

Team 18 Risk Assessment Safety Plan

Project information:

| The Centennial Calendar | | March 2, 2018 |
|-------------------------|----------------|-------------------------|
| Name of Project | | Date of submission |
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| Faculty mentor | Phone Number | e-mail |
| Dr. Dorr Campbell | (850) 410-6610 | Dorr.campbell@fam.u.edu |
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I. Project description:

Create an operational 100-year mechanical calendar that accounts for day, month, year, and leap year. The mechanism cannot use any electricity or a solar converter and is to operate with only annual maintenance.

II. Describe the steps for your project:

- 1) Acquire and create designs for display, energy system, and connecting linkages.
- 2) Acquire appropriate materials to be manufactured.
- 3) Waterjet and machine parts for the display, energy system, and connecting linkages.
- 4) Quality inspection of manufactured parts.
- 5) Assemble the subsystems into a working prototype.

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)

In step 3 when parts are to be cut in the waterjet and machined, there is always the inherent risk of materials chipping off and puncturing someone's skin, which can possibly lead to one being blinded if hit in the eye.

Moreover, sharp edges left over after cutting can be hazardous if mishandled, potentially leading to cuts and lacerations. This has a chance of occurring in both steps 3 and 4 above.

In step 5 when the prototype is to be assembled, hand tools will be utilized. This can lead to a myriad of hazardous situations if these tools are mishandled.

In any of the steps above that involve handling machinery used for manufacturing, if these devices are used by inexperienced and unknowledgeable users, inherent risks will be present that can lead to hazardous, and potentially fatal, scenarios.

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.

Online research shows that issues with waterjets don't occur often but when they do it is often fatal. Many waterjet incidents are a result of carelessness or poor maintenance. By taking ones' time and paying attention to what one is doing it would reduce the number of "close call" encounters which eventually lead into bad habits. Sharp corners from cut material also pose a threat, but an easy fix is to wear thick, mechanic gloves and avoid grabbing onto the fresh cut side of the material. Hand tools are an additional hazard to take note of because of their pointy surfaces and possible rust or oxidation of the metal. If one has an open sore and chooses to use rusty hand tools, they could contract tetanus. Purchasing new gloves and new, quality tools would solve the issue.

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).

Personal protective equipment (PPE) such as protective eyewear and long sleeves will reduce the risk inherent in the usage of a waterjet by providing a shield to potentially dangerous debris expelled from cutting of materials.

Gloves should be worn to prevent the sharp edges formed by cutting the material from potentially cutting the skin of the user.

By examining the warnings and implementing proper usage of any machinery or hand tools used and using any PPE recommended for each tool injuries can be mitigated.

Engineering controls such as an enclosure around the waterjet remove hazards associated with debris before they come in contact with the user.

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”).

- 1) Acquire and create designs for display, energy system, and connecting linkages.
- 2) Acquire appropriate materials to be manufactured.
- 3) Waterjet and machine parts for the display, energy system, and connecting linkages.
Send part files to a professional waterjet operator and machinist to get the parts safely manufactured.
- 4) Quality inspection of manufactured parts.
Wear necessary PPE, such as eye protection, gloves, and read equipment safety instructions when adjusting parts.
- 5) Assemble the subsystems into a working prototype while utilizing appropriate PPE.

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

In the event of a cut or laceration, the device in use should be cut off to prevent further injuries. Then the cut should be cleaned wrapped, and bandaged properly, preferably by one with first-aid experience. The shop manager should be notified of the injury that occurred. If the cut is deep enough to require stitches, 911 may be called as further medical attention will be needed.

If a foreign object is embedded in one's eye, the device in use should be cut off to prevent further injuries. The individual should then wash their hands and attempt to flush the object out of their eye. The shop manager should then be notified of the injury that occurred. If the foreign object is embedded too deeply to flush out, 911 should be called and no further action should be taken until medical professionals arrive to assist.

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 |
|---------------------|----------------|--|--------------|
| Dr. Shayne McConomy | (850) 410-6624 | Smcconomy@eng.famu.fsu.edu | |
| Dr. Dorr Campbell | (850) 410-6610 | Dorr.campbell@famu.edu | |
| Robert Parsons | | | |

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 |
|-------------------------|----------|----------------|------|
| Zachary W. Brower | 3/1/2018 | | |
| Michael S. Patrick | 3/1/2018 | | |
| Alyna B. Segura-Sanchez | 3/1/2018 | | |
| Jacob W. Williams | 3/1/2018 | | |
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Report all accidents and near misses to faculty mentor.