

Snowsports Innovation and Design

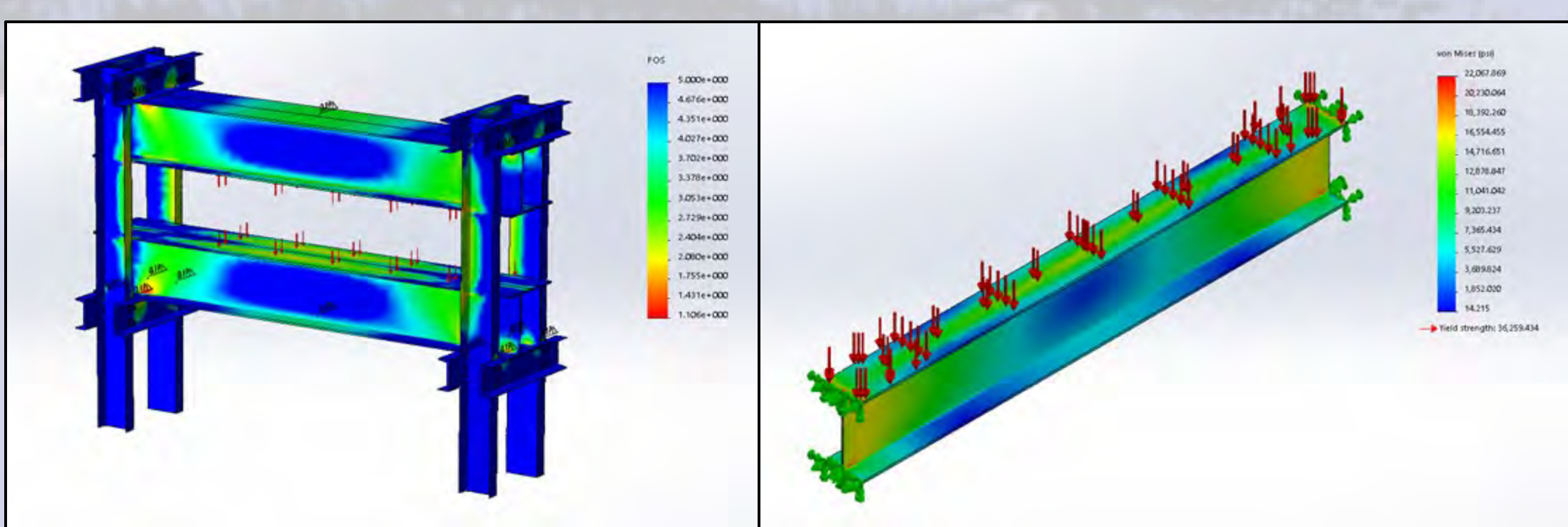
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Introduction

The ski industry is a highly competitive, rapidly evolving market where new designs and technologies are introduced every year. The biggest roadblock to innovation is the time and cost it takes to prototype new ski designs. Our goal was to create a ski press featuring an adjustable camber system and digital temperature control to reduce the time and cost of prototyping ski/snowboard designs while maintaining a competitive price point.

1. Frame

- Safely supports the pressure generated by the pneumatic pressing system
- Open press bay allows for easy loading of materials



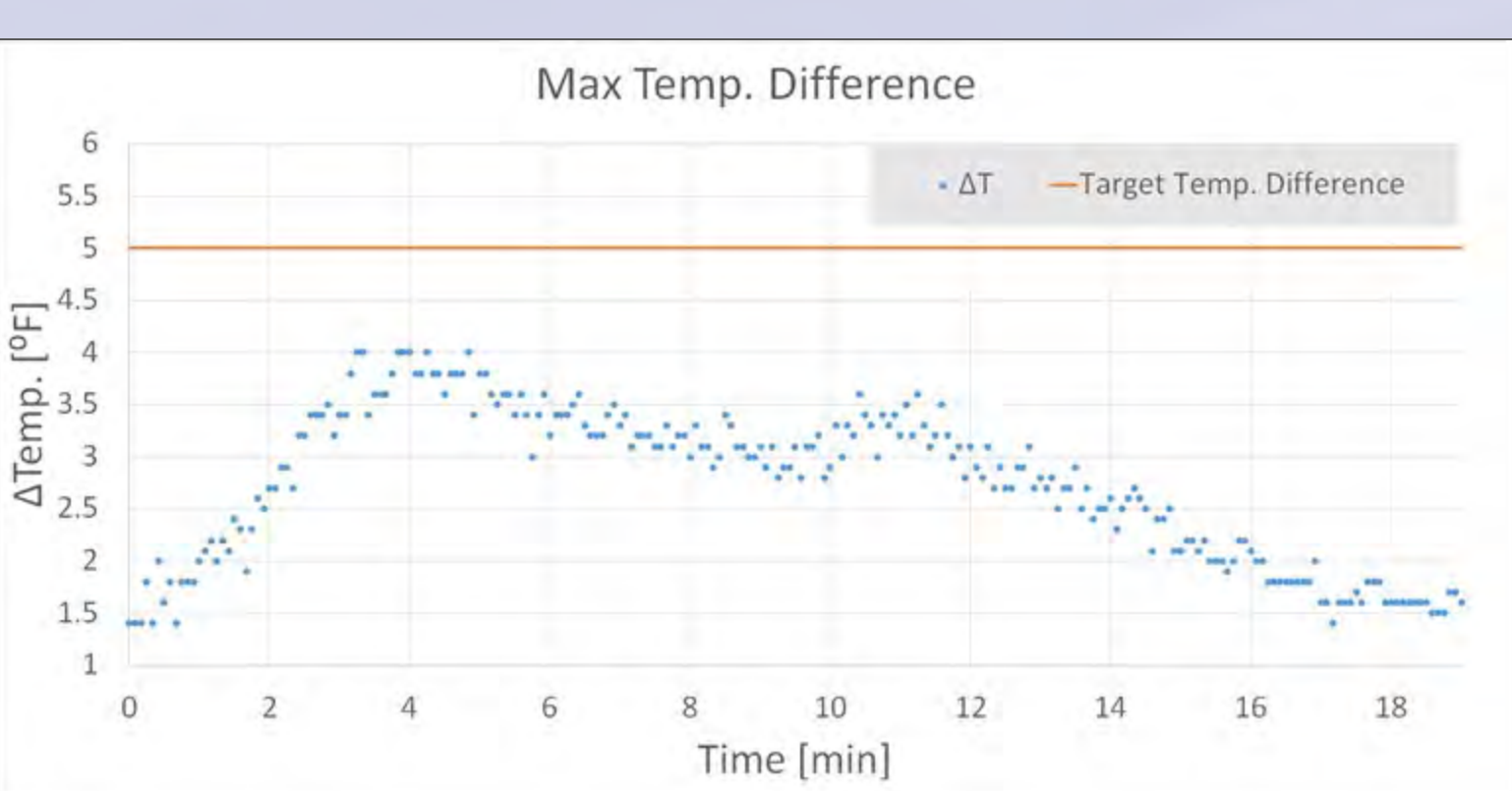
FEA of factor of safety distribution for the complete frame FEA of stress distribution of 12X26 I-beam used along length of press bay

Specifications	Target	Achieved	
Max Strain	<161µε	156µε	✓

The max strain represents the strain in the region with the lowest factor of safety

2. Heating Element

- Provides adequate and even temperature to bring out the best properties of the epoxy resin used to bind ski materials

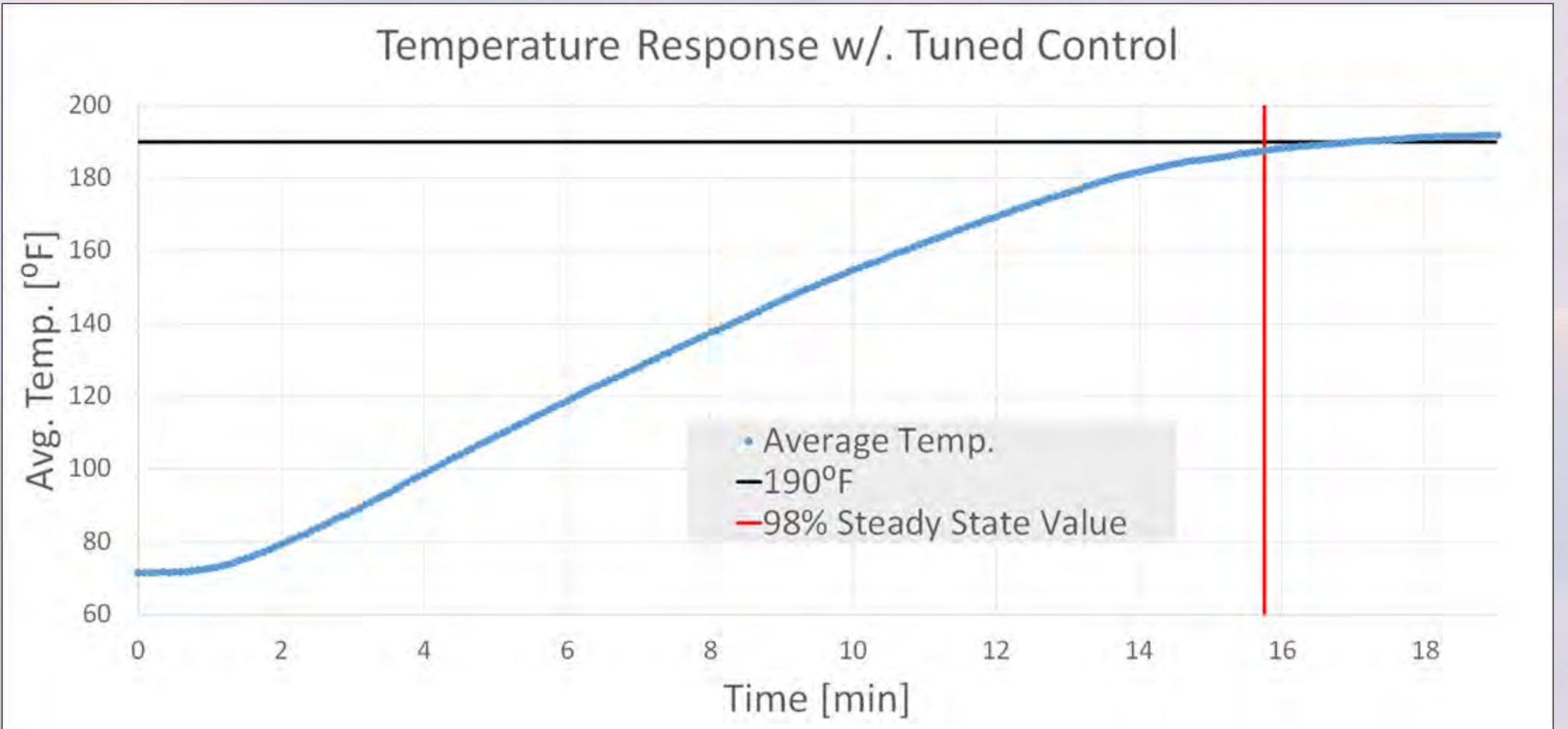


Temperature distribution in sacrificial ski with desired temperature of 180F

Specifications	Target	Achieved	
Max Temp.	>180F	190F	✓
Temp. Distribution	<5F	4.1F	✓

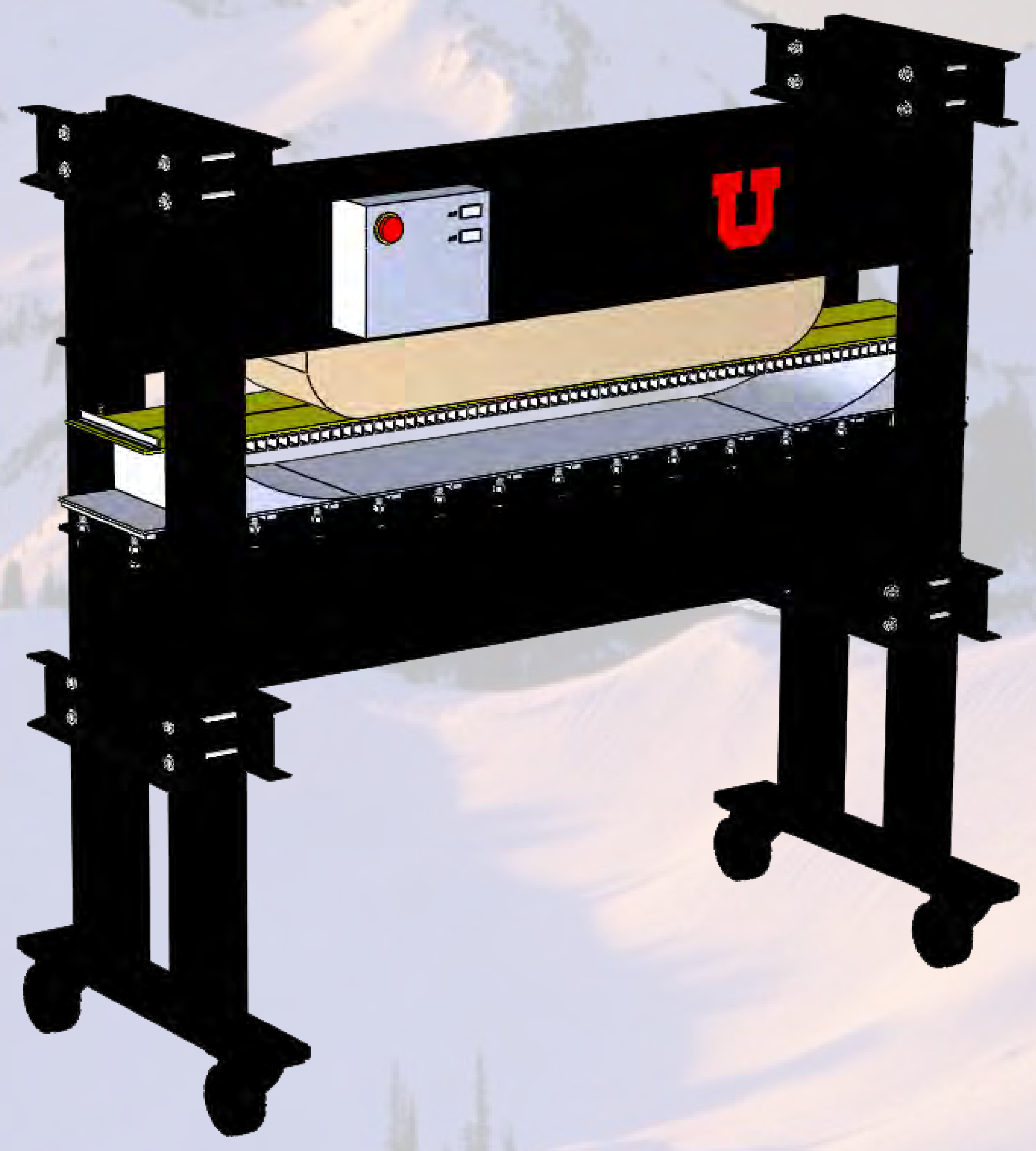
3. Digital Controls

- Tuned PID control of heating element quickly and accurately brings internal temperature of ski to desired temperature



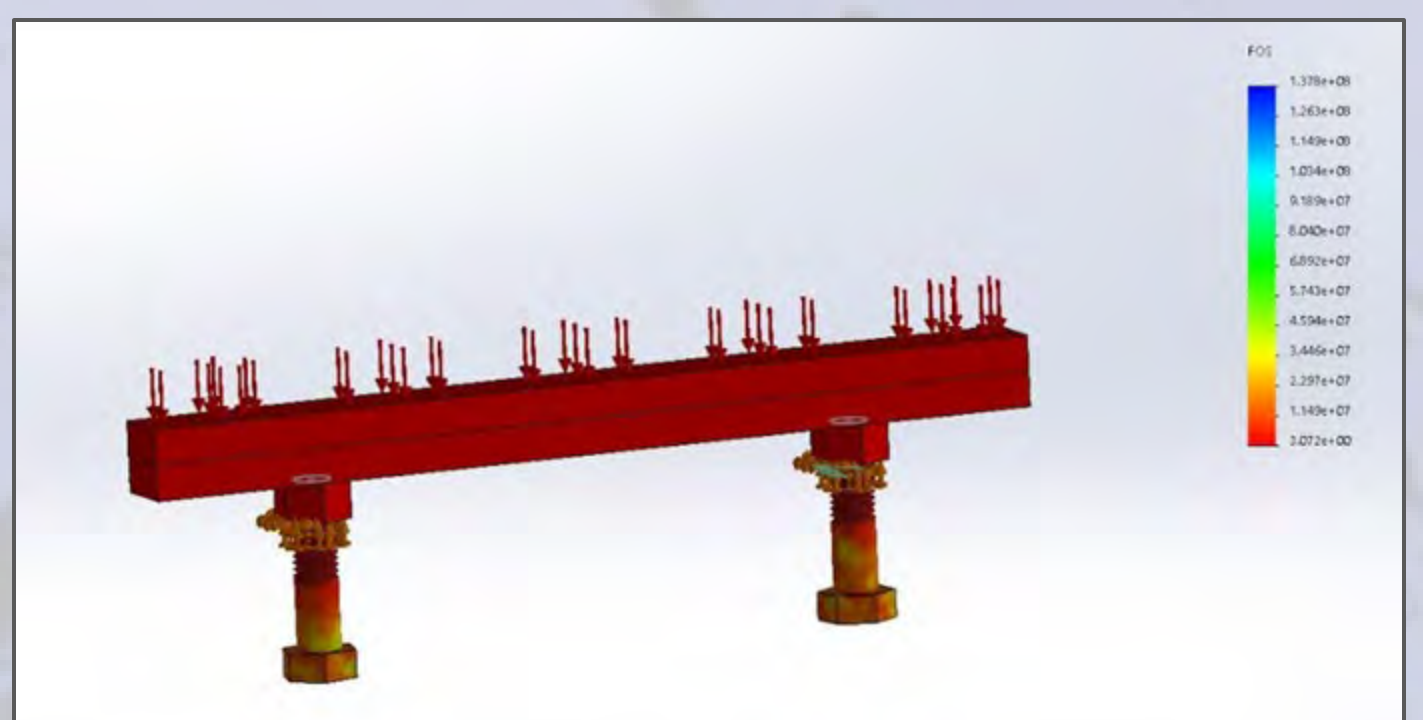
Temperature response of the heat blankets in the press

Specifications	Target	Achieved	
Temp. Ramp-up Time to 180F	<20min	15.75min	✓



5. Adjustable Camber System

- Adjustable lower mold removes the need to create a new mold for different camber profiles which saves time and decreases cost
- Rigid design minimizes deflection of the lower mold for accurate and consistent camber profiles

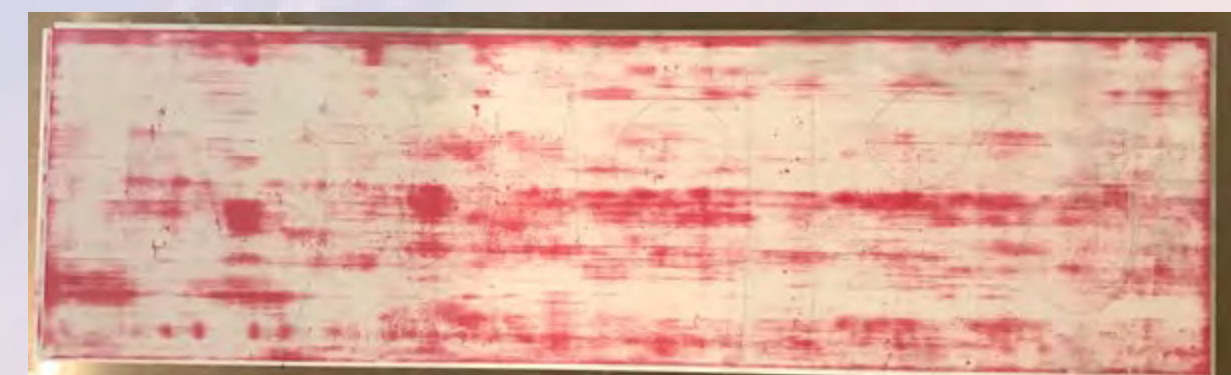


FEA of factory of safety for the adjustable camber system cross members

Specifications	Target	Achieved	
Range of Adjustment	>.25in	.79in	✓
Max Deflection	.02in	.019in	✓

4. Pressure System

- Pneumatic pressure system provides adequate and even pressure to ski materials
- Firehose-based system removes the need for an exact upper mold which decreases the manufacturing time and cost per ski



FujiFilm pressure sensitive film used to check for even pressure distribution indicated by pink markings

Specifications	Target	Achieved	
Reach a high pressure	>50psi	80psi	✓
Even pressure distribution	all areas speckled pink	all areas speckled pink	✓

Conclusion

The results of this project is a product that can manufacture skis and snowboards quickly, consistently and at a decreased cost compared to conventional ski presses.

Specifications	Target	Achieved	
Total Cost	<\$2500	\$2400	✓