Appendix A: Environmental Impact Report

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## A. Materials Contained in Design

ALUMINUM EXTRUSIONS

The aluminum extrusion used for a majority of the robot hull is composed of extruded 6105-T5 aluminum. There are numerous recycling plants in Milwaukee which all buy scrap aluminum extrusions. Throughout the robot’s construction and after the robot’s life has ended all aluminum hull components will be salvaged.

TRACE METALS/ELEMENTS

Components used in the electrical design contain copper, silver, tungsten and silica. Electrical components should be recycled for reuse. These contained elements are not harmful to the environment.

LEAD

This element poses an environmental impact to water supplies and ecosystems. Organisms can be killed due to improper disposal of lead. Two different components of the system contain lead. The first component is lead acid batteries used to power the robot. These lead acid batteries must be recycled properly to reclaim the dangerous lead. The second component with lead is the solder used in the electrical connections. Components are connected together by a lead based solder. See the data sheets attached at the end of this appendix for material safety.

## B. Materials Contained in Prototype

The materials contained in the prototype are identical to the materials in the design. The prototype and the final design are the same robot. See section A for the full list of materials.

## C. Special Handling Instructions

The robot is intended for educational and demonstration purposes, primarily in classroom settings, and therefore is designed to be transported to various locations in the Milwaukee area. While the intent was to keep the robot fairly portable, given the size and weight of the robot, as well as necessary components, such as the air compressor, it is ideal to utilize a cart when transporting the robot long distances, to reduce the possibility of damage to components in case of drops. Given that many components of the robot will rely on electricity, settings where the robot may come into direct contact with water, such as in rain, are to be avoided.

Before operating the robot, all systems must be confirmed to be functioning correctly. The robot should also be placed in an open area free of unintentional obstacles, including people, to minimize the likelihood of personal injury or damage to the robot’s components. Being a user controlled robot, it is up to the users and observers to be vigilant in removing and avoiding obstacles when the robot is operated. Special care should be taken in being aware of the high pressure line running from the air compressor to the robot’s onboard system, as it may be a tripping hazard, and to make sure it is not tangled during operation.

In the event of malfunction in the robot, there will be a stop button located on the robot to stop running operations in the robot and cause it to enter a stable position and an emergency stop located on the robot stopping all operations in the robot. In cases that the microcontroller is not malfunctioning, but other systems in the robot are, the stop button located on the robot should be utilized, however if the microcontroller is not accessible due to the malfunction, the emergency stop located on the robot should be utilized to stop all power flow to the robot’s systems.

## D. Special Storage Instructions

The robot has been designed to be stored with few special considerations, as the metal parts are non-corrosive, however should be stored in a clean, dry, moderate-temperature environment when not in use. To avoid possible personal injury or damage to the robot and its components, it is advised that when in storage, the robot is stored below head level when in a shelving unit, or on level ground if possible.

## E. Disposal Instructions

All metal components should be recycled for reuse. All electrical components should be recycled as well. However, particular care of the lead acid batteries should be taken. Lead acid batteries must be recycled to reclaim the lead contained within.