Multi-Material Printing on Prusa XL

Step 1: Preparing the 3D Model in Rhino

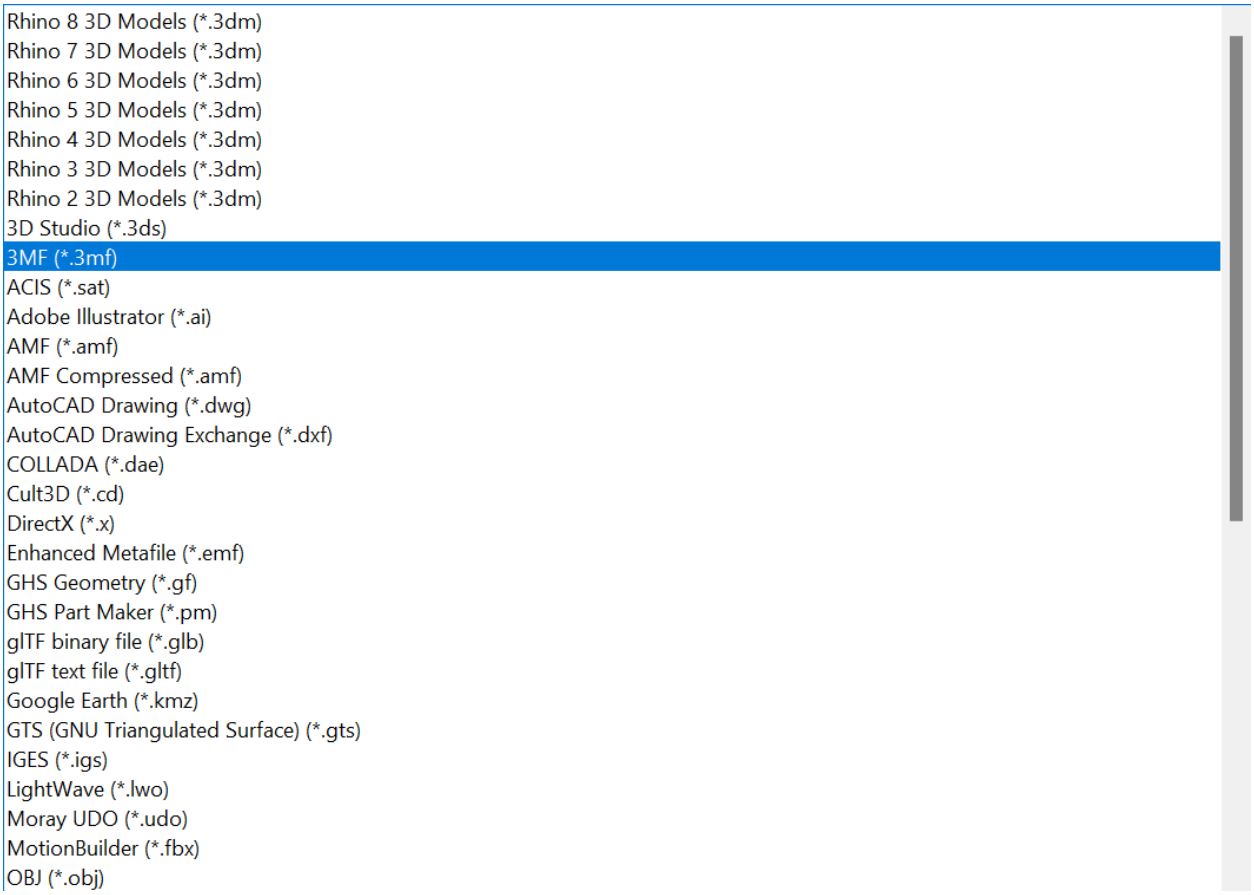
Important: Before exporting a **3MF** file, ensure that your Rhino model is correctly prepared for multi-color printing.

1. **Model Setup:**
    - Ensure your model consists of separate, **solid, closed polysurfaces** or **meshes** for different color zones.
    - Each part intended to be a different color must be a **separate object**.
2. **Converting to Mesh:**
    - If your objects are **NURBS**, convert them into meshes using the **Mesh** command.
    - Adjust settings to maintain detail while keeping a reasonable poly count.

Step 2: Exporting a Multi-Body 3MF File from Rhino

Important: Rhino allows exporting models as **3MF**, which retains object separations for multi-color printing.

1. **Export as 3MF:**
    - Select all objects in the model.
    - Go to **File → Export Selected**.
    - Choose **.3MF** as the file format.
    - In the **3MF Export Options**, ensure correct object separation.
    - Click **OK** and save the file.

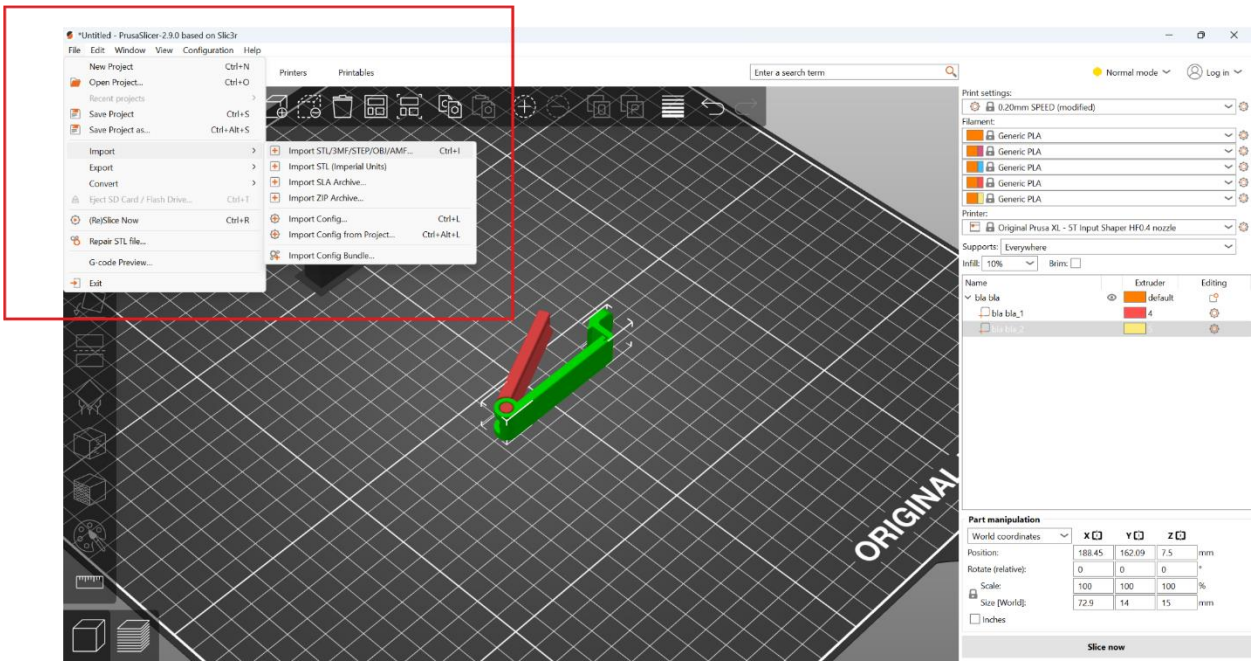


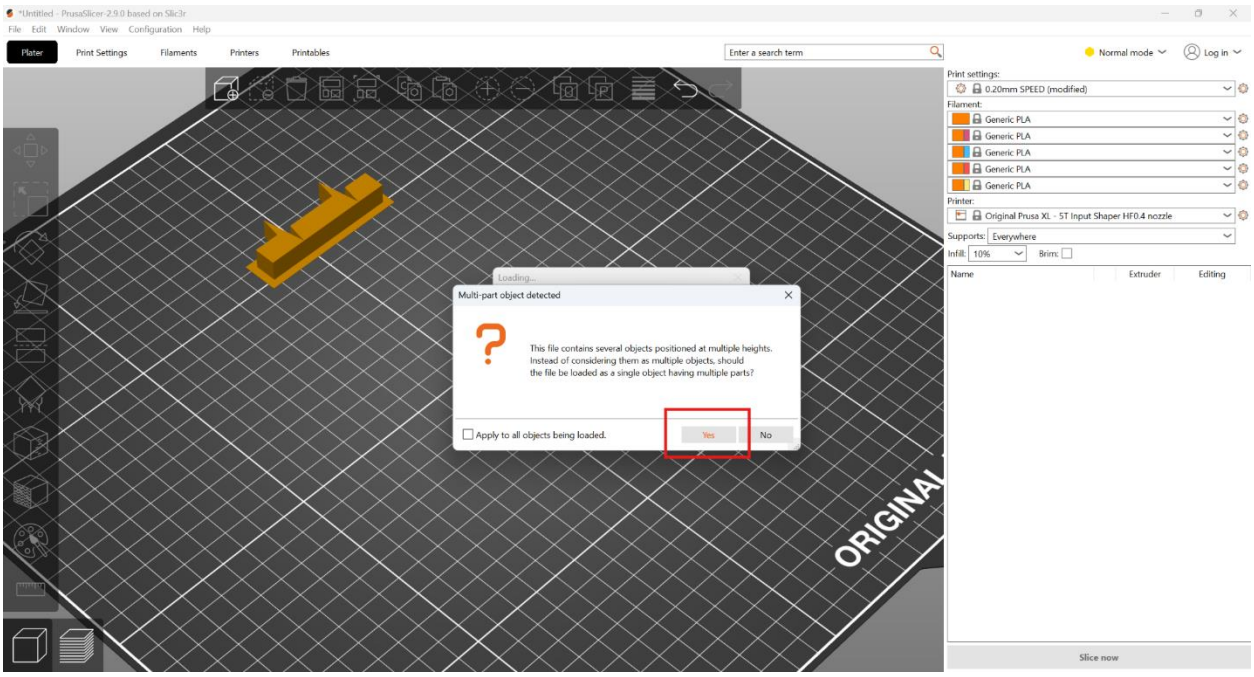
Step 3: Importing the 3MF File into PrusaSlicer

Once the **3MF** file is exported, import it into **PrusaSlicer** for multi-color setup.

1. **Open PrusaSlicer:**
    - Launch **PrusaSlicer**.
    - Click **File → Import** and select the **3MF** file.

2. **Handling the Multi-Part Model:**
    - When imported correctly, **PrusaSlicer** should recognize different parts as **separate bodies**.



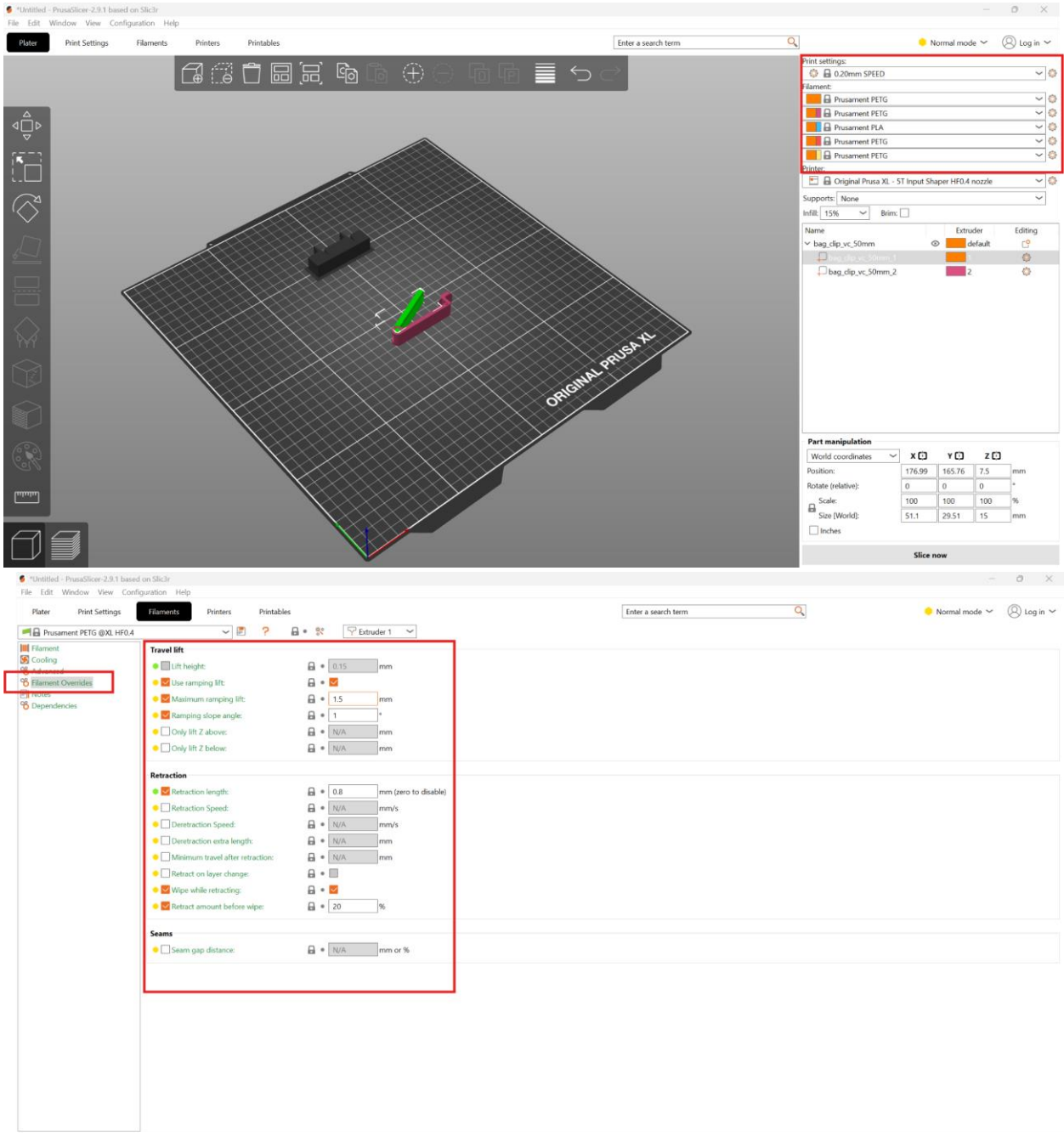


Step 4: Assigning Materials to Different Extruders

Important: The **Prusa XL 5T** supports up to **5 filaments**, allowing for distinct color assignments.

1. **Assigning Material to Each Extruder:**
    - Extruders are **numbered from 1 to 5** (top to bottom).
    - Assign a material from the available selection.

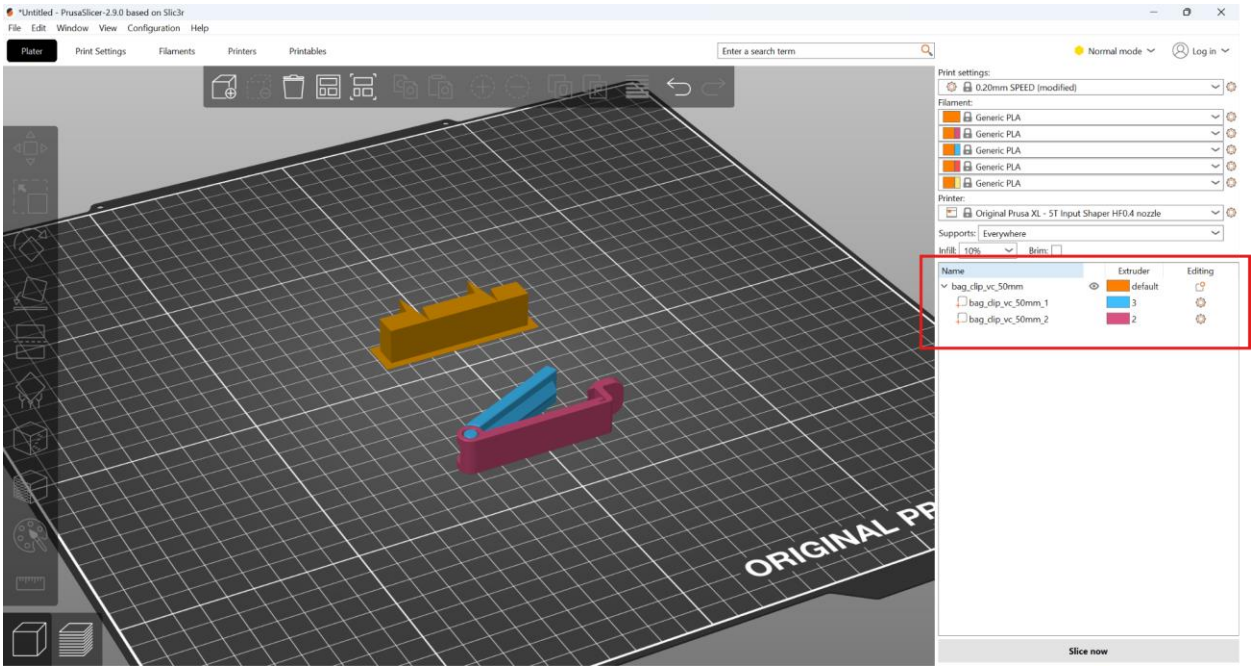
- Override settings if needed via **Filaments Menu > Filament Overrides** (upper left side of PrusaSlicer).



Step 5: Assigning Different Extruders to Different Parts of the Model

1. Click on the model.
2. Navigate to the **Object List** (right panel).

3. Click the **paint icon** next to each part.
4. Assign each part to a different **extruder (Extruder 1–5)**.



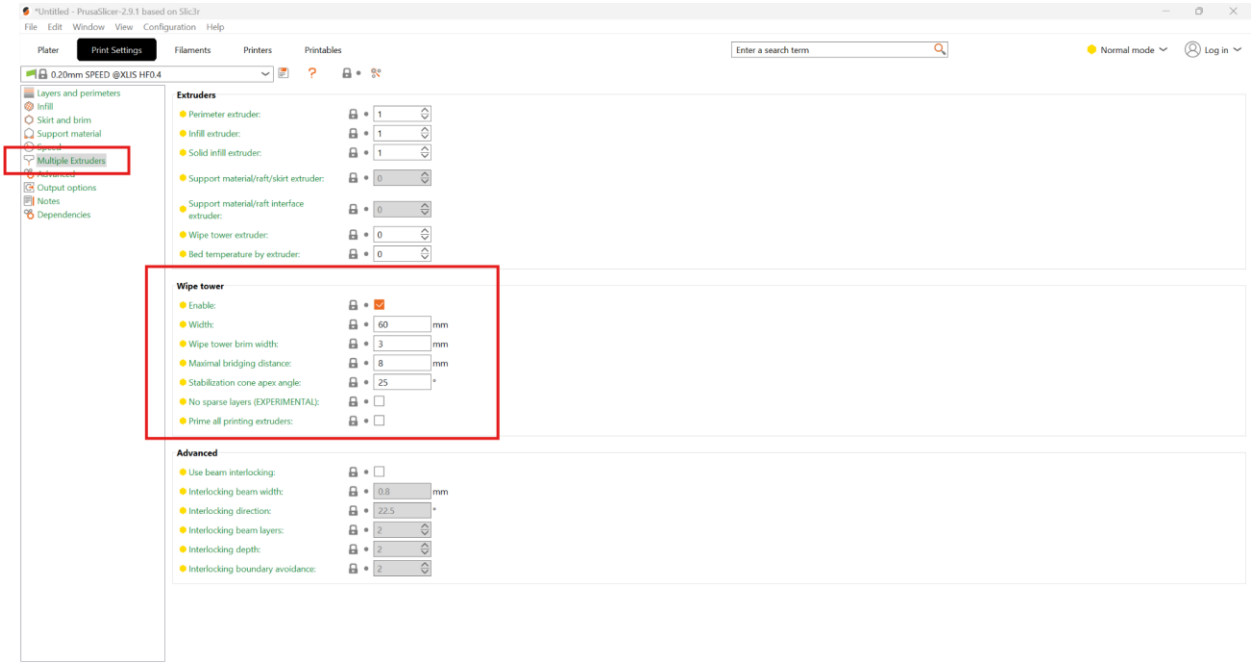
Step 6: Enable Wipe Tower in PrusaSlicer (Prusa XL - 5T)

1. **What is the Wipe Tower?**
    - A **wipe tower** is a structure printed alongside your model in **multi-material printing** to manage filament transitions.
    - It prevents color contamination and ensures each extruder is primed before printing continues.

2. **Why Use a Wipe Tower?**
    - **Prevents Color Mixing:** Removes residual filament from the previous color before switching.
    - **Ensures Clean Color Transitions:** Eliminates leftover material from the nozzle to avoid blending.
    - **Reduces Print Defects:** Prevents under-extrusion or nozzle clogging due to improper purging.
    - **Optimizes Multi-Material Printing:** Essential for achieving sharp, accurate color separations.

3. **How to Enable Wipe Tower:**

    - Open **PrusaSlicer** and load your multi-material model.
    - Navigate to **Print Settings > Multiple Extruders**.
    - Locate the **Wipe Tower** option and enable it.
    - Adjust the **Wipe Tower Size** based on the filament type and color transitions.
    - Preview the slicing to ensure the wipe tower is correctly generated.



4. **Best Practices for Wipe Towers on Prusa XL:**

    - **Optimize Tower Size:** Larger towers ensure cleaner transitions but consume more filament.
    - **Use Input Shaper for Stability:** Reduces the risk of unstable towers.
    - **Check for Proper Adhesion:** Ensure the wipe tower has a strong first layer to prevent failures.
    - **Minimize Wasted Material:** Use **Wipe into Infill** or **Wipe into Object** to reduce waste.

Step 7: Slicing and Previewing the Print

1. Click **"Slice Now"** to process the print.
2. In the **Preview** tab, verify:
    - Correct **color assignments**.

    - **Seam alignment** and **layer transitions**.
    - No **unintentional overlaps** or **missing parts**.

Note: If you are unsure about slicing, refer to the Prusa XL Tutorial. Link Here.

Step 8: Exporting G-code and Printing

1. Once satisfied with the settings, click **Export G-code**.
2. Save the file to an **SD card** or send it via **network** to the **Prusa XL 5T**.
3. Load the correct filament colors into the five extruders.
4. Start the print and monitor the first few layers for accuracy.

Troubleshooting Notes:

- If colors **aren't assigned correctly**, go back to **Step 4** and ensure each part has a distinct extruder assigned.
- Use **PrusaSlicer's Preview** to check transitions.
- If you encounter **slicing issues**, verify the **3MF export from Rhino** to ensure objects are separate.