Artimedes - Kinetic Sculpture

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Abstract

The team, Art Combined with Engineering, was tasked with creating a kinetic sculpture that positively represents engineering, displays a minimum of three engineering principles, and creates interest for future prospective engineers.

Figure 1: Planetary Gear Set

Figure 2: Timing Belts

Background Information and Project Goals

Background Information

- A kinetic sculpture is a sculpture that incorporates movement as a basis element. From the team's research, most kinetic sculptures are powered by wind or motors. However, A.C.E wanted to have an interactive sculpture so the user can view and understand the mechanics of the piece.

Project Goals

- Showcase at least 3 engineering principles
- Be easily transported by one to two people
- Users safety is vital
- Must be durable enough to last for years
- Cost effective ($2000 budget)
- Entice potential engineers

Final Result

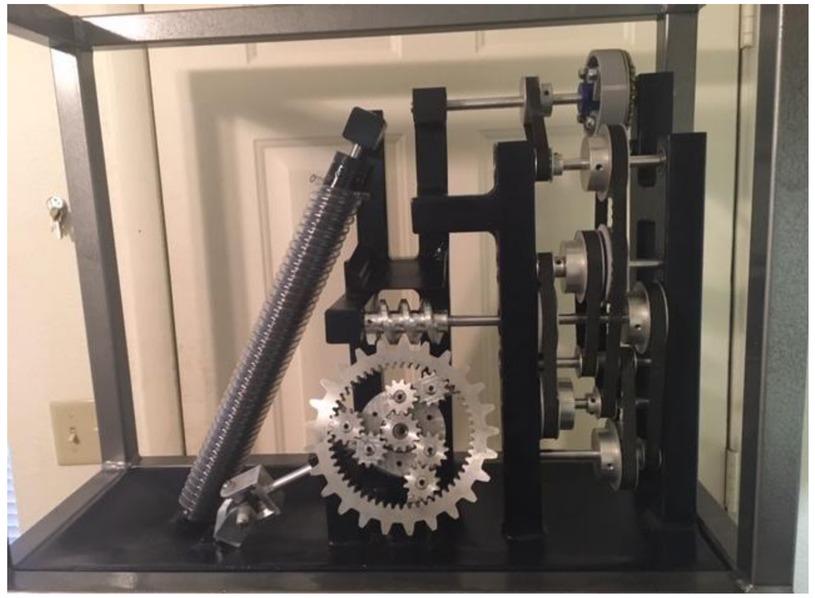

Figure 3: Kinetic Sculpture

Conclusion

Building a kinetic sculpture gave the team experience in machining, casting, welding, machine design, engineering design, and mathematical analysis. With an open ended project, the team was able to produce any type of kinetic sculpture. A.C.E decided to showcase the heart of mechanical engineering by utilizing gears, meanwhile displaying the potential for beauty and art that engineering contains.

Analysis

Using the belt ratios seen in the sculpture, as well as gear parameters and friction forces, we were able to calculate the force needed to operate the sculpture at the main hand crank by using knowledge gained in Machine Design and Manufacturing courses.

Final Gear Ratio is 4.08:1
Torque Required is 13.72 lb/in

Table 1: Gear Speeds

Gear	RPM
Worm	50
Ring	2
Outer Planetary	2.1
Inner Planetary	3.3
Sun	0

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