

Keeping Current on Kill-Switches

Picture this: an experienced boater is cruising in a powerboat. He takes the wise precaution of wearing his inflatable life jacket and his engine kill-switch lanyard is securely attached to his wrist. Momentarily distracted by a passing boat he is caught off guard by another boat's wake and is thrown overboard. But because he is wearing his kill-switch lanyard, the engine immediately shuts down and the boat has only drifted 150 feet away from him — a much shorter distance to swim than if the vessel continued on without him, or worse, circled back around toward him in the water.

Employing an engine kill-switch device may be one of the simplest things you can do to protect yourself and your crew from the potential hazards of a fall overboard. Traditional kill-switch lanyards can also be a source of frustration for boaters, especially in situations resulting in accidental engine cut-off. The list of potentially embarrassing scenarios is not short, but it shouldn't be used as an excuse not to wear one.

While a kill-switch is a requirement on new personal watercraft, owners of some older and/or larger motorized vessels will have to choose an after-market model to safeguard those on board. So for Foundation Findings #42, we decided to run some "real-world" tests on currently available emergency shut-off switches and crew-overboard devices. We examined these after-market options to see what quirks or kinks might appear in everyday boating situations.

A kill-switch is a safety device designed to cut electricity to an engine. Gasoline-powered engines require an electrical current to run, so when a kill-switch cuts the electricity from the battery the engine will immediately shut down. Diesel engines, on the other hand, do not require a constant flow of electricity so traditional kill-switches won't work.

The Contenders

We tested four different lanyard kill-switches: Sea Dog Universal Kill Switch, Cole Hersee Emergency Cut-Off Switch, Sea Choice Kill Switch and Sierra Emergency Cut-Off Switch; and three wireless crew-overboard devices with optional kill-switch features: Emerald Marine Alert2, Maritech Safety Virtual Lifeline and Mobilarm MOBi-

lert 720i. We also included two universal kill-switch key sets from Kwik Tek — one for PWCs and one for boats. We quickly realized that it is impossible to evenly compare the lanyard and the wireless systems. Each has its own ideal circumstances and potential limitations.

The variables investigated were ease of installation, the length of the lanyards, the force required to pull the key out from various angles and shut off the engine (lanyards), and the time it took for the crew-overboard devices to receive the signal to shut off the engine (wireless). For details on our test methodology and procedures go to www.boatus.com/foundation.

Round One: Putting the Pieces Together

The lanyard kill-switches were the easiest to install despite the lack of instructions in most. If you have ever changed an electrical outlet in your house, you can probably install one of these. We had difficulties with the Cole Hersee because of the oddly-shaped hole required to accommodate its profile. But its unusual shape is what makes it more convenient to use. Designed as a simple up-and-down switch with a protective cover surrounding it on three sides, it was the only kill-switch we tested that allowed the engine to be restarted without the lanyard attached.

Installing most of the wireless systems proved to be more complicated. Though detailed instructions were included with each, there were no comprehensive wiring schematics and the idiosyncrasies commonly found among engines can make following those instructions exasperating. It's a safe bet that the average boater will need a professional marine electrician to install

some of these models, especially if connecting the unit to a chart plotter or GPS.

Round Two: All Wired Up

With the lanyard kill-switches freedom of movement is a concern. On a personal watercraft you don't normally move around much so the risk of accidentally killing the engine is minimal. On larger boats, movement can be a significant factor. On our 22-foot center console, the lanyards were long enough to provide some room to move about but, one of our participants — John Adey, technical director of the American Boat and Yacht Council — noted that we could have easily pulled the key off with a sudden motion. The instructions included with one of the units stated that the lanyard is to be worn around the wrist, but many people attach it to their life jackets where it can be easily forgotten.

Freedom of movement is also impacted by the amount of force required to pull the lanyard key out. Using a digital fish scale, we measured the weight of the pull from several angles and the results varied widely (see chart opposite). The Sierra lanyard demonstrated the most resistance and would therefore be the least likely to cause an accidental cut-off.

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The universal key sets rarely fit as well as the originals. We would recommend buying a replacement lanyard from the original manufacturer, if possible.

We also found out how important it is to have a spare key for your kill-switch. One of ours flew into the water and sank on our

first pull-test. Only two of the six lanyards we tested had floats attached — the Sierra and the universal set for personal watercraft. Having a spare is also essential when your helmsman gets thrown overboard with the lanyard attached. Without a spare you can't restart the boat to go retrieve the person in the water.

Round Three: The Age of Wireless

We tested three wireless crew-overboard devices and found that each has features suited for different boating conditions. Offering more convenience than lanyards, all three provided multiple sensors that could be worn by each person on board. Lanyards only protect the helmsman and you have to remember to detach and then reattach it every time you step away from the steering console. The wireless units can be attached at the beginning of your voyage and left on for the duration of the trip. Each system also had a "rescue mode" to disengage the kill-switch, providing for engine restart and crew-overboard retrieval.

The first wireless system we looked at was the Alert2 which offers features that make it a good choice for coastal/offshore boating. Its water-activated sensors send radio signals back to the base unit when wet. An optional radio direction finder (RDF) enables the user to search for the transmitter's radio signal when retrieving the crew-overboard. This could be a life-saving feature in rough conditions or low visibility. In our tests, the Alert2 matched the lanyards' time in cutting the engine. When the transmitter got wet the engine died and the alarm sounded instantly.

Next was the Virtual Lifeline, which is best suited for inland boating on protected waterways and has a quick response time similar to the lanyards. Its water-activated sensors immediately sound an alarm and cut the engine when submerged. This unit could



"Ally," a man overboard rescue mannequin on loan from USCG Auxiliary Division 12, is wearing the MOBi-lert transmitter attached at her waist.

also be used as a precautionary mechanism: When swimmers are in the water they could each wear one of the sensors so the skipper can't restart the engine until everyone is on board. The third wireless unit we tested, the MOBi-lert, is primarily a crew-overboard alarm device that works by sensing a disruption in the radio signal between the sensor and the base unit. This occurs when the sensor goes outside the range of the signal or is submerged in water. The kill-switch unit that we tested was a prototype made specifically for us and is not yet commercially available. The manufacturer said that the unit may be released as an optional add-on for retail sale later in the year.

According to the manufacturer, there is a built-in delay to prevent a false activation, and a second delay on the engine cut-out unit. We timed 11 seconds between the time the sensor went in the water and the alarm. Ten seconds later the engine cut.

This convenient delay between alarm and engine-kill allows the boat operator to turn back and pick up the crew-overboard

without having to restart the engine. Since the MOBi-lert's multiple sensors are always on, you'll always know when your crew is on board.

The MOBi-lert is well-suited for coastal and offshore boating as it can also be connected to a GPS or chart plotter and will automatically trigger a crew-overboard waypoint if someone falls into the water.

The Lowdown

There is no single device that is perfect for every situation. Each has advantages for specific boating conditions. A lanyard kill-switch is a must for anyone boating solo or operating a PWC, but it only provides protection if you're wearing it. If the helmsman has to attend to something out of reach it would have to be detached to avoid accidentally killing the engine. To prevent loss of power at a critical moment it should not be worn in an emergency situation or while docking.

The wireless systems provide a safeguard for the entire crew. Each has features suited for a particular environment and should be used in addition to your life jacket and other safety gear. The systems might also be used in conjunction with a lanyard. If the helmsman is simply thrown from his seat and not into the water, only a lanyard will kill the engine giving the pilot time to recover control of the boat. In sum, it is most important to consider the kind of boating you plan to do before making a purchase. ■

— By Amanda Suttles

Lanyard Kill-Switches	Ease of Installation	Installation Diagram & Directions	Time from Engine Kill to "Rest" ^s	Detachment Force (pull angle)			Lanyard Length (Stretched)	Price
				•High •Mid •Low	(back)	(side)		
Units Tested	1=Hard 5=Easy	Yes/No	Seconds	(back)	(side)	(down)	Feet/Inches	
Sea Dog - Universal Kill Switch	4	No	6.11	2lbs 4oz	4lbs 2oz	3lbs 1oz	64.5	\$12.29
Cole Hersee - Emergency Cut-Off Switch	3	No	6.11	1lb 4oz	3lbs	1lb	53.5	\$22.99
Sea Choice - Kill Switch	4	No	6.11	1lb 7oz	4lbs 11oz	3lbs 11oz	64.5	\$27.59
Sierra - Emergency Cut-Off Switch	4	Yes	6.11	5lbs 12oz	6lbs 7oz	6lbs 1oz	53.5	\$19.99

Man Overboard Systems	Ease of Installation	Installation Diagram & Directions	Time from Engine Kill to "Rest"	Price	Optional Add-on Equipment Prices
Units Tested	1=Hard 5=Easy	Yes/No	Seconds		
Emerald Marine - Alert 2 ^s	3	Yes	6.11	\$979.00	Portable RDF - \$799
Maritech Safety - Virtual Lifeline XL	3	Yes	6.25	\$549.00	additional sensors-\$158 for 2
Mobilarm - Mobi-lert 720i ^s	2	Yes	11.36, 21.23 ^s	\$1,208.00	kill-switch price unavailable

^s Measured as time between when sensor is dropped in the water (or lanyard pulled out) and when boat came to "rest" - "rest" being defined as when the boat slows enough for its wake to slap against the stern

^s Our kit included a receiver (\$499) and 2 transmitters (\$239 each)

^s Time elapsed from sensor dropped in the water - First time is when alarm sounded, second time is engine shutdown

^s Mobi-lert 720i is not yet available in the U.S. Price quoted is for the 7200T, a similar model, which is available in the U.S.