Sample Engineering Notebook Entries

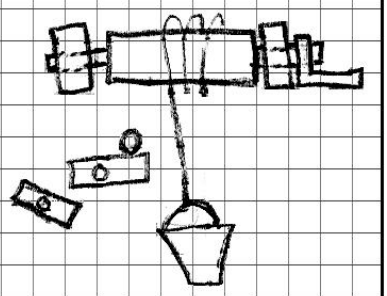
The following would be considered **excellent** examples of entries in an engineering notebook.

Continued from page 12-4

1st Idea for a Wheel and Axle Sub-System

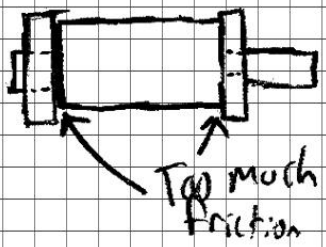
125

5/13 I came up with a way to use the wheel and axle in my design. A weight falls into the bucket and causes the axle to spin. The wheel (what looks like a hand crank in this case) is attached to the axle and would also spin ...hitting something and transferring its energy to the next part of the system. Now I have to figure out how to use it in my system.

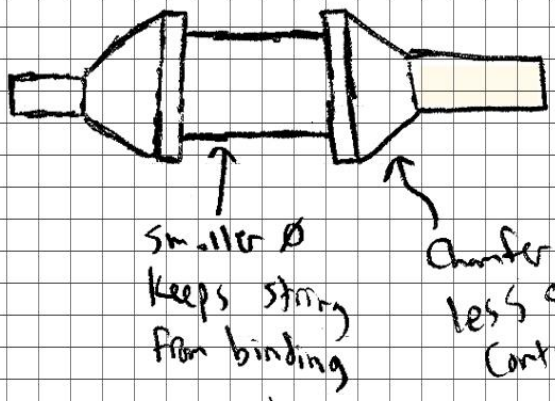


My instructor let me borrow a book to help me get some ideas for my system. I found a great idea for a screw and wedge mechanism on page 194.

Chironis, N, and Sclater, N, (1996). Mechanisms and Mechanical Devices Source-book (2nd edition). New York, NY: McGraw-Hill.



5/15 It's Sunday, and I came in at 10:00 AM to work on the project. I spent the morning modifying the wheel and axle design, because I think it is going to cause too much friction between the side walls and the bracket that will hold it in place. I also went to the other Technology Lab and found some 1" diameter aluminum bar stock to make my wheel and axle.



2nd Idea
Modified Wheel and Axle address potential friction issue

Continued on page 12-6

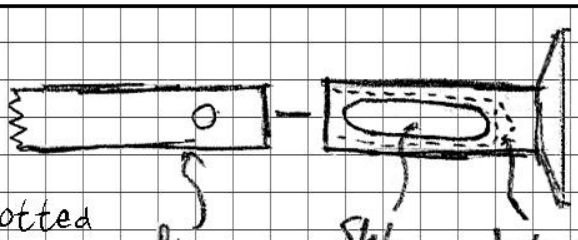
SIGNATURE [signature] DATE May 15, 2005

DISCLOSED TO AND UNDERSTOOD BY Richard Blais DATE 5-15-05

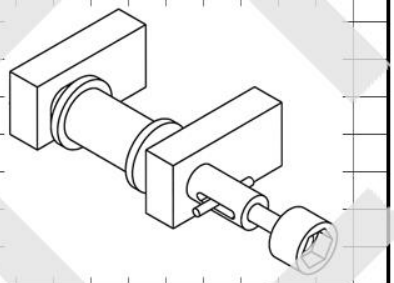
PROPRIETARY INFORMATION

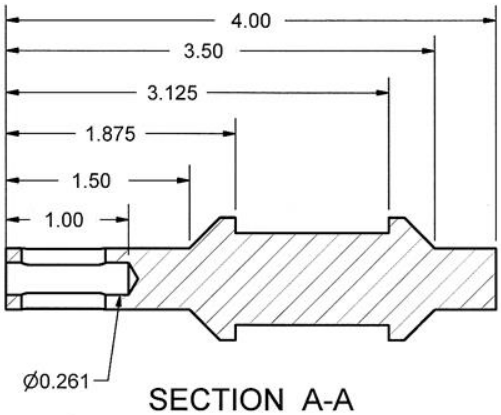
Continued from page 12-5

3rd Idea
Linear Motion Allowance

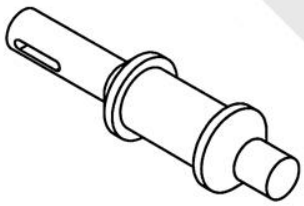


5/15 (continued) I added a slotted hole to the design, which will allow a shaft to connect to the wheel and axle. As the wheel and axle spins, the shaft (which is held in place by a pin) will also spin. A spring inside the slotted hole will allow the pin (which attaches to a screw on the other end) to move linearly...hence the reason for the slot. I drew up the necessary models in CADD, and assembled them to make sure they will work (in theory). I then created a dimensioned drawing of the new wheel and axle design and fabricated it on the metal lathe.

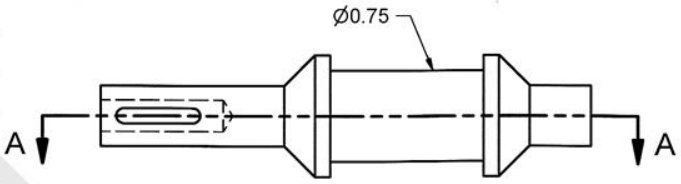


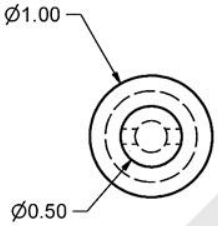


SECTION A-A



Aluminum Axle
Scale 1:1





CADD Printouts of Assembled Sub-System and Technical Drawing of Wheel and Axle

Continued on page 12-7

SIGNATURE Richard Blais DATE MAY 15, 2005

DISCLOSED TO AND UNDERSTOOD BY Richard Blais DATE 5-15-05

Continued from page 126

Picture of Prototyped Wheel and Axle Sub-System

String and Bucket not shown

taken 5/17 with digital camera and cleaned up in Photoshop

wheel_axle_subsystem.jpg

5/17 I finished machining the wheel and axle, and tossed together a mock-up of an idea for the pin so that I could test the design. The spring was purchased from the local hardware store, and cost me $0.75. My instructor gave me a bin full of scrap hardware parts to scavange through. That's how I found the 6-32 machine screw and 5/16 nut.

Wheel and Axle Mechanical Advantage calculations

r_a = radius of the axle

r_w = radius of the wheel

MA = mechanical advantage

$$MA = \frac{r_w}{r_a}$$

$$MA = \frac{0.75}{0.5}$$

$$MA = 1.5$$

5/18 Without considering friction in the system, my wheel and axle design ~~should give~~ should multiply the input force one and one-half times. Hopefully this will be enough to turn the screw on the other end of the pin. I think a brass weight falling into the bucket should work.

Continued on page

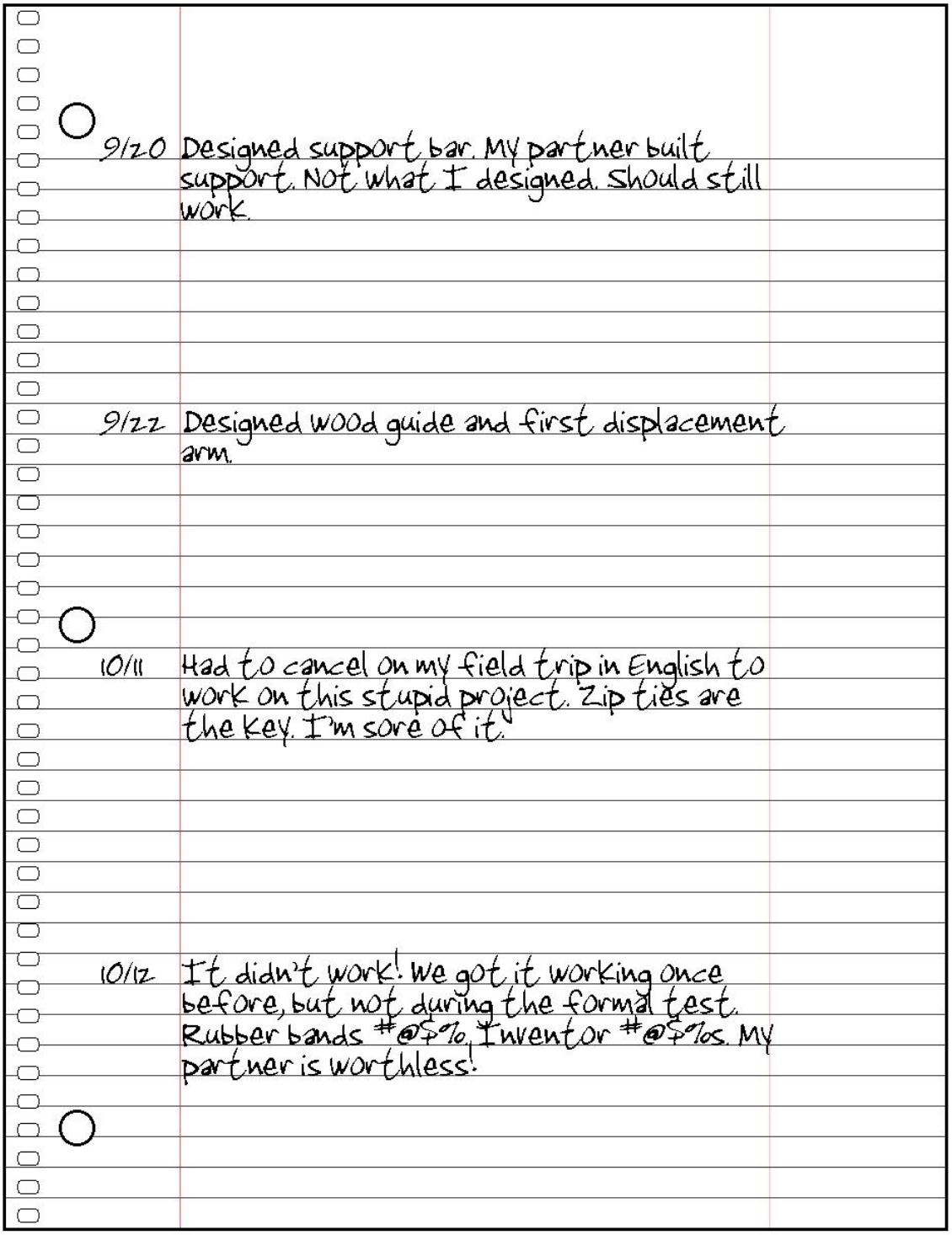
SIGNATURE | DATE

DISCLOSED TO AND UNDERSTOOD BY | DATE | PROPRIETARY INFORMATION

Why do the previous examples represent outstanding entries in an engineering notebook?

- The pages have been sequentially numbered.
- The pages are part of a bound notebook.
- There is a dedicated location on each page for the designer’s and witness’s dated signatures.
- All figures and calculations have been clearly labeled.
- Inserted items have been properly attached to their respective pages.
- The date for each entry is clearly identified.
- The student included annotated sketches that help the reader understand the ideas.
- Detailed explanations of how the designs are supposed to work were given.
- The student gave evidence of research.
- Problems that were encountered through experimentation were chronicled, and ideas to fix them were clearly evident.
- A technical drawing for a prototype was given, which specified the material from which the part was to be made.
- A digital photograph of the prototype was included that suggests how the object is to be assembled.
- The information given in the entries is proportional to the amount of time given per class period.
- Any mistakes that were made had a single line drawn through them. Mistakes were initialed.

The following is an example of an **unacceptable** engineering notebook. Keep in mind that each entry represents a reflection of 75 minutes of continuous work.



Why does the previous example represent an unacceptable engineering notebook?

- The student submitted a sheet of loose leaf paper that was removed from a wire bound spiral notebook. An engineering notebook must be a bound document. No pages should ever be removed from an engineering notebook.
- The page number is not identified in ink.

- The student did not sign and date the page.
- Several class meetings between 9/22 and 10/11 are not represented by notebook entries.
- No sketches, CAD model graphics, or technical drawings are included to support the idea that the support bar, guide, or displacement arm was actually designed or being built. It also appeared that the student was leaving room so that he/she could go back and add sketches later on in an attempt to satisfy the rubric.
- Except for wood, which encompasses a broad spectrum, no tools or materials were identified as being used.
- The student offered no explanation as to functions of the support bar, wood guide, and displacement arm.
- The entries do not show that the partners talked about their ideas or worked on their designs as a team.
- The entries do not talk about any special considerations or problems that might have been encountered during the design of the parts.
- Only fragments of ideas have been documented. There is no detail at all.
- The student used inappropriate expletives in a formal document and was openly disrespectful to his/her teammate.
- 75 minutes of work cannot be accurately and completely summed up in one sentence.