Summary

14. Some Issues With These Three Studies

by Gary Polson, PropellerSafety.com
Polson Enterprises
 October 11, 2022 version

1989 NBSAC Report

1. Mercury Marine and Outboard Marine Corporation (OMC) were represented on the 4 to 7 person NBSAC subcommittee on propeller guards which created at least the appearance of bias.

2. Dick Snyder of Mercury Marine knowingly supplied incorrect accident statistics to the NBSAC propeller guard subcommittee, significantly understating the number of BARD reported propeller fatalities.

3. One year before the 1989 NBSAC subcommittee was formed, USCG assigned two of their own researchers (Purcell and Lincoln) to study the issue of propeller guards. USCG's experts reported they were unable to determine the efficacy of propeller guards without better accident data, underwater biomechanical testing, and a better understanding of propeller guard design.

4. The NBSAC subcommittee was charged with determining the frequency of propeller accidents and current trends in such accidents. The body of their final report included no statistics, no information on trends in accidents, the number of injuries was not considered, no efforts were made to account for the number of unreported accidents.

5. Primary reasons NBSAC provided for rejecting propeller guards were:

   A. Propeller guards cause blunt trauma injures which are worse than propeller cuts.

   B. Snyders Snyderism claim that 80 percent of all propeller accidents occur at operating speeds.

   C. Propeller cuts are neat, clean, and easily stitched up by a doctor (another Snyderism).

   D. Propeller guards increase forward facing cross sectional area over that of the propeller, meaning people could be struck by the guard that would have been just missed by the propeller.

   E. Propeller guard cross sectional area could be 300 percent greater than an open propeller.

   Statements A through E above were not proven, and still have not been proven.

6. Mercury misrepresented the status of their development of a propeller guard for the U.S. Marine Corps. Mercury was involved in a large contract to manufacture propeller guards for the Military as the subcommittee was making their final presentation but had told the subcommittee the project was not successful.

7. When Dick Snyder of Mercury Marine and the NBSAC subcommittee reported boat propellers make nice clean cuts that can be easily sewn up by a surgeon, they left out a few problems:

   A. Several propeller victims bleed to death. Survivors often face many surgeries.

   B. Propeller injuries are widely known for having serious problems with water borne bacterial infections.

   C. Amputees deal with life changing issues in addition to very expensive prosthetics.

8. The NBSAC study ignored injury accidents. Just one year earlier, USCG researchers (Purcell & Lincoln) said injury accidents had to be considered when evaluating efficacy of propeller guards because the only difference in many injury and fatal accidents is chance.

Almost everything the boating industry regularly states from the NBSAC report and the two impact studies is unproven or not true.

Head Impact Study

1. The researchers struck a Hybrid III crash dummy in the forehead in the worst manner possible.

2. The Hybrid III crash dummy's neck was many times stiffer in compression than a human neck.

3. No testing was performed without a propeller guard for comparison.

4. Impact tests were conducted with the drive trimmed into a vertical position (zero trim) which prevented the crash dummy head from sliding down the propeller guard which would have reduced peak impact loads.

5. Researchers used the bounds defined by Mertz to determine serious neck injury (established with very limited data). Even then, SUNY test results did not reach those levels.

6. Acknowledged the 1989 NBSAC study rejected guards in part due to blunt trauma injuries but had no experimental data to support that decision.

7. They used a computer model of the crash dummy to compare with their results, instead of a computer model of a human.

8. The crash dummy was used far outside of its intended purposes and operating conditions without using cadavers to verify the results.

9. Testing and the resulting technical papers were paid for and overseen by boating industry lawyers.

10. Multiple statements in the final version of the head impact paper are directly from Dick Snyder's pre-publication review of the paper.

11. As the technical paper went through a series of revisions it gradually became more favorable to the boating industry's positions.

12. The study said the leading edge of the guard was blunt, but it was only 5/16 inch wide and the impacts occurred underwater.

Leg Impact Study

1. The leg study used cadavers with average age of 75 years old that had been embalmed for several years.

2. Soft tissue damage was "guessed" because soft tissue on the cadavers was described as being "leather like".

3. Early versions of the leg impact paper mentioned the work was done under contract for Mercury and OMC. The final version of the paper does not even mention Mercury or OMC, leaving the reader to think it is an independent study.

4. Leg impact researchers published a paper stating there were on average about 100 people injured or killed by propellers a year (Event 1 data) when they knew many more were reported.

5. Propeller guards were rejected in part due to horizontally placed lower legs wrapping around the front of the guard. No testing was performed with younger, fresher cadavers, the drive properly trimmed, the leg in a vertical position, or without a guard for comparison.

6. The researchers used several hedge words and phrases in describing the conclusions of the paper.

The Present

The NBSAC, head impact, and leg impact studies are sometimes cited as stating propeller guard impacts are worse than open propeller impacts above 2, 5, 10, 13.7, or 15 miles per hour.

The same difficulties cited by USCG's researchers (Purcell & Lincoln) in 1987 face today's propeller guard researchers, lack of (1) good accident data, (2) underwater biomechanical testing data, & (3) propeller guard design studies.)