

### **Engineering Notebook**

# **Engineering Notebook**

- What Is an Engineering Notebook?
- Why Keep an Engineering Notebook?
- Who Keeps an Engineering Notebook?
- Contents
- Engineering Notebook Sections
- Standard Page Layout
- Best Practices
- Historical Examples



### What Is an Engineering Notebook?

An engineering notebook is a book in which an engineer will formally document, in chronological order, all of his/her work that is associated with a specific design project.

- Clear and detailed description of your design process
- Someone unfamiliar with work could take over project without additional information





### Why Keep an Engineering Notebook?

An engineering notebook is recognized as a *legal document* that is used in patent activities to...

- Prove the origin of an idea that led to a solution
- Prove when events or ideas occurred
- Prove diligence in turning the idea into a solution
- Prove when an idea became a working solution ("reduced to practice")





### Who Keeps an Engineering Notebook?

### Engineers that work on R & D

- Legal documentation of work
- Continuity in projects

### **Engineering students**

- High school and college students
- Develop time management skills
- Improve research, documentation, and communication skills
- Basis for professional presentation of work



**PLTW** Engineering

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### Contents

- Discovering the problem
- Research
- Sketches with labels and descriptions
- Brainstorming
- Calculations
- Your daily thoughts and ideas
- Pictures

- Expert input (names, positions, contact info, details of conversations)
- Work session and meeting summaries
- Test procedures, results, and conclusions
- Digital technical drawings
- Design modifications

#### **Everything** you do/think related to a specific design project



# **Engineering Notebook Sections**

- Title Page
- Table of Contents
- General Chronological Entries
- References
- Business/Expert Contacts

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# Standard Page Layout

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  - Include a statement of the proprietary nature of notebook

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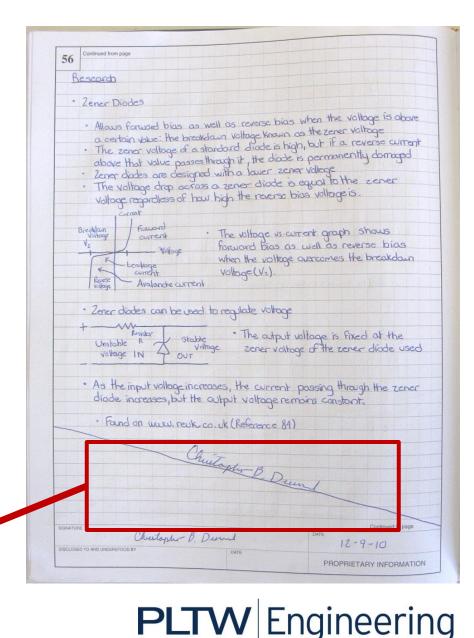
- All work is in pen.
- Markers that bleed through the paper are not used.
- Pages are sequentially numbered in ink on the top outside edge.
- Notebooks are bound.
  - Cannot add pages
  - Cannot remove pages

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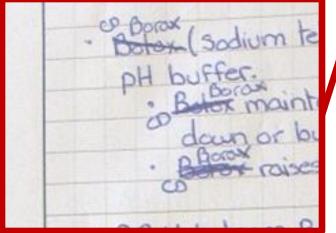
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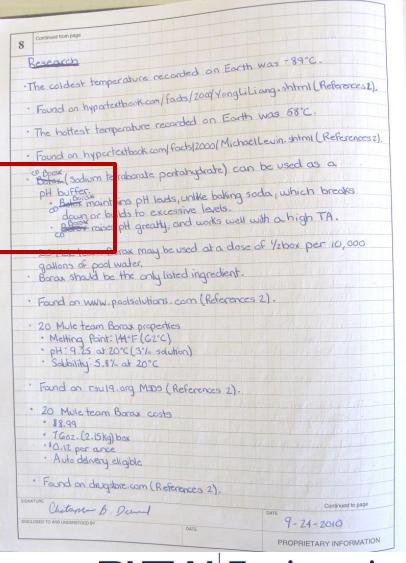




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- If you make a mistake, draw a line through it, enter the correct information, and initial the change.
- Never erase or remove anything.

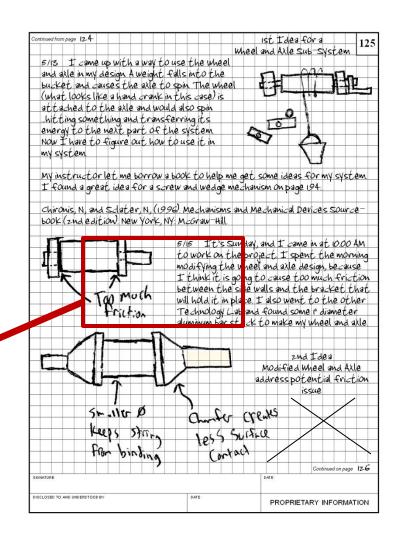




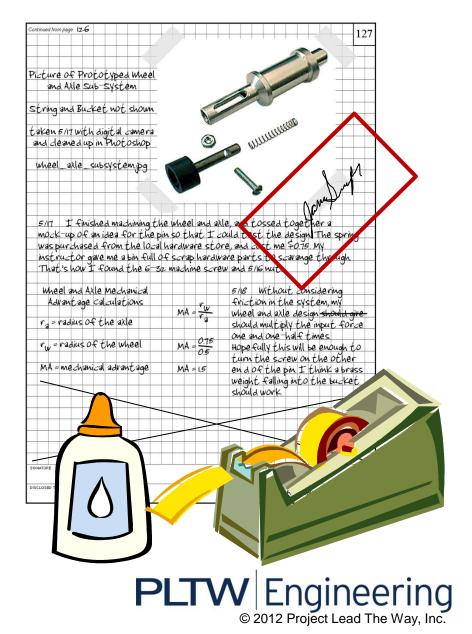
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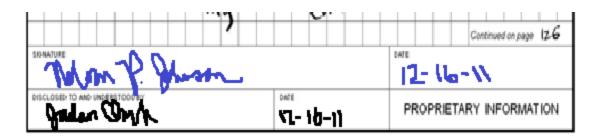
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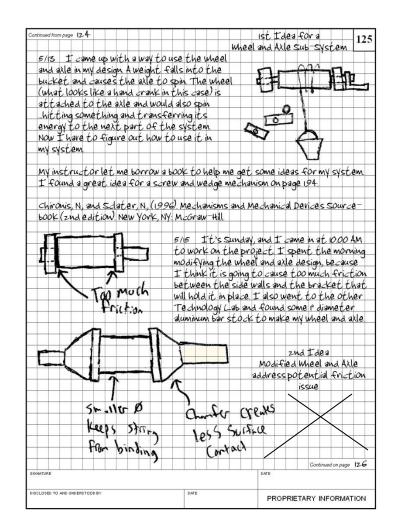


- Sign and date each page before the next page is started.
- A colleague or mentor should corroborate the events and facts on each page and sign as a witness.



Store the notebook in a safe location.
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- Sketches
  - Label all parts of the sketch
  - Describe each sketch



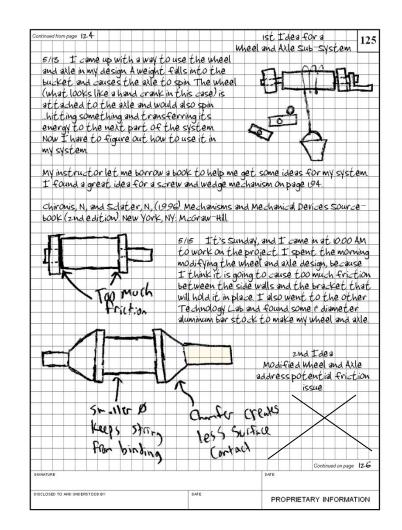
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Picture of Prototyped Wheel and Axle Sub-System

Mheel and Axle Mechanical Advantage calculations	r
$r_a = radius of the axle$	$MA = \frac{10}{r_3}$
$r_{w} = radius of the wheel$	MA = 0.75
MA = mechanical advantage	MA = 15

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Picture of Prototyped Wheel					5	T
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- Progress Entries
  - Reflect on tasks accomplished, successes, and failures
  - Reflect on future needs and tasks to be completed



# Be NEAT, be ACCURATE, be LEGIBLE, and be THOROUGH.



# **Historical Example**

- Page from Earl Silas Tupper's (1907 -1983) "Invention Diary and Sketchbook"
- Mr. Tupper developed a wide range of inventions, including Tupperware

Paint Pot. March 14, 1939 Faint Pot. Farl S. Tupper - Uses: 1. Tree Men and Jarmens. tar try paint schellack. A. around every house, Jarm 1. molded rubber handle aut shaps for panet grease & oil, etc Stock 10% round 3. Headle Sets nicely into hole in bole seen for pointing pile seen cutes. 3. Handle to the role inte, to carryon Singer Distribution: Handle loop Son 1. Sell they try supple around boat houses 5. Proper Container 2. Thoy hardwares and 10 Cent 3. Three a parent, shellas or other Company as a reme Antanir Premium (special other Btentable Teatures 1. Handle ( mitel handle arms raming up to commit deal Paint pot from "Invention Diary and Sketchbook," 1939 Earl S. Tupper, Leominster, Massachusetts

Doodles, Drafts and Designs: Industrial Drawings from the Smithsonian

**PLTW** Engineering

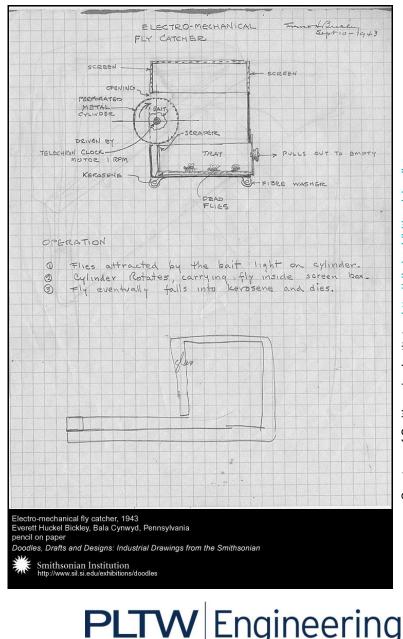
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pencil on paper

Smithsonian Institution http://www.sil.si.edu/exhibitions/doodles

# **Historical Example**

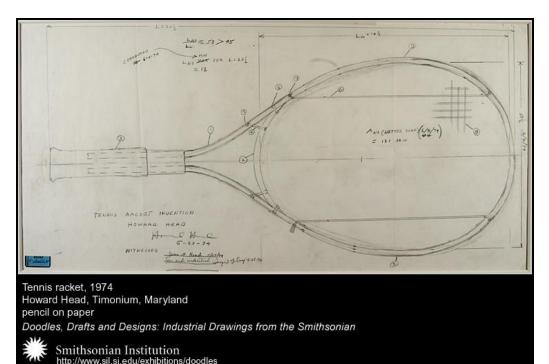
- Everett Huckel Bickley (1888-1972) original design notes, for an electro-mechanical fly catcher, 1943
- Mr. Bickley developed dozens of inventions. His most lucrative invention was a bean-sorting machine that separated good beans from bad.



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### **Historical Example**

- Howard Head (1914 1991) original design for an over-sized tennis racket, 1974
- The larger racket more than doubled the sweet spot of the traditional racket





Courtesy of Smithsonian Institute: http://sil.si.exhibitions\doodles

### **Course Binder**

- Differs from the Engineering Notebook
- Used to store *all* course material <u>not</u> included in the Engineering Notebook including
  - Activities
  - Research
  - Reference material
  - Handouts





# **Engineering Notebook**

- What Is an Engineering Notebook?
- Why Keep an Engineering Notebook?
- Who Keeps an Engineering Notebook?
- Contents
- Engineering Notebook Sections
- Standard Page Layout
- Best Practices
- Historical Examples



### Reference

Tupper, E. S. (1939). *Invention diary and sketchbook*. Retrieved from Smithsonian Institute website:

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Bickley, E. H. (1943). *Design notes*. Retrieved from Smithsonian Institute website: http://www.sil.si.edu/exhibitions/doodles

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