

# Mech 153 – Final Project (2010)

Work in groups of 2 to 3.

Due date is as posted on my website ([www.fireflylabs.com](http://www.fireflylabs.com))

Your group's design must be unique. That means it must be different than any other group in the class.

A manufacturer of recumbent bicycles is interesting in coming up with something really unique and interesting for her customers to buy and ride. She wants to take the standard, ordinary chain drive and explore the possibility of using a combination drive.

Here is picture of the early prototype the design team has been working on.



## **A few facts about the existing transmission system**

- The centre-to-centre distance between sprockets is 600 mm.
- The human power transmitted at peak effort is 950 watts.
- The human can pedal at 100 rpm during the peak input of power.
- Small Sprocket: 17 teeth, Large Sprocket: 50

The marketing department wants to sell this bike to people with a true love of odd mechanical devices and has determined that the “chain-only” style of power transmission is much too simple to capture the imagination of the mechanical enthusiast. They want you and your team to examine two different combinations of chains, V-Belts and Gears. Here they are:

- a. Chain/V-Belt; and,
- b. V-Belt/Gears

(I’ll describe what I mean by this, in class.)

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When you think about this design challenge a little more you will realize that somewhere between the pedal input and the wheel output there will have to be another shaft assembly to hold the intermediate components in place. You will need to focus on this and design it. For each of the two designs the company has asked for a unique bearing and shaft arrangement. That means, for your Chain/V-Belt you will have to choose a type of bearing, shaft size and means of attaching the components onto the shaft (splined shaft or keyed shaft). For the V-Belt/Gear arrangement they want something different.

At the end of your investigation you must report on your work. Here are some of the things they want included in their report.

1. Really great sketches of your designs. CAD drawings are not acceptable. Fully label your sketches and make them fabulous.
2. A short written description of each of your designs.
3. A short specification as to which components go together to make up each of your designs.
4. A complete set of selection results that describe the selection process you went through to arrive at your design. Site text table references, show calculations, page references, web references (if you have any). In addition, provide a summary of your results.
5. Make your report super easy to go through and read. Consider your audience ... they are marketing people ... they respond well to nicely laid out, easy to follow yet complete work. They do ... really.