAINER CAP BELOW DECK	1150 TEU
CONTAINER CAP ON DECK 2 TIERS	562 TEU
GRAND TOTAL 2 TIERS	1712 TEU
3e TIER	291 TEU
GRAND TOTAL 3 TIERS	2003 TEU
4e TIER	221 TEU
IN CASE STABILITY ALLOWS	2224 TEU

Revised 16-8-83

LENGTH OVER ALL	[illegible] M
LENGTH BETWEEN PERP	[illegible] M.
BREADTH MOULDED	32,24 M
DEPTH TO UPPERDECK MLD	[illegible] M
DEPTH TO 1ST TWEENDECK	14,77 M
DRAUGHT DESIGN	[illegible] M
DRAUGHT CONSTRUCTION	12,00 M

108

Nedlloyd Fleet Services
Newbuilding Department

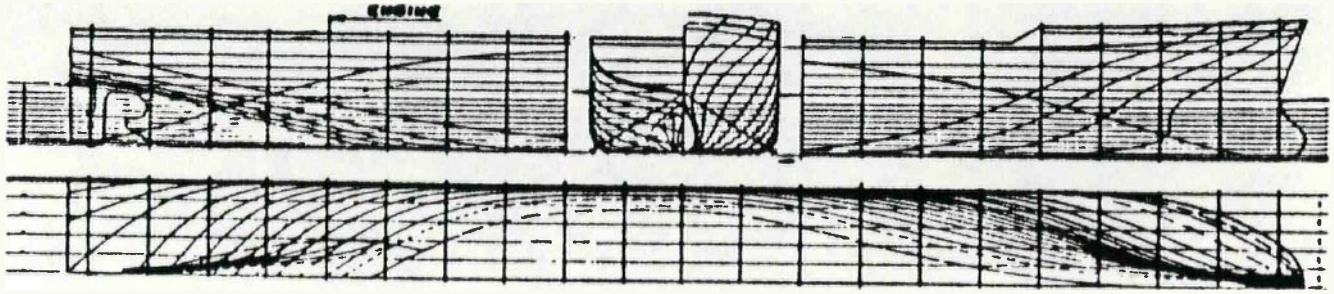
"UNIVERSAL" CONTAINERSHIP

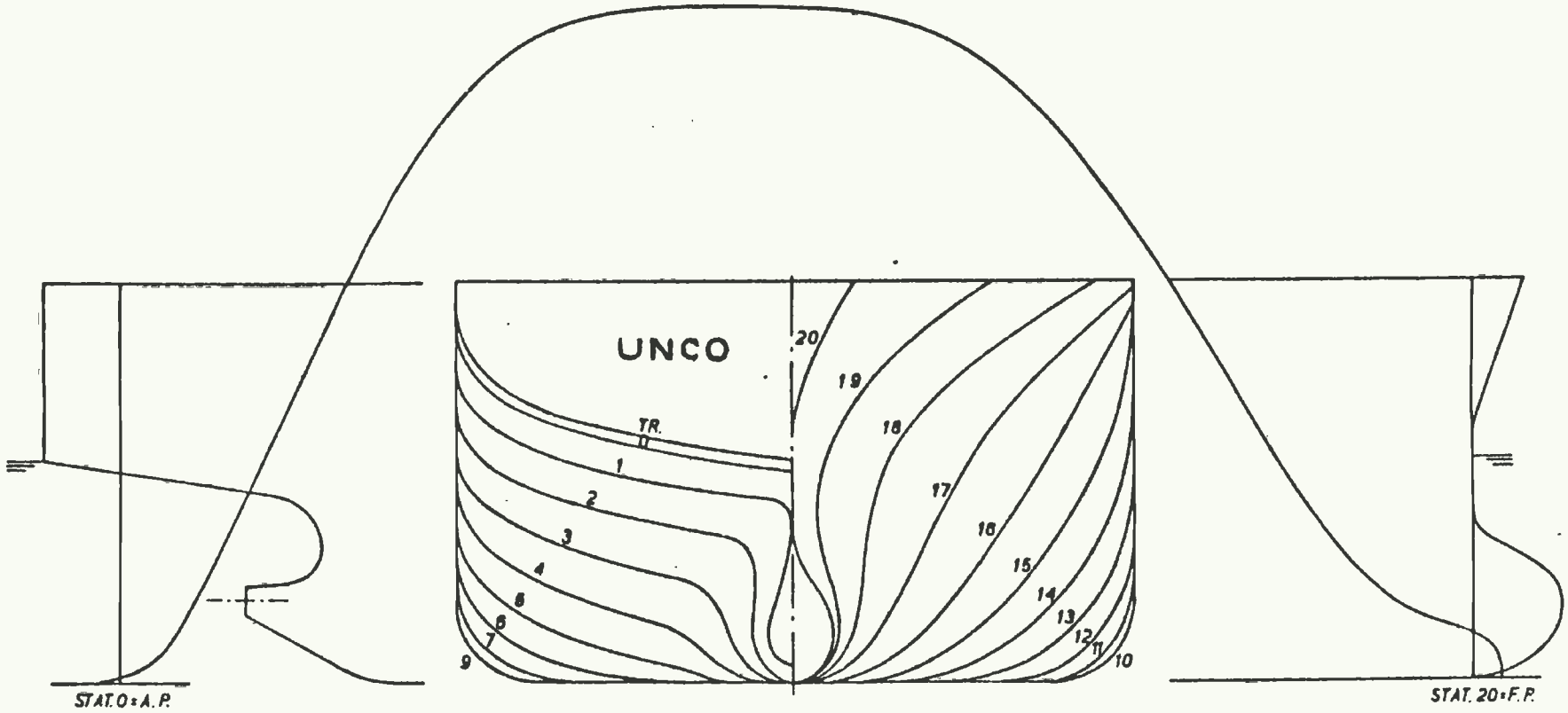
NEDLLOYD CLARENCE

1 : 500 EMEC

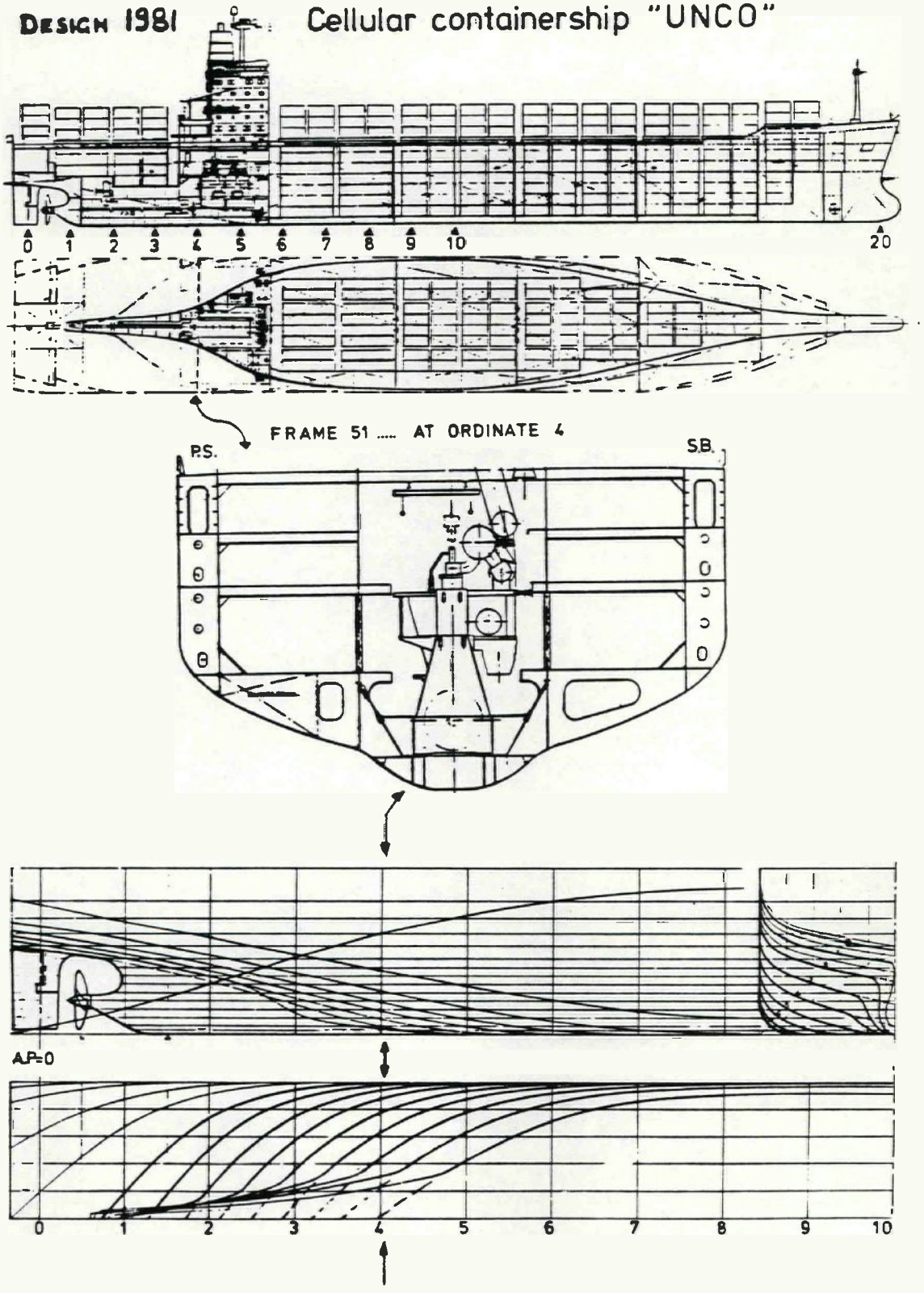
225

SHIP MODEL No. 5901 C BULB IV





DRAWING No. M 5901-36

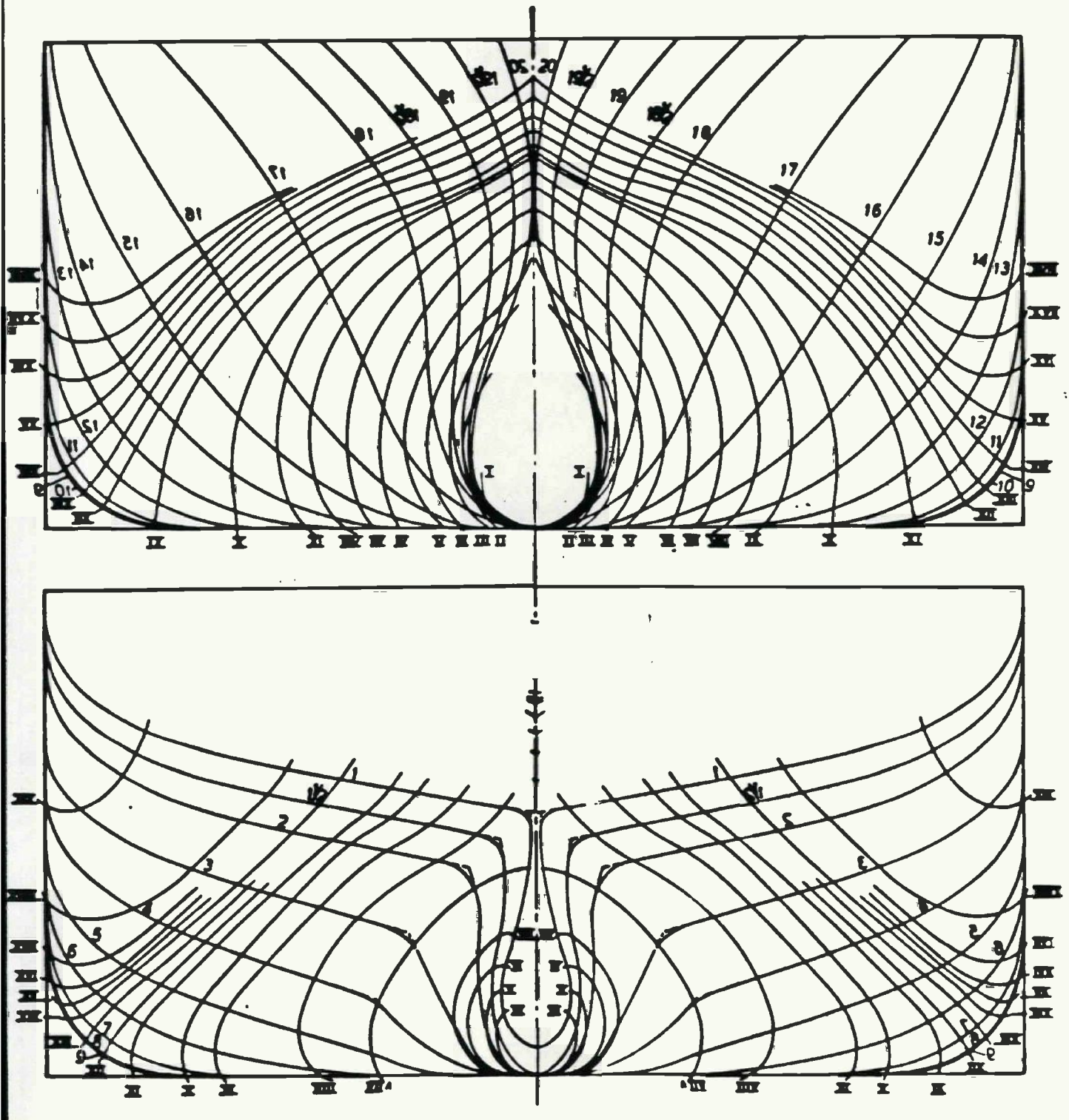

DESIGN 1981
Cellular containership "UNCO"
0 1 2 3 4 5 6 7 8 9 10 20
FRAME 51 ..... AT ORDINATE 4
P.S.
S.B.
A.P.=0
0 1 2 3 4 5 6 7 8 9 10

"UNCO"

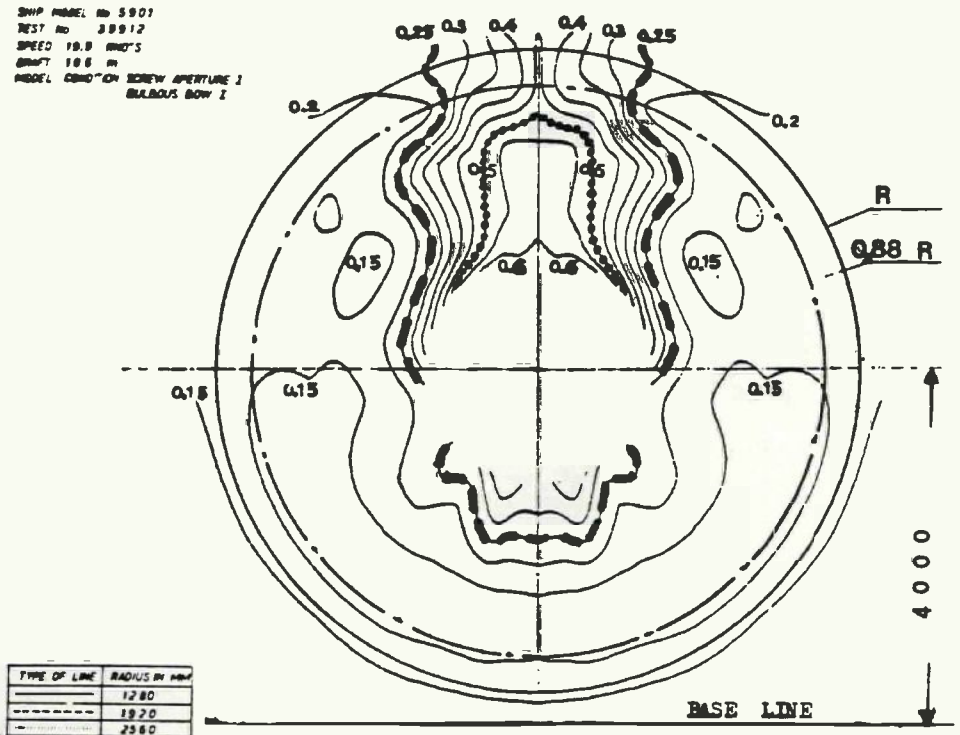
SHIP MODEL Nº 5901

STREAMLINES.

DRAFT 10.60 m SPEED 19 KNOTS TEST Nº 39891

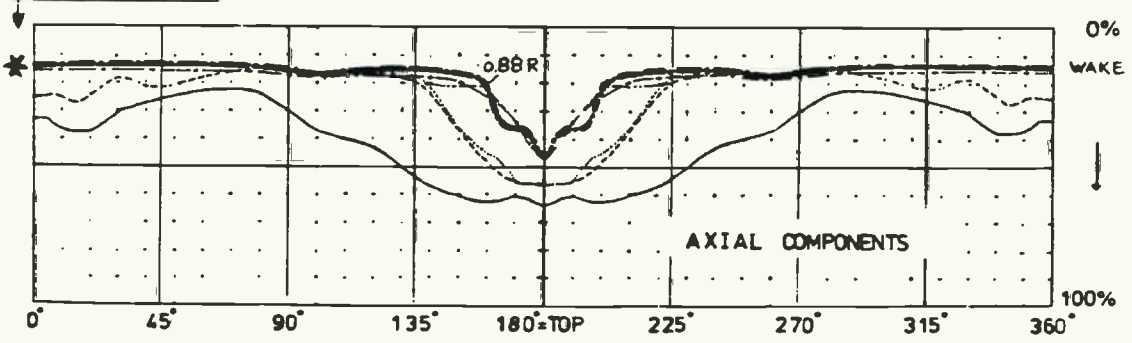


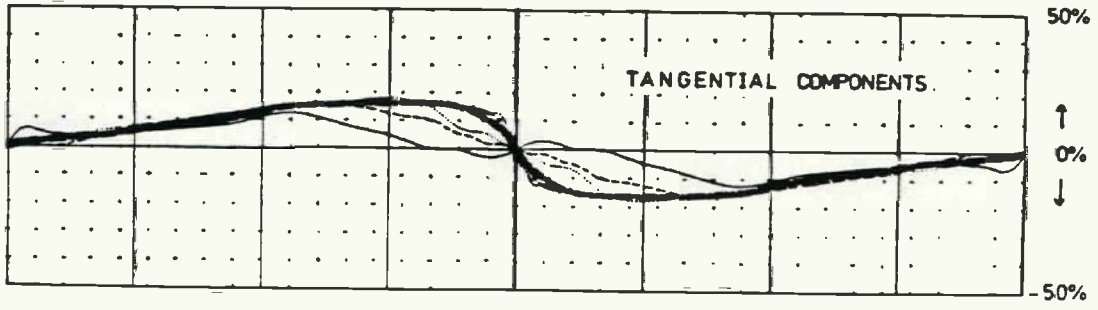
WAKE FIELD MEASUREMENTS
"Universal" containervessel ("UNCO"),
AT 10,60 m DRAFT.

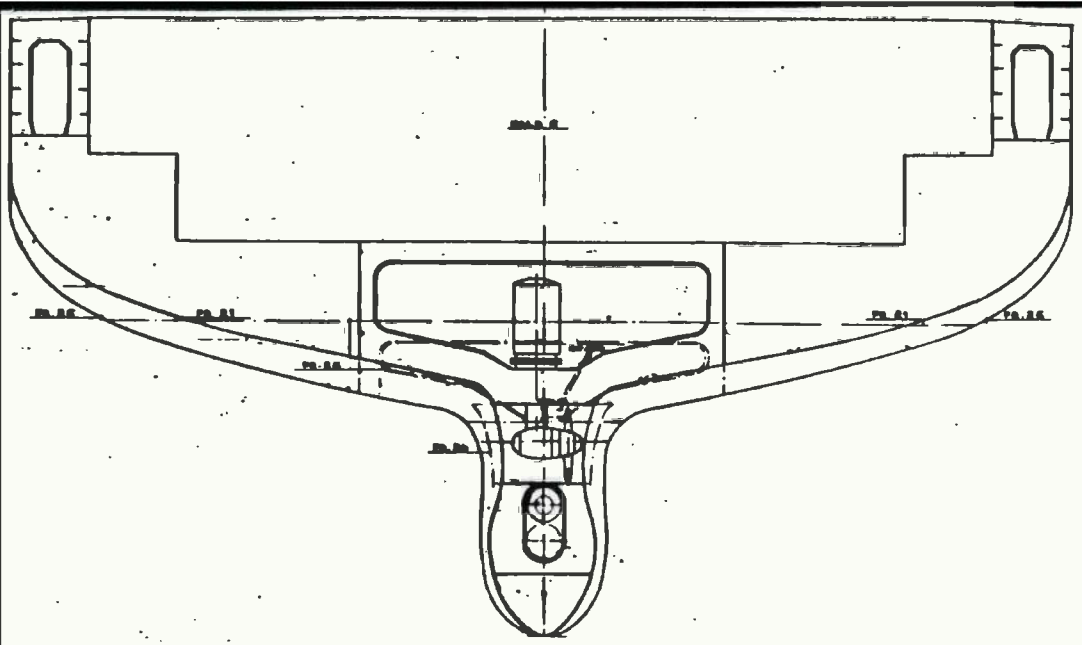


TYPE OF LINE	RADIUS IN mm
———	1280
- - - - - -	1920
— · — · —	2560
———	3200
—·—·—·—	3520
— — — —	3840

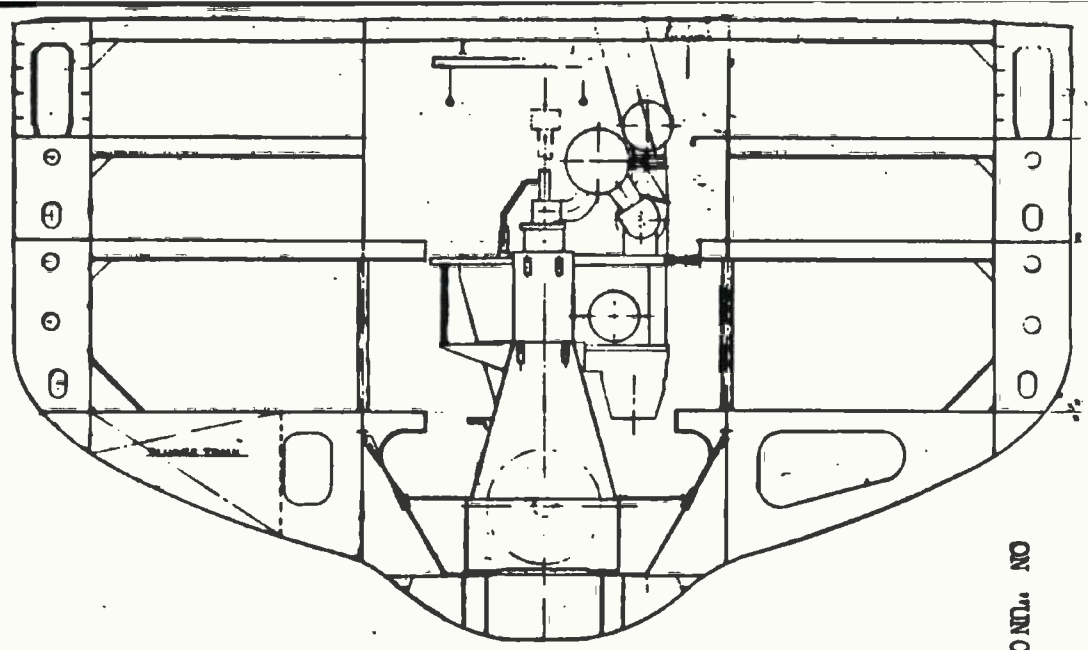
LINES OF EQUAL AXIAL VELOCITY COMPONENTS (Vx/V)



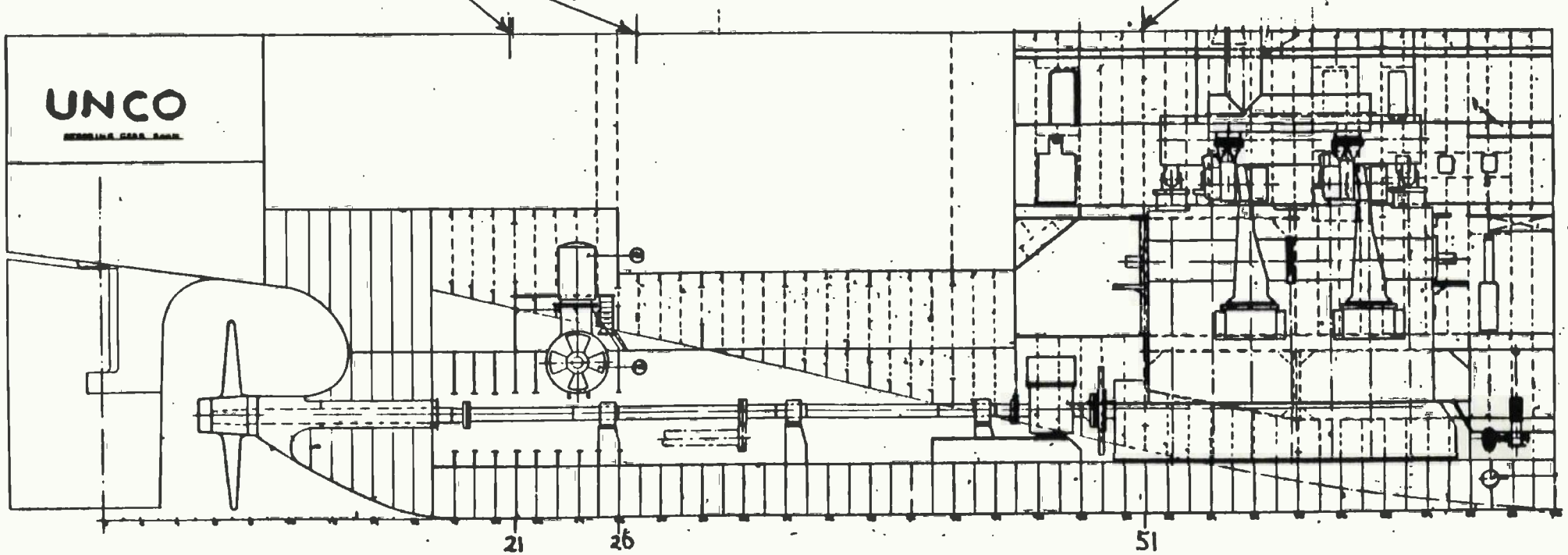




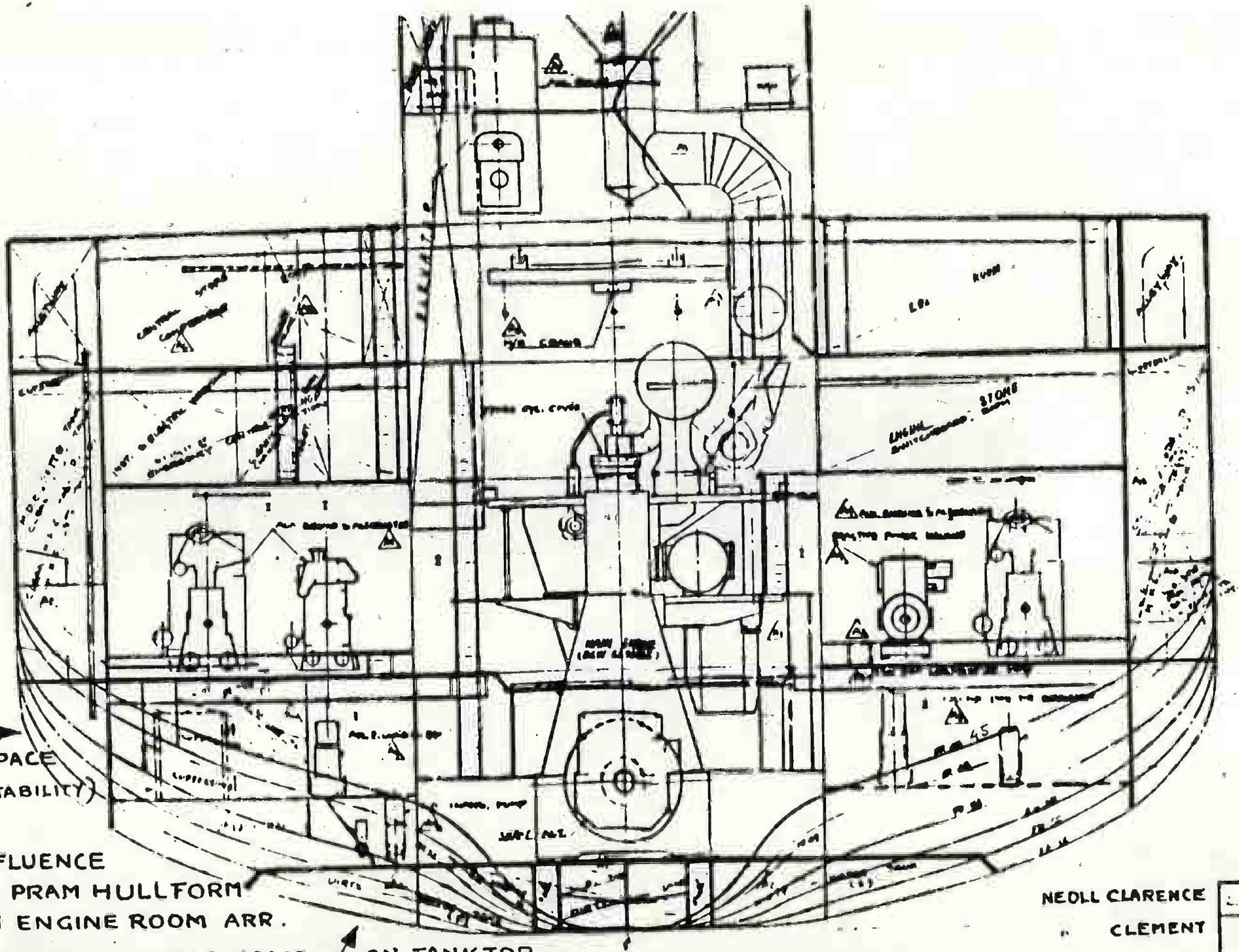
FRAMES 21 & 26



FRAME 51



CRITICAL FRAMES
ON "UNCO"-TYPE VESSEL



INFLUENCE
OF PRAM HULLFORM
ON ENGINE ROOM ARR.

UNCO

NEOLL CLARENCE
CLEMENT
FR 45 SECTION

SMALL CONTAINERSHIP "GEARED"

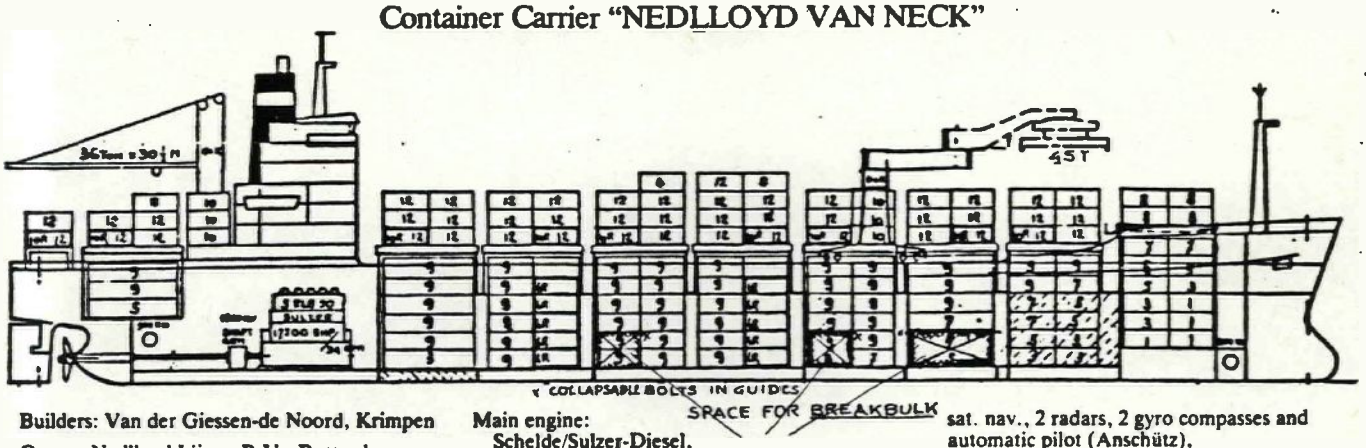
"KLECO"

"NEDLLOYD VAN NECK"

" VAN NOORT "

" VAN DIEMEN"

Container Carrier "NEDLLOYD VAN NECK"



Builders: Van der Giessen-de Noord, Krimpen
Owner: Nedlloyd Lijnen B.V., Rotterdam
Yard number: 929
Delivery: December 7th, 1983

Tonnage	abt.	24 500 GRT
Deadweight	abt.	23 700 t
Length o. a.		182.75 m
Length b. p.		174.00 m
Breadth		30.50 m
Depth to upper deck		16.20 m
Draught (design)		10.00 m
Speed (85 % MCR)	abt.	18 kn

Classification:
B.V.

Main engine:
Schelde/Sulzer-Diesel,
type 5 RLB 90,
12 900 kW at 94 rpm ~ 14000 KW MAX
fixed propeller (Lips)

Auxiliary engines:
2 Diesel alternators, 1500 kW at 720 rpm each,
1 Diesel alternator, 700 kW at 720 rpm
1 shaft-driven alternator system, 1300 kW
1 emergency Diesel alternator set,
160 kW at 1800 rpm

bow thruster (Lips), stern thruster — thrust 15.5 t each

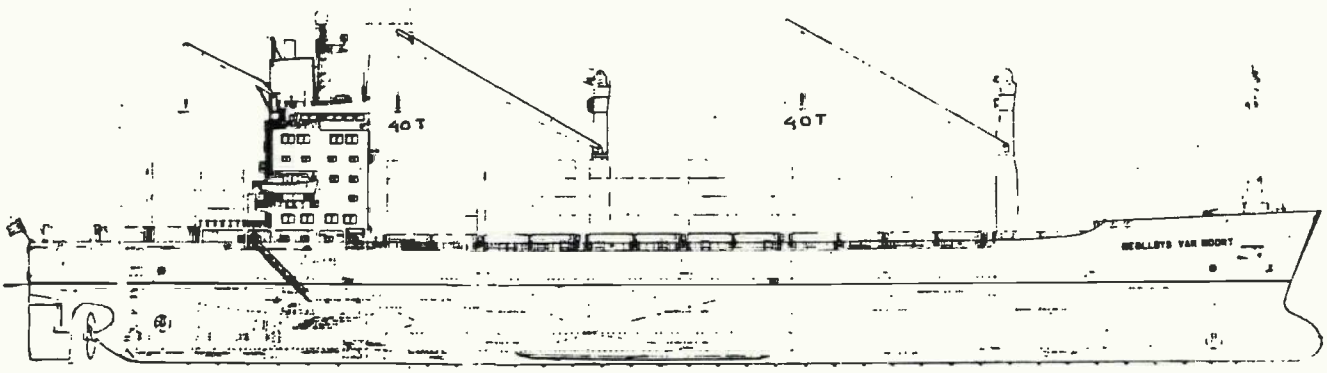
4 V.H.F. receivers, radio direction finder, sat. nav., 2 radars, 2 gyro compasses and automatic pilot (Anschütz), adaptive steering unit
Accommodation for 40 persons
5 cargo holds (without tweendeck)
Hatch covers: system MacGregor pontoon-type
1 gantry crane of 45 t,
1 deck crane of 36 t

Container capacity:	TEU
in holds	776
on deck	668
Total	1444

Partly 4th tier on deck 142 (empty)
150 reefer plugs

~ 1600 TEU ÷ 12.7 Ton

M/V "NEDLLOYD VAN NOORT" - VAN DIEMEN"



Builders: van der Giesen-de Noord, Krimpen aan den IJssel, the Netherlands
Owner: Nedlloyd Lijnen B.V., Rotterdam
Yard number: 930
Type: Multipurpose, container carrier
Delivery: 5th April 1984

Tonnage	23 790 GT
Deadweight	23 800 t
Length o. a.	182.73 m
Length b. p.	174.00 m
Breadth moulded	30.50 m
Depth to main deck	16.20 m
Depth to tween deck	12.16 m
Draugth	10.00 m
Speed	18 kn

Classification:
BV + 1-3/3 Haute Mer Aut.

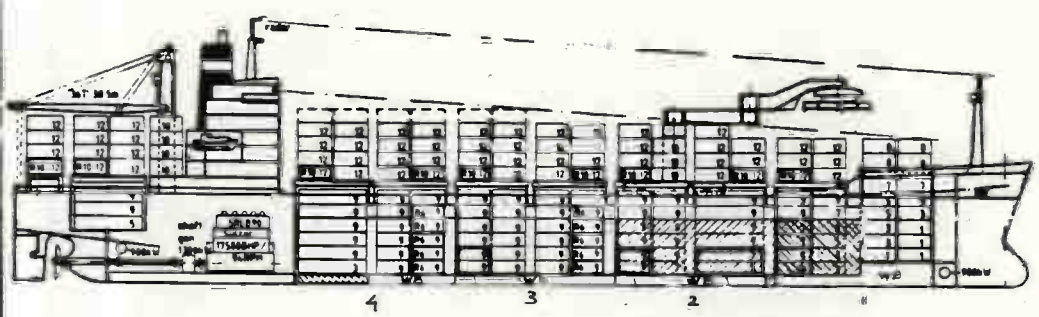
Main engine:
KMS-Sulzer 5 RLB 90, 14000 kW at 94 rpm

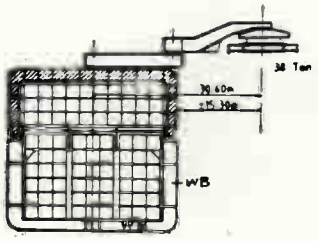
Auxiliary engines:
1 oil fired 2.6 t/h, 10 bar
1 exhaust gas 2.8 t/h, 12 bar
Bowthruster Contr. pitch — 14.5 t thrust (6000 V, 900 kW)
Sternthruster Contr. pitch — 14.5 t thrust (6000 V, 900 kW)

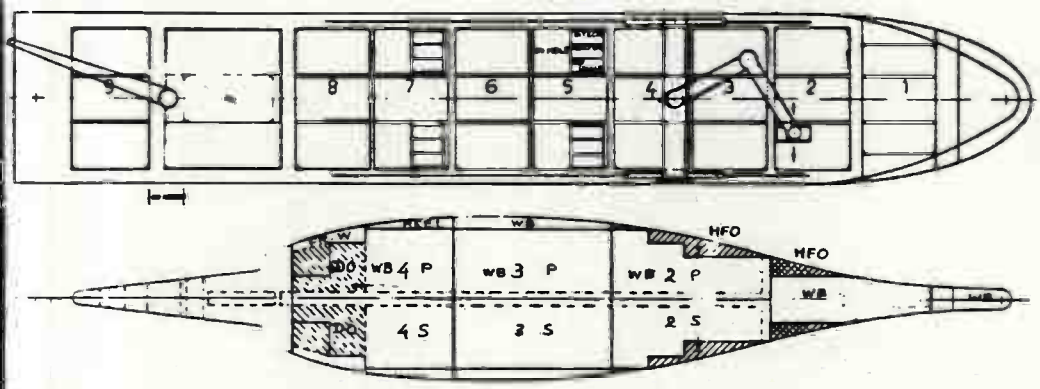
Alternators:
2 × 1500 kW at 720 rpm, 450 V, 60 Hz
1 × 700 kW at 720 rpm, 450 V, 60 Hz
1 × 1300 kW, shaftgenerator, 70-94 rpm, 450 V, 60 Hz emergency 160 kW

Equipment:
Gyro compass/autopilot (Anschütz)
Accommodation for 40 persons (26 aircond.)
Holds: 4/Mechanical ventilation,
2,5 airchanges/hr.
Tube lighting
CO_2 fire extinguishing
Hatch covers: Slab type, non sustained by container guides
Max weigth of panels abt. 25 t
Loading gear: 2 of 40 t, 16.35 m (electr./hydr. single deck cranes)
2 sparecranes 5/6.3 t — 14.5/11.5 m type E2H (O&K)
Container: 1514 TEU ~ 1600 TEU ÷ 12.7 T
46 FEU
Fixed and loose container equipment (OSR)
Reefer plugs: 146

Three NEDLLOYD "KLECO"-class cellular containerships.







Length over all	182.50M±0.23
Length betw perpend	174.00M
Breadth mld	30.50M
Depth mld	16.20M
Draft DESIGN mld	10.00M
Displacement	34852TON
Light ship	11030TON
Deadweight	23822TON
Water ballast	7874 m3
Fresh water	411 m3
Heavy Fuel Oil	2883m3
Diesel oil	366m3
Lubricating oil	281m3

Cont below deck	10976T.14x784
Cont on deck	9674T.14x691
Homog LOADED	20650T×14×1475
CENTR GRAVITY BOX = 45%	

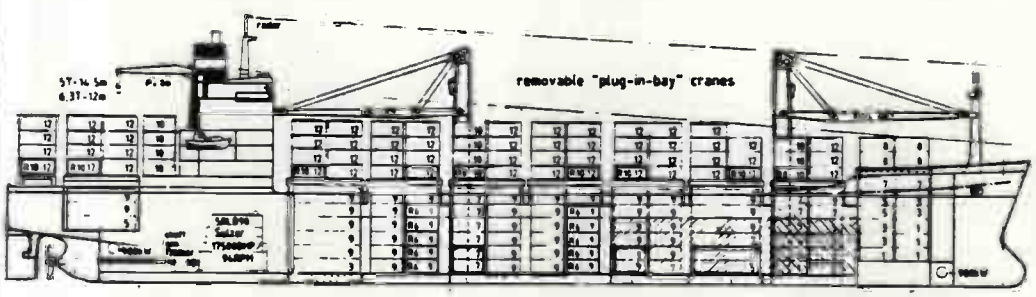
EVEN KEEL: #0 M

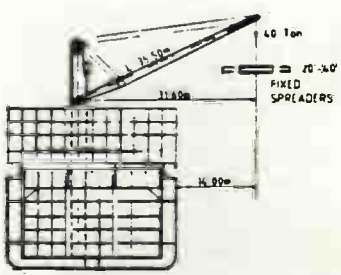
G'M = 0.41 M

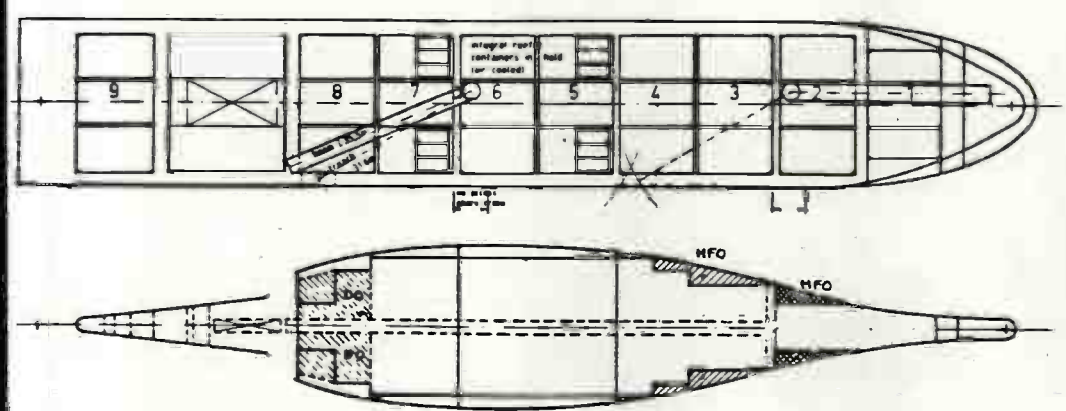
NEDLLOYD VAN NECK 929

Delivery date: 2 December 1983
Yard v/d Giessen de Noord

1475 TEU × 14 TON







Length over all	182.50M±0.23
Length betw perpend	174.00M
Breadth mld	30.50M
Depth mld	16.20M
Draft DESIGN mld	10.00M
Displacement 9.94 M	34687 TON
Light ship estim.	11000 "
Deadweight "	23687 TON

Water ballast	7874m3
Fresh water	411m3
Heavy Fuel Oil	2883m3
Diesel oil	366m3
Lubricating oil	281m3

NEDLLOYD VAN NOORT 930
" VAN DIEMEN 931

Delivery April 1984 / July 1984
Yard v/d Giessen de Noord
Class Bureau Veritas

1426 TEU × 14.2 TON

TEU

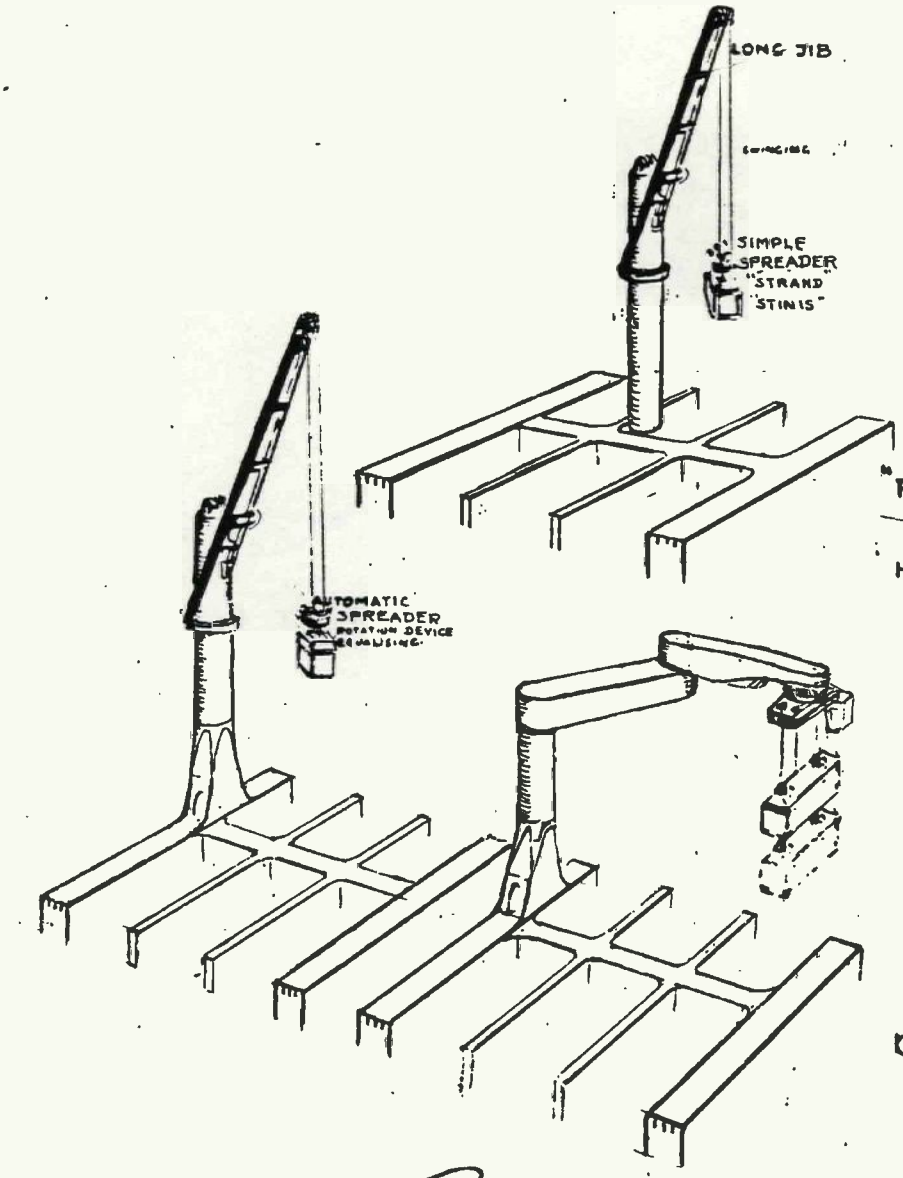
Cont below deck	10678T.142×752
Cont on deck	9571T.142×674
HOMOG LOADED	20249.142×1426
CENTR GRAVITY BOX = 45%	

EVEN KEEL 9.94 M

G'M = 0.46 M

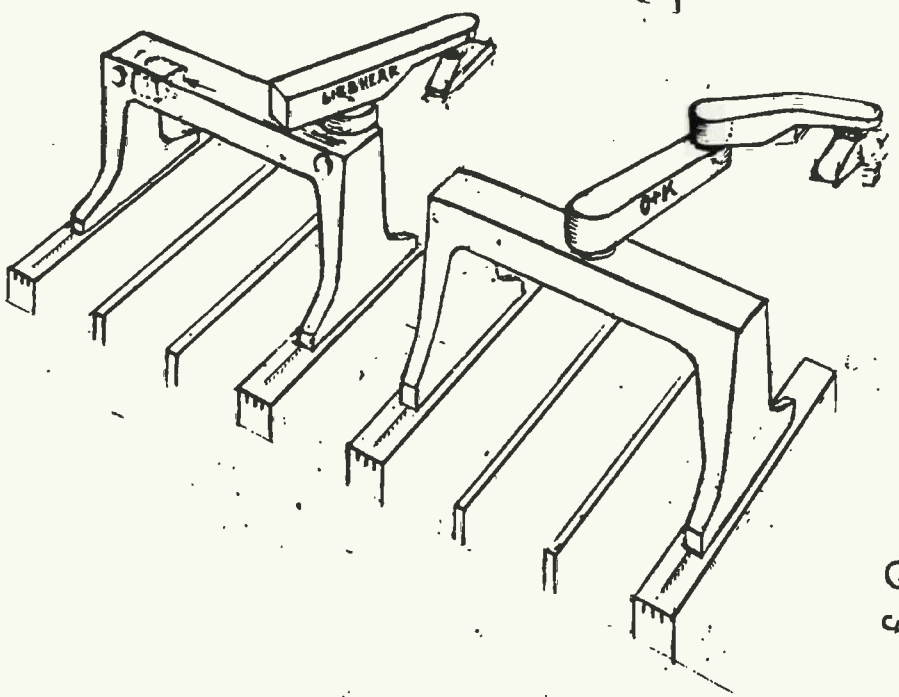
BV 2-12-83

CARGO GEAR : ON / OFF



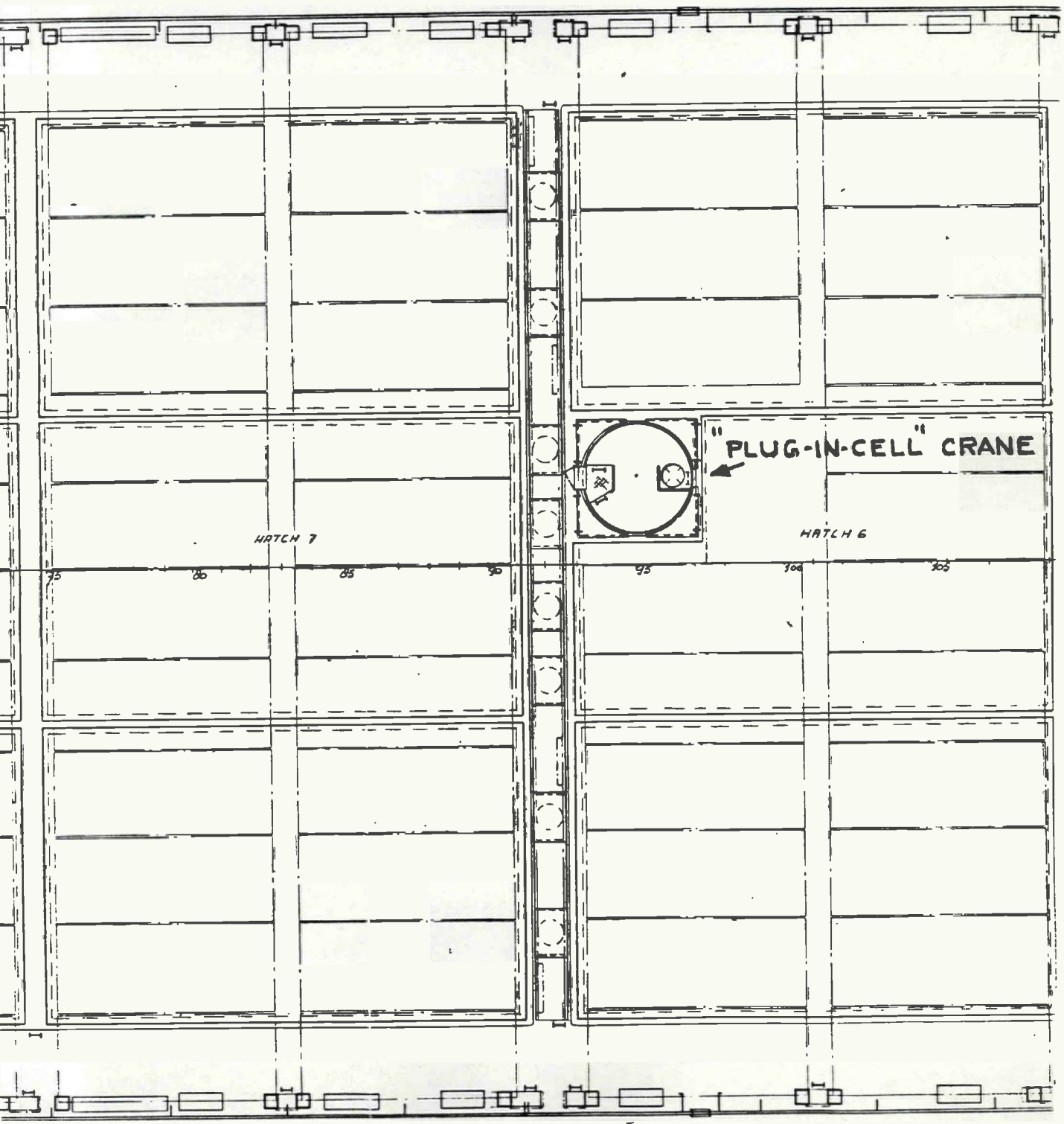
TEMPORARY :
"PLUG-IN-CELL" CRANE
LOSS OF CONTAINER SPACE
HOWEVER : EASY TO TAKE OUT

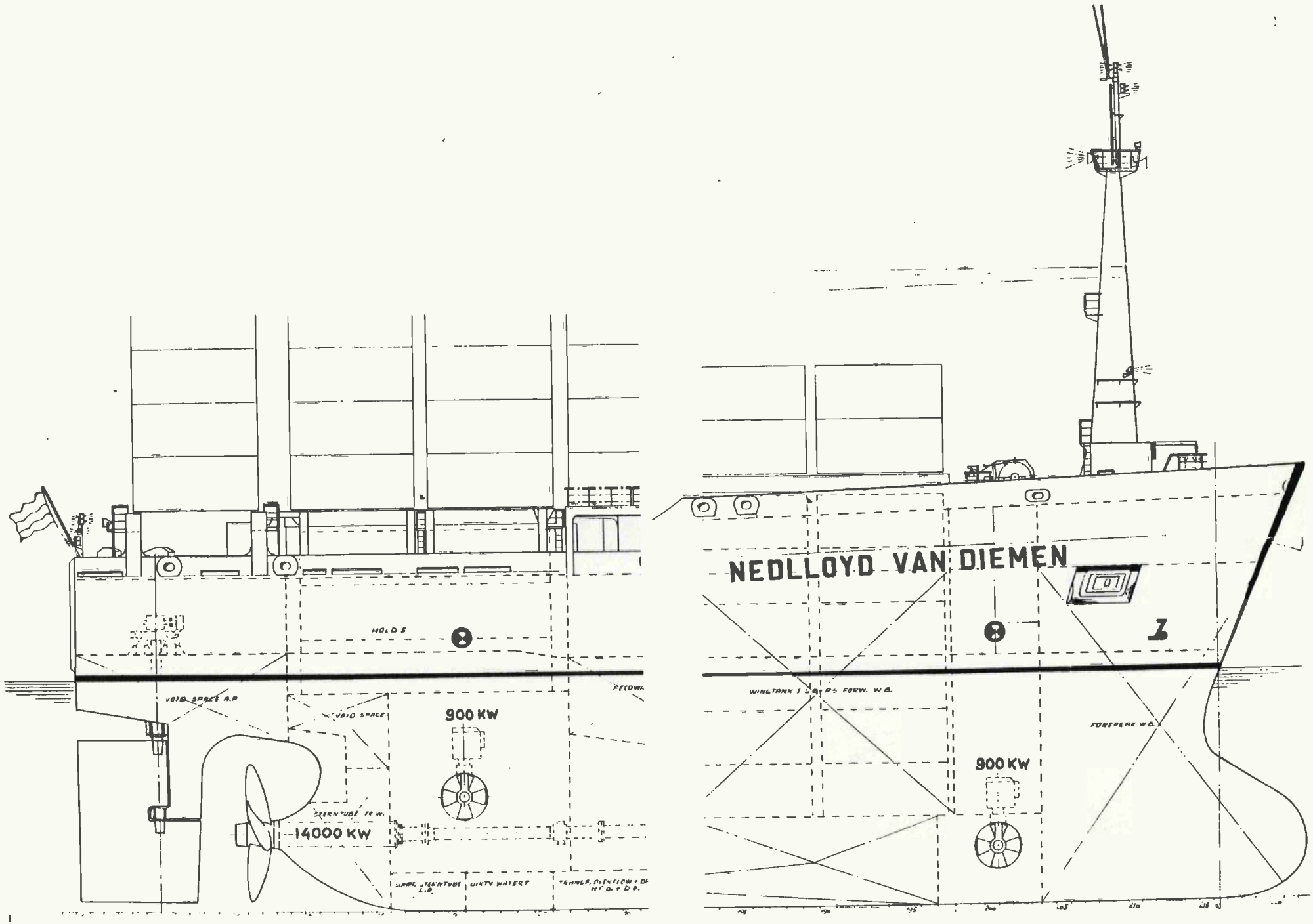
CRANES ROOTED IN SHIP SIDE

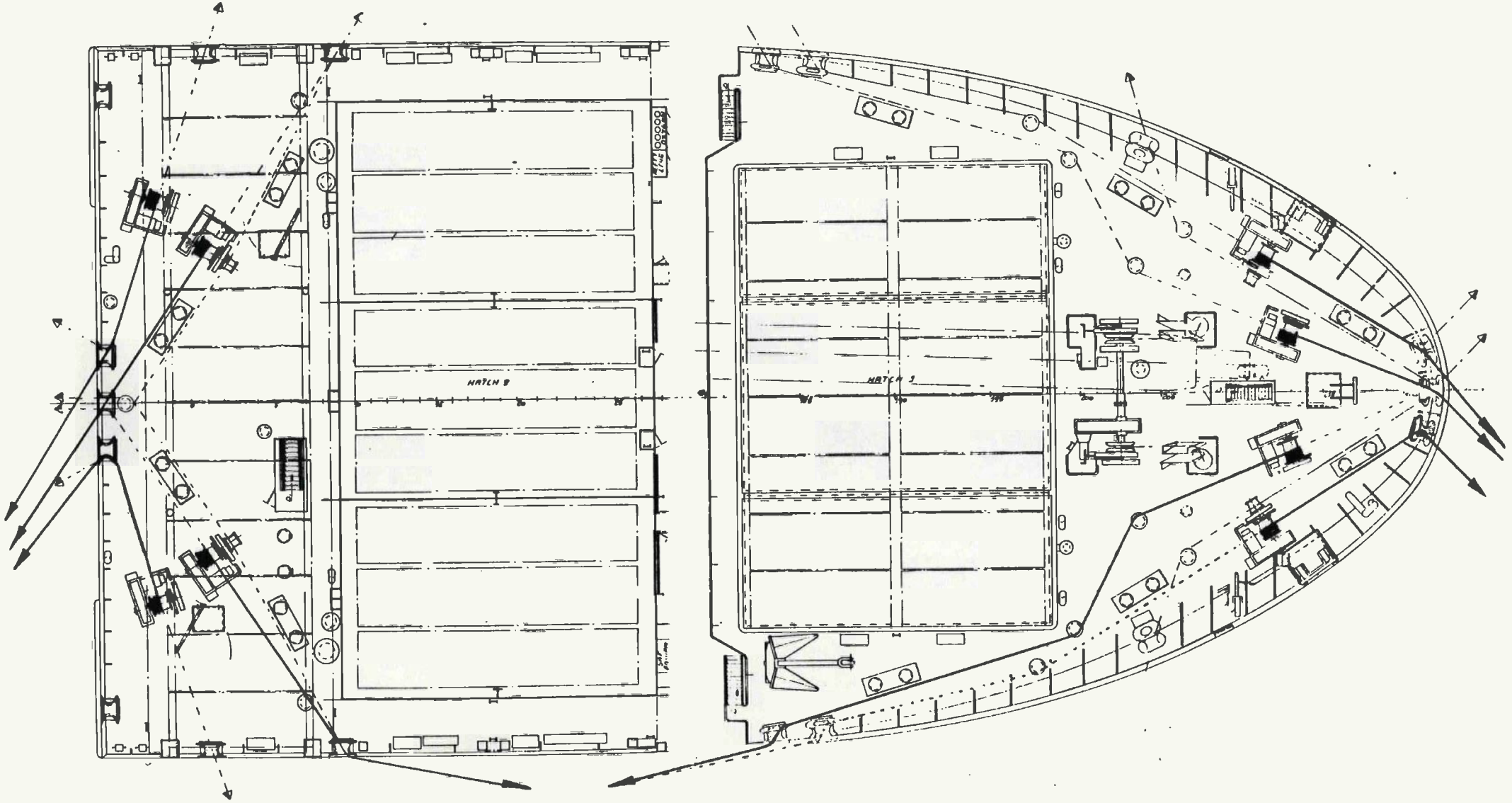


GANTRIES
CAN BE REMOVED OVERNIGHT

UPPERDECK

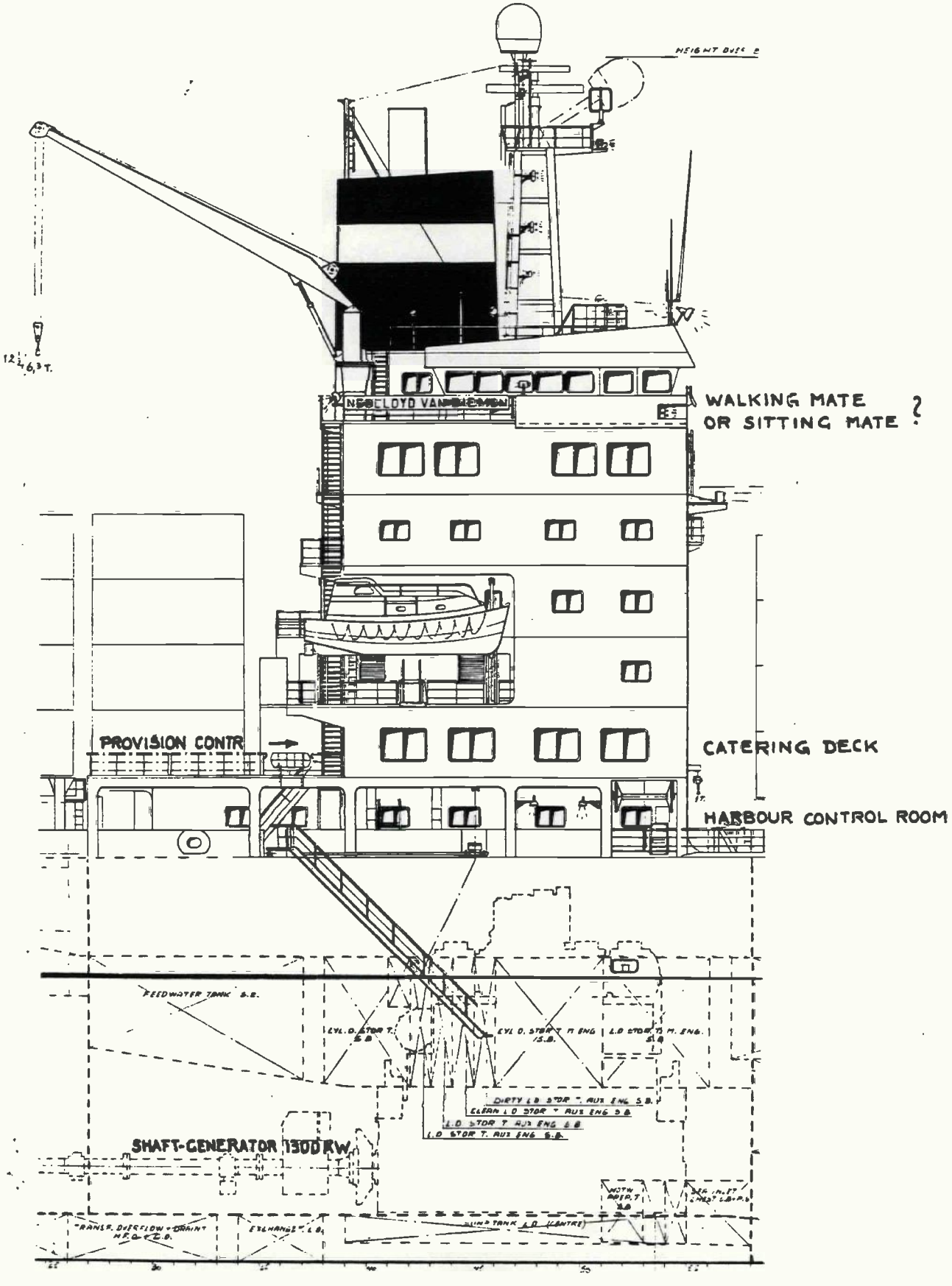



NEDLLOYD VAN DIEMEN
HOLD 5
VOID SPACE A.P
VOID SPACE
900 KW
14000 KW
WING TANK
FOREPEAK W.B.
900 KW

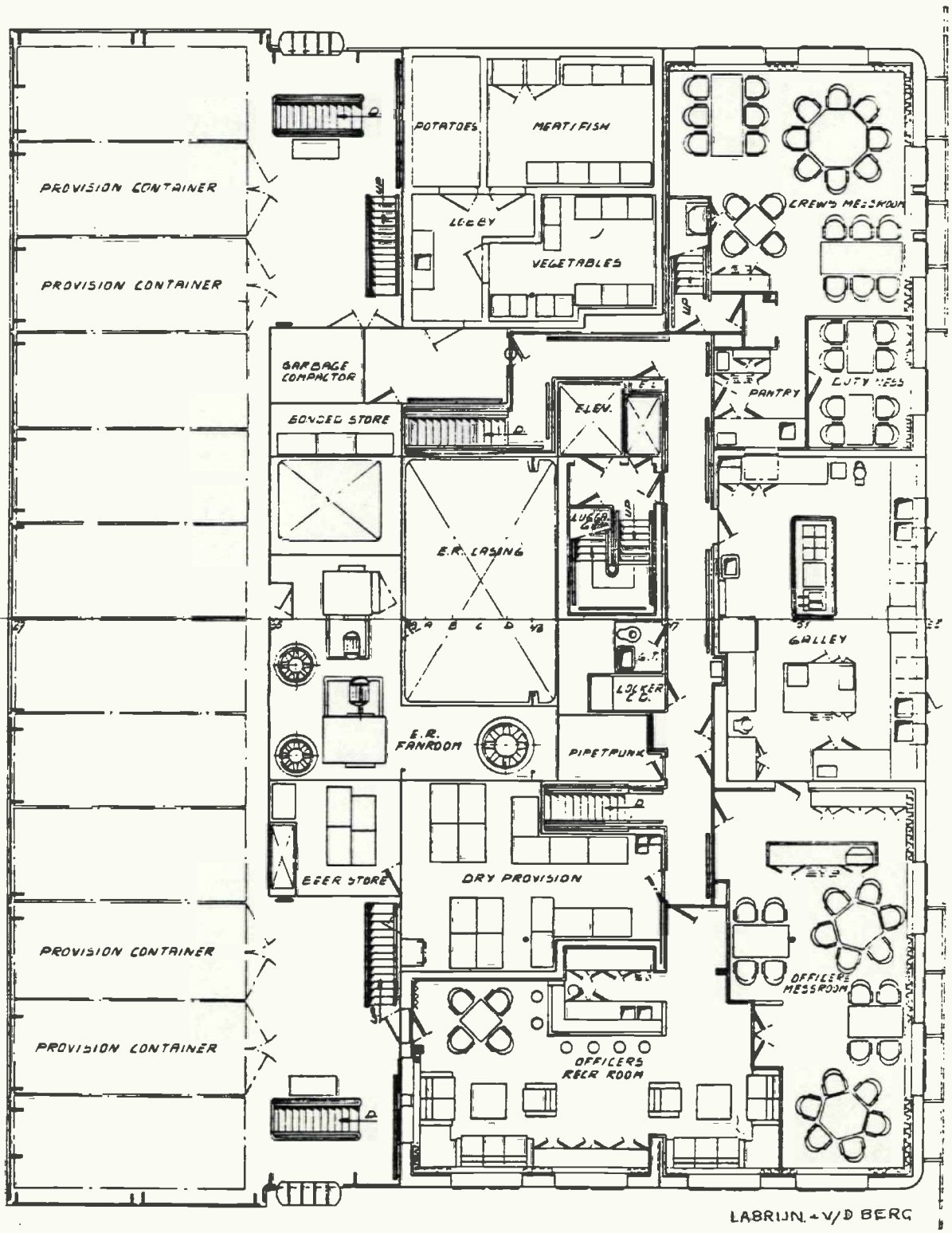


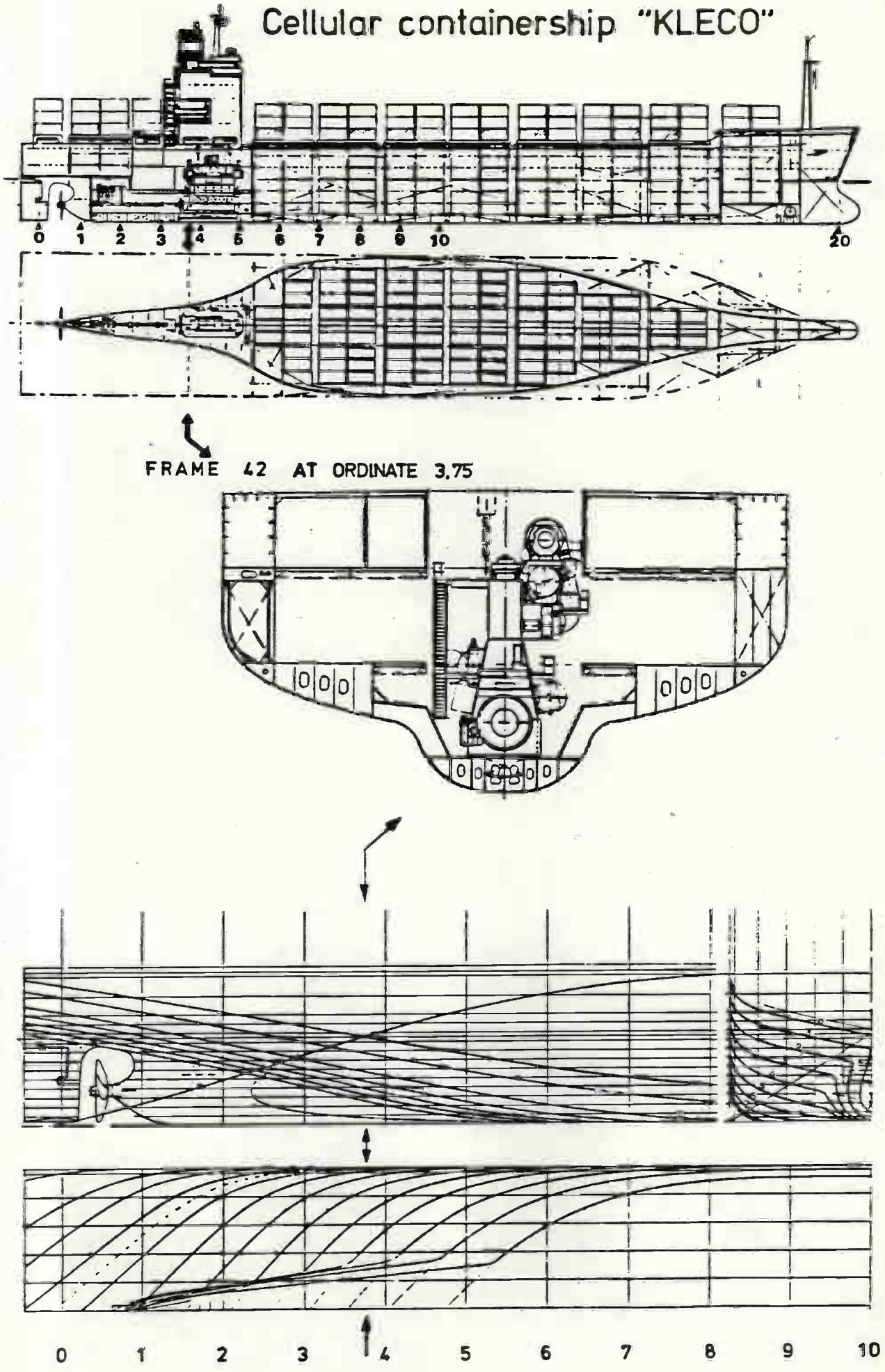
3 WIRES + 1 SPRING
4 CT WINCHES

1 SPRING + 3 WIRES
4 CT WINCHES


WALKING MATE
OR SITTING MATE ?
PROVISION CONTR
CATERING DECK
HARBOUR CONTROL ROOM
SHAFT-GENERATOR 1300 KW

1ST DECK

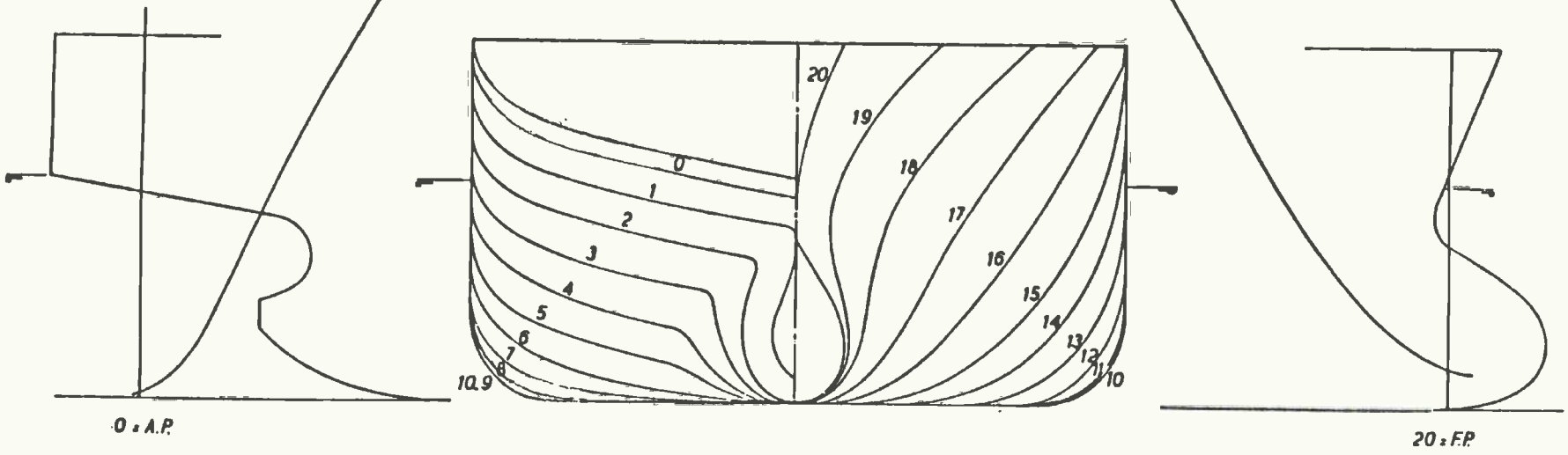

PROVISION CONTAINER
PROVISION CONTAINER
PROVISION CONTRAINER
PROVISION CONTRAINER
POTATOES
MEAT/FISH
LOBBY
VEGETABLES
CREWS MESSROOM
GARBAGE COMPACTOR
BONDED STORE
ELEV.
PANTRY
DUTY MESS
E.R. CASING
GALLEY
E.R. FANROOM
PIPETRUNK
BEER STORE
DRY PROVISION
OFFICERS MESSROOM
OFFICERS BEER ROOM
LABRIJN + V/D BERG

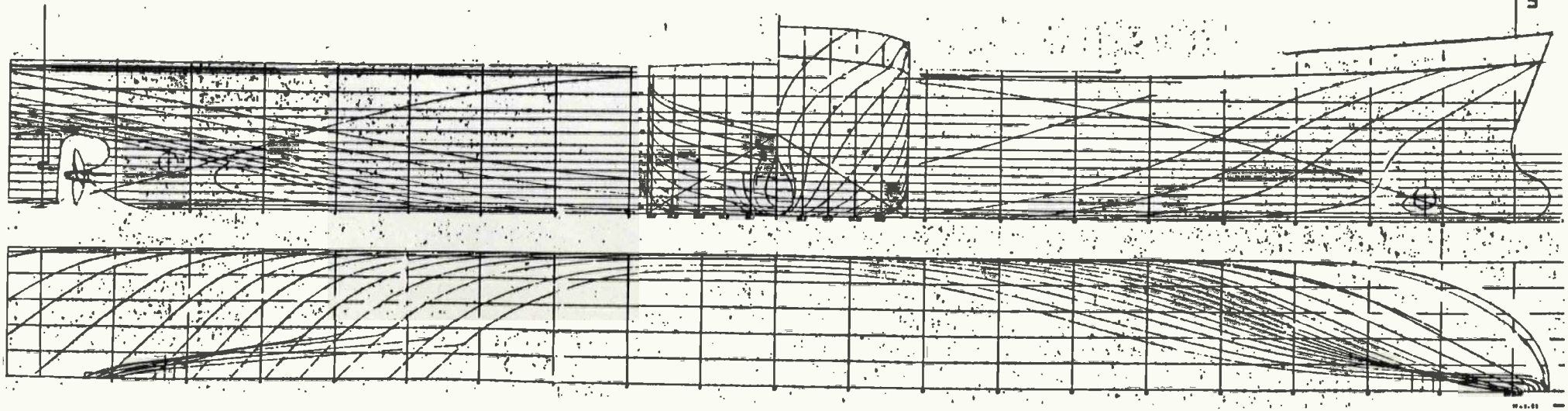

Cellular containership "KLECO"
0 1 2 3 4 5 6 7 8 9 10 20
FRAME 42 AT ORDINATE 3.75
0 1 2 3 4 5 6 7 8 9 10

"KLECO"

NEDLLOYD VAN NECK
" VAN NOORT
" VAN DIEMEN

SHIP MODEL No. 5943 B

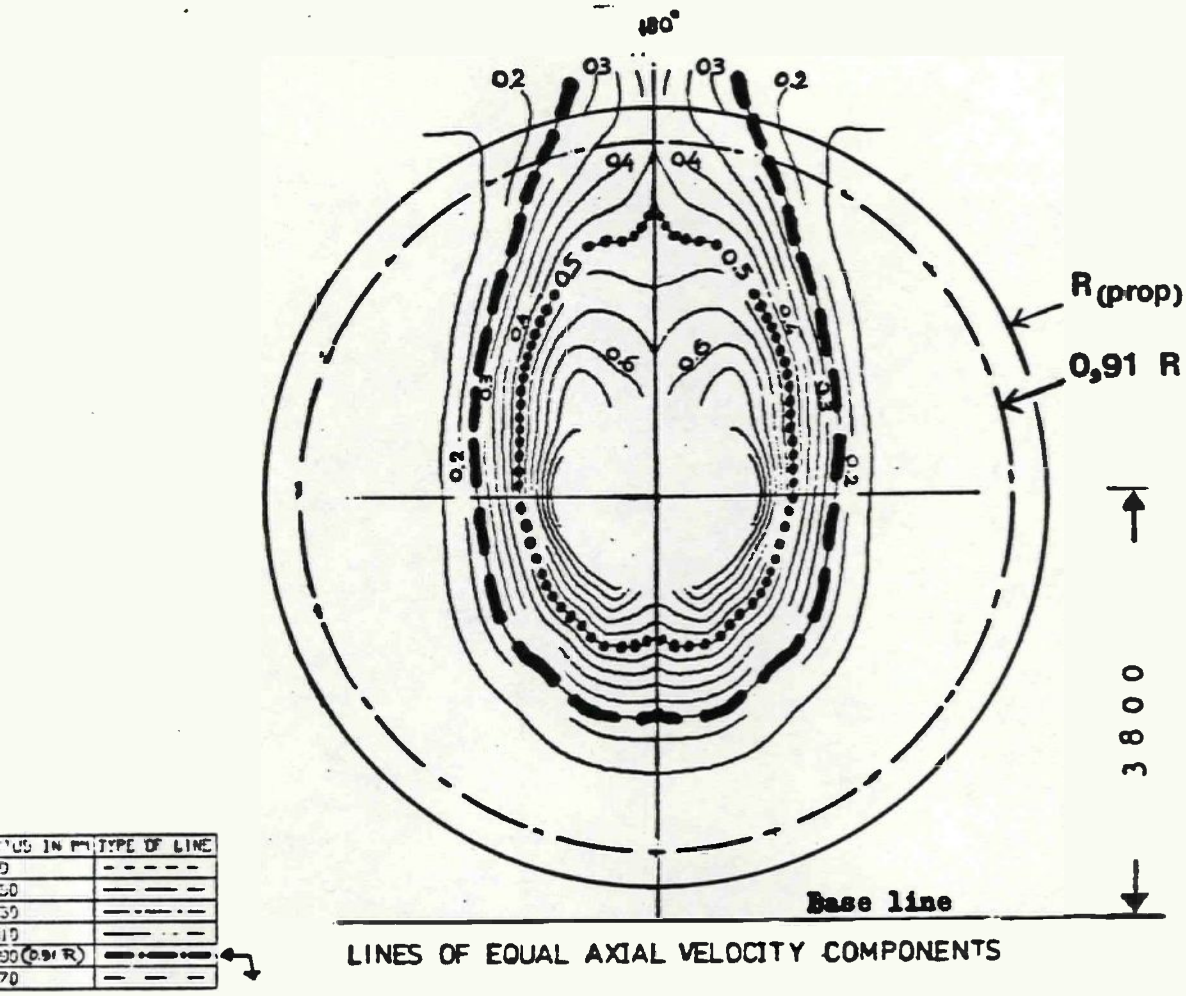




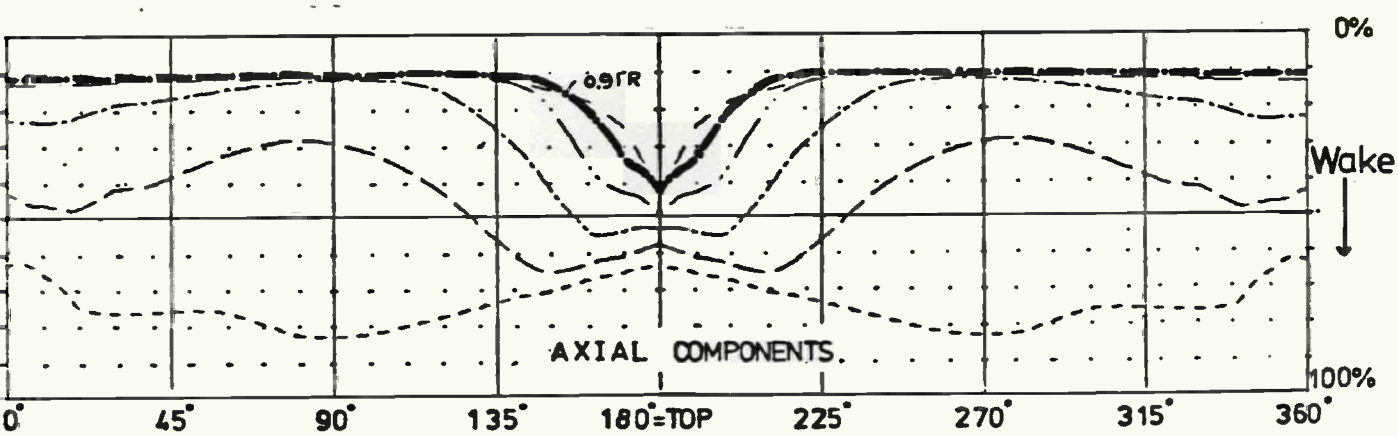
DRAWING No M 5943 - 49

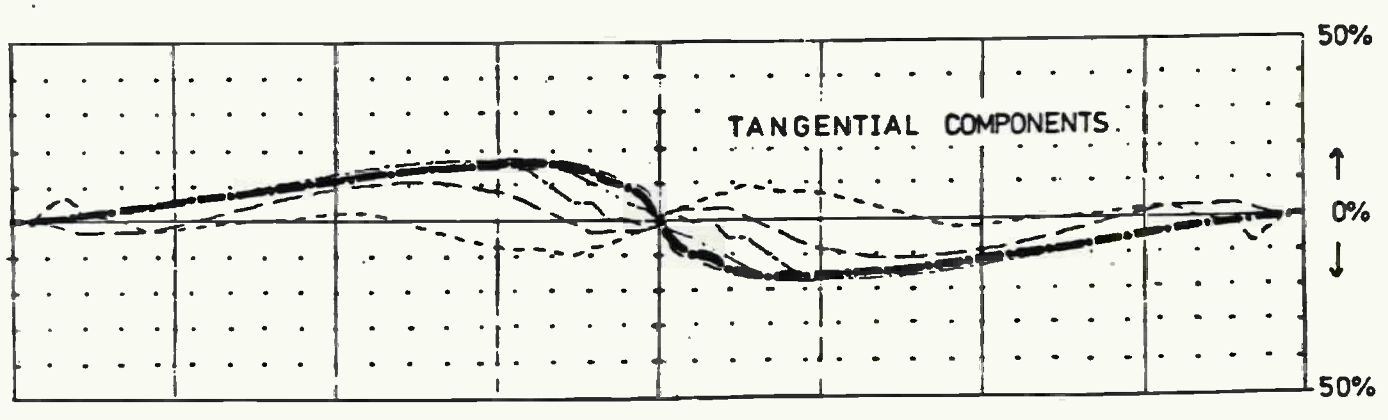
Netherlands Ship Model Basin

WAKE FIELD MEASUREMENTS
"Klein" containervessel ["KLECO"]
AT 10,00 m DRAFT.

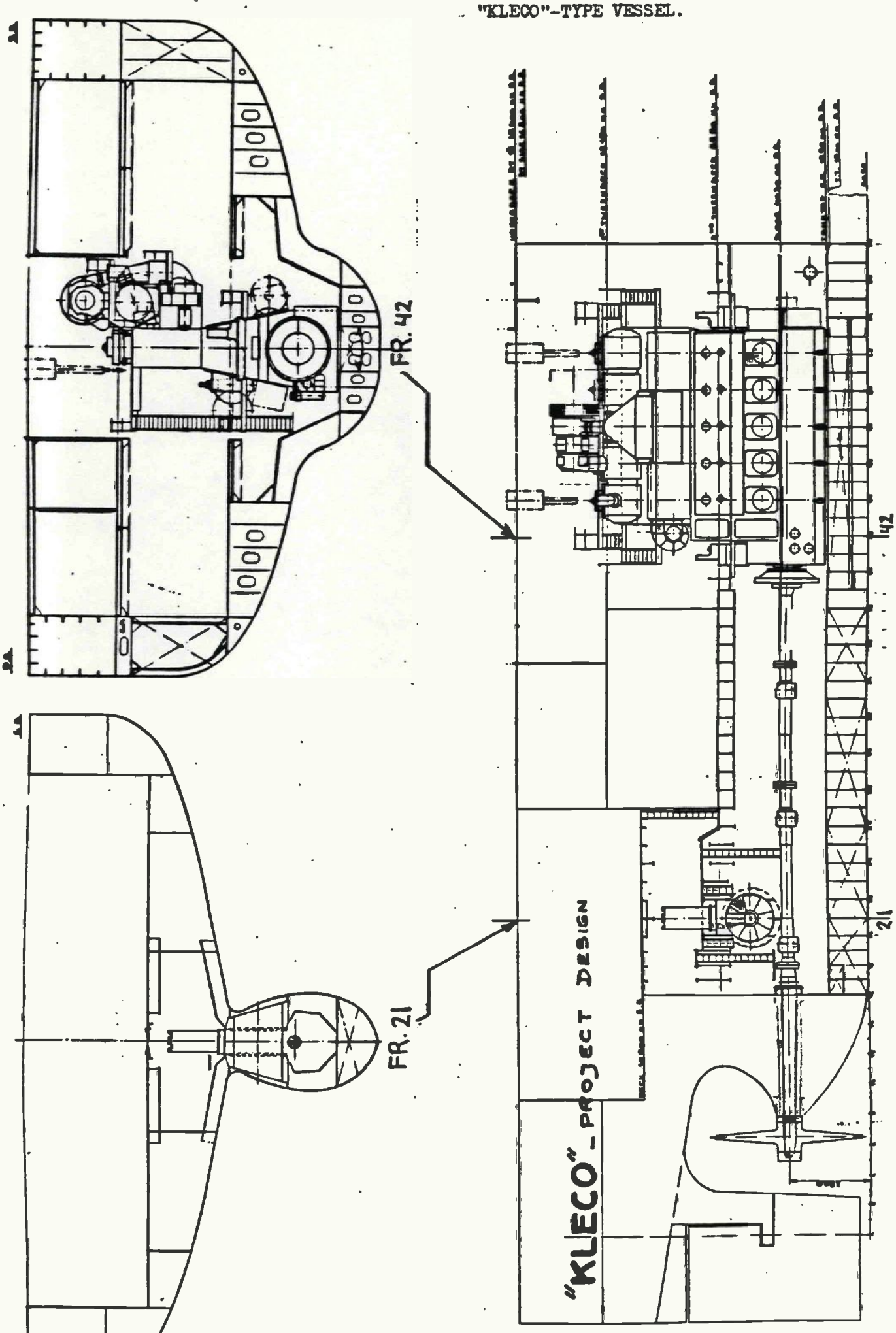


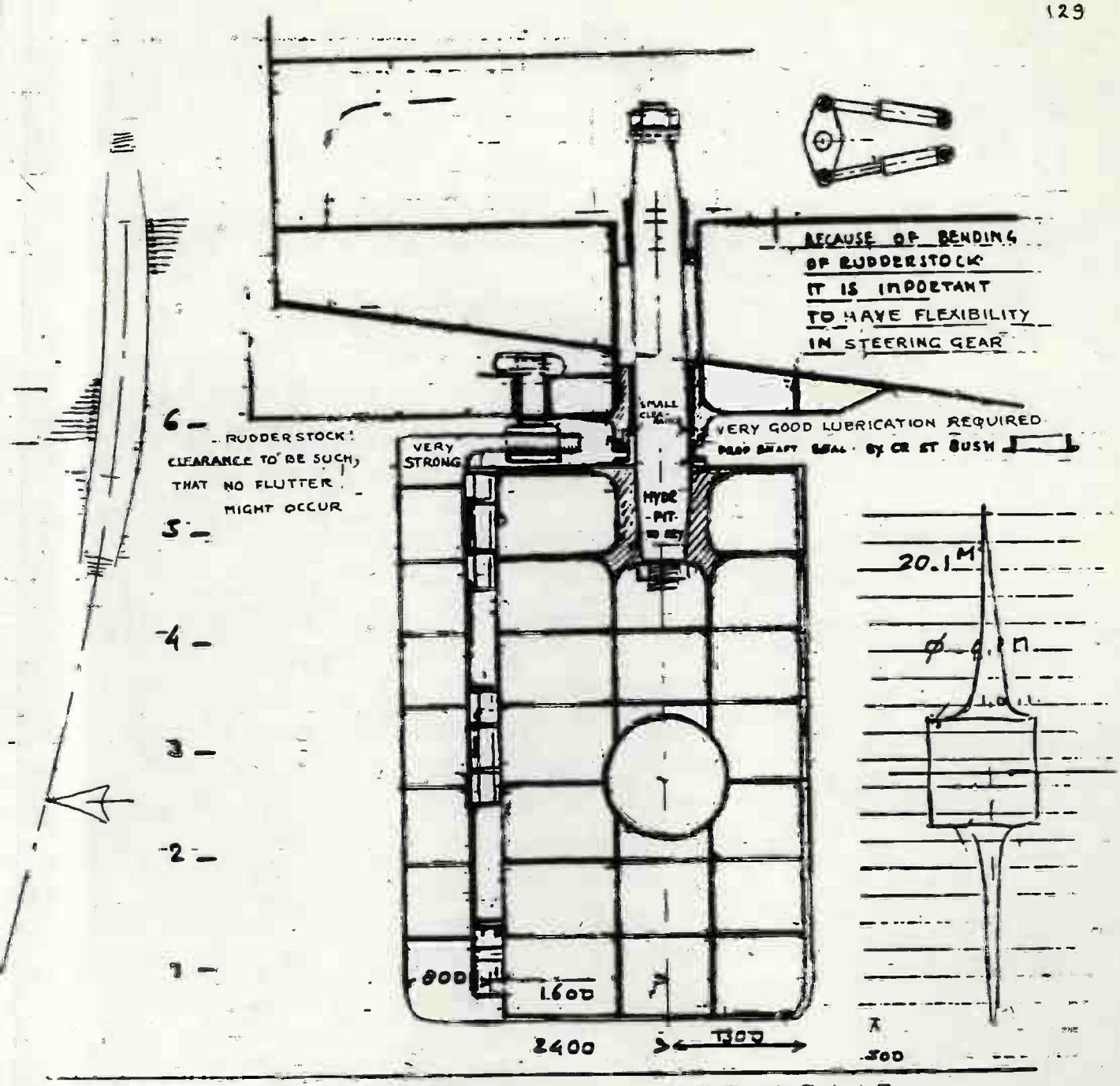
LINES OF EQUAL AXIAL VELOCITY COMPONENTS



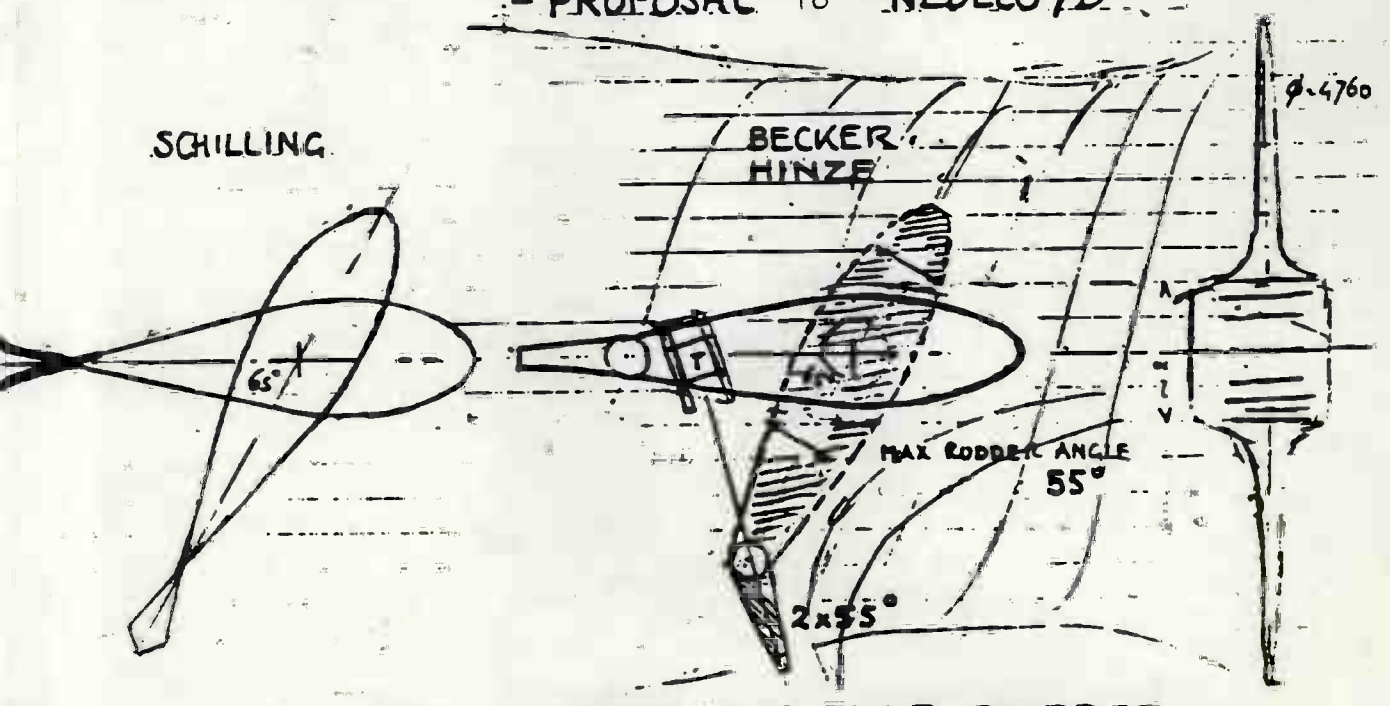


"KLECO"-TYPE VESSEL.





PROPOSAL TO NEDLLOYD



HIGH LIFT FLAP-RUDDER

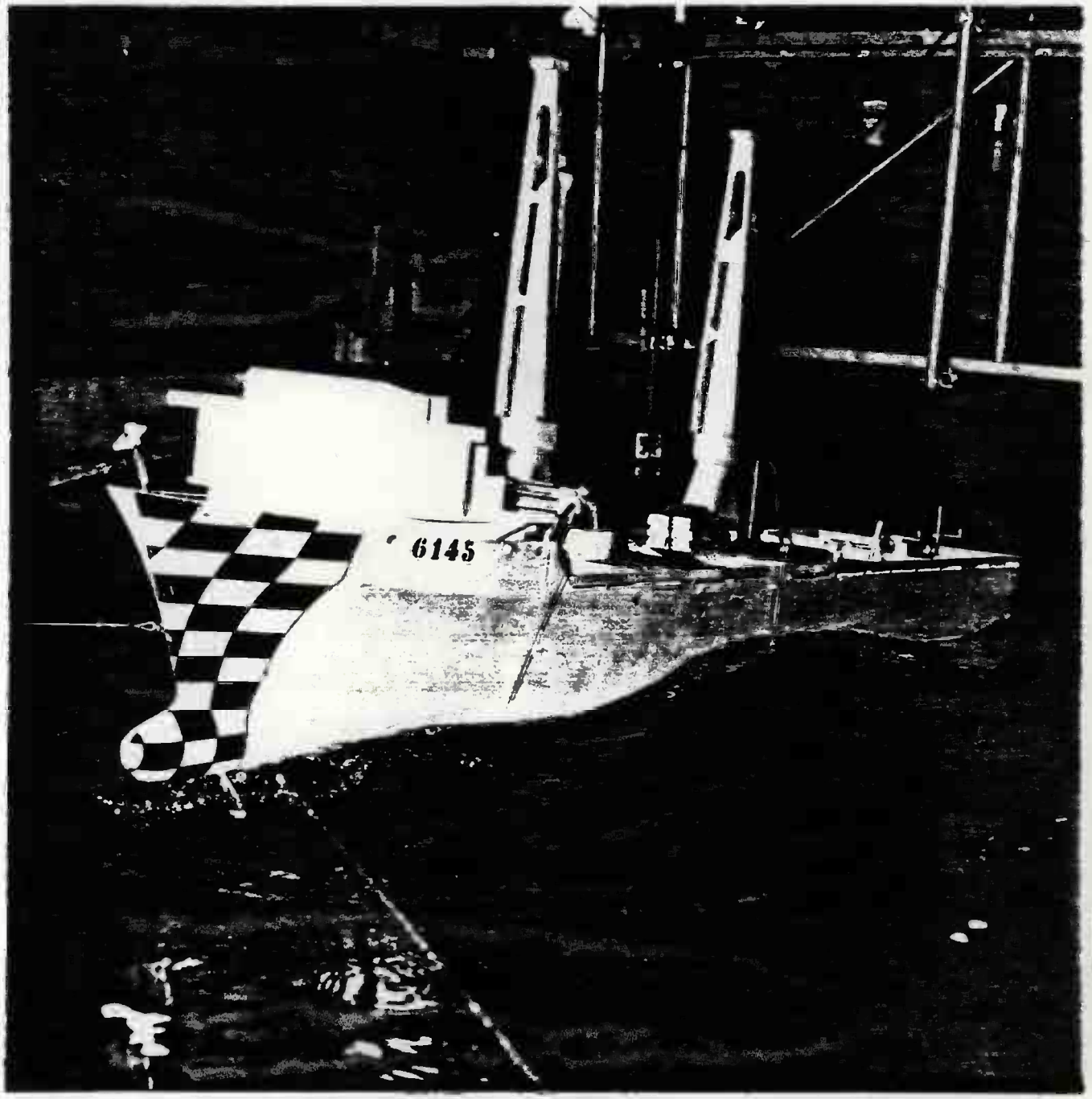
HEAVY LIFT VESSEL

LANDING CRAFT

418

131x

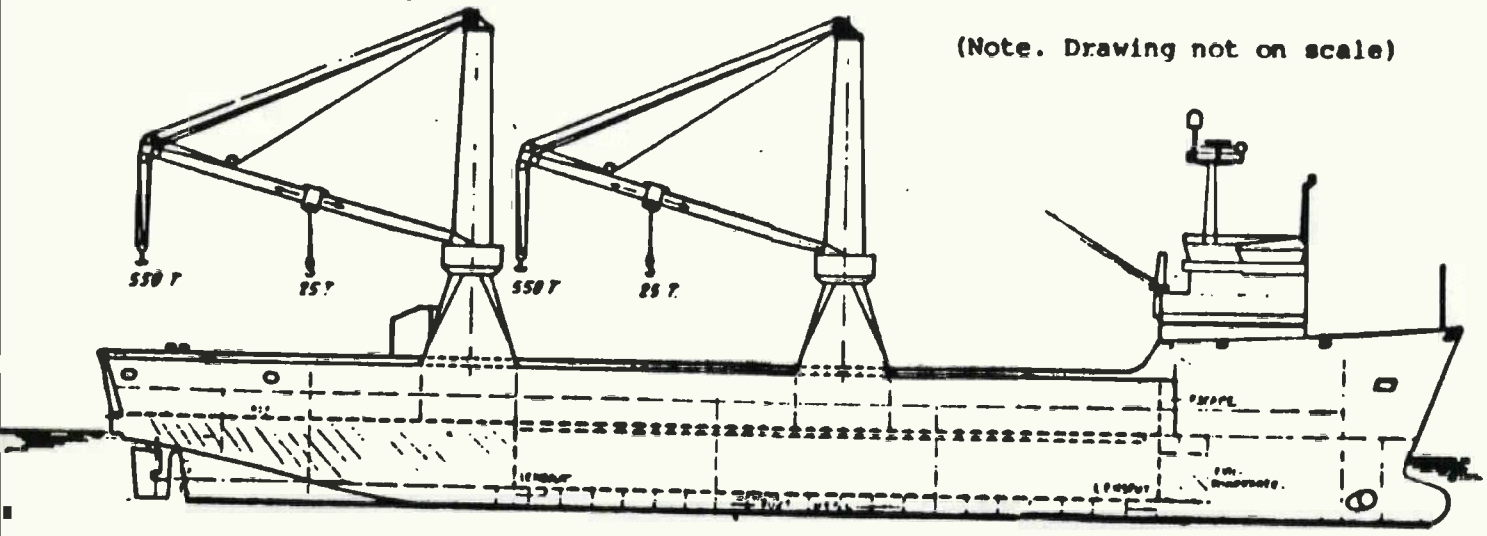
FRONTISPIECE

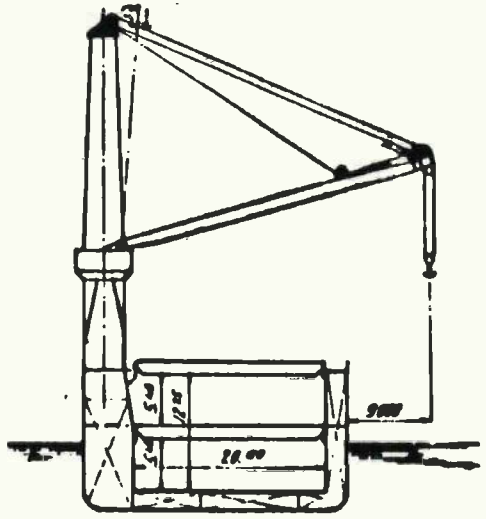


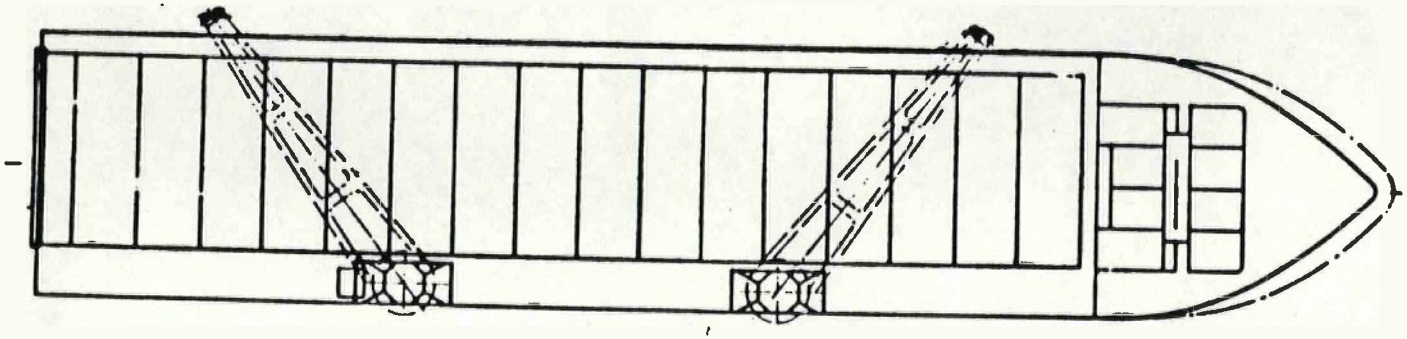
Ship model at 5.5 kn. speed in Beaufort 11 head seas.

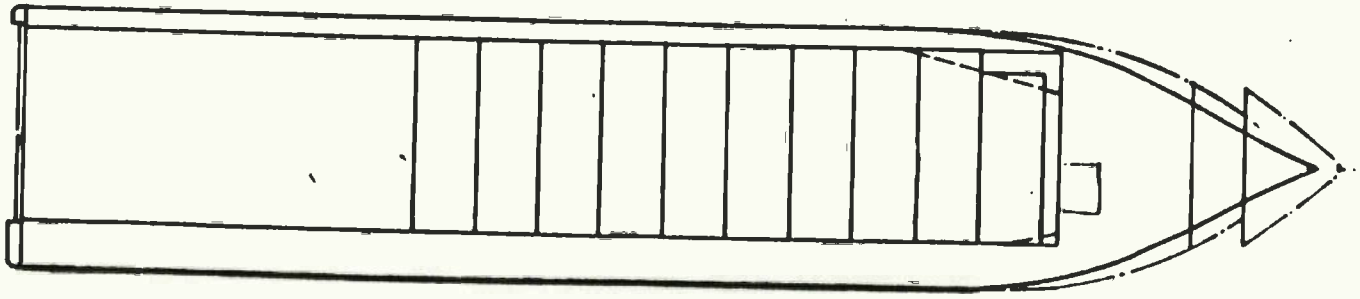
HEAVY LIFT / ROLO / CONTAINER CARRIER - NEWBUILDING PROJECT FOR MAMMOET SHIPPING, 1983.

(Note. Drawing not on scale)









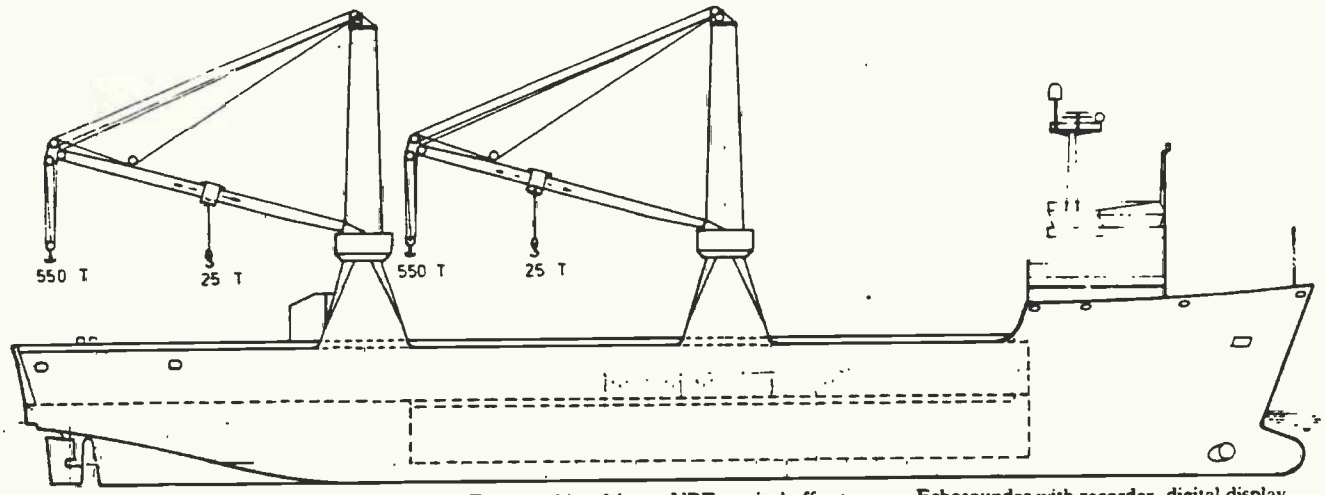
DESIGN STAGE

Length o.a.	145.50	M
Length p.p.	134.00	M
Breadth	28.3	M
Depth	14.80	M
Draught (dsn)	7.00	M
Deadweight (")	9000	T
Speed (svc)	14	Kn.
Engine output	2 x 3800	KW
Lifting capacity	2 x 550	T
Aux. hoists	2 x 25	T

	Sq.M	Cub.M	Contnr.Cap.
L.Hold	1320	7100	155 TEU
Twn.deck	2200	11900	256 TEU
Weath.dk	3180	(4 trs)	656 TEU
Totals	6700	19000	1076
	Sq.M	Cub.M	TEUS

Stern ramp LxW = 7½ x 20 M
Cap. 2500 T.

M/V "HAPPY BUCCANEER"



Builders: Hitachi Shipbuilding & Engineering Co., Innoshima, Japan
Managing owner: Mammoet Shipping B.V., Amsterdam
Yard number: 4755
Type: Heavy Lift Ro/Ro vessel
Delivery: 1st August 1984

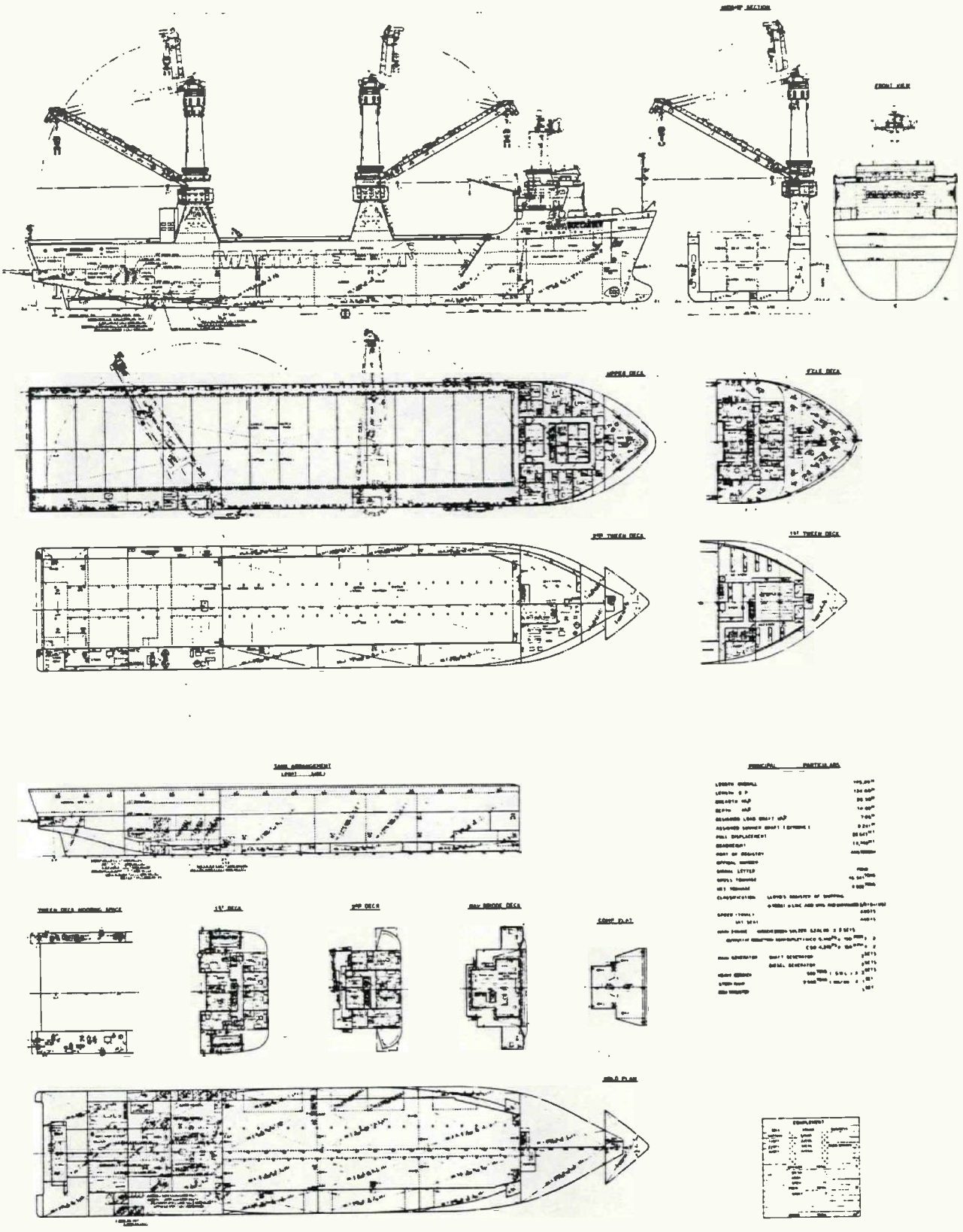
Tonnage	16 341 GT 4 902 NT
Deadweight	9 627 t
Length o. a.	145.50 m
Length b. p.	134.00 m
Breadth moulded	28.30 m
Depth moulded	14.80 m
Draught (design)	7.06 m
Speed (service)	15.5 kn

Classification:
L.R. + 100 A 1, LMC and UMS
Unmanned engineroom (O+) for Netherlands Shipping Inspectorate
Main engine:
two Hitachi-Sulzer, type 6ZAL 40 diesel engines, output 3800 kW each at 560 rpm
two CPP propellers
Nishishiba Bowthruster
Each machine drives a UBE vertical off-set single reduction gear with hydr. multiplates type clutch, with output to a Lips four bladed, variable pitch propeller and with driving gear for a shaft generator
Alternators:
2 sets diesel alternators 800 kVA (600 kW) at 720 rpm (Nishishiba)
1 Emergency alternator, output 160 kVA (120 kW) at 60 Hz by 1800 rpm (Nishishiba)
1 Automatic control oil fired boiler, type SH-10, cap. 1 000 000 kcal/hr (1162 kW) (Saarloos)
2 Exhaustgas boilers, type SET-206-37VB-3, cap. 500 000 kcal/hr at 70 % load of the main engines (Saarloos)
Equipment:
3 Bilge-ballast pumps, cap. 600 m³/h each at 25 m head and 1750 rpm (Teikoku)
1 Bilge-ballast stripping pump, cap. 135 m³/h at 20 m (Teikoku)
2 sets Gyrocompasses (Anschütz)
autopilot with follow-up tillers in wheelhouse and both bridgewings (Anschütz)
Echosounder with recorder, digital display and four transducers
electromagnetic log (Sagem)
2 sets radars (Sperry)
Directionfinder (Ramantenn/Radio Holland)
Satellite navigator (JRC)
Weather facsimile (JRC)
Special installations:
1 Sternramp 20.00 × 7.50 m max./2500 mt
Accommodation for 24 persons
Holds: 1
Hatches: 1 110.50 × 20.00 m
Hatch covers:
closed box type covers on upperdeck (16 sets and 1 set of cross beam) and on 2nd tweendeck (10 sets)
Loading gear:
2 revolving type crane, starboardside s.w.l. 550 t (combined 1100 t)
2 auxiliary hoist (trolley at derrick) s.w.l. 25 t
Total cargo capacity:

grain	19 800 m³
bale	6 820 m³

Container: 1058 TEU or 512 FEU + 34 TEU

M.V. HAPPY BUCCANEER
GENERAL ARRANGEMENT



Two H.L.M.C.'s of m.v. "Happy Buccaneer"

The two Heavy Lift Mast Cranes of m.v. "Happy Buccaneer" were constructed by Huisman-Itrec in cooperation with Blohm & Voss A.G.

PRINCIPAL PARTICULARS

Length overall	145.89	M
Length B.P.	134.00	M
Breadth MLD	28.30	M
Depth MLD	14.80	M
Deadweight at 7.06 M draft	9.627	MT
Lightship	9.903	MT
Displacement at 7.06 M draft	19.530	MT
Deadweight at 8.241 M draft	13.740	MT
Lightship	9.903	MT
Displacement at 8.241 M draft	23.643	MT
Gross tonnage	16.341	tons
Net tonnage	4.902	tons

Classification: Lloyd's Register of Shipping
+ 100 A1, + LMC and UMS
unmanned E/R (0+) NSI

Speed (trial) 6M - 8320 SHP - 157 GR/HPHR - 31.4 T/D - 16.5 KN
12% extra (at sea) 7M - 8180 SHP - 156 GR/HPHR - 30.6 T/D - 15.0 KN.
Main engine: Hitachi Zosen Sulzer 6ZAL 40 x 2 sets.
Output (at reduction gear outlet): M.C.O. 5140 P.S. x 150 R.P.M. x2
C.S.O. 4370 P.S. x 150 R.P.M. x2

Main generator	Shaft generator	800 KW	2 sets
	Diesel generator	600 KW	2 sets
Bow thruster		750 KW	1 set
Heavy derrick		550 tons SWL	2 sets
Aux.hoist (trolley at derrick)		25 tons SWL	2 sets

Sternramp	- length	7.50 m
	- width	20.00 m
	- ro/ro capacity	2500 t
Dimension of hatch (clear opening)		
	- upperdeck	110.50 x 20 m
	- tweendeck	67.20 x 20 m
Underdeck height		
	- lowerhold	5.40 m
	- tweendeck	5.40 m
	when tweendeck covers open	12.25 m

Cargo capacity

Lowerhold	(L= 68.88 m B= 20.60 m)	1370 sqm	7450 sbm	154 TEU
Tweendeck	(L=110.46 m B= 20.60 m)	2270 sqm	12350 cbm	256 TEU
Upperdeck	(L=112.40 m B= 28.00 m)	3180 sqm	———	644 TEU
	Total	6820 sqm	19800 cbm	1054 TEU

Hatchcover load: 5 ton per m^2 without stanchions
15 ton per m^2 with stanchions underneath.

Container capacity: 1054 TEU a 9,3 ton per TEU

RO-RO LANDING CRAFT INTER ISLAND SERVICE

(July 1980)

Now on order in Singapore for delivery next year is a unique type of general purpose freighter that could well be the prototype of the standard ship that is needed in huge numbers to modernise the decrepit fleet of inter-island traders operating around the archipelago of South East Asia. Designed by Burness Corlett & Partners Australia, which has a headquarters in Sydney, this 80m vessel has been ordered from the yard of Selco in Singapore by the Australian operator V. B. Perkins for operation between Singapore, other Asean ports and the Northern Territory capital of Darwin. The craft will also provide a much needed service to the mining companies around the remote Northern coast of Australia, where there is an increasing amount of mineral activity, much requiring the shipment of heavy or awkward plant, to sites where there are no port facilities.

The Australian company, which has operated a variety of ex-Naval landing craft tonnage, first was established to provide support to the various agencies assisting the aboriginal tribes in the North West coast of the country, but the considerable investment in mineral exploitation, and the development of the North-West shelf oilfields have led to a great demand for specialised tonnage. The specification has called for a ship of unusual flexibility, able to operate off remote beaches, take the ground, operate with ro-ro operations and carry large quantities of cattle, including the large Brahmin cattle that thrive in the hot climate. There is also a need for the ship to carry large quantities of fuel in bulk form, high grade ores, and general cargo, while trailers and containers are offering.

Of about 2.000 d.w.t., the craft that has been developed to fulfil this demanding specification provides for a bow loading arrangement, with the lengthy ramp being capable of landing either on wharf or beach. Cargo drives straight up the ramp, which will be of Navire manufacture, onto the main deck which is open to the sky for half its length. Overheight cargo can be carried in this area. The after end of the main deck is fully enclosed, with the watertightness being assured by a wide door across the forepart. This enclosed space is divided into two by an athwartships bulkhead. Two telescopic cranes are to be fitted on top of the deck erection for cargo handling when the ship is lying alongside, or for working into craft. Thus, with the exception of the central exhaust casing, and a small space right aft where steering gear and stores are situated, the whole of the main deck, for its full height, is available for the stowage of cargo. Other cargo gear includes the provision of portable racks for the stowage of up to 600 large cattle. Cargo fuel oil tanks are situated beneath the main deck port and starboard and on the centreline. Two small freezer lockers are carried port and starboard in the forecastle, to cope with the quantities of refrigerated stores that require transport.

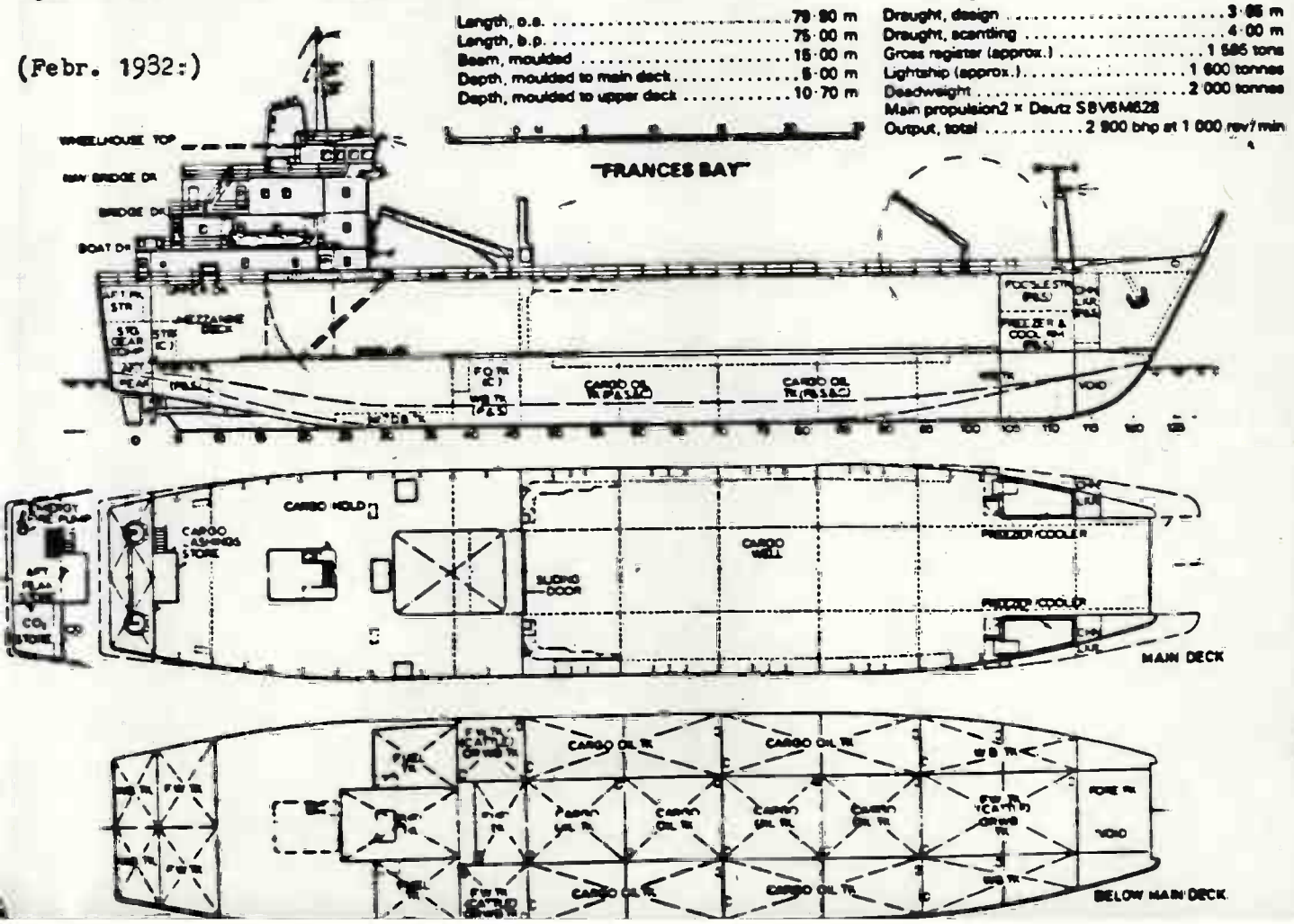
Main engines specified for the V. B. Perkins vessel will be two Deutz SBV6 628 engines driving the twin screws, and each providing 1500 h.p. at 1,000 rev/min. Three Deutz generators, each producing 253 kW are also to be supplied. A comprehensive alarm and control system will be provided to monitor the machinery and tanks, the vessel being outfitted for UMS running. She is to be delivered in March 1981.

A four decked accommodation will be provided on the ship as designed, a large crew being provided for under Australian manning arrangements. It is however clear that this arrangement would be easily altered to provide limited passenger accommodation, or a much smaller accommodation block.

The design is thought to have much merit for fulfilling the need for an economical and efficient vessel that capital starved owners in the Philippines or Indonesia could use to replace their elderly tonnage, a design that would improve port handling times in largely inadequate facilities. It has been calculated that there is a need for more than one hundred vessels of such type over the next ten years, but finance, in the form of aid packages remains the key.

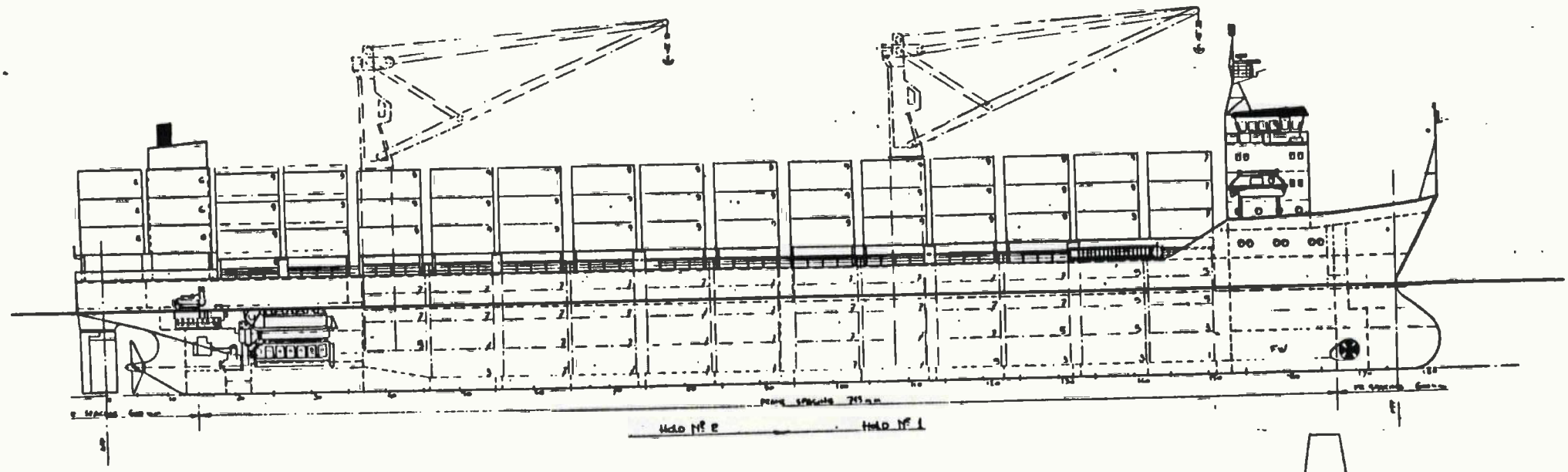
(Febr. 1982:)

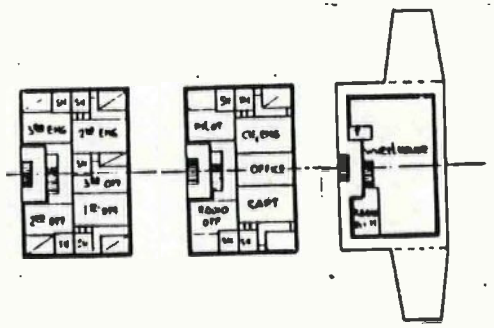
Length, o.a.	79·90 m	Draught, design	3·65 m
Length, b.p.	75·00 m	Draught, scantling	4·00 m
Beam, moulded	15·00 m	Gross register (approx.)	1 585 tons
Depth, moulded to main deck	5·00 m	Lightship (approx.)	1 600 tonnes
Depth, moulded to upper deck	10·70 m	Deadweight	2 000 tonnes
		Main propulsion2 × Deutz SBV6M628	
		Output, total	2 900 bhp at 1 000 rev/min



CONTAINER-FEEDER <9000 GT

OSLO '69





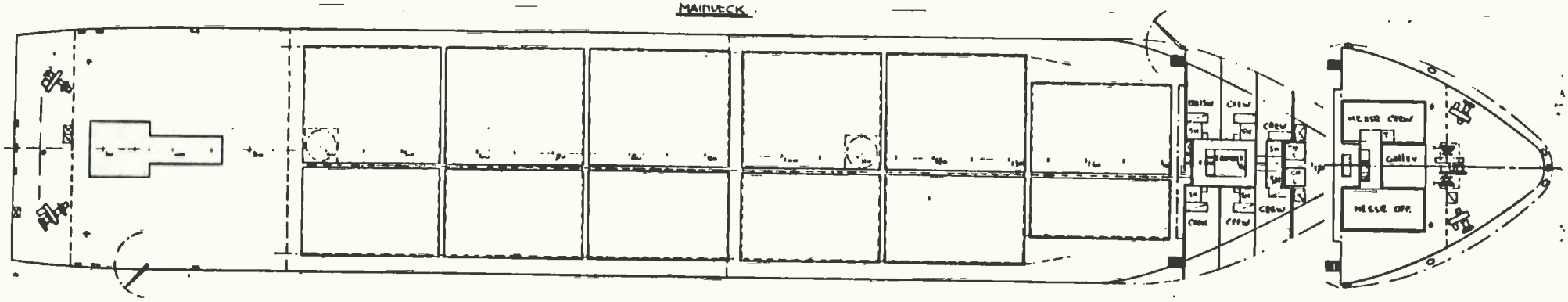
Nedlloyd Fleet Services
Newbuilding Department

GENERAL ARRANGEMENT PLAN
CONTAINER FEEDER VESSEL

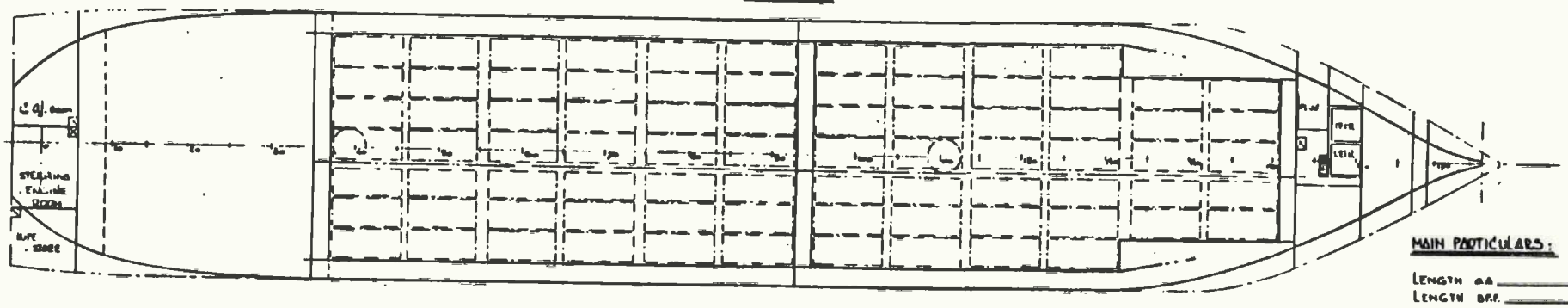
Drawn F.V. Date 20-9-95	Scale	No 001
BUYS + YREE		Sheet 1 Sheet No 2

CONTAINER-FEEDER < 9000 GT
600 - 625 TEU x 15 TON/TEU

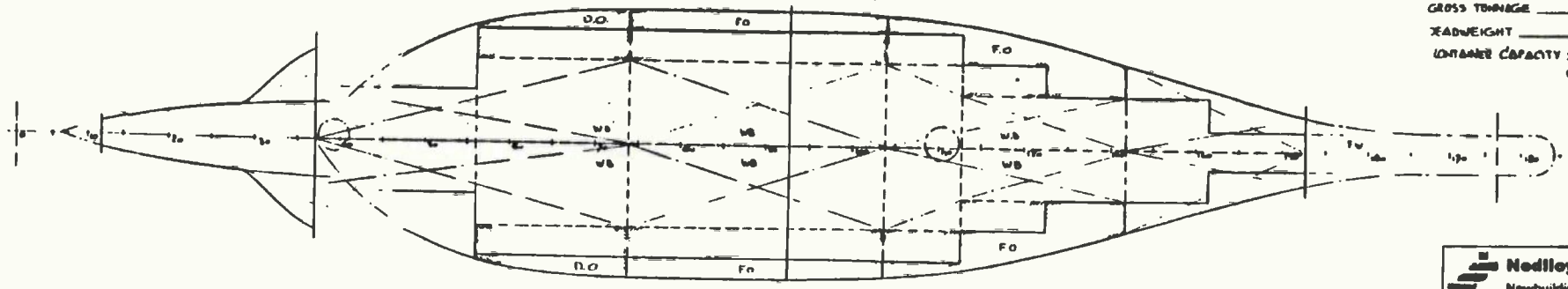
MAINDECK



TWEENDECK



TANKTOP



MAIN PARTICULARS :

LENGTH oa	130.20 M
LENGTH bpp	123.50 M
BREADTH moulded	22.30 M
DEPTH moulded	10.50 M
DRAFT	± 7.60 M
GROSS TONNAGE	(9000 GT
DEADWEIGHT	11 000 T
CONTAINER CAPACITY : ON DECK	427 TEU
IN HOLDS	291
TOTAL	718 TEU

Nedlloyd Fleet Services
Newbuilding Department

GENERAL ARRANGEMENT PLAN
CONTAINER FEEDER VESSEL

Drawn EV. Date 20-9-85	Scale NONE	No 001
Copyright reserved BUYS+VREE		Drawing No 8

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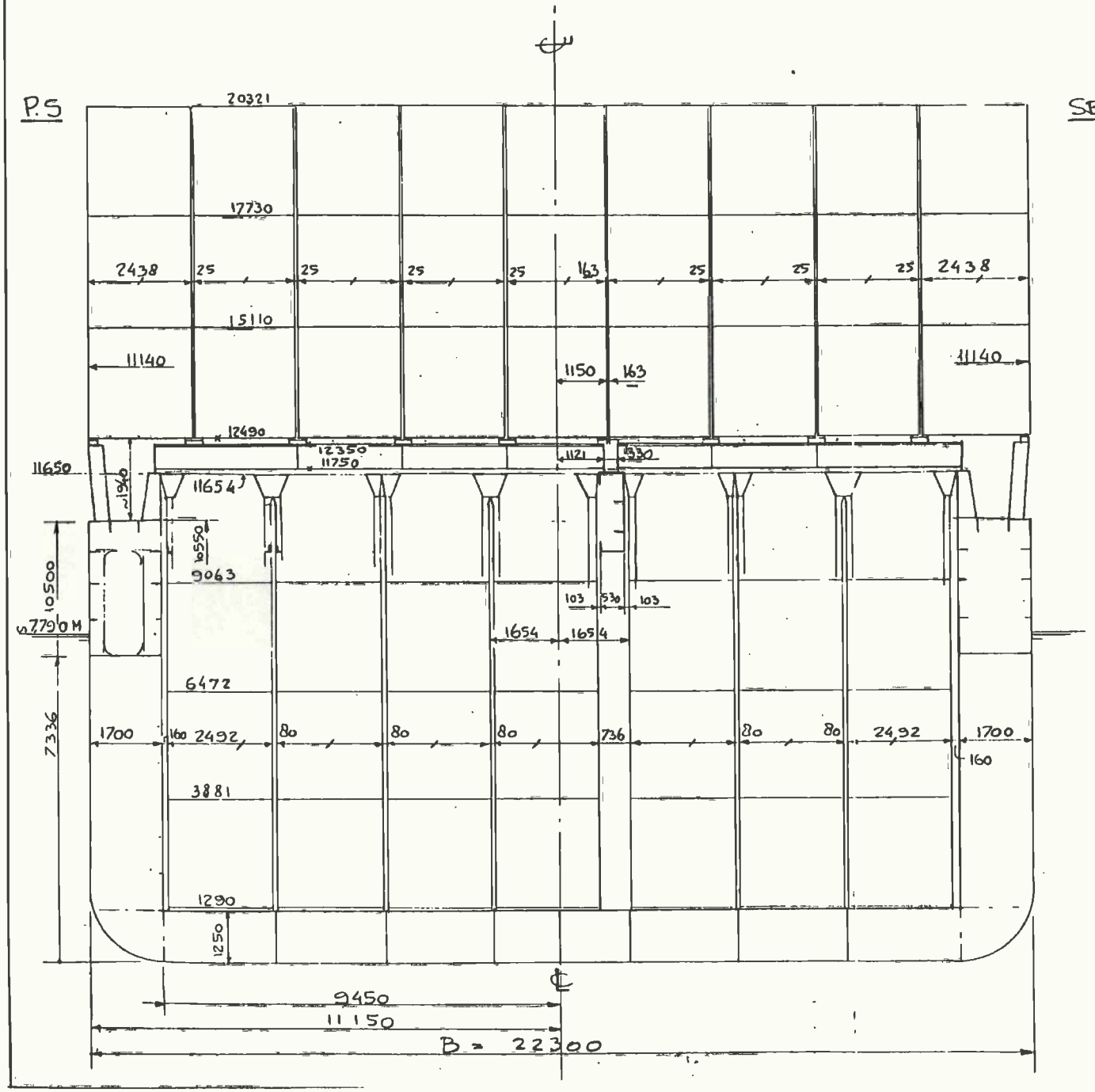

MAIN PARTICULARS :

LENGTH o.a	130.20 M
LENGTH BPP	123.50 M
BREADTH moulded	22.30 M
DEPTH maindeck	10.50 M
DRAFT	± 7.80 M

Nedlloyd Fleet Services
Newbuilding Department

MIDSHIP SECTION
CONTAINER FEEDER VESSEL

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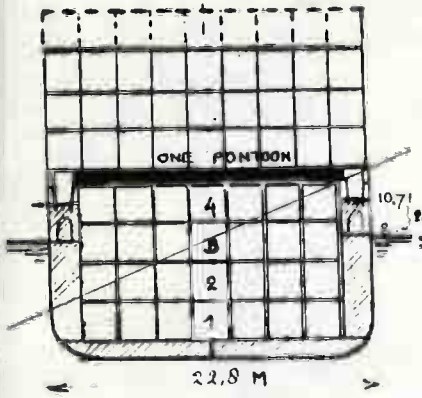
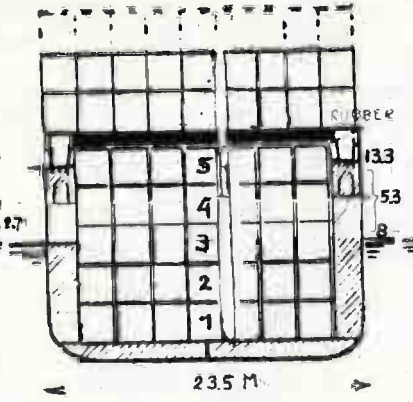
Drawn C.B Date 24-9-85	Scale 1:100	No 002	
Copyrights reserved BUYS		Sheets Sheet No 1	Revision

CELLULAR CONTAINER VESSELS :
CROSS SECTIONS
TEU CAPACITY "REALISTIC", ON BREADTH

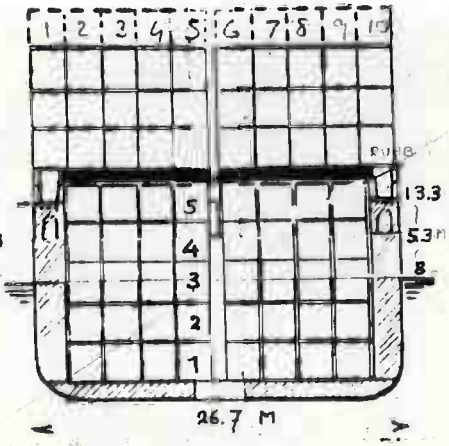


7 ACROSS

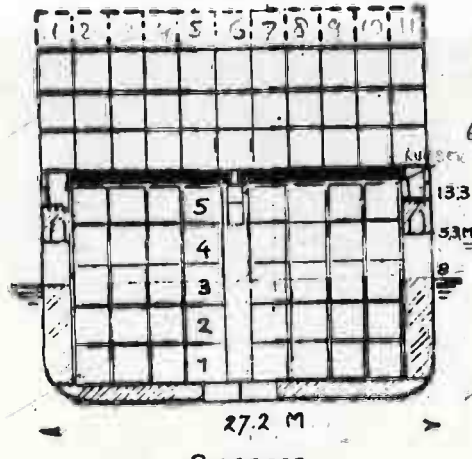
KG = 80% H
LS



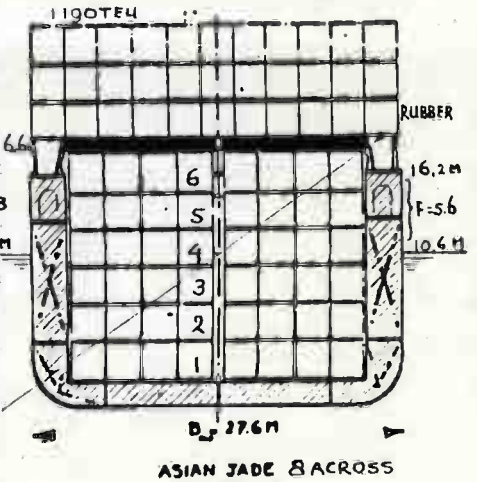
7 ACROSS



8 ACROSS



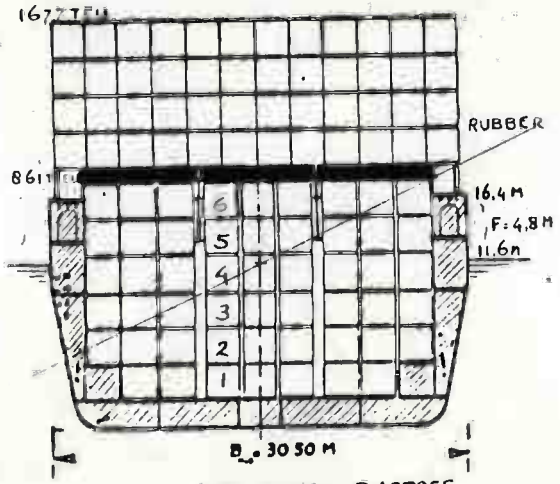
8 ACROSS



ASIAN JADE 8 ACROSS

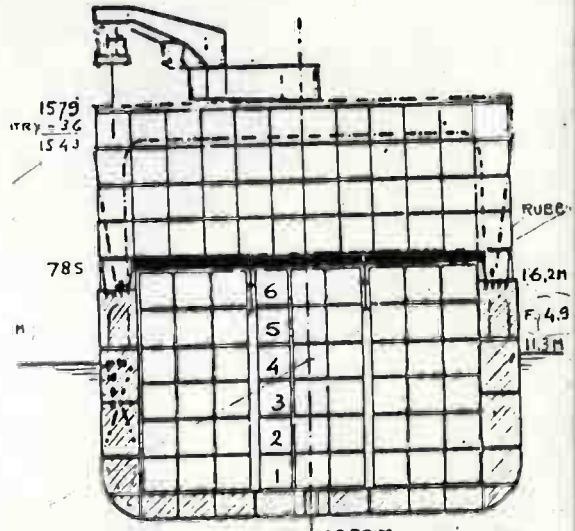
KG : 70.6% H
LS

ALL VESSELS TO HAVE WATERTIGHT HATCHCOVERS



ABEL TASMAN 9 ACROSS

KG : 71.8% H
LS

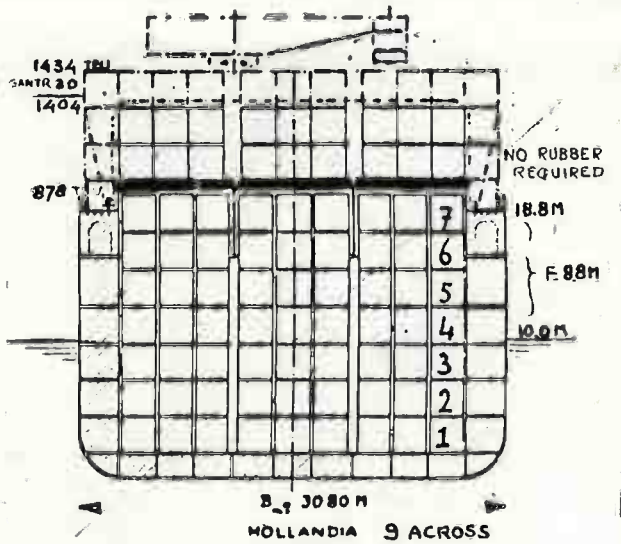


V. NECK
V NOORT
V DIEMEN

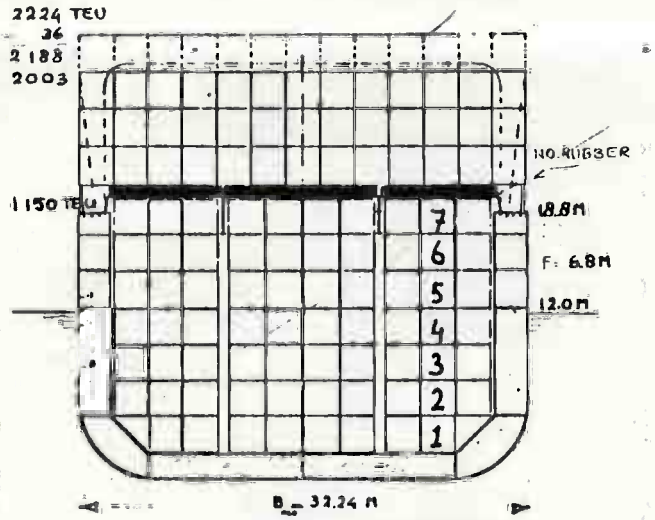
=KLECO - 9 ACROSS

KG : 69.7% H GEARLESS

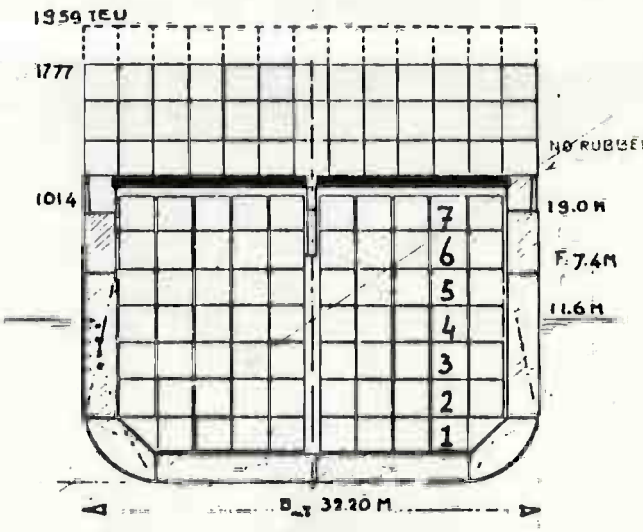
KG : 71.9% H WITH 2 DIBCR



HOLLANDIA 9 ACROSS
ZEELANDIA
KG = 66.4 % H
LS
" = 67.5 % H

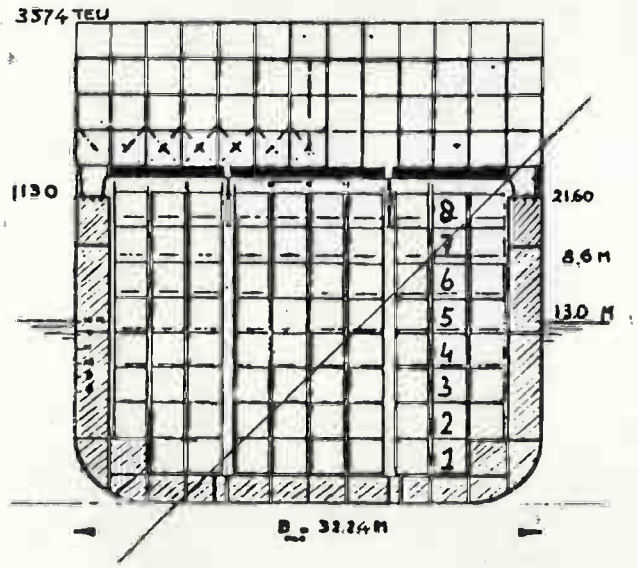


CLARENCE 10 ACROSS
CLEMENT
KG = 66 % H
LS
" = 68 % H

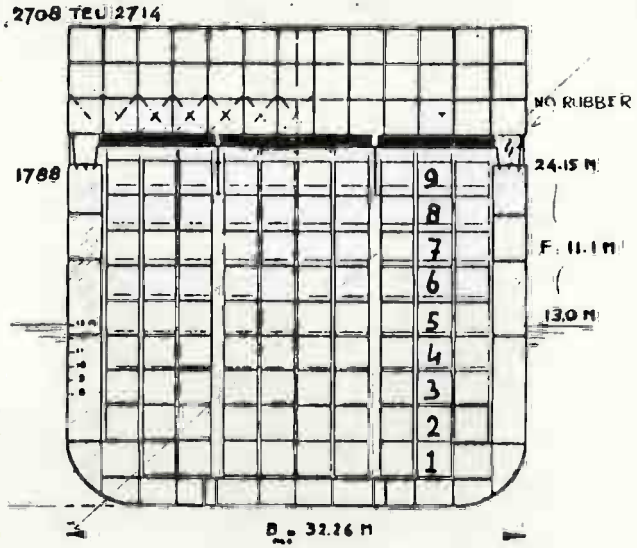


COLOMBO 10 ACROSS
KG = 67.4 % H

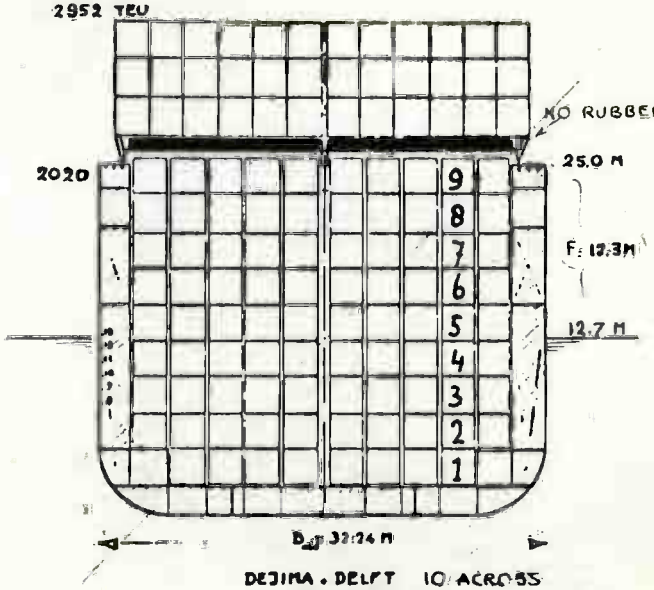
WATERTIGHT HATCHCOVERS ARE NOT REQUIRED



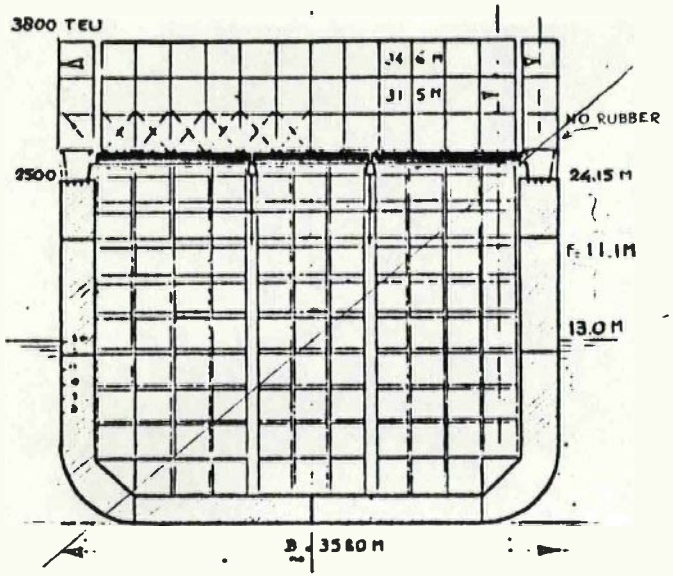
PROJECT 10 ACROSS

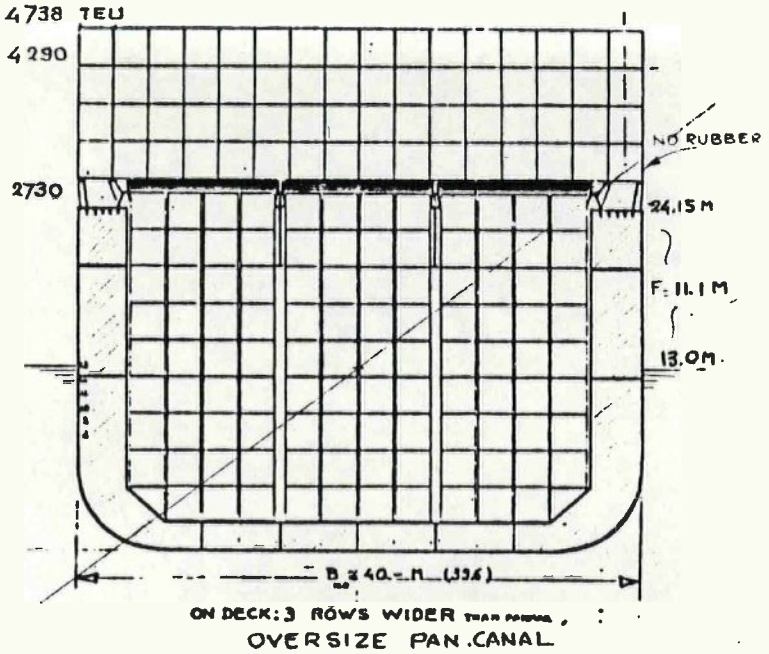


HOUTMAN-HOORN 10 ACROSS
KG = 56.3 % H
LS

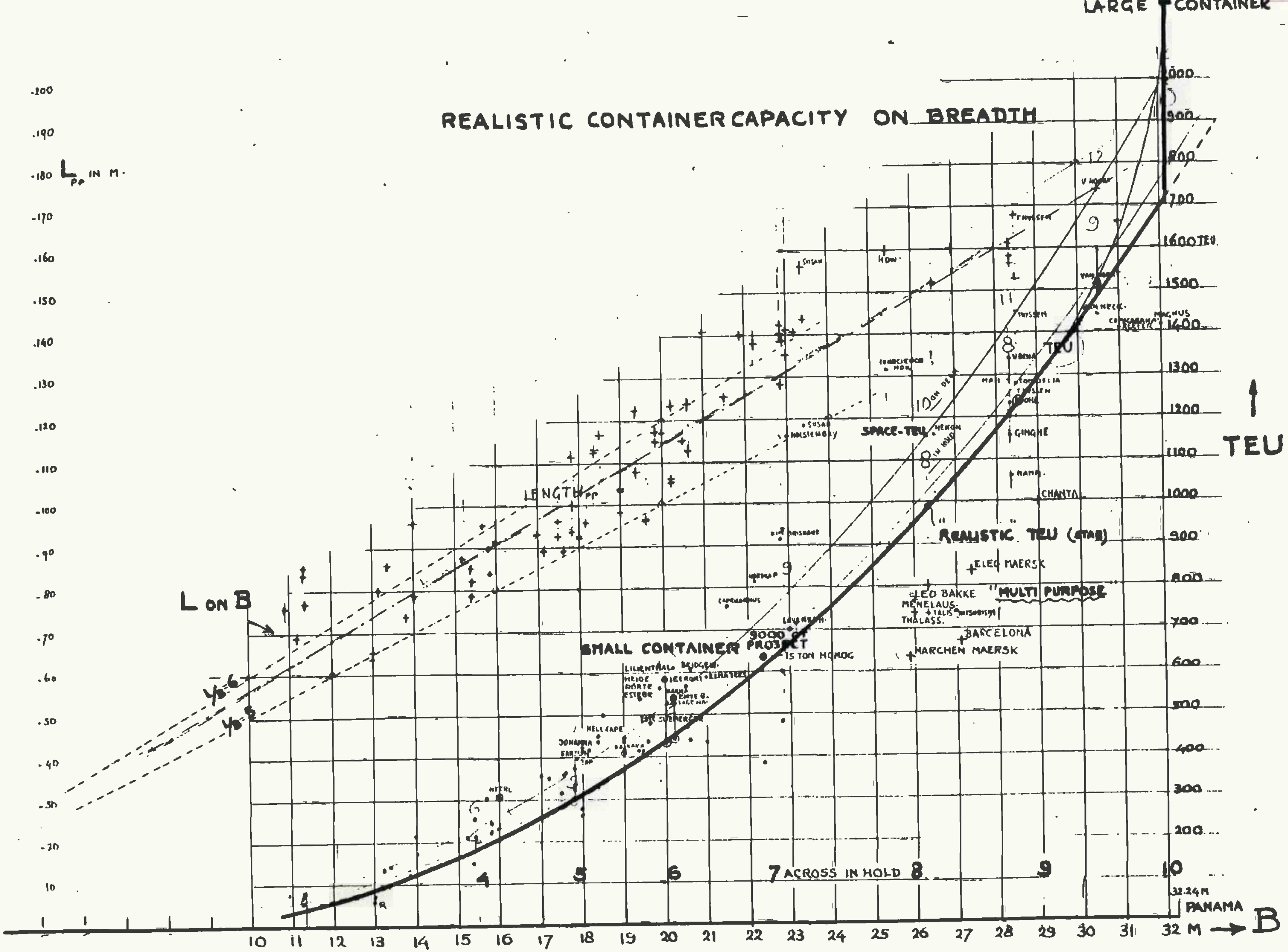


DEJIMA - DELFT 10 ACROSS
KG = 53.5 % H
LS





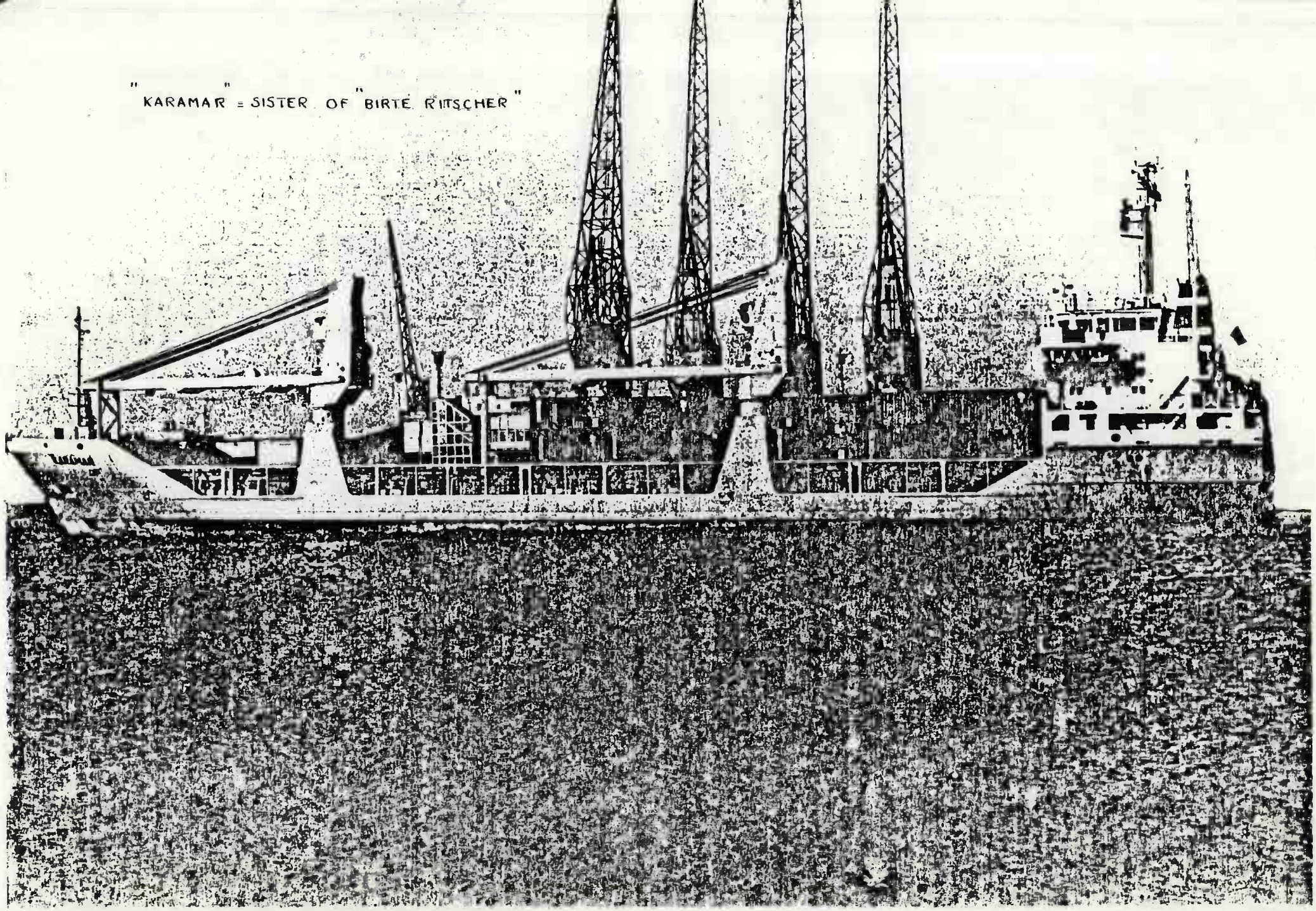
WATERTIGHT HATCHCOVERS ARE NOT REQUIRED.


REALISTIC CONTAINER CAPACITY ON BREADTH
LARGE CONTAINER
L_{PP} IN M.
TEU
L ON B
LENGTH PP
SPACE-TEU
REALISTIC TEU (ATAB)
MULTI PURPOSE
SMALL CONTAINER PROJECT
9000 GT
ELEO MAERSK
ELEO BAKKE
MENELAUS
THALASS.
BARCELONA
MARCHEN MAERSK
CHANTA
GINGHE
7 ACROSS IN HOLD 8
32.24 M PANAMA
32 M
B

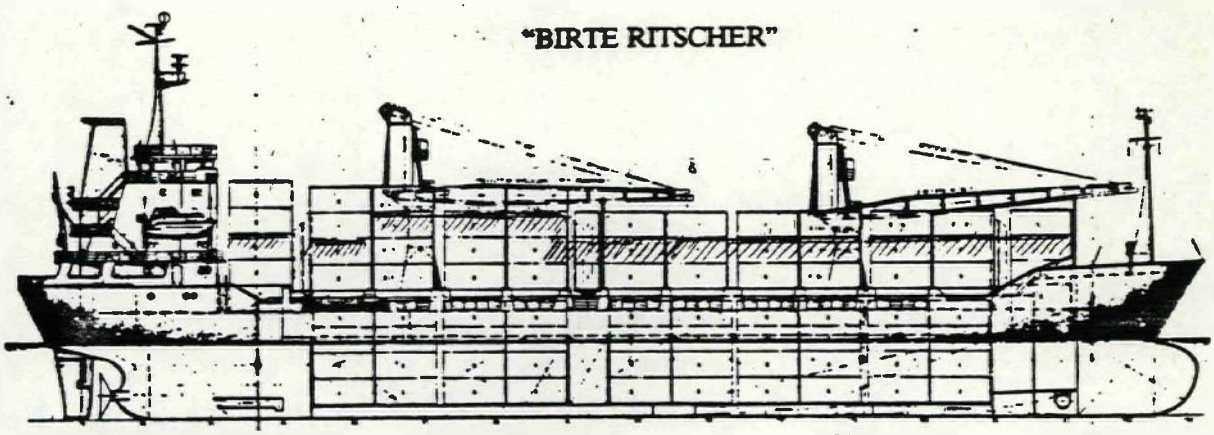
CONTAINER-FEEDER:

DEVELOPMENT TO LESS-SAFE-SHIPS!

CREW, GROSS TONNAGE, LOW FREEBOARD.


"KARAMAR" = SISTER OF "BIRTE RITSCHER"

"BIRTE RITSCHER"



Builders: J. J. Sietas KG Schiffswerft GmbH & Co, Hamburg-Neuenfelde
Owner: MS "Birte Ritscher" Gerd Ritscher GmbH & Co, Hamburg
Yard number: 898
Type: 117
Delivery: August 27th, 1983
Tonnage: ~ 6700 GT (est.) below 4,000 GRT 2,560 NRT

Deadweight	8170 t
Length o. a.	117.50 m
Length b. p.	105.80 m
Breadth (moulded)	20.20 m
Depth	10.80/8.27 m
Draught	7.50 m
Speed	16 kn

Classification:
G. L. + 100 A4 E "Containership" + MC E AUT
"strengthened for heavy cargo and grab"

Main engine:
M.A.N.-Diesel engine, type 40/45, 4963 kW
reduction gear HSU-1000.C (Tacke)
coupling Rato-S-3711 (Vulkan)
controllable pitch propeller
shaft-driven generator (690 kVA)
3 separators OSA 20, 1 separator OTA 7 (Westfalia)

Auxiliary engines:
2 Diesel generators, 233 kW/270 kVA each
1 Diesel generator 310 kW/360 kVA/1,500 rpm
bow thruster (Jastram)

electr. mainsteering Naviguide NN, gyrocompass Navigat II, autopilot Navipilot II (C. Plath)

2 hatches (weather deck): No. 1 37.80 × 15.30 m, No. 2 25.20 × 15.30 m
2 hatches (2nd deck): No. 1 37.80 × 15.50 m, No. 2 25.20 × 15.50 m
Hatch covers: system MacGregor hydr. operated folding type and 2 rolling covers

2 electr.-hydr. turning cranes of 35 t/27 m each

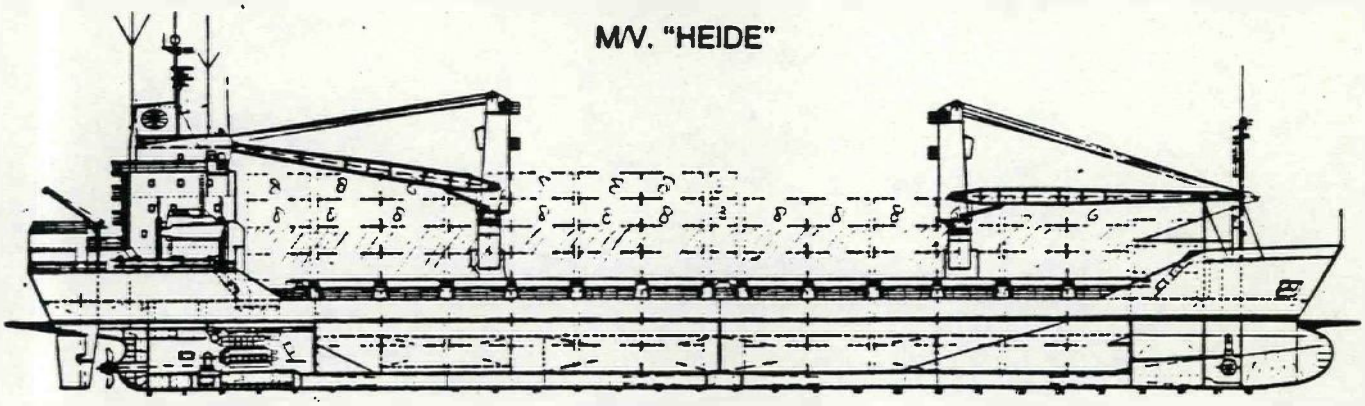
Total cargo capacity:

grain	abt. 11,000 m³
bale	10,870 m³

Container capacity:	20'	or 40'	+ 20'
in holds	230	112	6
on deck	311	118	75
Total	541	230	81

30 reefer plugs, fitted with 40' cell guides
REALISTIC: 443 TEU

M/V. "HEIDE"



Builders: Rickmers Rhederei GmbH Rickmers Werft, Bremerhaven
Owner: T Shipping GmbH & Co. KG, Wentorf
Yard number: 417
Delivery: March 10th, 1983

Tonnage	5332 GRT – 5 957 GT, 2 951 NT
Deadweight	8 020 t
Length o. a.	127.50 m
Length b. p.	117.20 m
Moulded breadth	20.00 m
Depth to maindeck	8.70 m
Depth to 2nd deck	5.20 m
Draught	6.58 m

Trial speed: 15.5 kn

Classification:
G.L. + 100 A 4 E eingerichtet für Containertransport + MC E AUT

Propelling machinery:
Deutz-Diesel engine
type: SBV 12 M 540
4413 kW (6000 HP) at 600/165 rpm
heavy oil operation 380 cst/50° C
Fuel consumption: 22 t per day

1 coupling EZS 241 S (Vulkan)
reduction gear HSU 800.D (TACKE-SCHIFFSGETRIBE ®)
controllable pitch propeller (Escher-Wyss)
1 shaft driven generator 550 kVA
1 coupling EZR 1022 (Vulkan)

Auxiliary engines:
3 Deutz-Diesel engines type: BA8M 816 LLK "W" 299 kW (406 HP) at 1200 rpm each
3 generators 347 kVA, 440 V, 60 Hz each
1 Deutz-Diesel engine type: F6L 912 — 57 kW at 1800 rpm
1 emergency generator 49 kVA

compressors (Hatlapa)
separators (Westfalia)
fresh water evaporator (Atlas-Denmark)
bow thruster type 60 F — thrust 60 kN, 400 kW (Jastram)
steering gear (Hatlapa)
gyro compass and automatic pilot (Anschütz)
satellite navigator
air conditioning plant according to the Duovent-system (Noske-Kaeser GmbH/ Svenska Fläktfabriken)

Crew: max. 22 persons
2 hatches each 37.80 × 15.66 m
Hatch covers: system KVAERNER
Loading gear: 2 hydraulic cranes of 350 kN/23 m — 250 kN/28 m (Liebherr)
2 stores cranes of 9.8 kN/7.5 m (Hatlapa)
Winches: 1 hydraulic automatic mooring winch 80 kN,
1 hydraulic comb. stern anchor/automatic mooring winch 124/80 kN and 2 hydraulic comb. windlasses/automatic mooring winches 48 mm U3 chain, 240/80 kN (Hatlapa)

Hold capacity:	grain m³	bale m³
hold 1	4 915	4 865
hold 2	5 145	5 145
Total cargo capacity	10 060	10 010

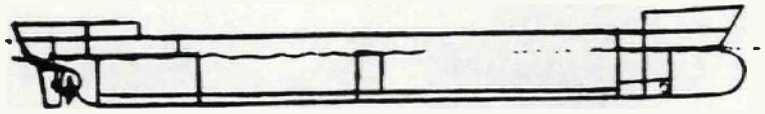
Container capacity:	TEU	or 40'	+ 20'
holds	198	98	2
on deck	384	162	60
Total	582	260	62

50 sockets for refrigerated containers
Container lashing and securing material (CONVER)
REALISTIC: 434 TEU

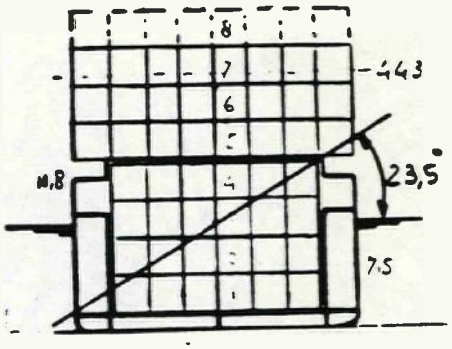
RELATIONSHIP GROSS TONNAGE → CREW
NEW REGULATIONS

WILL RESULT IN LESS SAFE SHIPS

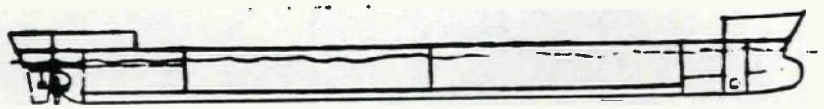
15 MAN



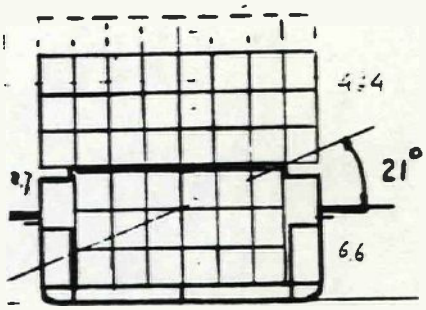
BIRTE RITSCHER



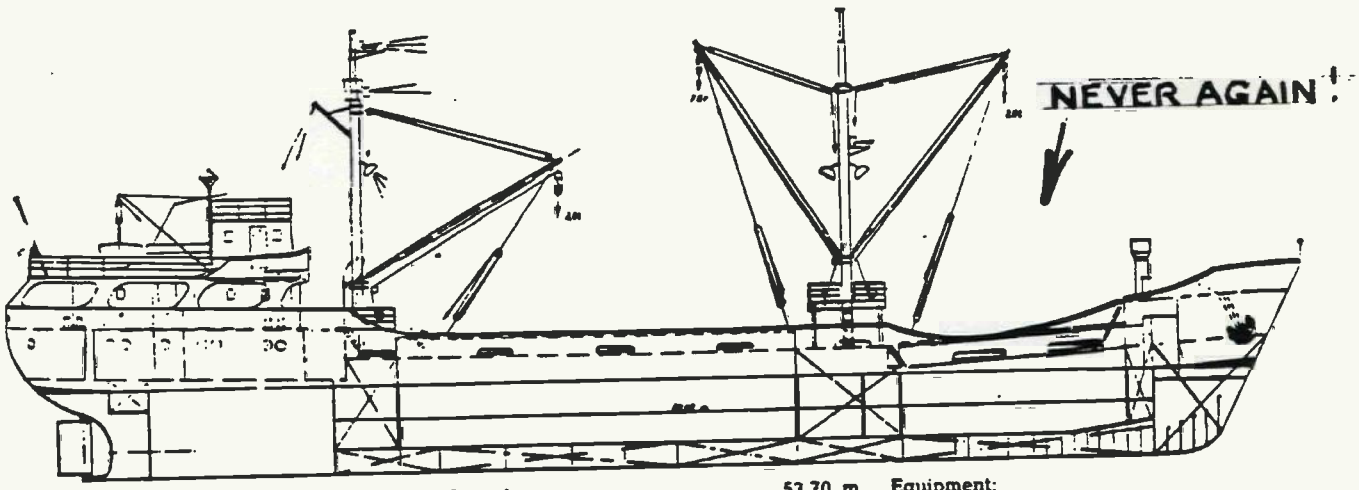
13 MAN



HEIDE



M/V "PINNAU" ex "Truso", "Rugia"



Call sign: DFRZ

Builders: Büsumer Schiffswerft
W. u. E. Sielaff, Büsum
Yard number: 214
Delivery: 28 Nov. 1963

Owner: Heinrich Jentsch, Mölln
Port of registry: Lübeck

Classification: GL + 100 A 4 E + MC
Date of class: Jan. 1983
Tonnage 497.13 GRT
328.90 NRT
Deadweight 933 t

Length o. a.	53.70 m
Length b. p.	48.60 m
Moulded breadth	9.30 m
Depth to maindeck	3.80 m
Depth to quarterdeck	4.84 m
Draught	3.75 m

Speed: 10 kn
Fuel consumption: abt. 2.2 t/day
Propelling machinery:
1 MaK diesel, type 6 Mu 451,
405 kW at 375 min^{-1},
Auxiliary engines:
2 dieselgenerator sets, 14.5 kW, 220 V, each
2 dieselgenerator sets, 25,0 kW, 220 V, each
1 shaft driven generator 8 kW

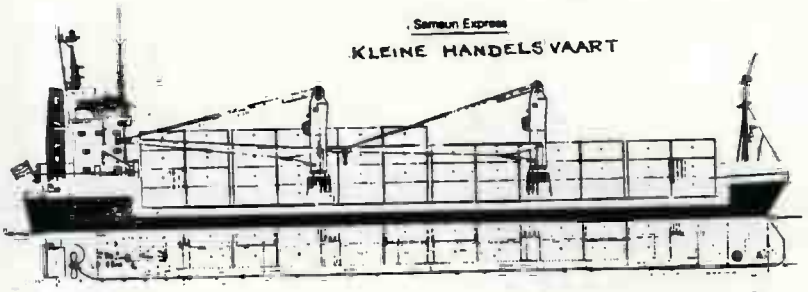
Equipment:
radar, autopilot, echo sounder,
direction finder, wireless station, VHF-unit,
steering gear, hydr. windlass
3 derricks 2.5 t, each
3 hydr. cargo winches with span, 19.5 kN, each

2 hatches
hatch 1 9.35 m × 5.10 m
hatch 2 16.48 m × 5.25 m
hatchway covering: wood

cargo capacity:
grain 1229.2 m^3
bale 1053.4 m^3

RELATIONSHIP GROSS TONNAGE → CREW = LESS SAFE

RESULTING IN MINIMUM RESERVE BUOYANCY

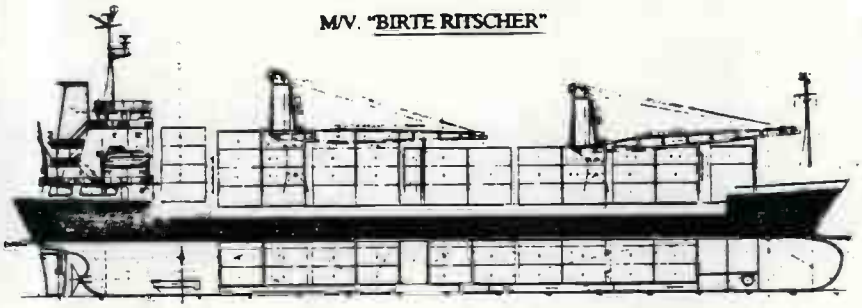


IN M L_{OA} L_{PP} B H T

106.6 x 99.6 x 17.90 x 8.50 x 6.50
FR = 2.0 M

DISPL = 8290 T 3999 GT
2940 KW

300 TEU x 15 Ton HOM. CREW 10-11

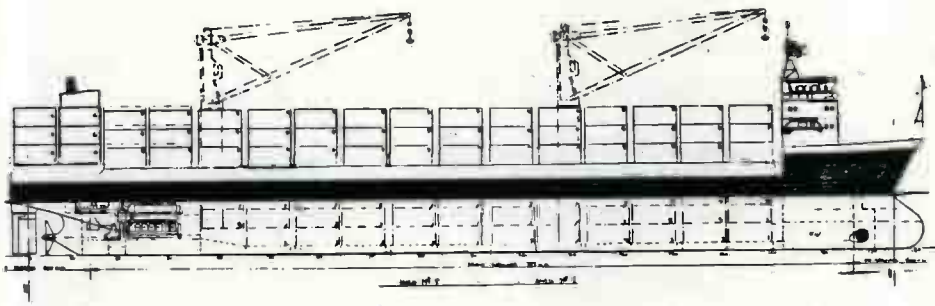


117.5 x 105.8 x 20.30 x 10.80 x 7.49
FR = 3.3 M

DISPL = 11660 T 6700 GT
4963 KW

410 TEU x 15 Ton HOM CREW 13-14

PROJECT

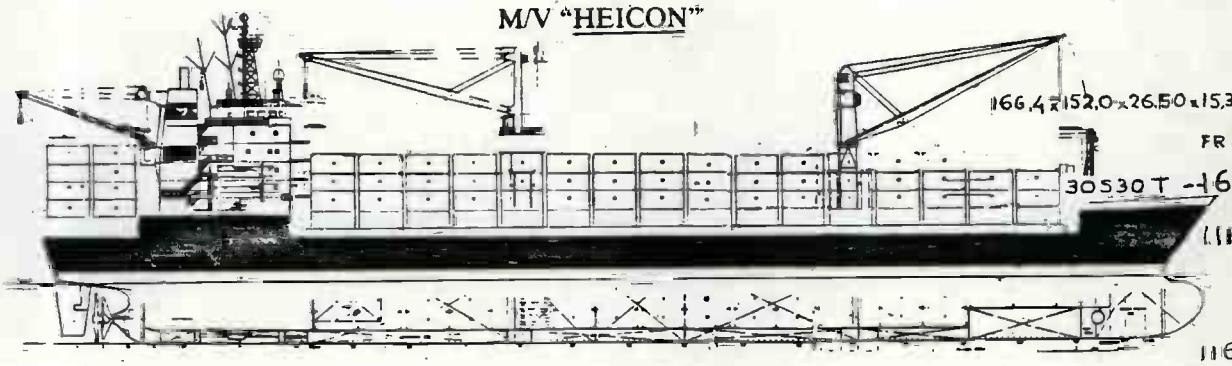


130.2 x 123.5 x 22.30 x 10.50 x 7.80
FR = 2.7 M

15000 T < 9000 GT
6000 KW

600-625 TEU x 15 TON HOM CREW 14

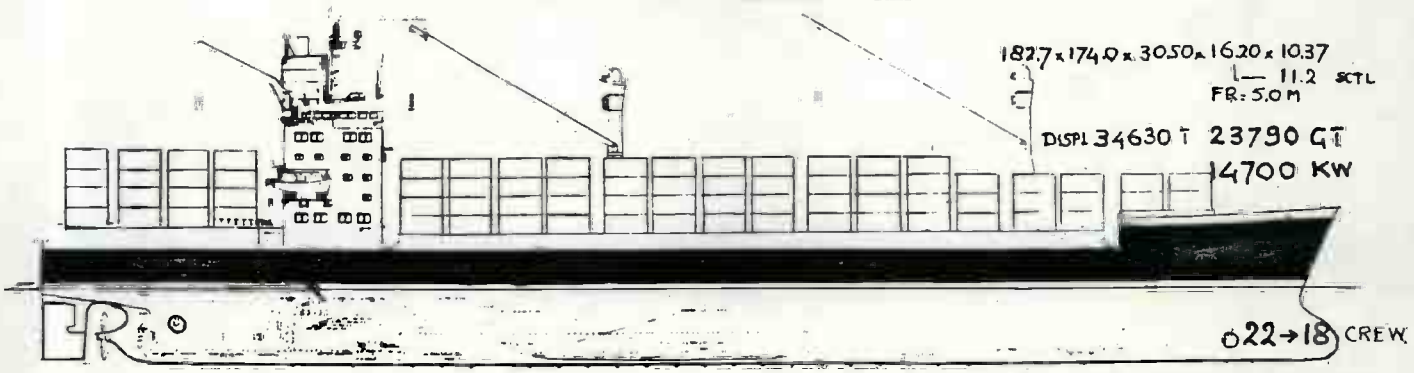
M/V "HEICON"



166.4 x 152.0 x 26.50 x 15.30 x 9.0
FR = 4.7 M ⌊— 10.6 SCTL

30530 T 16517 GT
11100 KW
16-18 CREW
1160 TEU x 14 Ton HOM.

M/V "NEDLLOYD VAN NOORT"



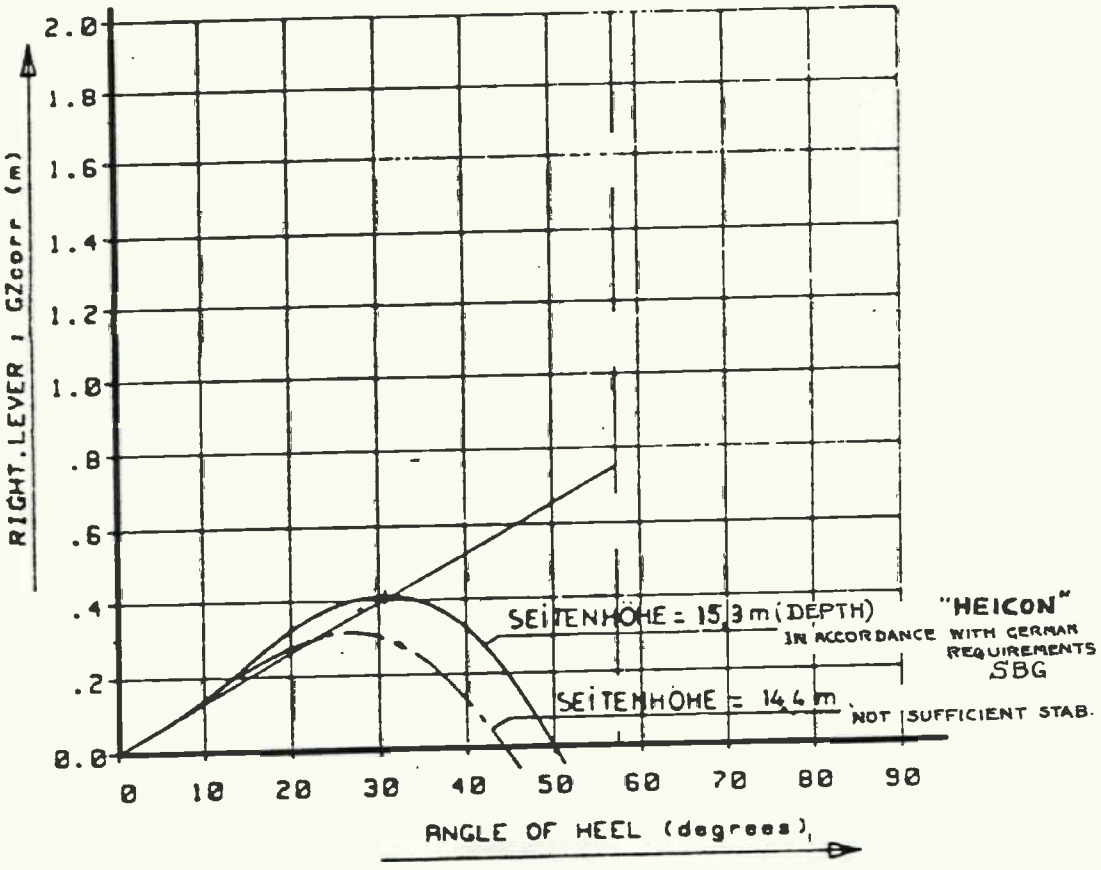
182.7 x 174.0 x 30.50 x 16.20 x 10.37
⌊— 11.2 SCTL
FR = 5.0 M

DISPL 34630 T 23790 GT
14700 KW

22 → 18 CREW

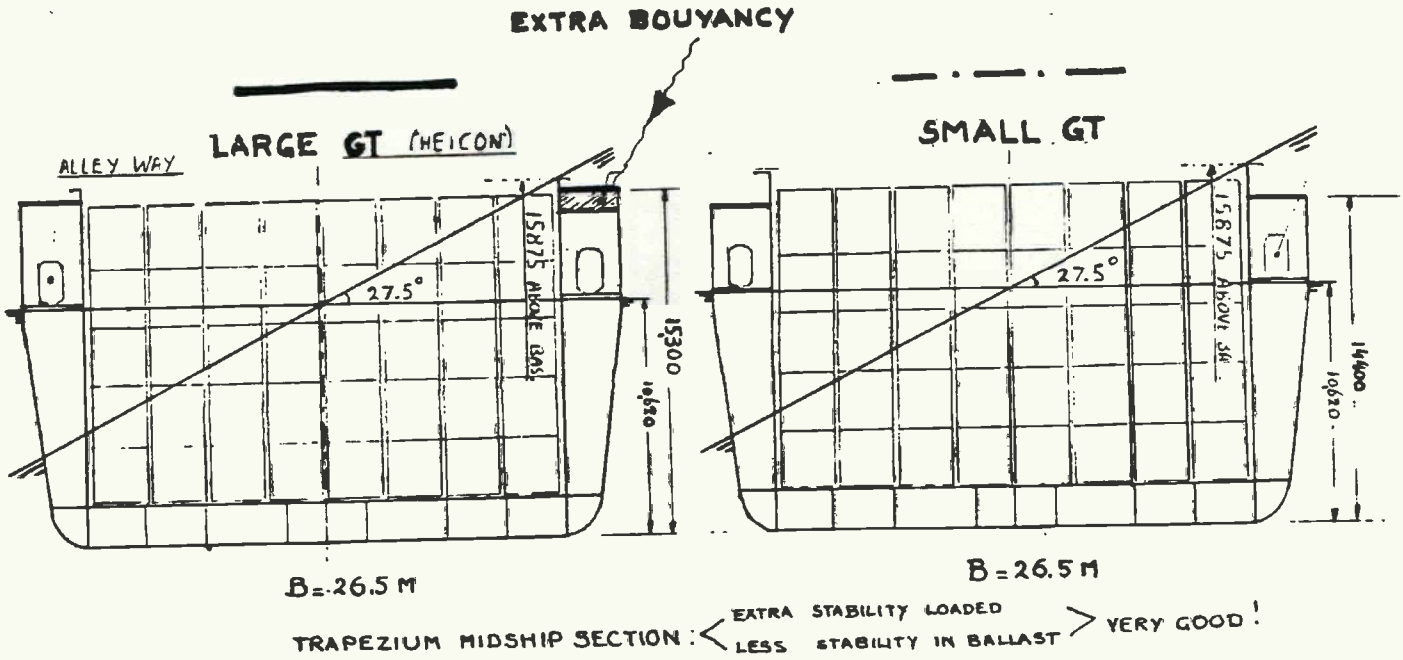
T = 10.0 M 1545 TEU x 12.7 Ton HOM.
T = 10.4 M 1598 " x 12.7 Ton "

INFLUENCE OF FREEBOARD ON STABILITY



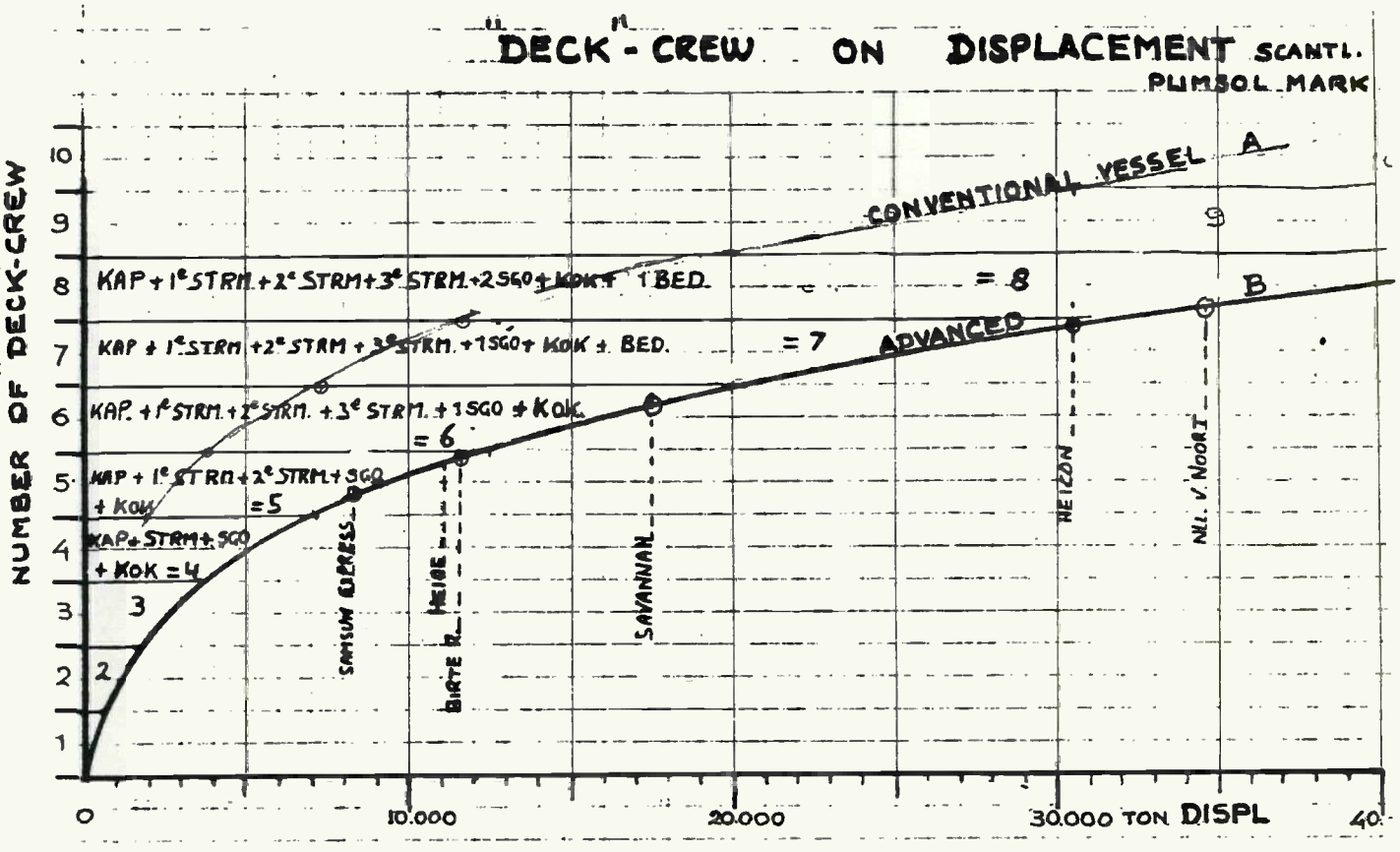
STABILITY RIGHTING-LEVER AT 2 DIFFERENT FREEBOARDS

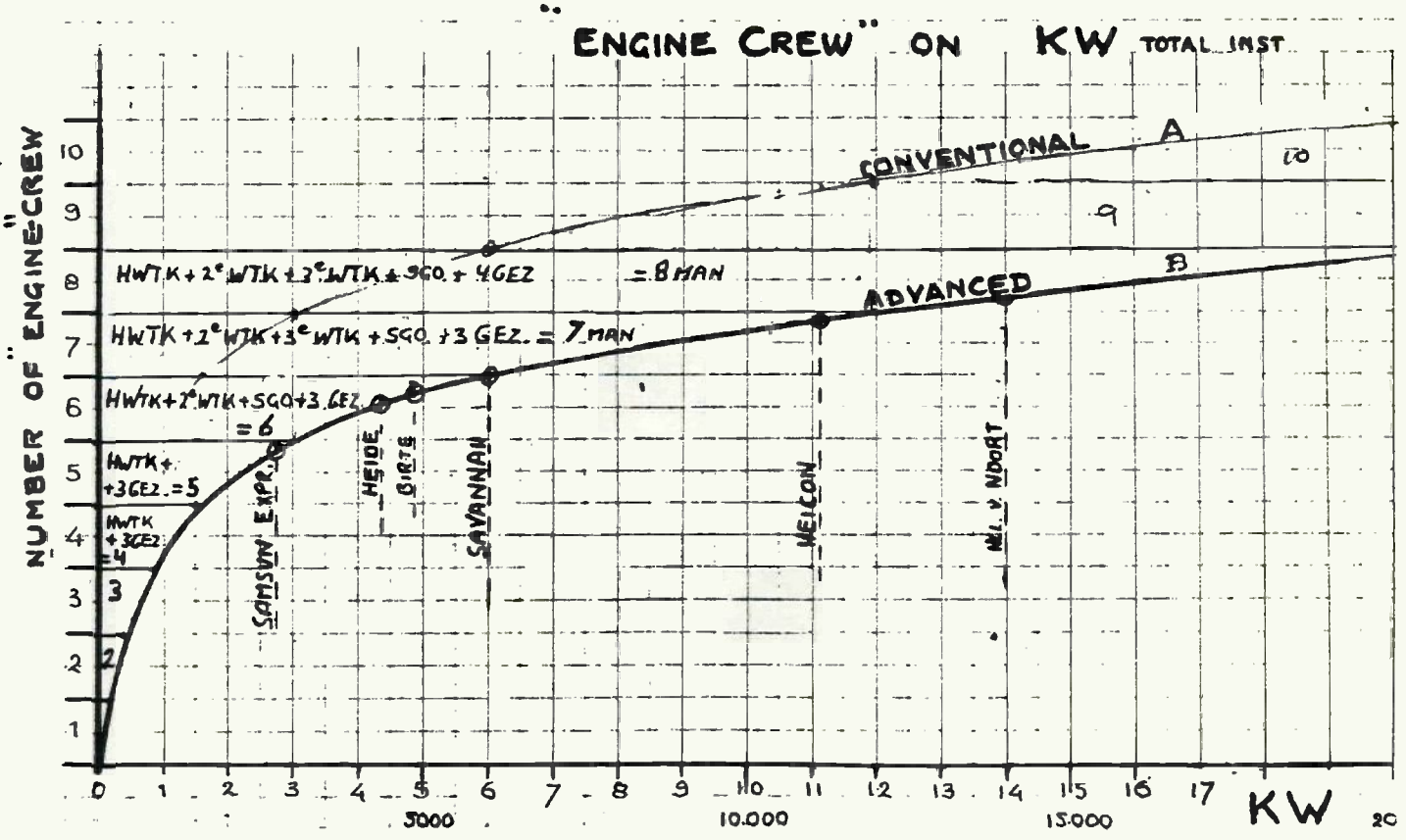
CONTR. VESSEL "HEICON"
BREMER VULKAN
(HANSA 1985 N:4)



TRAPEZIUM MIDSHIP SECTION: < EXTRA STABILITY LOADED / LESS STABILITY IN BALLAST > VERY GOOD!

PROPOSAL:


"DECK-CREW" ON DISPLACEMENT SCANTL.
PLIMSOL MARK
"NUMBER OF DECK-CREW"
CONVENTIONAL VESSEL A
ADVANCED B
KAP + 1e STRM + 2e STRM + 3e STRM + 2 SGO + KOK + 1 BED. = 8
KAP + 1e STRM + 2e STRM + 3e STRM. + 1 SGO + KOK + BED. = 7
KAP. + 1e STRM. + 2e STRM. + 3e STRM. + 1 SGO + KOK. = 6
KAP + 1e STRM + 2e STRM + SGO + KOK = 5
KAP + STRM + SGO + KOK = 4
3
2
SAMSON EXPRESS
BIRTE
HEIDE
SAVANNAH
HEICON
NL. V. NOORT
0
10.000
20.000
30.000 TON DISPL
40


"ENGINE CREW" ON KW TOTAL INST
"NUMBER OF ENGINE-CREW"
CONVENTIONAL A
ADVANCED B
HWTK + 2e WTK + 3e WTK + SGO + 4 GEZ = 8 MAN
HWTK + 2e WTK + 3e WTK + SGO + 3 GEZ. = 7 MAN
HWTK + 2e WTK + SGO + 3 GEZ = 6
HWTK + 3 GEZ. = 5
HWTK + 3 GEZ. = 4
3
2
SAMSON EXPR.
HEIDE
BIRTE
SAVANNAH
HEICON
NL. V. NOORT
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 KW
5000
10.000
15.000
20

Mehrzweckfrachter/Semi-Containerschiff
„Corinna Drescher"

"ELMA TRES"

CAPSIZED NOV 1981 IN HEAVY WEATHER (BERMUDA)

BLACK OUT NO SPEED NO STEERING.

VESSEL // WAVES : ROLLING : DECKCONTAINERS OVER BOARD (BLOCK LASHING) STEELWIRE

VESSEL HEELING

HATCHCOVERS SLIDING

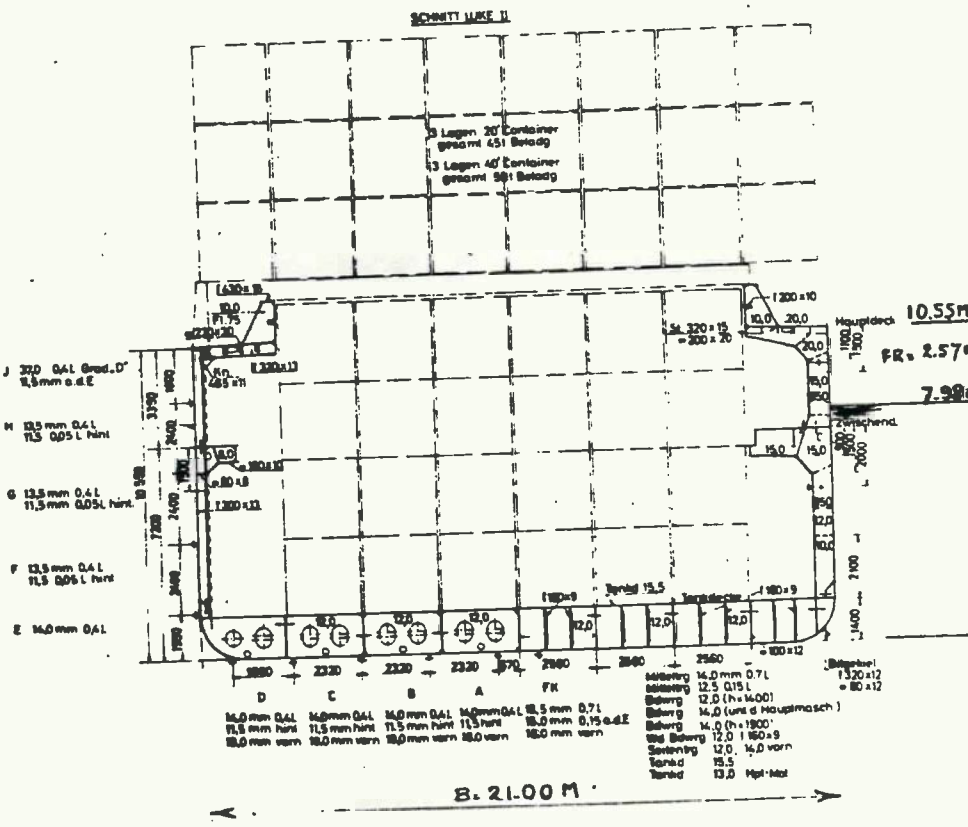
WATER IN HOLDS

CAPSIZE WITHIN 15 MIN

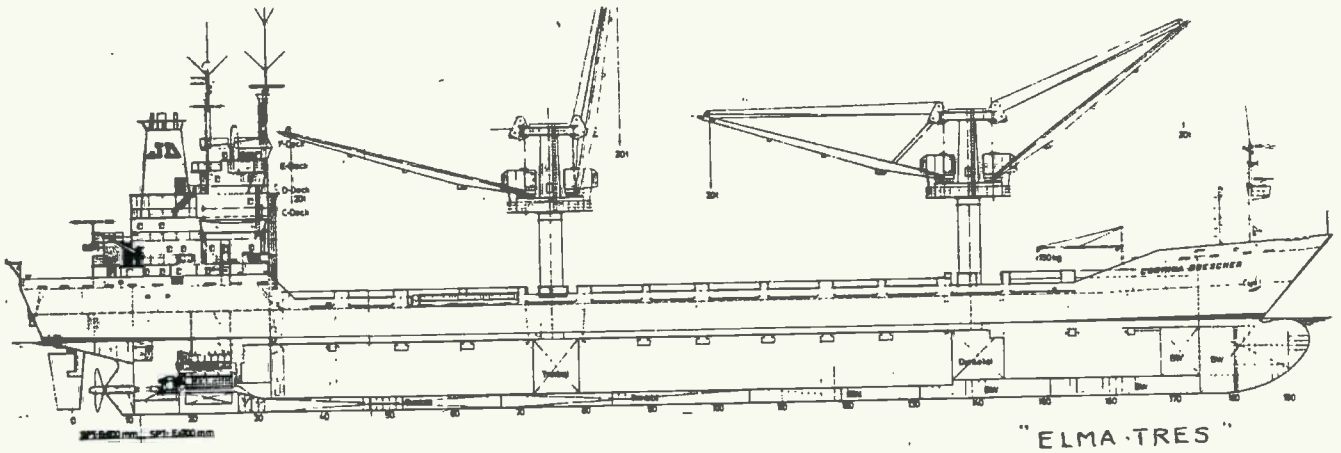
CHIEF MATE SURVIVED

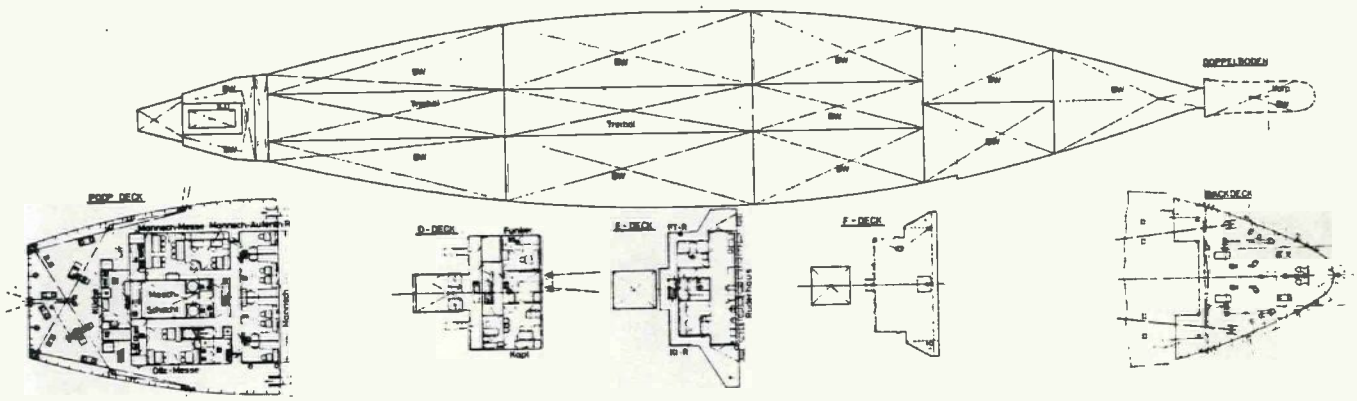
ON CAPSIZED LIFEBOAT

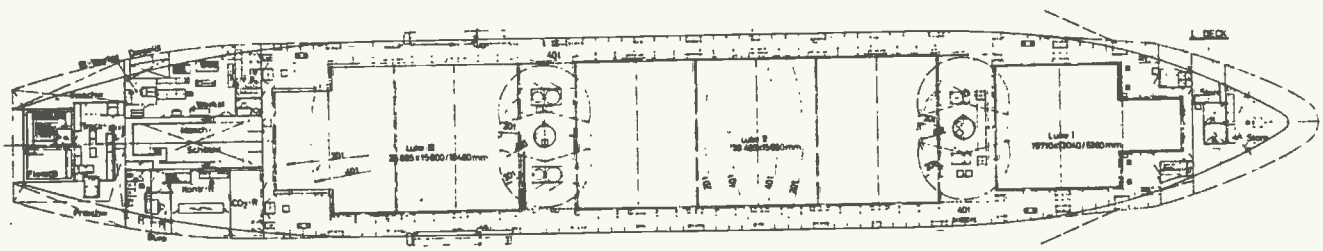
23 MEN LOST

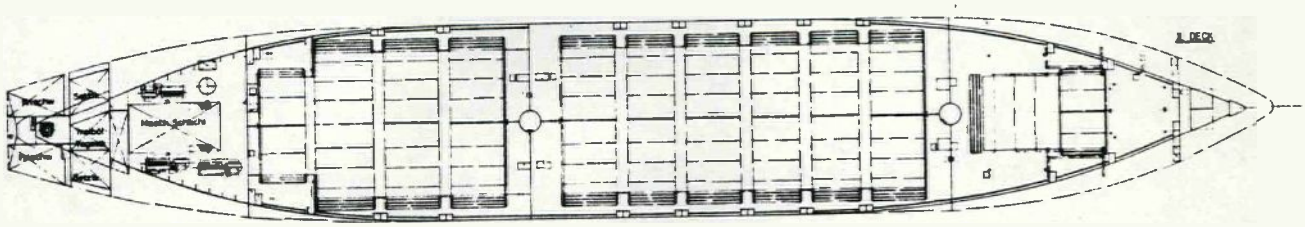


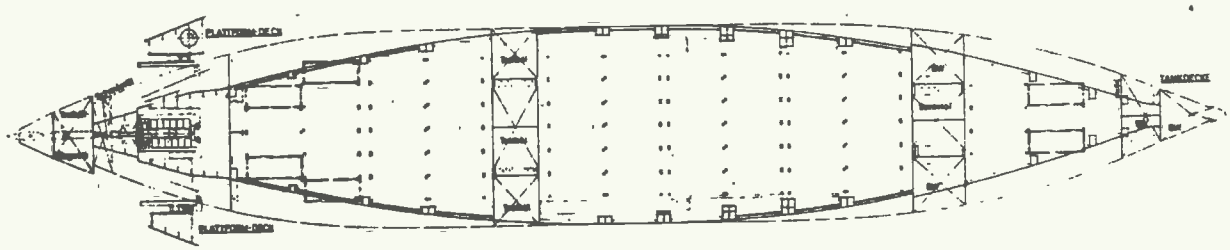
Hauptspant









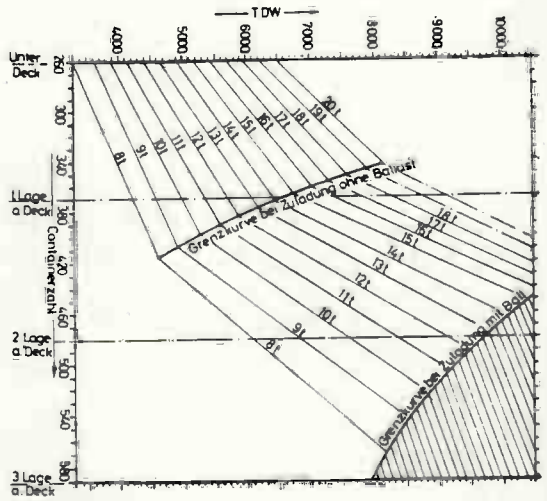


Generalplan

ELMA - TRES"

Technische Hauptdaten:

Länge über alles	140,67 m
Länge zwischen den Loten	127,50 m
Breite auf Spanten	21,00 m
Seitenhöhe 1. Deck	10,55 m
Seitenhöhe 2. Deck	7,20 m
Maschinenleistung	6 176 kW ≙ 8 400 PS
Freibordtiefgang als Volldecker	7,98 m
Tragfähigkeit als Volldecker	10 497 t
Vermessung als Volldecker	7 800 BRT
Probefahrtsgeschwindigkeit (T = 7,98 m, PD = 5 294 kW ≙ 7 200 PS)	16,47 kn
Tiefgang auf Vermessungsmarke	6,76 m
Tragfähigkeit auf Vermessungsmarke	7 859 t
Vermessung auf Vermessungsmarke	4 283 BRT
Besatzung	26 + 2 Personen
Container unter Deck	260 TEU
Container auf Deck	331 TEU
Laderauminhalt (Schüttgut)	16 709 m³
Laderauminhalt (Stückgut)	15 423 m³
Treiböl	1 021 m³
Dieselöl	209 m³
Frischwasser	218 m³
Ballastwasser	2 278 m³



Stabilitätsdiagramm für die Containerfahrt

Entwurf

Dem Entwurf lagen die folgenden Bedingungen zugrunde:

— überdurchschnittliche Containertragfähigkeit nach Stauplatzzahl und Durchschnittsgewicht,
— hohe Umschlagleistung im Hafen,
— flexible Einsatzmöglichkeiten in der Stückgut- und Massengutfahrt bei weltweitem Einsatz,
— wirtschaftliche Antriebsanlage bei schneller Umlaufzeit.

Das Schiff ist als Einschrauben-Trockenfrachtschiff mit drei Laderäumen und einem durchlaufenden Zwischendeck entworfen worden. Es ist für den Transport von 20'- bzw. 40'-Containern, Stückgut, Schüttgut sowie Holz- und Schwergutladung ausgelegt. Die Container werden ohne Führungseinrichtungen gefahren, jedoch erlauben die lichten Lukenöffnungen den späteren Einbau von Zellengerüsten in allen Luken.

Das Schiff wird durch fünf wasserdichte Querschotte unterteilt. Die Maschinenanlage und das Deckshaus mit Wohn-, Erholungs - und Betriebseinrichtungen sind achtern angeordnet. Davor liegen die drei Laderäume, wobei die Querschotte zwischen den Unterräumen 1, 2 und 3 zu Tieftanks ausgebildet worden sind.

Die Formen des ausfallenden Vorstevens mit der kurzen Back, des Bugwulstes und des schlanken Hinterschiffes wurden unter Berücksichtigung guter Seefähigkeits-, Widerstands- und Propulsionseigenschaften bei gleichzeitiger Vermeidung von propellererregten Schwingungen gewählt.

Der Doppelboden erstreckt sich zwischen dem Stopfbuchsenschott und dem Kollisionsschott über die gesamte Länge des Maschinenraumes und der Laderäume.

Das Schiff verfügt über eine Containerstellplatzzahl von 591 TEUs. Alternativ können 263 40'-Container plus 65 20'-Container geladen werden. Diese hohe Stellplatzzahl und der direkte Zugriff zu jeder 40'-Gruppe auf Deck und im Raum geben dem Betreiber gute Möglichkeiten, verschiedene Häfen während einer Rundreise anzulaufen.

Das Diagramm gibt einen indirekten Überblick über die Stabilität des Schiffes in der Containerfahrt. Aufgetragen ist die Tragfähigkeit über der Containerzahl mit verschiedenen Containerdurchschnittsgewichten als Parameter. Das rechteckige Kennfeld wird durch die Geraden TDW = Const. = Maximum und Containerzahl = Constr. = Maximum begrenzt. Die Ausnutzung des Kennfeldes wird durch die geforderten Stabilitätskriterien eingeschränkt (dunkler Bereich).

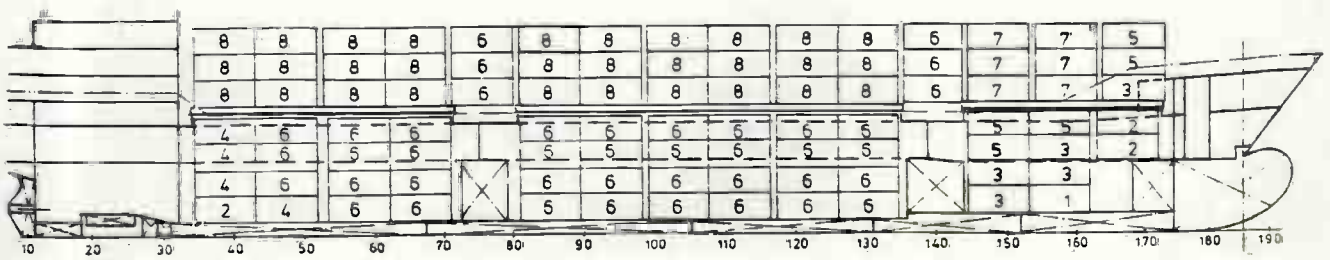
Im vorliegenden Fall ergab sich der Stabilitätsumfang als Grenzkriterium. Je kleiner der schraffierte Bereich, desto besser ist der Ausnutzungsgrad des Schiffes für den Betreiber, denn er hat dann sowohl die Möglichkeit, bei reduzierter Containerzahl hohe Durchschnittsgewichte pro Container als auch die volle Stellplatzzahl bei reduziertem Durchschnittsgewicht zu fahren.

Der Ausnutzungsgrad des vorgestellten Schiffes ist außerordentlich hoch. Dies gilt um so mehr, als bei sämtlichen Containern eine Höhe von 8'6" sowie ein Schwerpunkt aus halber Höhe angenommen worden ist.

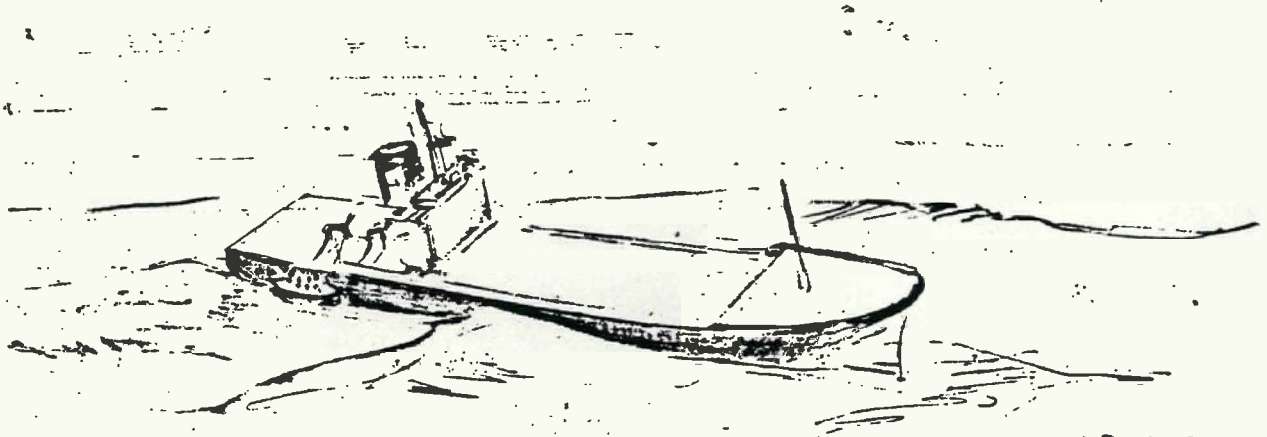
Die eingezeichnete Grenzkurve „Zuladung ohne Ballast" (Kriterium Stabilitätsumfang) könnte auch als Grenzkurve der Formstabilität, die Grenzkurve „Zuladung mit Ballast" (Kriterium Stabilitätsumfang) als Grenzkurve der verbundenen Form- und Gewichtsstabilität bezeichnet werden.

Da das Diagramm nur für den Fall homogener Gewichtsverteilung aussagefähig ist, sind zusätzlich Containerladefälle mit unterschiedlichen Gewichtsverteilungen in den Lagen gerechnet worden.

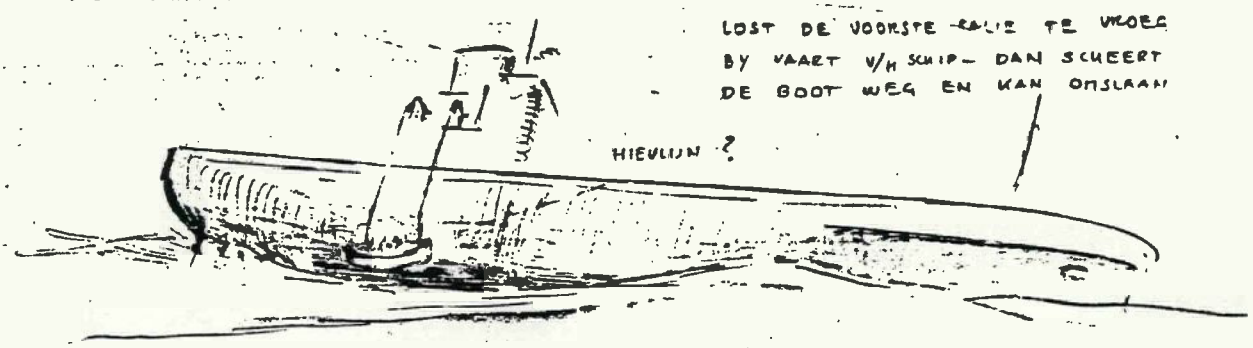
So ist u. a. im Stabilitätsbuch bei 592 TEUs ausreichende Stabilität nachgewiesen, um bei einem Containerdurchschnittsgewicht von 15 t im Raum an Deck in drei Lagen Container von im Mittel 8 t bzw. bei 20 t im Raum im Mittel von 7 t tragen zu können. Hierbei lagen bezüglich Schwerpunktshöhe und Grenzkriterium die oben erwähnten Werte zugrunde.



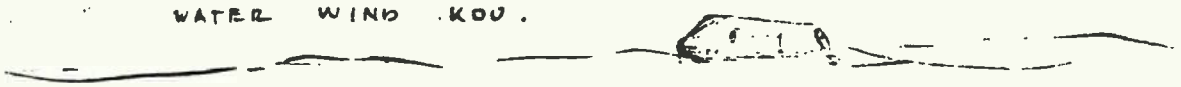
Containerstauplan



HET LOSSEN VAN DE SLOEPTALIES IS KRITIEK BOVEN EEN ZEE BF 6 à 7
ALS DE ZEEEN MET 6 TOT DE SNELLER LANGS DE ROMP LOPEN
LOST EERN TALIE TE VROEG DAN KAN DE SLOEP LEEGKIEPEN



DE GESLOTEN SLOEP BIEDT MEER BESCHUTTING TEGEN BOTSEN ,
WATER WIND KOU .



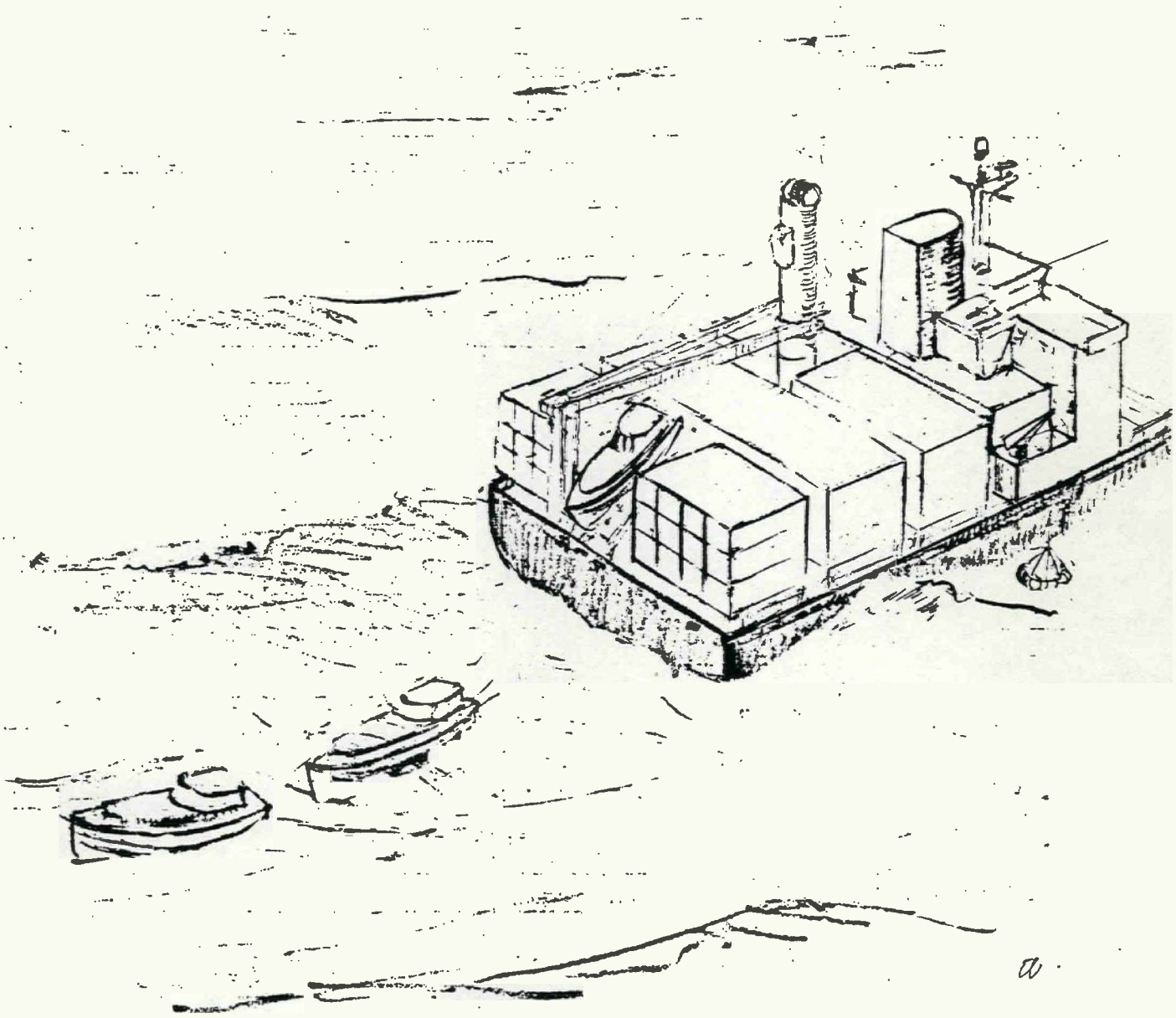
ECHTER HET OPNIEUW AANPIKKEN AAN DE HYSTALIES IS MOEILIJKER.

BIJ 't AANPIKKEN DREIGT EEN KLAP VAN 't ONDERBLOK TEGEN DE KOP
OMDAT DE NIET SNEL KUNT WEGDUIKEN

EXTRA STROPPEN NAAST DE TALIES KUNNEN HIER DE OPLOSSING GEVEN

NA HET OPHIJSEN DE SLOEPTALIE ZELF WEER INPIKKEN

NADEEL : EXTRA HYSHOOGTE V/D DAVIT IS VEREIST



MORE SAFE : FREE LAUNCHING LIFEBOAT.

DEVELOPED BY VERHOEF

- DE LANCEERSLOEP KOMT GOED TE WATER OOK BIJ ZWARE ZEE EN VAART V/H SCHIP
- DE VERTRAGING OP 'T MOMENT VAN DUIKEN ZAL MOETEN WORDEN GEMETEN AAN DE WERKELIJKE VOLGELADEN BOOT (OOK AAN DE BIJNA LEGE BOOT !) : 6g-8g IS TE VERWACHTEN OP GROND VAN DE ERVARINGEN IN NOORWEGEN IS DE VERTRAGINGS-SCHOK DOOR HET LICHAAM GEMAKKELIJK TE ABSORBEREN ("HARDING"-LANCEERSLOEP OP BOORPLATFORMEN EN OP "TARCOOLA" VAN WILHELMSEN
- UIT PROEVEN IN DE BRANDING V/H STRAND TE HVH MET HET MODEL 1:5 BLIJKT 'T VOLGENDE

A LEGE GESLOTEN BOOT

MET WEINIG MENSEN AAN BOORD, BIEDT DE "HOGE BLAAS" EEN GROTER AANGRIJPINGSVLAK AAN DE BREKERS
OOK MET STABILITEITSMOMENT IS RELATIEF KLEINER DAN BIJ DE GELADEN GESLOTEN BOOT
GEVOLG IS DAT DE BOOT EERDER WORDT OMVERGEGOOID
HET WEER OPRICHTEN GEBEURT HEEL SNEL.

B. GELADEN GESLOTEN BOOT

AANZIENLIJK RUSTIGER EN ZEEWAARDIGER.
IS NAUWELIJKS OM TE KRIJGEN.
- NA ONSLAAN. RICHT HET SCHIP ZICH VLOT OP

C. DEZELFDE BOOT MET OPEN LUIKEN, GEDEELTELIJK VOLGESLAGEN,

DRIJFT NOG VOLDOENDE HOOG OP 'T WATER.
IS VERBAZINGWEKKEND ZEEWAARDIG
ALHOEWEL ZWAARMOEDIG
IS NAUWELIJKS OM TE KRIJGEN

CONCLUSIE MET EEN GROTE WATERVERPLAATSING (GEWICHT) IS HET EEN OPTIMALE REDDING BOOT, ECHTER ONGESCHIKT ALS "MANOVERBOORD"-BOOT (ONSINZIENS), OMDAT DEZE MOEILIJK IS OP TE HALEN IS UIT RUWE ZEE.

DE 1 PUNTS HIJSINRICHTING IS VEEL SAFER DAN DE 2 PUNTS TALIE HIJSINRICHTING VAN DAVITS

ALS MANOVERBOORD BOOT LIJKT EEN BOSTON WHALER VOORZIEN VAN ZWARE RUBBERFENDER 'T BESTE

CONTAINER LASHING.

Nedlloyd

From: G. Nieuweboer COO/LOS

To: Hr E. Vossnack/FNB

Ref. LOS/GN/IA

Your ref.

Date: 20 augustus 1985

Korte opsomming ontwikkelingen in de containertrade

De ervaring toont aan:

a het gemiddelde containergewicht neemt toe;

b onder druk van de economische omstandigheden komen gewichten van containers voor, die het maximum toegestane gewicht overschrijden;

c steeds minder toepassen van lichte containers op zware (aan het dek zware, onderdeks lichte);

d vermindering van motivatie bij bootwerkers/bemanning om zorg te hebben voor sjormaterialen. Verzamelen en opbergen vermindert sterk. 's Winters glad-slagzij;

e overboord verdwijnen van sjormateriaal (twistlocks- stangen- spanschroeven);

f ontwikkelen van nieuwe sjorsystemen, echter ook sterke sanering van firma's, hetgeen aanvulling bemoeilijkt-kostbaarder.

g informatie naar schip vertraagt;

h blockstuwage m.b.h. van bridge fittings geen zeevaste stuwage garandeert (te grote spanningen en breken) zie b.

i ongelijke hoogten containers 8'- 8'6" - 9' het brugfittingsysteem niet toestaat;

g flexibiliteit in de stuwage blokkeert;

Het gevolg van bovengenoemde ontwikkelingen is:

a dat de walplanning, welke zo noodzakelijk is bij containerstuwage, niet voldoende geïnformeerd wordt over gewicht containers;

b toenemend "last-minute-bookings" waar geen gegevens van bekend zijn;

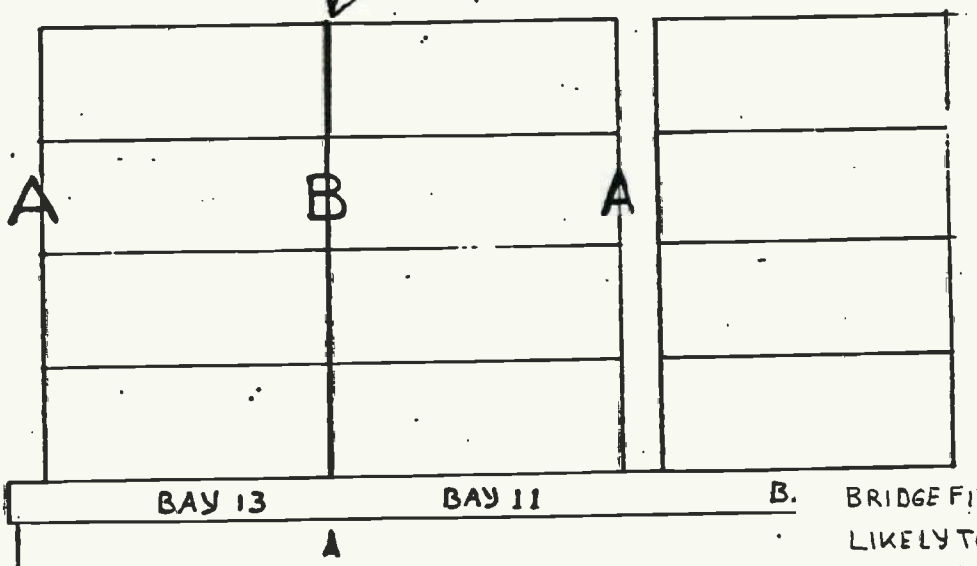
c dat punten a en b bij kleinere schepen grote gevolgen hebben voor zeewaardigheid (vaststellen MG vaak een farce).

d het zeevast sjorren op kleinere schepen wegens te weinig ruimte, weinig tijd, kleine bezetting, lage tarieven niet adequaat wordt uitgevoerd.

Naarmate de vaargebieden onder grote invloed staan van snelveranderende weersomstandigheden zijn de gevolgen aanzienlijk groter met als uiterste gevolg omslaan (Duitse Bocht, Golf v. Biscaje, Golf du Lion).

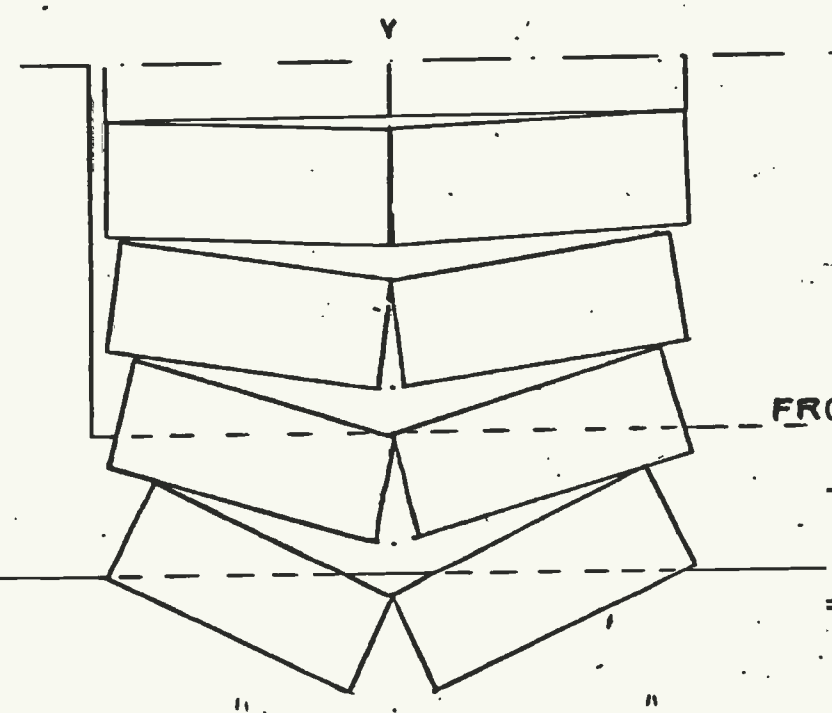
Op grond van bovenstaande uiteenzetting dient het sjorsysteem en de materiaalvoorziening gedurende de leeftijd van het schip zodanig te worden uitgevoerd, dat snelheid, veiligheid en zeewaardigheid hand in hand gaan en dat is mijns inziens te bereiken met het nieuw ontwikkelde systeem "CONTAINERGELEIDERS AAN DEK" met aangepaste luikpontoons. Gezien het niet in de hand hebben van het MG op basis onvoldoende informatie dient de constructie van het schip een betere beheersing van het MG mogelijk te maken.

NO PROPER LASHING POSSIBLE DUE TO BLOCKSTOWAGE
NOT SUFFICIENT SPACE FOR ACCESS
TO FIT TWIST LOCKS
TO FIT RODS + TURNBUCKLES

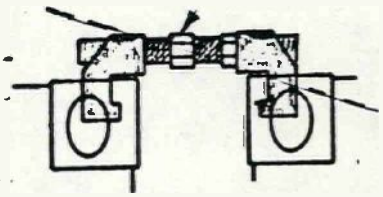


BRIDGE FITTING : CLUMSY HANDLING,
LIKELY TO BREAK OR BEND DUE
TO TOO LARGE FORCES IN ROUGH SEAS,
OR WHEN THROWN ON DECK (~10MT)

BLOCK-STOWAGE



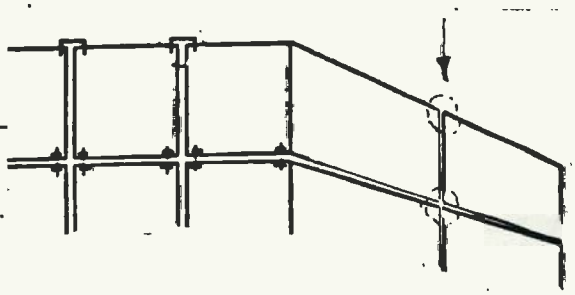
"BREAKING-OUT"



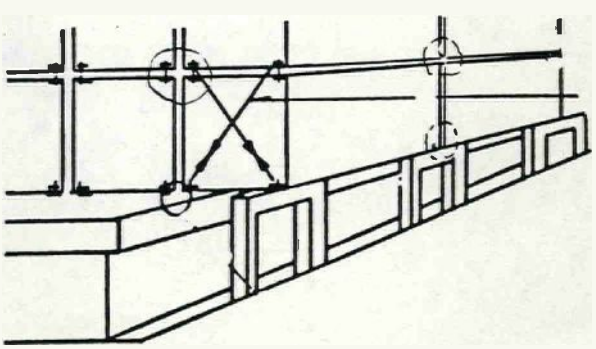
BRIDGE FITTINGS ON TOP
ARE OFTEN OF NO USE :: !

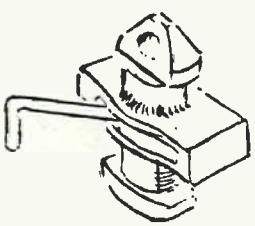
- UNEVEN SURFACE OF BOXES
- MIND 8' AND 8½' — DIFF IN HEIGHT

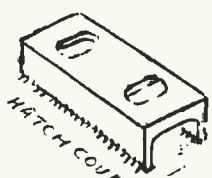
FRONT B : NO PROPER LASHING.
IMPOSSIBLE TO TURN TWISTLOCKS



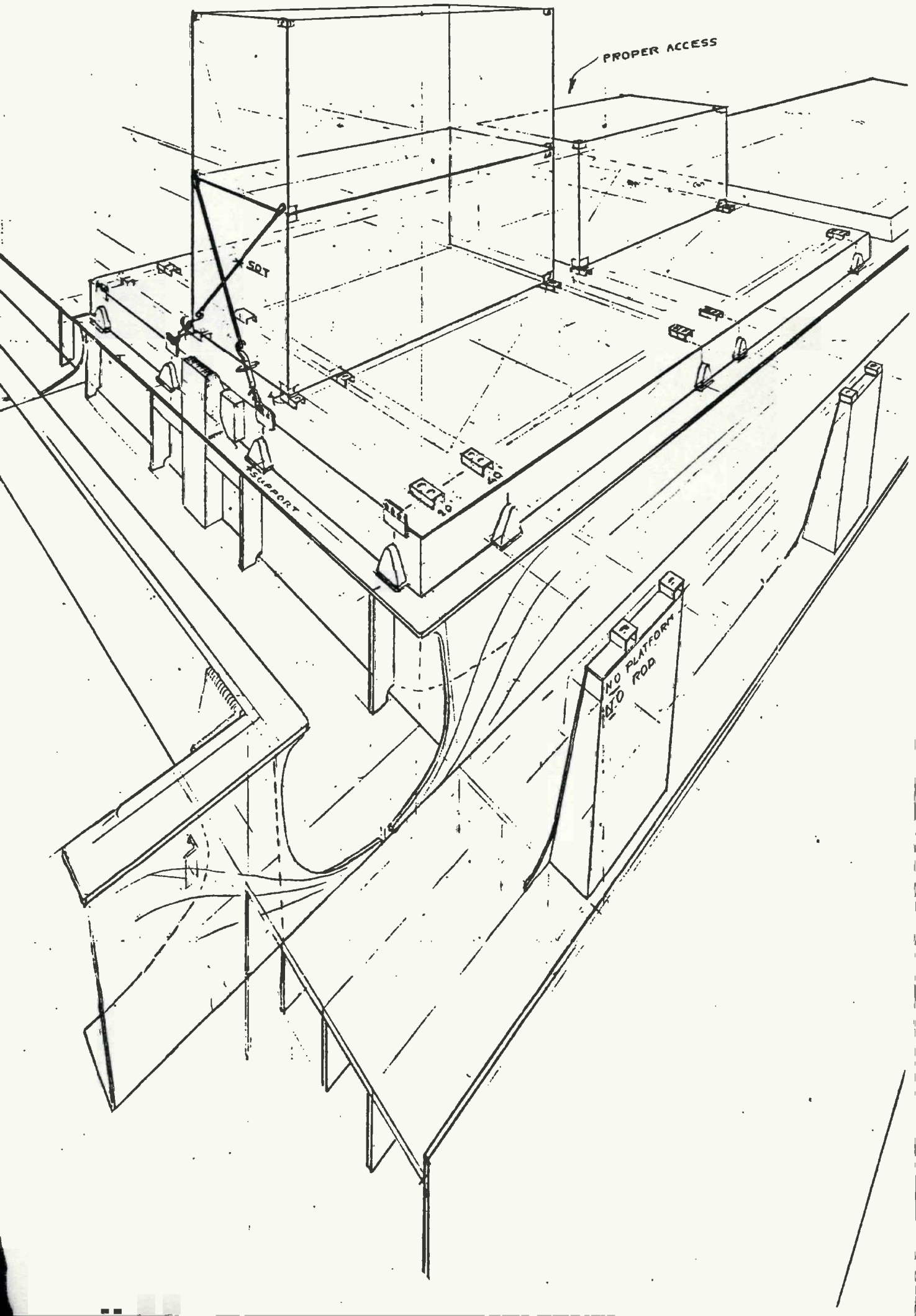
FRONT A: PROPER LASHING BY TWISTLOCKS







TWIST LOCK

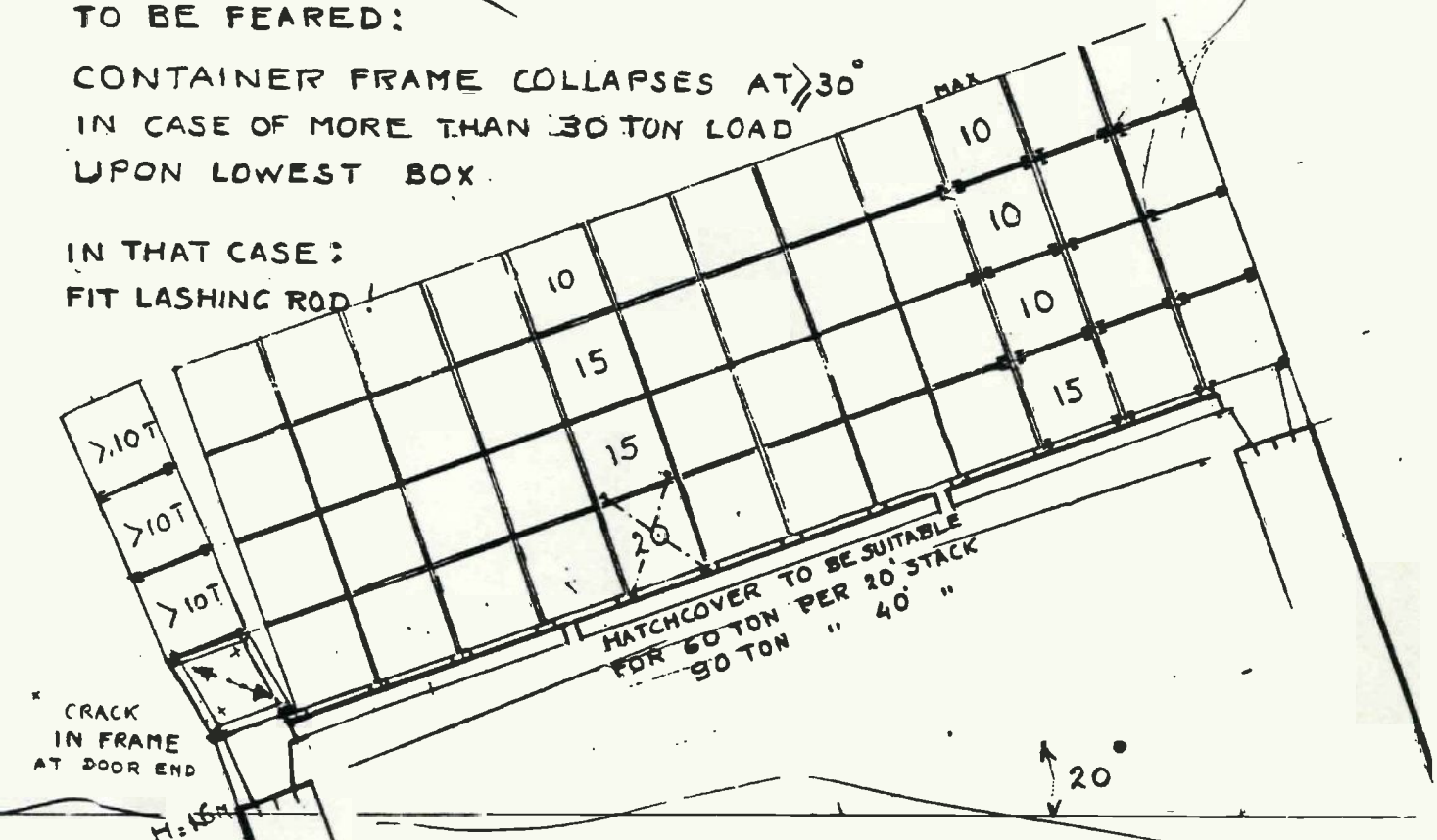

PROPER ACCESS
SDT
SUPPORT
NO PLATFORM
NO ROD

SECURING

NORMALLY: TWISTLOCKS ONLY
IN CASE STACKLOAD ≤ 45 TON

TO BE FEARED:
CONTAINER FRAME COLLAPSES AT ≥ 30°
IN CASE OF MORE THAN 30 TON LOAD
UPON LOWEST BOX

IN THAT CASE:
FIT LASHING ROD!



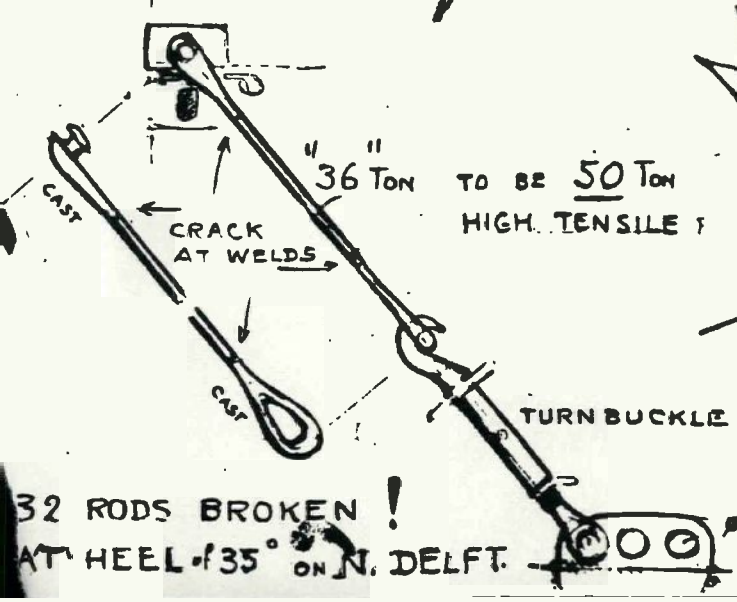
PRACTICAL HEELING TEST WITH 4 HIGH STACK
IS BARELY NEEDED, TO SEE WHAT WILL HAPPEN

IF GM REASONABLE: ABOUT 6-8% EXTRA BY DYNAMIC EFF

AVOID ROLLING RESONANCE!
GM TO BE < 6'

ANTI ROLLING FINS NOT EFFICIENT
IN HEAVY GALE
AT SLOW SPEED

HANDY RODS

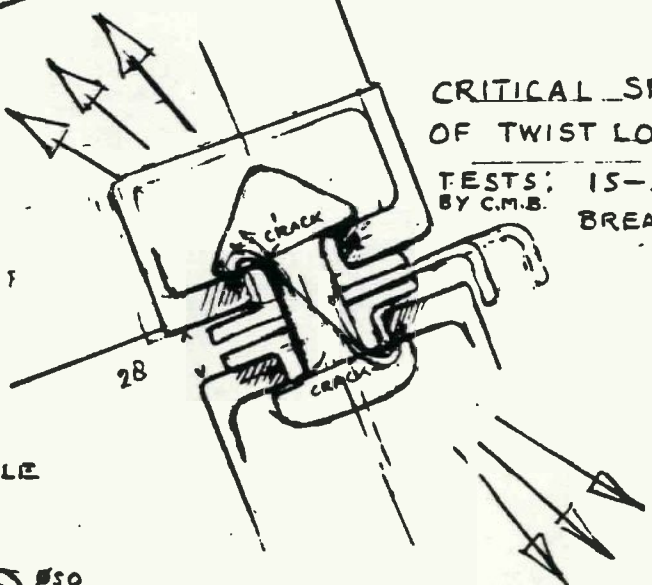


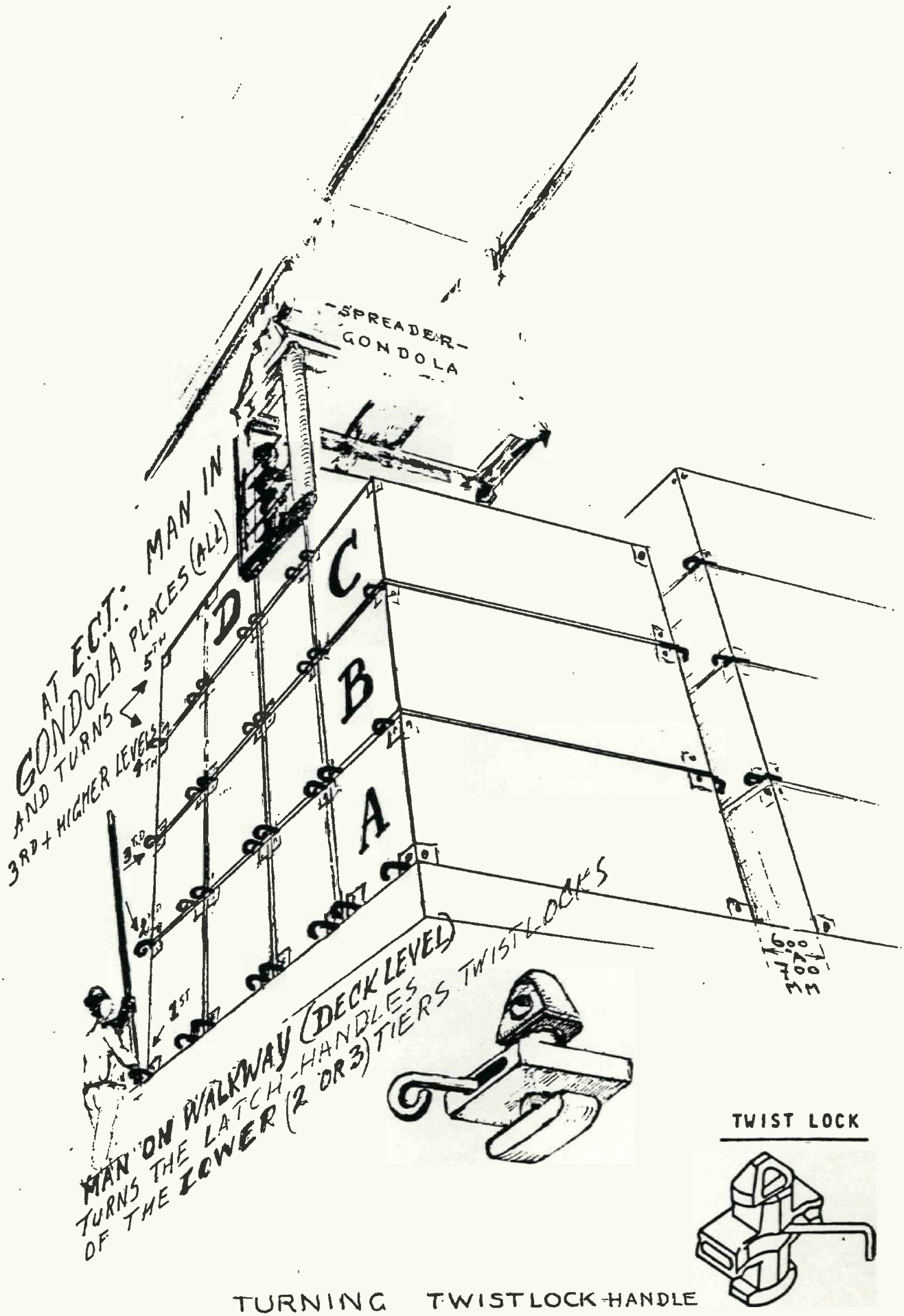
" " 36 TON TO BE 50 TON
HIGH TENSILE !

32 RODS BROKEN !
AT HEEL of 35° ON N. DELFT

CRITICAL SPOTS
OF TWIST LOCKS

TESTS: 15-50 T
BY C.M.B. BREAKLOAD





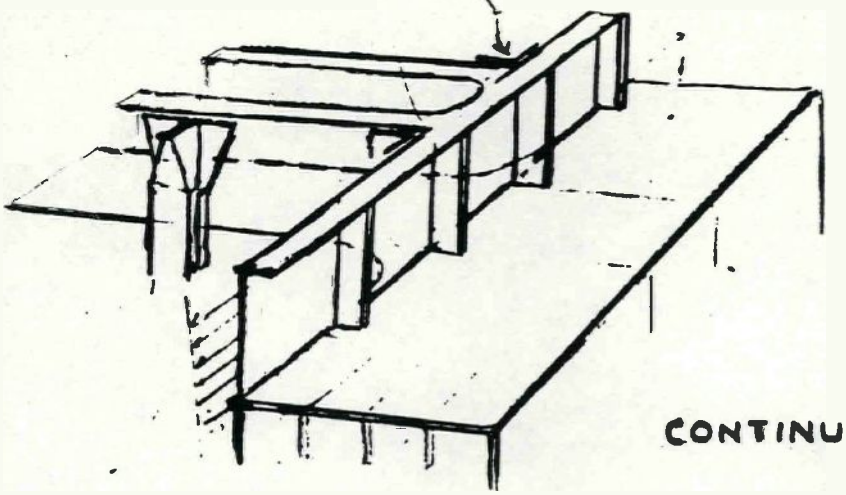
TURNING TWISTLOCK-HANDLE

SIMPLE PROPER CONSTRUCTION

BUYS

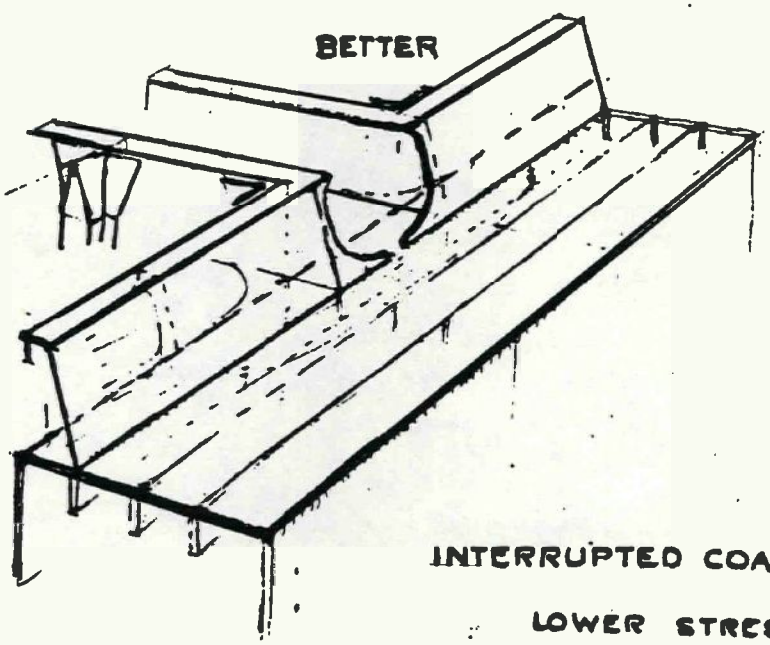
SHOULD BE A SHARP CORNER FOR CONTAINER INTAKE

HOW ABOUT CRACKS
BY LONGITUDINAL STRESS ?
(HOGGING)



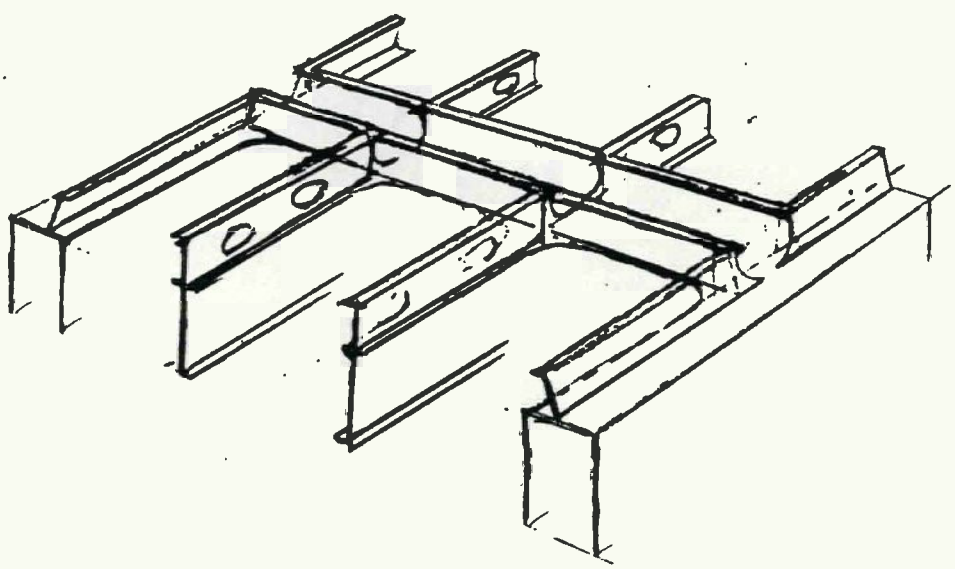
CONTINUOUS COAMING

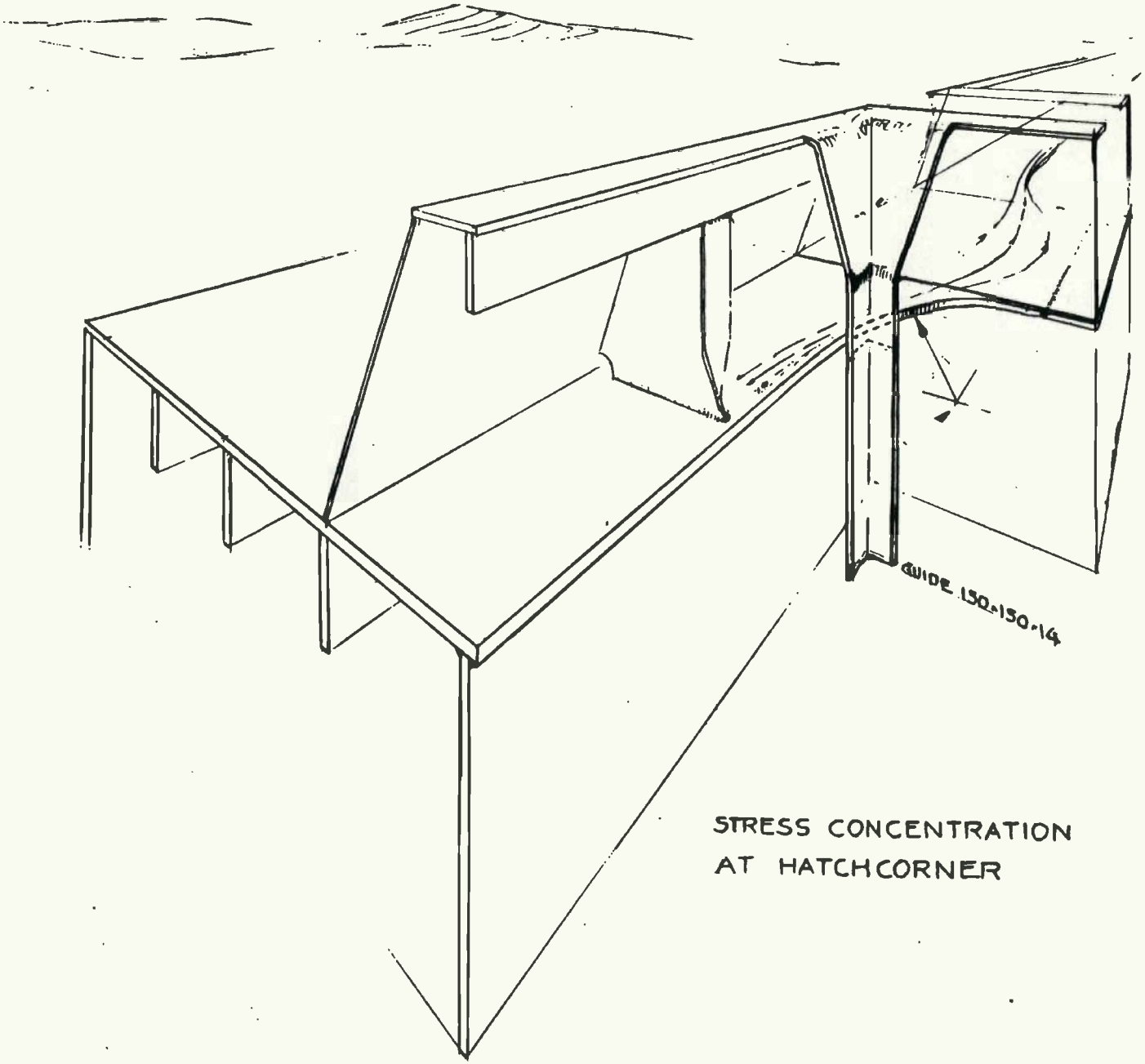
BETTER



INTERRUPTED COAMING FLUSH

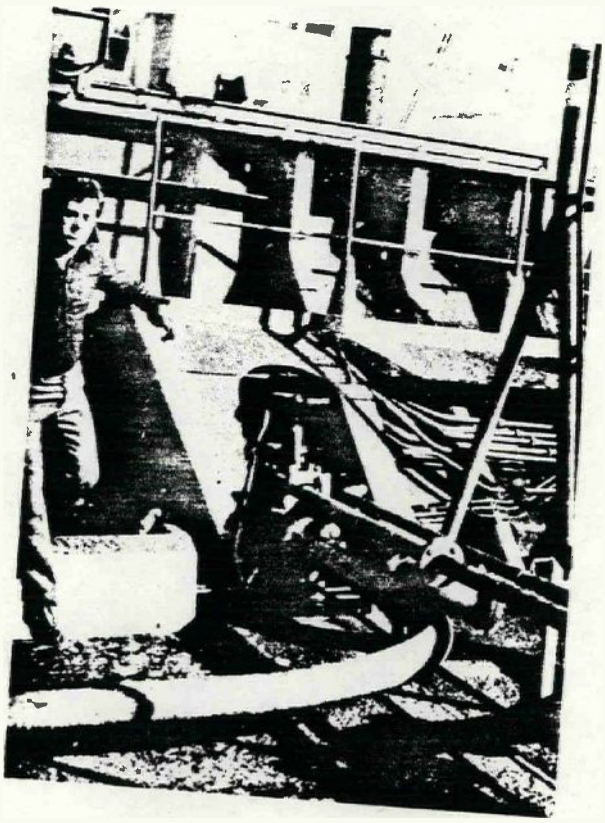
LOWER STRESS
STIFFENING INSIDE
(MAINTENANCE)





STRESS CONCENTRATION
AT HATCHCORNER

CLEAN DESIGN , LESS MAINTENANCE



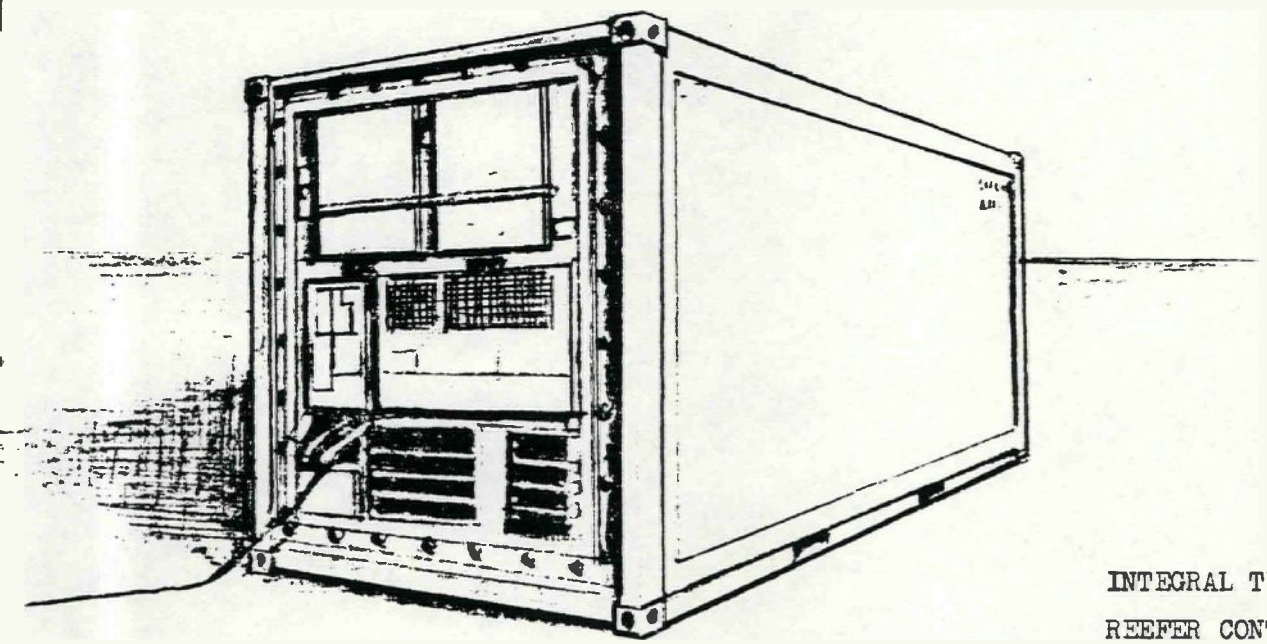
MAINTENANCE ON STANDARD-VESSEL !

REEFER CONTAINERS

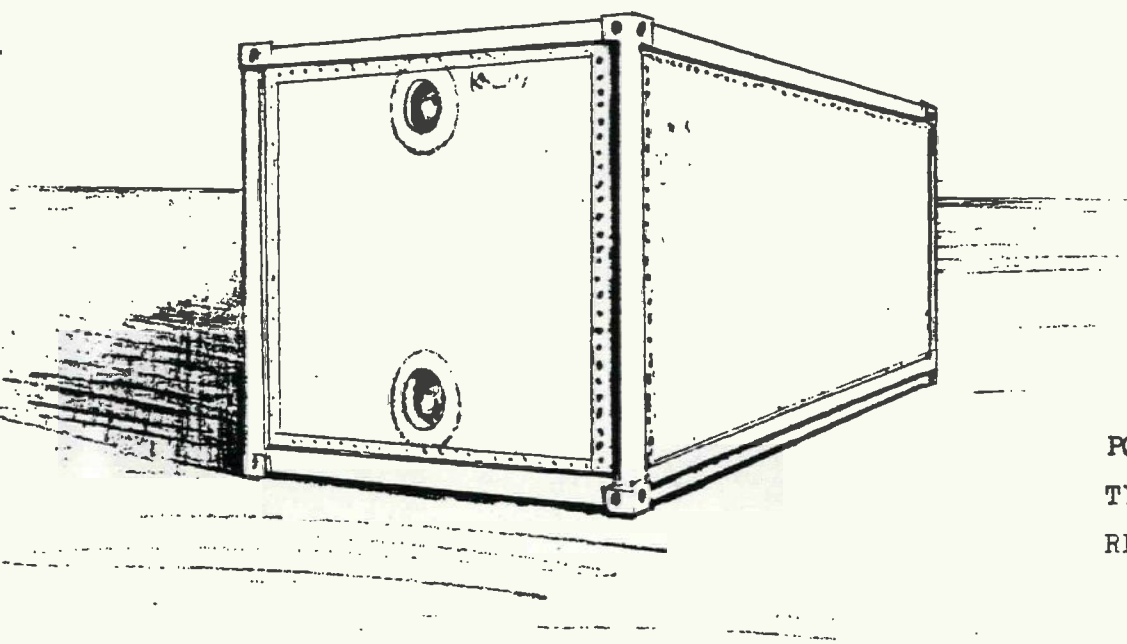
"INTEGRAL" VERSUS "PORTHOLE-BOX"

CONNECTED TO

SHIPS-DUCTS



INTEGRAL TYPE
REEFER CONTAINER

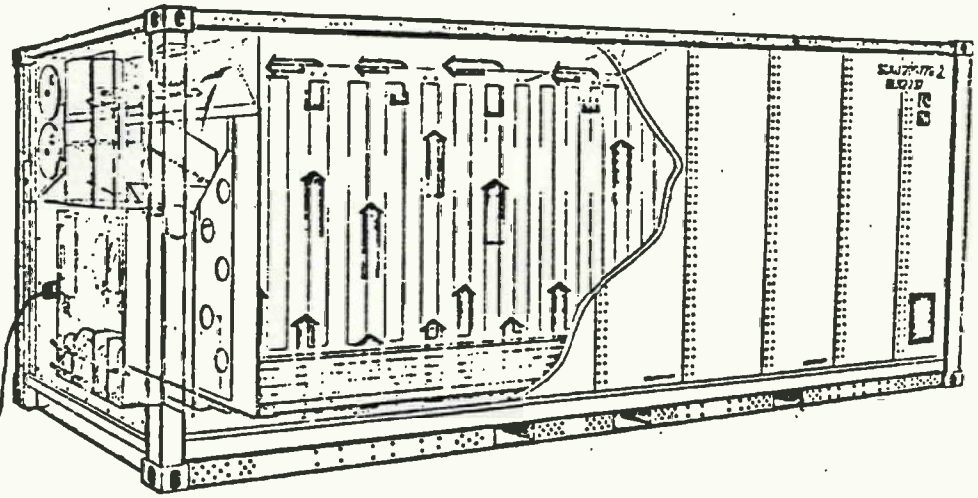


PORTHOLE / DUCTED
TYPE
REEFER CONTAINER

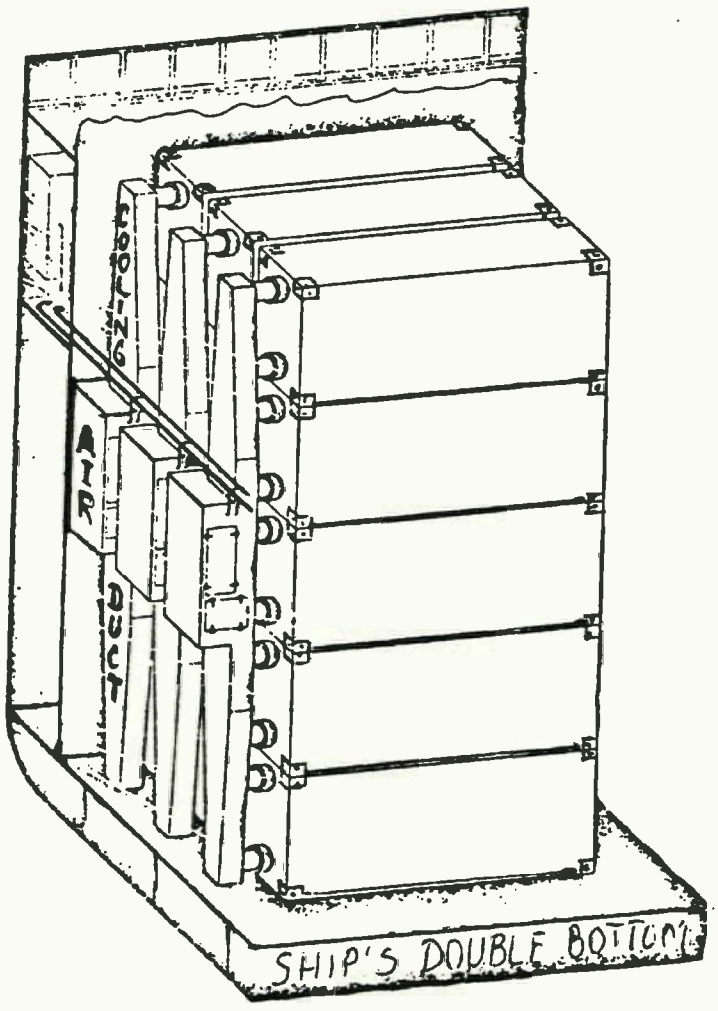
"INTEGRAL" SYSTEM

(Cooling engine built-in in box)

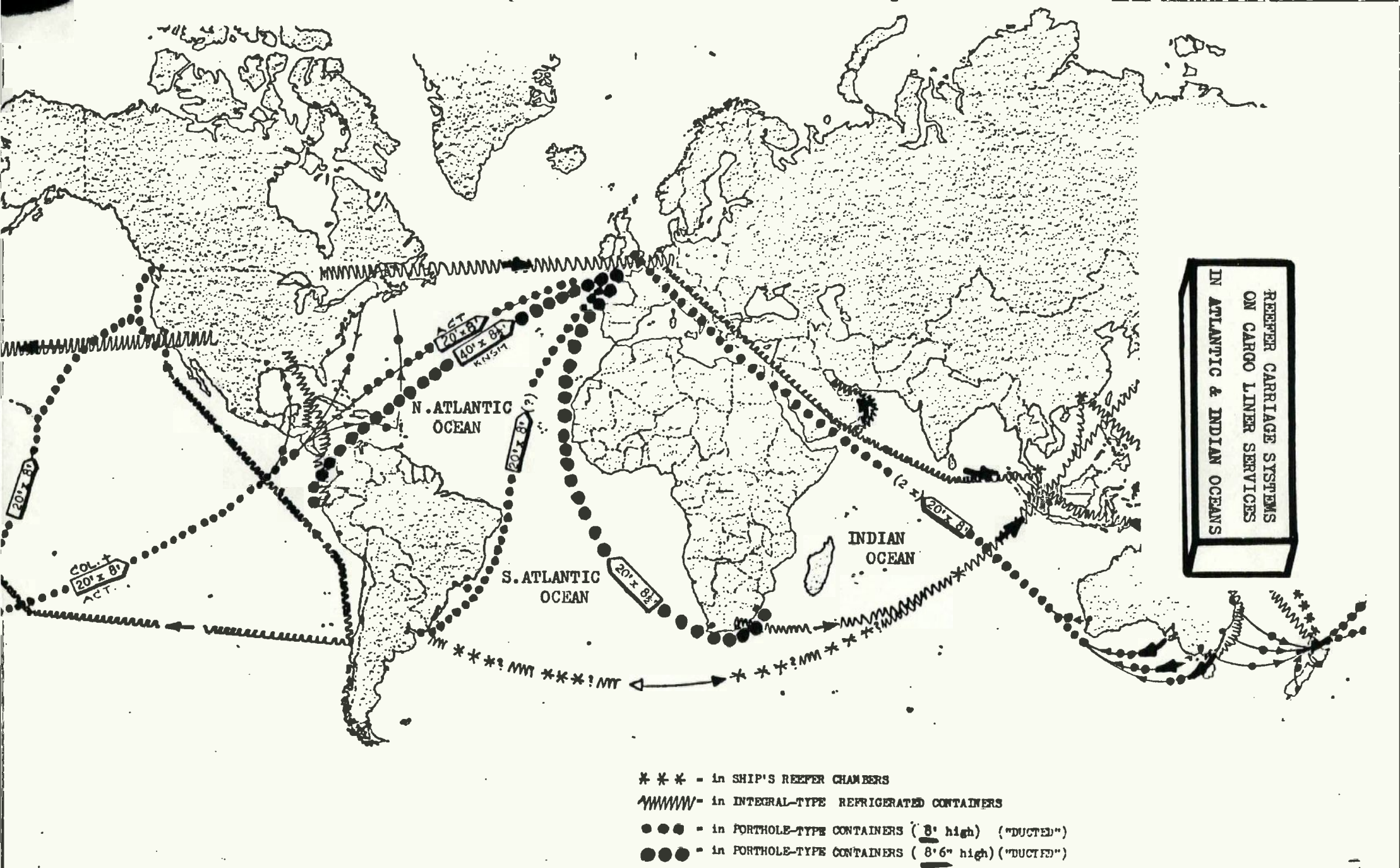
(Ship supplies electric power only)

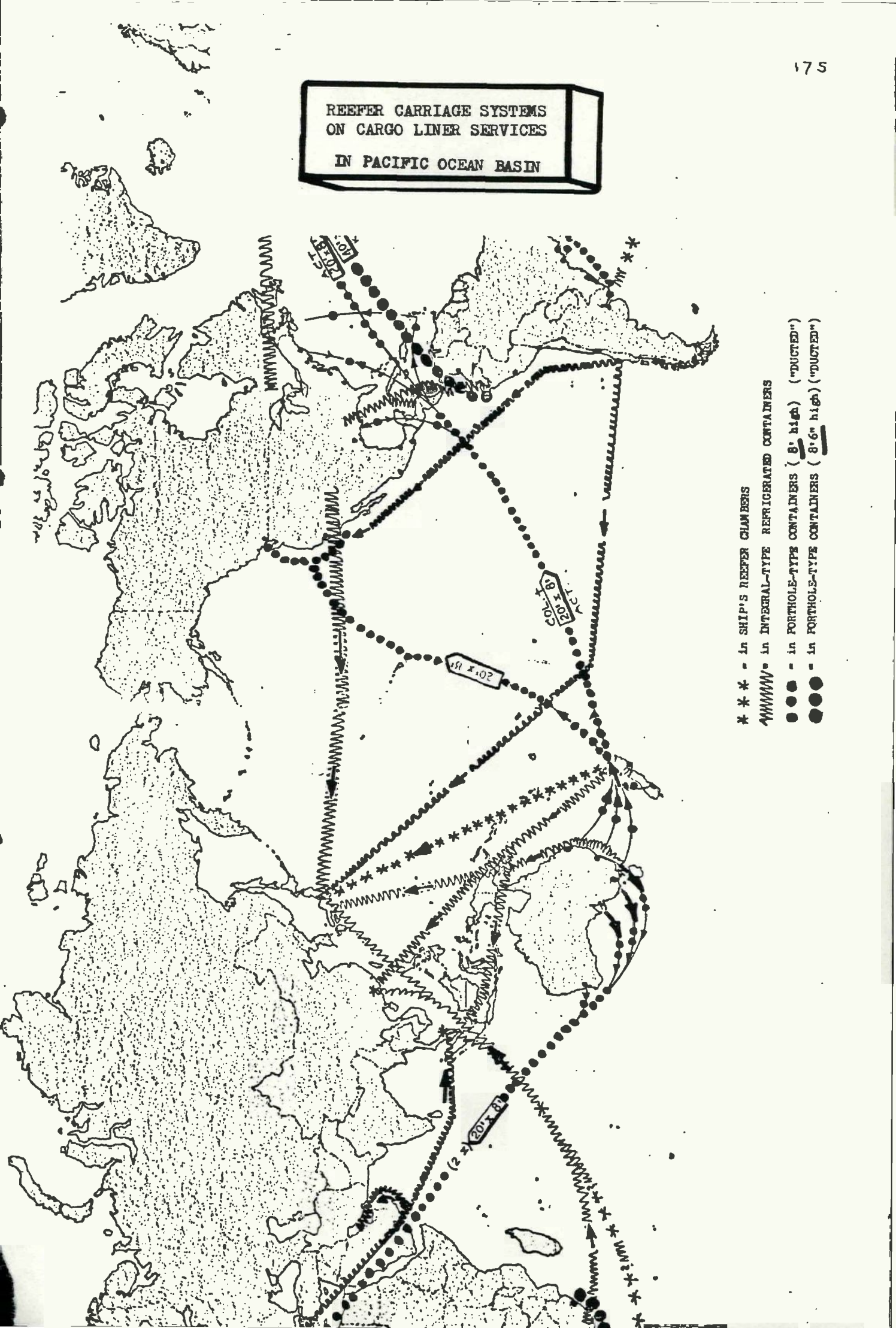


DUCTED SYSTEM
(Also called "PORTHOLE" system)



(Ship's cooling system)

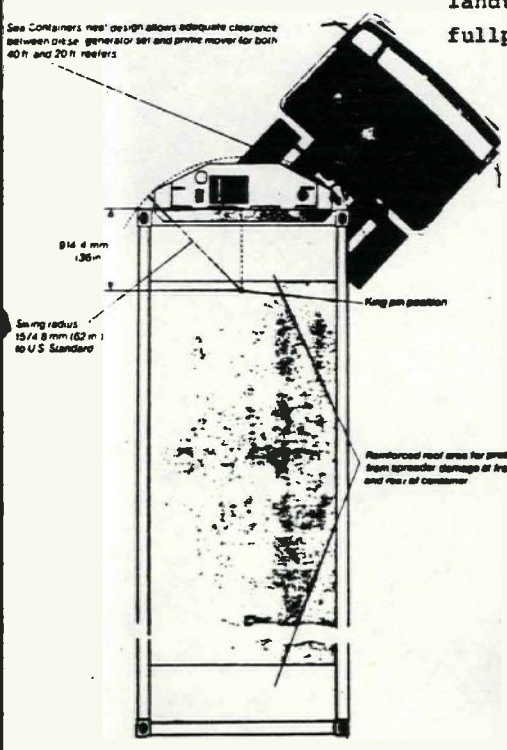

REEFER CARRIAGE SYSTEMS
ON CARGO LINER SERVICES
IN ATLANTIC & INDIAN OCEANS
N.ATLANTIC OCEAN
S.ATLANTIC OCEAN
INDIAN OCEAN
20' x 8'
40' x 8½'
(2 x 20' x 8')
COL. + 20' x 8' ACT.
* * * - in SHIP'S REEFER CHAMBERS
- in INTEGRAL-TYPE REFRIGERATED CONTAINERS
- in PORTHOLE-TYPE CONTAINERS (8' high) ("DUCTED")
- in PORTHOLE-TYPE CONTAINERS (8'6" high) ("DUCTED")

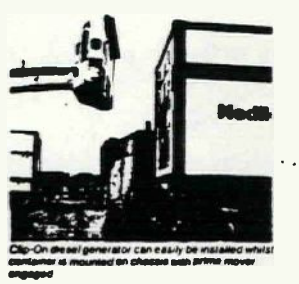

REEFER CARRIAGE SYSTEMS
ON CARGO LINER SERVICES
IN PACIFIC OCEAN BASIN
* * * - in SHIP'S REEFER CHAMBERS
- in INTEGRAL-TYPE REFRIGERATED CONTAINERS
- in PORTHOLE-TYPE CONTAINERS (8' high) ("DUCTED")
- in PORTHOLE-TYPE CONTAINERS (8'6" high) ("DUCTED")
20' x 8'
(2 x) 20' x 8'

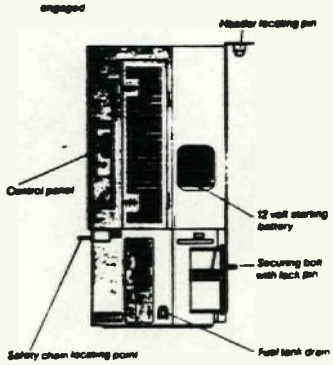
REEFER BOX SYSTEMS COMPARISON.

INTEGRAL type v.a.v. PORTHOLE type

	INTEGRAL REEFER BOX system :	DUCTED PORTHOLE BOX system
INVESTMENT	Independent of vessel	Vessel to have refrigeration plant (Freon R 22 - brine system)
	Plugs on deck....Air cooling	Ducts in hold to be suitable for
	Air cooling	40' x 8½'
	Plugs in holds Water cooling	or for 20' x 8½'
		or for 20' x 8 '
		(It is difficult to convert ducting)
INTERCHANGEABILITY OF BOXES AND FLEXIBILITY OF VESSELS FOR OTHER TRADES	Very flexible	Not flexible. Vessel tied to one trade.
LEASING OF BOX	Integral reeferbox is always leasible.(') This might be important in case of small fluctuations in reefer transport. (') FOR REEFERS ONLY.	Impossible to lease porthole box. Sometimes it is difficult to offer an insulated porthole box for general cargo at the normal rate because space is 1½ m^3 less than normal G/C-box.
HOT CLIMATE OPERATION		
COOLING DURING FEEDERING WAITING LANDTRANSPORT-	Usually rather easily feasible to keep cargo cooled ashore by - providing plugs at terminals - " plugs on feederships - " generator set to the integral container during landtransport seems to be fullproof.	Usually almost infeasible to keep cargo cooled down ashore without the use of - special nitrogen cooling plant at terminals - or terminal clip-ons. Special space is needed. - Special clip-on refrigeration units during land transport are necessary which are cumbersome/unreliable (Now liquid-nitrogen is used as replacement of Clip-On Frig., but...) - On feederships it is impossible to cool by clip-on frig. units.
		Only suitable if waiting time in tropic areas without cooling is very short: - Boxes to be sent to plantations where cooled-down fruit is loaded. - Alternatively the boxes are to be loaded with the fruit (bananas eg.) near to the vessel alongside the quay - and immediately after loading the bananas, the box is to be taken into the vessel and connected onto the cooled-air ducting for cooling-down.
		- In case of availability of cold stores at loading ports or at the plantations the ducted box type may be applicable (higher cube for bananas Northbound and utilizable for general cargo Southbound). - Land legs in tropics to be short. - Land legs in moderate climate (NW Europe) to be covered within 1-2 days' time if cooling is not provided).







INTEGRAL type : PORTHOLE type

SYSTEM'S SUITABILITY

INTEGRAL type: Easily interchangeable. Suitable for most trades, especially in irregular trades:
- FAR EAST & PACIFIC BASIN
- JAPAN - USA & AUSTRALIA trfc.
- JAPAN - AFRICA trades

(so: Low volume/High value cargo) Often practical limit yet as to quantity acceptable (due to labour-intensive attending) aboard trunkline vessels: up to 600 boxes/vessel, or less. (proportionally small quantity per vessel)

PORTHOLE type: Very poorly interchangeable. Suitable for regular trades with high volume (Box = cheaper/better volume):
- NW EUROPE - AUSTRALIA/N.Z. 20' x 8'
- NW EUROPE - SOUTHERN AFR. 20' x 8½'
- NW EUROPE - CARIBBEAN 40' x 8½'

(so: High volume/Incl. low value cargo) Proportionally large quantities/vessel acceptable (and wanted) aboard the trunkline vessels.

EARNING CAPACITY

	INTEGRAL 20'	INTEGRAL 40'	PORTHOLE 20'	PORTHOLE 40'
Weight & Volume	3200 kg / 27 m^3	6000 (± 5%) kg	2600 kg / 29 m^3	5000 kg
Floor cap.	9 pallets	19 pallets	10 plts	20 pallets

(so: larger earning capacity/box)

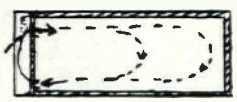
TEMPERATURE REGULATION

INTEGRAL type: Requirements to be fulfilled, more flexible in adaptation

PORTHOLE type:
- 4 temperatures of brine which is circulating in the vessel.
- Same temperature per stack (≃ 7)
- Problems may arise if a stack is only partly filled with reefer boxes:
  - Compressors cannot work below a certain minimum load level.
  - Problems with crosstainting might arise (fruit/fish e.g.)
  - Fruit Board requirements to be fulfilled, (if applicable).
- Less problems for engineers on board vessel.
- More stable conditions at sea.

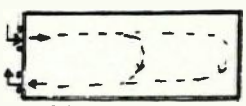
PROBLEMS DURING SEA TRANSPORT

INTEGRAL type:
- More problems for ships' engineers: Knowledge, spare-parts available? Instruction books! Against 'reduced crew' concept line.



PORTHOLE type:
- Less problems for ships' engineers
- More stable conditions at sea.

However:



PTI

- Every container to be checked before being taken aboard.
- Good organisation ashore (for looking after the integrals) is an absolute requirement.
- During initial period there may be teething troubles, however, on the long run things usually run smoothly.

- Non-homogeneous cooling inside box might occur (40' box with bananas).
- Differences in air temperature between highest and lowest boxes in same stack may occur due to ambient conditions and surroundings (e.g. near hatchcovers or tanktop).
- During initial period there may be teething troubles such as:
- Air leakage of rubber couplings,
- Freezing of box to coupling and damage to rubber 'tires'.

INTEGRAL type	:	PORTHOLE type
- Integral reefer must be of first class quality, e.g.: Carrier, Daikin, Thermoking, Mitsubishi.		- Damage to fruit by water particles which circulate in the airflow (water produced by defrosting) might occur if supervision should lack.
STOWAGE FLEXIBILITY ON BOARD SHIP		
Integrals can be stowed on deck and/or underdeck (if air-blower or preferably water cooling is provided underdeck which is not that expensive as ducting system) (- More flexible / less investment on shipboard).		As (usually) not ducting provided above deck, stowage must be under deck and into certain stacks which limits flexibility of stow on board. (-Less flexible / more investment on shipboard).
MAINTENANCE COSTS / BOX		
Per box (solely)... 240 USD/BxYr		Per box (solely) ..... 60 USD/BxYr.
INVESTMENT IN SHIP + BOX (PER SLOT PER YEAR OF A SHIP'S LIFETIME)		
PLUGS & TRAFO'S 4000 $/Bx, Over 20 Yrs at 8% .....400 USD/BxYr		SHIP'S PLANT 25000 $/Bx (Compr./Ductg) Over 20 Yrs at 8% .....2600 USD/BxYr
2x INTEGRAL = 2x 18000 $/Bx (Each 10 Yrs 8%) x 2 .....=5365 USD/Yr. slot		2x PORTHOLER = 2x 8000 $/Bx (Each 10 Yrs 8%) x 2 = 2400 USD/YrSlot
Total, incl. mainten^{ce} 6005 USD/Yr. Slot		Total, incl. maint^{ce} 5060 USD/YrSlot
FURTHER COSTS:		
Plug-in points on terminals Generator sets for land hauls		Cooling facilities ashore Clip-on/Gen. sets for long land hauls.