

船舶振动噪声重点实验室 National Key Laboratory on Ship Vibration & Noise

Cabins Noise Control on the Large Oil-tanker

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1. Introduction



The DRAFT CODE ON NOISE LEVELS ON BOARD SHIPS has been adopted by MSC91 (November 2012) to provide international guideline for protection against noise regulated by regulation [II-1/3-12] of the International Convention for the Safety of Life at Sea (SOLAS).





1. Introduction



	IMO A.468(XII)	New Code			
		1,600-10,000 GT	≥10,000 GT		
Work spaces:					
Machinery spaces	110	110	110		
Machinery control rooms	75	75	75		
Workshops	85	85	85		
Non–specified work spaces	90	85	85		
Navigation spaces :					
Navigating bridge and chartrooms	65	65	65		
Listening posts	70	70	70		
Radio rooms	60	60	60		
Radar room	65	65	65		
Accommodation spaces :					
Cabin and hospitals	60	60	55		
Mess rooms	65	65	60		
Recreation rooms	65	65	60		
Open recreation areas	75	75	75		
Offices	65	65	60		
Service spaces:					
Galleys, without food processing equipment	75	75	75		
operating					
Serveries and pantries	75	75	75		
Normally unoccupied spaces:					
Spaces not specified	90	90	90		

室

Voise

1. Introduction



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The prediction of noise onboard ship may be useful for new oiltanker in understanding what reductions might be achievable for certain changes in design or operational behavior.

Such models may be used to analyze the noise sources on the ship, the noise transmission paths through the ship, and estimate cabin noise levels onboard ship.

This analysis can help to choose and identify noise control measures.





Research scheme for cabin noises control





Noise Sources

main engine auxiliary engines engine room fans engine casing HVAC(heating, ventilation and airconditioning systems)

propeller





As the frequency increasing, the compute quantity becomes more enormous, and the precision becomes worse.

Statistic energy analysis (SEA) is a effective method for solving the sound frequency band (medium-high frequency) problem.







SEA model for large oil-tanker



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Noise level values plotted on Navigation deck





Noise level values plotted on E deck





Noise level values plotted on D deck



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Noise level values plotted on C deck







Noise level values plotted on Upper deck



Therefore, two recommendations of noise control measures have been proposed in the improvement design:

Floating Floors are used in all of the accommodation rooms on the main deck.

The internal structure of the exhaust stacks of engine chamber can be designed to sound absorption channel with **muffer device**.





After improved design, the noise levels in various spaces and cabins are able to meet the limit requirements of guidelines.

Cabin noise levels after control measures

Deck	Location	Initial/dB(A)	Ultimate/Measured	Limited/dB(A)
Navigation deck	bridge wings	72.1/71	66.4	70
Upper deck	work's room (6P)	57.6	54.3/53	55
	work's room (4P)	57.1	53.9/53	55
	hospital	56.8	53.4/52	55
	treatment room	56.2	52.8/52	55

4. Conclusions



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The acoustic prediction results were consistent with cabin noise levels of the real ship test.

The acoustic prediction helps to early detect excessive noise spaces and guide to make noise control measures during the design of the oil-tanker.

Accommodation spaces as much as possible not to be arranged on the main deck, or floating floor should be laying in these cabins.

The intake and exhaust stacks should be as far away as possible from the accommodation spaces, otherwise, intake and exhaust air noise will impact on the noise levels in these areas.



THANK YOU FOR YOUR ATTENTION