

# B. P. Mandal College of Engineering, Madhepura



**Course: Bachelor of Technology**

A Project Report On

## Comprehensive 3D Modeling Project (Lahori Zeera Bottle Modeling in Blender)

*Submitted By*

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**Semester (Year): 5th (3rd)**

**Session: 2022-26**

*Under the guidance of*

**Prof Sujeeet Kumar**

Assistant Professor, CSE, BPMCE

**2022 - 2026**

## Declaration

I, **Ketan Anand**, hereby declare that the work presented in this project titled "**Comprehensive 3D Modeling Project (Lahori Zeera Bottle Modeling in Blender)**" is the result of my own efforts, carried out as part of the Minor Project for the 5th semester of the B.Tech program. This project has been supervised by **Prof Sujeet Kumar**.

I further declare that this report has not been submitted elsewhere for any other degree, diploma, or award. All the information and data used in this project are authentic, and proper references have been provided wherever required.

I also acknowledge the guidance and support received from my project supervisor and faculty members during the course of this project.

**Signature Date:**

Place:

**Ketan Anand**

**22118128007**

# Certificate



This is to certify that **Ketan Anand**, a student of the Department of 3D ANIMATION AND GRAPHICS, B. P. Mandal College of Engineering, Madhepura, has successfully completed his Minor Project titled "**Comprehensive 3D Modeling Project (Lahori Zeera Bottle Modeling in Blender)**" as part of the curriculum for the 5th semester of the B.Tech program.

The project was supervised by **Prof. Sujeet Kumar**, and this report presents the work and findings during the project.

The work has been completed by the student under my guidance, and the report is a true reflection of the work undertaken by him.

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## Mentor's Signature

**Prof. Sujeet Kumar**

Mentor

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## Head of Department's Signature

**Prof. Murlidhar Prasad Singh**

HoD, CSE

## Acknowledgement

It is a great pleasure for me to acknowledge the assistance and support of many individuals who have been responsible for the successful completion of this project work.

First, I would like to express my heartfelt gratitude to **B. P. Mandal College of Engineering, Madhepura** for providing me with the opportunity to pursue my Bachelor's degree at this esteemed institution and for supporting me throughout this minor project in my **5th semester**.

I would like to express my deepest gratitude to **Prof. Arbind Kumar Amar, Principal, B. P. Mandal College of Engineering, Madhepura**, for his constant encouragement and support through-out the course of this project.

I would also like to thank Prof. Murlidhar Prasad Singh, Head of the Department, Computer Science and Engineering, B. P. Mandal College of Engineering, Madhepura, for his valuable guidance and support.

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Professor, Department of Computer Science and Engineering, for his expert guidance and for pro-viding his time and valuable suggestions at every step of this project.

I would like to thank the faculty and staff of the Computer Science and Engineering department for their support.

I am also grateful to my family and friends for their constant encouragement and support through-out the course of this project. Lastly, I would like to thank everyone who directly or indirectly helped me in the successful completion of this project.

**Ketan Anand  
22118128007**

# Comprehensive 3D Modeling Project (Lahori Zeera Bottle Modeling in Blender)

Ketan Anand

## Abstract

The purpose of this project was to design a realistic 3D model of a **Lahori Zeera soft drink bottle** using **Blender**, an open-source 3D modeling and rendering software. The objective was to simulate a real-world product using professional 3D techniques such as profile modeling, the spin tool, modifiers (solidify and subdivision surface), and texture mapping with UV unwrapping. The modeling process began with setting up a reference image to guide the proportions and shape of the bottle. A 2D profile of the bottle was created and then revolved using the spin tool to generate the full 3D mesh. Thickness was added using the Solidify modifier, and the model was refined using the Subdivision Surface modifier for smoothness. The bottle cap was modeled separately using basic extrusion and inset techniques on a cylinder mesh. Materials were applied using the **Principled BSDF shader**, simulating glass for the bottle and plastic for the cap. The product label was mapped onto the surface using UV unwrapping and an image texture. The scene was lit using an HDRI environment and three-point lighting, and final renders were produced using the **Cycles renderer**. This project not only demonstrates foundational modeling and texturing techniques but also reflects an understanding of product visualization workflows in Blender. It serves as a comprehensive exercise in transforming a real-world object into a fully rendered 3D asset suitable for use in advertising, animation, or virtual product showcases. showcasing the potential of this hybrid approach in real-world applications.

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## Introduction

1. This project involves the 3D modeling of a Lahori Zeera soft drink bottle using Blender, an open-source 3D creation software.
2. The objective is to create a realistic digital replica of the bottle, including its shape, materials, label texture, and lighting.
3. The project covers the entire 3D modeling workflow:
4. Setting up reference images
5. Modeling using mesh and curve tools
6. Applying modifiers (Spin, Solidify, Subdivision Surface)
7. UV unwrapping and texture mapping
8. Material and shader setup
9. Lighting, camera positioning, and rendering
10. The Spin tool was used to revolve a 2D profile to form the 3D body of the bottle.
11. A Solidify modifier added realistic wall thickness, and Subdivision Surface smoothing made the bottle appear polished and production-ready.
12. The bottle cap was modeled separately using basic geometric tools such as cylinders, extrusion, and beveling.
13. The label was added through UV unwrapping and texture mapping using an image texture aligned to the surface of the bottle.
14. Materials were created using the Principled BSDF Shader, simulating:
15. Transparent glass for the bottle
16. Matte or glossy plastic for the cap
17. Lighting was done using HDRI and 3-point light setup, and the final render was generated using the Cycles render engine.
18. This project helped in understanding product visualization, precision modeling, material realism, and rendering techniques.

## **2. Objective**

- To develop a 3D model of a real-world product (Lahori Zeera bottle)
- To learn and apply Blender tools such as Spin, Solidify, Subdivision Surface
- To gain experience in UV mapping, material creation, and rendering
- To simulate a realistic product scene using lighting and camera setup

## **3. Software and Tools Used**

- Blender (Version 4.x)
- Modeling: Mesh editing, Spin Tool, Extrude, Loop Cuts
- Modifiers: Solidify, Subdivision Surface
- Rendering: Cycles Renderer
- Lighting: HDRI & 3-point light setups



## 4. Reference Image

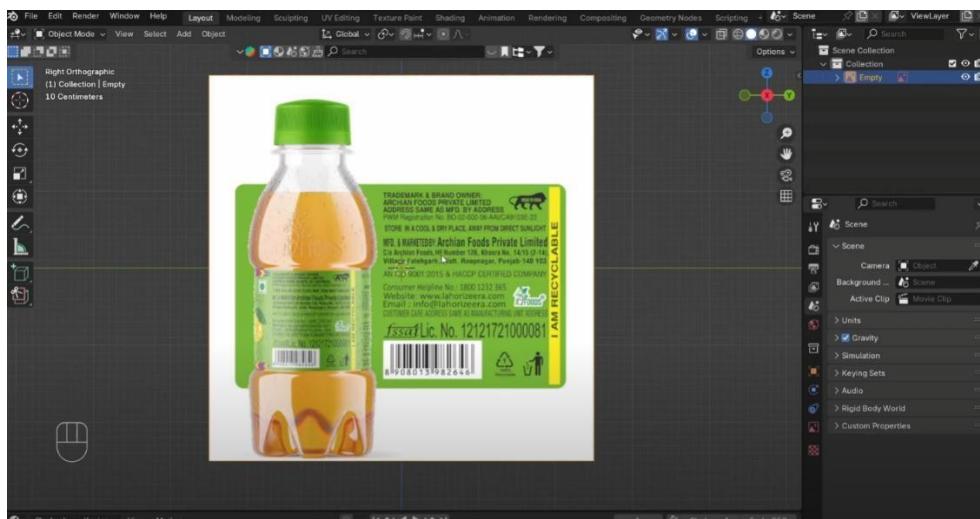
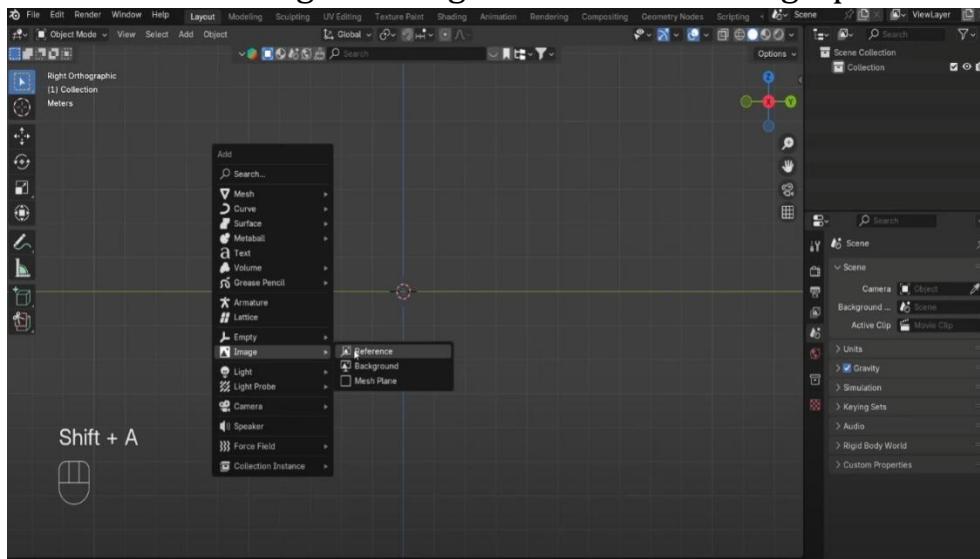
A front-facing reference image of a Lahori Zeera bottle was imported into Blender as a guide for modeling. This ensured the proportions, shape, and label placement matched the realworld product.



## 5. Modeling Process

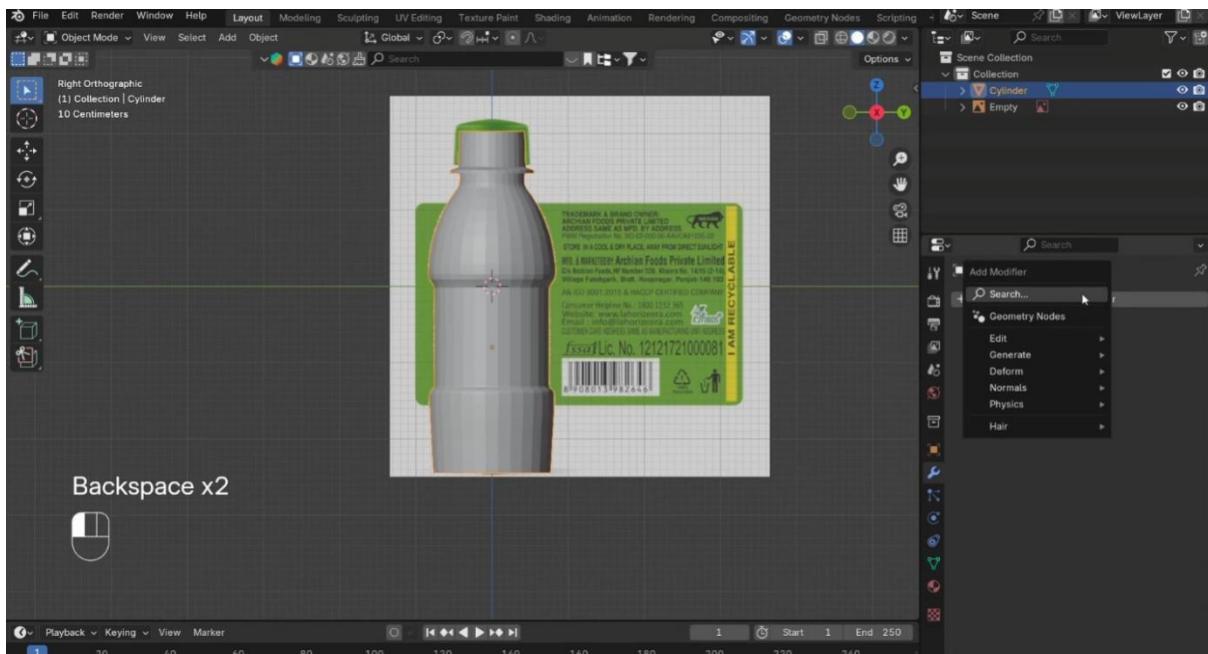
### 5.1 Blender Scene Setup

- Deleted default cube
- Added reference image via Add > Image > Reference
- Locked the image and aligned it in front orthographic view



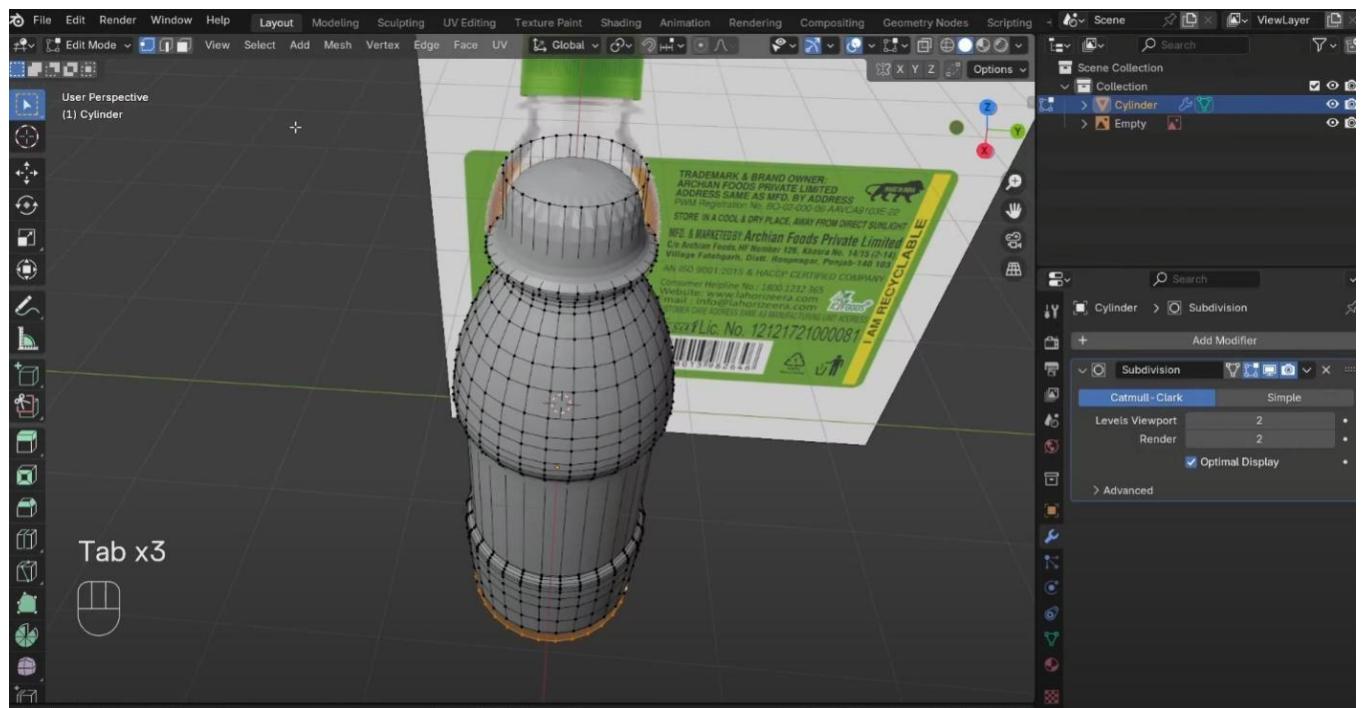
### 5.2 Creating Bottle Shape (Spin Tool)

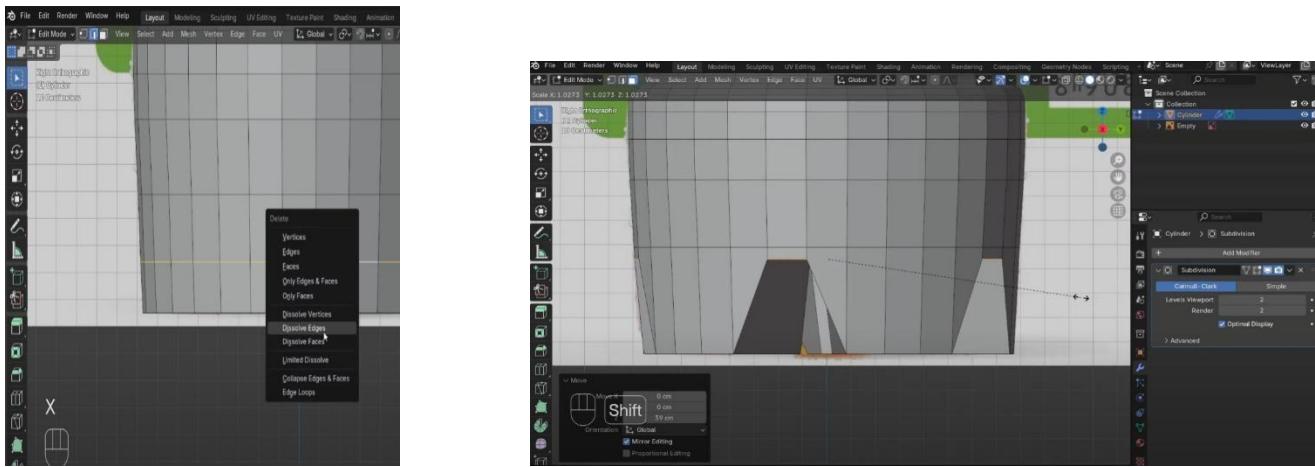
- Created a half-profile outline of the bottle using vertices and the extrude tool
- Used the Spin tool to revolve the profile 360 degrees around the Z-axis
- Cleaned up the resulting mesh



### 5.3 Applying Solidify Modifier

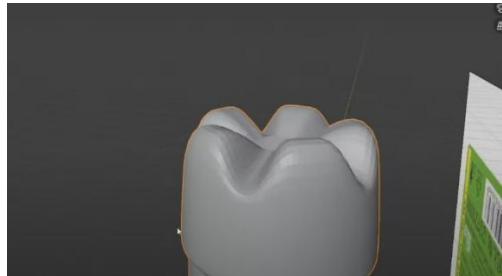
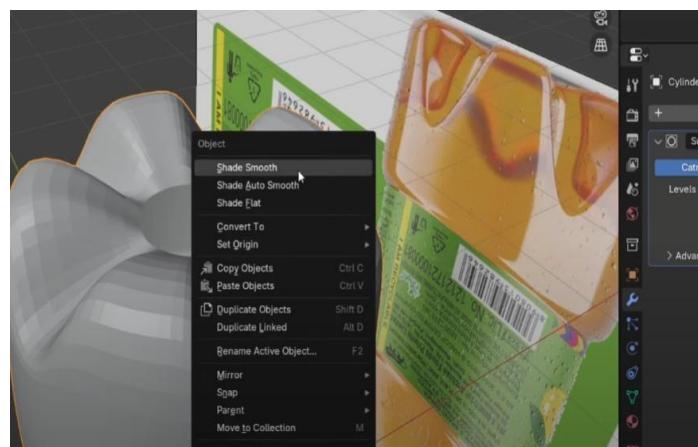
- Added the Solidify modifier to give the mesh realistic wall thickness
- Set thickness value around 0.03 units



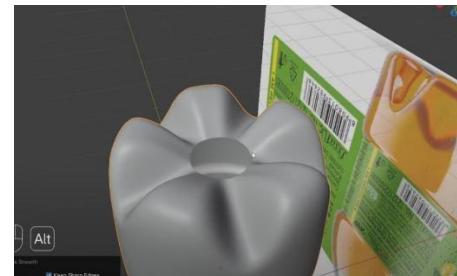


## 5.4 Smoothing with Subdivision Surface

- Applied the Subdivision Surface modifier to smooth the shape
- Set Viewport = 2, Render = 3
- Enabled Shade Smooth for better surface finish



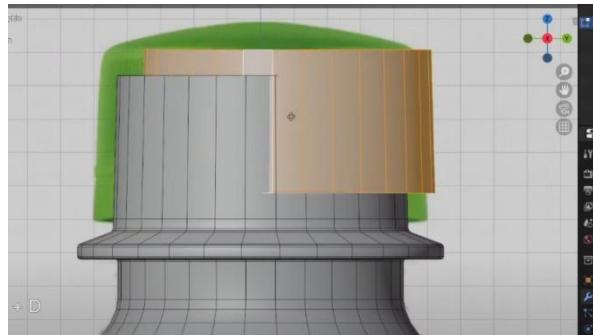
Before smooth



After smooth

## 5.5 Modeling the Bottle Cap

- Added a cylinder
- Scaled and extruded faces to form the cap
- Added bevels and edge loops for detail and smooth shading



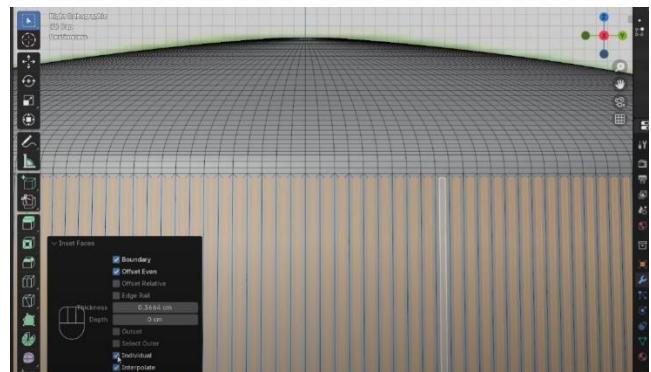
1



2



3



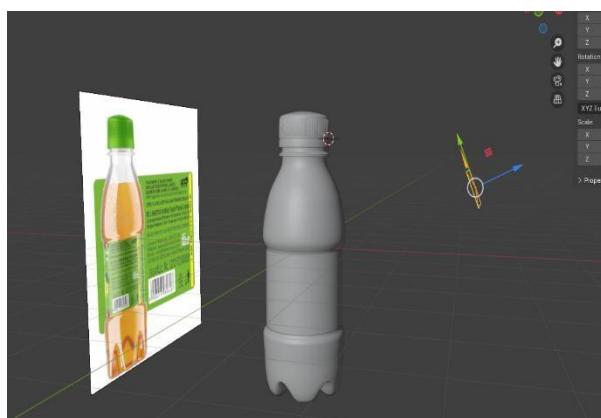
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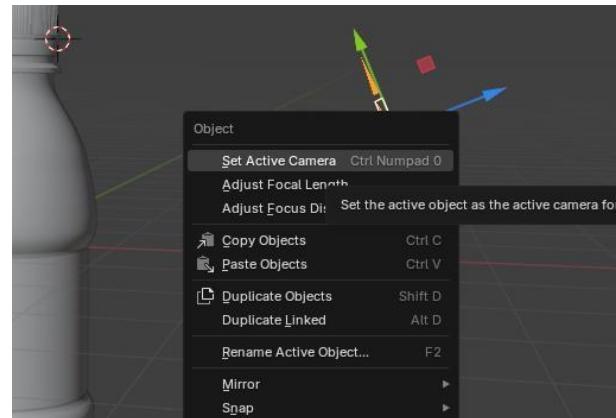
5

## 6. Lighting and Camera Setup

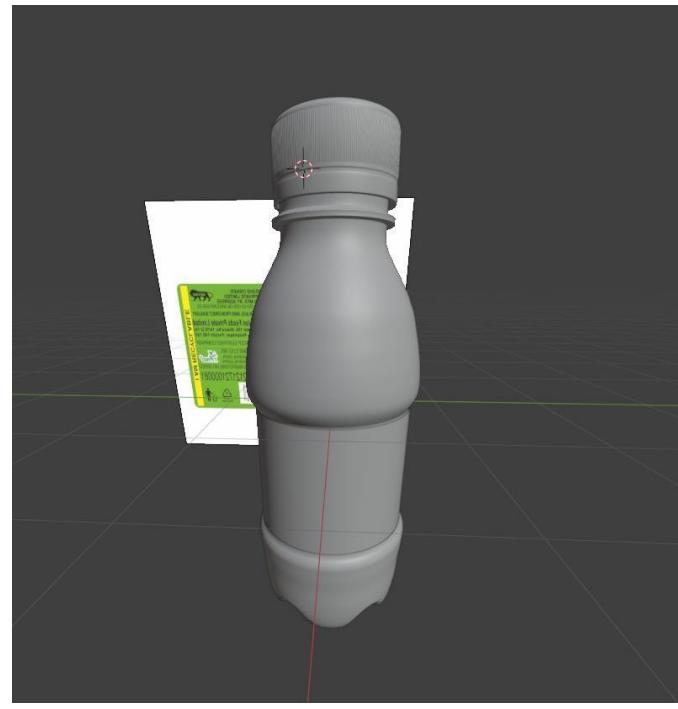
- Used an HDRI environment image for natural lighting
- Added 3-point lights: Key Light, Fill Light, Rim Light
- Placed the camera in front view using Numpad 0
- Adjusted focal length and angle for best composition



1



2



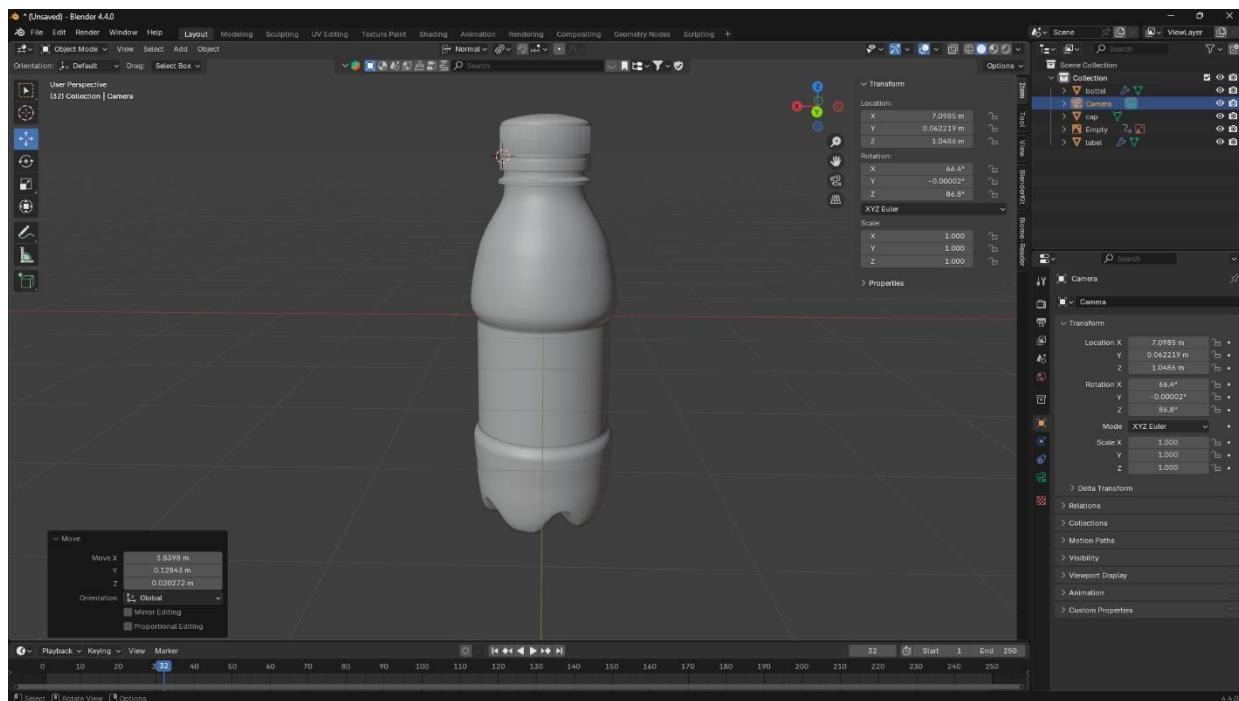
3

## 7. Rendering Process

- Switched to Cycles Render Engine
- Set Render Samples = 512 for high quality
- Enabled features: Bloom, Ambient Occlusion, Screen Space Reflections
- Final render resolution: 1920 x 1080

## 8. Final Output and Screenshots

- Final render displays a realistic 3D model of the Lahori Zeera bottle
- Includes accurate label placement, material properties, and lighting
- Screenshots show different views: perspective, wireframe, UV layout, final render



## 9. Skills Learned

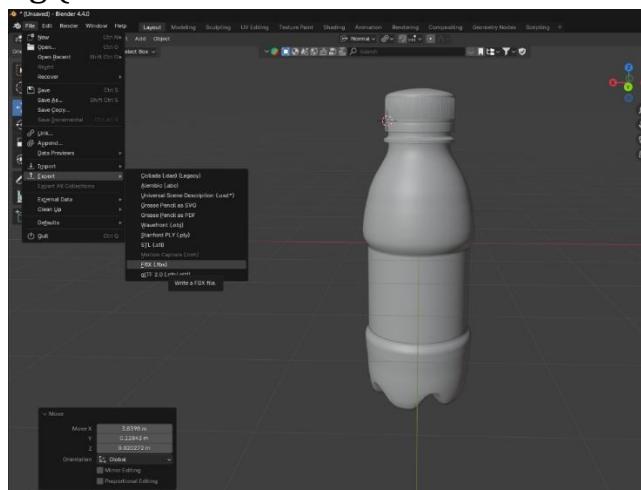
- Profile modeling and using the Spin tool
- Applying and adjusting modifiers
- Creating realistic glass and plastic materials
- UV unwrapping and texture placement
- HDRI lighting and camera framing
- Rendering and export workflow

## 10. Conclusion

This project provided a complete learning experience in product modeling using Blender. It covered everything from importing reference images to rendering a polished, realistic final image. The final outcome meets industry standards for digital product visualization.

## 11. File Export and Preview

- Exported the final model as .FBX and .OBJ
- Rendered output saved as PNG
- Animation turntable can be rendered as MP4
- Used Viewport Shading (Material Preview and Rendered View) for previews



## 13.Appendix

### A. System Specifications

- **Blender Version:** 3.6.0 (or your version)
- **Operating System:** Windows 10 / macOS / Linux
- **Processor:** Intel Core i5 / Ryzen 5 (or better)
- **RAM:** 8 GB (minimum), 16 GB recommended
- **Graphics Card:** NVIDIA GTX 1650 / AMD Radeon RX 580 (or better)
- **Display Resolution:** 1920x1080

### B. Blender Add-ons Used

- **LoopTools** – for mesh modeling
- **Node Wrangler** – for easier shader editing
- **Import Images as Planes** – for references/textures
- **Rigify** (if rigging was used)
- **Extra Objects** – to access additional mesh primitives

### C. File Organization

Folder Name	Description
/References	Contains all reference images used
/BlenderProject	Main .blend file
/Textures	All image textures used in materials
/Renders	Final render images and animation outputs
/Assets	Downloaded models or environment maps

### D. Common Shortcuts Used in Blender Shortcut Function

G	Grab/Move
R	Rotate
S	Scale
Shift + A	Add new object
Tab	Toggle Edit/Object Mode
Ctrl + Z	Undo

### E. External Resources

- **Texture Sources:** [Poly Haven](#), [CC0 Textures](#) •
- **HDRI Source:** [HDRI Haven](#)

## **14. References**

- **Product Reference Image:** Lahori Zeera bottle image (used for modeling guide)
- **Blender Official Documentation:** <https://docs.blender.org>
- **Blender Guru Tutorials:** <https://www.blenderguru.com>
- **HDRI Lighting Source:** <https://polyhaven.com/hdris>
- **Free Texture Sources:** <https://cc0textures.com>, <https://textures.com>

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This project represents a significant milestone in my learning journey with Blender. From modeling to rendering, each step of this project allowed me to explore industry-relevant tools and techniques. I am confident that the skills acquired through this project will serve as a strong foundation for more advanced 3D design work in the future.

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