

PROPELLER AWARENESS EDUCATION MODULE

PREVENTING PROPELLER ACCIDENTS



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RATIONALE - PROPELLER STRIKE AVOIDANCE EDUCATION

- (1) Boat propeller injuries have been described:

“motor propellers can inflict severe, devastating injuries that result in death, loss of extremities, and severe permanent deformity, disfigurement, and/or disability”

“the injuries surpass by far those seen in other motor vehicle accidents, and some authors (Hummel) compare the resulting wounds with those seen on the battlefield.”

Dr. Miguel Menedez-Fernandez, “Motorboat Propeller Injuries” Annual of Plastic Surgery, 1998, quoting from published accounts by Doctors Gomez, Kutarski, Price, Moorefield, Hummel, and Mann

- (2) The United States Coast Guard (USCG) Office of Recreational Boating Safety (RBS) has looked at this problem since 1978 when a statistician suggested a propeller guard could provide protection in 600 to 3000 propeller accidents per year.
- (3) The 1989 National Boating Safety Advisory Council (NBSAC) sub-committee report looked at the universal application of propeller guards and felt they were not suitable for all boats, and therefore recommended them for no boats. Instead they recommended “the most rational approach to the problem is to educate boaters, especially operators.” Seventeen years later, there is no education standard to teach propeller accident prevention.

- (4) The USCG Office of RBS statistics – fatalities and injuries.

2002 - 239 struck by propeller reflected a 19% probability of fatality and represented 4.0% of all fatalities and injuries.

2003 - 266 struck by propeller reflected a 12% probability of fatality and represented 5.0% of all fatalities and injuries.

2004 - 186 struck by propeller reflected a 17% probability of fatality and represented 4.0 % of all fatalities and injuries.

- (5) The National Association State Boating Law Administrators (NASBLA) comment in 2002 on NPR 2001-10163 supported education and legislative efforts in lieu of mandatory guards. This standard would address this alternative.

- (6) Since 1978 a disproportionate number of children have been victims to propeller strikes and an increasing number of rental boats (13%) are involved. According to the USCG 2002-2004 statistics, houseboat and pontoon rentals represent 39% of all rentals involved.

- (7) The USCG statistics, 2002-2004, determined the most at risk boats: outboards (51%) and sterndrive (30%) and targeted the most at risk boat lengths from 16 to 26 feet.



IT IS WHAT YOU KNOW sometimes

1. Know that a 13" propeller blade can travel from head to toe on an average person in less than one tenth of a second. A typical three-blade propeller, running at 3200 rpms can inflict 9600 impacts in one minute or 160 impacts in one second. Dr. Mendez-Fernandez "Motorboat Propeller Injuries." Annual Plastic Surgery, 1998; 41:113-118.
2. Know that too many children die of this accident or are disfigured for life. Your children are supposed to outlive you. According to SPIN research only, in the summer of 2004, more than 50% of the deaths/injuries by propeller were children 17 and under. In 2005, more than 35% of the deaths/injuries by propeller, from data available to SPIN research, were children 18 and under.
3. Know what propels your boat. As in Carbon Monoxide (CO) deaths, what you cannot see can harm or kill you or your loved ones. Show ALL your passengers where the propeller is located. Indicate the location with bold warning labels. The State of Utah has the most dramatic label message for propeller and CO and generously provides them, upon request (Utah State Parks and Recreation 801-538-7341). SPIN also distributes these labels. Locate the propeller in relationship to the boarding ladder.
4. Know that once you are in the way of the spinning propeller, it is no longer what you know, it is **TOO LATE**.



WHO IS AT RISK?

Experienced and inexperienced, educated and uneducated, old and young, swimmers, boaters - operators and passengers, divers, PWC riders. **EVERYONE!**

FIRST LINE OF DEFENSE - EDUCATION

1. Get an education from a National State Boating Law Administrators Association (NASBLA) approved Boating Course (refer to www.nasbla.org). Courses are offered by the United States Coast Guard (USCG) Auxilliary; Power Squadrons; many States, and the Marine University of Fort Lauderdale Florida at crista@marineuniversity.org
2. Insist on thorough training at the point of rental.
3. Research and obtain additional training before you purchase or operate a boat.
4. Make sure propeller safety is thoroughly understood by all before boarding a vessel.



SECOND LINE OF DEFENSE-AVOID ACTIVITIES POSING PROPELLER THREATS

1. Bow Riding - especially on pontoon boats
2. Swimming in or around any boat engine (Carbon monoxide also poses a huge danger)
3. Sliding off Houseboat slides
4. Sitting on the swim platform or ladder
5. **Falling Overboard** listed as #1 cause of deaths and injuries again in 2005, according to the USCG. Stay in or with your BOAT! Wear personal **flotation devices or life jackets**. Drowning is still number 1 consequence of accidents/incidents. Look into the inflatable-type devices that also allow you to get plenty of sun and movement while you remain safe should you fall overboard.
6. Jet Skiing/personal water craft (PWC) - Be very alert to traffic and wakes. PWC riders are often victims of propeller strikes. Make certain your PWC is equipped with off throttle steering controls to help avoid collisions and encounters with boat propellers.
7. Teak surfing, tubing, water skiing. **Do not teak surf**. This puts you at close proximity to the propeller and in danger of CO affixiation. Tubing and skiing ropes may catch into the propeller and pull you into the blades.
8. Boating Under the Influence. No one deserves the consequences of impaired judgement and poor reflexes caused by sun & alcohol. Drink lots of water.



Knowing about these dangers are important. However, be aware of the **safety equipment** which is available. Installed safety technology/equipment provides the highest level of security when judgement and education or circumstances fail.

THIRD LINE OF DEFENSE - SAFETY TECHNOLOGIES

WHAT TECHNOLOGIES CAN PROTECT US AGAINST A PROPELLER?

1. **Kill Switches also known as emergency shutoff switches** or lanyards - Many boats since 1995 provide lanyard engine shut off, or “kill”, switches as standard equipment. Older boats can be retrofitted with them.

In September 2004, NASBLA passed the Model Act for all states to adopt a law mandating the use of the lanyard or remote wireless kill switches on boats such equipped.

2006 resolutions by the NBSAC have recommended that the USCG proceed with two regulations: (a) mandatory wear of the shut off switch; and (b) make it mandatory that all new boats manufactured be equipped with a cut-off (“kill”) switch .

2. **Wireless Shut off switches.** A remote system now available to give you more freedom. Shuts down the engine and eventually stops the propeller if ANY passenger goes overboard.
3. **Ladder/Gate Interlocks** to prevent common boarding accidents - propeller is frozen until the ladder or gate is unlocked, giving your assigned “lookout” the opportunity to check around the stern, reducing accidental engaging of the engine.
4. **Anti-feedback steering** greatly reduces the threat of the circle of death.



5. **Propeller Guards** - Cage-Type Guards or Ring-Type Guards, as applicable to type of vessel and environment. **Please note that on a pontoon boat**, if one falls from the bow of that boat there is no escape from the propeller. If you must have a pontoon boat, a cage, a ladder interlock system, and a remote shut off system-combo is your best defense.
6. **Jet Drives** have NO PROPELLER.

WHERE DO I LOOK FOR SAFETY TECHNOLOGIES? (To List a few)

1. Use the Internet. Use Google or other Search Engines for "propeller guards", "propeller safety" "propeller injury prevention" to view the many different manufacturers and styles of "shrouds" and other propeller safety technologies. Go to www.rbbi.com for a list of various existing and emerging propeller safety technologies.
2. Technologies by MariTech Industries were favorably reviewed in a study conducted through a USCG grant to The Marine Technology Society in 1998. MariTech Industries (888-755-7767) www.maritechsafety.com for guards and ladder interlocks www.wirelesslanyard.com for wireless transmitter to sound an alarm and shut off the engine if an operator or occupant is ejected.
3. Florida State Nature Conservancy www.floridaconservation.org for review of technologies.
4. Engine manufacturer, your boat dealer, or a boating supply store. Chances are, you already have a lanyard on your boat. Engage it EVERY time.
5. Contact the USCG Office of Recreational Boating Safety at <http://www.uscgboating.org>. To obtain the Listing of Current Interventions Devices, contact Dan McCormick, at the USCG at 202-267-6894.



Now that your boat is equipped with the appropriate safety technologies, the rest is up to you:

PREVENT, PREVENT, PREVENT:

- √ **GET AN EDUCATION.** It is not what you know when you are in the strike zone. It is what you know to keep yourself clear of that zone.

- √ **THE WARNING LABEL.** Make it specific in no uncertain terms: **DANGER, DEATH, DISMEMBERMENT. DO NOT APPROACH THE PROPELLER. DO NOT LEAVE ENGINE IN IDLE WHILE BOARDING OR SWIMMERS ARE IN THE WATER.**

- √ **PRE-BOARDING INSTRUCTIONS:** Establish clear rules for reversing, idling, swim platform activities, boarding ladders and seating.

- √ **ASSIGN A RESPONSIBLE ADULT** to each child.

- √ **ASSIGN A LOOKOUT**

- √ **ENGAGE THE EMERGENCY SHUT OFF SWITCH** every time.



**PREVENT, PREVENT, PREVENT:
REVIEW COMMON SENSE STANDARD OPERATING PROCEDURES**

- √ Do a head count before start up.
- √ Assign a responsible lookout.
- √ Assign a seat to each occupant.
- √ Never bow ride or sit on gunwale, transoms, seat-backs, etc.
- √ Always engage your Lanyard Kill Switch between the Ignition and the Operator's person or Always engage the remote shut off system and have each occupant wear a sensor.
- √ Never start a boat with the engine in gear.
- √ Never board or disembark a boat when the engine is on, i.e. idling. The propeller is still rotating.
- √ Be aware of extreme waters or weather conditions.
- √ Be aware of congested areas and designated swimming zones.
- √ Know how to recognize divers' flags or buoys.
- √ Be smart about high risk activities: water skiing, inner tubing or riding a PWC (the "rapid transit" into a propeller)
- √ NEVER operate a boat under the influence of alcohol or drugs.



PREVENT, PREVENT, PREVENT: PERSON OVERBOARD - PROPELLER SAFETY PROCEDURES

- √ Turn the bow of the boat toward the person in the water; keep the prop to the rear.
- √ Slow down, circle around, and keep the individual in sight **at all times**.
- √ Take the engine out of gear and turn off the engine at least a boat length from the victim.
- √ Tie a line to a float and pull the person toward the boat.
- √ Practice this procedure, then practice it again.
- √ Remember turn the boat opposite of a car to keep the prop away from the in-water person.
- √ Have the designated LOOKOUT alert and in position watching for any sign of danger.
- √ Seems like a cake walk until you are in rough waters and under stress, tired, overheated or the person overboard is the most important person in your life.



PREVENT, PREVENT, PREVENT

FIRST LINE OF DEFENSE:

GET EDUCATED

SECOND LINE OF DEFENSE:

**AVOID ACTIVITIES POSING
A HIGH RISK OF
PROPELLER STRIKES**

THIRD LINE OF DEFENSE:

**INSTALL SAFETY
TECHNOLOGIES**

PREVENT, PREVENT, PREVENT

BOAT SMART, BOAT RESPONSIBLY, YOU'RE IN COMMAND