



TA201P

INTRODUCTION TO MANUFACTURING PROCESSES-I, *SUMMER TERM 2021*

ROTATING BRIDGE

PROJECT REPORT



GROUP 7

SECTION S7

Instructor: Dr. Anish Upadhyaya

Tutor: Dr. Shashank Shekhar

Teaching Assistants: Mr. Abhishek Kumar & Mr. Albert Linda

Lab In-charge: Mr. IP Singh

GROUP MEMBERS

Anupam Kumar Yadav (190166)

Anjali Rai (190146)

Arpit Verma (190178)

Aritra Banerjee (190174)

Jayanth Reddy (190156)

Arpit Maheshwari (190176)

Anshuman Singh (190162)

Anirudh Meena (190141)

Arvendra Singh Kushwaha (190183)

Aparna Nagdeve (190171)

Anshumann(190162)

Table of Contents

<i>PREFACE</i>	4
<i>ABSTRACT</i>	5
<i>WORK DISTRIBUTION</i>	6
<i>ISOMETRIC DRAWING</i>	7
<i>PART 1</i>	8
THE ROTATING BRIDGE+ CIRCULAR BASE+ ROTATING PILLAR SECTION	8
<i>PART 2</i>	10
GEARS(SPOKES+PILLARS)	10
<i>PART 3</i>	12
HOLLOW BOX & HANDLE	12
<i>Part 4</i>	13
CONVEYOR BELT	13
CONVEYOR PULLEY (Central & Side)	15
<i>PART 5</i>	17
Ship	17
<i>Material List and Cost Analysis</i>	19
<i>Timeline of Workflow</i>	20
<i>ACKNOWLEDGEMENT</i>	21

PREFACE

While we took three weeks to design the project, but we needed the accumulated knowledge, experience, and study of a lifetime during that time.

We are third-year students of IITK's electrical engineering department. We always wanted to do our own metallurgical project, and the college provided us with the opportunity under the course TA201A, currently taught by Prof. Anish Upadhyaya.

The design of every part has been given great detail as well as trying to satisfy its purpose so that it can be manufactured efficiently and effectively.

ABSTRACT

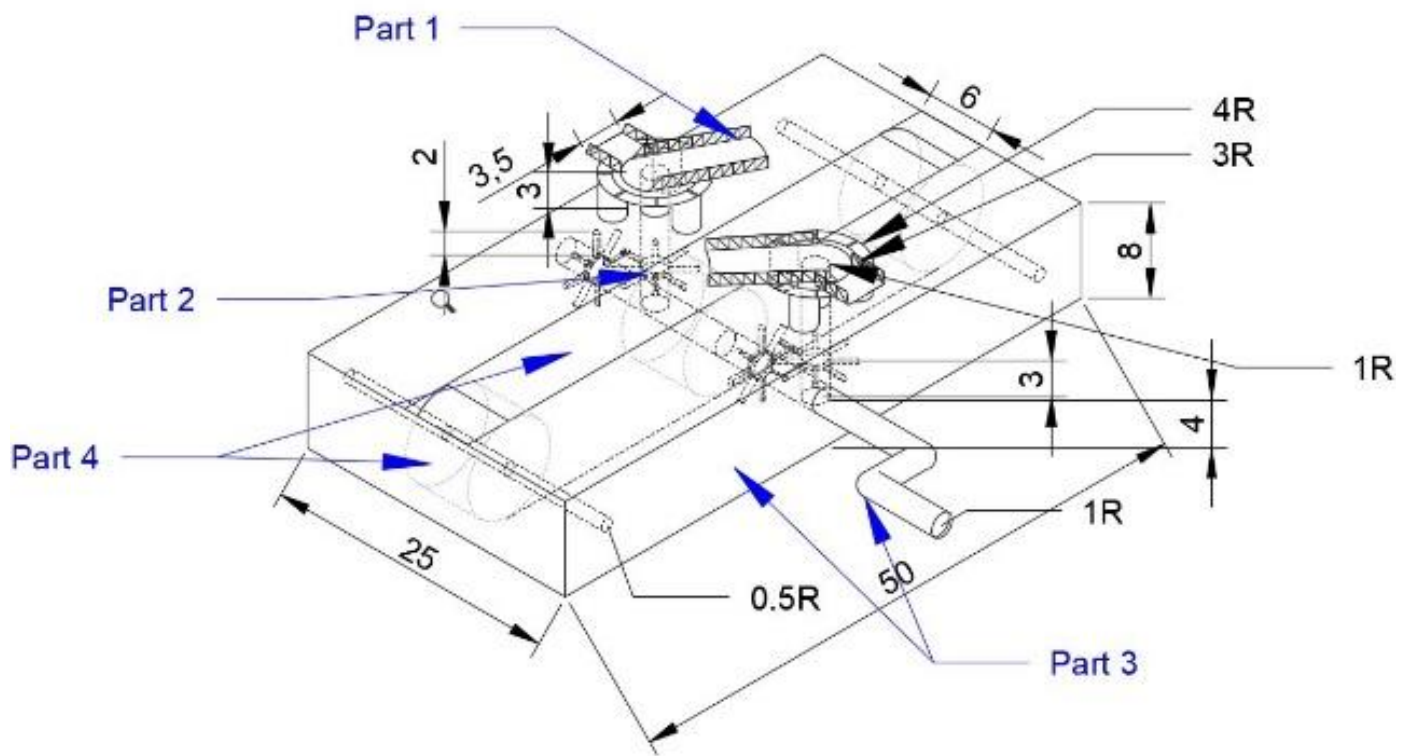
We picked up the idea of rotating bridge for our project because we wished to construct a dynamic project that had some real-life applications. So, in our project we have displayed the problem that is faced by a stationary bridge and have presented a solution to it.

The model consists of two rotating bridge halves each supported by a rotating pillar. The rotation mechanism is brought into action by bevel gear mechanism which are in turn rotated manually by a handle attached. Also, it consists of a conveyor belt with a ship to display how upon arrival of a ship with a sufficiently larger height the rotating bridge comes into action. To show the working of the project conveniently we have used a single axle which upon rotation causes both, the movement of the ship and rotation of bridges.

WORK DISTRIBUTION

WORK	NAME	
Complete Isometric	Anupam Kumar Yadav	
Railing + Bridge(including circular base and supporting pillars)	Anjali Rai, Arpit Verma	
Rotating pillars+spokes	Aritra Banerjee ,Anshumann	
Hollow covering +handle	Jayanth Reddy	
Conveyor + 3Pulley+supporting rods of pulley	Arpit Maheshwari, Anshuman Singh	
Abstract,Motivation,Acknowledgement	Anirudh Meena	
Ship	Arvendra Singh Kushwaha	
Compilation of work into final report	Aparna Nagdev	

ISOMETRIC DRAWING

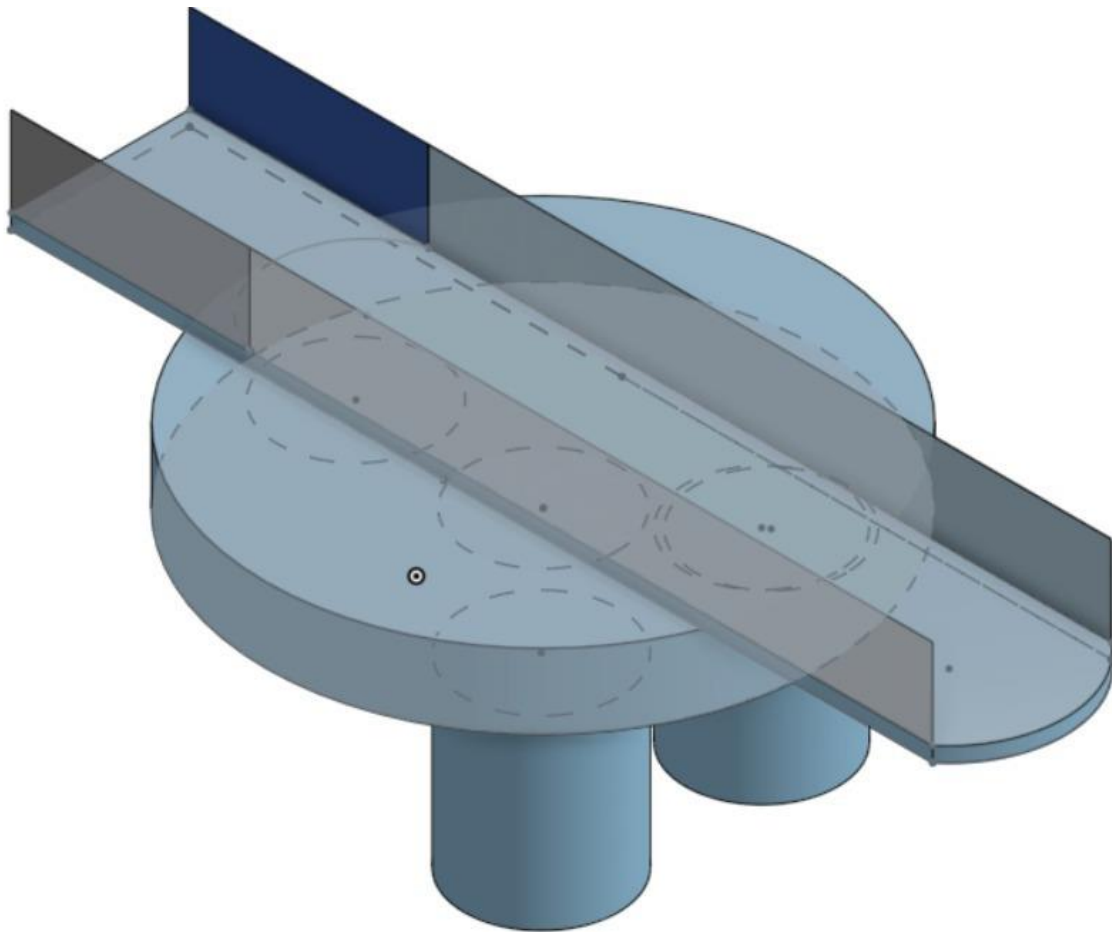


Dimensions are in cm.

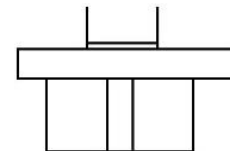
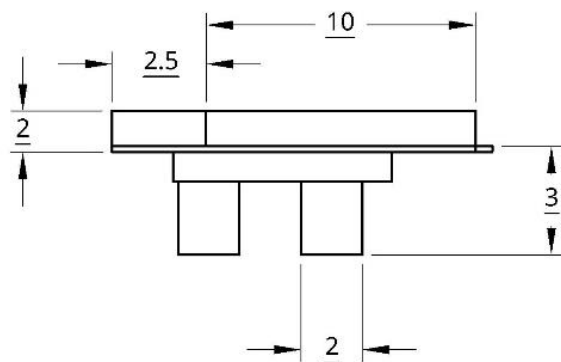
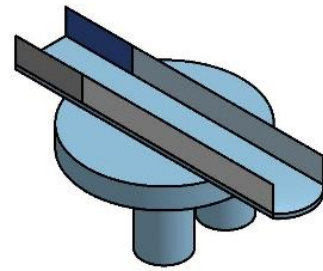
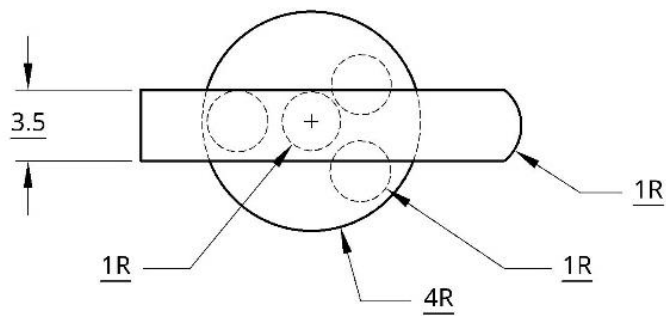
PART 1

THE ROTATING BRIDGE+ CIRCULAR BASE+ ROTATING PILLAR SECTION

Design



Orthographic: Bridge + Circular base + supporting pillars



Dimensions are in cms.

Materials used for the part

Mild steel rods, Mild steel sheets

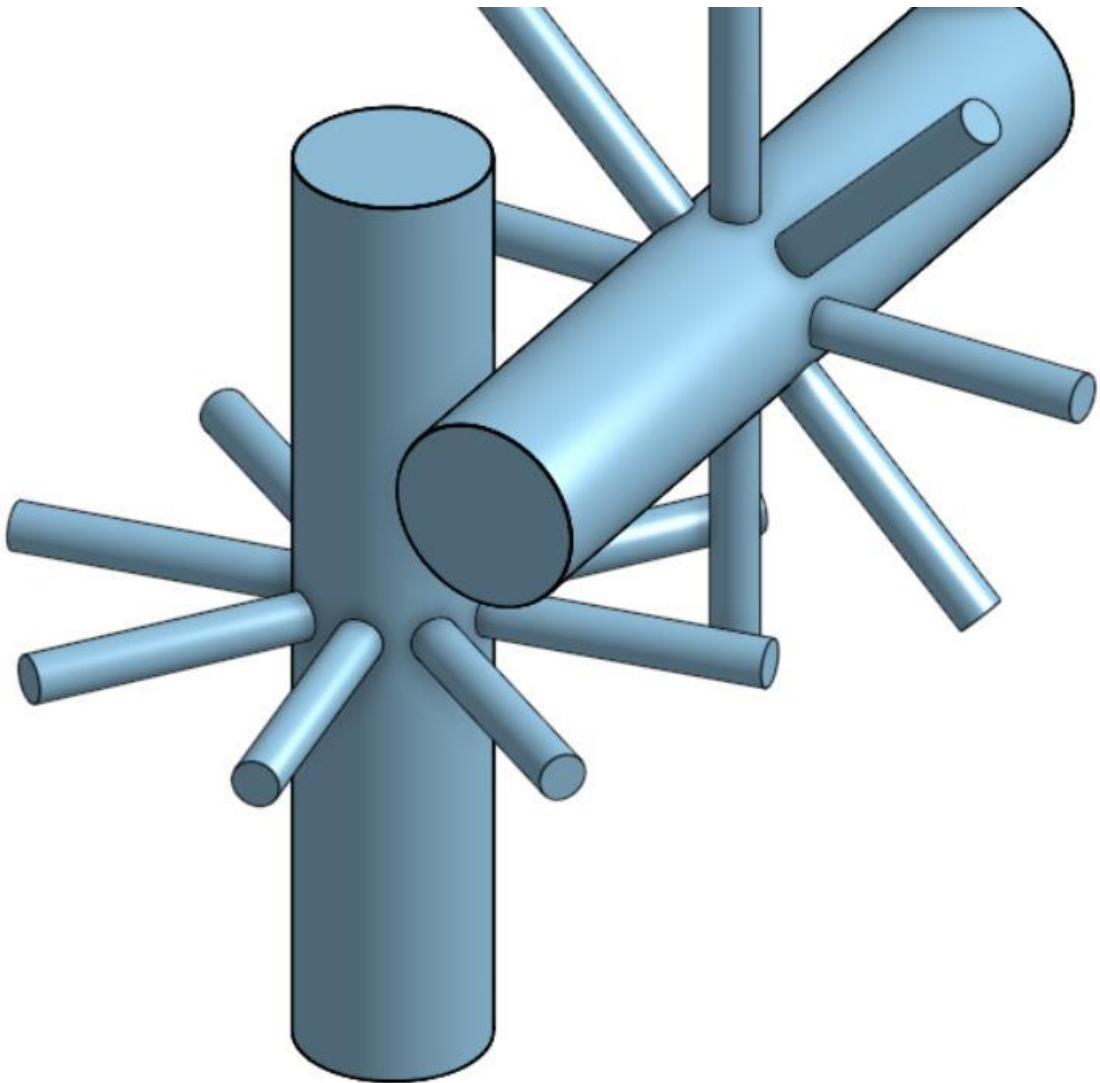
Manufacturing

Casting, Welding, Cutting

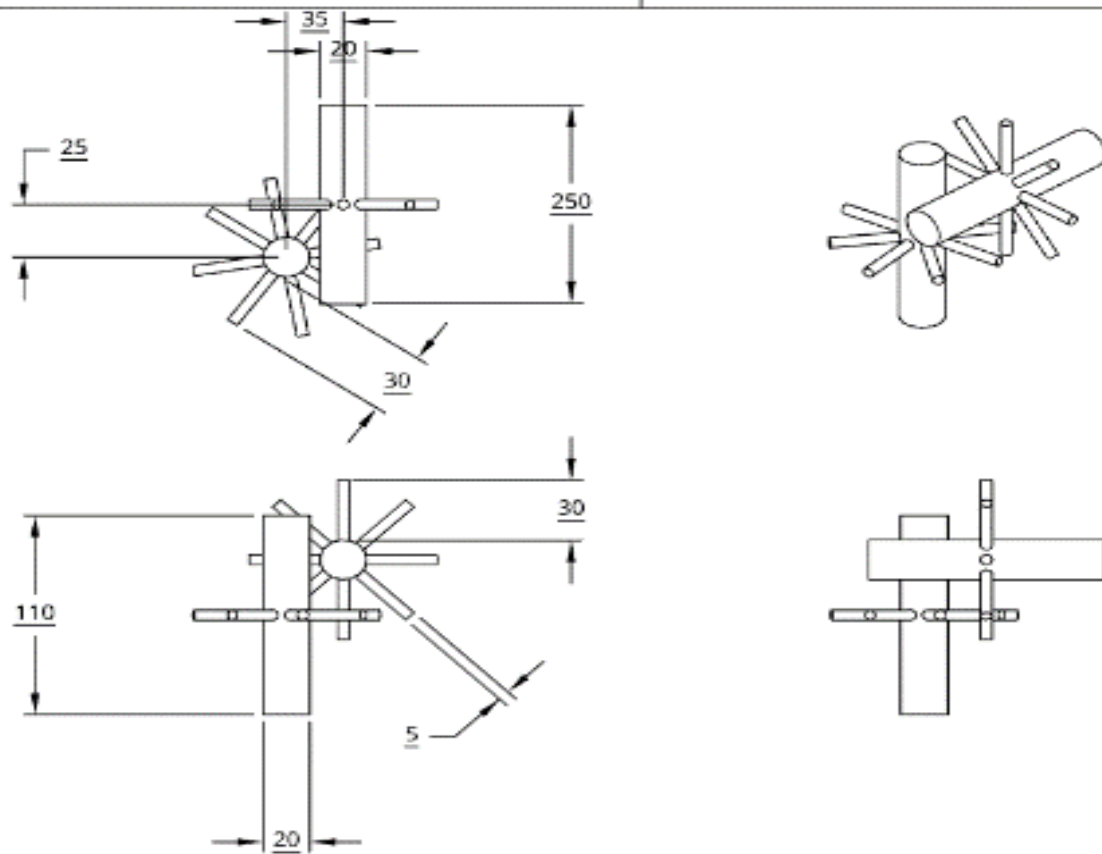
PART 2

GEARS(SPOKES+PILLARS)

Design



Orthographic: Spokes + Pillars



Dimensions are in mm

Materials used for the part

Mild Steel Round rod (5 mm dia) x 16

Mild Steel Round Pipe (20mm dia) x2

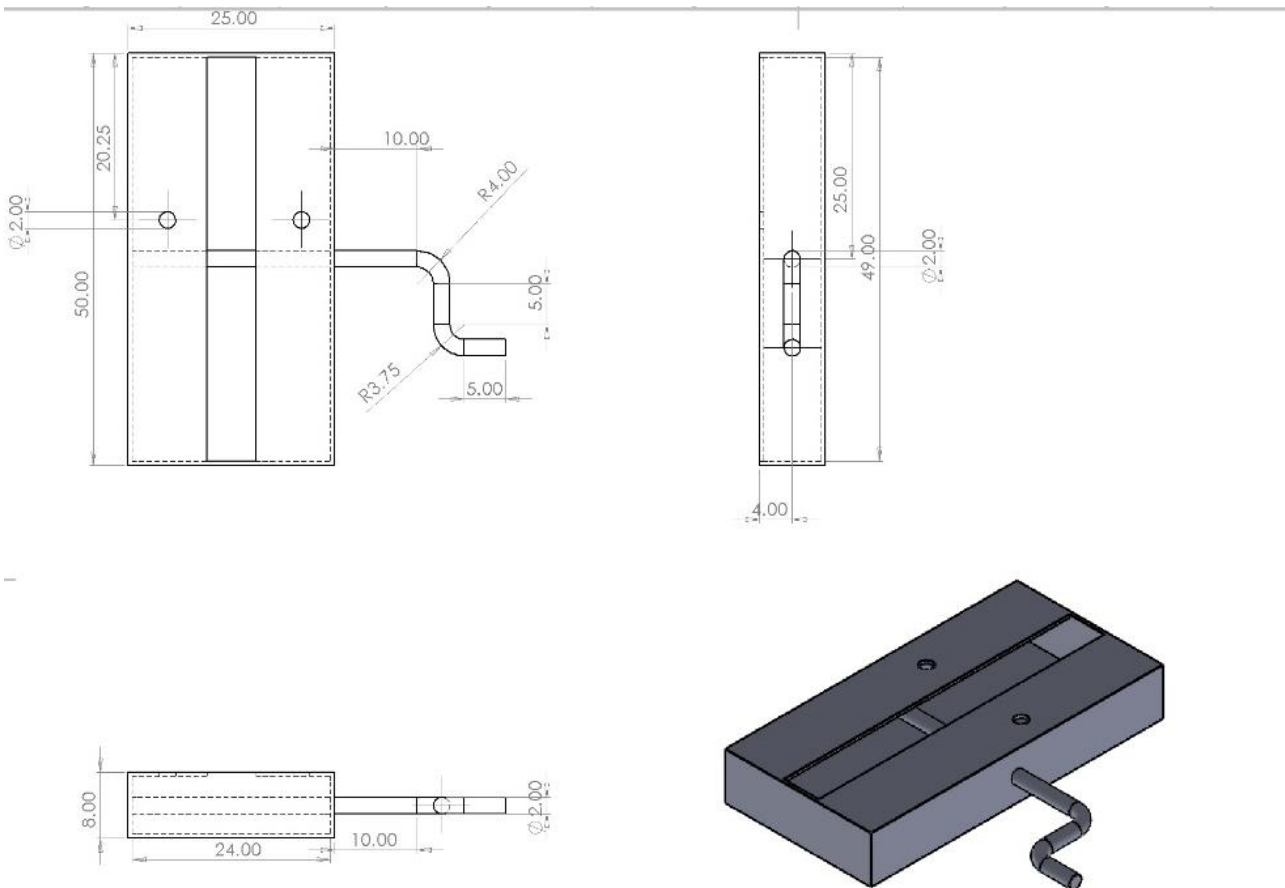
Manufacturing

Welding, Casting, polishing

PART 3

HOLLOW BOX & HANDLE

Design



Dimensions are in cms

Materials used for the part

Iron rods, mild steel sheets

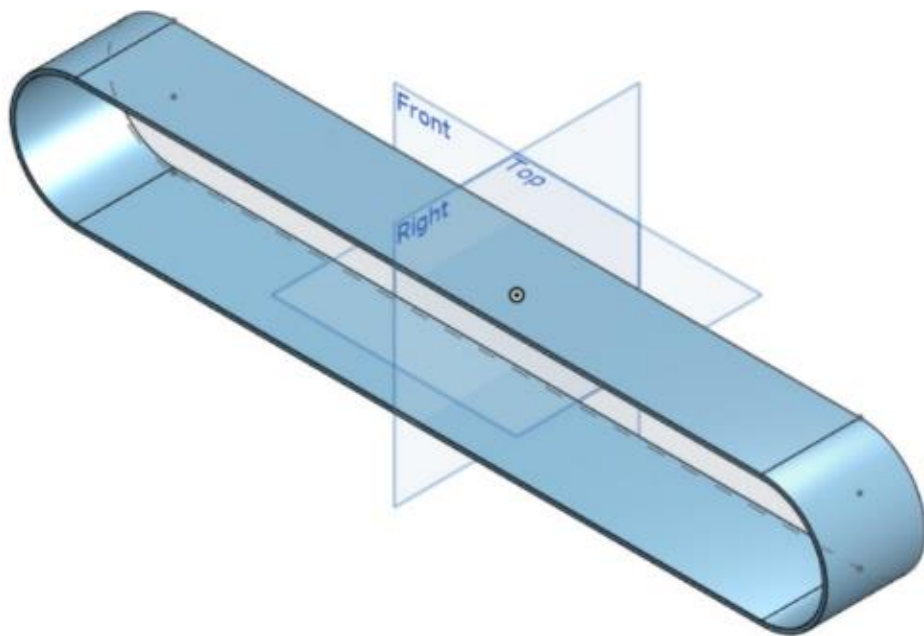
Manufacturing

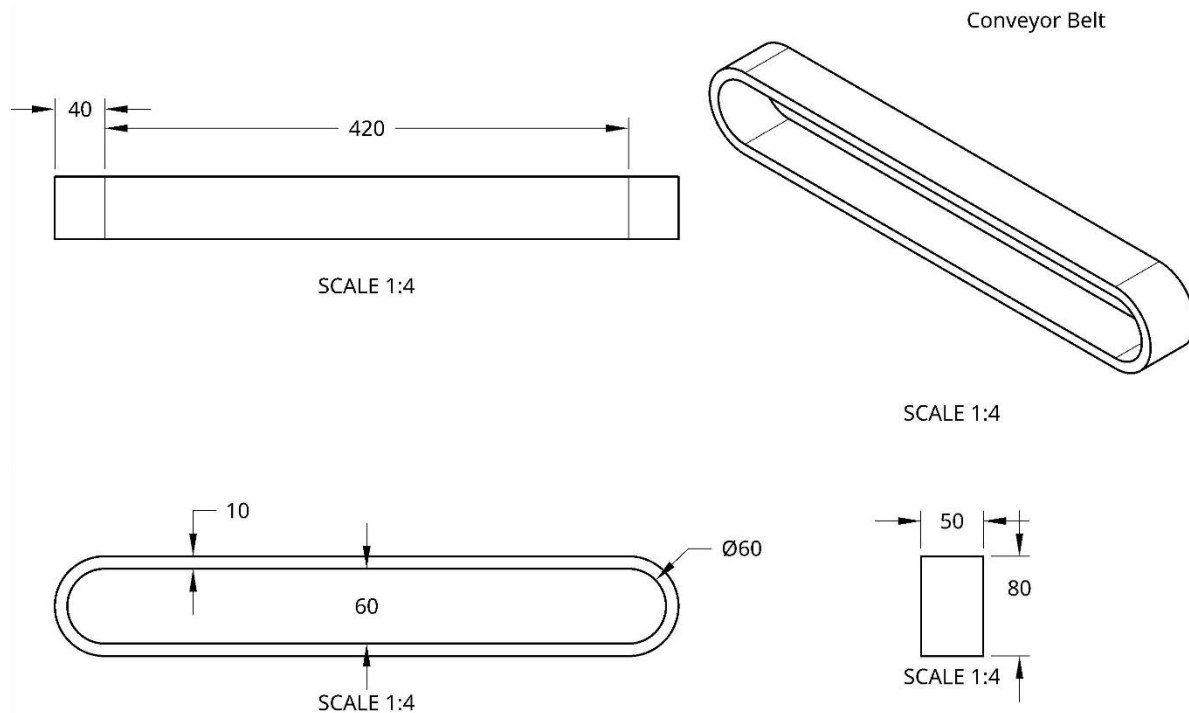
Bending, welding, cutting

Part 4

CONVEYOR BELT

Design



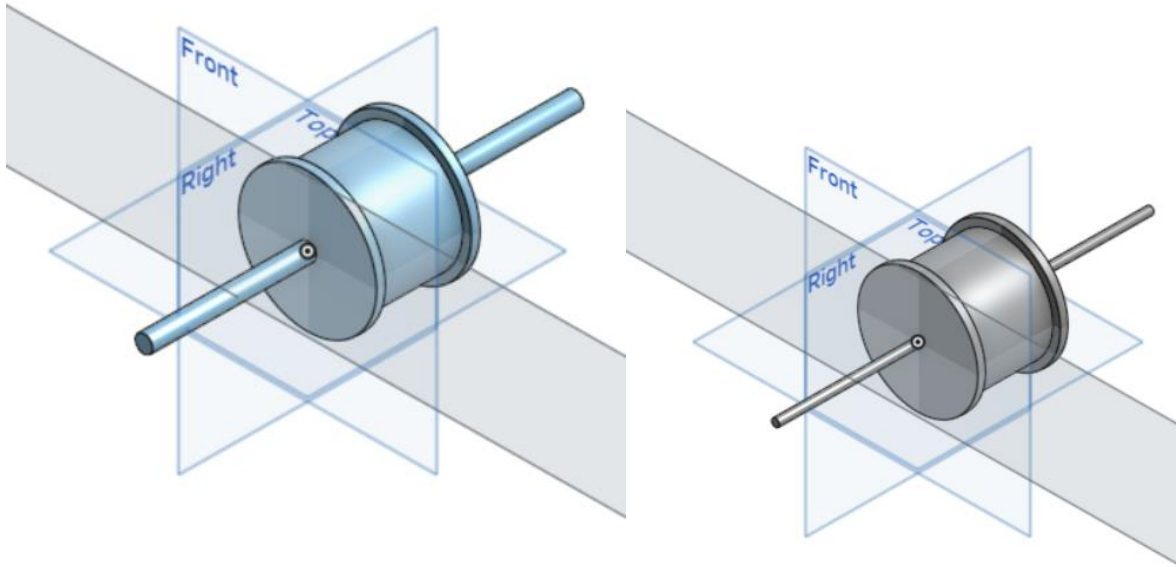


Dimensions are in mm

Manufacturing

This conveyor belt consists of solid woven fabric dipped in PVC paste and adding PVC or Nitrile covers which are combined by a process called vulcanising

CONVEYOR PULLEY (Central & Side)



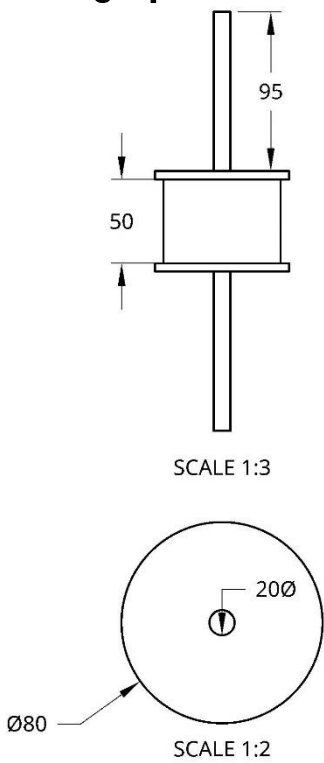
Materials used for the part

Cast iron, wooden pattern of pulley, Metal discs

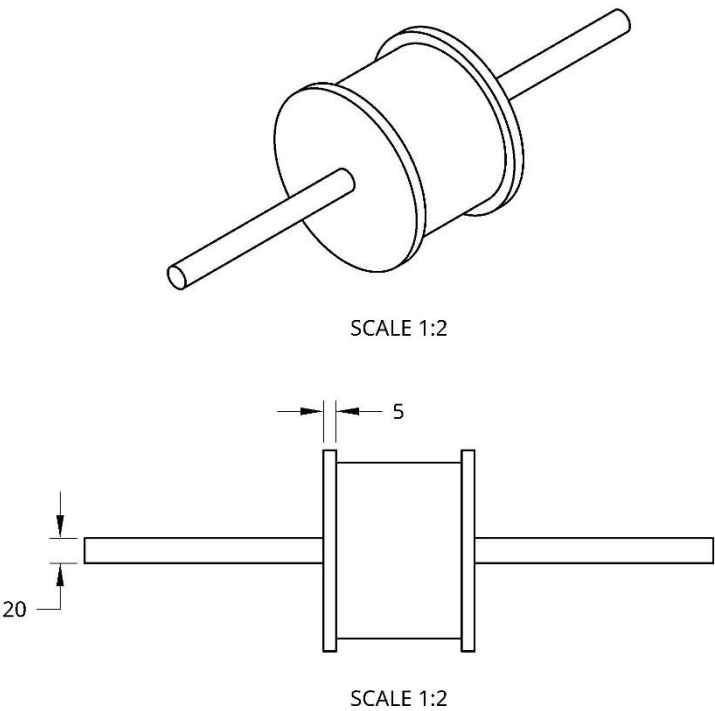
Manufacturing

Sand moulding, casting, welding

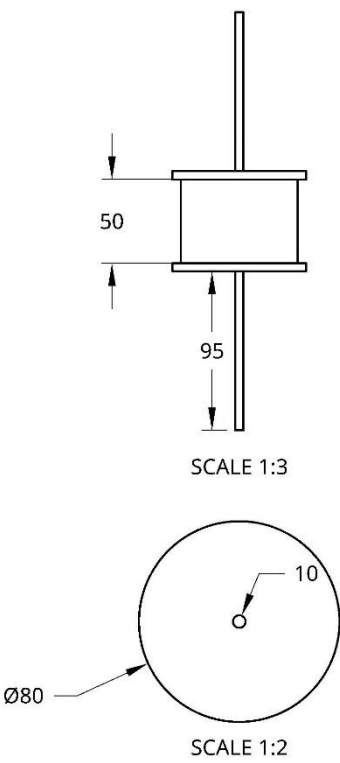
Orthographic: Central Pulley



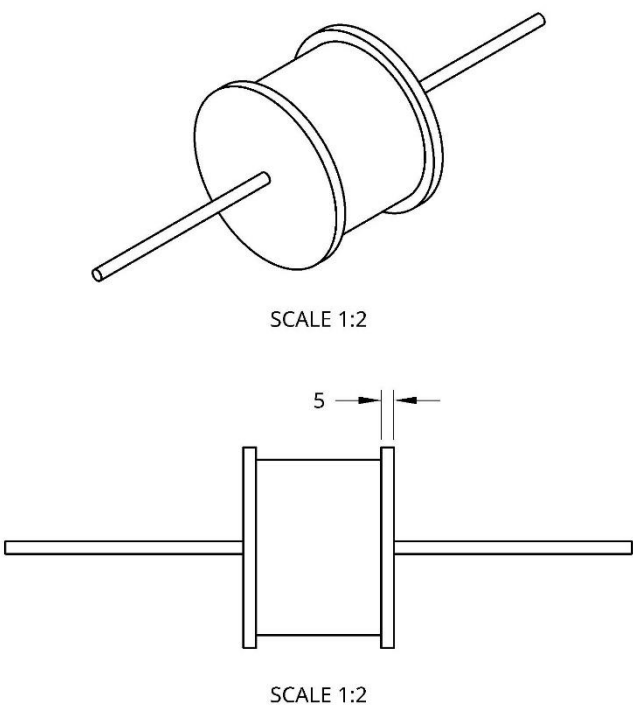
Central Pulley



Orthographic: Side Pulley



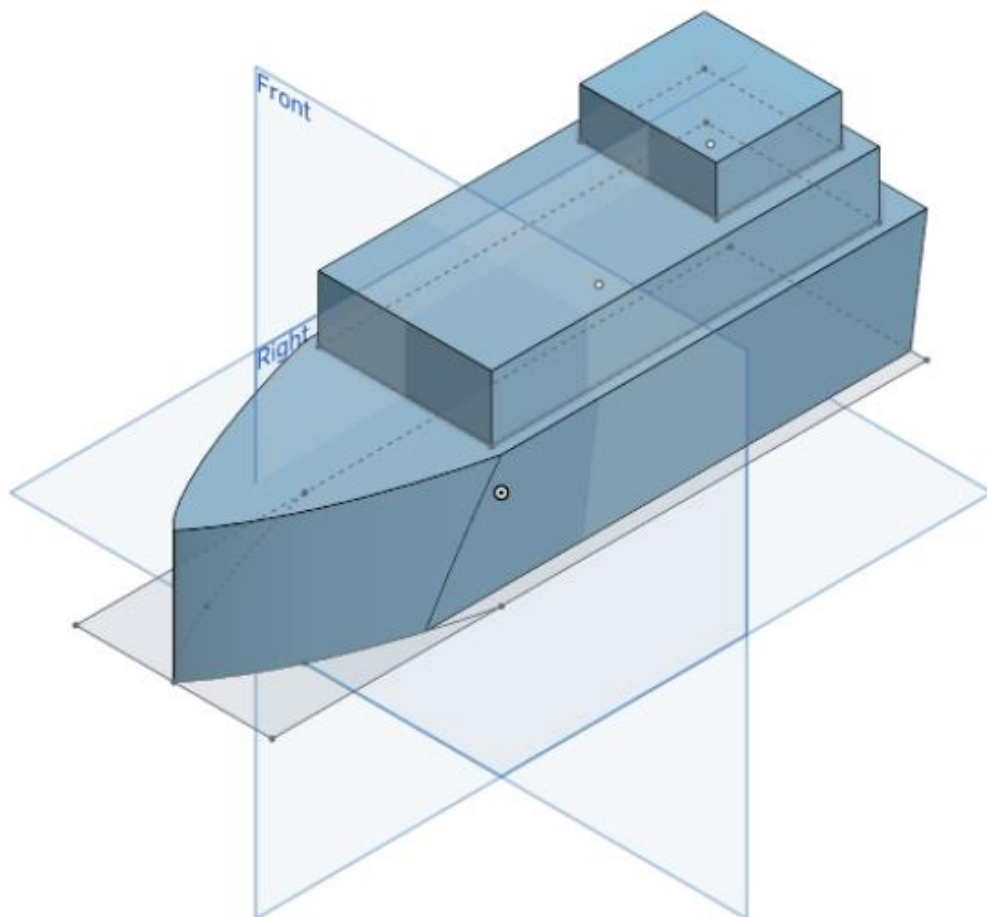
Side Pulley



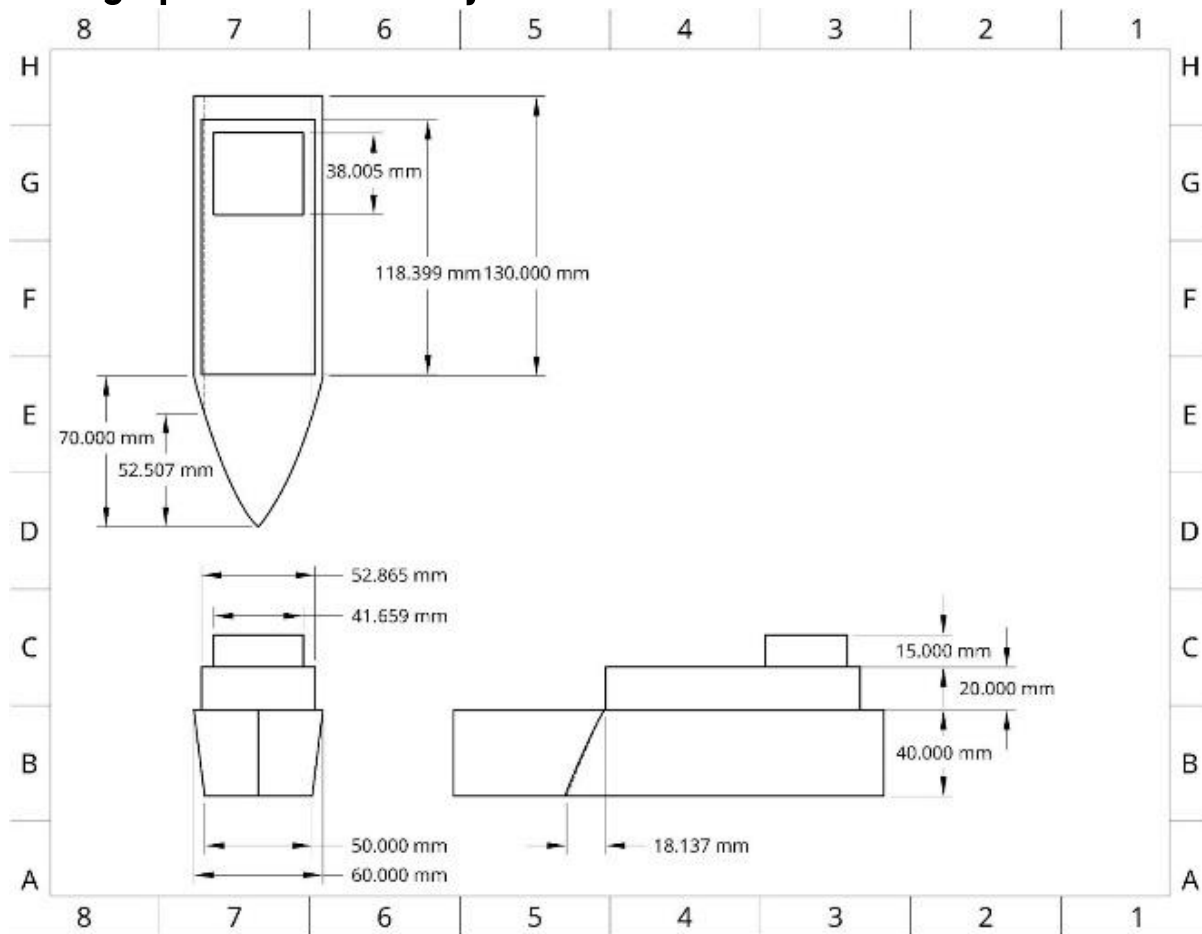
Dimensions are in mm

PART 5

Ship Design



Orthographic: Central Pulley



Materials used for the part

GI Sheet(0.5mm)

Manufacturing

Sheet Metal Bending, Soldering, Sheet metal cutting

Material List and Cost Analysis

Part No.	Part Name	Material	Cost(Approx.)
1	Bridge & Pillar	Mild steel sheet(0.16ftx1.10ftx1mm) Mild steel rod(25mm diax 30mm length) Mild steel rod(3mm dia x 1700mm length)	Rs. 39
2	Gear with spokes	Mild Steel Round Rod (5mm dia x 30mm) Mild Steel Round Rod (20mm dia x 110mm)	Rs. 24
3	Hollow box & handle	Mild steel sheet (2 mm thickness) Mild steel round rod(20mm dia x571	Rs. 415
4	Conveyor pulley and belt	Mild steel round rod (20 mm dia x 95mm) Mild steel round rod (10 mm dia x 95mm) Mild steel discs(80 mm dia, 5 mm thickness) Cast iron ingots PVC belt- 1080mm(l)x50mm(w)x2mm(thick)	Rs. 613
5	Ship	GI Sheet(300mmx360mmx0.5mm)	Rs. 40
Total			Rs. 1131

Timeline of Workflow

Week number	Work done
Week 1	Discussion for project proposal
Week 2	Finalisation of idea and work distribution
Week 3	Complete isometric and abstract
Week 4	Engineering drawing of all components
Week 5	Compilation
Week 6	Final report and Video presentation

ACKNOWLEDGEMENT

As we went through this project, we had an opportunity to demonstrate our creativity. We encountered many difficulties. We were inspired by Prof. Anish Upadhyaya as we went through the project and provided us with an outlet for expressing ourselves.

Thank you to tutor Dr. Shashank Shekhar, teaching assistants Abhishek Kumar and Albert Linda, and the technical staff Mr Indra Pal Singh really helped us to handle our project properly and thoroughly.

Afterward, we were assigned the final task of completing the project, and we are very appreciative of all the TAs, Lab Assistants, Helpers, who made sure that our project was done.

Thank you again to everyone who helped us with this project.

Besides earning points, Our team is working on this project also to gain knowledge and experience the process of designing and implementing our ideas on our own. Thanks to all who assisted along the way.