

## MECH 3200 – 12S – Homework Chap.1,2,3

This was the Team Design Project from 2011 Fall. We will use this problem several times this term as an example.

### Problem Scenario

The State Parks Department would like to make the back country in one of the state parks accessible to hikers, and hikers only (i.e., no horses, ATV's, or motorcycles – dogs are OK, and while there is no need to encourage mountain bikes, there is also no special need to accommodate them). A problem (or an opportunity, from the exclusion point of view) is that access to the back country requires passage of a potentially dangerous river (many hikers have been swept away) that flows in a gorge. Parks anticipates a crossing from one bank of the gorge to the other at a point on the extreme left of the photo below:



where the width of the gorge (high bank to high bank) is 150 ft.

Parks does not like the idea of a rope bridge. Previous rope bridges have had slippage type accidents associated with them. Parks feels that a more substantial bridge (suspension board bridge, for instance) becomes more horse/ATV/motorcycle friendly at the same time as it reduces slippage hazard, and also requires maintenance workers to hang their hides out over the dangerous river more often.

So Parks would like a hiker-powered cable car or tramway. Parks will not staff the tramway, though they will visit for maintenance. Parks will act as the construction manager for the

completed design, probably contracting out most of the individual fabrication and erection tasks. Getting specialized off-road vehicles (such as HMMWV) to either bank is difficult, but can be arranged (easier to the near bank). To satisfy Parks, the subject of this project is the whole tramway system of: cable and supports; car; human-powered propulsion; and landings. Or some other set of design features that satisfy the customer requirements.

### Homework Assignment

Please prepare:

1. List of Customers (users)
2. List of Customer Requirements (CR's) and correlate these to each customer
3. List of Engineering Characteristics (EC's) by which to measure the satisfaction of the CR's
4. Completed House of Quality (HoQ), resulting in target levels for the EC's
5. Write an Engineering Design Specification (EDS). This will include both EC's (primary design targets) and less forming but still important things like installation, safety, and social issues. Try to keep this brief - there is no need to be anywhere near as extensive as the drywall taping example.
6. Write an essential problem statement

Recall that, per syllabus, all HW in 3200 will be presented in the style of a technical memorandum. How to do this will be covered later in the course. But for now: "Use spellcheck, write clearly, use as few words as possible, and make your point as quickly as possible." Use bulleted lists where appropriate instead of wrap-around text. Number and caption every figure.

### Hint

Not to dictate a solution, but just so you can visualize what might represent a feasible point in design solution space:



