
NATIONAL
CARGO
BUREAU

We were asked to:

- Review the vessel's Cargo Securing Manual
- Review the sufficiency of securing arrangements for the Main Deck (containers) and 2nd Deck (RORO cargo)
- Review the sufficiency of securing arrangements for any "suspect loads" such as (but not limited to) high, heavy, or athwartships stows
- Calculate the breaking or failing points for the above

S.S. EL FARO

Review of vessel's Cargo Securing Manual

Title:	Revision Number:	Effective Date:	Procedure Number:
Cargo Securing Manual Introduction	Rev. 0	12 December 2005	E-03-136
	Prepared By: HEC	Approved By:	Page: 1 of 6

SS EL FARO (Ex. NORTHERN LIGHTS)

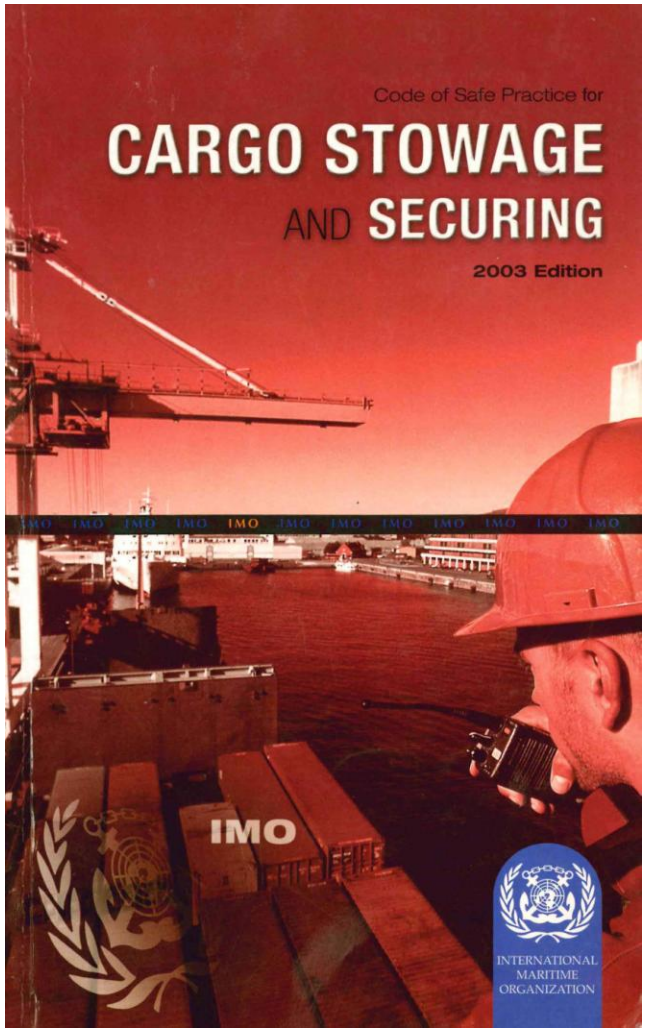
Cargo Securing Manual

APPROVED
on behalf of the Government of the vessel's registry for compliance with SOLAS 1974 (as amended) subject to conditions of ABS Letter dated
20 JAN 2006
ABS HOUSTON

The Cargo Securing Manual (CSM) consists of the following procedures and appendices:

Document ID	Current Issue	Title
Procedure E-03-136	Rev. 0	Introduction
Procedure E-03-200	Rev. 0	General
Procedure E-03-335	Rev. 0	Stowage Arrangements
Procedure E-03-435	Rev. 0	Cargo Securing Devices
Procedure E-03-535	Rev. 0	Stowage and Securing of Containers
Procedure E-03-600	Rev. 0	Stowage and Securing of Non-Standardized Cargo
Procedure E-03-725	Rev. 0	Stowage and Securing of Ro-Ro Cargo
Appendix E-03-135-A1	Rev. 0	Stowage Arrangement Plan and Capacity Table
Appendix E-03-136-A2	Rev. 0	Stowage Section Diagrams
Appendix E-03-135-A3	Rev. 0	Shore Crane Stack Height Calculation
Appendix E-03-135-A4	Rev. 0	Specification of Fixed Securing Devices
Appendix E-03-135-A5	Rev. 0	Locations of Fixed Securing Devices in Hold
Appendix E-03-135-A6	Rev. 0	Locations of Base Sockets and Padeyes on Deck
Appendix E-03-135-A7	Rev. 0	Specification of Portable Securing Devices
Appendix E-03-100-A8	Rev. 0	Operating Instructions for Semi-Automatic Twistlocks
Appendix E-03-135-A9	Rev. 0	Deck Strength and Maximum Stack Weights
Appendix E-03-135-A10	Rev. 0	Hold Securing Arrangements, Strength Limitations, and Instructions
Appendix E-03-135-A11	Rev. 0	Deck Securing Arrangements, Strength Limitations, and Instructions
Appendix E-03-135-A13	Rev. 0	Typical Stack Weight Diagrams
Appendix E-03-135-A14	Rev. 0	Influence of Lashing Parameters on Stack Weights
Appendix E-03-135-A15	Rev. 0	Acceleration Data
Appendix E-03-100-A16	Rev. 0	Table of Container Properties
Appendix E-03-135-A17	Rev. 0	Advanced Calculation Method for Non-Standardized Cargo
Appendix E-03-111-A18	Rev. 0	Test Certificates for Fixed and Portable Securing Devices

"THIS MANUAL HAS BEEN EXAMINED FOR COMPLIANCE WITH THE INTERNATIONAL MARITIME ORGANIZATION'S CODE OF SAFE PRACTICE FOR CARGO STOWAGE AND SECURING, APPENDIX 2, AND THE 1994/1996 AMENDMENTS TO THE CODE, AND FOUND TO BE SET OUT IN THE MANNER PRESCRIBED IN THE CODE AND PROVIDES THE NECESSARY GUIDANCE TO THE MASTER REGARDING ADEQUATE SECURING OF CARGO UNITS. THIS APPROVAL DOES NOT REMOVE THE MASTER'S RESPONSIBILITY FOR ENSURING THE SHIP IS STOWED SAFELY."



Appendix 2

Guidelines for the preparation of the Cargo Securing Manual

MSC/Circ. 745 – *13 June 1996*

1 In accordance with regulations VI/5 and VII/6 of SOLAS 1974, as amended, cargo units and cargo transport units shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration, which shall be drawn up to a standard at least equivalent to the guidelines developed by the Organization.

2 The Maritime Safety Committee, at its sixty-sixth session (28 May to 6 June 1996), considered the draft guidelines for the preparation of the Cargo Securing Manual prepared by the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers (DSC) at its first session (5 to 9 February 1996), and approved the Guidelines as amended and set out in the annex to this circular.

3 These Guidelines are based on the provisions contained in the annex to MSC/Circ.385 but have been expanded to include the applications explicit to ships which are equipped or adapted for the carriage of freight containers, taking into account the provisions of the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), as amended. They are of a general nature and intended to provide guidance on the preparation of such Cargo Securing Manuals, which are required on all types of ships engaged in the carriage of cargoes other than solid and liquid bulk cargoes.

4 Member Governments are invited to bring these Guidelines to the attention of all parties concerned, with the aim of having Cargo Securing Manuals carried on board ships prepared appropriately and in a consistent manner, and to implement them as soon as possible and, in any case, not later than 31 December 1997.

5 This Circular replaces MSC/Circ. 385 dated 8 January 1985.

Chapter 1
General

Chapter 2
Securing devices and arrangements

Chapter 3
Stowage and securing of non-standardized and semi-standardized cargo

Chapter 4
Stowage and securing of containers and other standardized cargo

Chapter 1

- Minor differences with respect to recommended text
- Insignificant as overall intent was met
- Considered satisfactory

Chapter 2

- Values given as SWL alongside BS with no apparent correlation
- No proper means of obtaining or verifying correct tension on underdeck lashings
- Inspection/maintenance documentation not present
- Generally in compliance

Chapter 3

- Non-standardized and semi-standardized cargo
- Incorporated CSS Code Annex 13
- Generally compliant but missing sketches showing layout and strength of securing devices
- Sketch in Appendix 5 of CSM difficult to reconcile with other requirements

Appendix 5:

Locations of Fixed Securing Devices in Hold

Scope: This appendix is applicable to the *SS EL FARO*.

Figure 1 shows the typical stowage arrangement for all trailers.

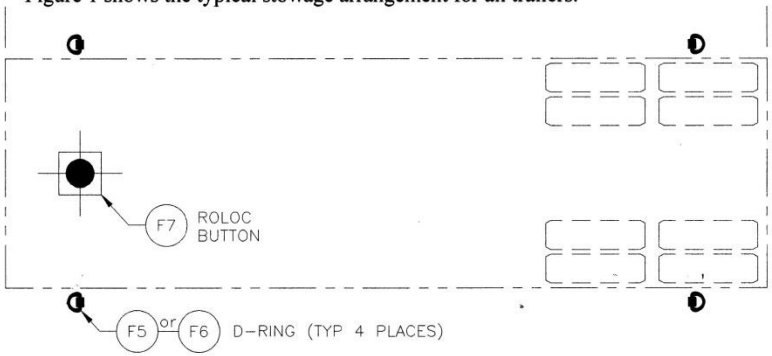


Figure 1. Typical Trailer Stowage

Figure 2 shows the typical arrangement for autos parked athwartships or on ramps. In addition, there are cloverleaf cut-outs on the third deck located in a grid on a 5'-6" spacing.

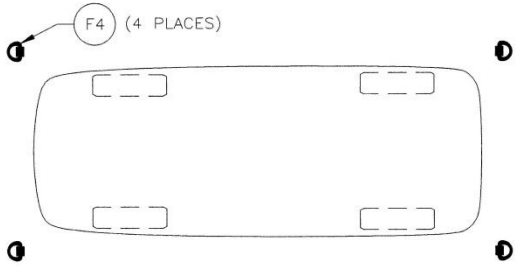


Figure 2. Typical Auto Stowage

Title:	Revision Number:	Effective Date:	Appendix Number:
Locations of Fixed Securing Devices in Hold	Rev. 0	12 December 05	E-03-135-A5
	Prepared By: HEC	Approved By:	Page: 1 of 1

Chapter 4

- Standard system for trailers specified use of roloc box on-button
- 45^{o} lashing angle or 4 feet lead
- If not, then Annex 13 to be used
- Planning of container stowage done ashore
- Container stack configuration diagrams provided for shipboard use difficult to use
- Not likely to be reviewed on board

Cargo Securing Manual

- Some errors and inconsistencies
- Confusing in some respects
- Overall deemed insignificant
- Errors and inconsistencies unlikely to have contributed towards the incident

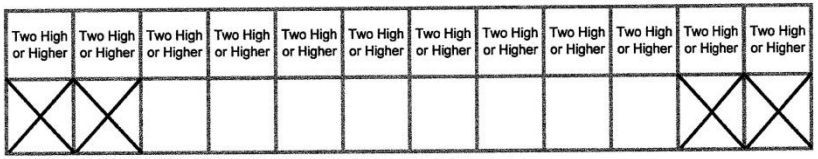
Sufficiency of Securing Arrangements for Containers

- In initial report identified several stacks overweight or not properly lashed
- Subsequently reduced the number of improperly lashed if securing in accordance with EL Class Minimum Lashing Requirements is acceptable
- In that case, only one improperly lashed container remained outstanding and the EL Class Minimum Lashing Requirements document could not be reconciled with the CargoMax program for that condition

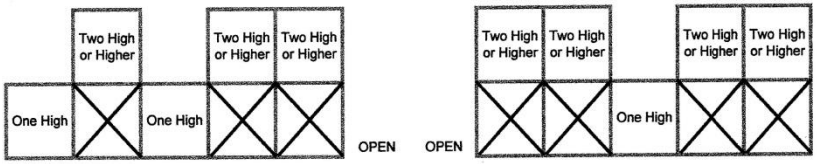
SSL EL Class Minimum Lashing Requirements - LoLo

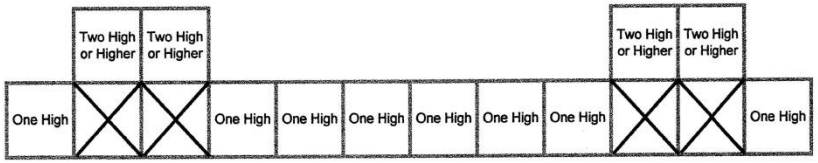
Additional lashing may be required for individual stacks as determined by Marine Operations.

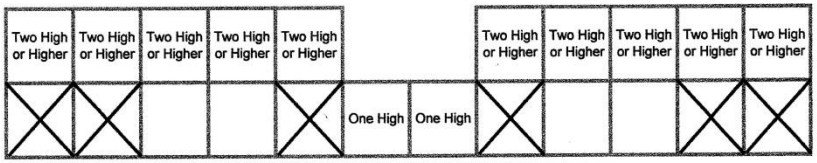
All bays will have the outer two high container stacks lashed regardless of where the outside box is located.



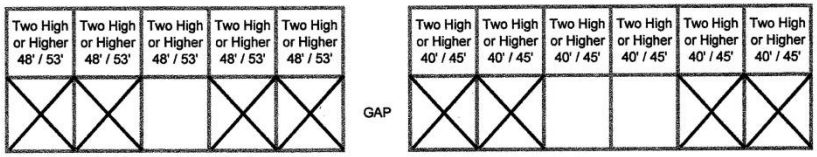
If there are two high containers next to an open cell located in the interior of the bay they will be treated as outer stacks.







If there are two high 48' / 53' containers next to a stack of 40' / 45' containers in the interior of a bay - a gap is created. Both the 2 high 48' / 53' stacks and 40' / 45' stacks of the bay they will be treated as outer stacks and lashed.



BAY 17

Stack 08 required to be single lashed in accordance with CargoMax - differed from EL Class Minimum Lashing Requirements

	12	10	08	06	04	02	01	03	05	07	09	11		Wt	VCG
90													90	0.0	0.00
88													88	0.0	0.00
86			40 9.54 16.9	40 9.54 18.0		40 9.54 10.7	40 9.54 11.0	40 9.54 13.9	40 9.54 13.4	40 9.54 11.3	40 9.54 12.2	40 9.54 12.2	86	119.6	90.24
84	40 9.54 20.3	40 9.54 21.5	40 9.54 20.4	40 9.54 12.5	40 9.54 20.9	40 9.54 17.3	40 9.54 22.9	40 9.54 22.5	40 9.54 21.1	40 9.54 23.5	40 9.54 18.1	40 9.54 23.8	84	244.8	80.61
82	40 9.54 23.5	40 9.54 22.2	40 9.54 15.0	40 9.54 23.2	40 9.54 24.1	40 9.54 23.6	40 9.54 18.3	40 9.54 16.0	40 9.54 19.0	40 9.54 18.2	40 9.54 22.5	40 9.54 16.1	82	241.7	70.99
Lash	LASH	LASH	T/L	T/L	T/L	T/L	T/L	T/L	T/L	T/L	LASH	LASH			
Lash Mgn	N.A.	N.A.	-0.9	1.8	N.A.	4.2	4.4	3.0	3.5	3.6	20.7	9.5			
Wt	43.8	43.7	52.3	53.7	45.0	51.6	52.2	52.4	53.5	53.0	52.8	52.1		606.1	
VCG	75.45	75.72	80.96	79.68	75.46	78.21	79.27	80.23	79.61	79.36	78.74	79.89			78.67
Str Mg	18.7	9.9	1.3	-0.1	8.6	2.0	1.4	1.2	0.1	0.6	0.8	10.4	54.9		

Sufficiency of Securing Arrangements for 2nd Deck RORO Cargo

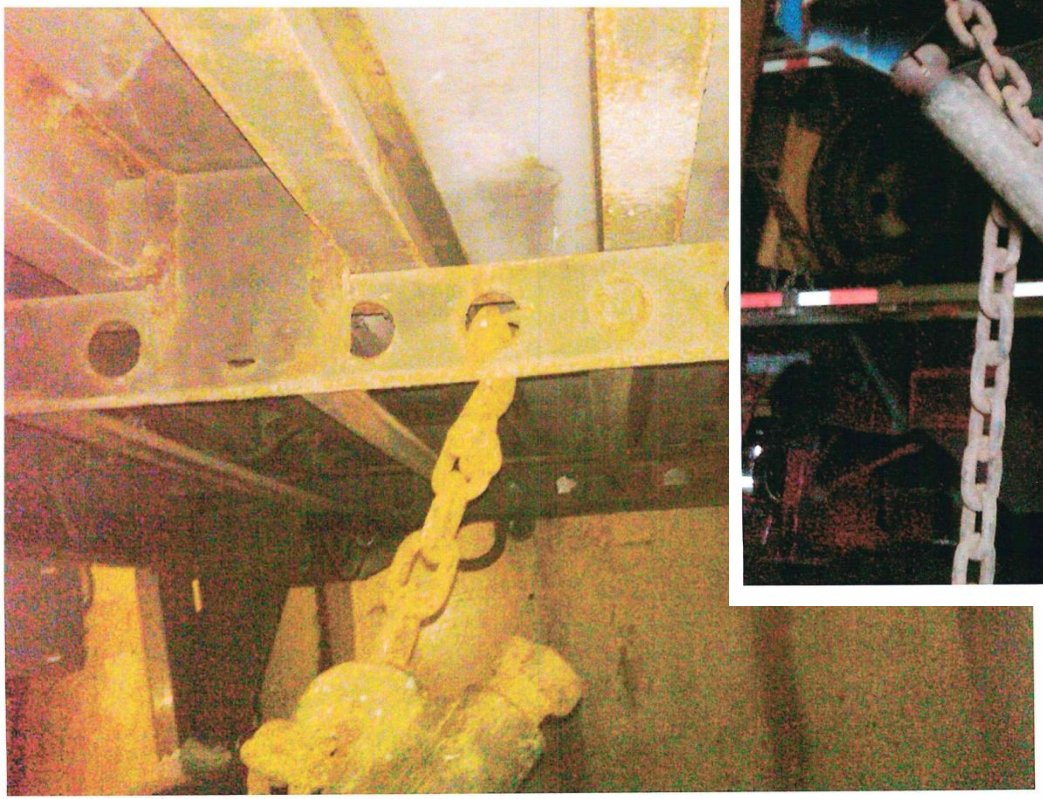
- A significant amount of 2nd deck trailer cargo was stowed off-button
- Off-button stowage is not part of the standard trailer securing detailed in the Cargo Securing Manual so, for off-button stowage, an Annex 13 calculation should be carried out
- No evidence of Annex 13 calculations was seen
- We carried out numerous calculations using Annex 13 methodology to determine whether cargo was properly secured

- We concluded that securing may have been satisfactory for most of the cargo if lashings were properly applied, but was not likely to be satisfactory for heavier pieces stowed off-button
- Details of weight limitations would depend upon a number of variables as outlined in our reports
- After reviewing photographs reportedly taken on board EL YUNQUE and others accompanying a Tote Lashing Manual for the class of vessels, it appeared that there may also be a tendency towards lashing not being properly applied at times
- In particular, photographs show lashing angles well in excess of the 45^{o} specified in the Cargo Securing Manual
- In addition, lashings did not always appear to be properly attached to points of equivalent strength on the cargo

Photographs from EL YUNQUE – lashing angles well in excess of 45°

Photographs from Tote Lashing Manual – lashing angles well in excess of 45°

Photographs from Tote Lashing Manual – questionable lashing attachment to trailers



Failure points

- We were not able to determine breaking or failure points due to the number of variables involved and insufficient information provided regarding, in particular, the manner in which lashings were actually attached and led and precise vessel motions