Adaptive Mountain Bike Chairlift

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Introduction

Lift-serviced mountain biking is gaining attraction around the country, especially among adaptive riders. This pastime includes riding a ski chairlift up and biking down the mountain.

The objective of the adaptive chairlift is to allow the riders to stay in their bikes the entire time and speed up the process to make it easier for everyone involved, from the rider to the assistants and lift operators. To accomplish this, we researched current chairlifts and aerial platforms and decided to create a trailer-like platform with folding ramps for entry & exit. Doing so allows for the rider to ride up onto the platform, while the lift operator moves the ramp down and pins it in place.

Problem

Most of the adaptive riders have complex disabilities that make the current process very challenging. They need help being transferred in/out of their bike directly to/from the chairlift, and then their bike, which has three to four wheels, needs to be awkwardly placed on a bike rack meant for a bike with two wheels. This takes up to 15 minutes and requires a lot of assistance.

Design Metrics

The solution to this problem is creating a new aerial lift that attaches at the Taco (see picture) and creates a more autonomous process without disrupting the flow of normal bike traffic. This lift needs to meet the metrics below:

- Takes significantly less time to execute (<3 minutes)
- The rider stays in their bike the entire time
- The lift meets safety standards (ANSI, swing < 15 degrees)
- The system can be supported by the Taco (total max load < 6.6kN)

Conclusion

We designed and manufactured an aerial lift that can be used during summer lift service mountain biking that takes x minutes to load/unload, allows for the rider to stay in their chair, and meet the safety standards. This will allow lift-serviced mountain biking to become a more accessible sport.