
Q133 - Deck Safety: Stability Problems

1. Damage stability of a MODU is the stability _____.

- **after flooding**
- which exists when the wind speed is less than 50 knots
- at survival draft
- before collision

Note:
Damage stability refers to a vessel's stability following damage and flooding, not in intact conditions or under specific environmental factors.

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2. When flooding occurs in a damaged vessel, reserve buoyancy _____.

- **decreases**
- remains the same
- increases
- shifts to the low side

Note:
Flooding increases a vessel's displacement, raising the waterline and reducing the watertight volume above it, which directly decreases reserve buoyancy.

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3. With no environmental forces acting on the vessel, the center of gravity of an inclined vessel is vertically aligned with the _____.

- metacenter
- center of flotation
- **original vertical centerline**
- longitudinal centerline

Note:
With no external forces, the center of gravity remains vertically aligned with the original vertical centerline because it is fixed by the vessel's weight distribution and does not shift with heeling.

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4. At all angles of inclination, which is the true measure of a vessel's stability?

- **Righting moment**
- Displacement
- Metacentric height
- Inclining moment

Note:
The righting moment is the true measure of a vessel's stability as it represents the restoring force resisting capsizing at any angle of heel, calculated by displacement multiplied by the righting arm (GZ).

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5. During counterflooding to correct a severe list aggravated by an off-center load, your vessel suddenly takes a list to the opposite side. Which action should you take?

- **Immediately stop counterflooding**
- Continue counterflooding, but in the opposite direction
- Continue counterflooding in the same direction
- Deballast from the low side

Note:
A sudden list to the opposite side during counterflooding indicates overcorrection and instability; therefore, immediately stop counterflooding to stabilize the vessel and reassess the situation.

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6. If a MODU takes a sudden severe list or trim from an unknown cause, you should FIRST _____.

- assume the shift is due to off-center loading
- **determine the cause before taking countermeasures**
- assume the cause is environmental forces
- counterflood on the side opposite the list or trim

Note:
When a MODU experiences a sudden, severe list or trim of unknown cause, the initial action should be to determine the cause before taking any corrective measures to avoid potentially worsening the situation.

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7. What will cause the free surface effects of a partially full tank on a vessel in motion to increase?

- The draft of the vessel
- **The surface area of the fluid in the tank**
- The height of the tank above the keel
- The displacement volume of the vessel

Note:
The free surface effect, which reduces stability, increases with the surface area of the fluid in a partially full tank because a larger surface area allows for greater liquid shifting during vessel motion.

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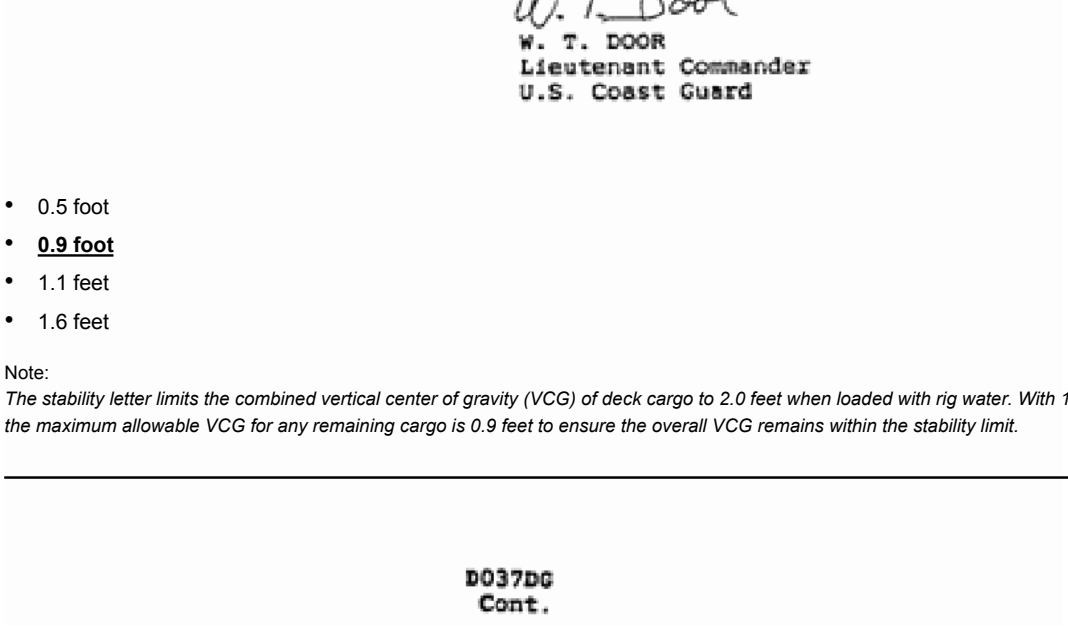
8. You have 12 containers of rig supplies each measuring 10'L by 4'B by 5'H and weighing 2.0 tons each. Each container is stowed on deck. What is the maximum VCG permitted of the remaining cargo if you are carrying rig water and load to maximum capacity



- 0.5 foot
- **0.9 foot**
- 1.1 feet
- 1.6 feet

Note:
The stability letter limits the combined vertical center of gravity (VCG) of deck cargo to 2.0 feet when loaded with rig water. With 12 containers already stowed, the maximum allowable VCG for any remaining cargo is 0.9 feet to ensure the overall VCG remains within the stability limit.

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9. You have 160 tons of below deck tonnage and 300 tons of above deck cargo on board. You must load 110 tons of liquid mud below deck. How much more deck cargo can you load

Lieutenant Commander
U.S. Coast Guard

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

- **55 tons**
- 99 tons
- 140 tons
- 360 tons

SEE NEXT PAGE FOR ATTACHMENT

Note:
The correct answer is 55 tons. Adding 110 tons of liquid mud results in 270 tons below deck, allowing a maximum of 355 tons on deck. Since 300 tons are already on deck, only 55 more tons can be loaded.

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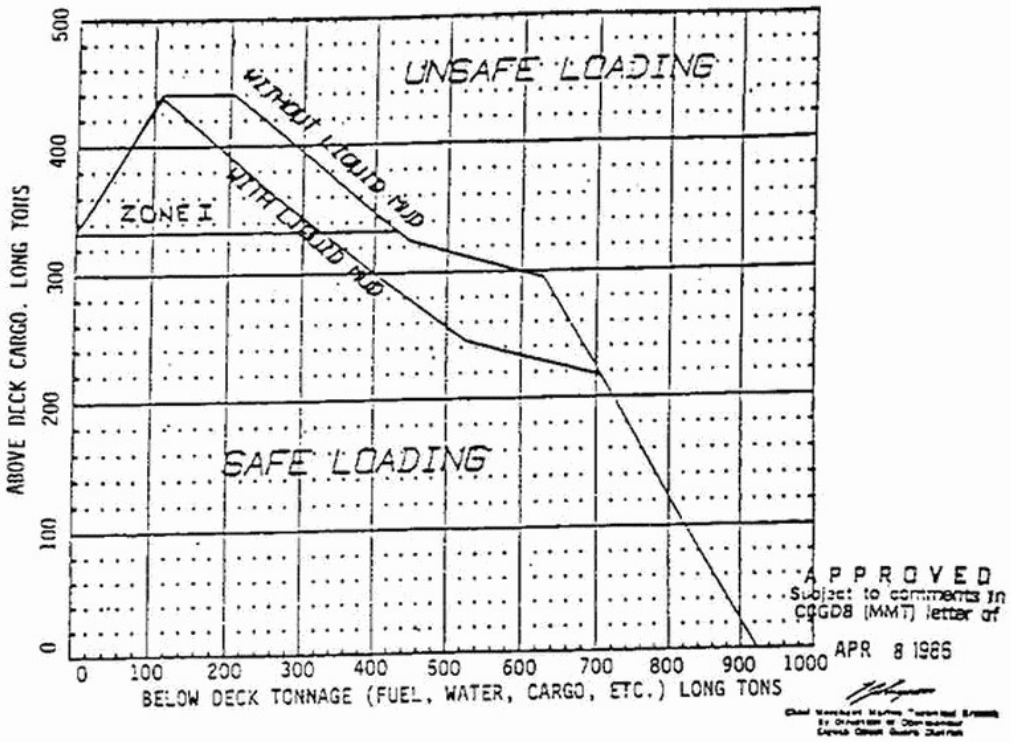

APPROVED
Subject to comments in
CGGD8 (MMT) letter of
APR 8 1985

USCG STABILITY
LOADING INSTRUCTIONS

1. DRAW A VERTICAL LINE UP FROM 'BELOW DK' LOAD. DRAW HORIZONTAL LINE ACROSS FROM 'ABOVE DK' LOAD. IF THEY MEET BELOW THE CURVE THEN THE LOADING IS OK. IF THEY MEET ABOVE THE CURVE THEN YOU MUST CHANGE THE LOADING.

2. MAX. DECK CARGO VCG 3.00 FT ABOVE DECK.

3. WHEN OPERATING IN ZONE 1 (I.E. MORE THAN 334 LONG TONS OF DECK CARGO) THE FOREPEAK BALLAST TANK SHALL BE PRESSED FULL.

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10. You have 180 tons of below deck tonnage including liquid mud. Your existing deck cargo is 300 tons with a VCG above the deck of 3.0 feet. What is the maximum additional cargo tonnage you are permitted to load

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- 20 tons
- 60 tons
- **100 tons**
- 400 tons

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Note:
The loading diagram permits a maximum of 400 tons of deck cargo with 180 tons below deck; therefore, the maximum additional cargo tonnage allowed is 100 tons (400 tons - 300 tons currently on deck).

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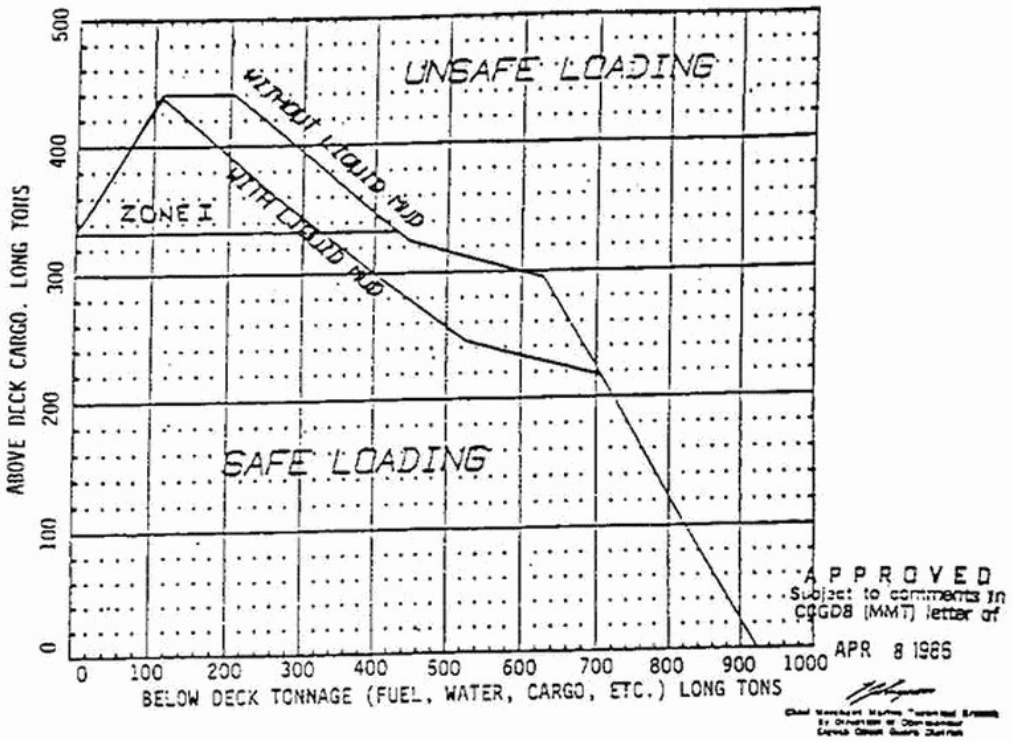

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