

FULL DEER ANIMAL FABRICATION USING LASER CUTTING

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Introduction

This project involves the creation of a laser-cut deer pattern using RD software. The deer design represents a stylized animal form suitable for decorative panels, wall art, signage, or architectural elements. The model was designed using Autodesk Fusion 360 and prepared for fabrication through laser cutting.

Fabrication Steps

1. Prepare 2D vector file (DXF format).
2. Import file into laser cutting software.
3. Place material sheet on laser bed.
4. Align and focus laser head.
5. Perform test cut for calibration.
6. Execute full cutting process.
7. Remove parts and perform finishing.

Design Process in Fusion 360

3D Model Creation

Step 1: Create a New Sketch

- Open Fusion 360.
- Start a new sketch on the XY plane.
- Set units (mm).

Step 2: Import or Draw Reference

- Insert a deer reference image (Canvas tool).
- Calibrate image scale.

Step 3: Trace the Silhouette

- Use:
 - Spline tool for smooth curves.
 - Line tool for straight segments.
 - Arc tool for curved sections.
- Ensure all curves are tangent and smooth.

Step 4: Close the Profile

- Make sure the entire silhouette forms a closed profile.
- Use “Trim” and “Extend” tools to clean intersections.

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Step 5: Add Internal Design Features

- Create decorative cut patterns.
- Offset edges for border effects.
- Maintain minimum bridge width ($\geq 2\text{mm}$ for wood).

Step 6: Define Slot Joints

- Use parametric dimensions.
- Set slot width = material thickness 2mm + tolerance 1mm.
- Use constraints for symmetry.

Step 7: Check Design

- Use Inspect tool.
- Ensure no open curves.
- Verify minimum feature thickness.

Step 8: Export for Laser Cutting

- Right-click sketch → Save as DXF.
- Import into RD laser software.
- Set cut order (inner cuts first, outer cuts last).

Material Selection

The following materials were considered:

Material	Thickness	Reason for Selection
MDF	2 mm	Cost-effective and easy to cut
Plywood	3–6 mm	Strong and lightweight
Acrylic	3–5 mm	Smooth finish and modern look

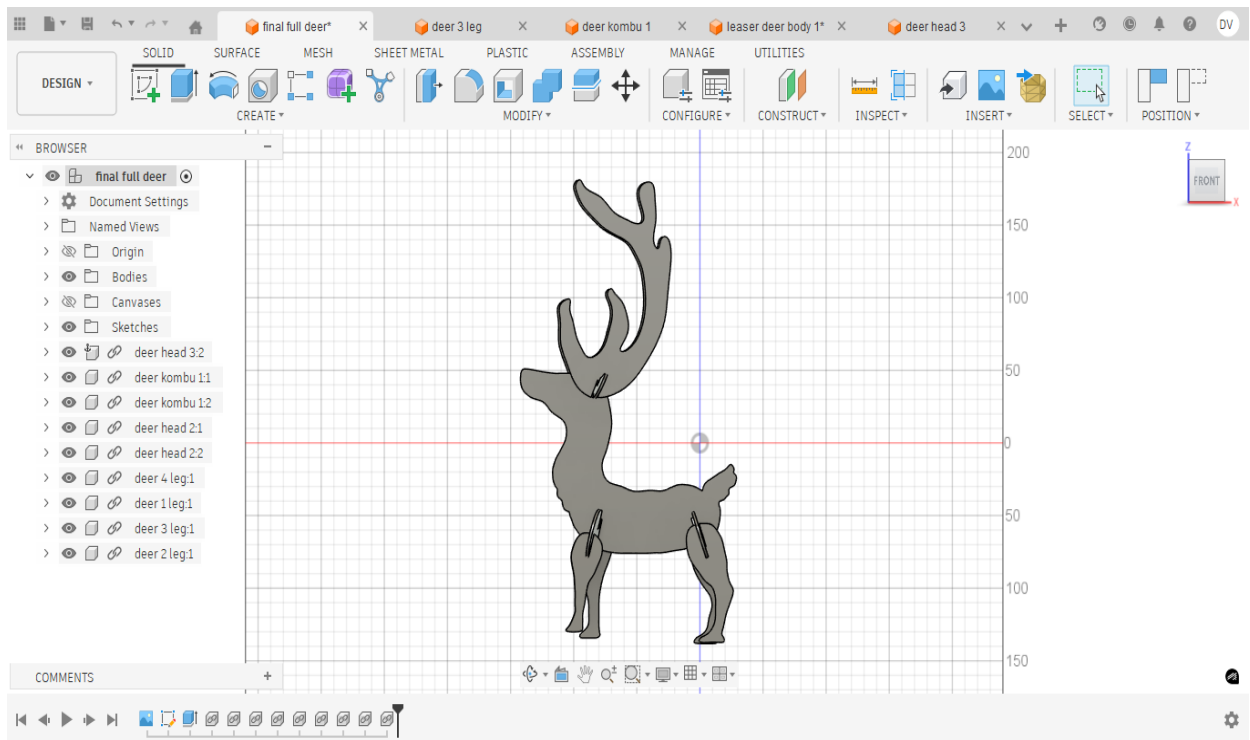
For this project, 2 mm plywood was selected due to its good strength and smooth finish.

Advantages of Laser Cutting Machine

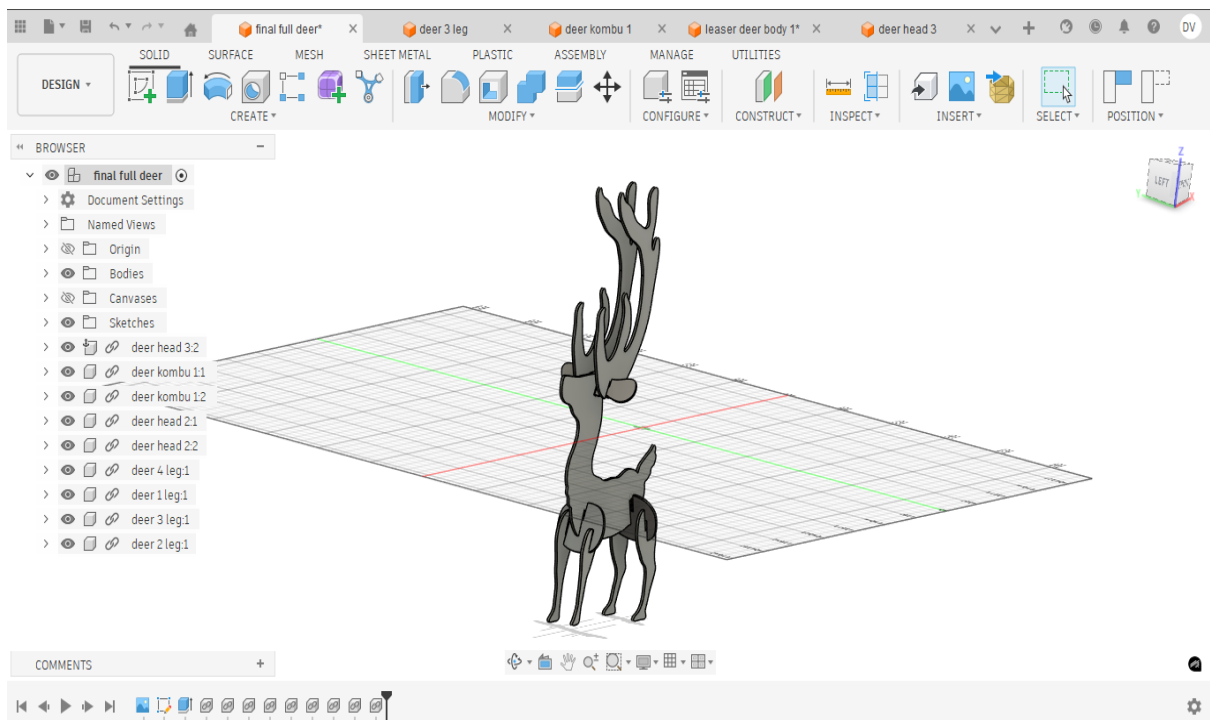
- High precision ($\pm 0.1\text{ mm}$)
- No tool wear
- Clean and smooth finish
- Complex shapes possible
- Fast production

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MODEL VIEW 1



MODEL VIEW 2



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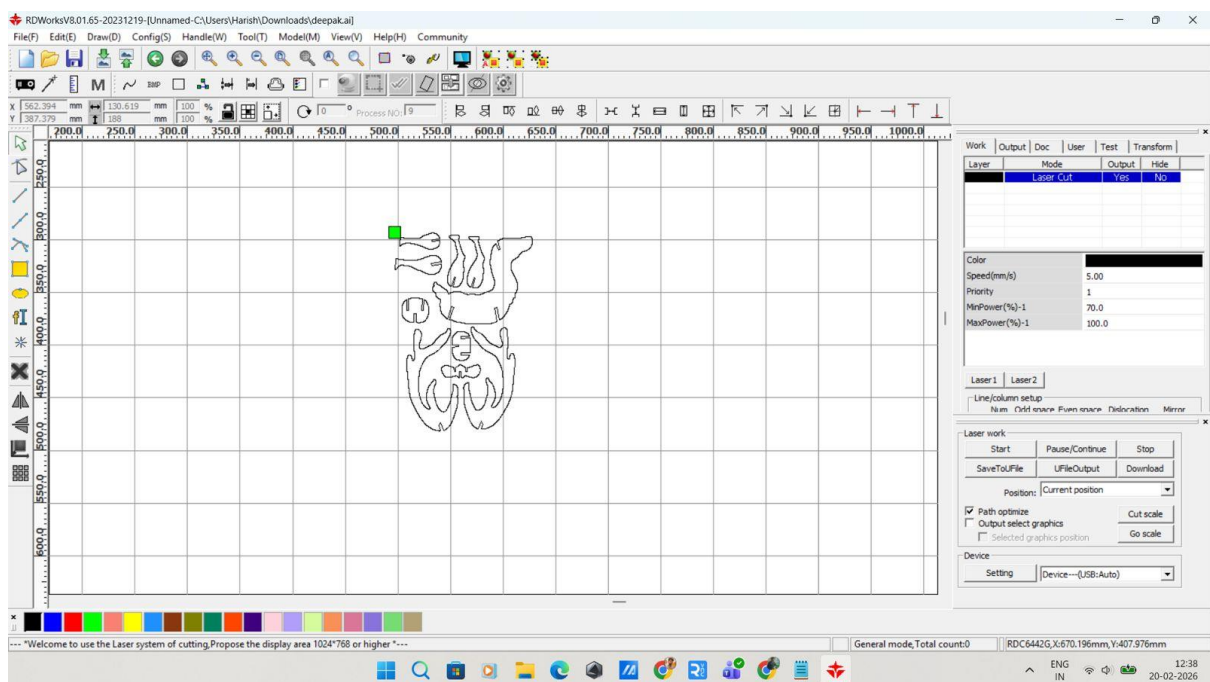
Exporting for Laser Cutting

- As Laser Cutting Requires Flat Patterns, the sliced layer were converted into 2D Sketches
- The Sketches were optimized to minimal wastage.

Laser Cutting Process

Importing into RD laser software

- The DXF files were imported into RD software
- The Slices were arranged optimally to maximize material efficiency

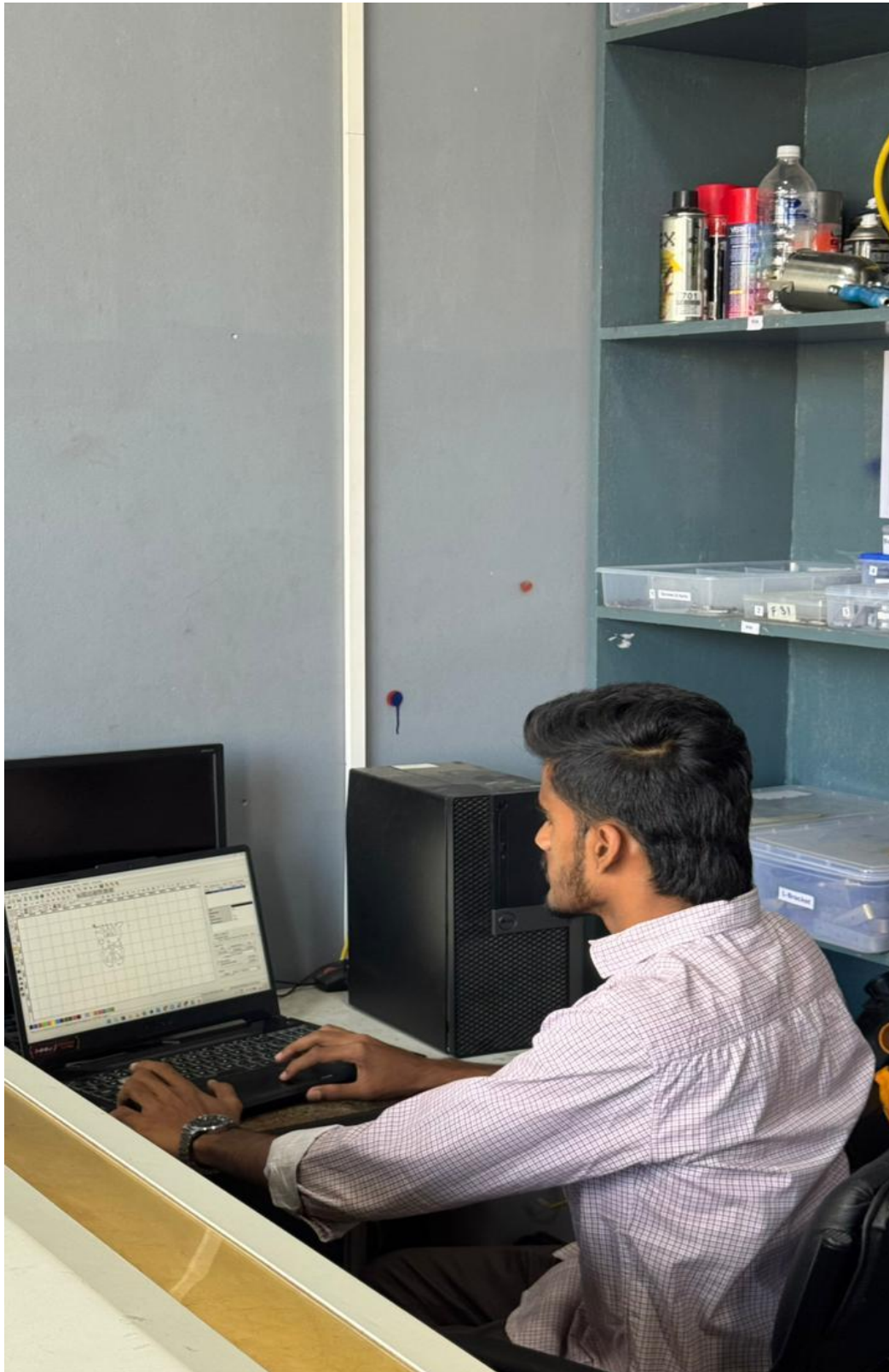


Setting Laser Cutter Parameters

- Power:
- Speed:
- These settings ensured precise cutting while minimizing burn marks on 2mm MDF sheets

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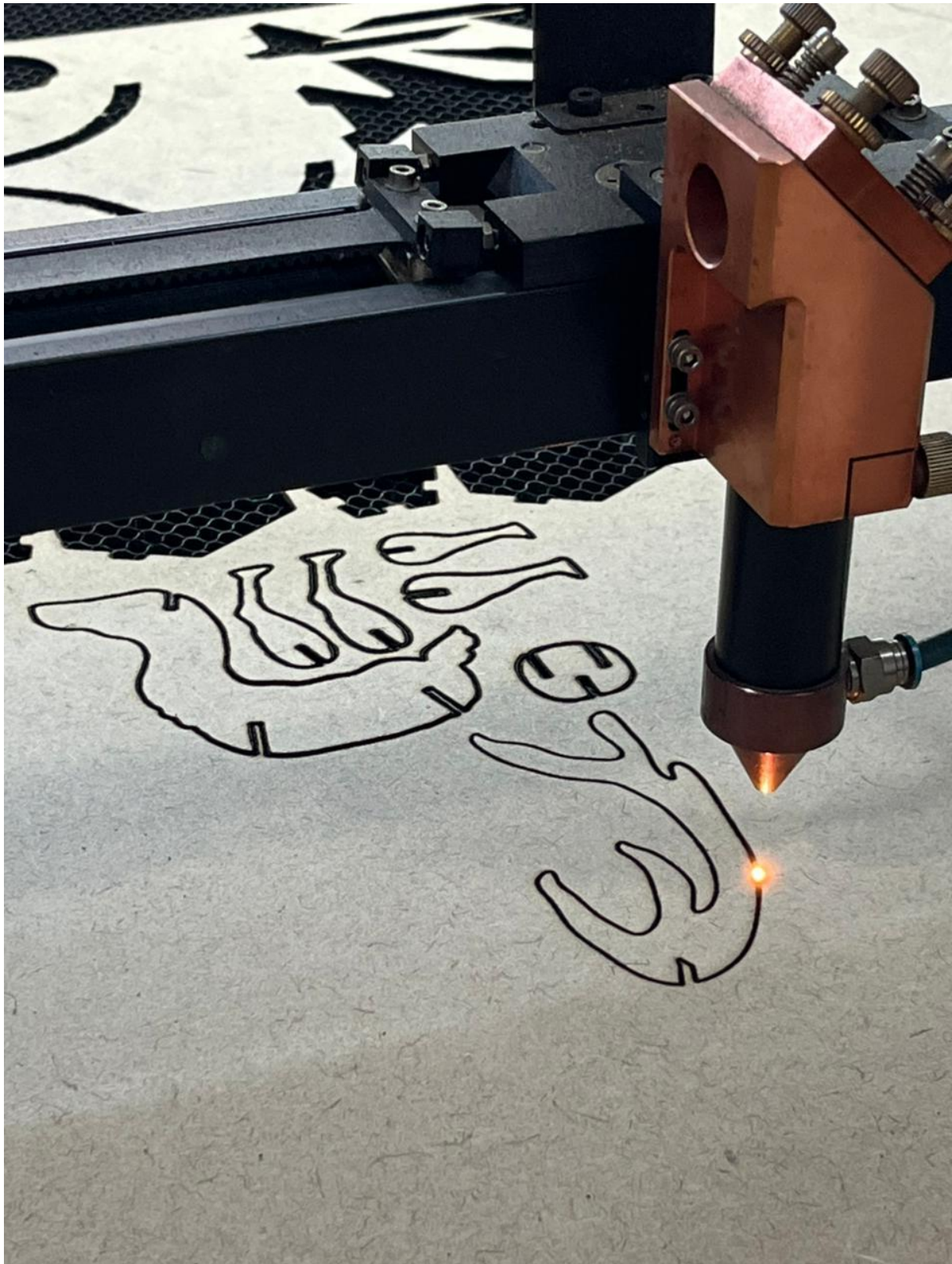
Laser Cutting Execution



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- The layer were cut sequentially ensuring high precision
- The cut pieces were carefully removed to prevent damage.

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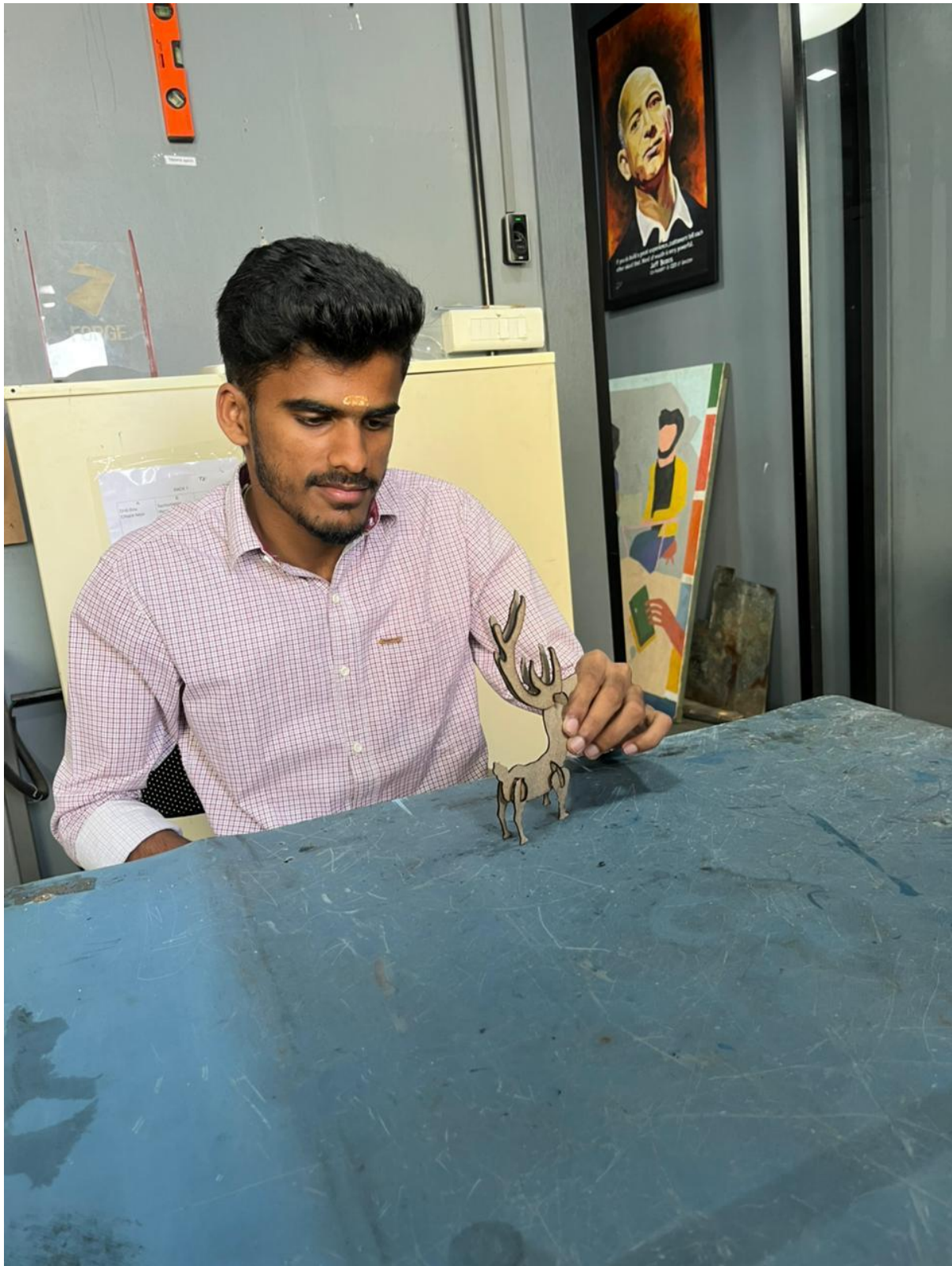
Assembly process



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- A precisely cut and well-structured hollow sphere was successfully fabricated.
- The Layered Contours Method proved to be an efficient and material-saving approach.
- The use of Fusion 360 for design and RD Design for execution ensured high accuracy and precision.

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- The assignment demonstrated the effectiveness of laser cutting in producing complex geometries with ease.