Meeting Minutes
Tuesday Apr 23, 2019
Meeting Called by: Mahmoud Shaban
Minutes recorded by: Ahmad Altheyaib
Attendees: Ahmad Alharbi , Ahmad Altheyaib, Mishary Alhooli, , Abdulaziz Hussain, and Mahmoud Shaban

Recording of what happened in meeting:

From 6:30 pm to 7:00pm	Ugrads is this week on Friday so we are going to do the PowerPoints slide.	Engineering Building
From 7:00pm to 8:00pm	We are meeting today to finish our Final PowerPoints slide to prepare for the final presentation. All of us are working in the powerpoint slide. Then, we did a practice presentation to make sure our presentation is not exceed the time limit	Engineering Building
From 9:00pm to 10:00pm	We wanted to make sure all of us are dressing well for our Poster and Final Presentation.	Engineering Building

Minutes:
Recording of what happened last week:

We wrote, printed and submitted our Poster.

Pictures:

Symbol of Peace

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Abstract

The purpose of this project is to create a kinetic sculpture that contains several engineering concepts that illustrates moving parts which helps inspire newcomers and visitors approaching Northern Arizona University (NAU). Inspiration would be through the process of combining art and engineering creativity by the operating systems available. The artistic part of this project will be illustrated through the bird movement of wings and tail with the assistant of mechanical engineering concepts. The project also utilizes methods of artistic creative skills by using engineering equipment along with different materials that completes the sculpture. The sculpture consist of two main sections, one is the bird model that includes moving wings and a tail. The second section is a box that contains the mechanism. The mechanism starts by a user interaction. The user will start the sculpture's movement by rotating a crank handle that rotates the crankshaft which transfers the energy to the remaining mechanical parts such as; gears, rods and a pulley system. The aim of this project is to inspire to assist the user into deciding a future path at NAU.

Problem Definition

Background: Nowadays sculptures are making a big contribution with influencing customers into purchasing products as well as inspiring people to decide their career path. Furthermore, the field of art and inspiration is becoming a big target throughout the world due to media and newly upgraded designs. Kinetic sculpture is an artificial man-made structure used for the purpose of expression and inspiration. In this sculpture we are utilizing the power of expressing our mechanical engineering principles.

Project goals:

Our goals in this project to inspire young kids as well as astonish visitors coming into Northern Arizona Mechanical Engineering Department. Using influential mechanical principles such as gears, a shaft, and a V-Belt. Covering the mechanical box and principles using an acrylic glass to create a box to help show the working system. It also consists of three tapering spear-like forms thrusting vertically.

Engineering Requirement:

Engineering Requirement	Targeted Dimensions
Weight of the device (Standard)	45 lbs
Volume (Size to fit through the door)	2.3 ft x 2 ft x 4 ft
Length of the wing (Both Together)	4 ft
Length of the rod	2 ft, 12 in x 0.75 diameter
Crankshaft	16 in x 1 in diameter
Timing Pulley	10 in x 1 in thick x 3.25 in diameter x 1 in
Gears	2 in diameter, 6 in diameter
V-Belt	2 ft

Mechanical principles

Initial Design

The initial design was based on one principle that is the crankshaft. Within this principle, inspirations started to build more ideas and mechanism. At first, two initial designs were created. Starting with a design based on 3-D printing and cardboard box. For the second initial design it was based on a shaft and two rods connected to the wooden wings of the bird.

Major Modifications

Major developments and insertions were added to the initial design to help develop the final design:

- Bevel gears created using a 3D printer
- A V-Belt attached at the end of the shaft to transfer energy
- From a wooden designed bird to a very dense Styrofoam bird
- Metal rods to PEX plastic pipe rods
- Melamine board used as a base

Final Product

The product is based on a hand powered crankshaft rotating on a clockwise rotation moving the bevel gears connected in the middle of the shaft to cause an eccentric timing pulley vertically with the PEX plastic pipes attached to the wings. At the end of the shaft a V-Belt is attached to transfer the energy to a rod and another timing pulley moving similarly to the other timing pulley to cause a tail movement.

Performance & Testing

Results:

- Crankshaft
  - Stable and has minimum amount of energy loss
- Bevel Gears
  - Maintained it's stability and acquired the 9- degree applicability
- V-Belt
  - The application of transferring energy from the crankshaft to the towards the opposite side of the bird where the tail is located
- Bird
  - Wings functioning realistically and the wingspan all together is 4 ft
  - The length of the bird body and tail is 4 ft in height

Acknowledgments

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