“Fly-Cycle” Assisted Start Flywheel for Bicycles
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Abstract

The bicycle is currently the most efficient means for human transportation. Currently there are over one billion bicycles in the world. With a growing interest in environmental preservation, and an increasingly high cost of fossil fuels, the bicycle is now in the public spotlight. Many people depend on bicycles as their sole means of transportation and frequently encounter situations where the benefit of a power assist is needed. The Fly-Cycle is intended to solve this problem by reducing the amount of energy input from the rider.

The Fly-Cycle is designed to use the energy stored in a rotating flywheel, powered by the rider, to assist in the start of a bicycle from a dead stop. Some of the design challenges we encountered were:

-Weight to benefit ratio
-Dynamic strength/robustness (figure 3)
-Energy loss through friction and inefficiency
-Zero emissions/environmentally friendly

Discussion/Conclusion

Given a relatively flat terrain, it has been shown that a net positive power output can be achieved with a flywheel/clutch system as compared to our benchmark. The added weight and the energy required to compensate is more than covered by the power output of the flywheel system - even with a 50% efficiency factor. The results are shown below.

Background/Problem

The purpose of the Fly-Cycle design project is to provide an assisted start from a complete stop by the use of energy stored in a rotating flywheel. The goal of our design project is to decrease the amount of effort required to start a bike from a dead stop while exceeding the performance characteristics of existing technology.

Results

Our proof-of-concept flywheel assembly (figure 4) can be adapted to many different bicycle configurations providing a broad range of applications.

-Does not require finite fuel resources
-Net positive energy output as shown in figure 6.
-Robust design as shown in figure 3.

Comparison to Benchmark

Benchmark: Schwinn 5-speed mountain bicycle.
Test: Our test consisted of having 2 different riders start from a dead stop and then travel a measured distance while being timed.
Results: (figure 5) An average of 772 Watts, or 7.4 Watts/kg.

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-Ryan at the AS Bike shop

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