

Department of Electronics

SPAN – Skill Planning and AcquisitionN Cell SP  N

CAD and 3D Printing Projects

PROJECT REPORT

Project Title : Computer Aided Design and 3D printing of a fixture to hold a cylinder in place for processing by a robot

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Sem & Branch : S4 RA Project

Summary :

1. Introduction:

The aim of this project was to design and fabricate a fixture using computer-aided design (CAD) and 3D printing technology to securely hold a cylinder in place for processing by a robot. The fixture needed to prevent rotation of the cylinder during processing while also allowing easy insertion and removal.

2. Design Requirements:

The fixture must securely hold the cylinder without rotation.

It should be compatible with the robot's processing mechanism.

Easy insertion and removal of the cylinder.

Material selection suitable for 3D printing and durable enough for repeated use.

3. Design Process:

Conceptualization: Initial brainstorming sessions were held to generate design ideas and identify key features such as the mechanism for securing the cylinder.

CAD Modelling: Using software such as SolidWorks, the fixture was designed in 3D, incorporating features like a locking mechanism.

Prototyping: Iterations of the design was prototyped to test functionality and make necessary adjustments.

4. Design Features:

Locking Mechanism: A mechanism was incorporated to securely hold the cylinder in place without rotation. This mechanism allowed for easy adjustment and tightening.

Material Selection: PLA (polylactic acid) was chosen for 3D printing due to its affordability, ease of printing, and sufficient strength for the application.

5. Fabrication:

The final design was 3D printed using a Fused Deposition Modeling (FDM) printer.

Quality control measures were implemented during printing to ensure dimensional accuracy and surface finish.

Post-processing techniques such as sanding and smoothing were applied to improve the aesthetics and functionality of the fixture.

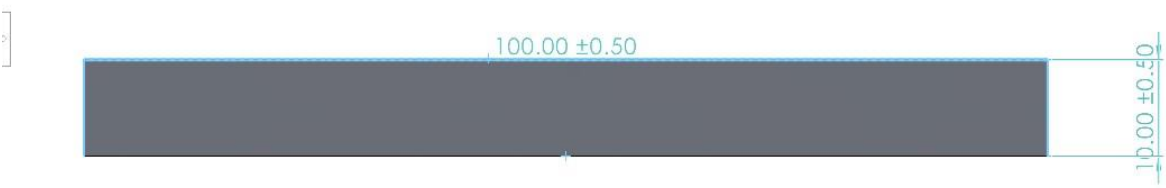
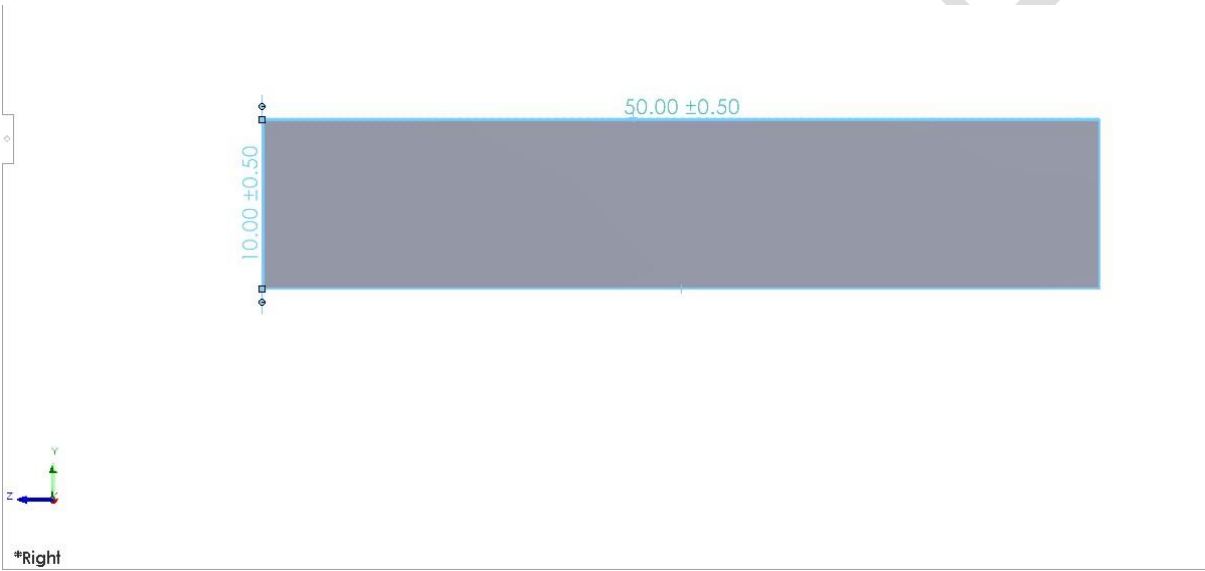
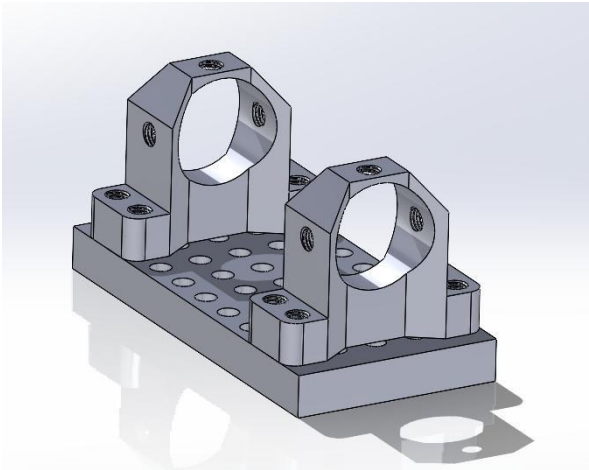
6. Testing and Validation:

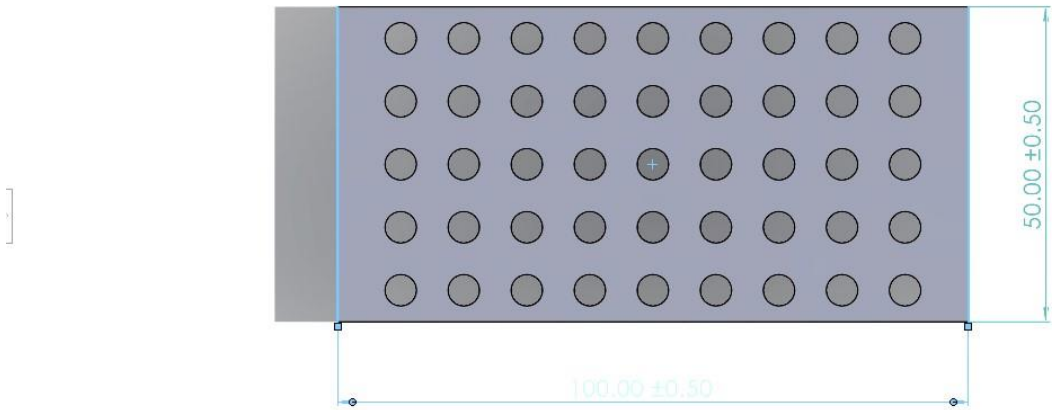
Functional tests were conducted to evaluate the effectiveness of the locking mechanism in preventing cylinder rotation.

7. Conclusion:

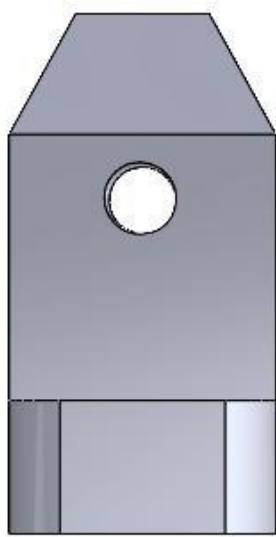
In conclusion, the project successfully achieved its objectives by designing and fabricating a fixture capable of securely holding a cylinder in place for processing by a robot. The integration of CAD and 3D printing technologies facilitated the efficient development of a functional and reliable solution. Further optimization and refinement may be pursued to enhance performance and address specific application requirements.

CAD Diagrams :

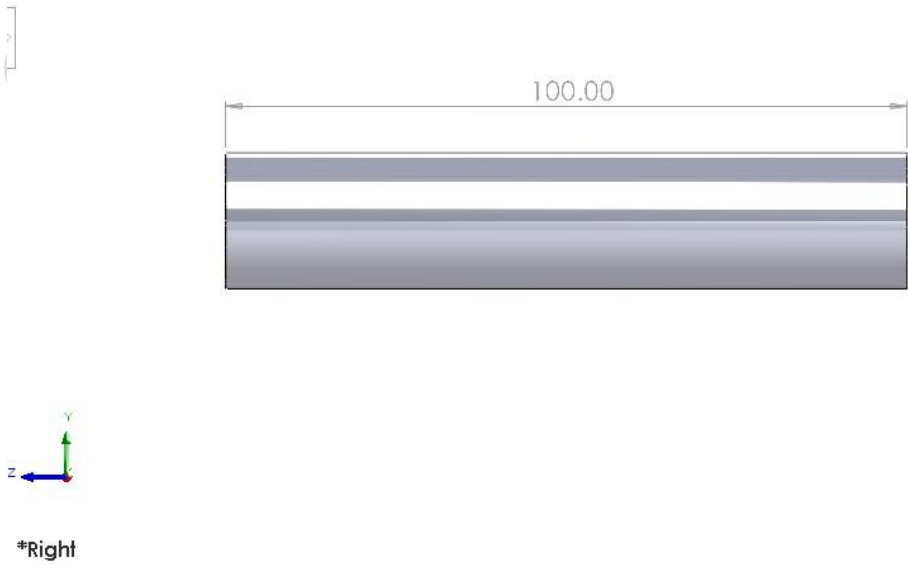
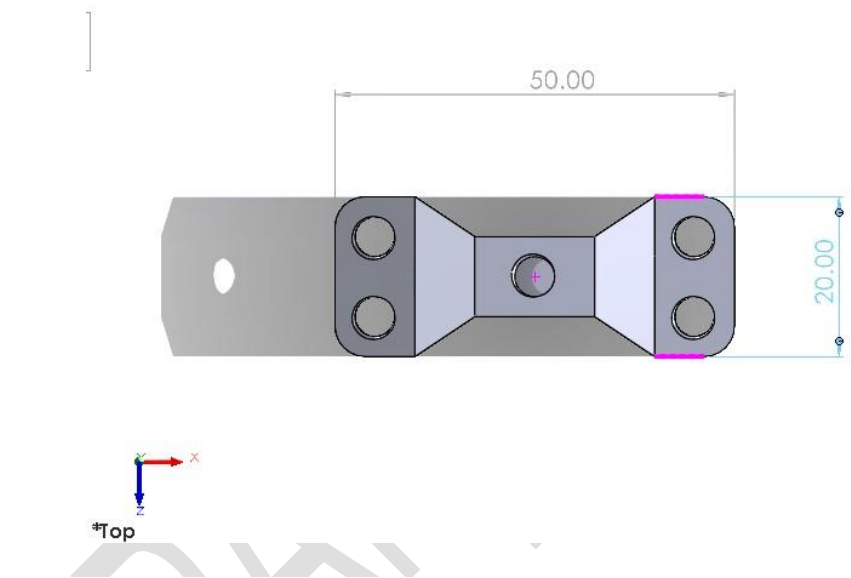
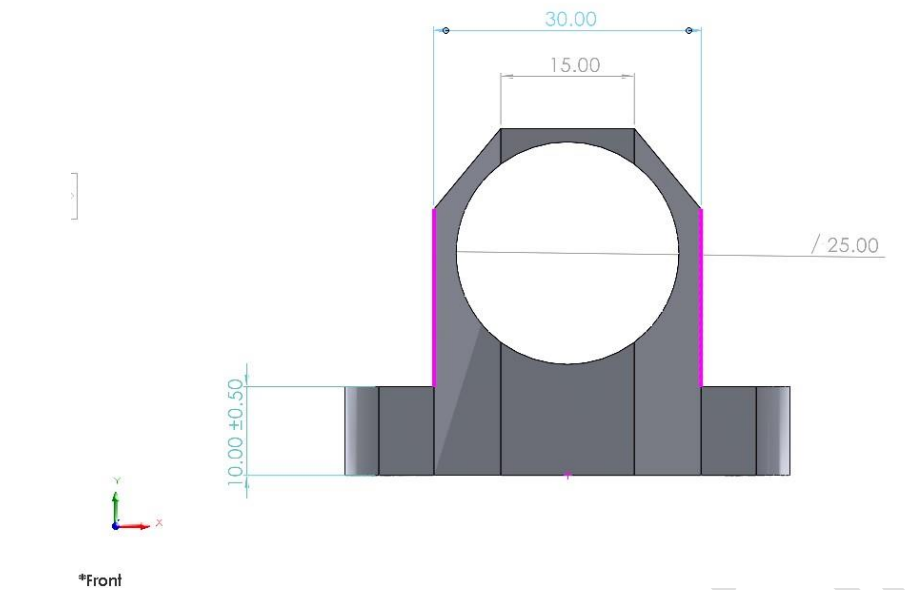




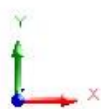
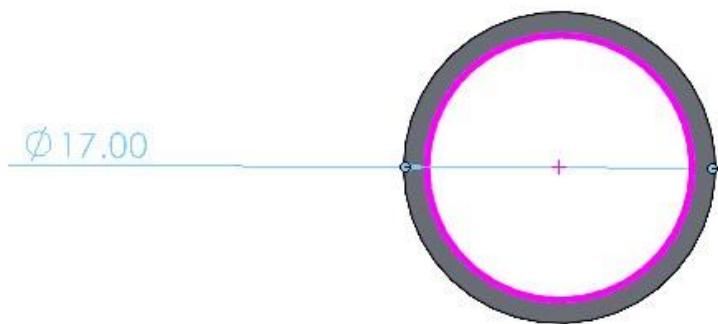
*Top



*Right

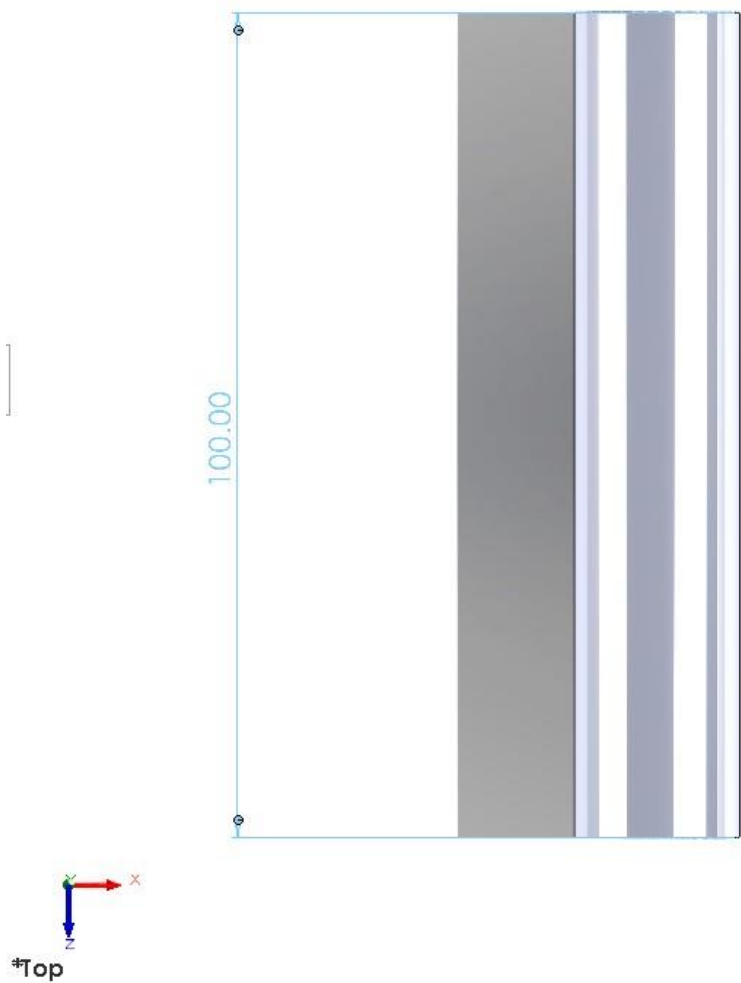


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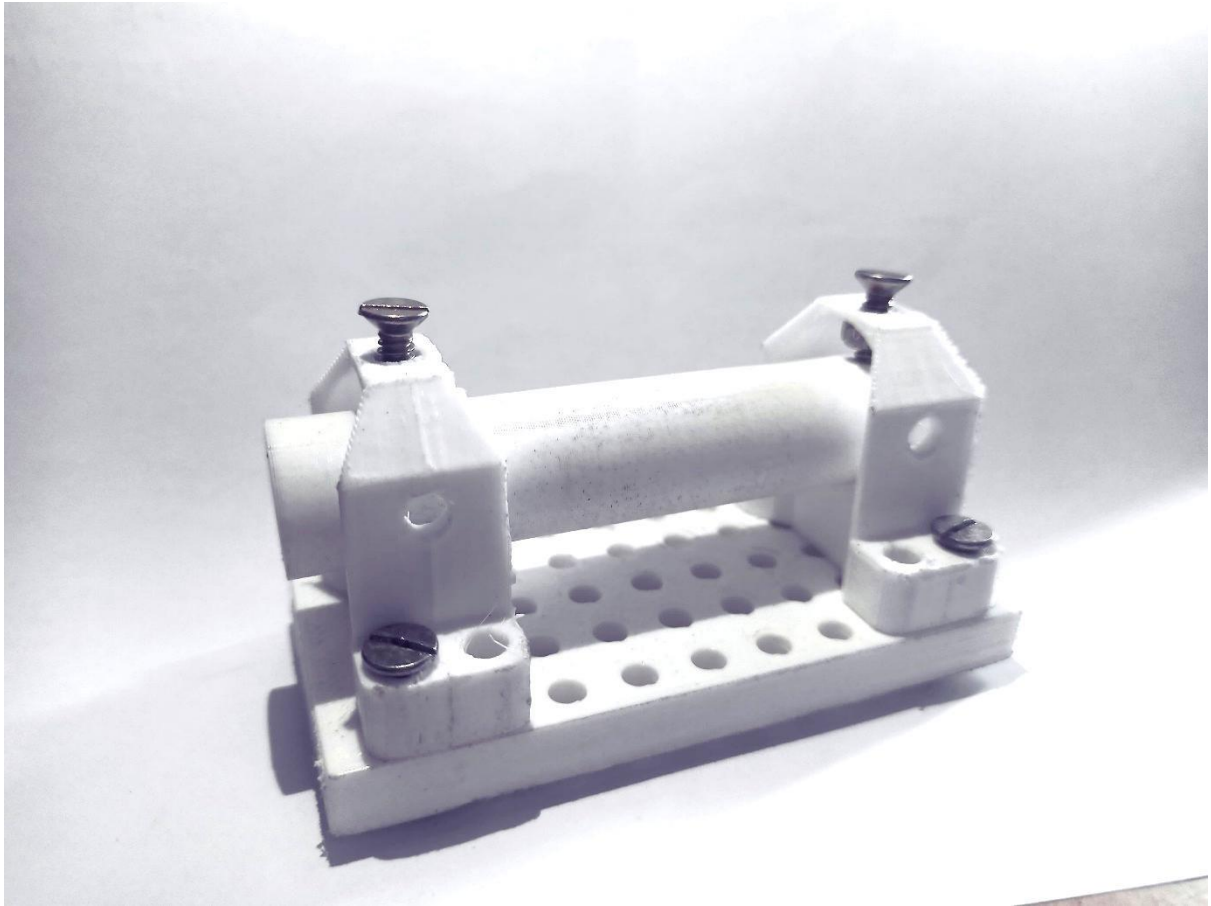


*Front

SPAN TISI



Output :



SPAN 110