Autodesk® Sim 360™ Moldflow ® : The Ultimate Analyst Toolkit

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AGENDA

Who **is Articulinx**

How **we use Autodesk® Sim 360™ Moldflow®**

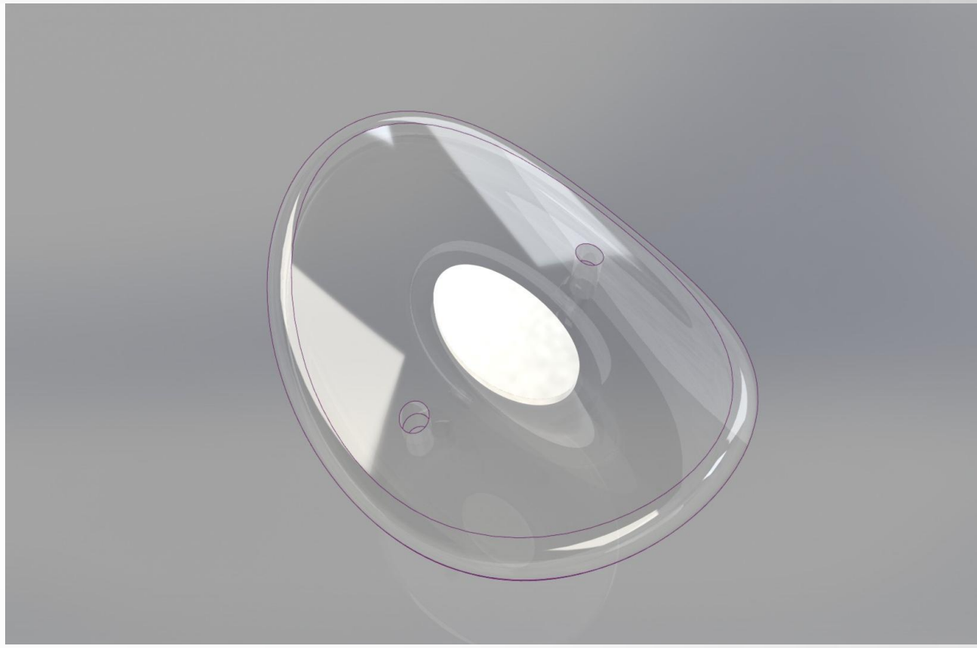
What **Autodesk® Sim 360™ Moldflow® can do**

Articulinx

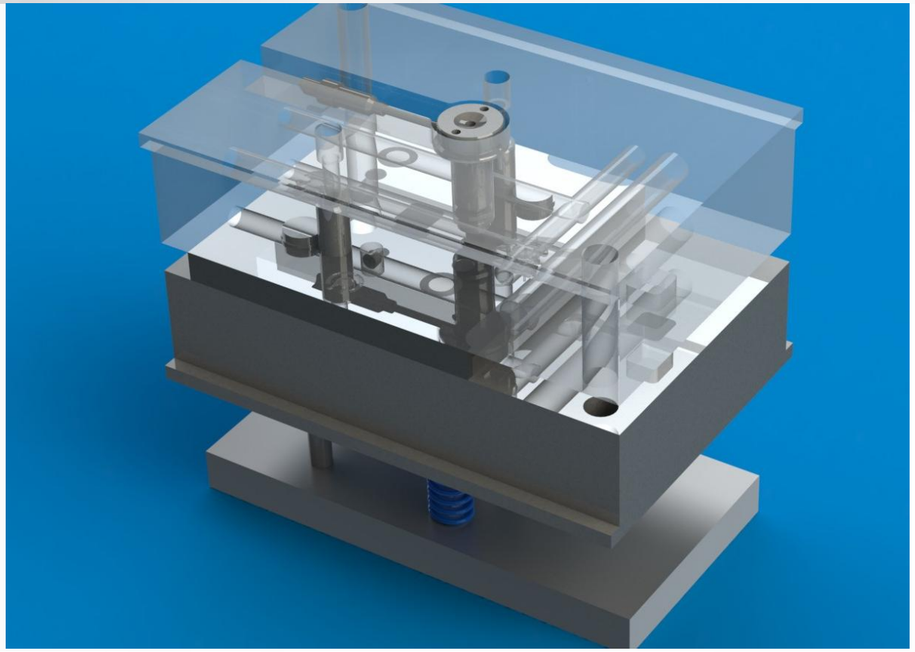
- Start-up medical device company
- Implant to alleviate pain associated with osteoarthritis
- Applicable to the extremities

Articulinx® ICC

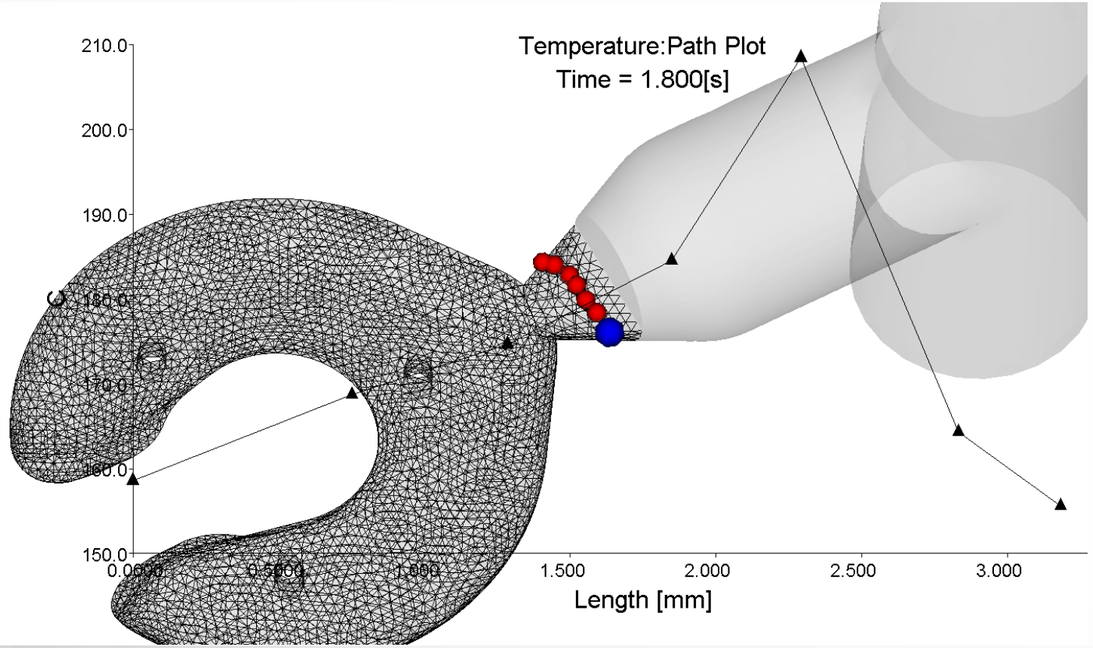
- Intercarpometacarpal Cushion – ICC
- Permanent implant
- Polymer-based
- Design requires insert molding

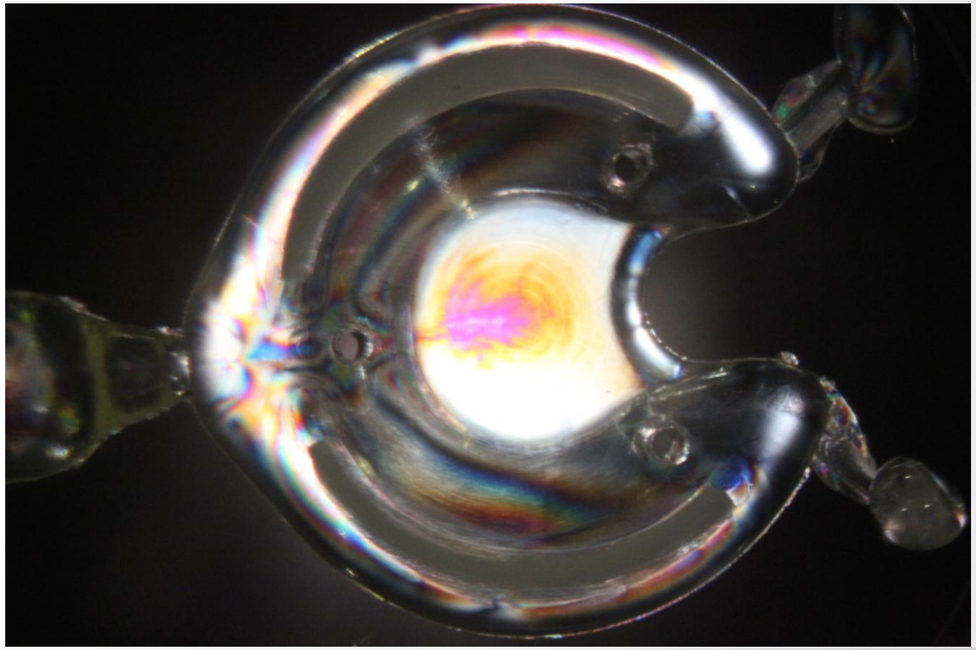


Injection Molding is a Key Process



Knowing our Device is Critical





Why Do We Simulate?

Build Better Products *Faster*

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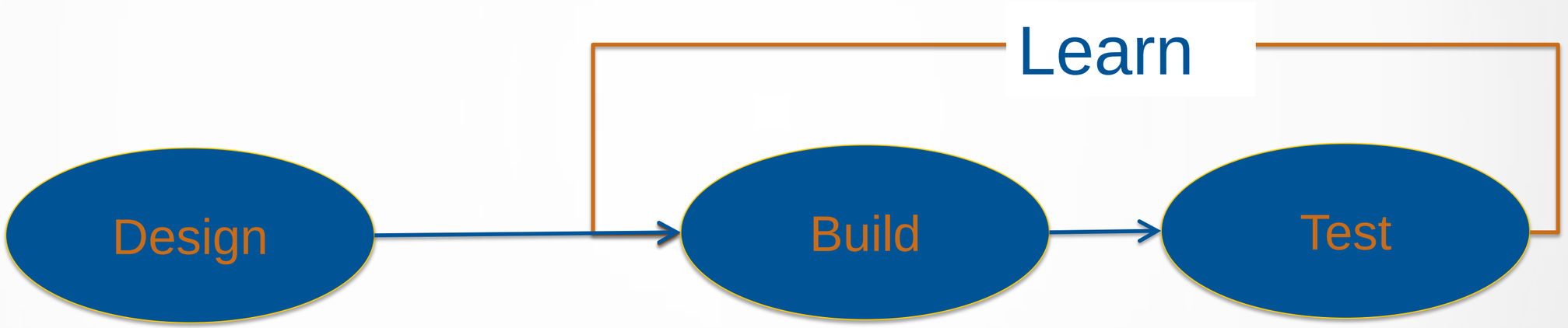
Build-Test Build paradigm is *Status Quo*

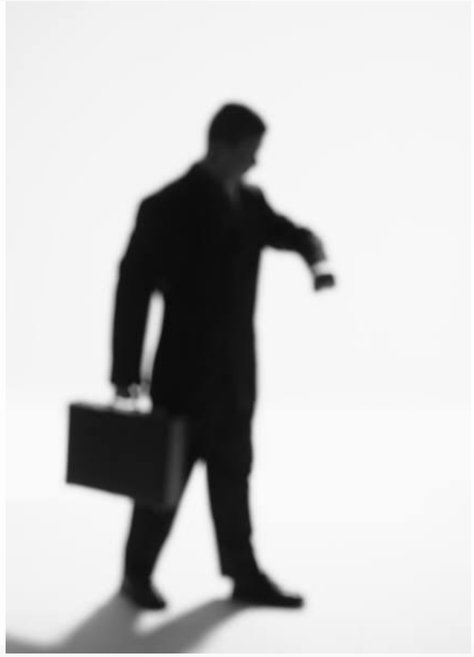


Design-Build-Test-Build Paradigm

- Dependent on the experience and skill of the Designer
- Limited analysis
- Relies on “Rules of Thumb”

Experienced and Talented Design Team

- Good: 10 iterations
- Better: 5 iterations
- Best: 3 iterations



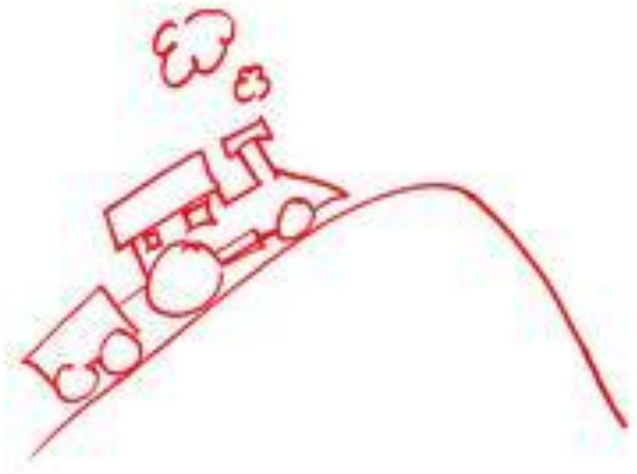
How Does Simulation Improve This?

- Iterate virtually
- Reduce time and cost
- Investigate test results sooner

What Do *You* Need to do This?

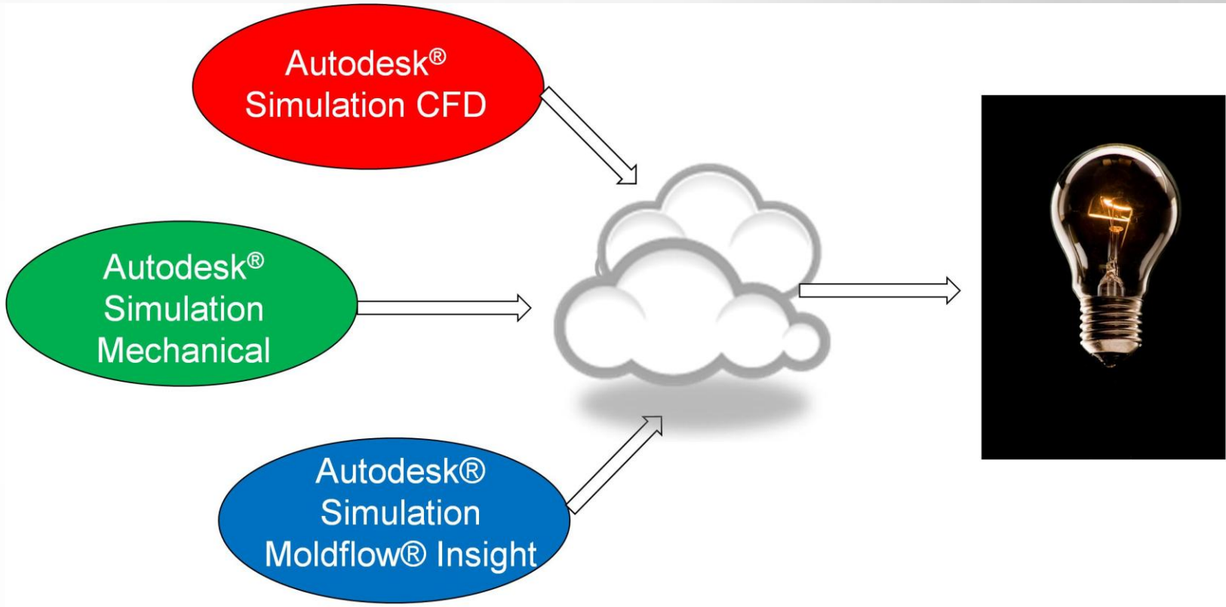
Software

- Accurate
- Easy to use
- Easy to Understand
- Complete



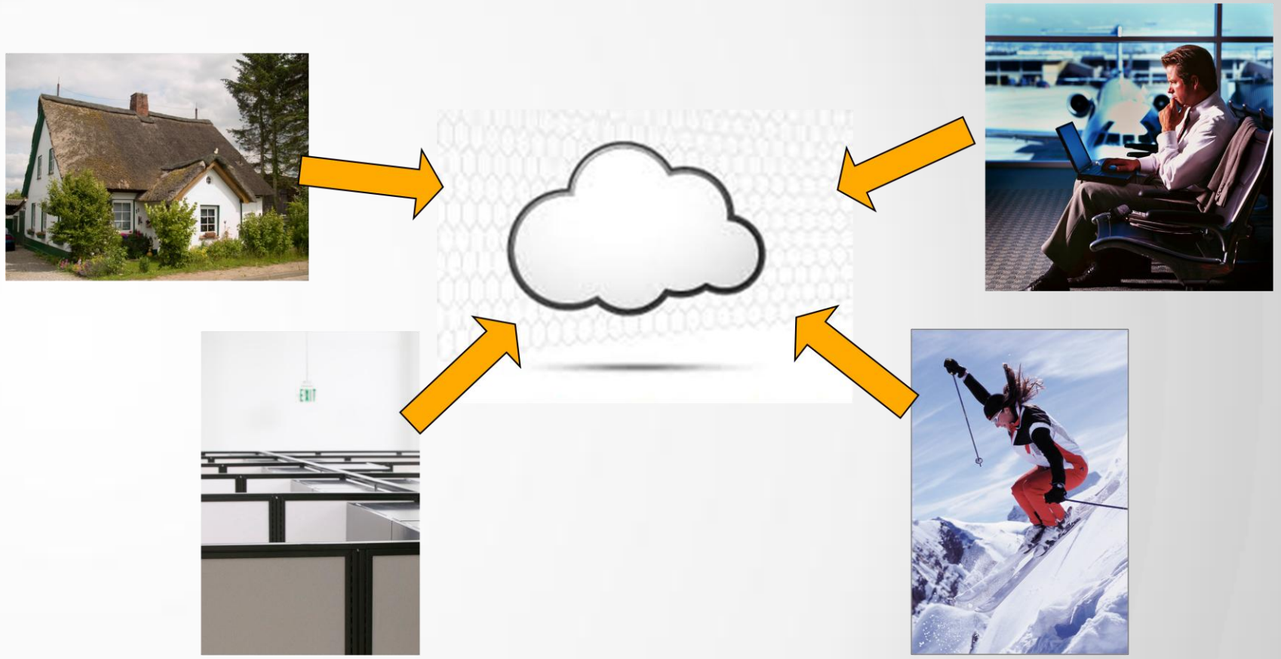
Autodesk® Sim 360™ Moldflow®

- Cloud based
- Complete software solution
- World class security



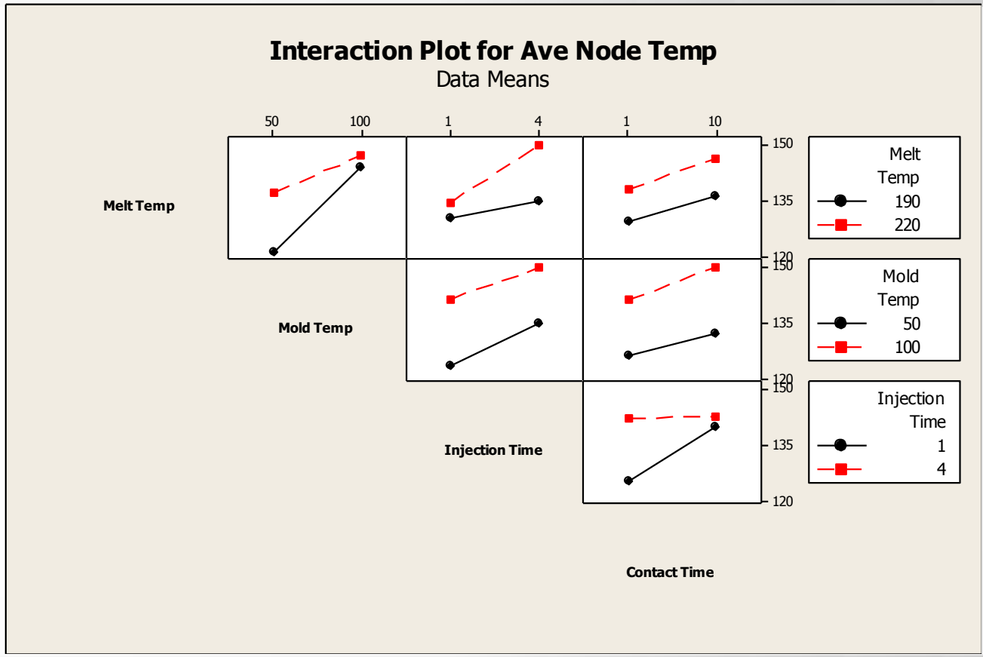
Autodesk® Sim 360™ Moldflow® Advantages

- Flexible Access
- Frees up computer resources
- Lower cost to own



Parallel Based Computations

- DOE with 16 runs
- 1 hour in the cloud = over 30 on the desktop
- Focus on data and results



What *else* Do *You* Need to do This?

- Right people
- Committed management team
- Willingness to change

Why Do We Simulate?

Build *Better* Products Faster

Allows for More Creativity

- Unique designs
- Revolution vs. evolution
- Allows the “goofball” design a fighting chance

Design Evolution vs. Revolution

- Good companies create *evolutionary* designs
- Great companies create *revolutionary* designs
- Autodesk® Sim 360™ Moldflow® gives enables us

New Industrial Revolution

- Additive Manufacturing
- Optimization
- Aesthetics back to design

Image by Thingiverse user Dizingof.

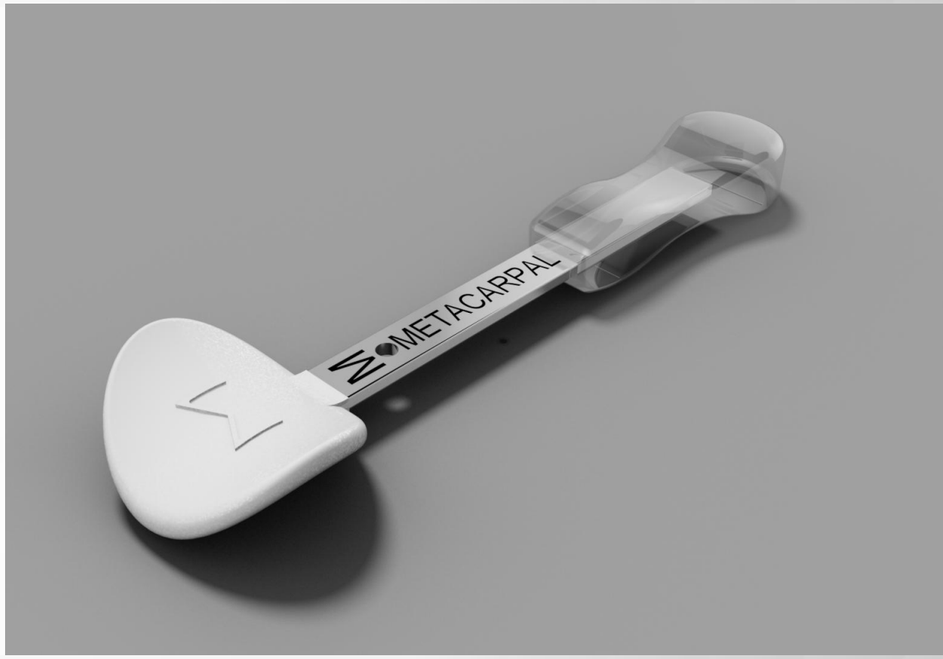
Autodesk® Sim 360™ Moldflow ® : The Ultimate Analyst Toolkit

- Complete set of tools
- Parallel computing, anywhere access, lower cost to own
- Build Better Products Faster

Autodesk® Sim 360™ Moldflow® is the ultimate Analysis Toolkit, enabling us to Build *Better* Products *Faster*

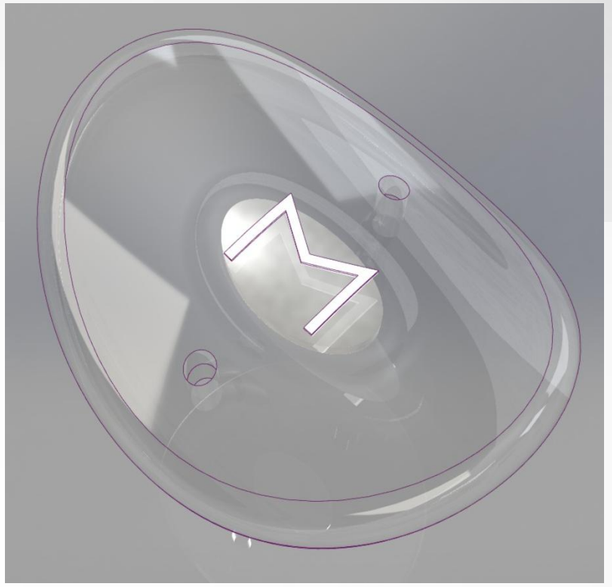
Articulinx® Sizing Trial

- Example of how we use the toolkit in the product development process
- Sizing Trial project
- Compressed timeline



Project Overview

- Accessory to our main product
- Necessitate by product expansion
- Very short development timeline

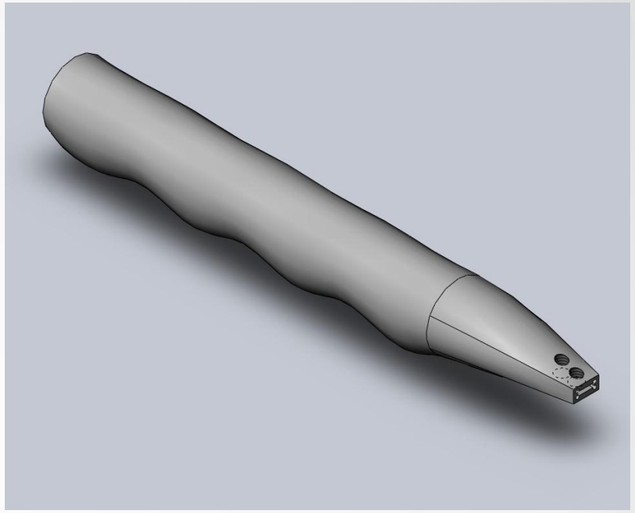


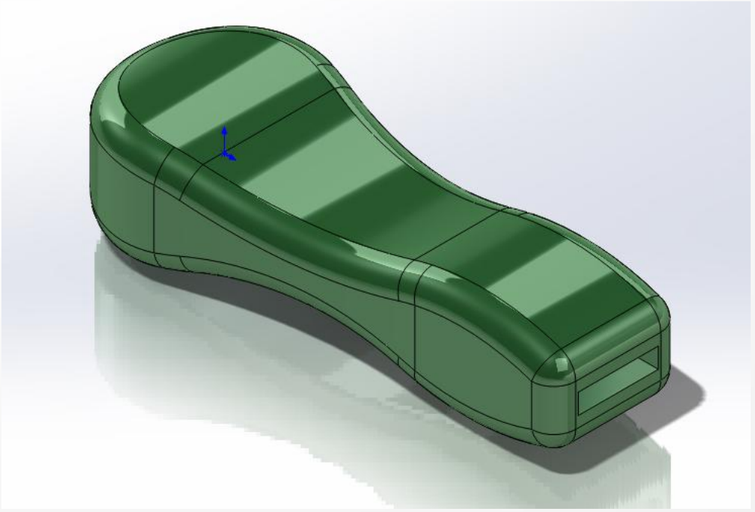
Design Inputs

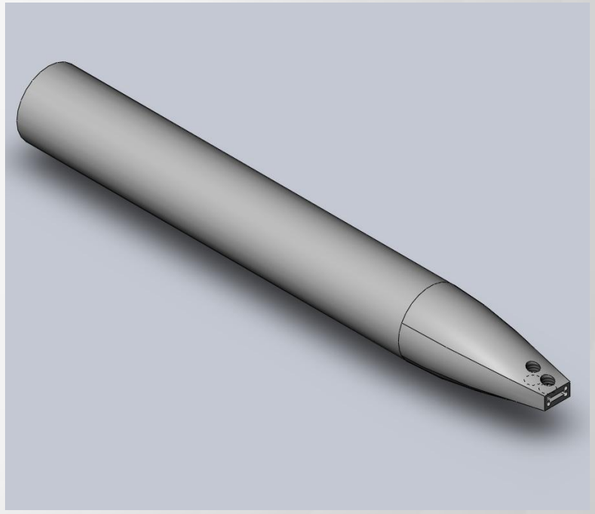
- Define the inputs for the design early
- Adjust as more information becomes available
- Inputs drive our simulation efforts

Handle Design

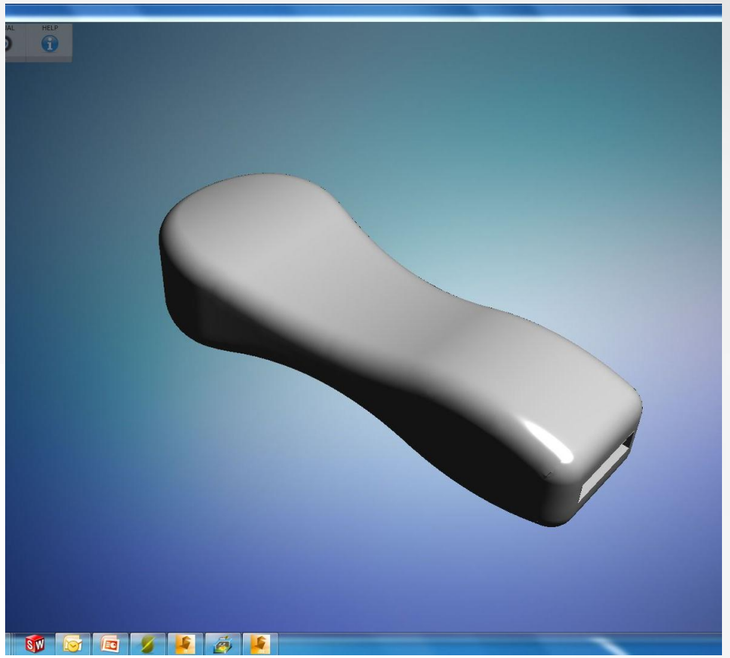
- Several designs considered
- Rapid prototyping
- Assessment of Feel



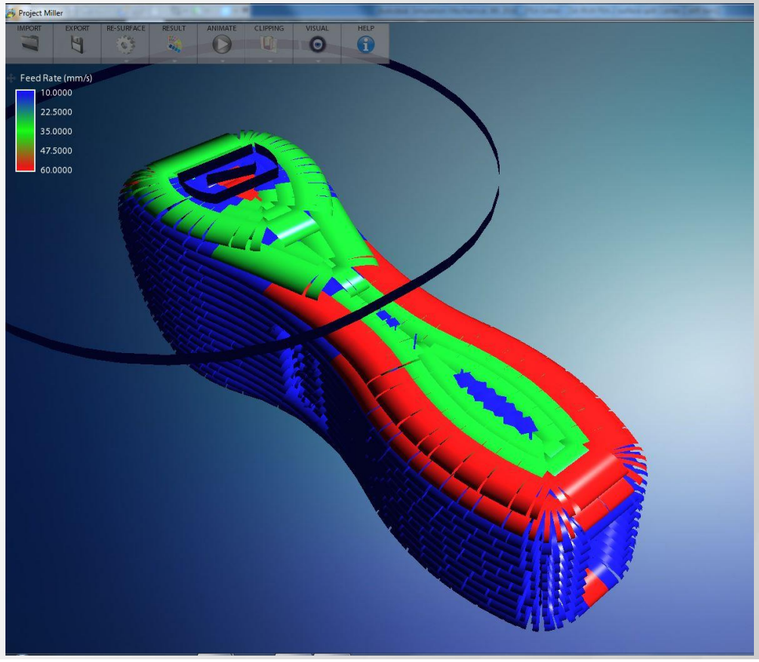




Project Miller

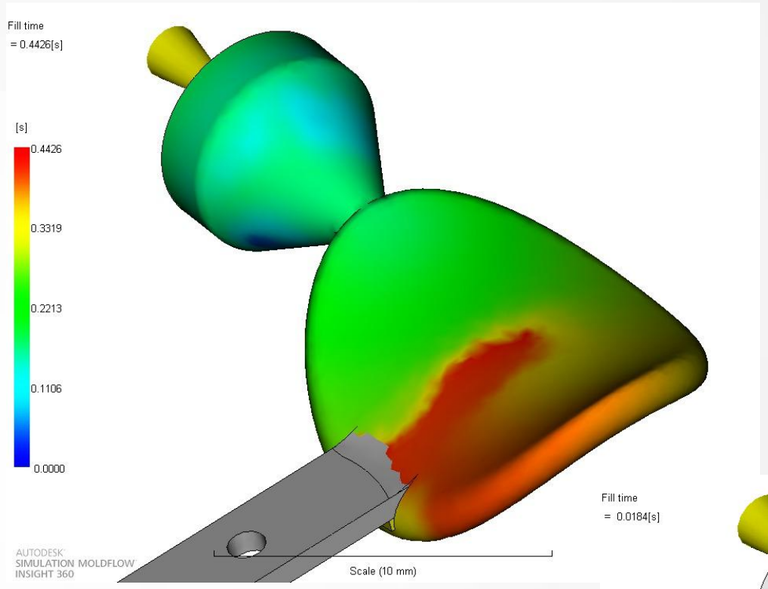


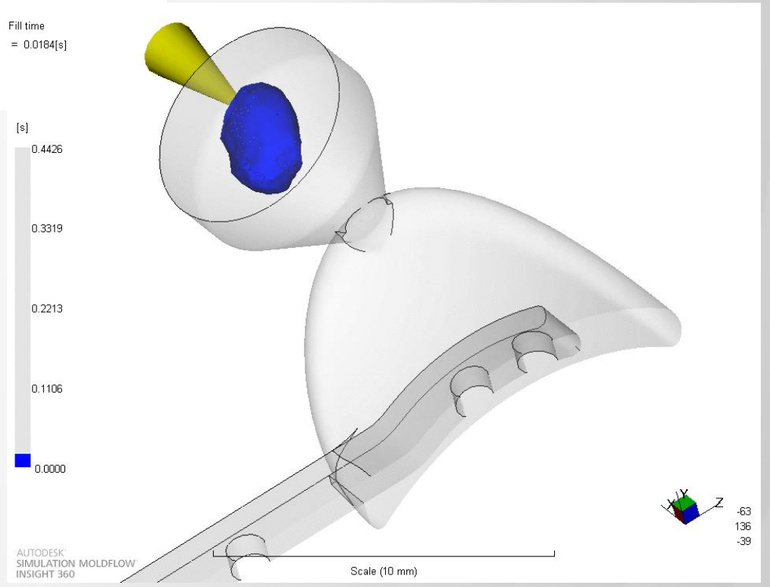
- Can my part be printed?
- How can we improve it?
- *Visualize* the part before you make it



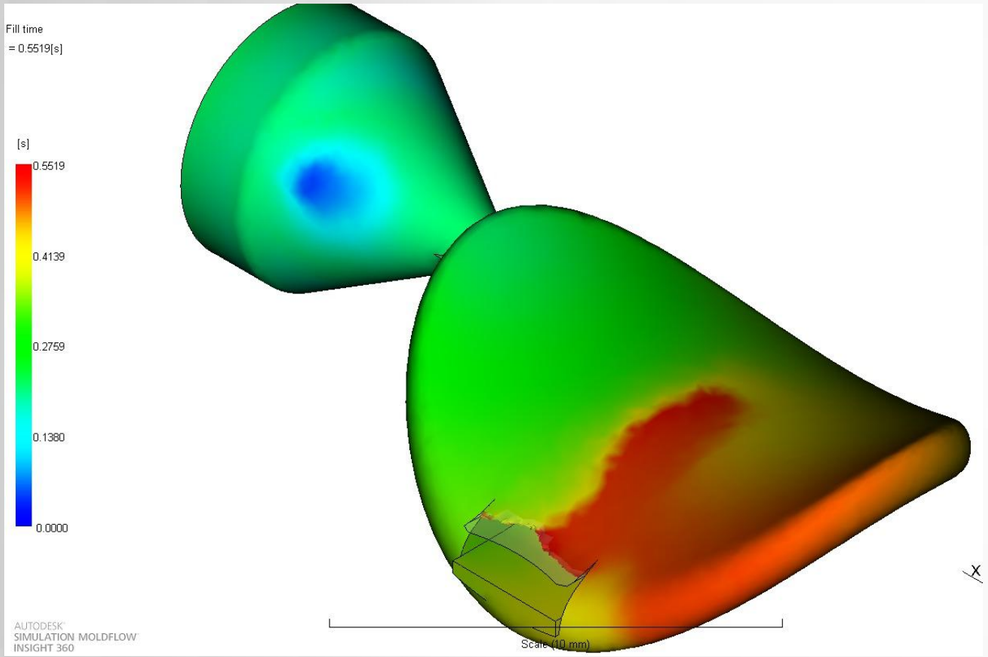
Insert Mold of the Stem to the Trial Device

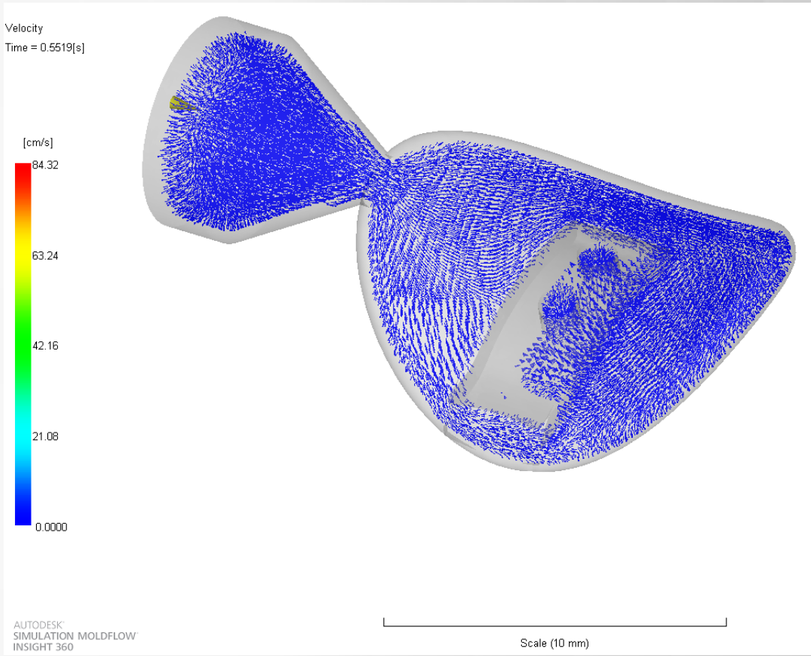
- Moldflow
- Optimize stem
- Optimize mold parameters





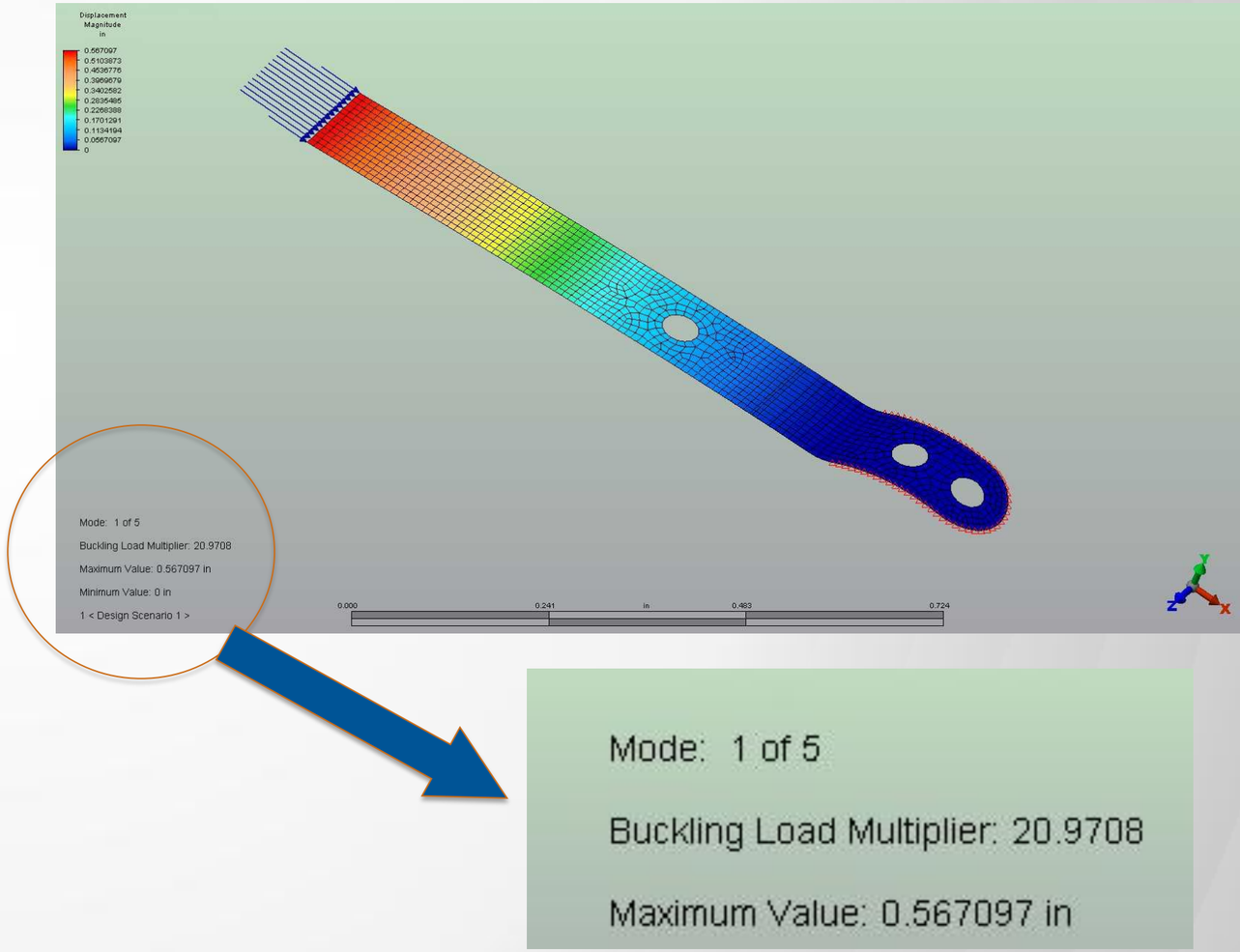
Mold works first shot!





Autodesk® Sim 360™ Mechanical Stem Design

- Buckling analysis performed on the stem
- Optimize cross section and end bends
- These results are inputted back into Moldflow

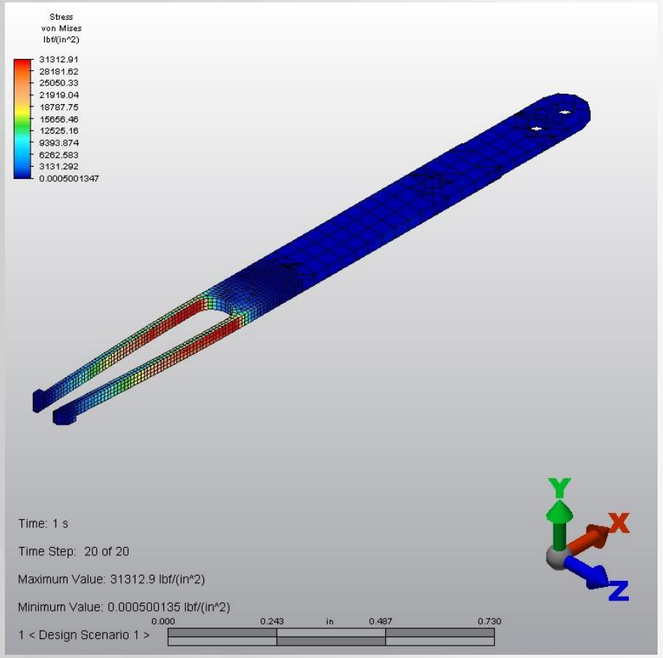


Mode: 1 of 5

Buckling Load Multiplier: 20.9708

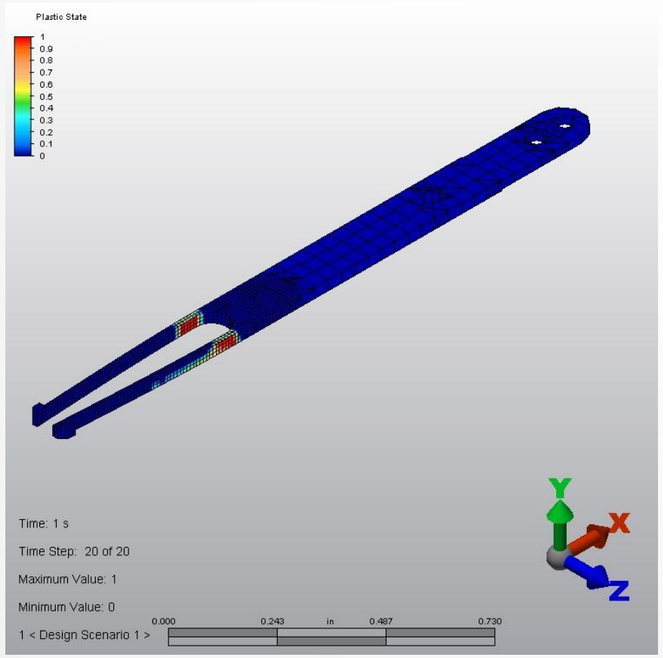
Maximum Value: 0.567097 in

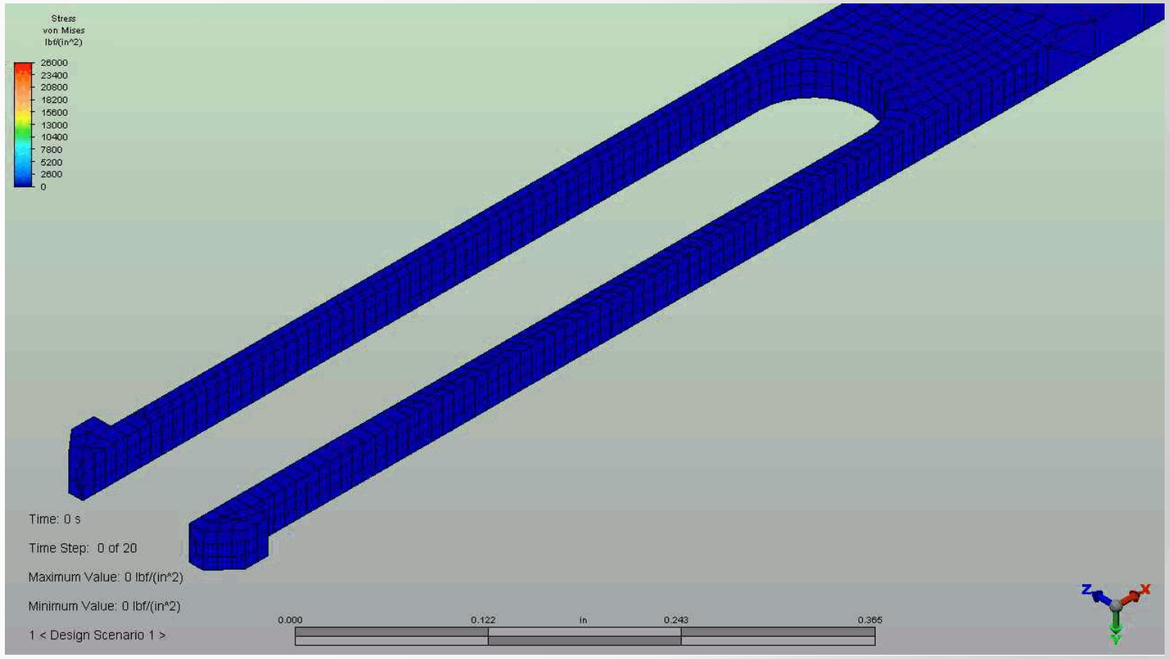
Autodesk® Sim 360™ Mechanical Snap Fit Analysis



Von Misses Stress

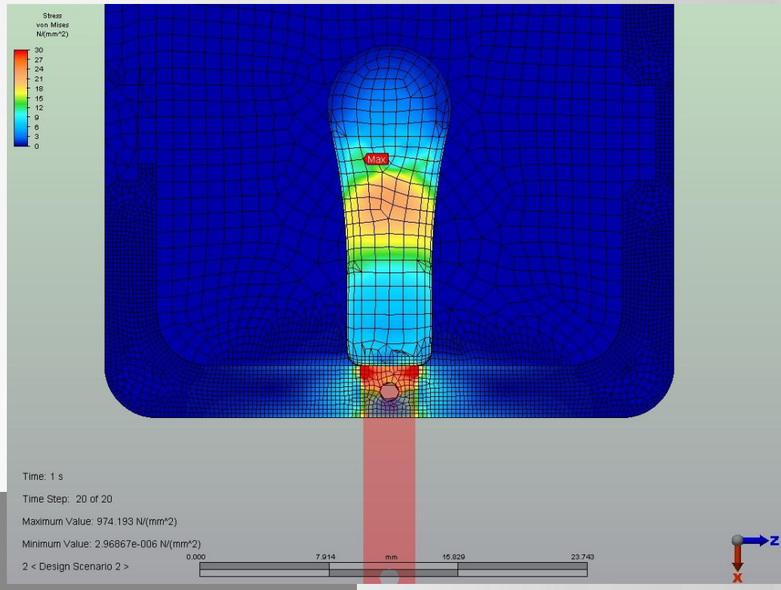
Plastic State

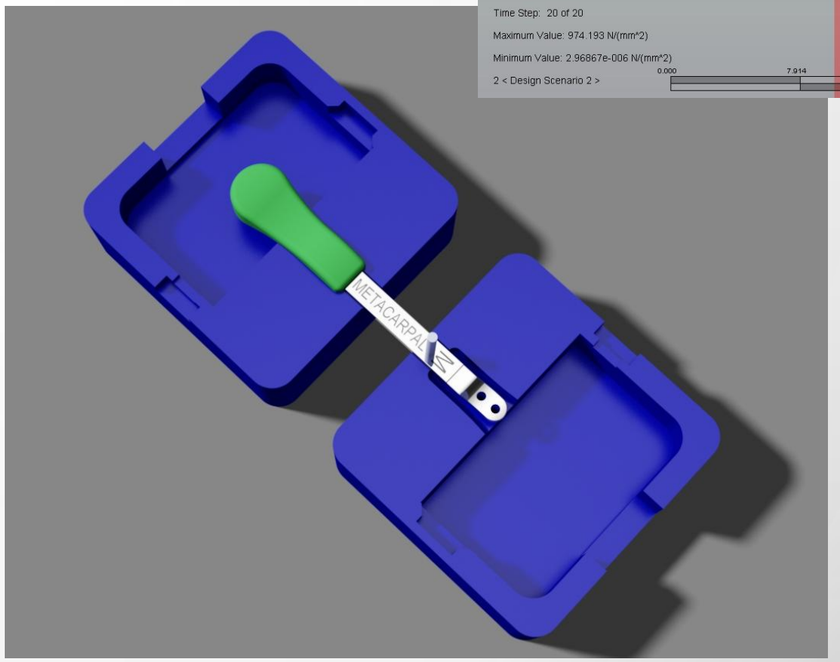




Test Fixture Development

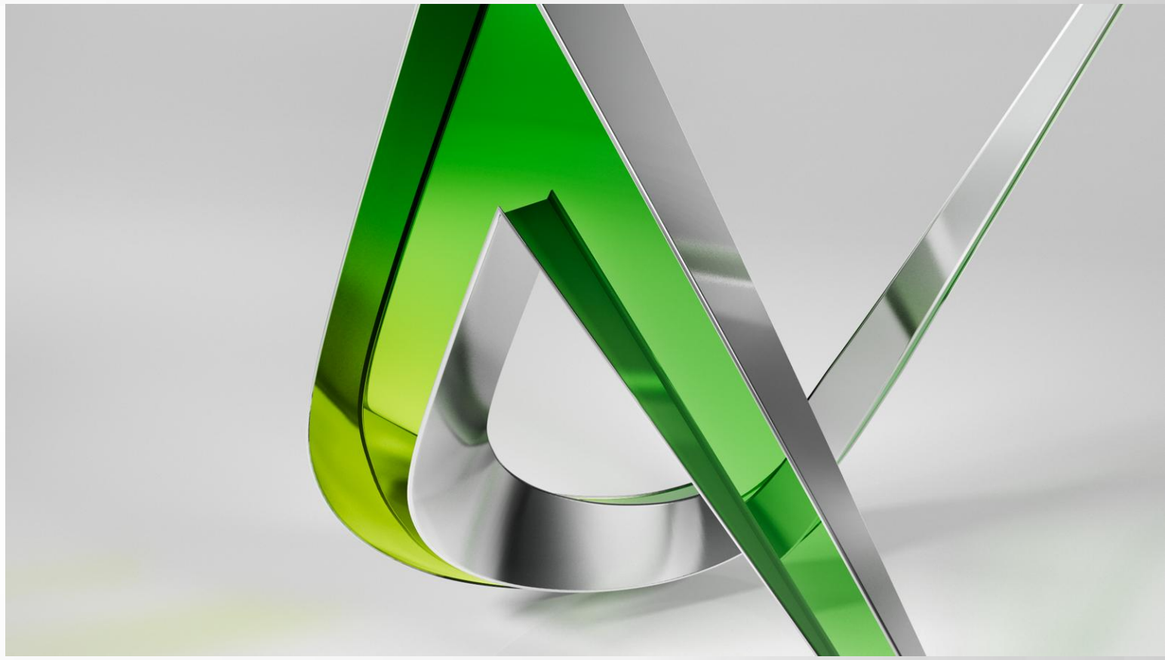
- Make custom text fixtures using 3D printing technology!
- FEA assures that the parts will function





Beyond Autodesk® Sim 360™ Moldflow®

- Autodesk® Showcase®
- Autodesk® Fusion 360™
- Autodesk® ForceEffect™



Autodesk® Showcase®

- Marketing material
- Instruction for use
- User facing materials

Figure 3: ICMC Sizing Trial

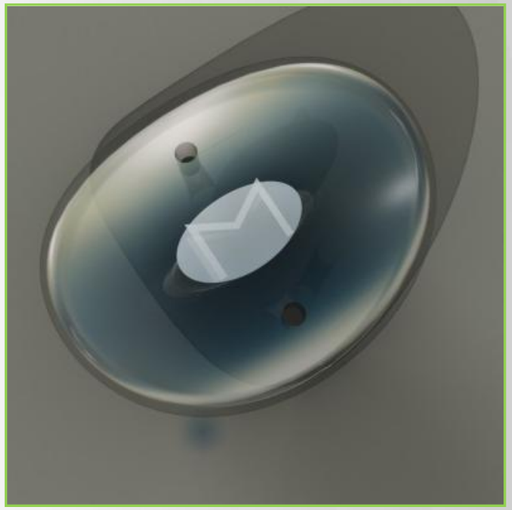


Figure 1: ICMC (InterCarpoMetacarpal Cushion)