

# NMT Robot Combat Arena

## Background and Objective

New Mexico Tech's mechanical engineering department has plans to host a robot fighting competition in the near future. In order for said plans to become reality, our team needs to construct the arena for this event. Our design has to be cost efficient, mobile, durable, and safe for competitors, referees, and spectators alike.

## Design Concept

A pallet rack was altered to become the frame of the arena, where a steel-covered wooden floor and wooden ceiling snugly fit. Polycarbonate sheets function as both windows and doors (Fig. 3) and various electronics help run the fights

## Design Specifications

- **Frame**
  - 8'x8'x8' modified pallet rack on casters
  - Actual arena height: 2½'
- **Floor**
  - Made of four 2'x8' sections (Fig 2.)
  - Surrounded by 3"x3" angle iron "bumpers"
  - Trap door mechanism on one side
- **Ceiling**
  - Two 4'x8' boards of ½" plywood with vents cut in
- **Windows/Doors**
  - 4 2'x8' ¼" polycarbonate sheets
  - Each has 2 industrial hinges along the top with 3 latches on the other sides (Fig. 3)
- **Electronics**
  - Neutral-White LED strip lights on the ceiling
  - 7-segment LED timer
  - 3 buttons, one for each combatant that stops the timer and one for the referee to reset/start the timer



Figure 1. Arena Frame and Wooden Subfloor

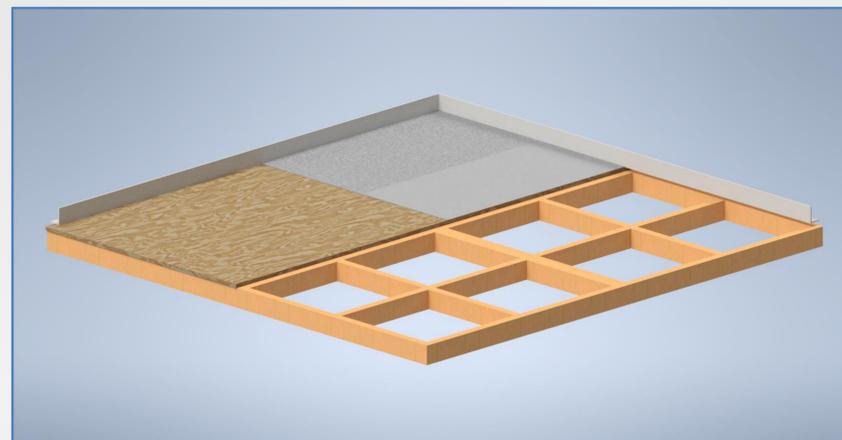


Figure 2. CAD Drawing of Arena Floor Layers  
Layers from Bottom to Top: 2"x4" lumber grid, ½" thick waferboard, 12 gauge steel sheeting, angle irons (at back)

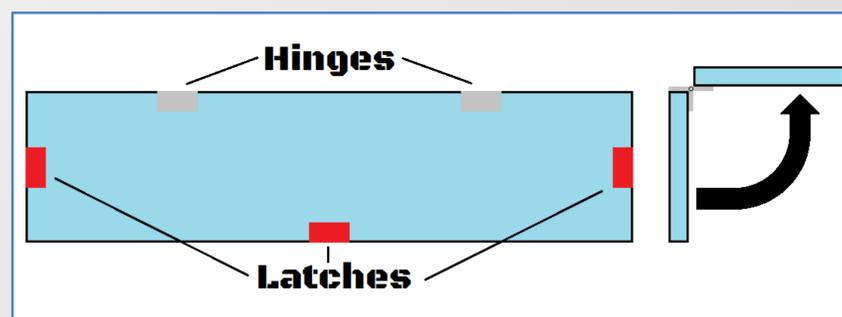


Figure 3. Setup (Left) and Movement (Right) Diagrams of Polycarbonate Window/Door

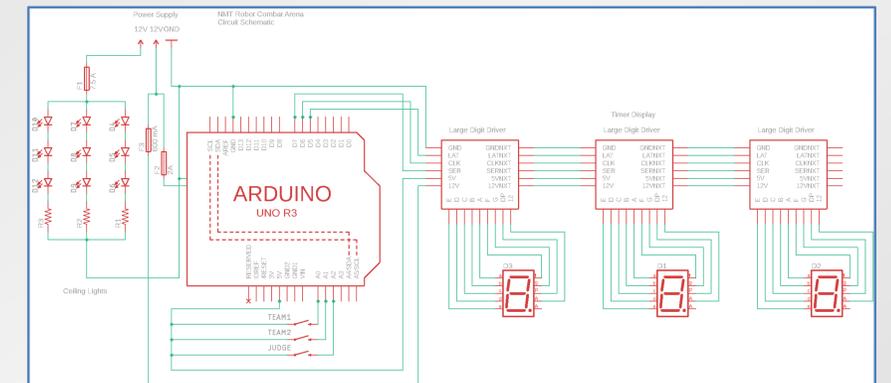


Figure 4. Circuit Diagram for Arena Electronics

## Progress

- All wooden floor sections constructed
- Trap door design ready to be implemented
- Sheet steel has been cut into 2'x2' squares
- Circuitry for all electronics mapped out (Fig.4)
- Design for access into arena finalized
- All major parts ordered

## Future Work

- Construct trap door mechanism
- Attach metal sheets to floor panels and place in frame
- Install polycarbonate windows with latches
- Construct the ceiling
- Incorporate the timer, buttons, and all lights
- Touch up and decorate (add NMT and Team Logos)

## Team Members of Spring 2020

Andrew Torres (Lead), Jack Rains, Adam Shannon, Johnathan England, Adam Magana, Dade Lincoln

## Acknowledgments

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