Given name Family nam

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Industrial Systems Engineering

Assignment/Lab Title: Group Project

Course name and number: ENGG100

Lab Section: _____

Date Performed: _____

Due Date: _____

Name(s) and SID:

1) _____

2) _____

3) _____

4) _____

5) _____

I confirm that this assignment/lab is my own work and has not been presented for assessment in any other class.

Signature **Date**

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1. INTRODUCTION

A can crusher is a device used to compress steel cans to reduce their size and make it easier to store and transport for recycling. It is an eco-friendly solution for anyone looking to reduce the amount of waste generated by their consumption of canned beverages. Our can crusher is designed to crush cans using mechanical power instead of electric or any other form of power. It also has the potential to make a significant impact on the environment by reducing the amount of aluminium waste that ends up in landfill. The report made by group provides a gist of the whole project, explanation of each design, it's constraints and how a design was selected based on an evaluation matrix and finally the final outcome of the design.

1.1 Constraints

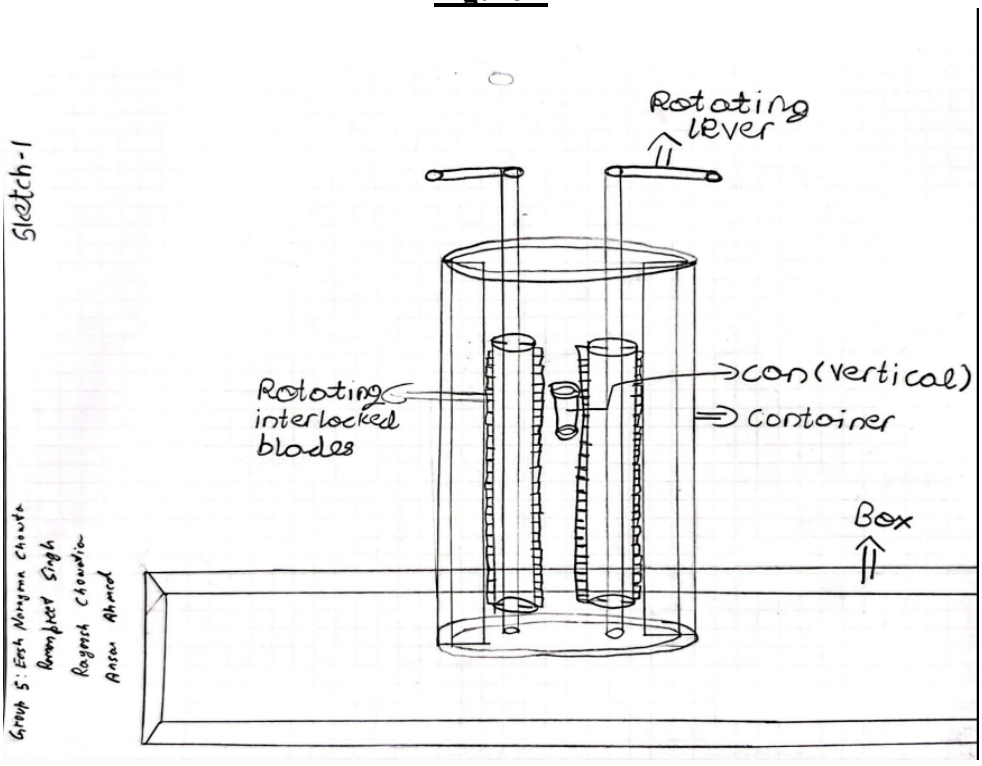
There were many constraints that we faced when we were designing the project but the most important constraint that the group experienced was the assembly of the design. Secondly, the challenge that the group faced was that the crusher should be operated mechanically was supposed to 4 or more component files which made the group think a lot on how to meet the assembly/part requirement.

2. PRELIMINARY IDEAS

2.1 Design Sketches

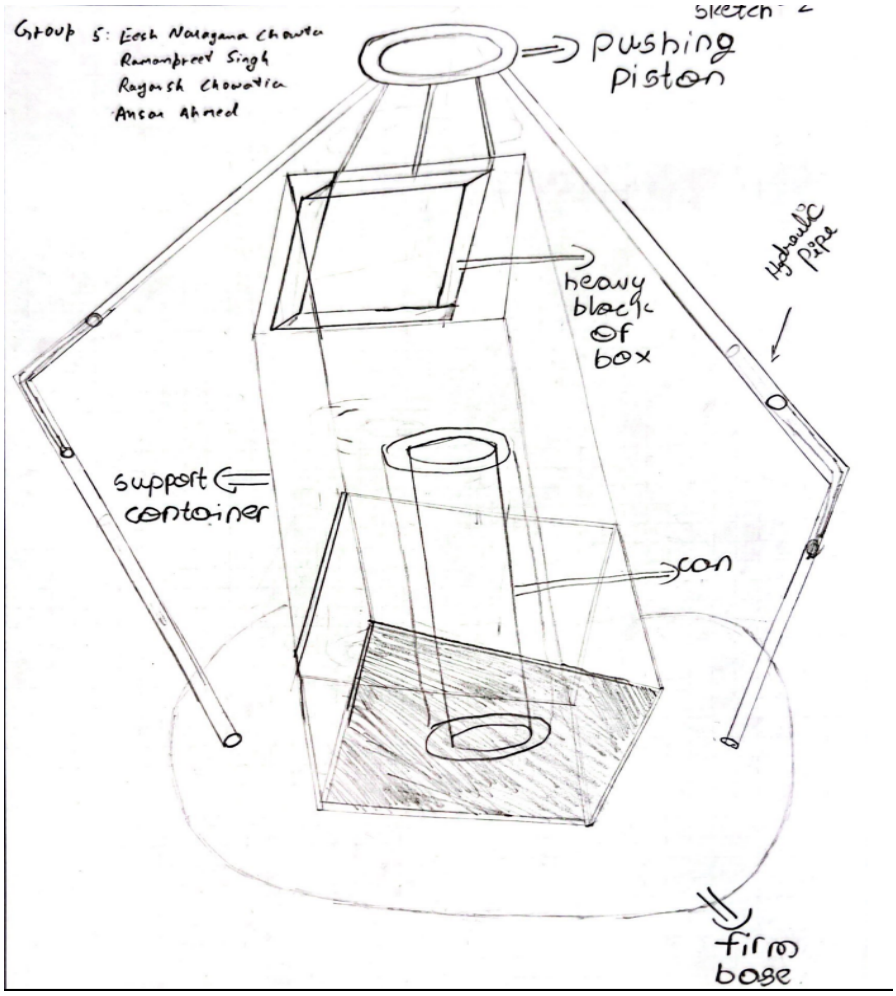
When it comes to designing a mechanical can crusher, there are several preliminary ideas that can be considered. The following are four different ideas that our group have generated from our brainstorming sessions and rough out design sketches:

Figure 1



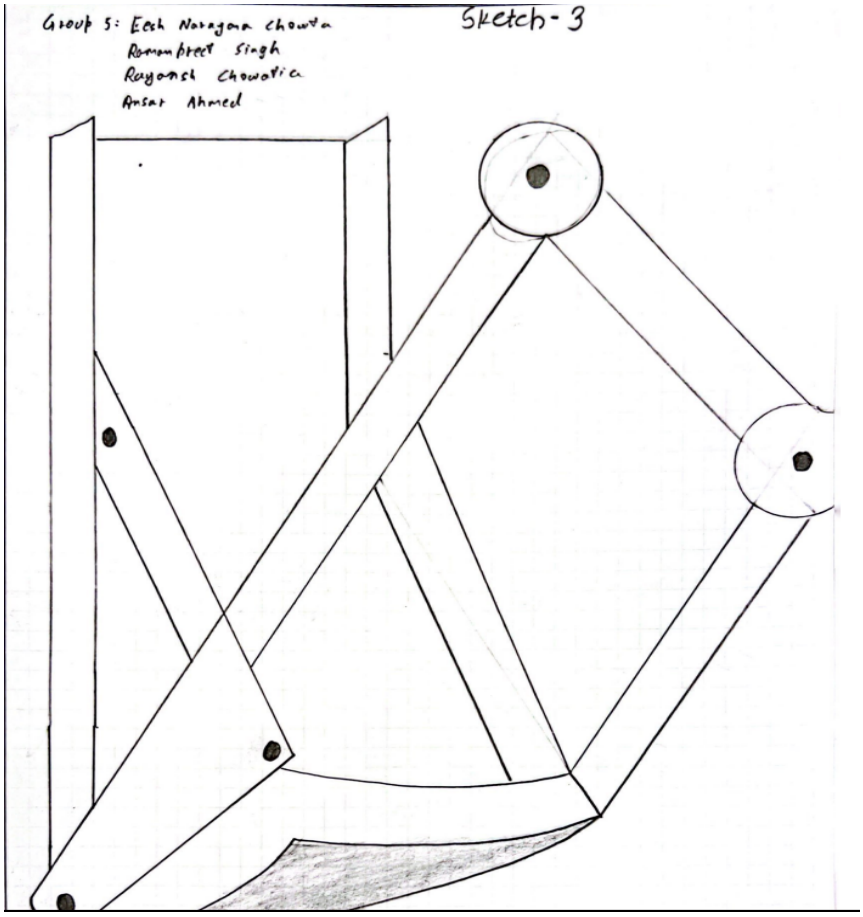
The initial idea was to use two rotating levers attached to a rotating interlocked blade as shown in the figure. The can will be placed on top and as we rotate the lever the can moves down, and gets crushed.

Figure 2



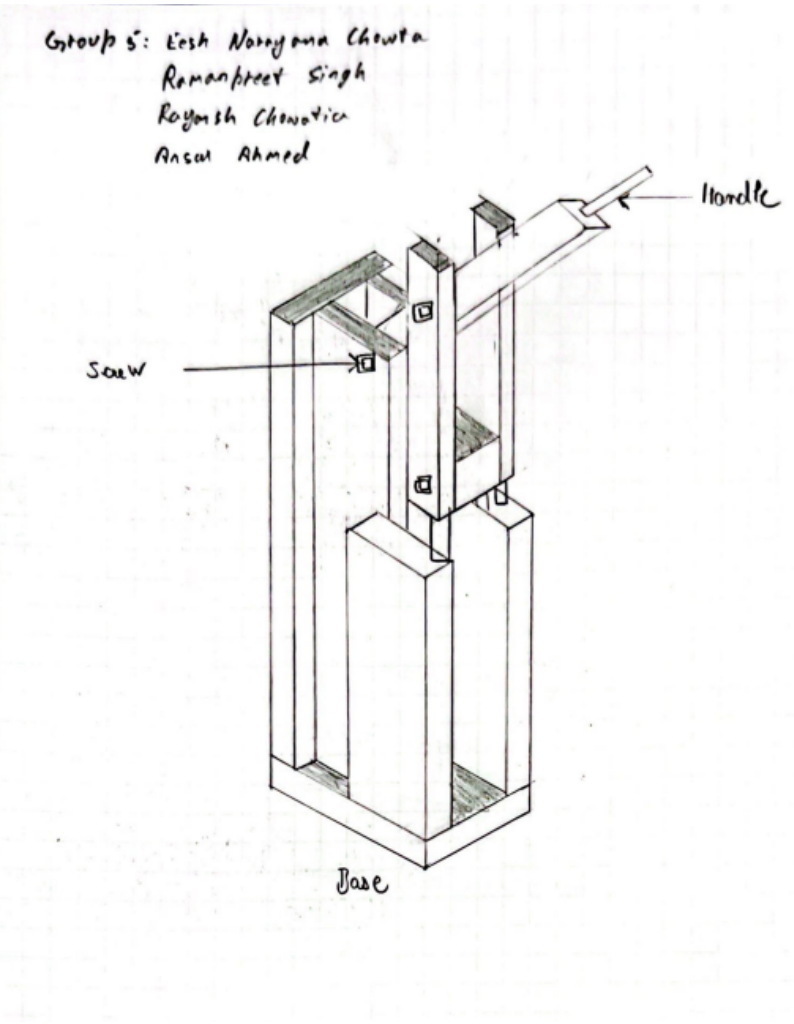
The idea here was to use a pushing piston which will be attached to a heavy block and the can would be placed below the block with a support container and as the piston moves the can gets crushed. The piston movement was moved with hydraulic pipes.

Figure 3



The third idea was a simple handled block where the can would simple be placed on the support and we place a can on the base and pull the handle down to crush it. The can gets squeezed by the top handle which can be swinged up and down using the screws attached to the side of the base.

Figure 4 (Final Design)



The fourth design sketch and the one that we intend to choose was this because it was well-structured and efficient compared to the other designs. The can will be placed on the base, and we have a handle attached to a connecting rod with a screw which moves the block down crushing the can.

3. DESIGN SELECTION

The following is a matrix that we derived to help us choose the perfect design in terms of different features:-

ENGINEERING DECISION MATRIX

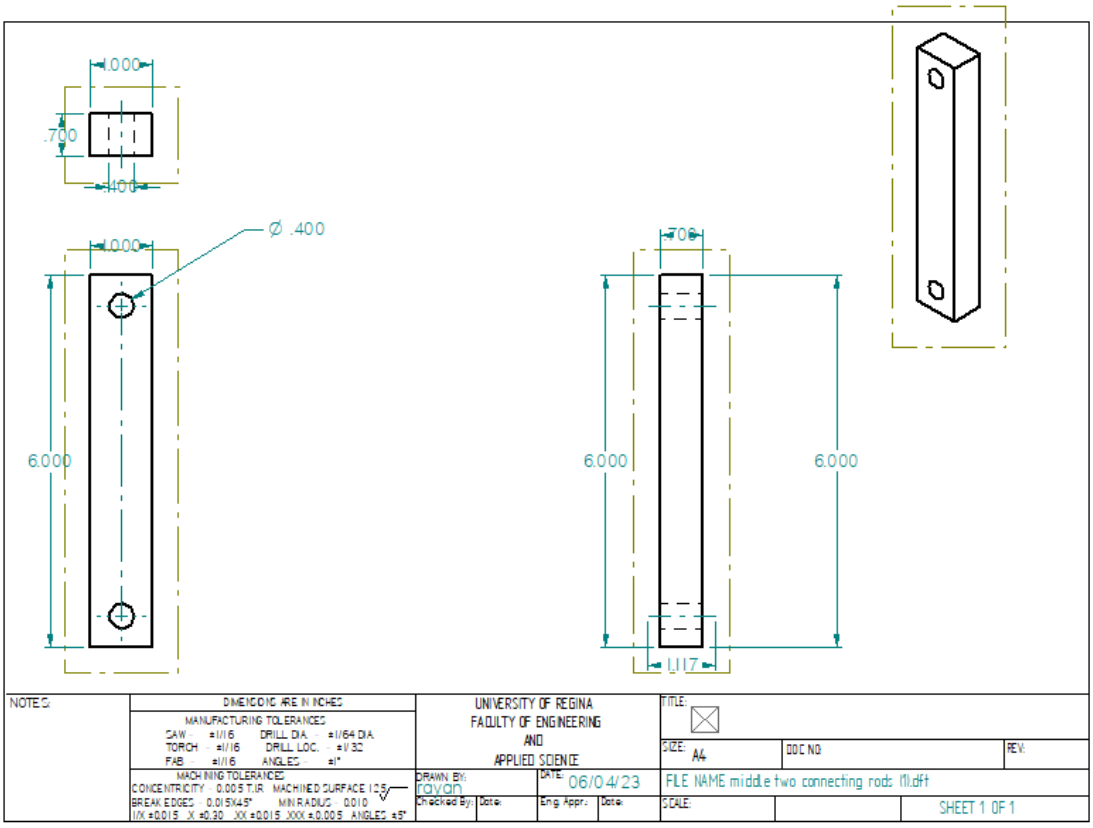
	Student Designs	Design 1		Design 2		Design 3		Design 4	
Design Criteria and Requirements	Weighting Factor (1-5)	Score	Weighted score	Score	Weighted score	Score	Weighted score	Score	Weighted score
Cost	3	2	6	3	9	4	12	5	15
Time period	3	3	9	2	6	4	12	5	15
Parts	2	3	6	4	8	5	10	4	8
Efficiency	4	2	8	3	12	5	20	4	16
Safety	5	4	20	5	25	4	20	5	25
Manufacturability	2	4	8	3	6	3	6	4	8
Sum of Weighted Score			57		66		80		87

Criteria examples:
Cost
Materials
Safety
Ease of use
Manufacturability

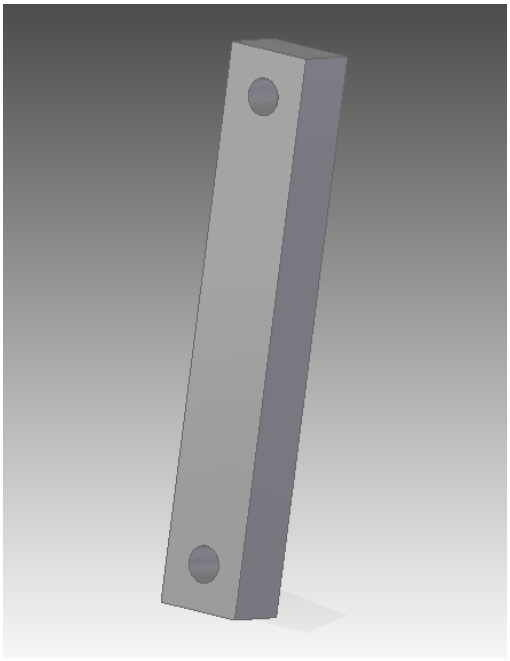
Scale 1-5 (5 Best)
Weighting Factor for Criterion: 1-5 (5 most important ; 1 least important0

The group has given weights according to different factors like Time, Parts, Cost etc. to come to a conclusion and as per the table given above the highest score corresponds to Design 4 since it was easy to build, assembly and efficient.

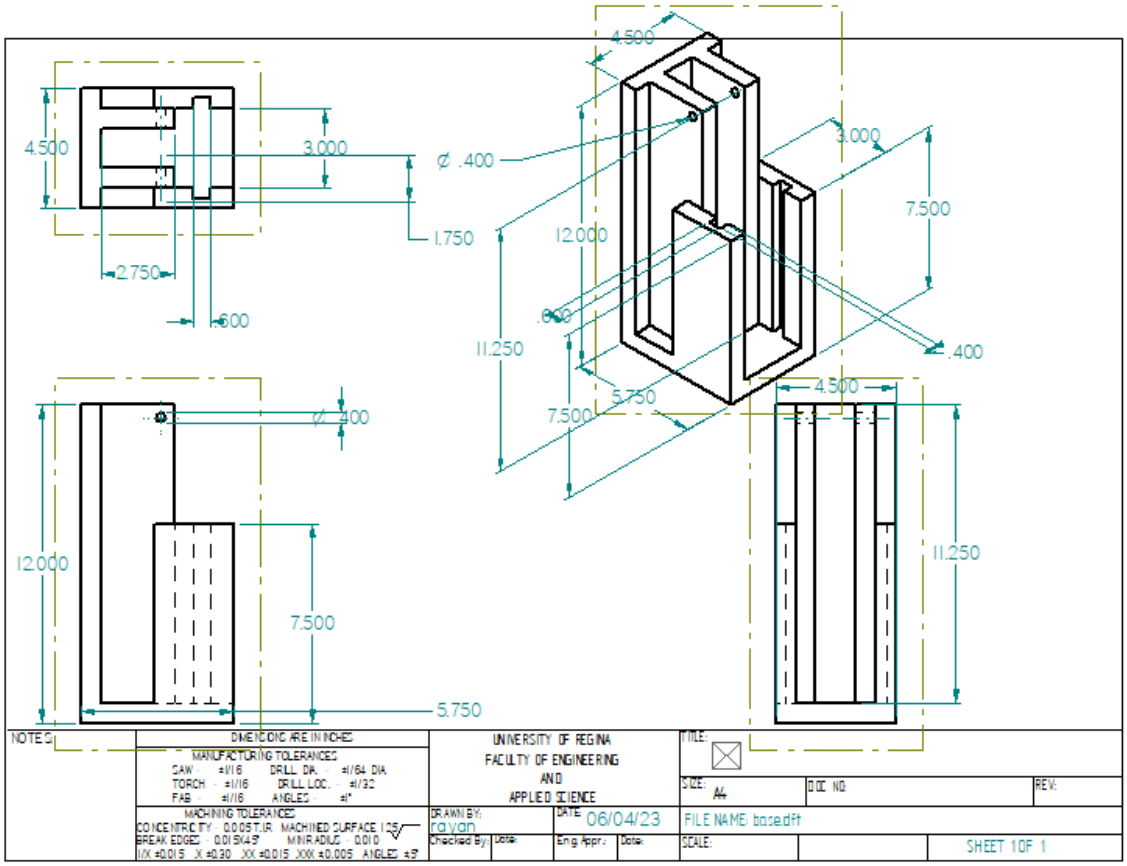
4. PART AND DRAFT FILES



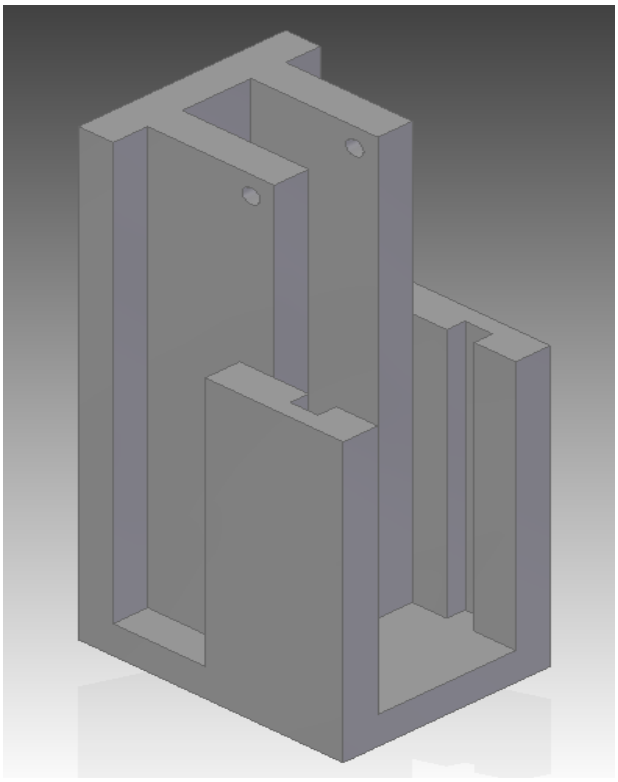
Middle Connecting bar draft



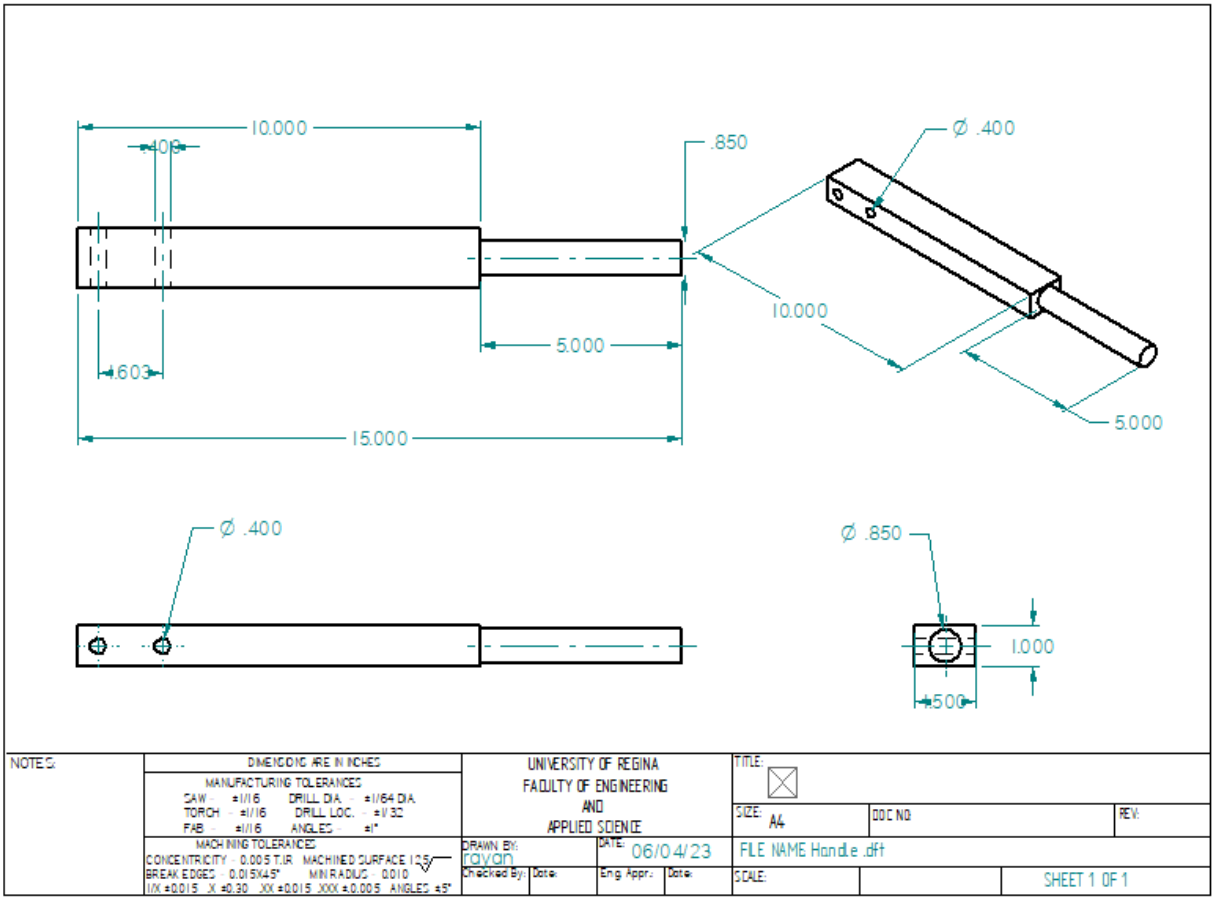
Middle connecting bar



Base Draft

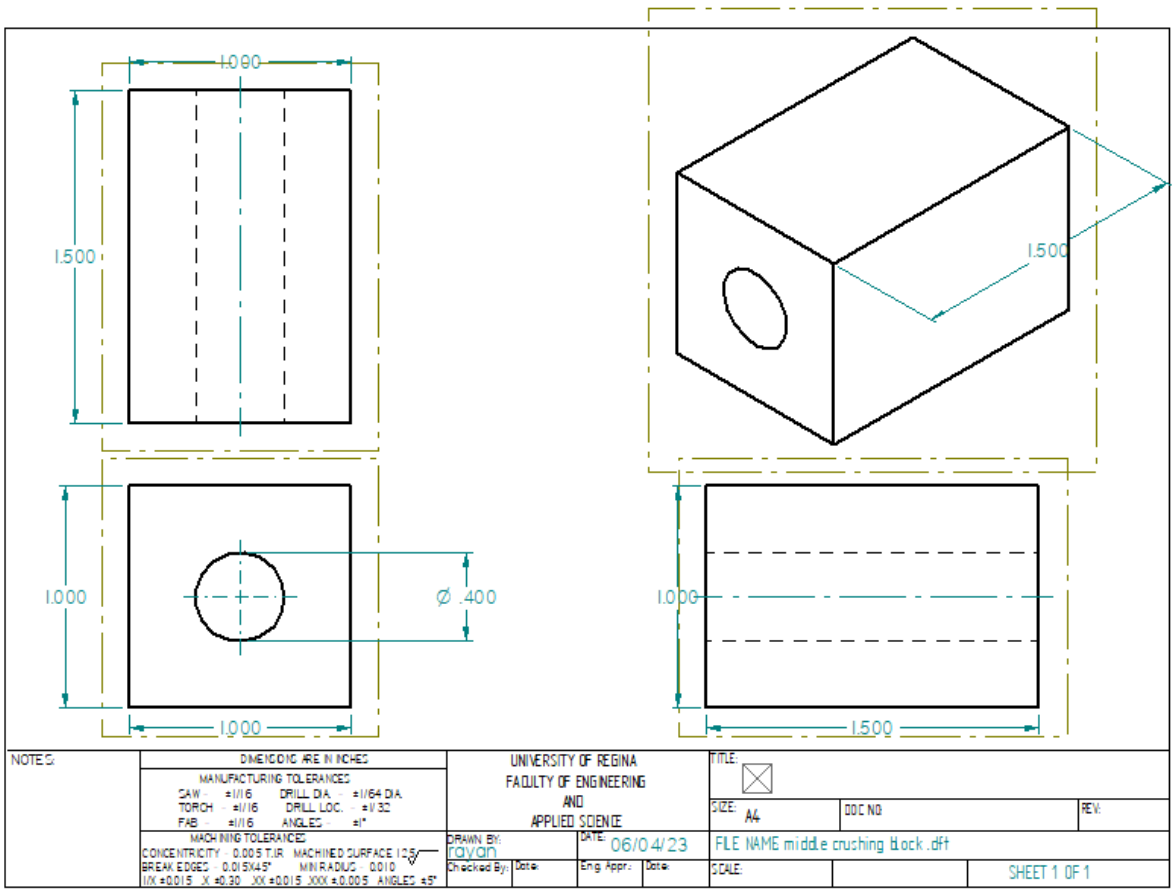


Base part

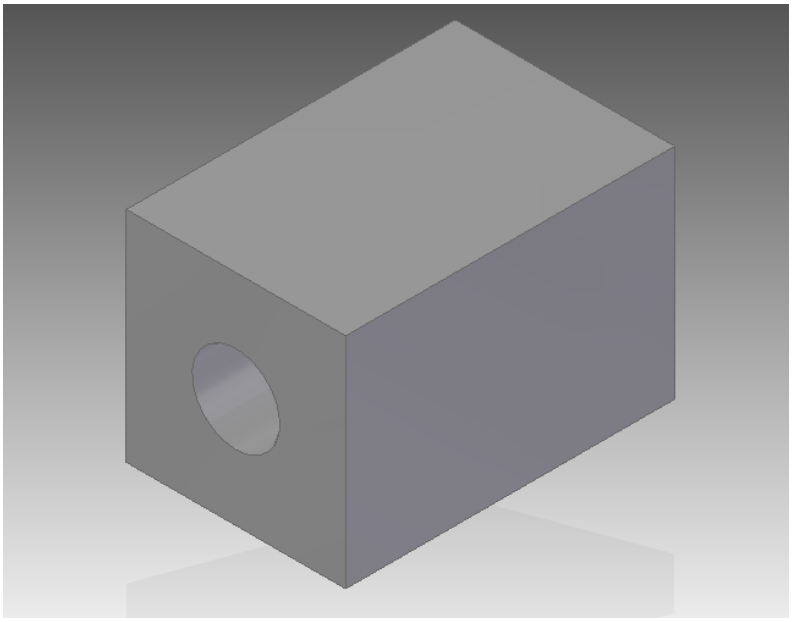


Handle draft

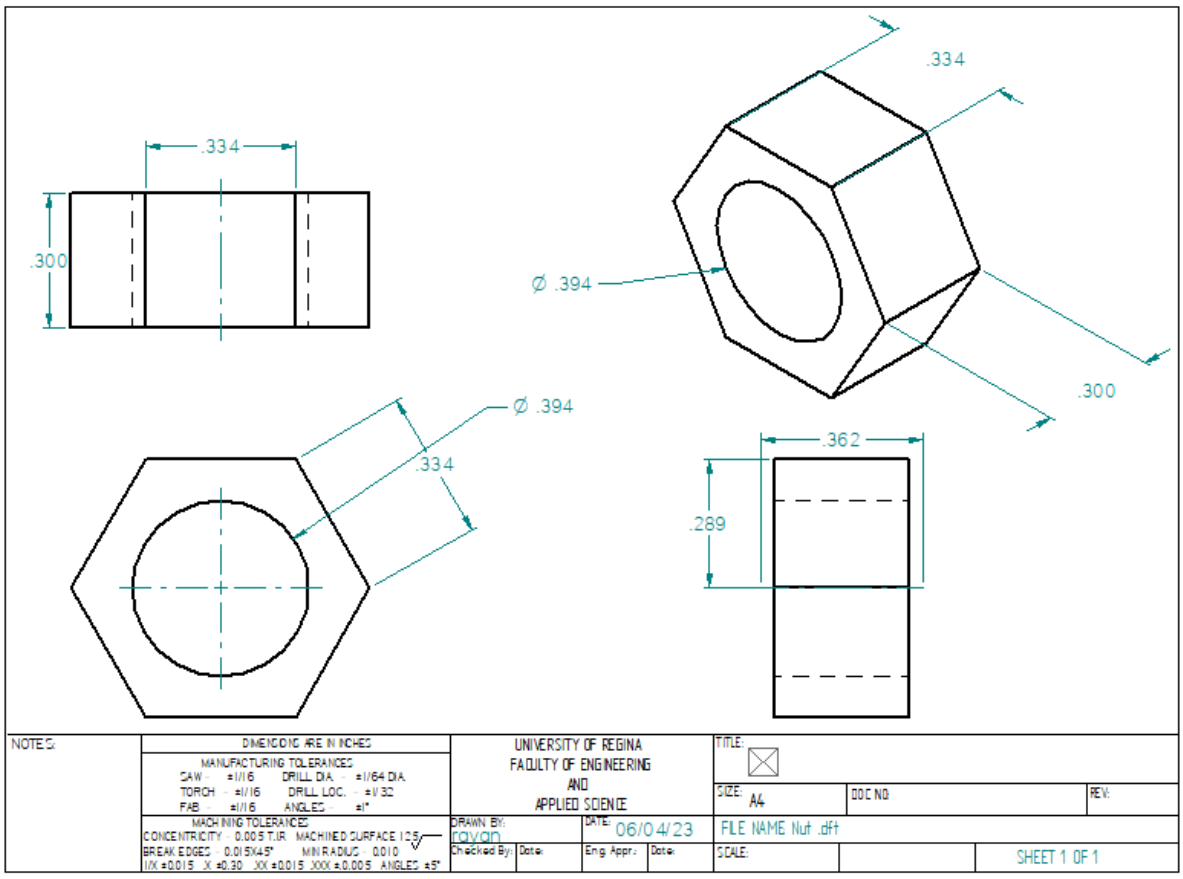
Handle part



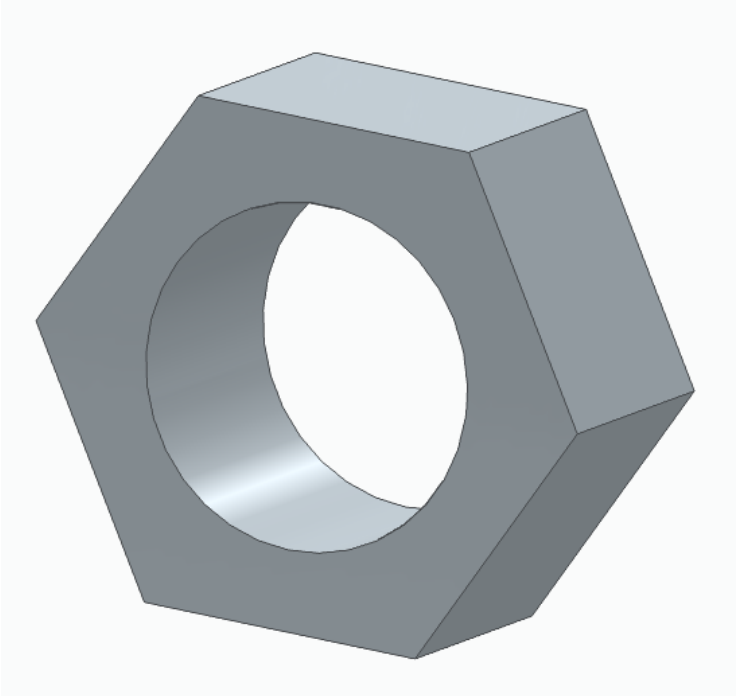
Middle crushing block draft



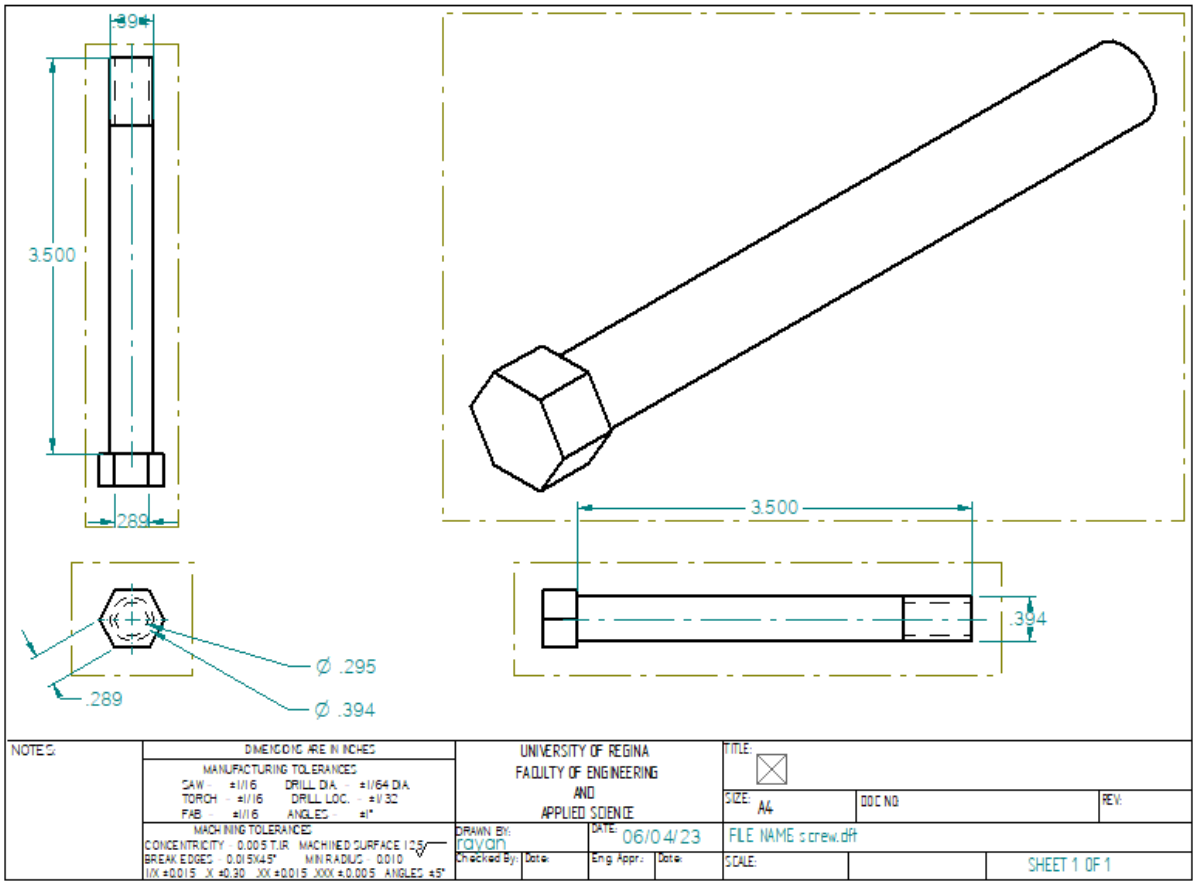
Middle crushing block part



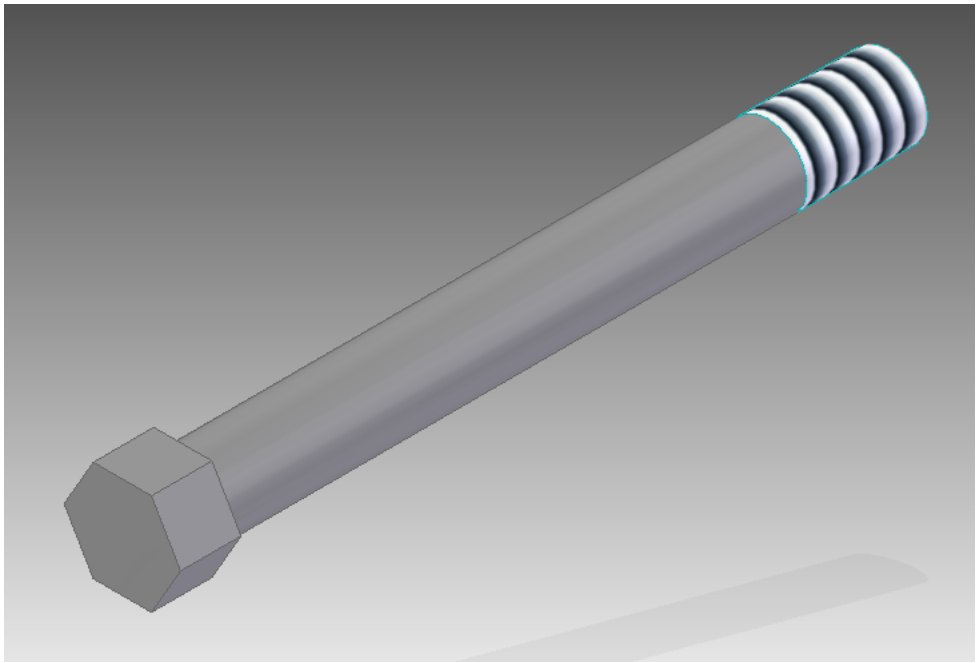
Nut draft



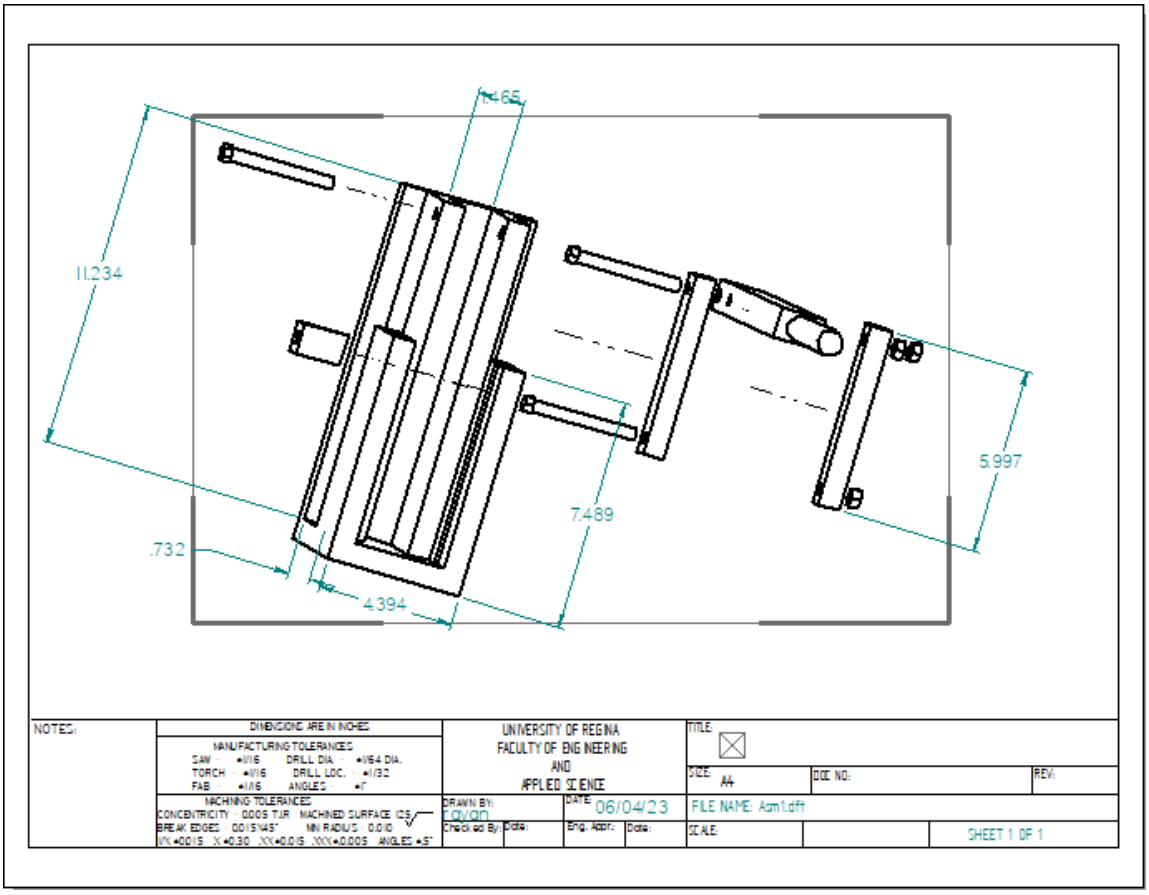
Nut part



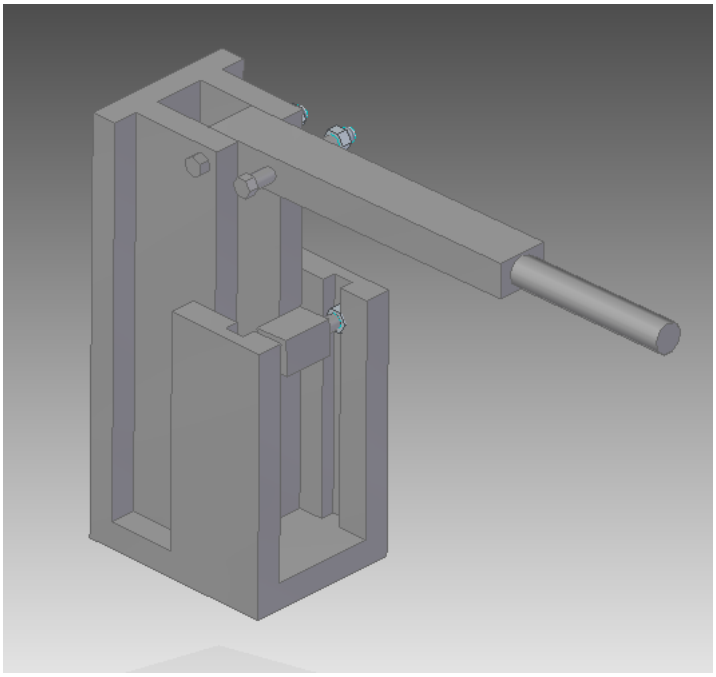
Screw draft



Screw part



Assembly Draft (exploded)



Final assembly