

Risk Assessment Safety Plan

I. Project information:

Revision of Lockheed Martin's Human Type Target System for Manufacturability		1/17/17
Name of Project		Date of submission
Team Member	Phone Number	e-mail
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Faculty mentor	Phone Number	e-mail
Patrick Hollis	850-410-6319	hollis@eng.fsu.edu

II. Project description:

Lockheed Martin desires to move forward with a design for a Human Type Target (HTT) System, utilizing a commercially available mannequin and ensuring that it falls appropriately when hit. In order to bring this product to market, Team # 7 has been tasked with designing and preparing the interfacing components and stand for manufacturing as well as enhance the mobility of the target. The team needs to prepare these components for manufacturing, ensuring their durability as well as keeping their mass production costs below the given values. Finally, Team # 7 needs to test the device under the various conditions, including gunfire, to determine the suitability of the device to meet these needs and requirements.

II. Describe steps from project initiation to completion:

1. Contact Sponsor: Identify need, coordinate prototype shipment.
2. Obtain Prototype: Test and identify issues with current solution.
3. Background Research: Similar products, how to make mobile, potential materials, injection molding standards.
4. Brainstorming: Ideation for stand and interface plate, analysis of alternative designs, design selection
5. Prototype Solution: Create detailed designs for the stand, interface plate, and 2x4 adapter. Order parts and assemble.
6. Test Prototype: Analyze stand, interface plate, 2x4 adapter and overall product durability.

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)

During step 2 there was potential for injury removing the existing prototype from the shipping box. It was heavy and an awkward shape to hold. There were also several exposed screws that protruded through the back of the wood. The wood can also splinter and cut your hands.

During step 5 there could be injury due to the assembly of the components necessary to construct Team 7's prototype. There will be several parts that need to be headed and then inserted into plastic; this will be done with a soldering iron. The heated component as well as the soldering iron itself may pose potential safety hazards. Furthermore, there are several components that need to be fastened using screws and pinching or pricking fingers is always a risk. Other than that, some of the components Team 7 will be receiving may be heavy and difficult to carry. This can pose threats such as muscle strain and injury if an item is dropped. A table saw and drill will also be used during the assembly process and power tools always pose potential threats.

Step 6 is potentially the most risk prone step of Team 7's process. This is the stage where the prototype will be tested. This product is supposed to be capable of withstanding lethal blows from military grade ammunition. With this in mind, Team 7 will induce high impact blows to simulate the ammunition impact. The prototype will also be dropped numerous times to identify problem areas and weakness. There may be several components that have sharp edges as they become damaged and Team 7 will have to be cautious of this.

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.

For step 2, our research found that Personal Protective Equipment (PPE) is the best way to avoid injury. This includes the use of proper gloves, shoes and clothing as well as keeping a watchful eye for anything else Team 7 may not foresee.

For step 5, appropriate PPE should be used. In this step, proper PPE would include safety glasses, gloves, ear protection, proper ventilation or mask for soldering iron. Partners should also be used for moving heavy equipment or holding parts in place during assembly. If necessary, Team 7 will consult with faculty advisor about parts of the project they may not be comfortable completing on their own.

For step 6, appropriate PPE should be used. The appropriate PPE here includes safety glasses, ear protection, gloves, closed toes shoes, long sleeve shirts and pant. Similar experiments have proven small fragments of the prototype may break off and become a projectile. These measures will hopefully mitigate the risk of injury.

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).

For heavy objects that need to be moved, Team 7 members will ask for help from another teammate or use proper equipment to help prevent injury or unnecessary strain on their bodies.

For when dealing with wood or other components that may have sharp or pointed edges the use of proper safety gloves will be enforced.

When assembling the prototype, Team 7 members will work together to hold components in place and continually check to be sure each member is being safe.

Respiratory protection will be needed while using the soldering iron. The fumes can be damaging so proper ventilation, safety masks and goggles will be used.

While using the saw and drill, PPE will be required and Team members will need to be aware of their body position, technique and hand placement. Injury from power tools can be serious and Team 7 will focus highly on these risks.

For shards and components that break off during testing or assembly, Team 7 will wear PPE such as gloves, goggles, long sleeves and pants. Team 7 will be sure to clean the work area after each test to ensure no left over parts pose a risk.

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. Contact Sponsor: Identify need, coordinate prototype shipment – No safety measures needed.

2. Obtain Prototype: Test and identify issues with current solution – Proper PPE as discussed above will be used at all times while working with the current Lockheed Martin Prototype.

3. Background Research: Similar products, how to make mobile, potential materials, injection molding standards – No safety measures needed.

4. Brainstorming: Ideation for stand and interface plate, analysis of alternative designs, design selection – No safety measures needed.

5. Prototype Solution: Create detailed designs for the stand, interface plate, and 2x4 adapter. Order parts and assemble – As discussed above there are several pieces of safety equipment that Team 7 needs to acquire prior to assembling their prototype. Team 7 will be sure to wear all needed protective equipment at all times. Each group member will also be responsible for checking on the safety of the other group members while working together.

6. Test Prototype: Analyze stand, interface plate, 2x4 adapter and overall product durability – This step requires a lot of safety measures to be enforced. Team 7 will need to find an appropriate testing location where other students will not be at risk from any components of the device that break off. All of Team 7's members will also need to wear the appropriate PPE for the task they are performing. Not all members need to be present for every test, but no team member should perform a test alone. As components become damaged team 7 will be careful to avoid sharp edges and properly dispose of anything that may be harmful to the team or the other students in the class.

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

1. Identify severity of the issue.

2. Identify appropriate response team.

3. Contact appropriate response team. For less severe incidents, this may just include faculty advisor, teacher and sponsor. For more serious incidents 911 and the appropriate response team may be contacted.

4. Reflect as a team on the issue and how it can be prevented in future exercises.

5. Enforce new measures.

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
Theresa Kozell	561-676-9696	Patrick Hollis	850-410-6319
Karen Williams	561-301-4492		

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.