

# PropellerSafety.com

propeller guard information center

To: ABYC & CED Investigative Technologies  
Reference: Propeller Guard Test Protocol

April 11, 2012

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## Reference: Request for Comment on Propeller Guard Test Protocol Draft

Thank you for the opportunity to comment on the Propeller Guard Test Protocol Draft.

### Comments:

#### Problem 1 - No boat hull used at SUNY CRESE

(Page 16) The SUNY CRESE testing used to evaluate effectiveness of Open Propeller, Cage, Concentric, and Ring Guards was performed by suspending the drive over a circular tank. No boat hull was present. In our opinion, this testing is invalid due to the changes in streamlines and pressures in the area of a propeller guard with and without a boat hull. We discuss this further on our site in a post titled, *The Emperor Has No Boat*.

Ref: The Emperor Has No Boat

<http://www.propellersafety.com/1986/propeller-guard-thoughts/the-emperor-has-no-boat/>

The industry has repeatedly objected to testing propeller guards on exemplar boats instead of the exact boat involved in an accident (ex: Decker v. OMC). SUNY CRESE testing did not even use a boat.

**Recommendation** - Run the hull/no hull discussion past some propeller-hull interaction experts or do some CFD (Computational Fluid Dynamics) with and without a hull, then verify the results in open water.

**Problem 2 - Propeller guard designs are forever stuck with the rating given the exemplar of their kind at SUNY**

(Page 16) The SUNY CRESE testing seems to have been a one time event with no plans for future tests. Those results were used to classify effectiveness of Cage, Concentric, and Ring Guards.

Guards produced by some manufacturers may have significantly different effectiveness than the exemplar of their type tested at SUNY CRESE.

Note - No mention of the use of flaps, lids, or shields similar to the shield used by Guy Taylor's 3PO guard was made.

While no provisions were made for testing effectiveness of a specific guard at SUNY CRESE, detailed gap chart curves are created for other characteristics (speed v. RPM, pitch v. RPM, fuel use v. RPM, etc.) for specific guards.

Sticking a guard design with the rating of its exemplar is not consistent with the rest of the protocol.

**Recommendation** - consider future SUNY CRESE testing as needed to allow manufacturers the option to test their guards at their expense.

**Problem 3 - All guards labeled as "Blunt force 15 mph"**

(Page 16) The SUNY CRESE testing labels all propeller guards as having blunt trauma issues above 15 miles per hour. Back on August 17, 2007 our Technologies page pointed out two expired Brunswick Trim Cylinder Trail-out patents (U.S. Patent 3,999,502 and U.S. Patent 4,050,359) that appear to have promise in delaying the onset of blunt trauma issues to higher speeds. We have since reiterated that several times, including on page 135 of our report on the USCG proposed houseboat propeller safety rule (dated June 10, 2010). At that time we also added a more recent Teleflex trim cylinder energy dissipation patent (U.S. Patent 7,722,418). The Teleflex approach is actually a cost reduction over current methods. The industry has not tested our theory.

Note - boats and drives are not labeled as "Blunt force 15 mph". They present more cross sectional area than guards and there are millions more of them.

**Recommendation** - test the Brunswick trim trail out patents and the Teleflex patent for their potential to delay the onset of blunt trauma issues to higher speeds.

**Problem 4 - Accepting test stand data that has not been validated**

(Page 16) Effectiveness discussion creates a table summarizing CRESE testing. The protocol accepts this data as representative of real world “people in the water” testing. Absolutely no testing was done to validate that hanging chimes of PVC pipe with ballistic gel molded to them behave similar to people in the water at similar positions. Especially not when tested without a boat hull. The tank and setup at CRESE was basically a test stand. To be applicable to the real world, test stand results must be correlated with real world results. That was not done.

**Recommendation** - review the literature for possible alternative approaches. Consider computer simulations (like CFD with SantosHuman), cadavers, human dummies (like grapple man), and other more realistic approaches. Live humans in wetsuits might be used in some tests. Considering doing open water testing with a real boat in reverse and at rest. Verify the selected approach replicates real world results.

**Problem 5 - Protocol is complex and expensive to conduct**

The propeller guard test protocol is complex, takes a long time to setup, and requires specialized equipment, instrumentation, and software. The bar has been raised too high for most small businesses manufacturing propeller guards to test their own guards.

**Recommendation** - develop a protocol that can be ran by small businesses producing propeller guards that still achieves the desired goals. Meanwhile, estimate the cost a guard manufacturer would have to pay to have their guard ran through the entire protocol (except CRESE).

### **Problem 6 - Need example calculations**

On several occasions, the protocol describes how to reduce the data for a specific test to a single rating or to a series of numbers. Several of those verbal descriptions are open to interpretation. We suggest an example be included in each case (show sample data and how it is reduced to a specific number, rating, or series of numbers.)

These instances include:

Page 9 - Summary Metrics (five bullets at bottom of page)

Page 13 - Steering Data (five bullets near top of page)

Page 14 - Peak Torque (statistical discussion in second paragraph)

Page 30 - Acceleration/Deceleration (five bullets near top of page)

Page 31 - Bollard Pull (Quantitative Results near bottom of page)

**Recommendation** - include examples illustrating how the ratings were actually calculated in the instances listed above. Those examples might be included in an Appendix.

### **Problem 7 - Typo**

Page 12 very top line, “second” should be “seconds”

**Recommendation** - change to “seconds”.

### **Problem 8 - No Definition of “Outboard/sterndrive/lower unit deflection”**

Page 12 Measurements bullet “Outboard/sterndrive/lower unit deflection” - are you talking about “trim”? “Outboard ... deflection” is also mentioned on page 34.

**Recommendation** - define ‘Outboard/sterndrive/lower unit deflection’.

### **Problem 9 - Same propeller used with and without guard**

Page 21 “Section 1.1.4 Propeller” states all testing (with and without guard) will be done with the same propeller. This places several guards at a distinct disadvantage. They pull the engine rpm down a little with the same propeller. Changing down a step in prop pitch allows them to rev back up (pull more horsepower) and improve their performance.

**Recommendation** - at least note that guards might be able to improve their acceleration and top speed performance if they were allowed to re-prop.

**Problem 10 - No sample propeller guard ratings from full propeller guard protocol tests are provided**

While Page 13 provides an example of the basic matrix ratings, complete ratings from running a guard through the protocol are not provided. From reading the protocol, it appears the entire ratings could be voluminous. It would be helpful to include an example of the full output (ratings) of a single guard ran through the protocol.

**Recommendation** - include a full set of ratings as an example. They could be in an Appendix.

**Problem 11 - ABYC and CED requested public comment but the protocol was not posted online. Few related documents are easily found online.**

No central repository was established and maintained to publicly store and distribute relevant files, talks, presentations, updates, results, and announcements. Many of the computer files that were at least briefly distributed were very large files not reduced in size for easy distribution.

We first learned that comments on the protocol draft were being sought by April 11th from an article in the online presence of a boating industry trade magazine. We contacted USCG for approval to post the protocol draft online since it was not available elsewhere (USCG had previously sent us a copy). USCG said comments were actually being sought by the contractors (ABYC and CED) so they forwarded our request to ABYC. They granted us permission to post the protocol online along with a presentation we had not previously seen.

We quickly posted the protocol and presentation, notified several propeller safety advocates, and posted notices in several industry online forums.

**Recommendation** - establish a place to store all relevant public documents (files, talks, presentations, updates, results, images, and announcements) online such as a website or Dropbox. Provide a notification system that automatically notifies those wishing to be alerted to new postings. Make sure the files have been reduced in size for easy downloading.

**Problem 12 - An early project goal was for CED to “Be recognized as independent third party regarding propeller guarding and injuries.” Historical and current events have led us to question the “independence” of the current protocol and its potential application to legal cases.**

**Event A - Industry developed the 1989 report and appears to be behind this one as well.**

Back in 1989 the industry produced the 1989 NBSAC Propeller Guard Subcommittee Report and anointed some new industry expert witnesses to enforce its findings in the courtroom (James Getz and Robert Taylor).

The 1989 “official” report condemned the use of propeller safety devices in statements like this one:

“Although the controversy which currently surrounds the issue of propeller guarding is, by its very nature, highly emotional and has attracted a great deal of publicity, there are no indications that there is a generic or universal solution currently available or foreseeable in the future. The boating public must not be misled into thinking there is a “safe” device which would eliminate or significantly reduce such injuries or fatalities.”

Our NBSAC Propeller Guard Subcommittee Report 1989 page covers the development of that report.

Ref: NBSAC Propeller Guard Subcommittee Report 1989

<http://www.propellersafety.com/nbsac-propeller-guard-subcommittee-1989/>

The industry controlled the development of the 1989 report. Now ABYC (the industry’s consensus standards organization) and CED (an engineering firm supporting manufacturers in product liability suits) team up to produce this protocol. Similarities in authorship to the 1989 report make us nervous.

**Event B - Authors of the 1989 report cashed in as expert witnesses for the defense. Authors of this protocol may do the same. That opportunity may taint their judgement while they are still writing the protocol.**

James Getz and Robert Taylor made a living off the 1989 report as expert witnesses for the defense.

Authors of the the current protocol would be stupid not to realize they have the same potential Getz and Taylor had to cash in on a document they authored that could be used against propeller safety devices in courtrooms for decades.

**Event C - With the help of the industry, CED identified 30 people worth contacting for information on propeller strikes. Several individuals more friendly toward the use of propeller safety devices were noticeably absent.**

The protocol project twice published a list of thirty people, organizations, or sources beyond USCG and the State Boating Administrators that might have information about propeller strikes. They were each individually contacted by the contractors. That list did not include Bob Hooper (Prop Buddy), Donald Balius (early propeller guard inventor), Bryan Chadwell (Chadwell Guard), or us (by far the largest Internet presence on propeller safety issues).

Among those that did make the list as having information about propeller strikes and being worthy of contacting were:

- Augusto Villalon - expert witness for the defense
- James Getz - Chairman of 1989 NBSAC Subcommittee on Propeller Guards and author of the final report
- Robert MacNeill - expert witness for the defense
- Peter Chisholm - Mercury's internal expert replacement for Richard Snyder
- John McKnight - led NMMA rally against the houseboat propeller safety regulation
- Don Kueny - OMC, frequent expert witness for the defense
- Mark Verwys - Plunkett Cooney, an industry defense legal firm
- Richard Snyder - longtime internal expert witness for Mercury, now a consultant
- Marcia Kull - previous Product Liability Counsel for OMC, Assistant legal General-Counsel - Litigation for Genmar, and then General Counsel for Volvo Penta
- Numerous boat company executives

The list above is obviously dominated by industry executives and industry legal experts.

Per CED documentation, each individual we just listed was asked question 4 and 5 below from the questionnaire in Attachment C to “Human Factors Analysis of Propeller Strikes”, a CED report dated June 5, 2009

4. Do you know of any individuals or groups, whether in industry, government, academia, advocacy not-for-profits, etc. with whom CED should make contact regarding this study?
5. Do you know of any other sources of information that would be relevant to this study, including past research, journal articles, reports, court testimony, news accounts, etc.?

Apparently none of those on the list mentioned Bob Hooper, Donald Balius, Bryan Chadwell, or us when responding to those questions. That seems to indicate they are either not very knowledgeable about the debate surrounding propeller accidents (which is hard to believe considering their positions), or they did not want to introduce potentially opposing viewpoints.

Bob Hooper, since deceased, may have had more “hands on knowledge” about propeller guards than all thirty people on that list combined.

**Event D - The protocol is capable of identifying minute differences in performance that may not be important, but may be magnified in the courtroom.**

The protocol appears to be capable of producing a very large report detailing minute differences in guarded and unguarded conditions, similar to those currently being produced in the courtroom by Robert Taylor of Design Research Engineering (DRE). Not all differences are of the same importance. For example, on Page 35, the protocol notes ride quality may be a minor variable with respect to testing propeller guards. We fear the industry may try to use the protocol to magnify less important differences.

**Event E - We first learned of the deadline for public comment from an article in an online boating trade magazine instead of being directly alerted of the deadline.**

We first learned of the April 11th comment deadline from an online boating industry trade magazine on March 23rd. Their coverage noted NMMA had already established a task force to respond to the protocol and was seeking more interested parties. We had not even heard of the comment deadline.

These incidents, and others have fueled our concerns.

**We are absolutely not accusing ABYC or CED or any of their employees of not acting independently. We are merely saying that historical events (1989 NBSAC Report), plus the events listed here leave us nervous about the “independence” of the protocol and its potential use in the courtroom environment.**

**Recommendation** - identify steps to win broader confidence in the “independence” of the protocol and its potential application in the courtroom environment, and take them.

In any future related projects, please consult our Who is Who in the Propeller Safety Debate page to identify a broader cross section of people with information about propeller strikes.

Ref: Who is Who in the Propeller Safety Debate  
<http://www.propellersafety.com/who-is-who-propeller-safety/>

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Thank you again for the opportunity to comment on the protocol. While we may not agree with some elements of the protocol, we do congratulate you for bringing a long and challenging project to a close. We also especially thank ABYC for allowing us to post the protocol and the related presentation online.

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<http://PropellerSafety.com>