

BLU MANUAL

Manual on loading and unloading of solid bulk cargoes
for terminal representatives
2008 Edition



BLU MANUAL

BLU MANUAL

BLU MANUAL

BLU MANUAL

BLU MANUAL

AVA

IMO

Documents

Document Sharing



Provided by IHS

Licensee=SONGA OFFSHORE

No reproduction or networking permitted without license

ORGANIZATION

BLU MANUAL

Manual on loading and unloading of solid bulk cargoes
for terminal representatives
2008 Edition



INTERNATIONAL
MARITIME
ORGANIZATION

Documents
London, 2008
Document Sharing Hub

First published in 2008 by the
INTERNATIONAL MARITIME ORGANIZATION
4 Albert Embankment, London SE1 7SR

Printed in the United Kingdom by MPG Books

2 4 6 8 10 9 7 5 3 1

ISBN 978-92-801-1492-8

IMO PUBLICATION

Sales number: I267E

Copyright © International Maritime Organization 2008

All rights reserved.
No part of this publication may be reproduced,
stored in a retrieval system or transmitted in any form
or by any means without prior permission in writing
from the International Maritime Organization.

Foreword

1 In response to the continuing loss of ships carrying solid bulk cargoes sometimes without trace and with heavy loss of life – the Code of Safe Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) was developed by IMO as one of a number of measures to enhance the operational and structural safety of bulk carriers. It was adopted as a recommendatory instrument by the International Maritime Organization's Assembly at its twentieth session in November 1997.

2 Possible stress and damage imposed by cargo handling throughout the life of a ship was considered to be a possible contributory cause of structural failure of bulk carriers leading to casualties and losses. The purpose of the BLU Code, therefore, is to provide guidance to ship masters of bulk carriers, terminal operators and other parties for the safe handling, loading and unloading of solid bulk cargoes.

3 To augment the BLU Code, the Manual on loading and unloading of solid bulk cargoes for terminal representatives (BLU Manual) is intended to provide more detailed guidance to Terminal Representatives (as defined in the BLU Code) and others involved in the handling of solid bulk cargoes; including those responsible for the training of personnel.

4 It should be noted that in this Manual, a reference to an appendix is a reference to an appendix in the BLU Code and a reference to an annex is to an annex in this Manual.

5 Further guidance on the safe loading and unloading of solid bulk cargoes is contained in the following publications:

Bulk Carriers, Handle with Care, IACS Ltd. 1998, 36 Broadway, London SW1H 0BH, United Kingdom,
Tel: +44 (0)207 976 0660, Fax: +44 (0)207 808 1100
E-mail: permsec@iacs.org.uk
Website: <http://www.iacs.org.uk>

The Loading and Unloading of Solid Bulk Cargoes, ICHCA International Ltd., Suite 2, 85 Western Road, Romford, Essex, RM1 3LS, United Kingdom
Tel: +44 (0)1708 735 295, Fax: +44 (0)1708 735 225
E-mail: info@ichcainternational.co.uk

Contents

	<i>Page</i>
Introduction	1
Section 1 – Definitions.	3
Section 2 – Suitability of ships and terminals.	5
Section 3 – Procedures between ship and shore prior to the ship's arrival	11
Section 4 – Procedures between the ship and the terminal prior to cargo loading/unloading.	19
Section 5 – Cargo loading and handling of ballast	27
Section 6 – Unloading cargo and handling of ballast.	31
Annex 1 – Pre-arrival ship/shore exchange of information. . . .	39
Annex 2 – Avoidance of damage during cargo handling	45
Annex 3 – Repair of damage incurred during loading and unloading	51
Annex 4 – Training of terminal personnel involved in loading and/or unloading bulk carriers	55
Annex 5 – Hazards.	57
Annex 6 – Emergency procedures	61

Introduction

1 The BLU Code applies to the loading and unloading of solid bulk cargoes, to or from bulk carriers of more than 500 gross tonnage. The BLU Code does not apply to ships which are not bulk carriers, by definition, and ships which are being loaded or unloaded using shipboard equipment only.

2 The guidance in this Manual is intended to complement the BLU Code by providing guidance on good practice, regardless of ship size, terminal capacity or cargo quantity. This should assist terminal representatives to implement the Code.

3 Although this Manual is written primarily in the context of the operation of major bulk terminals operating ship loaders and unloaders, smaller bulk facilities and non specialist terminals may also load and/or unload solid bulk cargoes by grabs, conveyors, chutes or even directly from vehicles etc. Not all the guidance in the Manual may be appropriate to such smaller terminals and facilities and the ships they serve but the general principles should still apply and be followed.

4 The guidance in this Manual is intended primarily to assist Terminal Representatives to understand the key issues to be dealt with at the interface between the ship and the terminal. It should also assist relevant ships' personnel to understand the issues involved from the terminal's perspective.

5 It should be noted that in this Manual, a reference to an appendix is a reference to an appendix in the BLU Code and a reference to an annex is to an annex in this Manual.

6 In the event of a conflict between the Code of Safe Practice for Solid Bulk Cargoes (BC Code) and the International Code for the Safe Carriage of Grain in Bulk (International Grain Code), the provisions of the International Grain Code should prevail.

Layout of guidelines

The text with the grey bar contains the specific language of the BLU Code and that without the grey bar contains the guidelines for the terminal representative.

Definitions

Definitions contained in the BLU Code are on page 3. In addition, the following definitions refer to a number of other expressions used in these guidelines.

BLU Code means the Code of Practice for the Safe Loading and Unloading of Bulk Carriers, as contained in the annex to IMO Assembly resolution A.862(20) of 27 November 1997.

Bulk carrier means a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, and includes such types as ore carriers and combination carriers.*

Cargo air draught means the distance from the surface of the water to the lowest point of the loader or unloader when in a fully raised position.

Dry or solid bulk cargo means any material, other than liquid or gas, consisting of a combination of particles, granules, or any larger pieces of material, generally uniform in composition, which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.

Terminal means any fixed, floating or mobile facility equipped and used for the loading and/or unloading of bulk cargo. The term includes that part of a dock, pier, berth, jetty, quay, wharf or similar structure at which a ship may tie up.

Shipper/receiver means any person in whose name or on whose behalf a contract of carriage of goods by sea has been concluded, or on whose behalf the goods are delivered to or received from the ship in relation to the contract of carriage by sea.

Stowage factor is the number of cubic metres which one tonne of the material will occupy.

* Refer to resolution MSC.79(70) relating to interpretation of provisions of SOLAS chapter XII on additional safety measures for bulk carriers.

Section 1

Definitions

BLU Code

1.1 *Air draught* means the vertical distance from the surface of the water to the highest point of mast or aerial.

1.2 *Combination carriers (OBO or O/O)* means a ship whose design is similar to a conventional bulk carrier but is equipped with pipelines, pumps and inert gas plant so as to enable the carriage of oil cargoes in designated spaces.

1.3 *Conveyor system* means the entire system for delivering cargo from the shore stockpile or receiving point to the ship.

1.4 *Hot work* means the use of open fires and flames, power tools or hot rivets, grinding, soldering, burning, cutting, welding or any other repair work involving heat or creating sparks which may lead to a hazard because of the presence or proximity of flammable atmosphere.

1.5 *List indication lights* means lights, visible from the deck, which light up to show that a ship is listing.

1.6 *Master* means the master of the ship or a ship's officer designated by the master.

1.6 Standard shipping industry practise is that the Chief Officer (First Mate) is the designated officer in charge of cargo operations, and is the person with whom the terminal representative will normally liaise.

1.7 *Pour* means the quantity of cargo poured through one hatch opening as one step in the loading plan, i.e. from the time the spout is positioned over a hatch opening until it is moved to another hatch opening.

1.8 *Terminal representative* means a person appointed by the terminal or other facility where the ship is loading or unloading, who has responsibility for operations conducted by that terminal or facility with regard to the particular ship.

1.8 For reasons of practicality it is accepted that the role of terminal representative cannot be limited to one person throughout the entire loading or unloading period, and that provision must be made for shift patterns and compliance with hours of work agreements and regulations.

1.9 *Trimming* (loading cargo) is the partial or total levelling of the cargo within the holds, by means of loading spouts or chutes, portable machinery, equipment or manual labour.

1.10 *Trimming* (unloading cargo) is the shovelling or sweeping up of smaller quantities of the cargo in the holds by mechanical means (such as bulldozers) or other means to place them in a convenient position for discharge.

1.11 *Trimming* (ship) is the adding, removal or shifting of weight in a ship to achieve the required forward and aft draughts.

Section 2

Suitability of ships and terminals

2.1 General

2.1.1 All ships nominated for loading should hold the appropriate valid statutory certification including, if required, the document of compliance* for ships carrying solid dangerous goods in bulk. It is recommended that the period of validity of the ship's certificates be sufficient to remain valid during loading, voyage and unloading times, plus a reserve to allow for delays in berthing, inclement weather or both.

2.1.2 The shipowner, manager or operator, when offering a ship for a particular cargo or service, should ensure that the ship:

- is maintained in a sound, seaworthy condition;
- has on board a competent crew;
- has on board at least one officer proficient in the languages used at both the loading and unloading ports, or has an officer available who is proficient in the English language; and
- is free of defects that may prejudice the ship's safe navigation, loading or unloading.

2.1.2 Terminals should determine the suitability of a ship for compatibility with both loading and/or unloading terminal infrastructure as appropriate.

2.1.3 It is essential that a ship selected to transport a solid bulk cargo be suitable for its intended purpose taking into account the terminals at which it will load or unload.

2.1.3 It is important that the terminal operator keeps its relevant customers informed of current terminal standards, limitations and

* Applicable to ships constructed on or after 1 September 1984.

operating conditions in terms of any changes to relevant navigational conditions, water depths, loading/unloading equipment and rates.

2.1.4 The charterer and shipper when accepting a ship for a particular cargo or service should ensure that the ship:

- is suitable for access to the planned loading or unloading facilities; and
- does not have cargo handling equipment which would inhibit the safety of the loading and unloading operations.

2.1.4 In addition to the checks carried out by the charterer and/or shipper and/or receiver, the terminal operator should take reasonable steps to assure that all bulk carriers nominated for loading/unloading at the terminal are operationally suitable in all respects for the purpose.

The following checks are examples of the type of checks that may be carried out:

- .1 Check appropriate sources of information to confirm that ship meets berth maximum and minimum size limits.
 - Length overall/beam/draft.
 - Number of holds.
 - Hatch lengths and widths. Compare dimensions with the most suitable hatch openings on the basis of the terminal's own experience. If hatches are less than the preferred size, loader/unloader operators should be informed and appropriate precautions taken.
 - Gearless/geared/gear type. Location of gear.
 - Working length from forward end of No.1 hold to aft end of aft hold.
 - Any equipment, design details or performance limitations that could affect the safety or efficiency of the operation.
- .2 The ship's owner, master or agent and the terminal representative should exchange pre-arrival ship/shore information, as per the examples in annex 1.

2.2 Ships

2.2.1 Ships nominated for bulk loading should be suitable for the intended cargo. Suitable ships should be:

- .1 weathertight, and efficient in all respects for the normal perils of the sea and the intended voyage;

- .2 provided with an approved stability and loading booklet written in a language understood by the ship's officers concerned and using standard expressions and abbreviations. If the language is neither English, nor French, nor Spanish, a translation into one of these languages should be included;
- .3 provided with hatch openings of sufficient size to enable the cargo to be loaded, stowed and unloaded satisfactorily; and
- .4 provided with the hatch identification numbers used in the loading manual and loading or unloading plan. The location, size and colour of these numbers should be chosen so that they are clearly visible to the operator of the loading or unloading equipment.

2.2.1 The ship should ensure the hatches are adequately identified.

2.2.2 It is recommended that all ships which are required to carry out stress calculations should have on board an approved loading instrument for the rapid calculation of such stresses.

2.2.3 All propulsion and auxiliary machinery should be in good functional order. Deck equipment related to mooring and berthing operations, including anchors, cables, mooring lines, hawsers and winches, should be operable and in good order and condition.

2.2.4 All hatches, hatch operating systems and safety devices should be in good functional order, and used only for their intended purpose.

2.2.5 List indication lights, if fitted, should be tested prior to loading or unloading and proved operational.

2.2.6 Ship's own cargo-handling equipment should be properly certificated and maintained, and used only under the general supervision of suitably qualified ship's personnel.

2.3 Terminals

2.3.1 Terminal operators should ensure that they only accept ships that can safely berth alongside their installation, taking into consideration issues such as:

- .1 water depth at the berth;
- .2 maximum size of the ship;
- .3 mooring arrangements;

- .4 fendering;
- .5 safe access; and
- .6 obstructions to loading/unloading operations.

2.3.1.1 Terminal representatives should ensure that the following matters are considered:

- .1 Tidal situation for the period concerned.
- .2 Weather forecasts.
- .3 Whether ship will berth port or starboard side-to.
- .4 Tug and line boat requirements.
- .5 Mooring requirements taking into account:
 - .1 The size and type of ship;
 - .2 Local tidal conditions and foreseeable weather conditions;
 - .3 The nature of the cargo and ballasting operations;
- .6 Any obstructions to berthing/unberthing operations.
- .7 The terminal operator should ensure an unobstructed and safe passage between the ship's gangway and the entrance (gate) of the terminal.

2.3.1.2 Pre-arrival ship/shore exchange of information should clarify:

- .1 Whether ship or terminal will provide the gangway. Responsibility for providing safety net, lighting and care of gangway. Generally the master is responsible for ensuring that there is safe access to and from the ship. Normally the ship provides the gangway and master and terminal representative jointly confirm that it is safe and suitable. Where the ship's own gangway is not suitable the terminal may provide one. However, the master is still obliged to ensure that it is maintained in a safe condition at all times.
- .2 If ship is geared, the ship/charterer should provide a plan of the ship giving the positions of the derricks or cranes, and the distances between them. The terminal representative should check the validity of test reports and certificates for cranes.
- .3 Loader/unloader booms should be raised clear of berth in good time when a ship is berthing/unberthing.
- .4 Loaders/unloaders should be parked clear of the normal angle of approach of a berthing ship, in case the bow overshoots the jetty.

2.3.2 Terminal equipment should be properly certificated and maintained in accordance with the relevant national regulations and/or standards, and only operated by duly qualified and, if appropriate, certificated personnel.

2.3.2 “Maintenance” refers not just to running repairs and upkeep of equipment, but to the planned and systematic inspection and maintenance of equipment at periodic intervals. This is normally carried out in accordance with manufacturer’s recommendations, national requirements, and industry codes of practice.

2.3.2.1 Where automatic weighing equipment is provided, this should be calibrated at regular intervals.

2.3.2.1 “Examination and testing” means the thorough examination of the crane or equipment at regular intervals, in accordance with relevant legislation and insurance requirements. Items needing particular attention include:

- .1 Lifting equipment.
- .2 Rotating equipment.
- .3 Access equipment.
- .4 Safety devices – alarms, anemometers, limit switches and controls, emergency stops, emergency escape and fire control equipment.
- .5 Structural steelwork for corrosion, fatigue or cracking.
- .6 Travel drive motors and braking systems, including storm anchoring arrangements.
- .7 Lubrication – adequate and regular application of correct lubricants.

2.3.2.2 “Good housekeeping” means that the entire terminal area and all the equipment on it should be:

- .1 Kept in a clean and tidy manner, with everything in its place and a place for everything.
- .2 Maintained to a high standard of safety and safety awareness.
- .3 Kept to a high standard of mechanical, electrical and structural maintenance.

2.3.3 Terminal personnel should be trained in all aspects of safe loading and unloading of bulk carriers, commensurate with their responsibilities.

2.3.3 Commensurate with their responsibilities, terminal personnel should be able to:

- .1 Understand the basic principles of bulk carrier construction.
- .2 Understand how loading/unloading operations can overstress and damage a ship and know why and how this must be avoided.
- .3 Understand the roles and responsibilities, as required under the BLU Code, of:
 - .1 The terminal representative.
 - .2 The ship loader/unloader operator, as applicable.
 - .3 Ship's master, chief officer and crew.
- .4 Know the standard procedures and plans by which bulk carriers are loaded and unloaded.
- .5 Know the ship/shore communications and emergency procedures applicable.
- .6 Know how to access and work safely on board a bulk carrier.
- .7 Understand and know how to safely start up, operate and shut down the ship loading/unloading equipment on the terminal for which they are responsible. (See annex 4).
- .8 Terminal personnel should be knowledgeable of their responsibilities under other relevant codes for example the ISPS Code (International Ship and Port Facility Security Code), IMO/ILO Code of Practice on Security in Ports and the ILO Code of Practice on Safety and Health in Ports.

2.3.4 Terminal operators should ensure that personnel involved in the loading and unloading operations are duly rested to avoid fatigue.

2.3.4 In addition to assuring that terminal personnel are duly rested, terminal personnel involved in cargo handling work should be provided with personal protective equipment such as safety helmets, safety footwear, high visibility jackets, gloves, hearing and respiratory protection, as required.

Section 3

Procedures between ship and shore prior to ship's arrival

3.1 Information exchange: general

3.1.1 It is important that the ship be provided with information about a terminal so the loading or unloading can be planned. Similarly, the terminal will need information about the ship to enable preparations to be made to load or unload the ship. It is important that the information be exchanged in sufficient time to allow preparations to be made.

3.1.1 (See annex 1).

3.1.2 Before loading commences there should be an agreement between the master and the terminal representative as to the rate of loading and order in which the cargo is to be distributed so as to achieve the final loading plan. In general, this agreement should be based on one or more of the following options:

- .1 the limitations or restrictions on loading procedures, if such are specified in the ship's loading manual or trim and stability booklet, or both;
- .2 if the restrictions mentioned in .1 do not exist, and the ship has a loading instrument which has been approved, the loading plan should be prepared on the instrument and there should be a protocol in place so that the loading remains, at all times, within the approved stress limits of the ship; and/or
- .3 if neither .1 or .2 can be satisfied, then a conservative procedure should be followed.

3.1.2 The master should forward the proposed loading/unloading plan to the terminal before the ship arrives:

- .1 The terminal representative should check the plan and ensure it corresponds to its expectations. If it does not, the terminal

may revert to the ship requesting a review of the proposed plan.

- .2 By giving the ship adequate time to prepare an alternative plan, in compliance with the ship's stability booklet and loading manual or instrument, it should be possible to identify a mutually acceptable loading sequence.
- .3 However, even where the load plan is not the terminal's preferred option, the terminal representative should co-ordinate and agree to a plan before starting operations. Operations should not start until agreement has been obtained.

3.1.3 Details should be provided of any necessary repairs which may delay berthing, the commencement of loading or unloading, or may delay the ship sailing on completion of loading or unloading.

3.1.3 The terminal should be informed if any proposed visits by ship repair contractors or service personnel, or if cranes or other equipment are required on the jetty.

3.1.4 The master should ensure he receives from the shipper of the intended cargo, details of the nature of the cargo required by chapter VI of SOLAS 1974, as amended.* Where additional details, such as trimming or continuous measurement of the water in the cargo, etc., are required, the master should inform the terminal accordingly.

3.1.4 Before commencement of loading of a solid bulk cargo, the shipper must provide the master with the characteristics and properties of the cargo, including:

- .1 Stowage factor, angle of repose, trimming procedures, and likelihood of shifting.
- .2 The transportable moisture limit and average moisture content where appendix A of the BC Code (Code of Safe Practice for Solid Bulk Cargoes) applies.
- .3 Flammability, toxicity, corrosiveness, chemical, oxygen depletion and any other hazards of the cargo, as applicable.

* Refer to MSC/Circ.663 and to the form for cargo information, which is set out in appendix 5 to the BLU Code.

3.1.5 The terminal representative should verify that the master has received the relevant cargo declaration form information, as applicable, in good time. (See BLU Code – appendix 5)

3.1.6 The master should inform the terminal representative of any particular precautions to be taken with the loading or unloading of the cargo.

3.2 Information given by the ship to the terminal

3.2.1 In order to plan the proper disposition and availability of the cargo so as to meet the ship's loading plan, the loading terminal should be given the following information:

- .1 The ship's estimated time of arrival (ETA) off the port as early as possible. This advice should be updated as appropriate.
- .2 At the time of initial ETA advice, the ship should also provide details of the following:
 - .2.1 name, call sign, IMO Number of the ship, its flag State and port of registry;
 - .2.2 a loading plan stating the quantity of cargo required, stowage by hatches, loading order and the quantity to be loaded in each pour, provided the ship has sufficient information to be able to prepare such a plan;
 - .2.3 arrival and departure draughts
 - .2.4 time required for deballasting;
 - .2.5 the ship's length overall, beam, and length of the cargo area from the forward coaming of the forward most hatch to the after coaming of the aftmost hatch into which cargo is to be loaded or from which cargo is to be removed;
 - .2.6 distance from the waterline to the first hatch to be loaded or unloaded and the distance from the ship's side to the hatch opening;
 - .2.7 the location of the ship's accommodation ladder;
 - .2.8 air draught;
 - .2.9 details and capacities of ship's cargo handling gear;
 - .2.10 number and type of mooring lines; and
 - .2.11 any other item related to the ship requested by the terminal.

- .3 Similar information in respect of ETA, unloading plan and details of the ship are required by unloading terminals.

3.2.1 See example of pre-arrival exchange of information checklist (annex 1).

- .1 It is important that the terminal receives updated ETAs.
- .2 Notifying the terminal of the proposed loading or unloading plan well in advance of arrival gives the terminal the opportunity to check that the information on which it is based is correct. For example, a plan may be based on a terminal having two loaders/unloaders where there is actually only one available. It also allows the terminal to check the plan against its preferred rotation, and to request a modification.
- .3 The master then has the opportunity to recalculate the plan and clarify any questions so that a safe, correct and mutually acceptable plan is agreed preferably before the ship berths.
- .4 If the terminal's suggested plan is unsuitable for the ship, and does not meet its stability and hull stress criteria, then the terminal representative and master should co-ordinate and agree on a plan before operations begin.
- .5 Other items of information requested by the terminal may include:
 - .5.1 Confirmation that ballast water is clean seawater ballast.
 - .5.2 Any ship defects which could affect operations.
 - .5.3 Ship's operational and navigational equipment safety status.
 - .5.4 Details of any planned bunkering and storing operations, or repairs to be carried out.
 - .5.5 Ballast handling rates.
- .6 Terminals should require both a cargo stowage plan and a plan indicating the order of loading/unloading and the quantity to be loaded/unloaded into/from each hold.

3.2.2 Ships arriving at loading or unloading terminals in a part loaded condition should also advise:

- .1 berthing displacement and draughts.
- .2 previous loading or unloading port.

- .3 nature and stowage of cargo already on board and, when dangerous goods in bulk are on board, the name of the material, IMO Class and UN Number or BC Number.*
- .4 distribution of cargo on board, indicating that to be unloaded and that to remain on board.

3.2.2 Ships should provide the terminal with a loading or unloading plan stating the cargo distribution plan for the cargo to be loaded/unloaded, the hold rotation and quantities to be loaded/unloaded per run.

3.2.3 Combination carriers (OBO or O/O) should advise of the following additional information:

- .1 nature of the preceding three cargoes;
- .2 date and place at which the last oil cargo was discharged;
- .3 advice as to content of slop tanks and whether fully inerted and sealed; and
- .4 date, place and name of authority that issued the last gas-free certificate which includes pipelines and pumps.†

3.2.3 During the unloading of dry bulk cargo it may be necessary to ballast one or more holds to reduce the cargo air draught of the ship. This is unlikely to introduce hazards if the pipeline system has been well washed. However, if a pump or pipeline has not been adequately washed, the ballasting operation may discharge residual oil into the hold. Atmospheric tests in the hold should therefore be made before any hot work is carried out in, adjacent to, or above a ballasted hold.

3.2.4 As soon as possible the ship should confirm that all holds into which cargo is to be loaded are clean, and free from previous cargo residues which in combination with the cargo to be loaded could create a hazard.

3.2.5 Information on the loading or unloading plan and on intended arrival and departure draughts should be progressively updated, and passed to the terminal as circumstances change.

* The BC Numbers have been deleted in the revised Code of Safe Practice for Solid Bulk Cargoes (BC Code), 2004, as adopted by resolution MSC.193(79).

† Refer to the chapter for combination carriers in the *International Safety Guide for Oil Tankers and Terminals* (ISGOTT) and in particular to the section on cargo changeover checklists and the section on discharge of bulk cargoes.