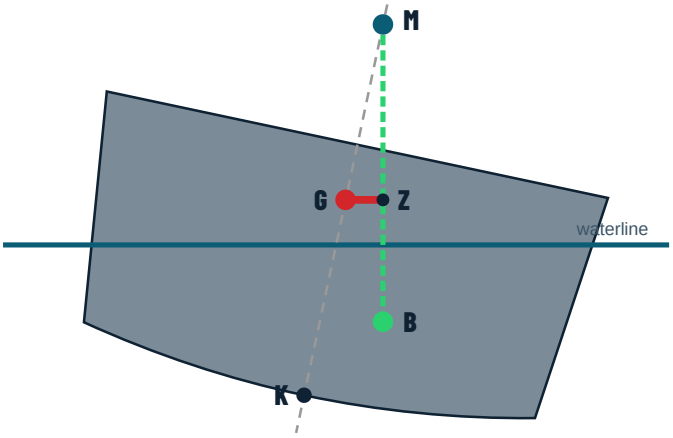
ZULU MARINER DATA CARD

13 STABILITY ON A PAGE

Why she floats upright, and the warning signs that she may not.

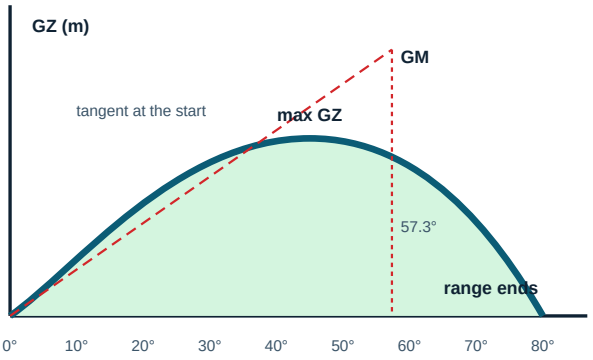
THE KEY POINTS

heeled 12° to starboard: B moves to the low side;
buoyancy acts up through B and M. GZ is the righting lever.



K	keel
B	centre of buoyancy (moves as she heels)
G	centre of gravity (moves when weight moves)
M	metacentre
GM = KM − KG	initial stability; bigger is stiffer
GZ = GM × sin θ	righting lever at small angles

THE GZ CURVE



Righting moment = displacement × GZ. Look for the angle of max GZ, the range, and the area under the curve.

ROLL PERIOD TELLS YOU GM

$$GM \approx (C \times B \div T)^2$$

T roll period in seconds, B beam in metres, C about 0.7 to 0.8 for ships. A slow, lazy roll means low GM. A quick, jerky roll means a stiff ship.

LIST OR LOLL?

	LIST	LOLL
Cause	weight off the centreline	G too high, negative GM
She leans	always the same side	either side, flops over
Roll	about the list	slow, lazy, about the loll angle
Fix	move weight to the high side	lower G: low tanks (low side first), remove top weight, kill free surface

WARNING SIGNS ON SMALL CRAFT

- Water on deck or in the bilge (free surface).
- Slack tanks; fish or ice high up.
- Lifting over the side, or nets hung from a high block.
- Everyone on one side or on the top deck.
- Freeing ports blocked.
- Towline leading across the beam (girting).

FREE SURFACE: WHY SLACK TANKS ARE DANGEROUS



Pressed full: no free surface | Slack tank, upright | Slack tank heeled: the water runs to the low side

Loose water acts as if G had risen. Keep tanks full or empty, bilges dry, freeing ports clear.

Study aid only. Not for navigation.
Check the current official rules. Card 13 · v1.7 · © Nautical Bridge