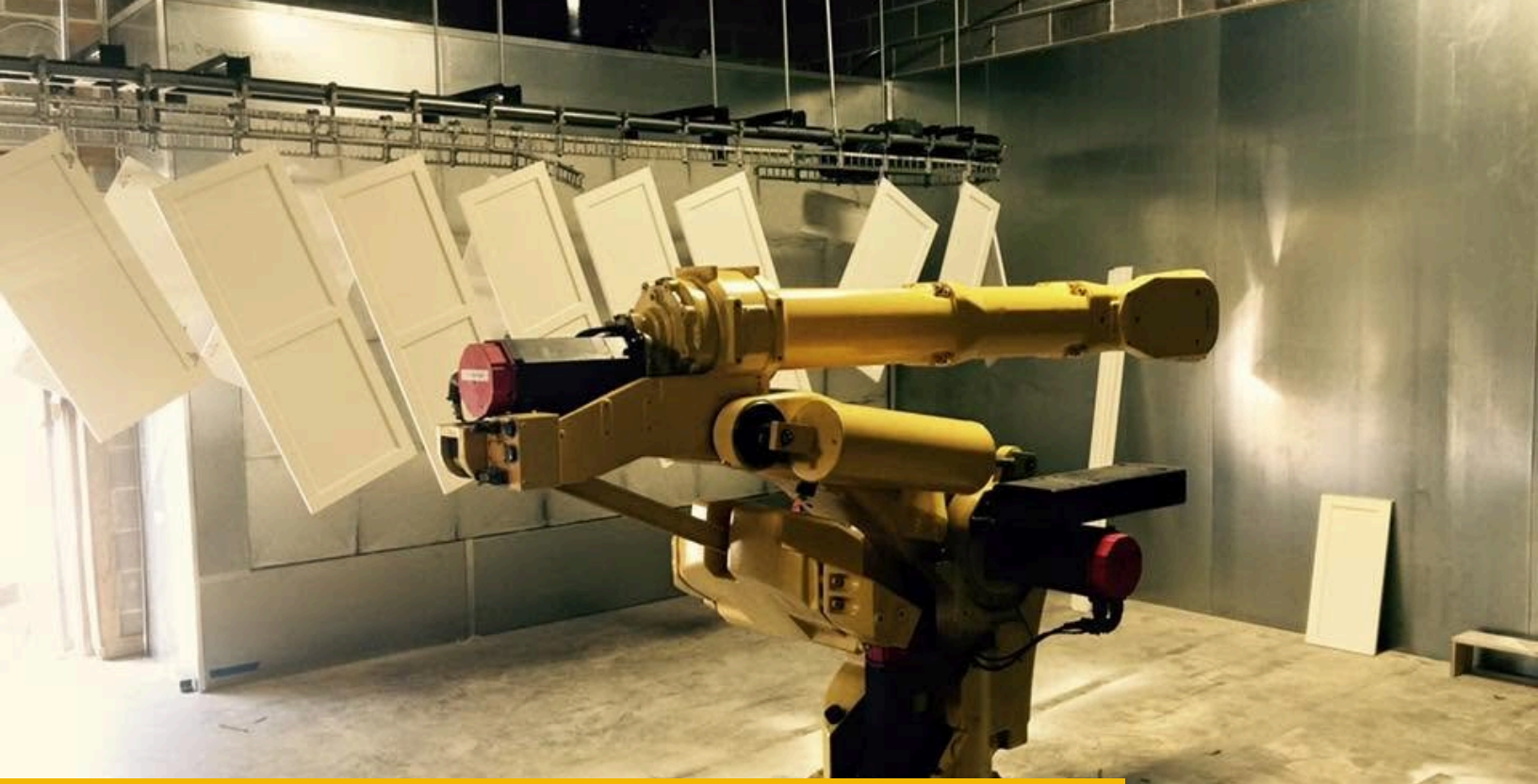


The robotic paint cell I built at Mode Fabrication. It finds each door's edges with lidar before it sprays.

Selected work, implementation and customer success

Bryan Thompson

A philosophy degree, three patents, a used GM welding robot I taught myself to program, and four years of hurricane claims. It's all the same job: figure out how something really works, then help the people stuck with it.

3
U.S. patents, one engineered wood, two marine

4
industrial robots put to work, two bought used

40+
people trained on five-axis CNC

$1M+
in sales from a one-man product business

Birmingham, Alabama
(205) 275-6898 bryan@surf-mode.com linkedin.com/in/bryanthompsonbuilds bryanthompsonbuilds.com

The first résumé I've ever written

I'm 26 years into my career, and this is the first time I've ever needed a résumé. Every job I've had led to the next one on its own, usually because I fixed something nobody had asked me to fix.

On paper that looks like a guy who can't make up his mind. To me it's one job done in a lot of different places: figure out how something actually works, find out why it isn't working for the people stuck with it, learn whatever I have to learn, and build the fix with them.

> **I've never once let "that's not my job" or "I don't know how to do that" be the end of the conversation.**

What I'd do for your customers

I'm looking for technical implementation, enterprise customer success, and solutions architecture roles: learning a product cold, figuring out what a customer is really trying to do, and getting them there.

I've been doing a version of that my whole career. I've trained more than 40 people on five-axis CNC machines, written software that coworkers in three offices actually used, taught boat owners to tune their own setups instead of calling me, and sat at kitchen tables explaining to homeowners what their policy covers and what it doesn't.

Based in Birmingham, open to remote work and travel. The stories below are the proof, and very few of them were one-man jobs. I've worked with machine operators and software engineers, Saudi buyers and Alabama shipping managers, ad agencies, integrators, and homeowners on the worst day of their lives. My part was usually getting all of them to understand the same problem. Where someone else built a piece, I say who.

How each story reads

Every story opens with a three-line summary: the **challenge**, the **solution**, and the **impact**. If you only have a minute, read those. The full story follows right under it.

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2022 to present

Independent Adjusting

A friend who adjusted claims walked me through what the job actually was, and I recognized it right away. It was what I'd done my whole life: know how things are built, figure out what broke them, and know what it takes to fix them. I went full time in 2022 and was paying the bills about three months in.

Today I work claims for about five independent adjusting firms. On the homeowner side that's carriers like Travelers, AAA, Tower Hill, SageSure, Progressive and Cincinnati. On the commercial side it's Lloyd's of London, Chubb and other large international insurers. I'm licensed in Alabama, Texas, Georgia, Florida, North Carolina, South Carolina, Kentucky and Louisiana, plus an Alabama workers' compensation license and a TWIA certification.

The work runs the whole cycle. I read the loss notice, call the insured, and read the policy for exclusions before I ever get in the truck. On site, I'm the expert of record on what caused the damage. I sketch every room, wall, opening and roof, write a line-by-line repair estimate in the order the repairs would actually happen, apply depreciation, and turn in a final report that cites the policy sections it relies on. Since 2022, four of my claims in the $1 million to $2 million range have gone all the way to depositions and mediation. I learned Xactimate and Symbility, the two estimating platforms the industry runs on, in a matter of days.

The way I see the job: hand the carrier a fully baked cake. Every policy section and exclusion is already cited, so nobody downstream has to rebuild my work. And if there's coverage for the homeowner anywhere in that policy, find it.

The Tornado Nobody Saw

Hurricane Helene, western North Carolina, 2024. Cause-of-loss analysis on a near-limits homeowner claim.

Challenge	A hillside home flooded by a creek, with no flood coverage and an owner who figured he'd get nothing.
Solution	I found wind damage in rooms the falling limb never touched, then found the weather data to prove it.
Impact	**On a $240,000 claim, my report supported about $180,000 for a family that expected close to nothing.**

The challenge

In 2024 I had four deployments: three to Houston and one long one to North Carolina after Hurricane Helene. Helene was the hardest work I've done as an adjuster, because so few of those homeowners had flood coverage. The mountains don't look like flood country, so nobody bought it.

One of those homeowners lived on the side of a mountain, above a creek that's basically a string of waterfalls. It's the last place on earth anyone would think to insure against a flood. The creek flooded anyway, and a tree-sized limb came down through his roof. When I pulled up, his family was picking through what was left of their things. He knew he didn't have flood coverage, and he figured that meant he'd get nothing.

The solution

The limb was the obvious damage, and it was what everybody was looking at. But walking the rest of the house, I noticed the top plates pulling away from the walls in rooms the limb never touched. Those walls had been racked sideways. That's not what rising water does to a house. That's wind.

So I followed the hunch. I went to the National Weather Service's tornado track data and found that an EF-2 tornado had passed within a quarter mile of the house, right at the edge of the survey's margin of error. Nobody had connected that tornado to this house.

That changed the whole claim. Flood was excluded. Wind was covered. My job became separating the two, line by line, and backing up every line with the evidence and the policy language. I attributed the damage from two feet up to the tornado and backed out everything the flood caused.

The impact

On a claim of roughly $240,000, close to the policy limits, my report supported about $180,000 in payment, for a family that expected close to nothing.

There was one smaller thing, too. I had a pile of USB power banks left over from IntelleSurf, a boat sensor project you'll read about below, so I left a few with that family so they could keep their phones charged and keep their kid's iPad running. By the end of Helene I'd given away about a hundred of them.

> **Most days in this job, I'm delivering hard news to people on the worst day of their lives. The job is to know the rules cold, look harder than anybody else, and find every legitimate yes.**

That's the same thing I'd want to do for a software company's customers: understand the rules of the product better than anyone, listen to what the customer is actually up against, and find the path that works.

2019 to present

SurfMode

A boat product I invented to fix my own boat. It went viral overnight, earned two patents, and has done more than $1 million in sales with no employees and no contractors. I still answer the calls, usually on a weekend, from somebody's boat, with the whole extended family aboard and every one of them waiting to surf.

Surfing for the Common Man

Invention, two U.S. patents, manufacturing, marketing and sales.



Challenge	Regular boat owners were told they needed a newer, pricier boat to wakesurf.
Solution	Two wings that turn the boat about 4 degrees and pull the bubbles away from the surf side, protected by two patents.
Impact	**More than $1 million in sales, profitable from the first sale, with no employees.**

The challenge

SurfMode was never a business plan. It started because I had a problem with my own boat. I loved wakesurfing, but getting a good surf wave usually meant one of two things: hauling thousands of pounds of extra ballast around, or buying a newer boat built for it. I liked the boat I had. I just wanted it to throw a better wave. So I started building things.

The solution

I started prototyping in February 2019. I cut the parts on my own CNC, suctioned them onto the hull, took the boat out, watched what the wave did, and went back to the shop. Over and over.

The breakthrough wasn't mine. My 11-year-old daughter wanted to try two wings at once, a small one up front and a big one in back. I told her it wouldn't work. She put them on anyway. The wave went from 6 or 7 feet to about 22 feet. I'll admit I was wrong in front of anybody when the result is that good. That two-wing setup became the heart of the product, and the heart of my two issued patents: U.S. 11,524,751 and U.S. 11,801,920.

But knowing it worked wasn't enough. If I was going to sell it, I had to know *why* it worked. Nobody trusts a product the guy selling it can't explain. So I went back to the shop, drew a rough boat in Revit, and plugged in the weights. Revit has a wind-load tool that runs on Autodesk's computational fluid dynamics engine, built for air moving over buildings. I found the variable that let me swap air for water and ran the boat through it.

There it was. The two wings yawed the boat about 4 degrees to one side and created a big low-pressure zone on the wing side. That low pressure pulled the air bubbles in the wake over to the non-surf side, which cleaned up the wave on the surf side.

That turn was the whole secret. Instead of piling on ballast to dig the stern in, the boat uses its own hull and engine to push the wave, so SurfMode owners can run with less ballast water, sometimes 70% less. It's the same basic principle the expensive surf boats use with their built-in surf systems. Testing with O'Brien Watersports, a 17-foot Carolina Skiff made a wave over 20 feet long, and we even got a surfable wave behind a WaveRunner.

When I explain it to customers, I skip the fluid dynamics. I tell them it turns the boat just slightly and pulls the bubbles over to the side you're not surfing. That's all most people need. And once they understand why it works, they can troubleshoot their own setup on the water instead of calling me.

The setup guide came out of one bad weekend

A customer had tried every wake shaper on the market. None of them stuck to his boat well, and when they did, the wave wasn't great. I'm pretty sure he'd decided SurfMode was going to fail before UPS even dropped it off. His first weekend out, with a boat full of people waiting to surf, he struggled the whole time. On Sunday he called and told me I'd better pay for return shipping, because this thing was terrible.

I asked him to call me back that evening, once things had calmed down. He did, and I walked him through the ideas behind how it works. Somewhere in that conversation he realized he'd been setting up SurfMode exactly like the products that hadn't worked for him. I nudged; he made the connection himself. He went out alone Monday morning, and it was a complete 180. He called me almost in tears to say his boat had just made the best wave he'd ever seen.

That call is why the setup guide I send every customer is a teaching document instead of a list of steps. It teaches the ideas: the front wing is the fulcrum of the whole system, the higher the rear wing sits in the water the cleaner the wave gets, and if a wing sprays water into the boat, it isn't low enough. A customer who understands those few things can dial in a boat I've never seen.

Going viral, and running all of it

I posted a video of my daughter surfing behind our WaveRunner on my birthday in 2019, and I made the first sale on September 3. Then it went viral, pretty much overnight. I hadn't planned on running a business. I was suddenly running one.

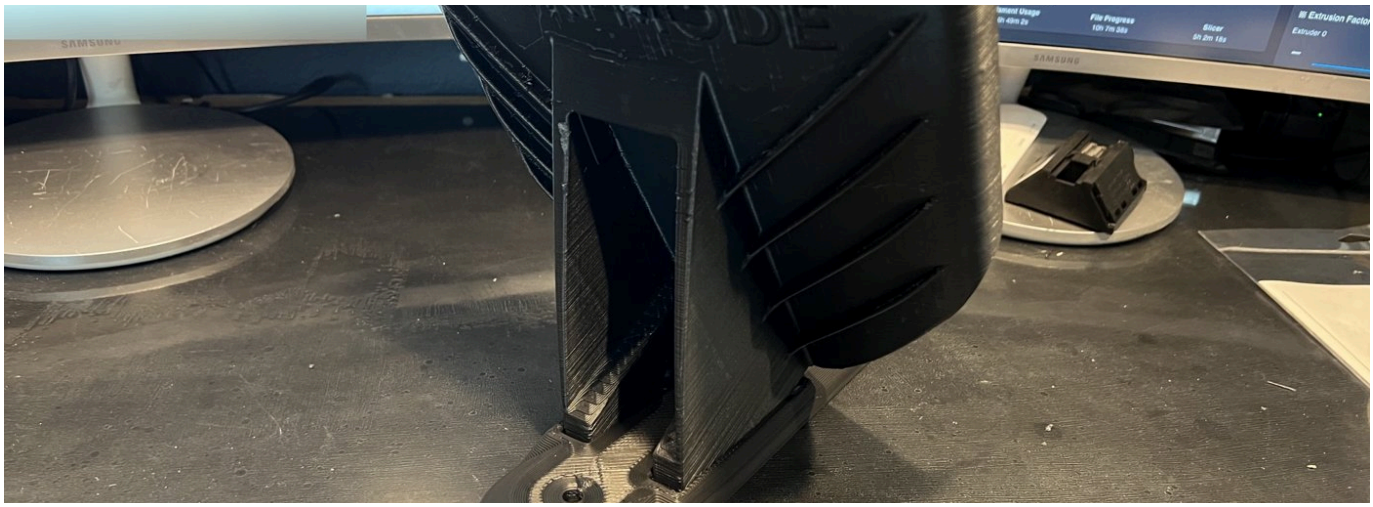
From then on, every piece of it ran through me. I designed the product for manufacturing and cut the parts myself. I built the store on Shopify, run the Facebook and TikTok ads, pack the orders, and answer every customer question personally. In 2022, Marine Accessories Corporation, a division of publicly traded Patrick Industries (NASDAQ: PATK), signed an exclusive partnership to sell SurfMode through its direct-to-consumer brand, Monster Tower. For the first 100 units, I couldn't buy the suction cups I needed on their own, so I bought Harbor Freight glass-moving handles, stripped out the cups and threw the rest away.

The impact

SurfMode has done more than $1 million in cumulative gross sales since 2019, and it's been profitable from the first sale. Each kit costs me about $36 to make and sells for $400, not counting my own machine time and labor.

In 2021, SurfMode made it through three rounds of Shark Tank casting, and I was invited to film in January 2022. A month later, production was suspended for COVID, and the episode never happened.

The part I'm proudest of is who bought it. These were regular boat owners who'd been told they needed a newer, more expensive boat to surf. They found out they didn't. They started posting their waves, helping each other dial in their setups, and pulling their friends in. A real community grew up around a product I built to fix my own problem.



The next-generation wing, 3D printed in UV-stabilized fiber plastic by my friend Ian McKinnon at TowerFlags. It works well on my boat, so I'm weighing skipping the injection mold entirely and printing what I sell.

It Wasn't Black Magic. It Was Math.

IntelleSurf (boat sensor and iPhone app) and WaveForm (automatic ballast control). Built with a software-engineer partner.



WaveForm in automatic mode, filling and draining three ballast tanks toward their targets.

Challenge	Every customer call came back to the same few numbers: how the boat sits in the water.
Solution	A bolted-in sensor and app that turned wave ratings into measurements, then a controller that sets the ballast itself.
Impact	**About 25 IntelleSurf units on the water, and 8 WaveForm units sold at about $1,000 in week one.**

The challenge

Once SurfMode took off, I spent a huge amount of time on the phone and in email helping customers set up their boats. A lot of new boat owners think a good surf wave is black magic: trial and error, a little luck, and whatever the guy at the dock told you.

But every one of those conversations came back to the same few numbers: how the boat sits in the water, nose to tail and side to side. We could have used a smartphone as the sensor, but on a boat people are glued to their phones, playing music and taking pictures, and a phone that keeps moving can't be the reference point. And if you could measure the boat itself, you could connect those numbers to the waves people actually liked.

The solution

IntelleSurf solved the phone problem by separating the sensor from the phone: a unit that stays bolted in the boat, paired with an iPhone app that shows the boat's attitude in real time and lets the rider rate each wave. The point was to turn something subjective, how good a wave felt, into numbers you could measure and repeat. My partner, a software engineer, wrote the app by adapting a sensor app he'd already built for manufacturing.

The bigger idea was the data. Collect ratings and measurements from boats all over the country, then let an AI model sort it out. You'd enter your boat's year and model and get a breakdown of what it takes to make a great wave, from the people who own that same boat. That only works with a big user base, and I never built one. In 2022, the AI tools weren't where they are now, either. But the gap is still there. Tens of thousands of people with older boats still dial in their wave by trial and error, and even brand-new boats with built-in surf systems keep their data to themselves. Nobody is pooling it.



The IntelleSurf beta sensor.

WaveForm came next, because the natural next step after measuring is acting on it. Every boat owner who surfs knows the ballast problem: people move around, you burn fuel, the wind picks up, and the wave changes. Somebody has to keep adjusting, and it's usually the driver. WaveForm was built to take that job away, so the owner could focus on driving the boat and teaching new surfers.

WaveForm was entirely my concept. I sourced the parts, soldered the connections and built the hardware, a control unit that sits between the boat's ballast system and its battery. I designed wiring harnesses that plug into the most popular ballast pump system, and my partner connected the unit to the app. The rider picks a target, and the boat fills, empties and rebalances its own ballast to get there.

The impact

IntelleSurf launched near the end of the season as a fully working product, and about 25 devices are out on the water. There isn't enough data yet to say much statistically. I still think the idea is a good one.

WaveForm sold 8 units at about $1,000 each in its first week of release, and I installed three of them myself, including on my own boat. Then I paused it on purpose. Asking owners to install it meant asking them to work on their boat's electrical system, and doing that right would take licensed installers and a support operation I couldn't fund yet. I wanted to watch how the first group handled it before I sold more.

> **SurfMode made the wave possible. IntelleSurf measured it. WaveForm tried to make the boat do it by itself.**

2016 to 2019

Mode Fabrication

I started Mode Fabrication out of the cabinet business and owned it outright. At its peak it ran six full-time employees and about $1 million a year in revenue, plus subcontractors on the big jobs, whose work I was responsible for. Most of our bids ran $75,000 to $100,000, and the largest reached $200,000.

Mode was where people sent the jobs nobody else would touch: odd materials, odd shapes, impossible deadlines. Film director Jon Erwin needed a Sprinter van turned into a mobile video-editing suite. An ad agency needed giant, working Amazon buttons in five days. A popsicle company needed twelve stores built at once across three states. Those calls came to me.

A Robot That Could See

Six-axis FANUC painting cell with 3D vision. Built with an outside vision integrator.

Challenge	Good finishers are hard to find and cost nearly double, and doors on a rack never hang the same way twice.
Solution	A six-axis FANUC paint cell with lidar that finds each door's edges before it sprays, built with a vision integrator.
Impact	**It painted 15,000 doors on a $200,000 Homewood Suites job, then moved on to steel windows and doors.**

The challenge

Good cabinet finishers are almost impossible to find. They make close to double what anyone else in the shop makes, and most shops are constantly losing them and hiring new ones. Robots have painted cars and appliances for decades, and I figured it was time for cabinet shops to get the same treatment.

The catch is that robots are great at painting the same part in the same spot a thousand times. Doors on a conveyor rack are never in the same spot twice. Each one hangs a little differently, so a robot running a fixed path either misses part of the door or paints the air around it.

The solution

I built a robotic painting cell around a six-axis FANUC robot and defined the robot's paths in and out of the conveyor. For the hard part, teaching the robot to see, I worked with an outside integrator. We added flash-type lidar cameras that find each panel's edges. The conveyor locks, the cameras measure the part, and the robot sprays only inside the edges it just found, using an algorithm the integrator and I wrote together.

Around the robot I built the rest of what a production finishing line needs: garment-rack-style carriers to move the parts, variable-speed ventilation, and PLC control of the painting and ventilation sequence.

The impact

The cell earned its keep in production on a Homewood Suites cabinet-refacing job: 15,000 doors, worth about $200,000. When that job was done, I adapted it to paint steel windows and doors.

When the Product Doesn’t Exist, Invent It

Engineered wood product, U.S. Patent 11,084,268. Sole inventor. Custom presses and vacuum equipment I designed and built.



Challenge	Our doors needed a core that wouldn’t warp, and the standard option had a $50,000 minimum order I couldn’t afford.
Solution	I split solid wood, bonded it back together with warp-bias fiberglass and PUR resin, and built the equipment to make it.
Impact	**Many times stronger than anything on the market, and U.S. Patent 11,084,268.**

The challenge

Our architectural doors needed a core that wouldn’t warp. An exterior door is hot on the outside and sitting against air-conditioned air on the inside, so something is always pulling it out of shape. The standard answer is stave core. It’s stable, but it’s built from veneers over a center that’s almost always white pine, which rots. And the minimum order was about $50,000, more than I could afford. So the question wasn’t where to buy it. It was whether I could make it.

The solution

I developed my own. A piece of solid wood is sliced in half, a special warp-bias fiberglass goes between the halves, the whole thing is impregnated with PUR resin, and it goes into a press. Once it cures, it comes off the press and gets milled into door stock. The result is real wood all the way through, with no veneers and no pine core. It stays straight through heat and cold, and it’s many times stronger than anything on the market.

Then came the half of the problem nobody warns you about. An invention you can only make one piece at a time is a science project. I had to build the equipment to make it in production.

Vacuum system. I built a production vacuum system from industrial-grade HVAC vacuum pumps, with a chamber made from steel drill pipe and a sliding tray, that holds the wood, fiberglass and resin at 29 inches of mercury so the resin gets all the way in.

Cold presses. I designed and built cold presses 16 feet deep, with gantries every 18 inches and threaded-rod actuators torqued evenly across the bed.

Flatness. I built a flat reference device to calibrate the platens, and got them flat to 0.040 inch over 8 feet, on a shop floor that was nowhere near that flat.

The impact

In our testing, standard stave core splintered at its first real deflection. Mine held up a lifted F-150. It took an F-350 to break it. The product earned U.S. Patent 11,084,268, Engineered Wood Product and Method of Making Same, issued August 10, 2021, with me as sole inventor.

Thinking Inside the Box

Steel City Pops. Built in Birmingham, shipped as kits.

Challenge	Steel City Pops was opening stores in three states, each with a tight construction window and a pile of separate vendors.
Solution	We built each store's interior in our Birmingham shop as a complete kit and shipped it staged in containers.
Impact	**Twelve stores from Texas to Kentucky, built in one shop, on time and staged in the order the contractor needed.**

The challenge

Steel City Pops was opening stores in Kentucky, Texas and Alabama, each going into a new development with a tight construction window. Every location needed cabinets, counters and finish work. The usual way is to order from a handful of vendors, ship the pieces separately, and hope everything shows up at the job site at the same time. When it doesn't, the store doesn't open.

The solution

I flipped it around. We built each store's interior in our Birmingham shop as a complete kit, then packaged and shipped it in staged containers. The complexity moved off the job site, where every day of delay is expensive, and into my shop, where I could control it.

The impact

Twelve stores from Texas to Kentucky, all built in one Birmingham shop. The product was consistent, it arrived on time, and it was staged in the order the contractor needed it.

Five Days for Amazon

Bring AtoB campaign for Big Communications, 2017. Designed, built and installed in about five or six days.



Challenge	Giant Amazon boxes and working Dash buttons for Birmingham's HQ2 pitch, nothing off the shelf, in five or six days.
Solution	I engineered every piece in Rhino3D and Alphacam, we cut it on the CNC, and crews installed four locations in one night.
Impact	**Two Gold ADDYs, and a campaign officials credit with landing Amazon's 1,500-job fulfillment center in Bessemer.**

The challenge

In 2017, Birmingham pitched itself for Amazon's second headquarters, and Big Communications ran the campaign, called Bring AtoB. They wanted Amazon's world dropped into the city overnight: shipping boxes big enough to walk around and giant Amazon Dash buttons that actually worked. None of it was off the shelf. There were no drawings and no props to buy, and they needed all of it in about five or six days.

The solution

Through Mode Fabrication, I designed, engineered and built every physical piece. I chose the materials and engineered the structures. For the Dash buttons, I started with the real thing: I measured a consumer button with calipers, scaled it up, and broke the giant version into parts we could actually make.

Every piece was modeled in Rhino3D, flattened and exploded into parts, then sent to Alphacam for toolpaths and cut on the CNC. Every part was unique, and almost every cut was a miter so the finished surfaces came out smooth and seamless. The buttons got automotive paint.

They also had to work, so I designed the mechanism that made pressing one trigger the signal, and Big Communications' electronics took it from there. Then we installed everything in one night: about five hours, four locations, several crews working at once.

The impact

Two of the pieces, the Amazon Dash Button and the Amazon AtoB Boxes, won Gold ADDY awards crediting me and Mode Fabrication as Designer and Fabricator, and the wider campaign won more. The campaign was Big Communications'. Everything you could touch was mine.

Birmingham didn't get the headquarters. But the campaign put the city on Amazon's radar. In June 2018, Amazon announced its first Alabama fulfillment center: a $325 million, 855,000-square-foot building in Bessemer with 1,500 full-time jobs. Jefferson County officials said their meetings with Amazon made it clear the campaign led to it, and a city official says the same thing in the campaign video. It went from an idea in somebody's head, to boxes on a sidewalk, to a building full of jobs.

Watch Big Communications' campaign video

How Mode ended

In 2019 I wound down the fabrication work. General contractors paid on 90-to-120-day terms, and a shop that runs on float needs a much bigger credit line than I had. I moved fully to SurfMode, which still runs under the Mode Fabrication name today.

2015 to 2017

Recreated Cabinets

I left American Printing after fixing some equipment for a cabinet shop owner and seeing how much room the business had to grow. I bought in as a 50% owner in 2015 and bought out my partner in 2016. When I started, the shop had three full-time employees, and I was the third. By the time I moved on, it had 20 full-time skilled employees, including an interior designer and a licensed architect, and revenue had grown from about $150,000 to about $1.8 million as we moved from high-end residential into commercial work.

Teaching a Machine Nobody Knew How to Teach

Five-axis CNC, Cabinet Vision, RazorGage and Alphacam. Self-taught, then trained 40+ people.



Challenge	Labor was 60% of every job, and our best cabinetmakers spent their days making cutting decisions by hand.
Solution	I moved cutting into software, taught myself a five-axis CNC, and built scale models to win over 20-year veterans.
Impact	**Labor fell from 60% of job cost to 25%, and I trained 40+ people, including 20 at other companies.**

The challenge

Labor was about 60% of the cost of every job. Materials were only 5 to 10%. And our most skilled, most expensive cabinetmakers were spending their time standing at a saw, making every cutting decision by hand. There was real craftsmanship in that shop. But a business can't grow when every cut depends on one person's experience and judgment, and there are only so many of those people to hire.

The solution

First, I moved the cutting decisions off the shop floor and into software. Cabinet Vision turned each design into cut sheets and labels, so the person at the saw was following a plan instead of making it up.

Then I bought a five-axis CNC, an SCM machine from J&G Machinery. I picked five-axis over four-axis for a practical reason: to drill pocket holes in the edge of a part, a four-axis machine needs four extra aggregate heads, and the price difference to go five-axis was small. Then I had to learn to run it, and there were no classes. I taught myself from the manual, mostly in Alphacam, all the way down to editing the machine's post-processor for fixturing and tool lengths.

The harder part was teaching everyone else. A five-axis head moves in ways that are hard to picture until it does something you didn't expect. So I built scale models of the machine, and people could see, in their own hands, what the head was going to do before it did it.

Not everybody was happy about it, at least at first. Bringing automation to someone who's done the job the same way for 20-plus years is hard. The most common complaint was a fair one: sometimes a stringer needs to be a "fat" 3/16 and a toe-kick a "skinny" 5/16, a 32nd over or under, because that's how the pieces really go together. Software that cut everything to the exact number didn't know that. So I showed them how to bump the saw a 32nd up or down, and as we learned which pieces they adjusted and how, I programmed those adjustments into Cabinet Vision so the parts came off the saw already right. The cabinetmakers stopped feeling like they had to hover over the apprentices, and they got to spend their time on what they were best at, like perfect miters and dovetail joints.

The hidden cost in the scrap pile

Time is money, and every time a cabinetmaker dug through a stack of cutoffs looking for a piece that might work, we were paying a skilled wage for a treasure hunt. The RazorGage cut that hidden labor drain way down. The little drop we did make, we stored and indexed, so people knew exactly where to find a piece. The software also showed us which sizes almost never got used, so we could throw those away with confidence. To be straight about it, the cut sheets didn't lower our lumber waste much. The savings were in labor.

The impact

I trained about 20 of our employees on semi-complex five-axis work, in under three weeks each. Then J&G Machinery, the dealer, started sending its other customers to me, and I trained another 20 to 25 people at other companies.

Cutting moved from skilled cabinetmakers to trained production staff. We went from five cabinetmakers to two in my first 18 months, the CNC replaced one more, and one stayed on to run assembly. Labor fell from about 60% of job cost to about 25%. The five-axis machine also let us take on intricate architectural work we couldn't have touched before, which is what led me to start Mode Fabrication.

2013 to 2015

American Printing

Marketing director, moving a traditional print shop into digital marketing, image recognition and CRM.

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Digital marketing, image recognition and CRM sales.

Challenge	The owner wanted a print shop to sell marketing without losing the print sales that paid the bills.
Solution	We stopped asking what customers wanted printed and started asking what they were trying to accomplish.
Impact	**About $200,000 in CRM and marketing programs, work the shop had never sold before.**

The challenge

I got to know American Printing as a customer. They printed the packaging and store displays I designed for Yellowhammer Grilling Chips. When I was ready for something new, they asked me to come in as marketing director. The owner wanted a traditional print shop to become a marketing and advertising business. My job was to move it into digital work without walking away from the print sales that paid the bills. Getting a sales team to sell something completely different from what they'd always sold was a new kind of problem.

The solution

We called the effort Page One. The idea was simple: stop asking customers what they wanted printed, and start asking what they were trying to accomplish. Then build the answer, whether that turned out to be print, video, software or all three.

For Cahaba Brewing in Birmingham, the answer was making the taproom walls tell the brewery's story. I used Aurasma image recognition so visitors could point their phone's regular camera at artwork around the brewery and get a short video about the beer behind it. No QR codes, no app to hunt down. It worked a lot like walking through a museum. We delivered it, and I built the customer contact database behind it so the brewery could keep talking to those visitors after they left.

For Shepherd Center, the Atlanta rehabilitation hospital, I went in to talk about posters and printed graphics. By the end of the conversation, I was looking at something much bigger: a donor-recognition system with digital displays. Around that, I scoped everything a big ad agency would do: a web-to-print campaign, ad buying, the works, as a roughly $500,000 proposal. The director told me he'd rather deal with just me than a team of advertising guys. Ownership decided not to pursue it, to avoid upsetting the local ad agencies, and asked me to focus on smaller projects. It's still the clearest example of what Page One was supposed to find.

The impact

I sold CRM and marketing programs to about 10 customers at about $20,000 each, roughly $200,000 in business a print shop had never sold before. I wasn't programming robots there. I was doing the same thing in a different room: figuring out what the customer really needed, finding the tool that could do it, and getting people excited enough to try it.

2005 to 2013

Jasper Lumber Company

I started at Jasper Lumber as a millwright apprentice, fixing the same equipment I'd later automate. From there I became plant manager of Jasper Specialty Wood, which bagged the shavings coming off the company's planer mill: one shift, five 10-hour days a week, targeting 3,500 bags a day at about 31 pounds a bag.

Then I became general manager of B&T By-Products, with 10% equity. Demand for shavings had outgrown what the sawmill could give us, even at about 100 tons of byproduct a day, so we built B&T to make shavings from whole logs. We later folded the planer-mill operation into it. By the time I left in 2013, B&T was running three shifts with 40 to 45 employees.

Man vs. Machine

Jasper Specialty Wood. Used GM welding robot turned palletizer.



Challenge	One man stacked 3,500 bags a day by hand, more than 50 tons, and a new palletizer cost too much.
Solution	I bought a used GM welding robot, taught myself to program it, and built the tooling and controls around it.
Impact	**The whole cell cost under $50,000 and paid for itself in about 12 months.**

The challenge

One man stacked every one of those bags onto pallets by hand. At 3,500 bags of 31 pounds each, that's more than 50 tons a day, lifted by one person, every day. It was exactly the kind of job that hurts people, and exactly the kind of job a robot is good at. The problem was money. A new, turnkey robotic palletizer cost far more than the business wanted to spend on one position.

The solution

I found a used six-axis FANUC robot that had spent its first life as a welding robot in a General Motors plant. There was one complication: I had no idea how to program an industrial robot. So I taught myself, writing most of the programs right on the teach pendant and loading a few longer ones over an RS-232 cable.

Then I built everything around it. I designed and fabricated the end-of-arm tool from aluminum T-slot extrusion, with suction cups and individual vacuum generators, so it could grab a bag without a central vacuum pump. I built a positioning chute so every bag landed in the same spot, added photoelectric sensors to tell the robot when a bag was there, and wired the conveyor stops and starts with hardwired relay logic. I didn't have a PLC yet, and I didn't need one.

The impact

The whole cell cost under $50,000. It eliminated a full-time position doing heavy, repetitive lifting, a job that paid $17 an hour on a 50-plus-hour week, and it paid for itself in about 12 months. That's before counting the workers' compensation exposure it took off the books.

One Robot, Two Jobs

B&T By-Products. A second used FANUC, with Allen-Bradley PLC control.

Challenge	The bagging-machine maker planned to dump sellable product on the floor for two months while commissioning.
Solution	A second used FANUC palletized those bags, then got a new tool and a PLC to feed pallets and slip sheets.
Impact	**A full line running two months early, then another full-time position automated.**

The challenge

When we built the new B&T plant, the bagging-machine maker sent technicians to commission their machines, and their plan was to run bags through and dump the product on the floor while they dialed things in. To them, the product didn't matter. To me, it was sellable product. And the rest of the plant wasn't going to be running for about two more months.

The solution

I bought a second used six-axis FANUC and set it up to palletize the bags coming off the line, so we kept every good bag and ran a complete production line without the rest of the plant. I bought a six-axis robot on purpose, instead of a machine that could only palletize, because I already knew what I wanted it to do next.

Once the plant was running, a full-time employee did nothing but keep our palletizer fed with empty pallets and slip sheets. Nobody thought of it as a problem. I saw a full-time salary spent on a job a robot could do. I built a custom end-of-arm tool with long-stroke pneumatic grippers for the pallets that retracted out of the way so the same tool could pick up a thin slip sheet, and controlled the cell with an Allen-Bradley SLC 500 PLC, programmed in ladder logic, tied into the rest of the automated line.

The impact

The robot ran a complete production line about two months before the rest of the plant was finished. Then it eliminated another full-time position. Same robot, two jobs, and a step up for me from relay logic to PLC programming.

Different Products, One Robot

B&T By-Products. Fuji four-axis palletizer serving two bagging lines.



Challenge	Two bagging lines made different products, and the easy answer was two of everything.
Solution	I designed the conveyors so both lines fed one Fuji palletizer, and learned its programming alongside the integrator.
Impact	**One robot, two products, no redundant equipment, and a second robot platform I could program.**

As B&T grew, we had two bagging lines making different products, and both needed palletizing. The easy answer was two of everything. Instead, I designed the conveyor layouts so both lines fed one Fuji four-axis palletizer.

Then, instead of handing the programming to the outside integrator and walking away, I worked alongside them until I understood the Fuji's completely different programming environment well enough to run and adjust it myself.

Finding the Goldilocks Number

Inline moisture meter and automatic dryer control. Integrated by our burner control vendor.

Challenge	Checking moisture meant a long walk and an oven test while the line kept running.
Solution	I found and selected an inline moisture meter, and our burner vendor wired it into the dryer controls.
Impact	**Rejected pallets dropped from about 10 a day to 1, a 90% cut.**

The challenge

Shavings have to be dried just right. Too wet, and they mold. Too dry, and they turn to dust. Checking moisture meant somebody walking 100 yards to the shaker screen for a sample, walking back, and running a 2-to-3-minute oven test. By the time we had a number, 7 to 9 minutes had gone by, and at about 20 bags a minute that's another 140 to 180 bags made with nobody knowing whether they were any good. That's two or three pallets out of spec before anybody knew it.

The solution

I specified and selected an inline moisture meter that reads the shavings as they move. Energy Unlimited, our burner control vendor, integrated it into the dryer controls, so the burner adjusted itself based on the readings. My part was finding the problem, finding the technology and choosing the meter; theirs was wiring it into the burner.

The impact

Rejected pallets dropped from about 10 a day to 1, a 90% cut. We went from checking whether we'd already made a mistake to keeping the mistake from happening.

The Cost of Doing Nothing, and Some Hot Air

A shop-floor database that showed what problems cost, and an air-assisted bag feed I invented.

Challenge	Everybody knew which machines broke down, but nobody knew what the breakdowns actually cost.
Solution	An operator-fed database that put dollar figures on problems, and a conveyor fix I invented for bag misfeeds.
Impact	**Real numbers for repair decisions, and a steady source of ruined bags gone.**

The challenge

Everybody in the plant knew which machines broke down. Nobody knew what those breakdowns actually cost.

The solution

I built an Access database that the operators fed from the floor: pallets completed, rejects and why, downtime, and repairs. It turned their observations into real-time production rates, downtime totals and repair histories, so managers and owners could see which problems were actually costing money.

The bag misfeeds showed up right away, with a dollar figure attached. Pine resin and sawdust built up on the conveyor feeding empty bags into the machine, the bags dragged, some arrived crooked, and a crooked bag came out ruined. So I invented a fix, and the idea came from an air hockey table: a conveyor that blows air up under the empty bags so they float instead of drag.

The impact

The database gave the plant real numbers to make repair and upgrade decisions with, and the air feed cut a steady source of ruined bags. The year after I built it, Premier Tech's salesperson told me they'd built the same idea into their new bagging machines.

From the Middle East to the Southeast

Export sales trips in 2011 and 2012.

Challenge	Saudi buyers did business through relationships, Jasper did it by price sheet, and either side could sink a deal.
Solution	I spent two trips listening, then trained both sides: our people on Saudi expectations, the buyers on how we worked.
Impact	**About $200,000 a year in exports to Saudi Arabia in both 2012 and 2013.**

> **"I had to win the hearts and minds of the Saudis, then come home and win the hearts and minds of the people in Jasper, Alabama."**

The challenge

In Saudi Arabia, business runs on relationships, not transactions. You eat dinner in a buyer's home, you meet his family, and you take time to know each other before anybody talks price. In Jasper, Alabama, business ran the American way: here's the product, here's the price, do you want it? And plenty of people in a small Alabama town had their own ideas about Saudis.

Either side could sink a deal without meaning to. One curt comment from a shipping manager in Jasper could offend the buyer on the other end of the phone, and the sale would go sideways.

The solution

I made two trips, in 2011 and 2012, and spent most of them listening, in homes and over dinners, learning what the buyers expected and why. Then I came home and explained it to our people: why the Saudis did business that way, and why the time it took would pay off.

I did the same in the other direction, walking the buyers through how our management, shipping and fulfillment worked. I couldn't be there to referee every call between our shipping office and their receiving dock, so I trained both sides.

The impact

About $200,000 a year in exports to Saudi Arabia, in both 2012 and 2013.

A Different Kind of Horsepower

Budweiser Clydesdales account, 2012.



Challenge	The Clydesdales are some of the most closely watched horses in the world, and their bedding has to be right every time.
Solution	I landed the account in 2012 and kept it on quality and dependable delivery.
Impact	**Our branded shavings traveled the country with them, and they still use those shavings today.**

In 2012, I landed the Budweiser Clydesdales as a customer for our shavings. It was a demanding account, because those are some of the most closely watched horses in the world, and quality and dependable delivery were the whole relationship. The Clydesdales travel the country for appearances, and our branded shavings traveled with them, in front of crowds everywhere they went. A bedding account turned into national exposure, and the Clydesdales still use those shavings today.

Yellowhammer Grilling Chips

Retail product development: packaging, displays and copy. Launched 2013.



Challenge	Hickory and cherry came with every tract of timber we bought, already paid for, and mostly got burned or ground up with the bark.
Solution	We set them aside at the chip mill, dried and bagged the chips at B&T, and I built the brand and the displays.
Impact	**A first Piggly Wiggly order of about 1,000 cases, plus placement in 10 Whole Foods stores.**

The challenge

Our chip mill bought timber by the tract, paid for by the ton. That meant every hickory and cherry tree on the tract was already paid for, and they're two of the best woods there are for smoking food. Almost none of it was getting used.

Hickory is hard, sometimes impossible, to debark, and bark in a load of wood chips is bad news for a paper mill. Rather than risk the bark content creeping up, the hickory got left on the tract and burned. Alabama hickory doesn't grow big enough to be lumber grade, so there was nowhere else for it to go. Cherry here grows small too. It usually broke apart in the debarker, and the pieces got ground up and sold with the bark. Neither one was a small amount.

The solution

We pulled them out of the stream. Loggers put the hickory and cherry on top of their loads, and the crane at the chip mill set them aside. At the end of each shift, the crane ran the hickory it had collected through the mill, then the cherry, and the chips went off the conveyor straight into their own chip trailers. B&T already dried wood fiber every day, so we took the chips from those trailers, ran them through our dryer, and bagged them.

Then I built the brand. I designed the kraft-paper bags, wrote all the copy that gave Yellowhammer its personality, and designed shipping cartons that opened up and folded into countertop store displays, so a grocery store didn't need to buy or build a fixture.

The impact

Yellowhammer launched in 2013 with a first Piggly Wiggly order of about 1,000 cases and placement in 10 Whole Foods stores, and it was featured in the September/October 2013 issue of Wiregrass Living magazine.

2003 to 2005

Gray Insurance

I was hired at Gray Insurance in New Orleans as a claims adjuster. Not a programmer. But it didn't take me long to see how much of the job was paperwork that a computer could do.

Taking Medical Billing Out of the Stone Age

Bill review and claims correspondence systems.

Challenge	Adjusters looked up every procedure code in printed fee schedules and retyped notices already in the claim file.
Solution	I digitized the fee schedules with OCR and built Access tools for bill review and self-filling regulatory letters.
Impact	**About 40 users in three offices used it for years, and my weekly bill review dropped to under an hour.**

The challenge

Medical bill backlogs landed twice a week, with up to 25 procedure codes on a single invoice. Every code had to be looked up in Louisiana's printed fee schedules, the allowed amount figured, and the decision documented by hand. On top of that, adjusters had to send state-required notices on time, retyping information that was already sitting in the claim file.

The solution

I scanned Louisiana's fee schedules and ran them through optical character recognition. The results were a mess, so I used the same data-cleanup techniques I'd built for the State of Alabama to fix thousands of records. Then I built an Access tool where an adjuster entered the procedure codes and the software pulled the fee schedule, did the math and produced the payment paperwork. I also built a separate correspondence and tracking system: a shared database, a screen for each adjuster, reminders for regulatory deadlines, and letters that filled themselves in using what was already in the claim.

The impact

My own weekly bill review went from hours to under an hour. The correspondence system spread to about 40 users, 25 at headquarters and the rest in the Midland, Texas, and Mobile, Alabama offices, and it stayed in use for years.

Thinking Outside the Hard Hat

Return-to-work design with an occupational therapist and engineers at Tulane and LSU.

Challenge	An injured worker couldn't wear a standard hard hat, and his job required one.
Solution	I brought in an occupational therapist and engineers at Tulane and LSU to design headgear that met OSHA rules.
Impact	**It changed how Gray handled permanent partial disability claims, starting with looking for a way back to work.**

An injured worker could no longer wear a standard hard hat, and his job required one. The easy answer was to write him off as permanently unable to go back. As his adjuster, I wanted to know whether that was actually true. I met with an occupational therapist, dug into what his job really required, and brought in engineers at Tulane and LSU. Together we worked out protective headgear that worked with his injury and met OSHA requirements. A lot of my job was convincing people that a solution might even be possible, then keeping them pulling in the same direction.

He ended up settling instead of going back to work. But the case changed how Gray handled these claims: the company started bringing in occupational medicine professionals to look for ways people could get back to work, instead of assuming they couldn't.

Jones Act Claims and a Crawfish Boat

Complex maritime injury claims with wide settlement authority.

Challenge	An injured maritime worker was getting $6 a day, and claims like his usually ran well over $1 million.
Solution	I learned what actually mattered to him, then wrote a check for his dream crawfish boat, well outside the usual playbook.
Impact	**A boat worth about $20,000 helped settle the claim for under $300,000, saving Gray hundreds of thousands.**

The challenge

Under the Jones Act, an injured maritime worker gets maintenance and cure while he recovers, and the legal minimum for maintenance was $6 a day. Nobody lives on $6 a day. A man in that spot needs help now, and all anyone is offering him is the idea of a big settlement someday. In Gray's experience, Jones Act claims usually ended up well over $1 million. I had wide authority to go beyond the minimum to keep claims out of court. The question was how to use it.

The solution

I spent time with him until I understood what actually mattered to him. It wasn't a big number at the end of a lawsuit. It was a boat of his own. So we drove to a boat dealer in Houma, Louisiana, and he picked out his dream crawfish boat, air-cooled engine and all. I wrote a check for the whole boat, and we took it home that day.

That did more to build trust than any promise of settlement money someday.

The impact

The boat cost about $20,000. It helped us settle his injury claim for under $300,000, on the kind of claim that usually ran well over $1 million. That saved Gray hundreds of thousands of dollars.

The problem looked like $6 a day. The answer was getting to know the man and earning his trust.

2000 to 2003

Where it started: software I wasn't hired to write

Right out of Auburn with a philosophy degree, I spent about ten months in Washington as an intern, first in the office of Rep. Billy Tauzin, then Sen. Mary Landrieu. Then I came home to Alabama and found out I liked building things that made people's jobs easier, even when the thing was software and nobody had asked me to build it.

Software to Meet the Press

Alabama Governor's Office, 2001 to 2003. Microsoft Access and Visual Basic on the state's AS/400 data.

Challenge	During state proration, reporters peppered the governor with contract questions nobody could answer on the spot.
Solution	I taught myself Access and Visual Basic and built a contract tracker on the state's AS/400 data.
Impact	**I printed answers offstage while questions were still being asked, and the press later got direct access.**

The challenge

As a special assistant in the Governor's Office, I wrote speeches for the governor and the state finance director, and I went with them to their press conferences. The state was in proration at the time, meaning there wasn't enough money to cover the budget, and reporters suspected the administration was slow-walking state contracts to save money. So every press conference turned into a dozen or more questions about where some contract stood.

Nobody could answer on the spot. Afterward, I'd get a hair-on-fire list of things to go research, and digging each answer out of the state's AS/400 mainframe was slow and painful. I wasn't hired as a programmer. I just had a problem at my own job, and I figured there had to be a better way.

The solution

I taught myself Microsoft Access and Visual Basic and built a contract-tracking system on top of the state's AS/400 data. It showed where every contract was in the approval process, how many days it had been sitting there, and where things were getting stuck, and it made the whole thing searchable. Then, instead of scrambling after every press conference, I started handing in clean, complete reports. The first reaction was, "Where did you get this?" I told them I wrote it.

The impact

My job changed overnight. At press conferences, I sat just offstage with a laptop and a printer, pulling answers while the questions were still being asked. A research scramble that used to take days became a real-time press conference tool. Eventually the press was given access to the system directly. Before I left state government, I spent my last seven or eight months working formally as a programmer in the state's Information Services Division.

Broken Software, Missing Programmer

Alabama Department of Public Health licensing agency.

Challenge	A licensing agency's software broke, its programmer was gone, and staff couldn't track expiring nursing-home licenses.
Solution	In about two days, I built a simple Access app on the AS/400 data and wrote queries to fix the bad records.
Impact	**The agency was back to work, and the state's IT division later used my cleanup scripts on its own system.**

An agency that licensed nursing homes and assisted-living facilities had a broken application, and the programmer who wrote it was gone. Staff couldn't see which licenses were expiring, prepare renewals or send the required notices. The data was still sitting on the AS/400. Nobody could get to it.

I didn't try to rebuild the whole system. I rebuilt what the people needed to do their jobs. In about two days, I built a simple, button-driven Access application that pulled the licensing data, reported upcoming expirations, handled the renewal rules, and produced the renewal notices automatically. Along the way I found that a lot of the underlying data was simply wrong, so I wrote cleanup queries to find and fix the bad records. Agency staff later told me the Information Services Division used my cleanup scripts to fix records in the underlying system, too.

Different problems. Same approach.

Government, insurance, a sawmill, a print shop, a cabinet shop, a fabrication shop, a boat product, and hurricane claims. It looks scattered until you notice the same thing happening every single time.

I find out how the work actually gets done, usually by doing it myself first. I was a millwright before I automated the mill, and an adjuster before I wrote the adjusters' software. I figure out where the people doing the work are getting stuck. Then I learn whatever I need to, whether that's a robot, a database, a five-axis machine or an insurance policy, and I build the fix with them, not just for them.

And I've done most of it as somebody's employee, not the boss: at the state, at Gray, at Jasper Lumber and at American Printing. That means making the case, then living with the decision when it isn't mine.

The part I'm best at is translating. I can stand on a plant floor and understand what an operator is fighting, then walk over to an integrator or a programmer and explain it in terms they can build. I can sit at a kitchen table with a family whose house just flooded and explain, plainly, what their policy covers and what it doesn't.

> **Learn the product cold, understand what the customer is really trying to do, and get the two to meet. It's the job I've been doing all along.**

I'd just like to do it somewhere that isn't waiting on the next hurricane.

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