

Virtual Author Talk



The Prop Effects Guidebook Eric Hart

A professional prop maker and author talks about his new book that shows readers how to create their own practical props and effects.

How did the book come about?

My first book, [The Prop Building Guidebook: for Theatre, Film, and TV](#), was selling well, and my publisher, [Focal Press](#), was interested in having another one.

You can find books on large-scale stage effects and lighting, as well as books on robotics and other hobbies, but nothing on the types of effects which prop builders specifically need to do. I felt this was a huge gap in the realm of prop books. A few prop books might cover how to wire a lamp or make a breakaway, but none offered a comprehensive look at all the magic we're asked to achieve.

I talked with people who run prop shops around the country to determine the scope of the book and which subjects to cover. I knew there would be a lot of technical information that needed to be covered: equations for electrical resistance, for instance, or graphs for flow coefficients

in pneumatic systems. Prop people do not necessarily speak that language. However, having worked in props for over a decade, I knew how to translate this information into something that could be understood.

A lot of the books in my reference library jump into the technical aspect pretty quickly, and that is necessary if you are designing robots, or building automation for a factory. For props, though, you usually just need to wire together a few LEDs, or play a sound with the push of a button. I wanted this book to allow you to jump into making simple effects without needing to know a lot

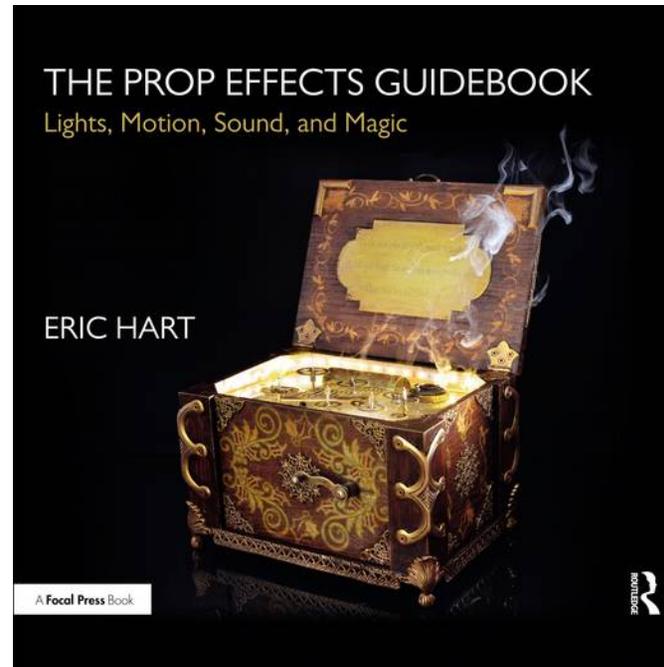
of technical information. However, that information is still there, ready for you to study as you tackle more complex effects.

Many people I talked with were excited about the prospect of this book, so my publisher was thrilled to have me write it.

Your book is all about the art of prop effects. Explain a little what this entails?

Props may need to light up, move, bleed, or burn. My book covers everything from mundane effects like making water come out of a sink, to truly magical effects, like having a vacuum cleaner drive across the stage on its own. Unlike full-stage effects, prop effects often need to be self-contained within the prop itself, so that brings its own challenges in terms of finding miniature parts and building custom mechanisms.

In film and television, a prop effect can be faked through camera edits, special effects, and off-screen manipulation. A prop effect for live performance, however, needs to perform its magic in full view of the audience, and it needs to be repeatable. This book covers all of these tricks, whether your prop appears on stage, in the street, or walking around the convention hall while cosplaying. I divided all the types of effects into broad categories and looked at the



various equipment, parts, and tools you need to build tricks within each of these categories.

I also look at the design of the effect itself: if your trick requires the operator to push multiple buttons, do they know what order to push those buttons in? Is it easy to change the batteries? Is it safe? These considerations can be just as important as knowing how a pneumatic solenoid operates, or how to calculate the resistance needed for an LED.

What sparked your interest in prop making?

My parents are both potters. I grew up surrounded by clay and sculpting tools. I spent my summers and weekends making plaster molds for a variety of pieces they produced. I have always had an interest in figuring out how objects are made: what materials they are composed of, and what machines and processes shape those materials. I also enjoy the stories of objects themselves, and what they say about the people and places they come from. I am kind of surprised it took me so long to discover prop making with all these interests, but I never really knew it could be a career.

As I gravitated toward set design in theater, I found myself needing to build a prop every now and then. After those first few, I was hooked. I loved the challenge of fabricating an object from scratch: breaking it down into its component parts,

determining the materials that would make it do what it needed to do, and shaping those materials. Most of all, I enjoyed that the end result was an object which told a story.

My first few years were focused on prop carpentry, which typically meant building the furniture and other items fabricated from wood and metal. I knew I would have to teach myself all the other skills, like molding and casting, sewing, and foam carving, if I ever wanted to get hired to build those kinds of props. I had a lot of years of self-study and experimentation to fill in all the gaps of my knowledge. It became this sort of unending quest to learn everything there is to learn about prop making.



How did you begin doing it professionally?

I discovered a love of set design for theater while in undergrad. I actually began college as an engineer, but left that because it turns out it is not very hands-on. My second choice was to work in film, but my school did not have a film department at the time, so I took theater classes instead.

Nowadays, I prefer live performance to film, so it is funny how that worked out. After graduating, I worked as a stagehand and set carpenter. A few years later, I started graduate school for set design and found myself working in the props shop. I was able to get a job as a props carpenter, building furniture for opera, left graduate school, and have been working in props ever since.

I spent a few years freelancing as a prop builder around the country before landing in New York City. The freelance life gets tiring after awhile. As a prop builder in theater, your only choices to advance involve either starting your own business, or landing one of the few full-time jobs in the larger regional theaters. I shifted over to management, working first as an assistant props master at the Public Theater for a few years, and now as the head of the props department at Triad Stage in Greensboro.

So my day-to-day job involves a lot of budgeting, shopping, organizing, and logistics, but I still get to build a few props on every show I do. Plus, I continue to take on freelance projects as my time allows.



This bust of Mary Stuart was cast in clear resin with lights inserted inside. The outside was painted to look like white marble, but when the lights turned on, the whole thing glowed. From Molly's Veil, at the Prairie Theatre Exchange, 2005. Photos courtesy of Kari Hagness.

I took a two-fold approach to writing this book. First, I researched the topics themselves to learn as much about them as possible. I looked at how electrical circuits work, what sizes and shapes of light bulbs exist, what types of fog machines are available, and basically all the other technical information that could inform each chapter. Then, I took a broad survey of how prop makers actually do effects. For instance, it may be "more correct" to choose a battery by calculating exact power requirements, then soldering a bunch of wires to connect it to your effect, but a prop maker might just

end up hot gluing some wires to the battery from their cordless drill. I talked to prop makers in a variety of situations, from larger theaters with ample budgets, to tiny black boxes operating on a shoestring, to be sure that my book had solutions for every situation.

This book is meant to dovetail with my first book, *The Prop Building Guidebook*, which teaches how to physically construct props. So when this book talks about, say, cutting wood or drilling metal, it does not need to devote precious space to those processes. It assumes you either know how to do it, or that you can look it up in *The Prop Building Guidebook*.

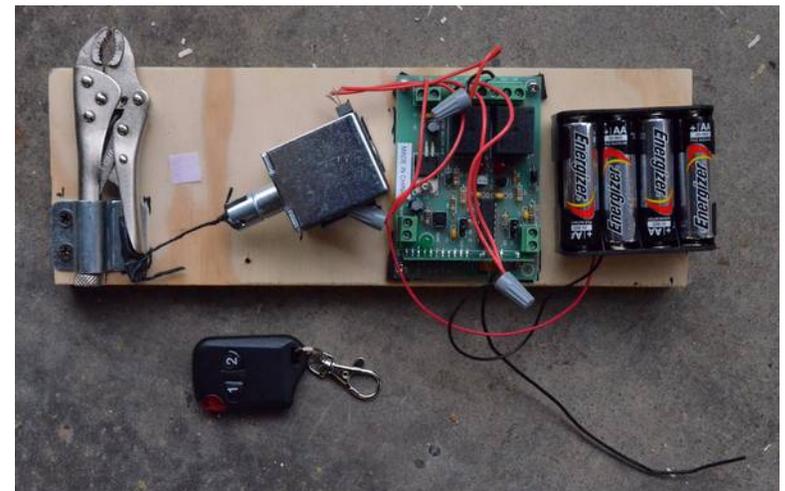
What did you discover in your research for the book?

I thought it was interesting that even though some prop builders are incorporating high tech solutions like microcontrollers and servo motors, the vast majority of tricks are still pulled off with low tech means. A few well-placed pieces of string and some pulleys can fill the whole stage with magic. It's important to know all these historical means for creating effects because they are still useful today. I dug through a ton of books as I gathered information for the book, and even the older prop texts taught me a few new tips and tricks.

It is amazing to learn that theaters had some fairly sophisticated effects before they even used electricity. Productions in the nineteenth century had walking dragons with light-up eyes that breathed smoke. They used retractable daggers in the 1700s

What areas of prop effects are covered in the book ?

I start with an overview of how to break down an effect and brainstorm solutions. You need a clear idea of what exactly your effect needs to accomplish before you can start designing a prototype to test your idea. From there, I delve into specific types of effects: electricity, lighting, motion, trick mechanisms, pneumatics, liquid delivery, breakaways, smoke and fire, sound, and control. The chapters are all self-contained, but they build on what comes before them. For instance, you need to know about electricity to build pneumatic effects, and you need to know about both electricity and pneumatics to develop some liquid delivery effects.



Small remote control unit triggers a solenoid, which opens the jaws of these locking pliers for this trick.



Figure 2-4: A single AA battery provides 1.5V. When we hook up a 1.5V lamp to it, it shines happily at full brightness.

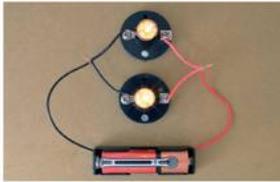


Figure 2-6: If we branch out the circuit and make two separate paths, the sockets are now connected in parallel. Each lamp receives 1.5V and shines at full brightness. Because we have two lamps, the battery drains twice as quickly as when one lamp is connected.

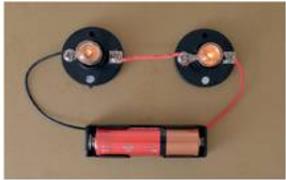


Figure 2-5: When two sockets are connected one after the other, we say they are connected in series. The voltage provided by the battery is split equally between both sockets, so each lamp only receives half, which in this case is 0.75V. This makes the lights shine at half brightness.



Figure 2-7: The most common way to connect batteries is in series. This increases the voltage. We have two 1.5V batteries, so our lamp is receiving 3V of power, which makes it shine twice as brightly and risks burning it out. Battery holders connect the batteries in series; a four battery holder will give you 6V, an eight battery holder will give you 12V, etc.

Illustrations explain simple parallel and serial circuits.

and had fake blood effects in Shakespeare's time. In many ways, my book is the first to describe these effects in a comprehensive manner.

Do you have any suggestions for costumers who want to create props or prop effects to enhance their costumes?

Try a few materials and techniques out. Prop building can be a very personal process. You may find a number of tutorials telling you to build a certain prop out of one material, but if you prefer to work in a different material, go for it. "The camera only sees the last coat of paint." As long as it looks good and does what it needs to do, it doesn't matter if you built it out of cardboard and tape rather than "professional" materials.

The same is true of prop effects. You can deconstruct existing objects to get what you need. For instance, a light-up toy can give you not only lights, but a battery holder, a switch, and some basic flashing effects for only a few dollars. You can integrate that into your costume and have some fairly sophisticated lights without having to know about Ohm's Law and without breaking the bank.

How will costumers and students of costume props and effects use this book?

The technology for creating a vast variety of effects has never been smaller, cheaper, or easier to use than it is now. You can add lights, sound, and moving parts to a costume without a degree in electrical engineering. In a lot of cases, you can build some pretty sophisticated effects for less than a hundred dollars. My hope for this



A small piece of dry ice was dropped into chalice of hot water.

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book is that beginners can learn how to start building their own effects and tricks, while more advanced prop builders will delve deeper into what they know and keep the book as a quick reference.

Eric Hart has been building props for theatre, opera, retail display and other industries since 2003. He is currently the props master at Triad Stage in Greensboro, North Carolina. Eric has built props for numerous theatres on and off Broadway, the Santa Fe Opera, the Actors Theatre of Louisville, and the Public Theater. He has also constructed props for commercials, theme parks, and holiday window displays at major New York City retail stores. Eric is a Visiting Professor at the University of North Carolina School of the Arts, and the author of "The Prop Building Guidebook: For Theatre, Film, and TV," published by Focal Press.