Second Generation Bicycle Charging Station

Progress Report

Jon Jerome, Michael Klinefelter, Connor Kroneberger, Kori Molever, Robert Rosenberg

January 30th, 2014

Contents

- Background
- Current Design
- Design Modifications
- Individual Tasks
 - Stand Redesign/Build
 - Main Bike Components
 - Housing
- Semester Plan
- Conclusion

Connor Kroneberger



Background



- Provide students of all levels with a way to understand and compare the amount of energy required to power and charge electronic devices with the amount of energy produced by pedaling a bicycle
- Improve on 1st generation design by increasing portability, adjustability and efficiency

Connor Kroneberger

Current Design



- Portable bicycle generator
- DC Motor with inverter to provide AC & DC power to small devices
- Adjustable seat height to
 accommodate riders of all sizes
- Direct contact roller to generator
- Welded AISI 4130 steel frame

Connor Kroneberger

Modifications to Proposal

- Lighter material for stands
- Stand redesign for ease of repeatability (duplicate stations)
 - Utilize fasteners instead of welds
- Alternate method to drive generator further research necessary
 - Chain driven
- Cost of bike and seatpost clamp -\$0 (donation)

Kori Molever



Individual Tasks

Team Member(s)	Task
Kori Molever & Connor Kroneberger	Stand Redesign and Build
Jon Jerome & Michael Klinefelter	Gear Ratio, Bike Repair and Service
Rob Rosenberg	Housing for Electrical Components



Stand Redesign & Build



Current Stand

Kori Molever

fppt.com

- Frame Design/Construction
 - Generator/shaft connection
 - Rotation/locking mechanism

6

- FEA on new stand
- Shop for Frame Components
 - Rigid members
 - Fasteners

Main Bike Components

- Replace the current crankset with a larger amount of teeth
 - Simplify the setup
 - Replaceable rings
- Selection of sealed cartridge bearings for bottom bracket
 - Low maintenance
 - Easy replacement



- Gears
 - Use of current gear set limited to the highest 3 gears
 - Potential to allow for chain-driven generator





Jonathan Jerome

Main bike components (Continued)

- Use of a trigger shifter
 - Greater accuracy in shifting between gears
 - Salvaged from donated bike
- Replace current tires
 - Thinner profile
 - Balance tread selection
 - Lower rolling resistance
 - provide traction during transport





Jonathan Jerome

Housing for Electrical Components



Rob Rosenberg

- Material selection
 - Similar to first generation, transparent for educational benefit
- Mechanism for locking/unlocking
 - To easily access components for repair/maintenance

9

Project Plan



fppt.com

Rob Rosenberg

Updated Budget

Material	Cost (\$)
Bicycle	\$0
Handlebars	\$50
Stands- Front and rear	\$ 250
Gear Cassette & Derailleur	\$ 50
Seatpost Clamp	\$0
Tools To Be Included	\$10
Fasteners	\$15
Display Box	\$50
Grand Total	\$ 425

Donated bicycle

11

Michael Klinefelter

Semester Schedule



Michael Klinefelter



Conclusion

- Bike and other key bike components were donated, reducing our proposed budget.
- The rear tire, shifter, and front cassette need to be replaced.
- Modifications to the bike stand will include lighter material selection and simpler design for repeatability.
- Housing will be transparent like the previous design, but with a more modern display.

