

### **Accident Mitigation Workshop #1002.03**

This grant funded the travel expenses, engineering/specialist fees, presentation fees and administrative fees associated with the following tests:

- Carbon Monoxide Testing – presentation at IBEX September, 2010 & METS November, 2010
- Propeller Guard Testing – results presented at Miami Boat Show February, 2011

Meeting announcements were sent out to the developed list of attendees; facility and presentation arrangements were made by ABYC. Minutes of each meeting were distributed to the attendees and other interested parties. Meeting minutes are attached.

# USCG

## Accident Mitigation Workshop Carbon Monoxide and Propeller Injury Avoidance

IBEX  
September 29, 2010  
Louisville, KY

### Minutes

Sponsored by:  
United States Coast Guard  
Office of Boating Safety  
Recreational Boating Product Assurance Division

Minutes prepared by:  
American Boat & Yacht Council, Inc. (ABYC)  
613 Third Street, Suite 10  
Annapolis, MD 21403  
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*Produced under a grant from the Sport Fish Restoration and  
Boating Trust Fund, administered by the U.S. Coast Guard.*

Mr. John Adey of ABYC welcomed the attendees and introduced Mr. Bill Daley from CED/Investigative Technologies, Inc. Mr. Daley presented an overview of the recent testing that was conducted in a laboratory setting to assess the differences in impacts from guarded and unguarded propellers. Mr. Daley then answered several audience questions:

1. What was the diameter of the prop?  
A-We believe 17 1/4".
2. What determined the length of the test sample?  
A - The length was picked to be representative of ones arm or leg but it is difficult to replicate the human body.
3. Why didn't you use a water test dummy?  
A - It is difficult to predict the motion of a body but rather we chose to examine the opportunity to come in contact with the propeller and also for repeatability.
4. Did you test any from the side?  
A - Yes the parked in gear sample.
5. What was the size?  
A - 3" diameter. We also used a cluster of three for larger diameter and mass of the samples.
6. Are all the guards tested commercially available?  
A – Yes.
7. Do you feel that the samples moved more than a human body?  
A - There was not an effective way to replicate a human body. So we tried to figure out what we can reliably and repeatedly test.
8. So cage protection is a viable protection i.e. there was no damage?  
A - Yes and no. Parked in gear is very effective. However, at speed there was significant blunt force trauma.
9. If the test subject was the length of your leg wouldn't the results have been different?  
A - We were not looking to replicate specific limbs, or accidents but, rather, opportunity to come into contact with the propeller. The opportunity for contact with the propeller would not have been significantly different with a different length of sample.
10. Did you do performance testing on these guards?  
A - Yes we did. However, our intention is not to evaluate guards, but to develop a protocol and list of performance characteristics to be able to test against.

11. Did you compare your trauma to other tests that have been done?

A - We made a conscious decision not to look at biomechanical contact but rather at yes/no - could this sample come into contact. Follow up tests could address the question if the contact occurred what the damage would be.

12. Would this become the protocol for biomechanical test protocols?

A - We are still formulating the conclusions.

Mr. Pete Chisholm from Mercury Marine introduced "Moving Propeller Alert", a new product offering that provides a visible warning intended to reduce the risk of propeller injuries to persons in the water near the stern of a boat when the engine is started, or placed in gear. In response to an audience question, Mr. Chisholm indicated the device is available for electronic control smart craft only at this time.

Mr. Colin Chamberlain of Australian Safety Propellers presented video results of recent testing of their safety propeller. A lively discussion ensued, with the result that the Coast Guard Office of Boating Safety directed ABYC to use the Safety Propeller for further validation testing of the draft test protocol.

The next meeting is tentatively planned during the week of February 14, 2011 in Miami Beach, FL.

## Appendix A - List of Attendees

Richard Blackman	Cambridge, MD
George Broughton	BRP US Inc
Kevin Doney	SPIN
Ulrich Heinemann	IMCI
Phyllis Kopytko	SPIN
Bob MacNeill	IMCA
Tom Marhevko	NMMA
David Marlow	Brunswick Boat Group
Ryan McKeehan	Cardiff, CA
Eric Miller	Correct Craft
Robert Newsome	NMMA
Timothy O'Connor	LEM Products, Inc
Christina Paul	K&L Gates
Scott Rolseth	EnviroProp
Bruce Rowe	Forever Resorts
Scott Sarason	Rumberger, Kirk, & Caldwell
Cindy Squires	NMMA
Guy Taylor	3Po Inc
Janice Taylor	3Po Inc
Mark Verwys	Plunkett & Cooney
Kiko Villalon	Ancon Marine Consultants
Gordie Villalon	Ancon Marine Consultants
David Wolfe	Teleflex Marine

# USCG

## Accident Mitigation Meeting Carbon Monoxide and Propeller Injury Avoidance

Miami International Boat Show  
February 17, 2011  
Miami, FL

### Minutes

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United States Coast Guard  
Office of Boating Safety  
Recreational Boating Product Assurance Division

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John Adey, ABYC, convened the meeting and welcomed the attendees. The list of attendees is attached in Appendix A.

During brief opening remarks, John Adey introduced Mr. Lou Novak of the USCG Office of Boating Safety. Mr. Novak provided an overview of his maritime and professional experience. With the retirement of Richard Blackman, Mr. Novak has assumed responsibility as the USCG point of contact for Accident Mitigation Workshops.

Guy Talyor and Larry Rowley of 3PO presented an overview of the development, testing, and conclusions of a hexagonal prop guard. Testing included running over squash and dummies with and without the guard in place on various boats on a lake. They also presented a version of the hexagonal prop guard with aft facing shield that swings up at planning speeds. The limitations of prop guards were discussed and Mr. Taylor indicated the next development would focus on impact from the front side of the lower unit. The presentation is located in Appendix B.

John Adey briefly discussed CO concentration levels related large short duration spikes in CO levels measured behind boats and around other outdoor power equipment. The question was posed whether traditional methods for testing CO levels and the associated threshold are appropriate for the outdoor environment.

Bill Daley of CED provided an update on the USCG Propeller Injury Avoidance grant. The Human Factor testing at the CRESE, University of Buffalo has been completed and the report and video will be available from the USCG Office of Boating Safety at a future date. A brief questions and answer secession ensued. The question was posed whether a boat hull would create different outcomes. The intent of the protocol was to identify opportunities for propeller contact in a controlled environment. A discussion ensued about the use of live boat testing. The consensus was there may be value in determining the hull interference in propeller strikes. Additionally, a discussion about operator responsibility and education ensued. The Coast Guard pointed out they have many programs to address the boater education. The presentation is located in Appendix C.

The next meeting is scheduled for IBEX October 2011 Louisville, Kentucky.

## Appendix A

### List of Attendees – Accident Mitigation Meeting, February 17, 2011

John Adey	ABYC
Robert Adriance	Boat U.S.
Pete Chisholm	Mercury Marine
David Collins	Buist, Moore, Smythe & McGee
Colin Chamberlain	Australian Safety Prop
Po Chang	USCG
Kristin Coleman	Brunswick Corporation
Gregory Davis	Davis & Company, Ltd.
Brian Goodwin	ABYC
Charles Hawley	West Marine
Eric Johnson	USCG
Jim Krystosek	Enviroprop Corp
Todd Lemke	Mercury Marine
Francis Manchisi	Wislon, Elser, Moskowitz, Edelman & Dicker
Charlie Game	E.C. Game Engineering
Robert MacNeil	IMCA
Alex Marconi	Snell & Wilmer LLP
Thomas Marhevko	NMMA
David Marlow	Brunswick Boat Group
Charlie McIntosh	ESP
Robert Newsome	NMMA
Louis Novak	USCG
Gavin O'Hare	CED
Christina Paul	KPL Gates, LLP
Darren Pauly	USCG
Margaret Podlich	Boat U.S.
Scott Rolseth	Enviroprop Corp
Larry Rowley	3 PO Inc
Bruce Rowe	Forever Resorts
Marie-Claude Simard	BRP
Guy Taylor	3 PO Inc
Janice Taylor	3 PO Inc
Robert Taylor	Design Research Engineering
Mark Verwys	Plunkett & Cooney, P.C.
Augusto Villalon	ANCON Marine Consultants, Inc
David Wolfe	Teleflex
Jeff Wasil	BRP