X-axis rods tuning parallel by clamps V2
ufodoctor3, June 17th, 2019, Rev. June 19th, 2019

1. Introduction

Many 3D-printer users complain the x-offset of printed objects if the x-axis rods are not perfectly cleaned and lubricated!

But lubrication means symptom suppression but not healing!
Finally, after many hours of frustrating experiments I asked my wife to look at the x-system.

In power off condition she moved the slider manually and observed a friction, mainly at the left side near the x-stepper motor. But when I pressed on the left side the two x-rods together with two fingers with a force of 25-30 N, the friction becomes reduced!
Diagnostic finding by my wife: the two x-rods are not parallel! Hard to accept for me!
No miracle that the very stiff x-slider with axial ball bearing gets blocked!
In the original situation the vertical (radial) forces at the ball bearings depend on the slider position, left about 30 N, right less than 1 N, with variable axial friction up to 1.5 N.

Following the advice of my wife, I measures the axial distance of the two rods to discover that the rods at the left side shows a value of 43.3 up to 43.4 mm, but at the right side 43.00!
As a first countermeasure I pulled on the left side the two rods together by a strong cable strap. Now we got good value 43 +/-0.05 mm, and no more x-offset during printing.

But this is not professional, varying ambient temperature will show a negative effect.

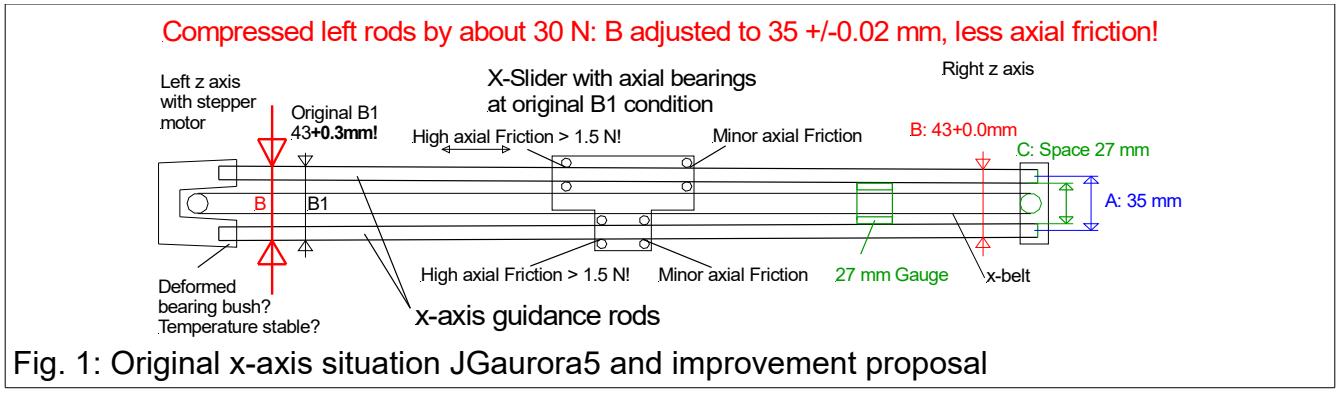

Fig. 1: Original x-axis situation JGaurora5 and improvement proposal

2 .Solution

We need to mount stable clamps, left and right, providing parallel rods with an axial distance of 35 +/-0.02 mm precision.
The axial distance A cannot be measured, sorry!
The outer distance B could be measured by a vernier caliper, but difficult to execute with an acceptable precision of +/- 0.01 mm.
The inner space C can be measured fine by a 27 mm gauge: blocked if to narrow, wobble if to wide! Simple, but effective!

3. Clamp Design

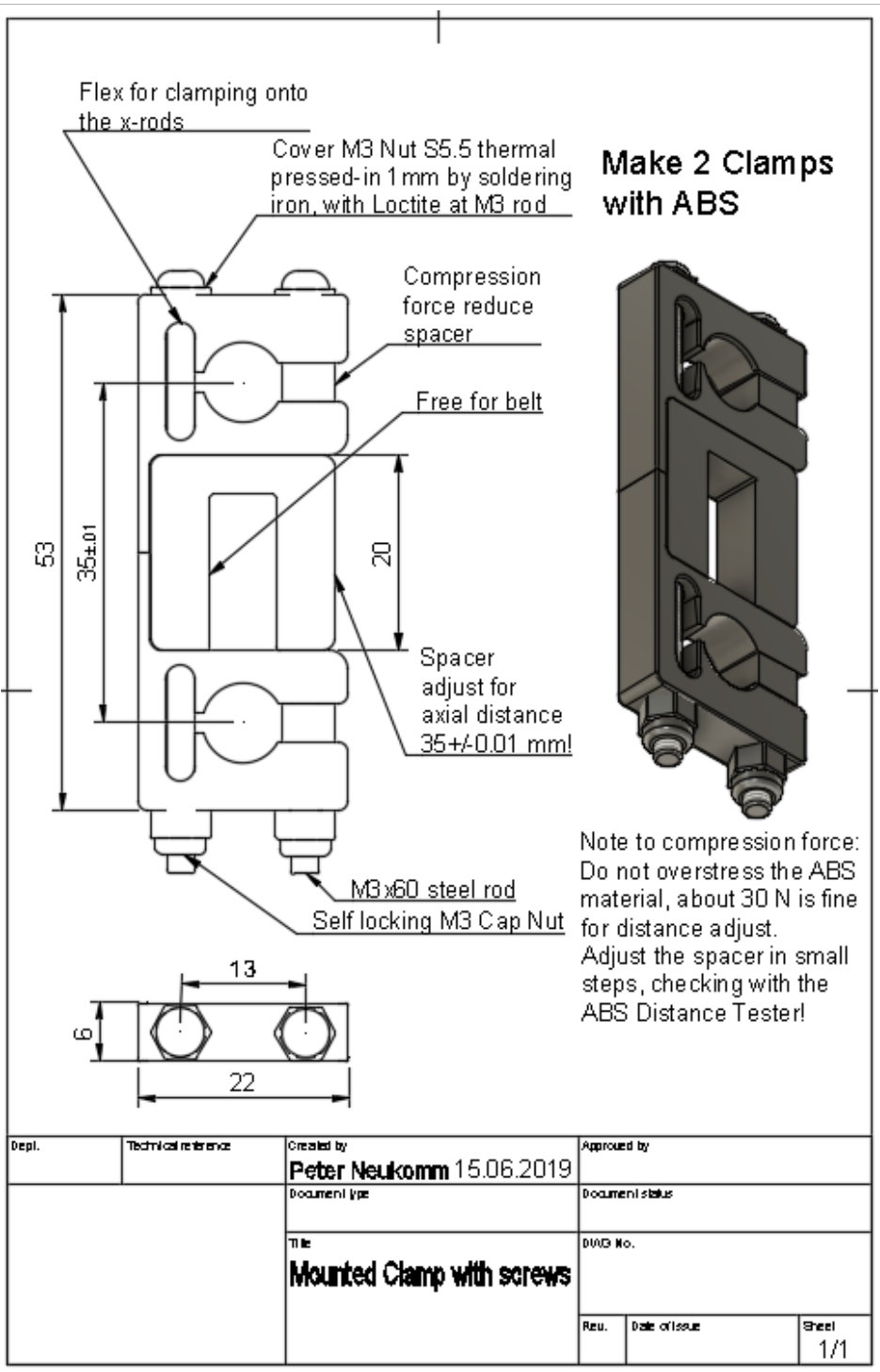

Fig. 2: Clamps for the parallel adjusting of the x-axis rods

If the 20 mm spacer does not fit at the beginning of the mounting, sand it in small steps for correct height, but do not apply extreme forces by the nuts on the M3 rods!
ABS is not suited for long-term mechanical stress.

4. ABS Clamps mounting and clamp manufacturing

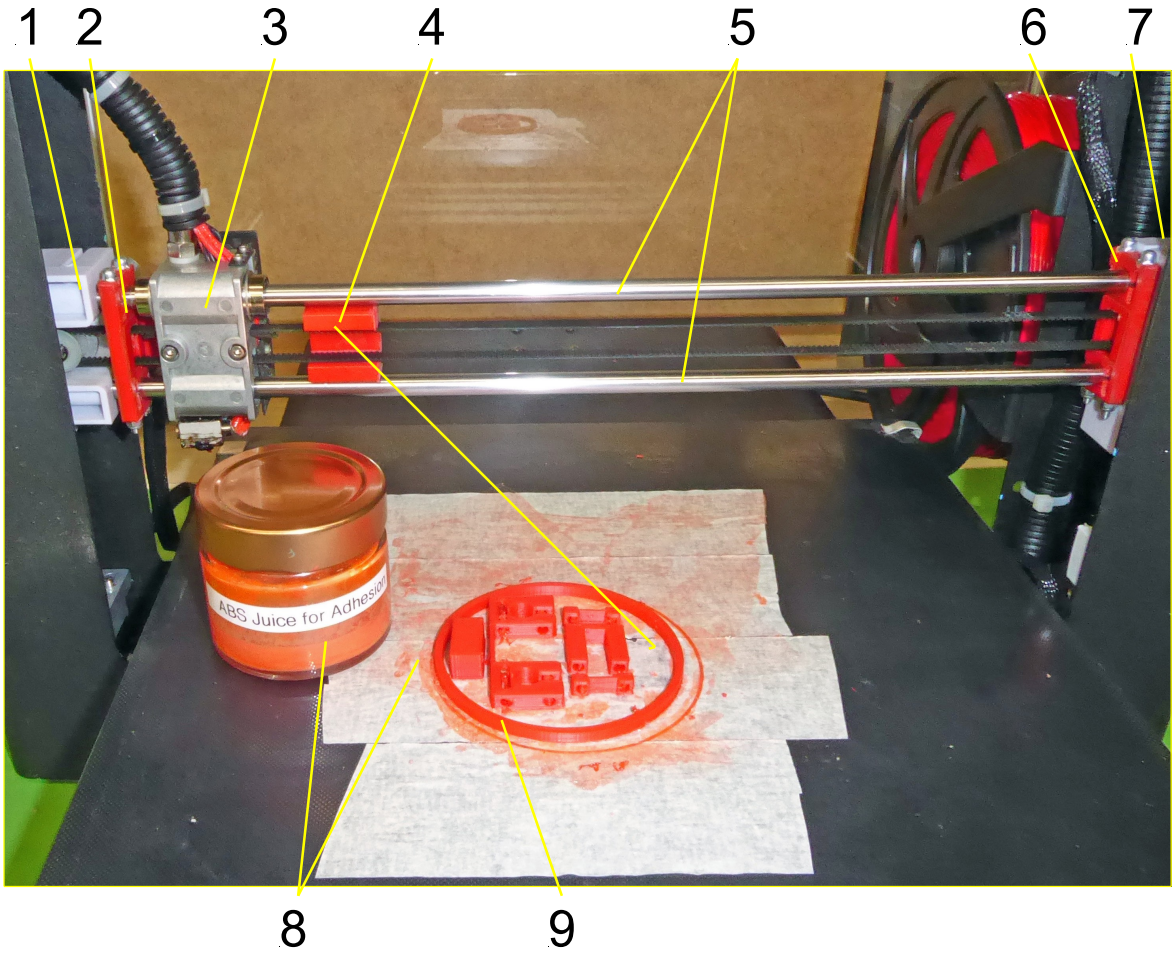

Fig. 3: Mounted clamps and manufacturing notes

1: Left z-axis
2: Left new clamp
3: x-slider
4: 27 mm Gauge (Axial Distance Tester)
5: D8 mm rods to be parallel adjusted, axial distance 35 +/-0.0 1mm
6: Right new clamp
7: Right z-axis
8: ABS juice, thin coated to painter tape
9: Anti-Warp Ring (very effective!)

For more info about ABS juice, glue and slurry see:

https://www.youtube.com/watch?v=8bYLRFMKDSY
Very good practical information!

5. ABS Clamp Printing

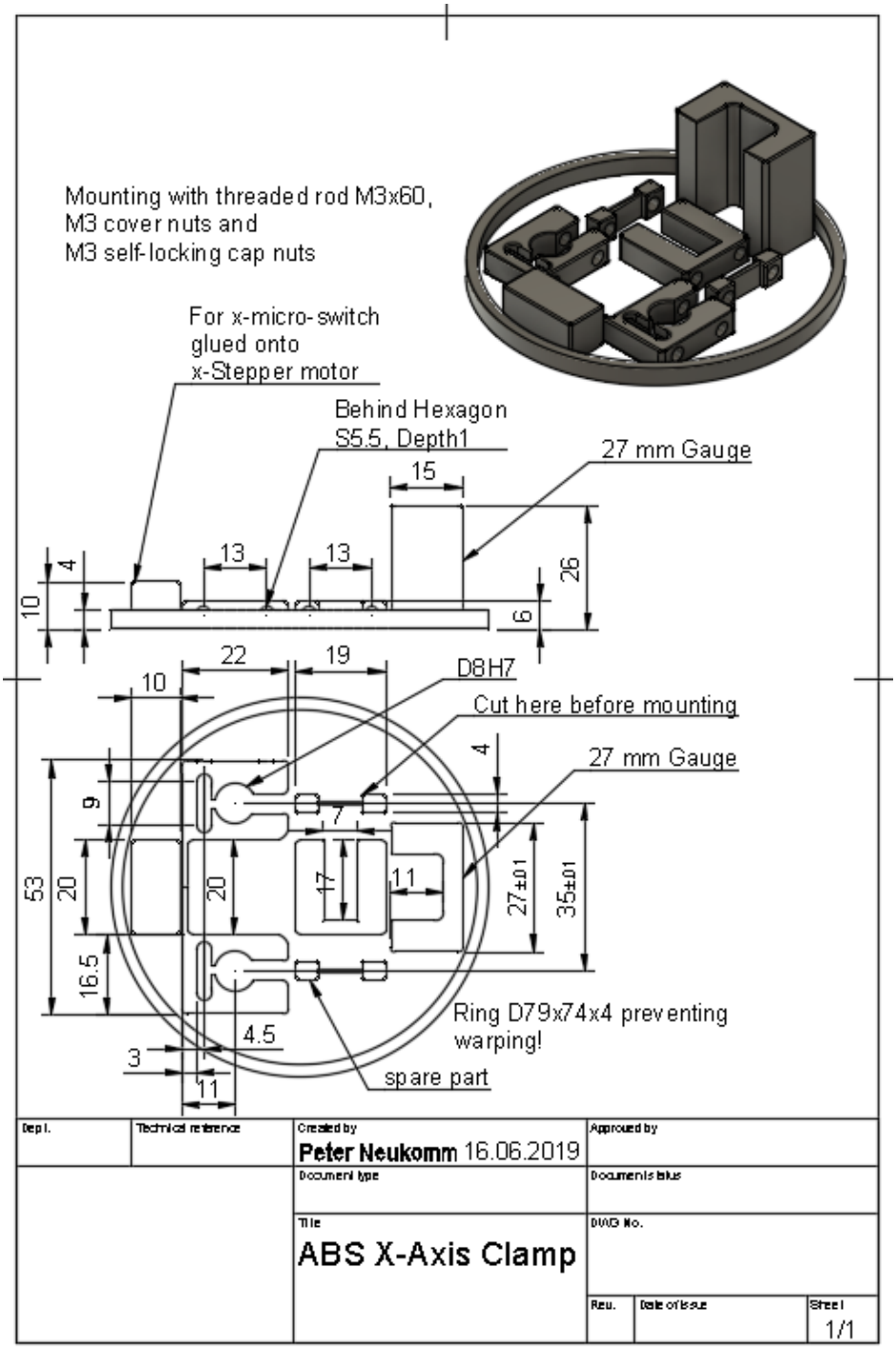

Fig. 4: Clamp design with 27 mm Gauge and x-micro-switch stopper

If you working with the Fusion 360, you can download my original fusion 360 doc file: https://a360.co/2x29YYP

See also the attached STL-File or GCode if you want to use this design without changes.

6. 3D-Printer setting

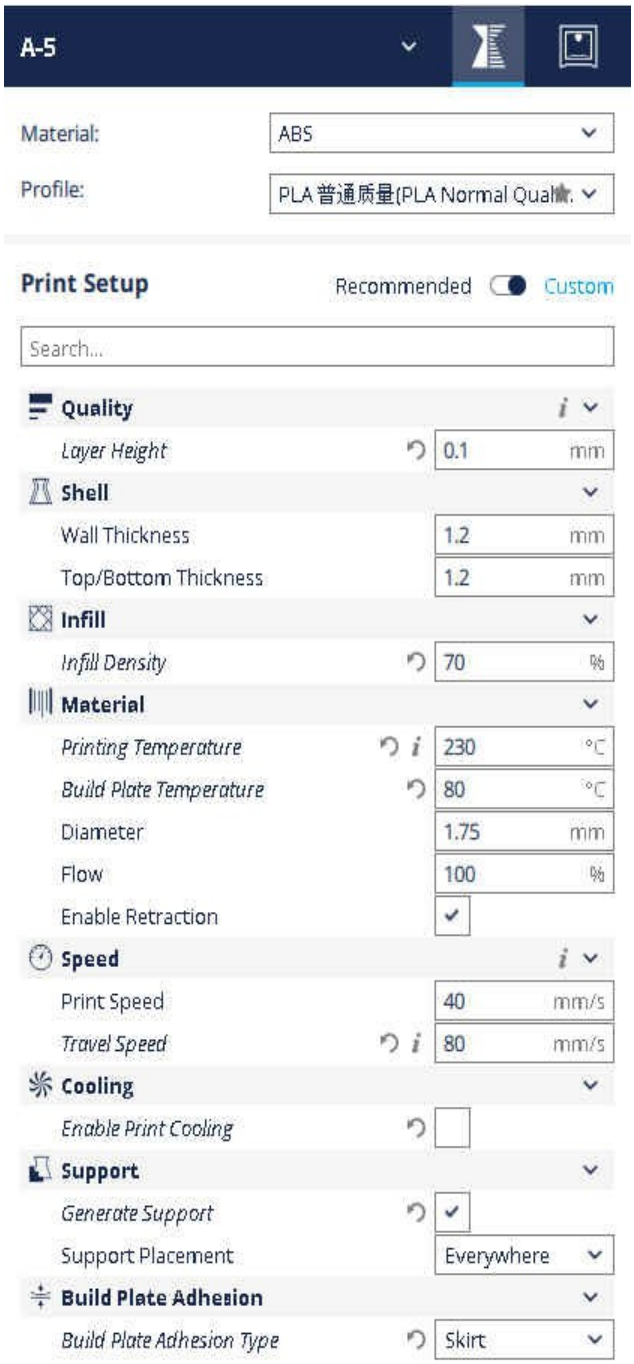

Fig. 6: Printing Data

JGaurora settings:

1. Protect the printer against external air-flow, best with 5 transparent plates 600x600 mm

2. Leveling: Two standard 80 grams papers

3. Building platform: Painter Tape

4. Adhesion: ABS Juice (see link for preparation on page 3), thin and flat layer using a scraper

Additional Printing Information

Good luck!
Peter