Alex Gardiner

Design Engineering Portfolio

Table of Contents

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Custom Skis

Folsom Custom Skis
October 2016-October 2018
Design Engineer, Production Engineer, Graphic Designer

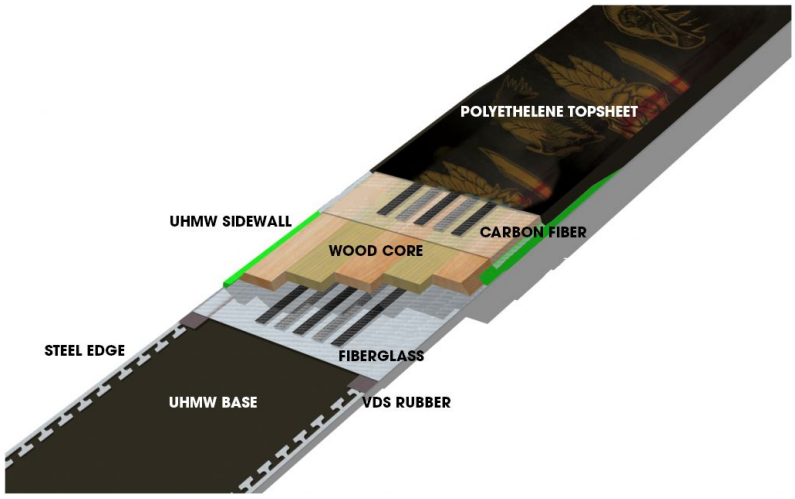
Objectives:

- Design and manufacture custom skis to individual client specifications
- Manufacture and deliver high quality product

Key Challenges:

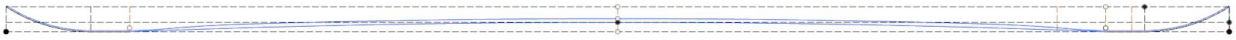
- Design for efficient manufacturability
- Manufacture skis accurately to design specifications
- Manufacture skis to meet high quality standards

Materials:

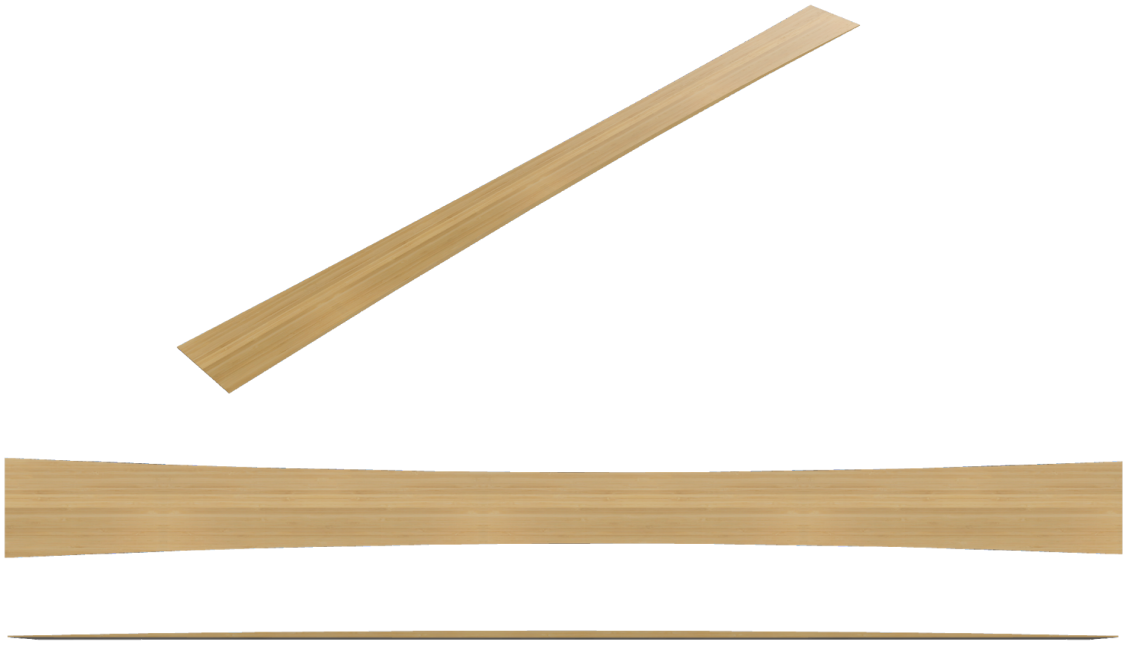


Design:

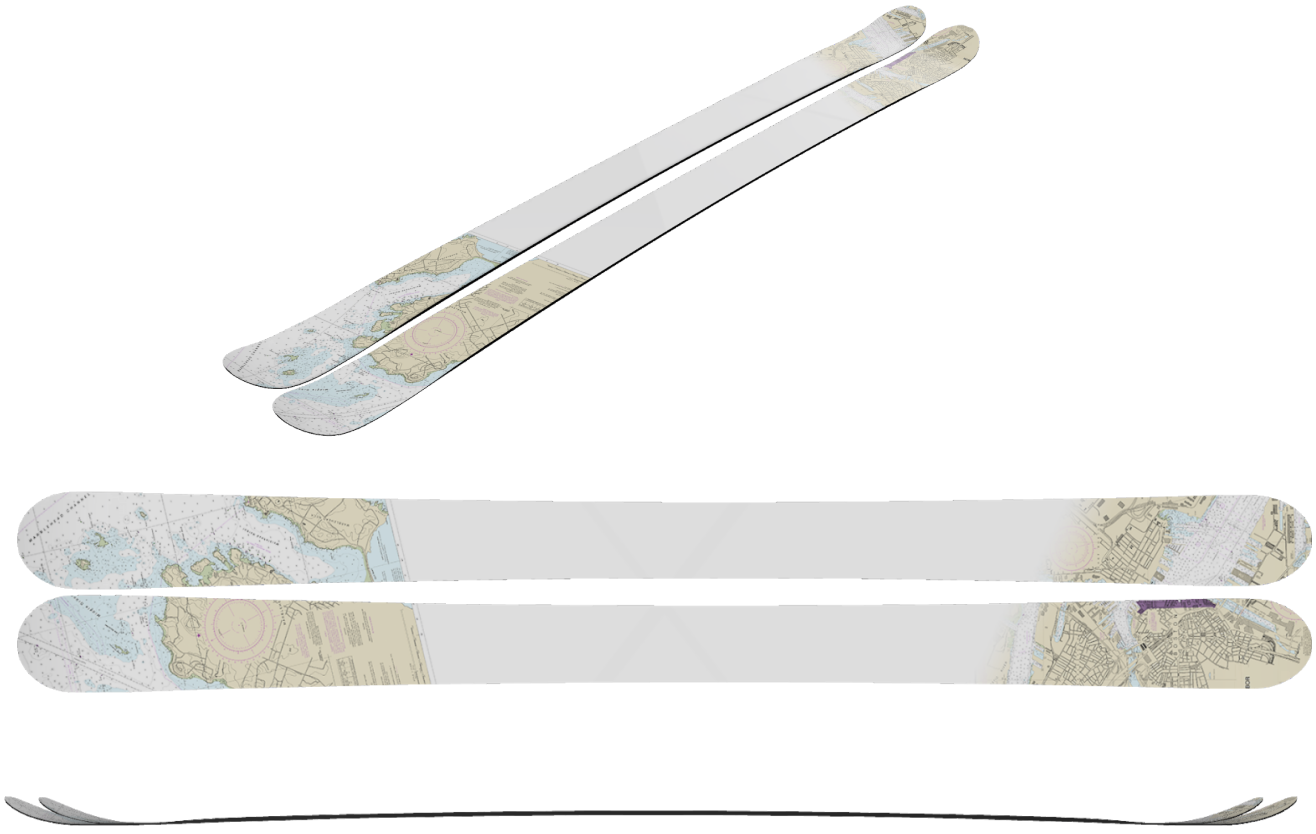
Baseout Geometry Sketch



Camber Profile Sketch

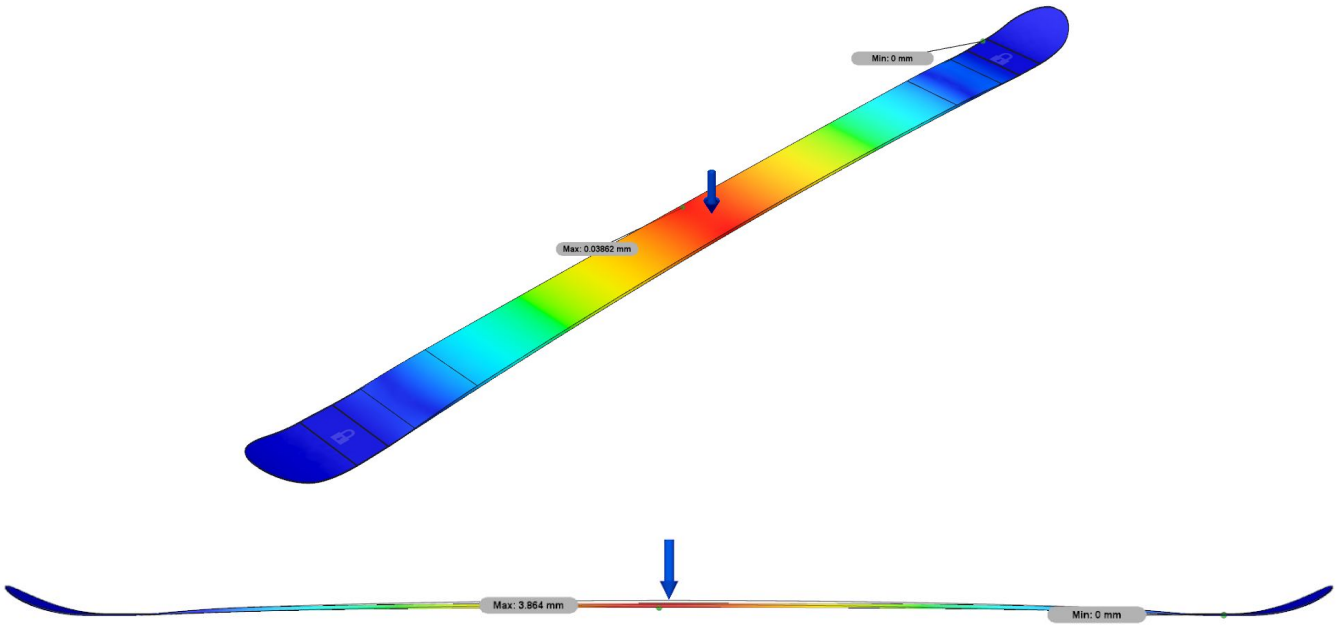


Ski Core Design



Final Design with Custom Graphic

Simulation:



Simulated Force on Ski

Automated Ski Edge Bender

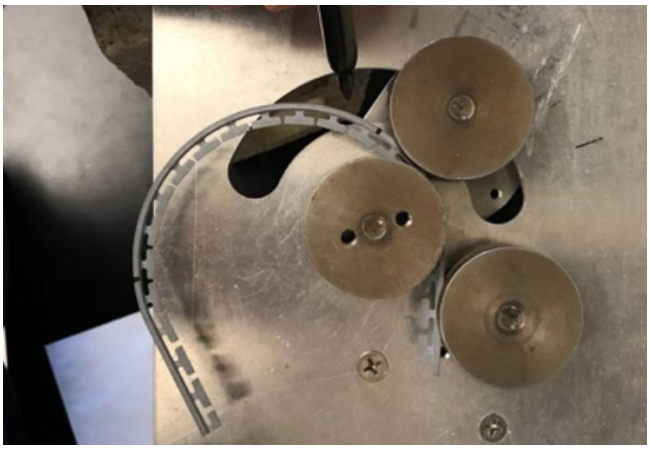
Folsom Custom Skis
September 2017 - May 2018
Design Engineering Advisor, Technical Liaison

Objectives:

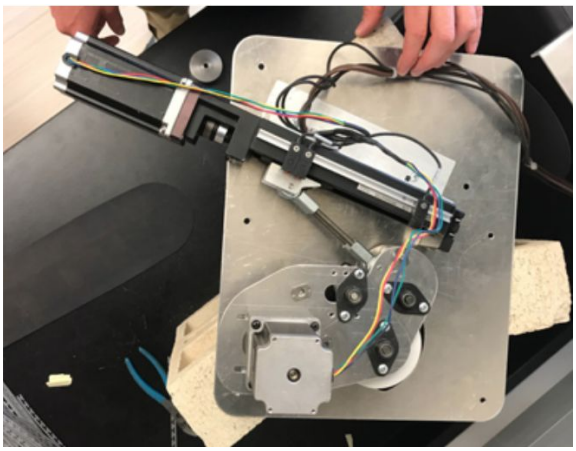
- Automate ski edge bending process
- Decrease production time of custom skis
- Increase durability of ski edges

Key Challenges:

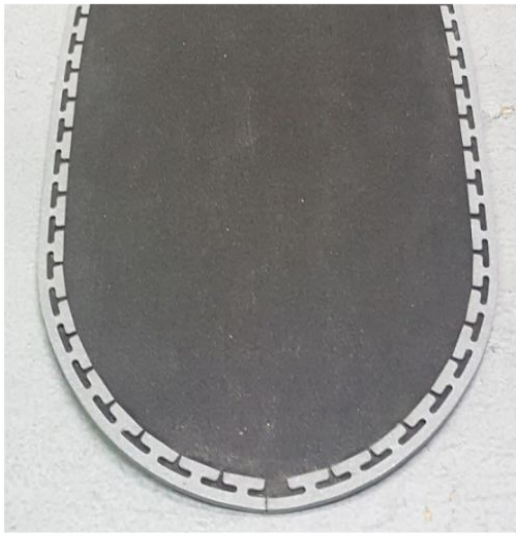
- Accommodating irregular ski geometry
- Accounting for material properties of ski edges
- Converting ski geometry to G code for CNC operation



Bending Wheels with Material Loaded



Components of Automated Edge Bender



Hand Bent Ski Edge with Tip Seam

Machine Bent Edge

Instrumented Thru-Axle

University of Denver/Sram Corporation
September 2014 - May 2015
FEA Specialist, DAQ Specialist, Manufacturing Engineer

Mountain Bike With Instrumented Thru-Axle

SRAM Maxle Ultimate

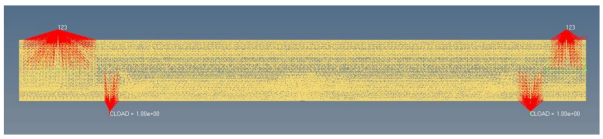
Objectives:

- Characterize loading conditions experienced by Maxle
- Design and build prototype of instrumented Maxle
- Perform stress analysis on Maxle using FEA and Field Data

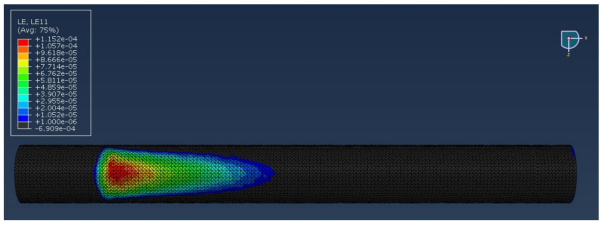
Key Challenges:

- FEA
- Circuit design/DAQ
- Part modification/System assembly

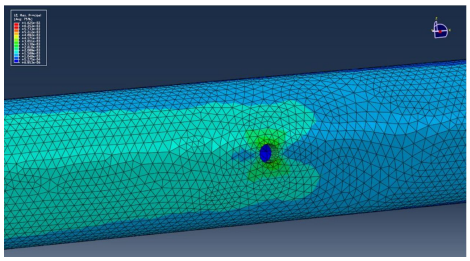
FEA (Performed in Hypermesh, Ansys, and Abaqus)**:**



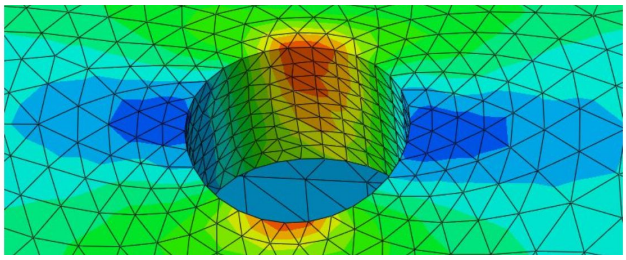
Meshing and Boundary Conditions



Axial Load Analysis

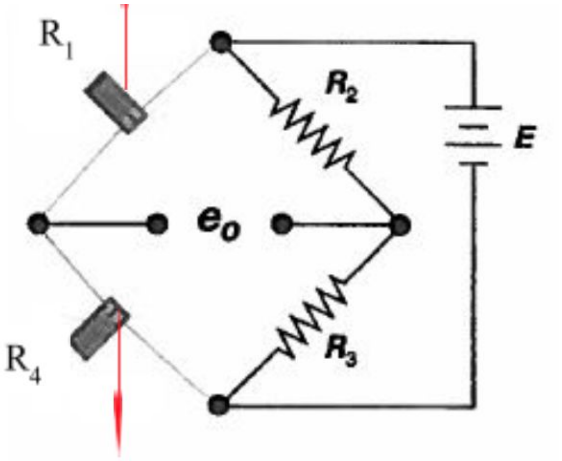


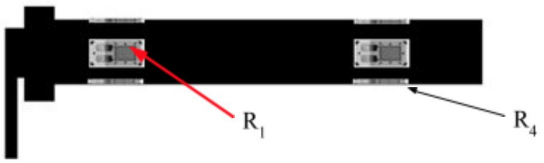
Hole Analysis for Safety



Biased Mesh Around Hole

Circuit Design and DAQ:

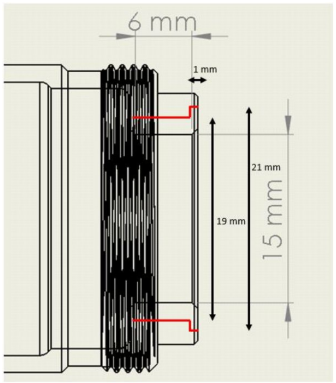




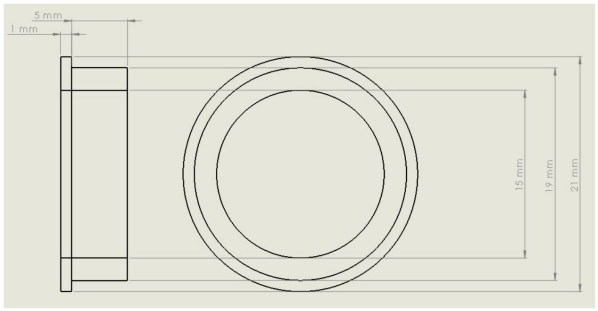
Half Wheatstone Bridge To Measure Bending Strain

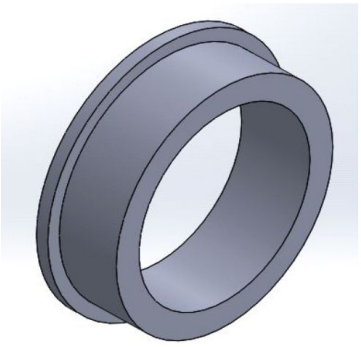
Circuit and DAQ System Housing

Part Modification and System Assembly:



Remove Material from Existing Hub

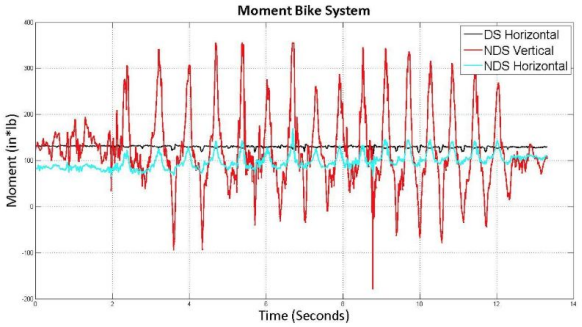




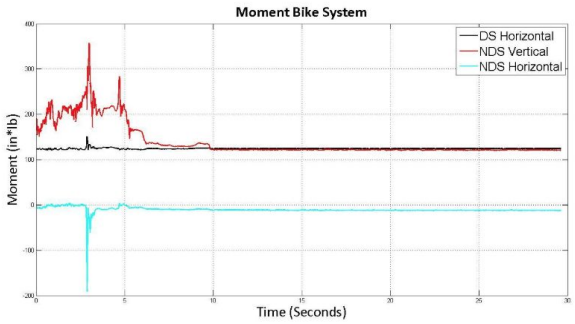
Fabricate End Cap for Hub

Final Assembly of Modified Part

Results:



Loading Experienced During Sprint



Loading Experienced Riding into Wall