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Mechanical Engineering ME 490H

**Problem Statement:** To build a functional scale model of the Campanile that contains 27 bells and can be easily transported.

## Customer Requirements

### Resemble ISU's Campanile

- Solid facades to mimic brick texture
- Replicate playability of the Stanton Memorial Carillon
- 1:5 scale = 20 ft extended height

### Stable

- Withstand 50 mph wind gusts
- Accommodate for uneven ground

### Easy To Setup

- 30 minutes for 1-2 people

### Portable

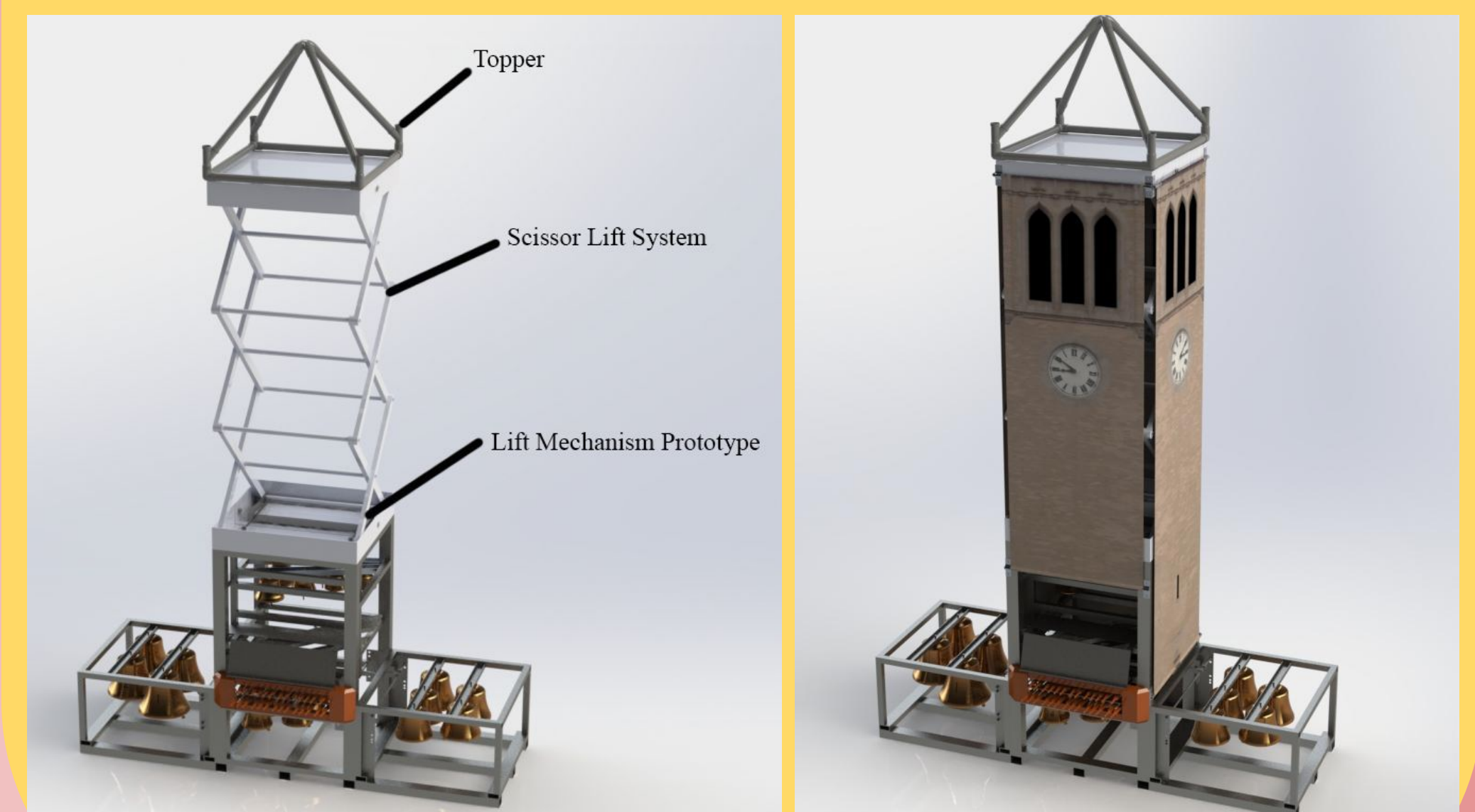
- Collapsible height 6.5 ft
- Fit through double doors
- Electric pallet jack, hydraulic trailer

## Project Objectives

- Determine the most appropriate pallet jack and trailer to haul the carillon
- Analyze vehicles capable of towing the proposed trailer
- Establish detailed loading, setup, & teardown procedures to maintain a high level of safety

## Carillon Model Design

- Two detachable side sections
- Tall center tower with scissor lift permanently affixed to its top
- Removable roof and facades



## Proposed Trailer

- 14' x 5' 8" bed
- Lowers to provide a 6.5° loading angle
- Elevates to 52" max dock height
- 7500 lbs max payload
- Tongue hitch for better vehicle versatility



Advance Metalwork Lift-a-Load Trailer

## Trailer Loading Procedures

- 4-bell section by hitch
- Facade transport container on top of 4-bell section
- 5-bell section in middle
- Roof container on top of 5-bell section
- Center tower with keyboard facing rear
- Pallet jack forks under center tower
- Taped and strapped down

## Proposed Pallet Jack

- Electric powered
- Rough terrain capability
- Capacity of 2650 lbs
- Pneumatic tires distribute weight



LiftMate Electric Rough Terrain Pallet Truck

## Setup Procedures

- Place the center tower in desired location and level
- Latch each side section to center tower
- Extend and lock outriggers into place
- Secure roof to center section and attach upper facades
- Extend scissor lift halfway to attach lower facades
- Fully extend scissor lift and secure facades to tower

## Conclusion

- Student Carillon Leadership Council (SCLC) will be in charge of transportation and setup at event sites
- As a result of choosing this trailer and pallet jack, the overall cost will increase by 5% (\$9,963)
- Procedures will be further detailed once structural design and facades are finalized

