

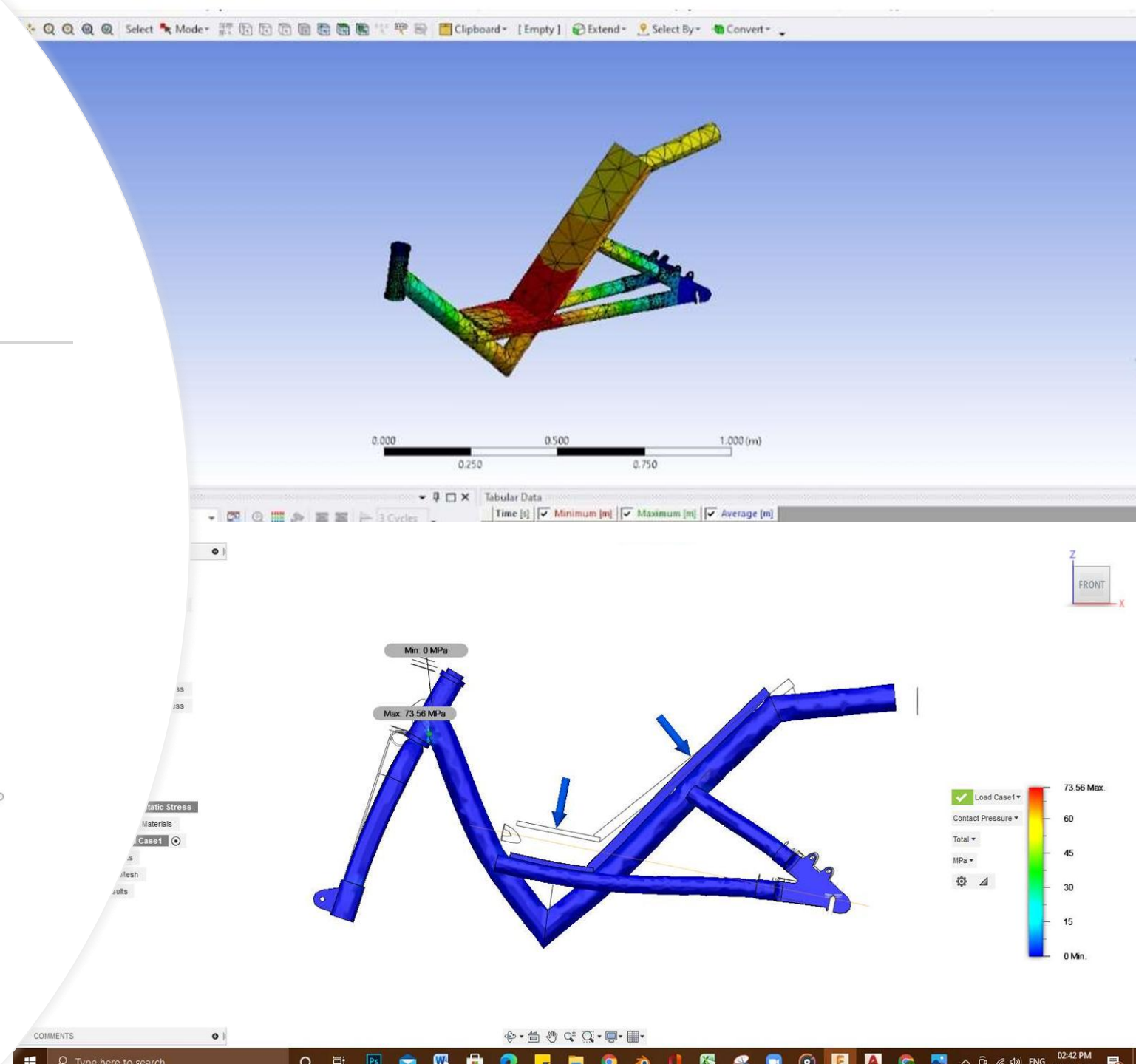
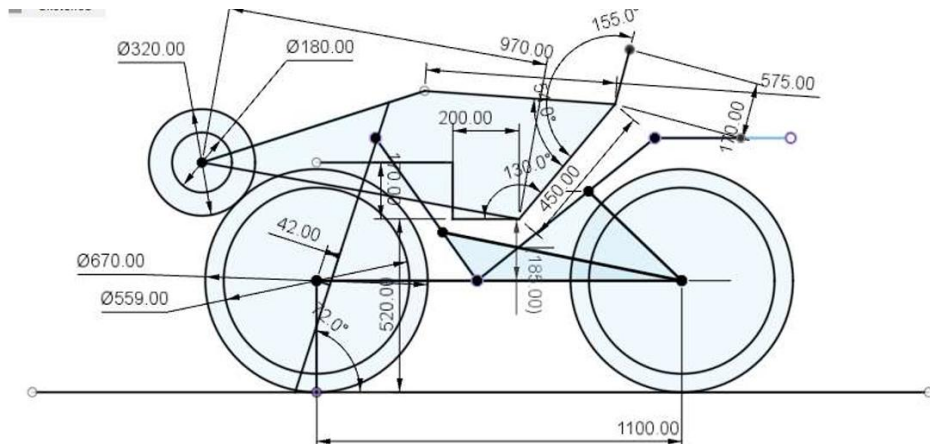
Bamboo Bicycle Frame

Bamboochi Bicycles

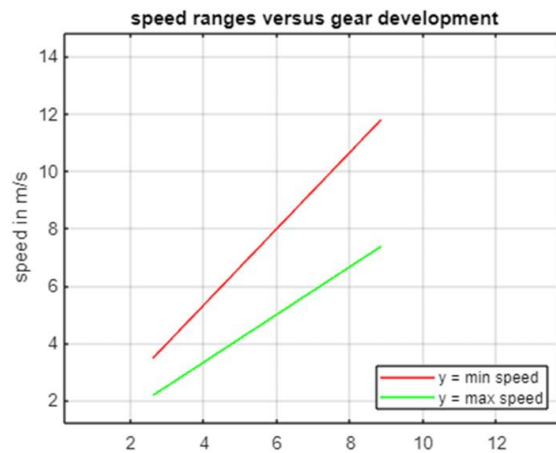
SolidWorks Model



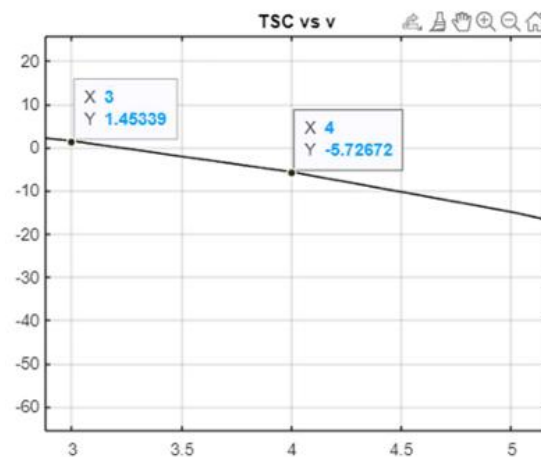
Geometric Design and Analysis



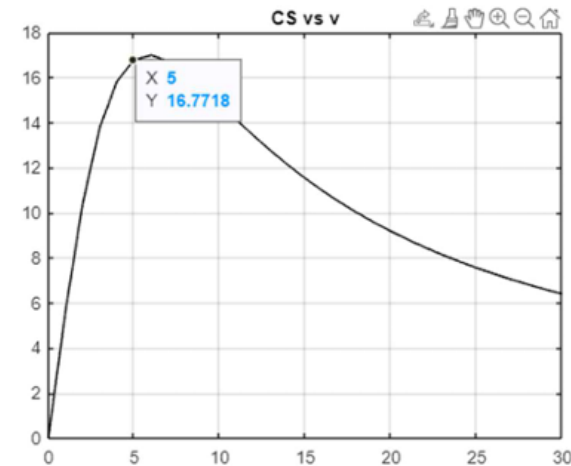
Patterson's Method



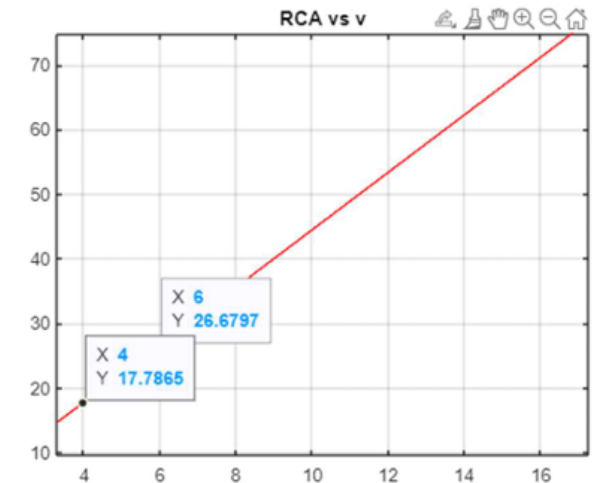
Speed v/s Gear development



Tortional Spring Constant v/s Velocity



Control Sensitivity v/s Velocity



Roll Control Authority v/s Velocity

Internship Projects

Tioga Cardiovascular

Catheter steering Inspection Fixture (Pass/Fail Functional test)

Requirement

Catheter bends at 120 degrees for valve deployment

Obstacles

Printing time

Radius of curvature measurement

Catheter alignment

Fixture Stability

Solution

SLA Printed fixture

Sturdy

Easy to use

Repeatable design and Process

Create Approval Requests, Equipment Specification and Equipment Qualification for documentation

Impact

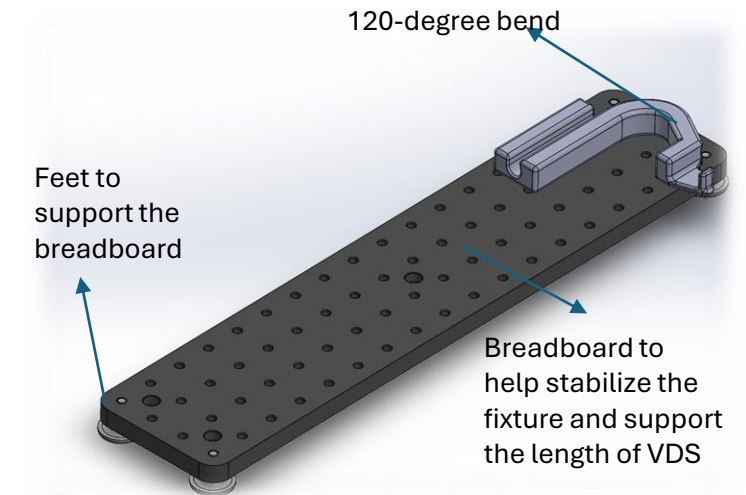
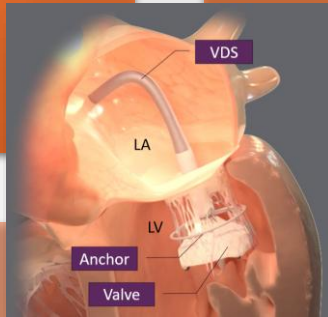
Efficient Inspection Method Implementation

Functional understanding of catheter Assembly

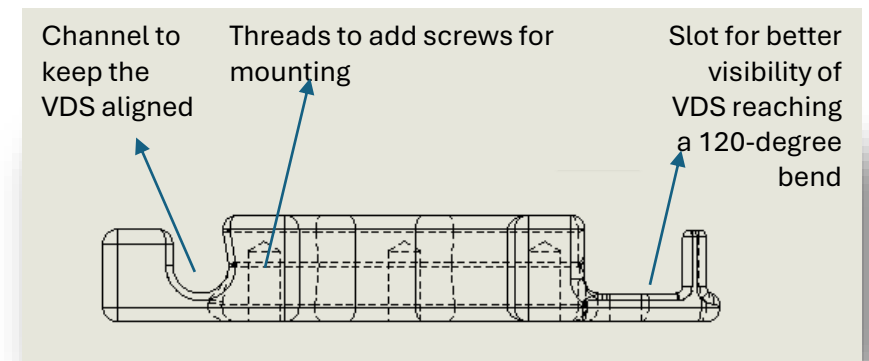
Learnt about different printing materials

First Fixture Printed 😊

Successful manufacturing, and on time implementation for use in Clean Room Environment.



Picture of the fixture



Catheter Handle Locking Mechanism

Problem

Yoke didn't clamp to lock Carriage handle assembly to prevent catheter handle assembly rotation



Obstacles

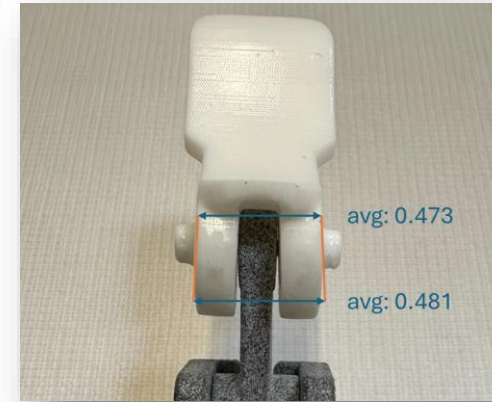
Cam dimensions incorrect
Time Constraint
Unknown inspection dimension
Supplier part

Solution

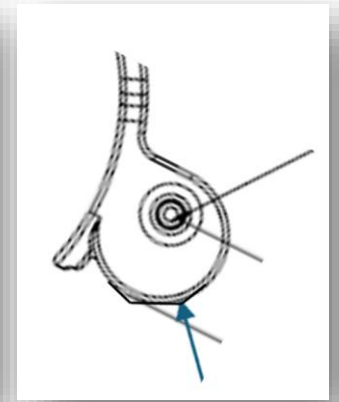
Re-work the current lot
Add inspection dimension
Change print orientation to avoid warpage at assembly location
Create MPI for rework

Impact

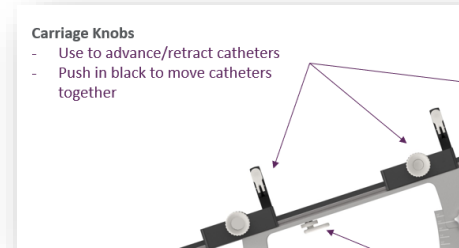
Saved future re-work requirements
Understood factors affecting 3D printing
Redefined cam profile inspection requirement



Flanged cam



Incorrect cam profile printed



Restricted cam movement



Vertical Catheter Braiding Machine Fixture

Problem

Incorrect Braid Pattern due to Oscillation of long mandrels



Solution

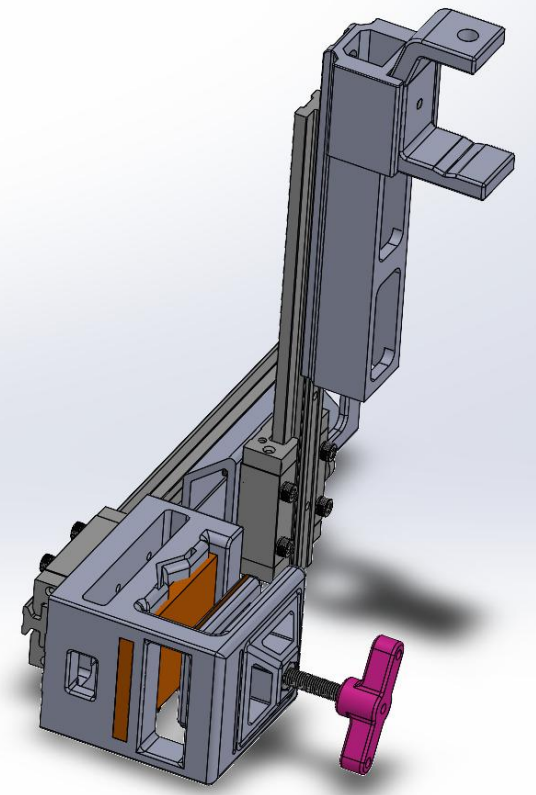
Dynamic Fixture to grip mandrels
Fixture to correct Wire Alignment
AR, EQ, ES for documentation purposes

Obstacles

Printing time
Dimensions and Cups
Silicone gripping mechanism
Diameter change
Space constraints

Impact

Cost savings compared to supplier's quote
Reduced rework/ rejects for braid PPI
First communication with equipment supplier
Improved fixture and process manufacturability.

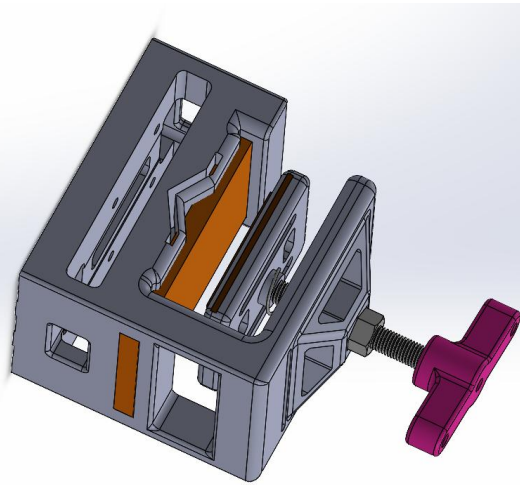
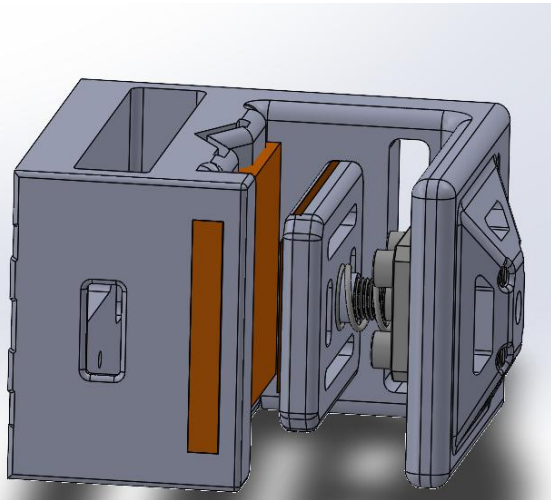


Vertical Catheter Braiding Machine Fixture

Dimensioned to assure correct assembly

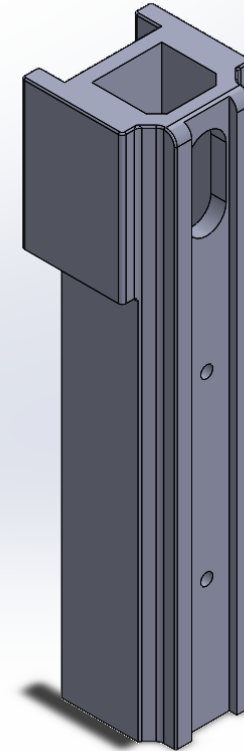
Slotted design to hold silicon without the need to gluing it

Slots to reduce material consumption and print time

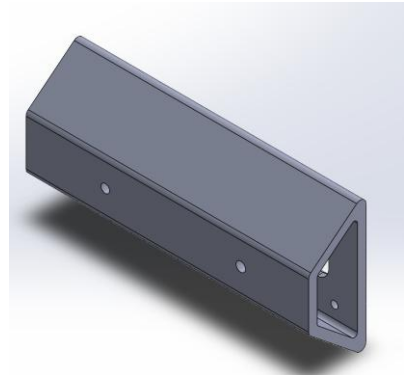


Linear coupling to facilitate sliding motion

Springs and adjustable knob to accommodate diameter change over length



Slots to prevent cup formation



Slots for better visibility during assembly

Recesses to prevent vibrations