Memorandum ME EN 3400 (Spring 2024)

To: Russ Askren

From: Brandon Lim

Date: 3/14/2024

Subject: Reading & Writing 2

cc: N/a

Attachments: N/a

1. **Identify the chapter or article you read, by author and title, distinguishing between book title and chapter title using IEEE bibliographic conventions.**

[1] H. Petroski, “Zippers and Development” in *Invention by Design: How Engineers Get from Thought to Thing*. Harvard University Press, 1996.

1. **Create a message (a single simple sentence (remember from reading Doumont)) that matches the article. Provide textual justification from the article to support your message.**

Problems found in everyday products generate new devices that are developed over many iterations and years to produce sound solutions.

“Howe’s device, like all inventions, addressed shortcomings associated with the existing way of doing things. [1]”

“His idea was to modify the way a plastic zipper would open so that it would be more effective in such applications…these handy new products came to be known as Ziploc bags. [1]”

“Not only did Madsen’s zipper remove the problems of snagging and jamming, but it had the additional advantages of being waterproof, dustproof, and airtight. [1]”

“He had an annoying time with a stuck zipper on his wife’s dress…in all, it took about six years from de Mestral’s conceptual design to come with a commercially viable product and the machinery to produce it economically…The product was sold under the catchy trademark Velcro. [1]”

“Such developments were clearly motivated by looking for ways to make zipper better or more economical, and such incremental variations and improvements on the same basic idea characterize much of engineering research and development. [1]””

1. **Summarize the content of article, with a focus on the engineering aspects of the content. Summarizing the content of the article should not simply provide a chronological summary of the article (the author did this, then the author did something else), but should show that you have digested and synthesized the content of the article in a manner that reflects our engineering interests. The summary must be comprehensive. For example, if the author uses four examples to demonstrate the message, I expect to see each example summarized and explain how it supports the message. Your summary should be complete and support the message you identify for the article.**

One major task that plagued the nineteenth century was the fastening and unfastening of clothing and shoes. Due to the shear number of hooks and buttons that were included on garments, mistakes in fastening became very time-consuming fixes. Elias Howe, Jr., the inventor of the sewing machine introduced a solution to this problem by creating a design for a new fastening device. This new fastening device laid out the groundwork for how a sliding fastener would operate but was never pursued commercially.

Whitcomb L. Judson, a Chicago mechanical engineer, grew tired of bending over to lace up his boots and created a new method to fasten boots known as a “clasp locker or unlocker for shoes”. Although this clasp locker was originally designed for fastening shoes, Whitcomb recognized the general application for wherever fastening interlocking parts may apply. Judson had run into various economic and manufacturing issues early in the development of the new fastening device and after a decade had passed since his first fastener-patent, Judson had found a solution. Judson had created a chain making machine that was responsible for the manufacturing of the interlocking hooks and links of a new fastener design known as the C-curity faster. Although Judson had made major improvements for sliding fastener, his designs still had problems of springing open and locking up.

Gideon Sundback was an electrical engineer that Judsons company, the Automatic Hook and Eye Company, hired to take on the role of making the C-curity fastener more economical and reliable. Sundback offered a solution to replace the hook design of the sliding fastener with a bead locking design that came to be known as Hookless No. 2. To manufacturer Hookless No. 2, Sundback developed a new machine known as the S-L machine that had had reliable and efficient production. The new sliding fasteners weren’t very popular due to manufacturer sewing complaints, but in the 1930s, the B.F. Goodrich company trademarked the sliding fasteners on their new boots as Zippers, creating the unofficial name for sliding hookless fasteners.

In the 1940s after World War II, the Automatic Hook and Eye Company, now known as Talon Inc, had many of their patents on zipper technology expire. This led to the competition and development of zipper technology by other companies. The Germans made revolutionary leaps in zipper technology by transitioning to plastic teeth instead of metal ones that could match easier with dyed garments. These advancements in zipper technology were motivated by looking for ways to make zippers more economical and better which follows the same ideas that characterize the engineering design process.

In 1948, a Swiss inventor, George de Mestral, wondered why woodland cockleburs stuck to his clothing. After investigation of the burs under a microscope, he discovered the mechanism that caused the burs to stick to his clothing and envisioned an application of the mechanism as an alternative to annoying zippers that often get stuck. De Mestral then designed a cotton prototype of this mechanism and later a more durable nylon version that he called “locking tape” to be used in textiles and garments as an alternative to zippers. Six years after the first conceptual design, the new fastening device was commercially viable and was sold under the trademark Velcro. Although Velcro was successful and fixed the issue of zippers locking up, it had its own shortcomings of longevity and did not replace the zipper entirely.

Metal zippers continued to create various issues ranging from snagging to corrosion of the teeth. Borgda Madsen, an inventor looking to fix the shortcomings of the metal zipper, came up with the idea of a completely plastic zipper. This solved the issue of snagging and jamming but also created many new advantages like better aesthetics in the clothing industry, waterproofing, dustproofing, and creating an airtight connection. To implement this idea, Madsen entrusted Steven Ausnit, a mechanical engineer, who brought the idea to life and created a successful product.

In the 1950s, Steven Ausnit began experimenting more with nylon and polyethylene fasteners that are implemented on plastic bags to provide convenient storage. His idea was to modify the way a plastic zipper functioned to be more effective in applications where small parts and items could be stored. Instead of creating a slider that would interlock beads or teeth together, Ausnit favored a design where the use of forces applied directly by the fingers could open and close bags. A Japanese inventor, Kahuji Naito, had developed such a design where the components of the zipper enclosure could be extruded as an integral part of the plastic bag. In 1962, Ausnit’s firm acquired the rights to the process and started the manufacturing and retail of the closable plastic storage bags. Later, Ausnit’s company grated the Dow Chemical Company a license to sell these plastic bags directly to consumers and they became known as Ziploc bags.

The zipper, Velcro, and the Ziploc bag are all amazing stories of the process it took to create a thing from an idea and how each invention inspired others just like it.

1. **Make observations (at least 3) about communication techniques that you found effective (or ineffective). If the article has images, take a careful look at how they are constructed, what the caption says, and how the article makes use of the images in the text. Or, identify a paragraph or section that is particularly well put together. What makes it work that way? Or, find a complex idea that was very well explained. What made the explanation work? Make sure you explain the technique with adequate justification that indicates you could use (or avoid) the technique. Since the articles are all PDFs, snipping examples to include in your memo is useful and recommended. These snips do not need to use proper figure formatting or referencing techniques.**

* I found it ineffective that this chapter started off talking about the development of zippers, took a quick hiatus to talk about Velcro, and then returned to advancements in zippers. I feel that it would have been easier for the readers to comprehend the information if the topics were grouped together more strictly. When immersed in the development of zippers, I feel like I was quickly transitioned into Velcro, and then randomly transitioned back into zippers. I will defiantly avoid this in my own work by trying to keep topics and concepts grouped together so that the reader will have an easy time following the information I present to them.
* I found that it was very effective for the chapter to include images in close proximity to where they are referenced in the text. This made it easy for me as a reader to reference what the text was talking about without having to scroll back and forth between pages. The figures caption also helps to distinguish it from other images in this chapter. This was very effective in the way that I did not have to second guess myself when comparing sections of text to their images. Using this technique in my own technical reports could drastically help clarify readers doubts and concerns because pictures can speak a thousand words when located in the correct sections.

A book with drawings and text

Description automatically generated

* An effective communication technique used in this chapter was the bolded sub-headings at the beginning of every new section. Although the sequencing of information in this chapter seemed ineffective to me, the bolded sub-headings helped to clarify the information I was about to read. If these bolded sub-headings weren’t used in this chapter, I would be very lost when transitioning from paragraph to paragraph. Utilizing this in my own writing will be a great way to ensure that the readers know what the information in the coming section is going to be about. To ensure good practice of this technique in my own writing, I think it will be important to format my writing well and to choose descriptive titles for each heading.

A page of a book

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