

U.S.C.G. Merchant Marine Exam  
Master/Chief Mate Offshore Supply Vessels  
Q202 Deck Safety – Stability Problems  
(Sample Examination)

**Choose the best answer to the following Multiple-Choice Questions:**

1. You have 400 tons of below deck tonnage and 100 tons of above deck cargo on board. You must load 160 tons of liquid mud below deck. How much more deck cargo can you load? See illustration D036DG below.
- A. 85 tons
  - B. 135 tons
  - C. 195 tons
  - D. 245 tons

Correct answer: B

2. The liquid mud tanks on your vessel measure 20'L by 18'B by 7'D. The vessel's displacement is 866 T and the specific gravity of the mud is 1.8. What is the reduction in GM due to a pair of these tanks (p/s) being slack?
- A. 0.24 foot
  - B. 0.56 foot
  - C. 0.95 foot
  - D. 1.12 feet

Correct answer: D

3. 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

4. What is the displacement of a barge which measures 85' x 46' x 13' and is floating in salt water with a draft of ten feet?
- A. 500 tons
  - B. 1452 tons
  - C. 1117 tons
  - D. 17.5 tons

Correct answer: C

5. Your drafts are: FWD 5'-08", AFT 6'-04". From past experience, you know that the vessel will increase her draft 1 inch for every 7 tons loaded. There is rig water on board and 10 tons of deck cargo. How many more tons of cargo can be loaded and still maintain the same trim? See illustration D037DG below.
- A. 32.0 tons
  - B. 25.0 tons
  - C. 14.8 tons
  - D. 18.0 tons

Correct answer: B

6. The sailing drafts are: FWD 23'-02", AFT 24'-06" and the GM is 2.8 feet. Use the information in Section 1, the blue pages, of the Stability Data Reference Book to determine the available righting arm at 30° inclination.
- A. 1.3 feet
  - B. 2.5 feet
  - C. 3.2 feet
  - D. 3.7 feet

Correct answer: B

7. 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

8. Your sailing drafts are: FWD 19'-06", AFT 20'-10" and the GM is 3.3 feet. What will be the angle of list if the #2 starboard deep tank (capacity 100 tons, VCG 19.1 feet, and 24 feet off the centerline) is filled? (Use the data in Section 1, the blue pages, of the Stability Data Reference Book)
- A. Less than 1°
  - B. 2°
  - C. 4°
  - D. 6°

Correct answer: C

9. The SS AMERICAN MARINER is ready to bunker with drafts of FWD 19'-00", AFT 24'-00". After all bunkers are on board, soundings indicate the tonnages shown in table ST-0171 below. Use the white pages of The Stability Data Reference Book to determine the free surface correction.

**ST-0171**

DB 1 CL	48.2	DB 6 P	87.0
DB 1A CL	81.9	DB 6 S	87.0
DB 2 P	71.2	DB 7 P	94.6
DB 2 S	71.2	DB 7 S	94.6
DB 3 CL	227.6	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 5 CL	180.0	DT 6 P	201.2
DB 5 P	178.0	DT 6 S	201.2
DB 5 S	180.0	DT 7 P	128.8
DB 6 CL	212.0	DT 7 S	128.8

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

Correct answer: C

10. You are on a supply run to an offshore drilling rig. You are carrying the load show in table ST-0015 below. What is the height above the main deck of the center of gravity of the cargo?

**ST-0015**

I.	Two reels of hoisting wire. Each reel is 8 feet in circumference, 4 feet wide and has 3000 feet of wire. Both reels are stowed on the flat. Wire weighs 1.55 pounds per linear foot. The tare weight of each reel is 500 pounds.
II.	Eight pallets of case goods stowed singly. Each pallet is 8'L x 4'W x 4'H and weighs 1 long ton.
III.	Twelve steel containers of cement. Each container weighs 1 1/2 tons. Each container is 8'L x 4'W x 4'H. The containers are stowed singly fore and aft.
IV.	Ten crates of stewards stores. Each crate measures 4'L x 4'W 3'H and weighs 420 pounds. Each crate is stowed on deck.

- A. 1.76 feet
- B. 1.97 feet
- C. 2.21 feet
- D. 2.32 feet

Correct answer: B

# United States Coast Guard National Maritime Center



## D036DG Part 1 of 3

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.



**D036DG**  
**Part 2 of 3**

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.

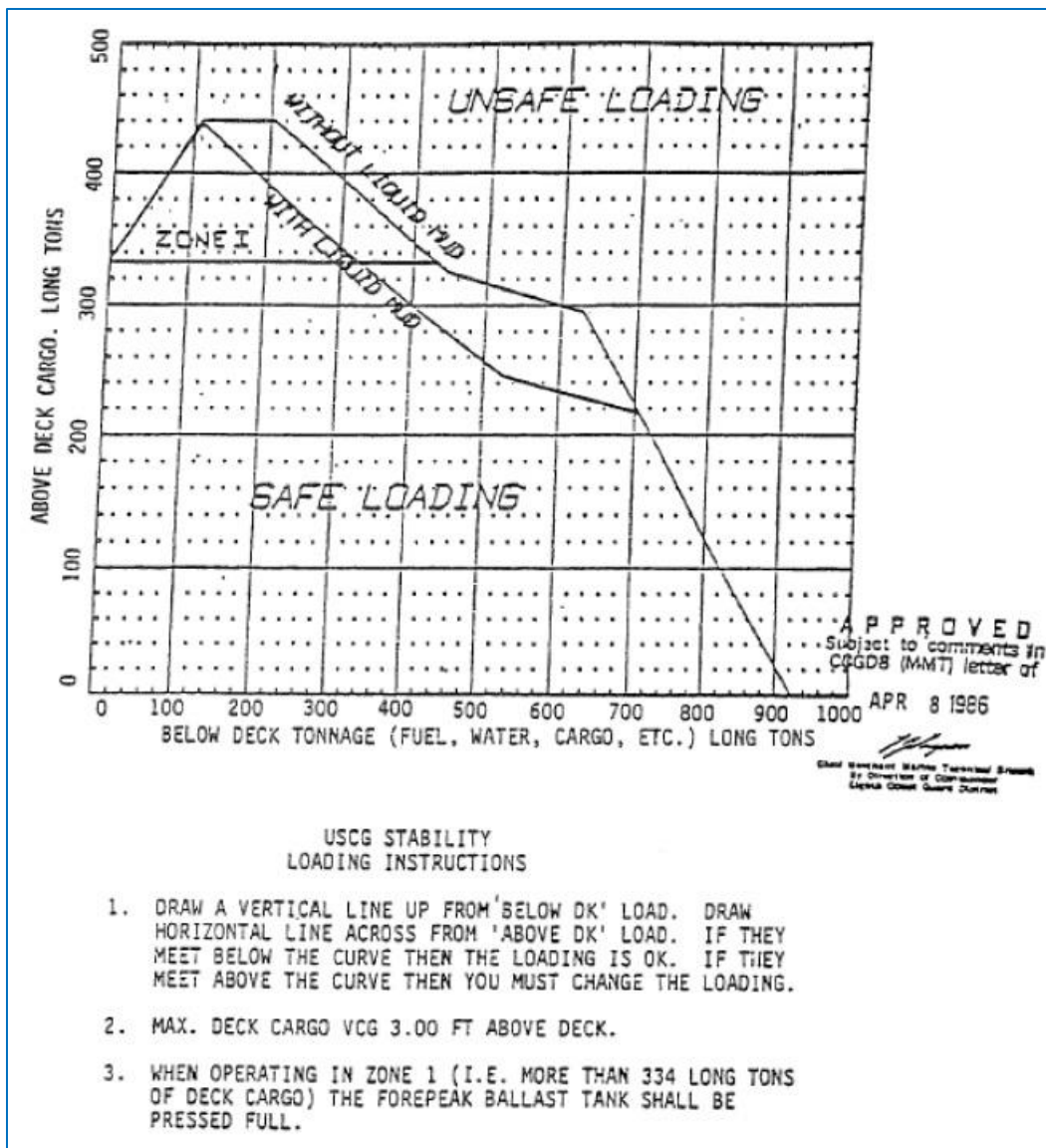
Sincerely,

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



## D036DG Part 3 of 3



# United States Coast Guard National Maritime Center



## D037DG Part 1 of 2

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



Commandant  
United States Coast Guard

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

16710  
13 May 87

Master, M/V SURVEYOR, O.N. 678678

Subj: M/V SURVEYOR  
Stability

Dear Sir:

A stability test, supervised by the U.S. Coast Guard, was conducted on the M/V SURVEYOR at New Orleans, Louisiana, on 7 May 1987. On the basis of this test, stability calculations have been performed. Results indicate that the stability of the M/V SURVEYOR, 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 maximum of 78 persons may be carried. In no case shall the number of persons exceed that allowed on the Certificate of Inspection.
2. The drafts as read on the draft marks shall not exceed 6 feet 3 inches forward or 7 feet 1 inch aft. Trim should be minimized. A loadline is not authorized.
3. The height above the main deck of the center of gravity of deck cargo shall not exceed 2.0 feet. Such cargo must be positively secured before leaving protected waters.
4. A maximum of 50 long tons of deck cargo may be carried when no other below deck ballast or cargo is carried. When rig water is carried, a maximum of 35 long tons of deck cargo may be carried, and no other below deck cargo or ballast is permitted.
5. No permanent ballast or other such weights shall be added, removed, altered, and/or relocated without the authorization and supervision of the cognizant Officer in Charge, Marine Inspection.
6. No watertight bulkheads shall be removed or altered without the authorization and supervision of the cognizant Officer in Charge, Marine Inspection.
7. The watertight door in the bulkhead at frame 18 shall be closed and properly dogged at all times when underway except when actually used for transit under safe conditions.

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**D037DG**  
**Part 2 of 2**

8. Cross-connections between all tank sets shall be kept closed at all times when underway.
9. Bilges shall be kept pumped to minimum content at all times.
10. Jet fuel may be carried on deck in eight DOT tanks. The total weight of the fuel and tanks shall not exceed 23.16 long tons and the vertical center of gravity shall not exceed 3 feet 6 inches above the deck. Such tanks must be positively secured against shifting in a seaway prior to leaving protected waters. Neither passengers nor other deck cargo shall be carried when such tanks are aboard the vessel.
11. 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 temporary stability letter shall be posted under suitable transparent material in the pilothouse of the vessel so that all pages are visible. It supersedes any stability information previously furnished the vessel.

Sincerely,

W. T. DOOR  
Lieutenant Commander  
U.S. Coast Guard