

FAMU-FSU College of Engineering
Project Hazard Assessment Policy and Procedures

INTRODUCTION

University laboratories are not without safety hazards. Those circumstances or conditions that might go wrong must be predicted and reasonable control methods must be determined to prevent incident and injury. The FAMU-FSU College of Engineering is committed to achieving and maintaining safety in all levels of work activities.

PROJECT HAZARD ASSESSMENT POLICY

Principal investigator (PI)/instructor are responsible and accountable for safety in the research and teaching laboratory. Prior to starting an experiment, laboratory workers must conduct a project hazard assessment (PHA) to identify health, environmental and property hazards and the proper control methods to eliminate, reduce or control those hazards. PI/instructor must review, approve, and sign the written PHA and provide the identified hazard control measures. PI/instructor continually monitor projects to ensure proper controls and safety measures are available, implemented, and followed. PI/instructor are required to reevaluate a project anytime there is a change in scope or scale of a project and at least annually after the initial review.

PROJECT HAZARD ASSESSMENT PROCEDURES

It is FAMU-FSU College of Engineering policy to implement followings:

1. Laboratory workers (i.e. graduate students, undergraduate students, postdoctoral, volunteers, etc.) performing a research in FAMU-FSU College of Engineering are required to conduct PHA prior to commencement of an experiment or any project change in order to identify existing or potential hazards and to determine proper measures to control those hazards.
2. PI/instructor must review, approve and sign the written PHA.
3. PI/instructor must ensure all the control methods identified in PHA are available and implemented in the laboratory.
4. In the event laboratory personnel are not following the safety precautions, PI/instructor must take firm actions (e.g. stop the work, set a meeting to discuss potential hazards and consequences, ask personnel to review the safety rules, etc.) to clarify the safety expectations.
5. PI/instructor must document all the incidents/accidents happened in the laboratory along with the PHA document to ensure that PHA is reviewed/modified to prevent reoccurrence. In the event of PHA modification a revision number should be given to the PHA, so project members know the latest PHA revision they should follow.
6. PI/instructor must ensure that those findings in PHA are communicated with other students working in the same laboratory (affected users).
7. PI/instructor must ensure that approved methods and precautions are being followed by :
 - a. Performing periodic laboratory visits to prevent the development of unsafe practice.
 - b. Quick reviewing of the safety rules and precautions in the laboratory members meetings.
 - c. Assigning a safety representative to assist in implementing the expectations.
 - d. Etc.
8. A copy of this PHA must be kept in a binder inside the laboratory or PI/instructor's office (if experiment steps are confidential).

Project Hazard Assessment Worksheet

| | | | | |
|--|-----------------------|-------------------|--|------------------------|
| PI/instructor: Dr. Shayne McConomy | Phone #: 850-410-6624 | Dept.: Mechanical | Start Date: 11/15/2022 | Revision number: 1 |
| Project: T506 Corning Plugger Pallet Short Part Stabilization | | | Location(s): FAMU-FSU College of Engineering (COE) | |
| Team member(s): Pawel Grum, Taylor Larson, Robert Kosmas, Segundo Sanchez, Jared White | | | Phone #: 561-768-3722 | Email: tml18bg@fsu.edu |

| Experiment Steps | Location | Person assigned | Identify hazards or potential failure points | Control method | PPE | List proper method of hazardous waste disposal, if any. | Residual Risk | Specific rules based on the residual risk |
|---------------------|-------------------------------|------------------|---|---|--|---|---|---|
| Machining Materials | Senior Design Lab | All team members | Slippage while drilling, sharp metal edges, sparks/heat | Difficult metal work will be done by a machine shop. Metal work done by team members will be done in the presence of at least one other member. The room will have ample lighting and will be well ventilated. | Safety Glasses Gloves | Metal shards/scrap swept and thrown away | HAZARD: 2 CONSEQUENCE: Severe Residual: Medium | After approval by the PI, a copy must be sent to the Safety Committee. A written Project Hazard Control is required and must be approved by the PI before proceeding. A copy must be sent to the Safety Committee. A second worker must be in place before work can proceed (buddy system). Limit the number of authorized Workers in the hazard area |
| CAD | College of Engineering Remote | All Team Members | Eye strain, Carpal Tunnel | Every 30 minutes of computer use, look at something 20-30 feet away for 30 seconds to prevent eye strain. Take a 5 minute break to walk/stretch for every hour of computer work. | Blue light glasses | N/A | HAZARD: 1 CONSEQUENCE: Negligible Residual: Low | Proper breaks shall be taken. To ensure breaks are taken a timer will be set. |
| Vibrational Testing | College of Engineering | All Team Members | Fall hazard, Lifting hazard, Pinching due to scissor lift, Potential injury due to motion of device | Appropriate clothing, testing with multiple team members present | Safety glasses, pants, closed-toe shoes, OSHA requires | N/A | HAZARD: 2 CONSEQUENCE: Minor Residual: Low med | Safety controls are planned by both the worker and supervisor. A second worker must be in place before work can proceed (buddy system). |

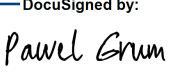
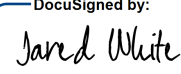

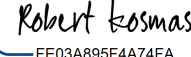
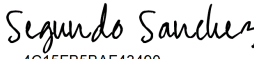
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|-------------------------------|-------------------------------|-------------------------|---|---|---|---|---|--|
| | | | | | protective headwear if there is potential for objects to fall on the head | | | Proceed with supervisor authorization. |
| Ceramic Dust Testing | College of Engineering | All team Members | Breathing in ceramic dust can be harmful to the lungs. Potential damage to lungs and ability to breathe properly. | Contain the testing within in a box or protected area. Use tarps to contain ceramic dust. Test will also be performed outside | Wear N-95 mask to prevent inhaling dust. | Ceramic dust can be disposed of in standard trash | HAZAR D: 3 CONSEQ : Moderate Residual: Medium | PPE must be applied before any testing can be complete. After approval by the PI, a copy must be sent to the Safety Committee. A written Project Hazard Control is required and must be approved by the PI before proceeding. A copy must be sent to the Safety Committee. A second worker must be in place before work can proceed (buddy system). Limit the number of authorized workers in the hazard area. |
| <u>Assembly of T</u> | College of Engineering | All Team Members | Pinching, Pallet lifting hazard, Potential to get cut due to sharp corners | Pallet at around 50 lbs will be lifted by 2 people | Safety glasses, closed-toe shoes, OSHA requires protective headwear if there is potential for objects to fall on the head | N/A | HAZAR D: 1 CONSEQ : Minor Residual: <u>L</u> ow | All PPE must be applied before any machine or equipment is used. Supervisor/PI must be notified before testing begins. If testing must be stopped for any reason, PPE must be reapplied before continuing. There must be more than one team member present when assembly is occurring. |
| <u>Assembly of Over Hangs</u> | <u>College of Engineering</u> | <u>All Team Members</u> | <u>Pinching, Low voltage electric shock, Potential to</u> | <u>Contain assembly in dry area. Keep the electric components</u> | <u>Safety glasses, closed-toe shoes</u> | <u>Dispose of electronic waste in</u> | <u>HAZAR D: 3 CONSEQ :Minor</u> | <u>Safety controls are planned by both the worker and supervisor.</u> |

| | | | | | | | | |
|--|--|--|--------------------------------------|-----------------------------------|--|-------------------------|--------------------------|---|
| | | | <u>get cute due to sharp corners</u> | <u>unplugged during assembly.</u> | | <u>appropriate bin.</u> | <u>Residual: Low Med</u> | <u>A second worker must be in place before work can proceed.</u> <u>Proceed with supervisor authorization.</u> |
|--|--|--|--------------------------------------|-----------------------------------|--|-------------------------|--------------------------|---|

Principal investigator(s)/ instructor PHA: I have reviewed and approved the PHA worksheet.

| <u>Name</u> | <u>Signature</u> | <u>Date</u> | <u>Name</u> | <u>Signature</u> | <u>Date</u> |
|-------------|------------------|-------------|-------------|------------------|-------------|
|-------------|------------------|-------------|-------------|------------------|-------------|

Team members: I certify that I have reviewed the PHA worksheet, am aware of the hazards, and will ensure the control measures are followed.

| <u>Name</u> | <u>Signature</u> | <u>Date</u> | <u>Name</u> | <u>Signature</u> | <u>Date</u> |
|-----------------|---|--|---------------|---|--|
| Pawel Grum | DocuSigned by:  31E4CAE04259470... | <u>02/21/2023</u> <u>11/15/2022</u> | Jared White | DocuSigned by:  EC3B8104D032498... | <u>02/21/2023</u> <u>11/15/2022</u> |
| Taylor Larson | DocuSigned by:  660F1FE53B7C409... | <u>02/21/2023</u> <u>11/15/2022</u> | Robert Kosmas | DocuSigned by:  FE03A895F4A74FA... | <u>02/21/2023</u> <u>11/15/2022</u> |
| Segundo Sanchez | DocuSigned by:  4C15FB5BAF43490... | <u>02/21/2023</u> <u>11/15/2022</u> | | | |

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DEFINITIONS:

Hazard: Any situation, object, or behavior that exists, or that can potentially cause ill health, injury, loss or property damage e.g. electricity, chemicals, biohazard materials, sharp objects, noise, wet floor, etc. OSHA defines hazards as “*any source of potential damage, harm or adverse health effects on something or someone*”. A list of hazard types and examples are provided in appendix A.

Hazard control: Hazard control refers to workplace measures to eliminate/minimize adverse health effects, injury, loss, and property damage. Hazard control practices are often categorized into following three groups (priority as listed):

- 1. Engineering control:** physical modifications to a process, equipment, or installation of a barrier into a system to minimize worker exposure to a hazard. Examples are ventilation (fume hood, biological safety cabinet), containment (glove box, sealed containers, barriers), substitution/elimination (consider less hazardous alternative materials), process controls (safety valves, gauges, temperature sensor, regulators, alarms, monitors, electrical grounding and bonding), etc.
- 2. Administrative control:** changes in work procedures to reduce exposure and mitigate hazards. Examples are reducing scale of process (micro-scale experiments), reducing time of personal exposure to process, providing training on proper techniques, writing safety policies, supervision, requesting experts to perform the task, etc.
- 3. Personal protective equipment (PPE):** equipment worn to minimize exposure to hazards. Examples are gloves, safety glasses, goggles, steel toe shoes, earplugs or muffs, hard hats, respirators, vests, full body suits, laboratory coats, etc.

Team member(s): Everyone who works on the project (i.e. grads, undergrads, postdocs, etc.). The primary contact must be listed first and provide phone number and email for contact.

Safety representative: Each laboratory is encouraged to have a safety representative, preferably a graduate student, in order to facilitate the implementation of the safety expectations in the laboratory. Duties include (but are not limited to):

- Act as a point of contact between the laboratory members and the college safety committee members.
- Ensure laboratory members are following the safety rules.
- Conduct periodic safety inspection of the laboratory.
- Schedule laboratory clean up dates with the laboratory members.
- Request for hazardous waste pick up.

Residual risk: Residual Risk Assessment Matrix are used to determine project's risk level. The hazard assessment matrix (table 1) and the residual risk assessment matrix (table2) are used to identify the residual risk category.

The instructions to use hazard assessment matrix (table 1) are listed below:

1. Define the workers familiarity level to perform the task and the complexity of the task.
2. Find the value associated with familiarity/complexity (1 – 5) and enter value next to: HAZARD on the PHA worksheet.

Table 1. Hazard assessment matrix.

| | | Complexity | | |
|-------------------|-------------------|------------|----------|-----------|
| | | Simple | Moderate | Difficult |
| Familiarity Level | Very Familiar | 1 | 2 | 3 |
| | Somewhat Familiar | 2 | 3 | 4 |
| | Unfamiliar | 3 | 4 | 5 |

The instructions to use residual risk assessment matrix (table 2) are listed below:

1. Identify the row associated with the familiarity/complexity value (1 – 5).
2. Identify the consequences and enter value next to: CONSEQ on the PHA worksheet. Consequences are determined by defining what would happen in a worst case scenario if controls fail.
 - a. Negligible: minor injury resulting in basic first aid treatment that can be provided on site.
 - b. Minor: minor injury resulting in advanced first aid treatment administered by a physician.
 - c. Moderate: injuries that require treatment above first aid but do not require hospitalization.
 - d. Significant: severe injuries requiring hospitalization.
 - e. Severe: death or permanent disability.
3. Find the residual risk value associated with assessed hazard/consequences: Low –Low Med – Med– Med High – High.
4. Enter value next to: RESIDUAL on the PHA worksheet.

Table 2. Residual risk assessment matrix.

| Assessed Hazard Level | Consequences | | | | |
|-----------------------|--------------|---------|----------|-------------|----------|
| | Negligible | Minor | Moderate | Significant | Severe |
| 5 | Low Med | Medium | Med High | High | High |
| 4 | Low | Low Med | Medium | Med High | High |
| 3 | Low | Low Med | Medium | Med High | Med High |
| 2 | Low | Low Med | Low Med | Medium | Medium |

| | | | | | |
|---|-----|-----|---------|---------|--------|
| 1 | Low | Low | Low Med | Low Med | Medium |
|---|-----|-----|---------|---------|--------|

Specific rules for each category of the residual risk:

Low:

- Safety controls are planned by both the worker and supervisor.
- Proceed with supervisor authorization.

Low Med:

- Safety controls are planned by both the worker and supervisor.
- A second worker must be in place before work can proceed (buddy system).
- Proceed with supervisor authorization.

Med:

- After approval by the PI, a copy must be sent to the Safety Committee.
- A written Project Hazard Control is required and must be approved by the PI before proceeding. A copy must be sent to the Safety Committee.
- A second worker must be in place before work can proceed (buddy system).
- Limit the number of authorized workers in the hazard area.

Med High:

- After approval by the PI, the Safety Committee and/or EHS must review and approve the completed PHA.
- A written Project Hazard Control is required and must be approved by the PI and the Safety Committee before proceeding.
- Two qualified workers must be in place before work can proceed.
- Limit the number of authorized workers in the hazard area.

High:

- The activity will not be performed. The activity must be redesigned to fall in a lower hazard category.

Appendix A: Hazard types and examples

| Types of Hazard | Example |
|-----------------------|--|
| Physical hazards | Wet floors, loose electrical cables objects protruding in walkways or doorways |
| Ergonomic hazards | Lifting heavy objects Stretching the body Twisting the body Poor desk seating |
| Psychological hazards | Heights, loud sounds, tunnels, bright lights |
| Environmental hazards | Room temperature, ventilation contaminated air, photocopiers, some office plants acids |
| Hazardous substances | Alkalis solvents |
| Biological hazards | Hepatitis B, new strain influenza |
| Radiation hazards | Electric welding flashes Sunburn |
| Chemical hazards | Effects on central nervous system, lungs, digestive system, circulatory system, skin, reproductive system. Short term (acute) effects such as burns, rashes, irritation, feeling unwell, coma and death. |

| | |
|------------------------|--|
| | Long term (chronic) effects such as mutagenic (affects cell structure), carcinogenic (cancer), teratogenic (reproductive effect), dermatitis of the skin, and occupational asthma and lung damage. |
| Noise | High levels of industrial noise will cause irritation in the short term, and industrial deafness in the long term. |
| Temperature | Personal comfort is best between temperatures of 16°C and 30°C, better between 21°C and 26°C. Working outside these temperature ranges: may lead to becoming chilled, even hypothermia (deep body cooling) in the colder temperatures, and may lead to dehydration, cramps, heat exhaustion, and hyperthermia (heat stroke) in the warmer temperatures. |
| Being struck by | This hazard could be a projectile, moving object or material. The health effect could be lacerations, bruising, breaks, eye injuries, and possibly death. |
| Crushed by | A typical example of this hazard is tractor rollover. Death is usually the result |
| Entangled by | Becoming entangled in machinery. Effects could be crushing, lacerations, bruising, breaks amputation and death. |
| High energy sources | Explosions, high pressure gases, liquids and dusts, fires, electricity and sources such as lasers can all have serious effects on the body, even death. |
| Vibration | Vibration can affect the human body in the hand arm with `white-finger' or Raynaud's Syndrome, and the whole body with motion sickness, giddiness, damage to bones and audits, blood pressure and nervous system problems. |
| Slips, trips and falls | A very common workplace hazard from tripping on floors, falling off structures or down stairs, and slipping on spills. |
| Radiation | Radiation can have serious health effects. Skin cancer, other cancers, sterility, birth deformities, blood changes, skin burns and eye damage are examples. |
| Physical | Excessive effort, poor posture and repetition can all lead to muscular pain, tendon damage and deterioration to bones and related structures |
| Psychological | Stress, anxiety, tiredness, poor concentration, headaches, back pain and heart disease can be the health effects |
| Biological | More common in the health, food and agricultural industries. Effects such as infectious disease, rashes and allergic response. |

Project Hazard Control- For Projects with Medium and Higher Risks

| Name of Project: | | Date of submission: |
|-----------------------|---------------------|--|
| Team member | Phone number | e-mail |
| Taylor Larson | 850-556-9735 | tmlarson@fsu.edu |
| Robert Kosmas | 850-512-0398 | rck19a@fsu.edu |
| Jared White | 561-768-3722 | jtw18c@fsu.edu |
| Pawel Grum | 331-431-1475 | pgrum@fsu.edu |
| Segundo Sanchez | 850-570-2138 | sas19x@fsu.edu |
| Faculty mentor | Phone number | e-mail |
| Eric Hellstrom | 850-645-7489 | hellstrom@eng.famu.fsu.edu |
| | | |

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").

Machining any metal materials could have significant risk if the proper precautions are not taken. The potential injuries include but are not limited to pinched, punctured, cut, blinded, or removal of limb. To combat these risks, eyeglasses and non-loose clothing will be worn and a second worker or "buddy" must be present for fabrication.

Any CAD that has to be done has a negligible risk. The potential injuries include but are not limited to eye strain and carpal tunnel. To combat these risks proper breaks and stretches will be followed. A timer will be used to ensure that breaks are taken at proper times.

Vibrational testing of the device has a low risk level. The potential injuries include, but are not limited to fall hazard, lifting hazard, and injury due to device motion. To combat these risks, proper lifting techniques will be used a second worker must present for all testing.

Ceramic dust testing has a moderate risk level. The potential injuries include but are not limited to breathing in ceramic dust can be harmful to the lungs. Potential damage to lungs and ability to breathe properly. To combat these risks proper masks and eye protection will be worn.

Assembly of the project device has a low risk. The potential injuries include but are not limited to pinching, pallet lifting hazard, potential to get cut due to sharp corners. To combat these risks proper assembly method will be evaluated and discussed prior to assembling parts, proper techniques will be used, and used a second worker must present for all testing.

Assembly of the overhangs has a low med risk. The potential injuries include but are not limited to pinching, small shocks, potential to get cut due to sharp corners. To combat these risks proper assembly method will be evaluated and discussed prior to assembling parts, proper techniques will be used, and parts will remain disconnected from power while building.

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

If there are any injuries, fires, or an emergency, the first step to be taken is to call 911. If there are any problems that may concern the facility, we have to contact our department representative.

- Remove the injured person from hazard location of accident if safe to do so.
- Call the appropriate authority (supervisor, FSUPD, 911, Poison Control dependent on severity and injury).
- Call emergency contact of injured person and inform them of incident.
- Shut down/close off source of injury, if possible, in a safe and controlled manner.
- Isolate scene until the responding authority arrives.
- Ensure responding authority has all necessary information on the situation and assist them however they may need.
- Call 911 for injuries, fires or other emergency situations.
- Call your department representative to report a facility concern.

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 |
|-----------------|--------------|--|--------------|
| Dana Larson | 850-556-8531 | Keith Larson | 850-410-6108 |
| Joseph Kosmas | 850-529-5993 | Keith Larson | 850-410-6108 |
| Lesley White | 561-339-1575 | Keith Larson | 850-410-6108 |
| Katarzyna Mik | 352-777-3724 | Keith Larson | 850-410-6108 |
| Edwardo Sanchez | 850-570-0985 | Keith Larson | 850-410-6108 |

Safety review signatures

| Team member | Date | Faculty mentor | Date |
|---|-------------------------|----------------|------|
| DocuSigned by: <i>Pawel Grum</i> 85E6A504259470... | 2/21/2023 4:15 PM EST | | |
| DocuSigned by: <i>Robert Kosmas</i> 85E6A504259470... | 2/21/2023 4:16 PM EST | | |
| DocuSigned by: <i>Jaylor Larson</i> 4C155B5BAF43490... | 2/21/2023 4:14 PM EST | | |
| DocuSigned by: <i>Segundo Sanchez</i> 85E6A504259470... | 2/21/2023 4:17 PM EST | | |
| DocuSigned by: <i>Jared White</i> 4C155B5BAF43490... | 2/21/2023 4:16 PM EST | | |
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Report all accidents and near misses to the faculty mentor.