ME349
Engineering Design Projects

The Design Notebook

Each student is required to maintain a design notebook for this course. It will be collected at the end of the semester to help me evaluate what you contributed to the design. Use a bound notebook rather than a 3-ring binder. Binders are too messy and are not accepted by the courts as evidence, should what you are working on ever result in a patent.

What should you put in your design notebook? The final report documents your design, but your notebook tells how you got there. Your design notebook is a record of everything you have done in developing your design. Use it as a diary to record how you spent your hours on the project. The design notebook is NOT a place for course lecture notes. Use another notebook for that.

Your design notebook should include information such as:

Calculations.
Brainstorming sketches.
Information gathering phone calls. Make sure you record the date, the name of the person you spoke to, his or her title and company and the telephone number.
Reference material from the library or the web. Record title, author and call number in case you have get it again.
Parts lists.
Model numbers of all competing parts that you could use in your design
Cost estimations.
Assembly steps.

Go for volume. If you are really working hard on this project, you will be filling in the neighborhood of 10 pages each week. It is not unusual to fill one notebook and be starting on a second before the end of the course. Try to think visually with regard to your notebooks. It should include thumbnail sketches of ideas, free-body diagrams, design process and the like. Again, volume is the key.

Organize the notebook chronologically and be sure to date each entry. Dating is very important if you want to follow up on a phone call or if the Patent Office wants evidence on exactly when you came up with your wonderful invention. Number the pages. That way you can write cross-referencing notes like, "See page 23 for other info on cylinders".

Don't erase anything. If you don't like what you have, cross it out with a large X that will let you see what's underneath. This is important because you may wish to refer back to idea in the future. It will also allow to see your mistakes and not make them twice. Use lots of white space to separate entries. This will make it much easier to scan it for information later.

Write everything in the notebook rather than on separate slips of paper. However, if you do end up with calculations or notes on scraps of paper, tape the scrap right in the notebook. Keep your notebook with you at all times so you can record that brilliant idea on the spot. Some of your best thinking may happen in the middle of the night or during the Osbornes. Architects and artists always carry a sketchpad with them and are sketching throughout the day. Engineers would do well to mimic them.

Periodically include an assessment of the current state of your project. A well-defined statement or diagram can significantly improve the documentation of the design process.

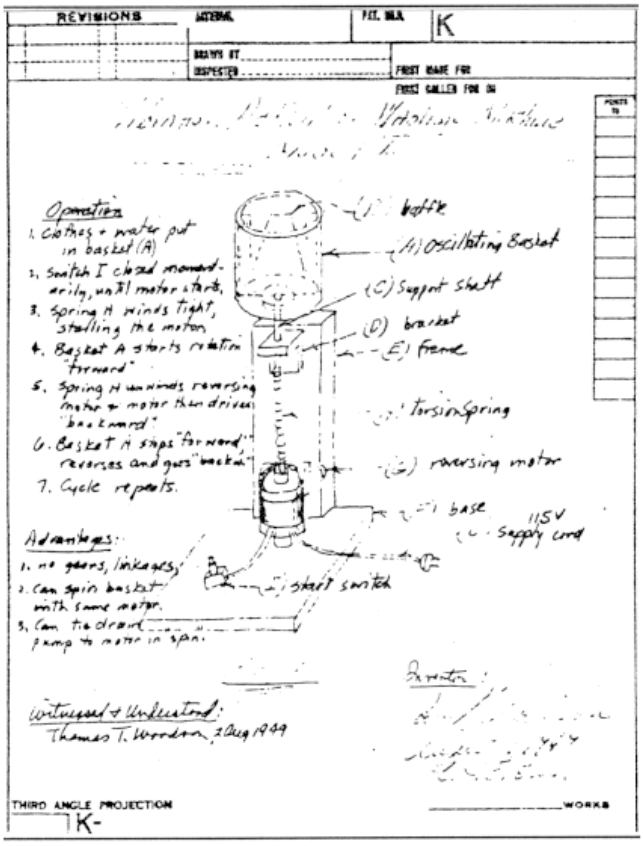
Write your name, phone number and e-mail address (and any other identifying information you wish to include) inside the front cover of your notebook. If it is ever lost you will want it returned as quickly as possible.

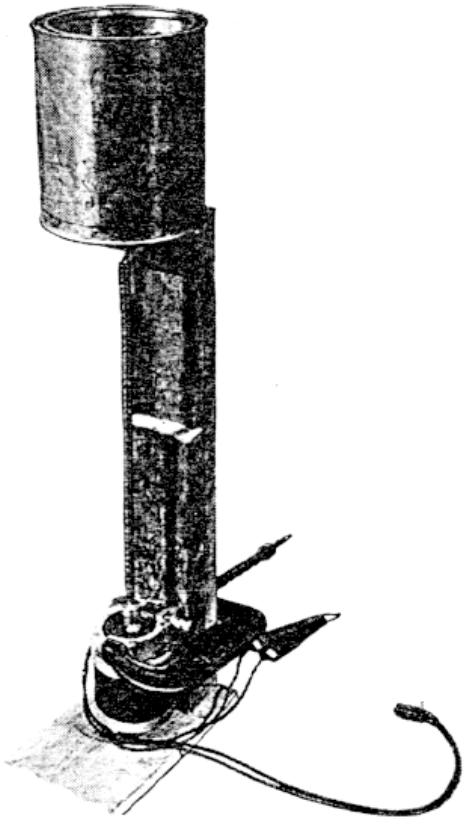
Keep your notebook neat. Do not use it as a coaster or to set your pizza on. Assume that your boss is going to read it to determine how big a raise you get. Finally, remember that what you include in your notebook is not just for you, but for others as well.

For more information on keeping a design notebook, you may wish to visit:

http://writing.colostate.edu/guides/documents/notebook/

Following are several samples of notebook pages:





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Observations:

- we need to ideally capture as many images as possible under varying conditions. Then we will compare the surface parameters of these images to profilometer reading off of the samples. Do we that comes the closest is the best stitching ⇒ our test will determine our detail design

- our tests will also verify that each parameter will work in being able to characterize distinct textures.

- In designing the frame, we will only look at existing manufacturers because (1) sponsor's priority is not w/ the design
2) existing equipment already exists.

⇒ Recommendation to sponsor - Surface topography is only a small factor in friction. Trying to correlate this information is not going to be very easy.

⇒ Parameters we will vary to see what affects vision measurements

- light intensity, direction of light
- angle tilt, warping of samples
- field of view, ~~angle of the lens~~ movement of sample should be parallel.
- magnification
- height
- statistical significance in one sample.

What else.

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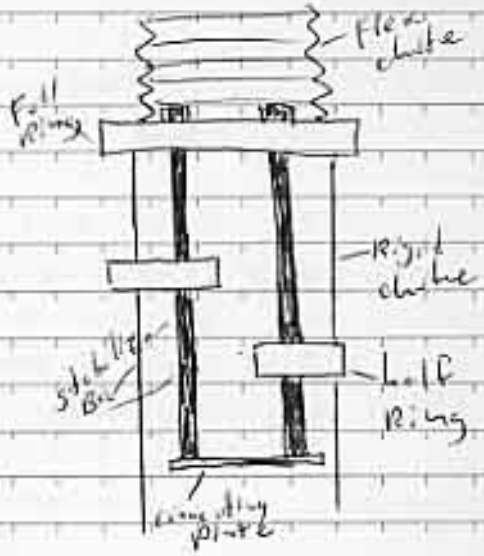
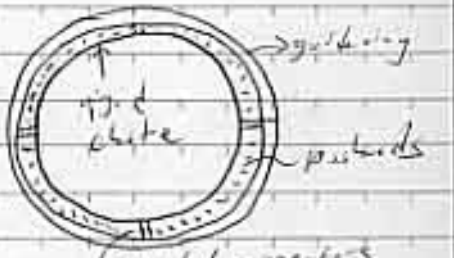
Stabilizers



Refer to the half ring top view on page ~~B~~ 55. The holes @ B are the points at which the actuating force acts, either up or down. Depending on the distribution of forces among the pushrods, the half ring will likely see a moment. Sometimes, the moment may tend to deflect the threaded rods and pushrods such that the half ring pulls away from the chute's outer surface. This deflection has been designed away, based on a suggestion by our Graphics advisor. A set of rigidly connected stabilizing bars could be fixed to the full ring, and bound at their ends. One bar from each stabilizer would pass through each half ring. This sliding fit would eliminate deflection away from the chute, and it would still allow axial motion of each half ring, independent of each other.

guide Ring



the guide ring's role is shown on pg 51, But here is a plan view. Really simple. A thin strip of metal is wrapped around the Rigid chute with enough clearance to allow a pushrod sliding fit. This keeps the pushrods from bending or buckling away from the chute

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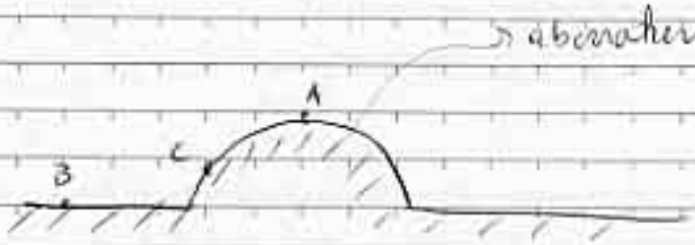
- We discovered that height does not correspond to pixel intensity like $(\frac{1}{\text{distance}})^2$ squared like we had hypothesized. There is a reason for this: for an aberration on the surface similar to the one below



point A is the brightest because it is closest to the camera and it reflects all incident light back to the camera if the light came perpendicular to it. Point C, however, is the darkest because it only reflects back a portion of incident light back to the camera. Actually, the only light it reflects back is not coming directly from the perpendicular (from straight top), it is the light that has reflected to it from some where else for example,

Point B is brighter than C because all incident from top does indeed go back towards camera.

Proposed solution to this problem:

1) have a ~~semicircle~~ semisphere of ~~the~~ light shining down on specimen.
2) cover specimen w/ a shroud that reflects light in all direction

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