AS 3762—1990
ISO 4868—1984

Australian Standard®

Measurement and reporting of local vibration data of ship structures and equipment

This Australian Standard was prepared by Committee AV/8, Vibration and Shock—Instrumentation and Measurement. It was approved on behalf of the Council of Standards Australia on 14 December 1989 and published on 14 May 1990.

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Australian Environment Council
Australian Gas Association
Confederation of Australian Industry
CSIRO, Division of Applied Physics
Department of Defence
Department of Industrial Relations and Employment, N.S.W.
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PREFACE

This Standard was prepared by the Standards Australia Committee on Vibration and Shock—Instrumentation and Measurement. It is identical with and has been reproduced from ISO 4868—1984, Code for the measurement and reporting of local vibration data of ship structures and equipment.

For the purposes of this Australian Standard, the ISO text should be modified as follows:

(a) Substitute a point (.) for a comma (,) as a decimal marker.

(b) The references to other publications should be replaced by references to Australian Standards:

Reference to International Standard		*Australian Standard*	
ISO		AS	
4867	Code for the measurement and reporting of shipboard vibration data	3764	Measurement and reporting of shipboard vibration data
6954	Mechanical vibration and shock—Guidelines for the overall evaluation of vibration in merchant ships	3763	Mechanical vibration and shock—Guidelines for the overall evaluation of vibration in merchant ships

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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, there 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.

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