MARINE AND HYDROKINETIC (MHK) ENERGY COMPOSITES DATABASE WORKSHOP

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INTRODUCTION

The Marine and Hydrokinetic (MHK) Energy Composites Database Workshop was held on May 13–14, 2015 at Sandia National Laboratories in Albuquerque, New Mexico. Participants were tasked to identify what are the critical composite materials related needs that must be addressed for the MHK Energy Industry to have success in their device's design, manufacture, operation, maintenance, and reliability. Attendees represented MHK wave and tidal device manufactures, composites industry, academic, national laboratory, and the Navy perspectives. This paper summarizes the workshop goals, agenda, and results.

This two-day workshop was used to identify what are the composite materials related needs that must be addressed for the MHK Energy Industry to have success in their device's design, manufacture, operation, maintenance, and reliability. To aid in these decisions, the workshop participants focused on the following activities to direct composite initiatives.

Workshop Goals

This two-day workshop was used to identify what are the composite materials related needs that must be addressed for the MHK Energy Industry to have success in their device's design, manufacture, operation, maintenance, and reliability. To aid in these decisions, the workshop participants focused on the following activities to direct composite initiatives.

Workshop Goal 1: Introduction to the Water Power Composite Materials Database.

- Data is being collected on MHK Composite Performance by Sandia National Laboratories & Montana State University to aid in composite materials selection for design, manufacture, performance, reliability, operation, and maintenance.

Desired Outcome 1: Water Power Materials Database Development

- The pubic Water Power Technologies Materials Database will provide MHK composite performance data to aid in composite materials selection for design, manufacture, performance, reliability, operation, and maintenance.
- Advisement on additional parameters is needed.
- A successful database will have the merits of the Wind Power Materials Database.

Workshop Goal 2: Identify Composite Related Barriers.

- Participants will identify composite materials related manufacturing science and engineering barriers that increase the cost of MHK construction, deployment, operation, maintenance, and reliability

Desired Outcome 2: Direct Composites Development.

- Successful identification will direct database performance data and impact future research that will reduce costs and improve these critical areas.

The diverse workshop attendees represented the following communities:

1. U.S. Department of Energy: EERE
2. MHK Wave (Columbia Power Technologies, Resolute Marine Energy)
3. MHK Tidal (Ocean Renewable Power Company, Aquantis Inc.)
4. Composites Industry (Ershigs, Inc., Janicki Industries, PPG Industries, Saertex)
5. Academic (Florida Atlantic University, Montana State University)
6. National Laboratory (Sandia National Laboratories, National Renewable Energy Laboratory)
7. U.S. Naval Research Laboratory

WORKSHOP OUTCOMES

The overall outcomes of the workshop are captured in detail in a Sandia National Laboratory SAND report, to be released shortly. This presentation will be used to introduce the MHK industry to the outcomes from 2-days of discussion. In summary, the outcomes of the workshop include:

- Identification of barriers related to the use of composites in MHK devices.
- Composite research needs as related to MHK systems.
- Identification of the needs for a materials database of composites related to MHK conditions.

Each of the items listed above was discussed with respect to short term, intermediate, and long terms emphases of the DOE/Sandia MHK research program, and is summarized as follows:

Short Term

1. Loads & Tolerances
2. Saturated Testing/Maintenance
3. Material Selection
4. Cores and connections
5. Manufacturing and Suppliers
6. Database of material properties
7. Looking at Other Industries

Intermediate:

1. Expand Database Properties and materials
2. Water Uptake/Diffusion characterization
3. Biofouling studies
4. Maintenance and damage tolerance issues
5. Improvements to Testing
6. Manufacturing
7. Design Needs

Long Term

1. Certification/Standardization
2. Biofouling and Water Uptake
3. Manufacturing Improvements
4. Uniform Testing Methods
5. More thorough materials database
6. Health Monitoring
7. Durability

CONCLUSION

The authors feel they have assembled a solid group of individuals in the MHK, composites, academic, government, and industrial arenas to contribute to the future direction of MHK composites research. Valuable information was shared and recorded from 2-days of round-table discussion. The authors look forward to disseminating this information in a formal presentation.

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