
International Standard



4868

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Code for the measurement and reporting of local vibration data of ship structures and equipment

Code pour l'exécution des mesurages des vibrations locales des structures et équipements de navires et présentation des résultats

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Descriptors : ships, vibration, measurement, definitions, recording instruments, testing conditions, technical data sheets.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4868 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*.

Code for the measurement and reporting of local vibration data of ship structures and equipment

0 Introduction

The term "local vibration", as used in the shipbuilding industry, applies to the dynamic response of a structural element, an assembly of structural elements, machinery or equipment which vibrates at an amplitude significantly greater than that of the basic hull girder at the location. This vibration may occur at a frequency of the hull girder or of a machinery component. Typical examples include the vibration of parts of the superstructure, smokestack, mast, binnacle, turbine, pipe or deck plate. These local vibrations generally result from :

- a) local flexibility of supporting structural elements; or,
- b) the vibratory characteristics of the machinery concerned.

In this International Standard, the term "vibration severity" is used to describe the vibration conditions in the ship and, based on long-established practice in the industry, the peak value of vibration velocity has been chosen as the primary quantity of measurement; since, however, much data have been accumulated in terms of vibration acceleration and vibration displacement, a plotting sheet has been adopted on which data may easily be plotted using any of these quantities of measurement.

1 Scope and field of application

This International Standard establishes uniform procedures for gathering and presenting data on vibrations of local structural elements or equipment in sea-going merchant ships. The procedures, where applicable, can also be used for inland ships and tug boats. Such data are necessary to establish uniformly the vibration characteristics present in various compartments on board ship and to provide a basis for design predictions, improvements and comparison against environmental vibration reference levels or criteria relative to reliability (of machines), safety (of structures) and habitability. The data are not intended to apply to the evaluation of the vibration of machines with respect to noise control or to the design of the machine or equipment under consideration. These latter cases will generally require specific diagnostic treatment and include a broader frequency range and more specialized instrumentation than is necessary for these general considerations.

This International Standard is concerned with local vibration measured on structural elements, superstructure, decks, bulkheads, masts, machines, foundations, equipment, etc., and only relates to the measurement and reporting of the local

vibration of the structure or equipment mounted thereon. Concern over local vibration may be caused by :

- a) the stresses due to the vibration, for example in the structure, in the equipment or attachments;
- b) the necessity of maintaining trouble-free operation of a machine or other equipment which might be jeopardized by the malfunction or degradation of components;
- c) the physical strain on man (habitability and performance);
- d) the effects of the vibration on its environment, such as adjacent instruments, machines, equipment, etc.

The frequency range considered includes propulsion shaft rotational frequencies, rotational frequency of machines and other significant source frequencies, such as diesel firing, blade or vane passage, etc.

This International Standard gives general principles of vibration measurement on board ships to improve vibration engineering. Therefore, in individual cases, items to be measured may be selected or added to meet the aims of the vibration measurement of each ship.

2 References

ISO 2041, *Vibration and shock — Vocabulary*.

ISO 4867, *Code for the measurement and reporting of ship-board vibration data*.

ISO 6954, *Mechanical vibration and shock — Guidelines for the overall evaluation of vibration in merchant ships*.

3 Definitions

In addition to the terms defined in ISO 2041, the following definitions are applicable.

3.1 free route : That condition achieved when the ship is proceeding at a constant speed and course with minimum throttle or helm adjustment.