Flooding not the only cause of capsize

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In the third installment of our series on stability (CFN October 2003, page 22A), we discussed heeling and right moments. One reader pointed out that in a capsize event the center of gravity (COG) would move to the side of the vessel because of a shifting load. This situation is true in the case of flooding or the shifting of unsecured loads in the hold such as fish and ice.

However, fishing vessels develop stability problems for reasons other than flooding and a vessel can capsize without flooding or shifting loads. Here are several examples.

- Adding superstructures, such as A-frames in the case of inshore scallopers, a modification that can impair a vessel's original intact stability.
- Ice accumulating on the rigging.
- Weight added above the original COG that raises the COG and makes the vessel less stable and more vulnerable to capsize. And
- In the course of fishing, vessels can get hung down or caused to heel drastically from things such as an overloaded scallop drag or net, severe icing on one side, an improperly executed turn, and more.

These situations can be further exacerbated by wind and/or waves acting on the high side. During these events the COG will remain in the same place as it was when the boat's stability was intact.

Three stability states

Stability, then, can be described in three different ways: *impaired* if weight has been added above the original center of gravity; *damaged,* if flooding has occurred; or *intact,* if stability is sufficient to withstand impairment or damage.

Taking the nonflooding, hung-down situation, the COG will remain in the original position while the vessel is heeling but the Center of Buoyancy (COB) will move in the direction of the heel and create a positive righting arm as the heel begins.

The positive righting arm will counteract the heeling moment and the vessel will remain stable (Fig. 1).

As the heeling increases, the COB will move back toward and past the COG. This creates a negative righting arm that promotes the capsize (Fig. 2).

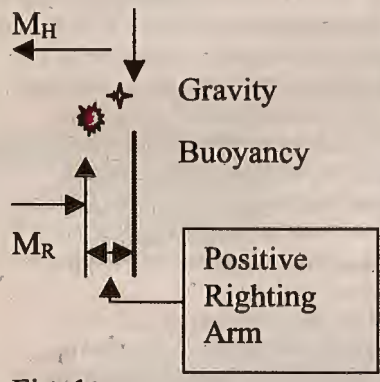

Fig. 1.

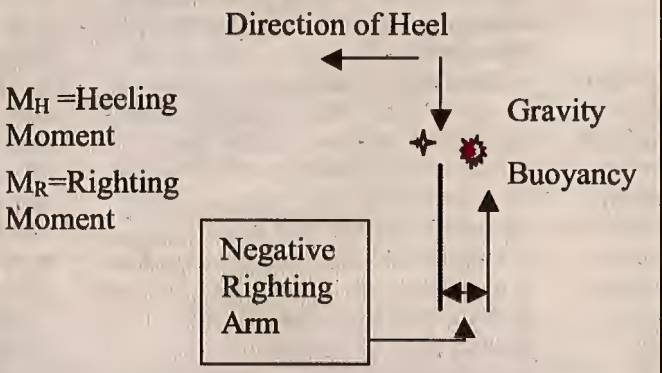

Fig. 2.

Please note: The accompanying diagrams are only schematics of the situations described and are not intended to represent exact relationships. Please see C.A. Marchaj, Sailing Theory and Practice, *Dodd Mead & Company, NY: 1954, pp. 334-341 for excellent descriptions, diagrams, and graphs of the relationship of COG to COB in nonflooding situations.*

FISH SAFE:

- Be alert for gear placement and handling situations that increase the risk of capsize.
- A nonflooding capsize situation is more likely to take the crew by surprise than one that results from flooding.
- Be aware of the stability limitations of your vessel.

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