

Program for Modeling – Adding details to your layout

Article 7: Opps – Printer issues and operator comments

As noted in the first articles, I have owned a couple of printers and others in my family have owned others including a rosin-based printer. With all the trials a tribulation that we had with other printers, my family has settled on the Prusa line of 3D printers purchasing both the original printer and the mini printer. I would like to note that my printers are used strictly for hobby work and the design and printing replacement parts for items that break around the house. The other family member decided he wanted some very specific cars that are not available from any commercial supplier. When he and his friends would gather to run trains, he wanted to send a wine/beer train from his bar area out on the layout for his friends to get their drinks. He was approached about producing these for sale through an online sales site. Since that initial discussion, he has designed and printed out a small switcher to go with the cars. To meet his commitments, he needs to keep both of his printers running, at times 24/7.

I thought that in this series of articles it would be good to take a few moments to review some of the issues that we have encountered, things that we have done to correct the problems, how to get help from other users, and finally help from Prusa.

During printing, first layer calibration is the most critical parameter in assuring that you get a good print. When I first starting printing, I assumed that the factory settings did not need to be modified". That seemed to work quite well, I thought! However, as I advanced from small items such as small pipes and valves to larger items such as wall sections, I found that the first layer was not sticking, and the print would come off the (steel) print plate. If the print was not being monitored, this led to large glob of plastic under the nozzle.

Before we could address the sticking issue, it was necessary to remove the plastic glob under the print head. To do this, go to the man menu and select preheat. Once selected, the screen will ask what material is being used.

To clean the PLA material from the print head, select the highest temperate option. Being very careful as the head heats up, remove the glob of plastic under the nozzle, being careful to not pull on the plastic until it has reached a melting temperature as you could damage the wiring around the print head. When the majority of the material has been removed, gently pry away any material from around the print head using a toothpick. When you have all of the material removed, use a small soft wire brush to further remove any residue plastic from the nozzle.

Once the head is clear, select setup from the menu and then select the z axis. Move the z axis down, but do not touch the print plate. Select the first layer print menu and print the pattern. Multiple adjustments may be needed until you can duplicate the test pattern described in the Prusa manual. When you have achieved a good first layer, record the z parameter for future reference.

Addressing the material not sticking to the print plate is an issue that was addressed in other printers. The solution there was to use 3M tape and Elmar's school glue. That is a messy solution and only adds to the effort to get a good print. The issue with the Prusa unit is that any finger grease or other contaminate on the print plate regardless of the first layer calibration activity will not allow the print to stick to the plate. The first time I cleaned the plate, I used the recommended fluid for cleaning the print sheet and only handled it around the edges. (I even went so far for a while as to wear gloves when cleaning the sheet.)

After cleaning, I could still see finger marks on the print plate. Here in enters the great resource for the Prusa product – many "how to" articles on the Prusa forum!

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The forum has questions listed and problems described by other users. Some post are answers to the listed questions, while other post what they have done to correct a problem, in some cases with video “how to” postings.

Combining this data with the data on the official Prusa web site is a tremendous tool for keeping your printers operating. Bear in mind that Prusa does not have any US centers to send your printer to for repairs. You can pack your printer up and send it back for repair, but the forum can provide much quicker answers and solutions for most of your issues.

3D printing for the hobbyist is still in its early stages, even though industry has been printing components for several years. However, those commercial printers are finically beyond the reach of most hobbyist and so finding a printer with a good forum, factory online data, and a chat line with the manufacturer is a prime reason to select any printer.

On the forum, several people had commented that they were having issues with parts sticking even after using the recommended cleaning fluid. One contributor on the forum indicated that we should look at the commercials for Dawn dishwater soap. If it cleans wild animals exposed to oil spills, it should work to remove oil film from our print plate. And it does. Even if you do not see any film, it is still a good idea to clean it after every so many prints. Since using this approach, with the first layer properly calibrated, I have not had anymore issues with parts not sticking to the print plate.

To ensure that any part is printing properly, it is recommended that you stay by the printer while the first 3 or 4 layers are deposited. Doing this, you can quickly assess the print bonding to the print plate, observe that the first few layers define what you are printing. If the print does not seem to be what you have designed, you may have a design problem. Abort the print and review it in the 3D Builder program. After those first few layers, I have gone about other task not watching the printer, even running some prints overnight.

Occasionally, you may encounter a problem that is not on the forum and that will require some intense work to identify the problem and determine the fix. As an example, during one of my longer print cycles, the print head would stop printing the part and move to the 0,0 position to force a X Y recalibration. It would then begin printing from where it had encountered the problem. In a single print, if it did this several times, and the printer was not being attended at the time of the reset, the part may not print properly and would have to be reprinted.

In this example, the fact that the problem continued to repeat itself during several attempts to print a part indicated it was not a random issue, but rather a problem with the printer. Going to the forum, the possible solutions were:

- Y belt was loose and thus skipping teeth during a move.
- Y belt pulley was loose on the stepping motor shaft.
- Y belt pulley was damaged.
- Y belt stepping motor was failing.

An examination of the belt and pulley showed that the pulley was ok and the stepping motor was performing. The belt seemed a little loose, so it was assumed after a little over a year and lots of printing that the belt had stretched and needed replacement. A new belt was ordered and installed. For the first few prints, all was well and then the problem appeared again. As the base plate was moved back and

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forth, it was noted that suddenly the Y belt jumped indicating as though it had skipped a tooth on the drive pulley. A close examination of the belt and pulley showed that they were ok, but we find a very small piece of plastic that stuck in one of the teeth of the pulley and periodically forced the belt up causing the belt to slip missed a tooth. Removing this piece of plastic eliminated this print problem.

Like many appliances around your house that are periodically updated, Prusa also post updates for firmware, slicer program, and manual. You can find these all at www.prusa3d.com.

From this website, you can select support and download the latest firmware for the printer and the latest software for the slicer. The printer will inform you when new firmware is available at the beginning of a print. Update the latest full release version.

You can Chat with Prusa or leave a message to Prusa from the site <https://shop.prusa3d/en/contact-us>

As these articles in this series are created and the files verified, the latest firmware and software is used. However, by the time you print any component out, there may have been updated firmware and software that may require you to tweak the files. You will not know if this is needed until you try printing.