

Horse Arena Water Sprayer

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Extended Abstract

Problem: This project addresses a problem at the Tri-State Therapeutic Riding Center in Cleveland, TN where dust accumulates in their horse arena during therapy sessions. This creates an uncomfortable and dangerous work and therapy environment.

Background: Tri-State Therapeutic Riding Center offers a physical therapy service to children with disabilities of all types. The children attend therapy sessions that incorporate horseback riding to work out muscles in their body that otherwise would not get any exercise. The distractions of horses, along with playing games such as catch, allow these children to take full advantage of therapy without it feeling like work. A few minutes into the therapeutic sessions, dust becomes an issue causing extreme irritation. Tri-State Therapeutic Riding Center tries to combat the dust using a traditional sprinkler that is manually moved every 15 minutes, but this process is ineffective and difficult to manage.

Procedure: The team began by touring the facility to get a deep understanding of the problem. The objectives functions and constraints of the project were created and then the brainstorming process began. We came up with 6 potential designs and to narrowed them down using a pairwise comparison. The Dust Buster was chosen and the build process began. Rough sketches were made to illustrate modifications to the Dust Buster until it met all of the clients needs and objectives without violating constraints. Once the Dust Buster was built the team took it to the Horse Arena for further testing. All issues we encountered after testing were then fixed and the device performed to the standards of Tri-State Therapeutic Riding center.

Results: The Dust Buster is a mobile sprinkler tailored to the needs of Tri-State Therapeutic Riding Center. It has a "T" style frame with 3 off road casters to enhance mobility and balance. On the bottom side of the frame there is a network of PVC plumbing equipped with five 360 ° sprinkler heads. The Frame is connected to a harness by rope so that the patients can pull the Dust Buster around the arena with ease.

Significance: The Dust Buster has made substantial improvements to Tri-State Riding Centers therapy program. Not only does it provide a dust-free environment, but is also designed in such a way that children can receive therapy to multiple muscle groups by personally maneuvering the device around the arena.