EXPO SPOTLIGHT EXPO SPOTLIGHT EXPO SPOTLIGHT EXPO SPOTLIGHT

V=25A√d

V= VOLUME IN GPM

A= AREA OF HOLE IN □"

d= DEPTH BELOW WL IN FEET

Emergency pumping:

Could your pump handle it?

Pumps serve a variety of purposes on fishing vessels, from cooling engines, to washing fish, to keeping lobsters alive, to keeping the boat afloat. Keeping the boat afloat is often the last thing that a boat's pumps are designed to do, however.

To get a feel for how much of a problem a typical fishboat pump can handle, I asked Ron Smolowitz and Al Blott of the National Marine Fisheries Service for a little help in calculating the water that would flow through a hole in a boat.

Blott came up with a formula, $V=25A\sqrt{d}$, where V is the volume in gallons per minute (gpm), A is the area of the hole in square inches, and d is the depth of the hole below the waterline.

A two-inch diameter hole, then, with an area of 3.1416 square inches, if it were four feet below the waterline, would flow 157 gallons per minute. The same size hole two feet below the waterline would give a flow of ~~78.5~~ gpm. 111.0

A four-inch diameter hole would have an area of 12.57 square inches and at four feet below the water line would flow at a rate of 628 gpm.

A gash three inches wide and 12 inches long would be 36 square inches for a flow of 1800 gpm.

With this idea of flooding rates that might be expected, we can compare some typical pumping rates for common fishboat pumps. A one-inch Jabsco is rated a 26 gpm @ 1750 rpm with a 10-foot head. A two-inch Jabsco boosts the output to 83 gpm.

A series 110 high-volume 1½" x 1¼" MP centrifugal pump can put out up to 130 gpm. Moving up to a 2½" x 2" pump gains a volume of 320 gpm, while a 4" x 3" centrifugal pump can handle up to 800 gpm.

A comparison of the pump capacities with the free-flow rates of underwater holes shows that it doesn't take much of a hole to get ahead of many common pumps. The military recognizes the limitations on countering flooding with pumps and concentrates on damage control. This is something fishermen should think more about, but Coast Guard casualty reports also show that larger pumps, back-up pumps, better pump placement, better plumbing, and better maintenance could have saved a number of lost vessels.

Obvious points to consider include placing pumps high enough so that they aren't immediately disabled by flooding and providing a means of keeping the pump suction clear. Flooding a compartment sets things adrift which wouldn't normally be part of the bilge water. Rough water compounds the problem by loosening up scale and gunk that clogs bilge pumps. Diaphragm pumps have less tendency to clog than other types. Suction strainers and sumps should be easily accessible for cleaning or have provisions for being blown out.

Bilge pumps and piping in compartments that don't get constant use need special attention to make sure they are clear of debris.

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