

Michigan Technological University

Energizing the Future: Rear Driven E-Rush

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Topics for Discussion

- Design Intent
- Chassis and Key Features
- Electrical Design
- Future Developments
- Conclusions and Questions



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Design Intent

- Maximize Range
- Reduce Noise
- Maximize Pulling Capability
- Reduce Weight
- Maintain Ride ability
- Reasonable Price
- Serviceability



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Chassis Update

- 2010 Polaris Rush
 - Lightweight 2-Stroke Chassis
 - Improved Ergonomics
 - Modern Styling and Design
 - Innovative Progressive Rate Rear Suspension



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Key Features

- Innovative Rear drive design
- Polaris Pro-Ride rear suspension

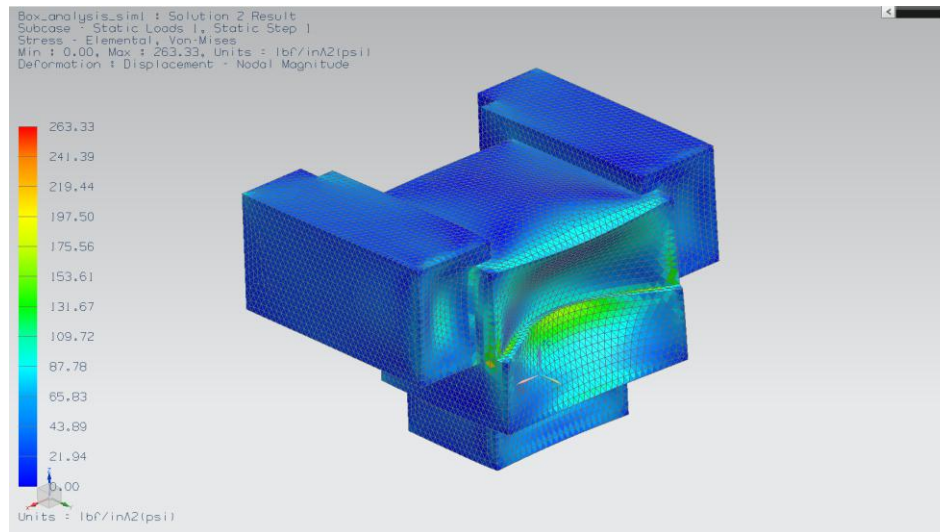


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Energy Storage Container

- Exceeds all rigidity requirements for competition
- Braced with 6061 Aluminum for extra strength and support

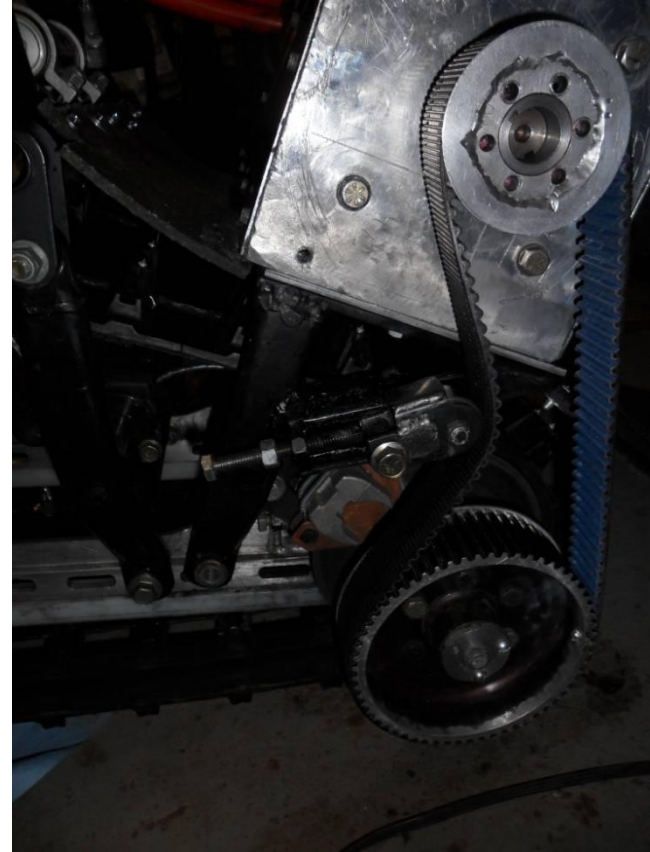


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Rear Drive and Development

- Implemented for increased driveline efficiency by eliminating the bubble effect.
- Addition of tensioner on drive belt
- Creates more options for battery packaging



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Rear Brake Relocation

- Located on Drive Shaft
- More dynamic/responsive braking
- Less rotating mass
- Less contradicting forces



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Electrical Design



- Maintain Stock appearance and packaging for similar rider ergonomics
- The 53lb AC induction motor is located in the rear to improve pulling power.
- Sled makes use of Lithium Iron Phosphate batteries which are more environmentally friendly



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Durability

- Gates Drive belt
 - Industrial belt made to withstand demanding load
- Box Construction
 - Polycarbonate and Aluminum frame to increase structural integrity, FEA done to demonstrate its strength



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Serviceability

- The battery Pack of the System is a 32 series system
 - Easy to wire, replace cells, and monitor all cells
- The motor is in the rear making it easy to access for maintenance



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Future Developments

- Refine Drive system

- Change the front attack angle for improved efficiencies

- Testing on snow to improve efficiency and pulling capability



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Conclusion

- Converted a Polaris Rush to rear drive
- Testing in the future
- Significant weight reduction
- Improved rider ergonomics and rider comfort
- Reasonable MSRP



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-Questions-

