

Fox Enterprises

Job Safety Analysis

Fox Enterprises team members are expected to stay safe at all times and to care for the safety of themselves and those around them. The following tasks are organized with relevant precautions and controls to ensure safety when carrying them out. If for some reason, an injury does occur, the JSA will be updated, and the Injury Action Table can be used to react to the situation. Team member Ian Palk is also CPR and Wilderness First Aid certified should any help be required in the event of injury.

| <u>Task</u> | <u>Hazards Posed due to Incorrect Handling</u> | <u>Precautions and Controls</u> |
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| <p>1. Using Power Tools</p> <p>1a. Using soldering iron or heat gun</p> | <p>1. Physical hazard, chemical hazard</p> <p>1a. May result in minor to severe burns and fires. Solder smoke or smoke from burned plastic may cause irritation, breathing problems, or sickness.</p> | <p>1. General:</p> <ul style="list-style-type: none"> - Wear protective glasses and work under the supervision of a mentor. - Keep hands clear of the tool's end. - Make sure those around the person operating a power tool know that the tool is being used. - In the event of an emergency warning or alert, yell "Stop". - In the event of injury, yell "Help" or "Ow" and make sure that you or someone nearby has properly turned off the power tools and placed them in a safe place. <p>1a.</p> <ul style="list-style-type: none"> - Work in a well-ventilated area (preferably outside). - Wear an air mask. - Do not work near flammable materials. - Be sure to use a solder-hand or another person to hold what is being worked on. - When not using tool, place tool in its stand, or if it has no stand, place it on a clear non-flammable surface. - Do not aim heat gun at yourself or others. - Do not hold heat gun on objects excessively, and turn off heat gun immediately if the |

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| <p>1b. Electric Motors (i.e. electric drills, saws, etc.)</p> | <p>1b. May result in cuts, bruises, etc. Moving parts and blades pose potential hazards.</p> | <p>object begins smoking.</p> <ul style="list-style-type: none"> - Allow the tool to cool before storing in a safe space. <p>1b.</p> <ul style="list-style-type: none"> - Clear waste after use. - Use tools appropriate to their needs (metal saw for metal, wood saw for wood). - Be aware of hand placement when holding objects being worked on. |
| <p>2. ROV Testing + Assembling</p> <p>2a. Watertight Enclosure</p> <p>2b. Wiring</p> <p>2c. Testing + Assembling Electronics</p> | <p>2. Physical hazard</p> <p>2a. Incomplete waterproofing may result in electrical shorts or electric shocks in water or on land when testing</p> <p>2b. Incorrect wiring may result in electric shocks or electrical shorts. Too much power supply or exposed wiring will also result in electrical shocks.</p> <p>2c. Physical injury to team members working on the robot may occur if electronics are tested or assembled hastily and carelessly. An</p> | <p>2.</p> <p>2a.</p> <ul style="list-style-type: none"> - Use a leak sensor in the enclosure to ensure electrical shut-down in the event of a leak. - Grease and re-grease endcaps of the enclosure each time it is sealed. - All electrical connections within the enclosure must be encased in heat shrink or some other form of covering. - Cover all electrical connections and exposed wires. <p>2b.</p> <ul style="list-style-type: none"> - Make sure an appropriate fuse is attached to the main positive power of the ROV to prevent surges. - Replace fuse immediately if it blows. - Cover any exposed wiring. - Plan out wiring before connecting it. - Double-check that wiring is correct and follows SID and any circuit diagrams that have been planned out before connecting to power. <p>2c.</p> <ul style="list-style-type: none"> - Turn off ROV and never connect to power when working on the ROV electronics. - Make sure electronics run in well-ventilated areas to prevent overheating, which can result in a minor burn if the electronic is |

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| | electric shock or minor burns may occur due to carelessness. | touched. |
| 3. ROV Handling 3a. Sharp Edges 3b. Transporting ROV | 3. Physical hazard 3a. Sharp edges may cause cuts and scratches when working on the ROV if not properly concealed. 3b. Incorrect handling of ROV may cause dropping it, falling, etc. | 3. 3a. <ul style="list-style-type: none"> - File down edges of metal, PVC, acrylic, etc.. - Tape down any loose parts. - Cover any points on the robot. 3b. <ul style="list-style-type: none"> - When carrying ROV, make sure multiple people help carry the weight. - Do not carry the ROV if you are incapable of doing so easily. - Do not carry ROV for long periods of time or with unwieldy hand-placement. - Use ROV stand to place it down. |
| 4. 3D Printing 4a. Cleaning extruder 4b. Removing prints from heat bed | 4. Physical hazard 4a. The 3D printer's extruder heats up to high temperatures, and may cause burns. 4b. The heat bed heats up to high temperatures, and may cause burns. | 4. 4a. <ul style="list-style-type: none"> - Make sure 3D printer is off. - Make sure 3D printer has cooled off since last use by checking the temperature of the extruder on the display. - Only touch extruder if it is cool and the printer is off. 4b. <ul style="list-style-type: none"> - Make sure 3D printer is off. - Make sure 3D printer has cooled off since last use by checking the temperature of the heat bed on the display. - Remove magnetic plate of heat bed. - Lightly bend plate back and forth until print pops off. |

In the case of injury, refer to the following Injury Action Table:

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| <u>Injury</u> *In all cases, consult a professional if necessary | <u>Immediate Action</u> *Minor injuries may be treated with laboratory medical kit |
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| | *After an injury occurs, update the JSA to better protect against future injury |
| Burn: | <ul style="list-style-type: none"> - Cool the burn with lightly running water and cold compresses - Protect the burned skin - Apply the burn gel found in the medical kit to the affected area(s) |
| Smoke inhalation: | <ul style="list-style-type: none"> - Find fresh air - Sit down - Drink water |
| Eye irritation from smoke: | <ul style="list-style-type: none"> - Move away from smoke source - Use emergency eyewash |
| Cut: | <ul style="list-style-type: none"> - Apply pressure to wound to stop bleeding - Clean the affected area with alcohol - Bandage if necessary |
| Material piercing skin: (eg. metal stuck in flesh) | <ul style="list-style-type: none"> - If the injury is minor, like a splinter, use tweezers to remove the splinter - In the case of any large pieces of shrapnel caught in skin or flesh, DO NOT pull the material out, but consult a hospital. Wrap bandages around the object and otherwise prevent it from moving. Pulling the object out may result in more injury if done without professional help. |
| Electric shock: | <ul style="list-style-type: none"> - Most electric shock should be minor, due to supplies used, and will cause no lasting damage, consult a professional otherwise |
| Other: | <ul style="list-style-type: none"> - Consult a professional or use the medical kit. - Update the JSA to include this new injury |