

Risk Assessment Safety Plan

Project information:

Mobile Anechoic Test Chamber		02-28-19
Name of Project		Date of submission
Team Member	Phone Number	e-mail
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Faculty mentor	Phone Number	e-mail
Dr. Eric Hellstrom	850-645-7489	hellstrom@magnet.fsu.edu
Dr. Shayne McConomy	850-410-6624	smcconomy@eng.famu.fsu.edu

I. Project description:

Design a way to efficiently and consistently record sound for centrifugal compressors while managing surrounding noise. The goal of the project is to consistently measure the sound power across the TT series compressors at Danfoss. The surrounding noise can be neglected due to the 10 dB difference between sound source and background. To measure the sound power, a recording of the sound pressure must be taken and then converted to the desired sound power. The system must be compatible with the current testing stand and easily assembled and disassembled to not interfere with production.

II. Describe the steps for your project:

Maneuver the device onto current testing stand to start. Connect device to power supply. Initiate appropriate programs to record the data as well as perform the conversions to sound power. Operator will start compressor testing and perform their normal operations for the test, as well as start the recording of the compressor. Once testing procedures are finished, the raw data is inputted into the conversion program. The measurements for sound power are displayed and stored. Once all necessary recordings are finished, and the testing of the compressor is done, the system should be disconnected from the power source. The device will then be removed from the testing stand and stored in a specific location.

III. Given that many accidents result from an unexpected reaction or event, go back through the steps of the project and imagine what could go wrong to make what seems to be a safe and well-regulated process turn into one that could result in an accident. (See examples)

Maneuvering the device onto the current testing stand can result in personal injury, such as muscle strain or the object falling. Connecting the device to the power supply can result in electrocution. Starting the compressor testing can result in electrocution, explosion, or personal injury. The system being disconnected can result in shock from the electrical source. Dismounting device can result in the system failing or muscle strain. Moving the system to a different location can cause a tripping hazard. Loading of the device can result in pinching. Moving the device along the track can result in pinching.

IV. Perform online research to identify any accidents that have occurred using your materials, equipment or process. State how you could avoid having this hazardous situation arise in your project.

The connections from the microphones to the power sources could have a short and cause a fire. The fabricated steel may have sharp edges. Spot welding may fail and warp the device. To mitigate a tripping hazard for storing, clearly mark the area where it rests. Sand the edges of the steel to ensure no rough sides. Keep wires out of the operation of the compressor.

V. For each identified hazard or “what if” situation noted above, describe one or more measures that will be taken to mitigate the hazard. (See examples of engineering controls, administrative controls, special work practices and PPE).

The microphones will be securely attached to the array. A process control system will be implemented to mitigate the hazards for lifting and storing the device. The track during use will be tightened down to ensure that the array does not shift during testing. Once the test is complete, the array can move off the track after loosening the lever. The array can then be easily lifted and moved to the designated storage space. The microphone holsters will be attached to the array without needing to be moved. The microphones can be easily slid into the holsters. There will be a surge protector to prevent shock. The wires will be contained in holders along the array so they are securely fastened without droopiness.

VI. Rewrite the project steps to include all safety measures taken for each step or combination of steps. Be specific (don’t just state “be careful”).

The operator will wear the appropriate PPE designated by Danfoss to use the testing system to reduce personal injury that may occur from the device. The device will be moved from the holding station onto the tracks and the securely tightened prevent movement. The microphones can be put into place before on the test stand. The device can be plugged into a power supply to reduce possibility of a short. The operator will begin their compressor testing procedure and start the sound power testing as well. The conversions will be done with the test running simultaneously. The measurements are displayed and stored. Once all necessary tests are done, the system should be disconnected from the power source. The track lever can be loosened to remove the array. Once the array is removed, it can be moved to designated area.

VII. Thinking about the accidents that have occurred or that you have identified as a risk, describe emergency response procedures to use.

If any hazards were to occur, contact the shop floor supervisor immediately. Depending on the severity of the injury 911 should be called. If a fire occurs follow the fire evacuation procedure provided by Danfoss.

VIII. List emergency response contact information:

- Call 911 for injuries, fires or other emergency situations
- Call your department representative to report a facility concern

Name	Phone Number	Faculty or other COE emergency contact	Phone Number
Arnold Schaefer	850-504-4974	Dr. Eric Hellstrom	850-645-7489
		Dr. Shayne McConomy	850-410-6624

IX. Safety review signatures

- Faculty Review update (required for project changes and as specified by faculty mentor)
- Updated safety reviews should occur for the following reasons:
 1. Faculty requires second review by this date:
 2. Faculty requires discussion and possibly a new safety review BEFORE proceeding with step(s)
 3. An accident or unexpected event has occurred (these must be reported to the faculty, who will decide if a new safety review should be performed.
 4. Changes have been made to the project.

Team Member	Date	Faculty mentor	Date

Report all accidents and near misses to faculty mentor.