

AOE DEPARTMENT SAFETY REVIEW FORM FOR **EXPERIMENTAL RIGS**

In the context of this form 'rig' refers to any potentially hazardous piece of equipment whose safe operation requires more detailed instructions and procedures than can be included in the Experimental Workspace Safety Review form for the area in which the rig is housed. Examples include a wind tunnel, laser system, high pressure tank, material testing machine, rotating system.

Before any such rig in the Department of Aerospace and Ocean Engineering is brought into operation, and **at least once per year** thereafter, a copy of this form must be completed, signed and submitted by the responsible faculty/staff member (usually the principal investigator). When an existing rig undergoes modifications which could affect its safety, a new copy of this form must be submitted by the responsible faculty/staff member at that time, and before it is operated again.

Completed forms should be submitted to the AOE Assistant Department Head for Facilities (Michael Philen) and should also be made available to other faculty/staff with relevant expertise, or with direct involvement in the rig or space where it is housed. Any advice resulting from this interaction should be copied to the Assistant Department Head, as well as being transmitted back to the responsible faculty/staff member. Once the responsible faculty/staff member is satisfied that all safety concerns have been met the final version of the form should be signed and submitted and a copy displayed in a prominent position on or adjacent to the rig and on the department safety website. The responsible faculty/staff member may then authorize its operation. Under no circumstances may a rig be operated without a completed, current copy of this form prominently displayed.

Date of form 7/15/23..... Form expires (no more than 1 year after form date): 7/17/24.....

Name of Rig Stability Wind Tunnel Test Section Removal and Installation System

Workspace where rig is located: Stability Wind Tunnel (Randolph Hall 25, 25A).....
Include room, building and name given to the space on the EHS training website.

Faculty/staff member responsible for the rig and its safety William J Devenport

Office Address 660 McBryde..... Phone 231 4456 Email devenport@vt.edu

1. An evaluation of the above rig has been performed and the following safety risks have been identified (append details where necessary):

The Stability Tunnel Test Sections and associated components (the anechoic chambers and testing decks) are large (2 to 8 meters in linear dimension) and heavy (several tons) items. They are mounted and maneuvered both at height (up to about 3m above the floor), using a hoist system, and at floor level, using a pneumatic air-bearing system. The exchange involves a detailed series of maneuvers in both Randolph 25 and 25A. The following risks are identified:

- 1. Fall risk. During the exchange it is necessary to climb on top of components to attach/detach the hoist system. Falling off could result in serious injury.***
- 2. Risk of crushing injury from:***
 - a. A component or item falling from the hoist***
 - b. Trapping of feet or fingers under an item as it is lowered to the floor, either from the hoist or the air-bearing system***
 - c. Trapping of body parts between an item and a wall or column of these spaces while maneuvering using the hoist or air bearings.***
- 3. Risk of head or foot injury from any loose item dislodged from a component during a move.***
- 4. Risk of tripping over compressed air hoses used with the air-bearing system***

2. The following actions have been taken to minimize those risks (append details where necessary):

The above risks are inherent in the operation, and so are being addressed by procedures, training and appropriate safety equipment, detailed under item 3 below.

3. A safe operating procedure has been developed (below). This includes protective equipment to be worn, whether users may operate the rig alone and, if necessary, precautions to be taken by others working in the same laboratory. The procedure is in a form suitable for posting on the rig.

- a) **All tunnel test section exchange operations will be conducted only by trained permanent staff (including faculty) of the Stability Wind Tunnel and the Department of Aerospace and Ocean Engineering. Students may not be involved or present during exchange operations.**
- b) **All staff involved in exchange operations must be recognized, on the EHS Lab Management Site as members of either the Stability Wind Tunnel, the AOE Machine Shop or the AOE Electronics Shop.**
- c) **Exchange operations will be under the direction of a single team leader. The leader will be Mr. Bill Oetjens (wind tunnel engineer) or, in the case of his absence, another staff person explicitly designated by him or the Wind Tunnel Director. All staff involved in the move will be addressed by the leader before operations begin to make his/her authority as leader clear, and to review safety procedures.**
- d) **It is the responsibility of the leader to ensure through the EHS Lab Management Site that specialized equipment and operations (such as working at height, using the crane or the scissor lift) are only conducted by staff members who have received the appropriate training. It is also the responsibility of each individual staff member to identifying any operations they should not be involved with due to a training deficiency, before such operations are begun.**
- e) **Hard-hats and protective footwear will be worn by all staff at all times during exchange operations. Clips must be installed on the corners of large components, where necessary, to avoid pinch points when/if those components are in motion.**
- f) **Exceptions to the above procedures require prior explicit permission from the Wind Tunnel Director**

4. Check one and include a list: The rig may only be operated by the following individuals.

The rig may only be operated under the supervision of the following individuals.

(List individuals here)

Staff of the VT Stability Wind Tunnel, the AOE Machine Shop and the AOE Electronics Shop, under the supervision of the team leader, identified above.

5. The above individuals are all registered on the EHS training website at https://secure.hosting.vt.edu/www.ehss.vt.edu/training/training_report.php and have taken all appropriate safety training courses. Their training is current and is recorded on the EHS website, under the above workspace name. The appropriate safety courses are (list here):

Minimum training required is Electrical Awareness, Fall Hazard Awareness, HAZCOM RTK, PPE Awareness. Other requirements depend on specific tasks assigned during exchange operations and must be verified by the team leader and individual involved before commencement of those operations.

Signature of faculty/staff member

Responsible for the rig and its safety William Payne Date 7/15/23