Propeller Injury Avoidance Device Radar Plot

by the Propeller Guard Information Center

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PropellerSafety.com

This document is NOT to be used to make boat outfitting decisions at this time. It is only for stimulating discussions, generating ideas, and feedback for improving this process.

Disclaimer - these tools are provided for information only. It is NOT professional advice. As a boat owner or operator you remain responsible for your own safety and for the safety of those on and near your boat. The Propeller Guard Information Center, Polson Enterprises, and/or Gary Polson assume no responsibility for actions taken or not taken based on this information.

This document is part of a Consumer Guide to Propeller Guards and Other Propeller Safety Modifications for Their Specific Boat and Operating Conditions the Propeller Guard Information Center.

All disclaimers on that site apply to this document as well.

Any scoring or ranking of propeller safety devices in this tool is just to stimulate discussion. We are NOT saying these are the correct rankings. Rankings have been assigned to illustrate how the process could work.

Propeller Injury Avoidance Device Radar Plot

Several general types of Propeller Injury Avoidance Devices were evaluated on paper and ranked according to their anticipated performance in specific types of situations, such as “Operator Fell Overboard First Pass” for when the boat operator just fell in and the boat passes over them.

Individual products within a basic type (such as XYZ brand ring propeller guard) may have slightly different performance, but the resulting chart can be used to identify classes of devices that can be used to reduce your risk due to certain types of exposure (situations).

The next few pages will list general types of Propeller Injury Avoidance Devices, list potential propeller injury situations, supply a spreadsheet of our quick tentative rankings of general types of devices against specific types of accidents, provide a general discussion of the Radar Plot, and provide additional information for use in selecting propeller safety devices. Much of this material was originally written in 2007 and may be dated.

List of General Types of Propeller Injury Avoidance Devices

As Listed on the Radar Plot Continued

Devices	**Comments**
Cage w/ Rear Screen	Cage Type propeller guard with screen over the rear (back)
Cage w/o Rear Screen	Cage Type propeller guard with out a screen over the rear (back)
Lanyard	Lanyard type kill switch worn by operator with a cord to device on the dash
Virtual Lanyard	Wireless lanyard kill switch - small tag worn by boat operator or by every-one on board EXCEPT by individuals when they are being towed
Swim Ladder & Swim Gate Interlocks	Switch on swim ladder or a swim platform gate that will not let the engine be started if the ladder is down or the gate is open.
Cameras	Camera(s) at the rear of larger vessels that feed a monitor at the helm to improve aft visibility
Ring Prop	Propeller with a “ring” as part of the propeller. The ring is physically at-tached to the end of the blades. They are no longer being produced.
Ring Type Guard	Ring or duct around the propeller
Vane Type Guard	to be added later
Cage, Ring, or Vane Guard w/flip up shield	to be added later
Concentric Rings Type Guard	to be added later

List of General Types of Propeller Injury Avoidance Devices As Listed on the Radar Plot Continued	
Deeper Boarding Ladders	to be added later
Mirrors	to be added later
Moving Propeller (MP) LED spinning light	to be added later
Secure handholds at boarding ladder	to be added later

List of Potential Propeller Injury Situations As Listed on the Radar Plot	
Situation	**Comments**
Operator Overboard First Pass	Operator just fell out and the boat passes over them
Operator Overboard Later Passes	Operator fell out, the boat passed over them, now it continues to circle and pass over them repeatedly
Non Operator Overboard First Pass	Someone other than the operator just fell out and the boat passes over them
Non Operator Overboard Later Passes	Someone other than the operator fell out, the boat passed over them, now it continues to circle and pass over them repeatedly.
People Towed by My Boat (in front or beside me)	People towed by your boat have swung around to close beside or in front of your boat.
People Towed by My Boat (right behind me)	People are in the water immediately behind the boat in preparation to being towed or returning to the boat from being towed
People Swimming from My Boat (in front)	One of more members of your party are swimming in front of your boat
People Swimming from My Boat (right behind me)	One of more members of your party are swimming closely behind the boat
People Being Towed by Other Boats	People being towed by other boats in your area of water
CONTINUED	

List of Potential Propeller Injury Situations As Listed on the Radar Chart CONTINUED	
Situation	**Comments**
People Swimming NOT From My Boat (in front)	People swimming in the area in front of your boat that are not members of your party
People Swimming NOT From My Boat (right behind me)	People swimming in the area behind your boat that at not members of your party.
People on Other Boats	People physically on other boats (can be hit by your prop in a boat collision)
Divers NOT From My Boat	SCUBA and freestyle divers that did not originate from your craft
Personal Watercraft (in front or beside me)	People on a PWC in front or near the side of your boat
Personal Watercraft (right behind me)	People on a PWC near the rear of your boat

Ranking the Devices Against the Situations

We quickly mentally evaluated the each device on the list of General Types of Propeller Injury Avoidance Devices against each situation on the List of Propeller Injury Situations. These are just quick, off the cuff rankings provided by us as an example of how this selection system could work. These are NOT official rankings. Each device was ranked from Zero to 10 for each situation. Additional input from the industry, the U.S. Coast Guard, and others is encouraged so we can improve these rankings and come to a consensus. The rankings were done on a spreadsheet, then used to generate the charts that follow. Several notes need to be considered when looking at the data.

1. Swimming includes on floats, fallen from tow ropes, etc

2. All data is for stern drives and inboards only

3. An open propeller would score ZERO in each situation. Avoiding the accident would score a TEN in each situation.

4. Data assumes the device is working properly and being used

5. Slower speed boats (like houseboats and pontoons) would have higher scores for propeller guards due to the lower impact velocities

6. Swim Ladder (and swim gate) interlocks would have higher scores on larger vessels where fewer people just jump over the side of the boat

7. Scores for a specific manufacturer's device may be different than the overall category score, however, the category score will typically be a good aid in selecting an appropriate type of device.

8. Virtual Lanyards are not being used by those being towed (tubers, wakeboards, skiers, etc)

9. Some Cage Type Propeller Guards with rear screens may not be practical at higher speeds due to drag and their impact on boat handling.

10. We suspect the boating industry would discount our rankings of propeller guards several points due to their view of entrapment issues.

Ranking of Each Device Type Against Each Situation

	Cage w/ rear Screen	Cage w/o Rear Screen	Lanyard	Virtual Lanyard on everybody	Swim Ladder	Cameras	Ring Prop	Ring Type Guard
Operator Overboard First Pass	7	7	2	2	0	0	5	6
Operator Overboard Later Passes	7	7	10	10	0	0	5	6
Non Operator Overboard First Pass	7	7	0	2	0	0	5	6
Non Operator Overboard Later Passes	7	7	10	10	0	0	5	6
People Towed by My Boat (in front or beside me)	7	7	0	0	0	0	5	6
People Towed by My Boat (right behind me)	9	5.5	0	0	0	8	5	5.5
People Swimming from My Boat (in front)	7	7	0	10	8	0	5	6
People Swimming from My Boat (right behind me)	9	5.5	0	10	8	8	5	5.5
People being Towed by Other Boats	7	7	0	0	0	0	5	6
People Swimming NOT From My Boat (in front)	7	7	0	0	0	0	5	6
People Swimming NOT From My Boat (right behind me)	9	5	0	0	0	8	5	5.5
People on Other Boats	7	7	0	0	0	2	5	6
Divers NOT From My Boat	7	7	0	0	0	0	5	6
Personal Watercraft (in front or beside me)	7	7	0	0	0	0	5	6
Personal Watercraft (right behind me)	9	5.5	0	0	0	7	5	5.5

Radar Plot Introduction

The scores above were used to generate the “Radar Plot” on the next page. Each situation is represented by a radial line on the chart. The score of each device against that situation is represented by a data point. Data points for a specific device are joined by a continuous line around the chart to form somewhat of a “cloud” on the radar plot.

The primary purpose of the radar chart is to help the viewer quickly identify one or more types of devices to deal with propeller Accident Risk worksheet they will begin to notice their main primary risks are “clumped” in certain areas such as falling overboard. A quick glance at the “Radar Plot” will identify certain classes of devices that perform better than others as an intervention for that specific problem.

For example, lanyard kill switches and virtual lanyards score high in preventing anyone from being struck by a circling boat after the first pass (because the kill the engine), however, a propeller guard is about the only way to prevent or reduce injuries at the moment you fall into the water. If you are confused by the chart on the next page, just look across the list of values above and find a device with a high score for the situation you are interested in. Any score above ZERO is an improvement over an open propeller.

ROUGH DRAFT - NOT FOR USE IN SELECTING PROPELLER SAFETY DEVICES

Propeller Injury Avoidance Devices
Radar Plot

Rough Draft
For Demonstration Purposes Only
Ratings Are NOT official

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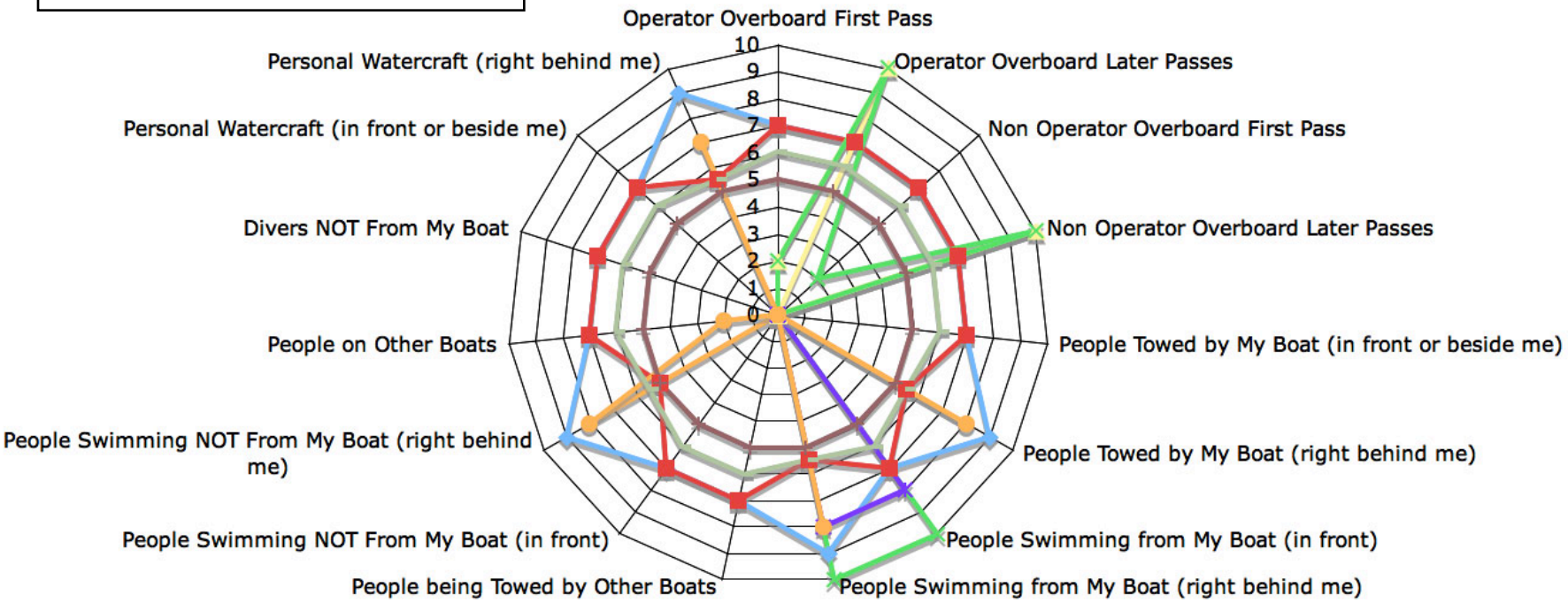

Summary

Once perfected, the radar plot OR its accompanying table could be used as a tool to identify the best propeller safety devices for your specific situation once you identify and group your risks using the Propeller Accident Risk worksheet.

Be sure to return to our post, Consumer Guide to Propeller Guards and Other Propeller Safety Modifications for Their Specific Boat and Operating Conditions for the complete process.

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