

3D PRINTING versus WOODTURNING

Competition or Complementary?

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- Vervaardiging deur wegsnyding teenoor vervaardiging deur toevoeging. (Subtractive versus Additive Manufacturing)
- Competition
- Complementary
- Braam Burger en Jan Richter se projekte

3D Drukwerk versus Houtdraaiwerk – Kompetisie of Aanvullend

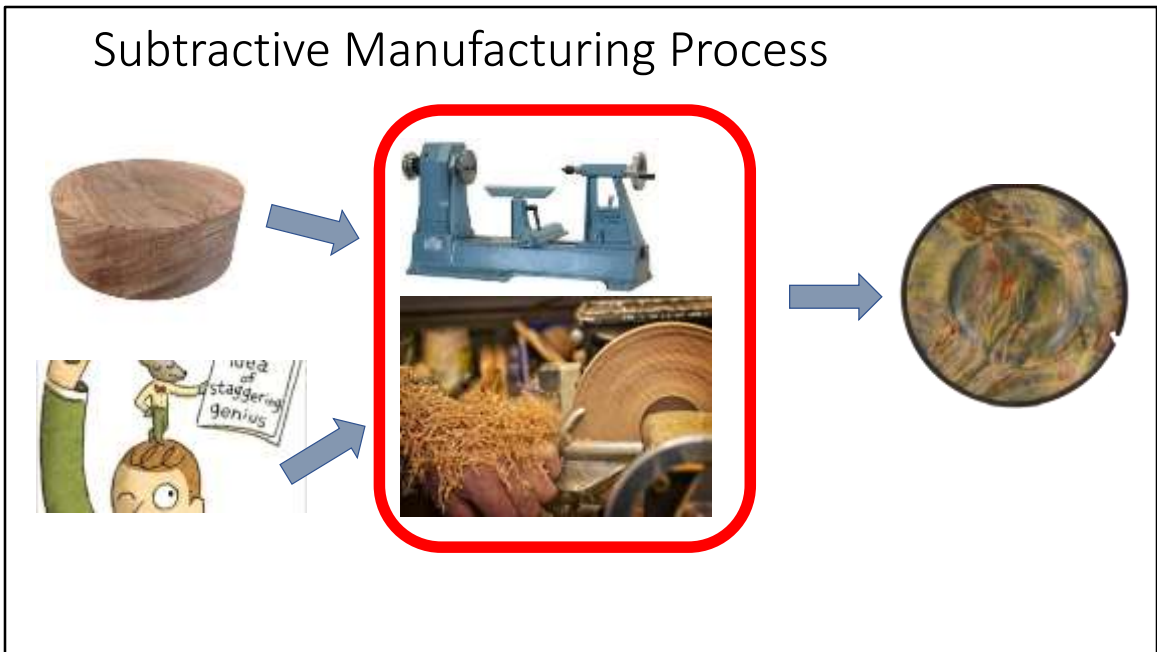
Nie 'n indiepte aanbieding oor 3D drukwerk nie, maar eerder 'n kykie na hoe 3D drukwerk en draaiwerk saam kan bestaan.

Ons gaan eerstens kyk na vervaardiging deur wegsnyding teenoor vervaardiging deur toevoeging of opbou prosesse.

Dan word gekyk na moontlike kompetisie tussen 3D drukwerk en houtdraaiwerk, gevolg deur die moontlike aanvulling van houtdraaiwerk deur 3D drukwerk

Ek gaan dan 'n oorsig gee oor my en Braam Burger se ervarings met 3D drukwerk saam met houtdraaiwerk en projekte oor die tydperk vanaf Apr 2019 tot nou. In sommige gevalle sal die werking van die hulpmiddels wat met die 3D drukker geskep is gewys word.

Subtractive Manufacturing Process



Subtractive Manufacturing (Vervaardiging deur wegsnyding)

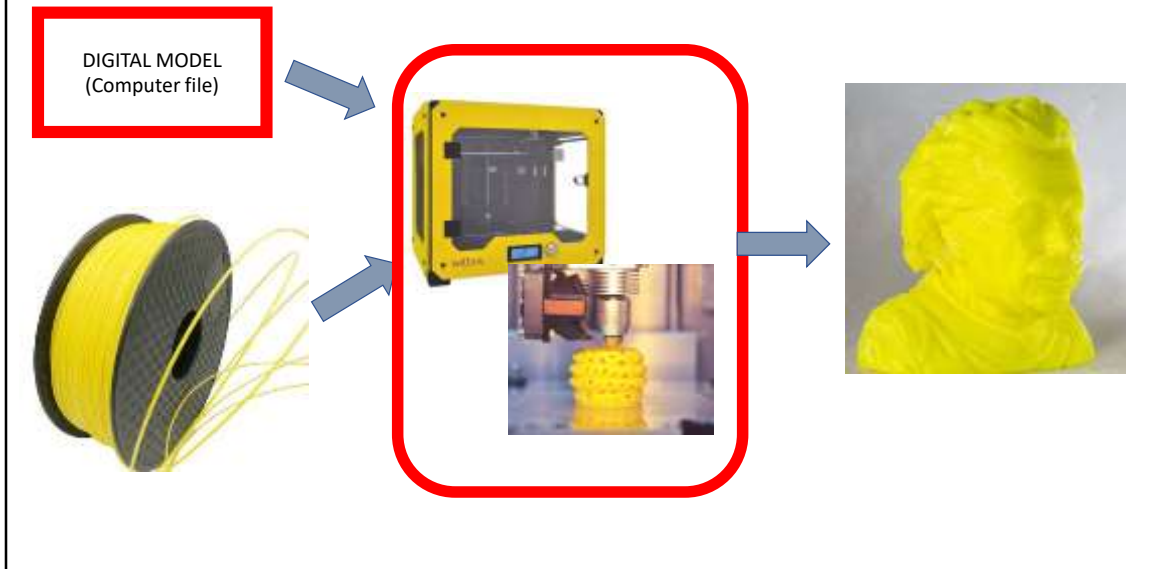
Woodturning can be seen as a subtractive manufacturing process.

In the case of woodturning the turner starts with a suitable piece or block of raw material, the wood blank. The blank is mounted in the lathe. The turner can work from a design on paper or an idea in his head. The turner cuts away unwanted wood until only the wanted product is left on the lathe. Normally there is always a lot of waste involved in the turning or subtractive manufacturing process.

CNC machining is another example of an additive manufacturing process. In this case the cutting process is controlled by a computer and the cutting is done according to instructions that is created from a digital model that was prepared with computer-aided design software.

(Dank en erkenning aan Carel van der Merwe vir die foto van die bord.)

Vervaardiging deur toevoeging

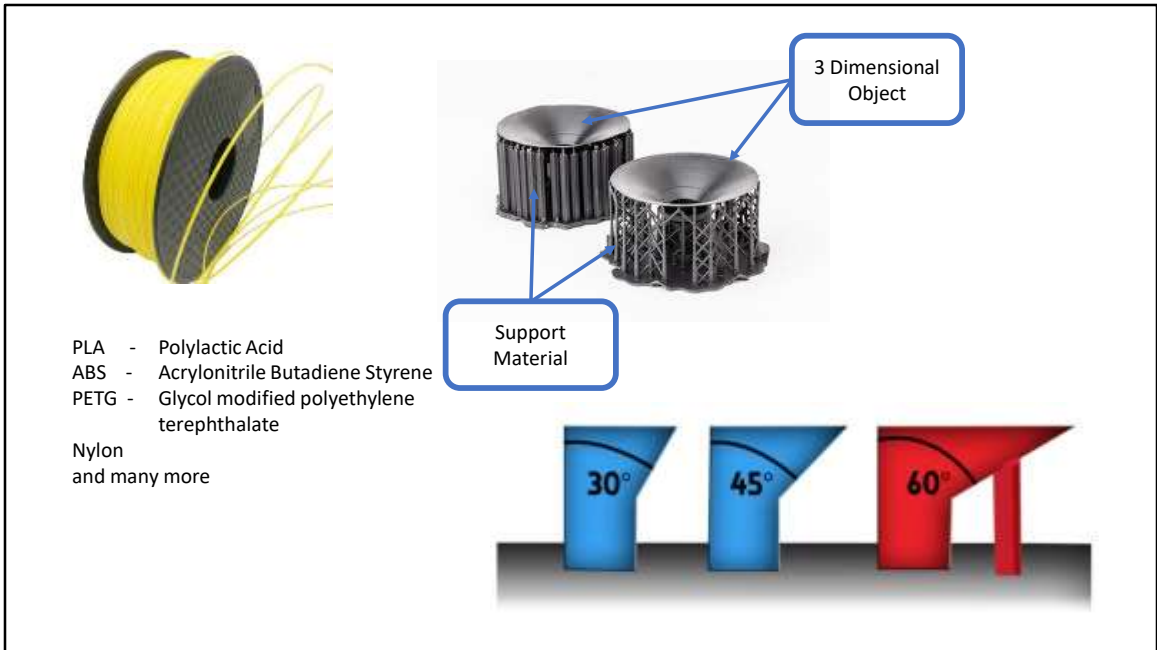


Vervaardiging deur toevoeging (Additive Manufacturing)

Vervaardiging deur toevoeging of meer spesifiek 3D drukwerk is die proses waar 'n 3D voorwerp vervaardig word vanaf 'n digitale model deur die toevoeging van materiaal in lae totdat die eindproduk voltooi is. Die drukker smelt die boumateriaal of filament en bou met die gesmelte materiaal die 3dimensionele voorwerp laag vir laag.

Die digitale model word gewoonlik geskep met rekenaar gesteunde ontwerp programmatuur. Voordat die 3 dimensionele voorwerp gedruk kan word, word die digitale model deur ander programmatuur in lagies gesny en die instruksies wat nodig is om elke lagie te druk word geskep. Die 3D drukker bou dan die 3 dimensionele voorwerp op laag vir laag deur die instruksie vir elke laag uit te voer.

3D Drukwerk was aanvanklik meer gebruik vir vinnige prototipe ontwikkeling maar daar is deesdae al meer 'n neiging om dit vir vervaardiging ook te gebruik.



3D Printing Material and Support Structures

The most used types of materials are PLA and ABS. ABS is more flexible than PLA but requires a higher print and bed temperature. It is also more difficult to print than PLA. PLA breaks more easily than ABS.

PLA is derived from renewable resources such as corn starch or sugarcane and is biodegradable under the correct conditions.

PETG is a material that is gaining more and more popularity in the 3D printing world. It is the type of plastic that is used the most and can be found in water bottles, clothing fibre and even food containers. It is durable and flexible.

Nylon is also used for durable objects that require strength.

Although 3D printing is an additive manufacturing process there can be waste. Waste will occur when one or more support structures are required to print an object. For example, if an overhang tilts at an angle more than 45 degrees from the vertical, then you may have to print that overhang with 3D printing support structures.

Kompetisie?



3D Drukwerk versus Houtdraaiwerk – Kompetisie

Soos wat hierdie fotos toon kan voorwerpe gedruk word wat ook op 'n draaibank gedraai kan word. Daar moet onthou word dat 3D drukwerk gebaseer is op 'n 3 dimensionele model wat eers geskep moet word. Die skepping van die 3D model kan onder andere gedoen word deur 'n voorwerp te ontwerp met rekenaar-gesteunde ontwerp programmatuur of deur 3 dimensionele skandering. Daar is selfs programmatuur beskikbaar wat gewone fotos kan omskakel na 3 dimensionele digitale modelle. Wanneer 'n suksesvolle digitale model geskep is kan dit oor en oor gebruik word vir die druk van dieselfde voorwerp.

Persoonlik dink ek dat 3d drukwerk nie werklik kompetisie vir veral kuns houtdraaiwerk is nie. 'n Kuns draaiwerk stuk reflekteer baie van sy skepper se karakter en kreatiewe eienskappe. In die geval van produksie houtdraaiwerk mag daar dalk 'n mate van kompetisie wees. Ons moet egter onthou dat soos wat Lou Coetzer per geleentheid gesê het, elke item wat uit hout gedraai word is uniek omdat geen twee stukke natuurlike hout identies is nie.

Complementary?



3D printing versus Woodturning – Complementary?

One can ask the question if 3D printing and woodturning can complement each other. These photos are from chucks and jaws printed by Henry Doolittle who is a member of the American Association of Woodturners. An article by him was published in the Dec 2016 issue of the American Woodturner.

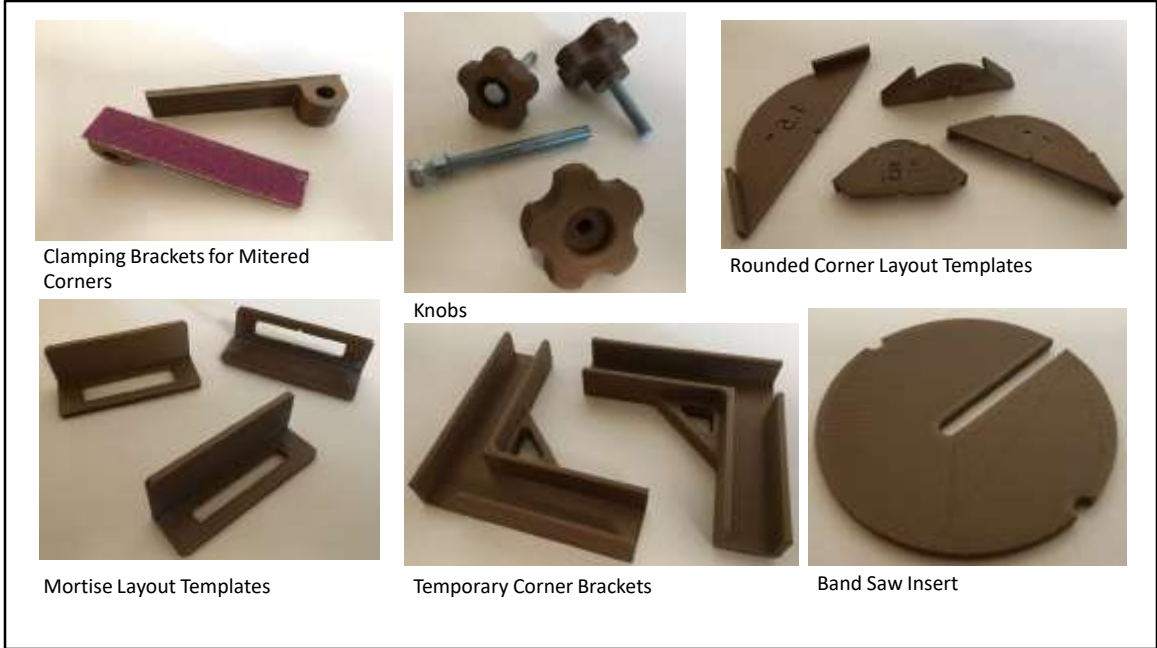
Top left is a vacuum chuck he is using to finish the inside of pewter cups that he is making on his lathe.

Bottom left jaws that are used for holding a sphere.

Middle top and bottom is a collet chuck.

On the right is a set of long jaws that is used to hold a hollow form

All these items were printed out of nylon.



3D Printed Gadgets for woodworking

It may be good to also have a look at gadgets printed for woodwork as such.

The gadgets in the above slide and the next slide were all 3D printed by a person with the username rschoenm and is used by him in his woodworking workshop. The link to this website is <https://www.instructables.com/id/3D-Printed-Gadgets-for-Woodworking/>



Angle Gauge



Magswitch Jigs



Height or Cutting Depth Gauge



Center Marker



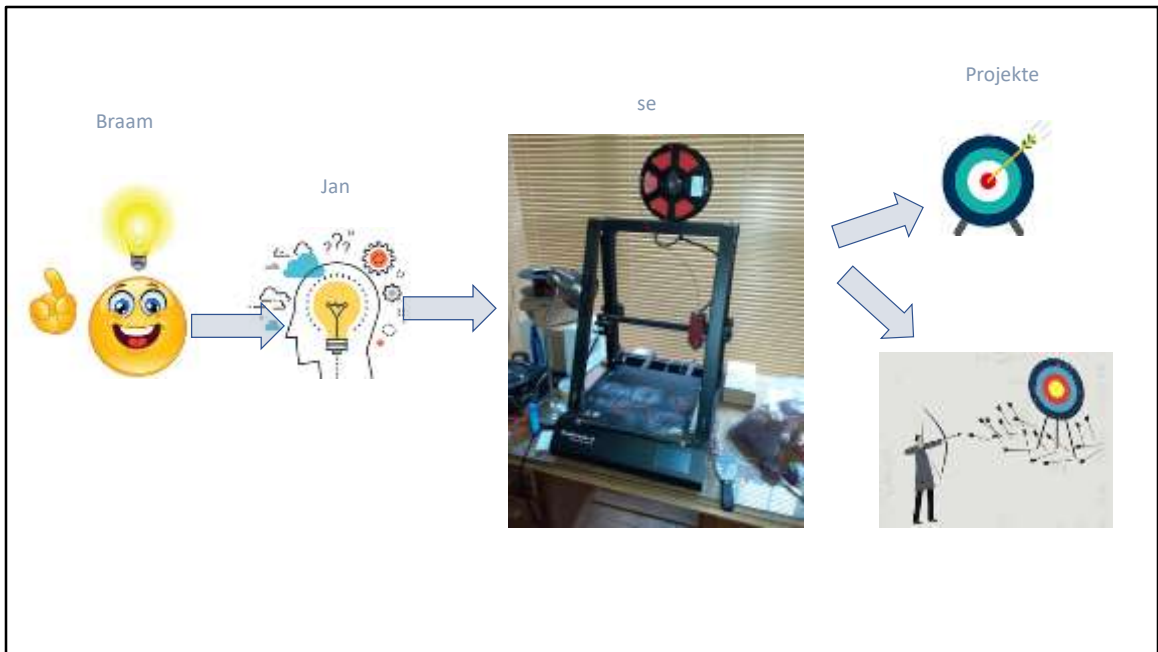
Miter Slot Bars



Dust Collector Adaptors

More 3D Printed Gadgets for woodworking

If you visit this link you will find links to other interesting sites.



In April 2019 het ons saam 'n 3D drukker aangeskaf. Een van ons kry gewoonlik 'n idee van wat ontwerp en gedruk moet word. Na baie dink en tyd op die rekenaar kan prototipes gedruk word. Soos op die prent is daar baie mis skote maar darem ook raaskote.

Ons gaan nou kyk na 6 projekte.



Insetsels vir sout- en peperpotjies

Die foto heel links wys ringe met skroefdraad in waarin 'n doppie kan inskroef. Die ring word in die onderkant van die hout houer vasgeplak (fotos 2de van regs en regs). Die houer met die doppie kan vir sout- en peperpotjies gebruik word (foto 2de van links).



Pepermeule met Soutpot

Hierdie projek is nog in die ontwikkeling fase wat die gebruik van 3D gedrukte komponente betref. Die foto links toon 'n pepermeule met soutpot waarvan die komponente wat die soutpot gedeelte aan die meule gedeelte verbind uit hars gemaak is. Die foto 2de van links bo wys die soutpot gedeelte links en die meule regs. Die foto 2de van links onder wys die soutpot wat oopgeskroef is links en die soutpot se skroefdeksel wat ook die koppeling met die meule vorm, regs.

Die foto 2de van regs wys die nuut ontwerpe 3D gedrukte insetsel. Die ring met die interne skroefdraad word in die die soutpot gedeelte vasgeplak en die ander ring met die eksterne gedeelte pas op die koppelstuk na die pepermeule gedeelte.



Travel Mate

A travel mate (photo left top) is a wooden holder for strings of sewing thread and one or two sewing needles. It is used for emergency repairs to clothes such as sewing on a button. In this project 3D printing are involved in two aspects.

A small plastic ring (photo 2nd from left top) is fitted in the longer lid of the travel mate. As shown in the photo on the right top the inner side of the ring is made up of 7 rings to ensure a better grip. The ring fitted in the longer lid is shown in the photo left bottom.

The travel mate is made of one blank for the two lids and another blank for the component that takes the strings of sewing thread, The blank for the lids are cut into the longer and shorter lids. The long lid is then drilled to take the component for the strings of thread and to take the ring, After forming the component that takes the thread, it is fitted into the short lid and shaped to take the longer lid with the printed ring. The outside of the travel mate is then shaped with the shorter lid hold in the chuck. Once the travel mate is shaped and finished the top of the shorter lid is then finished by holding it in 3D printed jaws mounted on a chuck (photo right bottom).



Pen Press

The two photos on the left top show a printed object or tool with a Morse taper 2 shaft and a flat frontend. The tools can be fitted in the Morse taper holes in the spindle of the headstock as well as in Morse taper hole in the tail stock of the lathe. It can be used as a pen press to assemble pens or key rings (photo on the left top). These pen press tools are printed with Morse taper 2 or Morse taper 1 shafts. In order to save material and make the printing time shorter a tool with a shorter shaft was developed (photo left bottom).

Another tool with a concave frontend was also printed and tested. Tests must still be done to determine if two tools with flat frontends should be used or should it be a combination of a flat frontend and a concave frontend.



Bic Special Pens

The Bic Special Pen (photo top) is made by drilling a 3.5 mm hole in the blank to fit the refill of a normal Bic pen. This hole is normally drilled before much shaping is done. In order to shape the pen, the blank can be mounted between centres or hold in a chuck with the drilled side supported by a sharp live centre. However it often happened that the small hole for the refill is damaged by the live centre.

A tool with a short MT2 shaft was printed to fit the Nova Live Centre (photo left bottom). There is a tapered hole in the tool with which the drilled end of the pen blank can be supported while the shaping is done (photo middle bottom). Final finishing of the opposite end of the pen is done by holding the pen in the soft jaws that are also used for the travel mate (photo right bottom).



Koffie Maatlepels

Mervin Walsh van Kaapstad draai baie koffie maatlepels (fotos links en 2de van links) wat hy op die markte daar verkoop. Hy gebruik 'n pasgemaakte kloustelsel uit hout om die lepel vas te hou wanneer dit uitgehol word. Hy kla egter dat die hout kake nie baie lank hou nie.

Die kake soos getoon in die foto 2de van regs is ontwerp en met die 3D drukker gedruk en suksesvol getoets. Die foto regs wys 'n lepel in die kake voordat dit uitgehol word.

Die proses wat gevolg word om die koffie maatlepels te maak is:

1. Kies 'n vierkantige draaiblok van ten minste 50 X 50mm en lank genoeg vir die lepel.
2. Sny die blok in die lengte in twee en plak die twee dele weer aanmekaar met 'n laag papier tussenin.
3. Vorm die buitekant van die lepels
4. Breek die twee dele versigtig uitmekaar en hol die lepel uit deur dit vas te hou in die gedrukte kake.

Kontak ons gerus as jy idees het vir
3D gedrukte hulpmiddels
of
Belangstel in enige van die projekte.

DANKIE!!!