PRIJEVOZ RASUTIH TERETA MOREM

PRAVNI PROPISI KOJI SE ODNOSE NA PRIJEVOZ RASUTOG TERETA

- SOLAS, Glava 6 i 7

- International Maritime Code of Safe Practice for Solid Bulk Cargoes (IMSBC Code).
- International Code for the Safe Carriage of Grain in Bulk.
- Code of Practice for the Safe Loading and Unloading of Bulk Cargoes (BLUCode).
- Resolutions of the 1977 SOLAS Conference, regarding the Inspection and Surveys of Bulk Carrier vessels.
- MSC/Circ. 908 (June 1999), Appendix C, Uniform Method of Measurement of the Density of Bulk Cargoes.
- MSC/Circ. 646 (June 1994) Recommendations for the Fitting of Hull Stress Monitoring Systems

OBILJEŽJA RASUTIH TERETA

- Rasuti tereti su tereti bez ambalaže koji se ukrcavaju, prevoze i iskrcavaju u rasutom stanju
- Udio takvih tereta u prekomorskoj razmjeni iznosi preko 30% ukupne pomorske trgovine.
- Prema obilježjima, rasuti tereti, mogu se podijeliti na:
  - tereti koji mogu postati žitki
  - tereti koji imaju kemijske opasnosti
  - tereti koji su nekohezivni (sipki)
  - ostali rasuti tereti (npr. tereti velikih gustoća)

- U rasutom stanju se najčešće prevoze
  žitarice, ugljen, rudače.

OBILJEŽJA RASUTIH TERETA

- Rasuti tereti koji mogu postati žitki
  - Grupa A IMSBC pravilnika
  - SOLAS Glava 6, dio B
  - Žitki tereti
  - Vlaga i vibracije
  - Problem slobodnih površina
  - Prijevoz na klasičnim brodovima za prijevoz rasutog tereta
  - Prijevoz na specijaliziranim brodovima za prijevoz žitkog r. tereta



OBILJEŽJA RASUTIH TERETA

- Rasuti tereti koji mogu imati kemijske opasnosti
  - Grupa B IMSBC pravilnika
  - Kemijski opasni rasuti tereti
  - SOLAS Glava 7, dio A (A1)
  - Klase opasnih rasutih tereta
  - Odredbe o slaganju odvajanju i prijevozu

OBILJEŽJA RASUTIH TERETA

- Nekohezivni rasuti tereti – sipki tereti
  - Grupa C IMSBC pravilnika
  - SOLAS Glava 6, dio B
  - Kut prirodnog priklona (kut osipanja)
  - 3 grupe u pogledu kuta prirodnog priklona

- Žitarice
  - SOLAS Glava 6, dio C
  - Međunarodni kodeks o prijevozu žitarica
  - IGC Code
  - Posebni zahtjevi i pogledu stabilnosti

OBILJEŽJA BRODOVA ZA PRIJEVOZ RASUTIH TERETA

Type	Length (Overall) (m)	Approximate Draught (m)	Deadweight (dwt)	Number of Cargo Holds	Remarks
Mini Bulk Carrier	100-130	Less than 10	3000 – 23,999	1 – 3	Employed in coastal trade, serving as feeder vessels to large ships. Their main trade consists of short sea voyages, carrying limited quantities of bulk cargoes generally to smaller ports **without** restriction on size of vessels.
Handysize	130-150	10	24,000 – 34,999	5	Medium size, can carry cargoes to a large number of ports, may carry considerable variety and quantity of bulk cargoes.
Handymax	150-200	11-12	35,000 – 49,999	5	The distinction between handysize and handymax is quite recent.
Panamax	200-230	13-15	50,000 – 79,999	7 – Single Skin 6 – Double Skin	Largest vessel that can pass through the locks of the Panama canal - breadth 32.2 m, LOA 289.5 m, draught not more than 12 m. Generally carry grain, coal and iron ore from US ports.
Capesize	230-270	17	80,000 – 199,000	9	Vessels too big to use the Panama or Suez canals. Known as Capesize vessels because they have to go around the Cape of Good Hope or Cape Horn. Only a few ports in the world can accommodate them in fully loaded condition.
Suezmax	NA	16.4	About 150,000	NA	The largest vessel that can pass through the Suez canal. The maximum allowed draught of the Suez canal is currently 18.90 m (62 feet). However, the authorities intend to increase this draught to 21.95 m by the end of 2017.
Very Large Bulk Carrier (VLBC)	270 and more	20 or more	180,000 and over	10	Very specialised, mainly purpose-built for specific trades.
Seawaymax	226 (max)	7.92	28,502 (max)		Largest vessel that can pass through the canal locks of the St Lawrence Seaway.
Malaccamax	330 (approx)	20	300,000		Largest vessel that can pass through the Straits of Malacca.
Setouchmax	299.9 (max)	16.1 (max)	205,000 (approx)		Maximum size allowed for ports in the Setouch Sea in Japan only.
Dunkirkmax	289 (max)	Various	175,000 (approx)		Maximum allowable beam = 45 m for eastern harbour lock in Dunkirk, France.
Kamsarmax	229 (max)	Various	82,000 (approx)		Maximum size allowed for port Kamsar in Equatorial Guinea.
Newcastlemax	Usually Capesize		185,000 (approx)		Maximum allowable beam = 47 m for port of Newcastle in Australia.

Table 1.4 – Typical Features of Various Types of Bulk Carriers

OBILJEŽJA BRODOVA ZA PRIJEVOZ RASUTIH TERETA

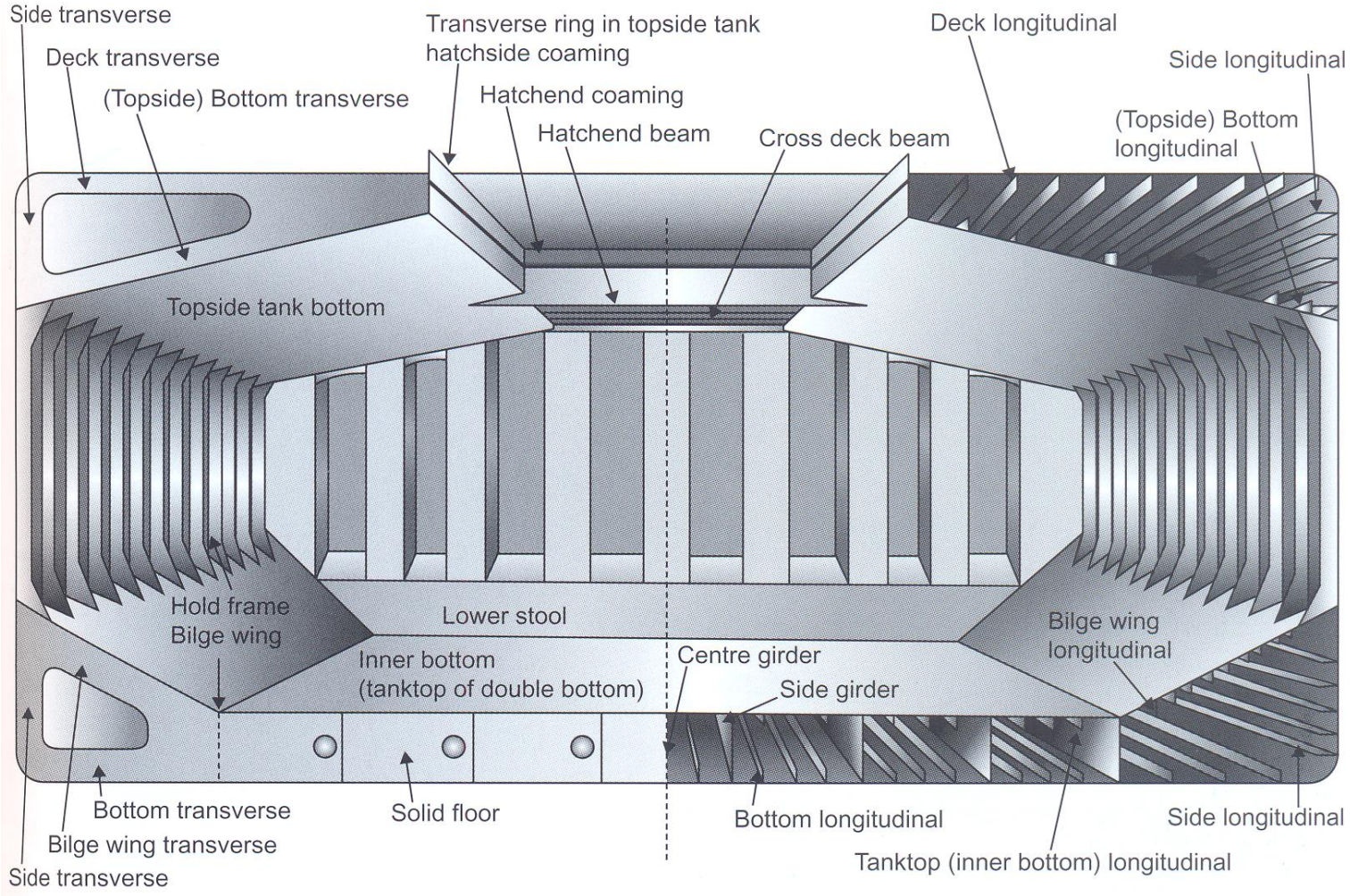


Figure 1.1 – Typical Section of a Bulk Carrier (Source: IMO Res. A.866(20))

OBILJEŽJA BRODOVA ZA PRIJEVOZ RASUTIH TERETA

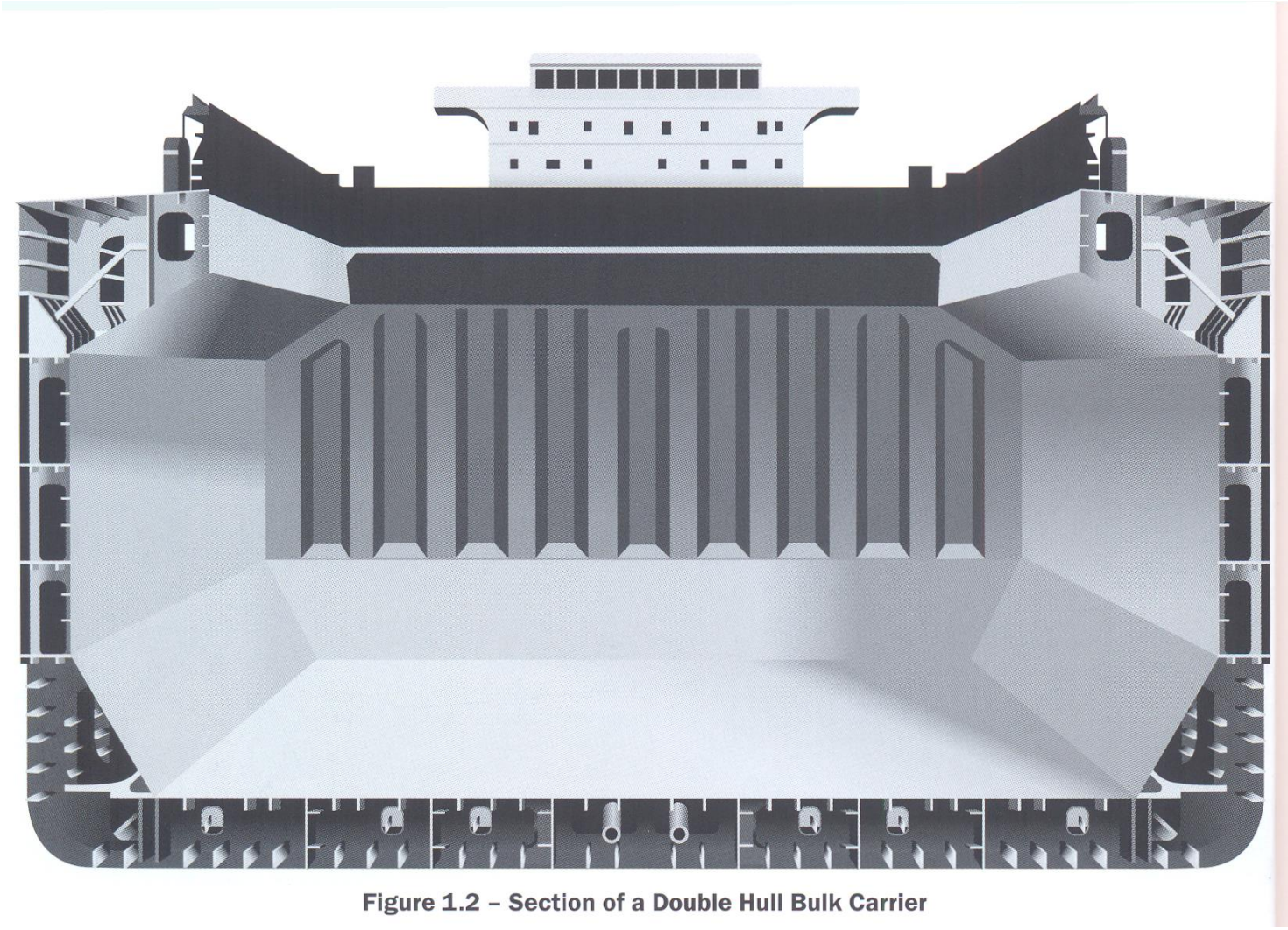


Figure 1.2 – Section of a Double Hull Bulk Carrier

PRIPREMA BRODA ZA UKRCAJ TERETA

- Podaci o teretu

FORM FOR CARGO INFORMATION

(Recommended layout)

Note: This form is not applicable if the cargo to be loaded requires a declaration under the requirements of SOLAS 1974, chapter VII, regulation 5; MARPOL 73/78, Annex III, regulation 4; and the IMDG Code, General Introduction section 9.

Shipper	Reference number(s)
Consignee	Carrier
Name/means of transport	Instructions or other matters
Port/place of departure	
Port/place of destination	
General description of the cargo (For solid bulk cargo - type of material/particle size)	Gross mass (kg/tonnes) ☐ General cargo ☐ Cargo unit(s) ☐ Bulk cargo
Specification of bulk cargo (if applicable) Stowage factor Angle of repose Trimming procedures Chemical properties* if potential hazard * e.g., IMO class, UN No. or BC No. and EmS No.	
Relevant special properties of the cargo	Additional certificate(s) (if required) ☐ Certificate of moisture content and transportable moisture limit ☐ Weathering certificate ☐ Exemption certificate ☐ Other (specify)
DECLARATION I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.	Name/status, company/organization of signatory Place and date Signature on behalf of shipper

As an aid to paper documentation, Electronic Data Processing (EDP) or Electronic Data Interchange (EDI) techniques may be used.

This form meets the requirements of SOLAS 1974, chapter VI, regulation 2; the BC Code and the CSS Code.

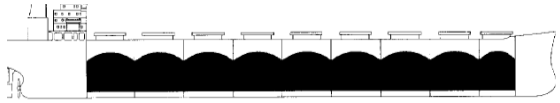
PRIPREMA BRODA ZA UKRCAJ TERETA

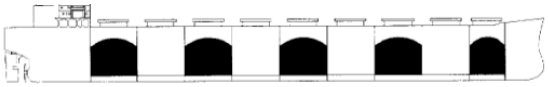
- Kako bi mogao sigurno boraviti na mjestu priveza i izvoditi prekrcajne operacije potrebno prikupiti podatke o:
  - obilježjima opreme za prekrcaj
  - manipulacijama balastom
  - dubinama na mjestu priveza, prilazu luci
  - gustoći vode
  - opstrukcijama na mjestu priveza, te prilaza
  - najmanjem dopuštenom gazu na dolasku
  - najvećem dopuštenom gazu na odlasku

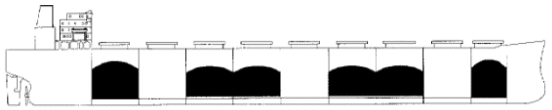
- Dužnost zapovjednika broda je da konzultira i sve dostupne publikacije koje predstavljaju stručan izvor podataka za teret koji se namjerava ukrcati i luku.

PRIPREMA BRODA ZA UKRCAJ TERETA

- Tijekom planiranja uzdužnog rasporeda tereta valja voditi računa:
  - poprečnim silama
  - momentima savijanja
  - najvećim dopuštenim masama tereta po pojedinim skladištima



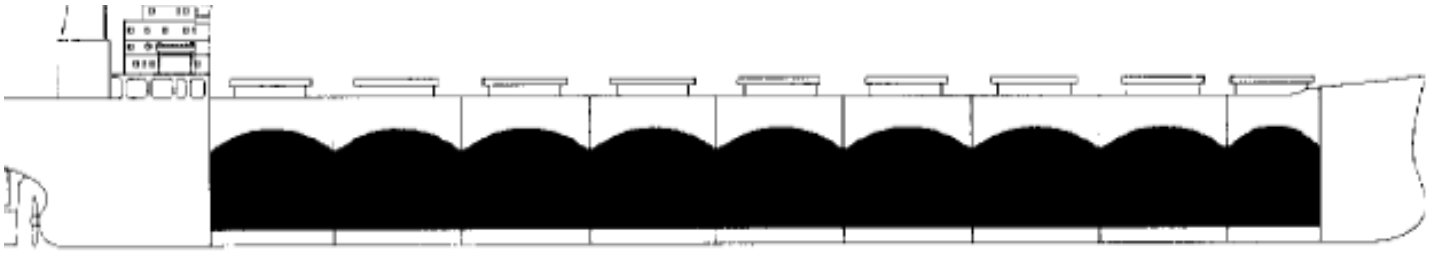




- Teret se u uzdužnom smislu može slagati:
  - ravnomjernim popunjavanjem skladišnih prostora
  - alternativnim slaganjem tereta skladišnim prostorima
  - popunjavanjem svih skladišnih prostora do punog kapaciteta osim jednog
  - blok slaganjem tereta po skladišnim prostorima (kada se krca generalni teret)

PRIPREMA BRODA ZA UKRCAJ TERETA

- Raspored rasutog tereta
  - Uobičajeni rasuti teret



  - Žitarice

PRIPREMA BRODA ZA UKRCAJ TERETA

- BLU Code - *CODE OF PRACTICE FOR THE SAFE LOADING AND UNLOADING OF BULK CARRIERS*
- SOLAS Glava 12

- Priručnik s informacijama o terminalu
- Popis provjere brod/terminal
- Plan ukrcaja/iskrcaja

PRIPREMA BRODA ZA UKRCAJ TERETA

- Popis provjere

SHIP/SHORE SAFETY CHECKLIST

For Loading or Unloading Dry Bulk Cargo Carriers

Date .....

Port ..... Terminal/Quay. .....

Available depth of water in berth ..... Minimum air draught* .....

Ship's name .....

Arrival draught (read/calculated) ..... Air draught. .....

Calculated departure draught ..... Air draught. .....

The Master and terminal manager, or their representatives, should complete the checklist jointly. Advice on points to be considered is given in the accompanying guidelines. The safety of operations requires that all questions should be answered affirmatively and the boxes ticked. If this is not possible, the reason should be given, and agreement reached upon precautions to be taken between ship and terminal. If a question is considered to be not applicable write "N/A", explaining why if appropriate.

	Ship	Terminal
1. Is the depth of water at the berth, and the air draught, adequate for the cargo operation?	☐	☐
2. Are mooring arrangements adequate for all local effects of tide, current, weather, traffic and craft alongside?	☐	☐
3. In emergency, is the ship able to leave the berth at any time?	☐	☐
4. Is there safe access between the ship and the wharf? *Tended by Ship/Terminal* *(cross out as appropriate)*	☐	☐
5. Is the agreed ship/terminal communications system operative? *Communication method* ..... *Language* ..... *Radio channels/phone numbers*	☐	☐
6. Are the liaison contact persons during operations positively identified? *Ship contact persons* ..... *Shore contact person(s)* ..... *Location*	☐	☐
7. Are adequate crew on board, and adequate staff in the terminal, for emergency?	☐	☐
8. Have any bunkering operations been advised and agreed?	☐	☐
9. Have any intended repairs to wharf or ship whilst alongside been advised and agreed?	☐	☐

*The term air draught should be construed carefully: if the ship is in a river or an estuary, it usually refers to maximum mast height for passing under bridges, while on the berth it usually refers to the height available or required under the loader or unloader.

PREKRCAJNA OPREMA ZA RASUTI TERET

- Rasuti teret se može prekrcavati korištenjem:
  - Grabilica
  - Konvejera
- Grabilice se mogu postaviti na kuku brodskog teretnog uređaja.
- Ovisno o vrsti tereta razlikuju se u izvedbi.
- Nosivost im može iznositi od 2 do 20 i više tona.
- Konvejeri se mogu koristiti za ukrcaj odnosno iskrcaj tereta ili za obje trgovačke operacije.




PREKRCAJNA OPREMA ZA RASUTI TERET

FIG 11.1 LOADING PIPE FROM SILO
(Courtesy Hartman Förderanlagen GmbH)

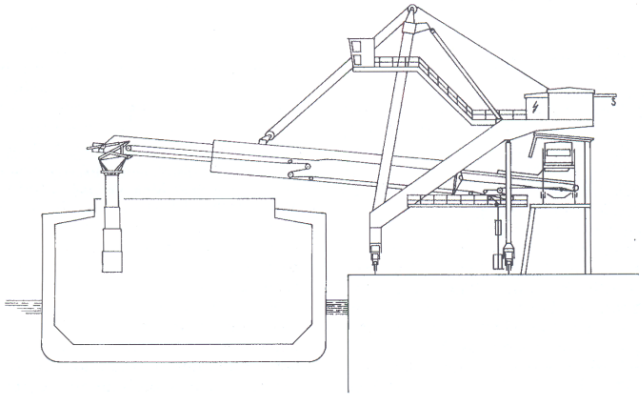


FIG 11.2 MECHANICAL SHIPLOADER
(Courtesy O & K Anlagen und System and PWH Anlagen & System)

PREKRCAJNA OPREMA ZA RASUTI TERET

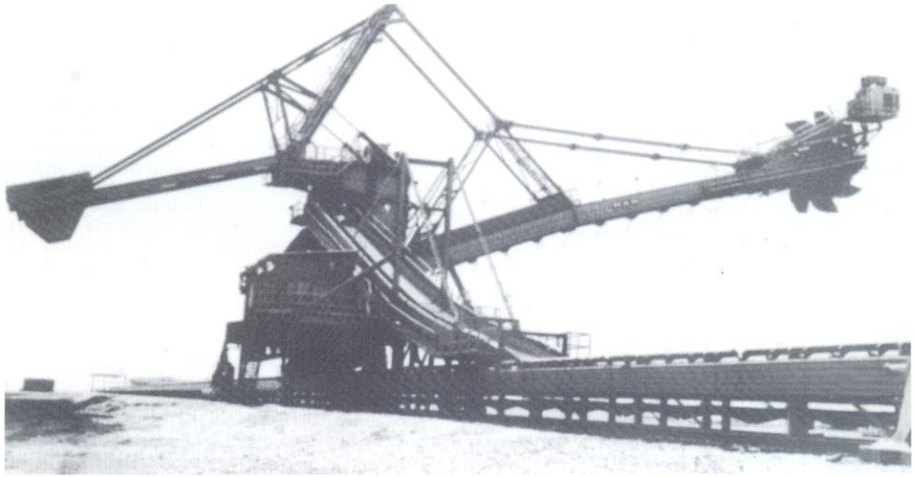
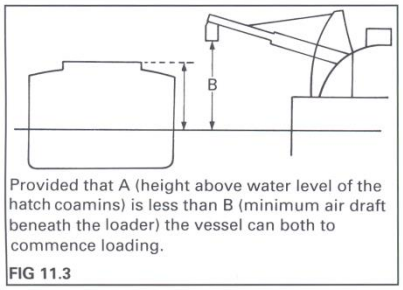
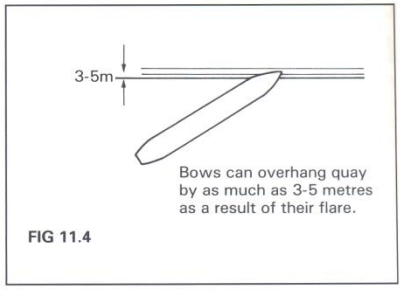


FIG 11.7 **STACKER/RECLAIMER** *(Courtesy of MAN Gutehoffnungshütte AG)*



Provided that A (height above water level of the hatch coamins) is less than B (minimum air draft beneath the loader) the vessel can both to commence loading.

FIG 11.3



Bows can overhang quay by as much as 3-5 metres as a result of their flare.

FIG 11.4

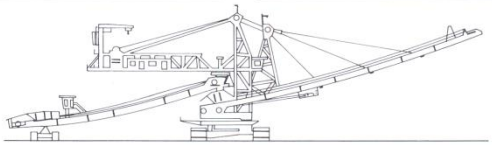


FIG 11.5 **STACKER** *(Courtesy O & K Anlagen und System and PWH Anlagen & System)*

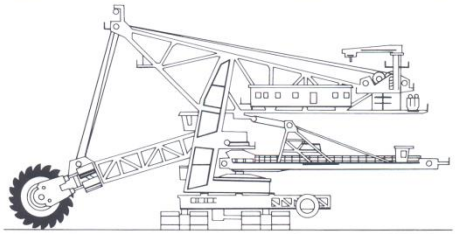


FIG 11.6 **RECLAIMER** *(Courtesy O & K Anlagen und System and PWH Anlagen & System)*

PREKRCAJNA OPREMA ZA RASUTI TERET

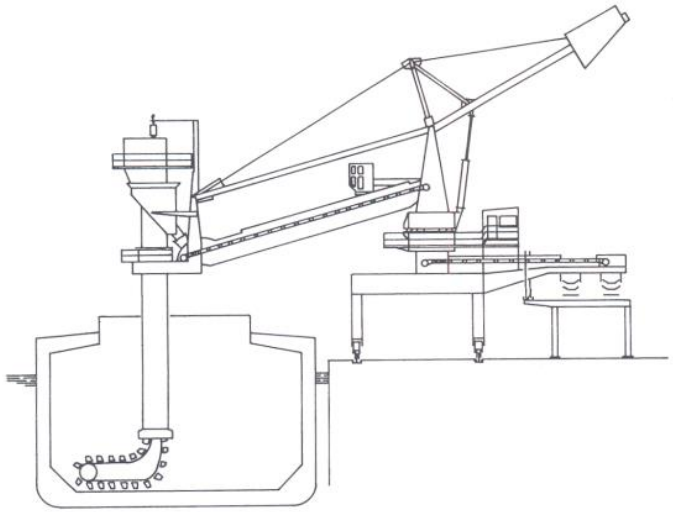


FIG 11.10 CONTINUOUS UNLOADER
(Courtesy OF O & K Anlagen und System and PWH Anlagen & System)

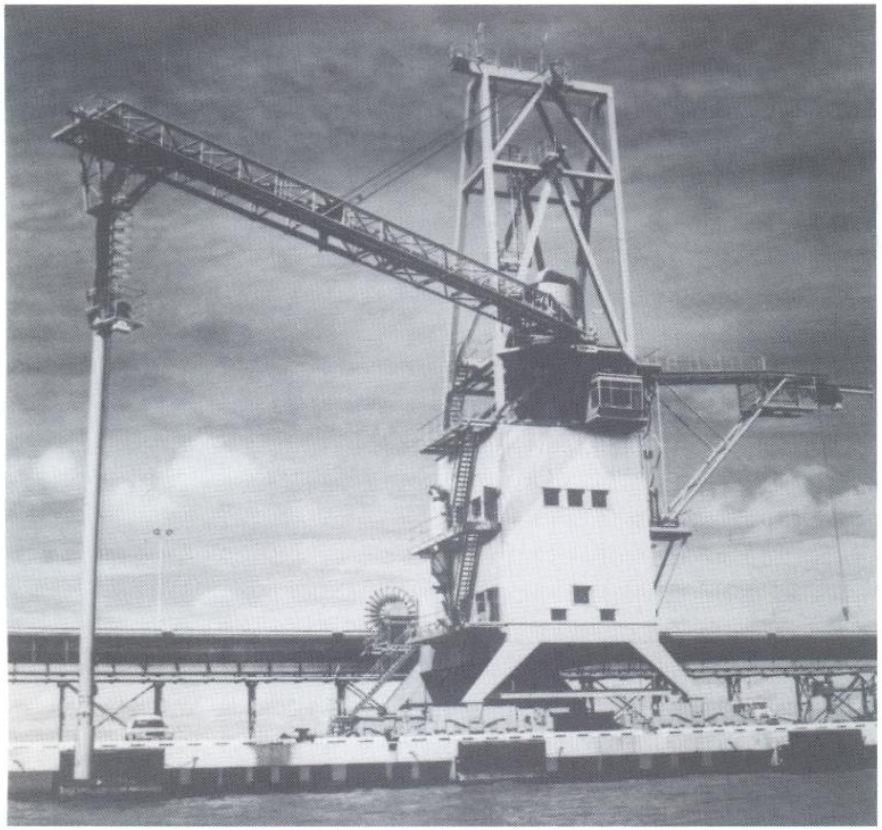


FIG 11.11 SUCTION UNLOADER
(Courtesy Hartmann Förderanlagen GmbH)

PREKRCAJNA OPREMA ZA RASUTI TERET

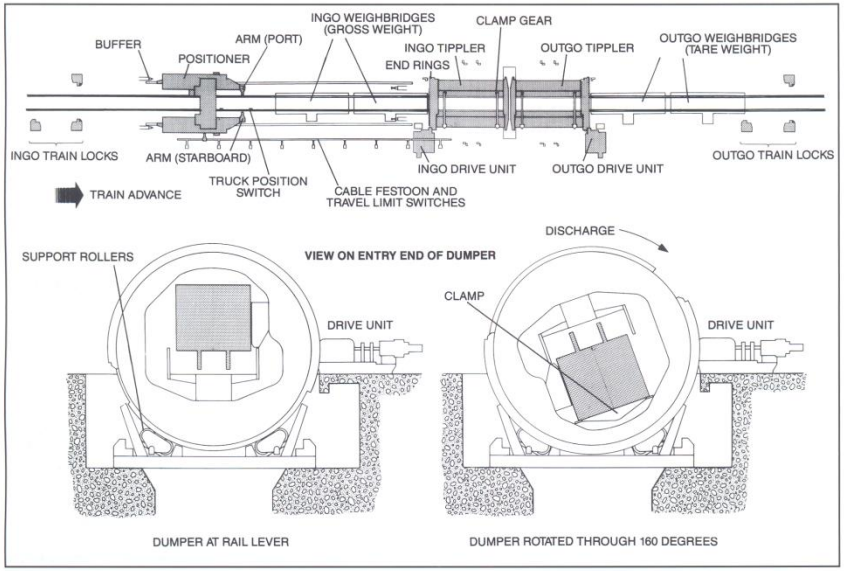


FIG 11.8 RAIL DUMPER SYSTEM TURNS RAIL WAGONS UPSIDE DOWN TO TIP OUT CONTENTS
(Courtesy of Strachan & Henshaw)

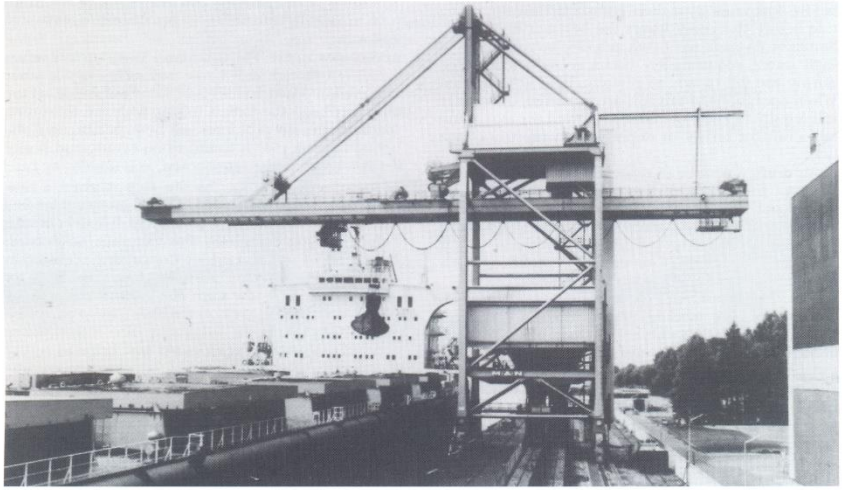
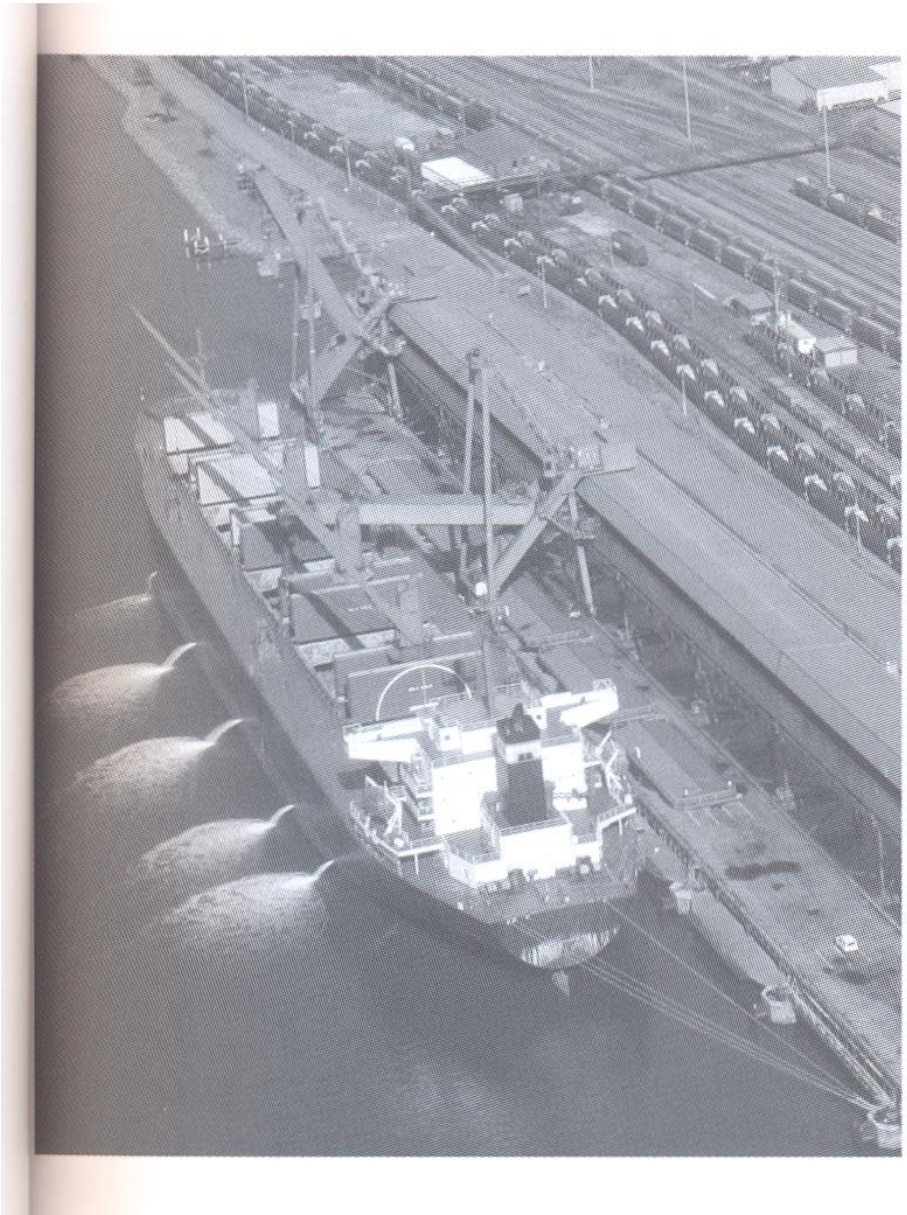


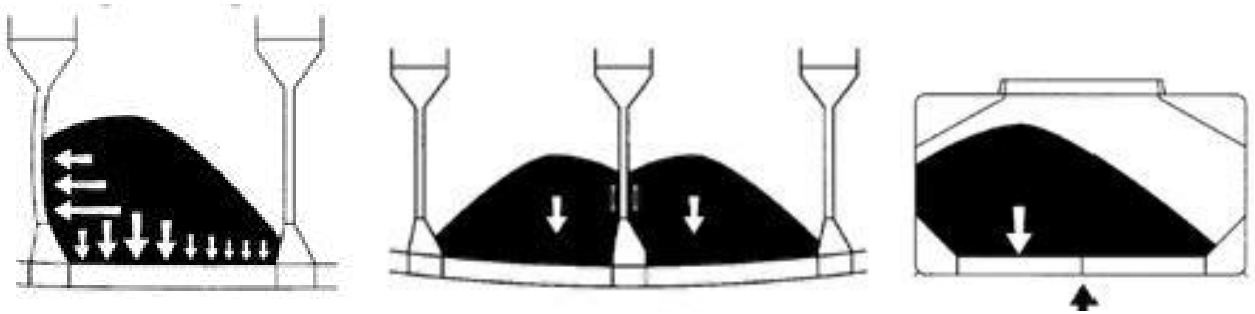
FIG 11.9 GRAB UNLOADER
(Courtesy of MAN Gutehoffnungshütte AG)

UKRCAJ TERETA I NADZOR TIJEKOM UKRCAJA



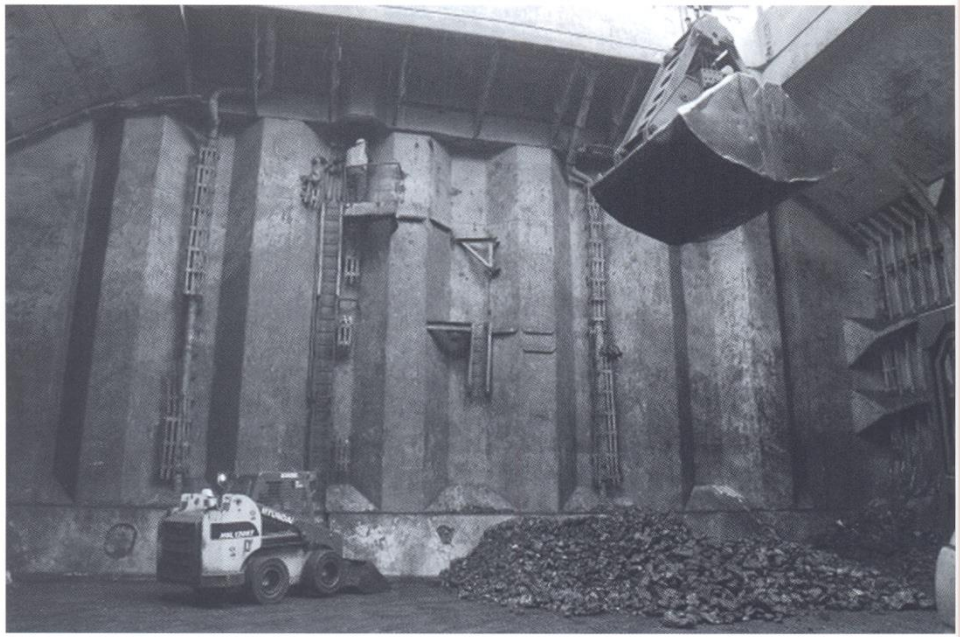
NAJČEŠĆE NEUSUGLAŠENOSTI KOJE UGROŽAVAJU SIGURNOST BRODA TIJEKOM UKRCAJA

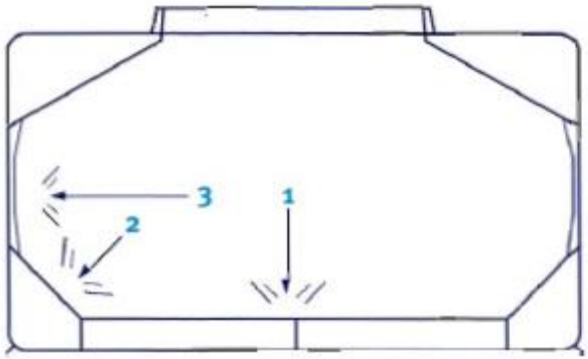
- Slaba komunikacija između broda i odgovorne osobe terminala.
- Nepridržavanje tijeka plana ukrcaja tereta.
- Odstupanje od mjera i zahtijeva navedenih u priručniku ukrcaja.
- Nesimetrična raspodjela tereta.
- Prekoračenje prekrcajnih količina u pojedinim segmentima ukrcaja.
- Ukrcaj tereta ne slijedi manipulacije balastom.

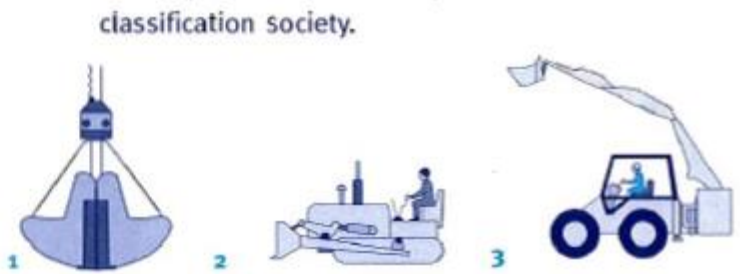


PRIPREMA I ISKRCAJ TERETA

- Moguća oštećenja skladišta tijekom iskrcaja







PRIJEVOZ RASUTIH TERETA MOREM