Houseboat Propeller Injury Avoidance Measures Proposed and Withdrawn by the U.S. Coast Guard:

An Analysis by the Propeller Guard Information Center

by Gary Polson P.E.

Originally Published June 10, 2010

Version: June 15, 2010

The Proposed Regulation Known as USCG 2001- 10163

Proposed in December 2001 and Withdrawn in October 2007

A web page has been setup to support this paper.
Please check it for updates and additional materials.

http://www.rbbi.com/pgic/houseboats

This paper is for informational purposes only. It is NOT professional advice for those considering modifying any boat with any safety devices.

Two Critical Findings

We are concerned two very important points may be overlooked due to the length and complexity of this report. Therefore we briefly mention them here. Both points are made in much greater detail in the report.

Critical Finding 1: The U.S. Coast Guard made a game changing error in estimating implementation costs of the proposed rule. They failed to recognize 95 percent of all houseboats only need a mirror and a swim ladder interlock system to comply. As a result their total implementation cost estimate was over 5 times the actual cost.

U.S. Coast Guard based their $1500 per houseboat implementation cost estimate on hauling every houseboat and installing two propeller guards on it. Per the proposed rule, 95 percent of all houseboats are private nonrental houseboats. Those houseboats only require a mirror (estimated cost $20 self installed per the proposed rule) and a swim ladder interlock system (estimated cost $100 plus installation per the proposed rule). Ninety-five percent of all houseboats did not require the much more costly alternative of hauling and installing propeller guards.

The National Marine Manufacturers Association (NMMA) estimated swim ladder interlock system installation required approximately 1.5 hours at $69 per hour or $103.50 each.

A rough estimate of implementation costs per private (nonrental) houseboats is provided in Table A.

Table A

Rough Estimate of Implementation Costs of Private Nonrental Houseboats

$20.00	Mirror (self installed)
$100.00	Swim Ladder Interlock System
$103.50	Swim Ladder Interlock System Installation
$223.50	**Total**

Table B estimates total implementation cost from the implementation cost per private (nonrental) houseboat from Table A and USCG's estimate of $1500 per rental houseboat. Vessel population data comes from the proposal.

Table B Total Implementation Cost per USCG and NMMA Data			
Boat Type	Implementation Cost per Houseboat	Number of Houseboats	Total Cost
Rental	$1,500.00	5,000	$7,500,000.00
Nonrental	$223.50	95,000	$21,232,500.00
Totals		**100,000**	**$28,732,500.00**

Total implementation cost per USCG and NMMA data from Table B is used in Table C to estimate the average implementation cost per houseboat.

Table C Estimate of Average Implementation Cost per USCG and NMMA Data		
Total Implementation Cost	Number of Houseboats	Average Implementation Cost per Houseboat
$28,732,500.00	100,000	**$287.33**

Using their own data, average implementation cost per houseboat is less than $300 per houseboat, not the $1,500 per houseboat stated by USCG. Similarly, the total implementation cost is approximately $29 million, not the $150 million stated by USCG.

Our own estimates, detailed in this report, calculate an average implementation cost of less than $200 per houseboat and a total implementation cost of less than $20 million.

USCG failed to recognize 95 percent of all houseboats subject to this proposed rule only require a mirror and a swim ladder interlock system to comply. That error led to a greatly inflated implementation cost estimate which caused the proposed regulation to be withdrawn.

Critical Finding 2: U.S. Small Business Administration (SBA) Office of Advocacy said USCG acted in error when they found the proposal would not have a significant economic impact on small businesses and as a result, the rule could be challenged in court. USCG cited SBA's challenge as a major factor in withdrawal of the proposal. SBA's comments included at least 15 major errors (see page 116), including using the wrong data set in their financial calculations. This report proves SBA's challenge was absolutely groundless.

SBA Office of Advocacy conducted a brief financial impact analysis and challenged:

"The Office of Advocacy asserts that the proposal fails to comply with the requirements of the RFA (Regulatory Flexibility Act) and the Administrative Protection Act (APA) and recommends withdrawal of the proposal for further analysis."

SBA contends the proposed regulation would have significant impact on small businesses (houseboat rental operations). USCG performed a brief analysis of the financial impact of the proposed rule. Using those results and the authority granted them under RFA Section 605, USCG certified the proposed regulation would not have a significant economical impact on small businesses. SBA contends USCG's certification was "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law" and as such, would not withstand an APA challenge. Per SBA, if the rule were issued, a houseboat rental operation could challenge the rule in court and have it set aside based on USCG's unlawful certification.

This report shows the economic impact analysis conducted by SBA contained at least 15 major errors (see page 116), including using the wrong data set in their financial calculations. The actual economic impact of the proposal on small businesses was only a small fraction of that calculated by SBA. SBA's own analysis was by their own definition, "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law". USCG should not hesitate to reintroduce NPRM 10163 due to SBA's false claims.

To: National Marine Manufacturers Association (NMMA)
Houseboat Industry Association (HIA)
U.S. Small Business Administration Office of Advocacy (SBA)

We identified many major errors in your public comments on the proposed rule. **We strongly encourage NMMA, HIA, and SBA to acknowledge to us, in writing, the errors we identified in your submissions (NMMA/HIA errors listed on page 101, SBA errors listed on page 116) so those errors will not be perpetuated in the future, or to provide materials supporting those statements if you feel they were not made in error.** We will place your acknowledgements and/or materials supporting your statements on the web site dedicated to this report. **If you elect not to respond, your inaction will result in even more propeller deaths and injuries as decisions continue to be made based upon the errors in your submissions.**

We also encourage written responses from Mercury Marine and others to the errors we found in their comments.

Note to Readers: This report covers a complicated subject and few will find it easy to read. It discusses the economic justification of the proposed rule. To determine its economic justification, we:

1. Develop houseboat population data for a total of twelve segments. We segment houseboats by rental/nonrental, number of engines (0 to 3), and presence of a flybridge helm. These variables also determine the type and number of emergency ignition cut-off switches (EICOS) required.

2. Develop and compare costs for each approach put forth by the proposal for each of the twelve segments.

3. Investigate injury and fatality data in great detail, including comparing our accident and fatality counts with accident data compiled by others.

4. Investigate how monetary values were assigned to injuries and fatalities and what those values should have been.

5. Separate the analysis of rental and nonrental houseboats due to their different requirements under the proposal.

These facts are addressed in great detail to accurately assess the economic justification of the proposed rule. The report also reviews and refutes industry comments in minute detail.

We contend insufficient attention to the details above led to withdrawal of the proposed regulation. We extended a tremendous amount of effort to bring this information together and encourage all involved with propeller safety to study it.

We warn you in advance, it will take considerable time and effort to fully understand this report. A list of abbreviations is provided as the last page.

We direct those with minimal reading time to the **Summary of Our Findings** immediately proceeding the Appendix.

The proposed rule was withdrawn well over two years ago. Writing and documenting this report has taken many hundreds of hours. We completed it as quickly as possible with our limited funds and resources.

Thank you for your interest in propeller safety. We also thank those who helped edit the paper, called errors and omissions to our attention, and commented on our rough drafts. We especially appreciate those with opposing views who supplied their comments.

We continue to welcome any comments, questions, or corrections you may have. Please email them to: polsong@virtualpet.com

Gary Polson

Propeller Guard Information Center

Table of Contents

Photographs, Charts, Drawings, and Decals

An overview of issues surrounding propeller safety is provided in our **Aspects of the Debate Surrounding Propeller Safety Issues chart**. It can be viewed online at:

http://www.rbbi.com/pgic/charts/propellersafety.pdf

Houseboat Propeller Injury Avoidance Measures Proposed and Withdrawn by the U.S. Coast Guard:

An Analysis by the Propeller Guard Information Center

by Gary Polson P.E.

Abstract: The U.S. Coast Guard (USCG) rejected USCG-2001-10163 based on a cost-benefit analysis in which they compared implementation costs to the cost of casualties (those killed and injured). USCG over estimated implementation costs when they included the cost of hauling and two propeller guards per every houseboat when over 95 percent of all houseboats only needed a mirror and a swim ladder interlock to comply. Additionally, USCG failed to identify several well documented houseboat propeller accidents that would have increased the cost of casualties. Errors in comments submitted by the boating industry led to even more mistakes in the cost-benefit analysis. This report shows that when the correct implementation costs and accident counts are used, the proposal is economically justified, and overwhelmingly so for rental houseboats. Since successfully defeating the proposal, the industry has continued fail to act. New propeller safety devices have come on the scene and USCG's propeller guard test protocol is nearing completion. In the absence of industry action, we call for reopening the proposal, especially as it applies to rental houseboats. Additional details are in the Action Items section of this report.

INTRODUCTION

On 10 December 2001, the U.S. Coast Guard (USCG) published a Notice of Proposed Rule Making (NPRM) that would require certain houseboats to install specific propeller safety measures.[1] Proposed rule, USCG-2001-10163, if adopted, would result in Federal Law 33 CFR Part 175. A highlighted copy of the NPRM is in **APPENDIX A**. The proposal was in response to an April 2001 recommendation[2] from the National Boating Safety Advisory Council (NBSAC).

Approximately six years later, on 18 October 2007, USCG published a Notice of Proposed Rule Making Withdrawal[3] (NPRMW) for USCG-2001-10163. A highlighted copy of the NPRMW is in **APPENDIX B**.

The NPRM called for owners of RENTAL non-planing recreational houseboats with propeller-driven propulsion located aft of the transom to install a propeller guard OR install all three of the following measures: (1) a swim ladder interlock device, (2) clear aft visibility device such as mirrors or a remote video system, and (3) an emergency ignition cut-off switch (EICOS).

The proposal called for owners of NONRENTAL houseboats meeting similar criteria to install a propeller guard OR install both the following measures: (1) a swim ladder interlock device, and (2) a clear aft visibility device.

---

[1] Federal Requirements for Propeller Injury Avoidance Measures. Department of Transportation. Coast Guard. USCG-2001-10163. Federal Register. Vol. 66 No. 237. Pgs. 63645-636450. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be102&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

[2] Minutes of National Boating Safety Advisory Council 67th Meeting. Cleveland Ohio. April 23-23, 2001. Page 34. Item 4. http://www.uscgboating.org/assets/1/Publications/67thNBSAC_Minutes.pdf Retrieved 1 May 2010.

[3] Federal Requirements for Propeller Injury Avoidance Measures. Department of Homeland Security. Coast Guard. Docket No. USCG-2001-10163. Federal Register. Vol. 72 No. 201. Pgs. 59064-59065. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=0900006480321737&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

Owners of NONRENTAL houseboats would not be required to install an EICOS, but would be required to use one if it was present. This approach was taken to reduce implementation costs on NONRENTAL boats.

Owners of RENTAL or NONRENTAL propeller driven houseboats could convert to water jet pump propulsion and become exempt to the NPRM.

In summary, owners of non-planing recreational houseboats with propeller-driven propulsion located aft of the transom are to implement one of the three options in Table 1.

Table 1
NPRM Options

Option 1	Install propeller guard(s)
Option 2	Install 3 measures if rental Install 2 measures if nonrental
Option 3	Convert to water jet pump propulsion

USCG sought input during a public comment period. Several comments filed by boating industry representatives provided inaccurate information. The U.S. Coast Guard used inaccurate data supplied by the boating industry in their cost benefit analysis. As a result, USCG found costs to exceed benefits and the proposal was withdrawn.

We replaced the industry submitted errors with accurate data in the cost benefit analysis. The NPRM was justified for all houseboats, and overwhelmingly so for rental houseboats.

The errors, those submitting them, how they were submitted, and how they factored into the decision to withdraw the NPRM is shown in great detail later in this report.

We will now identify houseboat population statistics needed to estimate NPRM implementation costs.

HOUSEBOAT STATISTICS

Before determining implementation costs, we must first develop basic statistics for the houseboat population. This will be done by:

1. Determining number of nonrental and rental houseboats.

2. Segmenting nonrental houseboats by their number of engines (needed to determine number of propeller guards or type of EICOS that would be needed).

3. Segmenting rental houseboats by their number of engines (needed to determine number of propeller guards if that option were chosen).

4. Further dividing each rental houseboat segment above into those with and without flybridge controls (needed to determine number of and type of EICOS that would be needed).

We will now begin developing the basic statistics.

The NPRM reports the U.S. houseboat population consists of 100,000 houseboats with 5,000 of those being rentals. See Table 2.

Table 2

Houseboat Population per the NPRM in units

95,000	NonRental Houseboats
5,000	Rental Houseboats
100,000	Total Number of Houseboats

To estimate the number of rental and nonrental houseboats with twin engines we:

1. Identified the USCG Boating Accident Report Database (BARD) as a sample population.

2. Acquired BARD data for 1995 - 2001.

3. Selected all houseboat records involved in any type of recreational boating accident (total of 977 houseboats, 371 being rental and 606 being nonrental per BARD data).

4. Eliminated all BARD records above in which the number of engines was not provided leaving a total of 779 houseboats (312 rental and 467 nonrental).

5. Counted the number of rental and nonrental houseboats with zero, one, two, and three engines and the number of houseboats with water jet drives. See Table 3.

6. Converted data in Table 3 to percentages based on the number of houseboats in the sample size (779). See Table 4.

7. Multiplied percentages in Table 4 times the population to estimate the number of houseboats in each category. See Table 5.

Table 3

BARD 1995-2001 Sample Houseboat Propulsion Data in Units

Number of Engines	All Houseboats	Rental Only	Non-Rental Only
None	17	2	15
One	388	178	210
Two	372	132	240
Three	2	0	2
Totals	**779**	**312**	**467**
Water Jets	13	7	6

Table 4 BARD 1995-2001 Sample Houseboat Propulsion Data in Percentages			
Number of Engines	All House-boats	Rental Only	Non-Rental Only
None	2.18%	0.64%	3.21%
One	49.81%	57.05%	44.97
Two	47.75%	42.31%	51.39%
Three	0.26%	0%	0.43%
Totals	**100%**	**100%**	**100%**
Water Jets	1.66%	2.24%	1.28%

Table 5 Total Houseboat Population by Number of Engines Estimated From 1995-2001 BARD Data			
Number of Engines	All House-boats	Rental Only	NonRental Only
None	3,083	32	3,051
One	45,572	2,853	42,720
Two	50,938	2,115	48,822
Three	407	0	407
Totals	**100,000**	**5,000**	**95,000**

Some Boats Will Not Need Modifications

Several categories of houseboats do not require modification to meet the NPRM. Populations requiring no modifications include:

1. Unpowered houseboats
2. Water Jet powered houseboats
3. Planing houseboats
4. Houseboats that already have propeller guards installed
5. Inboard powered houseboats with propellers forward of the transom
6. Nonrental houseboats that already have a mirror and a swim ladder interlock switch
7. Commercial and U.S. government owned houseboats

Approximately two percent of all houseboats involved in BARD reported accidents were unpowered and would not require modifications (NPRM applies only to propeller driven houseboats). Some areas of the United States, such as Seattle, are well known for harboring large numbers of unpowered houseboats. A tour guide even provides tours of Seattle's permanently moored houseboat community.[4]

Similarly, approximately 1.6 percent of all houseboats involved in BARD reported accidents were water jet powered and would need no modifications (NPRM only applies to propeller driven houseboats). For example, Tri-Lakes Houseboat Rentals[5] on Table Rock Lake in Missouri was well known for renting water jet powered houseboats.

---

[4] Discover Houseboating; Your Tour of Life on the Water! http://www.discoverhouseboating.com Retrieved May 1, 2010.

[5] Tri-Lakes Houseboat Rentals, Kimberling City MO. http://www.tri-lakeshouseboat.com Retrieved January 18, 2009. Note - our May 1, 2010 review of this web site found it to be under the control of a different houseboat rental operation. The original site is still archived online at: http://web.archive.org/web/20080310004657/http://www.tri-lakeshouseboat.com

Several public comments mentioned planing houseboats. They are not subject to the NPRM.

Some houseboats already have propeller guards installed and would need no further modifications.

Many nonrental houseboats are inboard powered (use shaft drives), often using V-drives. Inboard powered houseboats with propellers forward of the transom require no modifications.

Many nonrental houseboats already have mirrors installed. Some of those houseboats already have swim ladder interlock switches installed and would need no further modifications to meet the NPRM.

Several companies own houseboats for commercial and entertainment purposes, as well as for charter, excursions, tours, cruises and party boats. Examples include: Utopian Cruises on Lake Travis (TX), Houseboat Adventures (LA), Capt. Mikes Ultimate Manatee Tour (FL), Serendipity Houseboat and Events Center (ID), and Stutzman Hells Canyon Guided Houseboat (OR). Commercial houseboats are exempt to the NPRM.

U.S. Government owned houseboats (for government use) are exempt. Native American Tribal owned houseboats such as the RRE Houseboats operation at Coulee Dam owned by the Colville Confederated Tribes are probably similarly exempt.

To be conservative, we chose to represent the number of boats not requiring modifications by the number of unpowered houseboats and to ignore the other six categories. We will base our calculations purely on the number of engines.

Single Engine Population

Per Table 4, approximately 57 percent of rental houseboats and 45 percent of nonrental houseboats are powered by a single engine and would require only one propeller guard if that option was chosen by the owner.

Engine Types

Those collecting data often blur the division between inboards and inboard / outboards (stern drives). We will not attempt to distinguish them separately here, however we will use BARD data to estimate the percentage of houseboats using outboard power. This data will become of interest later when industry representatives discuss the number of accidents by drive type.

To estimate the percentage of houseboats powered by inboards, inboard/outboard (stern drives), and outboards we:

1. Used the same BARD data for 977 houseboats involved in reported accidents from 1995 though 2001 described earlier.

2. Eliminated 118 records for which no engine type was specified.

3. Counted the number of houseboats in each engine category for the 859 remaining houseboats and converted the results to percentages. See Table 6.

Table 6

BARD 1995-2001 Sample Houseboat Propulsion Drive Types

Type	Number of Houseboats	Percentage of Houseboats
Inboard	249	28.99%
Inboard/ Outboard	271	31.55%
Outboard	339	39.46%
All / Total	**859**	**100%**

There is almost exactly a 60/40 split with 60 percent powered by Inboard or Inboard/ Outboard engines and 40 percent Outboard powered. See Table 7.

Table 7 Houseboats by Engine Type	
Percentage	Engine Type
60.54%	Inboard or Inboard / Stern Drive
39.46%	Outboard

Rental Houseboat Flybridge Frequency

Some larger houseboats have a steering wheel and an extra set of controls (flybridge controls) on the upper deck.

To comply with the NPRM as it is written, rental houseboats with flybridge controls may need an EICOS on the flybridge. Rental houseboats with twin engines and flybridge controls may need a twin engine EICOS on the flybridge.

We will now estimate the frequency of flybridge controls on rental houseboats for each engine category (no engine, single engine, twin engines, triple engines).

The presence of flybridge controls is not recorded in BARD data, so we studied some houseboat builders and rental operations for indicators of flybridge frequency by length.

Forever Resorts, a well known houseboat rental operation, rents houseboats built by Fun Country Marine. Forever Resorts' web site[6] indicates they use flybridge controls on their houseboats 56 feet and longer. The Monticello River Yachts,[7] a builder of houseboats, web site indicates they begin installing flybridge controls on houseboats of 60 feet and longer. We checked Sumerset Houseboats for sale on YachtWorld and found them offering flybridge controls on units of 60 feet and longer.

From the examples just discussed, flybridge controls appear to be installed on some houseboats of 55 feet and longer. However, we did find a few shorter houseboats with flybridge controls.

Considering information from these builders, we elected to represent every rental houseboat of 52 feet in length or longer as having flybridge controls. The exact length break point chosen, will later be shown to have very little affect on the average implementation cost for all houseboats subject to the NPRM.

Having identified a conservative cut off length for rental houseboat flybridge controls (52 feet), we turned back to the BARD data used earlier and identified 288 rental houseboats for which both length and the number of engines were supplied. See Table 8.

Table 8 Rental Houseboat Distribution by Length and Number of Engines in BARD Database in Units			
Boat Length	Single Engine	Twin Engine	Total
<52 feet	77	28	105
52 feet and over	87	96	183
Total	**164**	**124**	**288**

Data from Table 8 is represented as percentages in Table 9.

[6] Forever Resorts web site.
http://www.foreverresorts.com Retrieved May 1, 2010.

[7] Monticello River Yachts web site.
http://www.monticelloriveryachts.com Retrieved May 1, 2010.

Photograph 1 Small Rental Houseboats at Bridge Bay Resort on Lake Shasta. August 2006 photo by Gary Polson.

Table 9 Rental Houseboat Distribution by Length and Number of Engines in BARD Database as Percentages			
Boat Length	Single Engine	Twin Engine	**Total**
<52 feet	26.74%	9.72%	**36.44%**
52 feet and over	30.21%	33.33%	**63.56%**
Total	56.95%	43.05%	**100.00%**

Table 9 indicates about 64 percent of rental houseboats have flybridge controls, and those are almost evenly split between single (30.2 percent) and twin engine (33.3 percent) installations. We feel the actual percentage of rentals with flybridge controls is lower than the approximately 64 percent indicated in Table 9.

For twin engine rental houseboats, Table 9 indicates about 77 percent of them are over 52 feet (33.3 percent/43 percent) which is the length we say all houseboats over have flybridge controls.

These estimates reflect hundreds of small houseboats in rental fleets providing an option for cost conscious customers, like the fleet of small houseboats at Bridge Bay Resort on Lake Shasta partially shown in Photograph 1.

Earlier, in Table 9, we estimated distribution of rental houseboats by number of engines and length to estimate the number of houseboats with flybridge controls for both single and twin engine units. Note, we assumed all houseboats 52 feet and over had flybridge controls.

Table 10 distributes Table 9 flybridge percentages among single and twin engine rental houseboats respectively (looks at single engine rental houseboats by themselves, then at twins by themselves).

Table 10

Rental Houseboat Distribution by Length and Number of Engines in BARD Database as Percentages (Flybridge Table)

Boat Length	Single Engine	Twin Engine
<52 feet (no flybridge)	46.92%	22.58%
52 feet and over (with flybridge)	53.08%	77.42%
Total	100%	100%

Percentages from Table 10 were used to redistribute the powered rental houseboat data in Table 5 (Total Houseboat Population by Number of Engines) into Table 11 which provides the number of units in each segment.

Table 11

Total Houseboat Population by Number of Engines and Presence of Flybridge Controls in Units
Estimated From 1995-2001 BARD Data

Number of Engines	Rental No Fly	Rental with Fly	Non-Rental	All Houseboats
None	32	0	3,051	3,083
One	1,339	1,514	42,720	45,572
Two	478	1,637	48,822	50,938
Three	0	0	407	407
Totals	**1,849**	**3,151**	**95,000**	**100,000**

Table 12 converts Table 11 into percentages.

Table 12

Total Houseboat Population by Number of Engines and Presence of Flybridge Controls as Percentage of Total Houseboats
Estimated From 1995-2001 BARD Data

Number of Engines	Rental No Fly	Rental with Fly	Non-Rental	Total
None	0.03	0.00	3.05	3.08
One	1.34	1.51	42.72	45.57
Two	0.48	1.64	48.82	50.94
Three	0.00	0.00	0.41	0.41
Totals	**1.85**	**3.15**	**95.00**	**100.00**

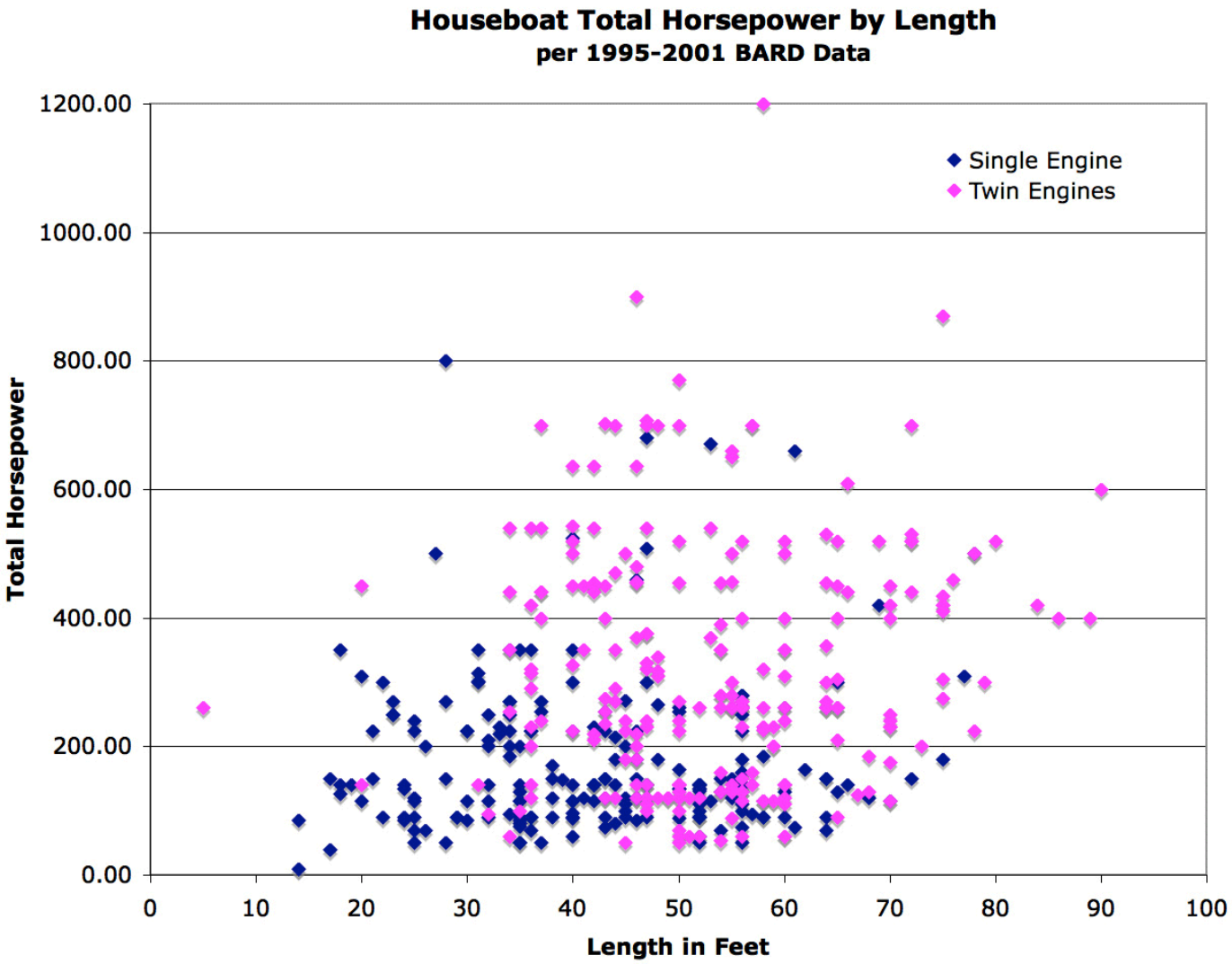


Chart 1 Houseboat Total Horsepower by Length

We plotted horsepower versus length for all houseboats in the 1995-2001 BARD databases, identified as being powered by single or twin engines for which length and horsepower data were provided, except one unit listed at 96 feet, 2900 horsepower. Results in Chart 1 show a large cluster of houseboats at or under about 150 horsepower almost regardless of length up to about 65 feet. Another group (the twin engine group) resembles a shotgun pattern centered at about 52 feet and 400 horsepower.

As would be expected, most single engine applications are in the lower left quadrant of the chart, while most twins are to the right of 40 feet.

Chart 1 could be useful in roughly estimating the number of houseboats that can plane. A few of the flyers (outlying data points) in Chart 1 may represent incorrect data entered in the field, or BARD data entry errors.

It is possible some of the twins are mislabeled in total horsepower. For example, the boat may have had twin 150 horsepower engines, but have been entered as having a total of 150 horsepower. We have seen errors of this type in the past.

We did not use Chart 1 to estimate the number of planing houseboats, but publish it here for others who may wish to do so.

Our Estimates Are Defendable

We made decisions, estimates, and calculations in our analysis in a manner to overestimate implementation costs.

For example, we used houseboats reported in BARD as being involved in any type of reportable accident to model the houseboat population (number of houseboats with 0,1,2,3 engines, number of houseboats over 52 feet in length, etc.). Longer houseboats and those with twin engines (indicative of being a larger houseboat) are thought to be over represented in BARD data because longer houseboats:

1. Have more people on board resulting in a vessel more likely to have many types of BARD reportable accidents (including slip and falls).

2. Operators are more likely to have difficulty making sure everyone is onboard and in a safe condition before getting underway.

3. Are more difficult for inexperienced operators, especially in the wind, resulting in more “collisions” of various kinds.

Therefore, we believe a specific long recreational houseboat has a greater probability of being in BARD than a specific short recreational houseboat. Similarly, twin engines are thought to be over represented in BARD. They tend to be associated with longer houseboats which due to issues just mentioned, are thought to be over represented in BARD. Overrepresentation of twin engines in our model leads to requiring more EICOS or more propeller guards which means our implementation cost estimates are probably high.

Segmenting houseboats based on their distribution in BARD data results in higher than actual estimates of the percentages of longer houseboats and twin engine installations in our model. Since flybridge frequency is linked to longer houseboats, which tend to have twin engines, our estimate of the percentage of rental houseboats with a flybridge is also probably high. This means our implementation cost estimates are probably high.

Additionally, accidents on permanently moored, non-powered houseboats are typically not required to be reported. As a result, we anticipate permanently moored non-powered houseboats to be under represented in BARD. Thus, there are probably more non-powered houseboats than estimated in our model. Our cost estimates include those additional non-powered houseboats as part of the various segments needing components to be brought into compliance. Therefore our implementation cost estimates are probably high.

The same can be said for our election to consider every rental houseboat 52 feet and over to have flybridge controls. That decision over represents the number of rental houseboats with flybridge controls, the most expensive houseboats to bring into compliance.

Our use of BARD data to estimate the number of houseboats in each of the twelve segments (number of engines by rental no flybridge, rental flybridge, and nonrental) skews the population in a manner that increases implementation costs. It does so by placing more vessels in the segments with higher modification costs per vessel (especially the rental twin engine segments and the rental flybridge segments) than are really in those segments.

We eliminated several propeller accidents counted by industry representatives due to our inability to positively confirm them as a propeller strike from the data available to us. Eliminating them reduced our cost of casualties.

We did not use the $6.3 million VSL (Value of a Statistical Life) currently being used by USCG. It is over twice that used in the NPRM. Using a $6.3 million VSL would have more than doubled our cost of casualties.

Throughout the report we tried to make every estimate in a manner that would stand up to the harshest criticism from those with oppos-

ing views. Our estimates are very defendable.

If anyone sees any problems in any of our estimates, please contact us.

USCG OBJECTIONS

USCG provided three reasons for withdrawing the proposal in the NPRMW:

1. Reconsideration of the costs that would likely result

2. Characteristics of the safety measures to be required

3. Uncertainty concerning the appropriate definition of “houseboat”

These three objections will now be individually addressed.

USCG Objection 1. Reconsideration of the costs that would likely result

This objection can be traced to two causes.

1. Between proposing and withdrawing the regulation, USCG switched from estimating compliance costs based on least cost of compliance (using the alternative measures) for each vessel type (rental, nonrental) to estimating compliance costs based on highest cost of compliance (propeller guards) on the most expensive vessel to modify (twin engine rental houseboat).

2. Several industry representatives commented costs would be higher than those listed in the NPRM and some furnished examples.

Switch to Most Expensive Option

This is probably the single most important point in this report. USCG took their eye off their own distinction between:

1. Compliance cost for private, nonrental houseboats (95 percent of all houseboats).

2. Compliance cost for rental houseboats (5 percent of all houseboats).

Nonrental houseboats only need a mirror and a swim ladder interlock to comply.

The industry overwhelmed USCG with data and exaggerated propeller guard installation costs on rental houseboats. All of a sudden, propeller guards were evil, cost $1500 per houseboat to implement, and were used in the cost benefit analysis for calculating cost of compliance for all houseboats.

USCG failed to take into account, 95 percent of all houseboats only need a mirror and a swim ladder interlock to comply.

Average implementation cost for ALL houseboats choosing to comply by using the alternative devices will later be shown to be less than $200.

USCG's mistake led to an error of $1300 per houseboat in their cost benefit analysis ($1500 - $200 = $1300), and to rejection of the proposal.

While our report goes on to identify many more errors, USCG loosing sight of the distinction between compliance costs for nonrental and rental houseboats single handedly brought down the proposed regulation.

The NPRM accurately states propeller guards are the most expensive option, while the NPRMW inaccurately states propeller guards are the least expensive option. The actual quotes follow.

Proposal: The second paragraph of the NPRM on Federal Register 2001 page 63648 states:

"the *MAXIMUM* cost is based on installation of a propeller guard, which we estimate to be $300 (self-installed)."

Withdrawal: The first paragraph of the NPRMW on Federal Register 2007 page 59065 states:

"The NPRM estimated that propeller guards, which would be the *LEAST EXPENSIVE OPTION* provided under the proposed rule, could be self-installed for approximately $300 each."

During the six years between proposal and withdrawal of the NPRM, industry cost discussions focused on guards. This led USCG base their cost benefit analysis on propeller guards and forget the alternative approaches.

In any event, the NPRMW says guards are the least expensive option when they most definitely are not. Ninety-five percent of all houseboats (private nonrental houseboats) only need a mirror and a swim ladder interlock to comply.

USCG lost sight of the distinction between nonrental and rental houseboat compliance costs. They calculated implementation costs for all houseboats based on propeller guards instead the less expensive alternative measures. That error led to rejection of the NPRM.

Industry Representatives Present Higher Costs

Industry representatives presented examples showing much higher implementation costs than those estimated in the NPRM. Their estimates are reflected in USCG's NPRMW cost estimate of $1500 per houseboat.

Actual Costs

Before commenting on cost estimates, we must first establish the correct costs. We will follow the steps below to establish more accurate cost estimates.

1. Establish costs for propeller guards.

2. Estimate propeller guard installation costs.

3. Estimate total costs for a propeller guard (cost plus installation).

4. Establish costs for each of the other three devices.

5. Estimate installation costs for each of the other three devices.

6. Estimate total costs for each of the other three devices (cost plus installation).

7. For those electing to use propeller guards, determine cost to modify one houseboat in each of the 12 houseboat segments (defined in Table 11 by separating them into rental non flybridge, rental flybridge and nonrental groups, then segmenting each of those groups by the number of propulsion engines).

8. Repeat Step 7 for those electing to use the other devices.

9. For those electing to use propeller guards, determine total cost to modify all houseboats by multiplying the number of houseboats in each segment by cost to modify one houseboat in that segment and summing costs for all 12 segments.

10. Repeat Step 9 those electing to use the other devices.

11. Compare cost of propeller guards versus the other devices for each of the 12 houseboat segments. Create a table indicating minimal cost of compliance for each of the 12 segments.

12. Similarly create a table indicating maximum cost of compliance for each of the 12 segments (see step 11).

13. Determine average minimal cost to modify one houseboat by multiplying minimal cost to modify each houseboat segment by the number of houseboats in that segment, then summing total implementation costs for all segments, and dividing the result by the total number of houseboats.

14. Similarly determine average maximum cost to modify one houseboat (see step 13).

Cost of Propeller Guards - Propeller guard costs are not critical to this NPRM as guards will be found to be the most expensive option. However, we will develop guard costs for comparison with other methods and for comparison with other cost estimates.

Per the NPRM, cage type propeller guards are $300 each.

We estimate it takes 30 minutes to install a cage type propeller guard based on USCG's own installation time of 20 minutes per guard during 2007 testing of their guard test protocol.[8] We allowed an extra ten minutes for on water installation.

---

[8] Minutes of the 11 October 2007 Carbon Monoxide and Propeller Injury Avoidance Meeting held in Miami FL at IBEX. Appendix B: USCG Propeller Injury Mitigation. Richard Blackman, USCG and John Adey, ABYC.
http://www.rbbi.com/pgic/pmeetings/minutes/07oct11ibex/appendixb.pdf Retrieved May 1, 2010.

A “typical installation” supplied by the National Marine Manufacturers Association and the Houseboat Industry Association (NMMA/HIA) in conjunction with Lake Powell - Aramark used $69 per hour as the cost of labor. We will use $69 per hour in our calculations. Installed costs per guard are calculated in Table 13.

Table 13 Propeller Guard Installed Costs per Guard	
Guard Cost	$300.00
Labor Costs .5 hrs labor/guard @ $69/hr	$34.50
Installed Cost per Guard	**$334.50**

Cost of the Three Other Devices -
The NPRM cost estimate for the three other devices is shown in Table 14.

Table 14 NPRM Estimated Device Costs	
Swim Ladder Interlock	$100 plus installation
Clear Visibility Aft Device	$20 self installed
Ignition Cut-off Switch	$40 plus installation

We found an error in the Swim Ladder Interlock price used by the NPRM.

NMMA/HIA show a swim ladder interlock was purchased for $68.60 (not the $100 listed in the NPRM). We also see the swim ladder interlock switch listed at $69 in the February 2000 issue of GoBoating, which mentions installation “may entitle you to a discount on your boat owner’s insurance.” We will use the correct price of $69.

We found similar errors in EICOS costs. This addressed further in our discussion of NMMA/HIA comments. As you will see later, actual EICOS are less than $40, but we will use $40 as the cost in our calculations.

We also note, twin engines will require a dual EICOS switch which costs $66.75 per Page 10 NMMA/HIA’s comment letter.[9]

We will use the device component costs in Table 15.

Table 15 Device Costs Used by PGIC	
Swim Ladder Interlock	$69 plus installation
Clear Visibility Aft Device	$20 self installed
Ignition Cut-off Switch (EICOS)	$40 plus installation (single engine) $66.75 plus installation (twin or triple engines)

NMMA/HIA comments estimate swim ladder interlock switch installation time at 1.5 hours, and twin engine EICOS installation time at 1 hour. To be conservative, we estimate single engine EICOS installation time as one hour (same as twin engine time). These installation times result in installed device costs calculated in Table 16, 17, and 18.

[9] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. Page 10. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

Table 16 Mirror Installed Cost Used by PGIC	
Mirror	$20.00
Self Installed	$0.00
Installed Cost	**$20.00**

Table 17 Swim Ladder Interlock Installed Cost Used by PGIC	
Interlock	$69.00
1.5 hrs labor @ $69/hr	$103.50
Installed Cost	**$172.50**

There are a few triple engine installations. One dual engine switch can cut-off several engines, so switch costs are the same for triples. We did add another hour of labor for triples in Table 18.

Table 18 Engine Emergency Ignition Cut-Off Switch Installed Cost per Helm Used by PGIC			
	Single Engine	Twin Engines	Triple Engines
EICOS Cost	$40.00	$66.75	$66.75
Installation Time in Hours	1 hour	1 hour	2 hours
Labor @ $69/hr	$69.00	$69.00	$138.00
Installed Cost per Helm	**$109.00**	**$135.75**	**$204.75**

Please recall, nonrental houseboats only need a Mirror and a Swim Ladder Interlock to comply. They do not need an EICOS.

EICOS Issues on Rental Houseboats - EICOS would only be required on rental houseboats. However it becomes a little more complex when you realize:

1. Single engine houseboats need a single EICOS at the lower control station (helm)

2. Twin engines need a dual EICOS at the lower control station (helm)

3. Houseboats with flybridge controls (an upper helm for driving the boat from the upper deck) may also need a single or dual EICOS at the flybridge helm depending on their number of engines.

Costs for Each Houseboat Segment - Table 11 previously divided the general houseboat population into three groups (rental without a flybridge, rental with a flybridge, and nonrental). It then segmented houseboats in each of those groups by their number of engines. Those twelve segments are numbered in Table 19.

Table 19 The Twelve Houseboat Segments Relevant to This NPRM			
Number of Engines	Rental Non Flybridge	Rental Flybridge	Non Rental
None	1	2	3
One	4	5	6
Two	7	8	9
Three	10	11	12

We now have all the information necessary to estimate implementation costs for a houseboat in each of the 12 segments using propeller guards or using the other devices.

Propeller guard implementation costs can be calculated from the installed cost per propeller guard established in Table 13 and the number of engines on boats in each segment of Table 19. The results are shown in Table 20.

Table 20

Propeller Guard Implementation Cost per Boat in Each Segment

Number of Engines	Rental Non Flybridge	Rental Fly-bridge	Non Rental
None	$0.00	$0.00	$0.00
One	$334.50	$334.50	$334.50
Two	$669.00	$669.00	$669.00
Three	$1,003.50	$1,003.50	$1,003.50

Device implementation costs per boat in each segment can be similarly calculated.

Nonrental boats, regardless of number of engines, only need a mirror (Table 16) and a swim ladder interlock (Table 17) to comply.

Rental Non Flybridge houseboats need a mirror (Table 16), swim ladder interlock (Table 17), and the proper EICOS for their number of engines (Table 18).

Rental Flybridge houseboats need a mirror (Table 16), swim ladder interlock (Table 17), and two of the proper EICOS for their number of engines (Table 18).

We added the appropriate device total costs just explained from Tables 16, 17, and 18 for each of the twelve houseboat segments identified in Table 19 to generate Table 21.

Table 21

2 or 3 Other Devices Implementation Cost Per Boat in Each Segment

Number of Engines	Rental Non Flybridge	Rental Flybridge	Non Rental
None	$0.00	$0.00	$0.00
One	$301.50	$410.50	$192.50
Two	$326.25	$460.00	$192.50
Three	$395.25	$598.00	$192.50

The lowest implementation cost for each of the twelve houseboat segments can be determined by comparing the cost for each segment in Table 20 (propeller guard implementation costs) to the cost for the same segment in Table 21 (implementation cost of the 2 or 3 other devices).

The cost in each cell (segment) of Table 20 (the propeller guard table) is equal to or larger than the cost in the corresponding cell (segment) of Table 21 (the 2 or 3 devices table). Therefore, the most economical way for any houseboat to comply with the NPRM is to use the 2 or 3 other devices. Propeller guards are the most expensive means for any houseboat to comply with the NPRM. The same conclusion was reached by the NPRM.

Table 20 now becomes the most expensive way to comply with the NPRM for each houseboat segment, and Table 21 becomes the most economical way to comply with the NPRM for each houseboat segment.

Calculating Total Cost of Compliance - Now that we have a value for the cost of each segment for propeller guards and for those using the other devices, we can multiply those values by the number of houseboats in each segment (established in Table 11) to determine the total and average cost. Table 11 is copied for convenience.

Table 11 (Copy)

Total Houseboat Population by Number of Engines and Presence of Flybridge Controls in Units
Estimated From 1995-2001 BARD Data

Number of Engines	Rental No Fly	Rental with Fly	Non-Rental	All House-boats
None	32	0	3,051	3,083
One	1,339	1,514	42,720	45,572
Two	478	1,637	48,822	50,938
Three	0	0	407	407
Totals	**1,849**	**3,151**	**95,000**	**100,000**

Table 22 shows the total costs for propeller guards (Table 20 times Table 11), the maximum cost of implementation.

Table 22

Maximum Implementation Cost by Segment - Propeller Guards

Segment Populations Were Estimated From 1995-2001 BARD Data

Number of Engines	Rental No Fly	Rental with Fly	NonRental
None	$0	$0	$0
One	$447,896	$506,433	$14,289,840
Two	$319,782	$1,095,153	$32,661,918
Three	$0	$0	$408,425
Totals	$767,678	$1,601,586	$47,360,183

Table 23 sums propeller guard implementation costs from Table 22 into rental and nonrental categories and calculates maximum average implementation cost per houseboat (based on a population of 100,000 boats).

Table 23

Maximum Average Implementation Cost per Houseboat (Propeller Guards)

Rental Houseboat Costs (5,000 boats)	$2,369,264
NonRental House-boat Costs (95,000 boats)	$47,360,183
Total Costs	$49,729,477
Maximum Average Cost per Houseboat	**$497.29**

Table 24 provides total costs for using other devices (Table 21 times Table 11).

Table 24

Minimum Implementation Cost by Segment - Other Devices

Segment Populations Were Estimated From 1995-2001 BARD Data

Number of Engines	Rental No Fly	Rental with Fly	NonRental
None	$0	$0	$0
One	$403,709	$621,497	$8,223,600
Two	$155,948	$753,020	$9,398,235
Three	$0	$0	$78,348
Totals	$559,657	$1,374,517	$17,700,183

Table 25 sums implementation costs for other devices from Table 24 into rental and nonrental categories and calculates minimum average implementation cost per houseboat (based on a population of 100,000 houseboats.

Table 25 Minimum Average Implementation Cost per Houseboat (Other Devices)	
Rental Houseboat Costs (5,000 boats)	$1,934,174
NonRental Houseboat Costs (95,000 boats)	$17,700,183
Total Costs	$19,634,357
Minimum Average Cost per Rental Houseboat	**$386.83**
Minimum Average Cost per Non-Rental Houseboat	**$186.32**
Minimum Average Cost per Houseboat	**$196.34**

Average cost for those choosing the most economical path to compliance is approximately $200 per houseboat as shown in Table 25. This is less than 1/7th the $1500 estimate provided by USCG in the NPRMW.

Other Cost of Implementation Estimates

USCG Estimate - USCG estimated implementation costs at $1500 per houseboat in the NPRMW:

"the NPRM revealed that most boats would need to be lifted out of the water for propeller guard installation, boats with twin engines would require a guard for each engine, and installation would be beyond the capabilities of most owners and operators. For these reasons a more realistic average cost per boat is approximately $1,500 for a total cost of $150 million."

The process USCG used to reach their $1500 average cost per boat is not documented in the NPRMW, however, it can be seen in a presentation[10] given by the Office of Boating Safety and summarized in Table 26.

Table 26 Costs per USCG Presentation at April 2007 NBSAC Meeting	
$300 X 2 Propeller Guards	$600
$12/ft X 50 ft hauling costs	$600
3 hrs labor @ $85 per hour	$255
Total Cost	$1,455

The total cost of $1,455 in Table 14 was apparently rounded up to the NPRMW estimate of $1500. It is based upon several errors:

1. About 2 percent of all houseboats need no modification to meet the NPRM (nonpowered) and 95 percent of those left are nonrentals that only need a swim ladder interlock and a mirror to comply ($192.50 including installation - see Table 21).

2. Propeller guards are not required by the NPRM. They are only an alternative to two (non rental) or three (rental) less expensive devices.

3. USCG states they selected the lowest cost option, however, the $1500 cost they use is far above the highest possible cost to implement the NPRM (the approximate $500 per houseboat seen in Table 23).

4. If an owner/operator does elect to install a propeller guard, the houseboat does not have to be lifted from the water. All they have to do is dock the houseboat, trim the drive up, shut off the engine, take the key(s) with them to prevent anyone else from starting the engine, slide up behind

[10] USCG-2001-10163; Notice of Proposed Rulemaking NPRM) Power Point presentation to April 2007 Meeting of National Boating Safety Advisory Council (NBSAC). Power Point slide #11 titled, "Examples of Costs, Contd."
http://www.rbbi.com/pgic/pregs/NBSACUSCG10163.ppt Retrieved May 1, 2010.

the houseboat in a small boat, tie up the small boat, and install a bolt on guard that does not require drilling, such as the MariTech SwimGuard. The exclusion of hauling costs immediately removes $600 from the USCG estimated cost. If the owner does not want to install propeller guard(s) from the water, they can wait and install them the next time the houseboat is hauled for some other purpose. The NPRM has a two year phase in for nonrental houseboats and a three year phase in for rental houseboats.

5. Houseboats definitely do not have to be hauled to install a swim ladder interlock device, a clear aft visibility device or an EICOS.

6. Guard installation is not beyond the capability of most owners. If they can operate basic hand tools, they can install a propeller guard. USCG's own report[11] says they installed one in 20 minutes with simple hand tools, and no drilling or lower unit modifications. Many owners who opt to use guards will self install.

7. Page 9 of the NMMA/HIA response[12] shows them only taking one hour to install two Maritech propeller guards (30 minutes per guard) on a 61 foot Sumerset rental houseboat. Thirty minutes somehow expanded by a factor of three to 1.5 hours per guard in the USCG example.

8. BARD data indicates only about 50 percent of houseboats subject to this NPRM are powered by twin engines, yet cost of implementation was calculated based on 100 percent being twins. With 50 percent singles and 50 percent twins, the average houseboat has 1.5 engines.
   1.5 guards X $300 per guard = $450
   Average propeller guard costs per houseboat are $450, not $600. This results in an immediate reduction in cost of implementation of $150.

9. As mentioned in #5, by USCG's own testing, it only takes 20 minutes per guard to install the MariTech SwimGuard, not the 1.5 hours per guard provided in the NPRMW. Since the average houseboat requires 1.5 guards (see previous step), average installation time per houseboat would be 30 minutes or .5 hours.

10. Labor costs as provided by the NMMA/HIA in their response[13] were $69 per hour not the $85 per hour used by USCG in the NPRMW calculations. At .5 hours per houseboat to install guards:
    .5 hours X $69 per hour= $34.50
    Compared to estimated NPRMW labor costs ($255 as shown in Table 26), this results in a savings of $220.50.

---

[11] Minutes of the 11 October 2007 Carbon Monoxide and Propeller Injury Avoidance Meeting held in Miami FL at IBEX. Appendix B: USCG Propeller Injury Mitigation. Richard Blackman, USCG and John Adey, ABYC. Page 2.
http://www.rbbi.com/pgic/pmeetings/minutes/07oct11ibex/appendixb.pdf Retrieved May 1, 2010.

[12] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. Page 9.
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

[13] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. Pgs. 9-10.
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

In summary, USCG's $1500 average cost estimate is unreasonably high, even for the propeller guard approach.

USCG itself acknowledged houseboats do not have to be hauled from the water to install some guards. Their April 2007 presentation at the National Boating Safety Advisory Council (NBSAC) includes a slide[14] stating:

"To install certain guards, many vessels must be hauled out of the water, which means that the owner would incur additional costs."

Note, USCG said to install "certain guards" which means some guards to not require vessels to be hauled. Hauling is a $600 expense in their example. Those wishing to minimize implementation costs would select a guard that did not require the houseboat to be hauled.

We calculated implementation cost of propeller guards of approximately $500 per houseboat (see Table 33). Even though propeller guards are the most expensive option, they are still $1,000 less per houseboat than USCG's estimate.

Actual propeller guard implementation costs would be even less than those we calculated due to many owners self installing guards.

USCG overestimated minimal cost of compliance by over $1200 per houseboat based on comments from the boating industry itself ($1500.00 - $287.33 = $1212.67 see Table C).

[14] USCG-2001-10163; Notice of Proposed Rulemaking NPRM) Power Point presentation to April 2007 Meeting of National Boating Safety Advisory Council (NBSAC). Power Point slide #11 titled, "Examples of Costs, Contd."
http://www.rbbi.com/pgic/pregs/NBSACUSCG10163.ppt Retrieved May 1, 2010.

NMMA/HIA Estimate - The National Marine Manufacturers Association (NMMA), in conjunction with the Houseboat Industry Association (HIA) estimated cost of compliance at $3,303.70 per houseboat in their 11 March 2002 comment letter to USCG.[15]

Major errors in NMMA/HIA's implementation cost estimate include:

1. Selection of a "typical" houseboat not representative of all houseboats (95 percent of all houseboats are nonrental houseboats and only need a mirror and a swim ladder interlock to comply).

2. Charging for hauling the houseboat twice when no hauling was necessary.

3. Charging for propeller guards PLUS charging for the other three devices when houseboats only need guards OR the other devices.

4. Charging for TWO swim ladder interlocks on their "typical" houseboat. Most houseboats only have one stern swim ladder. Photograph 2 is a rear view of a huge 105 foot by 21 foot Fantasy Yachts Houseboat exhibited at the 2007 Tulsa Boat Show. The red arrow in Photograph 2 indicates the vessel's single pull out swim ladder. Even this 105 foot houseboat only has one ladder. Our calculations are based on one swim ladder. If a houseboat did have two aft swim ladders, it will only require one swim ladder switch. The switch can respond to multiple sensors. The only additional costs would be a magnetic sensor for the second swim ladder and its installation.

Additional errors in the NMMA/HIA implementation cost estimate are identified later in our discussion of their comments.

---

[15] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. Pgs. 8-11. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

Photograph 2
Stern View of 105 ft. by 21 ft. Fantasy Yachts Houseboat With One Pull Out Swim Ladder at 2007 Tulsa Boat Show

SBA Estimate - Small Business Administration Office of Advocacy estimated costs at $600 per houseboat in their 11 March 2002 comment letter.[16]

The SBA estimate is based on the cost of propeller guards $300 per guard, and this statement on Page 9 of their comments:

"Since many houseboats have two propellers, the cost per boat would be $600."

SBA's logic is flawed on several counts, including:

1. Propeller guards are the most expensive option.

2. "Many houseboats have two propellers" does not mean they all do. According to our calculations based on BARD data, more houseboats have one or no propeller than have two.

3. They failed to note 95 percent of all houseboats only need a mirror and a swim ladder interlock system to comply.

May 2002 USCG Meeting Estimate - At request of NMMA, the Coast Guard Office of Boating Safety supplied several representatives to meet with boating industry representatives concerning the NPRM on 7 May 2002.[17]

NMMA and ABYC sent several representatives who were joined by representatives of Forever Resorts, Sumerset, Thoroughbred Cruisers, Stardust Cruisers, Pensus Marinas, and Rainey Lakes (Rainey Lakes joined by teleconference).

At that meeting, cost of implementation was estimated by industry representatives at $1,172 per houseboat ($34,000 for 29 houseboats).

April 2007 NBSAC Meeting Estimate - USCG supplied an implementation cost estimate of $1,455 for a twin engine 50 foot houseboat at the April 2007 National Boating Safety Advisory Council (NBSAC) Meeting. The estimate was supplied as part of a USCG Power Point presentation.[18]

---

[16] U.S. Small Business Administration letter to USCG dated 11 March 2002. USCG Docket Item # USCG 01-10163-92. Page 9.
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1eb&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

[17] Summary of Meeting at U.S. Coast Guard Headquarters. Washington D.C. May 7, 2007. USCG Docket Item # USCG 01-10163-184.
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be171&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

[18] USCG-2001-10163; Notice of Proposed Rulemaking NPRM) Power Point presentation to April 2007 Meeting of National Boating Safety Advisory Council (NBSAC). Power Point slide #11 titled, "Examples of Costs, Contd."
http://www.rbbi.com/pgic/pregs/NBSACUSCG10163.ppt Retrieved May 1, 2010.

Comparison of Estimates

Several implementation cost estimates are provided in Table 27.

Table 27

Cost of Implementation Estimates per Houseboat

Estimate	Amount
PGIC (us)	$196.34
USCG Maximum Cost Estimate (supplied in NPRM)	$300.00
SBA Office of Advocacy	$600.00
May 2002 USCG Meeting	$1,172.00
April 2007 USCG at NBSAC Meeting	$1,455.00
U.S. Coast Guard Least Cost Estimate (supplied in NPRMW October 2007)	$1,500.00
NMMA/HIA	$3,303.70

From the wide range of estimates in Table 27, it is obvious organizations are not all calculating cost of compliance in the same manner.

Cost of implementation estimates in Table 27 also show how far the industry distorted the actual data. The NMMA/HIA cost estimate is over 16 times our cost estimate. We encourage close scrutinization of any future NMMA/HIA propeller safety device cost estimates.

USCG Objection 2. Characteristics of the safety measures to be required

The NPRMW says the USCG cost estimate of $1500 per houseboat:

"does not include cost of periodic maintenance to clear debris from guards or the resulting decrease in fuel efficiency."

Again, the NPRM does not require propeller guards. The most cost efficient way to meet the requirements is to install two other devices for nonrental houseboats and three other devices for rental houseboats.

Owners do not have to install a propeller guard, therefore any associated maintenance or fuel costs are immaterial to those who chose the minimum cost of implementation.

However, if someone choses to install a propeller guard AND happens to be operating in an area that has debris AND that debris becomes lodged on/in the guard it is usually not a problem. Just like a fouled prop, they shift the drive into reverse and blow the debris off.

Regarding increased fuel consumption, the NPRM states on 2006 Federal Register page 63649:

"The propeller guard devices do not create sufficient drag through the water for these slow moving non-planing vessels to result in an increase of consumption of fossil fuels or increase air pollution due to increased exhaust."

If propeller guards do affect houseboat fuel consumption, their affect can be more than compensated for by employing a few of these fuel economy tips:

1. Slow down (reduce drag and reduce fuel consumption per mile).

2. Lighten the houseboat (take off any unnecessary equipment or supplies).

3. Keep the hull clean.

4. Prop the boat correctly (select size and pitch of propeller to put full open RPM in proper RPM range).

5. Use stainless steel propellers (thinner and more efficient).

6. Repair any "dings" in the propeller.

7. Use larger diameter propellers when possible (select drives with gear ratios that make their use possible).

8. Use modern fuel efficient engines.

9. Keep the engines tuned up and properly maintained.

10. Install a fuel flow gauge and use it to select optimum cruise speeds.

11. Do not run hard into the wind for long periods of time.

12. Only carry the fuel needed plus a reasonable reserve.

13. Do not carry excessive amounts of fresh water for your planned trip length.

14. Stay a little longer at each location, take advantage of activities (games, water slides, personal watercraft, inflatables, DVDs, fishing, swimming, sunbathing, exploring, taking photos, eating, and other activities) to reduce the total distance traveled each day.

15. Do not leave the houseboat idling for more than a few minutes. Shut the engine off when not in use.

In addition to the tips for owners and operators just mentioned, opportunities to reduce drag exist for houseboat builders and for marine drive manufacturers as well:

1. Utilize modern technologies, such as Computational Fluid Dynamics (CFD), to design houseboat hulls for reduced drag.

2. Design marine drives to integrate with houseboat hulls in a manner to reduce drag (such as “through hull” drives).

3. Design marine drives to integrate with guards in a manner to reduce drag.

In summary, houseboat owners do not have to install propeller guards, but if they do, guards are generally self cleaning by shifting to reverse. USCG says propeller guards will not affect fuel consumption, but if they do, normal boating fuel efficiency economy tips can be used to compensate for any additional drag.

USCG Objection 3. Uncertainty concerning the appropriate definition of "houseboat"

The NPRM defines "houseboat" on 2001 Federal Register page 63649 as:

"Houseboat means a motorized vessel designed primarily with accommodation spaces with little or no foredeck or cockpit, with low freeboard and a with a low length to beam ratio."

The National Marine Manufacturers Association (NMMA) and the Houseboat Industry Association (HIA) reviewed the proposed definition and accepted it except for changing "with a low length to beam ratio" to "with a high length to beam ratio".[19]

We have no issues with the definition as amended by the NMMA and HIA, as long as it is applied with common sense. For example, vessels currently being rented or sold as "houseboats" are probably houseboats. If a company is a member of the Houseboat Manufacturers Association (HIA) and the company manufactures boats, it probably manufactures some houseboats. If a vessel's registration says "houseboat" on it, it is probably a houseboat. If the definition still needs more specificity, houseboats are defined in many other regulatory documents. Those definitions sometimes mention traits like detachable utilities or facilities for residential use, large boat with square sides with "house like" characteristics and living accommodations, and a vessel used more as a destination than for travel.

Boaters TV episode 28: Julie's Got A Crush on Houseboats[20] provides a nice video definition of traditional houseboats. "Julie" mentions they are motorized pontoon or full hull based and serve more frequently as secondary or as vacation homes or for tourism. She also notes they are most commonly used on fresh water lakes and rivers, may have up to three levels and accommodate from 4 to 15 people.

These may not be perfect definitions, but one can certainly be put together and applied with common sense to determine which vessels are houseboats and which ones are not.

If necessary, a panel could be established to review photographs of specific vessels requesting exemption based on not being a "houseboat". Since most houseboats are models built by well known manufacturers, a list of models submitted for exemption could be reviewed, and the results posted by the review committee, making it unnecessary for them to review similar vessels over and over.

Some might suggest that if you are in the business of building or renting houseboats and do not know what a houseboat is, you might be in the wrong business.

Footnote

Naval architects sometimes define planing boats as having a speed to length ration (S/L) of 4.0 or above. Since planing is also dependent upon displacement (which is significant in the case of houseboats), they also define planing boats as having a Volume Froude Number of 2.3 of above. Both measures are approximate points on a continuum. However, if establishing a definition of a planing houseboat becomes an issue, they could provide some guidance.

---

[19] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. Pgs. 11-12. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

[20] Julie's Got A Crush on Houseboats. Episode 28. August 20, 2007. The Boater's TV. http://www.theboaters.tv/2007/08/20/28-julies-got-a-crush-on-houseboats-two-hydroslider-impressions-new-tbtv-finale Retrieved May 1, 2010.

PROCESS FOR EVALUATING ECONOMIC JUSTIFICATION OF THE NPRM

Before we respond to Public Comments, we need to lay some groundwork in how regulatory groups evaluate economic justification of proposed rules, the challenges in obtaining accurate houseboat propeller injury and fatality statistics, and how the value of a life and the value of an injury were established.

First, we will explain how decisions are made based upon costs and benefits of proposed regulations (economical justification). It is a five step process:

1. Estimate cost of implementation

2. Estimate the number of people killed and injured

3. Assign cost to a typical houseboat propeller injury and a typical houseboat propeller fatality

4. Calculate total cost of casualties from steps one and two

5. If the cost of implementation is less than the cost of casualties, the proposal is economically justified

Components of Economical Justification

USCG is bound to investigate the economic justification of proposed rules before implementing them.[21]

The "official" process was established by President Clinton in the Office of Management and Review Executive Order 12866 Regulatory Planning and Review[22] and Executive Order 13422 Further Amendment to Executive Order 12866 on Regulatory Planning and Review.[23]

The process also allows consideration of:

1. Non quantified costs (such as a potential reduction in insurance premiums for using propeller safety devices)

2. Non economic costs (such as long term psychological well being of those who witnessed their loved ones being hit by a propeller)

3. A disproportionate percentage of fatalities and injuries to children and young people (this may be more relevant on other types of vessels)

In this NPRM, the basic question is, do the cost of propeller injuries (number of injuries times cost per injury) plus the cost of fatalities (number of fatalities times cost per fatality) exceed implementation costs for the time period being considered?

The NPRM compared implementation costs to the cost of casualties over a ten year period. At first, we thought USCG chose ten years due to service life of the components, drives, or houseboats. However, when we spoke[24] with USCG Office of Boating Safety about the matter, they said they used ten years because they "felt ten years was a good period for an economical assessment."

When I asked for more clarification on exactly why they selected ten years, they said ten years was selected because it was a reasonable length of time.

We do not object to USCG's choice of ten years. In future NPRMs we encourage USCG to explain the origin and logic behind the number of years used in the cost benefit analysis.

---

[21] Executive Order 12866 from the Office of Information and Regulatory Affairs (OIRA), a subagency of the Office of Management and Budget (OMB).

[22] Presidential Documents. Executive Order 12866 of September 30, 1993. Regulatory Planning and Review. Federal Register. Vol. 58 No.190. October 4, 1993. Pgs. 51735-51744. http://www.whitehouse.gov/omb/inforeg/eo12866.pdf Retrieved May 1, 2010.

[23] Memorandum for Heads of Executive Departments and Agencies, and Independent Regulatory Agencies. Implementation of Executive Order 13422 (amending Executive Order 12866) and the OMB Bulletin on Good Guidance Practices. Executive Office of the President. Office of Management and Budget. April 25, 2007.
http://www.whitehouse.gov/omb/memoranda/fy2007/m07-13.pdf Retrieved May 1, 2010.

[24] Telephone conversation with USCG Office of Boating Safety. June 2, 2008.

Estimating the Number Killed and Injured

Costs of failing to act are estimated based upon the number of injuries and fatalities. For this NPRM, those values were obtained from USCG's Boating Accident Report Database (BARD).

Because BARD is quite complex, several writers based their comments upon prior compilations of BARD data, or more specifically, upon a compilation made by Richard Snyder, now retired from Mercury Marine.

Due to the complexity of BARD, it requires considerable skill and care to properly identify all the houseboat propeller accidents, then to properly determine which ones were rental and nonrental vessels.

Many errors were made in prior compilations, including the Richard Snyder compilation. Those errors led to reduced fatality and injury counts, which resulted in a reduced cost of casualties. The resulting low cost of casualties was found to be less than estimated implementation costs, and the NPRM was withdrawn.

Withdrawal on the NPRM was based in part upon:

1. Incomplete count of BARD reported houseboat propeller accidents by USCG.

2. Omission of several properly reported BARD accidents by boating industry representatives in their compilations and discussions of BARD data.

3. Omission of some houseboat propeller accidents from BARD.

Detailed lists of known houseboat propeller accidents resulting in injuries and fatalities will be compiled later in this report.

Appendix C discusses the process of compiling BARD data and the various compilations used by us and others.

Placing a Value on Human Life

Some say we should value certain lives more than others (for example young professionals may be thought to be worth more than older homeless people). Each government agency engaged in safety regulatory activities establishes a value of human life for those people the agency is charged with protecting.

Early researchers calculated value of a human life based solely on economic considerations. They estimated earnings and working lifespan of a person, then combined this figure with direct accident costs (medical costs, lost wages, etc.).

In recent years, researchers have turned to the “Value of a Statistical Life” (VSL), sometimes called “Willingness to Pay” (WTP) when making these estimates. A group of people each at a similar very low fatal risk to the accident are identified. The risks are explained to them (sometimes in statistical terms). They are asked how much they (as individuals) would be willing to pay to eliminate those risks.

How much they are willing to pay, the number of people at risk, and the current accidental death rate can then be used to estimate the Value of a Statistical Life (or how much those at risk are willing to pay to save a life). “Willingness to Pay” often results in placing higher values on a human life than strictly summing up the costs and expenses surrounding an accident.

Many research studies have attempted to define value of a human life. Most government agencies currently (2008) use a VSL between $5 million and $7 million.

The houseboat propeller injury avoidance NPRM uses a value of $2.7 million. This value came from the Department of Transportation (DOT), the U.S. Government Agency USCG was under before being made part of Homeland Security. In 1993 DOT rec-

ommended a value of a life (an avoided fatality) of $2.5 million.

In 1996 DOT raised their value of a life to $2.7 million (the value used in the NPRM). 29 January 2002, a little over one month after USCG issued this propeller safety NPRM, DOT raised their value of a life to $3 million.[25] DOT has since raised their VSL to $5.8 million.[26]

The $2.7 million value of life used by USCG in this NPRM is low in comparison with values used by several other agencies. For example:

1. Department of Transportation (responsible for USCG policy when the NPRM was published) currently (2009) uses a value of $5.8 million.

2. Consumer Product Safety Commission (CPSC) currently (2008) uses a statistical value of life of $5 million.[27]

3. Environmental Protection Agency (EPA) used a VSL value of $6.12 million (in 2005 dollars) in their recent Control of Emissions from Marine SI and Small SI Engines, Vessels, and Equipment Draft Regulatory Impact Analysis.[28]

4. As part of the Department of Transportation, the Federal Aviation Administration currently (2009) uses a value of $5.8 million.[29]

The Coast Guard commented on withdrawal of the proposal in a January 2008 BoatUS article.[30] In that article, USCG said one life is equal to $3 million.

During final stages of writing this report, we discovered a June 2008 Department of Homeland Security document[31] establishing their current (2008) value of a statistical life as $6.3 million.

USCG used this $6.3 million VSL in their proposal to expand use of arrival and departure

---

[25] Memorandum. Revised Departmental Guidance: Treatment of Value of Life and Injuries in Preparing Economic Evaluations. January 29, 2002. U.S. Dept. of Transportation. Office of the Secretary of Transportation.
http://ostpxweb.dot.gov/policy/Data/VSL02guid.pdf Retrieved May 1, 2010.

[26] U.S. Department of Transportation Memorandum to Secretarial Officers, Modal Administrators. Treatment of the Economic Value of a Statistical Life in Departmental Analysis. February 5, 2008.
http://regs.dot.gov/docs/Value%20of%20Life%20Guidance%20020508.pdf Retrieved May 1, 2010.

[27] Consumer Product Safety Commission. Standard for the Flammability of Residential Upholstered Furniture; Proposed Rule. Federal Register. March 4, 2008. Pg. 11714.

[28] Table 8.3.2 Unit Values Used for Economic Valuation of Health Endpoints (2000$). Control of Emissions from Marine SI and Small SI Engines, Vessels, and Equipment. Draft Regulatory Impact Analysis. EPA. EPA420-D-07-004 April 2007. Draft to OMB, March 30, 2007. Pgs. 8-12 to 8-16.

[29] Revised Departmental Guidance: Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses.
http://www.faa.gov/regulations_policies/policy_guidance/benefit_cost/media/Revised%20Value%20Of%20Life%20Guidance%20Feburary%202008.pdf Retrieved May 1, 2010.

[30] Prop Guards Not Required. Elaine Dickinson. BoatUS. January 2008. Pg. 46.
http://www.nxtbook.com/nxtbooks/boatus/200801/index.php?startid=46 Retrieved May 1, 2010.

[31] Valuing Mortality Risk Reductions in Homeland Security Regulatory Analysis. Final Report. June 2008.
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064807dd9c8&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

(NOAD) and automatic identification system (AIS) devices on commercial vessels in a proposed rule that originated in 2005 and was published in the Federal Register in 2008.[32]

These findings confirm the $2.7 million VSL in the houseboat propeller injury avoidance NPRM was too low.

[32] Vessel Requirements for Notices of Arrival and Departure, and Automatic Identification System. Dept. of Homeland Security. U.S. Coast Guard. Docket No. USCG-2005-21869. Federal Register. Vol. 73. No. 242. December 16, 2008. Pgs. 76295-76318.

Placing a Value on Injuries

This NPRM places a value of $506,300 on each severe houseboat propeller injury. The NPRM did not explain the origin of this figure.

After considerable research, we found the NPRM injury value was derived from factors in a table developed by the U.S. Department of Transportation (DOT) that estimates cost of various types of injuries as a percentage of the cost of a fatality.

People in propeller accidents often suffer several different injuries (amputations, cuts, contusions and other injuries to multiple sites on their body). Similarly, those in automobile accidents often suffer several injuries of various types on different areas of their body.

The automotive industry and several others use the Maximum Abbreviated Injury Scale (MAIS) to score the most severe injury suffered by a person in an accident. The MAIS scale ranges from MAIS 0 (No Injury) to MAIS 6 (unsurvivable / fatal).

The actual MAIS Scale as introduced by the Association for the Advancement of Automotive Medicine is shown in Table 28.

When someone receives several injuries in an automobile accident, the most severe injury received by the person is identified and scored according to Table 28.

Table 28

MAIS Injury Severity Scale

by the Association for the Advancement of Automotive Medicine

MAIS Scale	Injury Description
MAIS 0	No Injury
MAIS 1	Minor Injury: abrasion, laceration, broken finger
MAIS 2	Moderate: simple broken bone, loss of consciousness
MAIS 3	Serious: complicated fracture, concussion
MAIS 4	Severe: massive organ injury, heart laceration
MAIS 5	Critical: spinal cord syndrome, crushed limb
MAIS 6	Unsurvivable: crushed skull, chest

DOT determines cost of injuries by MAIS score by estimating medical, emergency services, market productivity, household productivity, insurance administration, workplace costs and legal costs for past accidents. Injury costs tend to depend more on outcomes (how well the person can be integrated back into their family, job, and society) than how life threatening the injury is.

DOT has established injury costs for each MAIS score as a fraction of current DOT "value of a statistical life".[33] DOT's Injury Costs Table is presented as Table 29.

[33] Treatment of the Economic Value of a Statistical Life in Departmental Analysis. Memorandum To: Secretarial Officers, Modal Administrators. From: Tyler D. Duvall, Assistant Secretary for Transportation Policy. February 5, 2008.
http://ostpxweb.dot.gov/policy/reports/080205.htm Retrieved May 1, 2010.

Table 29 DOT Injury Costs Based on MAIS Injury Severity Scale Injury Values Are Presented as Fraction of the Current Value of a Statistical Life as Established by DOT	
MAIS Scale	Value of Injury as Fraction of the Value of a Statistical Life
MAIS 0	0
MAIS 1	0.002
MAIS 2	0.0155
MAIS 3	0.0575
MAIS 4	0.1875
MAIS 5	0.7625
MAIS 6	1

Per Table 29, a person whose most severe injury scored as an MAIS 4 has an injury that would cost .1875 times the current DOT value of a statistical life.

USCG was under DOT when this NPRM was written. As a result, the NPRM uses DOT VSL values.

DOT established value of a statistical life as $2.7 million in 1996, the NPRM was published in December 2001, and DOT moved the value of a statistical life to $3 million on 29 January 2002. USCG became part of the Department of Homeland Security in February 2003.

Multiplying injury value for MAIS 4 (.1875) times DOT value of a statistical life at the time the NPRM was published ($2.7 million) results in a value of $506,300, the same value used by USCG in this NPRM.

We suggest those injured by houseboat propellers may have more severe secondary injuries (struck in two or more regions) than the secondary injuries of those in automobile accidents. In addition, DOT raised the "value of a statistical life" to $3 million a month after the NPRM was published. Plus the Department of Homeland Security established their VSL at $6.3 million in June 2008.

Table 30 lists DOT values for fatalities and MAIS 4 injuries by the date they took effect.

To compensate for the points just made, we will retain MAIS 4 as accident severity for houseboat propeller accidents, but will use the January 2002 DOT value of $562,500 per houseboat propeller injury (.1875 X $3 million). Note, this is in accordance with USCG's own statement in a January 2008 BoatUS article[34] in which they state the value of a life used in this NPRM was $3 million.

Table 30 Cost per Fatality and Injury		
	Fatality	MAIS 4 Injury
NPRM/ DOT December 2001	$2,700,000	$506,300
PGIC / DOT January 2002	$3,000,000	$562,599
DOT February 2008	$5,800,000	$1,087,500
DOHS June 2008	$6,300,000	$1,181,250

[34] Prop Guards Not Required. Elaine Dickinson. BoatUS. January 2008. Pg. 46. http://www.nxtbook.com/nxtbooks/boatus/200801/index.php?startid=46 Retrieved May 1, 2010.

Additional Considerations

As mentioned in the introduction to this section, other benefits can be considered in justifying a proposed rule.

Many costs not quantified by us are listed in **Appendix F**. A few of those dealing with psychological well being are discussed below.

Spouses, children, other family members, and friends quite often witness their loved one's propeller accident. Personally experiencing this traumatic event can result in long term emotional difficulties for them as well.[35] This is especially true of children witnessing such an event.[36]

Those injured, family members and friends witnessing the accident, bystanders, emergency responders, those who may feel responsible for the accident, family members later told of the accident, health care workers, journalists covering the accident, and even safety advocates, clinical therapists, and accident prevention specialists are all susceptible to boat trauma (similar to road trauma which may result in Post Traumatic Stress Disorder Syndrome (PTSD), and a host of other psychological challenges).

Counselors in many settings work with trauma survivors. The counselors themselves sometimes develop trauma from their secondary exposure to their client's traumatic experiences. This type of trauma is often referred to as vicarious trauma (or second hand shock). Its affect on advocates, therapists and friends has been studied in other settings.[37, 38]

The horrificness of propeller injuries, and the settings is which they occur (family members often present) increase the probability others will contract psychological and emotional issues.

We also note the total absence of long term follow up studies on those injured by propellers. We find no studies following up on their physical or mental well being. The long term efforts at coping with returning to their family, the workplace, and society in general may be more difficult than those injured in other situations. It is a travesty that we know more about the long term affect of propeller strikes on marine mammals than on people.[39]

Also missing are the unrealized contributions for societal good of those lost to propellers and that of their unborn children.

---

[35] First on the Scene and Witnesses of Road Trauma. Road Trauma Support Team Victoria (Australia). July 2008.
http://www.rtssv.org.au/static/files/brochures/rtstv-passenger.pdf Retrieved May 1, 2010.

[36] Psychiatric Sequelae after Traumatic Injury: The Pittsburgh Regatta Accident. D. Richard Martini, Christopher Ryan, Don Nakayama, and Max Ramenofsky. Journal of the American Academy of Child and Adolescent Psychiatry. Vol. 29. No. 1. January 1990. Pgs. 70-75.

[37] Preventing Vicarious Trauma: What Counselors Should Know When Working With Trauma Survivors. Robert Trippany, Victoria White Kress, and Allen Wilcoxon. Journal of Counseling & Development. Vol. 82. Winter 2004. Pgs. 31-37.

[38] Vicarious Trauma and Its Impact on Advocates, Therapists and Friends. Research and Advocacy Digest. Washington Coalition of Sexual Assault Programs (WCSAP). Vol. 6. No. 2. March 2004.
http://www.wcsap.org/pdf/RAD%206-2.pdf Retrieved May 1, 2010.

[39] Differentiating Serious and Non-Serious Injury of Marine Mammals: Report of the Serious Injury Technical Workshop 10-13 September 2007, Seattle Washington. NOAA Technical Memorandum NMFS-OPR-39. September 2008.
http://www.nmfs.noaa.gov/pr/pdfs/interactions/serious_injury_techmemo2008.pdf
Retrieved May 1, 2010.

Objections Raised in Public Comments

Several objections were raised during the public comment period. Among them were:

1. Insufficient casualties to justify the proposed rule

2. Higher costs to implement than estimated

3. Maintenance costs associated with propeller guards

4. Danger of collisions when swim ladder interlock systems disable propellers

5. Lack of practical benefit from clear aft view devices due to length of many houseboats

6. The rule would be unenforceable or otherwise ineffective

7. Imprecise definition of a houseboat

8. The industry needs detailed guidance on acceptable propeller guards and swim ladder interlock systems

9. The proposed rule would effect a shift of liability from boat operators to boat manufacturers.

We will now respond to these Public Comment (PC) Objections.

PC Objection 1. Insufficient casualties to justify the proposed rule

The NPRM provides these statistics:

"This proposed rule is appropriate because the Boating Accident Reporting Database (BARD) shows that the number of injuries and fatalities reported during calendar years 1990 through 1999 occurred at a chronic rate. BARD data for the same period revealed a total of 18 injuries and 2 fatalities involving non-planing recreational houseboats."

When the NPRM was first proposed (December 2001), the Department of Transportation estimated society was willing to pay $506,300 to avoid a serious injury and $2,700,000 to avoid a death per the NPRM. Values in effect in December 2001 create a willingness to pay of approximately $14.5 million over the 10 year period ($9.1 million for 18 injuries and $5.4 million for two fatalities). The very next month, January 2002, DOT raised its VSL to $3 million.[40] Our analysis of houseboat propeller accident data **(APPENDIX D)** indicates USCG properly recorded 22 injuries plus 2 fatalities during that period (1990-1999).

We were quite surprised to find our count of properly classified BARD houseboat propeller accidents to be four more than those found by USCG for the same period.

Our Comparison of Accident Compilations (**APPENDIX E**) indicates our estimate of which BARD reported accidents USCG elected not to count:

1. Two twenty foot houseboats for possibly being planing boats.

2. One 1996 California accident due to California privacy laws.

3. Either a 1996 St. Lawrence SeaWay accident for being in offshore or a 1994 California accident due to privacy issues.

We encourage USCG to identify exactly which four accidents listed in their column in the spreadsheet in our **Appendix E** they excluded and why.

In 2000, the State of California requested their boating accidents be removed from BARD to protect the privacy of their citizens. Older archived versions of BARD must be consulted to find data for some California accidents. This is discussed further in **Appendix C**.

In addition we identified two more houseboat propeller injury accidents in BARD that were not classified as houseboats.

1. 21 June 1997 propeller injury accident involving 53 foot Stardust houseboat is misclassified as a "motor cabin boat" (note Stardust is a houseboat manufacturer).

2. 18 June 1998 propeller injury accident involving a 40 foot boat that is actually labeled as a "houseboat" in the "Boat Model" column of the BARD database, but incorrectly labeled as a "motor cabin boat" in the "Boat Type" column.

---

[40] Memorandum. Revised Departmental Guidance: Treatment of Value of Life and Injuries in Preparing Economic Evaluations. January 29, 2002. U.S. Dept. of Transportation. Office of the Secretary of Transportation.
http://ostpxweb.dot.gov/policy/Data/VSL02guid.pdf Retrieved May 1, 2010.

We also found two houseboat propeller accidents during this time frame that are not recorded in BARD:

1. 11 May 1993 involving a boat being used as part of a flotilla of several houseboats on Lake Mead carrying federal managers from the Bureau of Land Management, U.S. Forest Service, and National Park Service. This accident is mentioned in several USCG 10299 Docket letters, plus the family involved made a presentation at a National Boating Safety Advisory Council (NBSAC) meeting.[41]

2. 28 May 1995 involving a PWC. The 1995 accident received some notoriety as it was one of two independent propeller accidents that occurred at the same place within minutes of each other. Interestingly, the other accident is in BARD. This evidence supports those suggesting there may be an organized effort to "not report" houseboat propeller accidents.

Adding the two accidents misclassified in BARD plus the two accidents we found not listed in BARD brings our 1990-1999 total accident count to 26 injuries plus 2 fatalities. Table 31A shows the sources of the injuries and fatalities listed by us (Propeller Guard Information Center).

Table 31B compares our injury and fatality counts to those provided by USCG in the NPRM. Please note we identified a total of EIGHT, or 44 percent, more injury accidents than USCG did in the NPRM.

Table 31A

U.S. Houseboat Propeller Accident Reports for 1990-1999

Propeller Guard Information Center (PGIC) Accident Count

Accident Segment	Injury	Fatal	Total
PGIC Count of BARD Properly Classified Accidents	22	2	24
PGIC Count of Accidents Misclassified in BARD	2	0	2
Accidents Identified by PGIC That Are Not in BARD	2	0	2
PGIC Total Not Including Unreported Accidents	**26**	**2**	**28**

Table 31B

U.S. Houseboat Propeller Accident Reports for 1990-1999

Comparison of Accident Counts

	Injury	Fatal	Total
PGIC Total	26	2	28
USCG NPRM Total	18	2	20
Difference	**8**	**0**	**8**

[41] Presentation by Donald A. Falvey to the National Boating Safety Advisory Council. Phoenix Arizona. November 14, 1994. Public Comments 52 and 53. USCG Docket 10299. (pdf pages 49-54 of link below). http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064803018ca&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

Accidents Continue to be Misclassified

The BARD2008 database file released in September 2009 indicates there were no houseboat propeller accidents in 2008.

We sorted the BARD2008 prop accidents by boat length and noticed a 54 footer here in Oklahoma (BARD # 2008-OK-0003 April 19, 2008). We previously logged this accident a few days after it occurred. It was a houseboat propeller accident on Lake Tenkiller. BARD2008 classified it as a Cabin Motorboat instead of as a Houseboat.

BARD2008 provides the MIC (Manufacturers Identification Code) for the hull as LGV which corresponds to Lakeview Yachts. BARD2008 also directly provides the boatbuilder's name as Lakeview Yacht.

Lakeview Yachts builds houseboats. Their website clearly identifies them as Lakeview Houseboats.[42] They are located in Monticello, Kentucky which in itself is a pretty good clue they build houseboats.

The boat involved in the accident was called a houseboat in at least 4 newspaper articles.[43]

BARD2008 reports the accident involved two people going down a water slide. There are not many 54 foot Cabin Motorboats equipped with water slides.

We visited with the family involved in the aftermath of the accident. It was a houseboat. BARD2008 misclassified it a Cabin Motorboat.

---

[42] Lakeview Yachts website
http://www.lakeviewyachts.com Retrieved May 1, 2010.

[43] Weekend Accident Victims Still Hospitalized. Muskogee Phoenix. April 20, 2008.
Woman Injured When Sucked Into Boat Prop. Muskogee Phoenix. April 22, 2008.
Woman Hospitalized in Boat Prop Accident. ArkLaTex. April 21, 2008.
Woman Hurt in Boat Accident. Tahlequah Daily Press. April 22, 2008.

Under Reporting of Accidents

The NPRM acknowledged many propeller accidents go unreported in this statement:

"The number of injuries to be prevented by this rule may be greatly understated since many boaters are unaware of the requirement to report accidents."

Under reporting of boating accidents and more specifically of recreational propeller accidents has been studied several times in the past.[44] Every study found a large percentage of propeller accidents go unreported.

For example, one study of local hospitals near four Texas lakes for three months and one week, found 13 propeller accidents and three propeller fatalities.[45] BARD only reported one propeller injury (and no fatalities) for the entire state of Texas during this period.

California, a major houseboat recreational region, stopped supplying complete individual accident reports to USCG in 2000 and asked USCG to cease making their previous data public.[46] The last California houseboat propeller accident listed in the NMMA/HIA response is on 13 July 1996.[47] There may be other California accidents from that date forward not listed.

The National Park Service is another source of under reporting. Several large house boating rental operations are located in National Parks or National Forests. Some accidents are reported to park officials, but not to the state in which they occurred. After many years of complaints, the National Park Service is still trying to improve its boat accident reporting system.[48]

BARD is built from data supplied by the states. It is only as good as the information they receive. USCG claims they received reports on most of the severe injuries and fatalities during this period. We do not agree.

As evidence we cite the Texas study just mentioned, and our documentation of EIGHT more houseboat propeller accidents during this time frame than reported in the NPRM. We assume many more went unreported.

A USCG 2006 study of 2002 BARD data[49] estimated less than 10 percent of non-fatal non-admitted (non hospitalized) boating injuries were reported:

"This study estimates that there may have been 30,000 or more non-fatal non-admitted

---

[44] Under Reporting of Accidents. Propeller Accident Statistics. Propeller Guard Information Center. http://www.rbbi.com/pgic/padata/padata.htm#under Retrieved May 1, 2010.

[45] A Study of Propeller Accidents at Four Texas Lakes in 1997, Boat-Propeller-Related Injuries -- Texas, 1997. Morbidity and Mortality Weekly Report (MMWR). Published by Center for Disease Control. Vol. 47 No. 17. Pgs: 354-356. Publication date: 8 May 1998.

[46] Accidents Dates, Locations Not Made Public Record. Thomas Peele. Contra Costa Times. July 2, 2006. http://www.contracostatimes.com/ci_5714668 Retrieved May 1, 2010.

[47] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. Line 26 of All Houseboats Table on Pgs. 22-27. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

[48] Boating and Water Use Activities. Federal Register March 23, 2007. Vol. 72 No.56. Pgs. 13694-13706. Section 3.5. Boating Accidents.

[49] Recent Research on Recreational Boating Accidents and the Contribution of Boating Under the Influence. Summary of Results. Bruce A. Lawrence and Ted R. Miller. Pacific Institute for Research and Evaluation. L. Daniel Maxim. USCGAUX. July 2006. Pg. 2. (pdf Page 4 in link below). http://www.uscgboating.org/assets/1/Publications/BUI_Study_Final.pdf Retrieved May 1, 2010.

boating injuries in 2002. This contracts with just 2,309 such injuries captured by the BARD system."

Over 90 percent of all recreational boating injuries went unreported in 2002 according to USCG's own study.

Common Practice in Accounting for Under Reporting of Accidents

The Consumer Product Safety Commission (CPSC) regulates safety issues for many consumer products. CPSC created the National Electronic Injury Surveillance System (NEISS) to estimate injury counts for products under its jurisdiction.

NEISS accomplishes this function by collecting data from a sample of hospital emergency departments across the United States. NEISS data is processed to estimate the number of injuries in the entire United States. CPSC uses those estimates when considering product safety initiatives. For example, NEISS data was used to establish accident counts when CPSC was considering regulatory changes to reduce All Terrain Vehicle (ATV) rollovers.

CPSC widely shares this data in many formats, including an online portal, NEISS Online.[50]

Boats are not regulated by the CPSC and therefore boating accidents are not normally reported in NEISS. A few propeller accidents do make it in as water skiing or tubing accidents. For example, we noticed a 2 July 2007 water tubing propeller accident (NEISS CPSC Case# 70709539). That accident does not appear in BARD, yet one more example of under reporting.

Use of NEISS data is not a new idea to USCG. They examined the potential for using NEISS data in a 1990s study done by George Washington University.[51] The Conclusions and Recommendations section of that study reported on Page 6-1:

"Contracting with the Consumer Product Safety Commission for data collection through the National Electronic Injury Surveillance System (NEISS) provides the greatest benefit for the least cost."

They even pilot tested it. Page 6-1 of their report states:

"An analysis of previously-collected NEISS boating accident data discussed in Part III served as a surrogate pilot test, and demonstrated the efficacy of this data collection alternative."

We strongly encourage USCG to immediately partner with CPSC and begin collecting propeller accident data in NEISS.

---

[50] National Electronic Injury Surveillance System (NEISS) On-line. http://www.cpsc.gov/library/neiss.html Retrieved May 1, 2010.

[51] Recreational Boating Accident Statistic Methodologies. George Washington University. Approx. 1992.

USCG Failed to Account for Under Reporting

USCG has jurisdiction over national boating safety regulations, but has no effort similar to NEISS to estimate accident injury frequencies. They only have their own boating accident reports which are known not to be filed for thousands of reportable accidents annually.

A few years ago USCG supplied the Emergency Nurses Association (ENA) with a grant to collect boating injury data from about 50 emergency departments from April 2001 through September 2001. A similar approach was used for 2002. Over the two year span, ENA used an 83 item questionnaire to interview 908 people about circumstances surrounding boating accidents. The National Association of State Boating Law Administrators (NASBLA) Boating Accident Investigation, Reporting and Analysis Committee minutes[52] reported on the study:

"There are 18 hospitals collecting data, spread across the U.S. In the first year, 171 had treated patients for injuries sustained in boating accidents, but none of the patients filed a BAR (Boating Accident Report) even though they were told they were required to do so."

We assume the "171" refers to 171 people injured in boating accidents coming to those 18 hospitals. A similar report presented at the 6th World Conference Injury Prevention and Control[53] indicates about 500 people injured in boating accidents were interviewed during the first year of the ENA study at 56 hospitals. 171 people /18 hospitals is reasonably proportional to 500 people / 56 hospitals.

We were forced to assume 171 referred to 171 people after making approximately 40 efforts to contact the ENA researchers by phone and email over a two year period. They did not return our calls or emails.

USCG made no use of ENA data (or of data from several other studies of under reporting cited on our PGIC web site) to account for non reported accidents. A reporting frequency of 100 percent was assumed, while their own study, the Emergency Nurses Association study, showed a boating accident reporting frequency of zero percent.

USCG also made no use of a study they commissioned to analyze 2002 BARD data.[54] The study found about 20 percent of boating injuries requiring hospitalization and 90 percent of non-admitted injuries were not reported to BARD.

---

[52] National Association of State Boating Law Administrators Boating Accident Investigation, Reporting and Analysis Committee. Interim Committee Meeting Minutes. April 21, 2005.

[53] Recreational Boating Injuries Treated in U.S. Emergency Departments. Susan MacLean, Pierre Desy. Emergency Nurses Association. Chapter 3. Sport and Leisure Safety. 6th World Conference Injury Prevention and Control. May 12-15, 2002. Montreal Canada.

[54] Incidence of Recreational Boating Injuries in the U.S., 2002. Bruce A. Lawrence and Ted R. Miller of Pacific Institute for Research & Evaluation. Presented at American Public Health Association 135th Annual Meeting and Expo. November 5, 2007.
http://apha.confex.com/apha/135am/techprogram/paper_158615.htm Retrieved May 6, 2010.

USCG Incentive Not to Report

USCG has established annual goals for the combined total number of recreational boating injuries and fatalities.[55] If your performance was being judged upon how few accidents you reported, how hard would you look for them?

Individuals are being held accountable for those annual goals to the Department of Homeland Security and to USCG in job performance reviews, Congress holds agencies to their goals by cutting funding when goals are not met.

The boating industry has a stake in these goals as well. USCG's annual recreational boating statistics report is widely reported in the media. Increasing boating accident reporting frequencies (reducing unreported accidents) drives up those statistics. Especially, when the percentage of unreported accidents has been estimated at over 90 percent by a USCG study.[56] Slight changes in reporting frequencies can cause huge swings in accident counts. USCG recognized this in their 2007 annual recreational boating accident statistics report: [57]

"A small change in the low reporting rate may cause a relatively large change in the statistics."

The boating industry fears an increase in the number of annually reported boating accidents, injuries and fatalities, regardless of its source, will draw the attention of boaters and potential boaters. Some will consider boating a risky activity and stop or reduce participation, resulting in decreased sales and profits. The industry makes these and other concerns known to USCG through NBSAC and other venues.

Forces this powerful (personal performance reviews, Congressional funding, industry profits) pushing for reduced accident counts make it difficult to increase the percentage of boating accidents reported in BARD.

We encourage the Department of Homeland Security and USCG to establish a structure of appropriate goals and incentives to reduce the number of unreported accidents. We are aware of some of their efforts in this area and commend them for those. However, the basic structure of the system (setting goals to reduce accident counts when less than ten percent of accidents are reported) is obviously flawed.

---

[55] Marine Safety Performance Plan. United States Coast Guard. November 2008. Page A-11.

[56] Recent Research on Recreational Boating Accidents and the Contribution of Boating Under the Influence. Summary of Results. Bruce A. Lawrence and Ted R. Miller. Pacific Institute for Research and Evaluation. L. Daniel Maxim. USCGAUX. July 2006. Pg. 2. (pdf Page 4 in link below). http://www.uscgboating.org/assets/1/Publications/BUI_Study_Final.pdf Retrieved May 6, 2010.

[57] Recreational Boating Accident Statistics 2007. USCG. COMDTPUB P16754.21. Pg. 11. http://www.uscgboating.org/assets/1/Publications/Boating_Statistics_2007.pdf Retrieved May 6, 2010.

Industry Incentive Not to Report

In early April 2009, we attended the 83rd Meeting of the National Boating Safety Advisory Council (NBSAC83) in Orlando Florida.

Some NBSAC members were concerned increased reporting percentages (fewer unreported accidents) plus reporting accidents from additional craft types could increase the number of annual fatalities and injuries.

They feared an increase in the number of reported fatalities and injuries over the previous year could have a bad affect on the image of boating. In NBSAC's defense, the Chairman did say, we should not let numbers dictate what we count (meaning reporting the accidents is more important than any impact the resulting annual statistics may have on the boating industry). However, it was quite evident that not all present were of similar mind.

As evidenced at NBSAC83, the industry is very concerned about annual accident statistics and especially the year to year differential in the number of accidents and fatalities. Increased accident counts equate to decreased sales of boats, related equipment, and services.

Just like USCG, several members of NBSAC (boat manufacturers and boat rental operations) have a strong incentive not to encourage the reporting of boating accidents.

Casualties Do Justify the Rule

Table 32 calculates cost of casualties using our accident data from Table 31A.

Table 32 Cost of Casualties 1990-1999 based on Total Accidents in Table 31		
	Injury Accidents	Fatal Accidents
PGIC Total	26	2
Cost each	$562,599	$3,000,000
Total Cost	$14,627,574	$6,000,000
Grand Total	**$20,627,574**	

Table 33 shows the NPRM is economically justified even while using the unusually low value of life used by USCG and ignoring unreported accidents.

Table 33 Economic Justification of NPRM	
Cost of Implementation (Table 25)	$19,634,357
Cost of Casualties (Table 32)	$20,627,574
Cost of Casualties Exceeds Cost of Implementation	**Yes**

Two other categories of houseboat propeller accidents not included in previous totals should also be recognized.

1. Houseboat propeller accidents listed as houseboat injury accidents in BARD, but not listed as a propeller accidents. We refer those who insist all propeller accidents are properly identified in BARD to our coverage of a 29 June 2002 party boat accident on Lewisville Lake.[58]

2. Houseboat propeller accidents not meeting the criteria to be listed in BARD (may have occurred on private property, occurred when the boat was not in the water, occurred when the boat was tied up and unmanned, happened when houseboat was out of water, etc.)

Cost of casualties and cost of implementation are relatively equal in Table 33. However, the balance is tipped much further toward justification by inclusion of the two accident categories identified above, plus the many factors listed in **Appendix F**.

[58] Propeller Accident Statistics: Some Accidents are Misclassified. Example of Prop Accident Classified as "Struck by Boat" Instead of "Struck by Propeller." Propeller Guard Information Center. http://www.rbbi.com/pgic/padata/lewisville/lewisville.htm Retrieved May 6, 2010.

Public Misled by USCG Annual Statistics

Each year USCG publishes an annual Recreational Boating Statistics report[59] summarizing BARD reported accidents.

As described on our Propeller Accident Statistics page,[60] BARD provides accident data as a series of three events. For example, Event 1 could be falling overboard, Event 2 being struck by boat, and Event 3 being struck by motor or propeller.

For propeller accidents, Event 1 propeller accident statistics tend to represent less than half the total number of propeller accidents. Event 1 propeller fatalities tend to represent about one-fourth the total number of propeller fatalities reported in BARD.

USCG's annual Recreational Boating Statistics report and accompanying press releases focus on Event 1 accident counts for various types of boating accidents. Many newspapers and magazines run a story reporting the annual statistics, or report them when covering a local boating accident. Their articles often erroneously cite Event 1 propeller accident statistics as the total number of propeller injuries and fatalities.

We have contacted several publications erroneously using BARD Event 1 statistics to represent the total number of propeller injuries and fatalities. These publication include not only newspapers,[61] but also major boating industry trade magazines such as Boat & Motor Dealer[62] and BoatUS magazine.[63]

---

[59] USCG Accident Annual Recreational Boating Accident Statistics.
http://www.uscgboating.org/statistics/accident_statistics.aspx Retrieved May 6, 2010.

[60] Propeller Accident Statistics. Propeller Guard Information Center.
http://www.rbbi.com/pgic/padata/padata.htm Retrieved May 6, 2019.

[61] Incidents Highlight Boating Risks. John Stucke. Spokesman-Review. Spokane Washington. July 17, 2008.
Be Prepared for Heading Out on the Water. Christina Rohn. Petoskey News-Review. Michigan. July 27, 2008.

[62] Prop Guards Are a Subject That Seems to Live Forever. Ralph Lambrecht. Boat & Motor Dealer. Sept./Oct. 2006. Pgs. 6 & 8.
Propeller Guards Again. Ralph Lambrecht. Boat & Motor Dealer. Jan./Feb. 2003. Pgs. 33 & 37.

[63] Prop Guards Not Required. Elaine Dickinson. BoatUS. January 2008. Pg. 46.
http://www.nxtbook.com/nxtbooks/boatus/200801/index.php?startid=46 Retrieved May 6, 2010.

These mistakes are also being made by health safety professionals. For example, the 1998 Center for Disease Control (CDC) study of propeller accidents on four Texas lakes[64] mentioned earlier, incorrectly used Event 1 propeller fatality data as the total number of propeller fatalities. The CDC study then used that data (the wrong data) to estimate the percentage of all boating fatalities represented by propeller fatalities. The end result being the public was once again mislead to believe the risk of propeller fatalities was much lower than it actually was.

The problem continues to this day. In the final stages of writing this report we watched Naples Daily News reports on the Audrey Decker v. OMC trial. One of their feature articles[65] reported Event 1 statistics for 2006 and 2007 as representing the total number of propeller accidents for those years. We contacted Naples Daily News and asked them correct it. They printed the correct statistics in a follow up article a few days later, but their misrepresentation of the stats had already been copied and republished by others.[66]

Some publishers have been extremely hard to convince when we explain the situation and ask them to print a correction. They refer us to articles written by others similarly erroneously using Event 1 statistics to represent the total number of propeller injuries and fatalities. Some have told us we do not know what we are talking about.

One hard to convince writer was a boating industry expert who had testified at several propeller injury trials. We were unable to persuade him or his publisher, Boat & Motor Dealer, in a lengthy exchange of emails that they were using the wrong statistics. Out of frustration, we published our exchange of emails online and they eventually, marginally responded.[67]

Event 1 data is important during accident mitigation analysis, but the general public would be better served by plainly providing the total number of BARD reported accidents, injuries, and deaths for each accident type.

We call for future annual releases to more prominently provide total occurrences statistics. This could be done by beginning the report with a one page press release listing total number of accidents, deaths, and injuries for various types of accidents plus other data typically published by those covering the annual release.

USCG currently (2009) presents Event 1 data for each of the most recent five years in Table 17 of their Recreational Boating Statistics 2008 Report[68] (on their pages 33-35). They present Event 1, Event 2, Event 3, and total

---

[64] A Study of Propeller Accidents at Four Texas Lakes in 1997, Boat-Propeller-Related Injuries -- Texas, 1997. Morbidity and Mortality Weekly Report (MMWR). Published by Center for Disease Control. Vol. 47 No. 17. Pgs: 354-356. Publication date: 8 May 1998.

[65] Lost Face: Scarred and Scared, Boating Accident Victim Heads to Court in Naples. Aisling Swift. Naples Daily News. June 6, 2009.
http://www.naplesnews.com/news/2009/jun/06/lost-face-scarred-and-scared-boating-accident-vict
Retrieved May 6, 2010.

[66] Trial Opens in South Florida Defective Product Lawsuit Over Serious Boating Accident. Law Offices of Cohn, Smith & Cohn. June 11, 2009.
http://www.southfloridainjuryattorneyblog.com/2009/06/trial_opens_in_south_florida_d.html
Retrieved May 6, 2010.

[67] How One Boating Trade Magazine Responded to the Truth. Propeller Deaths and Injuries: Another Inconvenient Truth. Propeller Guard Information Center.
http://rbbi.com/pgic/tpapers/mediacov.htm#truth Retrieved May 6, 2010.

[68] Recreational Boating Statistics 2008. US. Department of Homeland Security. U.S. Coast Guard. Office of Auxiliary and Boating Safety. COMDTPUB P16754.21.
http://www.uscgboating.org/assets/1/Publications/Boating_Statistics_2008.pdf Retrieved May 6, 2010.

occurrences data for the most recent year in Table 18 (their page 36).

In September 2009, we forwarded a possible table layout to USCG Office of Boating Safety for reducing confusion between “Event 1” and total occurrences data in their annual boating statistics report.

The format we suggested for each of the most recent five years is in **Appendix I**. It also includes Event 1, Event 2, Event 3, and total occurrences data so USCG’s Table 18 would no longer be needed.

In our opinion, some did not respond to USCG’s call for public comments on this NPRM because they did not know the actual frequency of propeller accidents. They were lulled into a false sense of security by USCG’s annual publishing of Event 1 statistics, and unaware many propeller accidents go unreported.

Many issues raised in this NPRM have application beyond propeller safety. For example those preparing cost benefit analysis data for the ABYC A-33 Emergency Engine / Propulsion Cut-Off Devices (lanyards and others) standard currently (2009) under development should be identifying ALL accidents in which lanyards could have been a mitigating factor, not just Event 1 accidents.

PC Objection 2. Higher Costs to Implement Than Estimated

Some groups suggest NPRM device cost estimates were low. The National Marine Manufacturers Association (NMMA) in conjunction with the Houseboat Industry Association (HIA) challenge USCG cost estimates on Page 2 of their public comment letter.[69]

"NMMA and HIA data, supplied by our members, challenge the $300 USCG estimated cost for the three combined measures: Swim ladder interlocks, clear visibility aft device, and ignition cutoff switch."

USCG did not estimate three combined measures at $300, they estimated them at $160 plus two installations. Ninty-five percent of houseboats subject to the NPRM only need TWO of those three measures ($120 plus one installation).

NMMA/HIA reported propeller guard costs of $333.50 for a MariTech guard X 2 for a twin installation = $667. They added $69 labor for installing two guards and $976 for hauling the houseboat from the water. As stated earlier, boats do not have to hauled to install MariTech guards.

The propeller guard invoice (copy included in their comments) shows guards were actually priced $299 each. A special powder coating was requested for an additional $34.50 each.

NMMA/HIA submitted implementation cost data for a 61 foot rental Sumerset houseboat with twin engines, flybridge controls and two swim ladders as representative vessel. This vessel is not representative of a typical houseboat. It actually represents something in the range of less than two percent of the houseboat population. See Chart 2.

Twin engine houseboats with flybridge controls are the most expensive vessels to modify. Our calculations estimated their total cost of implementation at $460.00 (See Table 21). Page 11 of NMMA/HIA's comment letter has an even much higher estimate for all houseboats:

"NMMA and HIA estimates of the total cost of implementing the three proposed propeller injury avoidance measures to be $3303.70 per houseboat."

The NMMA/HIA cost estimate includes expensive mirrors for clear aft vision. These mirrors were designed for in-plant use in areas fork lift truck operators and/or pedestrians need to see what is coming down a crossing aisle. They were not designed for use as rear view mirrors.

The four mirrors they propose range in size from 12 inches in diameter to an 18 inch by 26 inch mirror. Their own letter says USCG proposed a 7 inch by 9 inch mirror.

Additionally, NMMA/HIA used two swim ladder interlocks when very few houseboats have two aft swim ladders.

NMMA/HIA use a vessel not representative of a "typical houseboat", inflate device costs, and inflate installation costs. They even haul the boat from the water TWICE, once for installing propeller guards and again to install a two swim ladder interlocks. Including charges for hauling and relaunching the boat twice, when it did not need to be hauled at all reveals NMMA/HIA's real intent.

NMMA/HIA inflate costs of the three modifications required for rental houseboats NOT electing to use propeller guards. Then, they add the cost of propeller guards on top of that to reach an implementation cost of $3,303.70 per houseboat and have the audacity to suggest that cost would apply to all houseboats. NMMA/HIA's cost estimate is ludicrous.

---

[69] USCG-2001-10163-88. National Marine Manufacturers Association letter to USCG Docket dated 11 March 2002 from John McKnight, Director Environmental and Safety Compliance. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

PC Objection 3. Maintenance costs associated with propeller guards

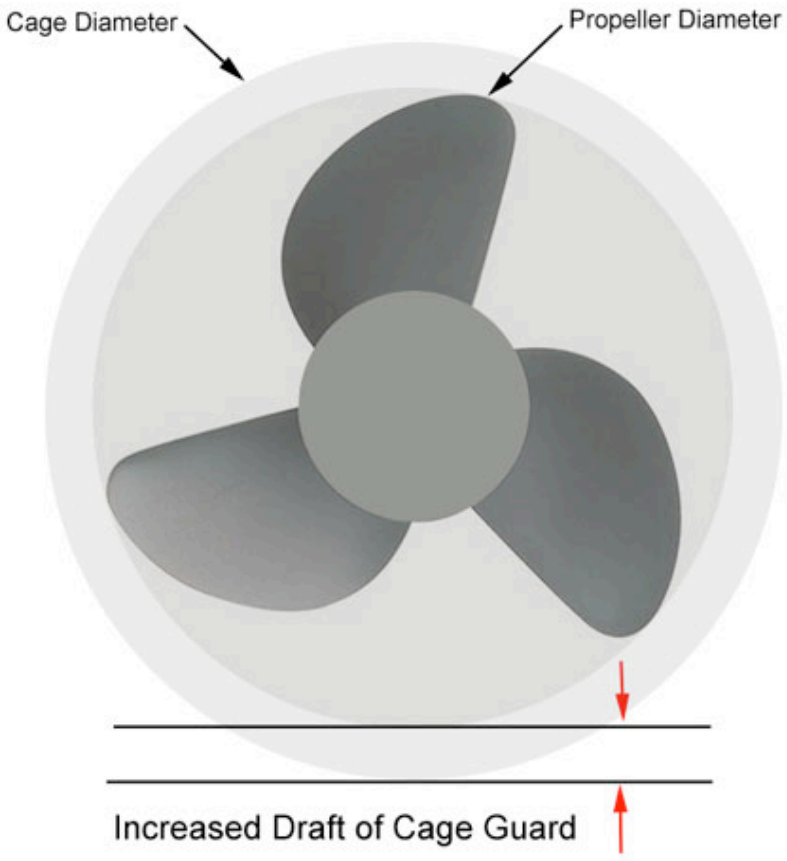
As stated earlier, propeller guards (1) are not required by the NPRM and (2) are not the most economical means to meet the NPRM.

Much has been made of cage type propeller guards adding another inch or two to the diameter of a propeller, which in turn, adds another inch or so to the draft of the propeller as seen in Drawing 1.

By extending down below the propeller, the cage makes it possible to strike underwater obstructions the propeller itself might have "just" cleared. While this is true, propeller guards were initially used to protect propellers. Cage type propeller guards provide some protection to propellers across their entire diameter, especially from floating debris.

An additional inch or two in draft would not cause houseboats to run aground in most lakes. For example, Lake Mead water levels were at 1214 feet (above sea level) in January 2000.[70] In January 2010 Lake Mead was at 1100 feet, a drop of over 100 feet and houseboats were still running. A two inch difference in draft will not cause groundings when the lake levels later drops 114 feet and houseboats are still running.

The additional depth of a cage will not cause significantly more groundings, and will cause none, if owners chose the most economical approach, which does not involve guards.



Drawing 1. Propeller Cage Guard Draft

[70] Lake Mead Elevation at Hoover Dam. U.S. Department of Interior. Bureau of Reclamation. Lower Colorado Region web site
http://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html Retrieved May 6, 2010.

PC Objection 4. Danger of collisions when swim ladder interlock systems disable propellers

Opponents suggest a swim ladder interlock failure may kill the engine, or prevent it from starting and result in a collision. Failures of electrical components of this nature are often detected either after long periods of inactivity or during an activation/deactivation (at the moment the switch is being “thrown”).

Long periods of inactivity correspond to the boat being stored overnight or longer. If the system fails in this situation, it would be no more dangerous than dozens of other situations that occasionally prevent starting a vessel that has been at rest overnight or longer. It would not typically increase risk of collision.

Activation and deactivation periods correspond to the ladder being raised or lowered. Swinging the ladder down means the boat is at rest. A failure of the switch in this situation would place you at no risk (you are at rest, that is why you lowered the ladder).

A failure of the swim ladder interlock when preparing to get underway occurs when the houseboat is still at rest. Now it is just at rest a little longer till the system is repaired, or the emergency bypass is activated. A failure of the swim ladder interlock during activation or deactivation will not typically increase risk of collision.

If the system did fail in a manner that stopped the engine while underway, it would be at houseboat “speeds”. Houseboats are large, slow moving, displacement vessels that glide to a halt when their engines die. Others in the water know to stay out of their way.

A failure underway would be similar to running out of fuel, clogging of fuel filters, major electrical shorts, or other mishaps that could stop the engine. Every day across the nation boat operators safely deal with countless similar occurrences. Disabled houseboats might become subject to winds or currents, but a key activated emergency bypass on the swim ladder interlock control box allows the vessel to be quickly restarted once the operator is sure no one is at risk in the water.

Swim ladder interlock switches are very durable, as seen in Photo 3 below. This houseboat swim ladder, with an interlock switch was hit by another boat, is noticeably bent (see bottom right of the photo), but the swim ladder interlock continues to function.

Photograph 3. Fully Functioning Swim Ladder Interlock With Bent Ladder

It is possible for someone to lower the ladder when underway in close quarters, kill the engine, and result in a slow moving collision. Similar collisions can happen when an operator steps away from the controls when their lanyard is attached and the engine dies.

One additional safety feature is the ability for someone at the stern to see a pending propeller accident, lower the ladder and save a life.

The environment for marine electronics is better on houseboats than on many smaller boats. Less engine vibration and hull slamming on large slow moving vessels like houseboats reduces vibration and g loads on electronic components, improving their reliability.

Additionally, the electronics themselves, or at least part of them are often mounted higher and further away from the surface of the water on a houseboat than they would be on a small boat. Some may even be mounted in the cabin. This reduces their exposure to moisture and water spray, which further enhances their reliability.

Improvements in marine electronics such as cable connectors, encapsulating, and potting of electronics with resin has also reduced electrical failures in general.

Properly designed, manufactured, and installed swim ladder interlock systems can be very reliable on houseboats. If a failure did occur while underway, it could be quickly dealt with by using the override.

PC Objection 5. Lack of practical benefit from clear aft view devices due to length of many houseboats

Some written comments implied mirrors may be of little use in seeing people directly behind the transom of large houseboats.

Page 63649 of the NPRM states:

"Clear visibility aft device means a device, such as a video camera and monitor or a mirror, that allows the operator to see aft of the vessel from the engine throttle control station to be aware of the presence of a swimmer near the propeller. "

Mirrors do provide some level of aft vision. However, they are not the only way to meet the NPRM. The NPRM suggests a "video camera and monitor" as an alternative.

Remote "aft" video monitoring is currently available in production automotive rear view mirrors built by Gentex.[71] They are in daily use preventing driveway "backover" accidents which are quite similar to many houseboat propeller accidents.

Numerous similar systems are currently for sale on eBay. Some include night vision, the ability to play movies and computer games, and other features.

More traditional video displays (like those used in security systems) add additional emphasis to their output.

Now (June 2010) we see many houseboats with backup cameras. Some are being installed by the builders. Besides being a safety feature, they provide convenience in backing up the boat.

Neither mirrors nor remote cameras are meant to replace good spotters and well trained houseboat operators. However, they do add another layer of protection.

PC Objection 6. The rule would be unenforceable or otherwise ineffective

These comments focus on water law enforcement professionals boating past a houseboat on the water and not being able to tell if it has propeller guards installed or not. By this logic we should repeal requirements for personal floatation devices and onboard fire extinguishers because they cannot be observed in a "pass by" either.

USCG members, lake patrols, state and local law enforcement professionals can verify compliance with the NPRM just like they check compliance with many other regulations. They board both suspicious and random vessels and conduct checks of their safety equipment during the course of their regular duties.

Compliance for 95 percent of all houseboats could involve just a mirror and a swim ladder interlock. A quick walk from front to rear of a vessel would spot those two features.

Houseboats are large lumbering vessels. Operators would not be able to race off and hide their boat to avoid inspection.

PC Objection 7. Imprecise definition of a houseboat

This objection was thoroughly addressed in the USCG Objection 3 section.

---

[71] Gentex Rear Camera Display.
http://www.gentex.com/wn_rear_camera.html Retrieved May 6, 2010.

PC Objection 8. Need detailed guidance on acceptable propeller guards and swim ladder interlock systems

This ploy is used by many industries. “We just don’t know what to do without some regulatory guidance”. Then they fight the guidance when it is offered, just like NMMA/ HIA and their members are doing now.

Using this logic, in the early days before fire extinguishers were mandated on recreational boats, boat manufacturers could not put a fire extinguisher on board because they did not know which one would be best. When your boat catches on fire, any functioning general purpose fire extinguisher is better than none at all. The same goes for cage type propeller guards built by reputable manufacturers for houseboat applications.

Concerning swim ladder interlock systems, at the moment there is only one system on the market. If the regulation calls for a swim ladder interlock system, use it. Do they really need guidance to understand that?

Those who do not wish to use the existing swim ladder interlock system, can build their own, providing they do not include an override. The MariTech Prop Stopper swim ladder interlock system patent[72] claims only cover devices including an override.

Propeller guards are not required to meet the NPRM. They are just one of the options. The most economical solution is to use the other devices. If owners elect to use propeller guards, we suggest they review. Appendix B of Minutes of the USCG Propeller Injury Mitigation presentation of 11 October 2007.[73] It discusses installation and operation of several propeller guards during development of a USCG propeller guard testing protocol.

Several rental houseboat facilities supplied reasons for not mandating propeller guards. Rental operations electing not to install propeller guards can install a swim ladder interlock, mirrors, and EICOS. Do they really need guidance to figure that out?

The industry does not need guidance. They are objecting to the very guidance they say they need (this NPRM).

Before this NPRM was proposed, the houseboat 3industry was telling USCG, “We do not know how to fix this problem, we need your help.” In late 2001, USCG presented the NPRM. Now the industry says, “we may not have known how to deal with the problem before, but we do know your approach will not work, plus the problem has since gone away.”

---

[72] U.S. Patent 6,276,974 Switch System for Preventing Marine Propeller Injuries. Issued to Propguard Inc. (now MariTech) on August 21, 2001.
http://patft.uspto.gov/netacgi/nph-Parser?patentnumber=6276974 Retrieved May 6, 2010.

[73] Minutes of the 11 October 2007 Carbon Monoxide and Propeller Injury Avoidance Meeting held in Miami FL at IBEX. Appendix B: USCG Propeller Injury Mitigation. Richard Blackman, USCG and John Adey, ABYC.
http://www.rbbi.com/pgic/pmeetings/minutes/07oct11ibex/appendixb.pdf Retrieved May 6, 2010.

PC Objection 9: The proposed rule would effect a shift of liability from boat operators to boat manufacturers

The NPRMW states:

"One commenter suggested the proposed rule would effect a shift of liability from boat operators to boat manufacturers."

We identified the source of that comment. It came from a 11 March 2002 letter[74] from Bridge Bay Resort on Lake Shasta. The letter was written by Bob Rollins, General Manager of Bridge Bay and Digger Bay Marina.

His letter states:

"The proposed ruling shifts the responsibility and liability away from the vessel captain and places it on the owner, boat builder, and drive unit manufacturer."

Mr. Rollins writes as if it should be the responsibility of the renter to make sure the vessel they rent was designed for safety. Do firearms manufacturers sell guns without trigger guards and safeties (guards and interlocks) and rely on fire arms safety training and a decal to prevent accidental discharges? Boat manufacturers, drive manufacturers, and houseboat rental operations are clearly responsible for designing and providing safe vessels.

This NPRM is merely trying to make sure the basic vessel is safe before placing it in the hands of the operator.

Mr. Rollins same letter states:

"Educating the public during vessel orientation and the appropriate signage will eliminate propeller accidents"

If, as Mr. Rollins claims, education and signage (responsibility of the drive manufacturer, boat builder, and boat rental operation) remove the risk of being struck by a propeller, there is no risk to be shifted.

But, how does he reconcile his statement with the Stacey Epping accident? She was a 19 year old Oregon State University student on a 7 May 1992 fraternity houseboat trip. Stacey was swimming behind the houseboat, caught in the propeller, lost one leg above the knee, and had many other major injuries. Doctors, surgeons and nurses worked on her for five hours and used over 60 pints of blood. If proper education and signage were in place, how did this accident happen on one of his Bridge Bay houseboats?

Education and signage are pieces of the solution, but individually or collectively, they will not "eliminate propeller accidents".

Vacation Environment

Houseboating, and especially rental houseboating takes place in a vacation environment. People let down their guard to have fun. They do not focus on houseboat orientations, warning decals, and safety instructions. They just kick back, relax, and party. People are less attentive in orientations than they would be back at the office, and pay less attention to warnings than they would in their own home.

The Mother Ship

By their very nature, houseboats are houses. We feel comfortable and safe in our home. A houseboat becomes our home for a few days.

In a very small boat, some dangers are fairly obvious (falling in, capsizing, sinking, large wakes, wind and waves, getting lost, cold water, getting stranded, exposure, etc.) Large lumbering houseboats wrap around us and protect us from the elements. We feel very secure onboard.

---

[74] Bridge Bay Resort 11 March 2002 Letter to USCG from Bob Rollins General Manager Bridge Bay Resort and Digger Bay Marina. USCG-2001-10163-89. Received 12 March 2002. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e6&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Houseboat rental operations try to make their guests feel warm and fuzzy. They tell them how easy a houseboat is to operate. If you have any problems, just radio us and we will run right out and help you. Rental houseboaters assume the vessels are safe and feel they are not alone. The “Mother Ship” (houseboat rental operation) is looking after them. Those onboard let their guard down because they feel they are in a protected environment.

Boater Fatigue & Alcohol

Let’s think for a minute about the people Mr. Rollins thinks the liability should fall upon. Houseboat renters are often young people out for a good time on the water.

Boater fatigue can begin to affect houseboaters after just a few hours of exposure to summer temperatures, wind, sun, glare, water, noise, boat vibrations, and rocking of the houseboat. It can slow reaction times, cloud judgement, and reduce effectiveness of training. Inexperienced boaters, like those frequently on rental houseboats, exhibit signs of boater fatigue more quickly than frequent boaters.[75]

Boater fatigue amplifies effects of alcohol (often sold by houseboat rental establishments). Together, boater fatigue and alcohol can render recent training ineffective, as well as reduce effectiveness of warning decals.

Despite Mr. Rollins comments, this is not the environment in which to expose people to risks and expect them to make correct choices.

The effectiveness of warnings and educational training in preventing houseboat propeller accidents will now be discussed.

Propeller Warning Signs Are Not The Answer

Engineers and Safety Professionals are taught to use the Safety Hierarchy when designing products. Safety Hierarchy is a sequence of steps used to reduce injuries once individual hazards are identified. The steps are:

1. Eliminate the hazard if possible. (like a water jet propulsion system eliminates an exposed propeller).

2. Use guards, shields, or barriers between people and the hazard. (like a propeller guard).

3. Use safety interlocks to prevent the accident from happening. (like a swim ladder interlock). Lanyard kill switches and wireless man overboard engine cut-off switches can similarly prevent those ejected from being hit by the propeller of their circling boat.

4. Warn of the hazard. (like a propeller danger decal at the stern, a placard at the helm, or an alarm at the stern signaling the engine is about to start).

5. Train and instruct users of the hazard. (such as during rental houseboat orientation sessions).

6. Wear personal protective equipment. (like American Power Boat Association junior stock outboard racers wear Kevlar suits to provide some protection against propellers).

Warnings are the fourth step of the Safety Hierarchy. They are much less effective than earlier steps, especially when you consider the environment on rental houseboats.

---

[75] At Risk on the Water: Exposure to the Elements Can Lead to Boater’s Fatigue. Tim Renken. St. Louis Post-Dispatch. July 18, 1999. Page T8,

Industry Changes Position on Obviousness of the Hazard and Creates Safety Label Warning

Prior to 2000, the industry often defended propeller cases claiming they were not required to warn of propeller dangers because propellers were an "open and obvious danger".

For example, in 1991 Brunswick filed a motion for Summary Judgement in the Seymour v. Brunswick propeller case in the State of Mississippi[76] based on propellers being and "open and obvious danger". The case was dismissed when the judge agreed propellers were "open and obvious danger". In 1995 an appeal reopened the case based on some court decisions in the interim.

American Boat and Yacht Council (ABYC) currently sets the industry "voluntary" standards for warnings. ABYC says a hazard is to meet 4 criteria before it requires a warning label:

1. The hazard is associated with the use of the equipment
2. The manufacturer knows of the hazard
3. The hazard is not obvious or readily discoverable by the user
4. The hazard will exist during normal use or foreseeable misuse

Please note criteria #3, "The hazard is not obvious or readily discoverable by the user". We will return to this criteria later.

At the April 2001 NBSAC Meeting,[77] NBSAC passed a resolution including a request for the USCG Institute of Rulemaking to address the following requirements:

"All propeller driven vessels 12 feet in length and longer with propellers aft of the transom shall be required to display propeller warning labels of appropriate size and content at appropriate location(s)"

This led to a USCG recommendation to ABYC in June 2002: [78]

"The CG recommended that the PTC (ABYC Hull and Deck Structures Project Technical Committee) develop a safety label to warn against propeller strikes, located at the transom boarding area. The PTC added a requirement for a prop strike warning label to be both at the helm and at the transom boarding area."

This in turn led to ABYC and NMMA's Boating Industry Risk Management Council (BIRMC) working together to develop a series of warning labels. The project was especially driven by the need for new Carbon Monoxide and Propeller Safety labels.

Those decals are now available from NMMA and are required on boats built by members of NMMA's certified boatbuilder program.

By producing and requiring a propeller warning label, the industry has shifted it position from saying propellers are an "open and obvious danger" (argued by Brunswick in the Seymour case mentioned earlier) to saying

---

[76] Seymour v. Brunswick Corporation. 655 So. 2d 881 (Mississippi 1995). In the Supreme Court of the State of Mississippi. No. 91-CA-01136-SCT. Shirley Elizabeth Burrell Seymour v. Brunswick Corporation, Mercury Marine Division.

[77] Minutes of the 67th Meeting of the National Boating Safety Advisory Council. Cleveland Ohio. April 23-24, 2001. Pg. 34.

[78] Trip Report. ABYC Hull and Deck Structures Project Technical Committee Meeting. Baltimore, Maryland. July 16-17, 2002.

they are “not obvious or readily discoverable by the user” (ABYC warning criteria #3 mentioned earlier and the new NMMA propeller warning decals).

A 2006 USCG brochure titled, “Beware Propellers ... A Hidden Danger”[79] confirms the danger is no longer considered obvious.

The decal project seemed to languish after the June 2002 warning label recommendation. After Mercury lost the Sprietsma propeller case[80] in December 2002 (industry lost its federal pre-emption defense), the industry became more interested in propeller warnings.

Prior to the U.S. Supreme Court decision on Sprietsma, propeller cases against boat builders and drive manufacturers were being summarily dismissed due to federal pre-emption. Now they had to defend themselves and began creating a second layer of defenses, of which warnings are a part.

We had an opportunity to attend NBSAC 83[81] where several mentions were made of boating industry lawyers being a significant constituent of BIRMC.

A quote from an ABYC publication[82] about how ABYC’s Technical Division worked with NMMA and BIRMC to design the new warning decals is revealing:

“And, they are working with NMMA’s BIRMC and industry to produce safety based warning labels that are on-message and easy to comprehend, while not being over alarmists or cosmetically overbearing - not a small task!”

It sounds like the industry is more worried about covering themselves than protecting their customers. In a 2005 interview with BoatUS,[83] Monita Fontaine, NMMA Vice President of Government Relations, speaking of the new decals, said:

“It has nothing to do with litigation and it has everything to do with education.”

That is hard to believe from the previous quote (cosmetic appearance and not being alarmist), from the actual decals, the makeup of BIRMC, and from the way decals are positioned on some boats. We have seen decals positioned so close to the drive you could be struck by the propeller, or crushed by the drive before you could read them.

---

[79] Beware Propellers ... A Hidden Danger. USCG. 2006. http://www.uscgboating.org/assets/1/Publications/USCG_prop_bro.pdf Retrieved May 6, 2010.

[80] Rex R. Sprietsma v. Mercury Marine, a Division of Brunswick Corporation. No. 01-706. U.S. Supreme Court. December 3, 2002.

[81] 83rd Meeting National Boating Safety Advisory Council. Orlando Florida. April 4-6, 2009.

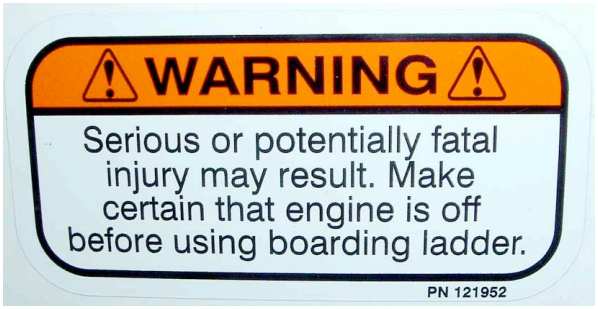
[82] Letter From the President. Skip Burdon. ABYC News. Spring 2005. Pg. 2.

[83] Stuck on You: Awash With Warning Labels. Elaine Dickinson. BoatUS. January 2005.

NMMA currently (2009) supplies two labels, one for the helm (Prop Helm Label NW 207-07) and one for the transom (Prop Transom Label NW-208-07). Both are all text with no graphics of a propeller or a propeller injury. They are black and orange on white which blends in well with most white fiberglass boats to meet their non-alarming criteria. NMMA's propeller transom label is shown as Decal #1.

Decal #1
NMMA Propeller Transom Warning

If NMMA's Propeller Transom Warning (Decal #1) is too alarmist for you, we noticed several boats at the 2008 Tulsa Boat Show using ladder warnings instead. They do not even mention the word "propeller". One boat we noticed at the Tulsa show used a ladder decal with a rounded outside border, direct printed warning symbol exclamation mark, and non-bold lowercase text. See Decal #2.



Decal #2
A Ladder Warning Decal

Left to police itself, the industry is obviously just trying to cover themselves from "failure to warn" lawsuits, and not really trying to warn boaters of propeller dangers.

NMMA/BIRMC decals were not around during the NPRM public comment period which ended May 11, 2002. They were announced in the press in 2005 (three years later). The industry thought warning decals were the solution, but it took them three years to come up with Decal #1. They were dragging their feet again.

As we understand it, BIRMC is currently (early 2010) still working on a propeller warning decal compatible with American National Standards Institute (ANSI) Z535 standards. A portion of the standard applies to warning labels placed on products. The standard describes a three part label using a signal word, (CAUTION, WARNING, DANGER), a pictograph to illustrate the hazard, and text describing how to avoid the hazard. Decal #3 from Safety Label Solutions is an example of an ANSI Z535 warning.

Decal #3
ANSI Z535 Warning Label Example
Safety Label Solutions. Used by permission.

There have been discussion of combining propeller warnings and carbon monoxide warnings into a single transom label.

The NPRM public comment period closed seven years ago and we are still waiting for a properly designed propeller warning decal.

The industry may be dragging their feet, in part, due to ANSI definitions concerning which signal word to use at the top:

1. WARNING - a hazardous situation which if not avoided, could result in death or serious injury.

2. DANGER - a hazardous situation which if not avoided, will result in death or serious injury.

By our interpretation, propellers would need the signal word “DANGER”. The industry may want to stay at “WARNING”. Writing DANGER on the transom might make prospective boaters nervous. It could also make propeller cases harder to defend. If boat builders know propellers are dangerous and located in close proximity to the boarding ladder, why is their no guard?

Even if they do eventually create an ANSI Z535 label, USCG’s own study[84] said their is no proof of the effectiveness of propeller warning labels:

“There is no evidence to indicate that warning signs would have prevented any of the known propeller strikes.”

That statement is understandable when you consider the sequence of events that must occur for a warning sign or label to be effective. We will now detail that sequence of events.

---

[84] Propeller Injury Protection: An Evaluation of the State of the Art of Recreational Watercraft Propulsion Systems. A Report of the Marine Technology Society. Prepared for the Office of Boating Safety. United States Coast Guard. Prepared by Mancil W. Milligan and Jeffrey S. Tennant. September 1997. Pg. 29.

Sequence of Events for a Warning Sign or Label to be Effective

For a written warning to be effective, a sequence of events must happen. If any one of these steps is missing, the warning will not be effective and the person will be exposed to the hazard.

To be effective, a warning must:

1. Be installed in a location that allows the remaining steps to occur before an injury occurs (those at risk need to have time to react)

2. Remain present and readable (not fall off, not fade too much to read, not be painted over, not be damaged too much to read, etc.)

3. Draw the attention of those at risk (they have to see it). If you are trying to warn people in the water when they are in the water, make sure the label is viewable from their position

In addition to the steps above, for a written warning to be effective, those at risk must:

1. Read the warning (most effective if by both word and powerful clear graphics to cross language barriers)

2. Understand the warning AND the proper action to take if the situation presents itself (be sure the warning is in the language of the reader)

3. Internally "buy in" (acknowledge this hazard could hurt them and decide they would like to avoid it)

4. Maintain their desire to recognize the risk and to take the proper action should it occur

5. Recognize the danger when it presents itself at a later time

6. Recall the proper action to take

7. Take the proper action in time to prevent the accident (change their behavior)

Anyone who thinks these ten steps (3 for the warning and 7 for those at risk) are going to be successfully executed every time someone new boards a rental houseboat might wish to rethink their position after viewing some YouTube rental houseboat videos.[85]

Warning signs are not the answer to stopping propeller accidents. However, properly designed and placed warnings should be used in conjunction with other interventions to reduce the frequency and severity of propeller accidents.

---

[85] YouTube rental houseboat videos include: Shasta by peterstompson added 1 March 2007 http://www.youtube.com/watch?v=fvTuADEG91A Retrieved May 6, 2010.

and Houseboating 2007 by stevewehaveaproblem added 4 July 2007. http://www.youtube.com/watch?v=1w-UtpqF6qs Retrieved May 6, 2010.

Interlocks Make Warnings More Effective

If industry representatives really feel warnings are the answer, they would be reinforcing them with interlocks to make sure the warnings are issued.

Examples of how propeller warnings could be warnings reinforced with interlocks on houseboats include:

1. An interlock preventing the engines from being started for several seconds (perhaps 7 seconds) during which a "beeping" sound similar to a truck backup alarm sounds at the rear of the vessel to issue a warning to those in or about to enter the water. Broadcasting a a prerecorded verbal warning in conjunction with the "beeps" could be even more effective. Sound levels could be automatically adjusted based on ambient noise levels. Several patents teach of adjusting backup alarm levels based on ambient noise levels, adjusting the waveform of the alarm to indicate range, and even detecting noise in the area of risk to indicate presence.[86] Self-adjusting backup alarms are on the market today.[87] Onboard music systems could be wired to broadcast the warning as well.
2. The warning to have a spotter at the rear could be enforced by placing a "doorbell" button on the rear deck to be depressed shortly before starting the engines. This forces someone to be on the rear deck where they would act as a spotter. The system could be programmed to require the "doorbell" to have been off (not depressed) shortly before its recent activation to prevent users from taping the switch down or disabling it. Similar behavioral enforcement interlocks are used to force school bus drivers to walk to the rear of the bus and check for kids asleep in the seats before they park the bus at night.[88] In one approach, the "doorbell" button could also activate self adjusting backup alarms, creating a double layer of interlocks (spotter and audible warning).
3. MariTech Industries' Captain's Mate Safety System[89] allows a houseboat captain and their mate to work in tandem assuring everyone is onboard and the swimming area is cleared before starting the engines.

The industry has previously rejected use of emergency ignition cut-off switches (EICOS) in small boats. It is very apparent they have no interest in reinforcing warnings.

---

[86] U.S. Patent 7,324,013 Safety Alarm System. Assigned to Preco Electronics. Issued 29 January 2008.
U.S. Patent 7,268,671 Shaped Modulation Audible Alarm System. Assigned to Caterpillar. Issued 11 September 2007.
U.S. Patent 5,315,288 Method and Apparatus for Controlling Electric Circuit Output Level in Backup Alarms, Lighting Fixtures, Sensors and the Like. Assigned to Electronic Controls Company. Issued 24 May 1994.
U.S. Patent 4,603,317 Electrically-Operated Backup Alarm. Assigned to Electronic Controls Company. Issued 29 July 1986.

[87] Smart Alarm. ECCO (Electronic Controls Company).
http://www.eccolink.com/ProductPages/AlarmHMPG.cfm Retrieved May 6, 2010.

[88] Child Reminder Systems by CRS Electronics
Sleeping Child Check Monitor by Doran Manufacturing
http://www.doranmfg.com/sleepingchildcheck.htm Retrieved May 6, 2010.

[89] Captain's Mate. MariTech Industries.
http://www.powerboatsafety.com/captainsmate.asp Retrieved May 6, 2010.

Education is Not The Answer

Several industry representatives commenting on the NPRM proposed boater safety education as a better solution than propeller guards and swim ladder interlocks.

For example, Mark Suttie of Lake Powell states on Page 18 of his comments:[90]

"We believe that boater education offers the greatest benefits in preventing propeller strikes."

That sounds all well and good, except when taken in context with Mr. Suttie's comments on Page 3 of his same letter:

"The Coast Guard's Boating Safety Circular #76 titled, 'Preventing Propeller and Boat Strike Accidents' states 'Operator inexperience, incompetence, negligence, and intoxification are significant contributing factors in reported boat and propeller strikes.'

We (*Lake Powell the Aramark company*) question whether the proposed interventions would have a corrective influence in preventing propeller strikes considering the significant factors stated above.

We (*Lake Powell*) agree with the Coast Guard in regard to the factors of inexperience, incompetence, negligence, and intoxification."

We (Propeller Guard Information Center) question if boater education alone will have a large corrective influence in preventing propeller strikes, given issues raised by USCG and agreed to by Mr. Suttie. Those statements provide additional evidence for requiring propeller injury avoidance devices.

Like warnings, education is also way down on the Safety Hierarchy list of steps. An example of why education is among the last steps to be taken can be seen from USCG's efforts to educate boaters to wear a Personal Floatation Device (PFD).

The annual USCG recreational boating accident report for 2006[91] reports:

"Over two thirds of all fatal boating accident victims drowned. Of those who drowned, ninety (90) percent (*underlining is theirs*) of the victims were not wearing their life jacket."

A 2009 USCG study[92] reported minimal changes in PFD wear rates among adult boaters on "all powerboats" from 1998 to

---

[90] Mark Suttie, Director of Environmental Management, Lake Powell, managed by Aramark letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-54. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1c0&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

[91] Executive Summary. Boating Statistics 2006. USCG. COMDTPUB P16754.20. Pg. 1.

[92] 2008 National Life Jacket Wear Rate Observation Study. Conducted by JSI Research & Training Institute, Inc. Thomas W. Mangione, Heather E. Lisinski, Molly Higgins-Biddle, Wendy Chow, and Mihaly Imre. Produced under a grant administered by the U.S. Coast Guard. March 31, 2009. Page 9.

2008. Per the study, wear rates for adults on "all powerboats" excluding PWCs fluctuated between 3.9% and 5.6% over the eleven year period. The 2008 wear rate for adults on "all powerboats" excluding PWCs was 4.8%.

Encouraging recreational boaters to wear life jackets has been a primary educational goal of the USCG Boating Safety Office and their of their partners[93] for decades.

Even with the efforts and advances listed below, adult powerboat wear rates are still hovering below 5 percent.

1. The arrival of easier to wear units (inflatables)

2. An endless array of program mascots (Snoopy, Theodore Tugboat, Panda, Coastie, Popeye)

3. Countless slogans ("Life Jackets Float ... You Don't", 'Boat Smart From the Start, Wear Your Life Jacket", "Don't Just Pack It, Wear Your Life Jacket", "Boat Smart, Boat Safe, Wear It", "Wear It")

4. PFD loaner stations

5. Pledge wear signing campaigns

6. A PFD song[94]

7. Several million dollars of advertising promoting wearing PFDs[95]

Millions of dollars spent on PFD educational programs have resulted in dismal PFD wear rates (less than 5 percent). We can only imagine the meager success of a poorly funded propeller safety educational project.

Education is not the magic bullet, but should be used to highlight and hopefully reduce houseboat propeller injuries and fatalities.

---

[93] National Safe Boating Council, USCG Auxiliary, Safe Kids USA, National Water Safety Congress, BoatUS, United States Power Squadrons, National Association of State Boating Law Administrators (NASBLA), American Canoe Association, National Marine Manufacturers Association (NMMA), Discover Boating, California Department of Boating and Waterways, Texas Parks and Wildlife Department, Montana Department of Fish, Wildlife & Parks, Sterns, Bass Pro, West Marine, Boater's World Marine Centers, State Farm Insurance Company, Nationwide Insurance Company of American, Soundings Magazine, Trans World Publishing (publishers of Boating World), U.S. Army Corps of Engineers, Boy Scout Sea Base, and many more.

[94] Boating Fun - Adventure on the Water. Produced Under a Grant From the Aquatic Resources (Wallop-Breaux) Trust Fund. Administered by the U.S. Coast Guard. Undated. Page 18.

[95] Nonprofit Grants. Grant Archives. Boating Safety Resource Center. U.S. Coast Guard Boating Safety Division. U.S. Coast Guard.
http://www.uscgboating.org/grants/grant_archives.aspx Retrieved May 26, 2009.

A REVIEW OF THE OBJECTIONS

We have shown the three objections raised by USCG (reconsideration of the costs, characteristics of the safety measures, and problems with the definition of “houseboat”) to be groundless.

Device and installation costs were inflated by industry representatives.

Characteristics of safety measures objections focus on alleged characteristics of propeller guards. Guards are not required by the NPRM and are the most expensive option.

NMMA/HIA say they are happy with the definition used in the NPRM with a minor modification (change “low length to beam ratio” to “high length to beam ratio”).

We also have also shown each of the nine objections raised in public comments listed by USCG (insufficient casualties to justify the NPRM, higher costs to implement than estimated, propeller guard maintenance costs, danger of collision from swim ladder interlock systems failure, impracticality of clear aft view devices, the NPRM can not be enforced, problems with the definition of “houseboat”, the industry needing guidance on propeller guards and swim ladder interlock systems, and the shift of liability to boat manufacturers) to be groundless.

Casualties do justify the NPRM. The NPRM is economically justified**.** Implementation costs are even lower than those estimated in the NPRM. Those challenging economic justification of the NPRM use the propeller guard option ($300 per guard and say all houseboats need two guards), when all houseboats can be brought into compliance for an average of less than $200 per houseboat using data in the NPRM and data supplied by NMMA/HIA.

Propeller guard maintenance costs are irrelevant. Propeller guards are not required to meet the NPRM and are the most expensive option. Those who elect to use propeller guards, can easily clear them of debris in most instances by reversing the drive. Propeller guards do not create enough additional drag at houseboat speeds to require any additional fuel per a USCG statement in the NPRM.

If a swim ladder system interlock system were to fail and disable to the boat, it would most likely occur at a time when the houseboat is at rest and would cause no danger. The emergency bypass could be used to start then, as well as after rare random failures while underway (after making sure the ladder was up and no one was in the water).

Mirrors add another level of protection to the use of a good lookout. Those wishing a better view aft can install closed circuit video cameras at the stern to feed video monitors at the helm.

The NPRM can be enforced when checking for compliance with other requirements, such as the number of life jackets onboard.

NMMA and HIA accept the houseboat definition provided in the NPRM with one minor modification.

No guidance is needed to select a swim ladder interlock system when only one is available. No guidance is needed to select propeller guards if the most economical approach is chosen. By rejecting this NPRM, the industry is rejecting the very guidance it says it needs.

The responsibility for designing safe vessels lays with rental houseboat operations, boat builders and drive manufacturers, not with houseboat operators.

In conclusion, all objections cited in the NPRMW are groundless.

ERRORS INTRODUCED BY INDUSTRY

Errors introduced by boating industry representatives led USCG to believe implementation costs would be higher and casualty costs would be lower than they actually were, resulting in the NPRM being withdrawn.

Errors in public comments from the five entities below played major roles in the rejection of the NPRM:

1. NMMA/HIA

2. SBA Office of Advocacy

3. Mercury Marine (from two sources)

4. Lake Powell - Aramark

5. Bridge Bay Resort

We will now detail those errors, who submitted them, when they were submitted, and how the industry was able to defeat the NPRM.

We strongly encourage those involved in any future propeller regulatory efforts to study this section carefully and not allow the industry to mislead USCG in the future.

NMMA / HIA COMMENTS

The National Marine Manufacturers Association (NMMA) comment letter[96] dated 11 March 2002 was written in conjunction with the Houseboat Industry Association (HIA).

In the NMMA/HIA comment letter, NMMA and HIA are presented as separate, distinct, and unrelated organizations.

HIA is one of several affiliates[97] (subsets) of NMMA that gather at industry trade shows to discuss common issues. Other NMMA affiliate organizations include the Inflatable Boat Manufacturers Association, Personal Floatation Device Manufacturers Association, Personal Watercraft Industry Association, and the Boat Trailer Manufacturers Association.

HIA's logo, and that of several other NMMA affiliates, as seen from the NMMA affiliates web page, are variations of NMMA's logo.

HIA's brief mention on NMMA's affiliates web page provides no list of officers and only provides an NMMA contact person (the director of all the affiliates).

HIA's web site[98] is on a domain name registered in 2006 to NMMA.[99] A look at the source code behind HIA's web site's home page reveals the following Hypertext Markup Language (HTML) code:

<meta name="author" content="NMMA Web Department" /><meta name="copyright" content="Copyright (c) 2007 NMMA. All rights reserved." />

HIA's web site is clearly being operated by NMMA's Web Department.

According to HIA's "Contact Us" web page,[100] their address is NMMA's street address with mail to be addressed to NMMA's director of affiliates or NMMA's director of membership.

HIA is just a subset of NMMA members with ties to the houseboat industry. This relationship allowed NMMA companies outside the houseboat industry with major interest in propeller regulations, to speak through HIA as well as through NMMA.

---

[96] John McKnight, Director Environmental and Safety Compliance. National Marine Manufacturers Association letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-88. Pgs. 8-11. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

[97] NMMA Affiliate Groups. NMMA web site. http://www.nmma.org/members/info/affiliates.asp Retrieved May 6, 2010.

[98] Houseboat Industry Association web site. http://www.houseboatindustry.org Retrieved May 6, 2010.

[99] WHOIS Search on houseboatindustry.org http://www.networksolutions.com/whois-search/houseboatindustry.org Search performed February 24, 2009.

[100] HIA. Houseboat Industry Association web site contact page. http://www.houseboatindustry.org/about/contactus.aspx Retrieved May 6, 2010.

NMMA and HIA Used as Mouthpiece

Brunswick is a huge force within NMMA. NMMA membership dues are based on each member's annual sales.[101] Its just good business practice for NMMA to pay more attention to their larger members. For example, Brunswick's annual dues are over 200 times that of some of NMMA's smaller members. Brunswick is actually worth even more to NMMA considering many of their smaller members are dependent upon the sale or use of Brunswick products for their income.

Brunswick and other major boating companies fear recognizing the benefits of propeller safety devices in any application might weaken their defense against not using them in others. They fiercely resisted the NPRM.

NMMA's job is to represent its members, so they strongly campaigned against the NPRM.

Had this been a "houseboat only" issue (such as the number of life jackets to carry onboard a houseboat), NMMA would have remained silent or provided a much lower key response. We believe NMMA's intense, organized response was driven by companies with interests outside the houseboat industry.

As evidence, please note the most lengthy section of the NMMA/HIA letter is a set of accident data compiled by Mr. Snyder of Mercury Marine (part of Brunswick).

As to NMMA speaking through HIA, the NMMA/HIA letter frequently opens sentences with "NMMA and HIA ...". Since it is a houseboat issue and NMMA is the broader organization, plus just being alphabetical, one would expect those sentences to begin with "HIA and NMMA ... ".

Several other signals indicate NMMA is speaking through HIA. The letter:

1. Never attributes a single point to HIA alone.
2. Mentions no HIA officers by name or position.
3. Refers to no companies as being members of HIA.
4. Is signed by Mr. McKnight of NMMA, but bears no HIA name or signature.
5. Is on NMMA letterhead and does not bear HIA's logo (which is a variant of NMMA's logo).
6. The letterhead used is from NMMA's Washington D.C. legislative office, not from NMMA's Chicago office used as HIA's address.
7. The bottom of the letterhead (used on Page 1) lists members of NMMA's Executive Committee by name. No similar list is provided for HIA.
8. Refers any questions or comments about the letter to Mr. McKnight at NMMA's Washington D.C. office, not to HIA.

We also find it interesting these two organizations are in perfect agreement on every point.

In today's time, HIA relies on NMMA for certification of vessels built by HIA members. NMMA wields considerable power over HIA.

In our opinion, NMMA and HIA were used by large companies as another mouthpiece for their views.

There is certainly nothing wrong with NMMA representing its members. However, they should not misrepresent themselves as coming to HIA's aid to help block the proposed regulation, when they really had a different agenda. In our opinion, NMMA was just using HIA as another letterhead to voice the opinion of NMMA's larger members interested in blocking the NPRM.

---

[101] NMMA Current Dues Schedule.
http://www.nmma.org/members/info/dues.asp Retrieved May 6, 2010.

SBREFA Review

Our government requires proposed rules resulting in significant economic impact upon a substantial number of small businesses to undergo an in depth cost-benefit analysis. This process is often called a SBREFA review after the name of the regulation, Small Business Regulatory Enforcement Fairness Act.

USCG concluded this NPRM did not have a significant economical impact on a substantial number of small businesses. As a result, they did not conduct a SBREFA review. On page 5 of their letter, NMMA and HIA disagree with USCG's decision.

NMMA and HIA urge USCG to conduct a SBREFA review to access the proposed rule's impact on small entities. NMMA's reasoning behind this urging will become more apparent after reading our discussion of the Small Business Administration Office of Advocacy public comment letter. SBA would have been closely involved in preparing the SBREFA review. Their input would, in our opinion, have been strongly biased in favor of NMMA/HIA's position.

NMMA/HIA Cost Estimate

Page 11 of NMMA/HIA's letter states:

"**NMMA and HIA estimates of the total cost of implementing the three proposed propeller injury avoidance measures to be $3303.70 per houseboat**."

NMMA/HIA's 2002 estimate of $3,303.70 is exorbitantly high for several reasons. Among them, their example:

1. Uses a boat not representative of most of houseboats to be modified. NMMA/HIA chose a 61 foot rental Sumerset houseboat with twin engines and flybridge controls. The example originates in a comment letter from Lake Powell,[102] an Aramark facility. According to our estimate, rental houseboats with twin engines and flybridge controls represent about 2 percent of the houseboat population, and are by far the most expensive to modify (see Chart 2). **Nonrental houseboats represent 95 percent of the population and cost less than $200 to modify in 2002.**

2. Hauls and launches the houseboat from the water TWICE. Once to install propeller guards and again to install a swim ladder interlock. Even if the boat had to be hauled, both modifications could be performed in the same hauling. Furthermore if you install propeller guards you do not need a swim ladder interlock to comply.

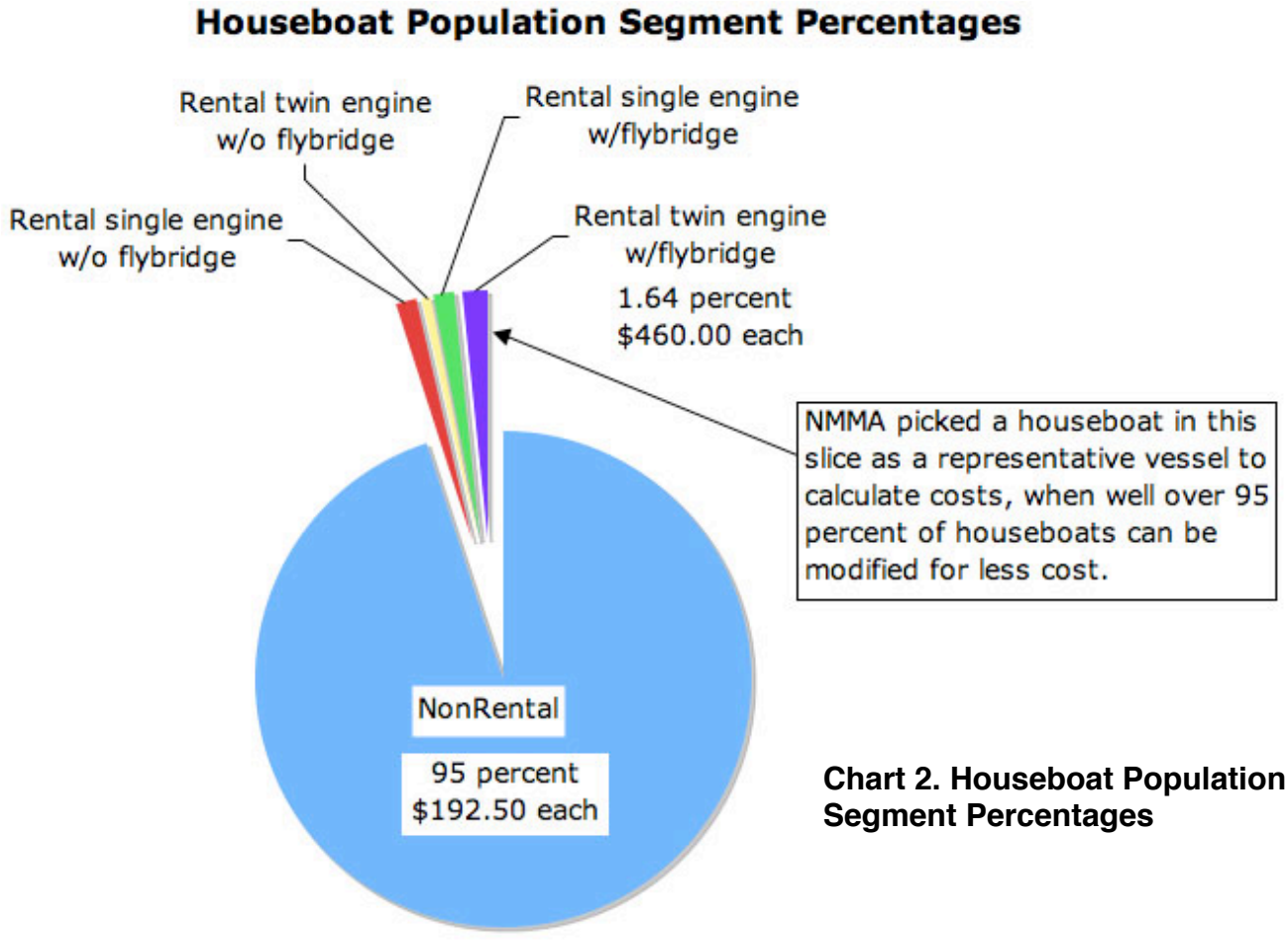


Chart 2. Houseboat Population Segment Percentages

[102] Mark Suttie, Director of Environmental Management, Lake Powell, managed by Aramark letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-54. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1c0&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

3. Fails to acknowledge some propeller guards can be mounted directly from the water with no drilling. They do not require hauling the houseboat from the water.

4. Includes all three modifications PLUS two propeller guards. Not one of the 100,000 houseboats in the United States needs all three modifications plus propeller guards to meet the NPRM. Page 11 of their letter clearly states the cost estimate is for "three proposed propeller injury avoidance measures", but they include the cost of all four.

5. Uses two swim ladder interlocks. We were unable to find a single Sumerset Houseboat (used in their example) that had two aft swim ladders on it. In addition, if a houseboat did have two ladders, it would not need two swim ladder interlock systems, it would only need two sensors.

6. Inflates 2002 component costs at almost every step as seen in the following section titled, "Examples of Inflated Component Cost".

NMMA and HIA issue a challenge on Page 2 of their letter:

"NMMA and HIA challenge the US Coast Guard's proposed solutions to reducing propeller injuries."

Our Challenge to NMMA/HIA

NMMA/HIA's challenge to USCG was somewhat nebulous. We have a much more specific challenge for them. We (Propeller Guard Information Center) challenge NMMA and HIA to defend their 2002 estimated cost of $3,303.70 per houseboat against the previous six numbered bullet points. They might also wish to explain why their estimate is so much higher than others (see Table 27).

Earlier drafts of this report invited NMMA/HIA to respond and have their comments published here. When we finished the Third Rough Draft, I sent the email on the next page inviting them to respond.

NMMA Press Release:

After USCG rejected the NPRM, NMMA, issued an October 22, 2007, press release titled, Recreational Boating Industry Supports USCG Withdrawal of Houseboat Propeller Guard Proposal.

The press release is composed of comments from John McKnight, NMMA Director of Environmental and Safety Compliance, and signer of the NMMA/HIA comments letter discussed in our report.

He says, "The Coast Guard originally proposed this rule as a first step that would eventually consider requirements for propeller guards or avoidance measures on all propeller driven boats."

It sounds like part of their resistance was similar to the National Riflemans Association resistance to banning assault weapons. They feared that giving any ground, would lead to giving up all their weapons / open propellers.

Mr. Knight goes on to say, "NMMA, working closely with the Small Business Administration (SBA), found that safety education and labeling provide a more effective way to reduce propeller-related accidents than requiring a propeller guard or opting to impose U.S. Coast Guard proposed avoidance measures."

Copy of our email requesting an NMMA/HIA response:

Date: Wed, 5 Aug 2009
Subject: USCG Houseboat Propeller Safety Proposal

To: John McKnight
Director, Environmental and Safety Compliance
NMMA

From: Gary Polson
Propeller Guard Information Center

Subject: Possible errors in your 2002 public comment letter to USCG on proposed houseboat propeller safety measures

Hello!

You may be aware we have been examining USCG's withdrawal of their proposed houseboat propeller safety regulation in October 2007.

We are compiling our findings into a report and recently posted the 3rd rough draft online. It can be downloaded from:

http://www.rbbi.com/pgic/houseboats/index.htm

You authored a letter in the USCG public comment period in conjunction with the Houseboat Industry Association (HIA).

A link to your comments is below:

http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf

Our rough draft includes a review of your letter (currently on pages 75-97) and identifies what we feel to be six errors in your cost estimate (currently identified on pages 78-79). We invite NMMA and/or HIA to formally respond to the six errors we identified in your cost estimate and will publish your (NMMA/HIA) response as part of our final report.

Please limit your formal response comments to the six cost estimate errors we identified. We welcome any comments you may have on other areas of the paper, but please send them separately from your cost estimate response.

We are now doing the final edit (just checking spelling, spacing, formatting, grammar, adding page numbers to table of contents, etc) and plan to finalize it over the next few weeks.

We have saved a maximum of four pages within the report for an NMMA / HIA response to the six cost analysis errors we identified in your public comment letter.

Would you please relay this letter to HIA. If NMMA and/or HIA wish to formally respond to the cost estimate errors, please send us those comments in electronic format by September 4th.

We can accept most word processing formats, however Adobe Acrobat .pdf might be the best way to maintain your formatting.

Or you can just fax it to (XXX) XXX-XXXX and we can scan it.

If your combined NMMA/HIA response is longer than four pages, please organize it with a four page summary. We will consider placing the remainder of your materials in the appendix or on our web page devoted to the report.

If you elect to formally respond, please do not refer to specific page numbers in the report as those page numbers may change in the final version.

If you have no desire to formally respond, please send us an email or call us to that effect as soon as you reach that decision so we can go ahead and release the final report as soon as we complete our final edit.

Thank you in advance for your time in responding to our request. If you have any questions, please contact me.

If we can ever be of assistance to NMMA/HIA in helping reduce the frequency and severity of propeller injuries, please contact me.

Have a nice day.

gary polson

propeller guard information center

(XXX) XXX-XXXX

On August 12, 2009, I called Mr. John McKnight of NMMA to make sure he received our email inviting NMMA/HIA to respond. Notes of our conversation are below.

John McKnight Response:

He said he received our request and read our comments, but can't answer those questions. The data was generated by SBA. SBA did the economics analysis on cost.

He said, Don't ask me about that stuff. It was a long time ago. Ask me about evaporative emissions, ethanol, or other more current topics.

He said Austin Perez (SBA) put those comments together.

Mr. McKnight provided some of his general opinions about the NPRM, then said it was tabled due to expense.

I said we were mostly asking NMMA about the six bullet points concerning the cost estimate, why the boat was pulled from the water twice, etc.. He said he thought those numbers came from Forever Resorts (the Appendix of his letter shows the costs came from Lake Powell / Aramark).

He did not respond to any of our six cost estimate bullet points and I did not press him. Mr. McKnight was very cordial and said he was sorry for not responding earlier. I thanked him for visiting with us.

We appreciate Mr. McKnight's comments, but are disappointed NMMA/HIA elected not to defend their comments against the six bullet points.

We (PGIC) still openly extend the challenge issued on page 84 of this document to NMMA. We are still awaiting your response.

INTENTIONALLY BLANK

Examples of Inflated Component Costs

NMMA/HIA's example used dual engine kill switches (EICOS) from Mercury for $66.75 each.

First, only about half all houseboats have twin engines and would need a dual EICOS. Single engine EICOS were previously estimated at $40 in the NPRM.

Second, major manufacturers like Mercury are well known for high priced service parts. This is why other companies manufacture and sell aftermarket "will fit" parts. BOATUS tested four aftermarket EICOS in their November 2006 issue.[103] They tested the Sea Dog Universal Kill Switch, Cole Hersee Emergency Cut-Off Switch, Sea Choice Kill Switch, and Sierra Emergency Cut-Off Switch. All four performed satisfactorily. Costs ranged from $12.29 to $27.59 with an average cost of $20.71 v. the $40 estimated by the NPRM or the $66.75 used by NMMA/HIA.

Before someone from Mercury claims these are not high quality Original Equipment Manufacturer (OEM) parts, we would like to point out that Brunswick (parent company of Mercury) currently (2008) sells at least three of these product lines through their marine parts distributing company, Land'N'Sea. If they are not any good, why is your parent company (Brunswick) selling them?

As noted by NMMA/HIA, dual engine installations will require dual EICOS. Saf-T-Stop Switch dual engine EICOS were available in May 2010 from CP Performance for $24.99 v. the $66.75 used by NMMA/HIA in 2002.[104]

Instead of using the 7 inch by 9 inch typical $20 truck mirrors suggested by USCG, NMMA/HIA's example used large, expensive, industrial mirrors ranging in size from a 12 inch diameter mirror to an 18 inch by 26 inch rectangular mirror. Mirrors that large could create a "blind spot" themselves.

The invoice NMMA/HIA supplies for propeller guards lists them at $299 each (not the $333.50 stated in their summary). Their example requested special powder coating, at an additional charge of $34.50 each.

In summary, NMMA/HIA inflated 2002 costs of single EICOS, dual EICOS, mirrors, and propeller guards.

NMMA/HIA Accident Data

As with most other groups responding, NMMA/HIA did not obtain their accident data directly from the U.S. Coast Guard Boating Accident Report Database (BARD). NMMA/HIA's comment letter includes a compilation of houseboat propeller accidents developed by Richard Snyder, retired employee of Mercury Marine. The same compilation is referenced in comments from Mr. Snyder himself, Joe Pomeroy of Mercury Marine, and by the Office of Advocacy of the U.S. Small Business Administration. Those basing their comments on his compilation, did not all reach the same accident counts.

NMMA/HIA provides a copy of Mr. Snyder's compilation of BARD reported accidents in their comment letter as Appendix A: Houseboat Propeller Accident Data: 1990-1998.[105] This and other compilations of houseboat propeller accident data are discussed in our **Appendix C**.

---

[103] Keeping Current on Kill-Switches. BoatUS Magazine. November 2006. Pgs. 48-49.

[104] Saf-T-Stop Switch. 855-KS-22. Brand Name T&H Marine. Sold by CP Performance. http://www.cpperformance.com/p-13200-saf-t-stop-switch.aspx Retrieved May 6, 2010.

[105] John McKnight, Director Environmental and Safety Compliance. National Marine Manufacturers Association letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-88. Pgs. 15-27. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

We will now develop the NMMA/HIA accident count from text in their letter, along with two counts of 1991-2000 U.S. houseboat propeller accidents by us (PGIC) and compare them:

1. NMMA/HIA houseboat propeller accident counts (Table 36)

2. Our own count of the BARD propeller accidents listed as “boat type = houseboat” (Table 38)

3. All U.S. houseboat propeller accidents known to us (PGIC) (Table 40)

NMMA/HIA discuss accident counts on Pages 3 and 4 of their comments. They divide accidents into 5 year periods (1991-1995 and 1996-2000), then segment the 5 year periods into “rental only” or “all houseboats” categories, and by drive type (inboard, outboard, stern drives). In addition, NMMA/HIA segment accidents by nonfatal injuries and fatalities. We assembled data from the text of their discussion in our houseboat propeller accident Tables 34 (Rental) and Table 35 (All Houseboats).

Table 34

BARD Reported Rental Houseboat Propeller Accidents per NMMA/HIA Comments

Drive Type	1991-1995		1996-2000	
	Injury	Fatality	Injury	Fatality
IB	3	0	0	0
OB	3	0	1	0
SD	4	2	0	0

Table 35

BARD Reported “All Houseboats” Propeller Accidents per NMMA/HIA Comments

Drive Type	1991-1995		1996-2000	
	Injury	Fatality	Injury	Fatality
IB	3	0	1	0
OB	5	0	2	0
SD	9	2	3	0

Boating industry representatives often segment accident data into small niches like this to make the accident counts appear smaller. For example, instead of addressing the total number of accidents (25 by adding up all the cells in Table 35), they say there were only 3 houseboat inboard propeller injuries from 1991-1995.

In efforts to segment accident data into ever smaller categories, NMMA/HIA fails to mention stern drives are frequently misclassified as inboards and vice versa, due to stern drives being known as inboard-outboards or IO’s. BARD inboard and inboard-outboard accident data are suspect to misclassification errors.

NMMA/HIA also failed to notice some BARD reported houseboat propeller accidents do not specify a drive type. Those accidents are not included in NMMA/HIA’s discussion of accident counts by drive type.

To prepare NMMA/HIA findings for comparison with other interpretations of BARD, we combined Table 34 (Rental) and Table 35 (All Houseboats) as Table 36.

Table 36 Summary of BARD Reported Houseboat Propeller Accidents per NMMA/HIA Comments				
Years	Rental Houseboats		All Houseboats	
	Injury	Fatality	Injury	Fatality
1991-1995	10	2	17	2
1996-2000	1	0	6	0
Totals	11	2	23	2

NMMA/HIA's comments identify each accident as a propeller/gear case injury, insinuating the injury may have resulted from a gearcase strike instead of being hit by the propeller. While some "struck by motor or propeller" planing boat injuries may have resulted from a gear case strike, most houseboat injuries happen at much slower speeds and are obviously propeller strikes. Furthermore those "sucked into the propeller" from the rear shortly after the drive was put in reverse cannot hit the gearcase unless they go through the propeller first.

We refer those who think propellers cannot suck people into them to **Appendix H**.

We will now closely review the BARD data and develop a similar chart to compare with NMMA/HIA's results in Table 36.

Actual BARD Boat Type = "Houseboat" Accident Count Data

We (PGIC) examined BARD propeller accidents data for boats BARD classified as houseboats very extensively during the preparation of this report. A spreadsheet listing each houseboat propeller accident we identified is in **Appendix D**. Table 37 counts accidents from our **Appendix D** for which USCG listed "Houseboat" for boat type. Table 37 does not include some accidents we found misclassified in BARD. It also does not include some accidents we found not listed in BARD.

We created Table 37 to allow a direct comparison with other sources not counting misclassified or unreported accidents.

Table 37

1990-2000 BARD Reported USCG Boat Type = "Houseboat" Propeller Accidents
Including Fatalities per Appendix D

Not Including accidents misclassified in BARD or not reported in BARD

Year	Rental Only	Non-Rental Only	Un-known	All House boats
1990	1			1
1991	1			1
1992	3	2		5
1993	3	2	1	6
1994	1			1
1995	2	2		4
1996	1	2*		3
1997				0
1998				0
1999		3		3
2000	1**	1		2

*The 18 May 1996 Beattie accident was classified as nonrental by BARD and in this table. However, it was a rental accident.

**The 12 Sept 2000 Shrayber accident shown here was originally entered into BARD, then later removed at the request of the State of California. Some versions show "0" here.

Table 38 compresses Table 37 into a format similar to Table 36 (the NMMA/HIA data).

Table 38

BARD Reported Houseboat Boat Type = Houseboat Propeller Accidents per Propeller Guard Information Center

Not Including accidents misclassified in BARD or not reported in BARD

Years	Rental Houseboats		All Houseboats	
	Injury	Fatality	Injury	Fatality
1991-1995	8	2	15	2
1996-2000	2	0	8	0
Totals	10	2	23	2

Table 36 which summarized NMMA/HIA's interpretation of BARD reported houseboat propeller accidents is repeated below for direct comparison with our interpretation of BARD properly classified data in Table 38 above.

Copy of Table 36

Summary of BARD Reported Houseboat Propeller Accidents per NMMA/HIA Comments

Years	Rental Houseboats		All Houseboats	
	Injury	Fatality	Injury	Fatality
1991-1995	10	2	17	2
1996-2000	1	0	6	0
Totals	11	2	23	2

We subtracted the entries in Table 36 (NMMA/HIA) from those in Table 38 to find the difference in our two interpretations of the BARD data (not including accidents misclassified by BARD or accidents not reported by BARD). The results are shown in Table 39.

Table 39

PGIC Count minus NMMA/HIA Count

Difference in BARD Reported Houseboat Propeller Accidents (Table 38 minus Table 36)

Not Including accidents misclassified in BARD or not reported in BARD

Years	Rental Houseboats		All Houseboats	
	Injury	Fatality	Injury	Fatality
1991-1995	-2	0	-2	0
1996-2000	1	0	2	0
Totals	0	0	0	0

Overall totals are close, but NMMA/HIA counted two more 1991-1995 rental accidents and one less 1996-2000 rental accident than us. They also counted one less 1996-2000 non rental accident than us.

Those differences allowed NMMA/HIA to create the impression of a more pronounced trend in accident reduction between the two five year periods than actually existed. They emphasize this trend on Page 3 of their letter:

"This clearly represents a trend in the reduction of propeller related accidents on rental houseboats."

NMMA/HIA' s self reported trend will be shown to have been greatly over exaggerated later when we include houseboat propeller accidents they failed to find.

Differences Between NMMA/HIA and PGIC Accident Counts

We will now identify the specific accidents that led to differences between our and NMMA/HIA's interpretations of the NMMA/HIA BARD data compilation.

Before we do, we will briefly discuss the U.S. Coast Guard Boating Accident Report Database (BARD) from which the NMMA/HIA data was compiled. BARD is discussed more in depth in **Appendix C**.

Each BARD reported accident has many data fields. Among those fields are three for Accident Types (such as "struck by boat or propeller", "struck by boat" or "struck by propeller/engine") and three for Accident Descriptors (such as "struck by boat", "struck by propeller", or "unable to determine if struck by boat or propeller". Accident Types and Accident Descriptors have changed some through time. Earlier (pre 1995) versions of BARD used numerical codes to represent the entries making interpretation of the raw data more difficult. "60" was the accident descriptor code for "struck by propeller" prior to 1995.

In an earlier docket, USCG Docket 10299, USCG supplied a group of documents listing several BARD data fields for 1988-1995 recreational boat propeller accidents.[106] The USCG 10299 Docket series of documents list every BARD reported accident with a "60" in any of its accident descriptor data fields ("60" represents "struck by propeller") for all types of boats.

NMMA/HIA (and we) tried to eliminate all accidents on the NMMA/HIA compilation (Ap-

[106] Report: Recreational Boating Accident Data and Boating Accident Coding Instructions. USCG-2001-10299. Supporting and Related Materials. Documents 0004 through 0007. http://www.regulations.gov/fdmspublic/component/main?main=DocketDetail&d=USCG-2001-10299 Retrieved May 6, 2010.

pendix D of their letter) indicated as being "struck by boat". We generally seemed to agree. Differences in our counts of these accidents arise from them failing to address boats with no drive type specified, failing to use the 10299 Docket materials to eliminate a few accidents, and failing to include a 2000 BARD reported California rental houseboat accident on their compilation of accidents.

Processes used to eliminate specific accidents from the NMMA/HIA list and the differences in our accident counts will now be discussed in considerable detail for each of the four segments (Rental 1991-1995, Rental 1996-2000, All Houseboats 1991-1995, All Houseboats 1996-2000).

Differences Rental 1991-1995 - NMMA/HIA list 14 rental accidents from 1991-1995 in Appendix A of their letter but only count 12 of them (10 injury plus 2 fatal) in the discussion in their letter.

Prior to 1995 USCG bundled these accidents as "struck by boat or propeller". NMMA/HIA (and we) eliminated "Rental" accidents #4 and #12 due to each of them having an accident type of "struck by boat" to arrive at a total of 12 rental accidents from 1991-1995.

We checked marine drive types on the remaining 12 accidents to verify the count per drive type matched NMMA/HIA's discussion, and it did. This reasonably confirms the two accidents listed above are the ones they eliminated.

NMMA/HIA also missed an accident meeting their criteria listed in their own table. 1993 "All Houseboats" Accident #11 is a rental boat, but it is not listed on their "Rental" page. It has a lower case "y" (for Yes) in the rental column. Other rental houseboats on that list have an upper case "Y". Accident #11 was probably missed when Mr. Snyder or someone else computer sorted those with an upper case "Y" to form the "Rental" list. We were unable to confirm this particular accident as a propeller accident. It has an accident type of "struck by boat or propeller", but does not include a "60" in the accident descriptors. However, it would have met the NMMA/HIA's criteria and does not show on their list.

They even missed it in their discussion of "All Houseboat" accidents because they failed to include accidents involving boats with no drive type specified, We eliminated it due to not being able to confirm it as a propeller accident from the information available.

We, PGIC, eliminated two additional rental accidents from the NMMA/HIA list. We will now explain why we eliminated those accidents.

The accident type code used by NMMA/HIA in selecting accidents for their list prior to 1995 is for "struck by boat or propeller". In addition to removing the two accidents mentioned above, we also removed two more for which the USCG Docket 10299 accident compilation did NOT list because they did not include a "60" in any of their accident descriptors. We are unable to confirm them as propeller accidents from the information before us so we left off two of the 1994 accidents, #9 and #10 on the NMMA/HIA Rental accident list. These same two accidents are listed as #15 and #16 on the "All Houseboats" list.

In summary, for rental accidents 1991-1995, we arrived at two less accidents than NMMA/HIA. The difference was due to our elimination of two 1994 rental accidents they counted.

Differences Rental 1996-2000 - NMMA/HIA list 3 rental accidents from 1996-1999 on their Rental Accidents list, but only count one in their discussion. They (and we) both eliminated accidents #16 and #17 on their Rental accidents list due to accident types of “struck by boat”.

We list one more 1996-2000 rental accident than NMMA/HIA. They failed to list the 12 Sept 2000 Shrayber accident in California. As mentioned earlier, California ceased supplying complete individual accident reports to the USCG in 2000 and asked USCG to cease making their previous data public.[107]

The Shrayber accident appears in one version of BARD we have, but very minimal details are provided (no date, no location, etc.). However in that version it is clearly labeled as having a water jet propulsion system. (Has a “5” in the Propulsion field). The Shrayber accident is absent from the Microsoft Access version of BARD.

NMMA/HIA probably missed the Shrayber accident either by accepting USCG’s misclassification of the houseboat as having water jet propulsion (the accident resulted in a well known propeller guard case, it was a propeller driven houseboat), or by searching in a version of BARD that excluded California accidents.

[107] Accidents Dates, Locations Not Made Public Record. Thomas Peele. Contra Costa Times. July 2, 2006. http://www.contracostatimes.com/ci_5714668 Retrieved May 6, 2010.

Differences "All Houseboats" 1991-1995
NMMA/HIA list 25 "All Houseboats" accidents from 1991-1995 in their appendix, but only include 19 in their discussion.

We will now identify the six accidents they dropped. (25 - 19 = 6)

From our earlier discussion they (and we) eliminated #4 and #12 on their rental list (#5 and #18 on their "All Houseboats" list) due to an accident description of being "struck by boat".

They (and we) also dropped "All Houseboats" accidents #19 and #21. Both have an accident type of being "struck by boat".

NMMA/HIA (and we) dropped "All Houseboats" accident #24. It was a second vessel involved in the same accident as accident #25.

They omitted "All Houseboats" accident #11 in error due to it not specifying a drive type. NMMA/HIA grouped accidents by drive type and failed to recognize some accidents did not specify drive type.

In summary, NMMA/HIA dropped six accidents 1991-1995 "All Houseboats" from the list in their Appendix when they discussed the accident counts. We checked the 19 remaining 1991-1995 "All Houseboats" accidents by drive type against the counts in their letter and they are correct. This reasonably confirms our determination of which accidents they counted.

We dropped five of the six dropped by NMMA/HIA. Then upon closer examination, we dropped the sixth one ("All Houseboats" accident #11) due to its accident type of being "struck by boat or propeller". It did not have a "60" in the original accident descriptors.

We, PGIC, counted only 17 of their 1991-1995 "All Houseboat" accidents list of 25. We dropped the six above plus two more.

Please recall that earlier we dropped Rental Accidents #9 and #10 (now "All Houseboats" accidents #14 and #15).

We almost dropped accident #2 on the NMMA/HIA "All Houseboats" list for being described as "struck by boat or propeller" in the NMMA/HIA "All Accidents" list. However, it does have a "60" (accident descriptor code for "struck by propeller") in the accident descriptions on the old 10299 Docket list so we retained it. For some unknown reason that entry (Accident Descriptor 2) is empty in the NMMA/HIA print out.

Differences All Houseboats 1996-2000 -
NMMA/HIA list 25 “All Houseboats” accidents from 1996-2000 in their appendix but only count 6 of them in their discussion.

We will now identify the 19 accidents they dropped. (25 - 6 = 19)

As mentioned earlier, they dropped accidents #16 and #17 on their Rental accidents list (#34 and #36 on the “All Houseboats” accident list) for accident types of “struck by boat”.

In addition, they dropped fifteen more “All Houseboats” accidents (accidents #27, 30, 31, 32, 33, 35, 37, 38, 41, 43, 44, 46, 47, 49, and 50) for an accident type of “struck by boat”.

NMMA/HIA failed to analyze “All Houseboats” accident #39 due to it not listing a drive type, however we dropped it as well because it had an accident type of “struck by boat”.

They dropped one additional accident. We turned to analyzing the accidents by drive type to determine which one. The bottom of page 3 of their letter clearly states there were two 1996-2000 outboard propeller / gear case injuries. Removing the accidents listed above leaves three outboard accidents (“All Houseboats” accidents #28, 29, and 45). For some unknown reason they removed one of those remaining three. It may have been “All Houseboats” accident #28 as it occurred on the St. Lawrence River within sight of the U.S.-Canadian border. We retained that accident.

In summary, NMMA/HIA dropped 19 accidents from their roster of 1996-2000 “All Houseboats” struck by boat or propeller list. We dropped eighteen of them and retained one outboard accident they eliminated (either “All Houseboats” accident #28, 29, or 45).

As mentioned earlier, we also added the 12 Sept 2000 California rental accident (Shrayber) which they missed.

More Accidents Not on the NMMA/HIA List - During our examination of 1991-2000 BARD data, we identified some BARD reported houseboat propeller accidents incorrectly classified as other types of vessels. We also identified some well documented houseboat propeller accidents that are not in BARD.

We will now develop a table of all 1991-2000 U.S. houseboat propeller accidents we (PGIC) have been able to verify for comparison with our summary of the NMMA/HIA data (Table 36). This will be done by adding the misclassified and unreported accidents identified in **APPENDIX D** to the BARD properly classified accidents (in Table 38).

BARD misclassified at least three houseboat propeller accidents as other types of vessels from 1991-2000, and failed to report two other accidents covered by the media and in USCG docket comments. These five accidents are briefly identified below.

1. Misclassified 21 June 1997 53 foot Stardust houseboat accident as a cabin motor boat.

2. Misclassified 18 June 1998 40 foot houseboat accident as a cabin motor boat. BARD even lists the “boat model” as “houseboat”.

3. Misclassified 1 July 2000 47 foot Drifter houseboat accident as a cabin motor boat.

4. Failed to report 11 May 1993 Falvey accident on Lake Mead.

5. Failed to report 28 May 1995 Larry Elmore accident on Lake Shasta.

The five accidents listed above are in addition to the California 12 Sept 2000 Shrayber accident which was properly classified in some version of BARD but is absent from the NMMA/HIA list.

Further details on each accident listed above are available in **Appendix D**. For a complete list of which accidents were included by NMMA/HIA and others in their accident counts, see **Appendix E**.

Table 40 adds these five accidents to our “All Houseboat” statistics from Table 38 and compares them with NMMA/HIA’s statistics.

Table 40

Comparison of “All Houseboats” Propeller Accidents Data From PGIC (Appendix D) and NMMA/HIA (Table 36)

Including SOME accidents misclassified in BARD or SOME not reported in BARD

Years	1991-1995		1996-2000	
Data Source	Injury	Fatality	Injury	Fatality
PGIC	17	2	11	0
NMMA	17	2	6	0
Difference	0	0	5	0

As seen in Table 40, our “All Houseboat” accident counts for 1991-1995 were the same (although we did delete some of their accidents and found others not listed by them). The major difference lies in 1996-2000 “All Houseboats” accident counts where we found five more than NMMA/HIA.

By leaving out these five recent accidents, NMMA/HIA was able to convince USCG of the “apparent” success of warnings and educational programs in reducing propeller accidents and that no further action need be taken. Per Page 5 of their comments:

“Increased training and safety awareness is clearly supported by trends in the USCG boating data.”

What is “clearly supported”, is NNMA/HIA left out at least five recent accidents. Furthermore, they “padded” the earlier accident counts with two accidents labeled as “struck by boat or propeller” that were unable to be positively classified as propeller strikes. Including them helped NMMA/HIA illustrate the trend they wanted to demonstrate.

Accident Trends & Risk Reduction

Building upon their self created significant decrease in the number of houseboat propeller accidents, NMMA/HIA state on page 4:

"With no fatalities reported since 1996, and a clearly evident trend towards a reduction in accidents and injuries, NMMA and HIA challenge the USCG to provide data that supports the need for this rule. NMMA and HIA attribute the trend in reduction in accidents and total elimination of fatalities to increased education and awareness."

USCG did provide data supporting the need for this NPRM. NMMA and HIA misinterpreted the data and presented their findings in manner that misled USCG.

Page 4 of the NMMA/HIA letter continues:

"NMMA and HIA attribute the trend in reduction in accidents and total elimination of fatalities to increased education and awareness. With the manufacturers and rental operations providing both customer training and labeling of hazard points, propeller accidents have been reduced and fatalities virtually eliminated."

Fatalities have not been eliminated. Accidents are still happening. The differences between a propeller accident that result in a serious injury and one that results in a fatality are random. If you start the propeller "x" times with people in the water behind the boat, you will get some close calls, some serious injuries, and some fatalities.

These accidents are still happening AND still being misclassified. A 45 year old woman was severely injured here in Oklahoma on Lake Tenkiller on April 19, 2008 while we were writing this report.[108] [109] She and another person slid down a houseboat water slide just as the engines started. The woman was "sucked into the prop", struck in the leg, and life flighted to a major Tulsa hospital. The BARD 2008 database later misclassified this accident as a Cabin Motorboat instead of as a Houseboat.

Among primary predictors of propeller strike survivability are:

1. Being struck in the head[110] (contra-indicator)

2. Paramedic response time

3. Transport time to a major trauma center

4. Age, health, and overall fitness of the person struck

These predictors have nothing to do with education and awareness of the danger. Anyone who recognizes propeller accidents are still happening and thinks fatalities are over, needs to rethink their position. How can they reconcile NMMA/HIA's statement, "fatalities virtually eliminated" with the Sylvia Rozon accident?

In October 2005 her husband, Richard Rozon, was an employee of Lake Powell Resorts & Marinas, one of the largest houseboat rental operations, the same Aramark location supplying the cost data in this section. He rented a houseboat through the employee rental program, went out on the water with his wife. She (Sylvia Rozon) was killed by a houseboat propeller. If their own employees are involved in fatal houseboat propeller accidents, how can they protect renters with just training and decals?

---

[108] Woman Injured When Sucked Into Boat Prop. MuskogeePhoenix.com. April 20, 2008.

[109] Woman Hurt in Boat Accident. Tahlequah Daily Press. April 22, 2008.

[110] ABYC Project Interface Project Technical Committee Meeting Minutes. November 5, 2008. Baltimore Maryland. CED Investigative Technologies slide titled, Location of Reported Injury.

No Single Failure

Similar to the "Safety Hierarchy", "No Single Failure" is another well known engineering safety principle:

"No single occurrence, human error, component failure, or malfunction will cause injury or major damage." [111]

Starting an unguarded houseboat propeller in reverse with someone in the water close behind it will almost instantly result in very severe injuries or death. This violates the "no single failure" principle, and affirms the need for guards and/or interlocks.

The Setting Makes a Difference

In the very early days of outboard motors, propellers were an acknowledged risk. They were somewhat obvious, in part because boaters often carried the outboard and clamped it to the boat before they took off. Propellers were smaller in diameter and lower in horsepower than today's recreational boat propellers resulting in a smaller danger area and less risk of being "sucked in". Early outboard boats were smaller, making it easier to keep track of the few people aboard, and easier to view the water near the stern.

Owners of early outboards were often outdoorsmen, grew up around farm equipment, and knew to give propellers and other rotating machinery a wide berth. Many of today's operators have little experience working around rotating equipment. Propeller risks have been grandfathered into our culture and now pose a significant risk, especially on rental houseboats.

If a new recreational/leisure activity were to introduce a similar hazard today, it would face much tougher scrutiny. For example, suppose a Jacuzzi/hot tub was designed for use at health clubs for boaters. Along with a submerged bench seat on one end for users to enjoy the hot tub, the opposite end has a "false transom" for accepting outboard motors (up to 135 horsepower) for wet testing. One or more members could leave their outboard mounted to the false transom and come and go while others enjoy the hot tub.

Those in the hot tub would sit on a bench seat with their toes just a few feet from the propeller blades. If the propeller were to be started in reverse, it would almost instantly pulls the feet and legs on those in the hot tub into the propeller. A switch that starts the outboard is on the wall in the hall about 30 feet from the door to the hot tub room. On the wall next to the switch is a control box (shifter and throttle). A small decal similar to Decal 4 (NMMA's prop helm Label #NW 207-07), is on the wall near the switch. It warns of danger to anyone in the hot tub, but those flipping the switch cannot see if the hot tub is occupied from where they are standing.

Decal 4
NMMA Propeller Helm Warning

Plus the switch is not just accessible to the person testing their outboard. Any kid walking down the hall could flip the switch and play with the control box (shifter and throttle).

Society would never accept the hot tub example just discussed. However, the only difference between it and those approaching the stern ladder of a houseboat from the water, is those in the hot tub would be better able to see the propellers and more aware of their presence.

---

[111] Product Safety Management and Engineering. Willie Hammer. American Society of Safety Engineers. Second Edition. 1993. Pg. 100.

Education

NMMA/HIA's letter concludes on Page 13 with the following statement:

"The most effective method of reducing the risk of injury from recreational boats, regardless of the hazard, is to increase education for boating safety."

NMMA/HIA is stating training and education, the 5th step of the Safety Hierarchy (see PC Objection 9, Propeller Warning Signs Are Not the Answer), is more effective than the first four steps: (1) Eliminate the hazard, (2) Use guards, shields or barriers, (3) Use safety interlocks, (4) Warnings. In so doing, they are going against decades of proven engineering safety principles. By NMMA/HIA logic, there is no reason for any safety devices on a boat, including fire extinguishers and PFDs. You just need to educate boaters not to start fires and not to drown.

Often, not all those on a rental houseboat go through the full orientation. Some on board may receive no training at all. Furthermore, houseboating can be by its very nature, a partying, laid back atmosphere in which those on board put off their concerns, relax, and may forget any training they may have received. In addition, those onboard often experience boater fatigue from long hours of exposure to the sun, water, and heat making them less observant and less careful.

Several YouTube videos portray the partying atmosphere that can surround rental houseboats.[112] Besides the party atmosphere on one boat, several houseboats are sometimes rafted together to form a huge party, creating an even greater danger to those in the water.

NMMA/HIA comments on training versus design are reminiscent of a similar comment letter back in 1995 from Holiday Harbor on Lake Shasta.[113] The letter from Holiday Harbor President, Stephen C. Barry, to USCG in response to an earlier proposed propeller safety regulation states:

"The emphasis should be on the education of the public more than the installation of protective devices."

Did Holiday Harbor forget to educate Felix Shrayber when he was severely injured on Lake Shasta by a Holiday Harbor houseboat propeller there a few years after their 1995 letter?

NMMA/HIA is now sending the same message Holiday Harbor did. Do they really know better than thousands of engineers and safety professionals? Is education the magic bullet, especially considering the partying atmosphere and boater fatigue, we think not.

---

[112] Typical YouTube Videos include: Shasta by peterstompson added 1 March 2007 http://www.youtube.com/watch?v=fvTuADEG91A Retrieved May 6, 2010.

and Houseboating 2007 by stevewehaveaproblem added 4 July 2007. http://www.youtube.com/watch?v=1w-UtpqF6qs Retrieved May 6, 2010.

[113] Holiday Harbor 30 October 1995 Letter to USCG from Stephen C. Barry President. USCG 95-041 / 10299-1907. Received 31 Oct 1995 by USCG. (pdf page 37 of the link below). http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064803018f4&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Summary of NMMA and HIA's Errors

To recapitulate some of the errors in NMMA and HIA's comments, they:

1. Inflated NPRM implementation costs by using a boat more expensive to modify than over 95 percent of those subject to the NPRM.

2. Inflated implementation costs by hauling and launching the "representative" boat twice when it did not need to be hauled at all.

3. Inflated implementation costs by including all three modifications PLUS propeller guards in their implementation cost when either option would have complied.

4. Inflated implementation costs by inflating component costs (EICOS, dual EICOS, mirror, swim ladder interlock system, propeller guards).

5. Inflated implementation costs by including two swim ladder interlock systems instead of one.

6. Misrepresented accident data counts by leaving out some accidents properly recorded in BARD.

7. Misrepresented accident data counts by leaving out some accidents previously removed from BARD by the State of California.

8. Misrepresented accident counts by leaving out some accidents improperly classified in BARD.

9. Misrepresented accident counts by failing to recognize some well known accidents not reported in BARD.

10. Misled USCG to believe increased training and safety efforts were having a significant impact on houseboat propeller accident frequency by leaving out several accidents.

11. Failed to recognize many propeller accidents go unreported.

12. Ignored two engineering safety principles, "Safety Hierarchy" and "No Single Failure".

13. Failed to acknowledge the reduced affect of training and warnings in the laid back, party environment sometimes present on rental houseboats.

SBA Office of Advocacy Comments

The Small Business Administration (SBA) Office of Advocacy filed their NPRM comments 11 March 2002.[114] USCG later said they considered this letter to be a major challenge to the NPRM.[115]

SBA opens their letter by challenging the proposal on legal grounds on Page 2:

"The Office of Advocacy asserts that the proposal fails to comply with the requirements of the RFA (Regulatory Flexibility Act) and the Administrative Protection Act (APA) and recommends withdrawal of the proposal for further analysis."

On Page 1 they point out small businesses can sue USCG if USCG fails to comply with RFA section 605. That section excludes an agency from having to perform a regulatory flexibility analysis (in-depth analysis of economic impact on businesses) IF they certify the proposal will not have significant economic impact on small businesses.

USCG certified the proposal would not have significant economic impact on a substantial number of small entities, SBA disagreed.

Citing the APA, on Page 3, SBA states:

"a court may hold an agency action unlawful and set it aside if the findings, and conclusions are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law". Advocacy asserts that the proposal, as published, would not withstand an APA challenge."

These challenges (RFA and APA) were taken seriously by USCG and were among the major reasons the proposal was dropped. We will return to them later in our discussion of SBA's comments.

We will now address the accident and economic impact data SBA uses to substantiate their claims.

Page 3 of the SBA letter states:

"Since 1996 there has been just one injury and no fatalities among rental houseboats."

SBA accident count comments are based on the BARD data compilation provided in NMMA/HIA comments.[116] We analyzed that compilation in our discussion of the NMMA/HIA comment letter and compare it with others in **Appendix C** and in **Appendix E.**

In addition to incorporating errors in the NMMA/HIA compilation of accidents in their findings, SBA even failed to list the one accident they did find in 2000 in their accident chart on Page 12 of their letter. SBA appears to recognize the 5 August 2000 Lake of the Ozarks accident in Footnote #1 on Page 3 of their letter:

"For example, in 2000, there was just one houseboat propeller accident but nearly 8,000 boating accidents reported."

Yet, SBA left the entire 2000 year line off their chart. Their ten year chart only has data for nine years.

SBA cites Richard Snyder, Mercury Marine's well known expert witness, as the source of

---

[114] U.S. Small Business Administration letter to USCG dated 11 March 2002. USCG Docket Item # USCG 01-10163-92. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1eb&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

[115] Comment by Carl Perry, USCG Regulatory Coordinator, at the 70th Meeting of the National Boating Safety Advisory Council (NBSAC) October 28-29, 2002.

[116] John McKnight, Director Environmental and Safety Compliance. National Marine Manufacturers Association letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-88. Pgs. 15-27. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

their accident statistics (the NMMA/HIA compilation).

As mentioned in our discussion of the NMMA/HIA letter, Mr. Snyder fails to count Felix Shrayber's 16 September 2000 rental houseboat propeller accident on Lake Shasta. This well known accident became one of the first propeller cases (Shrayber v. Holiday Harbor) to be reconsidered after the U.S. Supreme Court overturned federal preemption in Sprietsma v. Mercury Marine.

He probably missed it because the State of California quit supplying complete individual boating accident information to USCG in 2000 and asked for removal of earlier data, effectively deleting this accident from some versions of BARD. He may have also missed it because the houseboat involved was misclassified as having water jet propulsion when it was first listed in BARD.

Mr. Snyder also failed to include the misclassified 47 foot Drifter houseboat propeller accident on 1 July 2000 we mentioned earlier. There were really at least 3 BARD reported houseboat propeller accidents in 2000 (Lake of Ozarks, Shrayber, and the 47 foot Drifter).

SBA's statement of there being only one houseboat propeller injury and no fatalities in 2000 was off by at least a factor of three (the 3 BARD reported accidents just mentioned).

Page 5 of the SBA letter states:

"Swim Ladder Interlock. With this device, the engine would shut off whenever a ladder is lowered near a propeller. This device is designed to prevent the situation where someone is climbing aboard at the same time another begins to operate the houseboat. Not once did BARD statistics indicate that "passenger/skier behavior" was a cause of an accident."

When someone near the rear of a houseboat is injured by a propeller when the operator starts the boat, the error is usually classified as "No proper lookout", not as "passenger/skier behavior". "No Proper Lookout" is actually one of the most frequently listed causes in the NMMA/HIA data. SBA tried to make readers believe statistics do not support need for a ladder interlock, when in fact they scream for one.

Small Business Calculation Errors

SBA committed several errors in estimating the NPRM's impact on small businesses. SBA is supposed to be an expert in helping small businesses identify basic statistics for their industry. They grossly failed to do so in this instance.

Page 9 of the SBA letter states:

"data supports a finding that most of the members of the houseboat rental industry are small. Advocacy compiled information on small businesses based on the North American Industrial Classification System (NAICS) and for NAICS 532292, which includes all recreational goods rental, 24,672 or 98% of the 25,219 firms were defined as small businesses based on SBA's definition of small business (less than $6 million in gross annual receipts)."

SBA made a major error in their calculations. Statistics they provide (24,672 of 25,219 firms) are really for SIC (Standard Industrial Classification) Code 7999 which is for Amusement and Recreation Services NEC (Not Elsewhere Classified). These statistics are NOT for NAICS (North American Industrial Classification System) Code 532292 (Recreational Goods Rental). SBA clearly used the wrong data.

In 1997 the U.S. Census Bureau changed from collecting data based on SIC codes to collecting data based on NAICS codes.

SIC 7999 is a huge classification. It included over 25,000 firms, among others: astrologers, bath houses, bingo parlors, circuses, carnivals, day camps, ag fairs, go cart rentals, miniature golf courses, horse shows, lotteries, off-track betting, parachute training, rental of saddle horses, rodeos, shooting galleries, swimming pools, wax figure expositions, and pleasure boat rentals. Any houseboat rental operation statistics in SIC 7999 are overwhelmed by the tens of thousands of other businesses in the classification.

NAICS 532292 code is far more restrictive, but still includes 1782 firms in 2002 (per us_rec02.txt file on SBA Advocacy web site). These businesses rent recreational items including among others: beach umbrellas, canoes, snow ski equipment, surfboards, tents, water skis, and pleasure boats. All of NAICS 532292 lies within SIC 7999, but it is dwarfed by the size of its parent classification. See Chart 3.

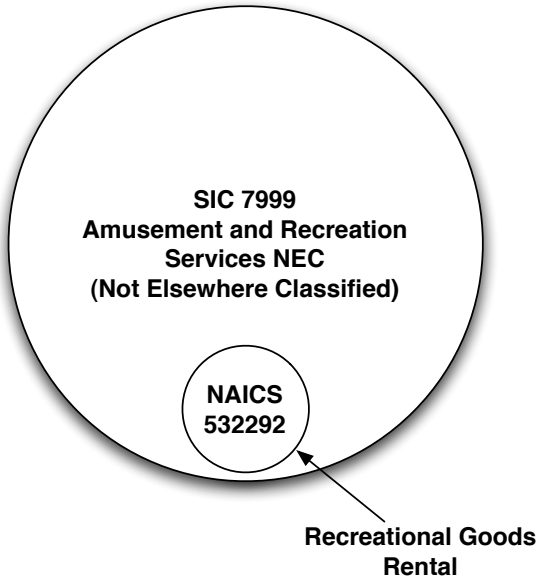


Chart 3 SIC 7999 and NAICS 532292 Drawn to Scale for Number of Firms

SBA used data from a different classification code than they said they were, rendering their economic impact analysis meaningless.

We propose SBA investigate use of NAICS 71393, the NAICS code for marinas, to represent houseboat rental operations in the future. Many houseboat rental firms call themselves marinas. They often provide, food, fuel, marina space for rent, and operate similar to other marinas. The actual NAICS definition for 71393 is:

"This industry comprises establishments, commonly known as marinas, engaged in operating docking and/or storage facilities for pleasure craft owners, with or without one or more related activities such as retailing fuel and marine supplies; and repairing, maintaining, or renting pleasure boats."

An even better solution would be for SBA and/or NMMA/HIA to request houseboat rental operations to supply their actual financial data.

SBA makes one major error after another in their letter. Page 9 continues:

"The information provided indicates that there will be a cost of $300 for the propeller guard per boat owned by a particular facility. Since many houseboats have two propellers, the cost per boat would be $600."

Previously, in Table 4, we showed approximately 52 percent of all houseboats have less than two marine drives. Those houseboats would need a maximum of one propeller guard ($300). SBA says all houseboats will need two propellers guards, when in fact, fewer than half on them will require more than one guard. Also please recall, guards are not required by the NPRM and are the most expensive option.

Many industries have several small companies and a few big ones. The degree to which the industry is concentrated in a few dominant companies is called its "Concentration Ratio". Business Census reports often provide Concentration Ratios for the number of employees, sales, and other variables for specific industries. SBA should be very familiar with this concept.

Page 9 of the SBA letter states:

"There are 5,000 rental boats and 300 facilities averaging about seventeen boats per facility. With an average cost of $600 per boat for seventeen boats, the cost per rental facility is $10,000.

SBA failed to recognize the houseboat rental industry is concentrated in a few very large companies surrounded by many smaller firms. The top 20 houseboat rental companies control well over 1,000 rental houseboats.

A few fleets mentioned their size in comments to USCG.

Lake Powell (Aramark) almost 400 houseboats on Lake Powell

Holiday Harbor (Shasta) - 75 houseboats

101 Boat Dock & 101's Place (Arkansas) - 30 houseboats

Rainy Lake Houseboats (Minnesota) - 29 houseboats

State Dock on Lake Cumberland was said to have approximately 92 houseboats during a bankruptcy sale per a December 2002 report.[117]

Seven Crown Resorts currently (2008) claims 250 houseboats.

The sites just mentioned total to about 875 houseboats. Add in Forever Resorts, Water Resorts, RRE, Holly Creek & Eagle Cove Resorts, and you are probably already past 1,000 houseboats at just these ten companies. To be conservative, we estimate the top twenty companies have a total of 1,000 houseboats. These large houseboat rental operations are dominant in their field of operation and not considered small businesses by SBA's own definition.

If SBA disagrees and feels the top 10 rental operations alone contain 1,000 houseboats, it just makes the following calculations even more in our favor.

5,000 rental houseboats minus 1,000 at the twenty largest facilities leaves 4,000 spread over the remaining 280 facilities. This results in about 14 houseboats per facility (not 17 as calculated by SBA). We suspect the median is much less the 14 boat average just calculated.

---

[117] State Dock May Have New Owners. Times Journal Online (Russell County Kentucky). 5 December 2002.

Only about half of all rental houseboats have two drives (see our Houseboat Statistics section) so propeller guard costs are about 1.5 guards/boat X $300/guard = $450/boat.
14 boats/facility X $450/boat = $6300/facility.

SBA said average costs were $10,000 for these smaller facilities, when they are really closer to $6,300 per facility for those choosing to comply with propeller guards. Actual costs would be even less for those choosing the three devices.

Page 10 of the SBA letter states:

"Using Advocacy's data on SIC 7999, a typical small business in this category generated approximately $300,000 in annual revenue. Therefore, this proposal would require a firm to use 3% of its annual revenue to comply. Advocacy asserts that 3% of a firm's revenue to comply is indeed significant. If 10% of the revenue generated by the typical firm in this category were profit, and this firm had to comply with this rule, the firm would have to forgo 30% of its profit. If a 7% profit margin were the minimum necessary for this business to remain in business, this business would not remain in business."

Earlier, SBA spoke of using NAICS 532292 to represent houseboat rental operators, now they go back to the much broader code, SIC 7999, as shown in Chart 3. Overall statistics for SIC 7999 are not representative of houseboat rental operations. As mentioned earlier, SIC 7999 contains over 25,000 firms ranging from astrologers to wax figure expositions. Any statistics developed from its data have more relevance to astrologers than to houseboat rental operations (there are more astrologers than houseboat rental operations in the classification).

SBA errors again by failing to notice rental operators are given three years to comply with the NPRM. They even quote the three year allowance from the Federal Register on Page 8 of their letter, but are oblivious to it two pages later when they say a typical rental firm would have to spend 3 percent of its annual revenue to comply. Even by SBA's calculations, it would only be 1 percent of annual revenue for three years which greatly reduces the NPRM's impact on annual profit margins.

Rental operators could modify one-third of their fleet each year. Or, they could just set aside one-third of the funds each year for three years. Either approach would reduce the annual economic impact to one-third that calculated by SBA.

Actual costs would be much less than one-third that calculated by SBA, even for those electing to comply with propeller guards.

1/3 X $6,300 = $2,100 per year

versus the $10,000 estimated by SBA.

If $2100 per year is still too much for them, they could take out a loan for part of it and pay it out over time.

SBA also overlooked the obvious. They failed to recognize houseboat rental operations could pass at least a portion of the NPRM implementation costs on to their customers. Any costs they pass on to their customers decreases the portion they bear themselves.

The houseboat industry absorbed carbon monoxide modifications and training expenses and stayed in business. They also dealt with very high fuel costs in 2008. They passed on those costs, why not these?

In summary, SBA's comments on economic impact on small houseboat rental companies were in error because SBA:

1. Elected to use propeller guards (the most expensive option).

2. Calculated the cost of two propeller guards for all the houseboats when the majority of rental houseboats have less than two drives.

3. Selected the wrong economic impact statistics (SIC 7999 instead of NAICS 532292).

4. Failed to recognize rental operations could modify one-third of their fleet per year for three years to reduce the economic impact of the proposed regulations.

5. Failed to recognize the Concentration Ratio of the houseboat rental industry reduces economic impact on smaller firms (they have less boats per firm that the overall average).

6. Failed to recognize rental operations could recover at least a portion (if not all) of their implementation costs by passing them on to their customers. Passing along at least a portion of increased costs in doing business resulting from a regulation is common practice. It was even pointed out in the NPRM on page 59064.

Accident Count Errors

SBA letter Appendix on Page 12 opens with:

"A reviewer provided Advocacy with reports from the Coast Guard's Accident Reporting Database (BARD) for the 10-year period, 1991-2000, for both rented houseboats and all houseboats, selecting all accidents resulting in injury or death as a result of contact with a propeller or engine."

Footnote #19 at the bottom of SBA's Page 12 identifies Richard Snyder as the "reviewer" who provided the data. As will be shown shortly, Mr. Snyder left out several BARD reported propeller accidents. In addition SBA's 1991-2000 accident table (reproduced as our Table 41A) omits data for year 2000.

SBA and Mr. Snyder also failed to acknowledge many propeller accidents are not reported in BARD. Several studies have proven propeller accidents are underreported, for example, the study by the Center for Disease Control and Prevention (CDC) of September 1991 though August 1992 propeller injuries.[118] The CDC estimated boat propellers were responsible for 1,155 injuries during this time period. USCG only reported 62 propeller strike accidents for all of 1992.[119]

SBA's Appendix on Page 12 of their letter includes a table summarizing 1991-2000 houseboat propeller accident data. See our Table 41A. SBA's table contains several errors, including:

1. Omitting a 1 August 1992 Tracker houseboat accident listed in the USCG Docket 2001-10299-5 supplement on Page 9. It is clearly marked as "60" in the Accident Descriptor2 column. "60" indicates "struck by propeller". It is even marked as "struck by boat or propeller" on NMMA/HIA's list.
2. An error in addition. SBA's accident table (our Table 41A) shows one "Rental Houseboat" accident in 1994, but a total for "All Houseboats" in 1994 of 0. The 1994 "All Houseboats" total should at least include the one rental accident.
3. Omitting reported accidents for the year 2000. Our data shows two BARD reported houseboat propeller injuries in 2000, plus one more from a 47 foot Drifter houseboat that was misclassified in BARD.
4. Omitting an accident referred to in a footnote of their own letter. They refer to a houseboat propeller accident in 2000 in a footnote at the bottom of their Page 3, but it is nowhere to be seen in their 1991-2000 accident table (our Table 41A).
5. Under reporting the actual number of houseboat propeller injuries in BARD.

Similar to NMMA/HIA's approach, SBA's discussion on Page 12 segments accident data into two five year periods (1991-1995 and 1996-2000). However, they failed to include any accident data for 2000.

---

[118] A Study of Boat and Boat Propeller-Related Injuries in the United States 1991-1992. Christine M. Branche-Dorsey, Suzanne M. Smith, Denise Johnson. National Center for Injury Prevention and Control. Centers for Disease Control and Prevention. Prepared for the U.S. Coast Guard and the U.S. Department of Transportation. Final Report June 1993. Report No. CG-D-12-93. http://handle.dtic.mil/100.2/ADA272907 Retrieved May 6, 2010.

[119] Boating Statistics-1992. U.S. Department of Transportation. U.S. Coast Guard. Pg. 8.

As we mentioned earlier, SBA missed at least three additional accidents in BARD due to classification errors.

1. A 21 June 1997 propeller injury accident involving a 53 foot Stardust houseboat misclassified as a “motor cabin boat” (note Stardust is a houseboat manufacturer).

2. A 18 June 1998 propeller injury accident labeled as a “houseboat” in the “Boat Model” column of BARD, but incorrectly labeled as a “motor cabin boat” in the “Boat Type” column.

3. A 1 July 2000 propeller injury accident on a 47 foot Drifter houseboat was misclassified as a “motor cabin boat”.

That makes a total of seven BARD reported accidents not shown the SBA’s “1991-2000 All Houseboats” table (Table 41A):

1. 1992 missed the 1 August 1992 Tracker accident

2. 1994 missed one by addition error in their table

3. 1997 missed the misclassified 21 June 1997 accident

4. 1998 missed the misclassified 18 June 1998 accident

5. 2000 missed the TWO accidents properly classified by BARD (Shrayber plus the 5 August 2000 Lake of the Ozarks accident)

6. 2000 missed the misclassified 1 July 2000 Drifter houseboat accident

SBA’s “1991-2000 All Houseboats” table failed to include seven BARD reported houseboat propeller accidents plus two more houseboat propeller accidents we found not listed in BARD (1993 Falvey and 1995 El-more). That raises the total to 9 known accidents they missed.

The Falvey’s even made a presentation at NBSAC about their accident and filed two letters with USCG during an earlier NPRM comment period.[120] SBA still missed them.

SBA and Mr. Snyder had an incentive to find as few houseboat propeller accidents as possible, and they did. They even “lost” two of the ones they did find (one 2000 accident listed in their footnotes that did not make it into their table, and a 1994 accident by arithmetic error in their table).

Tables 41A and 41B compare SBA’s accident table compared to actual BARD data.

Table 41A and 41C compare SBA’s accident data to actual BARD data PLUS two other houseboat propeller accidents we found reported in the media.

[120] Presentation by Donald A. Falvey to the National Boating Safety Advisory Council. Phoenix Arizona. November 14, 1994. Public Comments 52 and 53. USCG Docket 10299. (pdf pages 49-54 of link below). http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064803018ca&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Table 41A
SBA'S Table of BARD Reported
Houseboat Propeller Accidents per Year (Page 12 of Their Letter)

	Rental Houseboats			All Houseboats		
Year	Injury	Fatality	Total	Injury	Fatality	Total
1991	1	0	1	1	0	1
1992	3	0	3	4	0	4
1993	1	1	2	5	1	6
1994	1	0	1	0	0	0
1995	1	1	2	3	1	4
1996	1	0	1	3	0	3
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	2	0	2

Table 41B
BARD Reported Houseboat Propeller Accidents per Year
per PGIC (Appendix D) Including Misclassified Accidents

	Rentals			All Houseboats		
Year	Injury	Fatality	Total	Injury	Fatality	Total
1990	1	0	1	1	0	1
1991	1	0	1	1	0	1
1992	3	0	3	5	0	5
1993	2	1	3	5*	1	6
1994	1	0	1	1	0	1
1995	1	1	2	3	1	4
1996	1**	0	1	3	0	3
1997	0	0	0	1	0	1
1998	0	0	0	1	0	1
1999	0	0	0	3	0	3
2000	1	0	1	3	0	3

* = One of these was unknown if rental or not
** = BARD only reported one rental, one reported nonrental was actually a rental. So true total is 2.

Table 41A (repeated from previous page)
SBA'S Table of BARD Reported
Houseboat Propeller Accidents per Year (Page 12 of Their Letter)

	Rental Houseboats			All Houseboats		
Year	Injury	Fatality	Total	Injury	Fatality	Total
1991	1	0	1	1	0	1
1992	3	0	3	4	0	4
1993	1	1	2	5	1	6
1994	1	0	1	0	0	0
1995	1	1	2	3	1	4
1996	1	0	1	3	0	3
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	2	0	2

Table 41C
Houseboat Propeller Accidents per Year
per PGIC (Appendix D) Including Two Not in BARD

	Rentals			All Houseboats		
Year	Injury	Fatality	Total	Injury	Fatality	Total
1990	1	0	1	1	0	1
1991	1	0	1	1	0	1
1992	3	0	3	5	0	5
1993	3	1	4	6*	1	7
1994	1	0	1	1	0	1
1995	1	1	2	4**	1	5
1996	2	0	2	3	0	3
1997	0	0	0	1	0	1
1998	0	0	0	1	0	1
1999	0	0	0	3	0	3
2000	1	0	1	3	0	3

*= One of the accidents was listed as unknown if rental or not
**= One of these accidents was only reported in the media and they did not specify if it was a rental or not.

One very dramatic difference between our findings and those of SBA, is the number of 1996-2000 “All Houseboat” accidents (the most recent years prior to SBA‘s letter). As shown in Table 41A and Table 41C, SBA only found five houseboat propeller accidents from 1996-2000, while we found 11. They counted less than half of the 1996-2000 accidents.

SBA used their own errors to their advantage and convinced USCG houseboat propeller accident counts had significantly decreased in 1996-2000.

SBA Comments Scripted by Big Business

SBA's public comments are clearly just another mouthpiece for the major players. SBA cites 19 references in their footnotes. Nine of those citations reference materials from Dick Snyder of Mercury Marine (a Brunswick Company), five reference materials from Mark Suttie of Lake Powell (managed by Aramark). The remaining five citations reference materials nonspecific to the marine industry.

According to Brunswick's 2002 annual corporate report,[121] Brunswick had approximately 21,015 employees in 2002 and net sales of approximately $3.7 billion.

Per Aramark's 2002 annual corporate report,[122] Aramark had approximately 200,000 employees in 2002 and annual sales of approximately $8.77 billion.

In their letter, SBA defined a small business as one with less than $6 million in gross annual receipts. SBA states a company, its parent company and all its affiliates are to be considered as a single entity in its definition of a small business.[123]

Brunswick and Lake Powell are not small businesses. SBA's comments are based on input from large companies, not from the small companies they claim to represent.

SBA cites Mr. Suttie's Lake Powell letter as one of its primary sources of information, however that letter was filed after 2 pm on Friday March 8, 2002. SBA's letter is dated Monday March 11, 2002. If that does not lead you to believe they were working together, see footnote #16 at the bottom of Page 9 of the SBA letter. It cites a March 8, 2002, personal communication with Mr. Suttie of Lake Powell (Aramark).

Similarly, footnote number 11 on Page 6 of SBA's letter cites a 7 March 2002 personal communication with Richard Snyder of Mercury Marine (Brunswick).

Absolutely no footnotes cite any communications with any marine small businesses. No marine small business are even mentioned in SBA's 11 page letter.

Footnote number 17 on page 10 of SBA's letter mentions NMMA's letter of March 11, 2002 (same date as their own letter). In our opinion, with the aid of NMMA, two large companies (Brunswick and Lake Powell) orchestrated SBA's response.

---

[121] Brunswick Corporation. Form 10-K. For fiscal year ended 31 December 2002. U.S. Securities and Exchange Commission.

[122] Aramark Corporation. Form 10-K. For fiscal year ended September 27, 2002. U.S. Securities and Exchange Commission. Pg.14.

[123] U.S. Environmental Protection Agency. Regulatory Flexibility Act / Small Business Regulatory Enforcement Fairness Act (RFA/SBREFA). Small Business: What is a "Small Business". http://www.epa.gov/sbrefa/business.htm Retrieved May 6, 2010.

Lake Powell's status as small business was first challenged by Marion Irving de Cruz of SPIN (Stop Propeller Injuries Now) in an email to USCG. USCG replied to SPIN's email in a 10 November 2005 post[124] to the docket:

"The Coast Guard has not attempted to investigate any comment claiming to be a small entity and relies on the expertise of the SBA to determine the validity of small business claims. Regardless of the status of the commenter, the challenge remains and we are focused on the challenges and analyzing the factual data related to the challenges."

That is not very comforting. USCG is going to rely on the "expertise of the SBA", the same organization that made at least 15 major errors in their comments, including misrepresenting statistics on houseboat rental operations and houseboat propeller accidents. SBA proved themselves incapable of analyzing their own data. Asking them to validate a challenge related to this issue is like asking the fox to guard the hen house.

USCG's comments also hint they made no effort to verify anybody's claims about anything. They just took all comments at face value. That is a disaster in the making as this report identifies dozens of errors in comments from just a few major industry critics.

SBA's comments were clearly scripted by major players in the marine industry, not by the small business they claimed to represent.

Marion Irving de Cruz Response:

Marion Irving de Cruz heads SPIN (Stop Propeller Injuries Now) and has been calling attention propeller safety issues for over 15 years.

She emailed us a comment regarding our discussion of her email to USCG concerning Lake Powell's status as a small business.

She said SPIN met with SBA Staff and provided them with Brunswick (Mercury Marine) and Aramark Industries (Lake Powell) annual reports to show how big business was manipulating SBA's decision. "Unfortunately, SPIN was not prepared with these detailed arguments in PGIC's research at that time and SBA was overly committed to the industry misrepresentation. Unable to get a reversal, SPIN went back to the USCG."

[124] U.S. Coast Guard Response to E-Mail Dated October 13, 2005. Question Number 1. 10 November 2005. USCG Docket Item # USCG-2001-10163-195. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be17e&disposition=attachment&contentType=pdf Retrieved May 1, 2010.

SBA Comments Received After Deadline

The public comment period closed at 5pm Monday March 11, 2002. The USCG docket details for SBA's submission[125] bears an author date, answer date, effective date, received/filing date, and date posted date of 03/11/2002, the final day for public comment.

But, the actual document bears a fax time stamp across the top of:

MAR 11 '02 05:16PM OFFICE OF ADVOCACY

It was clearly faxed after the 5 pm deadline and probably from the nearby SBA Office of Advocacy.

All the public comments are time stamped with a date and time of receipt by the Department of Transportation (USCG was under them at that time). SBA's document, USCG 01-10163- 92,[126] is very clearly time stamped:

02 MAR 12 AM 9:10

It was received after the deadline for public comments, which was later extended.

In May 2010 we noticed the Docket Detail for USCG-2001-10163 on regulations.gov has now been changed to indicate comments were due by 11:59 ET on 03/11/02. The Notice of Proposed Rulemaking (NPRM) clearly stated the delivery room would only accept submissions until 5pm 03/11/02. It makes no mention of the other filing methods (mail, fax, online) being accepted after 5pm 03/11/02.

---

[125] Docket Detail for USCG-2001-10163-0092. Public Submission ID #92. http://www.regulations.gov/fdmspublic/component/main?main=DocketDetail&d=USCG-2001-10163 Retrieved May 6, 2010.

[126] U.S. Small Business Administration letter to USCG dated 11 March 2002. USCG Docket Item # USCG 01-10163-92. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1eb&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Summary of SBA Advocacy Errors

To recapitulate some of the errors in the SBA Advocacy letter, they:

1. Misrepresented the accident count when they stated there had only been one rental accident with injury and no rental propeller fatalities since 1996. SBA missed the 2000 Shrayber accident.

2. Misrepresented the number of houseboat propeller accidents in 2000 when they stated there was only one houseboat propeller accident in 2000 (footnote on Page 3). We found three in BARD data alone.

3. Misled USCG on the frequency of propeller accidents in the swim ladder area. SBA tried to make an issue out of "passenger/skier behavior" not being listed as a cause of propeller accidents to those in the swim ladder area. "No Proper Lookout" is the cause typically listed for propeller accidents in the swim ladder area. "No Proper Lookout" is one of the most frequently listed causes in the NMMA/HIA Appendix SBA based their comments on.

4. Erred when supplying statistical data for NAICS 532292 (Recreational Goods Rental). SBA mistakenly supplied data for SIC 7999 (Amusement and Recreation Services Not Elsewhere Classified). SIC 7999 has almost 15 times as many companies and is much more diverse.

5. Erred in logic when they deduced all houseboats need two propeller guards from "many houseboats have two propellers". Most houseboats have less than two propellers and would need a maximum of one guard if that option were selected.

6. Miscalculated the average number of houseboats per small business. SBA failed to recognize a significant portion of the business is concentrated in a few very large operations. This reduces the average number of houseboats per small business, and the average implementation cost per small business.

7. Miscalculated average economic impact of the NPRM as a percentage of profits. SBA used non-representative SIC 7999 data to estimate average annual profit per company. This error rendered their economic impact calculations are meaningless.

8. Failed to recognize the NPRM has a three year implementation period for rental operations. Operators could elect to modify one-third of their houseboats per year. Or they could just set aside one-third of the funds each year for three years. Resulting annual costs would be one-third those calculated by SBA (actually much less due to Error #5).

9. Failed to recognize rental operations could recover at least a portion (if not all) of their implementation costs by passing them on to their customers.

10. Failed to acknowledge many propeller accidents go unreported.

11. Failed to include a 1994 accident listed in their own table of "All Houseboat" propeller accidents (our Table 41A) in the total number of 1994 accidents. SBA listed it on the left, but failed to show it on the right. It is impossible to have one "Rental" accident and zero "All Houseboats" accidents.

12. Failed to list any 2000 accidents in their 1999-2000 accident table (our Table 41A), even after they mentioned in their letter.

13. Failed to list 7 BARD reported houseboat propeller accidents in their "All Houseboats" accident table.

14. Failed to list 2 houseboat propeller accidents reported in the media, but not listed in BARD. One of those families even made a presentation at NBSAC about their accident and filed two letters with USCG during an earlier NPRM comment period.

15. Inflated their implementation cost estimate by complying with propeller guards instead of the more economical approach of using the alternative devices.

USCG felt SBA's objections were of considerable weight per a comment by Carl Perry, USCG Regulatory Coordinator, at the 70th Meeting of the National Boating Safety Advisory Council (NBSAC) October 28-29, 2002:

"A major challenge to the rule was the objection from the Small Business Administration."

With 15 major errors, and no input from small businesses, SBA's comments have no credibility. Their letter is riddled with errors, misrepresentations, and false statements. Any consideration USCG gave issues specifically due to them being raised by "SBA" was obviously misspent.

USCG mistakenly rallied around SBA's comments as the Gospel Truth. Comments and concerns of propeller victims and victim's families were overshadowed by SBA's misrepresentation of the facts.

The APA Challenge is Defused

USCG appeared to have been especially afraid of the Administrative Protection Act (APA) challenge issued by SBA on Page 3 of their letter:

"a court may hold an agency action unlawful and set it aside if the findings, and conclusions are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law". Advocacy asserts that the proposal, as published, would not withstand an APA challenge."

We exposed countless errors and mistakes in SBA's letter. As a result of our findings published in this report, SBA's own comments would not have withstood an APA challenge.

The APA challenge is defused. USCG should not hesitate to reintroduce NPRM 10163 due to any SBA comments or challenges.

MERCURY MARINE COMMENTS
- Joe Pomeroy

Mercury Marine commented in an 11 March 2002 letter by Joe Pomeroy, General Counsel of Mercury Marine.[127]

Accident Counts

We spent considerable time analyzing Mr. Pomeroy's accident counts. Page 1 of his letter states:

"Our review of U.S. Coast Guard statistics demonstrates that for rental houseboats there is one propeller or gearcase related injury and no fatalities in the past five years. (Note, our review of the statistics does not indicate whether this was on a planing houseboat or a displacement houseboat.)"

Mr. Pomeroy says there was only one BARD reported rental houseboat propeller OR gearcase accident in the last five years. After some study, we determined he was talking about 1996 through 2000 accident data.

Our Table 37 is reproduced here for comparison with Mr. Pomeroy's data. Table 37 summarizes 1990-2000 BARD reported houseboat propeller accidents from **APPENDIX D.** It does not include accidents misclassified by BARD or accidents not reported in BARD.

Copy of Table 37

1990-2000 BARD Reported USCG Boat Type = "Houseboat" Propeller Accidents
Including Fatalities per Appendix D

Not Including accidents misclassified in BARD or not reported in BARD

Year	Rental Only	Non-Rental Only	Un-known	All House boats
1990	1			1
1991	1			1
1992	3	2		5
1993	3	2	1	6
1994	1			1
1995	2	2		4
1996	1	2*		3
1997				0
1998				0
1999		3		3
2000	1**	1		2

*The 18 May 1996 Beattie accident was classified as nonrental by BARD and in this table. However, it was a rental accident.

**The 12 Sept 2000 Shrayber accident shown here was originally entered into BARD, then later removed at the request of the State of California. Some versions show "0" here.

Table 37 agrees with Mr. Pomeroy's statement of only one rental accident in the last five years (1996-2000) with one exception.

[127] Joe Pomeroy, Mercury Marine letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-86.
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e3&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

He missed the September 2000 Felix Shrayber rental houseboat accident in California.

The Shrayber accident may have been excluded due to one or more of these reasons.

1. The propulsion system of the houseboat that struck Shrayber was mistakenly classified in BARD as a water jet. He was struck by a propeller. His accident went to court twice as a propeller injury case.

2. California boat accidents have been purged from recent annual BARD database files at request of the State of California.[128] That action immediately removed details of the September 2000 Felix Shrayber accident. Removal of recent California accidents from BARD is well known to Mercury Marine.

3. Some ten year compilations by others failed to list data for the tenth year (2000).

Mr. Pomeroy calls the remaining June 1996 Lake Powell houseboat rental propeller accident a "propeller OR gearcase" accident insinuating it may have been a gearcase injury and the propeller may have not been involved. This accident was most definitely a propeller accident and the BARD database Mr. Pomeroy is quoting proves it in at least four ways:

1. Older versions of the 1996 BARD "Primary" table include the following verbal description of this accident, "Vessel hit a swimmer with its propellar (sic), causing lacerations in the victims legs."

2. The BARD Injury table codes it definitely as a propeller injury (code =1 in Propeller column).

3. The BARD "Primary" table codes it as propeller accident (Accident Type 1=14).

4. The victim's primary injury is coded as a "laceration" in the Injury table.

It was very obviously a propeller accident and Mr. Pomeroy knows it. He just wants to put doubt in the mind of USCG.

Mr. Pomeroy then says BARD does not indicate if the person struck in the same June 1996 accident was injured by a planing houseboat or a displacement houseboat. Now he is insinuating the NPRM may not have applied to this vessel and thus the accident may not have been prevented, when in fact it would have applied to this houseboat.

While BARD does not specifically state if it was a planing boat or not, BARD does provide the Manufacturers Identification Code (MIC) for the hull, length, and model year. The boat is a 50 foot 1983 model Kayot rental houseboat.

Kayot was well known for producing pontoon houseboats in this era. iBoats.com provides basic statistics for several 1983 Kayote houseboat models. Specifications for the 1983 Harris-Kayot Boats 8351-2 show a 53 foot hull, 168 inches wide with a 140 horsepower inboard.[129]

We are quite sure Mr. Pomeroy can call upon the vast resources and knowledge at Mercury Marine to evaluate this vessel. Almost anyone can tell you a rental 50 (or 53) foot pontoon Kayot houseboat about 14 feet wide on Lake Powell powered by a 140 horsepower inboard is not a planing houseboat. He certainly could now, as Brunswick acquired Harris Kayot in 2005.

Mr. Pomeroy first tried to pass off the June 1996 accident as being a gearcase injury, then he tries to slip it off as being caused by a planing houseboat when he knows full well neither is the case.

---

[128] Accidents Dates, Locations Not Made Public Record. Thomas Peele. Contra Costa Times. July 2, 2006. http://www.contracostatimes.com/ci_5714668 Retrieved May 6, 2010.

[129] Specifications for 1983 Harris-Kayot Boats 8351-2. iboats.com http://www.iboats.com/Harris-Kayot_Boats__8351-2__1983/bp/62b144671r0 Retrieved May 6, 2010.

The “lawyer” is coming out in Mr. Pomeroy’s comments. He tries to stay within at least some of the facts but “spins” them to protect his company. As a boater, do you feel comfortable with him lobbying USCG on behalf of your safety?

In addition, he failed to notice a May 1996 rental houseboat accident mistakenly identified in BARD as a nonrental houseboat. The vessel was clearly a rental houseboat. State police identified it as a rental in the media,[130] it happened in a well known houseboat rental area, plus BARD reports the “boat builder” as Gananoque. Houseboat Holidays, Ltd.[131] builds, rents, and sells small to midsize pontoon houseboats from Gananoque Ontario Canada. They are sometimes referred to as Gananoque Houseboats.

The houseboat operator and person struck were both from Windsor, Ontario Canada (across the border from Detroit) while the accident occurred hundreds of miles away on St. Lawrence River near Heart Island (north of Syracuse). The distances involved also seem to indicate it was a rental.

There were at least three BARD reported rental houseboat propeller accidents in the five years prior to the writing of Mr. Pomeroy’s letter, including:

1. 9 June 1996 Lake Powell

2. 18 May 1996 Beattie (Heart Island)

3. 16 September 2000 Shrayber (Shasta)

Page 1 of Mr. Pomeroy’s letter twists those three accidents into only one rental accident. His comment is repeated below:

“Our review of U.S. Coast Guard statistics demonstrates that for rental houseboats there is one propeller or gearcase related injury and no fatalities in the past five years.

When he reports there was only one rental accident in the last five years, besides missing the other two BARD reported accidents, he fails to recognize that not all propeller accidents are reported to BARD. He also fails to recognize even more BARD accidents reported as nonrental may have really been rental houseboats. His comments on page 1 continue with:

“Over the past ten years there have been a total of two rental houseboat fatalities and ten injuries.”

He is talking about 1991-1995 plus the 1996-2000 data we just discussed. He used 1991-1995 data from the BARD compilation for “Rental Houseboats struck by boat or propeller” from NMMA/HIA’s comment letter. This compilation was originally put together by Richard Snyder, retired from Mercury Marine. We analyze the NMMA/HIA/Snyder compilation in our review of the NMMA/HIA letter and in **Appendix C**. We verified Mr. Pomeroy used this compilation from his comments about the number of outboard, inboard, and stern drive propeller accidents in the various time periods. We checked his counts against the NMMA/HIA compilation and they matched, when taking the following adjustments into account.

He excluded four accidents marked as “struck by boat” in the accident descriptions (#4, #12, #16, and #17 on the “Rental Houseboats” list) and retained the rest. That process leaves him two accidents we were surprised he did not reject (#9 and #10 on the “Rental Houseboats” list). Those two accidents are not positively confirmed as propeller accidents from the data. SBA even rejected them from their list.

Mr. Pomeroy also left out #11 on NMMA/HIA’s “All Houseboats” list. That accident meets his criteria, but was missed by him due

---

[130] Two Boating Accidents Injure 4 on St. Lawrence. Watertown Daily Times (New York). 21 May 1996.

[131] Houseboat Holidays, Ltd. of Gananoque Ontario, Canada. http://www.gananoque.com/hhl Retrieved May 6, 2010.

to its lower case “y” in the rental column. See **Appendix C** for more details.

He may have been trying to “load” accidents into the 1991-1995 time span to show a greater reduction in accident counts compared to 1996-2000. Errors in his data conveniently reinforce his comment, the accident counts had fallen so far “that the problem is virtually nonexistent.”

If he was trying to stack the deck in 1991-1995, he should have also mentioned:

1. The Falvey 11 May 1993 rental houseboat propeller accident not recorded in BARD.

2. A 4 July 1993 BARD reported propeller accident from California that answers the rental/nonrental question as “unknown”. It may have been a rental.

3. A 28 May 1995 houseboat propeller accident on Shasta Lake reported in the media, but not listed in BARD has a high probability of being a rental houseboat accident.

Once again Mr. Pomeroy is reporting stats to meet his needs. Earlier he “underloaded” 1996-2000 stats. Now he “overloads” 1991-1995 stats in an attempt to show a decreasing number of rental propeller accidents in the most recent five year period.

Pomeroy Says Prop Accidents Are Reported

On Page 2, Mr. Pomeroy states;

"As a parenthetical comment, I would like to address the oft-repeated shibboleth that Coast Guard statistics fail to accurately convey the extent of recreational boating injuries. ... "I cannot recall a single lawsuit in which a formal boating accident report had not been filed and reported in the U.S. Coast Guard statistical database."

At least one incident since Mr. Pomeroy's letter proves houseboat propeller accidents developing into legal cases are still not being recorded in BARD. The September 2002 Tyler rental houseboat propeller accident at Forever Resorts on Lake Mead developed into Tyler v. Forever Resorts and Fun Country Marine. This rental houseboat propeller accident is not listed in BARD.

A Freedom of Information Request to USCG resulted in a response[132] indicating they could find no mention of the Tyler accident. USCG reported they spent two hours trying to find any incident reports, reports of occurrence, or search and rescue records relating to a "possible incident" involving Ms. Tyler on September 1, 2002, on Lake Mead and were unsuccessful.

Forever Resorts is one of the largest rental houseboat operations with several locations across the country. Bruce Rowe, Director of Marine Services for Forever Resorts, is a member of the National Boating Safety Advisory Council (NBSAC). NBSAC is sponsored by USCG. Mr. Rowe is very aware of the need to report boating accidents. Ms. Tyler even spoke as a propeller victim at the 76th NBSAC meeting in November 2005, attended by Mr. Rowe. That meeting was also attended by at least four representatives of the USCG Office of Boating Safety, including the Chief of the Office of Boating Safety and USCG still has no record of the Tyler accident. It is obvious the industry is not proactive in reporting houseboat propeller accidents.

Note - a response from Mr. Bruce Rowe of Forever Resorts is on the next page.

---

[132] Freedom of Information Act response from S. M. Sawyer. Chief, Office of Search and Rescue. US. Coast Guard. U.S. Department of Homeland Security to Robert A. Rosin and Associates, LTD. Undated.

Bruce Rowe's Response:

In early April 2009, Bruce Rowe of Forever Resorts visited with me at the 83rd National Boating Safety Advisory Council about our comments concerning him in this section. He correctly pointed out it was not his responsibility to report the Tyler accident directly to USCG. It was their (Forever Resort's) responsibility to report the accident to the National Park Service (NPS) and they did. We have seen the accident report, NPS worked the accident. He pointed out it is NPS's responsibility to report accidents to states, who then report them to USCG. He said that in more recent times, after finding this accident was not listed in BARD, he visited with his state boating law administrator who then followed up with NPS about why the accident was not reported to the state.

Mr. Rowe thinks there are very few houseboat propeller accidents and attention should instead be focused on open motor boats where most propeller accidents occur. Similar to Mr. Pomeroy, he believes some BARD reported houseboat propeller accidents are actually people hit by the skeg, drive or boat and not by the propeller.

Mr. Rowe said he recalled the houseboat accidents were split about 50/50 between rental and nonrental houseboats. I pointed out there are about 20 times more nonrental than rental houseboats which seems to make rental houseboats much more likely to be involved in a propeller accident than nonrental houseboats. He asked where I came up with the 20 to one ratio from. I told him it was in the NPRM.

He said there had only been one houseboat propeller accident on Lake Mead. Our records show three: (1) 1993 Falvey, (2) August 21, 1995 (Unknown), and (3) 2002 (Tyler).

We very much appreciate Mr. Rowe's comments.

Yet one more accident developed into a legal case and is unrecognized by Mr. Pomeroy in his own interpretation of BARD data. The Shrayber rental houseboat propeller accident at Shasta in 2000. It later developed into Shrayber v. Seven Crowns. The accident was in earlier versions of BARD (prior to being purged at the request of the State of California). However, Mr. Pomeroy was unable to find it according to his letter when he said there was only one rental accident in the past five years. It may have also been missed due to the houseboat involved being misclassified as having a water jet drive (no propeller - no propeller injury). The legal case was tried at least twice as a propeller injury (both before and after the Sprietsma case). It was a propeller accident.

Mr. Pomeroy continues on Page 2:

"The notion that there are significant injuries or even fatalities that go unreported to the Coast Guard is in my opinion an unvalidated supposition completely contradicted by experience."

Several houseboat propeller accidents went unreported both before and after this letter. A few examples are:

1. The 1993 Falvey houseboat propeller accident. Mrs. Falvey's houseboat was part of a flotilla of rental houseboats touring Lake Mead facilities as part of a National Park Service, U.S. Forestry Service, and Bureau of Land Management conference. She and her husband spoke concerning her accident at a NBSAC meeting and both sent in letters[133] to USCG during the comment period of an earlier USCG NPRM. The Falvey accident is also referenced in numerous NPRM comment letters, including one dated 29 June 1995 from Mark Suttie at Lake Powell -Aramark.[134] The Falvey accident is not in BARD.
2. The Elmore houseboat propeller accident at Shasta on 28 May 1995. It was even reported twice in the Redding Record Searchlight,[135] but is not in BARD.
3. The 1 September 2002 Tyler houseboat propeller accident on Lake Mead. This accident occurred a few months after Mr. Pomeroy wrote his letter and is not in BARD.
4. The Lederer houseboat propeller fatality accident on Lake Oroville 17 Jul 2005. California quit supplying individual accident data to BARD so this accident is not in BARD. (Note - there is some dispute as to if he was actually struck by the propeller).

And yet more validation for Mr. Pomeroy, in the 1990s, USCG found hundreds of fatal accidents worked by its own Search and Rescue (SAR) office were not in BARD. SAR had classified them as "offshore" (over 3 miles out), but most of them were "near shore" and many should have been listed in BARD. USCG awarded a research grant to Boat/U.S. Foundation to audit recreational boating fatalities for 1993-1994.[136] A later second grant funded an audit of 1995-1997.

---

[133] Falvey letters to USCG dated 3 July 1995. USCG Docket Items # USCG-2001-10299-52 & 53. (pdf pages 49-54 of link below).
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064803018ca&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

[134] Mark Suttie, Director of Marine Services, Lake Powell, managed by Aramark letter to USCG dated 29 June 1995. USCG Docket Item # USCG-2001-10299-10-9. Pg.1. (pdf pages 17-20 of link below).
http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064803018c6&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

[135] 2 Men Cut by Propellers at Lake. Candace L. Brown. Redding Record Searchlight. May 29, 1995. Injured R.B. Skier Vows Accident Won't Put Stop to Lake Fun. Jim Schultz. Redding Record Searchlight. May 31, 1995.

[136] The Case of the Missing Reports: Possible Misleading Statistics About Boating Accidents. Elaine Dickinson. Boat/US Magazine. January 2000.
http://www.findarticles.com/p/articles/mi_m0BQK/is_1_5/ai_61555348 Retrieved May 6, 2010.

Even the Inspector General of the United States, disagrees with Mr. Pomeroy. Page iii of the Inspector General's Report, "Audit of the Performance Measure for the Recreational Boating Safety Program"[137] states:

"Database Used to Measure Progress Is Not Accurate. The data in the Boating Accident Report Database (BARD), which the Office of Boating Safety uses to collect statistical data from the States on recreational boating accidents have been consistently understated. BARD data were understated because recreational boating fatalities identified in the Coast Guard search and rescue management information system (SARMIS) were not reported to the Office of Boating Safety."

The Inspector General's report goes on to supply a chart showing an additional 66 to 103 fatalities per year in SARMIS from 1993 to 1998 that should have been listed in BARD, but are not.

In 2008, fatal accidents were still going unreported. Page 8 of USCG's 2008 Recreational Boating Statistics Report[138] summarizes news media accident and casualty reports collected by a UCGC contractor that were not reported by the states to BARD. The contractor found 13 unreported fatalities.

These facts (unreported houseboat propeller accidents identified by PGIC in this report, 66 to 133 fatalities a year not being reported by SARMIS, the Inspector General's report, and a contractor finding 13 unreported fatalities in 2008) totally obliterate Mr. Pomeroy's comments and prove hundreds of fatalities are not recorded in BARD. Compare the truth to Mr. Pomeroy' s statement on Page 2 of his letter we quoted earlier:

"The notion that there are significant injuries or even fatalities that go unreported to the Coast Guard is in my opinion an unvalidated supposition completely contradicted by experience."

The information just provided positively shows Mr. Pomeroy was wrong. Additionally, it destroys the industry's oft repeated claims that all serious propeller accidents and fatalities are reported in BARD.

Marion Irving de Cruz Response:

Marion Irving de Cruz of SPIN (Stop Propeller Injuries Now) emailed us a comment on our discussion of unreported accidents.

She said Arizona failed to report the 1993 houseboat propeller fatality of her son, Emilio Cruz. When her letter to USCG went unanswered, she contacted California U.S. Senator Dianne Feinstein's office. They stepped in to get an answer and a report on his death, which is now recorded in BARD.

---

[137] Audit of the Performance Measure of the Recreational Boating Safety Program. United States Coast Guard. Report Number: MA-2000-084 dated April 20, 2000. http://www.oig.dot.gov/library-item/4600 Retrieved May 6, 2010.

[138] Recreational Boating Statistics 2008. COMDTPUB P16754.21. U.S. Department of Homeland Security. U.S. Coast Guard. Office of Auxiliary and Boating Safety. Page 8. http://www.uscgboating.org/assets/1/Publications/Boating_Statistics_2008.pdf Retrieved May 6, 2010.

Litigation Testing

Mr. Pomeroy discusses Mercury Marine's testing of propeller guards on Page 2:

"Mercury Marine has sponsored or performed more tests on prop shrouds, and their potential for injury, than any other person or entity including the only truly scientific experiments on injury prevention."

Yes, Mercury Marine has run several tests on propeller guards. Mercury's tests are described as litigation testing by Stephen Bolden in Motorboat Propeller Injury Accidents: [139]

"...manufacturers, in performing litigation testing, are not concerned with gathering information for the purpose of redesigning or improving a guard; rather, they are concerned with simply reporting on whatever propeller guard deficiencies they are able to demonstrate through such testing"

Mr. Bolden goes on to point out testing, development, and retesting is the norm in product development.

Yet, when testing guards, Mercury just runs a test designed to break the guard or have it fail in some way. They report it failed, and make no efforts to improve the device. However, when their own products and prototypes fail similar tests, test results are analyzed, improvements are made, and testing is resumed in an iterative fashion. Product improvements are made with the goal of passing the test.

For those who believe Mercury is really testing guards in hopes of finding a means to protect people in the water, we offer the following Mercury Marine Prop Buddy Test as an example.

Mercury Marine Prop Buddy Test: An Example of Litigation Testing

In April 2006 Mercury Marine tested the Prop Buddy guard (designed by Robert Hooper) on 17 foot 4 inch boat built by Cruiser Yachts with a 140 horsepower 1976 MerCruiser stern drive in response to a lawsuit.[140]

Mercury has a "log test" stand in which a marine drive is mounted and a heavy, fake "log" is propelled at the leading edge of the drive to test durability. Previously, Mercury tested cage type propeller guards by mounting them on drives and propelling the "log" at them. Recognizing Prop Buddy's very beefy construction would easily pass the log test, they chose to focus on other issues.

Mercury's test request called for testing top speed/acceleration, fuel consumption, and handling. Performance and fuel consumption (with and without the guard) showed relatively small differences that might be hard to use as a court defense, so Mercury focused on boat handling issues.

Their test request reports the small, planing boat was difficult to steer with the drive trimmed full under while on plane:

"There was extreme steering torque with the Hooper guard installed while on plane with the drive in the tucked under position. I was unable to turn to starboard (Right) when operating under these conditions. It was difficult to maintain a straight line course.
The boat would pull hard to the port (left) while accelerating when the Hooper guard was installed with the drive in the tucked under position. Trimmed under is the typical position when accelerating.
The steering torque improved (was reduced) as the drive was trimmed out. It was not an issue when operating at WOT trimmed for best speed."

---

[139] Motorboat Propeller Injury Accidents. Stephen R. Bolden. Model Trials. Volume 41. American Jurisprudence. Lawyers Cooperative Publishing. 1990. Pg. 220.

[140] Hooper Prop Guard Evaluation. Mercury Component Test Request. ID Number 2006-698. Date of Request 04/07/2006. Originator: Pete Chisholm. Test Purpose: A-B Comparison of performance of an exemplar boat with and without a guard manufactured by Hooper.

Those reading Mercury's test report are left thinking Prop Buddy guards create unresolvable steering issues on all boats. However, Mercury MerCruiser faced the same problem with their own Bravo Three stern drive about ten years earlier. Operators of several boats powered by Bravo Three stern drives found the rear of their boat coming up at higher speeds when the drive was trimmed under. This forced the bow down resulting in bow steering, just like the boat in Mercury's Prop Buddy test.

When the problem surfaced on the Bravo Three, Mercury MerCruiser engineers created spacers called Trim In Limit Blocks to physically limit trim under. They were offered as Trim Spacer Kits in MerCruiser Service Bulletin No. 94-1[141] and later made standard in December 1994 per Service Bulletin No. 94-14.[142] Now (2009), approximately fifteen years later, Mercury MerCruiser is still selling Bravo Three stern drives.

If Mercury was really trying to solve the propeller safety problem, when bow steering issues surfaced during Prop Buddy guard testing, they would have just thrown on a couple spacers to limit trim under and ran the test again.

Mercury's Prop Buddy Test Request lists "Total Approximate Hours" to run the test as six hours. During that time they ran one boat with and without the guard with a few different props and called it a failure. The same guard has been used on hundreds of boats, including by those owned by NASA and the U.S. Navy.

Furthermore, Prop Buddy guards are not able to lift the back of slow moving, heavy vessels like houseboats. If this issue still exists, it is limited to smaller, lighter, faster boats.

Mercury's Prop Buddy test is definitely an example of litigation testing. They tested the Prop Buddy guard, found what they felt to be a performance flaw, said the guard failed, and stopped the test. All the time, they full well knew how to remedy the problem, because they had encountered it on their own products. Mercury failed to apply the solution because they wanted the guard to fail.

Mercury Marine's test request (also used to store the results of the test) has three areas for comments: (1) a "Recommendations" section for those involved with the test to write any suggestions they may have for improving the "thing" being tested, (2) a section titled "After Test Notes by the Requesters", and (3) a section titled "Comments". Mercury's Prop Buddy test request (and the results of that test) do not have a single word written in any of those three comment sections. Are we really supposed to believe nobody at Mercury had any ideas about how to solve the bow steering problem?

On Page 2 of his letter, Mr. Pomeroy tells us how Mercury Marine has tested many propeller guards and never found one that will work:

"Mercury Marine has sponsored or performed more tests on prop shrouds, and their potential for injury, than any other person or entity including the only truly scientific experiments on injury prevention."

Now you now know what kind of testing they really did, litigation testing designed to fail the guards. No efforts were made to improve the guards, not even when they knew the solution and had it in their parts department.

---

[141] Bravo Trim in Limit Spacer Kits. MerCruiser OEM Service Bulletin. No. 94-1. Revised 1/19/94. http://www.crownline.net/limiterblocks/om94_1r.pdf Retrieved May 6, 2010.

[142] Bravo Three Trim "in" Limit Blocks. MerCruiser OEM Service Bulletin. No. 94-14. http://www.crownline.net/limiterblocks/om94_14.pdf Retrieved May 6, 2010.

INTENTIONALLY BLANK

Mercury Makes No Attempts to Improve Existing Guards

Mercury openly admits they have made no efforts to improve existing cage type guards.

In a 2008 deposition,[143] Richard Snyder related the development of the cage type guard he invented and patented (U.S. Patent 4,957,459) in 1990. When questioned about making any further improvements upon that design or upon any other guards developed by others, he responded:

Question - And Mercury Marine hasn't done anything to try to improve on that design, have they, as far as you know?

Answer - I'm not aware of anyone else at Mercury that has worked in that - in the area specifically of a cage guard.

Question - And the other guards that Mercury has tested we talked about on Friday. Those have all been developed by other people, correct, outside of Mercury Marine?

Answer - Yes. That's correct.

Question - And Mercury Marine has not made any efforts to work on those guards and try to refine the design or improve them, have they.

Answer - Other than thinking about it. I don't recall anything specific about making hardware to refine it because nothing has been thought that would be worthy to do.

In 2002 (year of the NPRM public comment period), Brunswick spent $83.8 million on marine engine and boat research and development.[144] They had approximately 13,800 employees in their marine engine and boat operations during that time. With all those resources, "nothing has been thought that would be worthy to do."

This attitude has been pervasive in the industry for many years. As further evidence, we present a 1989 quote from OMC's Director of Public Affairs published in the St. Petersburg Florida newspaper.[145]

"Our contention," says Laurin Baker, director of public affairs for Outboard Marine Corp. (OMC), another major boat engine manufacturer, "is that (propguards) are not feasible to build for thousands of boat models, and that even it they were, they would not appreciably decrease propeller injuries and might even increase them."

Ms. Baker was actually echoing a document presented by the plaintiffs as exhibit 269 in the Decker vs. OMC propeller injury trial.[146] Although unsigned and undated, it was purported to be a position statement on propeller guards written in 1977 by OMC legal representatives.

"Although Outboard Marine corporation has investigated and attempted to develop an efficient propeller guard for personal protection over the years and has examined and tested such claimed devices developed by others, no device which will protect the swimmer under some operational conditions without causing greater risk of injury under some other operational conditions is within the state of the art of engineering design."

---

[143] Jacob A. Brochtrup vs. Mercury Marine, et. al. U.S. District Court for the Western District of Texas. Austin Division. C.A. No. 1: 07-CV-643-SS. Oral Deposition of Richard H. Snyder. April 7, 2008. Page 213.

[144] Brunswick Corporation. Form 10-K for Fiscal Year Ended December 31, 2002. U.S. Securities and Exchange Commission.

[145] Calling Out the Guard. Sheryl James. St. Petersburg Times Floridian. September 4, 1989. Pages D1 and D3.

[146] Audrey Decker and Frederick Decker vs. Outboard Marine Corporation. Circuit Court of the 20th Judicial Circuit in and for Collier County Florida. Exhibit 269.

Since Brunswick is unable to think of anything worthy to do in terms of improving cage type guards, we offer three suggestions here. Additional suggestions can be found in the Action Items list in the Summary section at the conclusion of this report.

1. The Flapper - we posted a cage guard design called the Flapper in the public domain in 2006.[147] The screen at the rear of the cage (end cap of the cage) is hinged at the top allowing the screen to swing up and trail out when underway, greatly reducing drag. A tab or “flap” at the bottom of the screen provides the drag force necessary to swing the screen up.

2. Trim Cylinder Trail Out - described in our discussion of Richard Snyder’s letter.

3. Use of flattened or elliptical wires/rods to reduce drag.

Breaking Events Near Publishing Time

A “Flapper” or “swinging rear screen” guard was used by the plaintiff in Jacob Brochtrup vs. Mercury Marine, et. al. as an example of a guard that could have been used to prevent or mitigate his injuries. The example used was the Navigator Guard and its 3PO swinging rear screen from CP3 (Guy Taylor). In early April 2010, the jury unanimously found in his favor for $3.8 million.

Coverage of our Flapper guard, photos of CP3’s swinging screen guard, and a brief history of “Swing Up” guards is provided online on our Possible Propeller Guard Technologies page.[148]

Mr. Pomeroy retired from Mercury Marine per a 14 May 2008 announcement.[149]

---

[147] Possible Propeller Guard / Propeller Safety Technologies. Entry posted on 13 October 2006. http://rbbi.com/pgic/ptech/ptech.htm Retrieved May 6, 2010.

[148] Possible Propeller Guard / Propeller Safety Technologies. Entry posted on 13 October 2006. http://rbbi.com/pgic/ptech/ptech.htm Retrieved May 6, 2010.

[149] Heads of Mercury Marine’s Legal Division Announce Retirements. IBI News. May 14, 2008. http://www.ibinews.com/ibinews/newsdesk/20080414142725ibinews.html Retrieved May 6, 2010.

Industry Choses Legal Defense Over Use of Safety Devices

Instead of designing, manufacturing, and installing propeller guards and other propeller safety devices, the industry chooses to spend millions of dollars defending itself in court. In the June 2009 Audrey Decker vs. OMC trial, an expert witness revealed his firm (just one of many regularly used by the industry) had been paid approximately $60 million to defend manufacturers in propeller cases.[150]

If the money paid to that one firm alone had been directed toward purchase and installation of devices required by this NPRM, every houseboat could have been outfitted and they would have had $40 million left over. ($200 per houseboat X 100,000 houseboats = $20 million).

How can consumers possibly think these companies are actively searching for a solution when they are so biased against the use of propeller guards and other safety devices?

Long ago chose to build a sound legal defense instead of investing in product safety. For example, a January 11, 1993, Mercury Marine Weekly Meeting Information report announced they won the appeal in the James Pree propeller case[151] after Pree's recent appearance on "Inside Edition". They reported this win adds to their nearly flawless record and will provide them with an even stronger legal defense to go along with their factual presentation.

Their own employees started to question Mercury's position on propeller guards after "Inside Edition" aired the Pree episode.[152] To address employee concerns, Mercury published a feature article by Dick (Richard) Snyder in the MerCourier (a Mercury Marine employee newsletter) titled, Why Prop Guards Are Not the All-Purpose Answer to Boating Safety.[153]

It reports the "Inside Edition" episode was critical of Mercury Marine and Outboard Marine Corporation because of their views on the use of propeller guards for marine engines.

It acknowledges that after "Inside Edition" aired the program, several employees began to ask, "Why don't we recommend prop guards for all boats?"

Mr. Snyder says that beyond slow idle speeds, guards do not do what they are supposed to do, then acknowledges use of guards on non planing boats:

"For years various cage or ring devices encircling propellers have been used in a few low-speed applications, such as surf rescue boats. In these applications, protection is understood to exist only when the boats are stationary or at low, off-plane speeds."

Those who have been struck by surf saving boat propeller guards at planing speeds may take exception to Mr. Snyder's statement. For example, one man was hit in the head by a guard as a boat went airborne over his during

---

[150] Court Blog: Day 9 (Audrey Decker vs. OMC). Naples Daily News. Online Blog. June 9, 2009. Entry labeled as: Posted at 5:30 pm on Thursday. http://www.naplesnews.com/news/2009/jun/09/jury-chosen-boat-propeller-guard-case Retrieved May 6, 2010.

[151] 983 F2d 863 Pree v, Brunswick Corporation. No. 91-3402. U.S. Court of Appeals. Eight Circuit. Decided January 7, 1993.

[152] Inside Edition. Matt Meagher reports on the dangers of people being maimed or killed while swimming near boat propellers. July 6, 1993. WNYW-TV New York. 7:30 pm Eastern Time. Summarized by Lexis Nexis.

[153] Why Prop Guards Are Not the All-Purpose Answer to Boating Safety. Dick Snyder. Mercury Marine MerCourier. Vol. 7. No. 10. December 1992 / January 1993. Pgs. 4-5.

a competition. Doctors told him he could not race again for at least five weeks.[154] A funeral versus being off five weeks, would not be a hard choice for most of us to make.

He presents blunt trauma, added mass, resistance to motion when under water, increased frontal area, and boat handling issues as among the complex causes why guards do not work. He doesn't have time to explain it here, but:

"When jurors can listen patiently to arguments and see evidence from both sides during a prop guard lawsuit, they invariably grow to understand the position of the propulsion manufacturers. This process which can take two or three days, can't be completed in five minutes and 20 seconds, the time allotted by Inside Edition. Given time for a proper presentation, Mercury has not lost a prop guard case in the last 10 years."

Mr. Snyder claims "Inside Edition" was manipulated by "lawyers who are interested not in safety, but in collecting big fees by winning lawsuits". He also claims one of the deaths Insider Edition attributed to a propeller was actually struck by the bottom of the boat or the skeg (Kevin Fitzpatrick). He fails to mention the courts did not agree.[155] They awarded his heirs $1 million due to the motor being defective "because the propeller blades were not encased in a protective guard." A superior court later overturned that verdict, but still attributed Kevin Fitzpatrick's injuries to the propeller.

He also failed to mention, this is the era in which Mercury was building their Federal Pre-emption defense. The merits of a propeller guard were immaterial. The judge just ruled pre-emption and Mercury walked away the winner.

Mr. Snyder's article says "Inside Edition" reported 2,000 to 3,000 people are maimed by a propeller annually with most of the accidents going unreported.

Mr Snyder countered with,

"Our survey of state boating law administrators indicates that most serious accidents are reported and amount to fewer than 500 annually."

That is very interesting. Mr. Pomeroy just finished telling us on Page 2 of his comments:

"The notion that there are significant injuries or even fatalities that go unreported to the Coast Guard is in my opinion an unvalidated supposition completely contradicted by experience."

Mr. Snyder's article reported they surveyed state boating law administrators and estimated fewer than 500 serious propeller accidents annually. The 1993 USCG boating statistics report (for 1992) indicates 347 vessels were involved in accidents in which people were "struck by boat or propeller". In that era, they tended to estimate about a third of those were struck by a boat. That would leave about 230 prop strikes. Mercury's own survey of boating law administrators placed the total at fewer than 500 (which we interpret as being at least over 400) and thereby fails to support Mr. Pomeroy's statement.

Notably missing from Mercury Marine's Weekly Meeting Information reports and their MerCourier articles is ANY mention of efforts toward preventing propeller accidents.

---

[154] Power Boat Racer Talks of High-Speed Race Escape. Daily Post (Liverpool England). April 30, 2004.

[155] Fitzpatrick v. Madonna and Outboard Marine Corporation. Superior Court of Pennsylvania. No. 2588 Philadelphia, 1991. 424 Pa. Super. 473; 623 A.2d. 322; 1993 Pa. Super. Lexis 674. Argued May 14, 1992. Filed February 23, 1993. Prior History: Court of Common Pleas, Civil Division, of Delaware County, No. 82-9635.

Today's Legal Defense

With loss of Federal Pre-emption, the industry has moved to a layered legal defense. They focus on traditional legal maneuvering, trying to reduce their potential liability, and teaching the jury about problems with propeller guards that may or may not be applicable to the boat or situation at hand.

Below is a list of steps the defense used in the June 2008 Decker vs. OMC trial, along with a few more they sometimes employ:

1. Move to strike several of the plaintiff's expert witnesses. (Claim they are not experts and should not be allowed to testify).

2. Move for summary judgement. (When there is no dispute as to the facts and one party is entitled to judgement as a matter of law.)

3. Argue the accident was caused by the use of alcohol, reckless, or negligent behavior.

4. Argue the boat/drive was built a long time ago. It has traded hands several times, and has been modified with parts they did not make, including the propeller.

5. Argue the injured person was not hit by the propeller (or at least their most severe injuries were not caused by the propeller). Claim the person was hit by the boat, by the drive, by the skeg, by the bullet, or by anything else except the propeller.

6. Argue that propeller accidents are rare.

7. Tout their 1989 NBSAC study.

8. Argue propeller guards cause other problems (increased diameter leads to greater probability of being struck, blunt trauma, reduced top speeds, drag, increased fuel consumption, boat handling issues, entrapment, boaters will take them off and their boat will then be overpowered).

9. Argue propeller cuts are clean cuts and not bad like crushing blunt trauma injuries.

10. Discredit the plaintiff's expert witnesses in any way possible, including personal attacks.

11. Tell the jury the plaintiff expert witnesses do not use propeller guards on their boats or the boats of their family members.

12. Tell the jury the industry rarely, if ever, loses a propeller injury case.

13. Tell the jury that neither the victim nor their family have been campaigning for propeller safety. If propellers are such a big safety hazard, why are they not trying to prevent this from happening to others?

14. Declare the waters on which the accident occurred to be "navigable waters" (used for maritime commerce) and seek limitations under Limitation of Liability Act (LOLA) 46 U.S.C. Section 181-196. There are plenty of nuances to this law, but the defense has often successfully used it to limit their potential liability to the post accident value of the vessel.

The industry's approach is currently working very well. Their trial presentations are very impressive, in part because they have given them several times and are well rehearsed.

The industry's formidable legal defense stumbled in Jacob Brochtrup v. Mercury Marine in April 2010.[156] Brochtrup was awarded $3.8 million (approx. $2 million from Brunswick which they which they may appeal).

---

[156] Jacob A. Brochtrup vs. Mercury Marine, et. al. U.S. District Court for the Western District of Texas. Austin Division. C.A. No. 1: 07-CV-643-SS.

MERCURY MARINE COMMENTS - Richard Snyder

Mr. Snyder, retired from Mercury Marine, often represents the industry as an expert witness in propeller injury cases. His comments were provided in a 26 February 2002 letter.[157] His letter was received after the initial 11 March 2002 deadline for public comment (it is time stamped 02 MAR 13).

Page 2 of his letter tries to divert attention from propeller injuries by pointing out propeller guards themselves can cause blunt trauma:

"Its the SPEED that matters. As a boat's speed moves past the 8-10 mph range, human heads and torsos can be badly injured by the blunt blow of an outboard or sterndrive gearcase, an inboard rudder, a boat hull as well as a sufficiently robust "prop guard" be it a ring, a cage or whatever. The speed of the beginning of a blunt trauma injury can run a little higher for lower legs and forearms and hands depending on a myriad of variables."

Yes, speed matters, but his statement diverts attention from the facts.

1. Guards are not required by the NPRM. They are one of three options (water jet, guards, or two devices for nonrental / three devices for rental).

2. He fails to note a large percentage of houseboat propeller accidents happen in reverse at very slow speeds. Blunt trauma is not an issue for them or for accidents going forward at slow speeds.

3. Many houseboats will not run 10 mph, and those that can are doing so less often due to high fuel costs.

4. Houseboats are a destination unto themselves. Many houseboats spend a small fraction of their boarded time underway. Those onboard enjoy the comforts of the houseboat and use it as a base station for other on water activities.

5. Houseboat propeller accidents at speeds over 8 mph are rare.

6. Blunt trauma resulting from nonplaning houseboats is less life threatening than being struck by a propeller and bleeding to death.

---

[157] Richard Snyder, Mercury Marine letter to USCG dated 26 February 2002. USCG Docket Item # USCG-2001-10163-106. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be10a&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Potential Blunt Trauma Solution: Trim Cylinder Trail Out

When Dick Snyder was asked if Mercury had ever tried to improve any propeller guards, he responding by saying nothing worthy to do had ever been thought of.[158] It seems like he failed to recall William "Bill" Mayer of Mercury Marine, was awarded two patents[159] back in the 1970s for a system that integrates with Mercury's existing trim cylinder memory piston system. The existing (and still current) design allows the drive to swing back, up, and over underwater obstacles struck at high speeds. The sequence of events is:

1. The drive strikes an obstacle
2. The memory piston stays at its current position
3. Fluid in the trim cylinders goes over relief valves built into the piston and flows from the rod side of the cylinder to between the piston and the memory piston as the cylinder rod extends
4. The cylinder extends, and the drive swings back, up, and over the object
5. Weight of the drive begins to force fluid back through internal check valves and it flows from between the piston and memory piston to the rod side of the cylinder
6. The cylinder settles back down to the memory piston (the cylinder piston retracts to the drive's prior position)

Mr. Mayer's invention adds an additional feature. It allows trim cylinders to trail out (swing back up, and over) at minimal pressure when the drive strikes underwater objects at slower speeds (fluid goes through an orifice instead of over the relief valves). Without Mr. Mayer's invention, slow moving boats striking underwater obstacles may abruptly stop, ejecting those onboard.

Mr. Mayer's approach has direct application to minimizing blunt trauma from propeller cages at midrange speeds by cushioning the impact. Mercury's patent (U.S. Patent 4,050,359) brags about how simple, economical, and reliable the approach is:

"Further, the hydraulic supply system does not require any complicated control structures or the like and can be conveniently and economically manufactured while maintaining or while providing reliable operation over a long operating life."

Mr. Mayer's approach could decrease blunt trauma at midrange speeds and possibly act as a cushion at even higher speeds. We encourage Mr. Snyder and Mercury to further develop this potential blunt trauma solution.

In the past, some have suggested drive companies reject propeller guards due the impact they would have on their lucrative propeller business. Currently, drive companies try to sell new expensive, high profit margin propellers to everybody that hits something. Mr. Mayer's invention also appears to have the potential to reduce impact damage to propellers, We hope the trim cylinder trail out system was not rejected for any negative affect it may have had on replacement propeller sales.

Last Minute Note at Press Time -
Teleflex Canada, Inc. was issued U.S. Patent 7,722,418 on May 25, 2010. Their approach appears even simpler than Mercury's and may even be a cost reduction over current methods.

---

[158] Jacob A. Brochtrup vs. Mercury Marine, et. al. U.S. District Court for the Western District of Texas. Austin Division. C.A. No. 1: 07-CV-643-SS. Oral Deposition of Richard H. Snyder. April 7, 2008. Page 213.

[159] U.S. Patent 3,999,502 Hydraulic Power Trim and Power Tilt System Supply. Assigned to Brunswick Corporation. Issued 28 December 1976.
U.S. Patent 4,050,359 Hydraulic Power Trim and Power Tilt System Supply. Assigned to Brunswick Corporation. Issued 27 September 1977.

Increased Guard Diameter

Opponents to propeller guards say the increased diameter of guards compared to propellers will result in blunt trauma to more people in the water (see Drawing 1).

Returning to part of Mr. Snyder's previously mentioned quote on Page 2:

".. human heads and torsos can be badly injured by the blunt blow of an outboard or sterndrive gearcase, an inboard rudder, a boat hull..."

Boat hulls present the same danger. If Mr. Snyder wants to ban guards for this hazard, why is he not trying to ban boats that go over 8 mph? They have more cross sectional area than propeller guards. Plus there are currently millions more boats than guards on the water.

Blunt trauma is rarely, if ever, an issue in houseboat propeller strikes. If the industry elects to address it, the two Brunswick patents discussed earlier have expired and are now in the public domain. Use them.

Entrapment

The industry often raises concerns about the entrapment of a person's limbs between a propeller and a propeller guard leading to more serious injuries. Entrapment is typically argued against ring type propeller guards.

Full cage type guards surround the propeller with a cage, often built from a heavy wire mesh. Their construction leaves little opportunity to entrap limbs, especially not from the rear or sides. Most houseboat propeller victims approach (or are pulled into) the propeller from the rear or side, shortly after the propeller begins to rotate. They could not be entrapped by a full cage type propeller guard.

Many industry representatives apparently gave up on this issue against the cage type guards specified in the NPRM and did not mention entrapment in their comments. Entrapment is not mentioned in either of the two template letters NMMA suggested its members follow when responding to the NPRM.

NMMA/HIA summed up the industry's concerns and did not mention entrapment in their comment letter. Entrapment was similarly not mentioned by USCG in their withdrawal of the NPRM.

Mr. Snyder, on the other hand, clung to the issue. On Page 3, he said:

"What about the risk of entanglement of hands and feet that can enter the back, the front, or the spaces between the wires depending on the style and design?"

We encourage Mr. Snyder to view the old PropGuard Inc. video[160] showing Keith Jackson of MariTech Industries in a wetsuit putting his hands, body and feet against a SwimGuard propeller guard while the houseboat is backing into him. There was absolutely no entrapment.

At the June 2009 Decker vs. OMC trial, neither side could identify a case EVER being filed involving entrapment in a propeller guard of ANY kind. This was born out in the comments of Mikal Watts, Audrey Decker's lead attorney in the trial as recorded by Naples Daily News.[161]

---

[160] SwimGuard Designer's Endorsement (approx. 58 second segment). SwimGuard Manufactured by PropGuard Inc. (now MariTech Industries). Approx. 8 minutes 21 second video when it was repackaged by PowerboatSafety.com. Retrieved from PowerboatSafety.com approx. August 21, 2009. Not online in late May 2010.

[161] Court Blog: Day 9: Jury Begins Deliberating in Trial of Woman Injured by Boat Propeller. Aisling Swift. Naples Daily News. June 9, 2009. Posted at 3:40 pm. Retrieved May 6, 2010. http://www.naplesnews.com/news/2009/jun/09/jury-chosen-boat-propeller-guard-case

"But in the real world, he pointed out, even defense experts admit there are no known cases of entrapment or lawsuits involving entrapment, the key defense argument for not promoting guards."

Entrapment is not an issue for full cage type propeller guards on houseboats, and absolutely not for those selecting the lowest cost of compliance with this NPRM which does not utilize propeller guards.

Plus if they really think entrapment is an issue, they better take off the propellers too because people have been caught/entrapped in open houseboat propellers.[162]

Drag

Mr. Snyder addresses drag issues of cage type guards on Page 3 of his comments:

"If a 10 mph houseboat lost 1/2 mph due to drag of a "prop guard cage" that would be a loss of 5% in speed, fuel economy, and gain in exhaust emissions."

Maximum fuel consumption and exhaust emissions would only occur during the small percentage of time boats capable of running 10 mph were really running 10 mph or faster.

Just properly "propping" the boat may make up 1/2 mph, especially changing to a stainless steel prop.

A five percent reduction in top speed on a 10 mph boat results in no additional emissions. The boat will just be going .5 mph slower. Once the boat is running at a level speed, the fuel is just going into overcoming drag. It does not matter if it is hull drag of 10 mph or hull drag plus propeller guard drag at 9.5 mph.

Finally, if a 1/2 mile per hour speed reduction is unacceptable, perhaps we should ban hot tubs from these vessels because their weight slows them down as well.

Richard Snyder Response:

In early April 2009 I visited with Mr. Snyder on several occasions during the 83rd National Boating Safety Advisory Council (NBSAC) meeting. During our discussions, he made several comments about an online rough draft of this paper.

He said he was impressed by the paper, but he particularly had an issue with the fuel consumption comments in this section.

More specifically with our comment, "A five percent reduction in top speed on a 10 mph boat results in no additional emissions. The boat will just be going .5 mph slower. Once the boat is running at a level speed, the fuel is just going into overcoming drag. It does not matter if it is hull drag of 10 mph or hull drag plus propeller guard drag at 9.5 mph."

Mr. Snyder correctly pointed out that while that is true, if the two boats were to cover the same distance in miles, the boat with the guard would require more fuel because it would require more time to cover the same distance. He also pointed out the same is true for exhaust emissions. They would be the same per unit time, but more for the boat with a guard if both boats covered the same distance.

He politely asked if I was trying to insinuate the industry had tried to hide propeller accidents. I told him I do not think they tried to hide them. I just think they did not look for them very hard.

He admitted the implementation costs used to reject the NPRM appear to have included some errors.

Mr. Snyder encouraged me to apply some of my zeal to other boating safety issues that might have a larger impact on boating safety. He was very cordial and supplied several insights into the operation of NBSAC and its attendees. We very much appreciate Mr. Snyder's comments and his hospitality.

---

[162] Man Recalls Movie, Saves His Daughter. Miami Herald. April 13, 1985. Coverage of a houseboat propeller accident on Lake Oroville.

Accident Statistics

On Page 4 Mr. Snyder provides several statistics echoed by NMMA/HIA and SBA in their comments. He lists houseboat propeller injury and fatal accident statistics for two five year periods (1991-1995, 1996-2000) grouped by Rental and NonRental, and sorted by drive type.

Mr. Snyder's statements may be based on his interpretation of the accident compilation he provided for NMMA/HIA.

When we compare his counts with ours, we find he:

1. Counted NMMA/HIA "All Houseboats" accidents #15 and #16. We excluded them due to not having a "60" ("struck by propeller") in their accident descriptors.

2. Did not include the two accidents we found not listed in BARD (Falvey and Elmore).

3. Did not count the three accidents we found misclassified in BARD.

4. Did not include the 5 August 2000 Missouri accident.

5. Did not include the Shrayber 2000 accident. (Note the propulsion system of the houseboat involved in the Shrayber accident was originally misclassified as a water jet in BARD). He may also have missed it due to California accidents being removed from BARD for privacy issues.

That makes a total of seven accidents missed by Richard Snyder, the industry's leading propeller accident expert for many years. He has no incentive to find accidents. He actually has an incentive not to find them. The more propeller accidents he finds, the louder the call for action from victims, victims families, and propeller safety advocates.

Mr. Snyder's propeller accident statistics are briefly discussed in **Appendix C** and can be compared with other compilations in **Appendix E**.

Richard Snyder Response:

During our discussions with Mr. Snyder at NBSAC83, we talked about the removal of California accidents from BARD beginning in 2000.

He said his comment letter was written near the end of the time he quit following the individual accident data in great detail, but he thought California accidents were still in BARD.

I told him they might be included in the overall totals, but are not listed as individual accidents.

Mr.Snyder said he would check into that in the future.

USCG released the annual 2008 BARD database file in September 2009. They named the file BARD2008 Sans CA.mdb ("Sans CA" means no California accident reports are included).

Guards Can Work

Interestingly, Richard Snyder concludes his comments on Page 4 with a "qualified" statement on the benefits of propeller guards:

"A well designed, well built, all encompassing cage type prop guard with smaller hole sizes designed for suitability on 10 mph maximum speed or less vessels can be beneficial with SOME of the accidental contacts on SOME waters (non-weedy, non-shallows)."

Lake Powell Comments

Lake Powell, a large houseboat rental operation managed by Aramark, supplied their NPRM comments in an 8 March 2002 letter by Mark Suttie, Director of Environmental Management.

Page 1 of Mr. Suttie's letter states:

"We have no reports of any propeller strike injuries associated with our rental houseboats"

They certainly had one three years later in October 2005 when an employee's spouse (Sylvia Rozon) was killed by a houseboat propeller.

We also spotted three other BARD reported houseboat rental propeller accidents on Lake Powell of which we suspect one or more belong to Lake Powell:

1. A 9 June 1996 accident on Lake Powell at Halls Creek Bay in Utah.

2. A 5 October 1999 accident on Lake Powell in Utah.

3. A 6 July 2003 accident on Lake Powell in Utah near Page Arizona. Note this accident has a "U" for unknown in the rental column of BARD. It may be a private boat.

Page 5 of Mr. Suttie's letter states:

"The Coast Guard stated for the Council April 22, 2001 'The Coast Guard does assume that the more serious an accident is, the more likely the accident will be reported. Therefore we assume almost all fatal accidents to be included in the reporting database.' "

Maybe the Coast Guard and Mr. Suttie forgot about the Inspector General of the United States report, "Audit of the Performance Measure for the Recreational Boating Safety Program" Report # MA-2000-0084 in which he found 66 to 103 fatalities per year from 1993-1998 that are not listed in BARD but were reported in another USCG database.[163] Those accidents are still not in BARD.

Mr. Suttie continues on Page 5:

"Since the Coast Guard states in the Notice that they "... assume the eighteen injuries to be severe...". We consider propeller injuries to be accurately reported."

This paper has already shown many houseboat propeller injuries were not accurately identified, reported, or recorded. Mr. Suttie's firm was wrong when they considered propeller injuries to be accurately reported.

Pages 6 & 7 of Mr. Suttie's letter contain their implementation cost estimate for a 61 foot Sumerset rental houseboat with upper and lower helms.

We discussed this data in our response to NMMA/HIA comments. Lake Powell presents a 61 foot rental houseboat with twin drives and a flybridge as representative of all houseboats, when it really represents less than two percent of the houseboat population (see Chart 2).

They include two irrelevant "haul and launch" fees of $976 each. It is not necessary to haul a houseboat to install a propeller guard. Propeller guards are not required and you do not need haul a houseboat to install a swim ladder interlock. You certainly do not need to haul the same boat twice. The only reason to haul the same houseboat twice is to inflate implementation costs.

Lake Powell installed very large, expense mirrors designed for use on shop walls to avoid fork truck collisions, instead of much smaller, more economical truck "rear view" mirrors on their "typical" houseboat.

---

[163] Audit of the Performance Measure of the Recreational Boating Safety Program. United States Coast Guard. Report Number: MA-2000-084 dated April 20, 2000.
http://www.oig.dot.gov/library-item/4600 Retrieved May 6, 2010.

Costs for two swim ladder interlocks were included in their “typical” installation. We were unable to find a Sumerset houseboat with two stern swim ladders. Once again they are just inflating implementation costs.

On Page 11 Mr. Suttie address the devices:

“The Coast Guard is misleading any boat owner and operator on the effectiveness of the purely physical interventions proposed by this notice. Safety cannot be “installed.” “

Is it time to rip the seat belts, air bags, anti-surge brakes, safety glass, flashers, shock absorbing bumpers, mirrors, child safety seats, and starter interlocks out of our vehicles since “safety cannot be installed”?

Mr. Suttie questions the definition of a houseboat on Page 12. He spends the entire page pointing out what he feels to be problems in the definition (“primary accommodation spaces”, “little or no foredeck or cockpit”, “low freeboard”, “low length to beam ratio”) but offers not a single word toward a possible improved definition. If he really wanted to help, he would have suggested a definition.

Objections to Single Source Provider

On Page 15 of his letter, Mr. Suttie objects to use of swim ladder interlocks because they come from a single source and because they include an override:

"Currently the sole manufacturer, MariTech Industries provides an over-ride mode that defeats the system. Houseboat operators will leave the system defeated after experiencing nuisance shut-down of propulsion engines.

Rulemaking that requires a particular intervention device is inappropriate where only one such device is currently commercially available, thus, advancing the financial benefits of a rule to the manufacturer."

For Mr. Suttie and others concerned the NPRM mandates use of a patented product, we offer these thoughts:

1. Use of swim ladder interlock switch is just part of one of the options provided by the NPRM. If Lake Powell or others object to benefiting their manufacturer, they can use one of the other options.

2. The uniqueness of MariTech's swim ladder interlock is their patent claims[164] for the override feature. If Lake Powell or others do not want an override, they can use an ordinary marine quality switch and relay, and wire it up themselves.

3. We suspect there are still opportunities to design other swim ladder interlock systems with an override and not infringe on the MariTech patent.[165] It is difficult to tie up all possible solutions to a problem in a single patent. As an example, we cite several patents[166] for blower safety switches (will not allow the engine to start unless the blower runs for a given time to remove fumes from the engine compartment of a boat) several of which include overrides. That problem had room for several patentable solutions. We suspect this one does as well.

4. If the NPRM was approved and MariTech failed to make the swim ladder interlocks available at a reasonable price, or to license their manufacture, the Government could force them to issue a compulsory license[167] to other manufactures.

As to objecting to the inclusion of an override, we noticed several patents[168] from boating companies for similar types of safety interlock systems. These patents include overrides. The industry is designing overrides into its own products, but objecting to them when designed by others.

---

[164] U.S. Patent 6,276,974 Switch System for Preventing Marine Propeller Injuries. Issued to Propguard Inc. (now MariTech) on August 21, 2001.
http://patft.uspto.gov/netacgi/nph-Parser?patentnumber=6276974 Retrieved May 6, 2010.

[165] U.S. Patent 6,276,974. Switch System for Preventing Marine Propeller Injuries. Assigned to Propguard, Inc. (now MariTech). Issued August 21, 2001.

[166] U.S. Patent 3,951,091. U.S. Patent 4,037,578. U.S. Patent 4,235,181. U.S. Patent 5,069,154. U.S. Patent 5,233,226. U.S. Patent 6,670,722. U.S. Patent 7,353,765.

[167] Patent Nonuse and the Role of Public Interest as a Deterrent to Technology Suppression. Kurt M. Saunders. Harvard Journal of Law & Technology. Vol. 15. No. 2. Spring 2002. Pgs. 389-452.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=535162 Retrieved May 6, 2010.

[168] U.S. Patent 5,105,755. Pontoon Boat Gate With Safety Switch. Assigned to Mastercrafters Corporation. Issued April 21, 1992.
U.S. Patent 5,233,226. Ignition System for Gasoline Powered Boats. Assigned to Master Mariner. Issued August 3, 1993.
U.S. Patent 7,081,028. Portable Control Device Used as Security and Safety Component of a Marine Propulsion System. Assigned to Brunswick. Issued July 25, 2006.

INTENTIONALLY BLANK

Lake Powell is Not A Small Business

As mentioned in our discussion of the U.S. Small Business Administration Office of Advocacy's comments, Lake Powell's input and comments were central to SBA's response, which in turn was a major factor in the NPRM's defeat.

Lake Powell is part of Aramark. According to Aramark's 2002 annual corporate report,[169] Aramark had approximately 200,000 employees in 2002 and annual sales of approximately $8.77 billion.

SBA's definition of a small business considers the company, its parent company and all its affiliates as a single entity.[170] In their comment letter, SBA defined a small business as one with less than $6 million in gross annual receipts. Lake Powell is not a small businesses, but they still used SBA's Office of Advocacy as a platform to reiterate their comments.

SBA confronted USCG, claiming the proposed rule would not withstand an Administrative Protection Act (APA) challenge due to the financial hardship it places on small business. The data behind that challenge was furnished by Lake Powell. The challenge itself was a major reason the proposal was withdrawn per USCG Regulatory Coordinator Carl Perry, USCG at the 70th Meeting of the National Boating Safety Advisory Council (NBSAC) October 28-29, 2002:

"A major challenge to the rule was the objection from the Small Business Administration."

Even though Aramark had over 200,000 employees, they voiced their concerns as a small business and their comments played a major role in rejection of the proposal.

---

[169] Aramark Corporation. Form 10-K. For fiscal year ended September 27, 2002. U.S. Securities and Exchange Commission. Pg.14.

[170] U.S. Environmental Protection Agency. Regulatory Flexibility Act / Small Business Regulatory Enforcement Fairness Act (RFA/SBREFA). Small Business: What is a "Small Business". http://www.epa.gov/sbrefa/business.htm Retrieved May 6, 2010.

Bridge Bay Resort Comments

Bridge Bay Resort, a large, well known houseboat rental operation on Shasta Lake, commented in an 11 March 2002 letter. It was written by Bob Rollins, General Manager of Bridge Bay and Digger Bay Marina. His letter was mentioned earlier in our Shift of Liability discussion (PC Objection 9).[171] Mr. Rollin's letter also contains the following statement:

"I would like to add, that "Prop Guards" are not the answer to safety. Educating the public during vessel orientation and the appropriate signage will eliminate propeller accidents."

If educating the public and proper signage will "eliminate propeller accidents", what happened in 1992 when Stacey Epping was critically injured by a Bridge Bay rental houseboat propeller?

We suggest Mr. Rollins and others who promote education and training as "the solution" read our response to similar comments in our PC Objection 9 section and in our discussion of NMMA/HIA comments.

[171] Bridge Bay Resort 11 March 2002 Letter to USCG from Bob Rollins General Manager Bridge Bay Resort and Digger Bay Marina. USCG-2001-10163-89. Received 12 March 2002. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e6&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Coordinated Comments

Public Comment period for the NPRM opened on 10 December 2000 and was originally scheduled to close on 11 March 2002. During the first comment period, 92 comments were filed (Bridge Bay Resorts comments were filed the day after the scheduled closing of comments). Of those 92 comments, 40 were filed on the last day, many of them from major entities.

Those submitting comments on the last day (11 March 2002) included: National Marine Manufacturers Association, Houseboat Industry Association, Small Business Administration Office of Advocacy, Mercury Marine, Water Resorts Inc., Holiday Harbor, Jones Valley Resort, Antlers Resort & Marina, Sierra Marina, Bethel Harbor, and Fantasy Custom Yachts.

The time stamp on NMMA's comment letter is difficult to read but looks like it says some time after 4pm and possibly some time after 4:50pm. That is cutting it very close.

There is certainly nothing illegal about working together and filing your comments on the last day, but when over 43 percent of all comments come in the last day it becomes very obvious. Among objectives that can be achieved by such an organized effort are:

1. A more united front

2. A more focused message

3. Spread out minor issues so no one letter raises them all

4. Review one another's letters for accuracy

5. Amplify your message

6. Able to respond to issues raised by the other side until near closing time

7. Your comments seem more valid because they are coming from multiple sources

8. Prevent others from responding to your objections because the public comment period closes at the end of the day

9. A few industry experts can comment in several letters

10. Data and test results (such as product testing, implementation costs from trial installations, mockups, surveys, and other actions taken in response to the NRPM) can be written up in several letters for emphasis

Some may attribute the last minute wave of comments from major players to procrastination. However, many of the letters carry a tone of dire straights that would result from economical hardships caused by the NPRM.

If a regulation was going to put us out of business, we would put our comments together and respond before the last day. The concentration of comments from so many major players on the last day hints they filed in an organized fashion to achieve one of more of the objectives listed above. The public comment period was later extended.

NMMA provided a "template" for its members to use in writing comment letters.[172] The basic form of their "template" is observable in several submissions. NMMA reemphasized their write in campaign when the comment period was extended.[173]

An example of industry letters reinforcing one another is use of the same accident statistics by NMMA/HIA, SBA Advocacy, Joe Pomeroy of Mercury Marine, and Richard Snyder, re-

---

[172] Propeller Injury Avoidance Measures. NMMA web site. http://www.nmma.org/government/environmental/articles/PropellerAvoidance2.asp Retrieved May 6, 2010.

[173] NMMA Issues Action Alert of Prop Guard Proposal. March 22, 2002. NMMA web site. http://www.nmma.org/news/news.asp?id=160&sid=3 Retrieved May 6, 2010.

tired from Mercury Marine. USCG heard these statistics at least four times from major players, and began to believe them. The only problem is, they were wrong.

RENTAL HOUSEBOATS ONLY

Rental houseboats account for a disproportionate share of propeller accidents. USCG failed to recognize the opportunity to apply the NPRM to rental houseboats only. Industry representatives say the large number of accidents on rental houseboats relative to their population results from their more frequent use. Industry's excuse (higher usage rates) is all the more reason to make rental houseboats as safe as reasonably possible.

Table 37 lists BARD reported houseboat propeller accidents per year for rental and nonrental houseboats from 1990 through 2000. It does not include accidents misclassified in BARD or not reported in BARD.

Over this 11 year period, 13 rental and 13 nonrental (note some nonrental accidents may have really been rental accidents) fit this criteria. Adjusting for the population (5,000 rental houseboats and 95,000 nonrental houseboats), a rental houseboat has 19 times the likelihood of a nonrental houseboat of being involved in a BARD reported propeller accident per these statistics.

(13/5,000)/(13/95,000) = 19

Even using USCG's estimate of $1,500 per houseboat to comply with the NPRM, it would only cost $7.5 million to bring all rental houseboats into compliance per Table 42.

Table 42

Total Rental Fleet Propeller Guard Installation Costs

Number of Rental Houseboats	Cost per Rental Houseboat	Implementation Cost
5000	$1,500	**$7,500,000**

Similarly, using the low accident count provided by NMM/HIA (see Table 36), and even the old December 2001 DOT $2.7 million value of a statistical life, the cost of casualties is in excess of $10.9 million (see Table 43).

Table 43

Rental Houseboat Propeller Injuries and Fatalities Cost of Casualties 1991-2000 per NMMA/HIA Accident Count

	Injury Accidents	Fatal Accidents
NMMA/HIA Total	11	2
Cost each	$506,300	$2,700,000
Total Cost	$5,569,300	$5,400,000
Grand Total	**$10,969,300**	

Using USCG implementation costs (about three times actual rental houseboat implementation costs), NMMA/HIA's accident count, and a low value of a statistical life, the NPRM is still economically justified on "Rental" houseboats by a factor of almost 1.5 to 1 (See Table 44).

Table 44

Rental Houseboat NPRM Economical Justification Factor (using USCG cost data and NMMA/HIA accident counts)

Cost of Implementation	Cost of Casualties	Economic Justification Factor
$7,500,000	$10,969,300	**1.46**

Table 45 calculates cost of casualties based on our accident counts (Table 41C), and DOT's January 2002 Value of a Statistical Life (Table 30).

Table 45 Rental Houseboat Propeller Injuries and Fatalities Based on Jan 2002 DOT Value of Life Cost of Casualties 1991-2000 per PGIC Accident Count		
	Injury Accidents	Fatal Accidents
PGIC Total	12	2
Cost each	$562,599	$3,000,000
Total Cost	$6,751,188	$6,000,000
Grand Total	**$12,751,188**	

Table 46 shows cost of casualties for rental houseboats are over 6.5 times cost of implementation.

So while the economic justification factor for all houseboats was a factor of about 1, even selecting the data supplied by those opposed to the NPRM, rental houseboats are about 1.5 to 1. Using the correct data, the benefits of implementing the regulation on rental houseboats are over six times cost of implementation.

Table 47 Rental Houseboat NPRM Economical Justification Factor (Using PGIC Cost Data, PGIC Accident Count, And DOT January 2002 Value of a Statistical Life)		
Cost of Implementation (from Table 25)	Cost of Casualties (from Table 45)	Economic Justification Factor
$1,934,174	$12,751,188	**6.59**

Why did USCG not recognize and act on this high economic justification factor? The errors and distracting comments submitted by industry representatives may have prevented USCG from seeing the now obvious benefits of the proposed regulation, especially as it applies to rental houseboats.

Table 48 calculates the break even cost of implementation per rental houseboat from the cost of casualties and the number of rental houseboats.

Table 48 Rental Houseboat NPRM Break Even Implementation Costs per Rental Houseboat (Using PGIC Cost Data, PGIC Accident Count, And DOT January 2002 Value of a Statistical Life)		
Cost of Casualties (Table 45)	Number of Rental Houseboats	Break Even Implementation Cost per Houseboat
$12,751,188	5000	**$2,550**

Per Table 48, even if it cost $2,550 per rental houseboat to implement the NPRM it would still be worth it. It actually cost an average of less than $400 per rental houseboat (see Table 25) when the proposal was made.

Implementing the NPRM for rental houseboats would spur competition among manufacturers of propeller safety devices resulting in even better, more economical solutions. Installing propeller safety measures on rental houseboats would also increase propeller safety awareness among owners of private houseboat. Some nonrental houseboats would voluntarily install these measures as well.

Propeller safety interventions have their greatest potential payback on rental houseboats. They are used more frequently than nonrental houseboats, have an almost endless stream of operators and passengers. They are often operated by novices (or at least novices to houseboats). Rental houseboats often have a “party atmosphere” associated with them which increases the risk for propeller strikes.

Boater fatigue especially affects novice boaters and others on rental houseboats trying to force as many activities into a few days on the water as possible. In addition, boater fatigue can multiply the effects of alcohol, often found on rental houseboats. These factors, and others, place most rental houseboats at much higher risk of being involved in a propeller accident than a similar family owned houseboat.

This is verified by our earlier calculations showing a specific rental houseboat is 19 times more likely to be involved in a BARD reported propeller accident that a specific nonrental houseboat.

With the cost of casualties over 6.5 times the cost of implementation for rental houseboats, it is time for USCG to act.

STATEMENT TO THE U.S. COAST GUARD

USCG Boating Safety Division and Auxiliary do a wonderful job with the resources available.

We especially commend you for:

1. Maintaining the expertise and commitment of your staff
2. Improving your relationship with NASBLA and other partners
3. Your educational outreach
4. Your efforts toward developing a propeller guard test protocol
5. Teaming with ABYC to study lanyard kill switches, boarding ladder placement (proximity to propellers), and human factors
6. Developing the rental boat education package
7. Holding accident mitigation update meetings
8. Getting NASBLA involved in your efforts to improve boat accident reporting
9. Contracting a news clipping service to capture boating accidents in the media, then using that information to follow up on non BARD reported accidents
10. Developing and deploying the web based BARD system
11. Conducting the National Recreational Boating Survey
12. Creating an advisory board (NBSAC)

In recent years, USCG, has faced some major problems and challenges:

1. Assuming a larger role in Homeland Security, as well as limited budgets and manpower have reduced your capabilities for independent evaluation of proposed recreational marine safety measures.
2. Problems with your handling of maritime (larger commercial vessels) safety issues[174] are resulting in more of your resources being deployed in that arena. This has put an even greater strain on USCG recreational boating safety resources.
3. Failure of the Deepwater project resulted in massive expenditures and ruined several patrol boats.[175]
4. Dealing with the 2010 Deepwater Horizon BP oil spill in the Gulf of Mexico.

As a result of these and other events, you are increasingly relying on industry comments for evaluating proposed regulations. Rejecting a proposed rule that really was economically justified is your penalty for trusting them. To some, the penalty has been the death or maiming of a loved one.

It is time to quit relying on industry at the expense of public safety.

This paper has shown the NPRM to be economically justified as it applies to rental houseboats by a factor of over 6.5 to one, not including unreported accidents and many other variables that would raise the factor even higher. It also shows the legal challenge raised by SBA's Office of Advocacy, as presented by them, has absolutely no merit.

Please right this wrong and reopen the NPRM, especially as it applies to rental houseboats.

---

[174] Coast Guard Maritime Safety Analysis: An Independent Assessment and Suggestions for Improvement. VADM James C. Card. Retired. November 16, 2007. Predecisional - Interim Coast Guard Document.

[175] The Troubled Waters of "Deepwater". CBS News. August 19, 2007. http://www.cbsnews.com/stories/2007/05/17/60minutes/main2823448.shtml Retrieved May 6, 2010.

ACCURACY OF ACCIDENT DATA

We spent a tremendous amount of time compiling and verifying houseboat propeller accident data. We studied the original BARD data in several formats, as well as numerous compilations by others.

Accurately compiling BARD data for rental and nonrental houseboat propeller accidents, is a complex process (see **Appendix C**).

We tried to make sure we sorted and analyzed the data properly. However it is possible we made a few errors along the way. We would very much like to be made aware of any errors in our 1990-2000 houseboat propeller accident data (spreadsheet in **Appendix D**). If you are aware of any errors in those entries, additional data surrounding those accidents, or any accidents not listed, please contact us at polsong@virtualpet.com

We strongly encourage USCG to develop an "official" spreadsheet (similar to **Appendix D**) listing houseboat accidents from 1990 to present, post it online, and update it as additional information becomes available.

Boating industry representatives continue to decry the lack of data surrounding propeller injuries. They call for putting off decisions until better data is obtained.

In early December 2002 we proposed creation of a Boating Industry Consortium to Address Propeller Injuries.[176] One of its primary charges would be improving data collection by reducing the number of unreported accidents, collecting more information on the accidents identified, and insuring its accuracy. Higher quality data will aid the industry in making decisions (such as this NPRM) and aid designers in developing more effective solutions. We are still waiting for phone to ring eight years later.

Industry representatives do not really want better data. If they did, they would have responded when the "lack of data" issue was raised way back in USCG's 1978 report, "Struck by Propeller Accidents", or when it has been repeatedly raised since. No response in over 30 years sends a strong signal of their lack of interest in improving data collection. Valuable information continues to be lost every day.

By collecting and posting media reports of propeller accident reports,[177] we (Propeller Guard Information Center) have single handedly, voluntarily done more to capture individual propeller accident data and make it accessible than the industry has in its entire history.

Boat and marine drive manufacturers spend considerable effort and expense in collecting, recording, analyzing, and storing information on warranty period product failures. Failure analysis tools are used to determine failure modes and identify root causes. Components and products are redesigned, tested, implemented, and monitored to reduce warranty failures (costs), improve customer satisfaction, and improve rankings in the annual J.D. Power Customer Satisfaction studies (which translate into sales).

Boat and marine drive manufacturers could employ the same types of techniques and methods used to reduce warranty failures to reduce the frequency and severity of propeller accidents.

---

[176] Boating Industry Consortium to Address Propeller Injuries. Polson Enterprises / RBBI.com http://www.rbbi.com/invent/guard/propg/updates/2002/supreme.htm#consort Retrieved May 6, 2010.

[177] Propeller Accidents Blog Media Coverage of Propeller Accidents. Polson Enterprises / RBBI.com http://rbbi.com/pgic/index.htm#acc Retrieved May 6, 2010.

Footnote

The February 2009 USCG Accident Mitigation Meeting was titled, Beyond the BARD: A Study in Alternative Accident Data.[178] They discussed boat insurance claim databases and marine surveyor databases as possible alternatives to BARD data.

The moderator, Dave Marlow of Brunswick, closed the meeting with:

"It is clear that while alternatives may exist to the BARD our efforts should be focused on making the existing system as viable as possible. It is doubtful we will find an alternative to the BARD where the end will justify the means."

He seems oblivious to the previous USCG sponsored study which found the Consumer Product Safety Commission (CPSC) National Electronic Injury Surveillance System (NEISS) accident data provided the greatest benefit for the least cost.[179] We see no mention of NEISS data in the minutes of the February 2009 meeting. The best alternative was not even included in the discussion.

---

[178] Beyond the BARD: A Study in Alternative Accident Data. USCG Accident Mitigation Meeting. February 12, 2008. Miami International Boat Show. Minutes by ABYC.

[179] Recreational Boating Accident Statistic Methodologies. George Washington University. Approx. 1992.

IDENTIFIABILITY BIAS

Shi-Ling Hsu in The Identifiability Bias in Environmental Law,[180] said:

"The identifiability effect is the human propensity to have stronger emotions regarding identifiable individuals or groups rather than abstract ones. The more information that is available about a person, the more likely this person's situation will influence human decision making."

During this NPRM's public comment period, several houseboat rental companies sent letters to USCG, explaining a little about their situation and how the NPRM would be a burden to them.

USCG and most of us have some concept of a rental boat operation and the people who work there. They are generally good, down to earth people, they enjoy the outdoors, they spend a lot of time on or near the water, they help others, are usually casually dressed, youthful through middle aged, and are generally cheerful. We even have some concept of their life away from work. We do not want to cause them a hardship.

On the flip side, USCG just sees stats and numbers about random people that might be injured or killed in the future. Future victims, their families, and loved ones do not have revelations during the public comment period revealing they or their loved one will be struck by a houseboat propeller in the future. Why would they write in to express their concerns?

Marine Sergeant Jim Smith is a hypothetical Desert Storm veteran who may have seen prop guards on rigid landing craft in Kuwait (sold to the Marine Corps by Mercury Marine). In today's time (2009) he lives in Reno Nevada, with his wife, Jane, and a couple young boys.

Jane is enjoying her life as a soccer mom after she worked to help support the family while Jim was in college.

In a few years Jim and Jane will put together plans to rent a houseboat on Lake Shasta to celebrate their wedding anniversary. During their long awaited family getaway, she will be struck and killed by a houseboat propeller, leaving her husband and two grieving sons behind.

Jane is just a future statistic. No one was concerned about her during consideration of the NPRM.

Those struck in the past are just numbers in BARD. Those who will be killed and injured in the future (like Jane) are currently even more abstract than the nameless, faceless statistics they will one day become. USCG is naturally biased against them out of concern for those employed at houseboat rental operations because they can put a face and a life on them.

USCG is not just thinking about typical people working at rental boat operations. They personally know several of the people involved. Would identifiability bias your judgement in favor of individuals you regularly work with at houseboat rental operations, houseboat builders, and marine drive companies and against unidentified, unknown, faceless individuals who will be killed or injured in the future if you were at USCG?

---

[180] The Identifiability Bias in Environmental Law. Shi-Ling Hsu. Draft. Florida State University Law Review. Vol.35 No.2 (Winter 2008). Pgs. 433-504. http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID983286_code182577.pdf?abstractid=964531&mirid=1 Retrieved May 6, 2010.

TO THOSE WHO DISPUTE OUR FINDINGS

We invite your comments.

Please review our arguments. The victims and future victims were shortchanged. The underlying causes behind withdrawal of the NPRM were:

1. USCG forgot that 95 percent of all houseboats only need a mirror and a swim ladder interlock system to comply.

2. Misleading information supplied by representatives of the boating industry.

3. SBA Office of Advocacy issued an APA challenge that was later shown by this report to be without merit.

Those underlying causes plus the three objections raised by USCG and the nine public objections cited by USCG led to withdrawal of the NPRM. Please address your comments against those objections or the three underlying causes listed above.

Those objecting to our economic analysis may find a few dollars here and there in an attempt to raise the implementation costs above benefits for “All Houseboats”. But please remember, we were extremely conservative in our calculations. It would take millions of dollars to equal several factors we left out. Some factors we excluded are listed in **Appendix F**.

We also note, in early 2010 a federal jury weighed similar factors and found a boat builder and a drive manufacturer guilty in a propeller injury product liability case[181] involving a strike behind a boat capable of much higher speeds (more challenging operational conditions for a propeller guard than houseboat speeds). The jury weighed the evidence and found the vessel to be defective (no guard). The boat builder and marine drive manufacturer (Sea Ray and Mercury Marine, both Brunswick companies) were found to be 66 percent responsible for the victim’s injuries.

We also welcome comments from industry representatives and organizations defending what we identified as errors in their comments (NMMA/HIA, SBA Advocacy, Mercury Marine, Lake Powell-Aramark, Bridge Bay). If we have in any way misrepresented your comments or were mistaken in our interpretation of them, please let us know and we will correct this report.

We can be reached at:
polsong@virtualpet.com

[181] Jacob A. Brochtrup vs. Mercury Marine, et. al. U.S. District Court for the Western District of Texas. Austin Division. C.A. No. 1: 07-CV-643-SS.

Summary of Findings

On December 10, 2001, the U.S. Coast Guard (USCG) published a Notice of Proposed Rulemaking (NPRM) for non-planing, propeller driven recreational houseboats with propellers aft of the transom. The proposed rule would require owners of these houseboats to install propeller guards OR some alternative measures. Use of a swim ladder interlock, a clear aft vision device (mirror), and an emergency ignition cut-off switch (EICOS) were the alternatives. Rental houseboats would require guards or all three alternatives. Nonrental houseboats would require guards or a swim ladder interlock and a clear aft vision device.

Public comments were invited. A Notice of Proposed Rulemaking Withdrawal (NPRMW) was issued on 18 October 2007. USCG supplied three reasons for withdrawing the proposal:

1. Reconsideration of the costs that would likely result

2. Characteristics of safety measures to be required

3. Uncertainty concerning the definition of “houseboat”

In addition, USCG reported nine objections raised in public comments. These objections were predominantly raised by houseboat rental operations, marine drive manufacturers, and related boating industry organizations (Houseboat Industry Association, National Marine Manufacturers Association, and Small Business Administration Office of Advocacy).

Propeller guards and related safety devices are an emotionally charged issue. The boating industry is on one side; propeller accident victims, their families, and propeller safety advocates are on the other. Historically, boating industry representatives have argued propeller guards do not work, create drag, increase fuel consumption, and are dangerous themselves due to blunt trauma, entrapment and boat handling issues. Propeller victims, their families, and propeller safety advocates counter those arguments with strong emotions, horrific injuries, disproportionate injuries to children and youth, lives lost, the industry expending minimal effort to solve the problem, the industry ignoring existing solutions, and technical feasibility of even better solutions. Supporters say, “If we can put a man on the moon, surely the boating industry can design an effective propeller guard” and the industry counters, “We can’t change the laws of physics”.

This time, the argument focused on non-planing, slow moving, displacement houseboats with cage type guards or with alternatives to guards. The boating industry found many of their previous arguments no longer applicable because:

1. Cage guards minimize risk of contact with propellers (previously argued you could still come in contact with a prop through some guards).

2. Drag issues, increased fuel consumption, blunt trauma, and boat handling issues are minimal to nonexistent at the slow speeds associated with non-planing houseboats (perviously argued these issues were significant at higher operating speeds).

3. Cage guards minimize entrapment issues (previously argued some types of guards entrap people).

Having lost their traditional objections, industry representatives chose new talking points:

1. Insufficient need (not enough accidents to justify action)

2. Implementation costs are higher than USCG estimates

3. Proposed devices, especially swim ladder interlocks, mirrors and kill switches, are not effective against the hazard, if propellers ever were a hazard

4. The proposed rule would have significant economic impact on small businesses (houseboat rental operations)

5. The term, “houseboat” was not precisely defined

Some industry spokesmen segmented accident counts into five year periods, discussed rental houseboat accidents only, or focused on accidents by drive type. Their approach reduced the number of accidents being discussed at any one time, leaving many readers thinking the total injury and fatality counts were much lower than they actually were.

Industry representatives supported their comments with inflated component costs and installation costs, and with deflated houseboat propeller accident statistics. Several comments from those with ties to the boating industry promoted warnings (decals/placards) and propeller safety education as better solutions than those proposed by USCG. These industry “talking points” helped persuade USCG to withdraw the proposed regulation.

Instead of designing, manufacturing, and installing propeller safety devices, the industry chose to spend millions defending itself. In the June 2009 Audrey Decker vs. OMC trial, one expert witness revealed his firm (just one of many regularly used by the industry) had been paid approximately $60 million to defend manufacturers in propeller cases. If just those funds alone had been directed toward purchase and installation of devices required by this NPRM, every houseboat subject to the NPRM could have been outfitted three times over.

This report documents hardware costs, intervention costs, and frequency of reported houseboat propeller accidents. Large differences were found between information supplied by the boating industry and the actual figures. Each industry error, mistake or omission led to a higher implementation cost or to a reduction in accident counts. In the end, fallacious industry calculations convinced USCG the proposed rule was not economically justified.

One major error was failing to recognize 95 percent of all houseboats only require a mirror and a swim ladder interlock to comply. As a result, we calculated an average implementation cost of $198.44 per houseboat, while the National Marine Manufacturers Association, in coordination with the Houseboat Industry Association, and Lake Powell (Aramark) submitted an average cost of $3,303.70 per houseboat. They reached such an astronomical figure by:

1. Selecting a houseboat that was more expensive to modify than 98% of all houseboats.

2. Hauling the houseboat from the water twice when it did not need to be hauled at all.

3. Inflating component costs and labor times.

4. Using the combined cost of both options (propeller guards plus the three other devices) when either approach would have brought any rental houseboat into compliance.

USCG reported objections raised by the Small Business Administration (SBA) were a major challenge to the proposed rule. SBA Office of Advocacy, in conjunction with the National Marine Manufacturers Association, the Houseboat Industry Association, and Richard Snyder, long time propeller accident expert witness for Mercury Marine, provided houseboat propeller accident data for a ten year period (1991-2000). SBA's submission included a ten year accident table in which they:

1. Only listed data for nine years (they called it a ten year table).

2. Listed one 1994 rental houseboat propeller injury, but failed to include the same accident in the total houseboat propeller injuries column for 1994.

3. Failed to include one houseboat propeller injury accident they mentioned earlier in a footnote in the same letter.

SBA also failed to find additional accidents misclassified in the U.S. Coast Guard Boating Accident Report Database (BARD) and failed to acknowledge some accidents are not in BARD.

SBA said accidents near swim ladders were not an issue because "passenger/skier behavior was not listed as an accident cause. SBA failed to recognize "No Proper Lookout" is the code commonly used for houseboat propeller accidents when starting the engine with someone near the propeller (swim ladder). "No Proper Lookout" is actually one of the most frequently listed accident cause descriptors in the NMMA/HIA accident list SBA based their comments on.

SBA committed major errors in calculating economic impact of the NPRM upon small business. Those errors included:

1. Using the wrong census data set to obtain basic economic statistics for houseboat rental operations.

2. Failing to recognize implementation costs could be spread over three years.

3. Failing to recognize at least a portion of implementation costs could be passed on to renters of houseboats (customers).

4. Failing to acknowledge over twenty percent of all rental houseboats are concentrated among a few large operations. This significantly reduces the average number of houseboats per small rental operation.

SBA threatened USCG with the possibility of legal challenges based on the Administrative Protection Act (APA). USCG saw SBA's comments as a major challenge, when in fact, SBA's comments were totally without merit.

The U.S. Coast Guard contributed to the defeat of the proposal by:

1. **Failing to recognize 95 percent of all houseboats could be brought into compliance with a mirror and a swim ladder interlock system in their final cost estimate.**

2. Switching from saying maximum cost of implementation is based on guards (in the NPRM) to saying guards would be the least expensive option (in the NPRMW) when in fact, they remained the most expensive option.

3. Failing to identify some houseboat propeller accidents that were listed in their Boating Accident Report Database (BARD).

4. Misclassifying houseboats involved in propeller accidents as other types of vessels in BARD.

5. Misclassifying one houseboat listed in a BARD reported accident as being powered by a water jet when the accident resulted in two legal propeller injury cases (pre and post Sprietsma).

6. Failing to make any accounting for houseboat propeller accidents not reported to BARD, even when some of those specific accidents are reported in other Coast Guard materials.

7. Allowing the State of California to withdraw its boating accident records from BARD.

8. Failing to recognize major errors in comments made by boating industry representatives.

9. Including a cost of $600 for hauling houseboats from the water to install propeller guards in their implementation cost estimate. Houseboats do not need to be hauled from the water to install some guards. Minimal cost of compliance should have been calculated without hauling. Plus as mentioned above, 95 percent of all houseboats can be brought into compliance with a mirror and a swim ladder interlock system.

10. Failing to use the updated Department of Transportation (DOT) value of statistical life (VSL) of $3 million issued by DOT one month after the NPRM was published. USCG was part of DOT at that time. Additionally, the value of injuries is based upon VSL. The new VSL would have impacted the Cost Benefit Analysis.

11. Failing to cite sources of certain data and decisions in the proposal (exactly which accidents did USCG count, how was the value of a life and the value of an injury estimated, why did they chose ten years of accidents to balance against, exactly how they arrived at their estimated cost of implementation per houseboat in the NPRMW, where certain comments they mentioned in the NPRMW came from, etc.). We spent a tremendous amount of time tracking down the origin of those specifics when they should have been more transparent. Similarly, original advocates of the proposal (including NBSAC) included ALL non-planing rental boats (like non-planing rental pontoon boats). Excluding them significantly altered the cost benefit analysis. USCG never explained why they dropped the other non-planing rental boats.

12. Placing major significance on comments from the Small Business Administration Office of Advocacy. SBA’s comments were riddled with errors, inaccuracies, and false statements.

13. Not previously establishing an ongoing relationship with the U.S. Consumer Product Safety Commission (CPSC) National Electronic Injury Surveillance System (NEISS) to capture information from propeller accident victims reporting to hospitals and emergency rooms. NEISS data could have been used to more accurately estimate propeller accident frequency.

14. Failing to make pre 1995 BARD data easier to access and easier to understand.

15. Prominently publishing “Event 1 data” in their annual boating accident report and annual boating accident press release. Every year several newspapers, magazines, and even marine publications print “Event 1” stats as the total number of propeller accidents when they typically represent less than half the propeller accidents and less than one-fourth the propeller fatalities reported in BARD. Failing to clearly distinguish between “Event 1” and “All Event” data misleads the general public to believe propellers are much safer than they actually are.

16. Failing to study and document life changes and long term affects caused propeller injuries and fatalities. No attempt has been made to estimate the number of people affected by propeller injuries and fatalities or how they were affected (spouses, children, family members, loved ones, friends, employers, coworkers, etc.).

17. Failing to previously study and document the closeness of feet and legs to propellers when using swim ladders, the frequency at which rental houseboaters are boarded using swim ladders, and level of visibility of those in the water immediately behind the boat from the helm when starting the engine(s).

18. Failing to study and document the awareness level of people in the water behind larger powered recreational vessels (such as houseboats) as to the location of the propellers AND as to the dangerousness of propellers.

19. Failing to include non-monetary costs in the cost benefit analysis. The Office of Management and Budget allows consideration of non-monetary costs when conducting cost benefit analysis. Family members are often present and witness their loved one being injured or killed by a propeller. No attempt was made to quantify those psychological / emotional costs.

20. Failing to recognize they could have opted to target the NPRM to one of more high risk segments of the houseboat population, such as rental houseboats or houseboats over “x” feet in length. Similarly, they failed to recognize they could have grandfathered in existing houseboats and targeted houseboats built after 20XX, houseboats entering rental fleets after 20XX, etc.. Note - we are not recommending grandfathering in existing houseboats, we are merely mentioning that option was not explored.

21. Failing to include public outcry from propeller victims and their families as a non-monetary factor in the cost benefit analysis. For example, the NPRMW made no mention of the over 1,800 form letters they received in support of the use of propeller guard technologies or jet pumps on rental houseboats in a previous public comment period.

We identified a total of EIGHT 1990-1999 houseboat propeller accidents missing in the NPRM statistics provided by USCG. Four were properly classified BARD houseboat propeller accidents, two were houseboat propeller accidents misclassified as other types of boats, and two were reported in the media, but never reported in BARD. One of those missing is specifically mentioned in several earlier NPRM comment letters. The family even made a presentation at a National Boating Safety Advisory Council meeting. Another is referred to in a footnote of the Small Business Administration Office of Advocacy’s letter.

With the missing accidents and USCG’s judgement clouded by the over 20 points just mentioned, USCG was unable to see through the errors, mistakes and omissions in comments submitted by the boating industry. A huge wave of industry letters on the last day for public comment overwhelmed USCG with inflated implementation costs and deflated accident counts.

The public comment period was later extended, but industry easily convinced USCG the regulation was not economically justified, and it was withdrawn.

This report exposes the errors, mistakes, omissions, and misleading comments submitted by the boating industry and proves the proposal was economically justified. Based on these findings, we urge the U.S. Coast Guard to reconsider the proposed rule, especially as it applies to rental houseboats.

We also point out an identity bias in which USCG knows and works with those in the houseboat industry while future propeller victims are not yet even faceless statistics. As with most proposed regulations, the proposal would cause some amount of difficulty for those in the houseboat industry. It is human nature for the more you know about a group, the greater influence it has upon your decisions regarding them. Those working in USCG Office of Boating Safety personally know many people working in the houseboat industry. They are generally good people. USCG does not want to cause them any difficulties. They do not know the nameless, faceless individuals that will be maimed and killed in the future. As a result, USCG is less likely to come to their defense as they consider the proposal. It is just human nature.

As a result of spending over two years studying the NPRM we produced the list of **Action Items** beginning on the next page. We call for USCG and the boating industry to implement them. We also encourage propeller safety advocates, the media, boaters, legislators, and the general public to call for these actions.

ACTION ITEMS

Based upon the errors we (PGIC) identified in the decision to withdraw USCG 2001-10163, we call upon the U.S. Coast Guard Office of Boating Safety and the boating industry to implement the following eight action items. Action items 1-4 are specific to the NPRM. Action items 5-8 begin to lay the foundation for continuous improvement in propeller safety.

1. Publicly acknowledge errors made during consideration of NPRM USCG 2001-10163. If these errors are not acknowledged, misleading costs and statistics will continue to be cited, leading to even more deaths and injuries. The errors are to be acknowledged by:

   A. USCG is to request a written response from NMMA/HIA to each of the 6 cost estimate errors listed beginning on page 83 that either explains why NMMA/HIA was right, or confirms they were wrong.

   B. USCG is to request a written response from SBA Office of Advocacy to each of the 15 errors listed beginning on page 116 that either explains why SBA was right or confirms they were wrong.

   C. USCG is to publicly acknowledge their final cost estimate was in error, in part, because they failed to recognize 95 percent of all houseboats could be brought into compliance with only a mirror and a swim ladder interlock system.

   D. USCG is to recalculate their cost of implementation estimate for ALL houseboats (per houseboat and total cost of implementation) based on:

      - Component and labor cost data provided in the NPRM and NPRMW
      - Nonrental houseboats only requiring a mirror and a swim ladder interlock system
      - Rental houseboats being about evenly split between single and twin engines
      - Propeller guards being installed from the water (no hauling)

   E. USCG is to publish the four responses above (1A through 1D) in the USCG 2001-10163 online docket for all to view.

2. Reinstate the NPRM, especially as it applies to rental houseboats in response to:

   A. The many cost benefit analysis errors PGIC identified in this report.

   B. PGIC calculations showing the proposed rule was overwhelmingly economically justified for rental houseboats.

   C. USCG/ABYC ongoing (2007-2010) development of the propeller guard test protocol.

   D. Recent (2009) ABYC testing and underwater video showing the close proximity of propellers to the feet and legs of people boarding via swim ladders.

   E. Entry of new propeller safety devices and approaches since the NPRM. Some new devices minimize previously raised objections by focusing on preventing propeller strikes to people in the water behind the vessel, the most common accident mode for houseboats.

F. The exposure (many people on board, new people every trip, training issues, use of alcohol, party environment, people frequently in water behind the boat, novice boaters, novice operators, boater fatigue in hot sun and long hours, swim ladder proximity to propellers, water slides, poor aft visibility from helm, boats are in use many hundreds to thousands of hours a season, rafting of multiple vessels, the propeller hazard may not be visible, quickness at which accident occurs, severity of potential injuries, etc.).

3. Revise and edit the NPRM to include the appropriate combinations of propeller safety devices, including the newer devices and approaches listed below.

   A. Backup video cameras, now optional on several houseboats

   B. Virtual Interlocks - ladder interlock, gate switch, wireless lanyards, Captain's Mate, etc.

   C. Swim ladder design (length, location, handholds, etc.)

   D. ANSI Z535 propeller safety warnings/decals at the helm and stern

   E. Propeller guards with swing up rear screens, like 3PO's Navigator with its 3PO Shield

   F. Any of the three approaches in Action Item #4 if testing proves them to be an effective option

4. Test the following three approaches using off-the-shelf hardware for possible inclusion as alternatives (or as part of an alternative) in Action Item #3 as soon as possible:

   A. Doorbell interlock (see page 75).

   B. Doorbell interlock that also activates self adjusting backup alarms (loudness automatically adjusted based on background noise level) for a few seconds (see page 75).

   C. Ignition interlock using self-adjusting backup alarms that sound for a few seconds in advance of engines being started (see page 75).

5. Require ANSI Z535 propeller safety warnings/decals/placards at the helm and stern as soon as possible.

6. Improve propeller accident data collection and availability by:

   A. Reformat USCG's annual Boating Statistics report to VERY CLEARLY distinguish between "Event 1" data and the total number of propeller fatalities and injuries ("All Event" data). See Appendix I.

   B. USCG sign on with NEISS to begin collecting recreational boating propeller injury/accident data as soon as possible (propeller injury data only, not all boating accidents).

   C. USCG create an "official" houseboat propeller accident table similar to our Appendix D. This table is to be a "living document" with accidents added or updated as new information becomes available.

7. Aggressively develop new technologies and approaches for the future such as:

A. Australian Environmental Safety Propeller, Patent #WO/2008/040049. A proper evaluation of this device may show it to be the most economical and least objectionable solution in many situations. More details are available on PGIC.

B. Ignition interlock using self-adjusting backup alarms that broadcast verbal warnings or a combination of verbal warnings and "beeps" for a few seconds in advance of engines being started (loudness automatically adjusted based on background noise level).

C. The Flapper (a guard design described on page 130 and further described on PGIC).

D. Trim Cylinder Trailout (a method of reducing blunt trauma described on page 135).

E. New methods of detecting people in the water near the stern (infrared, acoustical, image recognition, motion detection, fish finders, etc.).

F. Use of flattened or elliptical shaped wires/rods in cage guard construction to reduce drag (similar to those used in surf lifeboat guards in Australia and New Zealand).

G. Propeller Guard With Reduced Drag invention as described on PGIC.

H. Man Overboard Detection Without Use of Lanyards or Tags as described on PGIC.

I. Establish a Technology Prize[182] for propeller safety devices similar to the 2005 "Innovations in Life Jacket Design Competition" sponsored by BoatUS and PFDMA, except with much larger prizes. Prizes could be awarded by entrant category (kids, junior high, high school, college, professional, etc.), by application (houseboats, pontoons, small boats), and by problem (in water detection, increasing visibility of downed skiers/tubers/boarders in the water, reducing ejections, automatically stopping "circle of death" boats, approaching large wake/wave alarms, etc.). An ongoing, multiyear contest could remain broad, but still encourage work in a specific segment each year.
Note - the industry paid approximately $60 million to just one of the firms defending propeller cases. A very small fraction of those funds could be used as Technology Prizes resulting in solutions that lead to fewer accidents and to fewer legal cases.

J. Rapidly completing USCG's propeller guard test protocol and begin webcasting USCG Propeller Injury Avoidance Meetings.

8. Eliminate the "nothing has been thought of that would be worthy to do" attitude.

If we can be of assistance to any parties involved, please contact us.

Gary Polson
Propeller Guard Information Center
http://www.rbbi.com/pgic polsong@virtualpet.com

Layout break after this text

[182] Technology Prizes for Climate Change Mitigation. Richard G. Newell and Nathan E. Wilson. Resources for the Future. RFF DP 05-33. June 2005.
http://www.rff.org/documents/RFF-DP-05-33.pdf Retrieved May 6, 2010.

APPENDIX A

Marked Copy of NPRM

Federal Requirements for Propeller Injury Avoidance Measures. Department of Transportation. Coast Guard. USCG-2001-10163. Federal Register. Vol. 66 No. 237. Pgs. 63645-636450.

DEPARTMENT OF TRANSPORTATION

Coast Guard

33 CFR Part 175

[USCG–2001–10163]

RIN 2115–AG18

Federal Requirements For Propeller Injury Avoidance Measures

AGENCY: Coast Guard, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Coast Guard proposes to require owners of non-planing recreational houseboats with propeller-driven propulsion located aft of the transom to install one of two propulsion unit measures or employ three combined measures. This change responds to recommendations made by the National Boating Safety Advisory Council (NBSAC). The proposed rule would reduce the number of boaters who are seriously or fatally injured when struck by a non-planing recreational houseboat with propeller-driven propulsion.

DATES: Comments and related material must reach the Docket Management Facility on or before March 11, 2002.

ADDRESSES: To make sure that your comments and related material are not entered more than once in the docket, please submit them by only one of the following means:

(1) By mail to the Docket Management Facility (USCG–2001–10163), U.S. Department of Transportation, room PL–401, 400 Seventh Street SW., Washington, DC 20590–0001.

(2) By delivery to room PL–401 on the Plaza level of the Nassif Building, 400 Seventh Street SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The telephone number is 202–366–9329.

(3) By fax to the Docket Management Facility at 202–493–2251.

(4) Electronically through the Internet Site for the Docket Management System at *http://dms.dot.gov.* The Docket Management Facility maintains the public docket for this rulemaking. Comments and material received from the public, as well as documents mentioned in this preamble as being available in the docket, will become part of this docket and will be available for inspection or copying at room PL–401 on the Plaza level of the Nassif Building, 400 Seventh Street SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. You may also find this docket on the Internet at *http://dms.dot.gov.* You may obtain a copy of this proposed rule by calling the U. S. Coast Guard Infoline at 1–800–368–5647, or read it on the Internet, at the web site for the Office of Boating Safety, at *http://www.uscgboating.org or at http://dms.dot.gov.*

FOR FURTHER INFORMATION CONTACT: If you have questions on this proposed rule, contact Carlton Perry, Project Manager, Office of Boating Safety, U.S. Coast Guard, by telephone at 202–267–0979 or by e-mail at *cperry@comdt.uscg.mil.* If you have questions on viewing or submitting material to the docket, call Dorothy Beard, Chief, Dockets, Department of Transportation, telephone 202–366–5149.

SUPPLEMENTARY INFORMATION:

Request for Comments

We encourage you to participate in this rulemaking by submitting

comments and related material. If you do so, please include your name and address, identify the docket number for this rulemaking (USCG–2001–10163), indicate the specific section of this document to which each comment applies, and give the reason for each comment. You may submit your comments and material by mail, hand delivery, fax, or electronic means to the Docket Management Facility at the address under **ADDRESSES**; but please submit your comments and material by only one means. If you submit them by mail or hand delivery, submit them in an unbound format, no larger than 8½ by 11 inches, suitable for copying and electronic filing. If you submit them by mail and want to know they reached the Facility, please enclose a stamped, self-addressed postcard or envelope. We will consider all comments and material received during the comment period. We may change this proposed rule in view of them.

Public Meeting

We do not plan to hold a public meeting but you may submit a request for one to the Docket Management Facility at the address under **ADDRESSES** explaining why one would be beneficial. If we determine that a public meeting would aid this rulemaking, we will hold one at a time and place announced by a later notice in the **Federal Register**.

Background and Purpose

Regulatory History. The Coast Guard received requests from the National Boating Safety Advisory Council (NBSAC), propeller strike prevention organizations, and the general public to require installation of propeller guards on recreational houseboats and other displacement (non-planing) vessels, including those leased by livery operations. While accident data currently available to us does not show a high number of reported fatalities from propeller strikes annually, the number of responses to the 1995 and 1997 notices of request for comments (discussed below) indicate a great deal of public interest in whether and how the Federal government should act to prevent propeller-strike accidents. After consideration of public input and consultation with the National Boating Safety Advisory Council (NBSAC), we determined that we should promulgate regulations for owners of houseboats as non-planing recreational vessels with propeller-driven propulsion aft of the transom.

Initial Notice of Request for Comments. To gather information from the recreational boating public and industry, we published a notice of request for comments in the **Federal Register** in May 1995 (60 FR 25191). We asked the recreational boating public to comment on: (1) The economic and other impacts of establishing a requirement for propeller guards on recreational houseboats and other displacement (non-planing) vessels; (2) suggestions on alternatives to propeller guards that should also be considered; (3) recommendations on the applicability of regulations; and (4) concerns of the livery and charter industries.

We received over 100 comments during the 60-day comment period. Various parties, including the National Association of State Boating Law Administrators (NASBLA) requested an extension of the comment period. To accommodate this request, we published a notice to reopen the comment period for an additional 120-days in August 1995 (60 FR 40545). We received 1,994 comments to this notice, including more than 1,800 form letters that supported a requirement to use propeller guard technology or jet pump propulsion on rental houseboats. An additional 69 comments also supported developing such a requirement. Fifty-seven comments objected to such a requirement. The information received was voluminous, but too general to help us develop a regulation.

Advance Notice of Proposed Rulemaking. We published an advance notice of proposed rulemaking (ANPRM) in March 1996 (61 FR 13123) that asked questions to gather current and specific information about the injuries involving propeller strikes and rented boats. We also announced a series of meetings across the country to enable the public to express their views. Some of the questions specifically sought out the following information: the appropriate Federal and State roles in reducing propeller strike incidents; whether government intervention is appropriate; and if so, whether it should be directed at the vessels, their manufacturers, their operators, their owners, or the companies leasing such vessels.

Second Notice of Request for Comments. After reviewing available research and the comments from the public, and consulting with NBSAC at its November 1996 meeting, we published another notice of request for comments in April 1997 (62 FR 22991) and provided a 90-day comment period. We solicited comments on the effectiveness of specific devices and interventions that may reduce the number of recreational boating accidents involving rented powerboats in which individuals are injured by the propeller. We also asked for information about other devices or interventions (propeller injury avoidance measures) that may reduce the severity of injuries to individuals involved in propeller-strike accidents.

The devices or interventions we asked about included: (1) Swimming ladder locations and interlocks; (2) large warning notices to make the operators, passengers and swimmers more aware of the dangers; (3) propeller location wands; (4) clear vision aft to alert operators to the presence of swimmers near the propeller; (5) propeller shaft engagement alarms to alert passengers and swimmers of a rotating propeller; (6) conversion of a standard inboard, outboard, or inboard/outboard engine with a jet pump propulsion engine; (7) ignition cut-off/auto throttle and neutral returns to stop the propeller when the helm is vacated or unattended; and (8) education specifically directed to the location and dangers of propellers. We also solicited comments on propeller guards, and any other devices that might reduce the occurrence or severity of injuries due to propeller strikes. Based on requests from the public, we published a notice that extended the comment period an additional 210 days in August 1997 (62 FR 44507).

Summary of Comments. In response to the ANPRM and the notices, we received 2,027 comments, more than 1,800 of which were form letters and none of which contained information sufficient to support proposing requirements for manufacturers of new recreational boats, nor did they help us determine the estimated burdens and costs to boat manufacturers. Of the total comments received, 95% were in favor of initiating a Federal regulation.

NBSAC Consultation. At the April 30, 2000, NBSAC Subcommittee meeting, we presented the results of our research on accident report statistics: vessels most frequently involved with injuries are open recreational motorboats in the category ''16 feet to less than 26 feet in length.'' We announced our intention to initiate a regulatory project that would require owners of this category of recreational vessels to attach pre-printed warning labels at strategic locations on their vessels. We would also propose requirements for owners to attach a propeller guard on a smaller number of rental non-planing houseboats. The Subcommittee report included the Coast Guard rulemaking project description. The Subcommittee presented its report to the full Council at the May 1, 2000, meeting and the Council accepted the Subcommittee's report without amendment.

At the October 2000 NBSAC Subcommittee meeting, the Subcommittee reviewed the preferred alternative from its April 2000 meeting and recommended that we propose, instead, an expanded list of interventions for vessels in the category ''16 feet to less than 26 feet in length.'' As a result, we developed and presented a number of propeller injury avoidance measures to NBSAC for their review. Again, the full Council accepted the Subcommittee report.

At the April 2001 NBSAC Subcommittee meeting, we presented the expanded list of alternatives from which owners of the affected vessels can choose for their vessels. After discussing the alternatives and their cost, the Council recommended that the Coast Guard, instead, develop four specific regulations:

(1) Require owners of all propeller driven vessels 12 feet in length and longer with propellers aft of the transom to display propeller warning labels and to employ an emergency cut-off switch, where installed;

(2) Require manufacturers and importers of new planing vessels 12 feet to 26 feet in length with propellers aft of the transom to select and install one of several factory installed propeller injury avoidance methods;

(3) Require manufacturers and importers of new non-planing vessels 12 feet in length and longer with propellers aft of the transom to select and install one of several factory installed propeller injury avoidance methods; and

(4) Require owners of all non-planing rental boats with propellers aft of the transom to install either a jet propulsion system or a propeller guard or all of several propeller injury avoidance measures.

This regulatory project would focus on implementing the fourth NBSAC recommendation. We will address the other NBSAC recommendations in subsequent regulatory projects. Due to the extensive broadening of the initial regulatory project, we are withdrawing the initial regulatory project, as published in the Notices section of this document, and initiating the first of a series of separate regulatory projects in response to recent NBSAC recommendations. We have placed the public docket for the initial regulatory project (CGD 95–041) into a new public docket (USCG–2001–10299) at the Docket Management System (DMS) at the above address under **ADDRESSES** for public viewing.

Use of the propeller injury avoidance measures described in this proposed rule would, in most cases, prevent direct contact of the propeller blades with persons in the water and minimize serious and fatal injuries due to propeller strikes.

Discussion of Proposed Rule

1. Section 175.03 of Title 33 Code of Federal Regulations would be amended to include definitions of the following terms used in this subpart: clear vision aft, houseboat, ignition cut-off switch, non-planing vessel, planing vessel, and swim ladder interlock. We would specifically like public comment on these terms and definitions.

2. Part 175—Equipment Requirements would be revised by adding a new subpart E—Propeller Injury Avoidance Measures.

3. New section 175.301, Applicability, would describe the category of recreational vessels that are subject to the new requirements: Non-planing recreational houseboats with propeller-driven propulsion located aft of the transom. We would specifically like public comment on definitions for terms used in this section.

4. New sections 175.310 and 175.315 would describe the specific safety measures required by this proposed rule. Section 175.310 instructs owners and operators of vessels for rent; section 175.315 instructs owners and operators of vessels not for rent.

Owner and Operator Requirements for Vessels for Rent

Under proposed section 175.310, owners of recreational, non-planing houseboats for rent with propeller-driven propulsion located aft of the transom must equip their vessels with either a propeller guard, or a combination of three propeller injury avoidance measures: A swim ladder interlock, an aft visibility device, and an emergency ignition cut-off switch. Operators of vessels for rent must use either a propeller guard or all three propeller injury avoidance measures listed above.

Owner and Operator Requirements for Vessels Not for Rent

Under proposed section 175.315, owners of recreational, non-planing houseboats not for rent with propeller-driven propulsion located aft of the transom must equip their vessels with either a propeller guard, or both of the following propeller injury avoidance measures: a swim ladder interlock and an aft visibility device.

Operators of vessels not for rent must use either a propeller guard, or all of the following propeller injury avoidance measures: a swim ladder interlock, an aft visibility device, and an emergency ignition cut-off switch (if factory installed).

We are not requiring owners of vessels not for rent to install an emergency ignition cut-off switch because it may be cost-prohibitive. However, if a vessel has an emergency ignition cut-off switch that was installed at the factory, vessel operators must use it. If a vessel does not have a factory-installed emergency ignition cut-off switch, we encourage, but do not require the owner to get one.

We would specifically like public comment on the availability of, and experience with, the safety devices described in this proposed rule. We would also like feedback about your experience operating a vessel with a propeller guard; fitting a propeller guard to a vessel drive unit; or concerns about propeller guard clogging, if any.

5. *Phase-in period for installing safety measures.* To minimize the immediate economic burden on owners of both rental and non-rental vessels and to provide a reasonable time period for compliance, we would provide a phase-in period for implementing the safety measures. Owners of vessels not for rent, lease, or charter would have 2 years from the date that a final rule is published to install the prescribed safety measures. Owners of vessels for rent, lease, or charter would have an additional year (3 years) from the date that a final rule is published to install the prescribed safety measures. We are allowing owners of vessels for rent an extra year because, in many cases, they have multiple vessels on which they must install the safety measures.

Regulatory Evaluation

This proposed rule is not a ''significant regulatory action'' under section 3(f) of Executive Order 12866, Regulatory Planning and Review, and does not require an assessment of potential costs and benefits under section 6(a)(3) of that Order. The Office of Management and Budget (OMB) has not reviewed this rule under that Order. It is not ''significant'' under the regulatory policies and procedures of the Department of Transportation (DOT) (44 FR 11040, February 26, 1979).

A draft Regulatory Evaluation under paragraph 10e of the regulatory policies and procedures of DOT follows:

Costs of Proposed Rule

We estimate that this rule would impose a $12 to $30 million economic cost on owners of approximately 100,000 non-planing houseboats. Approximately 5,000 of these vessels are rented, leased or chartered.

Owners who lease, rent, or charter non-planing recreational houseboats would have to install either a propeller guard or three combined measures. The three measures include a swim ladder interlock ($100 plus installation), a clear visibility aft device ($20, self-installed), and an ignition cut-off switch ($40, plus installation). Owners of non-planing non-rental recreational houseboats would not be required to install an ignition cut-off switch. Therefore, in our calculation of the total minimum cost to this group of owners, we have only included the cost of the other two measures.

Owners could convert their engine into a jet pump at a cost of $2500 and be exempt from this rule. Because we do not expect many houseboat owners to do this, the maximum cost is based on installation of a propeller guard, which we estimate to be $300 (self-installed).

To minimize the immediate economic impact of this rule, owners of non-rental houseboats are provided two years to comply; rental and livery businesses are granted an additional year (three years) to comply.

We estimate that costs to the government would be minimal. The Coast Guard would have to expand its Boarding Officer personnel training to include checking for installation of the injury avoidance measures, a propeller guard, or a jet pump engine in a safe and determinative manner, during currently required field boardings of recreational vessels for safety equipment checks.

Benefits of Proposed Rule

This proposed rule is appropriate because the Boating Accident Reporting Database (BARD) shows that the number of injuries and fatalities reported during calendar years 1990 through 1999 occurred at a chronic rate. BARD data for the same period revealed a total of 18 injuries and 2 fatalities involving non-planing recreational houseboats. The number of injuries to be prevented by this rule may be greatly understated since many boaters are unaware of the requirement to report accidents.

The benefits of avoiding future propeller strike injuries and fatalities are based on the eighteen propeller strike injuries and two fatalities caused by non-planing houseboats from 1990 through 1999. If we anticipate 100% compliance with this regulation and assume the eighteen injuries to be severe, then the total monetary benefits of injuries avoided are $9.1 million. The total monetary benefits of injuries avoided are based on the value society is willing to pay to avert a severe injury, which the Office of the Secretary of Transportation has calculated to be $506,300.

In addition, two propeller-related fatalities were reported in the accident database from 1990 through 1999. If compliance with the regulation prevents these fatalities, then the total monetary benefits of fatalities avoided, based on the value society is willing to pay to avert a fatality, are $5.4 million ($2,700,000 × 2 deaths). The total monetary benefit to society for avoiding all of the injuries and fatalities involving non-planing houseboats are $14.5 million ($9.1 for injuries and $5.4 for fatalities) over a 10-year period. This exceeds our lowest cost estimates of $12 million. If at least twelve fatalities are averted due to the implementation of the regulation, the benefits will exceed our highest cost estimates of $30 million for this rule.

Vessel owners may incur additional benefits from lower insurance premiums as a result of their use of improved safety measures.

The Coast Guard expects that this rule would reduce the number of people who are killed or injured due to a propeller strike involving non-planing recreational houseboats.

Small Entities

Under the Regulatory Flexibility Act (5 U.S.C. 601–612), we have considered whether this proposed rule would have a significant economic impact on a substantial number of small entities. The term ''small entities'' comprises small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

Individuals, not small entities, own the majority of non-planing recreational houseboats affected by this rule; however, under the Regulatory Flexibility Act, the Coast Guard must determine the impact on small entities. The Coast Guard estimates that there are 300 houseboat rental facilities that must install the propeller injury avoidance measures required by this rule. In order to minimize the burden on these small entities, the Coast Guard would provide them 3 years (an additional year beyond the 2 years provided to owners of non-rental houseboats) to comply with this rule.

Therefore, the Coast Guard certifies under 5 U.S.C. 605(b) that this proposed rule would not have a significant economic impact on a substantial number of small entities. If you think that your business, organization, or governmental jurisdiction qualifies as a small entity and that this rule would have a significant economic effect on it, please submit a comment to the Docket Management Facility at the address under **ADDRESSES**. In your comment, explain why you think it qualifies and how and to what degree this rule would affect it.

Assistance for Small Entities

Under section 213(a) of the Small Business Regulatory Enforcement Fairness Act of 1996 (Public Law 104–121), we want to assist small entities in understanding this proposed rule so that they can better evaluate its effect on them and participate in the rulemaking. If the rule would affect your small business, organization, or governmental jurisdiction and you have questions concerning its provisions or options for compliance, please contact Carlton Perry, Project Manager, Office of Boating Safety, by telephone at 202–267–0979, or by e-mail at *cperry@comdt.uscg.mil.*

Small businesses may send comments on the actions of Federal employees who enforce, or otherwise determine compliance with, Federal regulations to the Small Business and Agriculture Regulatory Enforcement Ombudsman and the Regional Small Business Regulatory Fairness Boards. The Ombudsman evaluates these actions annually and rates each agency's responsiveness to small business. If you wish to comment on actions by employees of the Coast Guard, call 1–888–REG–FAIR (1–888–734–3247).

Collection of Information

This proposed rule would call for no new collection of information under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501–3520).

Federalism

A rule has implications for Federalism under Executive Order 13132, Federalism, if it has a substantial direct effect on State or local governments and would either preempt State law or impose a substantial direct cost of compliance on them

We have analyzed this proposed rule under that Order and have determined that it does not have implications for federalism. Under this proposal, the Coast Guard establishment of a performance standard or equipment installation requirement would not conflict with any existing State statute. The Coast Guard routinely consults with the National Association of State Boating Law Administrators (NASBLA) and will continue to do so on this specific regulatory project.

Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531–1538) requires Federal agencies to assess the effects of their discretionary regulatory actions. In particular, the Act addresses actions that may result in the expenditure by a State, local, or tribal government, in the aggregate, or by the private sector of $100,000,000 or more in any one year. Though this proposed rule would not result in such an expenditure, we do discuss the effects of this rule elsewhere in this preamble.

Taking of Private Property

This proposed rule would not effect a taking of private property or otherwise have taking implications under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

Civil Justice Reform

This proposed rule meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

Protection of Children

We have analyzed this proposed rule under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. This rule is not an economically significant rule and does not concern an environmental risk to health or risk to safety that may disproportionately affect children.

Indian Tribal Governments

This proposed rule does not have tribal implications under Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, because it would not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

To help the Coast Guard establish regular and meaningful consultation and collaboration with Indian and Alaskan Native tribes, we published a notice in the **Federal Register** (66 FR 36361, July 11, 2001) requesting comments on how to best carry out the Order. We invite your comments on how this proposed rule might impact tribal governments, even if that impact may not constitute a ''tribal implication'' under the Order.

Energy Effects

We have analyzed this proposed rule under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. We have determined that it is not a ''significant energy action'' under that order because it is not a ''significant regulatory action'' under Executive Order 12866 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. It has not been designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. Therefore, it does not require a Statement of Energy Effects under Executive Order 13211.

Environment

We have considered the environmental impact of this proposed rule and concluded that, under figure 2–1, paragraph (34)(d), of Commandant Instruction M16475.1D, this proposed rule is categorically excluded from further environmental documentation. The proposed rule requires owners of non-planing recreational houseboats with propeller-driven propulsion located aft of the transom to install one of two propulsion unit measures or three combined measures. The propeller guard devices do not create sufficient drag through the water for these slow moving non-planing vessels to result in an increase of consumption of fossil fuels or increase air pollution due to increased exhaust. A ''Categorical Exclusion Determination'' is available in the docket where indicated under **ADDRESSES.**

List of Subjects in 33 CFR Part 175

Marine Safety.

For the reasons discussed in the preamble, the Coast Guard proposes to amend 33 CFR part 175 as follows:

PART 175—EQUIPMENT REQUIREMENTS

1. The authority citation for part 175 continues to read as follows:

Authority: 46 U.S.C. 4302; 49 CFR 1.46.

2. Amend § 175.3 by adding the following undesignated definitions in alphabetical order to the rest of the section, to read as follows:

§ 175.3 Definitions.

* * * * *

Clear visibility aft device means a device, such as a video camera and monitor or a mirror, that allows the operator to see aft of the vessel from the engine throttle control station to be aware of the presence of a swimmer near a propeller.

Houseboat means a motorized vessel designed primarily with accommodation spaces with little or no foredeck or cockpit, with low freeboard and with a low length to beam ratio.

Ignition cut-off switch means a device that interrupts the engine ignition to stop the engine when the operator moves away from the engine throttle control station.

* * * * *

Non-planing vessel means a vessel with a hull that is designed to ride through the water at any speed.

* * * * *

Planing vessel means a vessel with a hull that is designed to ride on top of the water beyond a minimum speed.

* * * * *

Swim ladder interlock means a device that interrupts the engine ignition to stop the engine when a swim ladder is moved into position near the propeller.

* * * * *

3. Amend part 175 by adding a new subpart E—Propeller Injury Avoidance Measures as follows:

Subpart E—Propeller Injury Avoidance Measures

§ 175.301 Applicability.

§ 175.310 Propeller safety measures for rental houseboats.

§ 175.315 Propeller safety measures for non-rental houseboats.

§ 175.301 Applicability.

(a) Sections 175.310 and 175.315 apply to recreational vessels described in § 175.1, which:

(1) Are monohull houseboats;

(2) Use a propulsion drive unit with an exposed propeller located aft of the transom; and

(3) Are designed to be operated in a non-planing manner.

(b) Sections 175.310 and 175.315 do not apply to multi-hull vessels or planing vessels.

§ 175.310 Propeller safety measures for rental houseboats.

(a) If you own a recreational non-planing houseboat and provide it for rent, charter or lease, you must either—

(1) Cover each exposed propeller located aft of the transom with a propeller guard attached in a secure manner; or;

(2) Do all of the following—

(i) Install and maintain an interlock device for each swim ladder;

(ii) Install and maintain a clear visibility aft device that provides a clear view, aft of the vessel from the engine throttle control area; and

(iii) Install and maintain an emergency ignition cut-off switch.

(b) If you operate a rented, chartered, or leased vessel that has an exposed propeller located aft of the transom, you must—

(1) Use all swim ladder interlock devices;

(2) Use a clear visibility aft device that provides a clear view, aft of the vessel from the engine throttle control station; and

(3) Use the emergency ignition cut-off switch.

§ 175.315 Propeller safety measures for non-rental houseboats.

(a) If you own a recreational non-planing houseboat and do not provide it for rent, charter or lease, you must either—

(1) Cover each exposed propeller located aft of the transom with a propeller guard attached in a secure manner; or

(2) Do both of the following—

(i) Install and maintain an interlock device for each swim ladder; and

(ii) Install and maintain a clear visibility aft device that provides a clear view, aft of the vessel from the engine throttle control station.

(b) If you operate a vessel with an exposed propeller located aft of the transom, you must—

(1) Use all swim ladder interlock devices;

(2) Use a clear visibility aft device that provides a clear view, aft of the vessel from the engine throttle control area; and

(3) Use the emergency ignition cut-off switch (if factory installed).

Dated: October 15, 2001.

Terry M. Cross,

Rear Admiral, U.S. Coast Guard, Assistant Commandant for Operations.

[FR Doc. 01–30479 Filed 12–7–01; 8:45 am]

BILLING CODE 4910–15–U

APPENDIX B

Marked Copy of NPRMW

Federal Requirements for Propeller Injury Avoidance Measures. Department of Homeland Security. Coast Guard. Docket No. USCG-2001-10163. Federal Register. Vol. 72 No. 201. Pgs. 59064-59065.

DEPARTMENT OF HOMELAND SECURITY

33 CFR Part 175

[Docket No. USCG–2001–10163]

RIN 1625–AA31

Federal Requirements for Propeller Injury Avoidance Measures

AGENCY: Coast Guard, DHS.

ACTION: Notice of proposed rulemaking; withdrawal.

SUMMARY: The Coast Guard is withdrawing its notice of proposed rulemaking that would require owners of non-planing recreational houseboats with propeller-driven propulsion located aft of the transom to either install a propeller guard or use a combination of other devices to avoid propeller injuries. The rulemaking is being withdrawn after reconsideration of which vessels would be subject to the proposed rule, the nature of the safety measures to be required, and the costs that would likely result.

DATES: The notice of proposed rulemaking published at 66 FR 63645, December 10, 2001, is withdrawn on October 18, 2007.

FOR FURTHER INFORMATION CONTACT: Jeff Ludwig, Project Manager, Office of Boating Safety, U.S. Coast Guard, by telephone at 202–372–1061 or by e-mail at *Jeffrey.A.Ludwig@uscg.mil.*

SUPPLEMENTARY INFORMATION:

Background

On December 10, 2001, the Coast Guard published a notice of proposed rulemaking (NPRM) entitled ''Federal Requirements For Propeller Injury Avoidance Measures'' in the **Federal Register** (66 FR 63645). The NPRM described a proposed Coast Guard requirement that owners of non-planing recreational houseboats with propeller-driven propulsion located aft of the transom install one of two propulsion unit measures or employ three combined measures. This proposal responded to recommendations made by the National Boating Safety Advisory Council (NBSAC). The NPRM was based on an expectation that a significant reduction in the number of boaters who are seriously or fatally injured when struck by a non-planing recreational houseboat with propeller-driven propulsion would occur.

Discussion of Comments

The Coast Guard received approximately 190 comments regarding the NPRM. Comments were received from those who have been injured by boat propellers; the relatives and friends of those injured or killed in such accidents; health care providers; boating safety and environmental advocacy groups; businesses and business associations; state and federal government agencies; and members of the general public.

Many commenters supported the proposed rule in order to better protect the boating public from propeller injuries. Some of those also advocated reducing the phase-in period to one year, and some advocated inclusion of pontoon houseboats under the requirements of the proposed rule. Among those who generally supported the proposed rule, some preferred using propeller guards over swim ladder interlock systems because they expected propeller guards to better protect swimmers. A few commenters also suggested increased costs could be passed on from manufacturers and rental companies to consumers.

Some commenters opposed the proposed rule because they perceived the number of casualties as insufficient to justify the proposed rule and argued the costs of implementation would be significantly higher than estimated in the NPRM. Many of these commenters also expressed concerns about the high maintenance costs associated with propeller guards, the increased danger of collisions when swim ladder interlock systems disable propellers, and the lack of practical benefit to be gained from clear view devices because of the length of many houseboats. A few suggested the proposed rule would be unenforceable or otherwise ineffective and advocated improved boater education.

Some commenters requested a more precise definition of houseboat, particularly whether monohulls and pontoon designs would be subject to the same requirements, and more detailed guidance on acceptable propeller guards and swim ladder interlock systems. One commenter suggested the proposed rule would effect a shift of liability from boat operators to boat manufacturers.

Withdrawal

The Coast Guard is withdrawing the NPRM published on December 10, 2001, after reconsideration of the the costs that would likely result, the characteristics of the safety measures to

be required, and uncertainty concerning the appropriate definition of ''houseboat.'' The Coast Guard believes its resources would be better directed toward regulatory projects that would have a greater impact on propeller injury avoidance.

The NPRM estimated that propeller guards, which would be the least expensive option provided under the proposed rule, could be self-installed for approximately $300 each. Equipping the estimated 100,000 houseboats that would be covered by the rule was estimated to result in a cost of approximately $30 million. A reassessment of these costs after publication of the NPRM revealed that most boats would need to be lifted out of the water for propeller guard installation, boats with twin engines would require a guard for each engine, and installation would be beyond the capabilities of most owners and operators. For these reasons, a more realistic average cost per boat is approximately $1500, for a total cost of $150 million. This figure does not include costs of periodic maintenance to clear debris from guards or the resulting decrease in fuel efficiency.

Because of the significantly higher cost of implementing the proposed rule, the Coast Guard is exploring options that would more effectively prevent propeller injuries and impose a smaller burden on the economy. For example, requiring ignition cut-off switches on an undetermined segment of recreational, propeller-driven boats could be a more cost effective approach, and there is also room for improvement in boating safety education.

Additionally, as some of the comments pointed out, the NPRM lacked a practical definition of ''houseboat,'' and straightforward performance requirements for acceptable propeller guards and swim ladder interlock systems. Although not independent grounds for withdrawing this rulemaking, the need for further research to resolve these questions, and the potential negative effect of more specific performance requirements on costs, made further pursuit of this rulemaking at this time even less preferable in comparison to other alternatives.

The Coast Guard remains deeply concerned about propeller injuries, and is committed to reducing them. In doing so, though, the cost and effectiveness of alternative measures must be reasonably considered.

The Coast Guard would like to thank those who submitted comments. All comments were considered in this decision. To view comments, go to *http://www.regulations.gov* at any time, under ''Search Documents'' enter the docket number for this rulemaking (USCG–2001–10163), and click on ''Submit.'' You may also visit the Docket Management Facility in room W12–140 on the Ground Floor of the West Building, 1200 New Jersey Avenue, SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The telephone number is 202–366–9329.

Authority

This action is taken under the authority of 46 U.S.C. 4302; Department of Homeland Security Delegation No. 0170.1.

Dated: October 10, 2007.

Howard L. Hime,

Acting Director of Commercial Regulations and Standards, United States Coast Guard.

[FR Doc. E7–20604 Filed 10–17–07; 8:45 am]

BILLING CODE 4910–15–P

APPENDIX C
BARD & BARD COMPILATIONS

This paper was written for those reasonably familiar with the houseboat propeller issue and with some familiarity with BARD, the USCG's Boat Accident Report Database.

We direct those unfamiliar with BARD to the two references below.

Propeller Accident Statistics
http://rbbi.com/pgic/padata/padata.htm

Houseboat Propeller Accident Statistics
http://rbbi.com/pgic/padata/houseboatpstats.htm

The actual BARD databases (one for each year) are complex databases composed of thousands of boating accidents, each one having dozens of variables scattered over four data tables (primary table, vessel table, injury table, fatality table). Data entries are often cryptic data codes (several data fields hold alphanumeric codes representing boat type, engine type, accident type, accident causes, accident descriptions, etc).

Some data codes have changed over time. New data fields have been added and old data fields have been changed a few times, especially those relevant to propeller strikes.

USCG "merged" many data fields from the tables into Microsoft Access databases for more recent years. That process left behind verbal comments in the old data tables that can be helpful in determining if a particular accident is propeller accident or not. As a result, we had to refer back to the old tables for several accidents.

Some of older BARD data tables are still available from RITA,[183] the Research and Innovative Technology Administration.

With thousands of boat accidents being entered into BARD each year, it is difficult to identify and view the specific ones of interest.

Accident Types are entered as a sequence of events (what happened 1st, 2nd, 3rd) as well as Accident Causes and Accident Descriptions. All these variables must be carefully evaluated to identify propeller accidents.

Since 1995, propeller accidents have been labeled as "stuck by motor or propeller". Prior to 1995 propeller accidents were in a broader category, "struck by boat or propeller". That made identification and verification of propeller strikes prior to 1995 more difficult.

In more recent years, USCG established a new data field to specifically indicate propeller accidents.

In 2000, the State of California requested their boating accidents be removed from BARD to protect the privacy of their citizens. Archived versions of BARD must now be consulted to find data for some California accidents.

These complexities, and more, makes BARD data difficult to understand and interpret

---

[183] U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics. Recreational Boating Accident Reporting Database.
http://www.transtats.bts.gov/DatabaseInfo.asp?DB_ID=140&DB_Name=Recreational%20Boating%20Accident%20Reporting%20Database&Link=0&DB_URL=Mode_ID=2&Mode_Desc=Maritime&Subject_ID2=0
Retrieved May 6, 2010.

The actual data tables are at: http://www.transtats.bts.gov/tables.asp?table_id=140
Retrieved May 6, 2010.

properly. As a result, those analyzing accidents often choose to base their analysis on compilations (lists of accidents) put together by others.

One preface to any compilation of BARD houseboat accident data, is the BARD database itself includes several misclassifications and errors discussed elsewhere in our report.

NASBLA Resorts to BARD Compilations

As an example of the difficulties encountered, even by safety professionals, in working with BARD, we cite a 2008 National Association of State Boating Law Administrators (NASBLA) Boating Accident Analysis Status Report.[184]

NASBLA decided to investigate drowning deaths of those who involuntarily entered the water (BARD reported accidents involving: man overboard, capsizing, sinking, ejected, etc.) NASBLA refers to this type of fatality as Drowning Deaths Involuntarily Leaving the Vessel (DDILV).

The accidents were to be analyzed by several BARD variables (boat length, type of boat, water temperature, alcohol, time of accident, activity at time of accident, operations at time of accident, number of persons onboard, speed, etc.). In response to a request from NASBLA, USCG supplied them with 2002-2006 BARD database files. NASBLA members on the subcommittee found the files difficult to work with and discuss according to their report:

"Subcommittee members noted the difficulties of working with such files, and above all, discussing the data and attempting subsequent analyses long distance, via conference call."

As a result, the task leader was to:

"enlist IT personnel in his division to generate those queries and pull the data for the DDILV categories ...."

Due to difficulties in directly working with BARD, NASBLA quickly resorted to compilations by others. At the time of the letter, NASBLA's subcommittee was running queries on these compilations and reviewing early findings. Their results will only be as good as the compilation they base their findings upon.

By not using the original data AND/OR not extremely thoroughly documenting the process by which the compilation was made, their findings are suspect and would be difficult to repeat.

Also please note, NASBLA members (well trained professionals) were struggling with the 2002-2006 BARD database files which are at least a magnitude easier to handle than pre 1995 BARD database files.

Similar to NASBLA, boating industry executives resorted to BARD compilations in responding to the houseboat propeller safety NPRM. This report shows those compilations were inaccurate. By providing erroneously low accident counts in their comments, industry representatives convinced USCG the rule was not economically justified.

We will now discuss some of the better known compilations of BARD propeller accident data.

---

[184] NASBLA Engineering, Reporting & Analysis Committee Accident Reporting & Analysis Subcommittee: Boating Accident Analysis Status Report. Charge 1. 2008. Page 2. http://www.nasbla.org/files/public/ERAC/ARA_accident%20analysis_status_71408.pdf Retrieved May 6, 2010.

USCG 10299 Compilation

In 1996 USCG prepared a compilation of propeller accident data for use in discussing proposed regulation CGC 95-041 Propeller Injury Prevention Aboard Rental Boats. The compilation is available online as part of the USCG-2001-10299 Docket from regulations.gov.

The USCG 10299 Docket accident compilation consists of four documents:[185]

1. USCG-01-10299-4 Recreational Fatal Boating Accident Data. Propeller Strikes. 1988-1993.

2. USCG-01-10299-5 Recreation Boating Accident Data. Propeller Strikes. 1988-1993.

3. USCG-01-10299-6 Recreational Boating Accident Data. Propeller Strikes. 1994.

4. USCG-01-10299-7 Boating Accident Report Coding Instructions. October 1994.

This USCG compilation includes propeller accidents from all types of recreational boats. The criteria for inclusion was one of the three or more “Accident Description” variables being coded as “60” which represents “struck by propeller”.

Accidents are separated by drive type and listed in sequence by date. The main data is presented in pairs of pages with about 45 accidents are listed vertically on each page. Information for a specific accident (a series of alphanumeric codes that must be looked up in a series of tables) spans the two pages.

The left entry on each page is the BARD accident number. The same accident is not at the same vertical location on each of the two adjoining pages (or even on these two adjoining pages). In addition the various data entries do not form a straight line across each page.

The USCG 10299 compilation lists propeller accidents for all types of boats, making it a lengthy report and a bit unwieldy to handle. Nonetheless, it is a great resource.

---

[185] Report: Recreational Boating Accident Data and Boating Accident Coding Instructions. USCG-2001-10299. Supporting and Related Materials. Documents 0004 through 0007. http://www.regulations.gov/fdmspublic/component/main?main=DocketDetail&d=USCG-2001-10299 Retrieved May 6, 2010

USCG NPRM Compilation

In preparation for the NPRM, USCG used BARD to calculate the number of houseboat propeller injury accidents and fatalities from 1990-1999. We discuss this count further in PC Objection 1 (our discussion of Public Comment Objection Number 1).

As mentioned in our earlier discussion we were startled to find our count of properly logged BARD accidents did not match theirs.

We identified 24 BARD 1990-1999 properly categorized houseboat propeller accidents of which two were fatalities. The USCG only identified 20 of which two were fatalities.

The USCG only supplied the injury and fatal accident count for the entire period with no breakdowns by rental, nonrental, 5 year periods, or by drive type. This makes it very difficult for us to be exactly certain which accidents they included. Our best estimate is they left out:

1. Two twenty foot houseboat accidents thinking they were planing houseboats

2. A 1996 California accident due to California privacy laws

3. Either a 1996 St. Lawrence Seaway accident for being offshore, or a 1994 California accident due to California privacy laws.

We will now explain why they did not also leave off other pre-1995 California accidents. Pre-1995 BARD data is more difficult to manipulate than 1995 and later BARD data due to the use of several different codes. When California asked to have their information purged, USCG probably thought purging pre-1995 data was too complicated and nobody looks at it anyway.

Further complicating pre-1995 BARD data, in 1995 the boat type code for houseboats changed from 8 to 4 and accident description codes first began separating “struck by boat or propeller” into “struck by boat” or “struck by motor or propeller”. So when USCG used the modern, easier to use Microsoft Access database files for 1995 to present, they missed the California accidents. However, when they used the older pre-1995 files, they found the ones prior to 1995 because they had not been deleted, with the possible exception of the 1994 Tagg accident.

In the future, we strongly encourage USCG to supply a list of specific accidents they are counting in the accident and fatality data. This would make it much easier for us and others to confirm the data and to identify exactly which accidents have been excluded. USCG did supply an accident list with the 10299 regulation they proposed in 1995. We encourage them to follow that example in the future.

NMMA/HIA Compilation

NMMA/HIA's 11 March 2002 comment letter includes a compilation of houseboat propeller accidents developed by Richard Snyder, retired of Mercury Marine. His compilation is also referenced in letters from Mr. Snyder himself, and from Joe Pomeroy of Mercury Marine.

The first page of NMMA/HIA's "Rental" and "All Houseboats" compilations are in our **Appendix G**.

The full compilation is presented as NMMA/HIA's Appendix A: Houseboat Propeller Accident Data: 1990-1998[186] on pages 15 to 27 of their document.

The best way to understand their compilation is to:

1. Print if off in landscape format

2. Divide it into two groups of six pages each (the first six pages represent "Rental Houseboats" and the second six pages represent "All Houseboats")

3. Lay each group of six pages end to end and tape them together as a six sheet wide spreadsheet.

Mr. Snyder chose to be a little broader than the USCG Compilation. His listing includes pre 1995 accidents listed as "struck by boat or propeller." He also includes 1995 and later accidents listed as "struck by propeller/engine" as well as those labeled as "struck by boat".

Several commenters focused on rental accidents, based their comments on his data, and divided the accidents into two five year periods (1991-1995 and 1996-2000).

We examined his "Rental Houseboats" accident list very closely. It includes 14 rental houseboat accidents from 1991-1995 plus 3 more from 1996-1998 and is titled, "struck by boat or propeller."

A close look at his "All Houseboats" list finds a 10 July 1993 rental houseboat accident not on his "Rental Houseboats" list (#11 on their "All Houseboats" list). The USCG uses the code "Y" to represent "Yes" in the rental column. This particular accident, #11 on the "All Houseboats" list, has a lower case "y" in the rental column. When Mr. Snyder's report was generated, they probably only sorted out the upper case Y's.

The NMMA/HIA compilation is discussed at length in our discussion of the NMMA/HIA public comment letter in the main body of the paper. That same section identifies which accidents were dropped from Mr. Snyder's compilation by NMMA/HIA when they supplied accident counts and makes further comparisons with our methodology and counts.

With each group of accidents (Rental and Non Rental) spanning six pages in landscape format AND their inclusion of several "stuck by boat" accidents, NMMA/HIA's compilation is confusing. It requires considerable study and personal notations to begin to understand it. NMMA/HIA could have made their compilation much clearer, and more useful by only listing propeller accidents they actually counted.

---

[186] John McKnight, Director Environmental and Safety Compliance. National Marine Manufacturers Association letter to USCG dated 11 March 2002. USCG Docket Item # USCG-2001-10163-88. Pgs. 15-27. http://www.regulations.gov/fdmspublic/ContentViewer?objectId=09000064802be1e5&disposition=attachment&contentType=pdf Retrieved May 6, 2010.

Others Interpret NMMA/HIA Compilation

Several letters appear to make use of accident data presented in NMMA/HIA's letter. Three of those interpretations will now be discussed.

Joe Pomeroy Compilation - Mr. Pomeroy provides rental houseboat propeller accident counts for 1991-2000 and for 1996-2000. We assume this information was gathered by Mr. Snyder. It may be based up on the NMMA/HIA compilation previously mentioned.

Mr. Pomeroy's accident counts were discussed in detail earlier, in our discussion of his letter.

Dick Snyder Compilation - Mr. Snyder lists the number of injury and fatal accidents in each five year period by classification (Rental and NonRental), sorted by drive type. His comments may be based on his interpretation of the NMMA/HIA compilation he previously assembled.

Mr. Snyder's accident counts were discussed in detail earlier, in our discussion of his letter.

SBA Interprets NMMA/HIA Compilation- As mentioned in our coverage of the SBA comment letter, SBA misinterpreted the NMMA/HIA compilation and made other errors as well. Among their errors were:

1. Omitting a 1 August 1992 Tracker houseboat accident listed as #2 on the NMMA/HIA "All Houseboats" list.

2. An error in addition. The table shows one "Rental Houseboat" accident in 1994, but a total for "All Houseboats" in 1994 of 0. The 1994 "All Houseboats" total per the "Rental Houseboats" half of their chart should be at least 1. (See Table 41A).

3. Omitting ALL reported accidents for the year 2000. Our data shows two BARD reported houseboat propeller injuries in 2000, plus one more from a 47 foot Drifter houseboat that was misclassified in BARD.

4. Omitting an accident referred to in a footnote of their own letter. They refer to a houseboat propeller accident in 2000 in a footnote at the bottom of their Page 3, but it is nowhere to be seen in their table (our Table 41A).

5. Under reporting the actual number of houseboat propeller injuries in BARD.

6. Failing to include accidents misclassified in BARD.

Future Uses of BARD and BARD Compilations

Initially, BARD data may seem fairly straightforward, however it is really quite complex. Users must pay very close attention to detail to make sure they identify the proper accidents. Identifying accidents meeting specific criteria becomes even more complex due to some accidents being misclassified or mislabeled.

Users working off a compilation of BARD propeller accidents put together by others, still need a good understanding BARD, assumptions made by those creating the compilation, and the process the compiler used to select the accidents.

We strongly encourage USCG to develop its own compilation of houseboat propeller accidents similar to our **Appendix D** and to footnote it with any additional data obtained after the annual databases were closed.

Our Compilation of Houseboat Propeller Accidents

Our own compilation is in **Appendix D**.

APPENDIX D

Propeller Guard Information Center Compilation of Houseboat Propeller Accidents

This compilation is included as a single page Adobe Acrobat .pdf version of an Excel Spreadsheet. Use the Adobe tools to magnify it so you can read it. Most pdf viewers will also allow you to rotate it.

If you are currently reading a paper copy of this document, go to the web site dedicated to this paper to view the spreadsheet in an easier to read format.

http://www.rbbi.com/pgic/houseboats

APPENDIX D		1990-2000 U.S. Houseboat Propeller Accident Log				Propeller Guard Information Center													
		11 December 2008 version																	
				Note: Many propeller accidents go unreported															
				Houseboat Accident Log															
	Accident	USCG BARD							Legal										
	Type	Accident	Accident																
Year	Code	Number	Date	Name	Location	Injury / Fatality	Rental		Case	Boat Builder	News Coverage	Situation	Notes						
1990	Rental-I	3127	7-Sep-90		AZ county15	struck by propeller Accident Desc2=60	Yes			Unknown of unknown length	USCG Docket 10299 supplement	swimmer or diver -Other vessel/operator at fault							
1991	Rental-I	199145069	24-Aug-91		Oregon county31	Accident Desc2=60	Yes			HLR= SMF Inc 50ft	NMMA Docket list # 1 AND USCG Docket 10299 supplement	swimmer or diver struck by propeller							
1992	Rental-I	19925074	7-May-92	Stacey Epping	Shasta Lake -CA county89	Leg amputated Accident Desc1=60	Yes		Yes	unknown 47ft	RRS 23 Jan 1993 / NMMA Docket list # 3/ USCG Docket 10299 sup.	backed into swimmer							
	Rental-I	19925192	31-May-92		CA county55	Accident Desc1= 60	Yes			MBC= MasterCraft Boat Co 50ft	NMMA docket list # 4 AND USCG Docket 10299 supplement	left boat/swam to shore - improper lookout							
	Rental-I	19925513	6-Sep-92	Matthew Wells	CA county89 - (Shasta Lake?)	Accident Desc1= 60	Yes			unknown 50ft	NMMA docket list # 6 AND USCG Docket 10299 supplement	fell from PWC and houseboat backed over him	RRS 1 Jul 1996 reports Matthew Wells nearly lost a foot in a Lake Shasta accid						
	Nrental-I	19925628	22-Jun-92	Gilbert Silveria	Shasta Lake -CA county89	Lost left leg, left arm injured Accidnet Desc1=60	?			unknown 50ft	RRS 23 June 1992 / NMMA Docket list # 7 AUSCG Docket 10299 sup.	backed into swimmer							
	Nrental-I	19032	1-Aug-92		CA county 37	Accident Desc2= 60	No			BUJ= Tracker 20ft	NMMA docket list # 2 AND USCG Docket 10299 supplement pg9	fell overboard, struck by propeller							
1993	Rental-F	19933272	21-Mar-93	Emilio Cruz	Lake Havasu	Fatality Accident Desc3=60	Yes		Yes	ZZB= Three Buoys HB 52ft	LA Times 23 Mar 1993 / NMMA Docket list # 10/ USCG Docket 10299	Jumped from one of four houseboats linked together, struck by prop							
	Rental-I	19935386	6-Aug-93		CA county63	Accident Desc1=60	Yes			FLX= Florida Boats 56ft	NMMA docket list # 12 AND USCG Docket 10299 supplement	falls overboard							
	Rental-I	19935430	4-Sep-93		CA county59	Accident Desc1=60	Yes			RHR= R&R Leisure Craft 56ft	NMMA docket list # 13 AND USCG Docket 10299 supplement								
	Nrental-I	199314047	13-Jun-93		Georgia county117	Accident Desc2=60				DCL= Delta Clipper 37ft	NMMA docket list # 8 AND USCG Docket 10299 supplement	water skier							
	Nrental-I	199331169	16-Aug-93		Missouri county29	Accident Desc1=60				CPV= Carrera 54ft	NMMA docket list # 9 AND USCG Docket 10299 supplement	fell over in sharp turn or acceleration							
	Nrental-I/Unknown	19935589	4-Jul-93		CA county89 (Shasta Lake?)	Accident Desc2=60	Unknown			unknown of unknown length	NMMA docket list # 14 AND USCG 10299 supplement	swimmer or diver /Other vessel/operator at fault							
Not in BARD	Rental-I	Not Listed	11-May-93	C. Falvey	Lake Mead -AZ		Yes				Letters in USCG Docket USCG 2001-10299-52,53	National Park Service flotilla for park service conference, lady fell from PWC and was swimming to ladder when the HB started							
1994	Rental-I	199445483	18-Sep-94	David Tagg	CA county83 (Shasta Lake)	severe cuts both feet Accident Desc2=60	Yes			HLR= SMF Inc 46ft	RRS 19 Sept 1994 / NMMA Docket# 17 & USCG Docket 10299 supplement	swimming under boat when engines started							
1995	Rental-F	9505806	21-Jul-95	Shirley Jones / Koop	Shasta Lake - CA	died 8 days later Accident Type1=14	Yes			Sunseeker 52ft	RRS 26 Jul 1995 / NMMA Docket list #20 + BARD	swimming toward boat when accidentally went into reverse							
	Rental-I	9534221	21-Aug-95		Overton, Lake Mead -NV	Accident Type 1 =14	Yes			Fun Country Marine 55ft	NMMA Docket list # 22 + BARD	drifting, no one at the controls							
	Nrental-I	9535083	8-Oct-95		Lake Winnipesaukee -NH	Accident Type 2 =14				Aquasport Marine IND 20ft	NMMA Docket list # 23 + BARD	collision							
	Nrental-I	9553007	17-Apr-95		Bullfrog Marina Lake Powell -UT	Accident Type 1 =14				Kayot 50ft	NMMA Docket list # 24+25 + BARD	collision with another houseboat, a Holiday Mansion 50ft as vessel "C" were also towing something							
Not in BARD	Nrental-I	Not Listed	28-May-95	Larry Elmore	Shasta Lake - CA	left foot, left thigh, lower left leg	Not specified in news				RRS 29 May 1995	backed into PWC he was on, bumped him off, sucked him in							
1996	Rental-I	9653110	9-Jun-96		Lake Powell-Halls Creek Bay - UT	Accident Type 1 =14	Yes			Kayot 50ft	NMMA Docket list # 29	maneuvering w/swimmer climbing ladder							
	Nrental-I/Rental	9639024	18-May-96	Mark L. Beattie	St. Lawrence River- Heart Island -NY	Accident Type 1 =14	CG=No /Yes per news			Gananoque 35ft	Watertown Daily News 22 May 1996 / NMMA Docket list # 28	dove in to retrieve a lawn chair, passengers yelled to operator to put in reverse, he did and boat passed over him							
	Nrental-I	9605838	13-Jul-96		Don Pedro Reservoir - CA	Accident Type 2 =14				Master Fabricators 50ft	NMMA Docket list # 26	maneuvering w/swimmer climbing ladder							
1997																			
MISCLASSIFIED	Nrental-I	199712182	21-Jun-97		Destin FL	Accident Type 1=14				Stardust 53ft **cabin motor boat**	BARD		"Houseboat" in boat model column						
1998																			
MISCLASSIFIED	Nrental-I	9819045	18-Jun-98		Polk City, IA	Accident Type 3=14				Unknown 40ft **cabin motor boat**	BARD	Tied to Dock, grounding per USCG	boat name "Harbor Master" boat model = Houseboat						
1999	Nrental-I	9951258	28-Aug-99		Devils Cove, Lake Travis - TX	Accident Type 1 =14				Summerset 66ft	NMMA Docket list # 42	Docking/Undocking per USCG							
	Nrental-I	9914058	23-May-99		Lake Lanier GA	Accident Type 2 =14				Unknown 60ft	NMMA docket list # 40	Leaving Raft Up for USCG							
	Nrental-I	9953154	5-Oct-99		Lake Powell UT	Accident Type 2 =14				Unknown	NMMA docket list # 45	Docking/Undocking per USCG, fell over	HB was vessel B. vessel A was a PWC, show zero people injured, maybe prop						
2000	Rental-I	200005616	16-Sep-00	Felix Shrayber	Shasta Lake - CA	leg cut four places Accident Type 1=14	yes		Yes	HHV= Holiday Harbor Inc 56ft	RRS 17 Sep 2000	Swimming while guiding a houseboat backing into a dock	Incorrectly classified as having water jet propulsion in BARD						
	Nrental-I	2000-MO-0252	5-Aug-00		Lake of Ozarks - MO	Accident Type 1 =14				Nautaline 43ft	NMMA Docket list # 48	docking/undocking per USCG							
MISCLASSIFIED	Nrental-I	2000-NC-0089	1-Jul-00		Lake Norman, Cornelius NC	Accident Type 1 =14				Drifter 47ft **motor cabin boat**	BARD	changing direction per USCG							

NOTES

Accident Codes	**Rental-I**	**Rental Injury**
	Rental-F	**Rental Fatality**
	Nrental-I	**NonRental Injury**
	Nrental-F	**Non-Rental Fatality**

Other Codes RRS = Redding Record Searchlight

NMMA docket list + Appendix A they supplied with their 11 March 2001 comments to U.S. Coast Guard docket (see our HB accident stats page) # XX = number of that accident on their "All Houseboats" list. USCG 2001-10163-88

USCG Docket Supplement 10299 = USCG -01-10299-4,5,6,7,8

1996 Beattie accident on Heart Island WAS a rental per news coverage (is not listed as such by USCG)

Legal Cases

Late 1980's Hightower accident - Hightower v. Cox 418 S.E. 2d 613 204 Ga. App. 105 / No. A92A0074 Court of Appeals of Georgia decided 20 March 1992

1992 Epping accident - Seven Resorts dba Bridge Bay Resort v. James Arthur Cantlen, Delta Upsilon, Stacey Lynn Epping US Court of Appeals 9th Circuit No. 93-17196. 57 F. 3d. 771 1995 A.M.C. 2087

1993 Cruz accident - de Cruz v H2O Houseboats, 38 ATLA L. Rep. 386 (Dec. 1995) No. LR2558

2000 Shrayber accident Shrayber v. Holiday Harbor 2003 WL 21197691 (Cal.App. 1 Dist., May 22, 2003) (NO. A099975)

2002 Robin Tyler v. Forever Resorts and Fun Country Marine Industries. District Court. Clark County Nevada

2005 Richard Rozon v. Aramark, Mercury Marine, and Tracker Marine. Central District Court Utah

APPENDIX E

Comparison of Accident Compilations

The comparison is included as a single page Adobe Acrobat .pdf version of an Excel Spreadsheet. Use the Adobe tools to magnify it so you can read it. Most pdf viewers will also allow you to rotate it.

If you are currently reading a paper copy of this document, go to the web site dedicated to this paper to view the spreadsheet in an easier to read format.

http://www.rbbi.com/pgic/houseboats

APPENDIX E			1990-2000 U.S. Houseboat Propeller Accidents											
		28 March 2009 version				Propeller Guard Information Center								
Comparison of Compilations				Note: Many propeller accidents go unreported										
			Houseboat Accident Log											
Reported in BARD	**USCG 10299 1988-1994 Compilation**	**USCG NPRM Accident Counts**	**NMMA/HIA Letter Appendix A Compilation "All Houseboats" List**	**Joe Pomeroy-Mercury Interpretation of NMMA/HIA list RENTAL ONLY**	**Dick Snyder-Mercury Statistics in his letter**	**SBA Interpretation of NMMA/HIA list**	**Year**	**Accident Code**	**USCG BARD Accident Number**	**Accident Date**	**Name**	**Location**		
		These are our best ESTIMATES of which ones USCG counted												
1990-3127	Page 22	Yes	Began with 1991	Began with 1991	Began with 1991	Began with 1991	**1990**	**Rental-I**	3127	7-Sep-90		AZ county15		
199145069	Page 19	Yes	#1	Yes	Yes	Yes	**1991**	**Rental-I**	199145069	24-Aug-91		Oregon county31		
19925074	Page 19	Yes	#3	Yes	Yes	Yes	**1992**	**Rental-I**	19925074	7-May-92	Stacey Epping	Shasta Lake -CA county89		
19925192	Page 9	Yes	#4	Yes	Yes	Yes		**Rental-I**	19925192	31-May-92		CA county55		
19925513	Page 14	Yes	#6	Yes	Yes	Yes		**Rental-I**	19925513	6-Sep-92	Matthew Wells	CA county89 - (Shasta Lake?)		
19925628	Page 20	Yes	#7		Yes	Yes		**Nrental-I**	19925628	22-Jun-92	Gilbert Silveria	Shasta Lake -CA county89		
1992-19032	Page 9	No- 20 footer	#2		Yes	No		**Nrental-I**	19032	1-Aug-92		CA county 37		
19933272	Page 20	Yes- Fatal	#10	Yes - Fatal	Yes	Yes	**1993**	**Rental-F**	19933272	21-Mar-93	Emilio Cruz	Lake Havasu		
19935386	Page 11	Yes	#12	Yes	Yes	Yes		**Rental-I**	19935386	6-Aug-93		CA county63		
19935430	Page 21	Yes	#13	Yes	Yes	Yes		**Rental-I**	19935430	4-Sep-93		CA county59		
199314047	Page 20	Yes	#8		Yes	Yes		**Nrental-I**	199314047	13-Jun-93		Georgia county117		
199331169	Page 21	Yes	#9		Yes	Yes		**Nrental-I**	199331169	16-Aug-93		Missouri county29		
19935589	Page 20	Yes	#14		Yes	Yes		**Nrental-I/Unknow**	19935589	4-Jul-93		CA county89 (Shasta Lake?)		
Not Listed	Not Listed	No- Not Listed in BARD	No - Not listed in BARD	No- Not Listed in BARD	No - Not listed in BARD	No - Not listed in BARD	**Not in BARD**	**Rental-I**	**Not Listed**	11-May-93	C. Falvey	Lake Mead -AZ		
199445483	1994 Page 3	Possible No - California	#17	No - California?	Yes	No - Addition Error	**1994**	**Rental-I**	199445483	18-Sep-94	David Tagg	CA county83 (Shasta Lake)		
	Compiled thru 1994		#15	NMMA/HIA #15	NMMA/HIA #15									
			#16	NMMA/HIA #16	NMMA/HIA #16									
9505806		Yes- California Fatal	#20	Yes - Fatal	Yes	Yes	**1995**	**Rental-F**	9505806	21-Jul-95	Shirley Jones / Koop	Shasta Lake- CA		
9534221		Yes	#22	Yes	Yes	Yes		**Rental-I**	9534221	21-Aug-95		Overton, Lake Mead -NV		
9535083		No- 20 footer	#23		Yes	Yes		**Nrental-I**	9535083	8-Oct-95		Lake Winnipesaukee -NH		
9553007		Yes	#24 & #25		Yes	Yes		**Nrental-I**	9553007	17-Apr-95		Bullfrog Marina Lake Powell -UT		
Not Listed		No- Not listed in BARD	No - Not listed in BARD		No - Not listed in BARD	No - Not listed in BARD	**Not in BARD**	**Nrental-I**	**Not Listed**	28-May-95	Larry Elmore	Shasta Lake- CA		
9653110		Yes	#29	Yes	Yes	Yes	**1996**	**Rental-I**	9653110	9-Jun-96		Lake Powell-Halls Creek Bay - UT		
9639024		Possible No - St. Lawrence Seaway	#28	No - BARD has as nonrental	Yes	Yes		**Nrental-I/Rental**	9639024	18-May-96	Mark L. Beattie	St. Lawrence River- Heart Island -NY		
9605838		No California	#26		Yes	Yes		**Nrental-I**	9605838	13-Jul-96		Don Pedro Reservoir - CA		
							1997							
199712182		No- Misclassified			No - Misclassified in BARD	No - Misclassified	**MISCLASSIFIED**	**Nrental-I**	199712182	21-Jun-97		Destin FL		
							1998							
9819045		No- Misclassified	No - Misclassified in BARD		No - Misclassified in BARD	No - Misclassified	**MISCLASSIFIED**	**Nrental-I**	9819045	18-Jun-98		Polk City, IA		
9951258		Yes	#42		Yes	Yes	**1999**	**Nrental-I**	9951258	28-Aug-99		Devils Cove, Lake Travis - TX		
9914058		Yes	#40		Yes	Yes		**Nrental-I**	9914058	23-May-99		Lake Lanier GA		
9953154		Yes	#45		Yes	Yes		**Nrental-I**	9953154	5-Oct-99		Lake Powell UT		
		Counted thru 1999												
200005616			No - California, WaterJet or 2000	No - California or WaterJet	No - California or WaterJet	No - 2000	**2000**	**Rental-I**	200005616	16-Sep-00	Felix Shrayber	Shasta Lake - CA		
2000-MO-0252			#48		No - may have missed year 2000	No -2000		**Nrental-I**	2000-MO-0252	5-Aug-00		Lake of Ozarks - MO		
2000-NC-0089			No - Misclassified in BARD		No - Misclassified in BARD	No - Misclassified	**MISCLASSIFIED**	**Nrental-I**	2000-NC-0089	1-Jul-00		Lake Norman, Cornelius NC		
		USCG excluded one of the two	NMMA/HIA counted #15 & #16	Pomeroy counted NMMA/HIA	Snyder also counted NMMA/HIA									
		Possible No's above	which were not counted by us	All Houseboats #15 & #16 which	All Houseboats #15 & #16 which									
		We are not sure which one		were not counted by us	were not counted by us									

APPENDIX F

Economic Justification Calculations in This Paper Excluded These Factors

We were very conservative in our economic justification calculations. Many factors not considered would have further reduced implementation costs or increased cost of casualties resulting in an even stronger economic justification of the NPRM. Factors we did NOT account for include:

1. In other similar proposals, such as the Consumer Product Safety Commission's proposal to ban three wheel ATVs,[187] government agencies estimate accident frequencies from actual emergency room visits. This was not done for houseboat propeller injuries, possibly excluding millions of dollars in casualty costs.

2. Calculations were made with a low Value of a Statistical Life (VSL) of $2.7 million or $3 million instead of a more realistic value of $4 million or more.

3. The percentage of houseboats requiring no modifications due to being non-propelled may be considerably higher than the two percent we estimated from BARD data. Permanently or near permanently moored houseboats are much less likely to be involved in a BARD reportable accident than a houseboat in normal use. Some areas are well known for mooring large numbers of liveaboard, permanently moored, non powered houseboats. For example, Seattle has a population of about 500 permanent houseboats used as floating houses with the largest concentration on the East side of Lake Union. One lady even gives tours of the area.[188] Tennessee River Valley Authority (TVA) lakes also have a large concentration of non-navigable houseboats. Non-powered houseboats are not subject to the NPRM.

4. Houseboat propeller accidents not reported to BARD that should have been.

5. Houseboats were finally included as a boat type on the Texas boating accident form[189] in April 2010, and are still absent on some other state's forms. As a result, houseboat accidents continue to be misclassified as other types of boats. Many accidents may already be on the books, just misclassified.

6. Many nonrental houseboats already have a swim ladder interlock. They would only need a mirror to comply.

7. The NMMA/HIA example used $69 per hour as the labor rate. Labor costs charged by rental operations include profit. The labor rate attributed to this NPRM should be the base rate less profit. Rental operations should not expect to make a profit off bringing their houseboats into conformance with the NPRM. Median hourly wages for a "49-3051 Motorboat Mechanic" in May 2005 were $16.31 per hour per the U.S. Department of Labor.[190] Mercury Marine's current warranty labor

---

[187] Consumer Product Safety Commission. All Terrain Vehicles: Advance Notice of Proposed Rulemaking; Request for Comments and Information. Federal Register. Vol. 70 No.198. October 14, 2005. Pgs. 60031-60036.

[188] Discover Houseboating: Your Tour of Life on the Water. Jeri Callahan, the "Houseboat Lady". http://www.discoverhouseboating.com Retrieved May 6, 2010.

[189] Boating Accident Report. Texas Water Safety Act. Texas Parks and Wildlife Department. Form #PWD 311-L2200 (6/99) does not list houseboats as a boat type. Retrieved January 18, 2009.
The new April 2010 version, Form #PWD 0311-L2000 (04/10) now includes houseboats as a boat type. http://www.tpwd.state.tx.us/fishboat/boat/responsible/accident_reports Retrieved May 6, 2010.

[190] 49-30511 Motorboat Mechanics. Occupational Employment and Wages, May 2005. U.S. Department of Labor.
http://www.bls.gov/oes/2005/may/oes493051.htm Retrieved May 6, 2010.

reimbursement rate for similar tasks might also be a comparison labor rate.

8. A sharp increase in demand for components needed to comply with the NPRM would spur competition and reduce costs.

9. We used NMMA/HIA labor times for twin engine ECIOS installation for single engine EICOS as well. Singles would require less time resulting in lower implementation costs.

10. Rental fleets would purchase “devices” at volume discounts.

11. Rental fleets would install components even faster after completing a few, as they move down the learning curve, further reducing installation costs.

12. Reduced insurance premiums.

13. Some houseboats already have propeller guards and would need no further modifications to meet the NPRM.

14. Some rental houseboat propeller accidents may not have been reported as recreational marine accidents because they were thought to have been commercial accidents.

15. Houseboat propeller accidents not meeting the criteria to be listed in BARD.

16. Houseboat injury accidents listed in BARD as another type of injury, but were really caused by a propeller.

17. Several BARD reported propeller accidents, especially those in the earlier part of the reporting period considered by this NPRM, are reported as vessels of unknown length (length code = 99) built by unknown manufacturers (MIC code = UUU). Some of these vessels may have been houseboats.

18. California houseboat propeller accidents that are not reported to BARD at the request of the State of California.

19. Houseboat propeller accidents occurring on areas under control of the National Park Service, U.S. Forest Service, or U.S. Army Corps of Engineers (USACE) that were not reported to BARD.

20. Some houseboats, as defined by the NPRM definition, are planing houseboats. They are not subject to this NPRM and would have no implementation costs.

21. A few houseboats are water jet powered and need no further modifications.

22. USCG estimated propeller injury costs based on an MAIS 4 injury (see section on Value of Injuries). Those injured by propellers are often injured very severely at multiple sites on their body. A case could be made for establishing an injury value between MAIS 4 and MAIS 5. This would significantly increase the cost of casualties.

23. Propellers on many inboard powered houseboats may be forward of the transom and not subject to this NPRM.

24. Commercial and U.S. Government owned houseboats are not subject to this NPRM. Native American tribal owned houseboats may not be either.

25. Psychological and emotional costs of parents, spouses, children, other family members and close friends that actually witnessed the accidents.

26. Consortium losses (loss of a spouse).

APPENDIX G

NMMA/HIA Accident Compilations

The first page of NMMA/HIA's "Rental" and "All Houseboats" propeller accident compilations.

PAGE 1.1 Houseboats (rental) RENTAL

ZBARPT1A
STRUCK BY BOAT OR PROPELLER 02/22/02
BOAT RENTAL

LIST	ACC_YEAR	ACC_MMDD	ACC_TIME	HULL_ID	ENGINE	BOAT_TYPE	BOAT_YEAR	HP	LENGTH	AGE	POB	BOAT_MANU	HULL_MAT
1	1991	08/24	14		INBOARD/OUTBOARD	HOUSEBOAT	80	999	50	32	8	HLR	STEEL (METAL)
2	1992	05/07	99		INBOARD/OUTBOARD	HOUSEBOAT	99	120	47	22	99	UUU	STEEL (METAL)
3	1992	05/31	15		OUTBOARD	HOUSEBOAT	99	999	50	24	12	MBC	STEEL (METAL)
4	1992	09/03	11		OUTBOARD	HOUSEBOAT	99	120	54	31	10	MRT	ALUMINUM
5	1992	09/06	17		INBOARD/GASOLINE	HOUSEBOAT	82	200	50	25	10	UUU	STEEL (METAL)
6	1993	03/21	16		INBOARD/OUTBOARD	HOUSEBOAT	87	140	52	22	99	ZZB	ALUMINUM
7	1993	08/06	15		OUTBOARD	HOUSEBOAT	81	40	24	15	99	UUU	ALUMINUM
8	1993	09/04	20		INBOARD/OUTBOARD	HOUSEBOAT	91	999	56	18	6	RHR	ALUMINUM
9	1994	07/14	17		INBOARD/OUTBOARD	HOUSEBOAT	93	260	56	51	99	FCX	ALUMINUM
10	1994	05/29	15		INBOARD/GASOLINE	HOUSEBOAT	91	260	56	99	2	FLX	STEEL (METAL)
11	1994	09/18	15		OUTBOARD	HOUSEBOAT	82	999	46	26	11	HLR	STEEL (METAL)
12	1995	07/19	14:00:00	RHR01055E888	INBOARD/STERN DRIVE	HOUSEBOAT	1988		50		9	LEISURE CRAFT	ALUMINUM
13	1995	07/21	17:59:00	ZZB3B044A787	INBOARD/STERN DRIVE	HOUSEBOAT	1987		52	30	15	SUNSEEKER	ALUMINUM
14	1995	08/21	17:20:00	FCX00009619I	INBOARD	HOUSEBOAT	1991	260	55		8	FUN COUNTRY MARINE INDUSTRIES	ALUMINUM
15	1996	06/09	17:00:00	KAY09563M83C	OUTBOARD	HOUSEBOAT	1983		50	49	4	KAYOT	ALUMINUM
16	1998	05/06	11:20:00	FCX00112G595	INBOARD/STERN DRIVE	HOUSEBOAT	1995	260	56		3	FUNCOUNTRY	ALUMINUM
17	1998	07/20	17:30:00	1023M88L	OUTBOARD	HOUSEBOAT	1988		36	42	3	BTLOP	STEEL

TOTAL

PAGE 1.1

Houseboats (all)

ALL

ZBARPT1A
STRUCK BY BOAT OR PROPELLER 02/22/02

LIST	ACC_YEAR	ACC_MMDD	ACC_TIME	HULL_ID	ENGINE	BOAT_TYPE	BOAT_YEAR	HP	LENGTH	AGE	POB	BOAT_MANU	HULL_MAT
1	1991	08/24	14		INBOARD/OUTBOARD	HOUSEBOAT	80	999	50	32	8	HLR	STEEL (METAL)
2	1992	08/01	18		OUTBOARD	HOUSEBOAT	88	70	20	33	7	BUJ	ALUMINUM
3	1992	05/07	99		INBOARD/OUTBOARD	HOUSEBOAT	99	120	47	22	99	UUU	STEEL (METAL)
4	1992	05/31	15		OUTBOARD	HOUSEBOAT	99	999	50	24	12	MBC	STEEL (METAL)
5	1992	09/03	11		OUTBOARD	HOUSEBOAT	99	120	54	31	10	MRT	ALUMINUM
6	1992	09/06	17		INBOARD/GASOLINE	HOUSEBOAT	82	200	50	25	10	UUU	STEEL (METAL)
7	1992	06/22	18		INBOARD/OUTBOARD	HOUSEBOAT	99	999	56	19	6	UUU	ALUMINUM
8	1993	06/13	17		INBOARD/OUTBOARD	HOUSEBOAT	73	225	37	61	2	DCL	FIBERGLASS
9	1993	08/16	18		INBOARD/OUTBOARD	HOUSEBOAT	67	185	54	62	10	CPV	STEEL (METAL)
10	1993	03/21	16		INBOARD/OUTBOARD	HOUSEBOAT	87	140	52	22	99	ZZB	ALUMINUM
11	1993	07/10	10		UNKNOWN	HOUSEBOAT	99	999	99	99	99	UUU	UNKNOWN
12	1993	08/06	15		OUTBOARD	HOUSEBOAT	81	40	24	15	99	UUU	ALUMINUM
13	1993	09/04	20		INBOARD/OUTBOARD	HOUSEBOAT	91	999	56	18	6	RHR	ALUMINUM
14	1993	07/04	18		INBOARD/OUTBOARD	HOUSEBOAT	99	999	99	99	99	UUU	ALUMINUM
15	1994	07/14	17		INBOARD/OUTBOARD	HOUSEBOAT	93	260	56	51	99	FCX	ALUMINUM
16	1994	05/29	15		INBOARD/GASOLINE	HOUSEBOAT	91	260	56	99	2	FLX	STEEL (METAL)
17	1994	09/18	15		OUTBOARD	HOUSEBOAT	82	999	46	26	11	HLR	STEEL (METAL)
18	1995	07/19	14:00:00	RHR01055E888	INBOARD/STERN DRIVE	HOUSEBOAT	1988		50		9	LEISURE CRAFT	ALUMINUM
19	1995	07/25	11:00:00		UNKNOWN	HOUSEBOAT	UNK		UNKNOWN				UNKNOWN
20	1995	07/21	17:59:00	ZZB3B044A787	INBOARD/STERN DRIVE	HOUSEBOAT	1987		52	30	15	SUNSEEKER	ALUMINUM
21	1995	06/11	16:00:00	TKZ00695B595	OUTBOARD	HOUSEBOAT	1995	500	78	51	5	STARDUST CRUISERS	ALUMINUM
22	1995	08/21	17:20:00	FCX000096191	INBOARD	HOUSEBOAT	1991	260	55		8	FUN COUNTRY MARINE INDUSTRIES	ALUMINUM
23	1995	10/08	14:15:00	OUAE2072L889	OUTBOARD	HOUSEBOAT	UNK	115	20	48	4	AQUASPORT MARINE IND	FIBERGLASS
24	1995	04/17	10:30:00	380500178	INBOARD	HOUSEBOAT	1978	140	50	43	1	KAYOT	STEEL
25	1995	04/17	10:30:00	HMH 00586 M83J	INBOARD/STERN DRIVE	HOUSEBOAT	1983		35		0	HOLDIAY MANSION	FIBERGLASS
26	1996	07/13	13:00:00	UNK.	INBOARD/STERN DRIVE	HOUSEBOAT	1974	165	50	58	5	MASTER FABRICATORS	STEEL
27	1996	08/04	0:15:00	GBN5017M80A	INBOARD	HOUSEBOAT	1980	770	50	46	13	GIBSON FIBERGLASS PRODS INC.	FIBERGLASS
28	1996	05/18	14:45:00		OUTBOARD	HOUSEBOAT	1983	50	35	26	6	GANANOQUE	STEEL
29	1996	06/09	17:00:00	KAY09563M83C	OUTBOARD	HOUSEBOAT	1983		50	49	4	KAYOT	ALUMINUM
30	1998	11/26	16:00:00	ARB593LTH495	OUTBOARD	HOUSEBOAT	1996	140	48	50	5	CATAMARAN CRUISERS	FIBERGLASS
31	1998	02/05	14:45:00	22833258K788	INBOARD/STERN DRIVE	HOUSEBOAT	1988	260	56		2	3 BUOYS'S	ALUMINUM
32	1998	07/18	16:00:00		OUTBOARD	HOUSEBOAT	1974	85	35	50	2	CREST	ALUMINUM
33	1998	08/01	13:00:00	NAT485030873	INBOARD	HOUSEBOAT	1974	520	48	40		NAUTALINE	FIBERGLASS
34	1998	05/06	11:20:00	FCX00112G595	INBOARD/STERN DRIVE	HOUSEBOAT	1995	260	56		3	FUNCOUNTRY	ALUMINUM
35	1998	09/07	15:00:00	HGV03303D797	INBOARD	HOUSEBOAT	1997	500	81	64	2	LAKEVIEW	ALUMINUM
36	1998	07/20	17:30:00	1023M88L	OUTBOARD	HOUSEBOAT	1988		36	42	3	BTLOP	STEEL
37	1999	06/15		HMH00384M80F	INBOARD	HOUSEBOAT	1980		36		0	HOLIDAY MANSION	ALUMINUM
38	1999	07/03	16:00:00		INBOARD/STERN DRIVE	HOUSEBOAT	UNK	110	52				STEEL
39	1999	12/11	16:00:00			HOUSEBOAT	UNK		36		0	AQUA CHALLET	ALUMINUM
40	1999	05/23	18:56:00		INBOARD/STERN DRIVE	HOUSEBOAT	UNK		60	32	8		UNKNOWN
41	1999	05/29	17:00:00		INBOARD/STERN DRIVE	HOUSEBOAT	1991	500	27	45	3	FOUNTAIN	FIBERGLASS
42	1999	08/28	16:00:00	SZJ02047F393	INBOARD	HOUSEBOAT	1993		66	55	8	SUMMERSET	FIBERGLASS
43	1999	07/02	15:40:00	TKZ000956D898	INBOARD	HOUSEBOAT	1998	420	84	37	1	STARDUST	ALUMINUM
44	1999	07/02	15:40:00		OUTBOARD	HOUSEBOAT	UNK	0	70	52	8	ADMIRER	ALUMINUM
45	1999	10/05	13:30:00		OUTBOARD	HOUSEBOAT	UNK	0	UNKNOWN	39	2		ALUMINUM
46	2000	05/27	11:00:00	GBN50516E989	INBOARD	HOUSEBOAT	1989		50	53	3	GIBSON	FIBERGLASS
47	2000	08/12			INBOARD	HOUSEBOAT	1970	540	34		0	TOLYCRAFT	FIBERGLASS
48	2000	08/05	15:31:00	NAT434210573	INBOARD/STERN DRIVE	HOUSEBOAT	1973	660	43	42	15	NATUILINE	FIBERGLASS
49	2000	05/29	13:30:00	GBN44264H990	INBOARD/STERN DRIVE	HOUSEBOAT	1990	470	44		0	GIBSON	STEEL
50	2000	07/22	12:20:00	FCX000259B999	INBOARD/STERN DRIVE	HOUSEBOAT	1999	230	59	36	9	FUN COUNTRY	ALUMINUM

TOTAL

APPENDIX H

Propellers Can Pull in Victims

Many victims report being pulled into a houseboat propeller from the rear.

Some industry representatives claim it is not possible to be sucked into a propeller. They say the only way you can be hit by the prop is to be in direct line with the propeller and be ran over.

The following houseboat propeller accident sequence illustrates how people can be pulled into a propeller:

1. Someone is in the water behind the houseboat.

2. The engine is started and the shift-throttle control is pulled backwards.

3. The propeller begins to rotate in reverse, the boat is still at rest.

4. A propeller is basically a screw. When it first begins to rotate in reverse, it is trying to screw through the water much faster than the boat is going in reverse. Suction generated by the spinning propeller pulls water in from a broad area, generally behind the boat, to fill the blades.

5. The person behind the boat is pulled in with that water and is struck by the propeller.

Incoming flow rates during these times (propeller is turning in reverse but the boat is not yet up to speed in reverse) can be quite high. We will now estimate the magnitude of the flow rate if the throttle were pulled to a position that would eventually result in the boat going 3 miles per hour in reverse with a 16 inch diameter propeller. If will assume the propeller is initially only 40 percent filled with water, and the engine initially droops about 30 percent in RPM when placed under load (it takes the engine a while to catch up and run at a level RPM). The propeller would require:

Pi X (radius of propeller in feet)^2 X (3 miles/hour) X 40% filled X (100% engine speed required for 3 mph in reverse - 30% engine speed droop) X (5280 feet/mile) X (7.41 gallons/foot^3) X (1 hour/60 minutes)

3.142 X .667^2 X .4 X .7 X 3 X 5280 X 7.41/60 = 765 gallons per minute per engine

The propeller in these calculations would be pulling in about 750 gpm (gallons per minute), and twice that much for twin engines. As the boat begins to speed up, the water begins to be partially supplied by rearward advancement of the houseboat, but initially it is pulled primarily from behind the boat.

NOTE- the propeller inflow calculations just completed are quick, rough calculations to gain a sense of the magnitude of the flow rate. They are not being presented as exact.

The possibility of people being pulled into a propeller was recognized at a 1999 National Boating Safety Advisory Council (NBSAC) meeting.[191] Dr. Jeffrey Tennant, co-author of the USCG report evaluating commercially available propeller injury protection devices said:

"that there were two very distinct modes for the operation of the propeller; 0 speed, no advanced velocity, the propeller is rotating but the boat has not moved yet there is induced flow near the front of the propeller that has the ability to bring (sic) object in in an axial direction"

The other co-author, Dr. Mancil Milligan, is quoted in the same NBSAC meeting minutes in response to comments from Ms. Phyllis Kopytko of SPIN, a propeller strike victim:

"what she experienced was a combination in that an object is going to move not in any pure direction but a pure radial direction. He said that the induced flow is going to move you, just like an object is moved by water current.

[191] National Boating Safety Advisory Council. 63rd Meeting. Portland, Oregon. April 26-26, 1999.

He said that when the propeller is turning and the boat is at low speed or high speed there is a relative motion that is going to move you."

Both of the USCG study authors agreed people can be pulled into propellers. We will now describe in detail how this can happen, and particularly how it happens on houseboats.

While a houseboat propeller is pulling in water faster than the houseboat is going in reverse, several hydrodynamic effects may affect people in the water behind the boat:

1. They may be pulled forward into the propeller with the inflow (as just discussed).

2. Propellers rotating in reverse may create vortices (area of submerged rotating water behind the propeller extending to the rear and possibly bending upwards toward the surface). People in these vortices may be pulled forward, laterally and/or down toward the propeller.

3. Gravity induced pressure and/or the vortices just discussed force some surface water behind the boat downward to replace the water being pulled forward by the propeller. As this water descends, viscosity (resistance to shear/flow), mass (inertia resistance), and surface tension of nearby surface water delay it from rushing in to fill the void. That delay can create a visible depression on the water's surface behind the propeller. People may float down the gentle slope of this depression toward the propeller (or toward the downward vortex) in some circumstances. Outboards and stern drives have anti-ventilation plates (a large flat plate above the propeller, often called an anti-cavitation plate) to prevent vortexes from pulling air directly downward into the propeller.

4. When you stick your arm out the window of a car going down the road you quickly feel the drag force generated by the air passing over your arm. Similarly, a person's body in the water is subject to drag forces from water flowing around it toward the propeller. Drag forces on a person's body or limbs generated by water flowing around them toward the propeller will pull the person toward the propeller. Velocities are much slower in the water situation than when sticking your arm out your car window. However, the much higher density and viscosity of water combine to greatly increase drag in comparison to air at similar speeds. This can be attested to by anyone who has tried to stand in chest deep water in a gently flowing river. Additionally, when a person is standing on a riverbed, friction between their feet and the ground resists the drag of water flowing around their body, but swimmers can only resist propeller inflow by trying to swim against it.

5. Most outboards and stern drives have through prop exhaust. Their engine exhaust flows out though the hub (center) of the propeller. When the propeller is turning in reverse, it is pulling water toward it while the exhaust is blowing a donut shaped hole backwards through the middle of it. The exhaust may increase the vortices of the fluid being pulled toward the propeller.

6. Water pumped forward by the propeller may actually raise the stern, bringing the propeller closer to the surface which further increases these effects.

Several effects just mentioned may be more pronounced when flow to or from the propeller becomes restricted, or when it takes longer for the boat to get up to speed such as:

1. In shallow water (like launching a houseboat after it has been beached).

2. With larger, broader transoms (like some houseboats).

3. Near shore (like when launching a houseboat after it has been beached).

4. Larger, heavier, underpowered boats take longer from the boat to catch up with the propeller speed (like houseboats) resulting in longer periods of exposure and allowing stronger vortices to develop.

Other Somewhat Similar Situations

Vortices similar to those in the inlet flow of a propeller first placed into reverse discussed earlier are well known to occur in several similar applications:

1. Power plant water intake pipes (horizontal intake pipes in power plant cooling lakes)[192]

2. Propeller pumps (submerged standing propellers mounted horizontally to a wall between two tanks to move fluid from one tank to the other)[193]

3. Horizontal sumps (horizontal intakes pulling in fluid from the bottom of a tank)[194]

4. Large horizontally mounted industrial propeller mixers[195]

---

[192] Flow-Boundary Effects on Critical Submergence of Intake Pipe. Yildirim, Kocabas, and Gulcan. Journal of Hydraulic Engineering. April 2000. Pgs. 288-297.

[193] ITT Design Recommendations. ITT Water & Wastewater AB. Undated. http://www.itttreatment.com/designrecommendations/p_oxidations_ditch_activated_sludge_treatment_oxidations_ditch_mixed_liquor_recirculation.pdf Retrieved May 6, 2010.

[194] Experimental and Numerical Investigation of Free Surface Vortex. Li Hai-feng, Chen Hong-xun, Ma Zheng, and Zhou Yi. Journal of Hydrodynamics. Vol.20 No.4 (2008). Pgs. 485-491.

[195] Flygt Compact Mixers pdf brochure #724485. Pg.10. http://www.flygt.fi/724485.pdf Retrieved May 6, 2010.

APPENDIX I

USCG Annual Boating Accident Statistics Report Table Layout Suggested by PGIC

In September 2009 we submitted a possible table layout to USCG Office of Boating Safety for reducing confusion between “Event 1” and total occurrences data in their annual Recreational Boating Statistics report.

We are sure our layout could be further improved upon. However, we feel in its current state, it could be an effective visual aid for USCG to begin a discussion focused on reducing the frequency viewers misinterpret their tables.

The table layout we suggested has since been slightly improved and is presented on the following page. If the table appears fuzzy on your computer screen, print it to view the chart more clearly.

Similar approaches could be taken with tables in other sections of the annual Recreational Boating Statistics report to reduce the probability of media representatives portraying “Event 1” data as total occurrences data.

See Public Mislead by USCG Annual Statistics in the Public Comments Objection 1 section of this report for additional information.

Footnote

We have since heard back from the USCG. They liked the table layout we suggested and are considering adapting a modified version of it for use in their next annual Recreational Boating Statistics report.

APPENDIX I
USCG Annual Boating Accident Statistics Report Table Layout Suggested by PGIC

Table 17A - 2008 Summary of Boating Accident Types

2008 Accident Type	Primary Accident Type Data				Secondary Cause of an Accident	Tertiary Cause of an Accident	All Accident Types Data		
	Accidents	Deaths	Injuries	Property Damage			Total Times Event Occurred	Total Deaths Associated with Accident Type	Total Injuries Associated with Accident Type
Total	4789	709	3331	$54,282,587					
Capsizing	348	189	227	$1,426,526	239	33	620	268	425
Carbon Monoxide Exposure	18	11	40	$0	0	0	18	11	40
Collision with Fixed Object	446	53	328	$4,696,802	47	9	502	56	368
Collision with Floating Object	59	5	30	$769,231	1	0	60	5	30
Collision with Another Vessel	1237	60	856	$8,854,700	63	7	1307	63	882
Departed Vessel	87	37	41	$67,315	54	28	169	74	99
Ejected from Vessel	123	17	105	$514,877	586	208	917	275	932
Electrocution	0	0	0	$0	0	0	0	0	0
Fall in Vessel	140	2	148	$65,270	175	16	331	10	427
Fall on Vessel	62	1	66	$7,500	14	1	77	1	84
Falls Overboard	431	188	257	$502,615	69	8	508	215	318
Fire/Explosion (fuel)	136	1	89	$4,542,417	3	0	139	1	91
Fire/Explosion (non-fuel)	78	2	12	$3,183,410	5	2	85	2	14
Fire/Explosion (unknown origin)	25	2	10	$15,980,500	0	0	25	2	10
Flooding/Swamping	475	89	179	$5,743,606	149	20	644	109	264
Grounding	322	13	241	$3,433,256	63	19	404	29	279
Sinking	16	2	3	$471,184	189	80	285	51	89
Skier Mishap	383	10	397	$4,826	0	1	384	10	397
Struck by Vessel	37	2	41	$2,400	188	32	257	26	315
Struck by Propeller	83	5	80	$600	80	18	181	21	176
Struck Submerged Object	154	5	70	$4,077,332	2	1	157	5	71
Other	123	9	111	$207,720	28	3	154	10	144
Unknown	6	6	0	$500	0	0	6	6	0

ABBREVIATIONS

AIS - Automatic Identification System used by some commercial vessels

ANSI - American National Standards Institute

APA - Administrative Protection Act

ATV - All Terrain Vehicle

BARD - USCG Boating Accident Report Database

BIRMC - Boating Industry Risk Management Council

CFD - Computational Fluid Dynamics

CPSC - Consumer Product Safety Commission

DDILV - Drowning Deaths Involuntarily Leaving the Vessel

DOT - Department of Transportation

EICOS - Emergency Ignition Cut-Off Switch

gpm - Gallons per Minute

hr - hour

LOLA - Limitation of Liability Act

MAIS - Maximum Abbreviated Injury Scale

NASBLA - National Association of State Boating Law Administrators

NBSAC - National Boating Safety Advisory Council

NEISS - National Electronic Injury Surveillance System

NMMA - National Marine Manufacturers Association

NOAD - Notification of Arrival and Departure system used by some commercial vessels

NPRM - Notice of Proposed Rule Making

NPRMW - Notice of Proposed Rule Making Withdrawal

MIC - Manufacturers Identification Code (code marked on the hull)

mph - Miles per Hour

OMC - Outboard Marine Corporation

OEM - Original Equipment Manufacturer

PC - Public Comments

PFD - Personal Floatation Device

PFDMA - Personal Floatation Device Manufacturers Association

PGIC - Propeller Guard Information Center

PWC - Personal Watercraft

RFA - Regulatory Flexibility Act

SAR - U.S. Coast Guard Search and Rescue Office

SARMIS - U.S. Coast Guard Search and Rescue Management Information System

SBA - Small Business Administration

SBREFA - Small Business Regulatory Enforcement Fairness Act

SPIN - Stop Propeller Injuries Now

TVA - Tennessee Valley Authority

USACE - U.S. Army Corps of Engineers

USCG - United States Coast Guard

VSL - Value of a Statistical Life

WOT - Wide Open Throttle

WTP - Willingness to Pay

Special Thanks

I would especially like to thank my wife, Lora, for allowing me to spend many hundreds of hours on this project and for her tireless assistance in editing the report. She was even patient with me when I edited it on countless road trips while she drove. Not many wives would have put up with that. She still jokes about how I said this paper was only going to be about twenty pages long when I started it. Thank you Lora.

For Full Coverage of Propeller Safety Issues

Visit the

Propeller Guard Information Center

www.rbbi.com/pgic

About the Author

Gary Polson holds two masters degrees from Oklahoma State University, is a licensed professional engineer, and has been associated with the marine industry for twenty years. His ability to pull from his previous experiences at Charles Machine Works (Ditch Witch Trenchers), Strength Tech, Inc. (family owned weight lifting equipment and accessories business), MerCruiser, Polson Enterprises (providing market, technical, business, and patent information), and the Propeller Guard Information Center provided him an excellent framework in which to structure this investigation. That framework plus his diverse research skills, attention to detail, and legal experience allowed him to see through the complexities surrounding USCG-2001-10163, analyze the data in great detail, discern the motives behind the parties involved, and report the truth.