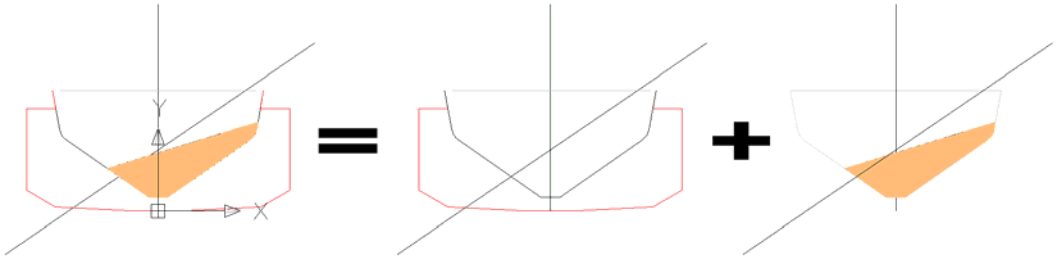
OPEN BARGE STABILITY

TP 7301 E

Title:	**Stability, Subdivision and Load Line Standards**
Number:	**TP 7301 E**
Date:	**1975**
Details:	**Marine Safety Directorate**
	Transport Canada
	Ottawa

Apply the principle of superposition of ffects:



- Behavior is studied vacuum vessel, with all except the load weights, calculating values for various displacements KN and heeling.
- Add heeling effect of a load that has taken a certain position in the hold, so its c. of g. No longer in the centreline plane.

CRITERIA

1. The area under the curve of righting levers (GZ) shall not be less than 0.055 m-radians up to 30 degrees and not less than 0.09 m-radian up to 40 ° or the angle of flooding, if lower.
2. The area of this curve, between 30 ° and 40 ° or between 30 ° and the angle of flooding, whichever is less, not less than 0.03 m-radian.
3. The righting lever (GZ) shall be at least 0.20 m for a heel equal to or greater than 30. "
4. GZ maximum value occurs at an angle preferably greater than 30 ° but not less than 25 °
5. The initial metacentric height shall not be less than 0.15 m.

righting arm for each heel φ, is calculated using the formula:

$$GZ = KN - \frac{Wo \cdot KGo \cdot \sin\varphi + w \cdot y}{Wo + w}$$

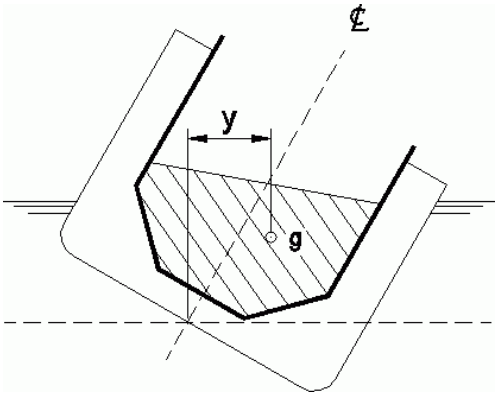


fig. 6

Where :

GZ = final righting arm

KN = value for the ship without cargo, with open-face helmet, the draft would have to load the hopper.
Consideration will be given the free surfaces of liquids in tanks, trim corrections, etc..

Wo = ship´s displazement without cargo.
KGo = C. of gravity heightof the unladen vessel
w = weight of the load on the pitcher, at all times. (variable as a result of spills)
y = load heeling

To calculate the slip angle φ r, depending on the angle of heel φ g of ρ charge density, can be applied two criteria:

Bureau Veritas

ρ_i = 1400 kg/m3
ρ_f = 2000 kg/m3

Si $\rho \leq \rho_i$ líquido

$$\varphi_r = \varphi_g$$

Si $\rho_i < \rho < \rho_f$

$$\varphi_r = \varphi_g \times \frac{\rho_f - \rho}{\rho_f - \rho_i}$$

Si $\rho \geq \rho_f$ sólido

$$\varphi_r = 0$$