Programming and Control System for Digimechanical Formwork
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Poster Summary

The Team’s poster encompasses many aspects of our product design process. Before delving into this process, the challenge of designing a way of moving a series of cartridges is presented. The key components of the continuous design cycle that the Team utilized to accomplish this goal is represented with various pictures that are associated with each component.

The first key component of this cycle is brainstorming. This component consisted of researching different motor types, power sources, electronics and mounting techniques. Also, brainstorming involved determining setup configurations of the essential components in the cartridge, various mounting techniques and the cartridge’s structural soundness. The design portion of the cycle consisted of implementing aluminum sheet metal for reinforcement against the torque of the motor, the inclusion of a router for wireless control, creating compatibility between the motor output and the gearbox and mounting the keyed output shaft for a solid mated connection. After laying out the design of the system and determining the requirements of it, the essential components are selected and purchased. These components include a Bosch automotive window motor, gearbox, spike relay, control module, wireless router, power distributor, 2Can module, circuit breaker and 12 volt battery power source. Installing these components and testing their interactions with each other is the next step in the cycle. In this part of the process, the Team modified a window motor to provide input for the gearbox, designed a mating system between the window motor and the gearbox and programmed the software to control the hardware. Finally, the redesign component provides insight as to where the future of this product will go. These ideas hint at using renewable energy sources to power the motor, making the cartridge out of material that is lighter and recycled, implementing more dynamic software, designing stacking and walking functionality and making this process fully autonomous. By following this product design cycle, the Team proved successful in creating a way of moving a cartridge wirelessly.