Cyc-light

Purple Team B

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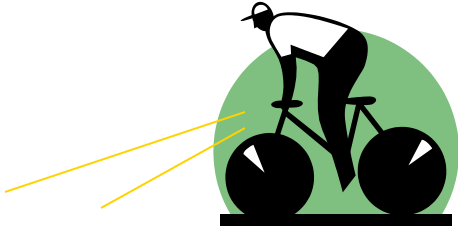
Our Product

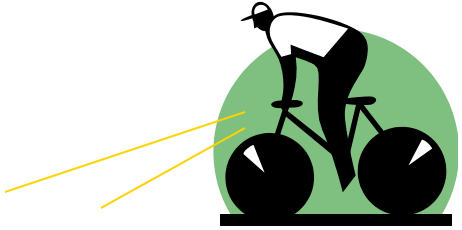
The Concept:



Regenerative Brake System for Bicycles to Power LED Flashers and Headlight

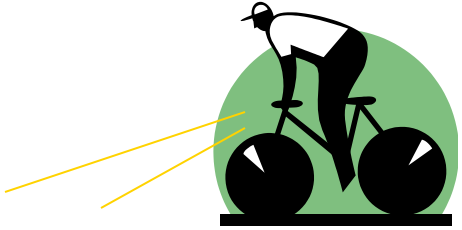
- 41% of Bicycle accidents happen at night, when the fewest people are biking.
- Goal: Recharge batteries without impeding normal cycling motion
- Normal energy dissipated in braking up to 1000 W compared to 3-4W to power LEDs

Major Issues



- **Electronics** – Conversion of varied source voltage to constant voltage for charging battery
- **Configuration** – Incorporation of existing bicycle components and geometry
- **Cost** – Batteries are inexpensive & LED flashers use very little energy
- **Feathered Braking**
- **Environmental Considerations** – weather-proofing

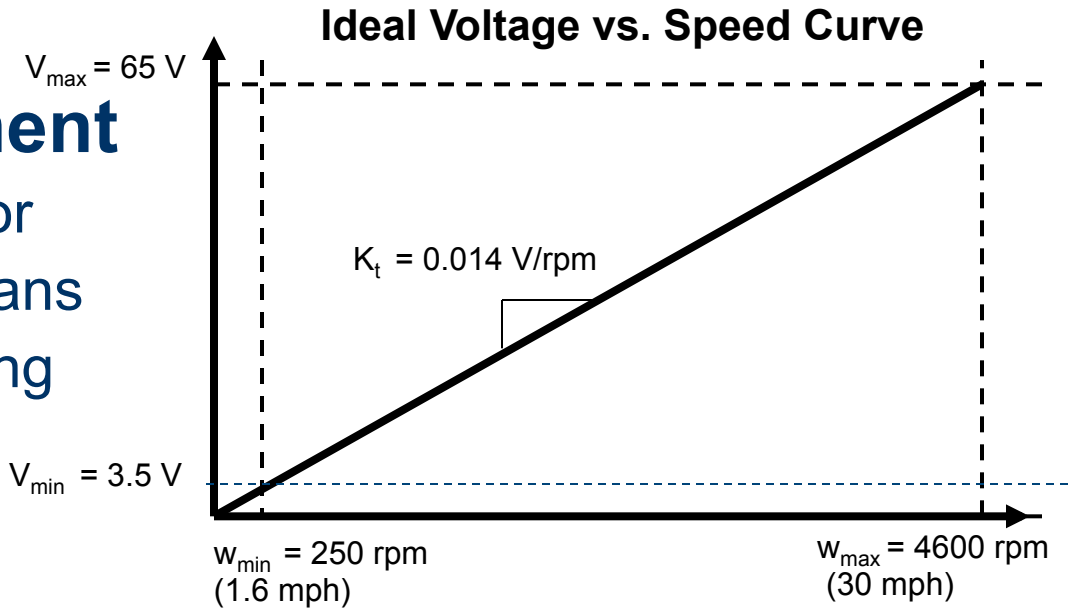
Motor Selection



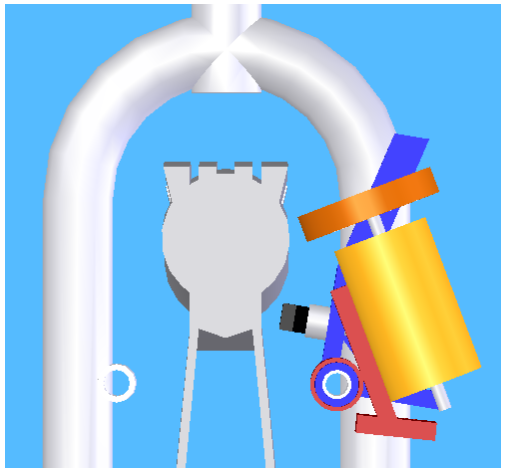
- 30 sec of braking for
  10 min of riding means

  braking

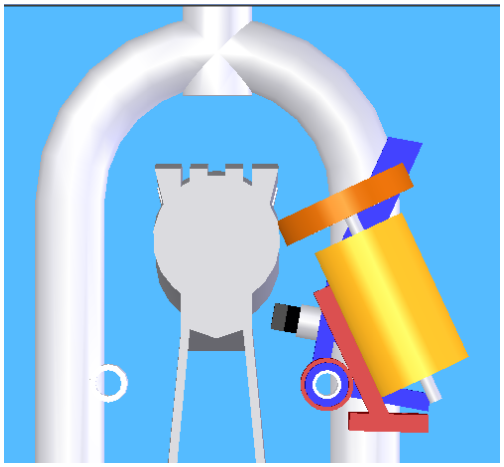
- **Power Requirement**
  - 30 sec of braking for
    10 min of riding means
    60 W collected during
    braking



Physical Implementation



Disengaged



Motor Engaged

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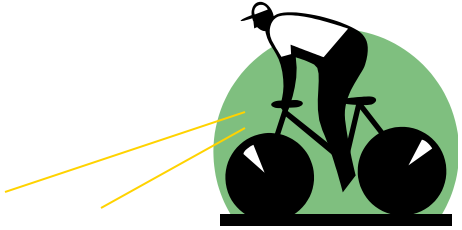
Friction Brake and Motor Engaged

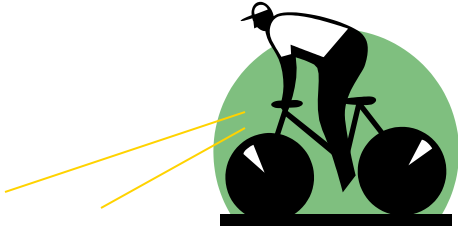
Energy Storage



- **Charging circuit**
  - Capacitor network quickly gathers energy during braking
  - Voltage is regulated to 5 V for 3 V + input
  - Switching Voltage Regulator is used for High Efficiency

- **Battery bank**
  - NiMH batteries
  - 2 AA batteries sufficient for flashers and headlight
  - Energy gathered by capacitors is used to charge batteries

Issues left to tackle:



- Low Battery Warning
- Theft Protection
- Adaptability
  - Mountain Bike & Street Bike Implementation
- Weatherproofing
- Variable braking power
- Lowering Costs

Electronic Configuration

LM2577 step-up voltage regulator