3D Printing

Added value with 3D printing for stringing

Goal of this presentation

Take away your “fear” of 3D printing and also to show you how cheap and accurate such parts are.

And to grow the 3D printing community in the stringing business.

Short introduction to 3D printing

Just a few advantages

- 3D prints can be very stable
- Prototyping
  - fast
  - easy
  - cheap
- Repeat accuracy within +/- 0.02 mm (depending on slicer settings)
- Personalization and customization

Types of 3D printing

There are three types of 3D printing:

- FDM (Fused Deposition Modeling)
  - most common
- SLA (Stereolithography)
  - pretty messy
- SLS (Selective Laser Sintering)
  - most expensive

FDM - Fused Deposition Modeling

- Most common type of 3D printing
- Very cheap
- Easy to use
- It's like a computer controlled hot glue gun

How does it work?

- A filament is fed from a spool into a heated print head
- The filament is melted there
- Deposited layer by layer onto a build plate through a fine nozzle

What you need

- 3D Printer
- Filament
- Model
  - downloaded
    - free of charge
    - fee required
  - self designed
- Slicer
- Time 😉

3D Printer

- No longer costs a lot of money (good reliable printers are available from 200 €)
- Easy to use
- A lot of help on Youtube etc.

Slicer - Why do you need a slicer?

A slicer cuts your model into slices and creates motion and control commands (G-Code) specially for YOUR 3D printer.

Slicer - Printing order of multiple prints

Single

- Slow (32 mpp)

Multiple per object

- Faster (24 mpp)

Multiple per layer

- Fastest, but layer adhesion can be weaker (20 mpp)

Main materials - PLA & PETG

PLA (Polylactic Acid)

- high surface hardness
- not for temperatures over 50 °C (122 °F)
- low UV and weather resistance

PETG (Polyethylene Terephthalate Glycol)

- for temperatures up to 70 °C (158 °F)
- high weather resistance
- good UV resistance
- a little hygroscopic

Other materials

Other materials

- ASA - Acrylonitrile Styrene Acrylate (fume is a little toxic)
- ABS - Acrylonitrile Butadiene Styrene (fume is toxic)
- Nylon (very hard to print, highly hygroscopic)
- TPU - Thermoplastic Polyurethane (very hard to print, highly hygroscopic, flexible)
- PC (Polycarbonate)
- PPA (Polyphthalamide (hard to print, nozzle temperature around 300 °C)

Possible composites for filaments

- CF & GF
  carbon & glass fibre
  very abrasive for
  nozzle, extruder, etc.
- wood
- glow in the dark
- marble

CAD programs

- Tinkercad (easy to use and web based)
- FreeCAD (free of charge and open source)
- SelfCAD (web based and application based)
- SolidWorks (expensive but powerful)
- Fusion 360 (expensive but powerful)
- And so on…

Why FreeCAD?

- No license costs
  - Feel free to donate and support that project
- Commercial use is allowed
- Transparency and Flexibility (open source)
- Good community
  - Search on the web or YouTube for help

FreeCAD example

Bambu Studio example

Websites for 3D models - Main websites

- Thingiverse
  https://www.thingiverse.com/
- MakerWorld
  https://makerworld.com/
- Printables
  https://www.printables.com/

Websites for 3D models - Useful boxes and trays

Custom Box Designer

https://bento3d.design/tray

Gridfinity

https://gridfinitygenerator.com/
https://gridfinity.perplexinglabs.com/

Tool trays

https://www.tooltrace.ai/
YouTube tutorial for the project

My own developments

Just a few ideas/examples to show you what is possible.

Sometimes things are useless for others,
but useful for you.

Reel holder

Filament:

PLA

Print time:

less than 1 hour

Used filament:

~30 grams

Costs:

70 Cent (per part)

Stencil ink holder

Filament:

PETG or PLA

Print time:

~ 3h

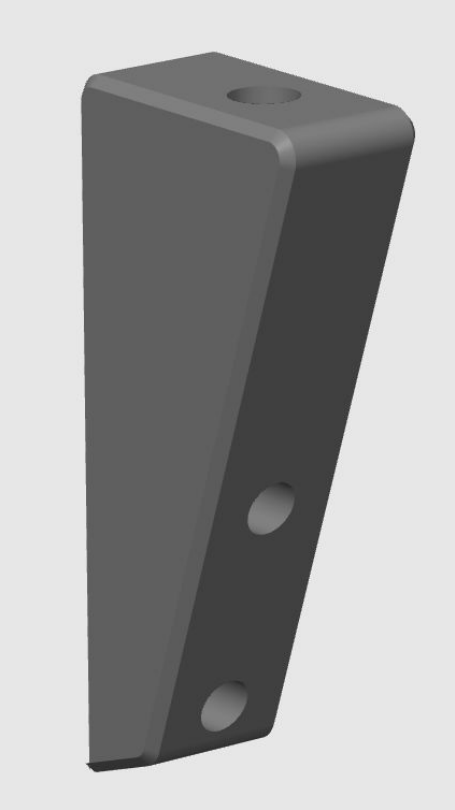
Used filament:

~ 80 g

Costs per part:

~2.50 €

Lamp Holder for Yonex ES5Protech



Filament:

PETG

Print time:

~3 hours

Used filament:

~ 90 grams

Costs:

~2.70 € (per part)

Buttcaps

Filament:

PETG

Print time:

~55 minutes

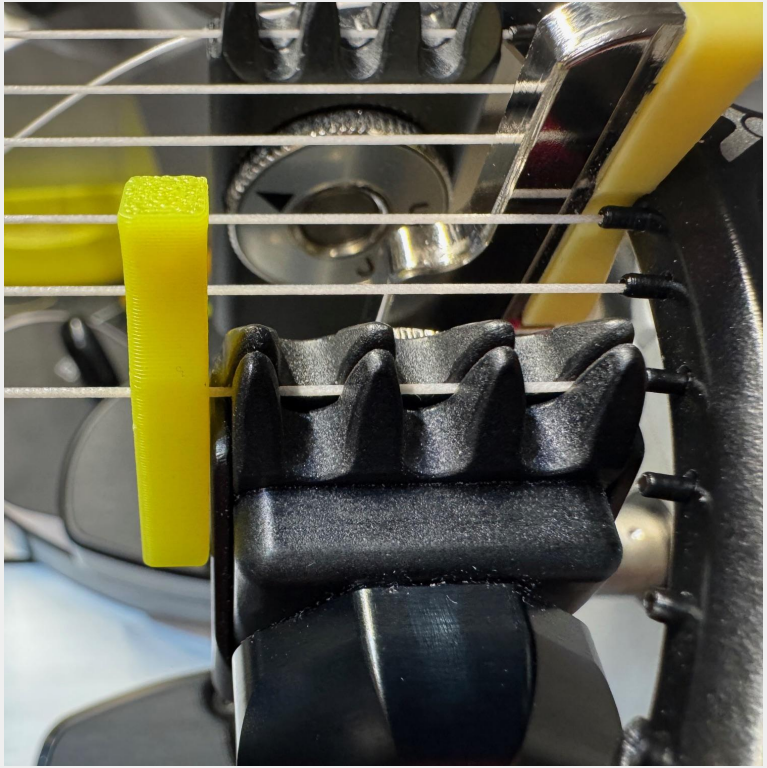
Used filament:

~ 14 grams

Costs:

~30 Cent (per part)

String Slip Tester



Filament:
PETG
Print time:
~17 minutes
Used filament:
~ 2 grams
Costs:
~5 Cent (per part)

Stringlab 2 - New measuring disk

Filament:

PLA

Print time:

~58 minutes

Used filament:

~ 24 grams

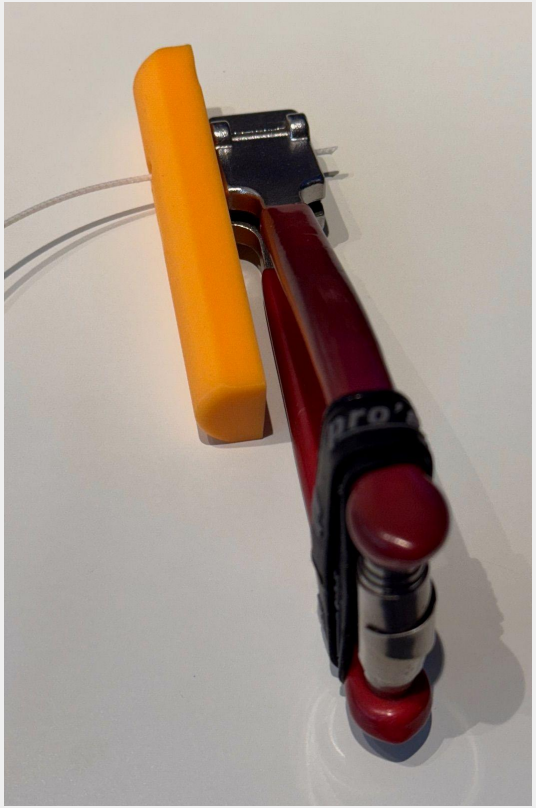
Costs:

~50 Cent (for both)

Yonex ES5Protech - Side Arm Extensions

Filament:
PETG
Print time:
~1:15 hours
Used filament:
~ 10 grams
Costs:
~30 Cent (4 parts)

Prestrech-Block



Filament:
PETG
Print time:
~40 minutes
Used filament:
~ 20 grams
Costs:
~50 Cent (per part)

Overgrip Box (2x 15 Overgrips)

Filament:

PLA or PETG

Print time:

~2:30 hours

Used filament:

~ 100 grams

Costs:

~3 € (per part)

My redesigns

Screw for customers with two reels

Filament:

PETG

Print time:

~45 minutes

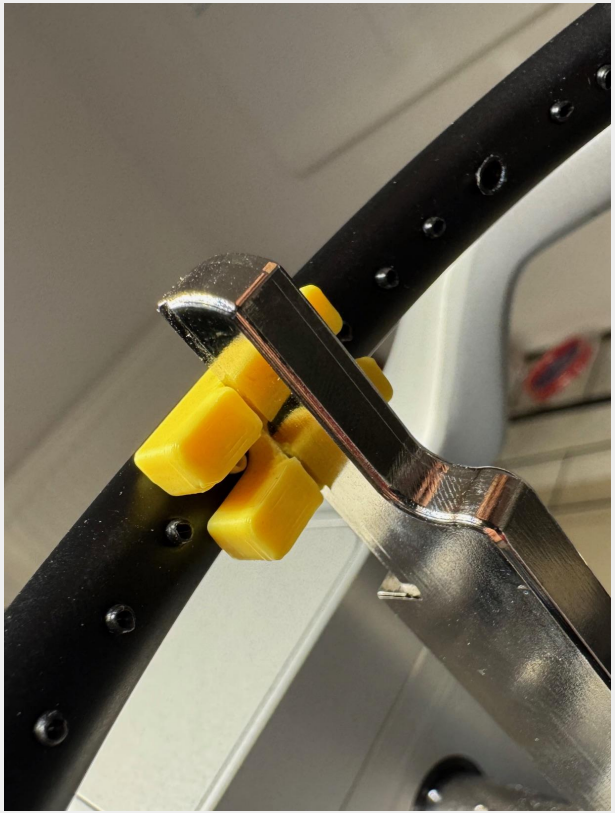
Used filament:

~ 7 grams

Costs:

~20 Cent (per part)

Load Spreader



Filament:
PETG
Print time:
~37 minutes
Used filament:
~ 5 grams
Costs:
~12 Cent (per part)

Spare/replacement parts - Yonex ES5Protech

Filament:

PETG

Print time:

~34 minutes

Used filament:

~ 6 grams

Costs:

~18 Cent (per part)

Spare/replacement parts - Yonex Japan Machines

Filament:

PETG

Print time:

~52 minutes

Used filament:

~ 4 grams

Costs:

~12 Cent (per part)

Long Starting Block

Filament:

PETG

Print time:

~52 minutes

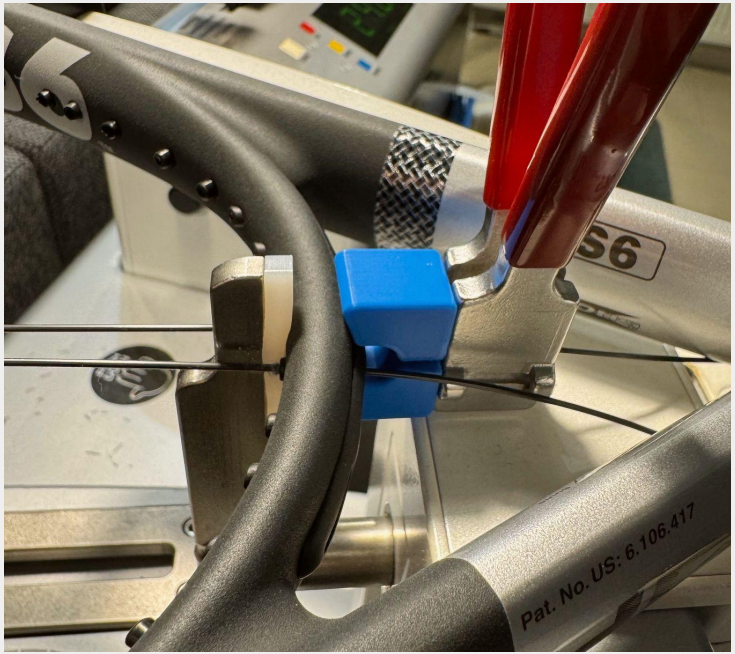
Used filament:

~ 22 grams

Costs:

~56 Cent (per part)

Bottom Starting Block

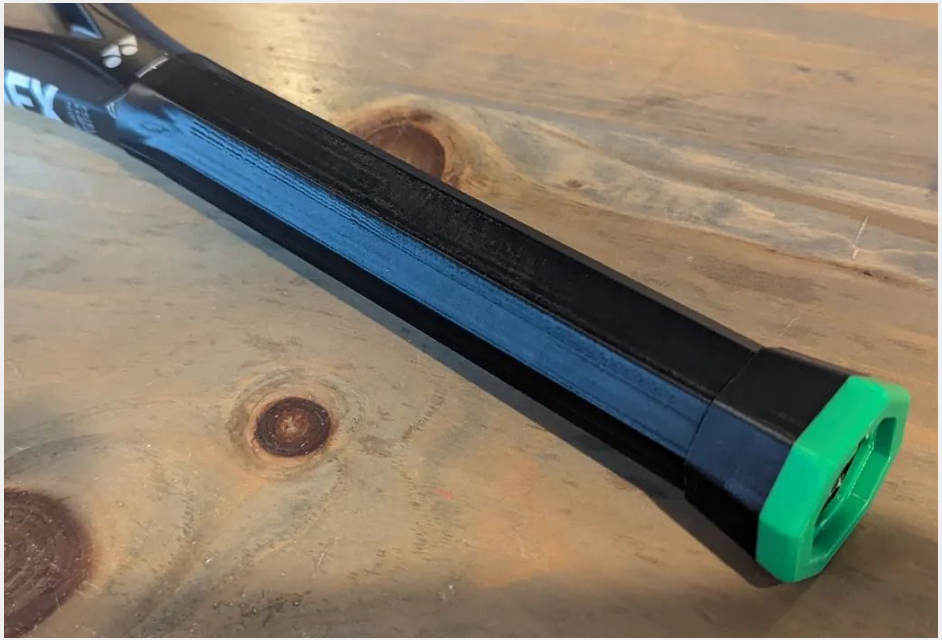


Filament:
PETG
Print time:
~32 minutes
Used filament:
~ 6 grams
Costs:
~14 Cent

Public projects

Yonex Grip pallets (EZone 100) incl. Buttcap

https://www.printables.com/model/1280009-tennis-racquet-grip-size-change-for-yonex-ezone-10



Wilson Buttcap

https://makerworld.com/en/models/800905-wilson-tennis-racket-buttcap

Custom Trap Doors

https://schlaegerschmiede.de/zubehoer/

Dampener

https://makerworld.com/en/models/240077-tennisracket-dampener#profileId-1317142

Starting Block with HEAD Logo

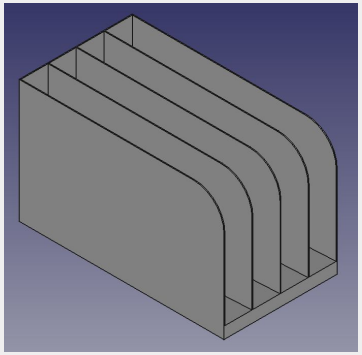
https://cults3d.com/en/3d-model/tool/tennis-stringing-tool-start-block-head-logo

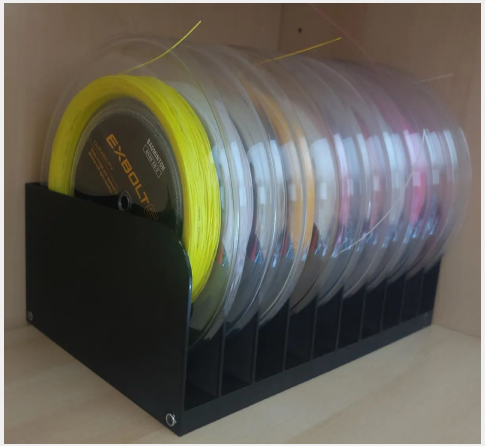
Stencil cards

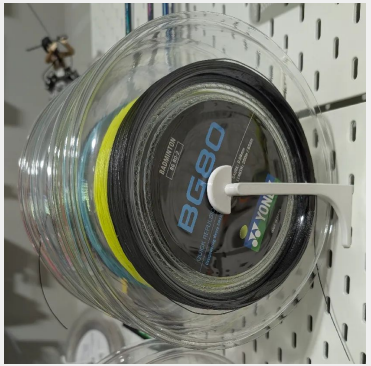
https://www.printables.com/model/587022-badminton-stencils/files

String Reel Holder (Badminton)

Mine:
https://www.thingiverse.com/thing:6494580
Bart:
https://www.printables.com/model/949775
jirom:
https://www.printables.com/model/1313382

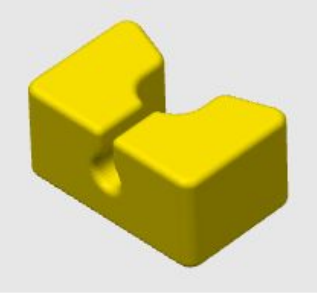


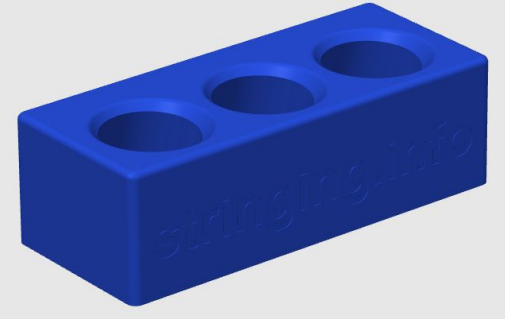


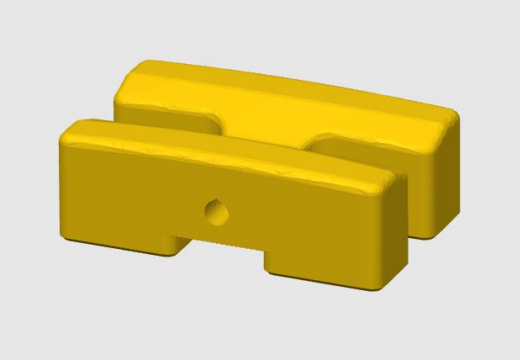


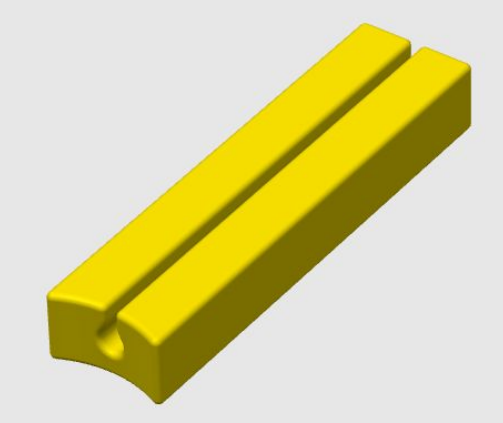
Near the end

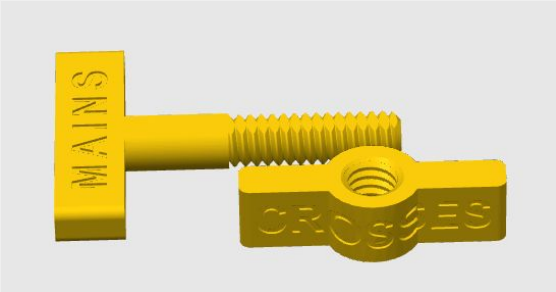
What I sell here











Future

- 3D printing is getting cheaper and cheaper
- Metal printing already possible
  - https://www.pcbway.com/rapid-prototyping/manufacture/
  - https://jlc3dp.com/
- Materials are getting better and better due to ‘new’ additives

Questions?

You can also ask me questions after the presentation.

Some last words

Have the confidence and make/develop your own parts!

Sell them so that others can benefit from them or make them public and available to everyone.

Thanks for your attention

Link to the presentation:

https://stringing.info/2025/10/07/ersa-3d-printing-presentation/

Some Links

3D Printers: https://bambulab.com/
FreeCAD: https://www.freecad.org/
Tinkercad: https://www.tinkercad.com/
CNC Kitchen: https://www.youtube.com/cnckitchen
Sland 3D: https://www.youtube.com/@slant3d
My Reel Holder: https://www.thingiverse.com/thing:7159861

My websites and contact:

- https://stringing.info/
- https://racket-service.info
- +49 151 54963987