Donald P. Shiley School of Engineering
University of Portland
ME 403/503 – Engineering Design, Product Realization
Fall 2016

Lake-Side Resort Development

So far as teams, you have developed several different concepts and these have been presented to the class. Each team has narrowed down the design to two different options – and these have been presented to class on September 20. Each team is to now down-select for a final option. Over the next week, collect enough data (through web searches, analysis, etc.) to better determine costs and other pros/cons of at least two options. You may consider the two options you presented to class, or you may include ideas presented by a different team, or if you have thought of a completely novel approach, that's fine too. But pick two options for further evaluation. Cost will be the major deciding factor for down-select – but selecting which option is "best" is a little like deciding between apples and oranges because the resort will be developed over the next several years. Present the cost of both options to the client with pros/cons of each next week.
Reminder: this is for the water supply for the resort only. It does not include construction of cabins, waste water treatment, internal fixtures (tub, sink, etc.), etc.

- Identify specific pump(s) including maker and P/N (part number).
- Identify piping (length, diameter, material)
- Identify any other major items needed; if any (not each and every nut/bolt/fitting/etc. --- just the major items). Describe those items sufficiently well so that details could be worked out later. For example, let us say you are including a filtration system (all teams should be). You could identify a specific maker and model from www.whateveryouneed.etc or specify flow rate needed, expected performance (what is it filtering out), etc. This will take some research into what defines filtration systems – don't just make up something.
- Identify general location of where the major components (such as pumps) will be placed and where the pipes will go (use the crude map provided in the first phase if that helps). Make it as much to scale as reasonable with this fictitious project.
- Provide cost estimates for all of the above. A good google search should provide the answers. If you can't find the cost of the specific pump (etc.), you should at least find the cost of a similar one. This is a student project, not a real project, so I expect reasonable attempt at determining costs, but if the data is not semi-readily available, do the best you can with a reasonable effort. Reasonable time ~ 15 minutes to determine cost of one item.
- If you are planning on doing the development in more than one phase, then be sure it is clear what is needed now, and what will be needed in the future. Since more cabins are planned to be built, at a minimum, each team will probably need to include additional pipe to be installed later. If additional pumps will be needed, include that.
- AS ALWAYS – follow the standard problem solving format! Be sure to include all assumptions, what information is "given", what you are trying to determine with specific calculations, etc. All engineering decisions (pump specifications, pipe size, etc.) must be supported by data (analysis, etc.).

Design of Experiments, pairing

1) The following data was given on the previous assignment. Fortunately, the experiment was designed such that "pairing" can be used….so use it. Does the analysis for pairing provide a different conclusion than the non-paired analysis? If it does, does that change your conclusion? Assume 95% confidence.

Grinder	Response for Slow	Response for Fast
1	1.22	1.96
2	1.63	1.8
3	2.42	3.01
4	3.12	3.05
5	0.76	1.23
6	4.23	4.89
7	1.58	1.3
8	2.81	3.17
9	2.19	2.94
10	3.75	3.9
11	1.66	2.28
12	3.8	4.4

2) Ditto.

Grinder	Response for Slow	Response for Fast
1	1.22	1.96
2	1.63	1.8
3	2.42	3.01
4	3.12	3.05
5	0.76	1.23
6	4.23	4.89
7	1.58	1.3
8	4.78	0.82
9	2.19	2.94
10	3.75	3.9
11	1.66	2.28
12	3.8	4.4

3) This is the data from the paperclip fatigue test. Analyze it using pairing and compare to non-paired conclusion. Does the analysis for pairing provide a different conclusion than the non-paired analysis? If it does, does that change your conclusion? Assume 95% confidence.

“tester”	Small	Big
1	14.5	30.0
2	19.5	36.5
3	13.5	31.0
4	10.0	22.5
5	15.5	23.5
6	13.0	25.5
7	10.0	15.5
8	14.5	19.0
9	20.5	29.0
10	20.0	94.0