Team 2374

Cart Conundrum Design Challenge

22 October 2011

Our primary concern with the cart we designed was usability. We wanted our cart to function as a vehicle to transport our robot, and little else. To this end, we refrained from adding extraneous amenities and instead focused on providing a repair platform and making it easy to transport our robot to and from the pit area. Though this resulted in a minimalist design, we believe that it will ultimately result in a superior cart.

Our cart fulfills its purpose as a repair platform in two ways. First, the robot is placed in a fairly open area. In its normal configuration, it can easily be accessed from three sides, allowing multiple people to work on the robot. However, there are situations where it is advantageous to access all four sides of the robot. We decided to add this capability by allowing the cart’s handle to slide off. The second way in which our cart fulfills this goal is through the addition of tool drawers. These drawers provide room for the most essential tools to fix our robot in competition. In addition, they make it easier to transport essential tools and spare parts to the field if our team is part of an alliance in the finals.

The cart is also designed to make transporting our robot simple and painless. This past year, we tried two different wheel configurations with our current four wheel cart. One with fixed casters by the handle and rotating ones at the opposite end and another with that caster orientation reversed. We realized that neither of these configurations is ideal, so we decided to use six wheels instead of four. Unlike the four wheel configuration with fixed casters near the handle, it gives the driver leverage for executing turns. It also provides the benefit of placing the cart’s center of rotation at its center, allowing the driver to easily maneuver through the chaos of the competition pit area. Our six inch diameter wheels also provide the benefit of being able to roll over any obstacle in our carts path, such as cable protection strips or elevation changes. Finally, we made travelling to our matches easier for our drivers by adding a shelf for our operator interface. By removing the need to carry this often unwieldy package for our robot controls, the drivers can focus on clearing a safe path for our robot as they travel to matches.