

Make a Chair from a Tree Or: How I Learned to Stop Worrying and Love the Bomb

Jack Kemper

“Mostly by myself” is a carefully phrased statement.” (Peter Follansbee on Jennie Alexander)

Part 1: “Make a Chair from a Tree”

Felling a Tree

Drilling for oil is “hard, dangerous work. It is not for the novice” (Alexander).

Buying a Log

Plastic pellets are available from a range of distributors across the world. In the US, if you have a wholesale license, you can purchase pellets in large quantities from petrochemical manufacturers like Exxon, Shell, or a number of others. However, for those of us operating as individuals, as craftspeople, plastic pellets can be sourced locally from industrial suppliers, online marketplaces, or if you ask nicely, local plastic production facilities. You can recycle your own pellets with your own grinding and cleaning facilities, but recycled pellets can pose a number of problems to your injection molding machine if not properly treated. Virgin plastic - or at least a mixture with some percentage recycled - is generally recommended to produce stronger parts that take longer to degrade.

Insect Damage

You may find a number of uninvited guests in your pellets. Especially without care to sealing your containers and cleaning the other spaces in your facility, insects may find a way into any of your materials.

Keeping Wood Green after Harvesting

Temperature control in your pellet storage system is a key factor in maintaining control over the shrinkage and strength of your final plastic parts.

Common Terms Used in Identification

Polypropylene (PP) - PP is the most common plastic in the world, used in a range of applications from bottles and caps to chairs and high-strength cord. PP is a recyclable thermoplastic, and given its strength, relatively low melting point, and even flow, an ideal candidate for injection molding. It is the plastic you will use to cast the joints for your chair.

High-Density Polyethylene (HDPE)

Low-Density Polyethylene (LDPE)

Polyvinyl Chloride (PVC)

Polyethylene Terephthalate (PET)

Acetal Butadiene Styrene (ABS)

Polyurethane (PU) - Although PU exists in thermoplastic form as the elastomer TPU, PU is a broader category that includes many resins (Shore D) and rubbers (Shore A) as well. In your chair, you will use 60A polyurethane rubber for the seat, a 2-part mixture roughly the hardness of a tire.

Tools Needed When in the Woods

Although many injection molds are made through other processes (like sinker electrical discharge machining and die casting), injection molds are usually fabricated on a CNC vertical mill (or a manual mill, for simpler parts). More axes can generate more complicated parts, but for the sake of fabricating a 2-part mold that requires draft, a 3-axis CNC will suffice. Although the task of machining a mold with complex surfacing on a manual mill can range from difficult to impossible, a standard vertical mill can also expedite many parts of the process, from drilling and tapping holes for the clamping bolts to reaming holes to tolerance for alignment pins to just facing and preparing stock (as well as fabricating hold down systems for the CNC mill).

Drawknifing Posts and Rungs

The lathe can be an important tool for certain parts of your molds. You could make an entire mold on your lathe, depending on scale and the complexity of the part. With a CNC lathe or a 4th axis on the CNC mill, you can achieve complex geometry on a round surface that would be impossible by hand, without an overly complex set of jigs. (See also the Southbend Corporation's book “How to Run a Lathe.” I read the 1942 edition, specifically for the WWII-era machines I have been working on. It includes an enlightening summary of the history of precision manufacturing through the lens of the screw-cutting lathe, as well as a series of incredibly precise detail drawings breaking down the functions of the machine in all its different forms).

Seating

Casting 2-part polyurethane rubber in a 2-part enclosed mold to produce a wide sheet without any bubbling can be very difficult. Although rubbers with lower durometers can naturally degas while curing, the 60A PU required for the strength of the seat requires a thorough degassing before pouring the final cast. There are 2 primary methods for degassing beyond the basic tricks (hitting the side and bottom of your pot or using a vibrating table of some sort): vacuum chamber degassing and pressure pot degassing. Vacuum chambers are the most common tool in this process, available through local hardware stores and industrial suppliers. Ideally, your vacuum chamber should reach at least 1 bar of pressure - higher pressure will just expedite the degassing further. Stir and then degas each part of your rubber before mixing. Mix well for 5 minutes with a non-porous mixing stick, scraping the sides and bottom of your pot, then degas the rubber. Given a 45 minute working time (or less, depending on the exact brand of rubber), I would not recommend degassing the mixed solution for any more than 10-15 minutes, especially if also using a pressure pot. Although not as necessary as the vacuum degassing, applying additional pressure pot degassing can help reduce bubbling even more. The pressure pot can present some challenges working on a small scale. I built my own pressure pot out of an HDPE bucket (with a rubber gasket on the lid), a couple smaller rubber gaskets, and an air compressor fitting. I later added some clamps and 2x4s to my setup to make sure the lid didn't blow off the bucket, but I was able to somewhat successfully degas my mixtures at 15 PSI for around 5 minutes. Pouring the rubber is a delicate process in itself, and you want to give yourself as much time and patience as possible at this stage. With larger operations, I usually find it useful to have a couple of friends around to help me out if things begin to move too fast, especially here at the end. Pour the rubber from the highest point you can reasonably achieve into the lowest point in the mold. Your pour should be steady, coaxing the plastic into the smallest stream it could possibly form, making sure not to disturb its entry. Once the mold is full, wait 16 hours, and you can remove your seat.

Assembling the Chair

Assembly requires only a singular 5/32 Allen key, which you should be able to find in your standard set. First, organize your parts and count them. You should have 6 counterbored back slat connectors, 6 overmolded threaded back slat connectors, 24 counterbored rung connectors, 24 overmolded threaded rung connectors, 48 10-24 black oxide socket head screws at 1-1/4" length, 18 10-24 black oxide socket head screws at 5/8" length, 12 16-1/2" lengths of 1" OD 1/8" wall aluminum tube, 2 18-1/2" lengths of the same tube (with knurling), 2 33" lengths of the same tube (also with knurling), 3 bent and radiused 2" wide pieces of 1/4" bar stock (at 17" length before the bend), 4 rubber finials, 4 rubber feet, and 1 rubber seat. First, prepare your connectors by inserting screws into them and tightening them down most of the way. This will allow you to slip your connectors over your legs with the rungs loosely installed, expediting the process. You will want to start with the back, just to make sure everything lines up well. Install the back rung for the seat as a reference point, lining the connectors up with the knurling on the back legs for grip. Make sure to install these on the lower knurling, so the seat stretches down to the front and back for comfort. You will remove these rungs after assembling the frame in order to install the seat. It adds some time, but it's helpful for alignment. Install the rest of the rungs and back slats along the back legs (including the rungs on the side planes of the chair - these can hang loose to the side for now), spacing the back slats around 2-1/2" apart and the bottom rungs 2-1/2" from each group of connectors (which should be spaced 3/4" apart, according to the spacing of the knurling). Assemble the front of the chair by installing 6 rung connectors on each leg and 3 rungs between the legs, according to the spacing of the knurling and the back. Connect the front and back legs via the extra rungs and connectors you installed on the both of them, and begin tightening the connectors, checking for alignment as you go. Remove the seat rungs and install the seat. depending on your comfort here, it might help to bring out a clamp or have someone lend you a hand with this, as the seat stretches tight across the frame. Once every connector is fully tightened by hand, you can take a seat in your new ladder-back chair.

Interlude: “E Pluribus, Pluribus” (Out of Many, Many)

“Plastic,” in its etymology, originates in the Ancient Greek “plastikos,” meaning “capable of being shaped or molded,” derived from “plastos,” which means “molded.” In my own language, to plasticize is to coat, to cover, to protect, to control, to wrap, to enshroud, to interface, to purify, to clean. Through these acts, plastic homogenizes, alienates, and deceives. Plastic is a paradox. In its ubiquity, plastic creates a monoculture that grows everywhere, reaching into every other material around it, making its way into our bodies and environments in ways we can barely now understand. Exponentially evolving with time, plasticization in all its forms has created a world where material consciousness is now more important than ever. “When the hierarchy of substances is abolished” (Barthes), our world entrenched in oil, plastic running through our veins, we must find new ways of directly engaging with this material culture: my work re-interprets plastic manufacturing as a performance of craft to resist material and labor alienation

When plastic was first introduced to the consumer market en masse, there was a sense of spectacle and theatricality around it. This is no doubt lost to some extent in our current era, as plastic becomes more and more seamlessly and invisibly integrated into our world. With the receding of spectacle, though, we also lose our perspective on plastic. I want to use my work to introduce a different sense of spectacle to this conversation, engaging with production in a new, reimagined performative mode to bring plastic to the surface of the material conversation. Taking on a theatrical, absurd language, translating plastic into nonsensical, contradictory material forms, I want to reconsider our relationship with it. Using seemingly disparate yet familiar symbols of design, my work complicates design's role in plasticization, as well as our complicity in the systems ultimately responsible for its production, both as designers and consumers.

Part 2: How I Learned to Stop Worrying and Love the Bomb

“[...] the redesigned world redesigns the designing animal. This is the real plasticity that is human” (Colomina & Wigley).

Learning to stop worrying is a complex process I've been struggling with my entire life. I don't think I'm alone in this; the world seems to exponentially present more things to worry about every day. As a maker, I have always found myself worried about material sourcing and the production behind the materials I'm using. Through my work, I've constantly looked into material histories, trying to trace parts back to their origins and understand where the raw materials going into the products and materials that I interact with as both a designer and consumer come from. I've also always been very worried about the labor going into these products, understanding the potential issues with labor regulations and workers' rights built into complex webs of outsourcing in a global capitalist system with the ultimate goal of the bottom line. Straying from traditional wood and metal working, I have translated my process into scaled-down industrial operations - milling metal, casting rubber, and injection molding thermoplastics. This has allowed me to reimagine craft as a perspective not specific to material or method, rather more focused on intention, a level of care for material and process that borders on obsession, or a worrying over and about material.

I have constructed my thinking around Jennie Alexander's seminal “Make a Chair from a Tree,” reframing my machining and casting as a sort of instruction manual, something for others to follow, like Alexander's book. Injection molding is a complex process often far removed from our positions as designers or consumers, especially today in the United States. Injection molding represents a sort of pinnacle of industrial capability, a measure of our complete capacity as a species for control over material, shaping it in any possible way we please. Although companies I admire like Precious Plastics have made these systems of knowledge more accessible to designers and fabricators like myself, the process is still not fully in reach.

I could make the same critique of Jennie Alexander's book, as much as I appreciate the sentiment of taking material production into one's own hands. Although the tools required are relatively affordable, Alexander's way of making still presents issues of accessibility; this isn't something everyone can put time and money into, especially when it's so easy to buy a monobloc chair at Walmart for \$25. Our world is much more wrapped up in plastic now; we are much more alienated from all of the materials and products we use. The people and machines that produce and transport these things likewise are alienated from the products of their labor and the other stages of increasingly complex processing most products and materials now go through.

Alexander's treatise challenges mass manufacturing, production, and outsourcing, but, in the end, her act of resistance may be more poetic than practical. Still, I celebrate this quality, I celebrate this process as a beautiful image of production autonomy, a beautiful rebellion against the larger industrial system. I just question the sense of nostalgia built into this poetic reverie. Making a chair from a tree implies a yearning for a simpler time, an older America, a life on the frontier, conquering and gaining control over the land, its materials, its fruits. It's wrapped up in roots of manifest destiny, an image of America as this wild thing to be conquered, a vision of the human as separate from the world, entitled to take as we please.

“And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.” (Genesis 1:29)

Genesis 1:29 captures this worldview with chilling clarity, offering up nonhuman material as commodity, as meat for human consumption. The pioneer striking oil and the craftsperson building a ladder-back chair share this fundamental assumption: “nature” exists to be appropriated. The tree, like the land, is flattened into symbol, into stock, into an idealized image of its position in relation to us humans as destined inheritors of the Earth. This flattening - this reduction of complex materials into simplified signs - relies on systems of division and categorization that frame “nature” as separate from “civilization.” These divisions are not physical but psychological, cartographic: false borders drawn across experience to produce a sense of control. We define through separation, but in doing so, we lose sight of the intricate, overlapping realities materials actually inhabit. A material is never just one thing. Its history is plural. But the ideology of design promotes clarity over complexity, a habit which intensifies with growing industry. “Design” as we think of it now is itself “a nineteenth-century product” (Colomina & Wigley), a tool to manage “the acceleration of industrialization” (Colomina & Wigley), the mounting chaos of production and all its effects on living and nonliving things across the world.

Design became a means of “explicitly negotiat[ing] between human and machine” (Colomina & Wigley), mediating the “natural” and the “industrial” - a kind of ideological infrastructure for the colonial-industrial project. It enabled, and still enables, the rapid expansion of consumption by standardizing how things are made, understood, and valued. I'm partial to this reading of design history because it doesn't shy away from complicity; it exposes the web. It understands design as both a response to and a reproduction of alienation.

Colonialism lives on through this legacy of alienation, operating through systems of precise, mathematical categorization to abstract people, land, and materials from their truth, disguising them as simulated ideas, grids, maps, taxonomies. The colonial mindset confuses precision with specificity; specificity requires context. It demands subjectivity. Fully embracing precision replaces this sort of lived complexity with metric regularity, abstracting the world into an idealized system of mathematical subdivisions, much like the maps colonial settlers used to navigate the globe and find new lands to tame. Design is rooted in our larger systems of consumption, and although it may not offer the tools to change them, it can still be a medium to critically engage with these systems and open up new conversations about the way we understand our role - and most importantly, our complicity - within them.

And so, I made a chair from a tree, rewriting and retranslating Alexander's original poem. Although more in line with the Shaker ladder-back construction, it mimics the same material logic as the Jennie chair. But it also inhabits the same space of nostalgia, that same ambiguous yearning for a time when the relationship between material, labor, and use felt somehow more legible, if not more just. Still, there's an undeniable irony in what I've collaged together. The resulting object mimics the visual and mechanical language of industrial design: standardized parts, efficient joints, clear paths to replication. It can be flat-packed. It can be assembled with a single Allen key. In that sense, it stages a familiar consumer script - Walmart, Ikea, Temu - all over again. The labor is gone, or at least hidden. You, the consumer, are freed from any tactile encounter with the process; the act of making is displaced, made invisible. You are offered control, but only the illusion of it. And maybe that's the part I find most disorienting: even in this attempt to reassert authorship, to reclaim the entire chain of production through the lens of craft, I find myself overwhelmed by the scale, at least as an individual. I grasp at total control, and yet the system resists. I am still alienated, just at a different layer of the process than I might otherwise be.

In the end, my work is focused around resisting the web of alienation in industrial plastic production for myself as a maker, translating this process within the material intentions of craft - I cannot do that for a consumer. The role of a consumer implies an inherent alienation between labor and product; the space the consumer occupies in isolation from production emphasizes “that the object which labor produces – labor's product – confronts it as something alien, as a power independent of the producer” (Marx). This space abstracts and objectifies the product; “objectification as loss of the object and bondage to it; appropriation as estrangement, as alienation” (Marx).

I am not proposing a revolution; Marx gives me hope because he worries. Alexander gives me hope because she worries. It is this constantly self-aware, critical perspective that is hope, continuing to complicate these conversations around material in the hope that we can more honestly recognize our complicity within industry and find new ways to frame and examine these alienated forces that deeply affect all of our lives.

“Artifacts are part of the body and brain. They are thoughts. But equally they are the potential of new ways of thinking” (Colomina & Wigley).

Sources in Order Mentioned

“Make a Chair from a Tree” by Jennie Alexander

“Mythologies” by Roland Barthes

“are we human?” by Beatriz Colomina and Mark Wigley

Genesis

“Estranged Labor” by Karl Marx