



University
of Idaho



CSC REAR DRIVE

TEAM SKIDADDLE :

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|-------------------|-----------------|
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1

VALUE PROPOSITION



Modern Snowmobiles have a track which is turned/driven with cog-drivers in the front. This pushes the track, which being a flexible element, bunches up. This leads to both drivetrain and handling inefficiency. A solution is to pull the track, by having the drivers in the rear. Currently, there are no rear driven snowmobiles on the market as an OEM or Aftermarket platform.

At the SAE Clean Snowmobile Challenge (CSC) which the U of I CSC Team competes in every year, technical innovation is highly valued. The Team

To meet both these challenges, the goal is to develop a rear driven snowmobile system that will be able to directly compare rear-driven and traditional drive technologies. Our team is proposing a swappable front to rear drive system for this year's CSC team and snowmobile. Our design seeks to have similar suspension design and performance, while being easy to swap with the stock configuration and require no input from the user while operated.



2

2

TEAM SKIDADDLE

2017 SKI-DOO MXZ TNT 850 E-TEC

System Specifications

- Engine Power Output – 120HP
- Driver Torque - ~242 ft-lbs
- Driver RPM – up to 6000 RPM



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SAE COMP & RULES

Competition Requirements

Description	Value	Unit
Sound Requirement- SAE J1161	< 67	dBa
Endurance Run	100	mi.
Acceleration -10 sec run	500	ft.
Weighted Acceleration	500	lbs.

Rules

- SAE 8.4.3: Brake modifications must retain stock braking performance.
- SAE 8.4.5: Brake rotor must be covered with a shield capable of retaining an accidental explosion.
- SAE 8.4.8: Moving parts must be isolated from the driver and other competitors
- SAE 8.6.1: The track must be commercially available
- SAE 8.6.2: The suspension travel must be ≤ 3 in.
- SAE 8.5.1: Runners must be commercially available.

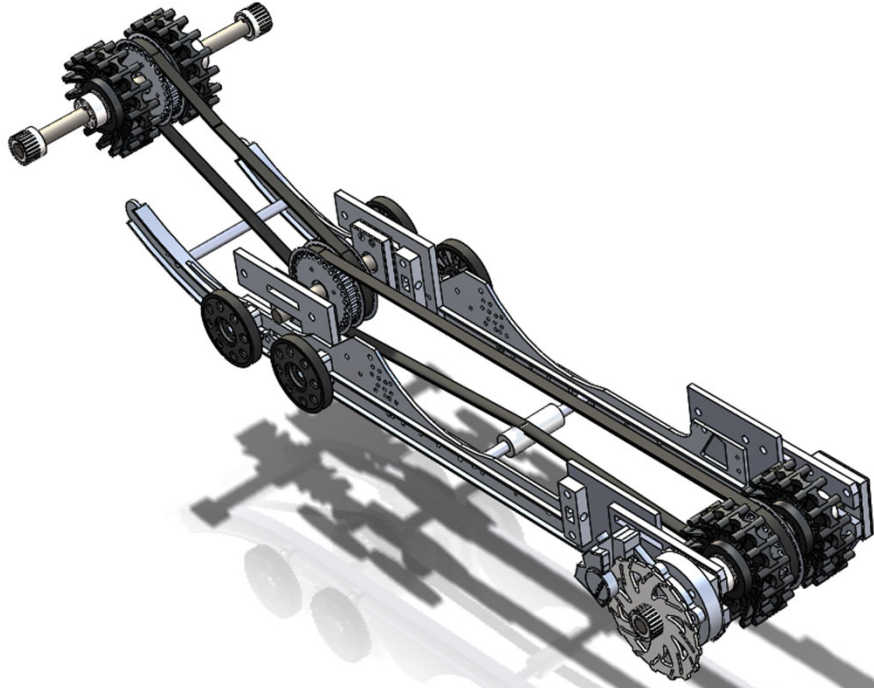
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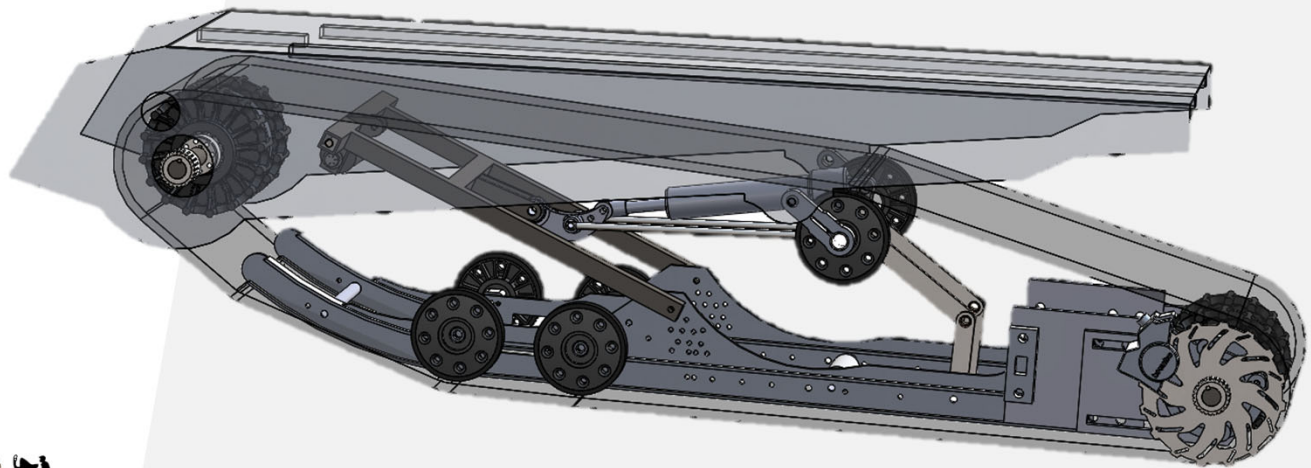
SINGLE AXLE BELT DRIVE



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SUSPENSION



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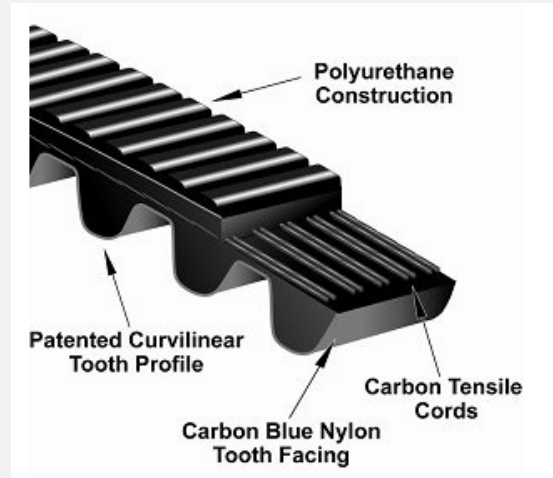
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SINGLE AXLE BELT DRIVE

Belt & Pulley types/specs

- Gates GT
- Polyurethane W/Carbon Cords
- 20mm Width
- Active Tensioning



7

7



TEAM MANAGEMENT

SCHEDULE

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|------------------------------------|------------|
| ▪ Mid-Design Review #2 – week of | 10/07/2019 |
| ▪ Detailed Design Review – week of | 10/21/2019 |
| ▪ Detailed CAD,BOM & FEA – | 11/03/2019 |
| ▪ Complete dFMEA – | 11/03/2019 |
| ▪ Fabrication begins – | 11/04/2019 |
| ▪ Fabrication finishes – | 12/17/2019 |
| ▪ Testing begins – | 01/20/2020 |
| ▪ SAE Competition – week of | 03/09/2020 |



8

8

TEAM MANAGEMENT



Budget: \$1,000

- Runner(s) \$500
- Silent Drivers \$1400
- Belts - \$500
- Pulleys - \$160
- Belt Tensioners - \$100
- Misc. Hardware - \$60
- Waterjet - \$80
- Belt Tension Gauge - \$40

Total \$2840



DESIGN VALIDATION PLAN



Requirement	Test	Test Subject	Target Date
Maximum torque driver shaft(s) shall sustain is 500 ft-lbs	SolidWorks analysis and/or Abaqus FEA	CAD Models	10/14/19
Forward Suspension arm shall sustain considerable tension, compression, and tosion forces	SolidWorks analysis and/or Abaqus FEA	CAD Models	10/14/19
Forward Suspension arm shall sustain considerable tension, compression, and tosion forces	On snow testing	Fully functional prototype	1/20/19
Forward Shock will not exceed a compression of 3 in.	In-HEV testing	Fully functional prototype	1/20/19
Rear Suspension arm shall sustain considerable tension, compression, and tosion forces	SolidWorks analysis and/or Abaqus FEA	CAD Models	10/14/19
Rear Suspension arm shall sustain considerable tension, compression, and tosion forces	On snow testing	Fully functional prototype	1/20/19
Rear Shock will not exceed a compression of 3 in.	In-HEV testing	Fully functional prototype	1/20/19
Maximum weight shall not exceed 20 lbs of the stock skid	Weigh the full system on the scale in GJ 126	Fully functional prototype	1/20/19
Design skid shall have less roll resistance than stock skid	CSC Roll Down Test	Fully functional prototype	1/20/19

