

# Recirculating Aquaculture System

PVG's College of Engineering and Technology & GKPIOM  
Product Innovation Lab



Project Guide :  
Team Members :

Prof. V.S.Chavan  
Kshitij Ghanekar  
Atharva Potnis  
Atharva Sinnarkar  
Suhrud Joglekar  
Atharva Sambhus

# Problem Statement

To design 3 stage water filtration system  
which should satisfy the following  
conditions: Compact Efficient Longer  
lifespan Cost effective Low  
Maintenance Less Energy Losses

# TABLE OF CONTENTS

1. Plan of Action
2. Introduction
3. Old Design vs NEW Design
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# PLAN OF ACTION

**CONCEPT BUILDING  
AND LITERATURE  
ACCORDING TO  
MANUFACTURING  
FEASIBILITY**

**5 DECEMBER 2021**



**MARKET SURVEY AND  
COMPONENT  
SHORTLISTING**

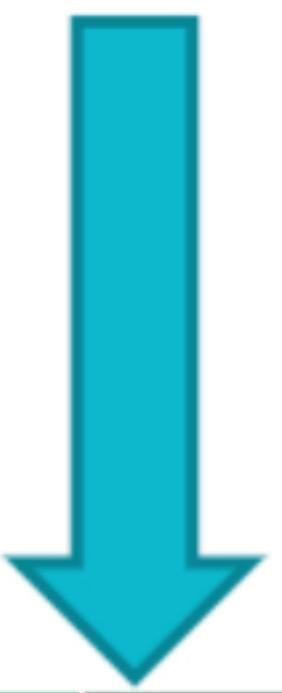
**25 JANUARY 2022**



**STUDY OF  
CURRENT  
EXISTING RAS  
SYSTEM AND  
UPDATED**

**10 JANUARY 2022**

**We are Here**



**Testing**

**7 APRIL 2022**



**ASSEMBLY OF THE SYSTEM**

**25 MARCH 2022**

Inspire

Learn

Innovate

Create

Evaluate

## Project Planning - Manufacturing of RAS

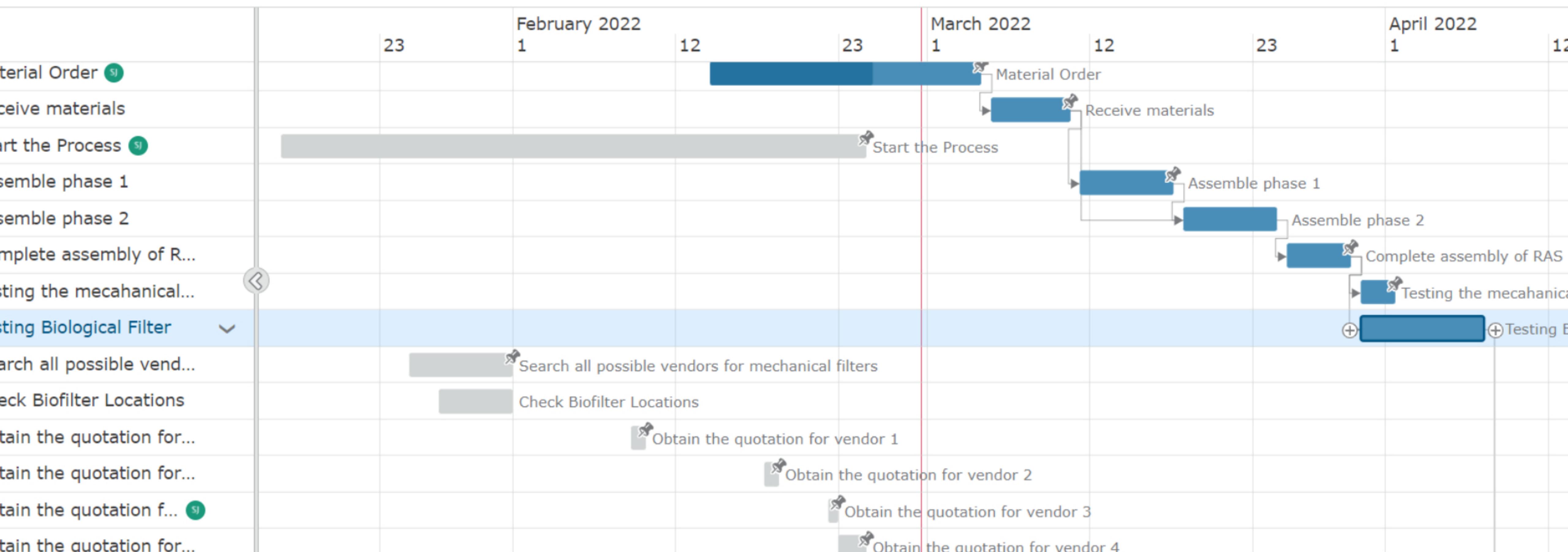
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## Manufacturing of RAS

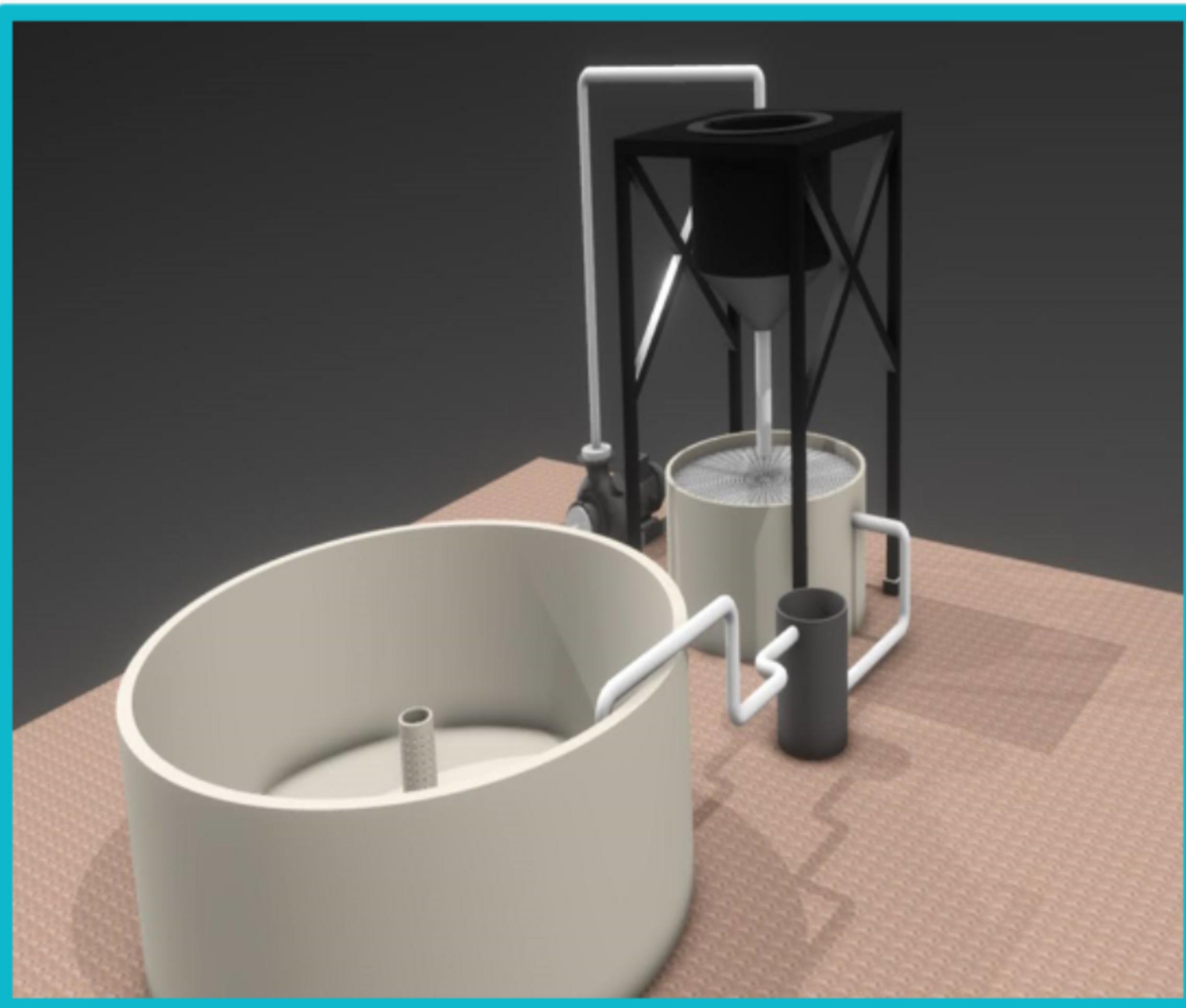
Tasks    Schedule    Members    Content



# Introduction

- ▶ Recirculatory Aquaculture System (RAS) is a technology where water is recycled and reused after mechanical and biological filtration.
- ▶ This method is used for high- density culture of various species of fish, utilizing minimum land area and water. In this system fish are typically reared in indoor/outdoor tanks in a controlled environment.
- ▶ Recirculating systems filter and clean the water by recycling it back to fish culture tanks. New water is added to the tanks only to make up for splash out, evaporation and that used to flush out waste materials.
- ▶ We intend to design, manufacture and test a 1000L RAS system for commercial Tilapia(GIFT).
- ▶ The basic idea is to filter existing water from fish tank using a series of processes viz. mechanical filtration, biological filtration, U.V. filtration.

# OLD DESIGN VS NEW DESIGN



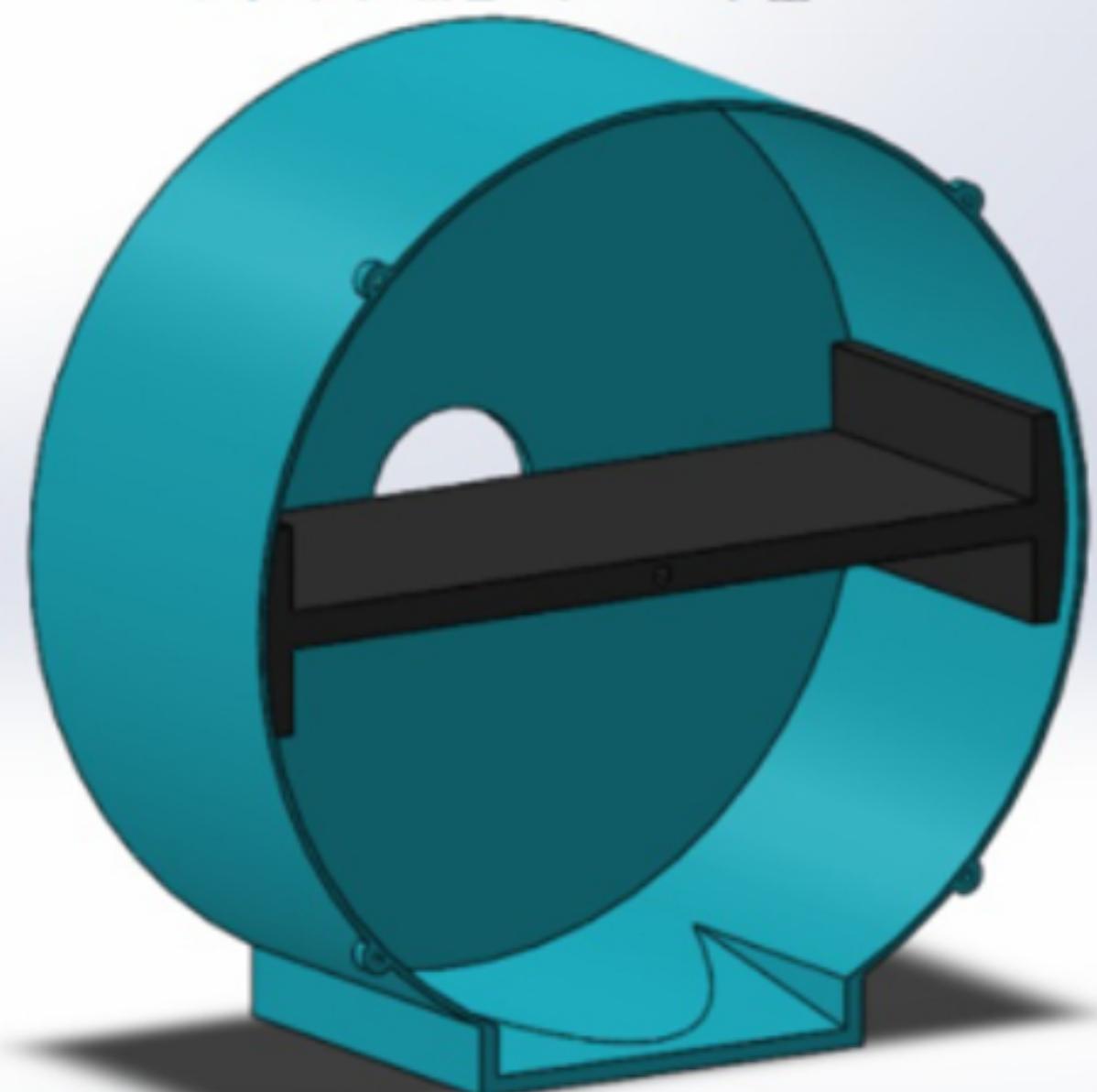
## Advantages of the New Design

- ▶ The design is more compact.
- ▶ More economical and Piping becomes simpler
- ▶ Most of the water flow is under the influence of gravity. Energy requirement is reduced.
- ▶ 2<sup>nd</sup> water pump is eliminated
- ▶ Automatic Feed delivery system is introduced.

# COMPONENTS OF RAS SYSTEM

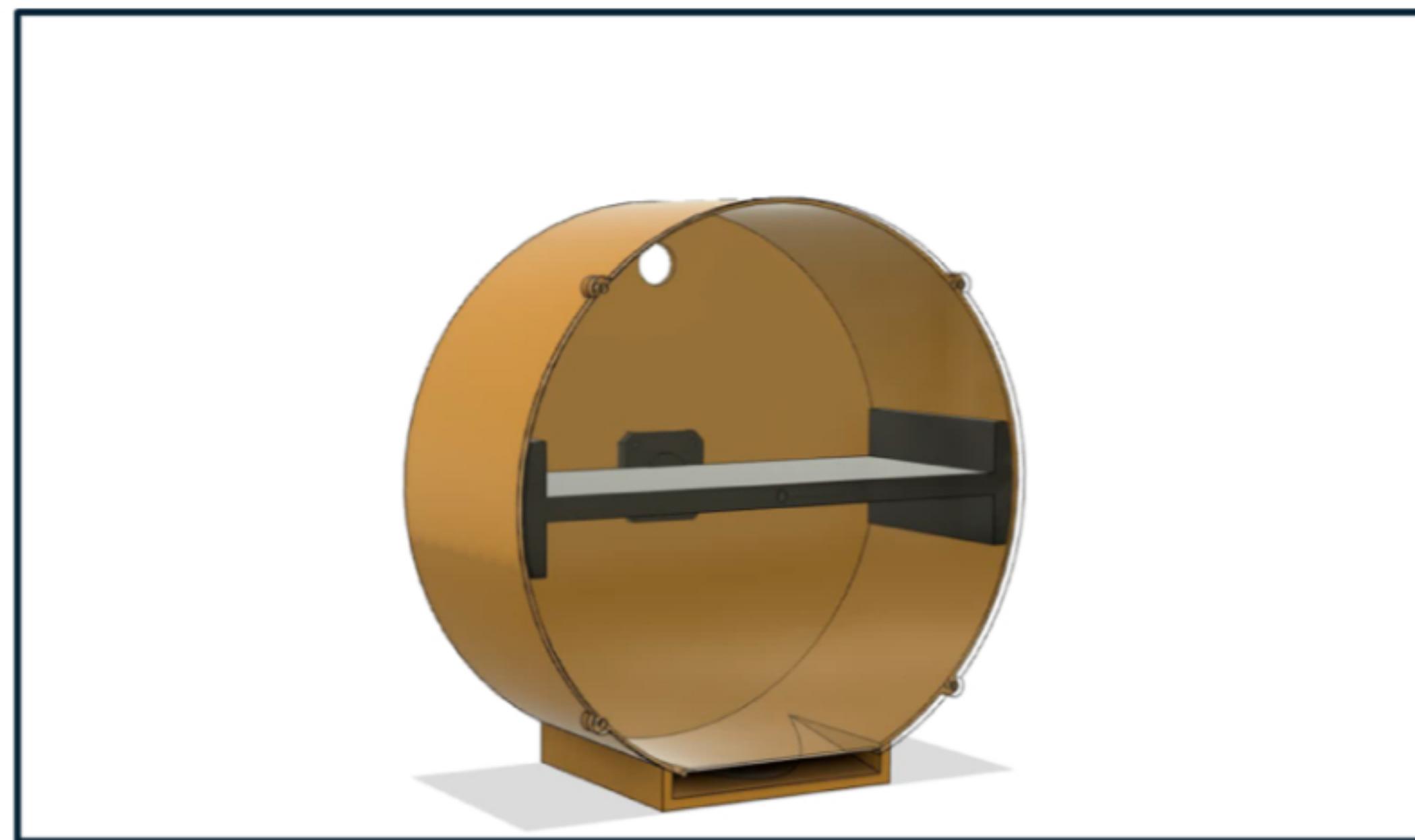
1. Fish tank
2. Mechanical Filter
3. Biological Filter
4. Ultraviolet Filtration
5. Automatic Feed System

# Automatic Feed Delivery System



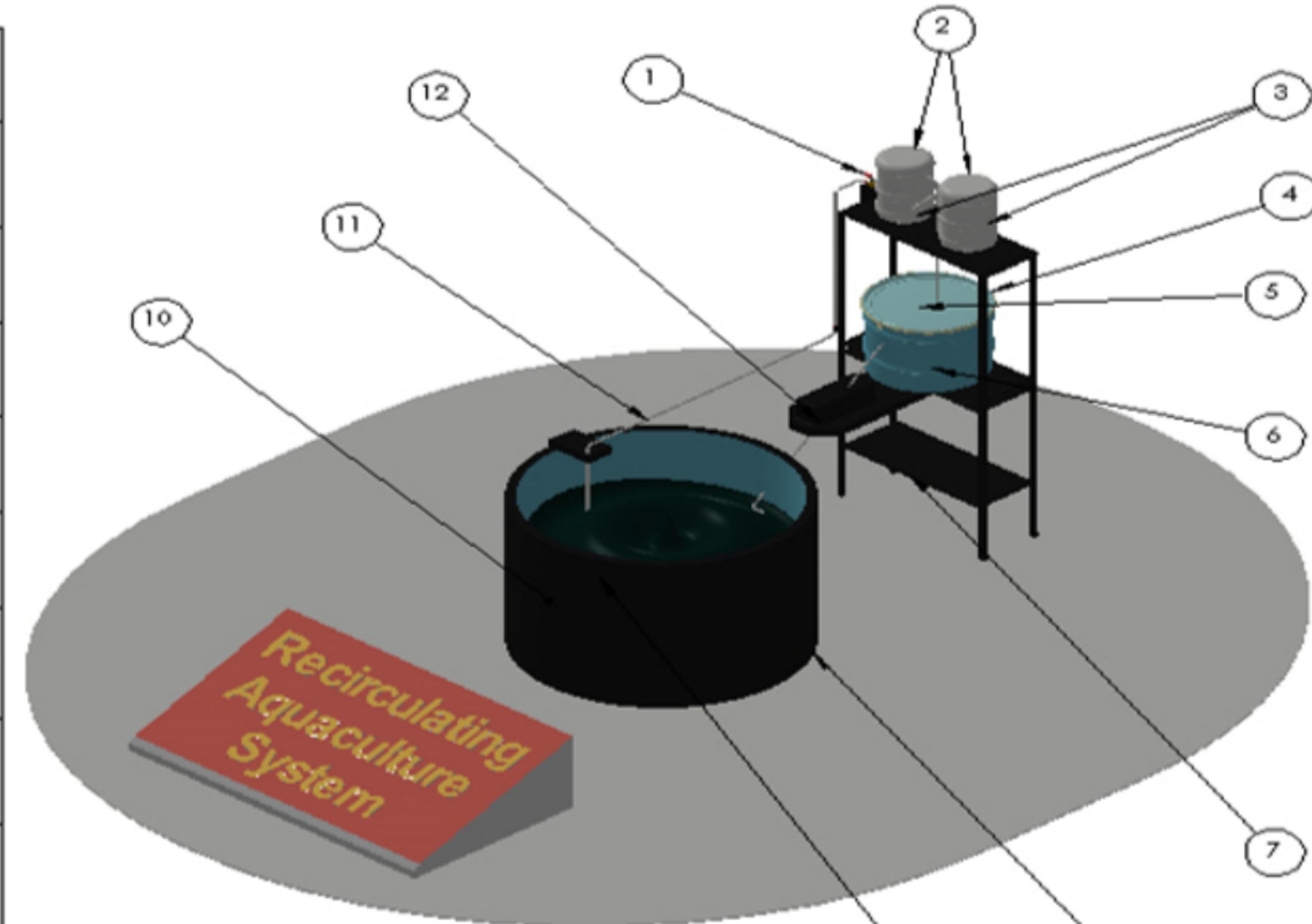
- It is absolutely necessary to feed the fishes 3-4 times a day.
- To reduce human efforts, we use a simple, cheap mechanism.
- One half of the system is equal to one feeding.
- The plate will rotate 4 times a day for 180 degrees delivering the required feed to the fish.

## Feed Delivery Mechanism



# BILL OF MATERIALS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	NRV	1/2"	2
2	MECHANICAL FILTER	BISLERI 20LTR	2
3	MESH PLATE	SS 316, 1 MTR X 1 MTR, 40 MICRON	1
4	WAVEMAKER	SUBMERSIBLE, 360 DEGREE ROTATION	1
5	BIOMEDIA	CERAMIC RINGS, 1KG PACK	15
6	BIOLOGICAL FILTER	50LTR	1
7	RACK	200cm SLOTTED ANGLE	1
8	FISH TANK	1500LTR	1
9	PUMP	SUBMERSIBLE, 4500L/HR, 1/2" OUTPUT, MAX HEAD HEIGHT-4M	1
10	AIR PUMP	2 OUTPUT	1
11	PIPE	1/2" PVC-10FT	1
12	UV LAMP SET	4W	1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: ISI-FAR ANGULAR			FINISH:	DETAILED AND REFRAIN SHARP EDGES	DO NOT SCALE DRAWING	REVISON:
ITEM NO.	NAME	SIGNATURE	DATE		REV:	
CH-100						
APPENDIX						
MFG						
QA				MANUFACTURER:	DWG NO:	
				WORKSHOP:	SCALE:	
				W.D.C.H.D.	STAMP:	Sheet 1 of 1

# COMPARATIVE SHEETS

SR. NO.	ITEM SPECIFICATIONS	QTY.	SUPPLIER'S NAME & ADDRESS		
	Hardware		Poona Electricals and Hardware Shivdarshan Chowk,Pune	Prince ply and hardware tools Atulnagar,Warje , Pune	Mahalaxmi electricals hardware and paints Hingane khurd, vitthalwadi, Sinhagad Rd. Pune
1	PVC Pipes 1/2" 10ft.	1Nos.	200	230	230
2	Water Tank (1500Ltr)	1Nos.	5250	7500	6750
3	Ball valve and NRV(5+2)	7Nos.	680	1340	1240
4	Barrel (200Ltr)	1Nos.	650	1010	750
5	Elbows and Connection(10+10)	20Nos.	200	225	350
6	Slotted angle rack (200cm)	1Nos.	7000	5500	5000
<b>TOTAL COST:</b>			13930	158056	14280
<b>GST @ 18%</b>			2507/-	2845/-	2840/-
<b>Packaging &amp; Forwarding</b>			(Included)	Included	Included
<b>Freight (Transportation), Loading &amp; Unloading</b>			(Included)	NIL	1500
<b>Insurance</b>			NIL	NIL	NIL
<b>Miscellaneous</b>			Nil	Nil	Nil
<b>Total Cost</b>			Rs. 16437/-	Rs. 18650/-	Rs. 18620/-
<b>VALIDITY</b>			30 Days	5 Days	40 Days
<b>PAYMENT TERMS</b>			100% advanced payment	100% advanced payment	100% advanced payment
<b>WARRANTY</b>			--	--	--
<b>INSPECTION</b>			--	--	--
<b>DELIVERY PERIOD</b>			--	--	--

Note: As per comparative Poona Electricals and Hardware have provided lowest quotation for the items that we specified hence we are requesting to proceed with payment for the same.

Prof. V. S. Chavan  
Prepared by

Dr. M.M.Bhoomkar  
HOD

Dr.M.R.Tarambale  
I/C Principal

21/02/2022  
G.  
Prof. R.V.Kaduskar  
Director

Redekar  
Shri.S.P.Redekar  
Director

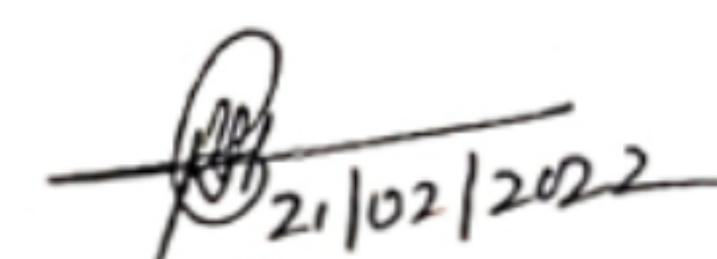
SR. NO.	ITEM SPECIFICATIONS	Q.T.Y.	SUPPLIER'S NAME & ADDRESS		
	Fish and Feed		Tamboli Fish Pune - Solapur Rd, Survey No 15, Hadapsar, Pune, Maharashtra 411028	Ulka sea foods Pvt. Ltd. Navi Mumbai, MIDC Taloja	Shashwat Aquaculture Nayar colony, Chikhali, Pune
I	Tilapia 100gm/pc  Tilapia Feed 28% protein(25 Kg bag)	150Nos. 1Nos.	2700  1050  3750	2850  1050  3900	2850  1050  3900
	<b>TOTAL COST:</b>		-	-	-
	<b>GST @ 18%</b>		(Included)	Included	Included
	<b>Packaging &amp; Forwarding</b>		<u>3000/-</u>	<u>10000/-</u>	<u>5000/-</u>
	<b>Freight (Transportation), Loading &amp; Unloading</b>		NIL	NIL	NIL
	<b>Insurance</b>		Nil	Nil	Nil
	<b>Miscellaneous</b>		Rs. 6750/-	Rs. 13900/-	Rs. 8900/-
	<b>Total Cost</b>		30 Days	25 Days	40 Days
	<b>VALIDITY</b>				
	<b>PAYMENT TERMS</b>		100% advanced payment	100% advanced payment	100% advanced payment
	<b>WARRANTY</b>		--	--	--
	<b>INSPECTION</b>		--	--	--
	<b>DELIVERY PERIOD</b>		--	--	--

Note : The transport, loading & unloading cost is high as the fishes need special containers with oxygen supply for them to survive the journey.

  
Prof. V. S. Chavan  
Prepared by

  
Dr. M.M.Bhoomkar  
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Dr. M.R.Tarambale  
SJC Principal

  
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Director

  
Shri.S.P.Redekar  
Director

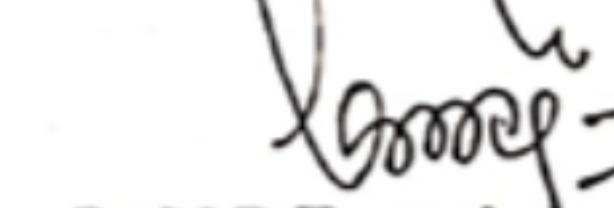
Note: As per comparative, Tamboli Aquaculture Services have provided lowest quotation for the items we specified hence we are requesting to proceed with payment for the same.

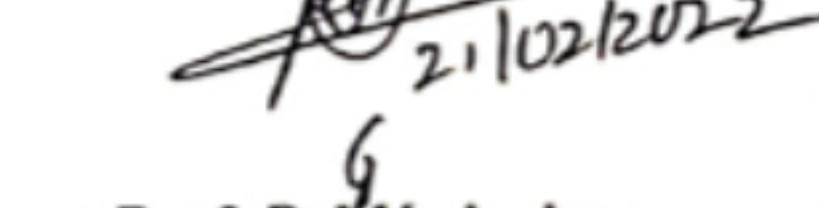
SR. NO.	ITEM SPECIFICATIONS	QTY.	SUPPLIER'S NAME & ADDRESS		
	Electronics		MTS SHOP NO 36, FIRST FLOOR, ROYALE SHELL, NEXT TO D.Y. PATIL COLLEGE, S.NO 29, RAVET, PUNE-411033	BOMBAY ELECTRONICS 3 B, Shamrao Vithal Lane, off Lamington Road, Grant Road East, Mumbai, Maharashtra 400007	PIONEER ELECTRONICS 406, Narsinha Chintamani Kelkar Road near Pasodya Vithoba Mandir, Vinayak Market, Budhwar Peth, Pune, Maharashtra 411002
1	Arduino Uno	1Nos.	650	700	700
2	Stepper Motor(>2kg-cm,12V)	2Nos.	1080	1500	1080
3	Extension board ( two outputs)	1Nos.	350	400	350
4	1.293D motor driver SHIELD	2Nos.	300	300	300
5	Ac to dc converter 12V 5A	1Nos.	500	450	500
6	11V lamp set (4 W)	1Nos.	800	790	840
<b>TOTAL COST:</b>			3680	4140	3770
<b>GST @ 18%</b>			<u>662.40</u>	<u>745</u>	<u>679</u>
<b>Packaging &amp; Forwarding</b>			(Included)	Included	Included
<b>Freight (Transportation), Loading &amp; Unloading</b>			(Included)	(Included)	(Included)
<b>Insurance</b>			NIL	NIL	NIL
<b>Miscellaneous</b>			Nil	Nil	Nil
<b>Total Cost</b>			Rs. 4342.40/-	Rs. 4885/-	Rs.4449/-
<b>VALIDITY</b>			30 Days	25 Days	40 Days
<b>PAYMENT TERMS</b>			100% advanced payment	100% advanced payment	100% advanced payment
<b>WARRANTY</b>			--	--	--
<b>INSPECTION</b>			--	--	--
<b>DELIVERY PERIOD</b>			--	--	--

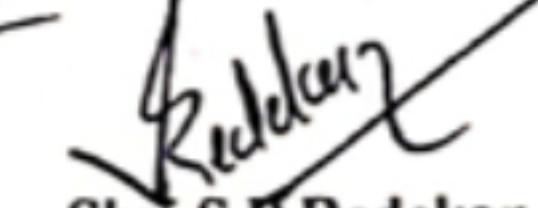
Note: As per comparative MTS Electronics have provided lowest quotation for the items we specified hence we are requesting to proceed with payment for the same.

  
 Prof. V. S. Chavan  
 Prepared by

  
 Dr. M.M.Bhoomkar  
 HOD

  
 Dr. M.R.Tarambale  
 Principal (IIC)

  
 Prof. R.J.Kaduskar  
 Director

  
 Shri.S.P.Redekar  
 Director

SR. NO.	ITEM SPECIFICATIONS	QTY.	SUPPLIER'S NAME & ADDRESS		
	Mesh		Jeewanjee's Budhwar Peth Pune, Maharashtra	Shanti Traders block,Bhosri MIDC Pune	Zain Corporation 372, Raviwar Peth Rd, Bohri Aali, Pune, Maharashtra 411002
I	38um Stainless Steel Mesh 1m*1m (SS 316)	1Nos.	4198.3  4198.3  <u>755.7/-</u>  <u>(Included)</u>  <u>(Included)</u>  NIL	1916  1916  <u>345/-</u>  <u>Included</u>  <u>NIL</u>  NIL	3762  3762  <u>677/-</u>  <u>Included</u>  <u>NIL</u>  NIL
	<b>TOTAL COST:</b>				
	<b>GST @ 18%</b>				
	Packaging & Forwarding				
	Freight (Transportation), Loading & Unloading				
	Insurance				
	Miscellaneous		Nil	Nil	Nil
	<b>Total Cost</b>		Rs. 4954/-	Rs. 2261/-	Rs.4440/-
	<b>VALIDITY</b>		30 Days	10 Days	40 Days
	<b>PAYMENT TERMS</b>		100% advanced payment	100% advanced payment	100% advanced payment
	<b>WARRANTY</b>		--	--	--
	<b>INSPECTION</b>		--	--	--
	<b>DELIVERY PERIOD</b>		--	--	--

Note: As per comparative Jeewanjee's have provided lowest quotation for the items we specified hence we are requesting to proceed with payment for the same.

Prof. V. S. Chavan

Dr. M.M.Bhoomkar

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HOD

Dr. M.R.Tarambale  
Principal (IIC)

21/02/2022

Prof. R.J.Kaduskar  
Director

Shri.S.P.Redekar  
Director

PUNE VIDYARTHI GRIHA COLLEGE OF ENGINEERING AND TECHNOLOGY & GKP(W)IOM, PUNE  
COMPARATIVE STATEMENT

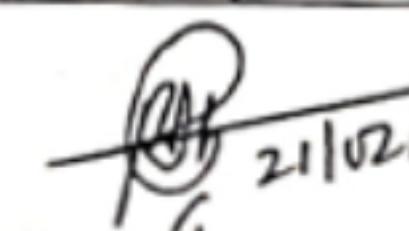
DATE: 08/02/2022

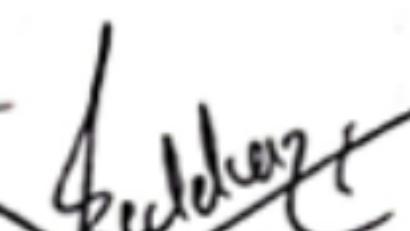
SR. NO.	ITEM SPECIFICATIONS	QTY.	SUPPLIER'S NAME & ADDRESS		
	Aquarium Products		Sai Sagar Enterprises Jijai Nagar Kothrud Pune	The treasure aquarium NDA road, Warje Malwdai, Pune	Niraj fish aquarium Dattawadi, Near Mhatre Bridge, Pune
1	Water Pump(4500 litre/hr)	1Nos.	4590	4500	5000
2	KI Biomedia (17 litre)	1Nos.	4500	5000	4500
3	Bacteria	1Nos.	180	850	200
4	Air Pump - 2 output	1Nos.	720	650	780
5	Wave Maker(7500lph)	1Nos.	1380	2800	1280
6	De-Chlorinator	1Nos.	200	100	200
<b>TOTAL COST:</b>			11390	13900	11960
<b>GST @ 18%</b>			2083	=	=
<b>Packaging &amp; Forwarding</b>			(Included)	=	
<b>Freight (Transportation), Loading &amp; Unloading</b>			(Included)	NIL	2000
<b>Insurance</b>			NIL	NIL	NIL
<b>Miscellaneous</b>			Nil	Nil	Nil
<b>Total Cost</b>			Rs. 13472/-	Rs. 13900/-	Rs.13960/-
<b>VALIDITY</b>			30 Days	30 Days	30 Days
<b>PAYMENT TERMS</b>			100% advanced payment	100% advanced payment	100% advanced payment
<b>WARRANTY</b>			--	--	--
<b>INSPECTION</b>			--	--	--
<b>DELIVERY PERIOD</b>			--	--	--

  
Prof. V. S. Chavan  
Prepared by

  
Dr. M.M.Bhoomkar  
HOD

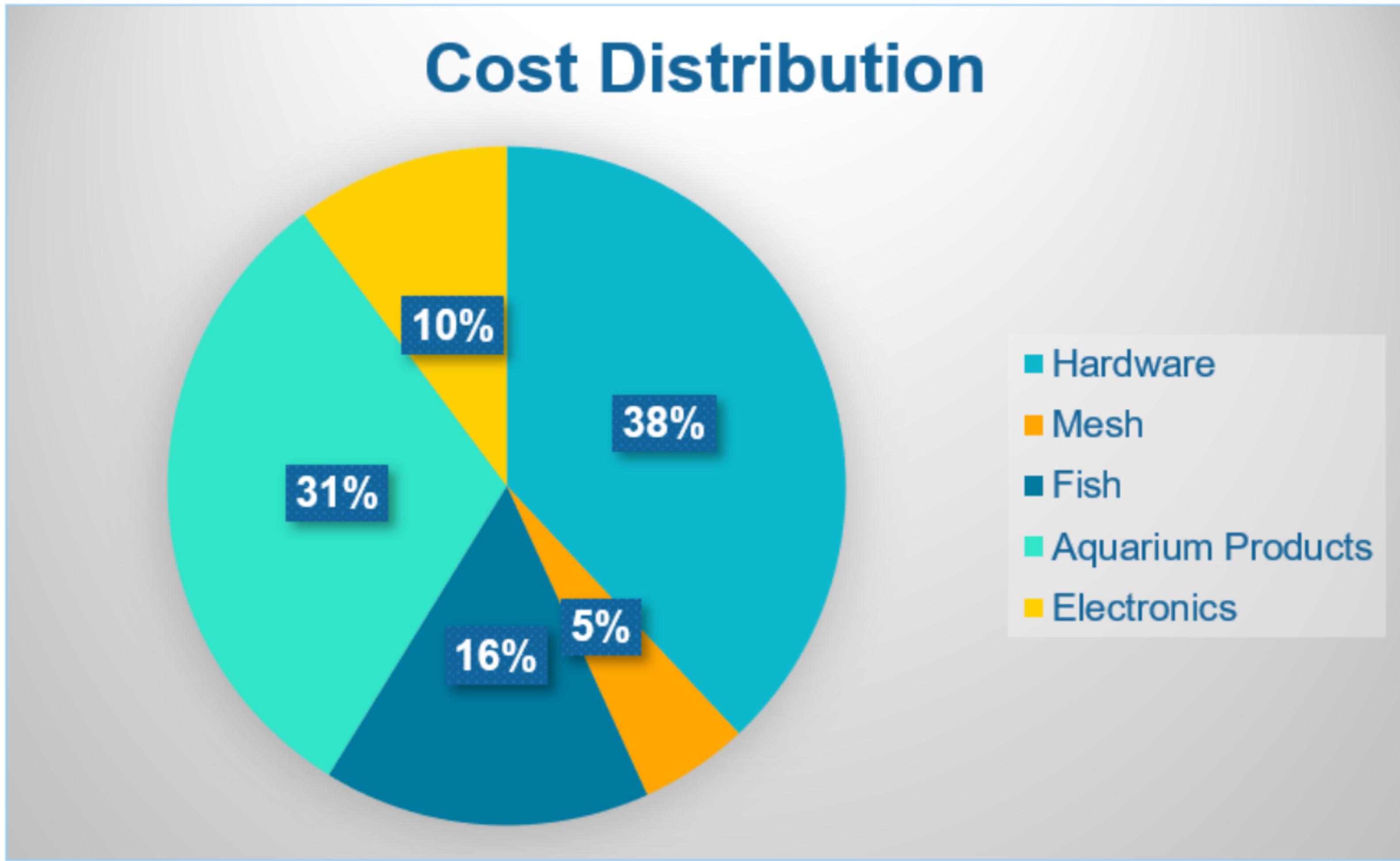
  
Dr. M.R.Tarambale  
Principal(T.I.C)

  
Prof. R.J.Kaduskar  
Director

  
Shri.S.P.Redekar  
Director

Note: As per comparative Sai Sagar Enterprises have provided lowest quotation for the items we specified hence we are requesting to proceed with payment for the same.

# PURCHASE ORDERS



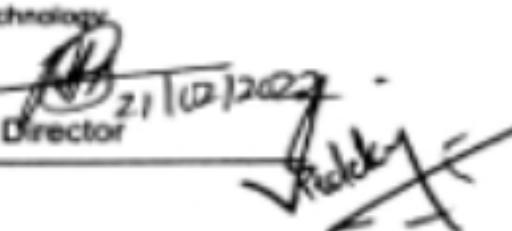
POONA ELECTRICALS AND HARWARE

MTS ELECTRONICS

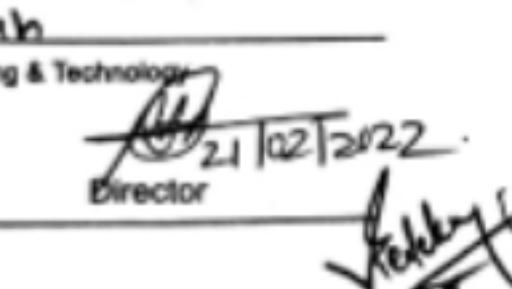
Pune Vidyarthi Griha's <b>College of Engineering and Technology</b>					
S. No. 44, Vidyanagar, Parvati, Pune 411009 Phone : 24228258, 24228265, 24228279 ♦ PAN No. : AAATP1233A ♦ GST No. : 27AAATP1233A1Z7					
<u>Department of Mechanical Engineering</u>					
To Poona Electricals and Hardware M/s Shop No. 6, Phule Chambers, Patavati, Shirdeshan Chowk, Near Rajiv Gandhi E-learning, Pune - 411009	Your Quotation No.	Our Purchase Order No. COET/MECH/21-22/PIL/12			
Date : 16/2/2022					
We are pleased to place the order with you for the supply of the following material. Please however, note the terms and conditions given below and overleaf for honouring this purchase order. Kindly confirm.					
<u>27ALNPT1837C1Z7</u>					
Sr. No.	Description	Quantity	Unit	Rate per unit Rs.	Cost Amount Rs.
1	1/2" UPVC elbow	10	Nos	10	100
2	1/2" UPVC pipe	1	Nos	200	200
3	1/2" Socket UPVC	10	Nos	10	100
4	1/2" UPVC ball valve	5	Nos	80	400
5	Barrel 200L	1	Nos	600	600
6	1/2" NRV	2	Nos	140	280
7	Tank black 1500 L	1	Nos	5250	5250
8	Rack	1	Nos	7000	7000
				18% GST	₹ 2507/-
Net Total Rs. Sixteen thousand Four hundred and thirty seven only				₹ 16437/-	
Price Basis	Sales Tax <input checked="" type="checkbox"/> Nil % against declaration	Excise duty at 80%	Other Levies NIL		
Payment Terms 100% <b>AGAINST DELIVERY</b>		Insurance, if any NIL	Mode of transport By Hand		
Delivery Schedule 1 Month		Handled by : <u>V.S. Chavhan</u> Prof. V.S. Chavhan			
1) Supplier 2) O/C 3) Accounts 4) Stores		For Pune Vidyarthi Griha's College of Engineering & Technology Gaurav Patel HOD Principal 21/02/2022 Director			

Pune Vidyarthi Griha's <b>College of Engineering and Technology</b>					
S. No. 44, Vidyanagar, Parvati, Pune 411009 Phone : 24228258, 24228265, 24228279 ♦ PAN No. : AAATP1233A ♦ GST No. : 27AAATP1233A1Z7					
<u>Department of Mechanical Engineering</u>					
To MTS Electronics M/s Shop no 36, First floor Royale shell, next to DY Patil college, S.No. 29, Panet Pune - 411033	Your Quotation No.	Our Purchase Order No. COET/MECH/21-22/PIL/16			
Date : 16/2/2022					
We are pleased to place the order with you for the supply of the following material. Please however, note the terms and conditions given below and overleaf for honouring this purchase order. Kindly confirm.					
<u>27ABKFM8055C1Z5</u>					
Sr. No.	Description	Quantity	Unit	Rate per unit Rs.	Cost Amount Rs.
1	Arduino Uno	1	Nos	650	650
2	Stepper motor(72kg - cm, 12V, single shaft)	2	Nos	540	1080
3	Extension board (two outputs)	1	Nos	350	350
4	L293D Motor driver shield	2	Nos	150	300
5	Acto DC connector 12V-5A	1	Nos	500	500
6	UV-lamp set(4W)	1	Nos	800	800
				GST 18%	662.40
Net Total Rs. Four thousand four hundred forty two rupees and Forty paise only				₹ 4342.40/-	
Price Basis	Sales Tax <input type="checkbox"/> Nil % against declaration	Excise duty at 80%	Other Levies NIL		
Payment Terms 100% <b>AGAINST DELIVERY</b>		Insurance, if any NIL	Mode of transport By Hand		
Delivery Schedule 1 Month		Handled by : <u>V.S. Chavhan</u> Prof. V.S. Chavhan			
1) Supplier 2) O/C 3) Accounts 4) Stores		For Pune Vidyarthi Griha's College of Engineering & Technology Gaurav Patel HOD Principal 21/02/2022 Director			

# SHANTI TRADERS

Pune Vidyarthi Griha's College of Engineering and Technology					
S. No. 44, Vidyanagari, Parvati, Pune 411009 Phone : 24228258, 24228265, 24228279 ◆ PAN No. : AAATP1233A ◆ GST No. : 27AAATP1233A1Z7					
<u>Department of Mechanical Engineering</u>					
To Shanti Traders M/s Step No. 1B, Plot No. JP 114, Jay Vatra comp. -ex T block, MIDC, Bhosari Pune - 411026	Your Quotation No.	Our Purchase Order No. COET/MECH/21-22/PIL/14  Date : 16/2/2022			
We are pleased to place the order with you for the supply of the following material. Please however, note the terms and conditions given below and overleaf for honouring this purchase order. Kindly confirm.					
<b>27APNPK3705E1ZJ</b>					
Sr. No.	Description	Quantity	Unit	Rate per unit Rs.	Cost Amount Rs.
1	SS 316 Wire Mesh 40 Microns 1mtr * 1Mtr	10.765 SQF	10.765 SQF	178	1916.17
				GST 18%	344.92
					- 0.09
Less discount Round off					
Net Total Rs. Two thousand two hundred sixty one only 2261/-					
Price Basis	Sales Tax <input checked="" type="checkbox"/> Nil % against declaration	Excise duty at 80%	Other Levies NIL		
Payment Terms 100 %		Insurance, if any	Mode of transport		
<u>AGAINST DELIVERY</u>					
Delivery Schedule		Handled by : Prof. V.S. Chavhan			
1 Month					
1) Supplier 2) O/C 3) Accounts 4) Stores		For Pune Vidyarthi Griha's College of Engineering & Technology Principal HOD 17/2/2022			
 Director 21/02/2022					

# TAMBOLI AQUACULTURE

Pune Vidyarthi Griha's College of Engineering and Technology					
S. No. 44, Vidyanagari, Parvati, Pune 411009 Phone : 24228258, 24228265, 24228279 ◆ PAN No. : AAATP1233A ◆ GST No. : 27AAATP1233A1Z7					
<u>Department of Mechanical Engineering</u>					
To Tamboli Aquaculture M/s Services 5A No 14, New Old carol, Vithalnagar, Pune-Belapur Road, Hadapsar, 411028	Your Quotation No.	Our Purchase Order No. COET/MECH/21-22/PIL/13  Date : 16/2/2022			
We are pleased to place the order with you for the supply of the following material. Please however, note the terms and conditions given below and overleaf for honouring this purchase order. Kindly confirm.					
<b>27APNPT8096A1ZD</b>					
Sr. No.	Description	Quantity	Unit	Rate per unit Rs.	Cost Amount Rs.
1	Tilapia Fish	150	Nos	18	2700
2	Transport	1	Nos	3000	3000
3	GROWFIN 24/1-3mm	1	Nos	1050	1050
				GST 0%	0
Less discount					
Net Total Rs. Six thousand seven hundred and fifty only 6750/-					
Price Basis	Sales Tax <input checked="" type="checkbox"/> Nil % against declaration	Excise duty at 80%	Other Levies NIL		
Payment Terms 100 %		Insurance, if any	Mode of transport		
<u>AGAINST DELIVERY</u>					
Delivery Schedule		Handled by : Prof. V.S. Chavhan			
1 Month					
1) Supplier 2) O/C 3) Accounts 4) Stores		For Pune Vidyarthi Griha's College of Engineering & Technology Principal HOD 17/2/2022			
 Director 21/02/2022					

## SAI SAGAR ENTERPRISES

Pune Vidyarthi Griha's

**College of Engineering and Technology**

S. No. 44, Vidyayanagari, Parvati, Pune 411009 Phone : 24228258, 24228265, 24228279

♦ PAN No. : AAATP1233A    ♦ GST No. : 27AAATP1233A1Z7

Department of Mechanical Engineering

To Sai Sagar Enter- M/s - PRISES 204, Devyani, Tijji Nager, Kothrud, Pune - 411038	Your Quotation No.	Our Purchase Order No. CoET/MECH/21-22/PIL/15
		Date : 16/2/2022

We are pleased to place the order with you for the supply of the following material. Please however, note the terms and conditions given below and overleaf for honouring this purchase order. Kindly confirm.

27AKXPM9706A1Z5

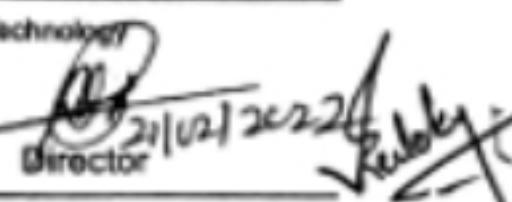
Sr. No.	Description	Quantity	Unit	Rate per unit Rs.	Cost Amount Rs.
1	Sunsun Submersible Pump HAB 4500	1	Nos	4590	4590
2	Bio media 1 KG	15	Nos	300	4500
3	Sunsun CT 202 2 Way air pump	1	Nos	720	720
4	OF antichlorine 210 ml	1	Nos	200	200
5	Sunsun JVP 131 wave maker	1	Nos	1380	1380
6	Aerotech starter bacteria	1	Nos	180	180
Less discount				GST 18%	2082.61-
+ round off					- 180.6
Net Total Rs. thirteen thousand four hundred seventy two only				13472/-	

Price Basis	Sales Tax <input checked="" type="checkbox"/> Nil % against declaration	Excise duty at 80%	Other Levies
		NIL	NIL

Payment Terms	100 %	Insurance, if any	Mode of transport
AGAINST DELIVERY	NIL		By Hand

Delivery Schedule	Handled by :
1 Month	Prof. V. S. Chavhan

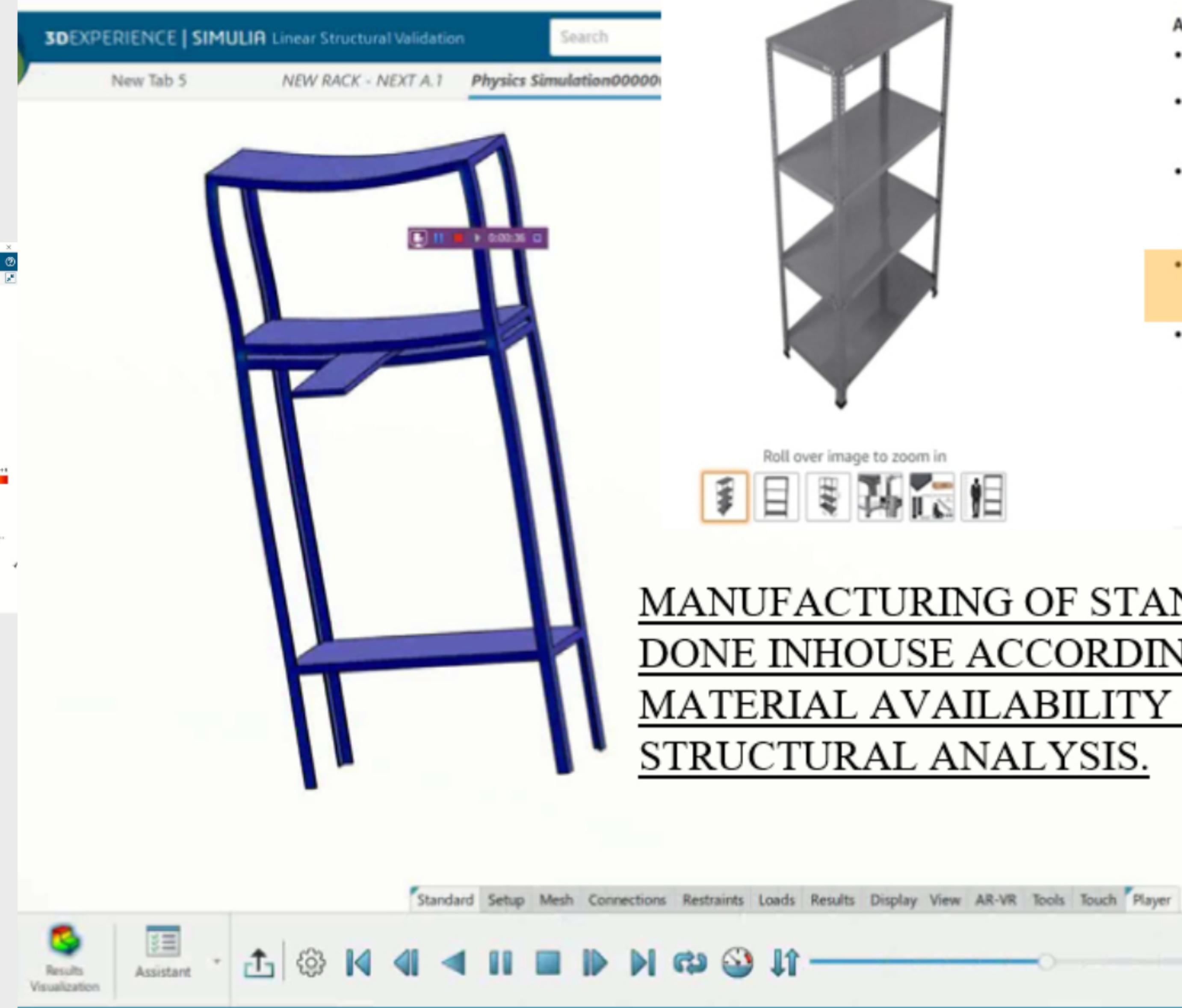
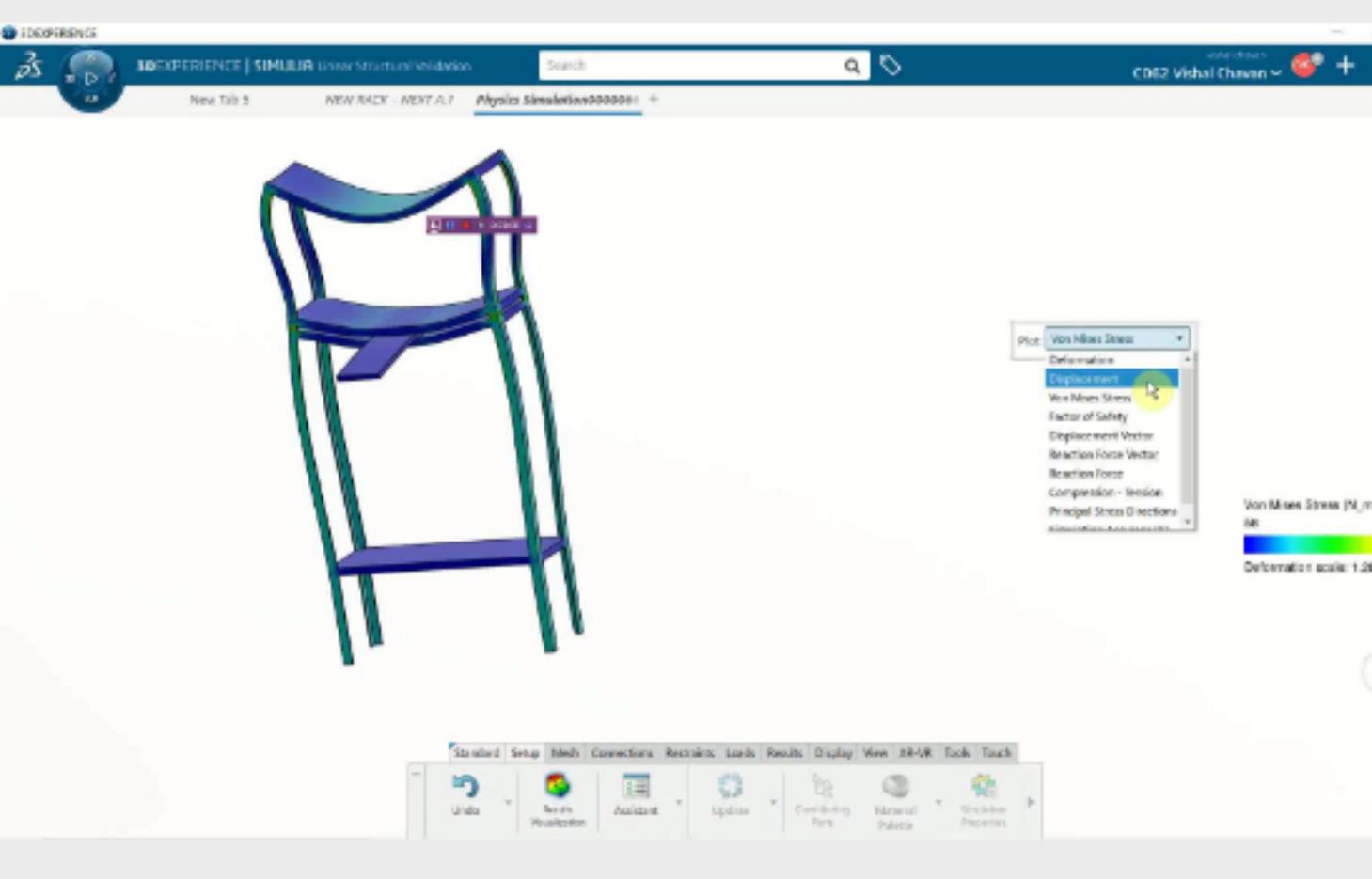
1) Supplier 2) O/C 3) Accounts 4) Stores	For Pune Vidyarthi Griha's College of Engineering & Technology Principal BSC
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21/02/2022  
Director

# SIMULATION AND ANALYSIS

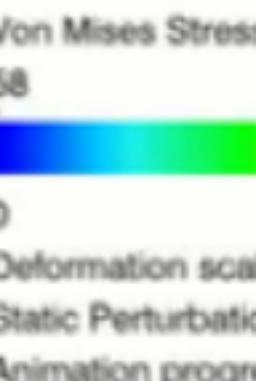
# STRUCTURAL ANALYSIS OF RACK



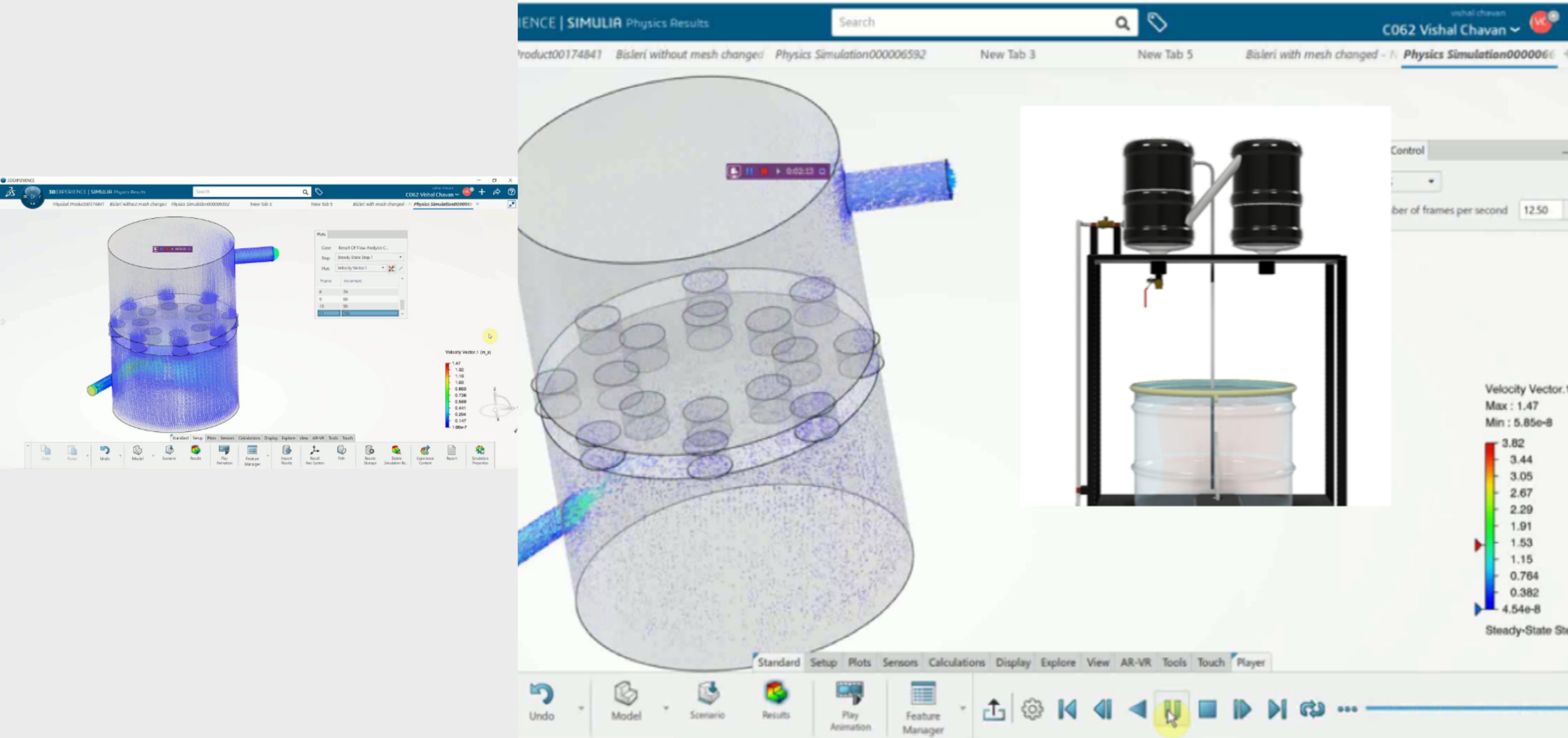
## About this item

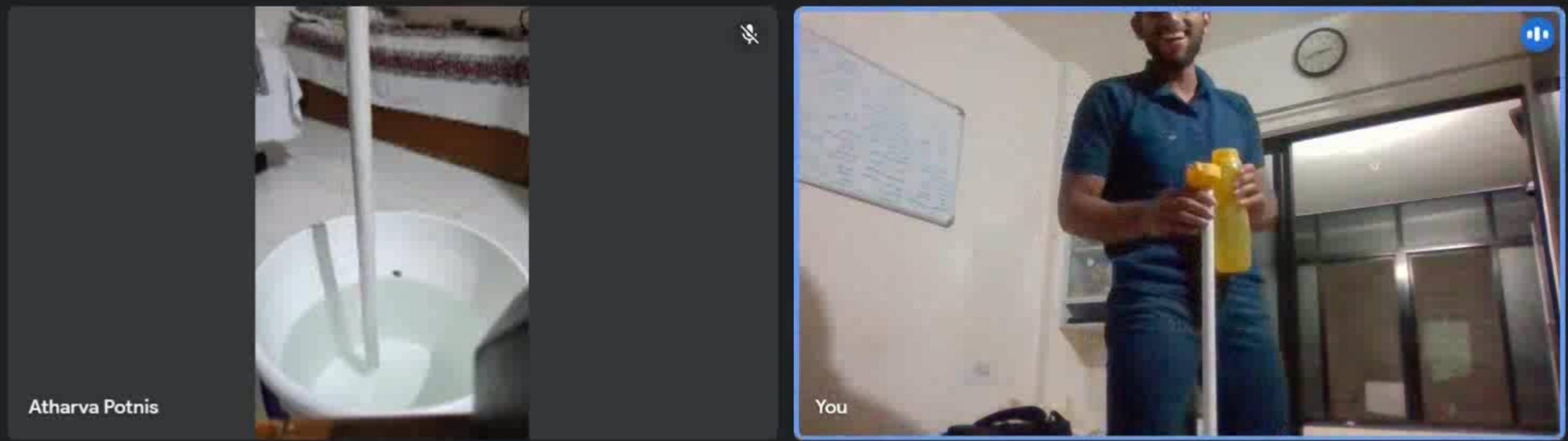
- Color : Gray, Capacity: 20 gauge, Material : CRC Metal Number of shelves: 4 Self, Size : 72 x 36 x 18 Inch
- Features: Quick in installation, Helpful in minimizing space & cost, Robust & Durable, High Grade Oil Paint Construction.
- With durable quality and multiple sizes, It's a multipurpose which can be used as Industries racks, bath racks, bookshelves, kitchen racks and cloth racks etc. Its very useful for various purposes and store room purpose.
- Weight capacity per shelf: 80 KG, Sales Package: 1 Standard Unit will be delivered to the customer in one packet consisting of 4 shelves.
- Storage problems in house, warehouse and industries are a common headache today. These compact racks and storage spaces to accommodate your items. Utility shelf racks can be used for multiple purposes like book shelf, clothes shelf, utensils shelf and anything else you want to use it for. This rack shelf is made from prime crc sheet metal. It can accommodate books, clothes, small things, toys and many more. You can load it up to its weight capacity.

**MANUFACTURING OF STAND WILL BE DONE INHOUSE ACCORDING TO MATERIAL AVAILABILITY AND STRUCTURAL ANALYSIS.**



# CFD OF MECHANICAL FILTER





## LEARNING FROM THE PROJECT

- ▶ The Catia Part Design application was extremely helpful to complete the cad parts.
- ▶ Exposure to a different untapped field.
- ▶ Project management skills.
- ▶ Market Survey and Vendor Selection
- ▶ Team work, co-ordination.

THANK YOU!