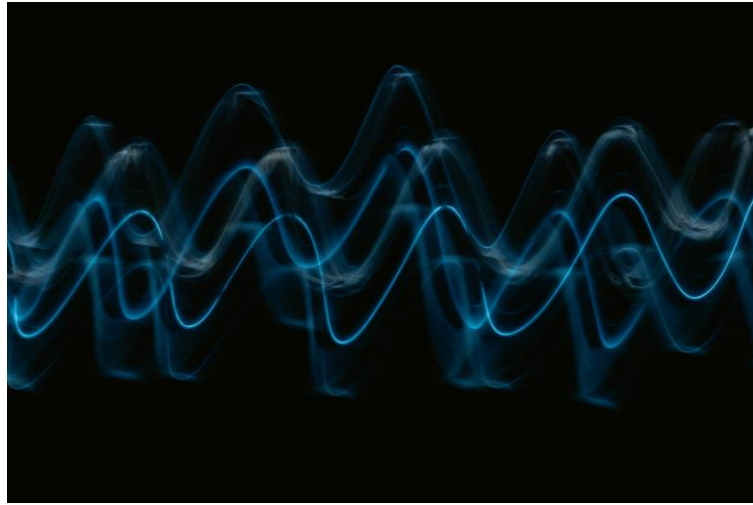


## Menilik Kenyamanan Suara (Kebisingan) Pada Moda Transportasi Kapal Laut



# Jenis-Jenis Kapal

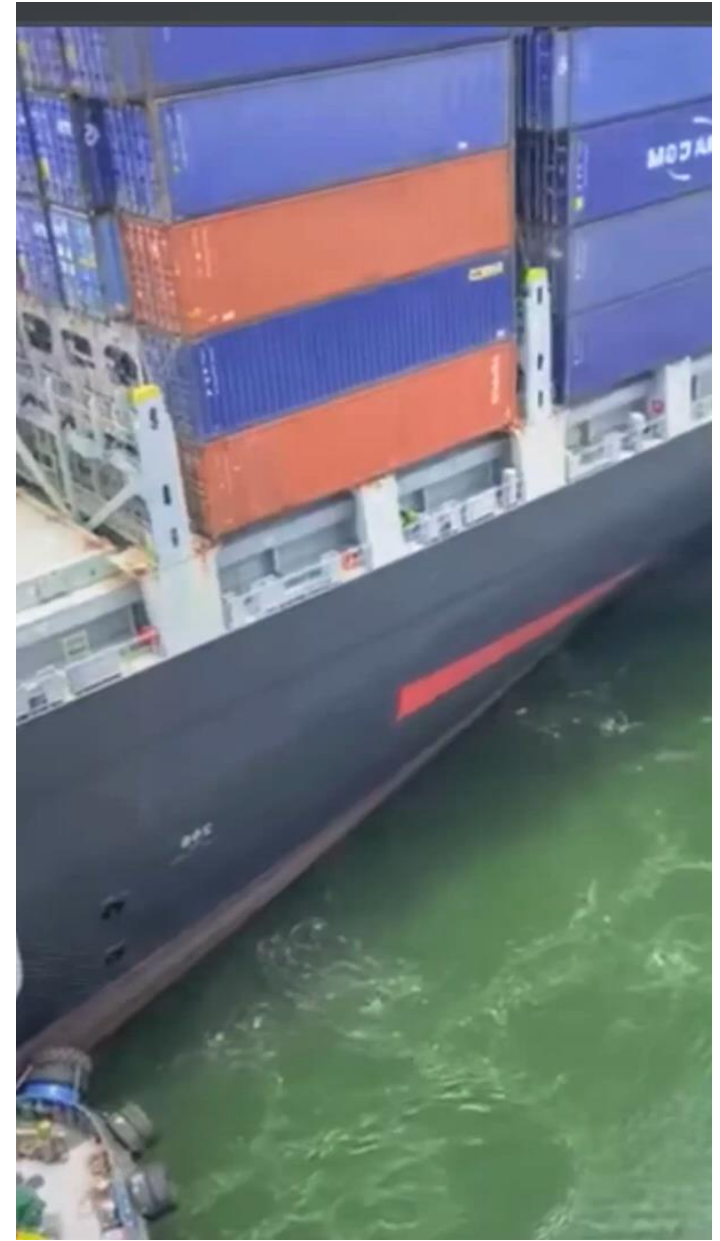
**1 KAPAL NIAGA / MERCHANT SHIP**

**2 KAPAL PENUMPANG / PASSENGER SHIP**

**3 KAPAL PERANG / NAVAL SHIP**

**4 KAPAL SPECIAL / SPECIAL PURPOSE SHIP**





# Ruangan-Ruangan Pada Kapal



Area Terbatas

Area Umum

# Ruangan-Ruangan Pada Kapal



## ALLURE of the SEAS<sup>SM</sup>

WE BUILD INCREDIBLE

www.AllureoftheSeas.com

### SHIP FACTS

Guest Capacity: 5,400 (double occupancy)  
 Gross Tonnage: 225,282  
 Staterooms: 2,700  
 Decks: 16 guest decks  
 Cruising Speed: 22 knots

**CENTRAL PARK™**

**Neighborhood Features:** 360° Skyline  
**Dining/Entertainment Venues:** Cheesecake Factory  
**Accommodations:** 254 Central Park View Staterooms

**Boutique Shopping:** 360° Skyline  
**Queue Class:** 254 Central Park View Staterooms  
**Accommodations:** 70 Central Park View Staterooms

**Pool Area:** 620 Zone  
**Sports Deck:** 2 F4500™ surf simulators  
**Solarium Area:** 4 Whirlpools

**POOL & SPORTS ZONE**

**Pool Area:** 620 Zone  
**Sports Deck:** 2 F4500™ surf simulators  
**Solarium Area:** 4 Whirlpools

**YOUTH ZONE**

**Neighborhood Features:** DreamWorks Experience  
**Youth Area and Activities:** Pool, Living Room, The Back Deck

**BOARDWALK™**

**Neighborhood Features:** Cabaret Theater  
**Dining/Entertainment Venues:** Boardwalk Drop House  
**Accommodations:** 221 Boardwalk View Staterooms

**Shopping:** Candy Beach  
**Queue Class:** 221 Boardwalk View Staterooms

**ROYAL PROMENADE**

**Neighborhood Features:** Cabaret Theater  
**Dining/Entertainment Venues:** Boardwalk Drop House  
**Accommodations:** 221 Boardwalk View Staterooms

**Boutique Shopping:** Fine jewelry, cosmetics, gifts, souvenirs and more  
**Accommodations:** 18 Promenade View Staterooms

**ENTERTAINMENT PLACE**

**Neighborhood Features:** 3-D Show Theater  
**More Entertainment Options:** Casino, Comedy Club

**Sea Features:** Sole massage suites, Couples massage suites, Thermal Suite, Beauty Salon, Youth Spa, Vitality Café

**Fitness Features:** 105 yards and resistance machines, Free-weights area, Studio Fitness classes, Sports/Club area, Kinetix™ class area, Largest jogging track at sea

# Kebisingan Pada Kapal

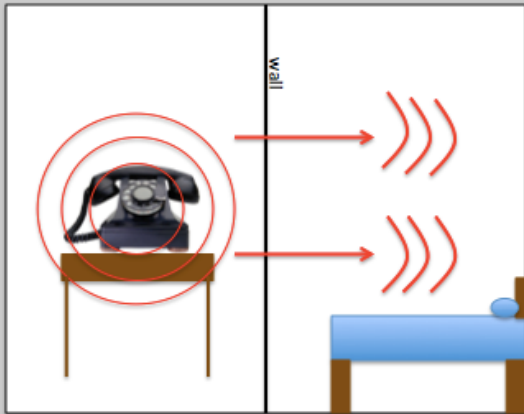
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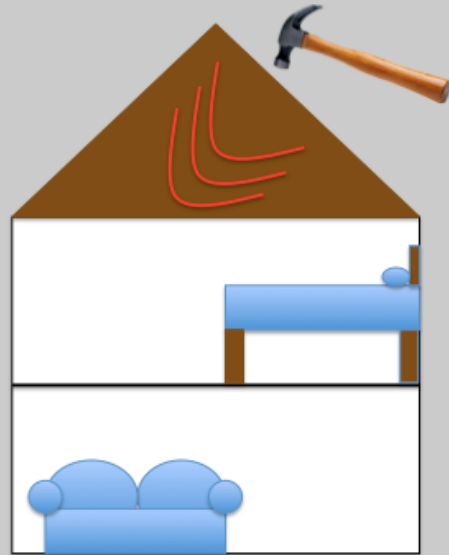
**Perbandingan Tingkat Kebisingan Pada Area Terbatas (Kamar Mesin) dan Area Umum (Kamar Penumpang)**

# Kebisingan Pada Kapal

Airborne Sound Transmission



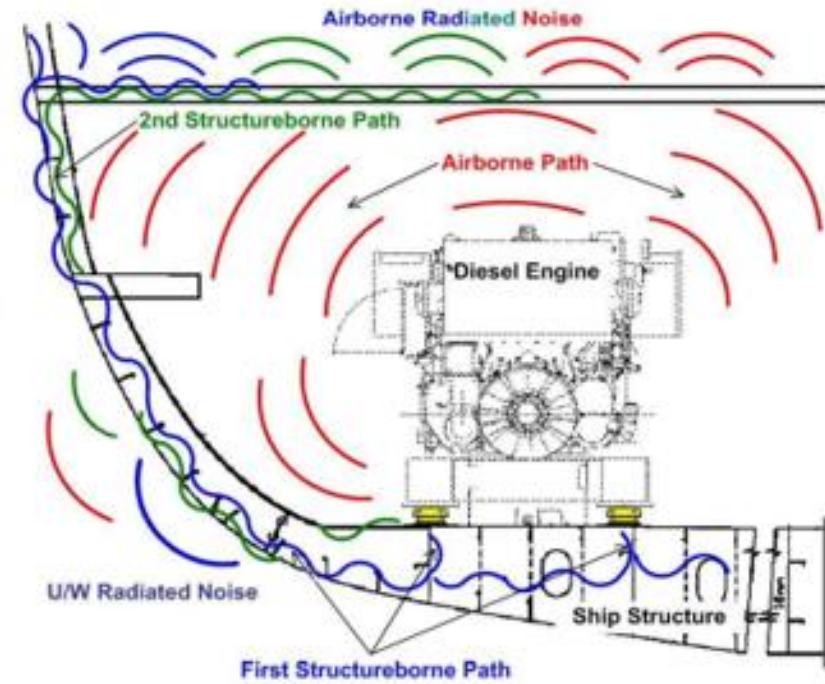
Structure-Borne Sound Transmission



NCE Report 07-001  
Noise Control Engineering, Inc.

Treatments for Reducing Underwater Sounds  
from Oil and Gas Industry Activities

FIGURE 7: Diagram Illustrating Three Significant Paths of Underwater Noise Generation from Machinery



# Kebisingan Pada Kapal

## SOURCES OF NOISE

While there are plenty of naturally occurring sounds in the ocean, an increase in commercial vessel traffic is the main reason for increased underwater noise<sub>1</sub>.

In the North Pacific Ocean, underwater noise has been **DOUBLING** in intensity **EVERY DECADE** for the past

**60 YEARS**<sub>2</sub>



Sound travels

**4.5 TIMES**

**FASTER** in water than in air.

## WHERE VESSEL NOISE COMES FROM

ENGINE AND ONBOARD MACHINERY

DRAG FROM POOR HULL MAINTENANCE

BOW/STERN THRUSTERS

PROPELLER

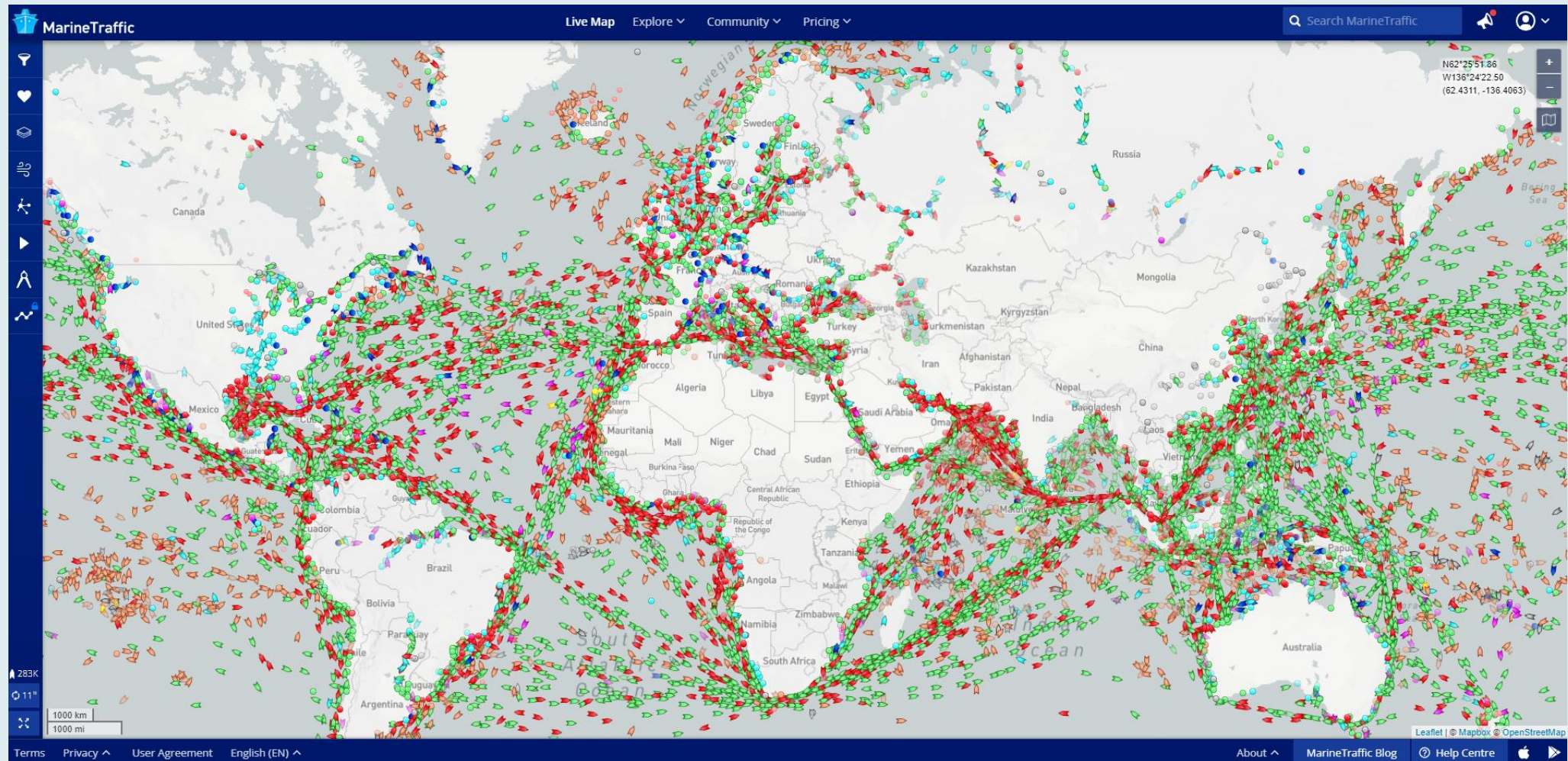
CAVITATION

NOISE INCREASES WITH SPEED<sub>4</sub>

Most underwater noise from large vessels is caused by propeller cavitation<sub>3</sub>.



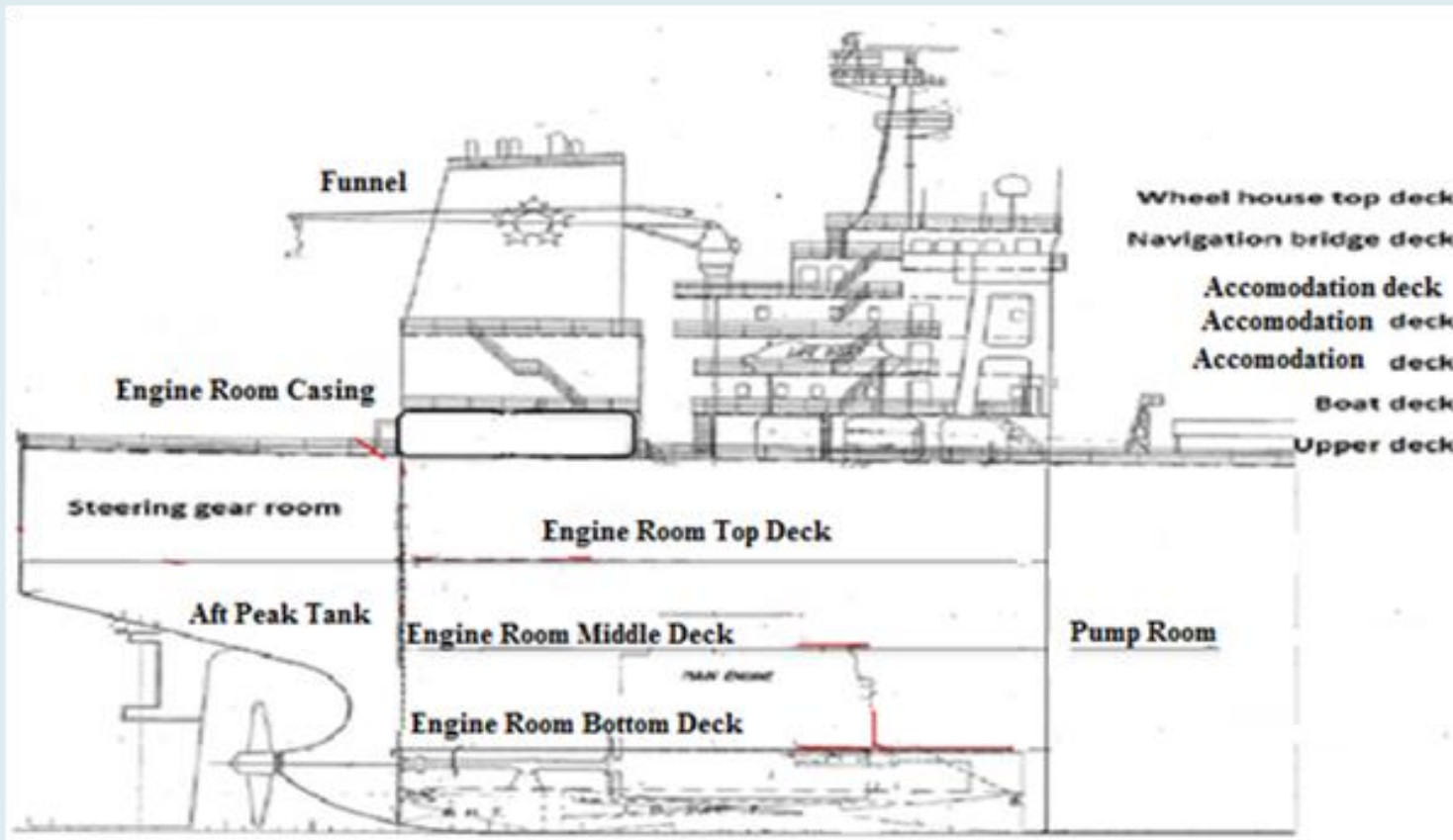
# Kebisingan Pada Kapal



# Denah Kapal Secara Umum

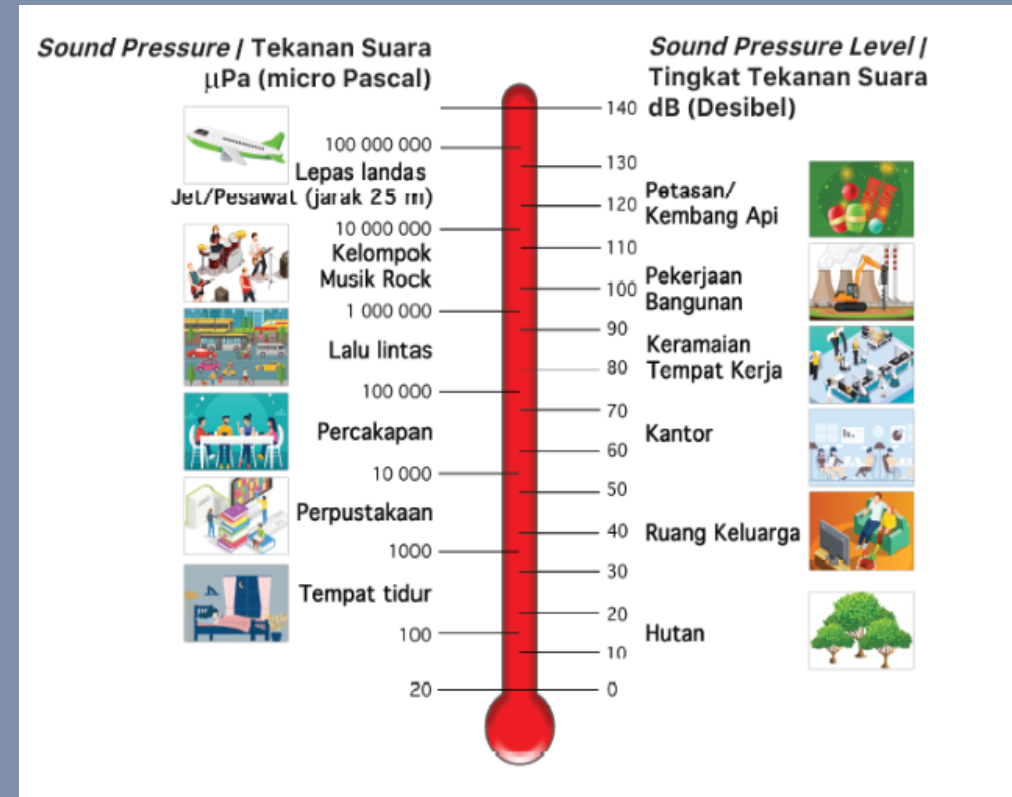


# Denah Kapal Secara Umum



# KEBISINGAN PADA KAMAR MESIN

No	Hasil pengukuran (dB)
1	103,7
2	102,4
3	101,5
4	101,8
5	103,8
6	101,5
7	103,4
8	103,7
9	103,5
10	101,4
Rata-rata	102,7



# STANDAR KEBISINGAN SUARA PADA KAPAL

Designation of rooms and spaces	Ship size	
	1,600 up to 10,000 GT	≥10,000 GT
<b>4.2.1 Work spaces (see 5.1)</b>		
Machinery spaces <sup>5</sup>	110	110
Machinery control rooms	75	75
Workshops other than those forming part of machinery spaces	85	85
Non-specified work spaces <sup>6</sup> (other work areas)	85	85
<b>4.2.2 Navigation spaces</b>		
Navigating bridge and chartrooms	65	65
Look-out posts, incl. navigating bridge wings <sup>7</sup> and windows	70	70
Radio rooms (with radio equipment operating but not producing audio signals)	60	60
Radar rooms	65	65
<b>4.2.3 Accommodation spaces</b>		
Cabin and hospitals <sup>8</sup>	60	55
Messrooms	65	60
Recreation rooms	65	60
Open recreation areas (external recreation areas)	75	75
Offices	65	60

Ini merupakan standar umum dari batas maksimal kebisingan kapal yang diatur pada *International Maritime Organization (IMO) Code on Noise Levels on Board Ship* dan juga *Safety of Life at Sea (SOLAS) 1974*

# CASE REPORT PENGUKURAN TINGKAT KEBISINGAN PADA KAPAL



KMP Muria milik PT ASDP Ferry, Kapal Jenis Roll on Roll off (RoRo) biasa digunakan sebagai kapal penyeberangan

Tabel 1 Hasil pengukuran tingkat kebisingan

Titik Pengukuran	Hasil Pengukuran dB(A)	IMO dB(A)	LR dB(A)	ABS dB(A)
Engine Room	102,9	90	110	100
Car Deck	87,1	-	90	-
VIP Room	51,4	60	50	55
Economic Room	78,1	75	65	65
Navigation Deck Outdoor Area	86,4	70	72	-
Navigation Room	57,7	65	60	-

Wibowo, Rindianti, et.al. 2014. Analisa Tingkat Kebisingan Kamar Mesin pada Kapal KMP Muria. Jurnal Teknik Perkapalan Vol.2, No.4 Oktober

# CASE REPORT PENGUKURAN TINGKAT KEBISINGAN PADA KAPAL



KM Papua Empat Milik PT Peln, Kapal Jenis Penumpang yang merupakan kapal perintis untuk daerah 3T

## Poop Deck Putaran 1300 rpm.

No.	Uraian	Noise (dB)
1	Emergensi Genset Fr. 0 – Fr. 3	50
2	Crew Kiri Fr. 3 – Fr. 12	52
3	Crew Kiri Fr. 3 – Fr. 12	55
4	122 Passenger Seats Fr. 27 – Fr. 43	50
5	Cafeteria Fr. 46 – Fr. 48	50

## Wheel House Deck Putaran 1300 rpm.

No.	Uraian	Noise (dB)
1	Wheel House Room Fr. 40 – Fr. 49	55
2	Chief Room Fr. 36 – Fr. 40	50
3	Captain Room Fr. 36 – Fr. 40	52
4	Electric Room Fr. 27 – Fr.36	50
5	Batterai Room Fr. 34 – Fr. 36	50
6	Mosque/Owner Room	50

## Main Deck Putaran 1300 rpm.

No.	Uraian	Noise (dB)
1	Mess Room Fr. 01 – Fr. 06	50
2	Crew Room	53
3	Galley Fr. 2 – Fr. 09	50
4	Prove Store Fr. 1 – Fr. 4	52
5	WC/KM. Ladies Fr. 9 – Fr. 17	50
6	WC/KM. Ladies Fr. 9 – Fr. 17	52
7	Pantry Fr. 14 – Fr. 17	52

## Hold Plan Putaran 1300 rpm.

No.	Uraian	Noise (dB)
1	Engine Room Fr. 07 – Fr. 29	101
2	Crew Room Fr. 2 – Fr. 3	90
3	60 Passenger Fr. 30 – Fr. 55	55

Sasono, Eko. 2007. Pengukuran Tingkat Kebisingan Pada Kapal Coaster. Jurnal KAPAL Vol.4 No.1

A dark, atmospheric photograph of a sailboat on the ocean with mountains in the background. The scene is dimly lit, with the sailboat's mast and sails visible against the dark water. The mountains in the distance are silhouetted against a slightly lighter sky. The overall mood is serene and contemplative.

At sea, I learned how little a  
person needs, not how much.

Robin Lee Graham



# Keep in Touch!



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