

EXPO 2013



CSC Rear Drive

Team Powder Train

Sponsored by the University of Idaho Clean Snowmobile Team through NIATT

University of Idaho
College of Engineering



Problem Statement

When a conventional front-drive snowmobile moves forward the track is pulled into tension on the top so that the slack is between the rails and the ground. This is hypothesized to decrease handling and cause inefficiencies in the track that lead to higher fuel consumption.

Objective

The purpose of this project is to design and build a rear drive system for the CSC Team's Ski-Doo snowmobiles that improves efficiency, as well as design and build a test apparatus to measure any improvement.

Client Requirements

- Bolt-in design with no chassis modification
- Minimum possible weight
- No increase in track noise, decrease noise if possible
- Decrease fuel consumption by increasing efficiency in the track
- Improve handling

Design

The design centers around a chain drive system. The stock front axle was modified to be a two part axle that transfers power from the chain case on the right side of the snowmobile to a drive chain. The two independently rotating parts of the front axle are designed to allow the snowmobile to drive in both forward and reverse without the transfer of power interfering with the brake, which is on the left end of the front axle. The drive chain on the front axle transfers power through a series of intermediate axles to the rear axle. The rear axle has drive wheels mounted on it that drive the track. The bearings for the rear axle are in sliding housings which allows the track tension to be adjusted.

Suspension and Rail assembly

The rear axle is integrated into the rails. The rails sweep to the inside to keep the assembly narrower than the drive wheels and reduce the stress on the rear axle.

The design integrates the stock suspension system.

Sliding bearing housings allow track tension to be adjusted.

The brake attaches to the left end of the front axle.

The chain case, which transfers power from the engine, connects to the right end of the front axle.

The wheels on the front axle, which drive the snowmobile in the stock configuration, spin freely unless the brake is applied.

Intermediate axles transfer power from the front axle to the rear axle via drive chains.

The outer part of the front axle links the brake to the front wheels and allows braking even if a drive chain snaps.

The rear axle drives the track.

Front axle

Sealed ball bearings separate the inner and outer axles.

The inner part of the front axle transfers power from the engine to the chain-drive system.

The two-part front axle allows each end to rotate independently, preventing interference between the brake and the chain-drive system.

Team Powder Train



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