

Subject :

Cargo Securing Manuals

NKTECHNICAL INFORMATION

No. : 180

Date : 22 April 1996

To: Shipowners and Shipbuilders Concerned

May the arrival of Spring find you prosperous and in good health.

The "Guide to Preparing Cargo Securing Manuals" described in NK Technical Information No. 178 have recently been completed. A copy of this Guide is enclosed for your reference.

The Guide have been prepared in accordance with the following basic policies. Consequently, it is hoped that this Guide will be used with sufficient attention paid to these points.

1. The Guide are based on DSC Circular 1 "Draft Guidelines for the Preparation of the Cargo Securing Manual" approved by the IMO DSC Sub-Committee.
2. Sample Cargo Securing Manuals are currently being prepared and will be provided to further aid in understanding how the Guide may be applied.
3. Since the structure and content of the Cargo Securing Manual will vary depending on the type of cargo, cargo securing devices, as well as the cargo intended to be transported, amongst other things, care should be exercised in this regard to make necessary distinctions in the following points when preparing each manual to ensure that the cargo securing manual is appropriate to the ship conditions and cargo to be secured:
 - Essential items required by the DSC guidelines;
 - Standard descriptions regarding instructions for the maintenance, inspection and operation of cargo securing devices;
 - Information that must be prepared and included in the manual by the person preparing the manual.

Since the number of pages of the completed sample cargo securing manuals will be quite large, it is expected to take at least another two weeks before printing of the samples manuals can be completed. Further, due to circumstances beyond our control, it will not be possible to provide individual copies to everyone. Consequently, copies will be distributed to each branch or office of the Society. While we

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apologize for any inconvenience this may cause, you are kindly requested to contact the ClassNK office nearest you for further information.

With the exception of certain cases, the Society will be able to approve cargo securing manuals on behalf of flag state Administrations. Shipowners and shipbuilders wishing to have their cargo securing manuals approved are kindly requested to submit the attached application form to the Head Office of the Society together with at least two copies of the cargo securing manual for which approval is being sought along with a corresponding set of copies of all related documents.

Your understanding of this matter is greatly appreciated.

Attachments:

Guide to Preparing Cargo Securing Manuals

Copy of application for Cargo Securing Manuals

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Application Form for Approval of Cargo Securing Manual

To: Nippon Kaiji Kyokai

Date:

Name of Applicant: _____

Address of Applicant: _____

Tel: _____

Fax: _____

Application is hereby submitted for approval of the Cargo Securing Manual for the vessel indicated below in accordance with Regulation 5 of Chapter VI and Regulation 5 of Chapter VII of the SOLAS Convention, as amended.

Name of Ship: _____

Class Number: _____

Flag: _____

Distinctive number of letters: _____

The cargo intended to be carried consists of the following (check applicable item(s)):

☐ Standardized cargo (cargo secured in accordance with a previously instituted cargo lashing plan):

☐ Container ☐ Other type of fixed cargo

☐ Semi-standardized cargo (certain specific types of cargo secured based on semi-standardized securing methods dependent on the type of cargo to be carried)

☐ Automobiles ☐ Other types of road vehicles (trucks, trailers, etc.)

☐ Non-standardized cargo (cargo other than standardized and semi-standardized types of cargo)

☐ Containers (cargo that cannot be secured according to standardized methods)

☐ IBC, flats, pallets, etc.

☐ Steel coil, heavy cargo items

☐ Timber stowed in holds

Please forward the invoice regarding fees for approval of the Cargo Securing Manual to the following address:

Name: _____

Address: _____

Tel: _____

Fax: _____

Guide to Preparing Cargo Securing Manuals

◆ Introduction

This Guide to Preparing Cargo Securing Manuals (hereinafter referred to as the 'Guide') is based on the DSC Circular 1 "DRAFT GUIDELINES FOR THE PREPARATION OF THE CARGO SECURING MANUAL" (hereinafter referred to as 'DSC Guidelines') finalized by the DSC Sub-committee of the IMO during the meeting of the sub-committee from 5~9 February earlier this year. It has been prepared in order to assist persons preparing Cargo Securing Manuals (also referred to simply as 'Manuals') to have a better understanding of how to prepare, organize and finally prepare their own Cargo Securing Manuals so that they are in accord with the guidelines described in DSC Circular 1, which aims at improving cargo handling and securing safety onboard ship. A brief description of the organization of this Guide and how to use it are presented below.

◆ Basic Concept concerning the content and presentation used within this Guide

To better illustrate the various components and aspects that need to be incorporated in a well written Manual, this Guide has been prepared to reflect the format that should be used when preparing an actual Manual.

The text of this Guide is of three types as follows:

- Text essential to all manuals. This text is indicated as plain type and includes the Preamble, Table of Contents, general information including definitions, chapter headings, sub-headings and the like.
- Text consisting of instructions regarding what should be included in the explanation concerning the content of the topic being described. This text is highlighted in colored areas.
- Text illustrating a sample of the wording that may be used in an actual Manual for a given item or topic. This text is enclosed in a box.

In completing the Manual, it is necessary that these various types of text be integrated in a manner appropriate to the type of ship and cargo for which the Manual is applicable. Further, there are times when additional important information needs to be appended to the instructions (highlighted in this Guide) in the Manual depending on the item being described.

Items which added to aid in clarifying the explanation of certain requirements in this Guide are surrounded with double lines for reference.

◆ Organization of the Guide for Preparing Cargo Securing Manuals

The organization of the Guide is outlined in (1) below. All the items numbered ① (Cover) through ⑤ (Chapter 2) are common items that area to be included in the

Guide to Preparing Cargo Securing Manuals

Cargo Securing Manuals of all ships, regardless of the type of ship or cargo covered. Items ⑥ and ⑦, which are indicated as Chapter 3 and Chapter 4, respectively, are applicable depending on the category of cargo being carried. The Table in (2) below summarizes which items are to be incorporated in the Manual according to whether it covers standardized or other types of cargo.

(1) Organization of Guide to Preparing Cargo Securing Manuals

- ① COVER
- ② PREAMBLE
- ③ CONTENTS
- ④ CHAPTER 1 GENERAL
- ⑤ CHAPTER 2 SECURING DEVICES AND ARRANGEMENTS
- ⑥ CHAPTER 3 STOWAGE AND SECURING OF NON-STANDARDIZED CARGO AND SEMI-STANDARDIZED CARGO
- ⑦ CHAPTER 4 STOWAGE AND SECURING OF CONTAINERS AND OTHER STANDARDIZED CARGO

(2) Summary of Items to be included in Cargo Securing Manual

Items	Cargoes carried	Typical type of ship
①~⑤ + ⑥	Cargo other than standardized cargo	• General Cargo Ships • Bulk Carriers • RO—RO Ships
①~⑤ + ⑦	Standardized cargo only	• Container ships carrying containers only
①~⑤ + ⑥ ⑦	Standardized cargo and non-standardized cargo or semi-standardized cargo	• Full container ships also carrying cargo using flat rack containers • Semi-container ships also carrying cargo other than containers

- (a) *Standardized Cargo* means cargo for which the ship is provided with an approved securing system such as lashing plans based upon cargo units of specific types.
- (b) *Semi-standardized Cargo* means cargo for which the ship is provided with a securing system capable of accommodating a limited variety of cargo units, such as vehicles, trailers, etc.
- (c) *Non-standardized Cargo* means cargo which requires individual stowage and securing arrangements.

◆ Items of General Note

When preparing the Manual, reference may be made to documents and similar materials related to satisfying the requirements of each chapter. Examples include manufacturer specifications and other similar supporting documentation describing the form, strength, etc. of each type of securing device mentioned in Chapter 2. In the case of containers ships discussed in Chapter 4, reference can be made to lashing plans currently provided onboard the subject ship. However, in such cases, the relevant documents need to be maintained together with the Manual so that they are readily available for use.

In cases where the documents and materials being referred within the Manual have not themselves been approved by the Society, it is necessary that they be submitted for review at the time the Cargo Securing Manual is approved. Further, all places where pertinent documents and materials referred to within the Manual be clearly marked to the extent possible.

Note:

The terms “existing ships” and “new ships” as used in this Guide are defined as follows:

“Existing ships” are ships the keels of which are laid before 1 July 1996.

“New ships” are ships the keels of which are laid on or after 1 July 1996.

Name of Ship:

Distinctive Number or Letters:

IMO Number:

Port of Registry:

Name of Owner:

Cargo Securing Manual

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PREAMBLE

The following text is to be included as part of the PREAMBLE.

- In accordance with the International Convention for the Safety of Life at Sea, 1974 (SOLAS) chapter VI and VII and the Code of Safe Practice for Cargo Stowage and Securing, cargo units, including containers, shall be stowed and secured throughout the voyage in accordance with this Cargo Securing Manual.
- This Cargo Securing Manual is required on all types of ships engaged in the carriage of cargo units.
- It is important that securing device meet acceptable functional and strength criteria applicable to the ship and its cargo. It is also important that the officers on board are aware of the magnitude and direction of the forces involved and the correct application and limitations of cargo securing devices. The crew and other persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo securing devices on board the ship.
- In cases when the provisions of this Cargo Securing Manual are revised, or the cargo securing devices described herein are significantly changed, this Manual should be reviewed and reapproved by the Administration or Classification Society acting on its behalf, as applicable.
- All appendices as well as relevant reference documents and materials should be maintained up to date.

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CHAPTER 1 GENERAL

- 1.1 Definitions
- 1.2 General Information

CHAPTER 2 SECURING DEVICES AND ARRANGEMENTS

- 2.1 Specification for fixed securing devices
- 2.2 Specification for portable cargo securing devices
- 2.3 Inspection and maintenance schemes

CHAPTER 3 STOWAGE AND SECURING OF NON-STANDARDIZED AND SEMI-STANDARDIZED CARGO

- 3.1 Handling and safety instructions
- 3.2 Evaluation of forces acting on cargo units
- 3.3 Application of portable securing devices on various cargo units, vehicles and stowage blocks
- 3.4 Supplementary requirements for ro-ro ships

CHAPTER 4 STOWAGE AND SECURING OF CONTAINERS AND OTHER STANDARDIZED CARGO

- 4.1 Handling and safety instructions
- 4.2 Stowage and securing instructions
- 4.3 Other allowable stowage patterns
- 4.4 Forces acting on cargo units

These CONTENTS are to be prepared with reference to the table shown in (2) in the introductory explanation concerning this Guide given above. Thus, ships engaged in the carriage of containers and standardized cargo only, all references to the above Chapter 4 will be changed to Chapter 3.

CHAPTER 1 GENERAL

The following text shall be included as part of "CHAPTER 1 GENERAL".

1.1 Definitions

- .1 *Cargo Unit* means vehicles (road vehicles, roll trailers, etc.), railway wagons, containers, flats, pallets, portable tanks, intermediate bulk containers (IBC), packaged units, unit loads, other cargo carrying units such as shipping cassettes, cargo entities such as steel coils and heavy cargo items such as locomotives and transformers. Loading equipment, or any part thereof, transported on the ship, but which is not permanently fixed to the ship, is also considered as a cargo unit.
- .2 *Cargo Securing Devices* are all fixed and portable devices used to secure and support cargo units.
- .3 *Maximum Securing Load (MSL)* is a term used to define the allowable load capacity for a device used to secure cargo to a ship. *Safe Working Load (SWL)* may be substituted for MSL for securing purposes, provided this is equal to or exceeds the strength defined by MSL.
- .4 *Standardized Cargo* means cargo for which the ship is provided with an approved securing system based upon cargo units of specific types. (For example, cargo which is secured in accordance with a set securing plan such as a lashing plan provided on container ships.)
- .5 *Semi-standardized Cargo* means cargo for which the ship is provided with a securing system capable of accommodating a limited variety of cargo units, such as vehicles, trailers, etc.
- .6 *Non-standardized Cargo* means cargo which requires individual stowage and securing arrangements.

1.2 General Information

- .1 The guidance given herein should by no means rule out need for always observing the principles of good seamanship, neither can they replace experience in stowage and securing practice.
- .2 The information and requirements set forth in this Manual are consistent with the requirements of the vessel's trim and stability booklet, International Load Line Certificate (1996), the hull strength loading manual (if provided) and with the requirements of the International Maritime Dangerous Goods (IMDG) Code (if applicable).
- .3 This Cargo Securing Manual specifies the arrangements and cargo securing devices provided on board the ship for the correct application to and the securing of cargo units, containers, vehicles and other entities, based on transverse, longitudinal and vertical forces which may arise during adverse weather and sea conditions.
- .4 It is imperative to the safety of the ship and the protection of the cargo and personnel that the securing of the cargo be carried out properly and that only appropriate securing points or fittings should be used for cargo securing.

- .5 The cargo securing devices mentioned in this Manual should be applied so as to be suitable and adapted to the quantity, type of packaging, and physical properties of the cargo to be carried. When new or alternative types of cargo securing devices are introduced, the Cargo Securing Manual should be revised accordingly. Alternative cargo securing devices introduced should not have less strength than the equipment which it replaces.
- .6 There should be a sufficient quantity of reserve cargo securing devices on board the ship.
- .7 Information on the strength and instructions for the use and maintenance of each specific type of cargo securing device, where applicable, is provided in this Manual. The cargo securing devices should be maintained in a satisfactory condition. Items worn or damaged to such an extent that their quality is impaired should be replaced.

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CHAPTER 2 SECURING DEVICES AND ARRANGEMENTS

2.1 Specification for fixed securing devices

① This sub-chapter should be prepared with due consideration to the following instructions.

This sub-chapter should indicate the following information regarding fixed securing devices;

(1) List of fixed securing devices

The following information should be indicated in the list.

- * Name of item
- * Type designation of item
- * Maximum Securing Load (MSL)⁵⁾
- * Total number of such items¹⁾

(2) Drawings indicating the arrangement of fixed securing devices²⁾

(3) Sketches of fixed securing devices

(4) Documentation including the following information:

- * Name of manufacturer
- * Type designation of item with a simple sketch for ease of identification
- * Material(s)
- * Identification markings³⁾
- * Results of strength tests or ultimate tensile strength tests
- * Results of non-destructive testing⁴⁾
- * Maximum Securing Load (MSL)⁵⁾

Notes: 1) Reference can be made to drawing arrangements of cargo securing devices in cases where the number of devices can be known from the drawings.

2) Distances between cargo securing devices are to be indicated in the case of Ro-Ro ships.

3) Identification markings consist of marks using paint or stamped impressions indicating the manufacturer, serial or other similar type of identifying number of the device.

4) Test results are to be indicated only in the case of non-destructive testing.

5) SWL may be used in place of MSL.

The items mentioned in (1) through (4) above may be referred to in a separate appendix.

[Sample text]

Specifications regarding fixed securing devices are shown in Appendix 1. Appendix 1 consists of the following documents.

- (1) List of fixed cargo securing devices
- (2) Arrangement of fixed cargo securing devices
- (3) Sketches of fixed cargo securing devices
- (4) Documentation for fixed cargo securing devices

List of fixed securing devices (sample)

ITEM	MODEL	STRENGTH (SWL)	Q'TY	REFERENCE
STOOL (SINGLE)	I-30T-H	20 TONS	120	App.1 P.1
STOOL (SINGLE)	I-30T	20 TONS	6	App.1 P.2
STOOL (DOUBLE)	I-31T	20 TONS	690	App.1 P.3
STOOL (DOUBLE)	I-31T-H	20 TONS	36	App.1 P.4
EYE PLATE (SINGLE)	H-6	21 TONS	660	App.1 P.5
EYE PLATE (SINGLE)	H-6H	21 TONS	68	App.1 P.6
EYE PLATE (DOUBLE)	H-7	21 TONS	1512	App.1 P.7
EYE PLATE (DOUBLE)	H-7H	21 TONS	114	App.1 P.8
SLIDING BASE (SINGLE)	I-22-E	20 TONS	20	App.1 P.9
SLIDING BASE (DOUBLE)	I-23-E	20 TONS	72	App.1 P.10

② This sub-chapter may be prepared according to below-mentioned instructions for existing ships which carry non-standardized cargo or semi-standardized cargo.

This sub-chapter should contain drawings which indicate the arrangement and strength of fixed cargo securing devices. In cases where there is no information on the strength of the devices in the drawings, a list indicating the strength of each securing device should be included. In such cases, the list is to be prepared such that it indicates the corresponding strength and type, etc. of each respective device shown on the drawing arrangements.

When drawing arrangements indicating the strength of the devices are appended to the Manual, they may be included in a separate appendix with a statement to that effect included in the text.

[Sample text]

The arrangement and strength of fixed cargo securing devices are shown in Appendix ○.

List of the strength of fixed cargo securing devices (sample)

ITEM	MODEL	STRENGTH (SWL)
CLOVER LEAF PLATE	C-14	4 TONS
CLOVER LEAF PLATE	C-15	5 TONS
RING PLATE	C-3	3 TONS
RING PLATE	C-6	8 TONS
CRINKEL BAR	C-7	1.6 TONS
CRINKEL BAR	C-10	2.3 TONS

2.2 Specification for portable cargo securing devices

This sub-chapter should indicate the following information regarding portable securing devices.

(1) List of portable securing devices

The following information should be indicated in the list.

- * Name of item
- * Type designation of item
- * Maximum Securing Load (MSL)⁵⁾

- * Total number of such items¹⁾
- (2) Sketches of portable securing devices
- (3) Relevant documentation including the following information:
 - * Name of manufacturer
 - * Type designation of item with a simple sketch for ease of identification
 - * Material(s), including minimum safe operating temperature²⁾
 - * Identification markings³⁾
 - * Results of strength tests or ultimate tensile strength tests
 - * Results of non-destructive testing⁴⁾
 - * Maximum Securing Load (MSL)⁵⁾

(4) Strength standard for one way use securing devices

This sub-chapter should contain information on the strength of one-way use securing devices. In the case of wire ropes, for example, the strength corresponding to their nominal diameter, for which reference can be to some recognized standard, may be acceptable. It should be borne in mind that a sufficient safety factor needs to be applied to used securing devices. Generally, a safety factor of from 2 to 5 times the strength of that for a new wire is applied to used wires.

- Notes: 1) When the current number of portable securing devices can be known from the inventory list maintained on board, reference may be made to the list. In such cases, a current copy of the inventory list is to be attached to the Cargo Securing Manual.
- 2) Only in cases when there is information regarding minimum safe operating temperature.
- 3) Identification markings consist of marks using paint or stamped impressions indicating the manufacturer, serial or other similar type of identifying number of the device.
- 4) Test results are to be indicated only in the case of non-destructive testing.
- 5) SWL may be used in place of MSL

Reference may be made to items (1) through (3) as appendices to the Manual as in the following example.

[Sample text]

Specifications for portable cargo securing devices are shown in Appendix ○. Appendix ○ consists the following documents.

- (1) List of portable securing device
- (2) Sketches of portable securing equipment
- (3) Documentation regarding portable securing equipment

List of portable securing equipment (sample)

ITEM	MODEL	STRENGTH (SWL)	Q'TY	REFERENCE
LASHING ROD (L=2100)	G-10-25	21 TONS	1696	App.1 P.11
LASHING ROD (L=4600)	G-10-22	12 TONS	655	App.1 P.12
LASHING TURNBUCKLE	BD-505R	21 TONS	2352	App.1 P.13
AUTO TWISTLOCK	NA-7	20 TONS	4602	App.1 P.15
HEIGHT ADJUSTER	G-8-2L-50	21 TONS	525	App.1 P.19
SLIDING TWISTLOCK	N-3T-E	20 TONS	164	App.1 P.20

Strength standard for one way use wire rope (sample)

	Breaking Load				(Reference) mass per <i>m</i> (kg/m)
Lay	Ordinary				
wire	Galvanized		Bear/galvanized		
	Grade G		Grade A		
dia. (mm)	t	kN	t	kN	
14	9.09	89.14	9.83	96.4	0.651
16	11.9	116.7	12.8	125.5	0.85
18	15	147.1	16.2	158.9	1.08
20	18.5	181.4	20.1	197.1	1.33
22.4	23.3	228.5	25.2	247.1	1.67
(24)	(26.7)	(261.8)	-	-	(1.91)
25	29	284.4	31.3	307	2.08

[6 x 24 : JIS G 3525-1977]

※ Care must be taken when utilizing used wire rope as it has a relatively lower strength than new rope to a ratio of ---/---.

2.3 Inspection and maintenance schemes

2.3.1 Inspections

This sub-chapter should, as a minimum, contain a statement similar to the example shown below. Other necessary instructions should be added as appropriate.

[Sample text]

Regular inspections and maintenance are to be carried out under the responsibility of the master.

- .1 Routine visual examinations of components being utilized, and
- .2 Periodic examinations/re-testing as required by the Administration.

2.3.2 Record of inspections and procedures for maintaining and repairing or rejecting securing devices

This sub-chapter, as a minimum, should contain procedures for accepting, maintaining and repairing or rejecting cargo securing devices. Other necessary instructions regarding procedures for repairing or rejecting securing devices should be added as appropriate. Some sample types of related text are offered below.

[Sample text]

- (1) When permanent deformation, break, etc. are found on a securing device, the device is to be removed from use, in principle.
- (2) In cases where such deformation or break is amenable to repair, such cargo securing device is to be repaired as soon as possible. Those devices which cannot be repair to acceptable safety standards are to be clearly marked as being unusable and disposed of accordingly.
- (3) An appropriate number of securing devices should always be kept on board.
- (4) Inspection records must be made and kept along with this Manual.

Records are to be maintained of all inspections, examinations and related checks, including tests, of all cargo securing devices. Examination/inspection records may be maintained separately from the Manual. When such records are maintained separately, a statement to that effect is to be included in the Manual. In cases where the results of examinations/inspections are recorded on the report of current inventory, such reports may be used instead. However, all records are also to include the following information, as well as the information stated in 2.2 above, as required:

- * Date of examination/inspection
- * Signature of person conducting examination/inspection
- * Name and type of items examined/inspected
- * Results of examination/inspection and measures taken, as appropriate.
- * The number of available devices.

2.3.3 Information to the master with regard to checking and adjusting securing arrangement during the voyage

This sub-chapter should contain information for the master regarding inspections and adjustment of securing arrangements during the voyage. A sample text is shown below.

[Sample text]

The master should give due care to checking and adjusting securing arrangements during the voyage as described below.

- (1) During normal sea conditions, cargo securing arrangements on deck and in holds should be periodically checked to ensure that all cargo is safely secured. When any of the following conditions are found, appropriate corrective action should be taken.
 - * Loose securing . . . Tighten
 - * Touching ship's structure . . . Correct (secure away from structure)
 - * Other . . . Correct as appropriate
- (2) When it appears that the ship will soon encounter unexpectedly heavy sea conditions, the following actions are to be taken beforehand.
 - (a) The securing arrangements of all cargo on deck and in the holds are to be carefully checked. When any of the following conditions are found, appropriate corrective action is to be taken promptly.
 - * Loose securing . . . Tighten
 - * Inadequate securing devices . . . Add
 - * Inappropriate securing angle . . . Correct
 - * Touching ship's structure . . . Correct (secure away from structure)
 - * Other . . . Correct as appropriate
 - (b) Special care is to be taken with regards to the securing arrangements of heavy cargoes, such as applying further lashings, in order to prevent the undue movement of any cargo unit which may in turn cause large-scale cargo movement and result in a serious situation.

Reference may be made to computerized maintenance procedures in this sub-chapter. When such procedures are adopted, all output should be kept along with the Manual to serve as a record of inspection. Further, information on the use of such procedures should be given in the Manual.

CHAPTER 3 STOWAGE AND SECURING OF NON-STANDARDIZED AND SEMI-STANDARDIZED CARGO

3.1 Handling and safety instructions

.1 Instructions concerning the proper handling and use of cargo securing devices

This paragraph should contain instructions on the proper handling of the cargo securing devices. Reference may be made to handling instructions prepared by manufacturers as appendices in the Manual (refer to sample manuals). Other necessary instructions should be added as appropriate. A statement to that effect, such as the example shown below, may be written in the body of the text with the documentation attached as an appendix to the Manual.

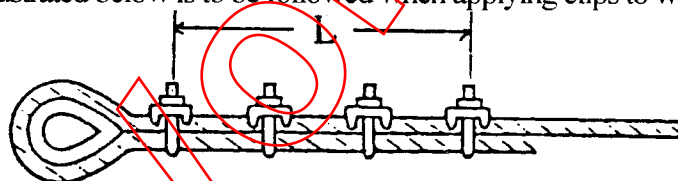
[Sample text]

Cargo securing devices are to be properly handled and used in accordance with the instructions given in Appendix ○.

When no such manufacturer's instructions, etc. are appended, actual detailed instructions are to be stated in the Manual, as shown in the following example.

[Sample text]

- (1) When dunnage is laid on deck, it should be directed athwartships so that bilge can be easily drained into the tank.
- (2) In applying wire ropes, chains, etc. due care should be given to any twisting on them.
- (3) The standard illustrated below is to be followed when applying clips to wires.



No. of clips: 3~4

Size: 20mm~22mm ϕ

L: 300mm~500mm

.2 Safety instructions related to handling of the cargo securing devices and to securing operations by ship or shore personnel.

This paragraph should contain safety instructions concerned with the handling of the cargo securing devices and to securing operations by ship or shore personnel. A sample text is shown below. Other necessary instructions should be added as appropriate.

[Sample text]

- (1) Ship personnel are to supervise cargo securing operations in order to prevent unsuitable stowage and securing of cargoes.
- (2) Working spaces are to be put in order and lighted by any lighting apparatus where it is dark.
- (3) Ship personnel are to inspect working spaces prior to securing operations and ensure that they are suitably safe for carrying out such work.

3.2 Evaluation of forces acting on cargo units

This sub-chapter should contain the following information:

- .1 tables or diagrams that give a broad outline of the accelerations which can be expected in various positions on board the ship in adverse sea conditions and with a range of applicable metacentric height (GM) values;

- .2 examples of forces acting on cargo units when subjected to the accelerations referred to in .1 as well as angles of roll and metacentric height (GM) values above when forces acting on the cargo units exceed the permissible limit for the specified securing arrangements;
- .3 examples of how to calculate the number and strength of portable securing devices required to counteract the forces referred to .2 above as well as safety factors to be used for different types of portable cargo securing devices.

The following methods may be used to evaluate the effectiveness of securing arrangements as they also include the information described above, provided that the method used is suitable to the category of cargo being evaluated.

- (a) CSS Code Annex 13 (refer to sample)

When using this method, care must be taken to ensure that the strength values for each securing device in current use are expressed in terms of MSL.

- (b) The rough estimation method described in section 2.2 of the "Guide to Cargo Stowage, Lashing and Securing Arrangements" published by ClassNK (in Japanese only) as well as in Appendix 3 of the same Guide

- (c) Traditional methods (refer to sample)

- (d) Methods approved by flag Administrations

In addition, methods other than those mentioned in (a) through (d) may be used provided that they take into consideration the requirements of items 1 through 3 above.

It is recommended that the designer of the Cargo Securing Manual convert the calculation method used into a form appropriate to the particular ship, its securing devices and the cargo carried. This form may consist of applicable diagrams, tables or examples of actual calculations.

When the evaluation method is appended to the Manual, such method may be included in a separate appendix with a statement to that effect included in the text of the Manual.

[Sample text]

Appendix ○ shows the method to be used to evaluate the effectiveness of securing arrangements and includes following information:

- .1 tables or diagrams giving a broad outline of the accelerations which can be expected in various positions on board the ship in adverse sea conditions and with a range of applicable metacentric height (GM) values;
- .2 example of forces acting on cargo units when subjected to the accelerations referred to in .1 above and angles of roll and metacentric height (GM) values above when forces acting on the cargo units exceed the permissible limit for the specified securing arrangements; and
- .3 examples of how to calculate number and strength of portable securing devices required to counteract the forces referred to .2 above as well as safety factors to be used for different types of portable cargo securing devices.

Other operational arrangements such as electronic data processing (EDP) or use of a loading computer may be accepted as alternatives to the above-mentioned requirements, provided that this system contains the same information. In cases when such alternative methods are adopted, input data and output should be submitted as a reference for approval of the Manual. Further, in such cases, the information in 1 through 3 above together with the method of calculation are to be included in the Manual as well.

3.3 Application of portable securing devices on various cargo units, vehicles and stowage blocks

3.3.1 Attention to the correct application of portable securing devices

This sub-chapter should draw the master's attention to the correct application of portable securing devices. A sample text is shown below. Other necessary information should be added as appropriate.

[Sample text]

The master is to pay careful attention to the correct application of portable securing devices taking into account the following factors:

- .1 duration of the voyage;
- .2 geographical area of the voyage with particular regard to the minimum safe operating temperature of the portable securing devices;
- .3 sea conditions which may be expected;
- .4 dimensions, design and characteristics of the ship;
- .5 expected static and dynamic forces during the voyage;
- .6 type and packaging of cargo units including vehicles;
- .7 intended stowage pattern of the cargo units including vehicles; and
- .8 mass and dimensions of the cargo units and vehicles.

3.3.2 Application of portable cargo securing devices

This sub-chapter should describe the application of portable cargo securing devices. A sample text is shown below. Other necessary instructions should be added as appropriate.

[Sample text]

Particular attention is to be given to the following points when applying portable securing devices.

- .1 Prior to the securing of any cargo, it should be confirmed that all securing devices are in good working condition.
- .2 Particular care should be taken to distribute forces as evenly as practicable between the cargo securing devices.
- .3 Where friction between the cargo and the ship's deck or structure or between cargo transport units is insufficient to avoid the risk of sliding, suitable material such as soft boards, dunnage, or other anti-skid material should be used to increase friction and prevent such sliding or slippage.

Where necessary, the text of the Manual should be supplemented by suitable drawings or sketches to facilitate the correct understanding and proper application of the securing devices to various types of cargo and cargo units (refer to sample manuals). One example would be illustrations of the standard method of lashing showing the number and angle of lashes (refer to sample manuals).

3.3.3 Guidance as to recommended location and method of stowage and securing of cargoes

This sub-chapter should contain guidance as to the recommended location and method of stowage and securing of containers, trailers and other cargo carrying vehicles, palletized cargoes, unit loads and single cargo items (e.g. woodpulp, paper rolls, etc.), heavy weight cargoes, cars and other vehicles. In cases where available documents are referred to, the documents should be attached as an appendix with the description of the reference.

[Sample text]

Guidelines concerning the recommended location and method of stowage and securing of cargo is shown in Appendix ○.

- ANNEXES I to XII of the Code of Safe Practice for Cargo Stowage and Securing are acceptable for use as relevant appendices.
- Other necessary guidelines should be attached as appropriate.

3.4 Supplementary requirements for ro-ro ships

A copy of IMO resolution A.581(14) should be attached to the Manual for reference, along with a description of the reference, in the case of ro-ro ships which regularly carry road vehicles with an authorized maximum total mass of vehicles and cargo of between 3.5 and 40 tons and road trains with a maximum total mass of not more than 45 tons (refer to sample manuals).

[Sample text]

Appendix ○ shows guidelines that are to be followed with regard to the carriage of road vehicles with an authorized maximum total mass for vehicles and cargo of between 3.5 and 40 tons and of road trains with a maximum total mass of not more than 45 tons.

Note:

- ※ Ro-ro passenger ships are beyond the scope of this Guide. Accordingly, instructions regarding the requirements described in paragraph 3.4.2 of the IMO DSC guidelines are omitted.
- ※ Instructions regarding the requirements stated in paragraph 3.5 of the IMO DSC guidelines are omitted as these requirements have no connection to the contents of the Cargo Securing Manual.

CHAPTER 4 STOWAGE AND SECURING OF CONTAINERS AND OTHER STANDARDIZED CARGO

Chapter 4 should be prepared in accordance with the instructions given below. On existing ships, the relevant documents already in use regarding safe stowage and securing may be integrated into the material used to prepare this chapter. However, in cases where the information required in sections 4.1, 4.3 and 4.4 of the Manual is not included in these documents, Chapter 4 should be completed by adding the necessary information to the text of the Manual.

4.1 Handling and safety instructions

.1 Instructions on the proper handling of the cargo securing devices

This sub-chapter should contain instructions on the proper handling and usage of cargo securing devices used for the stowage and securing of standardized cargo. Handling instructions prepared by manufacturers may be used in place of preparing separate instructions in the text (refer to sample manuals). However, any relevant information necessary to the safe and proper handling of the devices as indicated in this Guide not included in such handling instructions is to be added to the text of the Manual. Other necessary instructions should be added as appropriate.

Where instructions on the proper handling of cargo securing devices prepared by manufacturers are available, reference may be made to them as appendices of the Manual as shown in the following sample text.

[Sample text]

Cargo securing devices are to be handled in accordance with the instructions given in Appendix ○.

.2 Safety instructions concerning the handling of cargo securing devices and securing operations for containers or other standardized cargo by ship and shore personnel

This paragraph should contain safety instructions concerning the handling and usage of cargo securing devices for and the securing operations of containers or other standardized cargo by either ship or shore personnel. A sample text is shown below. Other necessary instructions should be added as appropriate.

[Sample text]

- (1) Ship personnel are to supervise cargo securing operations in order to prevent the unsuitable stowage and securing of cargoes.
- (2) Working spaces are to be put in order and lighted by any lighting apparatus where it is dark.
- (3) Ship personnel are to inspect working spaces prior to securing operations and ensure that they are suitably safe for carrying out such work.

4.2 Stowage and securing instructions

4.2.1 Stowage and securing plan

This sub-chapter should consist of a comprehensive and understandable plan or set of plans that provide a necessary overview of the following items

1. longitudinal and athwartship views of under deck and on deck stowage locations of containers as

appropriate;

2. alternative stowage patterns for containers of different dimensions;
3. maximum stack masses;
4. permissible vertical sequences of masses in stacks;
5. permissible stack heights with respect to approved sight lines; and
6. application of securing devices using suitable symbols with due regard to stowage position, stack mass, sequence of masses in stack and stack height. The symbols used should be consistent throughout the Cargo Securing Manual.

Where documents including information in 1. to 6. above are available, they may be referred to as appendices. In general, relevant documents on existing ships include the information. Where lack of some of the information are found in the documents, necessary information should be supplemented.

[Sample text]

Stowage and securing plans are presented in Appendix ○ and include a necessary overview of the following items:

1. longitudinal and athwartship views of under deck and on deck stowage locations of containers as appropriate;
2. alternative stowage patterns for containers of different dimensions;
3. maximum stack masses;
4. permissible vertical sequences of masses in stacks;
5. maximum stack heights with respect to approved sight lines; and
6. Application of securing devices using suitable symbols with due regard to stowage position, stack mass, sequence of masses in stack and stack height.

4.2.2 Stowage and securing principle on deck and under deck

This sub-chapter should support the interpretation of the stowage and securing plan with regard to container stowage, highlighting:

1. the use of the specified devices; and
2. any guiding or limiting parameters such as dimension of containers, maximum stack masses, sequence of masses in stack, stacks affected by wind load, height of stacks.

It should contain specific warnings of possible consequences from misuse of securing devices or misinterpretation of instructions given.

Reference may be made to documents including the above-mentioned information where they are already available from the manufacturer, shipyard or other relevant source.

[Sample text]

Appendix ○ shows the stowage and securing principles to be applied in stowing and securing cargo on and below deck. Appendix ○ supports the interpretation of the stowage and securing plan with regard to container stowage, highlighting:

1. the use of the specified devices; and
2. any guiding or limiting parameters as dimension of containers, maximum stacks masses, sequence of masses in stacks, stacks affected by wind load, height of stacks.

4.3 Other allowable stowage patterns

This sub-chapter should provide the information necessary for the master to deal with cargo stowage situations deviating from the general instructions addressed under sub-chapter 4.2 of the Manual, including appropriate warnings of possible consequences from misuse of securing devices or misinterpretation of instructions given.

Where documents including above-mentioned information are available, reference may be made to them in appendices to the Manual.

[Sample text]

Appendix ○ set forth necessary information for the master to refer to when dealing with cargo stowage situations that deviate from the general instructions given in sub-chapter 4.2 of this Manual.

Appendix ○ includes information on the following:

- .1 alternative vertical sequences of masses in stacks;
- .2 stacks affected by wind load in the absence of outer stacks;
- .3 alternative stowage of containers with various dimensions; and
- .4 permissible reduction of securing effort with regard to lower stacks masses, lesser stack heights or other reasons.

4.4 Forces acting on cargo units

This sub-chapter should present the distribution of accelerations on which the stowage and securing system is based, and specify the underlying conditions of stability. Information regarding forces induced by wind and sea on deck cargo should be provided.

Where documents including such information are already available, reference may be made to them as appendices of the Manual. Where some necessary information is found to be lacking in the documents, such information should be supplemented to the Manual as necessary.

[Sample text]

Appendix ○ shows the forces acting on cargo units and includes the distribution of accelerations on which the stowage and securing system is based, together with the underlying conditions of stability.

It should further contain information on the nominal increase of forces or accelerations with an increase of initial stability. Recommendations should be given for reducing the risk of cargo losses from deck stowage by restrictions to stack masses or stack heights, where high initial stability cannot be avoided.

[Sample text]

In the case of loading containers, it is necessary that the stowage plan be carefully observed with adequate consideration given to the ship's stability. If any deviation from the plan is to be expected, the intended stowage pattern, in principle, should be reviewed taking account of the ship's stability.

For the ships having a high initial stability, it should be borne in mind that greater forces or accelerations than those indicated in the Manual will act on cargoes when the ship navigates in severe sea conditions on which the evaluation of forces and accelerations is based. Under such circumstances, such actions as reviewing stack height or stack masses need to be taken in order to prevent the containers stowed on deck from washing away.

It is desirable that the above text be supplemented with clear concrete instructions.