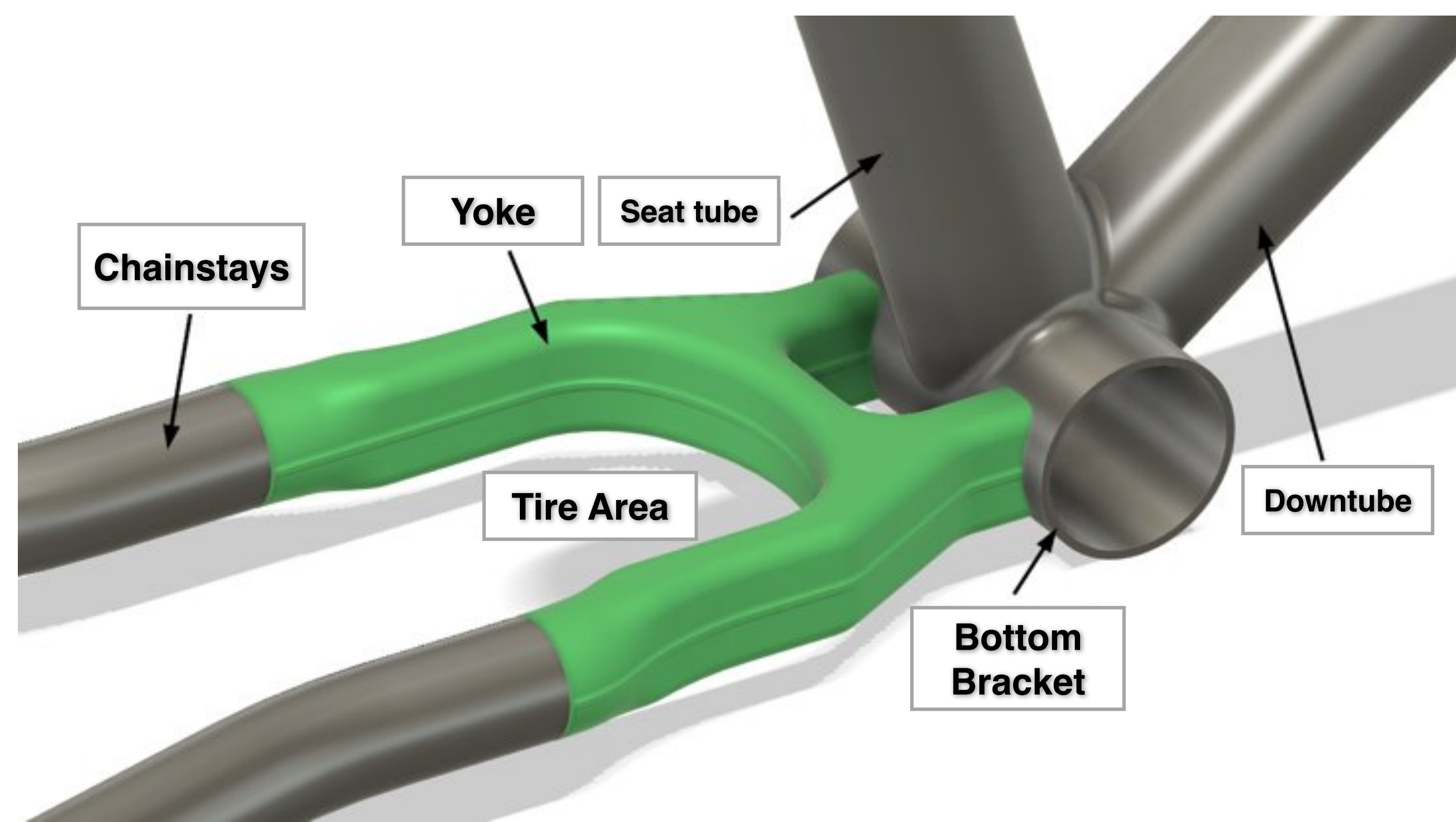


Parametric Bicycle Yoke

Robby Harrigan, Walter Minehart, Jordan Olson, Colin Reay



Stakeholders: Bike Builders' Club
Problem: Existing yokes are expensive and lack configurability
Deliverables: Yoke design, prototype and manufacturing equipment



CAD Design and Drawings



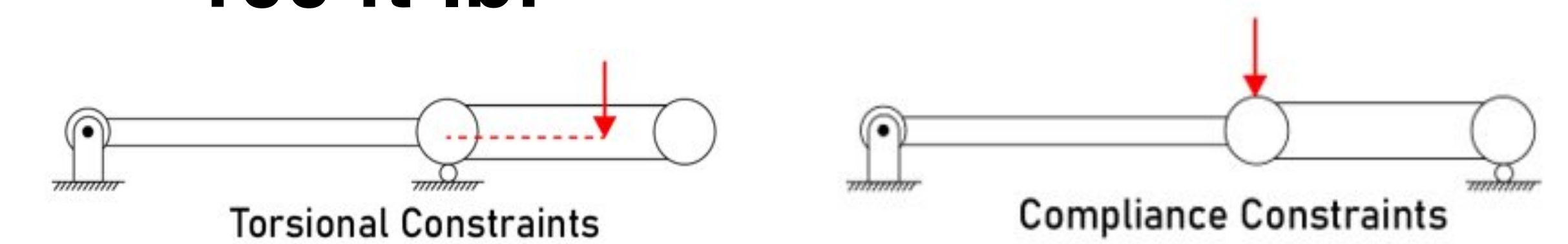
Prototype Yoke

Bicycle Built with Yoke

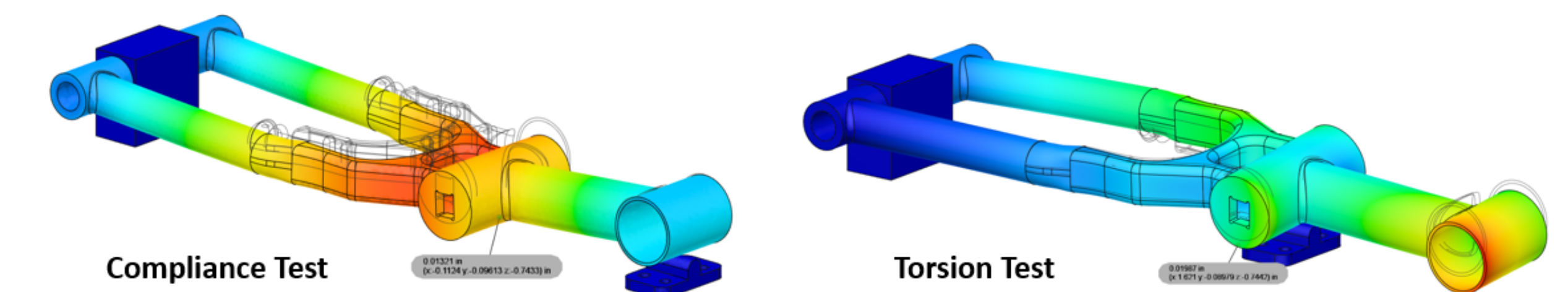


Torsional Pedal Load, 100 ft-lbf

Vertical Seat Load, 77 lbf



Fusion 360 FEA



Structural Validation



Torsion Testing

Compliance Testing

Deflection Comparison

Test	FEA	Testing	% Dif.
Torsional Load	.016"	.010"	37.5
Vertical Load	.010"	.006"	40

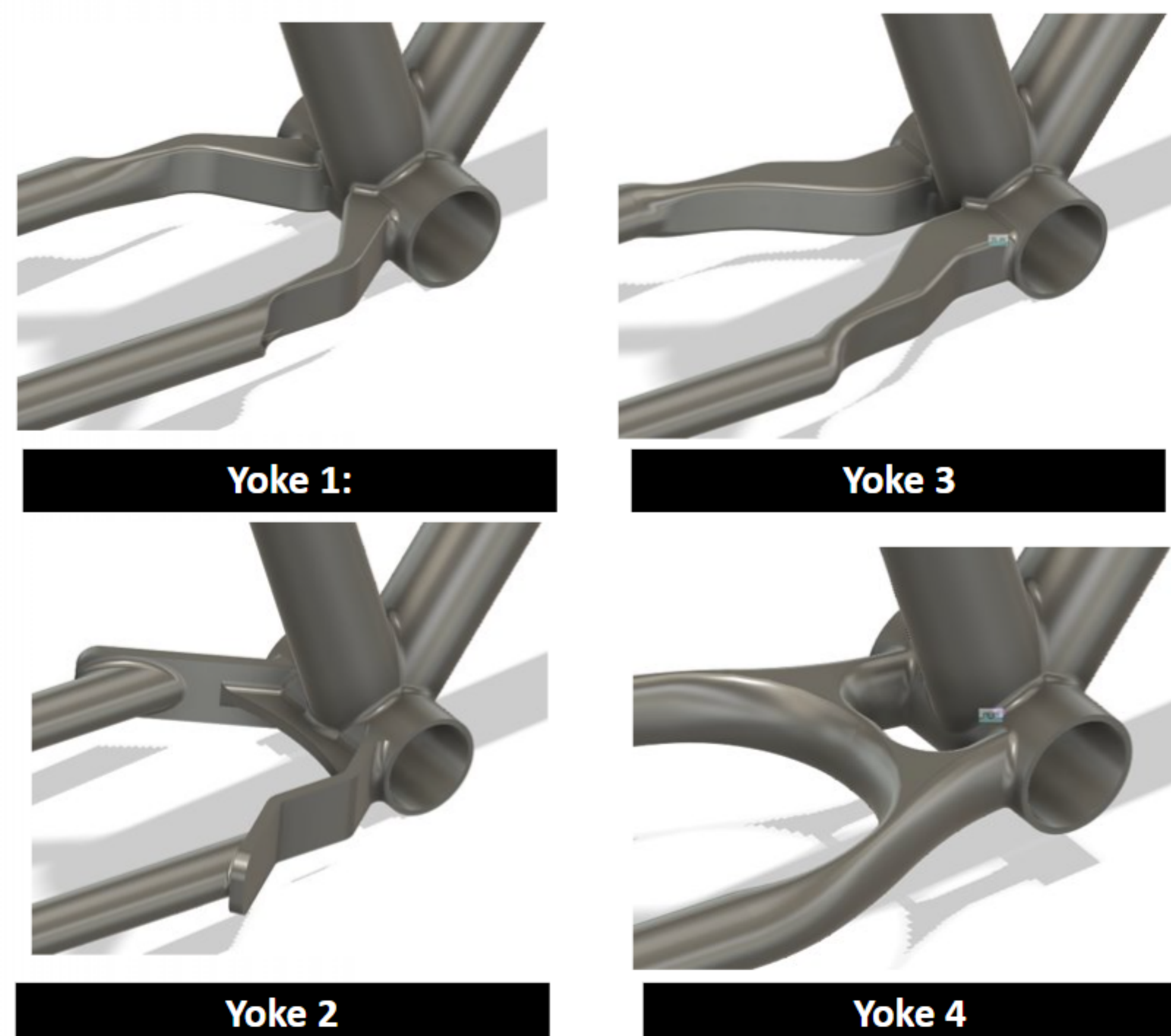
Next Steps

- ❖ Documentation + knowledge transfer to club members
- ❖ Produce more yokes (target 10+)
- ❖ Real-world testing with large sample group

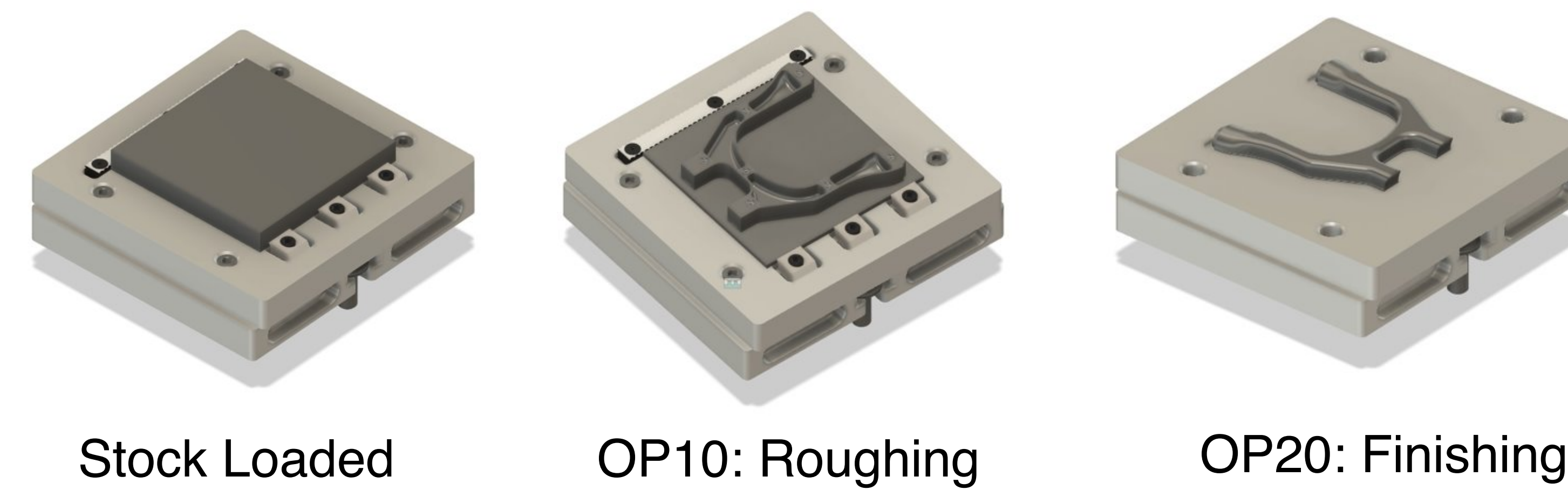
Key Specifications:

- ❖ Adequate stiffness
- ❖ Low weight
- ❖ Low cost
- ❖ Configurability

Design Ideation



Manufacturing Overview

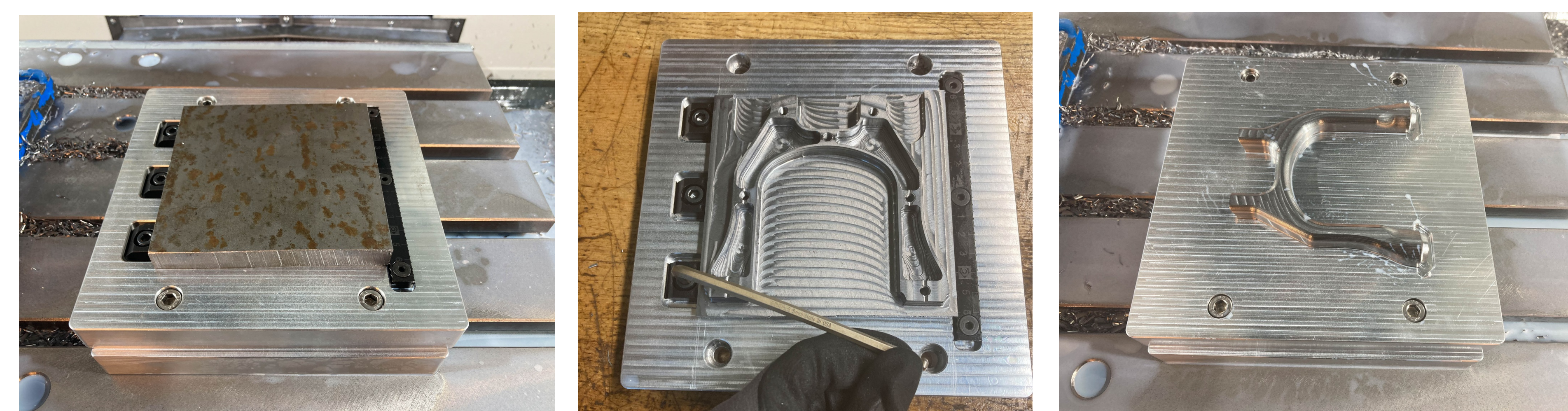


Stock Loaded

OP10: Roughing

OP20: Finishing

Machine Shop Fabrication



Stock Loaded

First Operation Finished

Finished Yoke