How to...
moulding & casting

waag society Mickael Boulay - 2015

Why ?

Duplicate easily piece (modules for example)
https://www.google.nl/search?q=blowner+band+saw&source=lnms&tbm=isch&sa=X&ei=8B8TVeuWDdHPaMuAqYAB&ved=0CAcQ_AUoAQ&biw=1280&bih=672#tbm=isch&q=machine+cable+guide&imgdii=_

Create piece in a non machinable material
rubber
foams https://www.formx.eu/molding--casting/pu-foams/pu-flexible-foams/index.php https://www.youtube.com/watch?v=fqj61nnvxdY
concrete https://www.google.nl/search?q=concrete+nacho+carbonel&biw=1280&bih=672&source=lnms&tbm=isch&sa=X&ei=xBsTVZWDOY2LaNDvgegF&ved=0CAYQ_AUoAQ
ceramics (needs plaster mould)
metal http://mickaelboulay.fr/index.php?/menu/transitions-process/
etc…

Inserts (screwdriver, usb stick, embedded electronics …)

Mindset =

Having a mould as perfect as possible (outcomes)
so that post-mould process is as little as possible.

3 ways

Traditional (hard or soft)
Tangible model, cast mould part 1, cast mould part 2, cast final piece

Digital Fabrication (soft)
Mill part mould 1 + 2, cast mould part 1 + 2, cast final piece

Digital Fabrication (hard)
Mill mould part 1 + 2, cast final piece

3 ways

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Digital Fabrication (hard)
Mill mould part 1 + 2, cast final piece

Did I say that?

Planning and designing are keys

Workflow

1- Design a piece

2- Design the mould of a piece

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3- Machine the negative mould (« mould of the mould »)

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4- Cast the positive mould

5- Cast the piece(s)

6- Finish the piece(s)

1- Design a piece

Different possibilities of material casted, different material for mould…

what result do I want ?

final piece's properties = ?

how hard/soft? how opaque/transparent? how watertight? etc

http://www.smooth-on.com/pdf/durometer_with_logo.pdf

Define 2 materials : piece material, mould material

(+ lubricant material if needed)

Draw piece in 3d software

Rhino, Sketchup, blender, etc. anything that can export .stl

2- Design the mould of a piece

Piece's geometry = ?

- flat surface?
- hollow?
- inserts?
- where will be the mould seam? (when possible on straight edge)

Draw mould in 3d software

- keys?
- pouring hole?
- vent ?
- check and if needed adjust design of mould (or piece)
- in relation with machining technique (ex: milling)

3- Machine the negative mould

Common point :

similar workflow = roughing toolpath, finishing toolpath.

! Never skip the roughing tool path !

More this afternoon !

4- Cast the positive mould

Material

- Use compatible materials
- Pot-life, shelf-life etc
- Working/curing temperatures etc
- Ratio (1:1 95:5 or ? by weight and/or by volume ?)
- Extra curing process (example : food grade silicons)
- Read the labels
- « drying » vs curing

Safety

- Gloves, masks, eye protection, ventilated area
- Even (any) dust is poison (plaster and likes)

4- Cast the positive mould

Quality

- Clean work area
- Cast in non polluted setup
- Use right lubricant (when needed)
- Mix well (avoid air bubble+uncured material)
- Pour well (avoid air bubble)

5- Cast the piece(s)

Everything like casting the mould

+ support soft mould if needed
+ tape/clamps mould parts together

6- Finish the piece(s)

Trim pouring chanel/vent
Flatten base
Finish surface (ex: sand off the seam)
Assemble