

BREAK: MCDS Production Table and Workstation Improvement

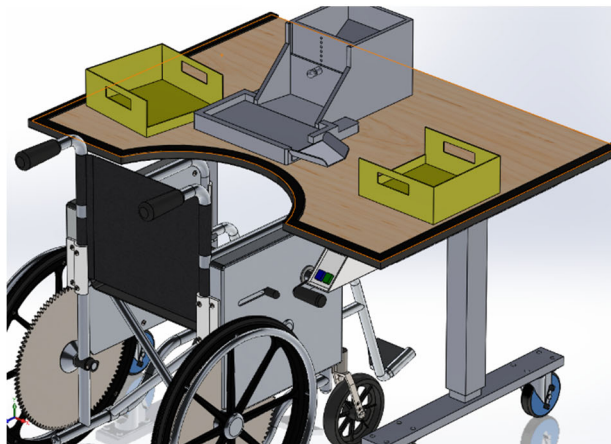
Multi Community Diversified Services, Inc. (MCDS), located in McPherson, KS, serves approximately 130 individuals with disabilities. The goal of MCDS is to provide as many employment opportunities as possible in an effort to give everyone the highest level of independence as possible. The work tables that the clients are using at the MCDS facility are not conducive to wheelchairs and create multiple barriers for productive work. Parts are often dropped and the edges of the tables often bruise the clients. It is difficult for the clients to reach and gather the parts needed. It is not ergonomically sound for the clients to move heavy objects and creates issues for the individuals who only have use of one arm, who have limited range of motion, etc..

This project was brought to the Biomechanical Rehabilitation Engineering Advancement of Kansas (BREAK) and assigned to a senior design project team. The goal of this project is to create a table(s) that will allow the clients to have full range of motion and work in a safe, productive environment. A major barrier for a productive environment is the inability to open bags, the dropping of parts, accuracy in counting, and remembering the sequence of the pieces. The scope of this project has been focused on those barriers. The team set out to create a functioning table that can move up and down to allow for varying heights for wheelchairs, a better organizational system, a table top design that will allow for easier counting parts and maintaining a smooth sequence of events, and to create an edge on the table top that will prevent the dropping of parts.

Overview of the Designed System Features

An ergonomically designed individual workstations for disabled individuals that includes:

- An adjustable table base for individual clients
- Gravity fed bins to help with organization
- Well defined system process flow
- Workstations consisting of adjustable base and feeder system
- Cushioned safety lining around the edges of the tables

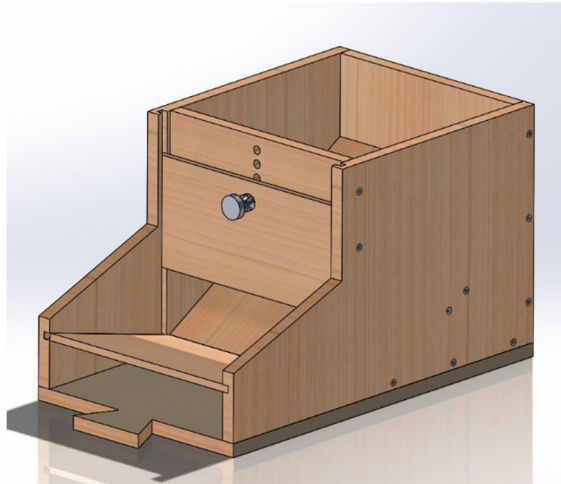


Computer-Aided Design Workstation Rendering

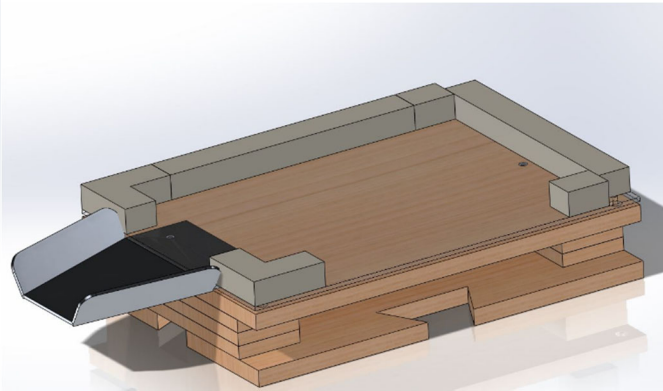


Example of Final Workstations

The key parts to the system are the adjustable-height “wrap around” table top that allows the worker to be closer to the work station, reduce their reach and effort. The bins and counting trays are also designed for efficiency. The bins have an adjustable height opening, to accommodate different types of parts (e.g. bolts versus washers). They integrate directly with and lock into the sorting tray



Gravity-Fed Parts Bin



Sorting tray with bagging shoot.

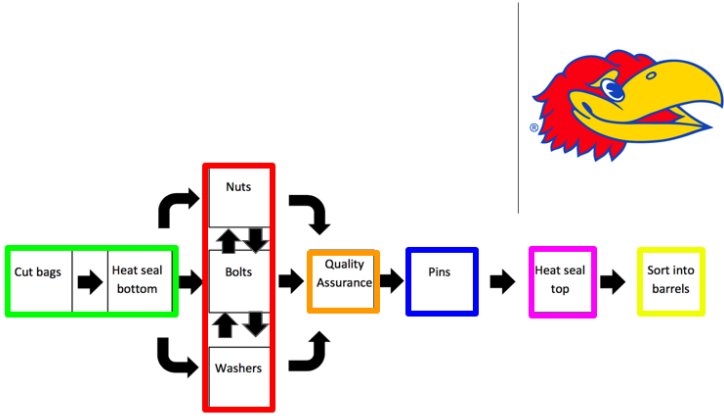
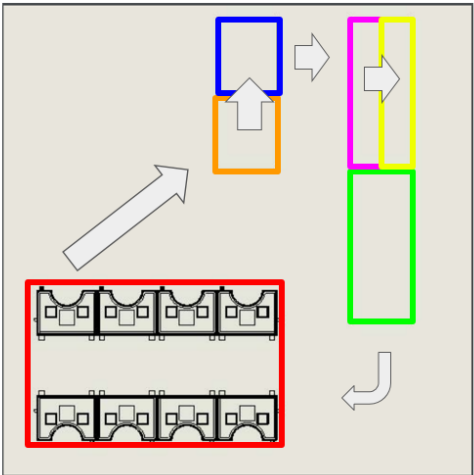
The gravity feed bins mean that the workers no longer have to reach over the sides and into a box to get parts. The storing trays have a plexiglass cover, so that different part counting layout sheets can be placed underneath. The shoot allows easy bagging of the counted parts (see Final Workstation image). All these changes improve the ease and efficiency of the process for workers with disabilities.

The students also designed a new fulfillment flow layout to make the overall process flow more efficient and easier for those supplying parts to the bagging stations. The cut and sealed bags go to the bagging station. The aisle between the bagging stations allows easy distribution of bags and parts to the bagging stations and easy pick-up of finished products. Those then move through a more streamlined process of quality assurance, adding the pins (additional parts), heat sealing and then sorting into the appropriate containers for shipment. In the end, six workstations were constructed and delivered to MCDS to facilitate more ergonomic and efficient work in the facility.



Example Custom table at MCDS with three students in the Background.

Process Flow



The redesigned overall process flow on the facility floor (shaded region) and as a linear flow.