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

Richard Lilly
Director, Research and Development
Articulinx®
richardlilly@sbcglobal.net
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*
Build Better Products *Faster*

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

Plastic State

Von Misses Stress
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

“Trial Device”

Figure 1: ICMC (InterCarpoMetacarpal Cushion)