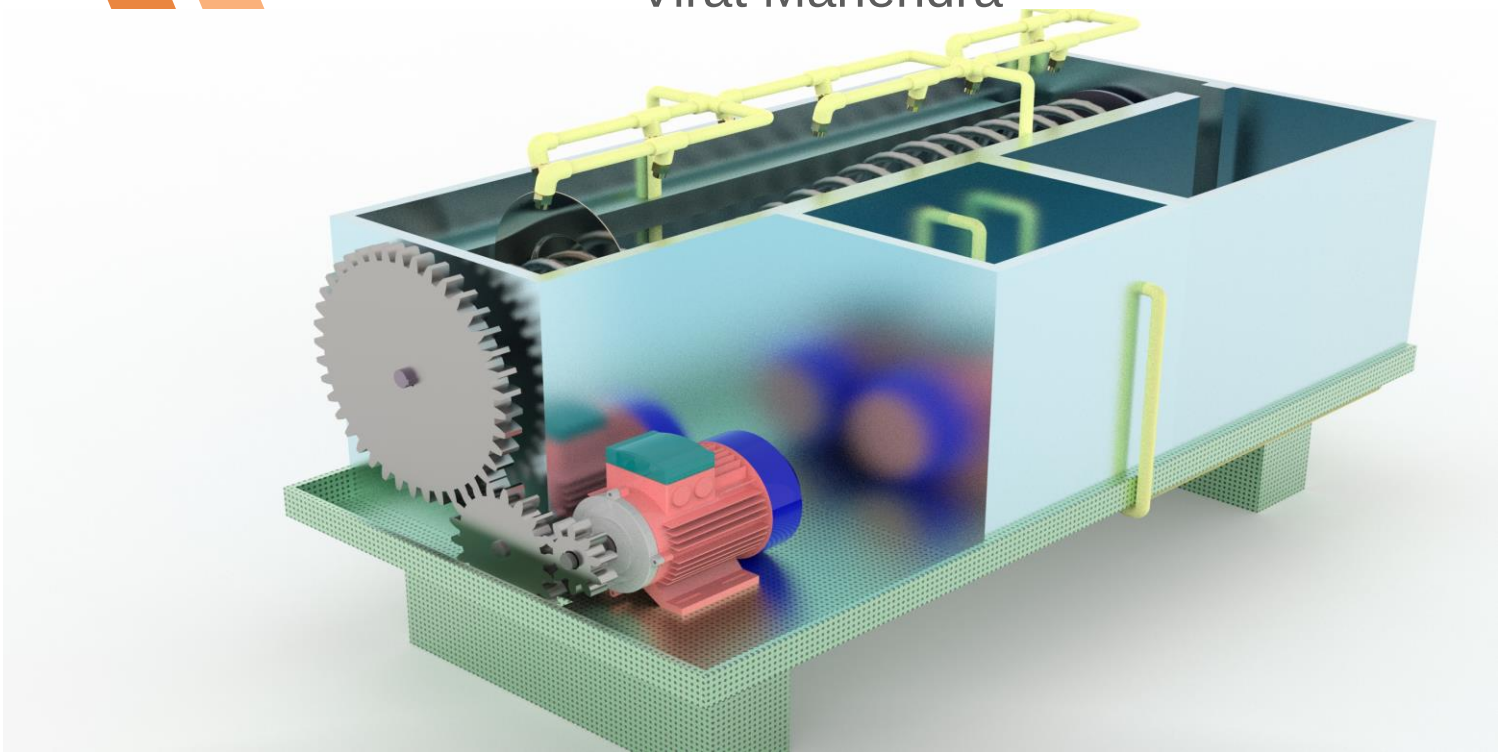
Automatic Dishwasher

Proposed by: Himanshu Dwivedi and Aditya Malhotra

Constructed by: Himanshu Dwivedi and Aditya Malhotra

Volunteers: Puneet Chandel and Virat Mahendra

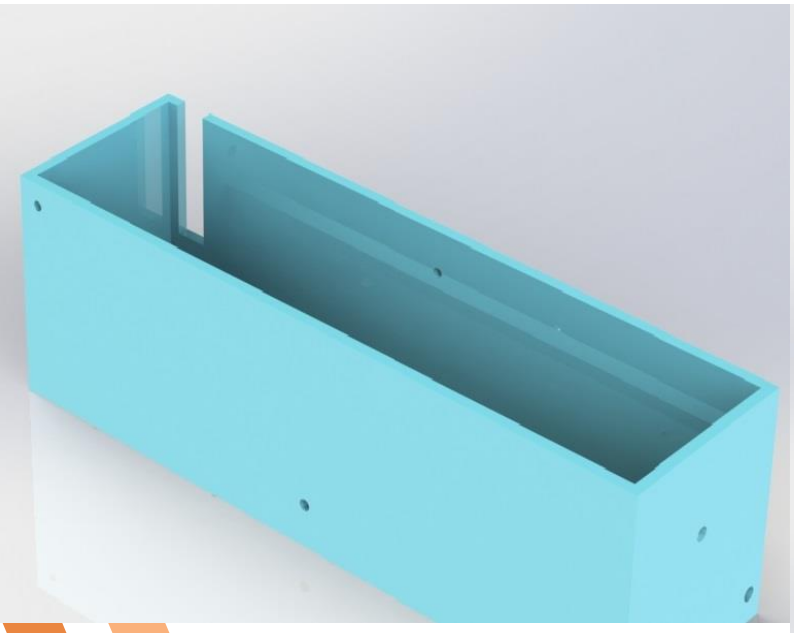


Abstract

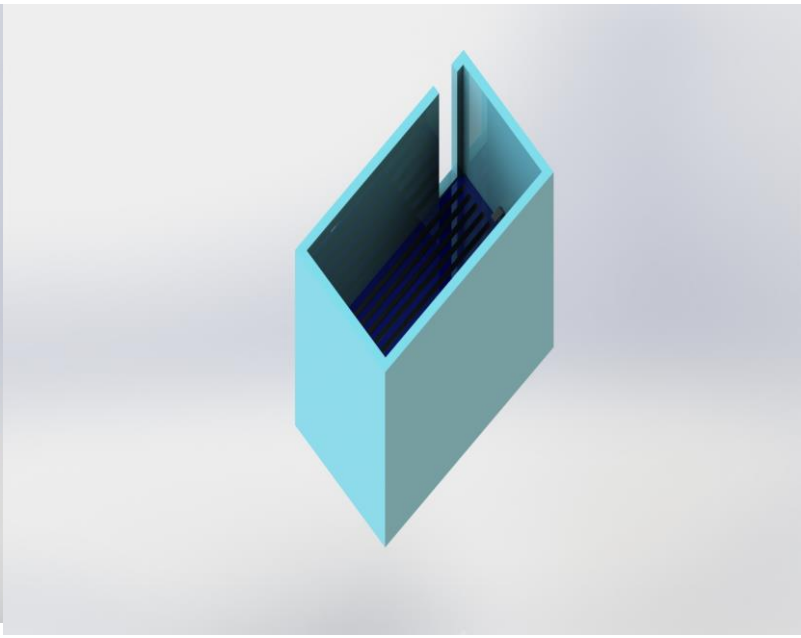
- In our country most of the foods are oily, hence a lot of effort is required for their washing. In hotels, restaurants, etc. there are a lot of dishes to be cleaned, which requires a lot of human effort and is very difficult. In our project, we are trying to improve the cleaning ability by using scrubbers and well-designed and separated chambers for stepwise cleaning.

Design and construction:

- Main body :The main body is formed of steel sheet metal. It has 3 well-designed and separate chambers.
- First chamber: In the first chamber, cleaning of the dishes takes place. It has 3 separated compartments for proper cleaning of the dishes.
- Second chamber: This chamber is for collecting plates after washing.



First chamber

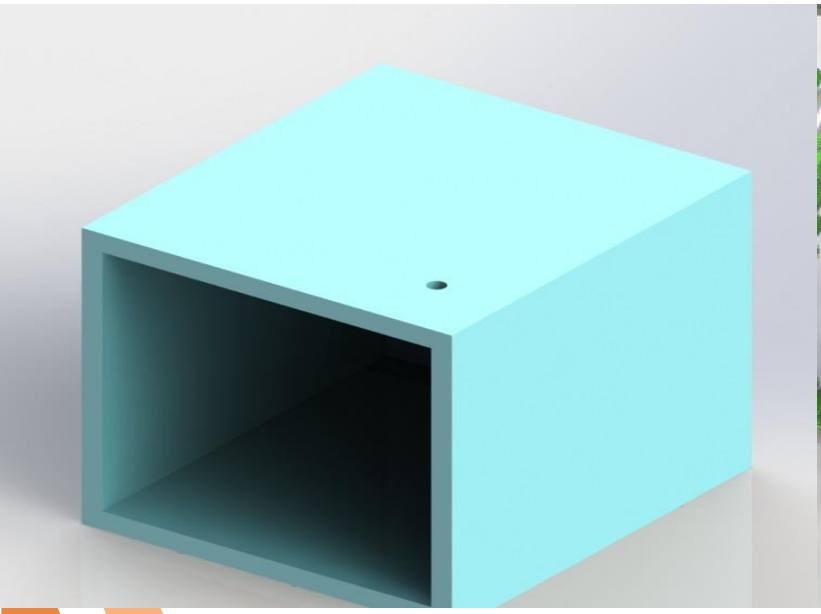


Second chamber

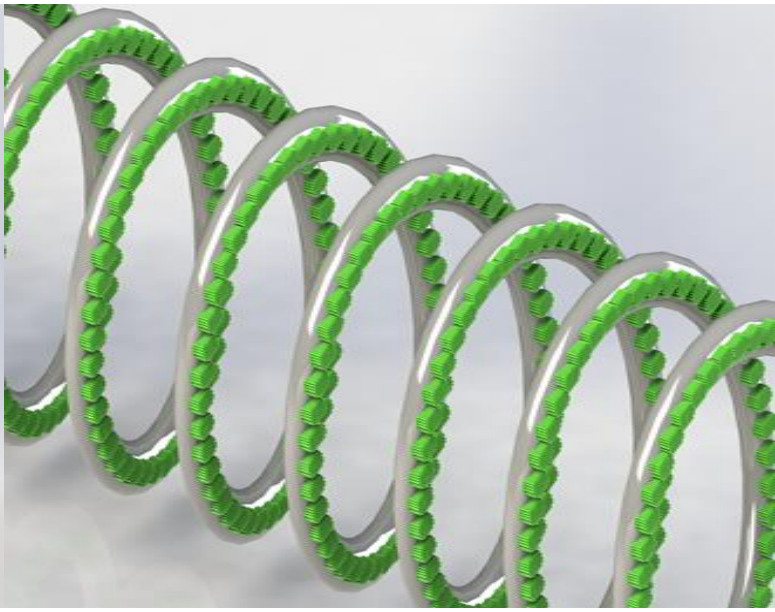
Design and construction:

Third chamber: In this chamber, soapy water is stored.

Helical pipes : The helical pipes are made of galvanized iron to resist corrosion. Scrubbers are mounted on the helical pipes to clean the plates effectively.



Third chamber



Helical pipes

Design and construction:

- Water pipes: •Water pipes are made up of PVC and Brass nozzles are used for spraying.
- Water pumps:•There are 2 pumps used, of 18W power each. One in the 1st chamber and the other in the 2nd chamber.

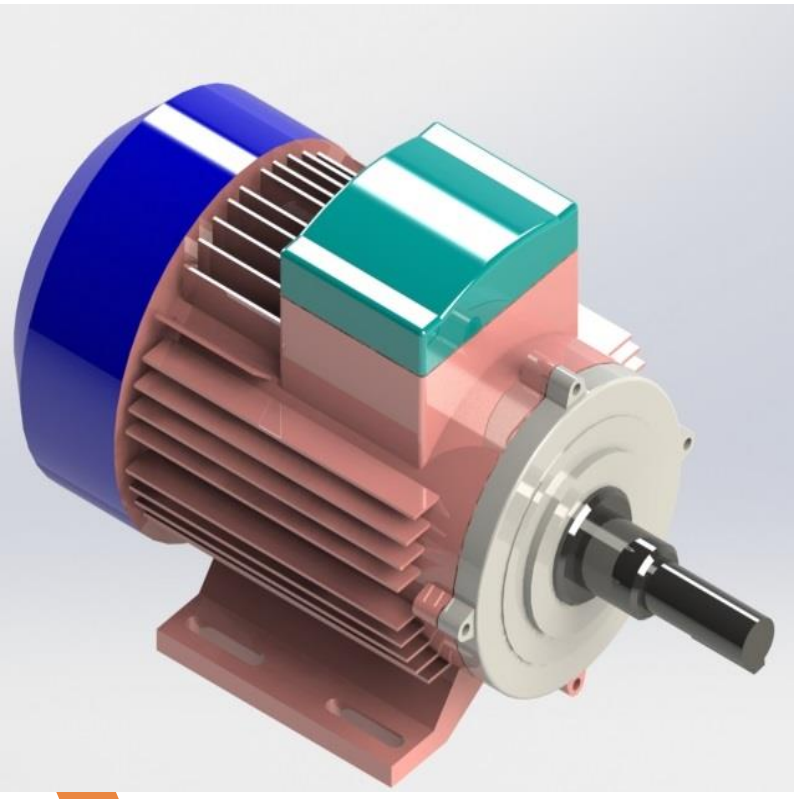
Water pipes

Nozzles

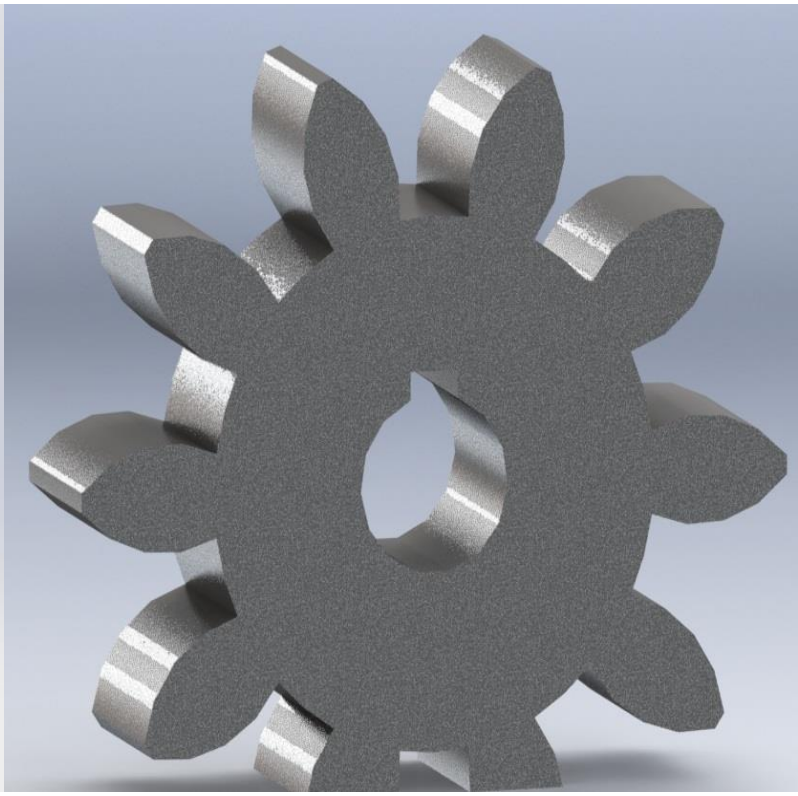
Water pump

Design and construction:

- AC motor: The motor is made up of iron added with nickel and cobalt sometimes. It provides input of 200 rpm.
- Gears: Here we are using 1:4 gear to get the output angular velocity 50rpm.
- Grilled metal sheet: It is made up of stainless steel used to collect the dishes after washing.



AC motor



Gears

Working:

❑ Progression of the dish:

It uses screw conveyor mechanism with scrubbers on the helical pipe for simultaneous scrubbing.

- **First chamber:** Firstly, the plate is loaded in the first chamber on the helical pipe.

1. 1st compartment: In the first compartment, the solid food particles on the plate are removed by spraying water.
2. 2nd compartment: In the second compartment, soapy water is used for cleaning the plates.
3. 3rd compartment: In the third compartment, freshwater is sprayed on the plates.

Working:

- Second chamber: After the washing of the plates, they are collected in the third chamber on the grilled sheet.

- Water movement:

- **Fresh water supply:** The freshwater enters into the main body through the inlet port and is supplied to the third chamber and 3rd compartment of first chamber directly through the PVC pipes.

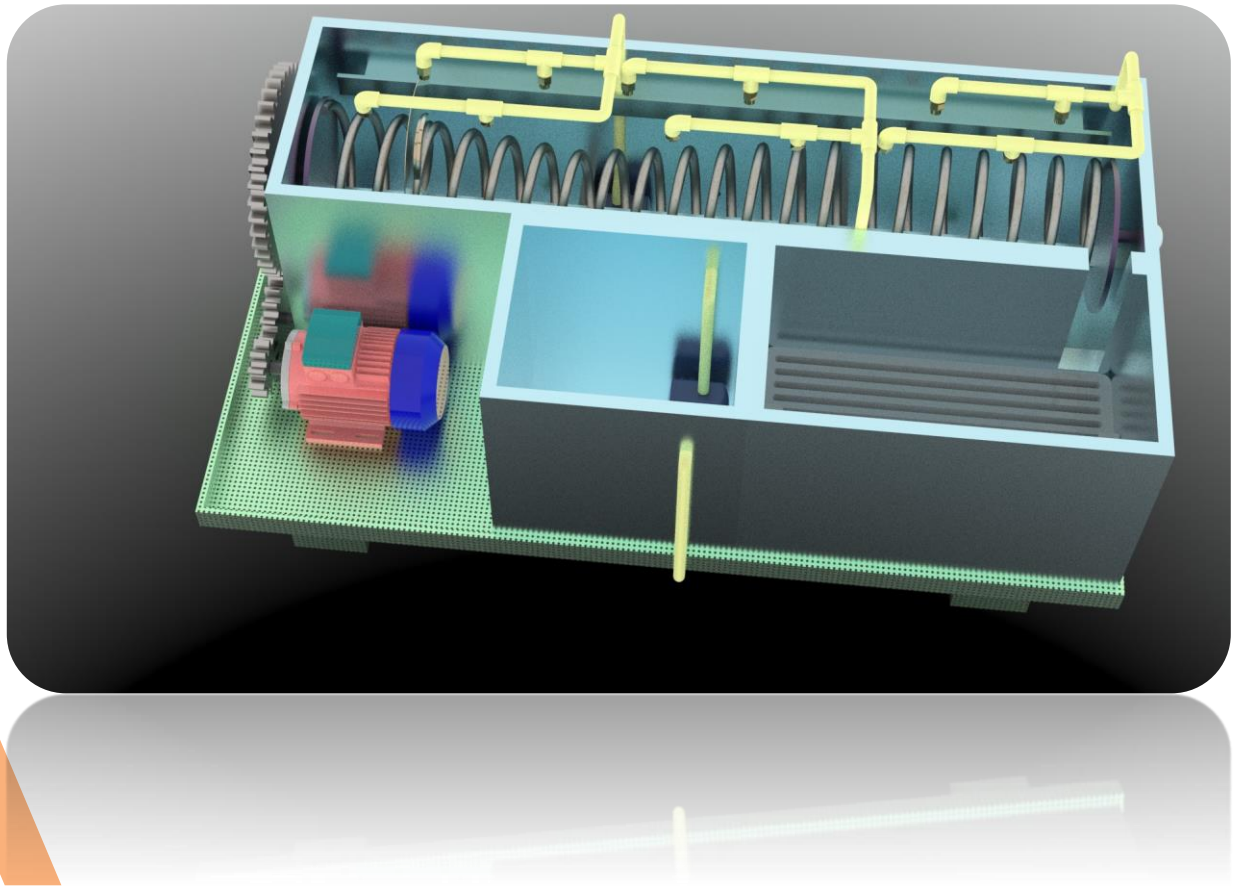
1. 3rd compartment: The fresh water is directly sprayed on the dishes for final rinsing.

2. Third chamber: In the third chamber, the freshwater is mixed with the soap to form soapy water.

- **Water supply into 2nd compartment :**The soapy water stored in the third chamber is supplied into 2nd compartment by using a motor.

Working:

- **Water supply into 1st chamber**: The water used in the 2nd chamber is supplied into the 1st chamber by using a pump for removing solid food particle.



Existing technologies

- Current dishwashers are mostly used in hostels, restaurants, and Guesthouses and they are used for normal cleaning purposes. They cannot handle oily or greasy utensils and hence they are not that hygienic. Simple Soap water spray and then clean water rinse are used to clean the utensils which don’t help in removing oil and dried stains at all. Also, they use a lot of water.

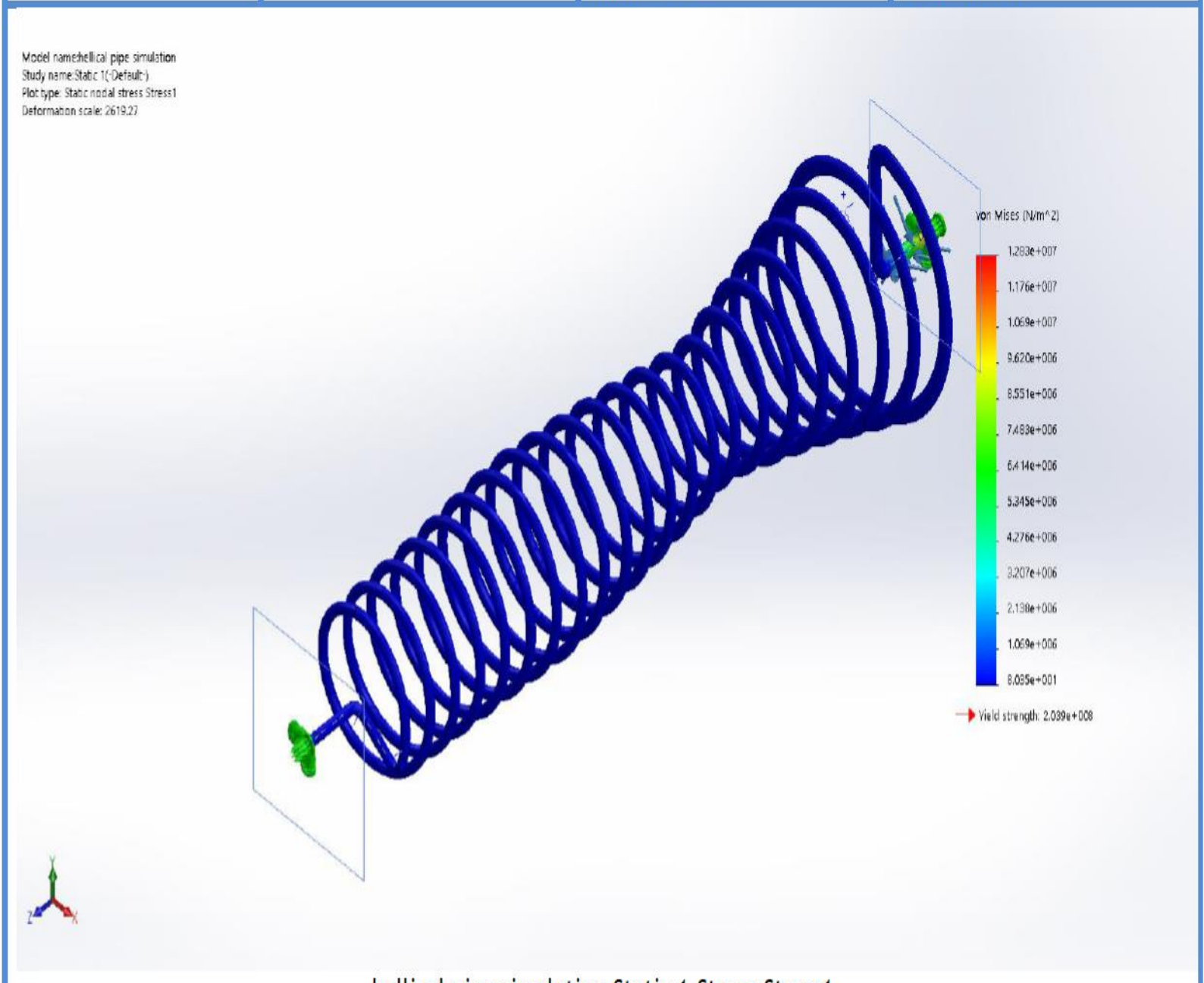
Our Advancements:

- We are trying to improve the cleaning ability by using scrubbers and well-designed and separated chambers for stepwise cleaning.

- We are taking care of minimizing the water usage by reusing the collected water from 2nd compartment in the 1st for removal of solid waste particles.

Simulation:

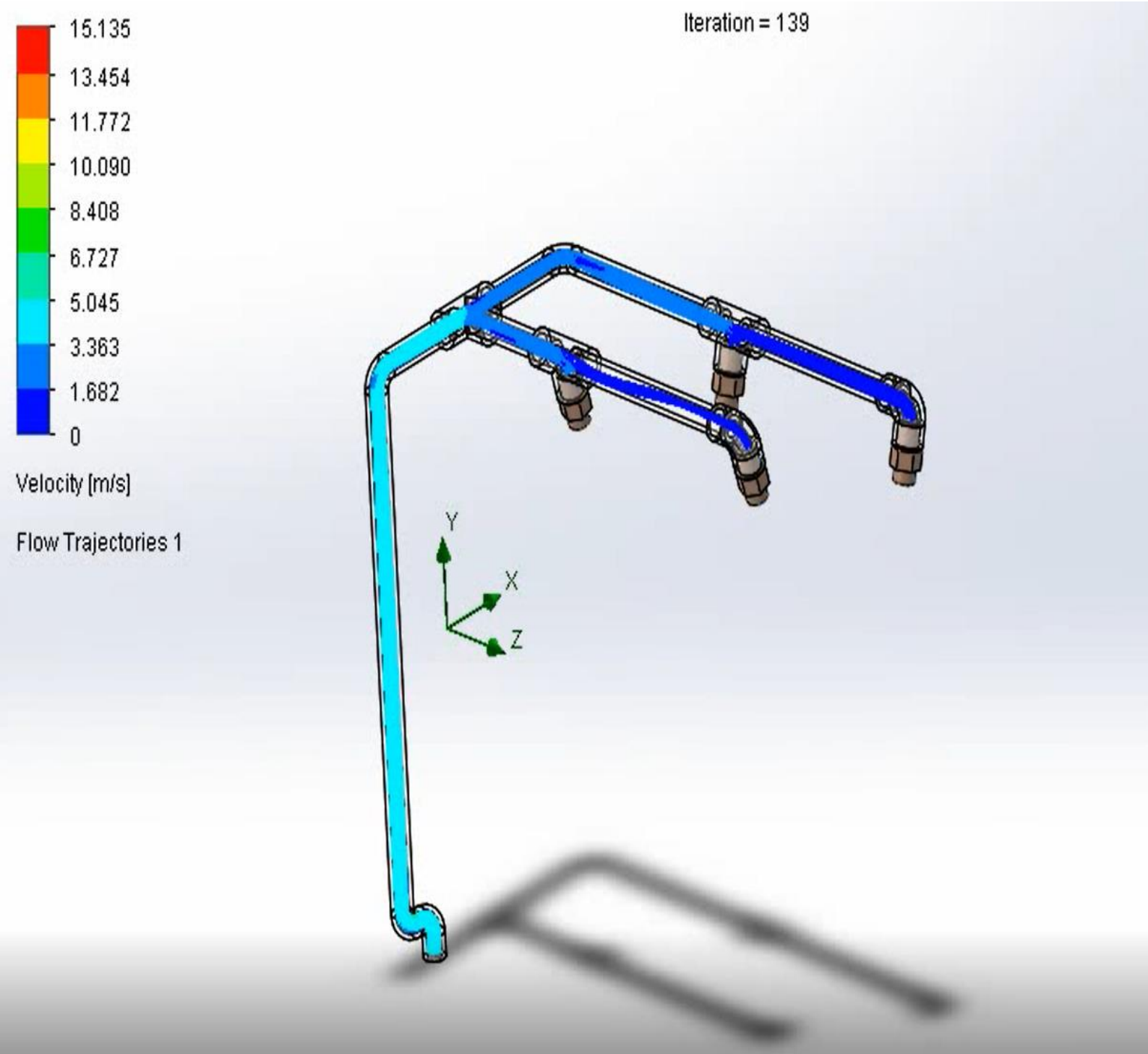
Name	Type	Min	Max
Stress1	VON: von Mises Stress	8.035e+001N/m^2 Node: 5443	1.283e+007N/m^2 Node: 6614



hellical pipe simulation-Static 1-Stress-Stress1

Simulation:

Pipe flow simulation



Advantages and disadvantages:

Advantages:

- Reduces human effort of washing dishes with hands.
- Promotes hygiene practices.
- Reduces water consumption.
- It is cost-effective and less time-consuming.

Disadvantages:

- It can only be used to wash plates and trays. We can not wash glasses and bowls.

Conclusion

Generally, we wash dishes with hands but this is not possible when the dishes are in a large amount. To clean the dishes, properly and efficiently we have to use a dishwasher. Since currently used dishwashers are not hygienic and we can not rely on them. So, we have to think of something else. Our project is the best alternative in this respect. Moreover, it also takes into consideration of minimum usage of water.