A MODEL OF A MAN

By John Vondrak

From modeling and product design to business models and life lessons, you can learn a lot from the incomparable Bill Gould, the product designer and toolmaker who adopted SolidWorks, KeyShot, and BOXX after decades at the drafting table.

It began with an email from BOXX sales consultant Michael Walls. He wanted me to see a YouTube video from C.ideas, an Illinois-based rapid prototyping consulting company. The video was entitled *3D Printing: Building the 1927 Miller Race Car.* The subject of 3D printing is fascinating enough, but as a car guy, I was more intrigued to see a smaller scale replica of a famous INDY race car created entirely from 3D-printed parts. Self-interest played a role as well. I had recently designed a BOXX company t-shirt (dubbing it the Retro Racer) as a tribute to our overclocked workstations and classic vintage garage signage. Michael wanted me to pay particular attention to the 29 second mark of the video where he said I would see an image of his customer, Bill Gould, sporting our shirt. Bill was there all right, and so was a fascinating and highly informative look at 3D printing hosted by C.ideas' Mike Littrell. In the video, Littrell referred to Bill as both a friend and "a fantastic designer." Looking at

the Miller car, the latter was obvious. Michael Walls had also confided that Bill was "a very cool and interesting guy." Those recommendations (accompanied by the fact that Bill was brilliantly fashion-conscious) inspired me to pick up the phone.

I began our conversation by asking how the Miller car came about. Bill told me that medical devices and consumer products are his primary work, and

he outputs a number of rapid prototypes each year. In one instance, he had a device which required a large console part, so an online search for an RP vendor led him to C.ideas. He and Littrell became friends and the C.ideas CEO began prowling around Bill's website looking for a project to work on together—something that would make a splash at a Rapid tradeshow exhibit. They settled on a quarter scale model of 1927 T-bucket hotrod, to be about the size of an office desk. It proved to be a big hit at the show with industrial trades picking up the story and *Desktop Engineering* magazine featuring the car's story in a rapid prototyping show supplement. The one problem with the model, however, was that it was fragile with delicate design details making it difficult to ship. "We needed something more robust," Bill recalls, "so for the next show we decided on the Miller."

Designing in Dassault Systèmes SolidWorks and rendering in KeyShot, Bill worked with Littrell for six months prior to the actual build which, once underway, was documented on video. Countless hours were edited down to twelve minutes and the finished product now has garnered over 53,000 YouTube views. The story has also graced the pages of industry magazines while the vehicle itself continues to draw crowds at tradeshows.

As a guy who drove a Model A Ford pickup truck throughout high school and college, Bill had adored the Miller since he was a kid. "They were magnificent automobiles," he says. "They didn't even use gaskets. Everything was hand-scraped." The vehicle was the namesake of American race car designer and builder Harry Miller, who was among the first to introduce innovations like front wheel drive in his 1925 Indianapolis 500 Miller 122 racecar. He would later go into business with legendary auto designer and entrepreneur Preston Tucker. "I've

known a lot of amazing people in my life," says Bill, but Miller is one that I would have really loved to have met and worked with."

Model Origins

For the record, Miller would likely have enjoyed working with Bill Gould as well. Raised by a single mother (who was also a noted professional artist) in Montana, Bill was the type of kid who could repair typewriters as an adolescent. By the time he and his mother relocated to southern California, he had developed an avid interest in model railroading and at 12 years of age, enjoyed his first live-steam model locomotive ride courtesy of business magnate Francis Mosely. The billionaire inventor, whose achievements included the Strip Chart Recorder, (he also founded Servo Products) served as Bill's mentor early in his business career and always shared profound bits of wisdom. "Every product has the right price and it's not necessarily your price" he would say, as well as, "Not everything has to be made." His influence on Bill is immeasurable.

By the age of 14, Bill landed a contract with Union Pacific cutting 10,000 pieces of model railroad track to be used in the company's promotional mailers. He had been recommended to them by a local hobby shop owner. After securing the contract, Bill's mother cosigned a loan for a Unimat lathe with a table saw attachment, and the young entrepreneur went into business. With the subsequent profits, Bill purchased a drill press and more watchmaker-sized tools which led to creating patterns for a model kit manufacturer by age 16. He was also winning a lot of modeling contests.

While in high school, Bill took interest in technical theater arts often working as a stage manager. The world of theatre management, lighting, set

painting, and props led him to California State University Los Angeles, home to an outstanding theatre arts program. It was here that he met Geri, an aspiring young actress, now his wife of 45 years. Throughout college, Bill continued to build models in a tidy little machine shop at home; even creating models for the popular 1960's CBS television show *Petticoat Junction*. To add to his exhausting workload, Bill also ran a gift product and custom furniture manufacturing company with artist (and still best friend) Mike Yazzolino. But with 17 credit hours short of graduation, he reached his limit and dropped out. "I couldn't go back to morning government class when I had three employees back in South Pasadena," he says.

Even though the manufacturing business was thriving, Bill elected to shut it down since his heart wasn't into it. He did stay involved with theatre however, working with the likes of Bob Hope and Jerry Lewis. These production gigs, along with many

others, found him once again burning the candle at both ends and this time, he collapsed—literally. "I did one too many shows, and after striking the set, I passed out on the steps of the theatre, waking up hours later," he recalls. "I realized I couldn't do this anymore."

He went to work as a professional modelmaker in 1969, first for a small firm, then two years at Hughes Aircraft Company, where 70-80 hour weeks were not out of the ordinary during the height of the Viet Nam War. Only in his twenties, Bill was easily the youngest worker in the large model shop, surrounded by master craftsmen in their late fifties and early sixties. As for encounters with the reclusive and legendary Howard Hughes, Bill saw him once, albeit from a distance, surrounded by an entourage and boarding a company plane. On one rare occasion, the reclusive billionaire ordered Bill chauffeured to a meeting, but then abruptly cancelled as the young toolmaker waited outside his office. Bill didn't take it personally, as this type of behavior was something for which Hughes was known.

Bill left the company in 1973 and with Geri founded the William L. Gould Co. which would later become Gould Studios—to this day a thriving enterprise. At the time, he and Geri were creating commissioned sculptures for the American bicentennial celebration. Bill purchased a lathe, a mill, eventually landed an old plastics machine, and then set about cutting molds. As the business grew to add an employee and four additional plastics machines, they created a plastic model kit for a client who subsequently stiffed him out of $2500.

One of Bill's employees suggested that if they weren't getting paid, they might as well work for themselves and not get paid. "So we built our own

model kit, a 120 ton Wrecking Crane, which is still regarded as among the best plastic kits ever made," Bill recalls. The business steadily expanded to include 1300 retailers and 48 wholesalers in nine countries, but it also grew beyond Bill's interest level. "I spent more time managing than creating," he says. "It became all about staffing, accounts receivable, and other stuff I hate. I'm a toolmaker." He also insists that he was at the wrong age. "I was forty and at that age, you have ego up to your ears," he admits. "I mistakenly believed that no one could run the business like I could, so I sold it. I found out later that a number of skilled CEO types would have loved the opportunity."

That business had not been without its memorable moments, however. Once, at a hobby trade show, Yoshio Tamiya, the founder and head of Tamiya, Inc., one of the world's leading plastic model kit manufacturers, asked if he could meet Bill. The pair conversed via interpreter and their conversation concluded with Tamiya purchasing a huge supply of Bill's kits. Tamiya explained that he wanted to give the kits to each of his designers as examples of how a model kit should be constructed. At another show, Bill met legendary rocker Rod Stewart, an avid model railroader who collected Bill's kits and asked the designer to autograph the box containing the latest edition.

Following the sale of the kit business, Bill and Geri moved to Santa Fe, New Mexico, where he went back to making prototype models for clients. However, in 1997, the couple returned to southern California, interestingly coincident with the explosion of the rapid prototype industry. As new processes, materials, and software came into vogue, Bill's prototype model-making business nearly collapsed. Customers could now get the same model in as little as three days that took Bill a month

to build. His sales evaporated. "I wanted to get into rapid prototyping," he confesses, "but everyone I knew who did so at that time went belly up. There was too much competition and not enough work."

For Bill Gould, it was time to evolve or die.

Evolve or Die

With thirty years as a modelmaker, precision machinist, toolmaker, molder, and plastic part designer, Bill had the experience. He had also spent a lifetime working with top industrial and product designers including Henry Dreyfuss and Richard Runyon. But Bill was also unique because of his levels of varied experience. He understood manufacturing, interacting with reps, and surviving through tough economic times. He queried his clients, as well as other reputable engineers and designers, and the consensus was clear—he needed to learn SolidWorks. He rolled up his sleeves, got his hands on the educational version, and enrolled in night courses at a local college where he quickly discovered that he was the only student with actual hands-on drafting experience and absolutely no CAD experience. "The rest were transitioning from other apps like AutoCAD, but my advantage was that I didn't have that baggage," he recalls. "I had nothing to unlearn." The other difference Bill noticed was that he was the only student who had

never owned a computer. He was starting from square one. The program would encompass 92 hours of the beginning and advanced versions of SolidWorks, and the application would not come easily. "I couldn't grasp it at first," Bill admits. "I'd get home at 10:30 at night and tell Geri that I couldn't do it, that I wanted to drop out." Fortunately, a business associate, who was also in the class, talked him down.

But then, it began to click. SolidWorks started making sense. "I realized there was no difference between SolidWorks and what I was doing previously," Bill says. "This was simply digital model making, adding something to something else or cutting something off of something else. Revolving, lofting, it was all the same." He further honed his skills by adding a semester as a teacher's assistant.

Communication Before Design

Since the early 2000's, Bill has designed in SolidWorks, making the successful transition from the drafting table (which he sold a month after getting SolidWorks!) to the keyboard and mouse. For his own personal projects (typically industrial archeology like cars and trains) Bill says his design process begins with inspiration and research and that he uses CAD to "reverse engineer." As for his client work, (medical devices, for example) it all starts at the conference table or the clients desk. "I ask what they need," Bill says, and apply my knowledge to their responses and input. Need assessment, risk assessment, prior knowledge—all of the things involved in the business approach to it. You can't design a thing until you know what the client wants. And believe me, keep quiet and listen! It's not about you- it's about your client."

Most of Bill's clients are start-ups. "They usually know where they're going, but not how to get there" he says. "So now it's time to take it and make it real." He also has what he refers to as "big boy clients" where his role often requires putting out fires of some nature or providing a set of outside eyes beyond their corporate culture. He also makes it clear that he usually doesn't cultivate large companies as it doesn't suit his business model. "I always remember the things Mosely taught me," Bill says. "Qualify your clients —you don't need them all. I qualify them against my own business model. I don't have resources to throw at huge projects, but I do have many significant strengths, which is a strong competitive asset. " Bill also recalls another bit of Mosely wisdom: "Always cultivate clients younger than you are." At 67, Bill is often the oldest guy seated at the conference table, providing support to a team of often younger players. But for him, the situation works. "I'm always careful to integrate," he says. "I don't present a threat to anyone on the team. I consider them as equally professional as I am, or they wouldn't be there."

For Bill, the biggest challenge in the design process is communication. "It's a critical issue," he says. "We're designing lifesaving medical devices, so you have to be extremely careful because these are things, if designed or implemented incorrectly,

could possibly injure or kill people." He laments the lack of good written communication skills— especially in younger people. "It's not a case of not knowing what they're talking about," he says. "Many of them just don't know how to properly communicate it. Younger clients tend to be weaker in their communication skills and use of language," he says candidly. "We're dealing with complex situations, FDA regulations, and the like and yet I often receive texts or emails, covering very in-depth analysis, which have been glossed over due to a lack of language skills. The writing can be very sloppy and it often requires five or six additional email exchanges for me to clarify."

Surprisingly, for a man who began in the world of pencil in paper, Bill doesn't spend time sketching, opting instead to dive right into SolidWorks. "Sometimes you don't know where you're going or even have a direction," he says, "so I do something. I might just put a box on the screen, maybe add another shape to it and that's when the ideas start to flow." SolidWorks is used by all his clients and the application makes sense to Bill. It must, since he has won the SolidWorks International Design Competition twice—besting leading competitors from large international corporations.

KeyShot is Key
When it comes to rendering, Bill is a fierce advocate of KeyShot, a leading, professional rendering program from Luxion. An early adopter, Bill has relied on the application since 2008 as the best way to present designs to his clients. It began as a value added feature—something Bill could offer that other designers did not. However, it has now become more of an industry standard, and in terms of Bill's business model, KeyShot makes up 30-35 percent of his business. "Everything is so visual now," he explains. "Most people don't

understand blueprints and really don't understand models unless they actually have one.

It's important to show your design visually, but expectations are high. In fact, I tell my clients to be careful when they choose to actually present a design to upper management. Typically, those people are not engineers and if you show prematurely, the boss can get the design locked in his mind which can then cause problems down the line when you actually present a very different-looking final product. He may say 'Hey, this isn't what you showed me. Why did you spend all that money redoing it?'"

For Bill, KeyShot has become a genuine profit center. He now also offers rendering for ad agencies and other companies as his KeyShot renders are usually better than what they can achieve with actual photography. In addition, he provides fine art printing, sells blueprints to modelers, and is a high-ranking Diamond Level artist on TurboSquid. "All of this is accomplished with the same technology and investment," Bill says, "but instead of vertical marketing, it's horizontal."

It's All in the BOXX

So how does Bill power his SolidWorks designs and KeyShot renderings? The key is a 3DBOXX 8920 workstation from BOXX Technologies. "I had used several systems over the years, including HP and Dell, as well as two excellent custom built Datel Systems workstations." Bill says. "But when I got really serious about SolidWorks and CPU centric KeyShot, and needed a high-end workstation that was really bulletproof but within my budget, I went with BOXX. Since I have huge multi-gigabyte files, render fine art prints, do large scale rendering for trade shows and billboards his BOXX was the perfect solution."

Having first been amazed by BOXX at SIGGRAPH three years previously, Bill returned in 2013 where he visited his friends at KeyShot, hosts of a marquee booth powered by 3DBOXX workstations and renderPRO personal desk side rendering systems. It was here where Luxion VP Thomas Teger and other KeyShot representatives told him to take a serious look at BOXX. As Bill made his way through the busy tradeshow floor, he passed Dell and HP's sprawling exhibits, but found them relatively vacant. When he reached the BOXX booth however, he couldn't get in. "I'm always intrigued by companies that have large numbers of people in their booths," he laughs. "There wasn't enough room. They were conducting demonstrations for six to eight people at a time, so I had to wait my turn."

What he witnessed in the demonstration and what he heard from the BOXX representative resonated with the man known for doing his due diligence. "It just absolutely made sense," Bill recalls. "From their core business model (Providing Solutions) to the fact that it's such a quality product, BOXX just made sense." The SIGGRAPH visit was followed by a phone call to BOXX performance specialist Michael

Walls. At the outset of their conversation, Michael wanted to know about Bill's workflow so the latter filled him in on his basic pipeline of SolidWorks, KeyShot, Adobe Photoshop CS5, as well as what he refers to as "lots of other weirdness."

"We talked at length about the type and size of models, the 3-4 gig files, and more," Bill recalls, and Michael recommended a great solution within my budget—an overclocked and liquid-cooled 3DBOXX 8920 with 16 cores (hyperthreaded to 32) and 32 GB of ram. He wisely suggested an SSD for the C drive, and 3x1 TB hard drives in a RAID 5 configuration, which have really made a difference." When quizzed about the cost, Bill doesn't blink. "I do my research," he says "and I look at cost secondary—because I know you get what you pay for. It was a no brainer. This is my primary tool. I have to rely on it every day. Besides, everyone I trusted recommended BOXX, so based on the number of cores, and their reputation, I chose BOXX." Bill is also amazed at how quietly this powerful workstation performs. "It's so quiet, compared to my other computers," he says.

Productive and Useful Time

According to Bill, the most profound impact BOXX has had on his business is increased productivity of at least 30 percent. "I don't have to wait for anything in SolidWorks—it's just there with no blocking," he says. "More importantly, it has opened up new possibilities because what I can do now, I can do faster. This means I can do more or when I reach decision points, I can produce three versions very quickly. Thanks to the BOXX, I'm working incredibly fast."

When I ask Bill about the difference his 3DBOXX 8920 has made in terms of rendering, he admits that

that this is when the situation gets critical. "Before, when I invested that little portion of ROI in a computer, electricity, and everything else, six hours of time rendering out an image, and then looked at it and said, 'Oh I missed this, or forgot to add that,' I would have to do another six hour rendering. Now I don't have to. In what takes maybe five seconds, I pull a thousand- pixel wide quickie shot, look at it, and once I'm satisfied, do an intermediate rendering, usually around 3000-wide pixels. That's what I do for most of my clients, as that's large enough for their presentations, print, etc. If I have thirty renderings, I can set up a queue to run overnight and it will be done by midnight. I now render in an hour what I used to do overnight with the Datel. My point is that you can't afford to waste time or your client's money and you can't afford to throw time away—that's even worse. If you're spending any time, it had better be productive and useful. BOXX has really made that possible for me."

To illustrate his point, as he often does, Bill tells a story. This one is about his time at Hughes Aircraft and a man he worked with named Ellis Slankard. Ellis apprenticed as a pattern maker at age12, and was a Master Journeyman, who had carved the seal for President Truman's DC 3 aircraft, the first presidential Air Force One. And he was painfully slow and methodical. "Pick up a chisel, make a couple of cuts, put it down, pick up another, do something, put it down," Bill laughs. "The joke in the shop was that grass grows faster than Slankard works." Bill and Slankard were bench mates and the elder taught a young Bill Gould everything he knew. By listening and observing, Bill began to understand that everyone's perception of Ellis was wrong. "Ellis always brought projects in way under budget and under time because he was a consummate professional and totally efficient," Bill insists. "He didn't waste a single motion. That's the way I am. I don't waste time and when you do that, you'll work efficiently."

The Business Model

As Bill's comfort and sophistication with SolidWorks and KeyShot has increased, so has his need for even greater rendering power. "The caustics, the HDRI and IES lighting—it all really munches cores when you go to render," he says. So for a man well-schooled not only in models, but business models as well, Bill has his eyes on the next logical phase. "If I can get KeyShot to continue to be more of an income producer for me," he says, "my next step is to get a renderPRO and at least double, or possibly triple, my cores. That would be a huge advantage." But as always, Bill is cautious and remains committed to his business model. "This is my 41st year in business," he reminds me, "and I've learned to let sales drive my expansion. When I was in my fifth year of business, I was full of piss and vinegar and went to a good local banker asking for $100,000 to expand. He told me I was being too aggressive, pushing too hard, and said no. 'I want you to be in business ten years from now,' he said. It was valuable advice and over time, as my sales increased, I did expand, bought another plastic machine and so on. Never try to grow too fast. Less than 2% of businesses are still open after five years."

Better By the Minute

Bill and Geri have recently relocated back to Santa Fe, which also means that Bill has sold off his machine shop. "I converted 30,000 pounds of machinery into 39 pounds of BOXX computer,"

he laughs, "and the computer has a million and a half tons of locomotives in it." And Geri is very excited to devote more time to her art. Geri is an internationally known artist, painter and sculptor, with works in the Smithsonian Institution, the Vatican Museum, and in many private collections. Bill often helps as her studio assistant, providing architectural elements or lettering and layouts for her public works projects.

A self-described "language freak" who studied under famed linguist (and United States Senator) S.I. Hayakawa, Bill continues to double as a technical writer, penning articles, textbooks, handbooks, and the like. He also has a deep love of music, and along with Geri (a Native American and enrolled member of the San Gabriel Band of Mission Indians) creates handcrafted musical instruments. He has sold over

350 flutes, but now devotes time to recording in their home studio with plans to release an album of Native American and Meso-American music.

Amazed by the incredibly diverse and seemingly exhausting life of the 67-year old William Gould, I wonder when he rests. After admitting that he does indeed work long hours, Bill adds "If you work efficiently, you don't get tired." I follow up by asking if it is safe to assume that he is a loyal BOXXer from here on out. Bill's response is as efficient as his work habits. "They'll pry that BOXX out of my cold, dead hands," he laughs. "BOXX doesn't sell computers. They sell solutions. I didn't care what my computer was. All I needed to know was 'Will it run SolidWorks without any harassment, without pixelating into boxes when you try to gimbal things around?' It also had to be very specific in regard to KeyShot since it was becoming critical to my business model. KeyShot only uses cores and doesn't care about GPUs. BOXX understands that." As always, the conversation circles back to business models. But this time, Bill wants to talk about BOXX. "You guys have the right business model," he says. "I see it exported throughout your literature, your presentations, and the way you look. It's something most companies don't understand. "After I thank Bill for the compliment, I ask one last question— even though I already know the answer.

"Will you ever retire?"

"I'm not planning to get old and retire," he says with a chuckle. "I'm getting better by the minute."

Without a doubt.

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