

Coffee Bean Sorter



MOCKUP REVIEW

Preliminary Customer Contract



Customer Need	Attribute	Specification
Accurately Removes Genetically Deformed Beans	Accuracy	80 % of target defects removed from good beans
Low Power	Power	100-150w
Receive 150 lbs of beans at once	Capacity	Handle 150 lbs
Easy loading and unloading for a 5 foot tall man	Size	Height: less than 4 ft
Sorts 150 lbs/hour	Sorting Capability	150/hr throughput
Must be affordable for small farmers	Price	\$300-500

Critical Issue:

Sorting Good beans from defective ones



Black



Eye Only

Pergamino



Size/Density

Rocks or Twigs



Size/Density

Cherry



Size

Genetically Deformed



Density

Density Sorting



- **DRUM SORTING**
- **VIBRATING TABLE**
- **WINNOWING**



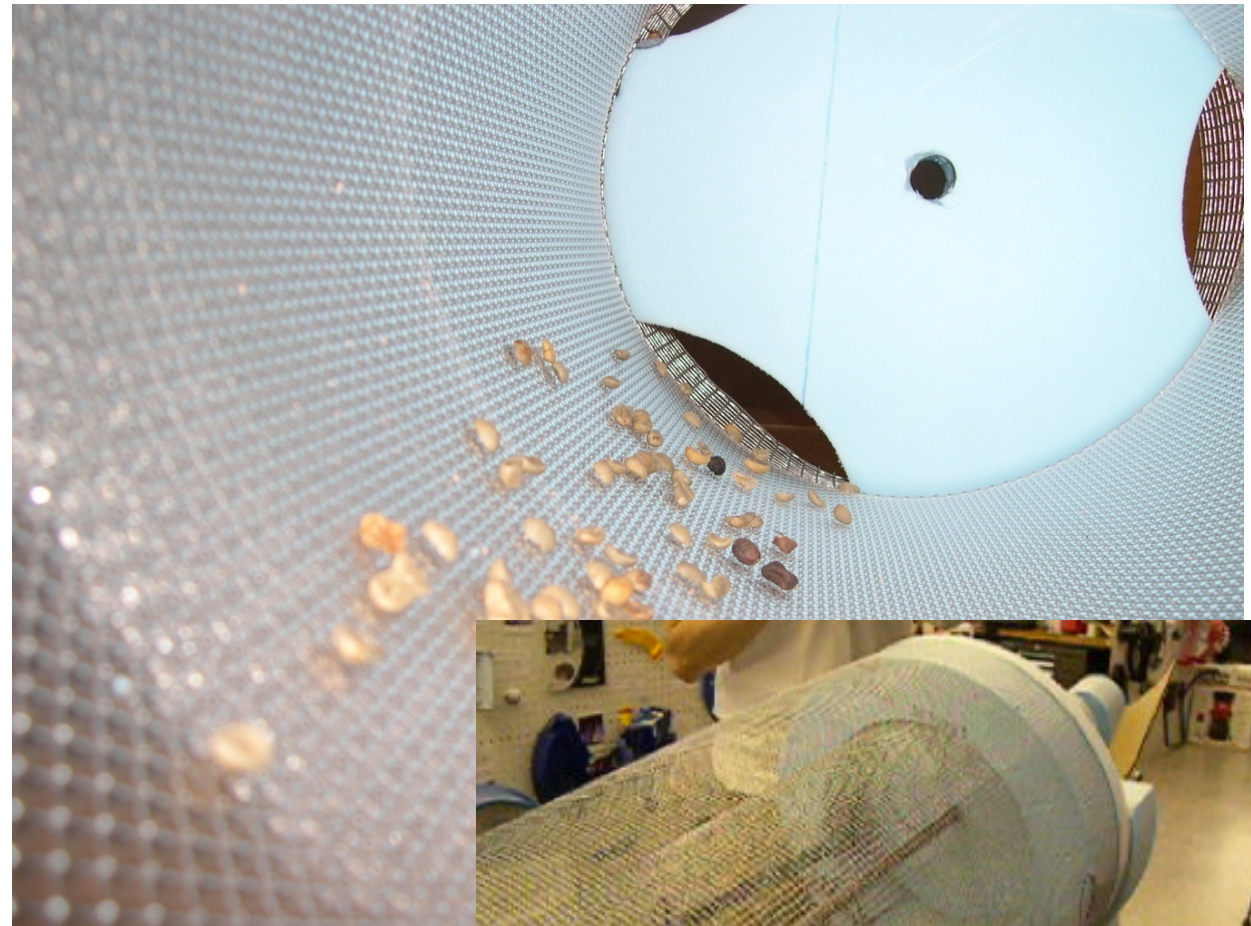
Drum Sorting

Testing results:

All beans stick to
side of walls
<no sorting>

Next phase:

Drum with
MUCH
BIGGER
diameter



Drum Sorting

Vibrating Table

Winnowing



Vibrating Table

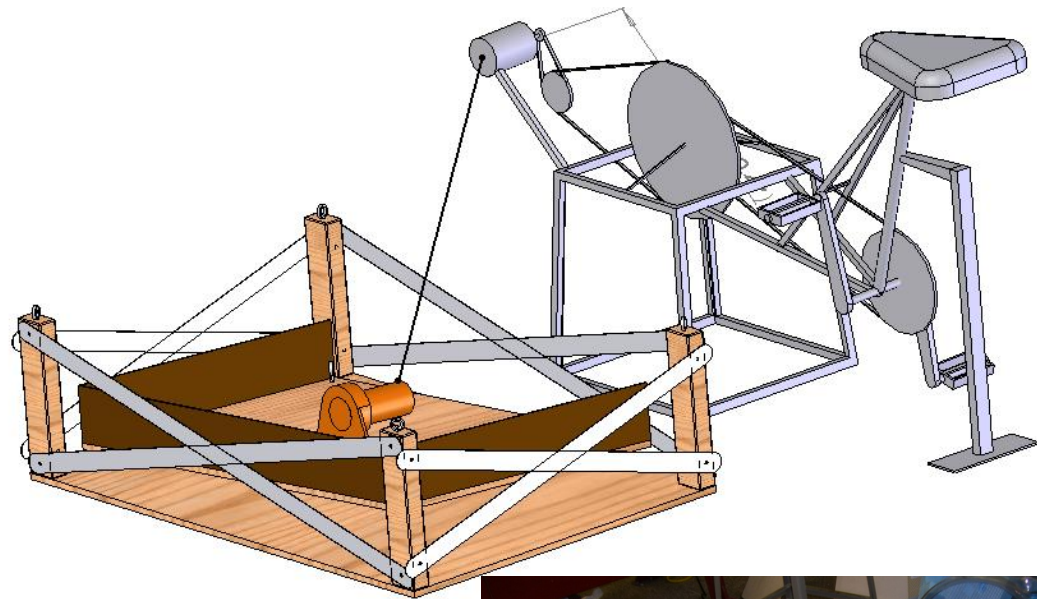
Testing results:

Peaberries sort
from rest with
>95% accuracy

Power: < 100W

Modification:

Different surfaces
Different motor
orientations



Drum Sorting

Vibrating Table

Winnowing



Winnowing

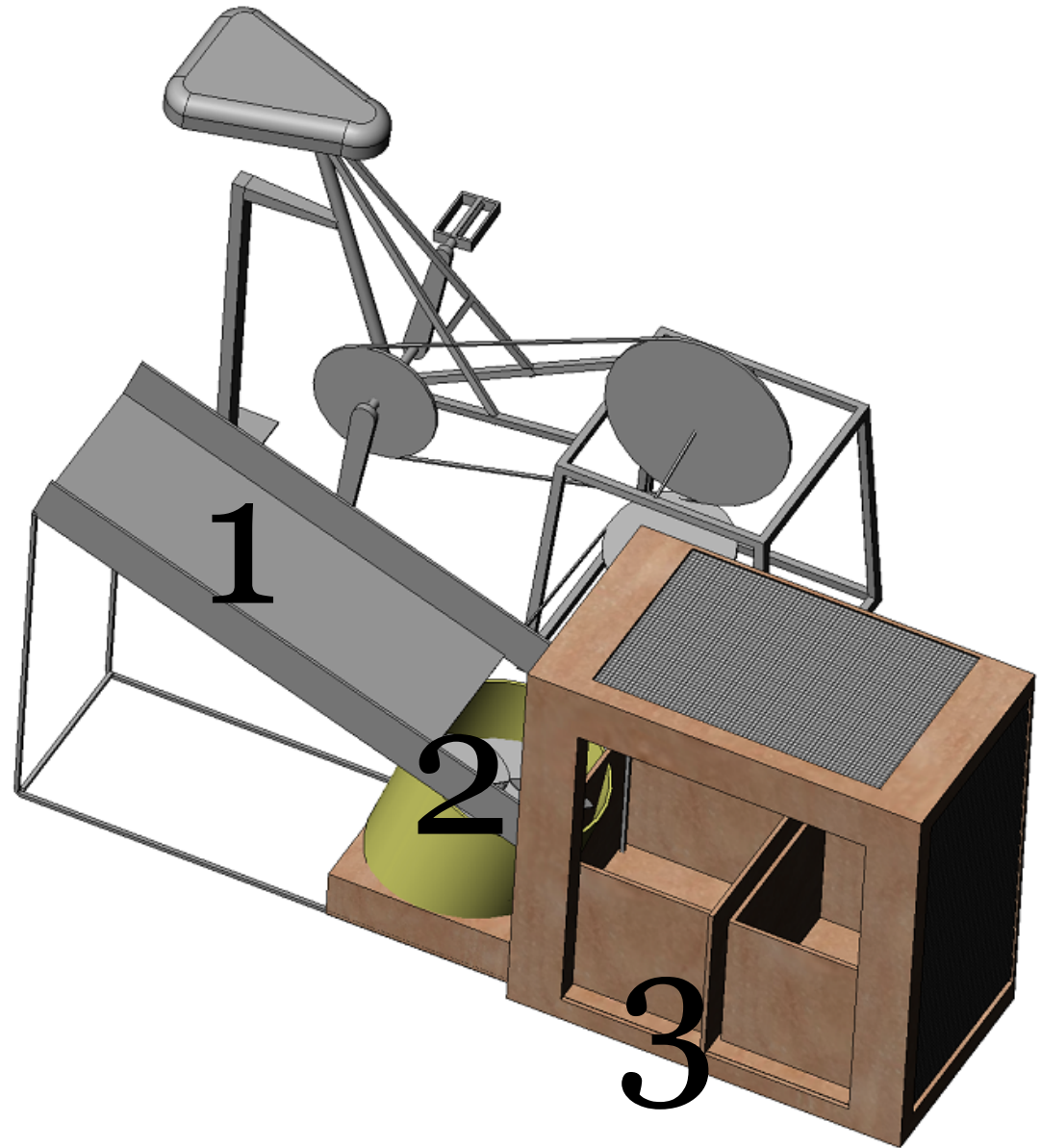
Testing results:

Some bad beans
in the good
beans

Modifications:

Bean feeder setup
Fan angle
Barrier height
Barrier distance

*Power constraints
on fans*

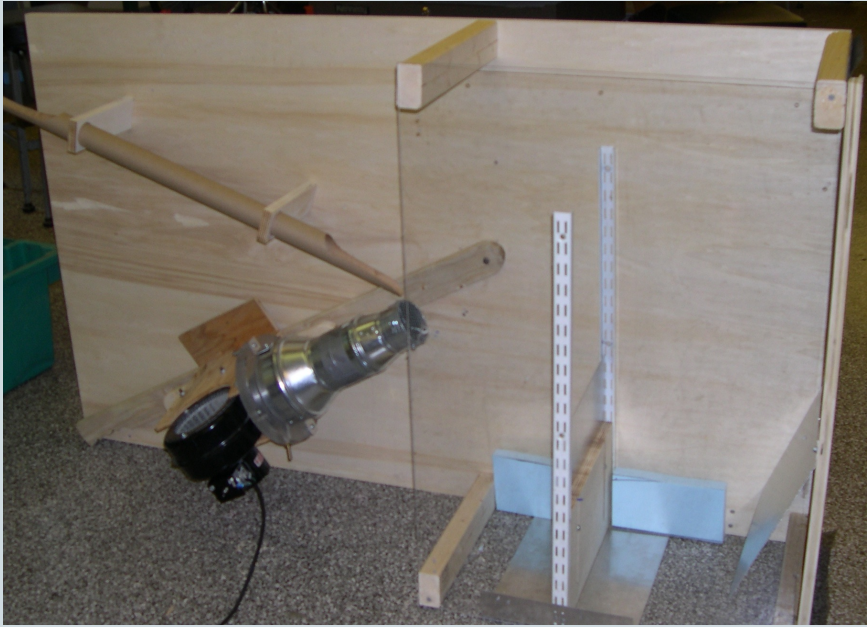
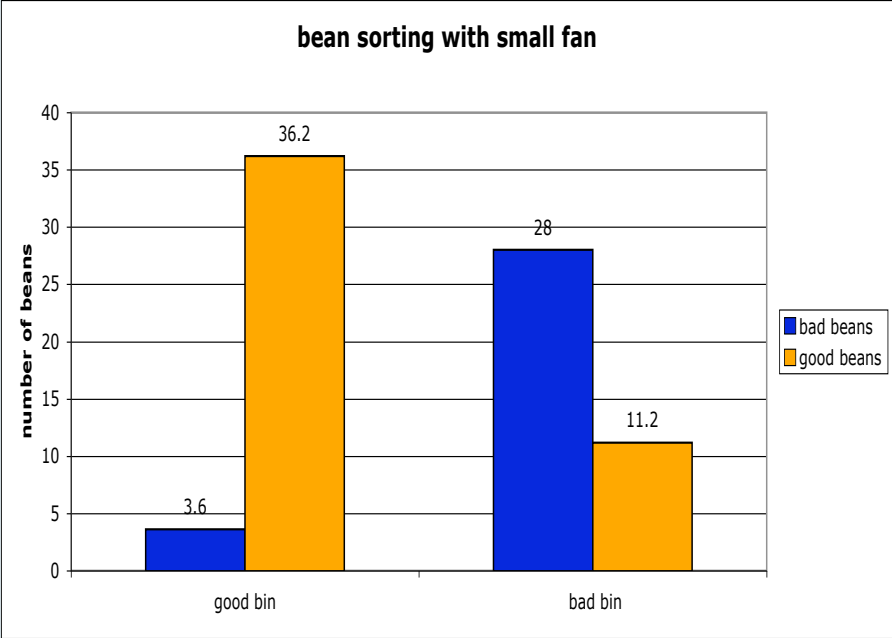


Key Risk Assessed



Accuracy

-88% defective beans sorted out
-Target Bin: 91% good beans



Drum Sorting

Vibrating Table

Winnowing

Power Analysis for Mock up Experiment



Large Winnowing Fan



$3.8\text{A} \cdot 120\text{V} = 456\text{W}$
steady electrical power
draw

Small Winnowing Fan



$0.8\text{A} \cdot 120\text{V} = 96\text{W}$ steady
electrical power draw

Table Vibrator



$0.9\text{A} \cdot 120\text{V} = 108\text{W}$
steady electrical power
draw

$\sim 100\text{W}$

Also note: Mechanical Input Power < Electrical Power Draw

Conclusion



Feasible



Valid Alternative

