

Senior Design Project Data Sheet

Project #	Project Name	Project Track	Project Family
P11001	Balance Training Bicycle: Pedal and Tilt Resistance	Assistive Devices/ Biotechnology	Assistive Devices
Start Term	Team Guide	Project Sponsor	Doc. Revision
2010-2	Dr. DeBartolo	Nazareth College Physical Therapy Clinic	

Project Description

Project Background:

This project was originally begun winter quarter of 2007 under project number P08001. It was revisited winter quarter of 2009 under project number P10001. This was designed to help patients at the Nazareth College Physical Therapy Clinic be able to bridge the gap between stationary bike and an outdoor bike in a safe way. Prior iterations of this project have experienced several performance issues with regards to the pedals, tilt mechanism and display.

Problem Statement:

The bicycle currently needs a better way of accomplishing the tilt resistance as the current method allows too much slack at the center position. Additionally, the pedaling resistance mechanisms need work to avoid jittery performance the user is currently experiencing. Lastly, the display mechanism needs to function correctly.

Objectives/Scope:

1. Improve tilt resistance and consistency
2. Improve pedal function
3. Functioning display mechanism

Deliverables:

- New display including a hit counter.
- New tilt mechanism design, analysis, and structure
- New pedal mechanism design, analysis, and structure
- Full biomechanics and ergonomics analysis

Expected Project Benefits:

- The conclusion multiple iteration project.
- Useable bike for neurologically impaired patients in physical therapy.

Core Team Members:

- Kyle Benesh – Project Manager – ME
- Lawrence Grant – EE
- Marc Sciarrino – ME
- Wesley Seche – ISE

Strategy & Approach

Assumptions & Constraints:

1. Elastic type tipping restrictors will not give the desired effect. A damper with a spring would be optimum.
2. Pedals will require a new braking material, a lubricant, or a new mechanism.
3. The display mechanism will need to be totally reworked

Issues & Risks:

- Hit counter rework is still undetermined.
- This project has two mechanical engineers assigned to it, when three MEs were originally requested.
- Retrieving the bike from Nazareth for modifications may be difficult due to time and resources for moving it.
- Materials and supplies research will be extensive.
- Availability of time with JJ Mowder from Nazareth may be difficult as they have a break while we are in class.
- Custom fabricated parts could set us behind if materials do not arrive quickly or machining tools are not available.
- Something a previous project group did may make some parts of our ideal design not feasible.
- Equipment additions could make stepping over the center difficult for certain individuals.
- If we needed to increase the flywheel diameter, it may prove difficult due to the current geometry of the frame.