**Risk Assessment**

**Safety Plan**

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| Project information: | | | | | | |
| Convertible High Heel Shoe | | | | |  | 3/2/2018 |
| Name of Project | | | | |  | Date of submission |
| Team Member |  | Phone Number |  | e-mail | | |
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| I. Project description: | | | | | | |
| The goal of this project is to design a shoe mechanism that can transition a high heel from an elevated state to a flat state. After a | | | | | | |
| extended periods of time, high heel shoes cause stress on the wearer's feet. This stress can lead to both long-term and | | | | | | |
| short-term medical conditions such as osteoarthritis, Morton's neuroma, and hammer toes. There are methods for reducing high | | | | | | |
| heel foot stress including: toe taping and use of gel inserts. Unfortunately, neither of these methods lessen the main cause of this | | | | | | |
| stress: forefront foot pressure. A convertible shoe will ease this pressure by transitioning to a flat state while still giving wearers | | | | | | |
| the choice of a more stressed, fashionable state. This method allows for a balance between fashion and comfort. Through | | | | | | |
| market research, we discovered that current convertible heels are not economically successful because of their high costs and | | | | | | |
| an affordable, fashionable, and convenient choice. Current competitors on the market use detachable heels making the shoes | | | | | | |
| inconvenient to the wearer. The team was inspired to create an option for women where no extra parts are needed. The team's | | | | | | |
| convertible shoe has a fixed heel that folds up into the sole of the shoe when wearers want to switch states. A flexible material is | | | | | | |
| also used at the front arch to account for the foot's change in angle during the different states. The team has currently developed | | | | | | |
| a 3-D printed prototype and is working to refine the design to create a wearable alternative. | | | | | | |
| 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) | | | | | | |
| Possible accidents that may occur include: | | | | | | |
| -Injury from the 3-D printer could occur during part printing. Injury includes severe burns | | | | | | |
| -Injury could occur during prototype testing if material used does not support the load of the testing subject. If the material | | | | | | |
| has a malformation this could also lead to a failure. Injuries from this accident include: broken bones, torn muscles, | | | | | | |
| concussions, and sprains. | | | | | | |
| If prototype testing does not occur in a clear area the user could fall and injure themselves. Possible injuries include: | | | | | | |
| broken bones, torn muscles, concussions, and sprains. | | | | | | |
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| 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. | | | | | | |
| Accidents that have occurred using polyurethane includes skin Irritation, lung infection and breathing problems. A way to avoid | | | | | | |
| this type of accident is to allow proper ventilation in the working environment so as that polyurethane fumes will properly be | | | | | | |
| displaced by oxygen. Polyurethane fumigation can be a way of avoiding such risks. Gas masks will also be worn to avoid | | | | | | |
| inhaling of polyurethane fumes | | | | | | |
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| 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). | | | | | | |
| Gas masks will be worn when working with polyurethane to avoid inhaling of poisonous gases. During prototype testing, we | | | | | | |
| will ensure the wearer has enough support from the ground to avoid body injuries. Torsional springs will be securely fitted to avoid | | | | | | |
| collapsing of the heel while walking. Wearer will test shoe in a clear space. | | | | | | |
| will ensure the wearer has enough support from the ground to avoid body injuries. Torsional springs will be securely fitted to avoid | | | | | | |
| Col  lapsing of the heel while walking. Wearer will test shoe in a clear space. | | | | | | |
| **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”).** | | | | | | |
| Carefully design the model to details and upload to the printer: | | | | | | |
| * Preheat the nozzle and gently apply topical adhesive. Begin printing model. | | | | | | |
| * After the model has printed: gently remove the model and use sander to sand rough edges off printed object. | | | | | | |
| * In order to avoid broken bones, torn muscles, concussions, and sprains: | | | | | | |
| Polish the gently assemble parts together after sanding. | | | | | | |
| Apply epoxy with protected hands onto the upper sole of the shoe. | | | | | | |
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| **VII. Thinking about the accidents that have occurred or that you have identified as a risk, describe emergency response procedures to use.** | | | | | | |
| The procedures for emergency responses will depend on the severity the accident. If when doing prototyping, a group member or | | | | | | |
| sustain an injury that requires immediate emergency treatment, the injured member will be taken to the emergency room and his | | | | | | |
| supervisor will be contacted after dialing 911. If the injury does not require immediate emergency assistance, the injured | | | | | | |
| member will report himself to his supervisor who will help to call AmeriSys. Lastly, if the injury sustained by the injured requires | | | | | | |
| no medical attention, then the injured will contact his supervisor to inform him about the injury. In the both severe and | | | | | | |
| mild cases, the FAMU-FSU Department of Mechanical Engineering should be alerted. | | | | | | |
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| 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 |
| FAMU-FSU Department of ME |  | (850) 410-6345 |  | Dr. S. McConomy |  | (850) 410-6624 |
| FSU Police Department |  | (850) 644-1234 |  | Dr. M. Devine |  | (850) 410-6378 |
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| 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 |
| Kali Nelson |  | 03/01/18 |  | Dr. Mcconomy |  |  |
| Dalton Brown |  | 03/01/18 |  | Dr. Hruda |  |  |
| Oladipo Jegede |  | 03/01/18 |  | Dr. Devine |  |  |
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**Report all accidents and near misses to faculty mentor.**