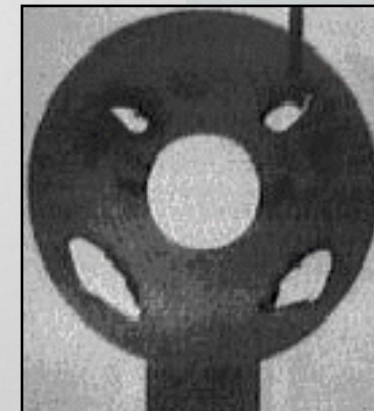
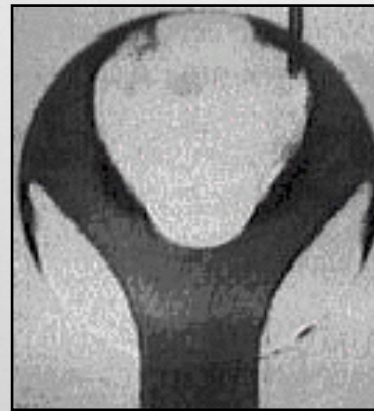
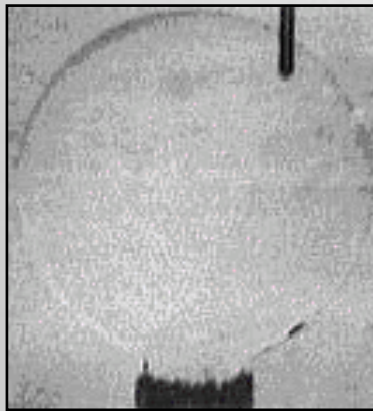
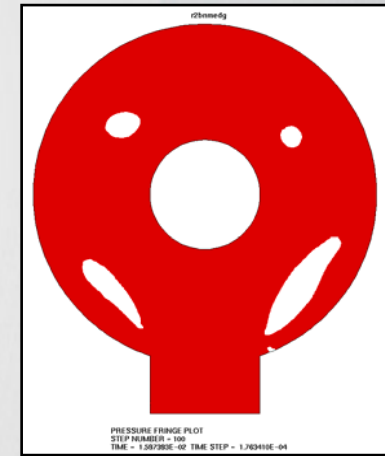
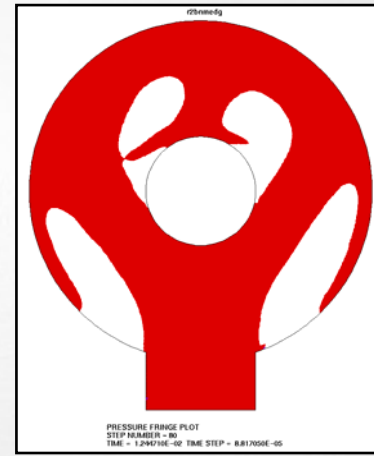
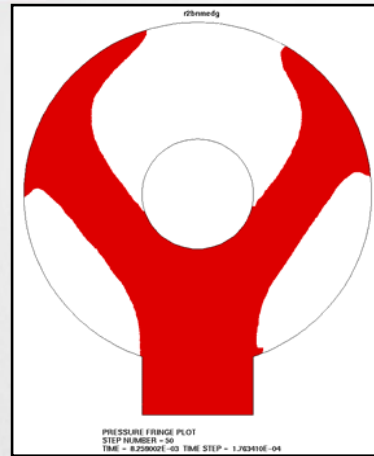
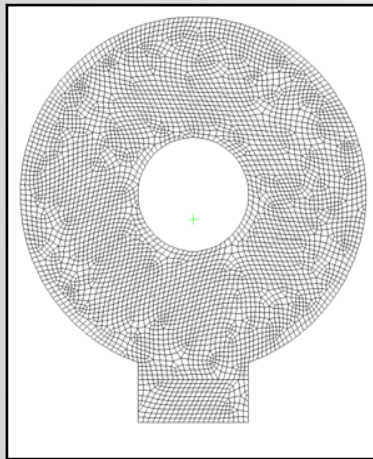


Industrial Validations

Casting Model Validations

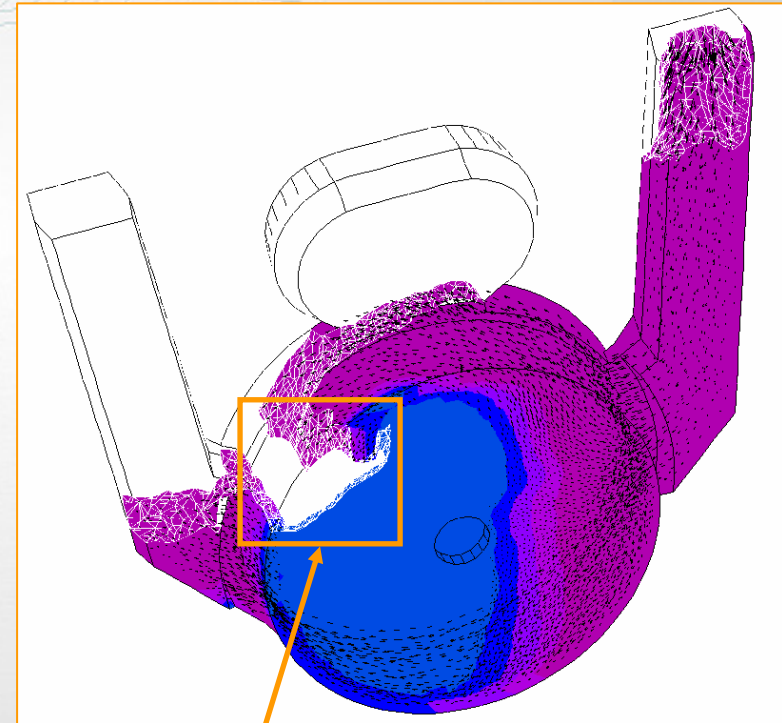
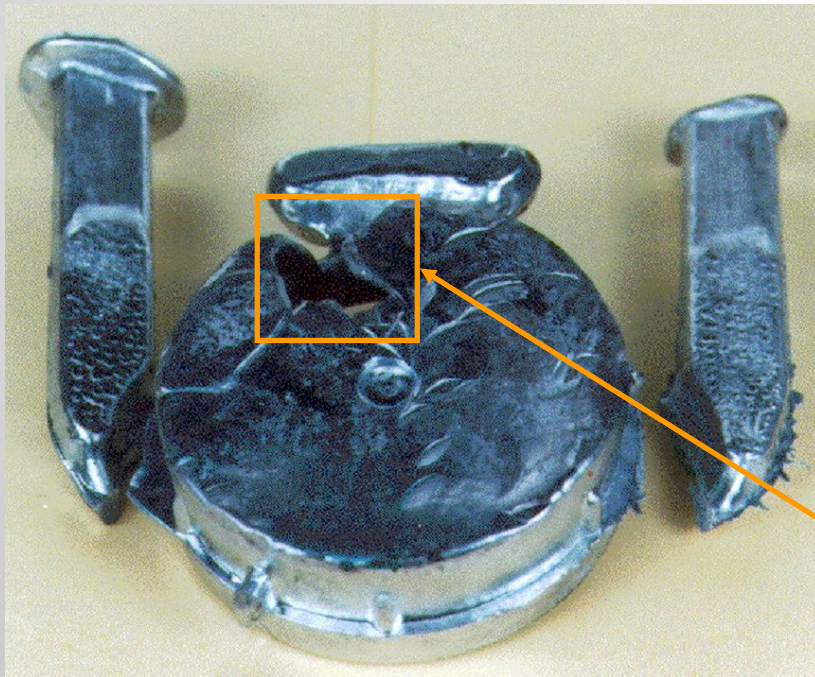
Filling (*Procast*)

Flow validation



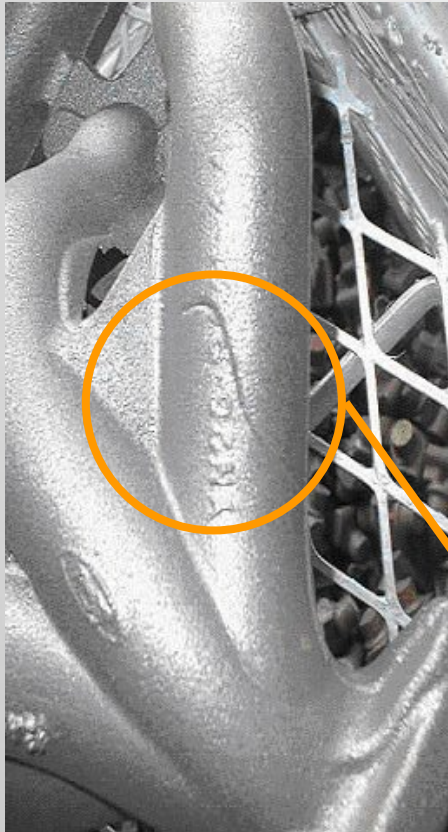
Arbeitsgemeinschaft, Metallguss, Aalen (D)

Filling (*Procast*)

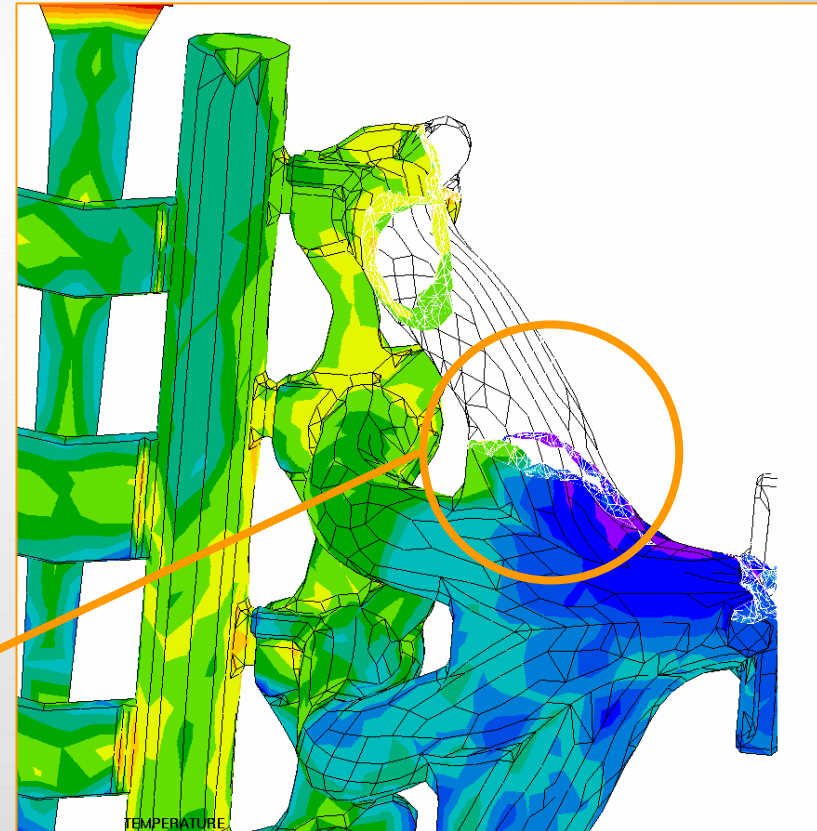


Incomplete filling

Filling (*Procast*)



Cold Shut

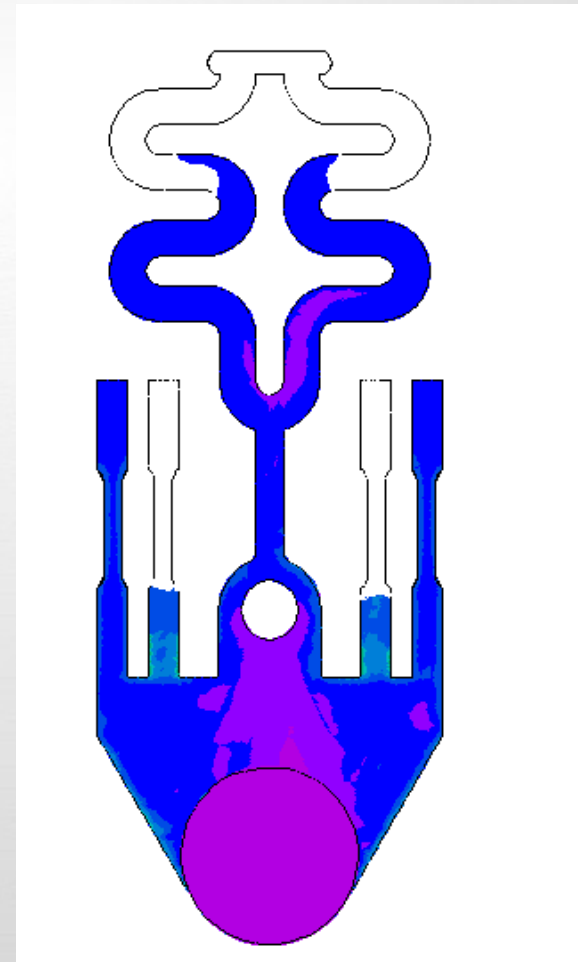


Filling (*Procast*)

Thixocasting validation



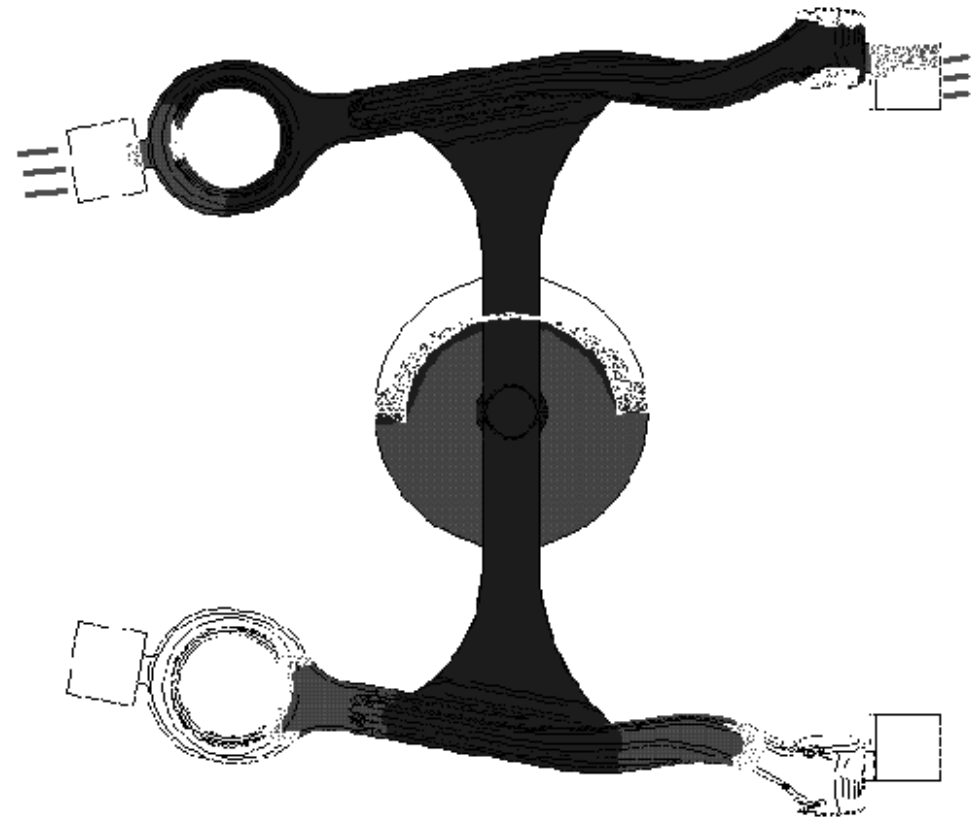
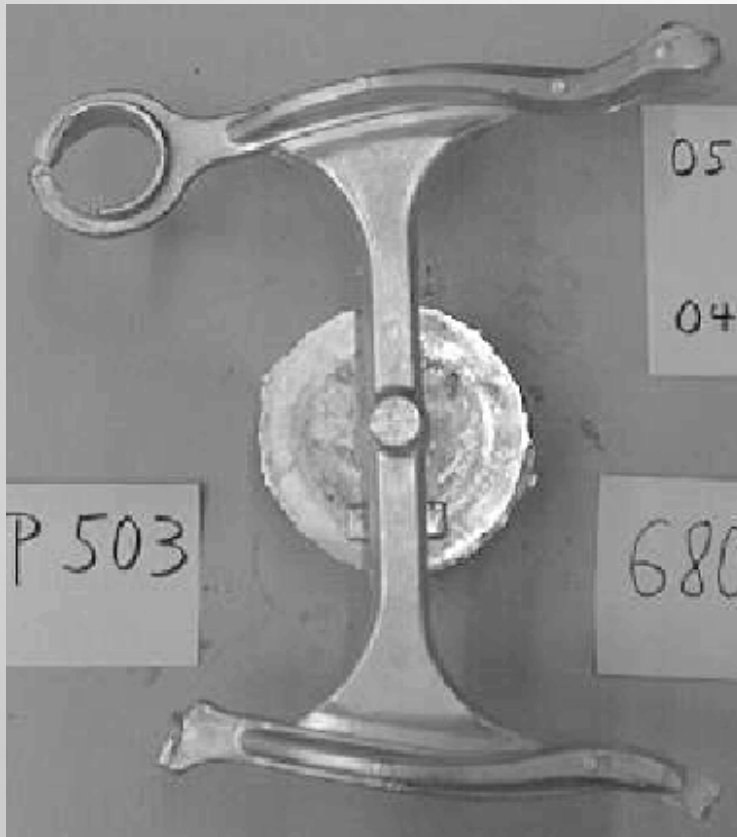
Sophia Antipolis, Collot



Magnesium alloy (AZ91):

Filling (*Procast*)

Thixocasting validation



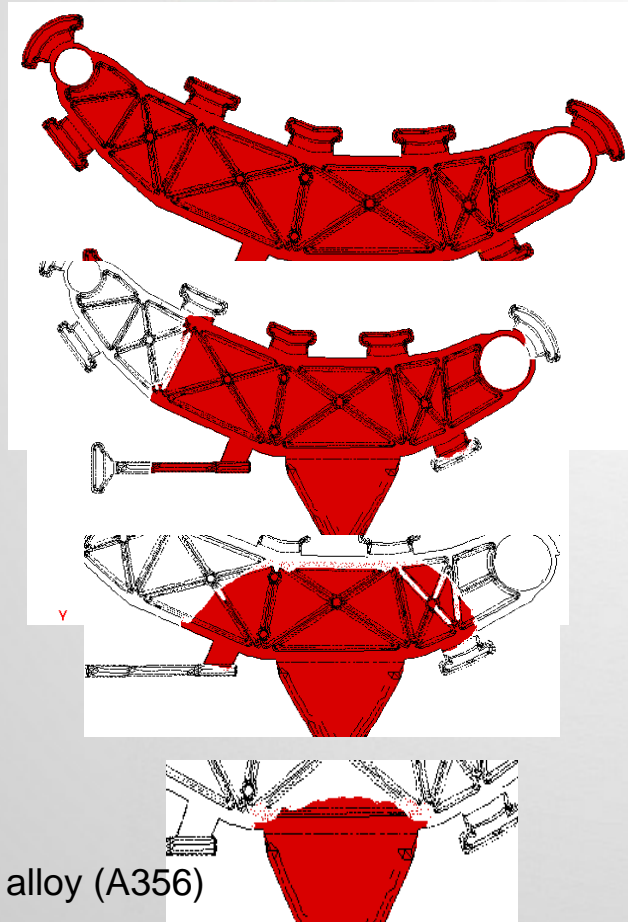
Courtesy of Alusuisse

Aluminium alloy (A356)

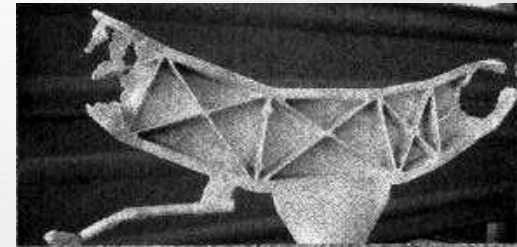
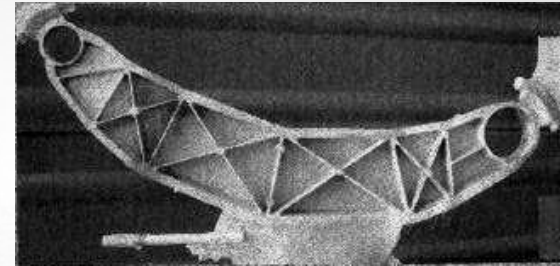
d2

Filling (*Procast*)

Thixocasting validation



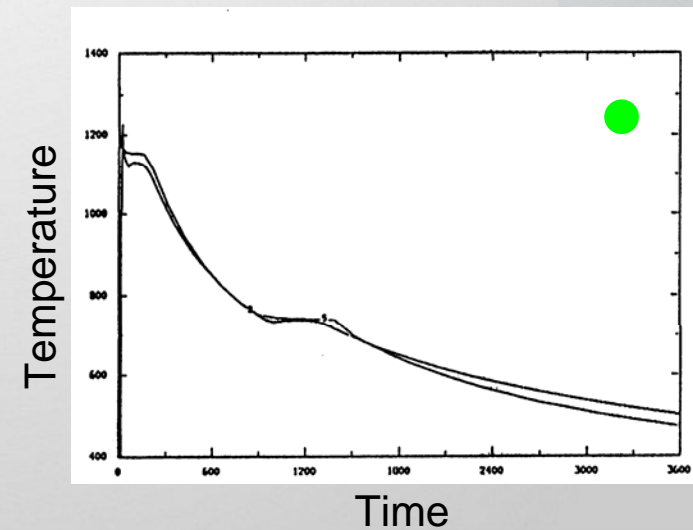
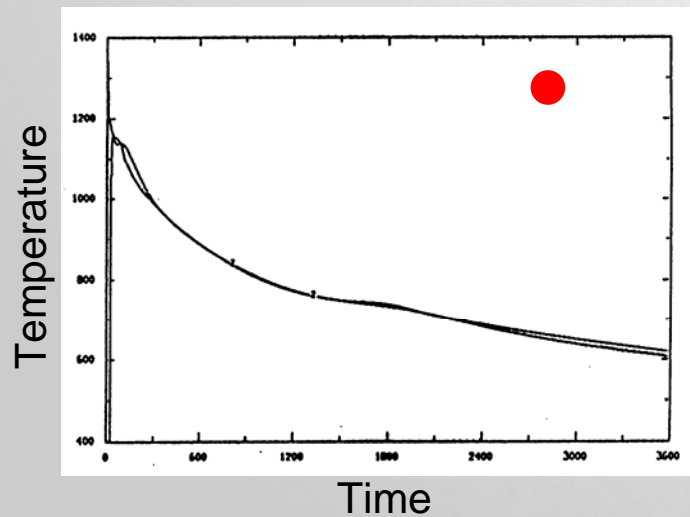
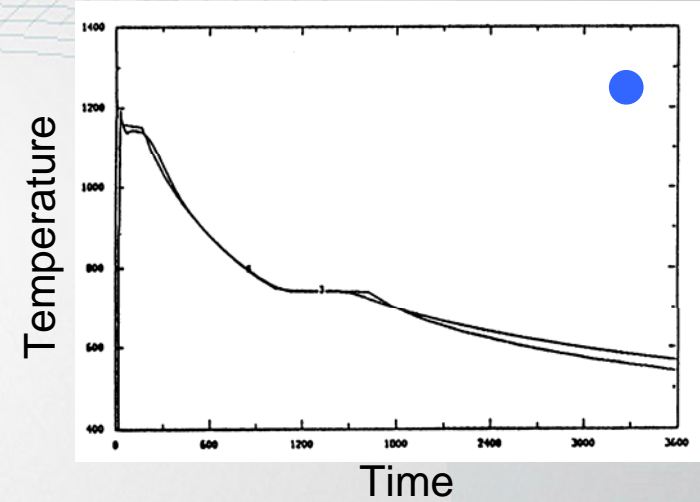
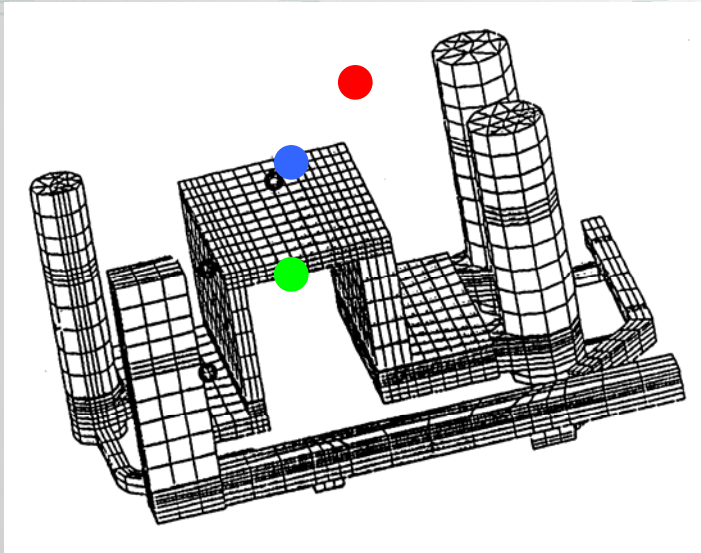
Aluminium alloy (A356)



Courtesy of Austrian Research Centre

Thermal (*Procast*)

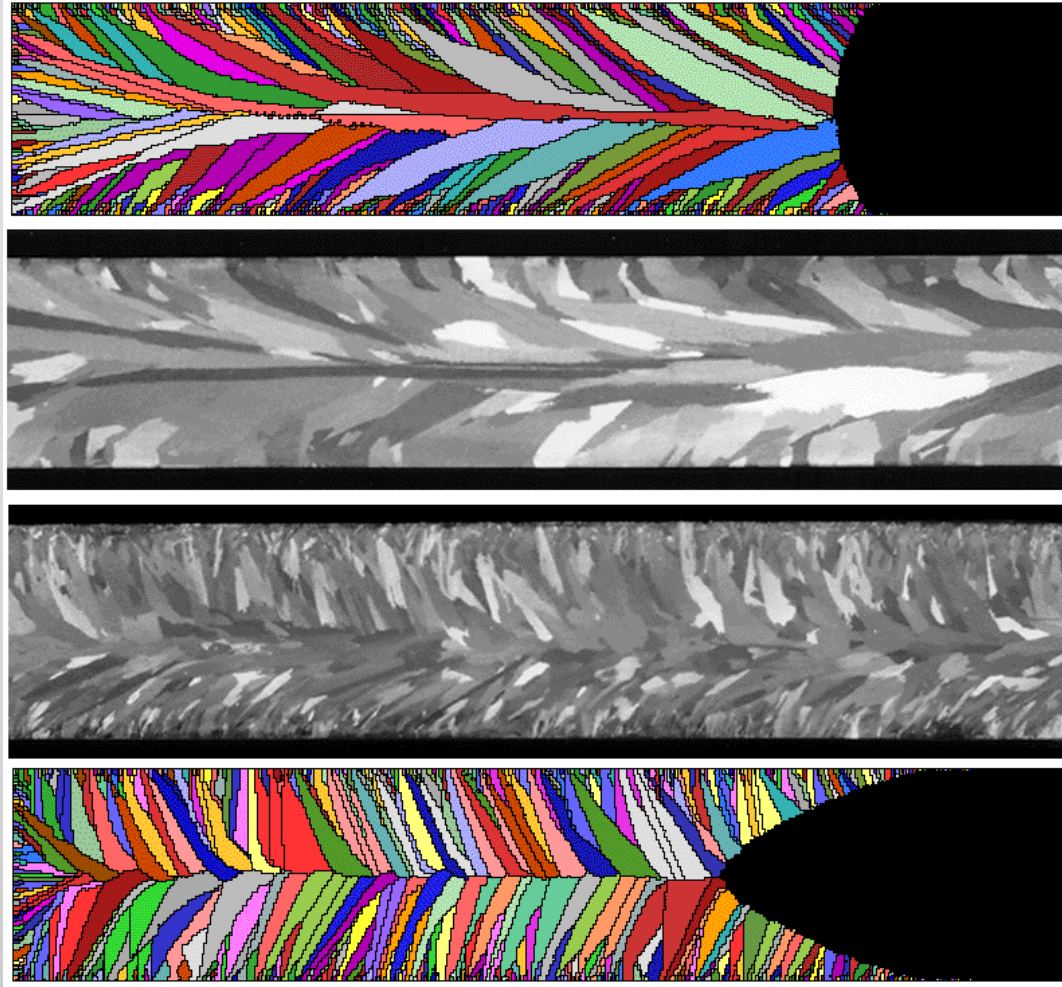
Temperature validation



Microstructure Validation

Microstructure (calcosoft)

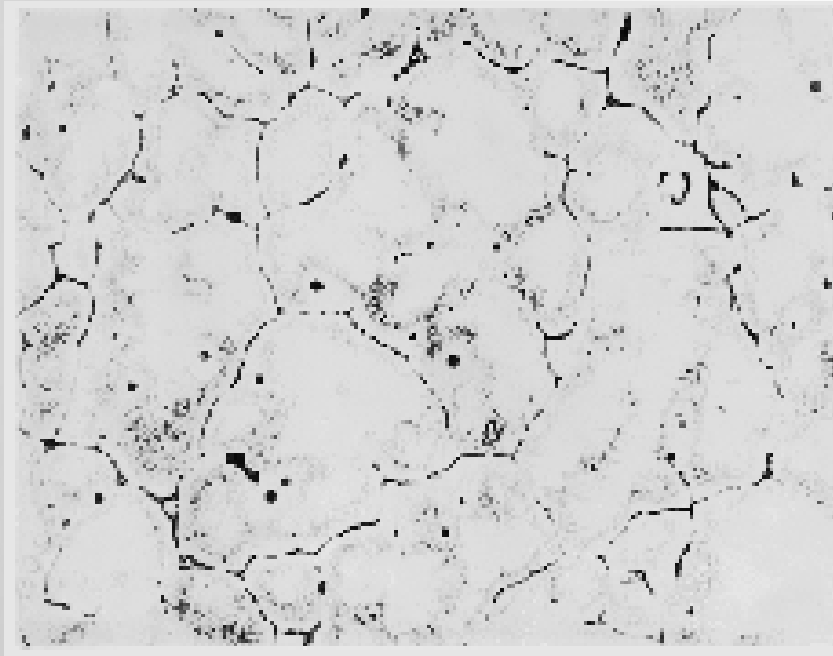
Microstructure validation



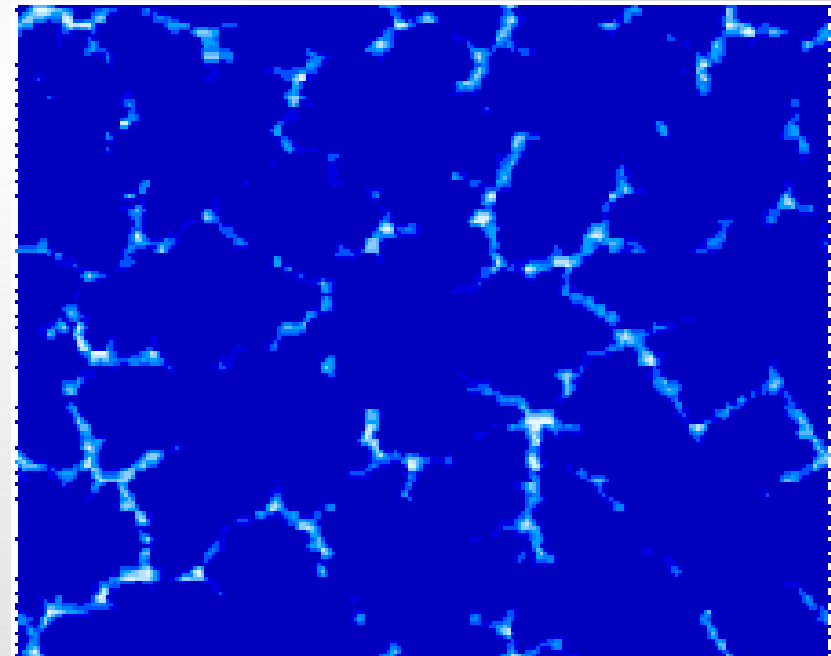
Microstructure (calcosoft)

EMPACT Project (DC)

AL-Mg-Si



Experimental microstructure map

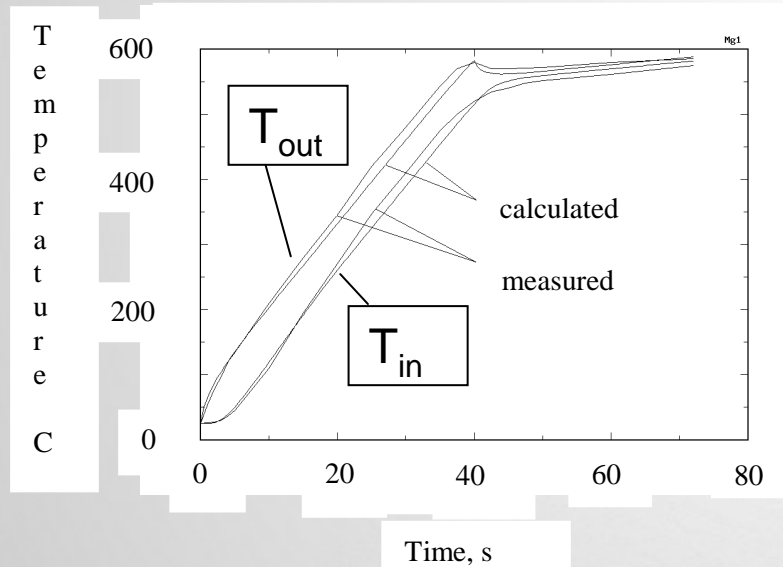


Calculated volume fraction

Induction Heating Validation

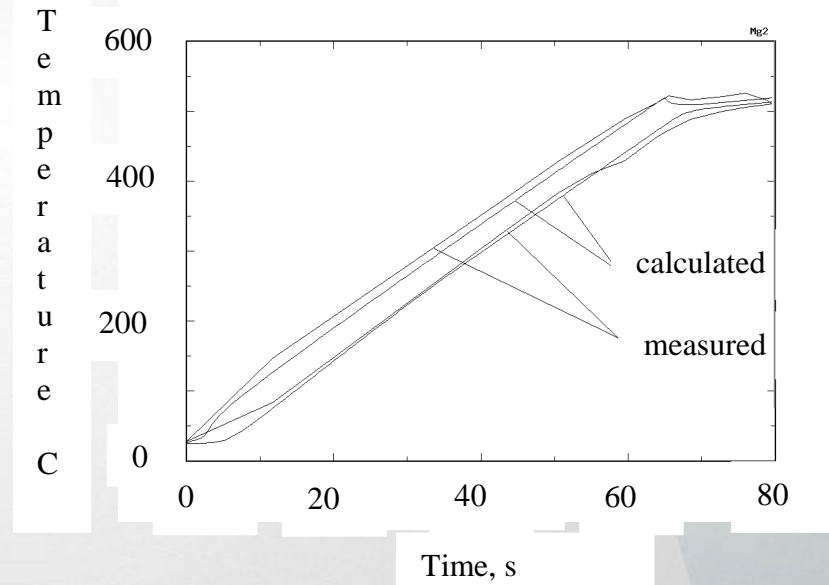
Induction Heating (calcosoft 2D)

Temperature validation

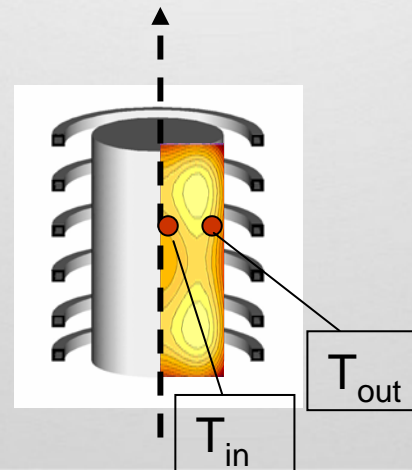


First ramp: 97V, 40s
Second ramp: 47V 32s
(total heating time 72s)

Magnesium feedstock (AZ91)



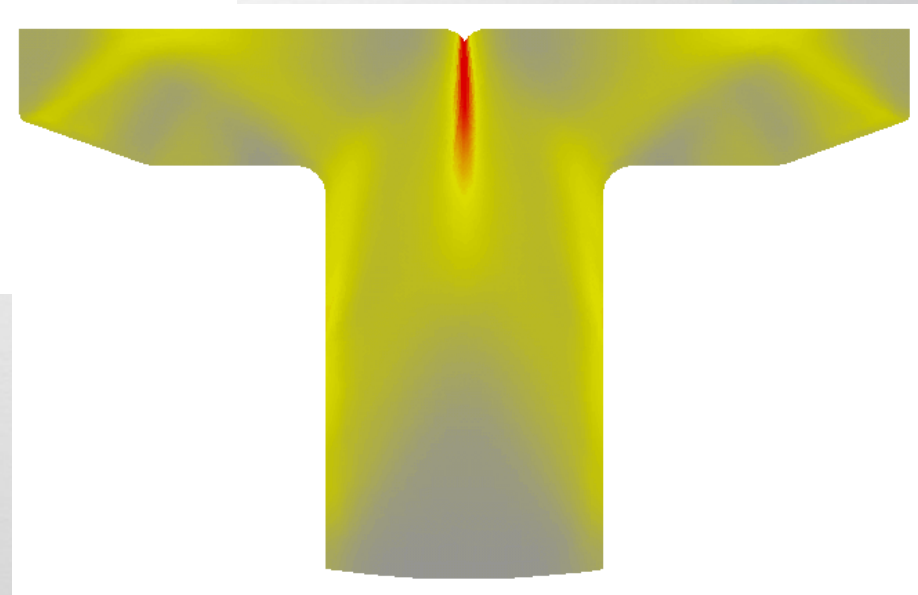
First ramp : 72V, 65s
Second step: 47V, 15s
(total heating time 80s)



Metal Forming Validations

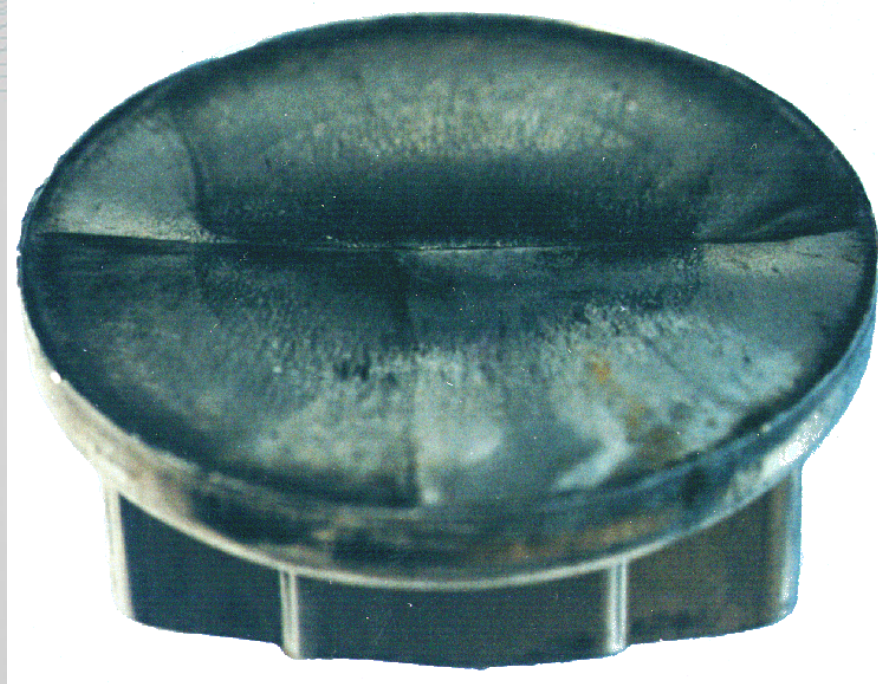
Piping Defect (DEFORM)

- Cold extruded 6062 aluminum pressure valve exhibited a piping defect on the ram/punch contact face



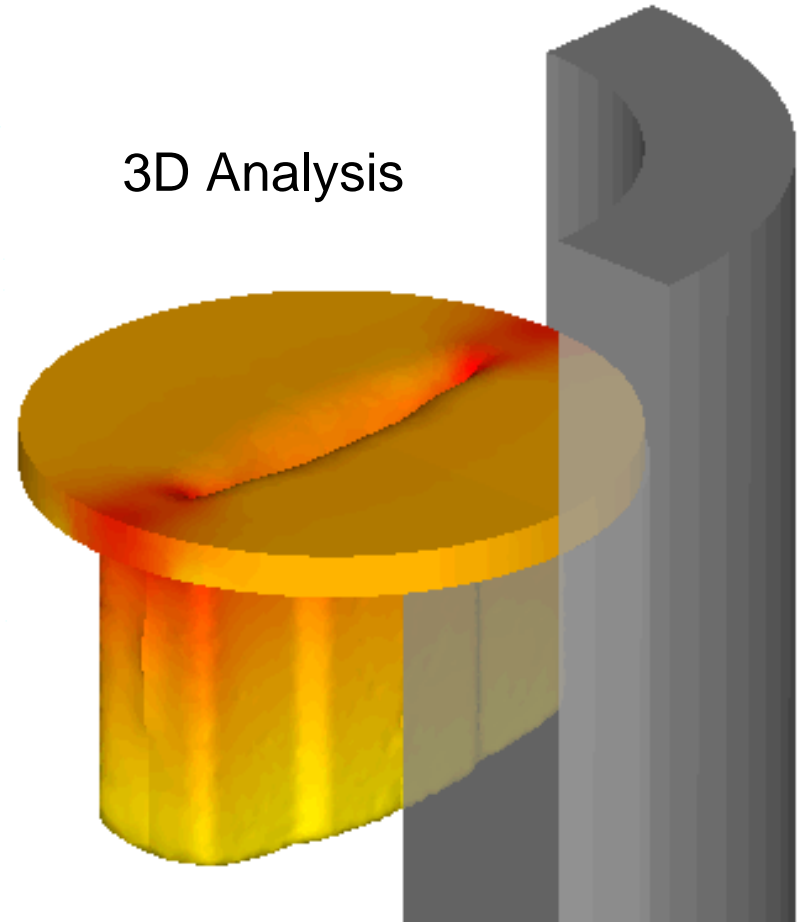
2D metal flow validation

Piping Defect (DEFORM)



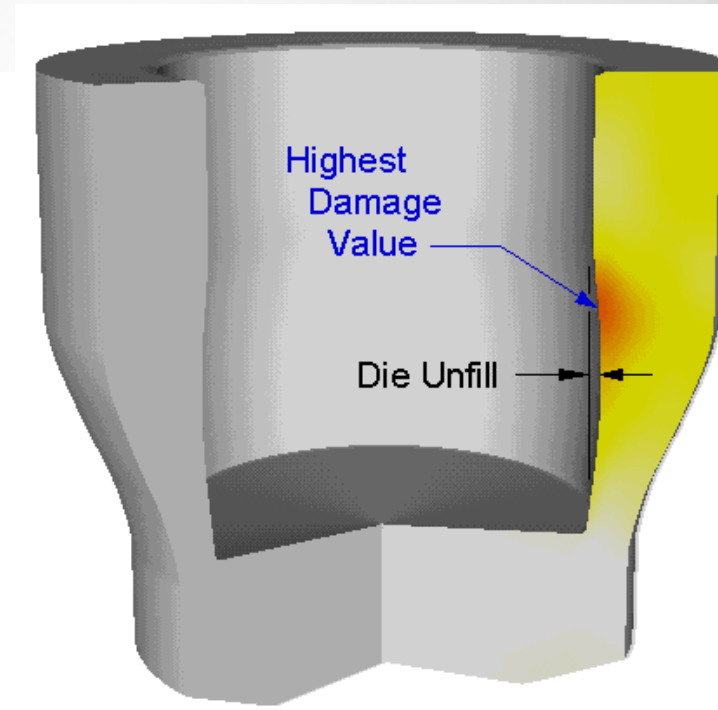
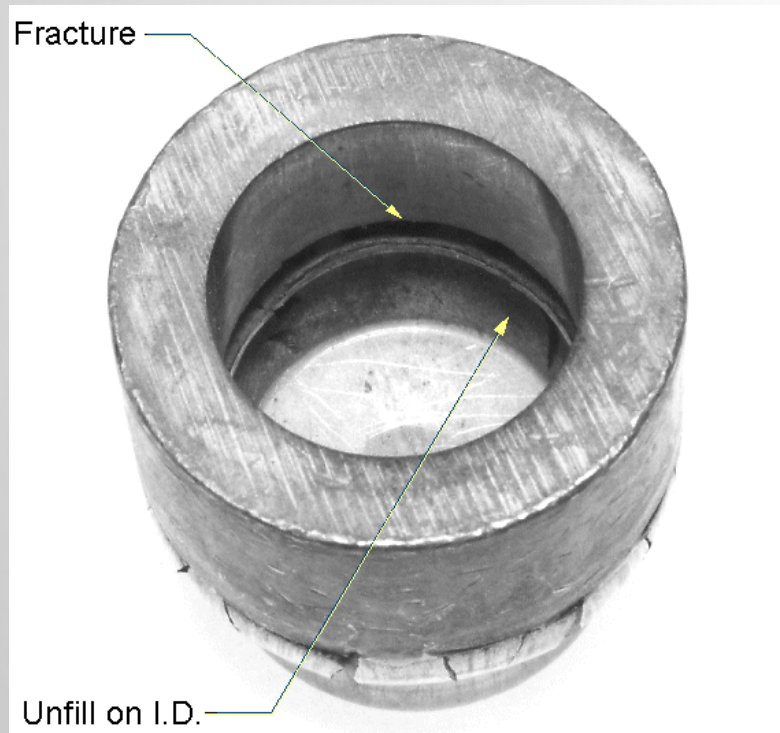
3D metal flow validation

3D Analysis



Fracture and Die Unfill (DEFORM)

- Reverse extrusion component experienced severe fracture during an initial die tryout



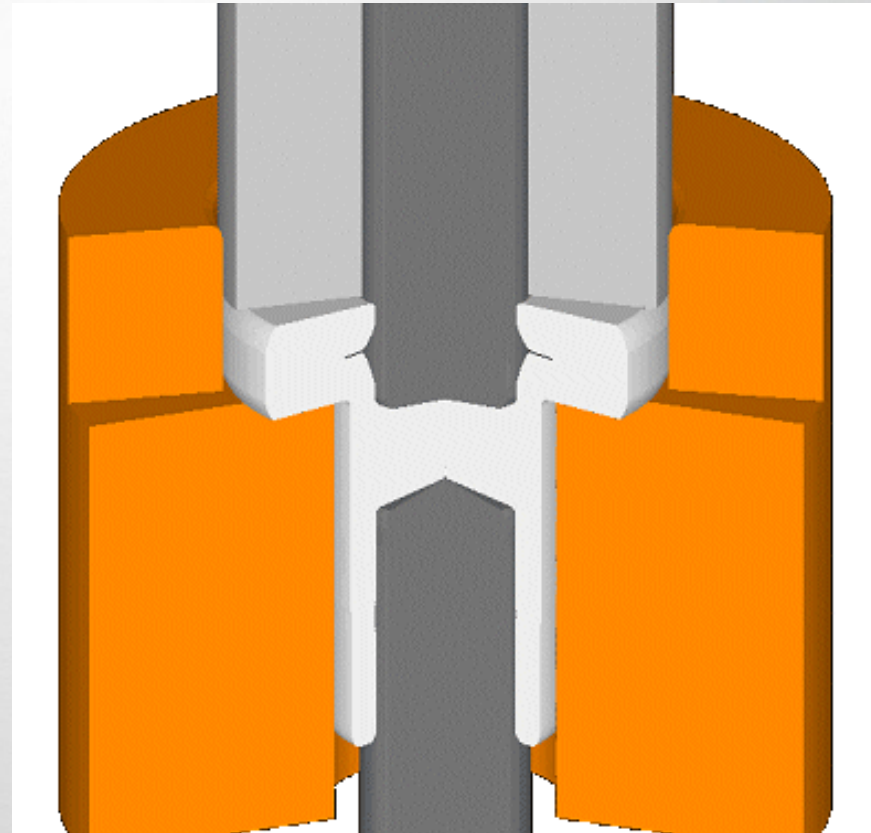
2D metal flow and fracture validation

Lap Defect (DEFORM)

- Cold headed fastener progression experiencing a surface lap defect



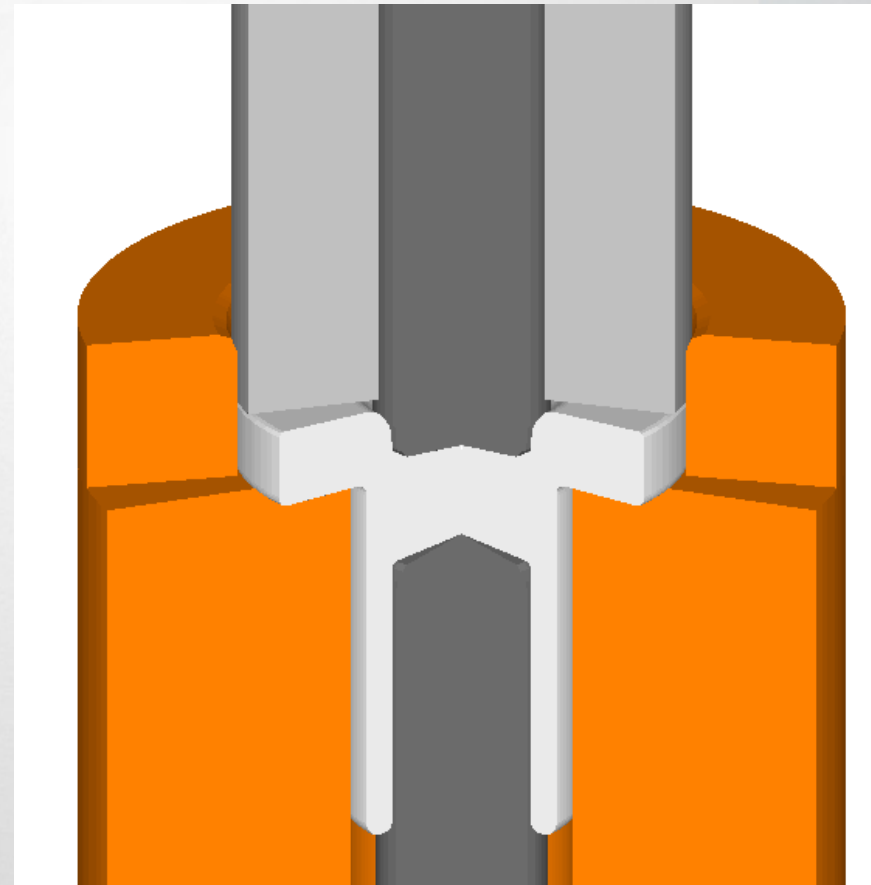
2D metal flow validation



Lap Defect (DEFORM)

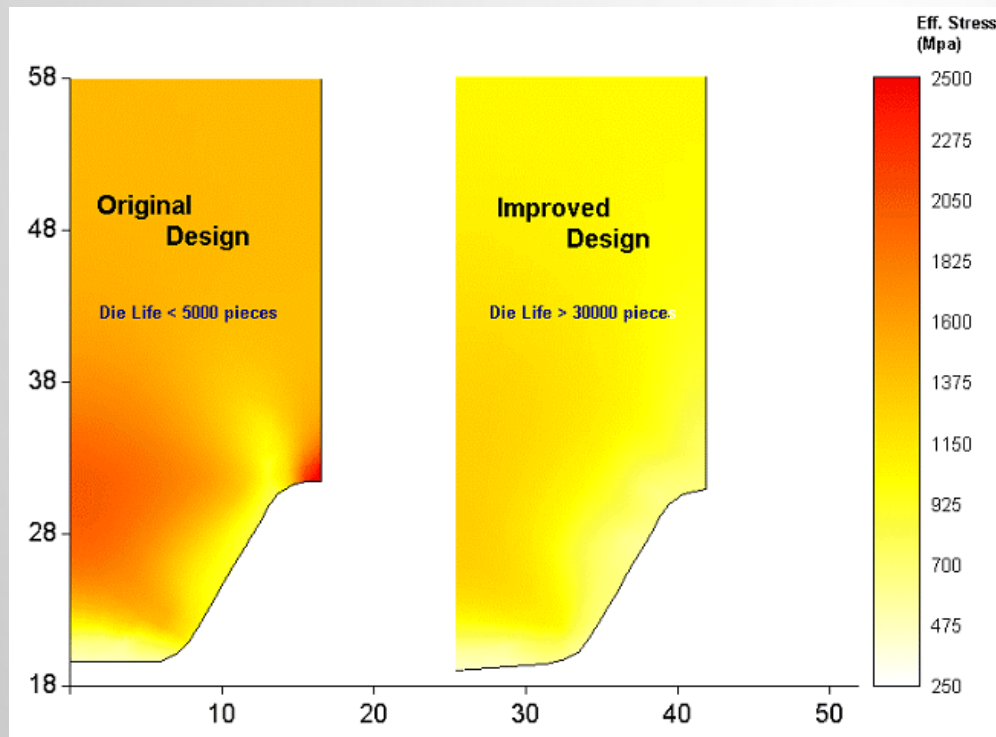


2D metal flow validation



Punch Fracture (DEFORM)

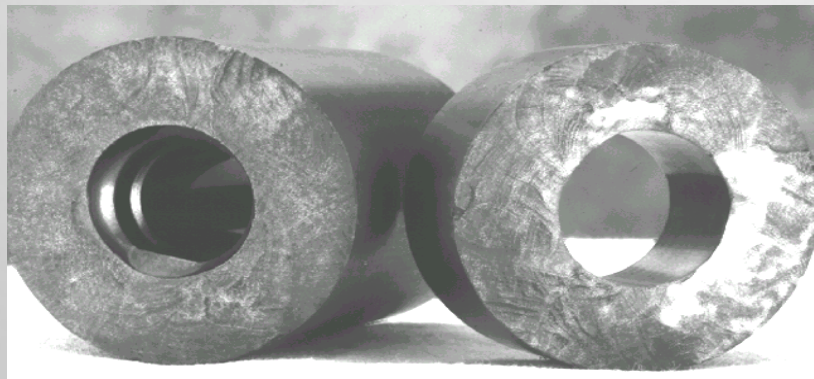
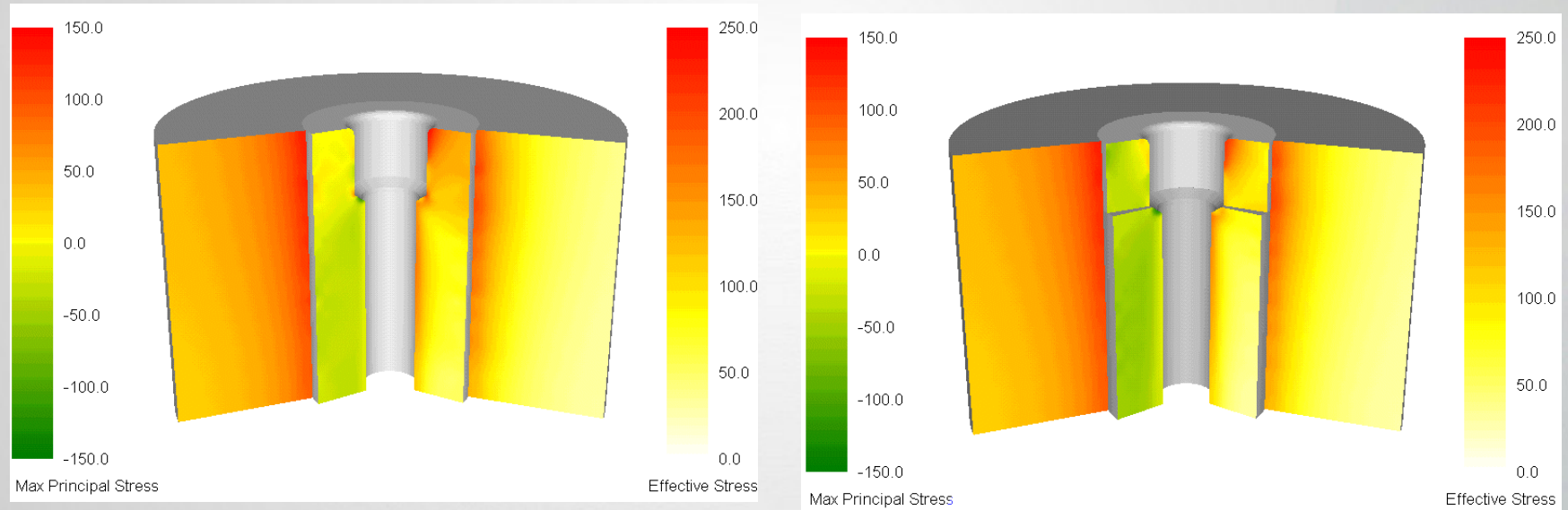
- ◆ Warm forming gear blank.
- ◆ Low cycle fatigue (LCF).



Fracture validation

Die Insert Fracture (DEFORM)

- ◆ Die (insert) failure of a cold formed automotive part.



Fracture validation