**TEAM**

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**Florida State University – Florida Agricultural and Mechanical University College of Engineering**

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**Fall**

Sponsor:

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Pedibus Development

MidYear Report

**I. Project Overview**

Capital City Pedicabs and its owner Ron Goldstein, along with future investors, has asked the Florida State University – Florida Agricultural and Mechanical University College of Engineering to aid in the development of a fully operating pedibus prototype. The project consists of four senior undergraduate mechanical engineering students that have been working together to design, analysis, and eventually manufacture a desirable model. The model designed will be represented as the operating prototype that will allow Capital City Pedicabs to hopefully expand their business and set up a pedibus manufacturing station in the southeast region of the United States.

**A. Project Goal**

The main goal of this project is to design and manufacture a road-ready pedibus prototype by April 2014. The design is to be eco-friendly, ergonomically attractable, and safe to the surround public. In the future, this project will aid as a reproduction rubric for future pedibus manufacturing.

**B. Project Objective**

Approaching into the spring semester, the main objective of the project still holds to present a final operating, multi-passenger pedibus model to the sponsors. In the past semester, the initial designing and analyzing stages of development were performed and completed to ensure that the model that is going to be manufactured is safe, easy to maintain, and comfortable for the passengers. To further approach the completion of this project the following points have to be met first.

* Finalize structural frame dimensions to conform to front and rear axles.
* Order raw materials and all mechanical parts for the final construction of the prototype.
* Manufacture the frame pedibus, by using outside welding resources.
* Assemble the pedibus. This involves the integrated drive shaft, front and rear axles, seats and peddling stations, driving console, and entertainment platforms.
* Perform final dynamic analysis for the finalized built prototype.
* Ensure the vehicle is safe to ride and abide to city regulations.
* Present the working model to the sponsor inspection and approval.

**II. Changes in Final Design**

 The pedibus design that is set to be manufactured is still the same design that was presented at the end of last semester. Only minor changes were made due to complexity and time constraints. The following changes have been made to the project to ensure a final completion date.

**A. Power Assistance**

An idea for the pedibus to involve an integrated power assistance provided by an electric motor was presented towards the end of the semester. An electric motor power assist would provide ease of peddling uphill or inclines. The topography of Tallahassee makes powering the pedibus without power assistance problematic in some areas of town. Due to the complexity of the connection between the motor and the pedal powered drive shaft, the final design will no longer involve power assistance. The absence of the electric motor will not alter the operation of the pedibus in anyway. The only concern is that the inclined roads will require more effort from the riders. The pedibus team discussed constructing the prototype without an electric motor with the sponsor and he agreed it was a good idea not to include it. His only concern was that the prototype be designed in a way that would allow for an electric motor to be added at a later date. The current design for the prototype will allow for this.

**B. Transmission**

An idea to include a transmission between the drive shaft and the rear axle was also being considered at the end of last semester. The transmission would allow for changes in cadence and torque requirements from the pedaling passengers. This could also be used to make pedaling more comfortable when driving the pedibus uphill. By changing the gear ratio the passengers could pedal faster with less torque and climb the hill slower but with less effort. Unfortunately, like the electric motor power assist, implementing this idea in the time allotted to complete this project will not be possible. The prototype pedibus we will be completing this semester will have space for a transmission to be added at a later date.

**III. Procurement**

 The pedibus Sponsor agreed to purchase all component required for the assembly of the pedibus project. The pedibus is a big vehicle requiring a large number of components to build it. Most of the components have already been ordered and purchased by the sponsor. The part already ordered include the metal framing, all bike gears and components, the rear axle, the front end, and the drive shaft.

All the aluminum and steel required to build the frame and the drive shaft were sourced at a local metal shop. Metal Fabrication and Sales of Tallahassee had prices comparable to those found online. They receive a shipment of metal every two weeks and the metal ordered to complete the pedibus prototype is expected to arrive next week.

The rear axle being used for the pedibus was removed from an 1995 Chevy Camaro. This rear axle was chosen for the favorably low gear ratio in the rear differential of 3.23:1. The rear axle was purchased at the local Pick n Pull on South Monroe. All members of the pedibus team met at Pick n Pull in the first week of the semester and worked together to cut the rear axle out of the Camaro. With the rear differential gear ratio known the gear ratio required for the bike gears was determined and the bike parts were ordered.

The bike components were purchased wholesale through the sponsors contact with a local bike mechanic. The bike parts ordered include the bike chains, gears, freewheels, seat posts, seats, and cranks required for all the pedaling station. The bike components are expected to arrive before the end of the month which will be well before they are required.

The front end of a mustang II was purchased from an online retailer. The front end includes all breaking, steering, and suspension components required for the pedibus. The front end is expected to arrive before the end of the month which is well before it will be needed in the construction.

The only parts not yet purchased are the wood for the bar tops and the material for the canopy. The reason these parts have not been purchased is they can be easily sourced at the local hardware store and they are the last things planned to be constructed on the pedibus. These parts are largely cosmetic and several options were presented to the sponsor. Once the sponsor chooses the bar top and canopy design he likes the final components will be purchased at a local hardware store.

**IV. Additional Resource Requirements**

Though a storage location for the unassembled parts and materials has been acquired, a workstation for the assembly of the parts still needs to be obtained. The work space will need to have ample work area, with tools and a welder. This location is being scouted currently, the sponsor has provided room to store the unassembled raw materials and has contact with a welder with a shop that could possibly be used to assemble the final project. Communication with the welder is currently in development and should be finalized by next week.

