Sample Safety and Technical Inspection

A sample of the safety and technical inspection form used to ensure teams are prepared for testing devices is provided below. Teams are required to work through this process in advance of testing their device with a qualified research technician, advisor, or similar university personnel; however, the competition prize administrators have the final say in approving the Safety and Technical Inspection form after being submitted by each team. The competition prize administrators may ask a team to revisit the Safety and Technical Inspection form if they believe there are safety concerns that have not been addressed. The sample Safety and Technical Inspection form is meant to provide guidance and by no means captures all the potential safety requirements each test facility may have.

Teams are also strongly encouraged to conduct a hazard identification (HAZID) and assessment[8] for their own design, installation procedure, and test plan, which is consistent with how safety plans are completed in the industry. During this process, each team would develop a risk assessment matrix (RAM) and mitigation strategies for any of the identified risks.[9] Given the wide variety of possible designs, the risk identification processes will help those team members involved in the Build and Test Challenge to identify the inherent and unique risks for their design and testing procedure. If possible, teams should have their HAZID reviewed by a qualified expert to audit and possibly help guide in the process.

MECC 2025 Safety and Technical Inspection Form
Team Name: _____
SAFETY
□ Wiring is deemed safe and uses adequate gauges—no electrocution or overheating hazard
□ Electrical systems are tied to earth ground with 100 kiloohms or lower resistor
□ Energized electrical components are adequately shielded—both electrically and mechanically
□ Proper heat rejection
□ Voltage is ≤48 volts DC at electrical load connection to data acquisition system or other monitoring systems at all times
□ All mounting fixtures fit without having to be forced
□ For any electrical load: all charging or bulk energy storage follows industry-accepted best practices (i.e., safe circuitry overvoltage/undervoltage protection, flame/spill containment)
ELECTRICAL
□ All electrical components outside the wet testing space are contained in enclosures (no tape)
□ Cable passthroughs in enclosures provide strain and chafe protection (e.g., cable glands)
□ Marine energy model device electronics and load electronics in separate enclosures
□ All external wiring is in cable form and utilizes commercial connectors
□ All electrical components are mechanically secured to enclosures

[8] United States Department of Labor. 2016. "Recommended Practices for Safety and Health Programs." Occupational Safety and Health Administration. https://www.osha.gov/shpguidelines/hazard- Identification.html.

[9] Teams are directed to the Marine and Hydrokinetic Technology Development Risk Management Framework for additional information: Snowberg, David, and Jochem Weber. 2015. *Marine and Hydrokinetic Technology Development Risk Management Framework*. Golden, CO: National Renewable Energy Laboratory. NREL/TP- 5000-63258. https://www.nrel.gov/docs/fy15osti/63258.pdf.

MARINE ENERGY MODEL DEVICE
□ Marine Energy model device for testing is substantively the same as in the report
□ Marine Energy model device side of any electrical load: no batteries, excessively large capacitors (individual or combo ≤10 joules)
□ Capable of installation in the wet testing facility in one assembly to minimize the chance of shifting pieces in the water.
□ Designed to be safely lifted by no more than two team members. If the device weighs more than what two team members can safely lift, adequate lifting points for a crane or equivalent hoist will need to be designed and inspected. Each team will need to evaluate each member's ability and fitness for physical work and material handling.
□ Able to be fully assembled outside of the wet testing facility to allow for mechanical and electrical system checks to be completed before entering the water. It may be necessary for a team to design a dry test stand or mount where the device can be attached without risk of accidental movement (do not simply place on a tabletop).
MECHANICAL
□ Review model design, installation, and test plan to minimize pinch points, sharps, entrapment, entanglement, etc.
□ Review model design, installation, and test plan to ensure there are appropriate safety measures in place if using an energized system (hydraulic pressure, compressed air, etc.)
Personal Protection Equipment (PPE)
□ Verify that all team members working on the Build and Test Challenge have access to appropriate PPE, such as gloves, eye protection, closed-toe shoes, appropriate work clothing, basic medical kit, etc.
ENVIRONMENTAL
□ Review installation and testing plan to account for the additional risk of working in or near water.
□ Ensure all materials, oils, fluids, etc. used in the build are test are properly handled and disposed of at completion.
WIRING
□ Wiring will reach the data acquisition system for measurements that are made outside of the wet testing facility.
□ Emergency-stop terminated with standard JST female receptacle with male pins (test fit to data acquisition system)
□ Emergency-stop signal (JST connector wiring) never draws more than 3 amperes and uses normally closed polarity during operation (students to describe)
LOAD
□ Team-supplied electrical or other load is certified for desired use
Inspecting Safety Personnel Printed Name and Signature: _____
Date and Time: _____
*noncompliant checkboxes should be circled above
Collegiate Team Faculty Advisor Printed Name and Signature: _____

Date and Time: _____