

## This Designer Loves Paper!

By Isabel Uria

I am a paper engineer, and I design with pop-ups.

The first time I took a serious look at a pop-up book since my childhood was in the summer of 2007 when I was entering my last year of undergrad studying Graphic Design. The book was Robert Sabuda's *The Wonderful Wizard of Oz: A Commemorative Pop-Up*. After observing every detail, fold, cut, paste, and paper mechanism, I decided I had to learn how to make these intricate pop-up constructions. I had no idea where to start. Little did I know that I would follow my curiosity for years until I entered an MFA program, during which I devoted myself to exploring the application of paper and pop-ups in graphic design.



Paper. It can be ripped, rolled, folded, pasted, printed on, and crumbled. Paper can cut you. But you can cut it right back! Paint on it, crease it, die-cut it, ink it, hole-punch it, staple it, dice it, use it as pulp, shape it, wear it: possibilities abound. Some artists and designers, such as Sabuda and I, choose to paper-engineer pop-up spreads or pop-up books. To paper engineer means to work with paper (cutting, folding, pasting) like an engineer would: to construct different mechanisms and structures into 3D shapes or forms. No one knows who coined the term. Since Robert Sabuda and Matthew Reinhart first published their own pop-up books, around 1995-2000, people in the industry referred to them as paper engineers, and thus the term became familiar.

Sabuda and Reinhart play with paper to make pop-up books. A pop-up book contains multiple pop-up spreads, most often five or six. In order for a paper-engineered work to be called a pop-up, it must be contained flat when the spread is shut and rise into three-dimensional form when opened. Pop-ups form part of the larger spectrum of movable books, which include (but are not limited to) flap books, tab books, volvelles, and others.

So why would a graphic designer choose to paper-engineer? In my case, I noticed the possibilities. Working with paper and designing with pop-ups offer endless possibilities. Paper engineering is a set of skills or a discipline that designers and enthusiasts alike can acquire, learn, develop, and build on. Designers can also enjoy the physicality of the pop-up. A pop-up may command more attention as a 3D design piece than many other 2D pieces. Similarly, it can serve to educate and transmit information to the reader/viewer in a more substantial and exciting way. People remember movable pieces because they interact physically with them. People touch and play with pop-ups. They don't just look at them and turn the page. Movable books can pop out at you to make you look. Sometimes, pop-ups even cross the boundaries of their three-dimensionality by diving into the screen's fourth dimension (in movies and theater-like storytelling). Due to this array of possibilities, I think paper engineering combined with graphic design make a viable option for designers today.



In an article written for the *LA Times* on August 21, 2005, Scott Martelle talks about the “wow effect” and refers to something Sabuda said: “People think that it’s magic... There’s no electricity, no metal or screws or things that you have to plug in. It is so non-tech, and you get to make the magic happen with your hands.” This “wow effect” attracts people to observe pop-ups more closely and even keep them as treasured objects. A couple of years ago, I researched simple pop-ups that could work as a design for an ad in a magazine’s double-page spread. A co-worker kept two pop-ups in her office drawer as inspiration pieces. “I saved them because they were so beautiful. No other design can compete with how compelling these are.” Her comment not only made me think about the power of the ad’s three-dimensionality, but it also made me consider how strong a design can become when it is paired with paper engineering.

One of the designs was from *Fruit of the Loom*. Made up of eight transparent spirals placed in a circular composition, these pop-up pieces converged at the center pulling all the spirals up as the spread opens. Little colorful women’s panties appeared as butterflies flying along the spirals, wiggling above the green, blurry, spring, plant-looking background. The pop-up ad attempted to simulate butterflies flying around a bush with flowers. While talking about the choice to make it a pop-up, my co-worker, a seasoned brand designer, noticed how the physicality of the object became more compelling as a design element over anything else. If it had not jumped off the page, she probably would not have given it a second glance. She would not have kept it neatly in her office drawer for over a year, either.

For me, a pop-up feels more engaging and playful. When a design pops up, it becomes a more tactile, physical experience for the viewer rather than only a visual one. I love how they move and how interactive they are. When I make a pop-up, I pay close attention to unexpected pops that the tension of the paper can create, and how these can further impact the design. Above anything else, knowing what the material can do and how it reacts to a series of cuts, folds, and pastes are key. By utilizing the qualities of paper to my advantage, I can bend, fold, twist, and/or attach different pieces to maximize the sense of movement. I must pay attention to the potential of paper and push its physical characteristics to create the most exciting of pop-ups.

Building pop-ups is not necessarily about constructing intricate designs, but using simple mechanisms in an efficient manner. This means making it pop more with the least engineering and sometimes with the least amount of paper. Andrew Baron, a master paper engineer, said to me during the *2008 Movable Book Society Conference*, “It’s important to cause the most movement out of each paper mechanism. The mechanism can be simple, but how much movement you can get out of that simple mechanism, that’s what counts.” Bruce Foster, another master paper engineer, agreed by sharing his views of what makes a pop-up great: “volume, movement, surprise, new techniques, or a surprising new twist on or combination of techniques, all in a great composition.” In my opinion, the physicality of paper engineering is most compelling because it deals with a multiple sensory experience. Not only do I look at a pop-up, but I experience it through touch and sound, as it opens and creases and un-creases. This helps me remember it. Through this experience, a designer can endow even the simplest of structures with the most curious effects, those “wow effects” that form part of a pop-up’s magic.



Paper engineering, in the form of pop-ups or other paper works, can also serve to visualize, educate, and communicate in a more exciting way. Information that I may consider hard to digest and remember or potentially boring and banal becomes easier for me to understand or more interesting based on how it is depicted. Here, I pose three distinct examples of how pop-ups can make designs better. The first example is a *volvelle*. The origin of *volvelles* reveals the history of where pop-ups came from and the purpose of movable books. The second example is Andrew Baron's *Acuity's Storybook Year*, one of the most recent high-budget pop-up books produced and released in 2010 as a limited edition for Acuity, a Californian insurance company. The third example is *Good 100*, where this magazine visualized its entire *Issue 017*, of Fall 2009, with paper illustrations and diagrams.

At the 2008 *Movable Book Society Conference*, held in Washington, D.C., I learned that Ramon Llull Majorca, a Catalan philosopher and mystic, was credited in the 13th century with inventing what we know now as the *volvelle*: a set of two or more discs that rotate from a center pivot to hide, match, reveal, and mismatch different combinations of information. Most recent research reveals it was not him, but a Benedictine monk of St. Albans, England, Matthew Paris (1200-1256), who invented the device, as well as maps with flaps that fold open, commonly known today as *gatefolds*. Both of these men used paper-engineered movable structures (*volvelles*) as functional tools with a purpose. Paris' *volvelle* marked Easter year by year while one of his maps, *Chronica Maiora*, depicted a pilgrimage to Jerusalem. Here, he used movables to create a branding and a wayfinding system. Llull attempted to collate all the knowledge he could into a single system—in the form of a *volvelle*—from which people could understand the universe and God. These very first movables took a paper-engineered structure and designed it to serve as a visual aid, a learning tool.

These were not the only instances of movable books used as tools. From the 13th to the 18th centuries, before movable books for children appeared, pop-ups were produced to teach adult students about anatomy, astrology, obstetrics, and astronomy. These books utilized flaps, rotating discs, and *fugitive sheets*—sheets not bound into a book, but loosely inserted into it. In turn, all these parts functioned as stacked layers of information. For example, for dissecting a body, you would lift the flaps and learn through the illustrated layers of body parts. Spratt's *Obstetric Tables*, published in 1848, even included a paper-engineered illustrated design of a partial-birth abortion being done in this era! It's important to know that, historically, pop-ups originated to educate and be visual aids. This is their first (of many) application possibility.

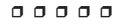
Jumping to modern times, pop-up books and pop-up spreads also show information in more exciting, unexpected ways. Mariano Sidoni's *Pop-Up Book Spreads* (2009), for example, translate bars or charts of data analysis into a range of complex paper models. Yet infographics is a slice of the pie of possibilities. Andrew Baron's newest book *Acuity's Storybook Year* takes the lead on how design and paper engineering can make everyday information exciting. Baron converted Acuity's annual report into an "adult corporate book that draws upon the tradition of children's books." The company asked for an annual report that would reflect the "staying power" of the company. Baron's design intent: to make this annual report the perfect opportunity to increase awareness among the company's employees of how well the company was doing and spread the word. How did he accomplish this? In a conversation I had with Baron, he talks about the process. "What is it

that children love about pop-up books?”—He asks, only to discover that the education-through-entertainment aspect is one of pop-ups’ most appealing attributes. So Baron chose nursery rhymes to develop stories within the book. The purpose was three-fold: nursery rhymes are instantly recognizable, they can be inviting in appearance, and they can involve metaphors of the company. The final book contains seven spreads of children’s stories—visualized in pop-up form, printed in full bleed color double-sided sheets—that function as metaphors to the vitality and growth of the company. It also includes the essential annual-report information tucked neatly on the right-hand-side inserts of each spread. It certainly looks nothing like an annual report! Yet the book still fulfills Baron’s and the company’s “meant to stick around” goal. This was a successful pairing of paper engineering and graphic design to result in an unusual, but exciting, project.

Finally, the third example, *Good 100*, shows paper engineering going from 2D to 3D back to 2D. This aspect impresses me about the possibilities of paper: the potential to play with it and move things back and forth from one dimension to the next in graphic design. For this magazine’s entire issue, the designers decided to construct all objects, shapes, forms, diagrams and other visualizations needed for the articles out of paper. Starting from the flat, colored sheets of what looks like construction paper, the objects were constructed in three-dimensional form. After this hands-on process finished, the designers carefully photographed the objects to fit into their allotted 2D flat space within the magazine. The photos of the paper objects became compelling visuals for the issue. They look fresh, unusual, and call the attention of viewers. In this case, paper functioned only through one sensory experience (2D visuals), but the pictures transformed the design feel of the magazine into a highly tactile experience. Each object—occupying its space in the white ground of the magazine—made me more aware of the physical space it contained. Even though I could not touch it, the 3D space of the image provided this high-tactile visual imagery throughout the issue.

The possibilities don’t end there. Pop-ups have even made it into the fourth dimension, to the screen and theatre. Bruce Foster worked on Disney’s animated film *Enchanted*. The opening and closing scenes begin and end with the six distinct pop-ups that were originally handmade by Foster, and later animated to fit the short film sequences within the motion picture. Similarly, in *Ice Book*, designers Davy and Kristin McGuire utilized 90° pop-ups as theater stages. They introduced light projections of short films onto the pop-ups as an interactive way of storytelling. In essence, they created a theatre performance in pop-up book form. The McGuires write that they “wanted to create an object with a life of its own—a tangible and magical ‘thing’ for an audience to experience.” Kristin also adds that there’s an “utterly beautiful effect of the light coming through the paper, creating shadows and silhouettes.” This also talks of the characteristics of paper that can be explored over and over, continuing the chain of possibilities.

The most inspiring possibilities of pop-ups have expanded beyond the use of only paper, like in Foster's or the McGuire's examples. Although we find the pop-up book most familiar, paper engineered movables can function as educational tools, public advertisement, art, aesthetically compelling designs, and visual aids.



I look back at my observations of the beauty and thrill of Sabuda's *The Wonderful Wizard of Oz*, the moment when I first wanted to paper-engineer. I still have great appreciation for that pop-up book. I had no idea the spiraling path of possibilities my curiosity for it would lead me to. Some graphic designers may believe paper engineering is only a niche within the larger scope of graphic design. Maybe so, yet (for me) paper engineering makes graphic design even more powerful and compelling. The tangible aspect and the interactive components of paper engineering propel me to prefer a pop-up design over many others. It is a style, a method to design with, filled with possibilities.