

DESIGN EXPO

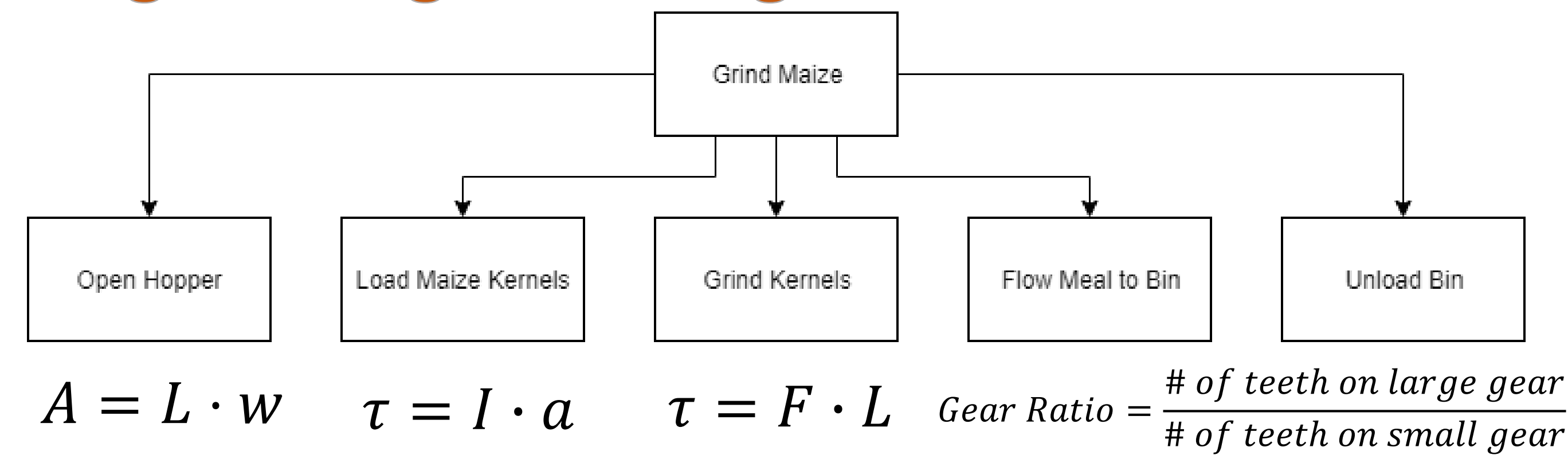
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Mechanical Engineering 270: Introduction to Mechanical Engineering Design (Section 4, Team 2)

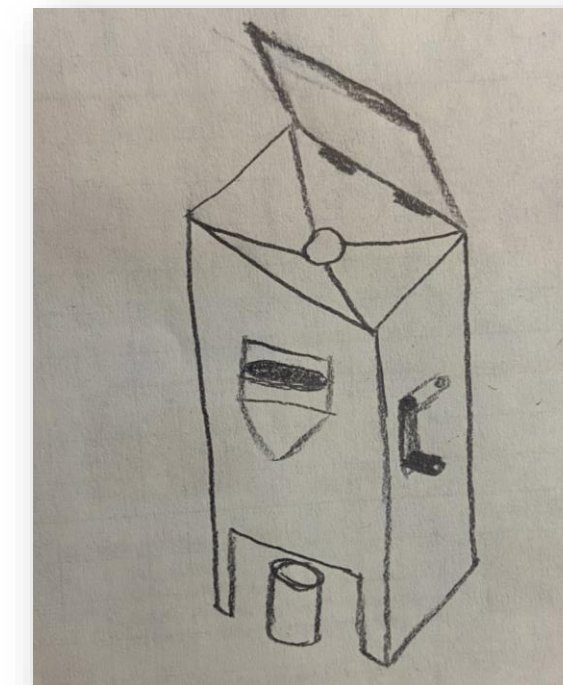
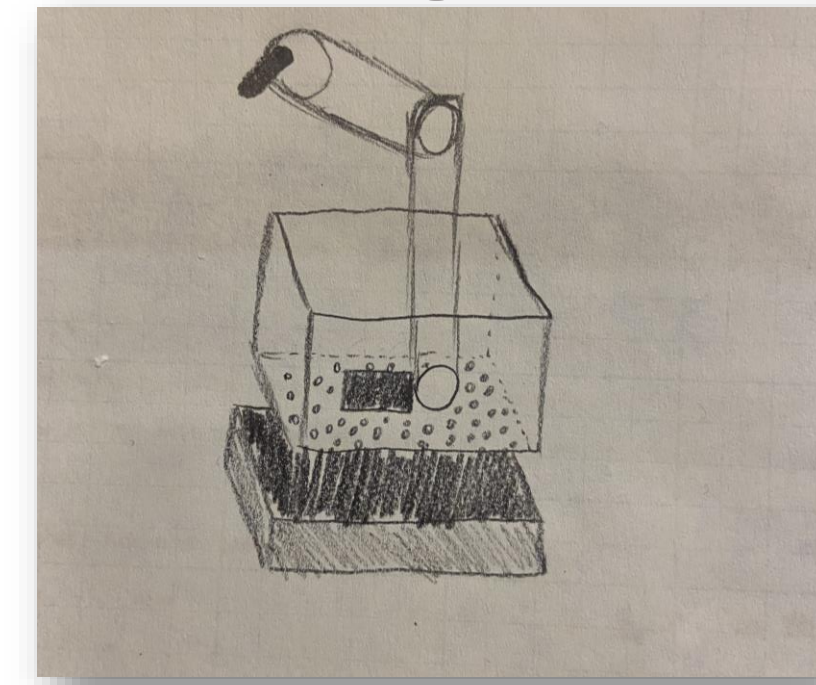
Problem Statement: The people of Zambia currently must walk upwards of 5 miles one way to get their white maize ground to make Nshima, their primary source of food. A local maize grinder would enable the people so spend that time on more important areas such as education.



Engineering Modeling



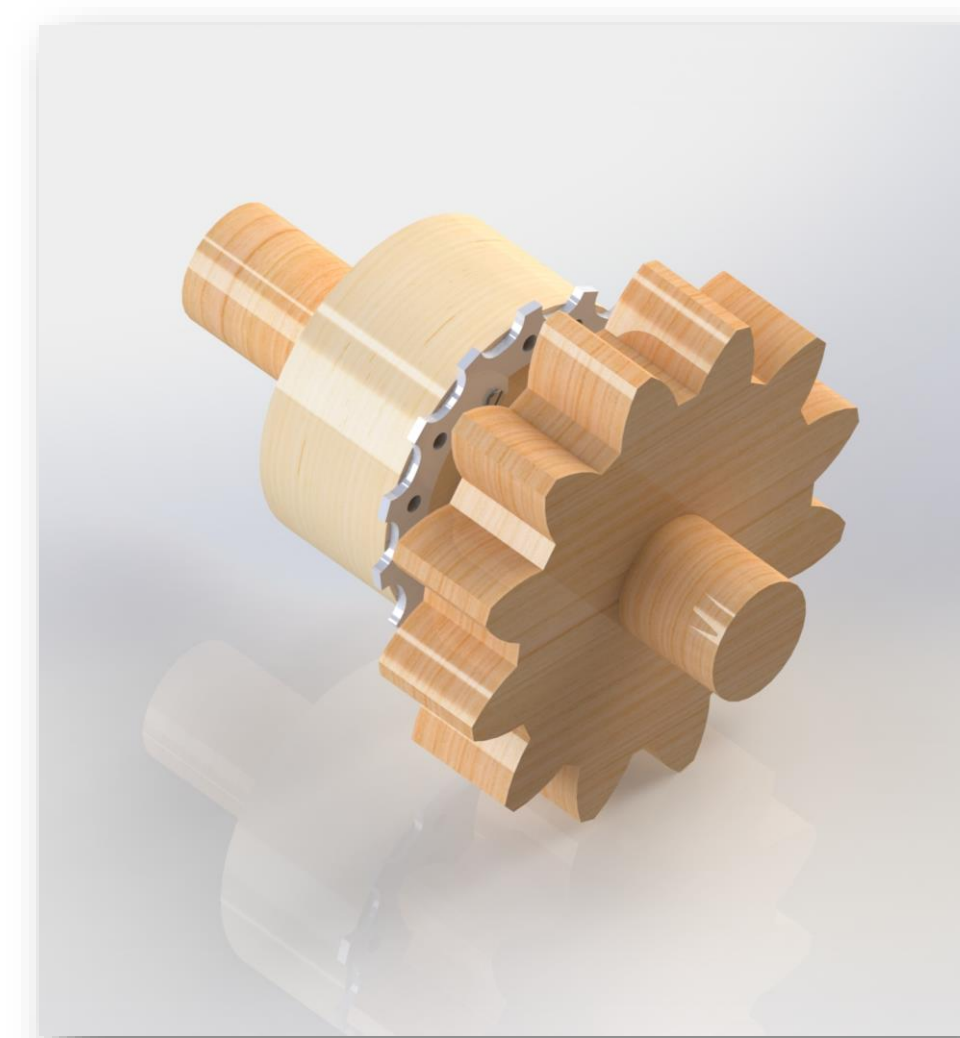
Concept Development



Alternative Design Initial Grinder Prototype Design

Prototype Design and Fabrication

Gear Assembly (N2001)

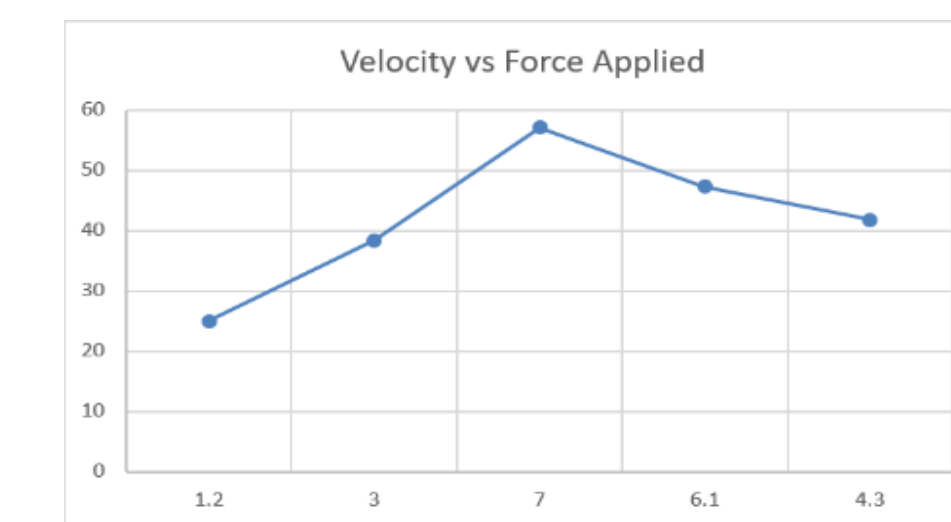


Fabrication Challenges

Manufacturing the wooden gear along with proper measurements to align with other gears.

Prototype Testing

- Ease of Use
 - 60% yes
- Efficiency
 - 2.67% efficient
- Velocity of Rollers to Force Applied



Profitability Analysis

Income (in USD)	Year 1	Year 2	Year 3
Units Sold	200	220	242
NIAT (Net Income After Taxes)	\$6,375.37	\$7,081.83	\$7,852.05

Voice of the Customer

- Easy to use
- Affordable for a village to purchase
- Locally sourced parts with the ability to be assembled & repaired locally

Specifications and Benchmarking

- Ability to be operated by one person
- Zero operating power from electricity
- Purchased and assembled for \$50 or less
- Requires less than 30 pounds to operate

Final Design

- Tension knobs were added to assist the chains

