Job Hazard Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **University of Washington:** UW Seattle | | **Department:** Aeronautics and Astronautics | | |
| **Activity or Process:** Soldering iron | | **Building/Room:** AERB 117 | | |
| **Job Title:** Student Researcher | | **Supervisor:** Christopher Lum, Ph.D | | |
| **Prepared By:** Nicholas Price | | **Date: 1/16/2019** | | |
| ***This document is the certification of hazard assessment for PPE for the workplace.*** | | | | |
| **TASKS/STEPS** | **HAZARDS** | **CONTROLS (SAFEGUARDS)** | | **PHOTO** |
| 1 Soldering iron turned on   1. Plug soldering iron into timed wall outlet. 2. Set temperature dial to temperature recommended by solder’s documentation. Be careful of the two temperature scales, one is in Celsius, the other in Fahrenheit. 3. Flip power switch on the side of the temperature control box. Flip off when finished, and unplug from the wall. | * Heated element: Temperature can exceed 500 deg. Fahrenheit contact with skin will cause severe burns, potentially cause fire if left on a combustible material. | * PPE- gloves * Iron never left unattended, leave in purpose-built iron holder if the iron needs to be put down but not put down. * Keep flammable materials clear of work area * Have a designated, organized workspace * Hold materials to be heated with tweezers or clamps * Use soldering iron stand when not in use * Keep cleaning sponge wet when in use * Keep other researchers clear of station while soldering * Use only iron temperature specified by solder. * Use the timed wall outlet attachment to plug the soldering iron into. Set timer for “30 min” setting. This will ensure power is cut to the soldering iron after 30 minutes if the researcher forgets to power off. | | The lab’s soldering iron in AERB 117, note the cleaning sponge, temperature control dial, and iron holder. |
| 2 Hot iron applied to solder and other materials | * Fumes: From rosin core or lead based solders can be toxic. Lead is the larger concern of the two. * Low risk of asthma development: Stems from fumes of the rosin-core solder. | * Fume extractor: A good fume extractor is an acceptable substitute for not using rosin-free solder. Rosin-free solder is still uncommon, and difficult to procure. * Well ventilated space * Use lead-free solders * PPE- safety glasses * Wash hands after use * Check solder documentation for any specific health risks. | | The Lab’s fume extractor in AERB 117. |
| 3 Soldering LiPo Battery Connectors | * Electrical Shock: Often caused by completing a circuit across both wire leads to the LiPo battery pack. This could be caused by skin contact, jewelry, or other wire/metal being used by the researcher. Beware, as shown in the photo to the right, the current pushed through a short circuited LiPo can be sufficient to almost immediately fuse the wires to a ring worn on a finger, making it doubly difficult to remove quickly. * Severe burns: Burns can result from short circuits, the soldering iron, or, more commonly, the XT60 connector. In the course of soldering the wires to the connector, prolonged heat can be required, heating even the plastic connector enough to burn. * Fire: Can result from a overheated, short circuited battery. See LiPo Handling JHA for further details. | * Remove rings, necklaces, other jewelry to avoid accidental short circuit. * ABC Fire Extinguisher * Only work on one exposed battery wire at a time. Wrap exposed wire in electrical tape or heat shrink when not being worked on. * Use indirect methods to handle connectors that are hot after soldering. Clamps or tweezers. * First Aid Kit * Wear the electrostatic grounding wristband at the soldering station. | | A LiPo short circuited across a ring worn on a “finger”. |
| 4 Soldering inside a S-UAV | * Severe burns: Working in close quarters, with both hands and soldering iron in the aircraft, it can be easy to accidentally burn yourself with the soldering iron. * Electrical shock: Most UAVs in our lab have an interior cramped with wires to batteries, switches, controllers, sensors, etc. If a battery is accidentally left in the aircraft, and there are instances of poor or partial electrical work inside, shocks could occur from exposed wire. | * Aircraft disconnected from power/battery pack removed from aircraft. * Never rest the soldering iron anywhere but its dedicated stand. * Be careful not to place hand in aircraft with the iron, use tweezers, clamps anywhere possible. * PPE – Gloves, safety glasses * Wear the electrostatic grounding wristband, this generally protects the electronics you’re working on more than you, but it’s a good control all the same. * Use electrical tape to temporarily cover exposed wires, use heat shrink to permanently cover wire. | | The electrostatic grounding wristband in AERB 117. |
| **Required Training** | | **Required PPE** | | |
| Electrical Safety Basic, UW EH&S Online Training  Fire Extinguisher, UW EH&S Online Training  Click to add required training.  Click to add required training. | | Safety glasses  Electrostatic Grounding Wristband  Gloves  Click to add hearing protection.  Click to add respiratory protection. | | |
| ***I have read and understand the contents of the job hazard analysis and the controls required to mitigate the risks from the idenitified hazards*** | | | | |
| **Name** | | | **Date** | |
| Josh Lee | | | 3/11/2019 | |
| Rostyk Svitelskyi | | | 3/14/2019 | |
| Helen Kuni | | | 3/15/2019 | |
| Mozes Jacobs | | | 3/30/2019 | |
| Alyssa Mell | | | 3/31/2019 | |
| Cooner | | | 4/30/2019 | |
| Wasif Siddique | | | **5/10/2019** | |
| Eli Sitchin | | | **6/17/2019** | |
| Liam Mortell | | | **6/25/2019** | |
| Chris Hayner | | | **6/25/2019** | |
| Parker Mayhew | | | **6/27/2019** | |
| Rori Fortmann | | | **6/28/2019** | |
| Zech Latimer | | | **7/1/2019** | |
| Howard Peng | | | **7/8/2019** | |
| Echo Liu | | | **10/25/2019** | |