

Project CDM-1.0

“Drying-Machine Two-in-One ”

Submitted to:

SOMAES- Mechtrix Committee

Submitted by:

The CDM Team

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1. Introduction

CDM-1.0 is a Cloth Dryer plus Fruits and Vegetable Dryer multifunctional machine which assists drying of wet clothes as well as fresh fruits and veggies using an artificial heating system made up of small fans and halogen tubes. The clothes can be hung inside the machine and will be rotated with the passing of hot dry air. The cloth hanging rack can be easily removed and replaced with veggies rotating top. This idea emerged first as the need of our own homes. As laundry dryers are highly expensive and unaffordable by many, this is the only solution to drying our clothes during the absence of sunlight due to our room's location or during the rainy season. Alternatively, it also creates an artificial environment for drying vegetables (sukuti). This ensures preservation of locally produced goods and can be consumed off-season as well solving the problem created by the wastage of local seasonal food faced by our country.

2. Our Team

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Education Level: 2nd Year

Skills: Programming, Electronics, Arduino IDE, Proteus, CATIA, ANSYS, MATLAB, KiCad

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3. Objectives

- a. To dry the wet clothes in an efficient manner.
- b. To solve local problems of fruits and vegetables by drying them out (sukuti).
- c. Portable, foldable and lightweight
- d. Easy to store and assemble in low space.
- e. Useful during the rainy season as well as in the room with no access to balconies with enough sunlight.

4. Significance

CDM is extremely cheaper than convectional laundry drying machine making it easily affordable by students and homes irrespective of their financial background. Besides price, the main qualities that makes our product different is that it is foldable, portable and lightweight which makes it easier for people living in crowded cities like Kathmandu with no access to balconies with sunlight and also who have less space in their rooms. It is also extremely useful for all the houses during the rainy season for drying out the clothes and to make sukuti. Overall it solves our personal problem of drying of wet clothes as well as national issue of local food wastage.

5. Accomplishment

5.1. Hardware needed

- a. Main Motor
- b. Rotating turntable bearing
- c. Bush



- d. Motor Couple



e. Halogen tube

Halogen tubes will be used as they are cost efficient with high working temperature

f. Propeller

Induction stove fan will be used for air circulation as meets with our temperature and cooling specifications

g. Tin Sheet

h. Wheels

i. Aluminum Shaft

j. Aluminum Plate

k. Bearing balls

l. Stainless steel plate(Jasta patta):

It is a general purpose steel alloy that is easy to weld and shape. Stainless steel has good mechanical properties, strong wear resistance, high hardness, rust and corrosion resistance. It can maintain its characteristics even at high temperatures.

m. Hinge:

It is used for joining two plates and allowing them to rotate freely.



n. Hinge lock:



o. Collapsible shaft



p. Toroidal disc



5.2. CAD Model using CATIA V5

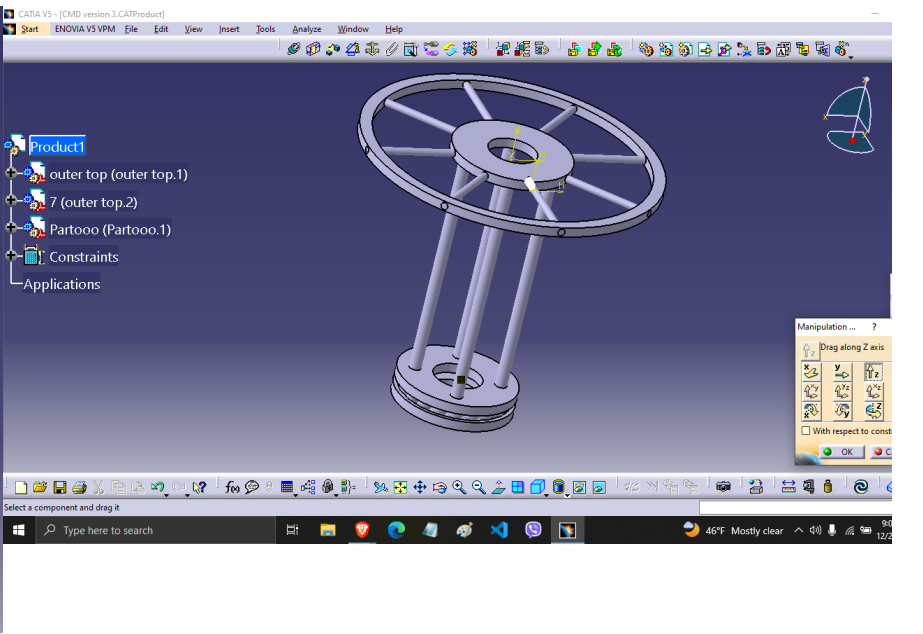
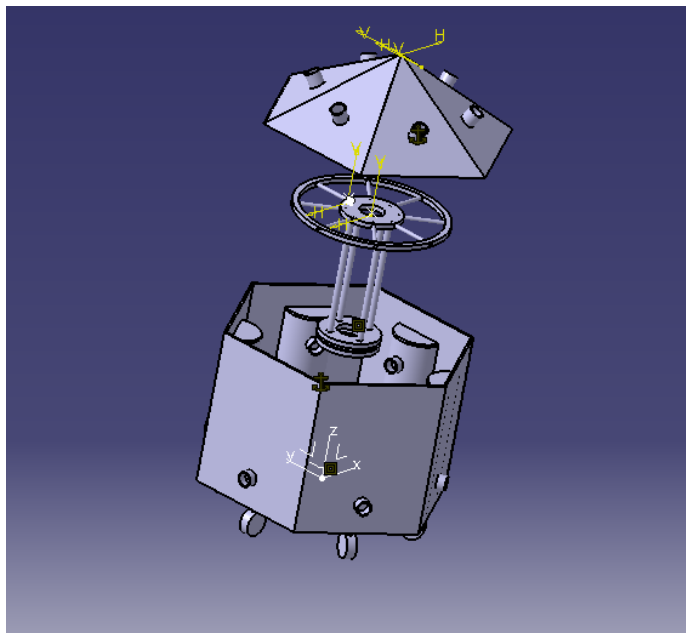
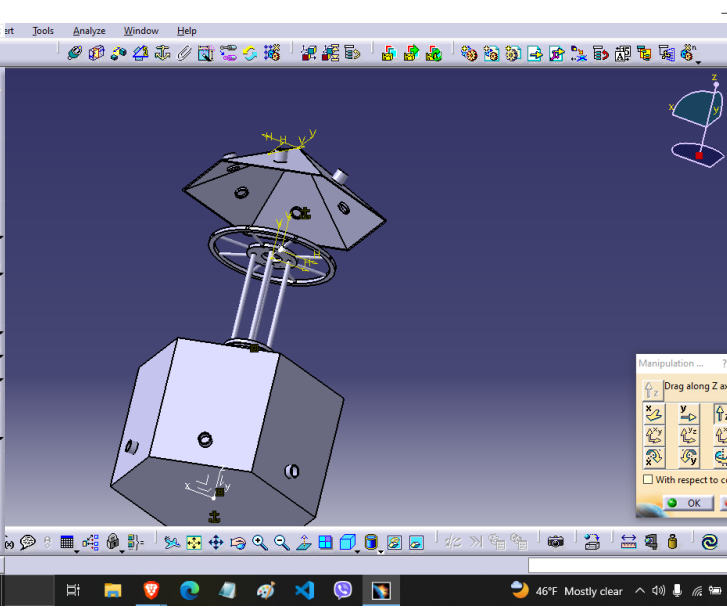
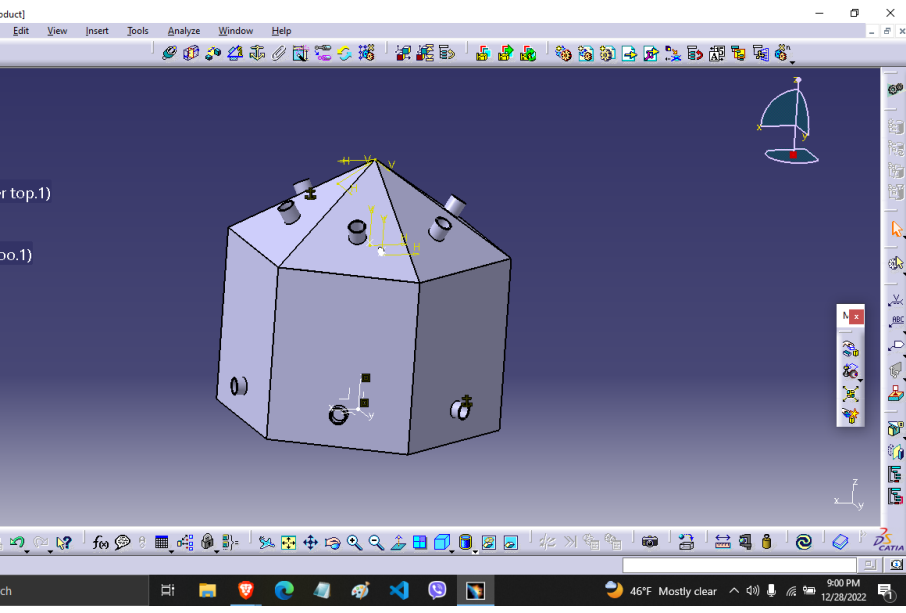
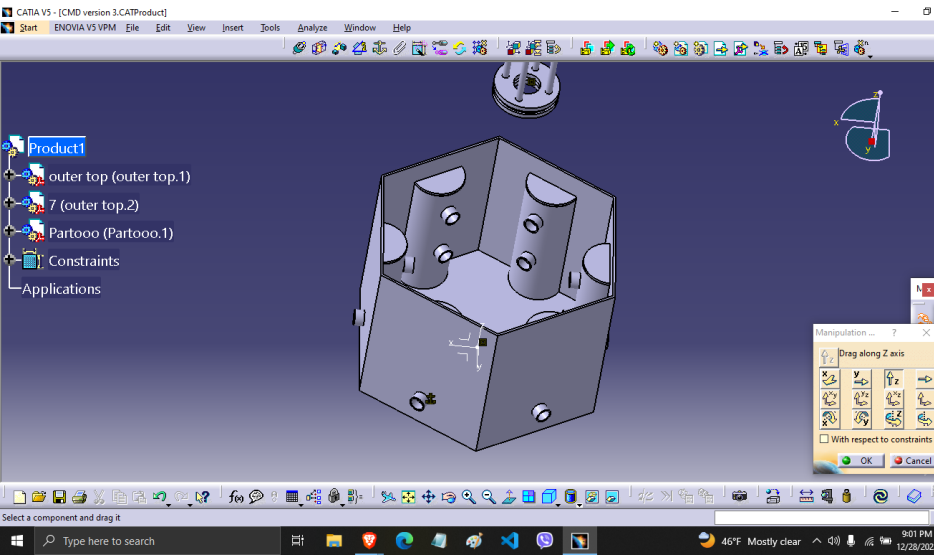
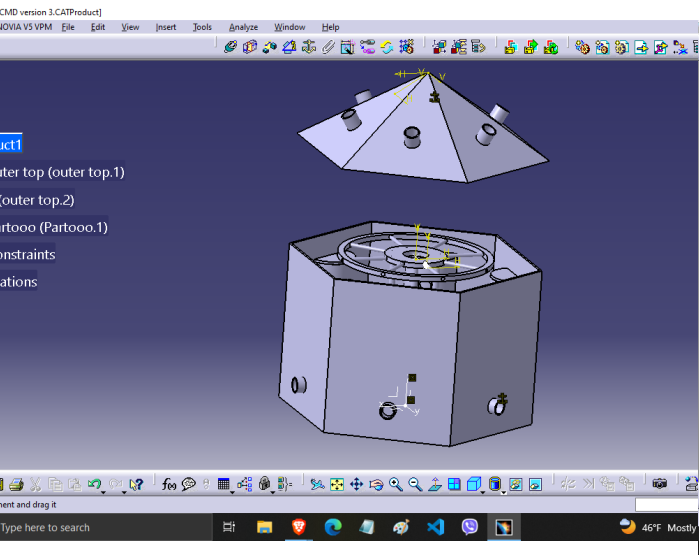


Fig:Some Glimpse of Designs

The design is done in CATIA V5 software. The design is pretty simple based on our theme of making it easily portable and lightweight. The whole system is covered by a hexagonal pyramid shaped metal sheet, which are foldable and joined by hinge. The shaft for hanging the clothes are too shrinkable and is rotated by a motor which lies at the center. The hot air is sucked from outside by a compressor and is passed inside through hot nichrome wires/halogen tube. Then the hanger with clothes is rotated in very low rpm. The vaporised water from clothes will rise up and escape through our holes... and excess water drops will fall onto surface.. which will be soaked by our sponge. The sponge and everything is totally reusable and The whole machine can be disassembled, folded and kept in very small space when not used. and even during setup we have wheels which makes it even more comfortable to change its position.

5.3. Electronics

- I. Motor Driver L298N
- II. Wires
- III. Matrix Board
- IV. Switch

5.4. Budget estimation and Availability of materials

- a. Main Motor: Rs. 1000
- b. Rotating turntable bearing: Rs. 2400 for 3 inch
- c. Halogen tube: Rs 189 each

<https://www.daraz.com.np/products/halogen-heater-halogen-bulb-tube-400w-8-inch-fire-bar-heater-lamp-element-bulb-i104864052.html#:~:text=price%20189%20per%201%20piece%20or%202%20PCs%20%3fText=per%20pcs%20ho%20>

- d. Propeller: Rs 246

<https://www.daraz.com.np/products/induction-stove-fan-4-inch-18v-plastic-blade-cooling-fan-for-induction-cooker-cooler-black-i107948681-s1029086200.html?spm=a2a0e.searchlistcategory.list.24.54bc2576H16dPi&search=1>

- e. Wheels: Rs. 3600 (four)
- f. Bearing balls: Rs. 40/ball of ¼ inches

g. Stainless steel plate(Jasta patta): Rs. 250 per kg

Availability: Hardware shop

h. Hinge lock: Rs. 100-150 per piece

<https://www.daraz.com.np/products/kabja-hinges-3-i116241234-s1031782935.html?spm=a2a0e.searchlist.list.19.5c3b2f3flpm41Y&search=1>

OR

Hardware shop

i. Hinge lock: Rs. 150 per Piece

Quantity: min 2

Availability: Any hardware shop

j. Collapsible shaft: Max 100 (per piece)

k. Motor Driver L298N: Rs. 350

l. Wires: Rs. 100

m. Matrix Board: Rs. 95

5.5. Scrap dealers

- Khushi Kabad, Kathmandu 44600
- Maa Kausalya Traders, Hatiban, Harisiddhi 28, Lalitpur
- Scrap senter, Kathmandu 44600

5.6. Discussions

- The machine is provided with 3 wheels so that it can be moved anywhere as per convenience.
- Tin is used to build outer parts to trap heat.
- Besides the foldable outer part, the stands are also made collapsible to save more space.

- Insulation of the whole machine, or partially, the walls of the machine.

6. Practicality

CDM-1.0 is not just project but a need. The design is simply shown in the above CAD design. It is easy to make with basic machinery skills of lathing and welding along with some experience with electronics and soldering. It's usefulness has also been already highlighted in the significance section.

7. Innovative Aspect

If we google search for cloth drying machine, besides laundry dryers, only one machine appears. Again, when we search of food dryers there are machines with totally different mechanism of drying than that of clothes. Combining both of their prices, it's over the reach of average household. However, our CDM-1.0 is a two in one affordable solution. It's foldable, portable, affordable, and efficient.

8. Relation With Theme

Imagination:

The problem we faced in our life made us imagine a possible solution. Our design and mechanism is mostly self-envisioned.

Innovation:

There is only one affordable cloth dryer in the market with low efficiency. And the food dryers are expensive with different setup as that of cloth dryer. However, our CDM-1.0 is the innovative approach combining solutions to both the problems.

Invention:

The two-in-one cloth and food drying machine is an invention in itself that doesn't exist elsewhere till now.

9. Conclusion

Our team is going extra miles to make our project successful. We are really hoping for our bright journey ahead.

