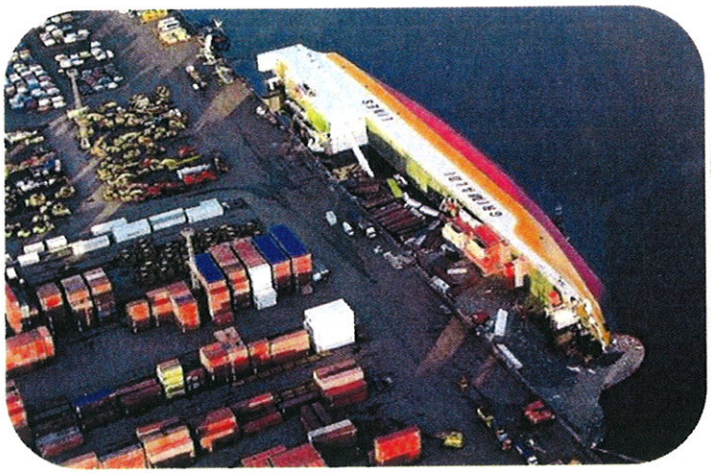
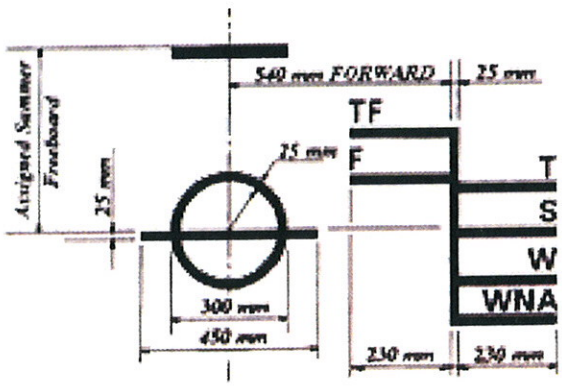
INTERNATIONAL INSTITUTE OF MARINE SURVEYING

NATIONAL CARGO BUREAU INC.

SHIP'S STABILITY SELF-STUDY COURSE





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Preface

This course was originally designed to ensure that National Cargo Bureau (NCB) surveyors understood and were able to properly apply the stability concepts necessary for safe loading and carriage of bulk grain, and to utilize this knowledge in other areas of their profession where concern for ship's stability is required. It has since been made available, as a self-study course, to all who may have a need or an interest in this subject. This includes vessels' personnel, operators, charterers, stevedores, agents and anyone else that may have a direct influence on, or concern for the outcome of, the loading of vessels with bulk grain.

Standards of Training, Certification and Watchkeeping (STCW) model course requirements are addressed to the extent that they fall within the scope of the above. While this is not intended to be an STCW model course, completion of this course should demonstrate that the basic principles and techniques involved with merchant vessel stability calculations have been mastered and provide a sound basis for further STCW stability training, should the student take that path.

This course addresses both statical stability, dealing with initial stability as measured by GM, and dynamical stability, which is concerned with the righting energy of the vessel over a range of angles of heel. The International Code for the Safe Carriage of Grain in Bulk (International Grain Code) is largely based upon dynamical stability and the latter part of this course deals with the stability calculations necessary to demonstrate compliance with the International Grain Code as well as United States Coast Guard (USCG) alternatives that may be applicable to certain domestic voyages.

The material in the course constitutes the text. It should be appreciated that, while this is sufficient to achieve the stated objectives, it is not all-inclusive and students seeking a more in-depth understanding of the subject matter would benefit from reference to one or more text books. The following (listed in alphabetical order) are particularly recommended:

Ship Stability for Masters and Mates, Bryan Barrass and D.R. Derrett
Published by Elsevier

Stability and Trim for the Ship's Officer, William E. George
Published by Cornell Maritime Press

The Management of Merchant Ship Stability, Trim and Strength, I.C. Clark
Published by The Nautical Institute

In addition, a copy of NCB's publication, "General Information for Grain Loading" is provided with the course, along with an excerpt copy of a Grain Stability Booklet for a Panamax bulk carrier.

Although effort is made in this course to present the material as simply and understandably as possible, it must be recognized that the intended purpose will not be achieved without effort and conscientious application.

How This Training Works

The course is divided into 14 modules intended as building blocks or steps toward familiarization with the material. A consistent numbering system allows each module's objectives to be matched to text and test questions. Each module consists of the following elements:

.1 **OBJECTIVES.** The objectives of each module will be stated at the beginning of each module.

.2 **LESSON.** Explanatory text, supplemented by drawings and additional references as necessary, is provided to meet the stated objectives. Where, in particular, complex theories and/or calculations are shown, a number of self-test questions are included so that the student can obtain a level of comfort and confidence prior to attempting the test.

.3 **TEST.** Each module contains a test based on the objectives and lesson of the module. Students who have completed the lesson and self-test questions within should feel confident with their level of success. Those that do not feel confident should seek further guidance prior to attempting the test.

.4 **COMMENTS.** Each module ends with a comment section where space is provided for the student's remarks, questions and/or comments. User feedback regarding any aspect of this training course is welcomed and encouraged. In particular, when the student feels that a test question is ambiguous or misleading, a comment which indicates understanding of the issue may result in credit for an otherwise incorrect answer.

All elements of a module begin with the module number. Objectives are shown in section .1 and itemized in subsections, .1.1, .1.2, etc. The lesson text is then shown in section .2, broken down into subsections corresponding to the objectives' subsections,

e.g. subsection .2.1 addresses the objective shown in .1.1 and subsection .2.2 addresses the objective shown in .1.2, etc. The test for the module is numbered as section .3 and test questions are numbered as subsections in a similar manner to the objectives and lesson text, i.e. test question .3.1 is based on the lesson text contained within .2.1 and intended to demonstrate that objective .1.1 has been met, test question .3.2 is based on the lesson text contained within .2.2 and intended to demonstrate that objective .1.2 has been met, etc. In some cases, more than one question may be needed to demonstrate that a particular objective has been met. In those cases, the questions for the same lesson and objective have an additional number, e.g. .3.1.1 and .3.1.2 would both refer to lesson text in .2.1 and objective .1.1, .3.2.1 and .3.2.2 would both refer to lesson text in .2.2 and objective .1.2, etc. The comment section is numbered .4 with no subsections and appears at the very end of the module.

Several sheets of graph paper have been provided near the back of the course booklet. These can be removed and used or copied as necessary.

Marking Scheme

The percentage of available marks for each question is shown at the beginning of the test section for each module. Students should ensure that they are familiar with the general concepts and principles shown in the module text by satisfactorily completing the self-test questions provided before continuing to the module test. It is recommended that students ensure that, in the tests, all necessary calculations are completely and clearly shown, as the grading scheme, in general, calls for a deduction of 40% of the available marks for a question for each error in applying principles and a deduction of 10% of the available marks for a question for each clerical error. Where necessary calculations are not shown and incorrect answers are submitted, errors in applying principles must be assumed.

In order to pass the course, students must achieve a minimum of 50% for each module and an overall average of at least 70%. Certificates will be awarded to successful students.

Students passing with an overall average of at least 80% will have a "Merit" notation placed on their certificates. Students passing with an overall average of at least 90% will have a "Distinction" notation placed on their certificates.

Support

NCB offers support to students through its New York office at no additional charge. Questions or comments can be E-mailed to ncbnyc@natcargo.org or faxed to National Cargo Bureau at +1 212 785 8333. Please make reference to SELF-STUDY STABILITY or similar in the subject line.

Evaluation

In order for NCB to continuously assess the effectiveness of the course and training materials, an End of Course Evaluation form is provided at the back of the course booklet (page 337). Students are encouraged to complete this, after finishing the course, and return it to NCB with candid comments so that future improvements and modifications can be made where necessary.