

U.S.C.G. Merchant Marine Exam

Second Mate to Master
Less than 1600 Gross Registered Tons

Q131 Deck Safety – Stability Problems

(Sample Examination)

Choose the best answer to the following Multiple-Choice Questions.

1. Your sailing drafts are: FWD 21'-08", AFT 22'-04" and the GM is 3.2 feet. What will be the angle of list if the #6 port deep tank (capacity 201 tons, VCG 11.4 feet, and 25.5 feet off the centerline) is filled? (Use the data in Section 1, the blue pages, of the Stability Data Reference Book)
- A. 2°
 - B. 4°
 - C. 6°
 - D. 8°

Correct answer: D

2. The SS AMERICAN MARINER is ready to bunker with drafts of FWD 20'-04", AFT 23'-06". After all bunkers are on board, soundings indicate the tonnages shown in table ST-0172 below. Use the white pages of The Stability Data Reference Book to determine the free surface correction.

ST-0172

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	214.4	DT 2 P	100.7
DB 4 CL	224.1	DT 2 S	100.7
DB 4 P	128.1	DT 3 P	86.1
DB 4 S	128.1	DT 3 S	86.1
DB 6 CL	212.0	DT 6 P	201.2
DB 6 P	87.0	DT 6 S	201.2
DB 6 S	87.0	DT 7 P	128.8
		DT 7 S	128.8

- A. 0.62 foot
- B. 0.80 foot
- C. 0.85 foot
- D. 0.99 foot

Correct answer: B

3. Your vessel has a beam of 40 feet, and you observe a still water rolling period of 20 seconds. What is the vessel's metacentric height?
- A. 0.3 ft.
 - B. 0.5 ft.
 - C. 0.8 ft.
 - D. 1.1 ft.

Correct answer: C

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4. Using the information in Section 1, the blue pages, of the Stability Data Reference Book, determine the danger angle for permanent list if the KG is 21.2 feet and the drafts are: FWD 27'-11", AFT 28'-07".
- A. 19°
 - B. 72°
 - C. 24°
 - D. 52°

Correct answer: C

5. Your drafts are: FWD 24'-09", AFT 27'-02". Use the blue pages of the Stability Data Reference Book to determine the vessels displacement if you are in salt water.
- A. 13,175 tons
 - B. 13,350 tons
 - C. 13,490 tons
 - D. 13,620 tons

Correct answer: D

6. You have 590 tons of below deck tonnage. There is no liquid mud aboard. If you have 84 tons of cargo above deck with a VCG above the deck of 2.7 feet, what is the maximum allowed VCG of the remainder of the deck cargo that is permitted? See illustration D036DG below.
- A. 2.54 feet
 - B. 2.85 feet
 - C. 3.11 feet
 - D. 3.55 feet

Correct answer: C

7. You are on a Mariner class cargo vessel. Your drafts are: FWD 21'-04", AFT 23'-04". You wish to increase the calculated GM of 4.8' to 5.8'. What tanks should you ballast? (Use the white pages in the Stability Data Reference Book.)
- A. Tanks: DB4, DB7
 - B. Tanks: DB2, DB5
 - C. Tanks: DB2, DB6
 - D. Tanks: DB6, DT7

Correct answer: A

8. Which is the primary type of welding employed in shipyards in the construction of cargo vessels?
- A. brazing
 - B. thermite welding
 - C. electric arc
 - D. pressure welding

Correct answer: C

9. You are loading in a port subject to the summer load line mark and bound for a port subject to the tropical load line mark. You will enter the tropical zone after steaming four days. You will consume 33 tons of fuel, water, and stores per day. The hydrometer reading at the loading pier is 1.006, and the average TPI is 66. What is the minimum freeboard required at the start of the voyage? Reference Table BL-0022 below.

BL-0022

FREEBOARD FROM DECK LINE		LOAD LINE	
Tropical	77 inches	(T)	7 inches above (S)
Summer	84 inches	(S)	*
Winter	91 inches	(W)	7 inches below (S)
Fresh water allowance	8 inches		

- A. 78 inches
- B. 82 inches
- C. 86 inches
- D. 88 inches

Correct answer: A

10. Your vessel's drafts are: FWD 23'-01", AFT 24'-05"; and the KG is 22.8 feet. Use the selected stability curves in the blue pages of the Stability Data Reference Book to determine the remaining righting arm at 30° inclination if the center of gravity is 1.9 feet off the centerline.

- A. 3.7 feet
- B. 2.3 feet
- C. 1.4 feet
- D. 0.7 foot

Correct answer: D

United States Coast Guard National Maritime Center



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U.S. Department
of Transportation
**United States
Coast Guard**



Commandant
United States Coast Guard

Washington, D.C. 20593-0001
Staff Symbol
Phone:

16710
8 Apr 87

Master, M/V HUDSON, O.N. 666666

Subj: M/V HUDSON
Stability

Dear Sir:

A stability test, supervised by the U.S. Coast Guard, was conducted on the M/V HUDSON at San Diego, California on 08 April 1987. On the basis of this test, stability calculations have been performed. Results indicate that the stability of the M/V HUDSON, as presently outfitted and equipped, is satisfactory for operation in Ocean Service as indicated on the Certificate of Inspection, provided the following restrictions are strictly observed:

1. a. The vessel shall only be loaded according to the instructions on the attached LOADING DIAGRAM bearing U.S. Coast Guard approval stamp dated 8 April 1986.

b. Drilling fluids may be carried. The maximum specific gravity of the fluids shall not exceed 2.60.

c. The vessel may engage in towing operations when loaded in accordance with the attached LOADING DIAGRAM.

2. The height above the main deck of the center of gravity of the deck cargo shall not exceed the value shown on the LOADING DIAGRAM (3.0 feet). Such cargo must be positively secured against shifting prior to leaving protected waters.

3. Permanent ballast, in the form of 64.4 long tons of high density fluids (sg. = 2.87), is to be maintained in the after peak tank. No permanent ballast shall be added, removed, altered and/or relocated without the authorization and supervision of the cognizant Officer in Charge, Marine Inspection.

4. The maximum summer load line draft is 13 feet 8 3/8 inches. Trim shall be minimized and shall always result in a freeboard of at least 22 inches at the stern.

5. No more than one centerline or P/S pair of the following tanks may be partially filled at any one time: fuel oil, lube oil, potable water, ballast/cargo water, fuel oil day tanks, drilling fluid. Cross-connections between all port and starboard tank pairs shall be kept closed at all times when underway.



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6. Main deck hatches and weather doors to the forecastle and machinery spaces shall be kept closed and fully secured at all times when underway, except when actually used for transit under safe conditions.

7. Main deck freeing ports shall be maintained operable and completely unobstructed at all times.

8. Bilges shall be kept pumped to minimum content at all times.

9. Suitable tables or curves for determining the capacities of full or partially full tanks shall be maintained aboard the vessel.

10. The Master should make every effort to determine the cause of any list of the vessel before taking corrective action.

It shall be the Master's responsibility to maintain the vessel in a satisfactory stability condition at all times.

This stability letter shall be posted under suitable transparent material in the pilothouse of the vessel so that all pages and the diagram are visible. It supersedes any stability information previously furnished the vessel.

Sincerely,

A. B. SEA
Lieutenant Commander
U.S. Coast Guard

Attachment: LOADING DIAGRAM for the subject vessel bearing U.S. Coast Guard approval stamp dated 8 April 1987



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