3D-PRINTING - Troubleshooting

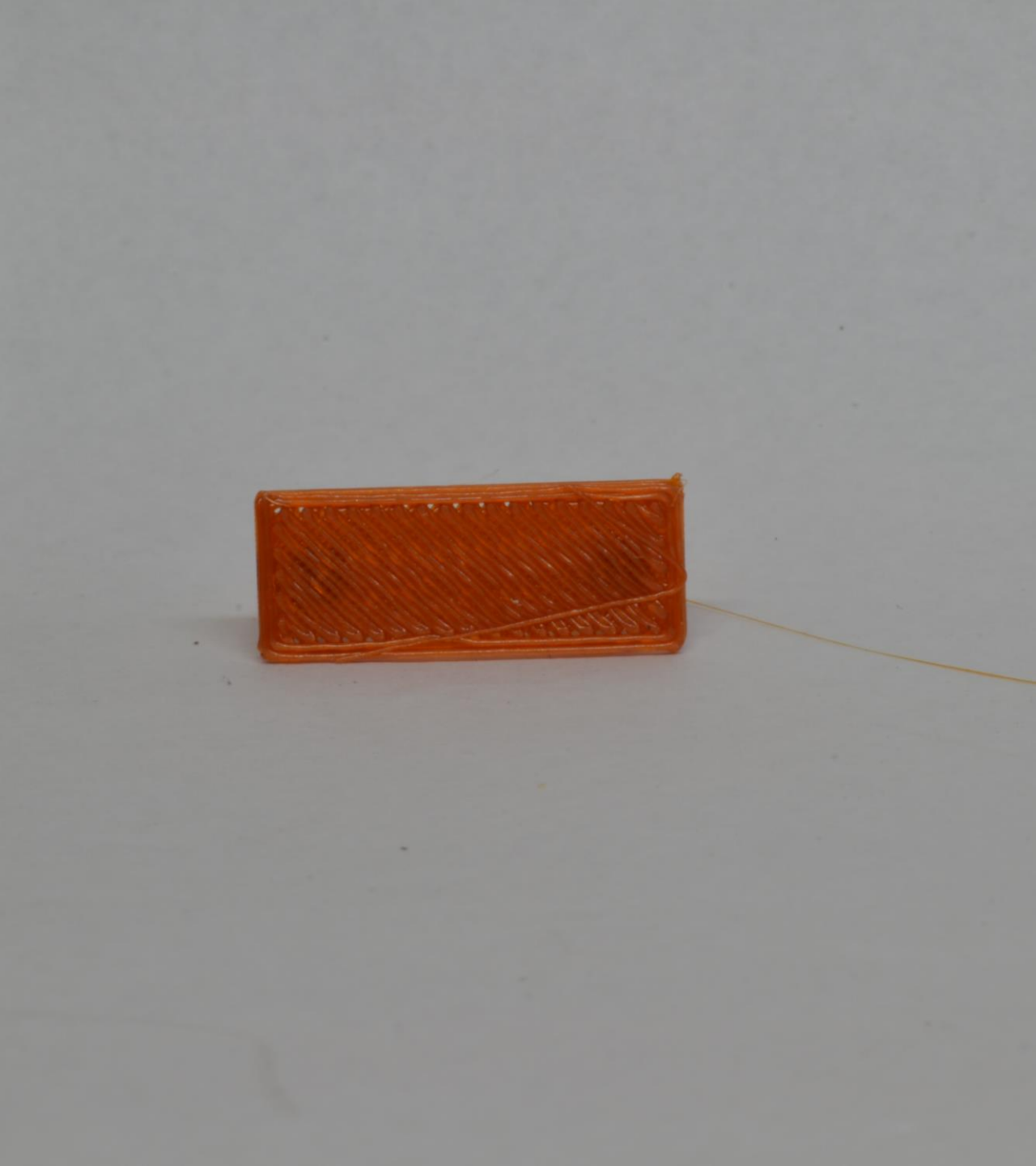# Errors, mistakes, problems

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- Four different error categories
    - User error
    - Machine error
    - Material error
    - Slicer error
        - Usually a user error

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Adhesion to printbed

- Most important thing when printing:
  - Part needs to stick to the bed
- First layer tells alot
- Sometimes, it can still loosen from bed on other layers too
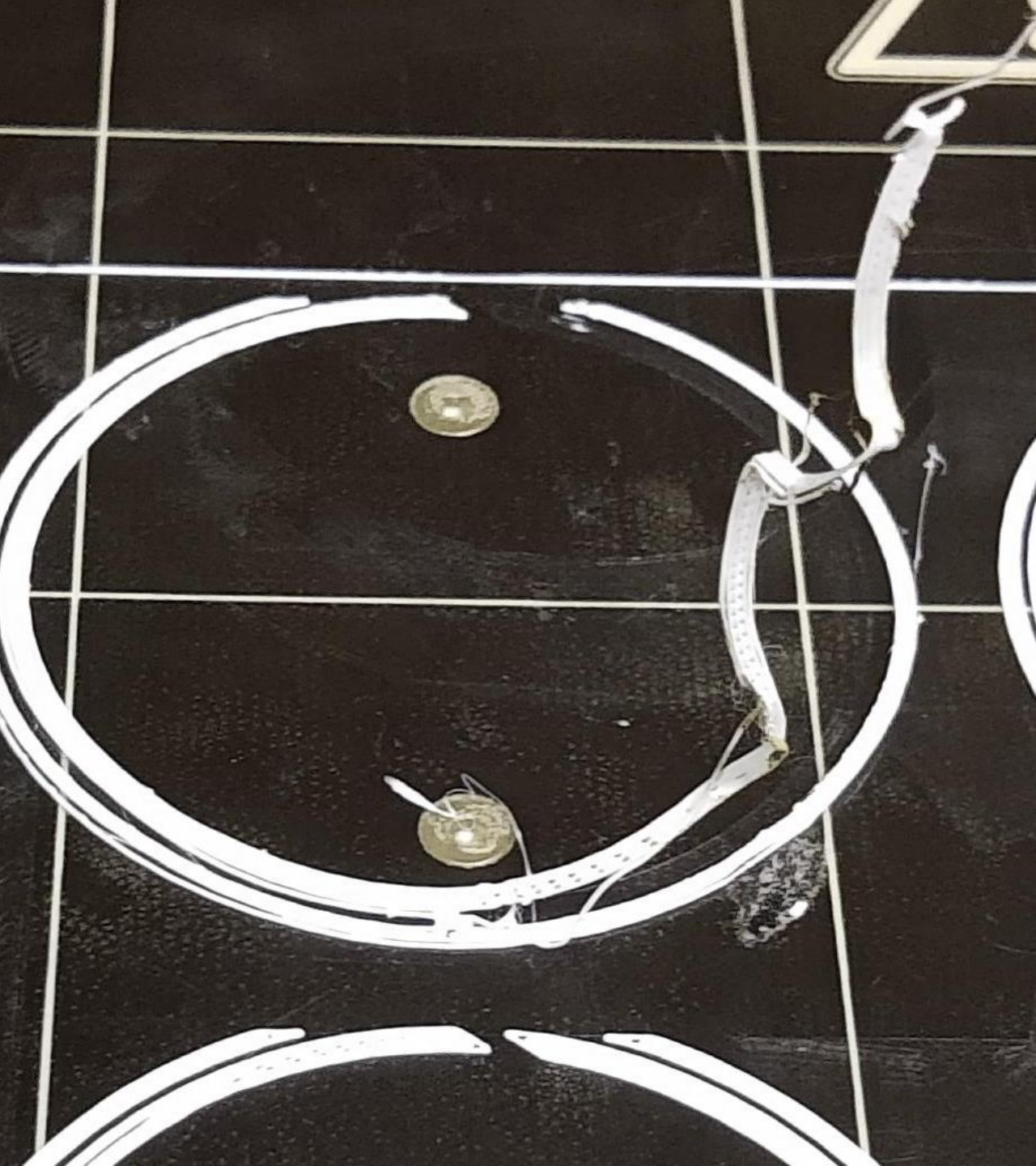
Reasons for this

1. Nozzle at wrong distance from bed (Too high / Too Low)

2. Printbed isn't leveled

3. Too fast print speed for first layer

4. Printing temperatures (Bed and/or nozzle)

5. Dirty printbed (Greasy, dusty)

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Nozzle at wrong distance from bed

- Check nozzle height after homing printer
- Adjust the offset with one of the following:
  - Moving the mechanical switch
  - Adjust bed
  - Adjust probe Z-offset in printer
  - Adjust Z-offset in slicer
  - Adjust Z-offset in printer (Live Z adjustment)

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Level the printbed

- Uneven printbed can be noticed in bigger prints
- How to fix:
    - Homing the printer
    - Disable stepper motors or turn printer off
    - Move the carriage to different corners of the print bed
    - Adjust the print bed from the screws on the corners
- Some printers have a menu for this, check if the printer has that menu available

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Too fast print speed

- Adjust the first layer print speed to much slower from the slicing software speed settings

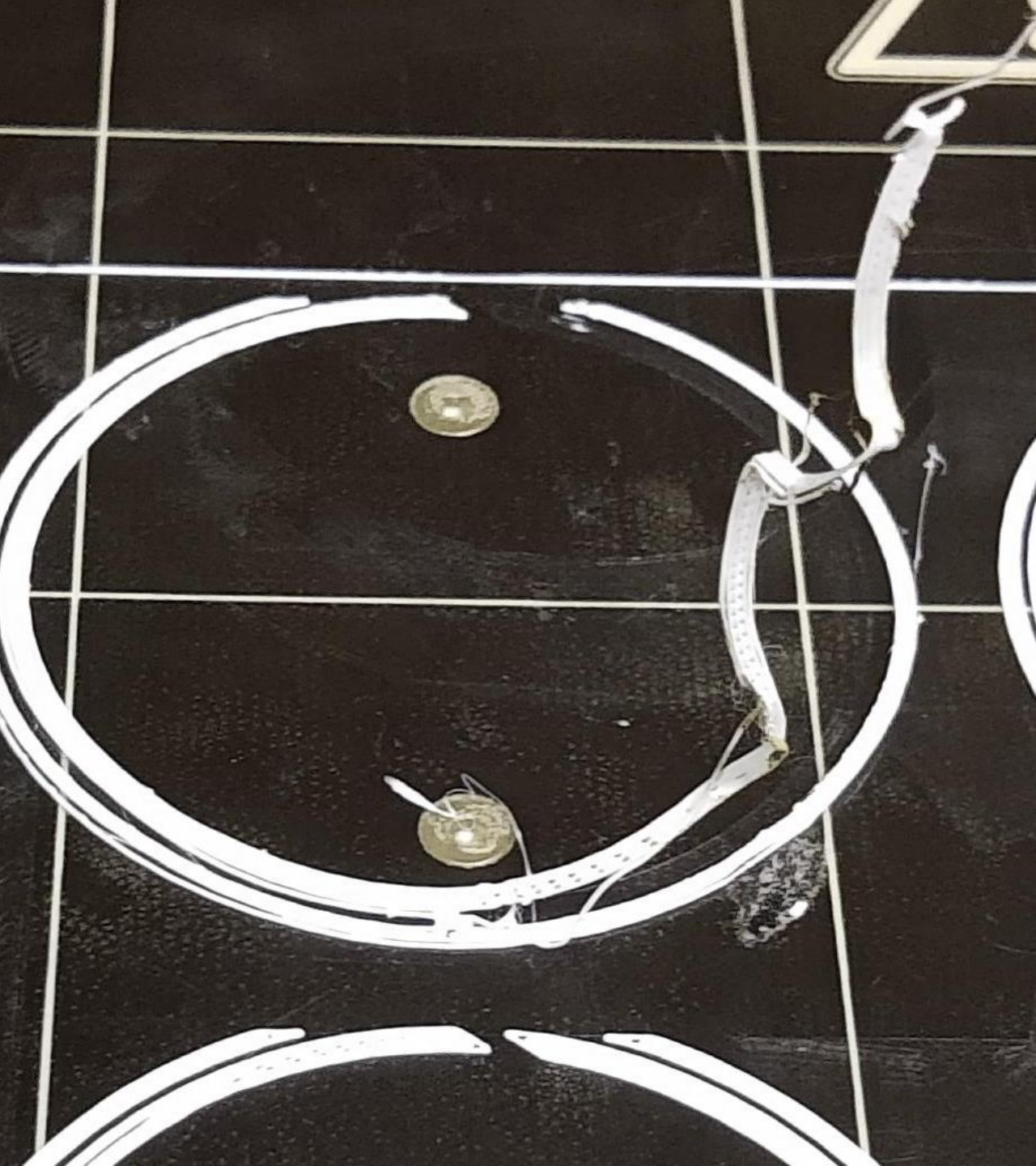- Or adjust the overall speed, also fixes the issue

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Dirty print bed

- Needs to be cleaned
- For glass/mirror, use dish washing liquid and water
- For PEI, use IPA (Isopropyl Alcohol)
- For Buildtak, use IPA (70%)

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Temperature settings

- Prints don't stick even after checking and fixing the other issues

- Printing temperature can be the issue

- Double check the recommended printing temperatures, go to the higher end

- Should do temperature calibration for each material you have

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Print warps from one corner

- Usually common in ABS, PETG and ASA prints. Sometimes also in bigger PLA prints

- Reasons:
  - Bad adhesion
  - Draft in room
 - Too cold room temperature

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Solutions

- Go through the steps on the previous problem
- Set bed temperature higher
- Check on the cooling settings
- Use adhesion helpers (software side)
- Use adhesion helpers (hardware side):
 - Dimafix, 3DLac, Printafix, gluestick

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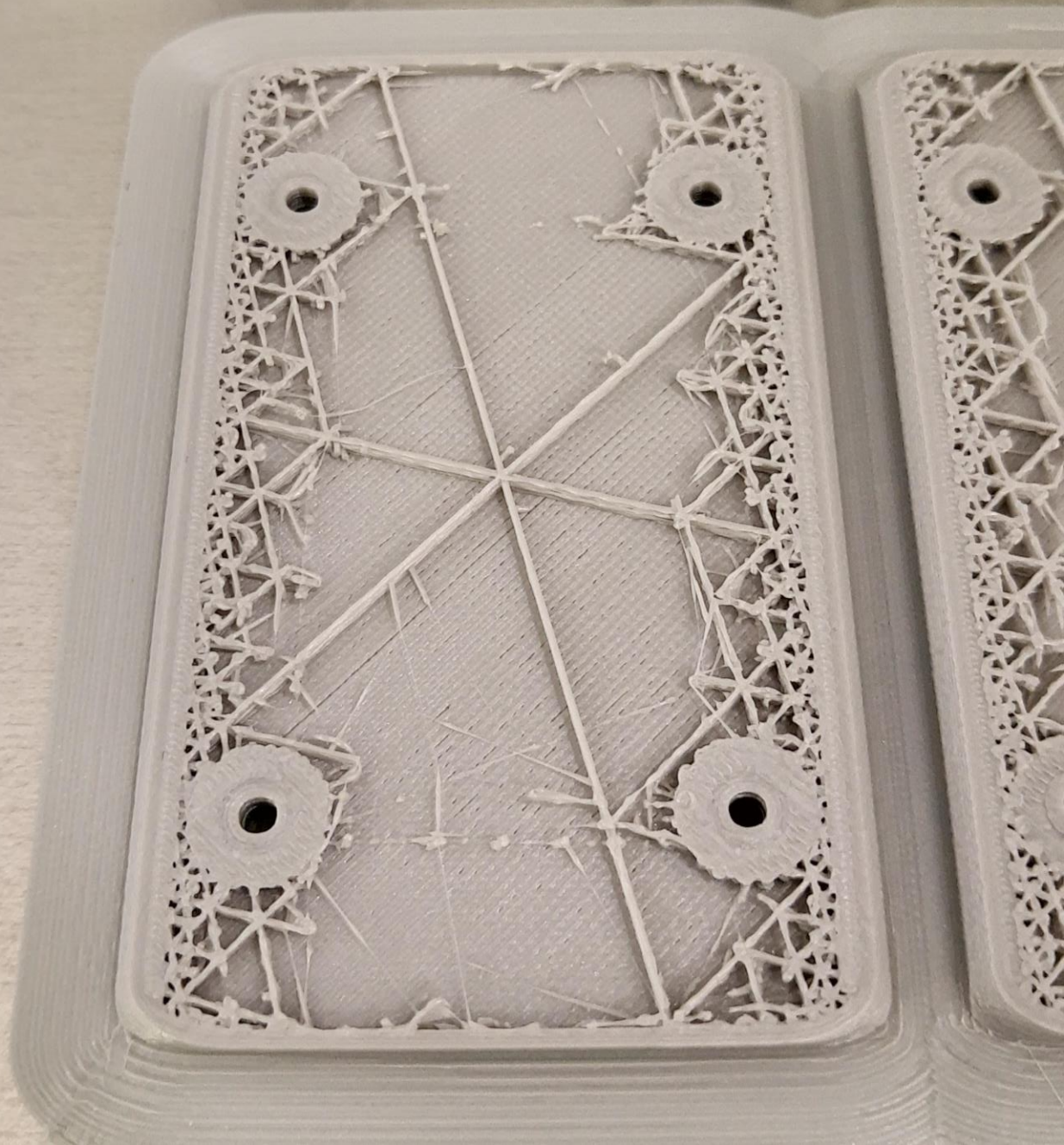
Print has holes

- Sometimes prints can have holes and uneven places where material hasn't been placed
  - Affects part strenght
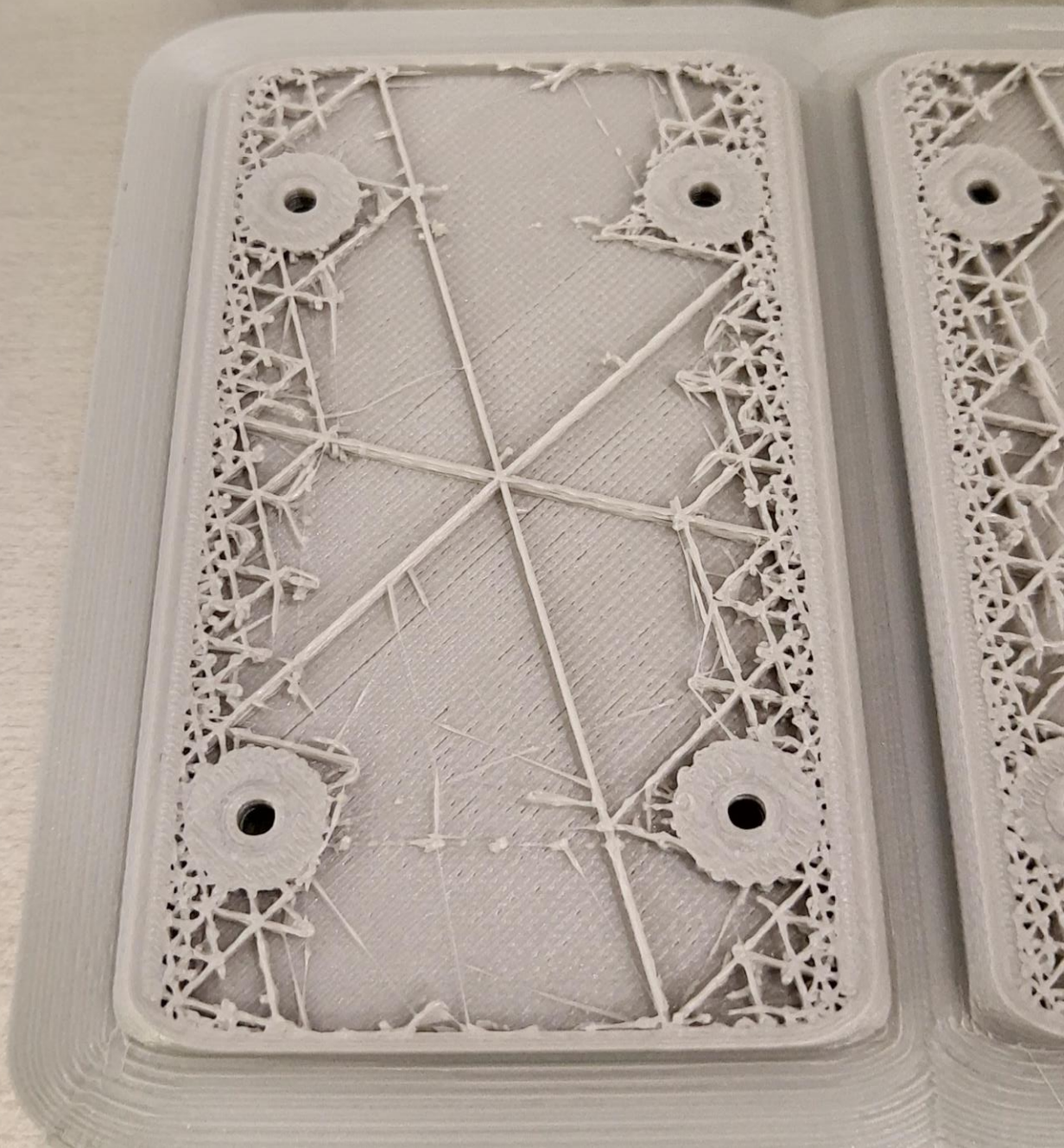- Part can easily crumble
- Non-appealing prints

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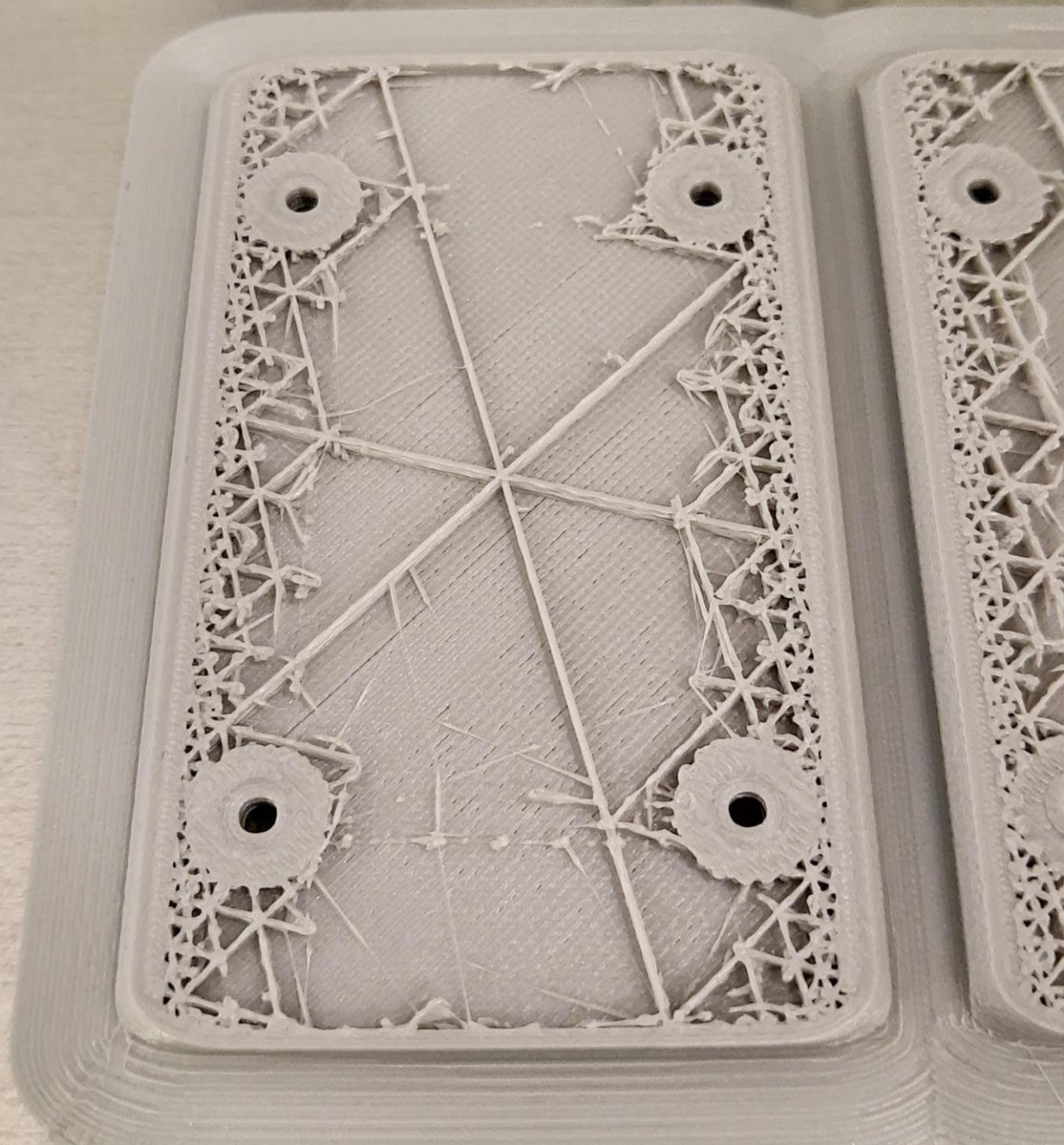
Reasons

1. Nozzle partly clogged
2. Printing speed too fast
3. Bowden – PTFE-tube
4. Printing temperature too low
5. Extruder has bits of plastic dust
6. Filament diameter varies
7. Print material can't move freely

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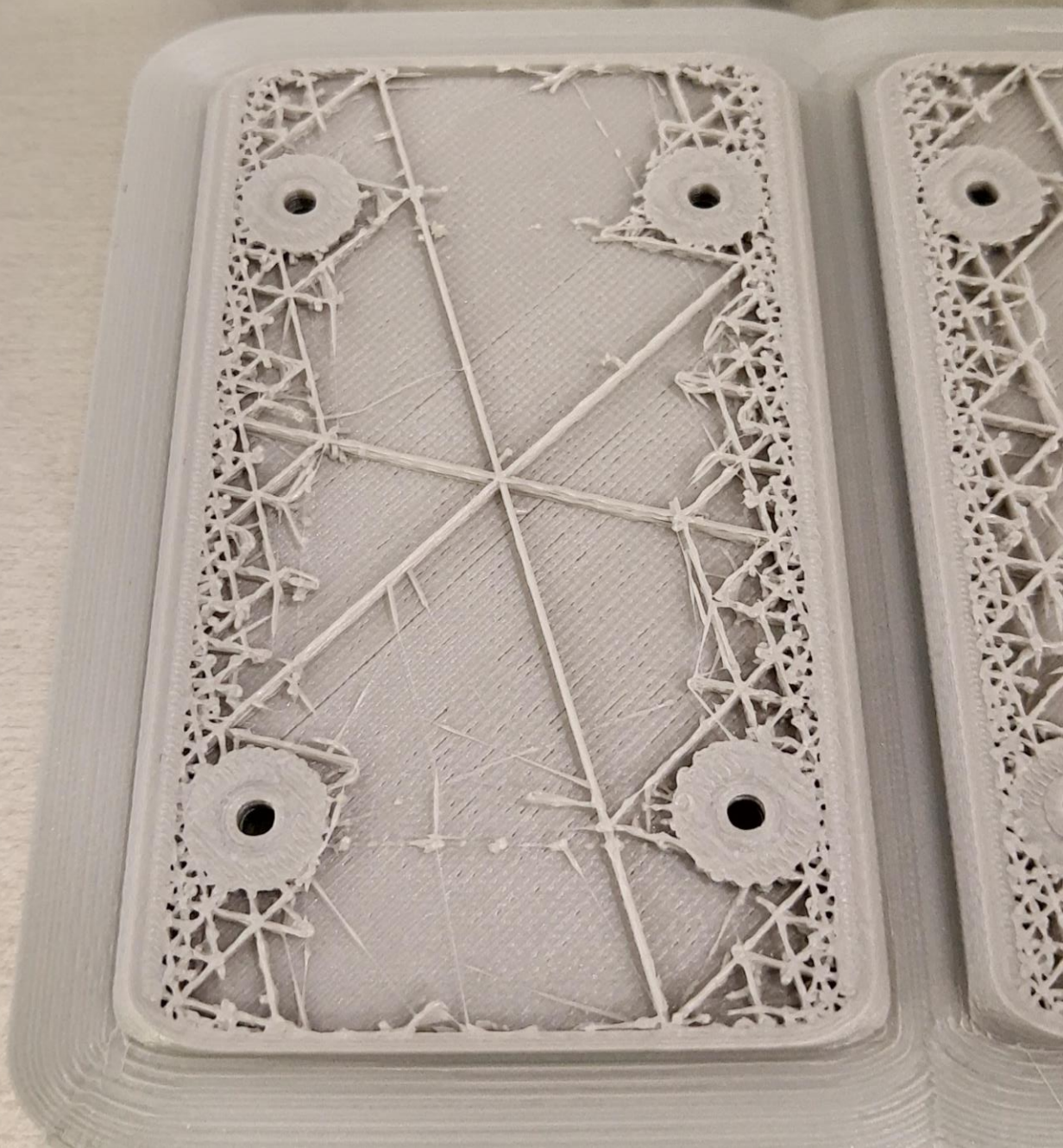
Nozzle clogged

- Sometimes after material change, there's left over material
- Should use old material temperatures for a while
- Push fairly enough material through
  - If it doesn't help -> take it apart and remove clog
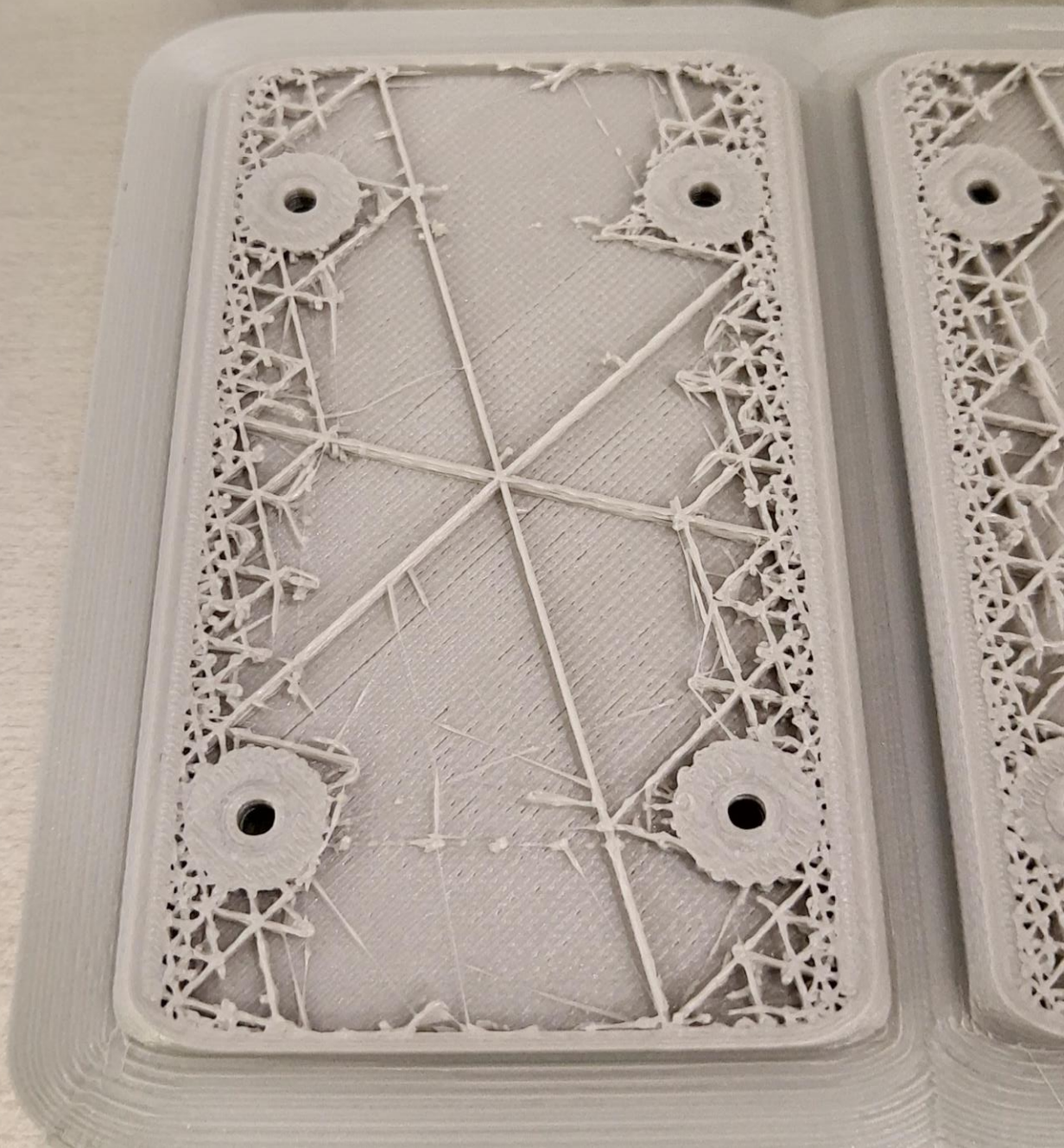
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Print speed

- Print speed too high, filament can't keep up.
  - Lower speed
  - Or raise temperature and flowrate to compensate

Bowden – PTFE

- Sometimes ptfe-tube can be a bit dusty
  - Clean with pushing new material through and see if anything comes out. Using compressed air might help in some cases
- Sometimes raising temperature in the heater, helps with the pressure and some extra doesn't matter in the tube

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Printer extruder

- Clean the cogs that push the filament
  - Requires taking extruder apart
  - Tooth brush or a brass brush

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Print material

- Really cheap material can be very low quality
- 1.75 is more like 1.8 or 1.7

Print material holder

- Make sure the filament roll can spin freely
  - 3D-printed spool holder
  - Check for tangles

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Print dimensions vary

- 20x20x20 cube doesn't add up
- Tolerances

Reasons

- Uncalibrated printer (Only on kits)
- Uncalibrated material
- Material dimension varies

Uncalibrated printer

- Check E-steps
  - Measure 120 mm of material from the extruder and mark it
  - Heat up the extruder to material temperature
  - Extrude 100 mm of material
  - Measure marked distance to the extruder
    - New E-steps = Old E-steps * (100/Measured distance)

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Uncalibrated material

- Print a 20x20x20 cube with 2 walls
  - Flow-value 100%
  - Measure wall thickness
  - Should be 0.8 mm with a 0.4 mm nozzle
  - Adjust the flow % accordingly
    - If it's less, raise %, if it's more, lower the %

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Uncalibrated printer

- Check Y- and X-steps after checking E-steps using a calculator.
    - https://blog.prusaprinters.org/calculator/

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Material dimension

- Measure average diameter from few meter distance
- Insert the diameter information into slicer to get 'calibrated' info to slicer
  - Really rare occasion this happens

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