

Prototype and mass production

Different manufacturing processes

Manufacturing processes (for prototyping and mass production):

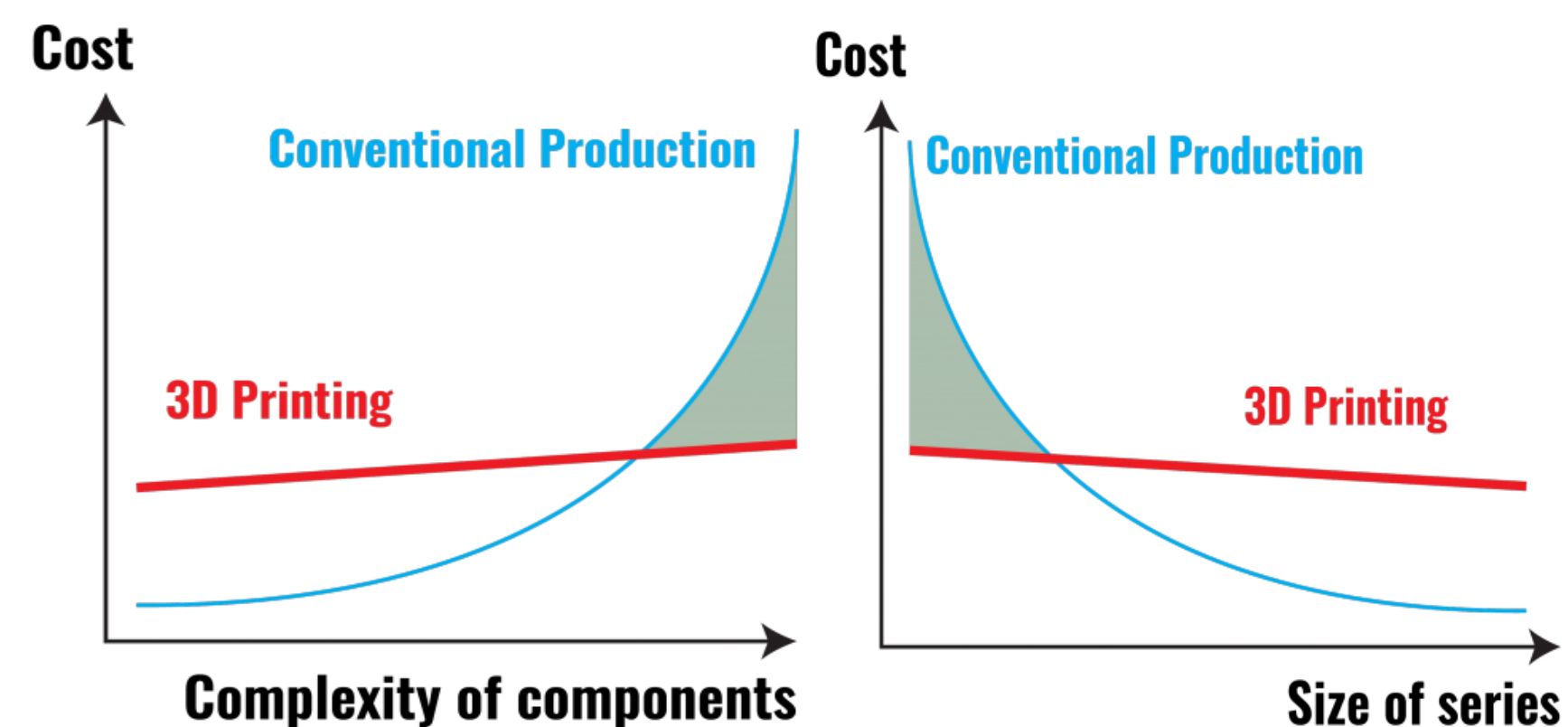
- Milling
- Turning
- Laser and waterjet cut
- 3D printing
- Weldments

Manufacturing processes (for mass production):

- Stamping
- Foundry
- Broaching
- Injection molding

Example of cost evolution

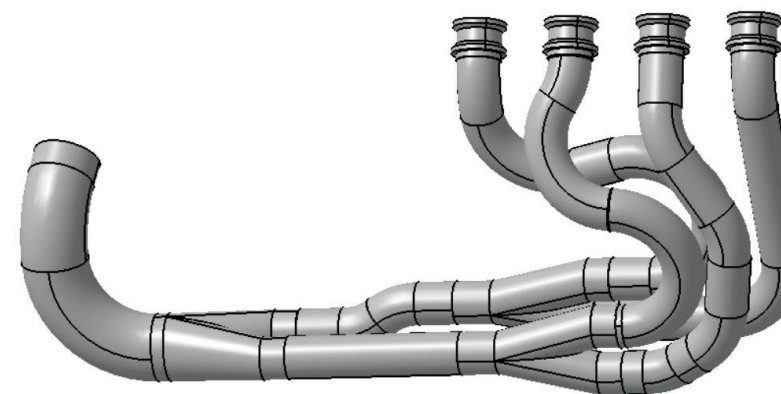
See below an example of cost evolution versus complexity and size of the series for 3D printing and conventional production.



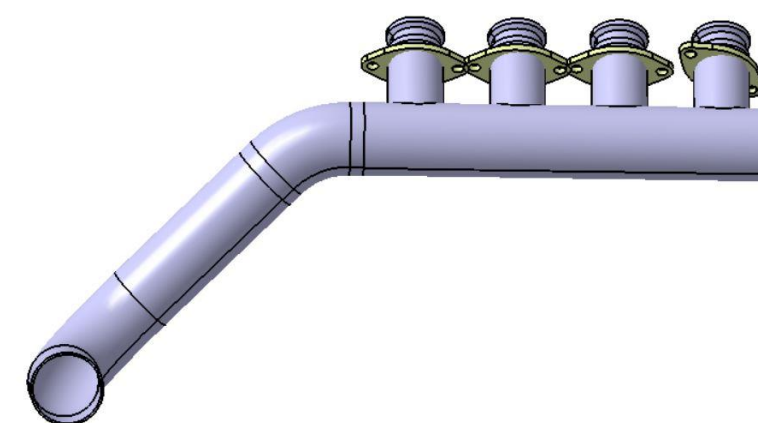
Examples of manufacturing processes for mass production

Exhaust system

Prototype: Complex geometry to realise acoustic waves.



Mass production: Reduce complexity to reduce cost.



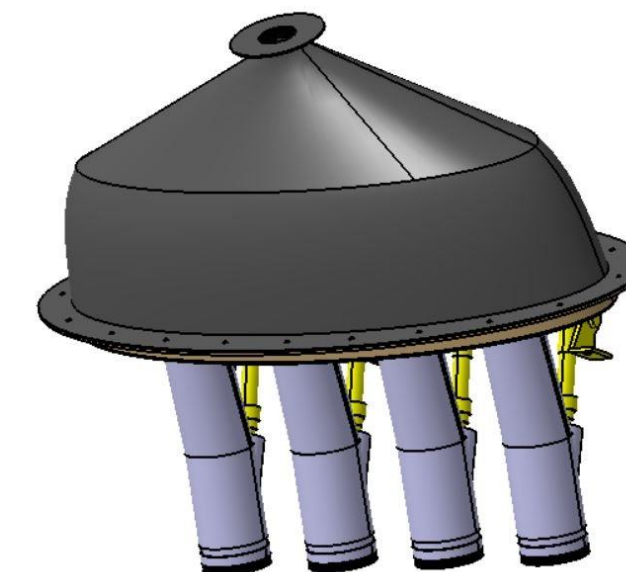
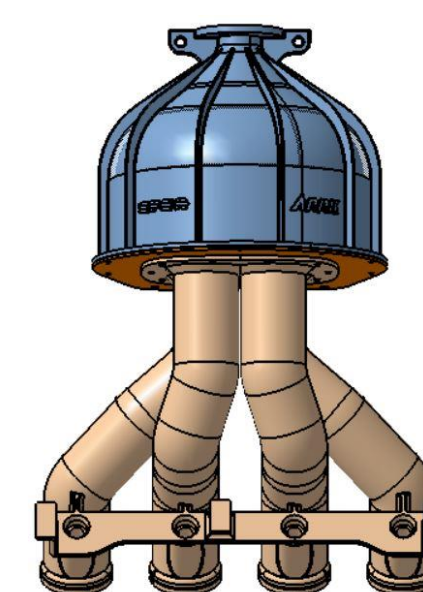
Intake system

Prototype: 3D printed part + aluminium laser cut part.

Mass production:

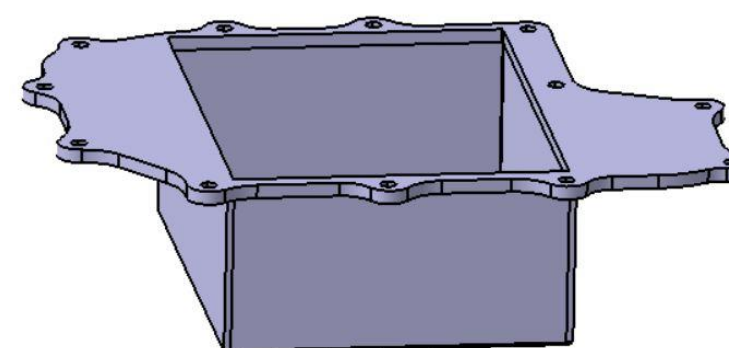
Left: Changement of manufacturing process. Thermoforming from extruded pipes + injection molding.

Right: Injection molding.

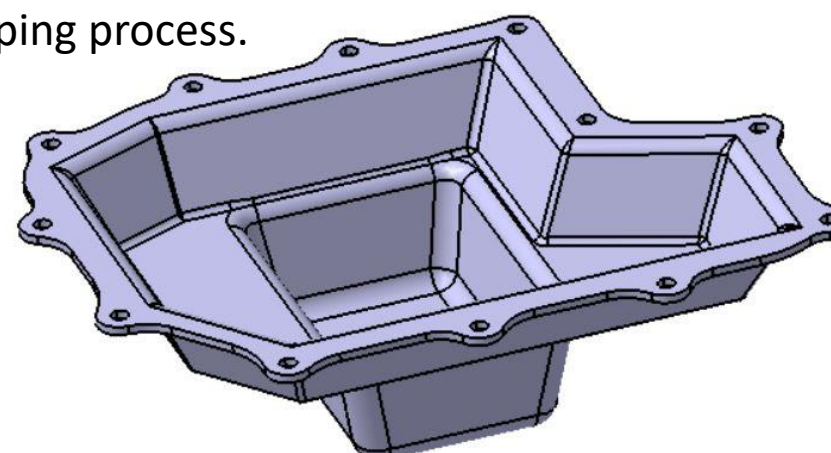


Oil pan

Prototype: Aluminium laser and waterjet cut part + welding.

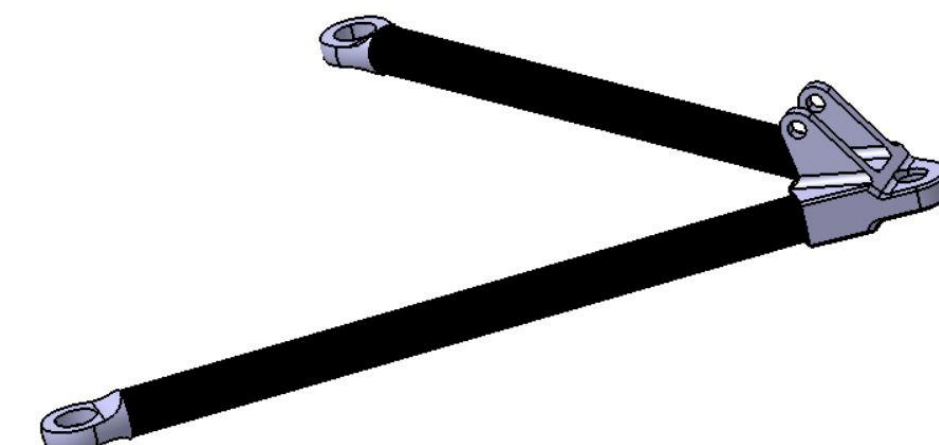


Mass production: Changement of manufacturing process. Stamping process.



A-arms

Prototype: CFRP tubes with aluminium machined parts.



Prototype: Changement of materials, manufacturing and assembly processes.

Weldments, steel with tubes and laser cut part.

