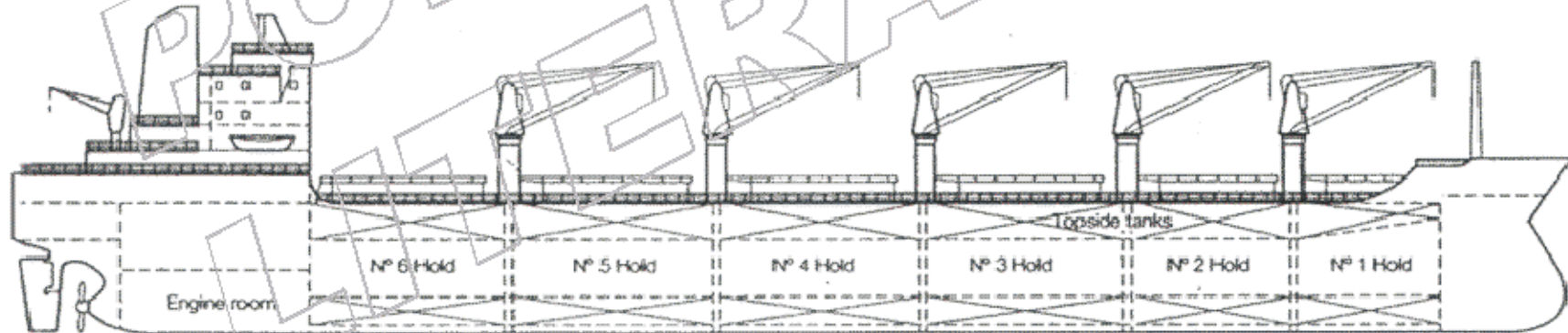
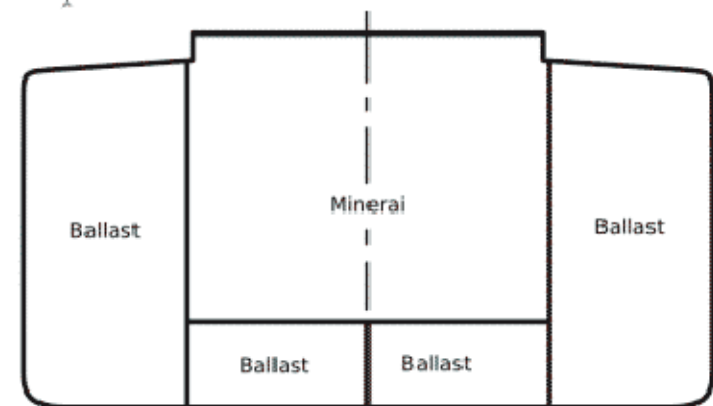
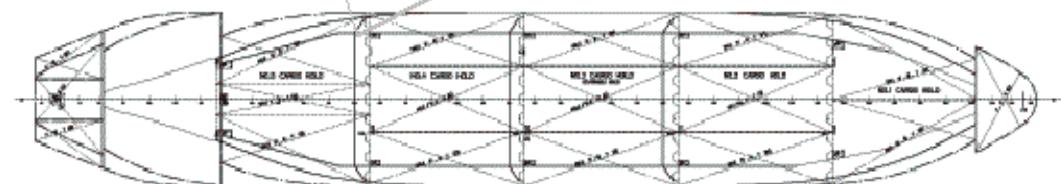
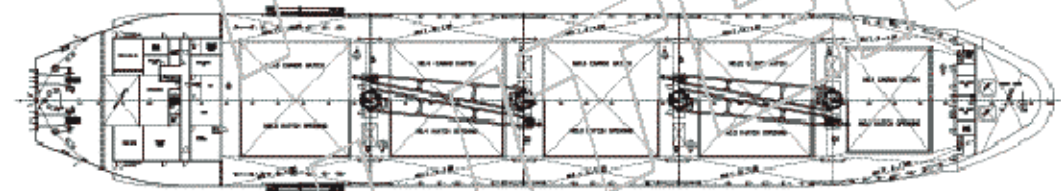
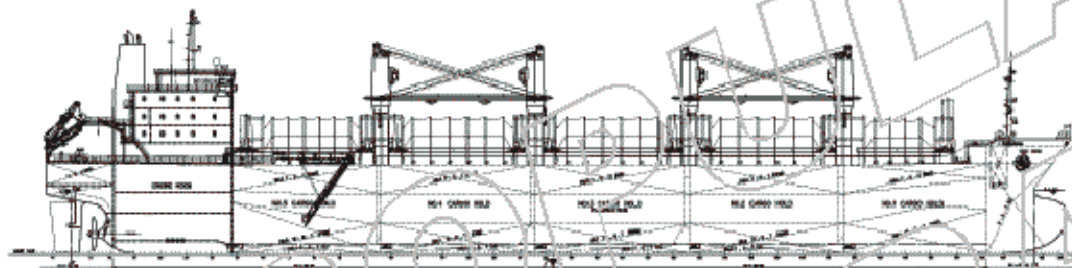
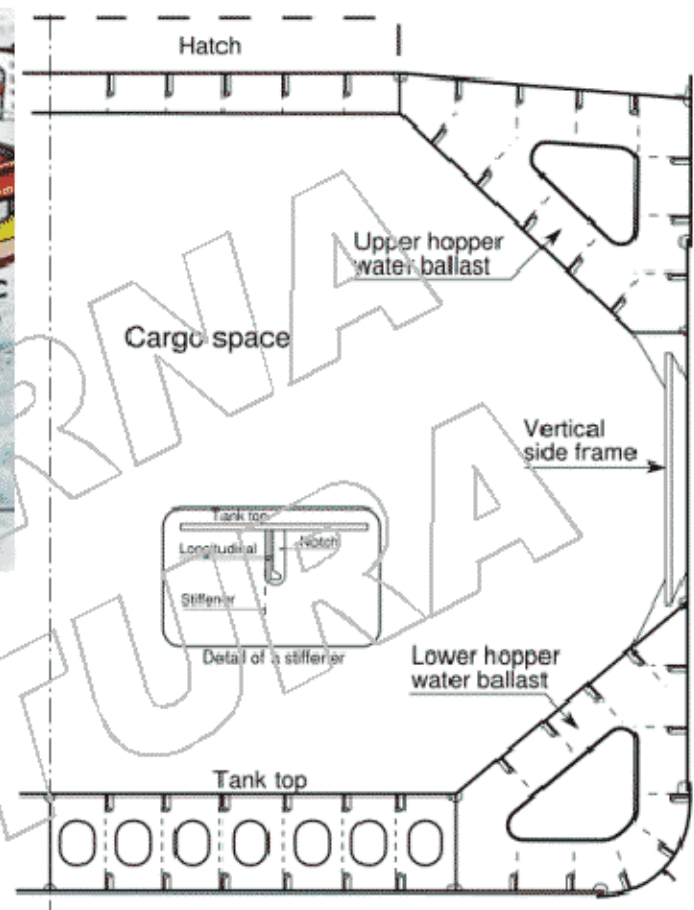
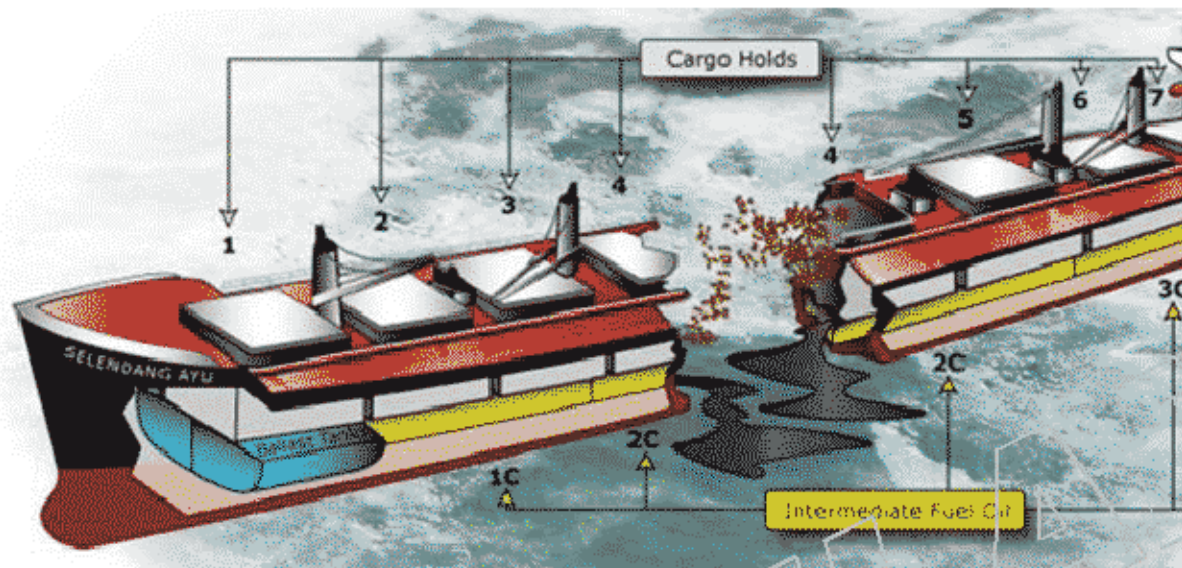


Tehnologija prijevoza rasutih, generalnih i specijalnih tereta





Rasuti tereti i vrste brodova



Podjela brodova po veličini (općenito)

Cargo ships are categorized partly by their capacity, partly by their weight, and partly by their dimensions (often with reference to the various canals and canal locks through which they can travel). Some common categories include:

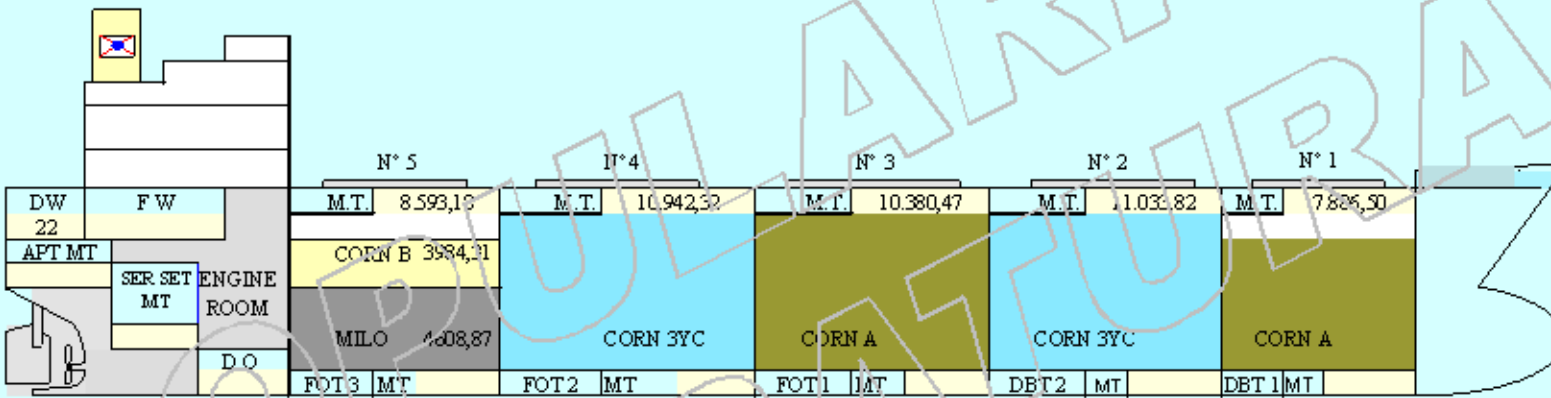
- Small Handy size, carriers of 20,000-28,000 deadweight tonnage
- Handy size, carriers of 28,000-40,000 deadweight tonnage
- Handymax, carriers of 40,000-50,000 dwt
- Seawaymax, the largest size which can traverse the St Lawrence Seaway, l-226 m, w-24 m, dft-7.92 m
- Aframax, oil tankers between 75,000 and 115,000 dwt. This is the largest size defined by the Average Freight Rate Assessment (AFRA) tanker rate scheme.
- Suezmax, the largest size which can traverse the Suez Canal, w-70.1 m, dft-16 m, air.dft.-68 m, typical 150,000 dwt & w-46 m.
- Panamax, the largest size which can traverse the Panama Canal, l-294.1 m, w-32.3 m, dft-12 m, air.dft.-57.91 m, typical 78,000 dwt
- Malaccamax, the largest size which can traverse the Straits of Malacca, dft-25 m
- Capesize, vessels larger than Panamax and Suezmax, which must traverse the Cape of Good Hope and Cape Horn in order to travel between oceans. Above 175,000 dwt
- VLCC (Very Large Crude Carrier), supertankers between 150,000 and 320,000 dwt
- ULCC (Ultra Large Crude Carrier), enormous supertankers between 320,000 and 550,000 dwt

Vježbe

Rasuti tereti

Rasuti teret - žitarice

M.V. _____			VOYAGE N° 20		
CARGO PLAN					
CARGO:	CORN "A","B","3YC"& MILO		FROM:	NEWORLEANS	
			TO:	JAPAN	



PORTS LOAD	NEWORLEANS				
ARRIVED	21/06/05 at 09:00 lt				
COMM LOAD	21/06/05 at 11:30 lt				
COMPL LOAD	23/06/05 at 22:20 lt				
DEPARTURE	24/06/05 at 01:45 lt				

SAILING DRAFT		PLIMSOL MARK	
FWD	12.00 m	STBL	12.02 m
AFT	12.00 m	PORT	12.02 m
MEAN	12.00 m	MEAN	12.02 m
DFL	sag 0.02 m	HEEL	0
GoM	3.61 m	F.V.A.	0.2667 m
S.F.	47 cu ft/m3	DEVS	1.000

DISTRIBUTION OF CARGO		
HOLD N° 1	MT	7.826,50
HOLD N° 2	MT	11.033,82
HOLD N° 3	MT	10.380,47
HOLD N° 4	MT	10.942,32
HOLD N° 5	MT	8.593,18
DECK CGO	MT	
TOTAL	MT	48.836,29

LEGEND		
		CORN B
		MILO
		CORN 3YC
		CORN A

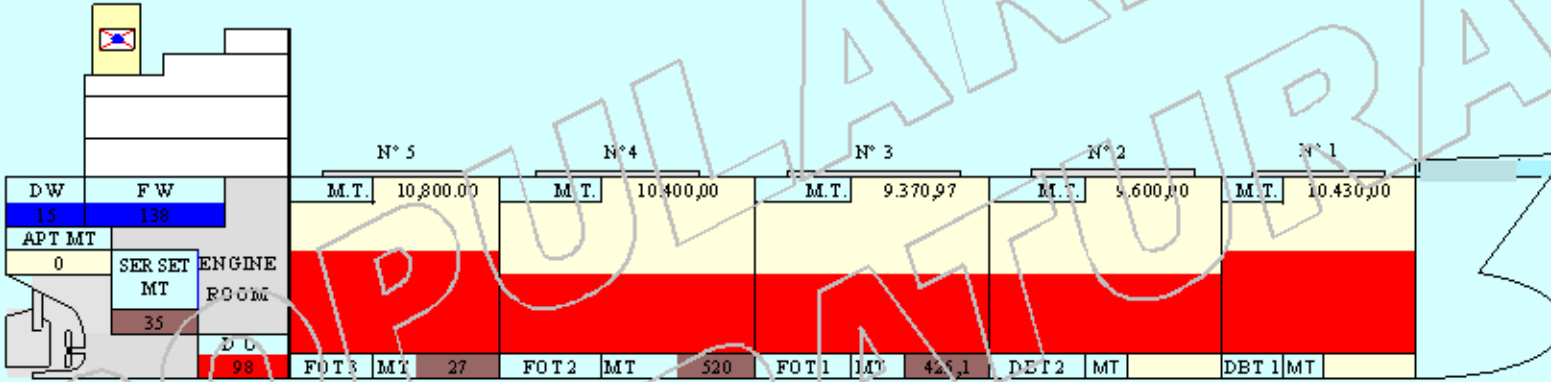
CARGO	MT	48.836,29
I.F.O.	MT	1.147,60
M.D.O.	MT	91,60
F.&D. WAT.	MT	113,00
BALLAST	MT	85,00
CONST.	MT	251,00
DIFF.SURV.	MT	0,00
TOTAL	MT	50.524,49

MASTER : _____

CHIEF OFFICER : _____

Rasuti teret – boksit – SF velik

M.V. _____		VOYAGE N° 36	
CARGO PLAN			
CARGO :	BAUXITE IN BULK	FROM :	TELANG ANCHORAGE
		TO :	RIZHAO



PORTS LOAD	TELANG ANCHORAGE
ARRIVED	23/02/07 at 16:15
COMM. LOAD	23/02/07 at 21:15
COMPL. LOAD	27/02/07 at 04:15
DEPARTURE	27/02/07 at 08:05

SAILING DRAFT		PLIMSOL MARK	
FWD	12.10 m	STBD	12.11 m
AFT	12.11 m	PORT	12.11 m
MEAN	12.105 m	MEAN	12.11 m
DFL	0.005 m	SAGG	HEEL 0.00 deg
GoM	5.83 m	F.W.A.	0.066 m
S.F.	0.80 m3/MT	DET'S	1.019

DISTRIBUTION OF CARGO		
HOLD N° 1	MT	10.430,00
HOLD N° 2	MT	9.600,00
HOLD N° 3	MT	9.370,97
HOLD N° 4	MT	10.400,00
HOLD N° 5	MT	10.800,00
DECK CGO	MT	
TOTAL	MT	50.600,97

LEGEND		
		BAUXITE IN BULK

CARGO	MT	50.600,97
I.F.O.	MT	1.007,10
M.D.O.	MT	98,00
F.&D. WAT.	MT	153,00
BALLAST	MT	49,70
CONST.	MT	304,83
DIFF. SURV.	MT	0,00
TOTAL	MT	52.213,60

MASTER : _____
CHIEF OFFICER : _____

Žitarice – NCB form

NATIONAL CARGO BUREAU, INC. GRAIN STABILITY CALCULATION		
S.S./M.V. _____	YEAR BUILT: _____	
COUNTRY OF REGISTRY _____	NET TONNAGE _____	OFFICIAL No. _____
AGENT: _____		
GRAIN LOADING BOOKLET APPROVED BY _____ DRAWING No. _____ DATE OF APPROVAL _____ APPLICABLE REGULATIONS _____ CHAPTER VI SOLAS 1974 ADDENDUM FOR UNTRIMMED ENDS APPROVED BY _____ DRAWING No. _____ DATE OF APPROVAL _____ LOADING PORT _____ BUNKERING PORT _____ DISCHARGING PORT _____ STEAMING DISTANCE _____ MILES PER DAY _____ TIME _____ DAILY CONSUMPTION: FUEL _____ DIESEL _____ WATER _____ DISPLACEMENT _____ DEADWEIGHT _____ DRAFT _____ FREEBOARD _____ WINTER _____ SUMMER _____ TROPICAL _____ FRESH WATER ALLOWANCE _____ TWTPT (AT SUMMER DRAFT) (If Applicable) _____ THIS IS CERTIFY THAT: 1. THIS CALCULATION IS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE VESSEL'S GRAIN LOADING BOOKLET AND THE APPLICABLE GRAIN REGULATIONS; 2. THE STABILITY OF THE VESSEL WILL BE MAINTAINED THROUGHOUT THE VOYAGE IN ACCORDANCE WITH THIS CALCULATION.		
CALCULATION PREPARED BY: (TO BE COMPLETED BY FORM PREPARED BY OTHER THAN SHIP'S PERSONNEL)		_____ MASTER
NAME (PRINT) _____ COMPANY _____ SIGNATURE _____ DATE _____		_____ EXAMINED: _____ N.E.C. SURVEYOR _____ DATE: _____

NOTE: ORIGINAL STABILITY CALCULATION AND GRAIN ARRANGEMENT PLAN TO BE SUBMITTED TO THE N.E.C. SURVEYOR. ALL TONNAGES USED IN THIS CALCULATION SHALL BE SHOWN IN THE FRAME UNIT 8 USED IN GRAIN LOADING BOOKLET.

[illegible]

... Žitarice – NCB form

FUEL AND WATER CALCULATION

INTERMEDIATE SECTION IS REQUIRED TO BE COMPLETED IF ARRIVAL SECTION SHOWS BALLAST WHICH IS NOT LISTED IN DEPART. SECTION. INTERMEDIATE CONDITION IS JUST PRIOR TO BALLASTING WHICH INCLUDES THE EFFECTS OF FREE SURFACE BUT NOT EFFECT OF WEIGHT OF THE BALLAST WHICH IS TO BE TAKEN ABOARD.

[illegible]

TOTAL LIQUIDS	0	0	0	2	0	0	0	0	0
SHIP AND CARGO	0	0	0	0	0	0	0	0	0
GRAND TOTAL DISPLACEMENT	0	0	0	0	0	0	0	0	0

DEPARTURE KG.	INTERMEDIATE KG.	ARRIVAL KG.
1.FREE SUR. CORR(+)	1.FREE SUR. CORR(+)	1.FREE SUR. CORR(+)
2. VERT S.M. CORR(+)	2. VERT S.M. CORR(+)	2. VERT S.M. CORR(+)
KGv	KGv	KGv

DEPARTURE KM		INTERMEDIATE KM		ARRIVAL KM	
DEPARTURE KGv	# DMD!	INTERMEDIATE KGv		ARRIVAL KGv	# DMD!
DEPARTURE GM	# DMD!	INTERMEDIATE GM		ARRIVAL GM	# DMD!
REQUIRED MIN. GM		REQUIRED MIN. GM		REQUIRED MIN. GM	

NOTES

(1) FREE SURFACE CORR.= $\frac{\text{SUM OF FREE SURFACE INERTIA MOMENTS}}{\text{DISPLACEMENT}}$ (THIS CORRECTION MUST BE APPLIED TO ALL SHIPS.)

(2) VERT. B.M. CORR. = $\frac{\text{SUM OF VERT. BHFT. MOM. FOR CARGO}}{\text{DISPLACEMENT}}$ (THIS CORR. APPLIES ONLY WHEN VERT. BHFT. MOM. ARE PROVIDED IN THE SHIPS GRAIN LOADING MANUAL.)

STABILITY SUMMARY

PART III

COMP. No.	STORAGE (1)	GRAIN DEPTH OR ULAGE	VOLUMETRIC HEELING MOMENT	S.F. OR DENSITY (2)	GRAIN HEELING MOMENT	VERTICAL SHIFTING MOMENT	
		FT/M	FT4/M4		LT.-FT. MT.-M.	FT4/M4	LT.-FT. MT.-M.
1.					#D (W/D)		
2.					#D (W/D)		
3.					#D (W/D)		
4.					#D (W/D)		
5.					#D (W/D)		
TOTALS:			0		#D (W/D)	0	0

1. UNDER STORAGE INDICATE "P" FOR FILLED COMPARTMENTS, "F-U" FOR FILLED COMPARTMENTS UNTRIMMED "PP" FOR PARTLY FILLED COMPARTMENTS, "SEC" FOR SECURED OR OVERSTOWED COMPARTMENTS.

2. STORAGE FACTOR USED IN PART 1 SHALL NOT EXCEED THE VOLUME PER UNIT WEIGHT (TEST WEIGHT) OF THE GRAIN. IF STORAGE FACTOR IS SAME IN ALL COMPARTMENTS, DIVIDE TOTAL VOLUMETRIC HEELING MOM. BY STORAGE FACTOR OR MULTIPLY BY DENSITY TO OBTAIN GRAIN HEELING MOMENT. IF STORAGE FACTOR VARIES, OBTAIN GRAIN HEELING MOMENT FOR EACH COMPARTMENT.

A. FOR VESSEL APPROVED UNDER	REGULATION 4, CHAPTER VI, SOLAS 1974 or REGULATION 4, IMCO RESOLUTION A.264(VIII), SOLAS 1960 or REGULATION 4, IMCO RESOLUTION A.184(VI), SOLAS 1960
------------------------------	--

	DEPARTURE	INTERMEDIAT	ARRIVA
DISPLACEMENT	0		0
KG/v	#DIV/0!		#DIV/0!
TOTAL GRAIN HEELING MOMENT	#DIV/0!		#DIV/0!
MAX. ALLOWABLE HEEL MOM.			
*ANGLE OF HEEL (12 Deg MAX)			
*RESIDUAL AREA	0.75 HETER-RODING		
*GM(0.3M OR 1FT. MIN)			

* TO BE COMPLETED IF VESSEL'S GRAIN LOADING BOOKLET DOES NOT INCLUDE TABLE OF ALLOWABLE HEELING MOMENTS. IN SUCH CASE, STATISTICAL STABILITY DIAGRAMS DEMONSTRATING THIS INFORMATION SHALL BE ATTACHED HERETO

B. FOR SPECIALLY SUITABLE SHIPS APPROVED UNDER SECTION VI(B), PART B CHAPTER VI SOLAS 1974 or SECTION VI(B), PART B IMCO RESOLUTION A.254(VIII) REGULATION 12, CHAPTER VI SOLAS 1960

$$\text{ANGLE OF HEEL} = \frac{\text{GRAIN HEELING MOMENT : 57.3}}{\text{DISPLACEMENT : GM}}$$

	DEPARTURE	INTERMEDIATE	ARRIVAL
TOTAL GRAIN HEELING MOMENT			
DISPLACEMENT			
GM (CORRECTED FOR LIQ. FREE SURF)			
ANGLE OF HEEL (5Deg MAX)			

① Comp't No	② Grain depth or stage	③ Volumetric heeling moment m ³ /mt		④ Stow Factor	⑤ Uncorrected Heeling Moments m tonnes/ft bias ③ ÷ ④	⑥ Correct -ion Factor	⑦ Corrected Heeling Moments m tonnes/ft bias ⑤ × ⑥
		Trimmed	Untrimmed				
		TOTALS:					

for this collection

[illegible]

Departure KG	Intermediate KG	Arrival KG
Free surface corr. (+)	Free surface corr. (+)	Free surface corr. (+)
Corrected KG _v	Corrected KG _v	Corrected KG _v
Departure KM	Intermediate KM	Arrival KM
DEPARTURE GM (KM – KG)	INTERMEDIATE GM	ARRIVAL GM
Required Minimum GM	0.30 m	0.30 m

$$\text{Free Surface correction} = \frac{\text{Total Free Surface Moments}}{\text{Displacement}}$$

	DEPARTURE	INTERMEDIATE	ARRIVAL
MAXIMUM SHEAR FORCE (% of allowable shearing)			
MAX. BENDING MOMENT (% of allowable shearing)			



Stručna literatura

Bulk Carriers Guidelines for Surveys, Assessment and Repair of Hull Structures 2nd Ed

1 Introduction

2 Class Survey Requirements

2.1 General

2.2 Annual Surveys

2.3 Intermediate Surveys

2.4 Special Surveys

2.5 Drydocking (Bottom) Surveys

2.6 Damage and Repair Surveys

4.3 Principles for Planning Document

4.4 Conditions for Survey

4.5 Access Arrangement and Safety

4.6 Personal Equipment

4.7 Thickness Measurement and Fracture

Detection

4.8 Survey at Sea or at Anchorage

4.9 Documentation Onboard

3 Technical Background for Surveys

3.1 General

3.2 Definitions

3.3 Structural Damages and

Deterioration

3.4 Structural Detail Failures

And Repairs

3.5 IACS Early Warning Scheme

(EWS) for Reporting of

Significant Damage

4 Survey Planning, Preparation and Execution

4.1 General

4.2 Survey Programme

5 Structural Detail Failures and Repairs

5.1 General

5.2 Catalogue of Structural Detail

Failures and Repairs

Part 1 Cargo Hold Region

Area 1 Deck Structure

Area 2 Topside Tank Structure

Area 3 Cargo Hold Side Structure

Area 4 Transverse Bulkheads Including

Stool Structure

Part 2 Fore and Aft End Regions

Area 1 Fore End Structure

Area 2 Aft End Structure

Area 3 Stern Frame, Rudder Arrangement

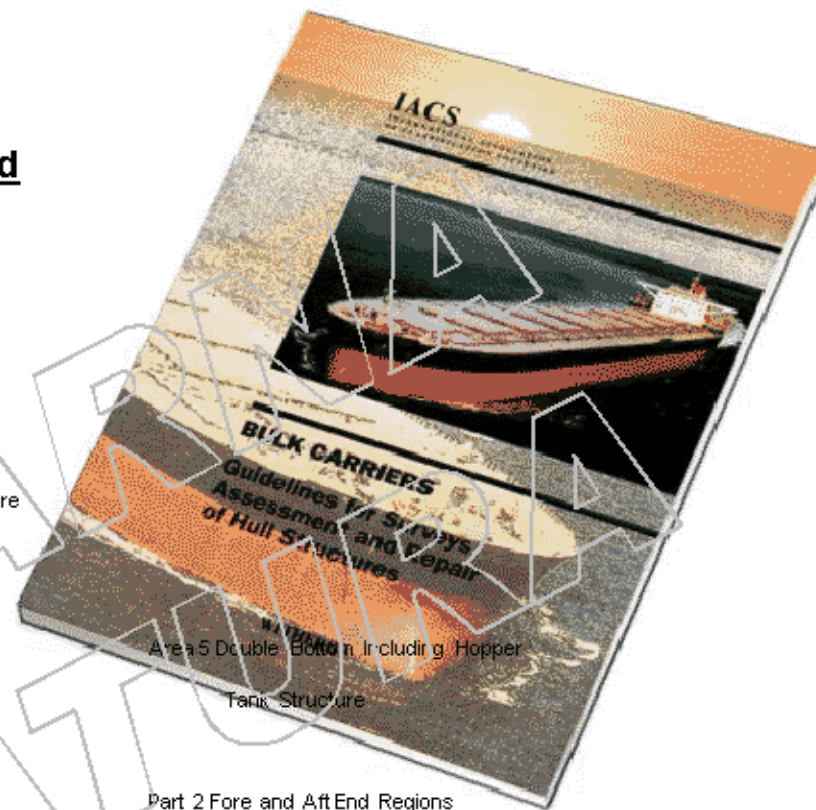
And Propeller Shaft Support

Part 3 Machinery and Accommodation

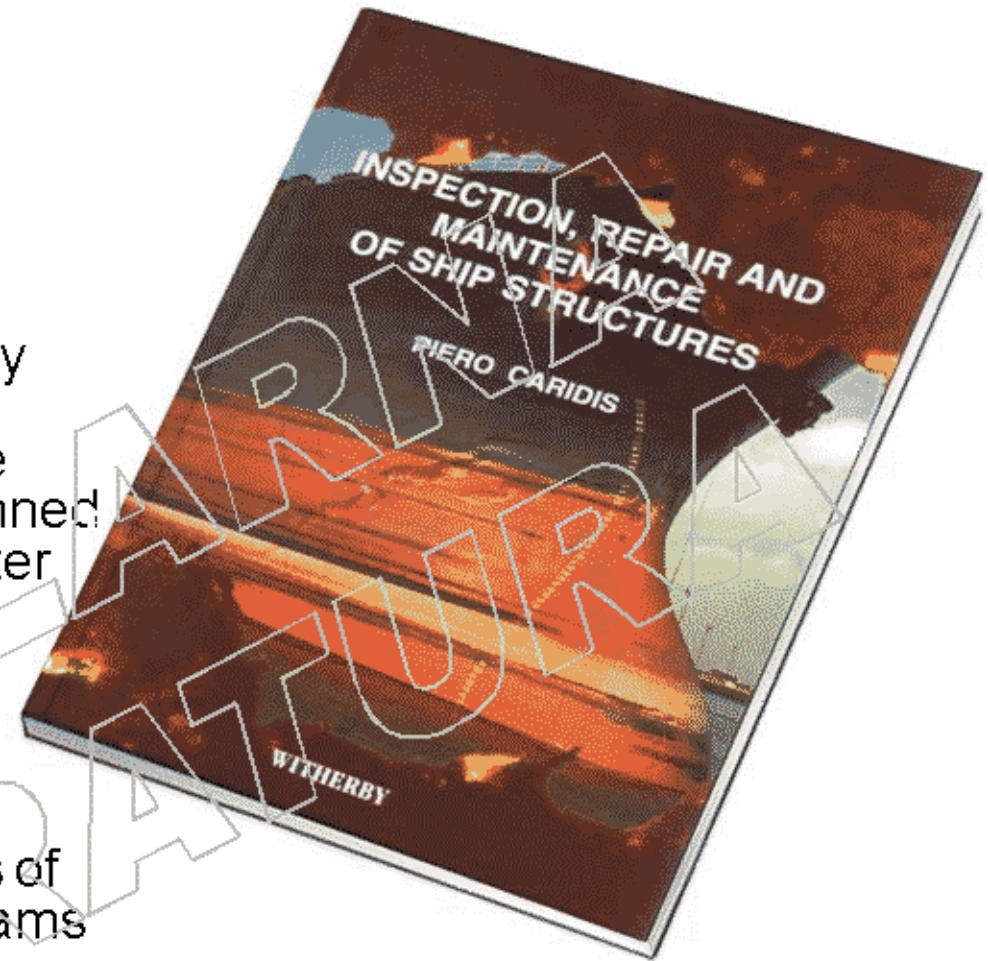
Spaces

Area 1 Engine Room Structure

Area 2 Accommodation Structure



- While enormous sums of money are spent on hull repairs, substantial economies could be made if they were properly planned using the application of computer technology.
- This book, with over 450 pages of text and many illustrative diagrams and pictures, should be an essential and invaluable guide to best practice in the repair, maintenance and classification of ocean-going merchant ships.



Code of Practice for the Safe Loading and Unloading of Bulk Carriers

- Introduction
- Section 1 Definitions
- Section 2 Suitability of ships and terminals
- Section 3 Procedures between ship and shore prior to the ship's arrival
- Section 4 Procedures between ship and terminal prior to cargo handling
- Section 5 Cargo loading and handling of ballast
- Section 6 Unloading cargo
- Appendix 1 Unloading cargo and handling of ballast
- Appendix 2 Loading and unloading plan
- Appendix 3 Ship/shore safety checklist
- Appendix 4 Guidelines for completing the ship/shore safety check list
- Appendix 5 Form for Cargo information
- Resolution A.862 (20) – Code of practice for the safe loading and unloading of bulk carriers



- The Maritime Safety Committee, at its fifty-ninth session (May 1991), adopted a new International Code for the Safe Carriage of Grain in Bulk (International Grain Code).

- This replaced the original chapter VI of the 1974 SOLAS Convention, which contained detailed regulations on the carriage of grain in bulk, with more general requirements and placed the detailed provisions on grain in a separate mandatory code.

- Resolution MSC.23 (59) (adopted on 23 May 1991)

- Annex International Code for the Safe Carriage of Grain in Bulk
- Part A Specific Requirements
- Part B Calculation of assumed heeling moments and general assumptions
- Appendix 1974 SOLAS Convention, Chapter VI, Part C, as amended by resolution MSC.22 (59)



Part 1 Introduction

1. General
2. Teamwork
3. Corrosion
4. Coatings
5. Cathodic Protection by Use of Anodes
6. Microbially Influenced Corrosion
7. Inert Gas in Ballast Tanks

Part2-1 New Building- Corrosion Protection of Ships Ballast Tanks

1. General
2. Planning
3. Cathodic Protection
4. Coating Selection
5. Steel Surface Preparation

5.1 Pre-Cleaning

6. Coating Application and Curing

6.1 Strip Coating

6.2 Environmental Control

6.2.1 Dehumidifiers

6.2.2 Dew Point Requirements

6.2.3 Extraction Ventilation

6.2.4 Heating

6.3 Pre-Application Controls

6.3.1 Thinning

6.3.2 Mixing

6.3.3 Equipment and Pressure

6.4 Thickness Minimum/Maximum Window

6.5 Erection Join-Up Areas

7. Acceptance Criteria

8. Seawater Testing-Tank Final Inspection

8.1 Seawater (or water) Testing

8.2 Defects Found During Tank Final Inspection

9. Inspection

9.1 Yard QC Duty

9.2 Contractor QC Duty

9.3 Coatings Manufacturer QC Duty

9.4 Owners Coatings Inspector Duty

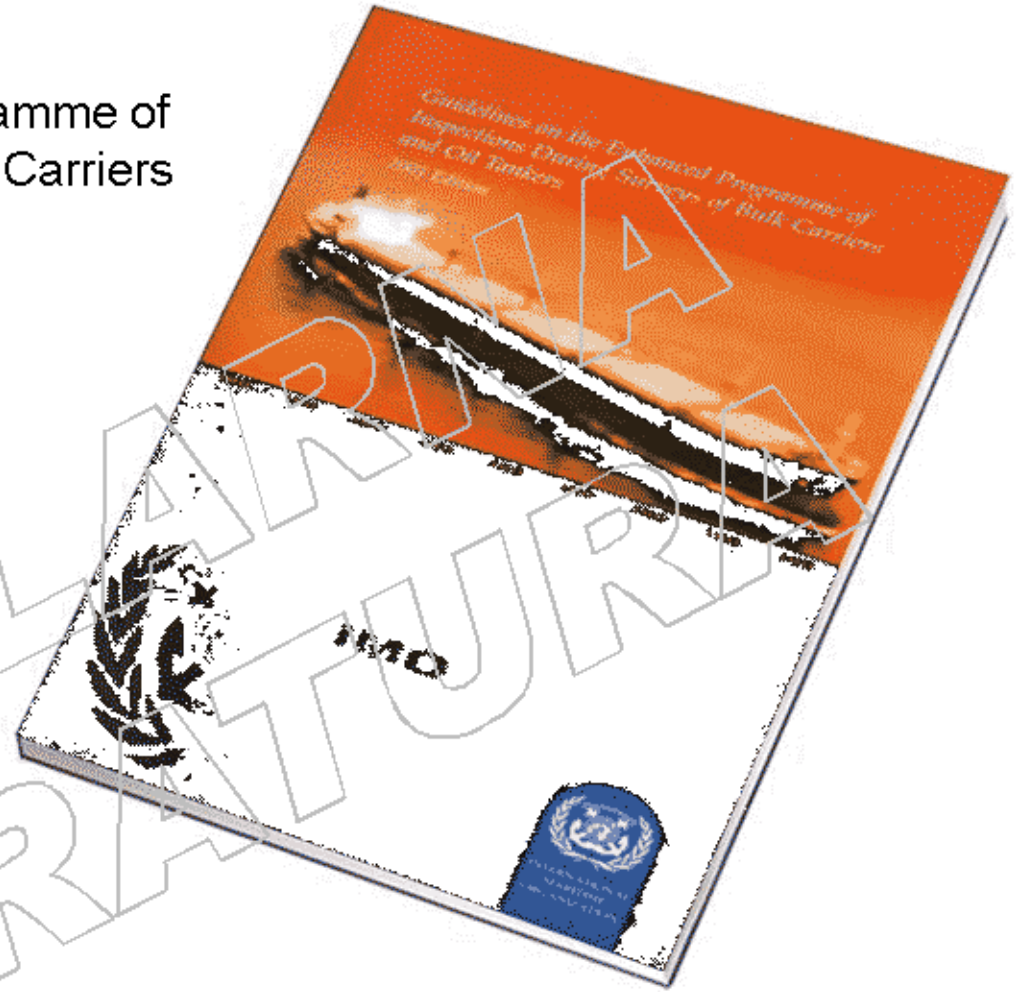


- The BC Code provides guidance to Administrations, shipowners, shippers and masters on the standards to be applied in the safe stowage and shipment of solid bulk cargoes excluding grain, which is dealt with under separate rules.
- The BC Code includes practical guidance on the procedures to be followed and the appropriate precautions to be taken in the loading, trimming, carriage and discharge of bulk cargoes.
- The current edition includes all amendments to the BC Code that were adopted by the Maritime Safety Committee at its seventy-ninth session by resolution MSC.193(79).



Guidelines on the Enhanced Programme of Inspections During Surveys of Bulk Carriers and Oil Tankers

- This publication contains, in part 1, a consolidated text of the Guidelines including the amendments in force at the time of publication, and, in part 2, the amendments not yet in force.
- It was adopted in 1993 by Assembly resolution A.744(18) and made mandatory in 1996, under SOLAS regulation XI/2, which requires that bulk carriers and oil tankers be subject to an enhanced programme of inspections in accordance with the Guidelines.
- The Guidelines are also mandatory under MARPOL regulation I/13G for oil tankers to which that regulation applies.

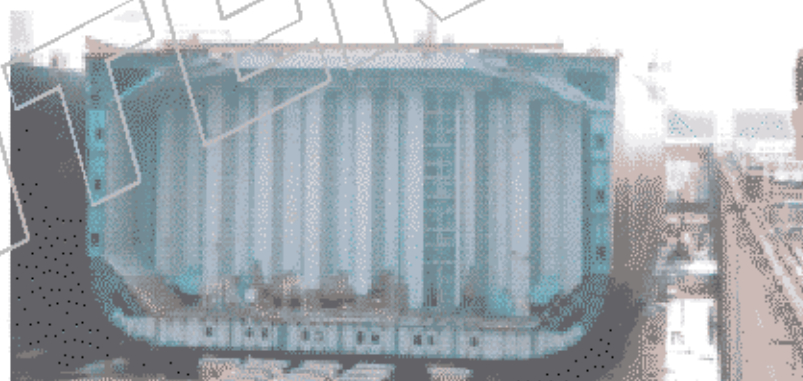


Generalni i specijalni tereti

i vrste brodova

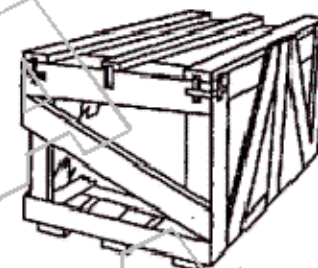
Povijesni razvoj prijevoza generalnih i specijalnih tereta morem i vrste brodova za prijevoz ovih tereta

- pojam generalnog i specijalnih tereta i njihova uloga kroz povijest,
- prijevoz generalnog i specijalnih tereta kroz povijest (brodovi i njihova konstrukcija uključujući brodska skladišta, tankove i opremu za prekrcaj tereta),
- moderni brodovi i njihove specifičnosti (brodovi za prijevoz generalnog tereta, višenamjenski brodovi, brodovi za prijevoz teških tereta, brodovi za prijevoz hladnog tereta, namjenski brodovi za prijevoz određene vrste tereta)



Pojam generalnog i specijalnih tereta i njihova uloga kroz povijest

- Generalni teret ~ Suhi jedinični teret,
 - drvena građa i trupci,
 - metalni proizvodi (čelični limovi, cjevi, žice i profili),
 - djelovi mostova, industrijskih postrojenja, strojeva i vozila,
 - papir i teret u balama,
 - sirovine i proizvodi prehrambene industrije,
 - tekućine i plinovi u prijenosnim tankovima.
- Specijalni teret ~ Suhi jedinični teret,
 - opasni teret,
 - teški teret,
 - hladjeni teret.



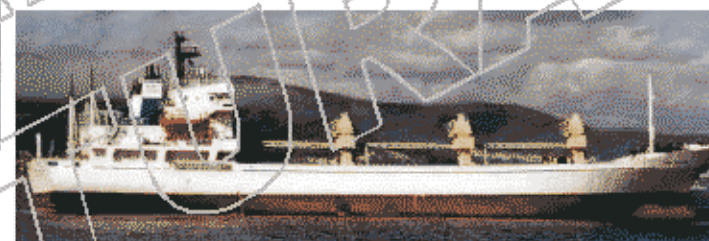
Brodovi za generalni i specijalni teret kroz povijest



Moderni brodovi za generalni i specijalni teret - Namjenski i nenamjenski



... moderni brodovi za generalni i specijalni teret - Namjenski i nenamjenski



Konstrukcija

