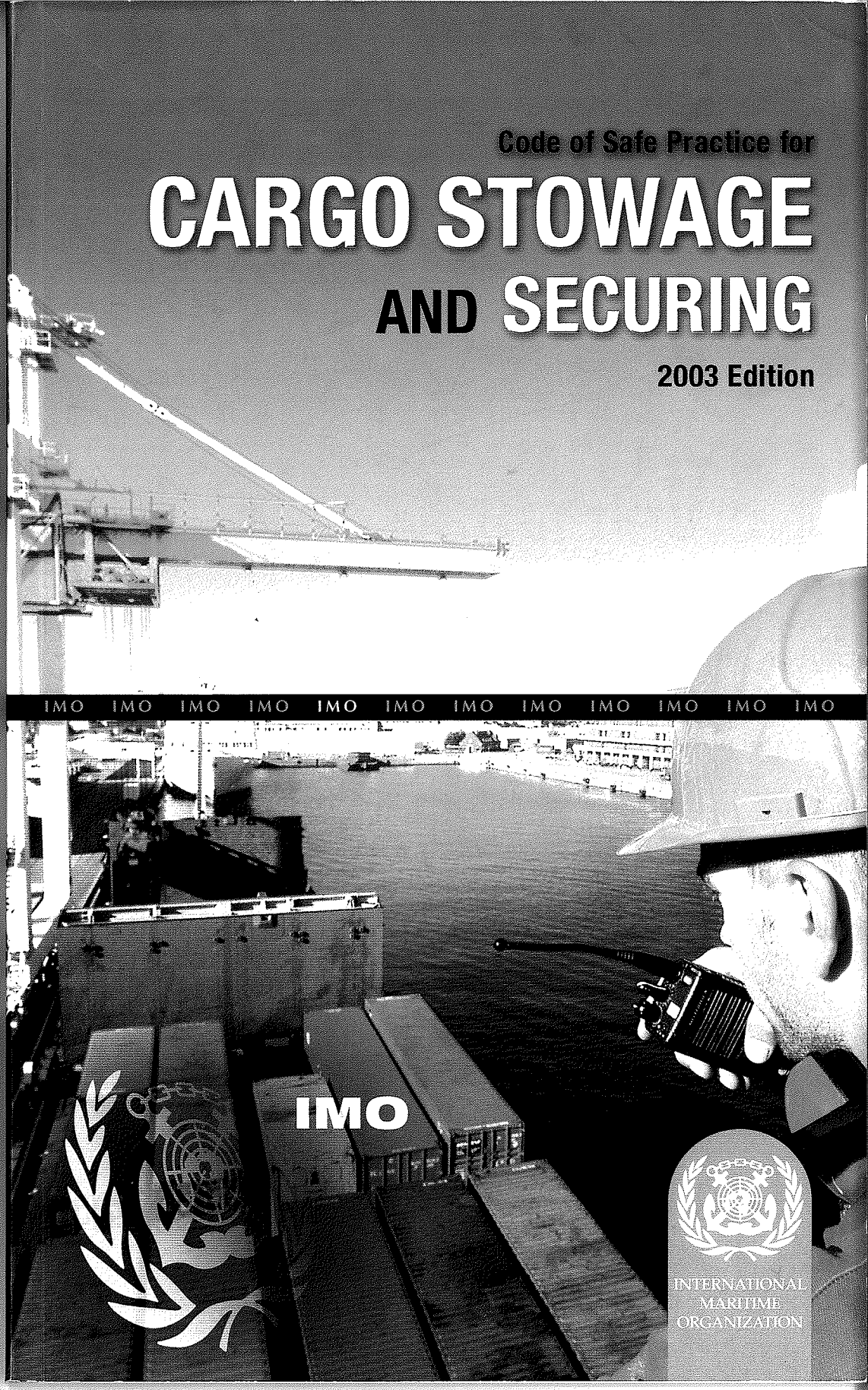
Code of Safe Practice for

CARGO STOWAGE AND SECURING

2003 Edition



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Annex 13

Methods to assess the efficiency of securing arrangements for non-standardized cargo

1 Scope of application

The methods described in this annex should be applied to non-standardized cargoes, but not to containers on containerships.

Very heavy units as carried under the provisions of chapter 1.8 of the Code of Safe Practice for Cargo Stowage and Securing (the Code) and those items for which exhaustive advice on stowage and securing is given in the annexes to the Code should be excluded. All lashing assemblies used in the application of the methods described in this annex must be attached to fixed securing points or strong supporting structures marked on the cargo unit or advised as being suitable, or taken as a loop around the unit with both ends secured to the same side as shown in annex 5, figure 2 of the Code. Lashings going over the top of the cargo unit, which have no defined securing direction but only act to increase friction by their pre-tension, cannot be credited in the evaluation of securing arrangements under this annex.

Nothing in this annex should be read to exclude the use of computer software, provided the output achieves design parameters which meet the minimum safety factors applied in this annex.

The application of the methods described in this annex is supplementary to the principles of good seamanship and shall not replace experience in stowage and securing practice.

2 Purpose of the methods

The methods should:

.1 provide guidance for the preparation of the Cargo Securing Manual and the examples therein;

.2 assist ship's staff in assessing the securing of cargo units not covered by the Cargo Securing Manual;

.3 assist qualified shore personnel in assessing the securing of cargo units not covered by the Cargo Securing Manual; and

.4 serve as a reference for maritime and port-related education and training.

3 Presentation of the methods

The methods are presented in a universally applicable and flexible way. It is recommended that designers of Cargo Securing Manuals convert this presentation into a form suiting the particular ship, its securing equipment and the cargo carried. This form may consist of applicable diagrams, tables or calculated examples.

For length/speed combinations not directly tabulated, the following formula may be used to obtain the correction factor with v = speed in knots and L = length between perpendiculars in metres:

$$\text{correction factor} = (0.345 \cdot v/\sqrt{L}) + (58.62 \cdot L - 1034.5)/L^2$$

This formula shall not be used for ship lengths less than 50 m or more than 300 m.

In addition, for ships with B/GM less than 13, the transverse acceleration figures should be corrected by a factor given in table 4.

Table 4 – *Correction factors for B/GM < 13*

B/GM	7	8	9	10	11	12	13 or above
on deck, high	1.56	1.40	1.27	1.19	1.11	1.05	1.00
on deck, low	1.42	1.30	1.21	1.14	1.09	1.04	1.00
'tween-deck	1.26	1.19	1.14	1.09	1.06	1.03	1.00
lower hold	1.15	1.12	1.09	1.06	1.04	1.02	1.00

The following cautions should be observed:

In the case of marked roll resonance with amplitudes above $\pm 30°$, the given figures of transverse acceleration may be exceeded. Effective measures should be taken to avoid this condition.

In the case of heading into the seas at high speed with marked slamming shocks, the given figures of longitudinal and vertical acceleration may be exceeded. An appropriate reduction of speed should be considered.

In the case of running before large stern or quartering seas with a stability which does not amply exceed the accepted minimum requirements, large roll amplitudes must be expected with transverse accelerations greater than the figures given. An appropriate change of heading should be considered.

Forces by wind and sea to cargo units above the weather deck should be accounted for by a simple approach:

force by wind pressure = 1 kN per m^2
force by sea sloshing = 1 kN per m^2

Sloshing by sea can induce forces much greater than the figure given above. This figure should be considered as remaining unavoidable after adequate measures to prevent overcoming seas.

Sea sloshing forces need only be applied to a height of deck cargo up to 2 m above the weather deck or hatch top.

For voyages in a restricted area, sea sloshing forces may be neglected.