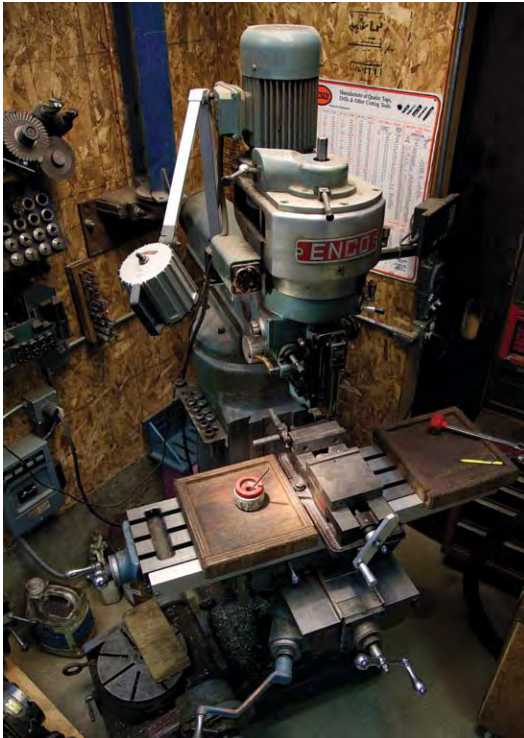




NORTH AMERICAN HANDMADE BICYCLE SHOW

2011 KAHBS

A GUIDE
TO THE
EXHIBITORS



Five Builders Discuss Materials, Craft and the Philosophy of Independent Manufacturing

by T. Herb Belrose

The products of bicycle building and design are as diverse as the framebuilders at the North American Handmade Bicycle Show. In the course of researching an article about the materials that builders use to create frames, I learned many fascinating, esoteric details about carbon fiber filaments, tube manufacturing, epoxies, welding and metallurgy. I then attempted to use my false expertise to interview a select group of framebuilders about their preferred methods and materials for building.



Ira Ryan, photo by T. Herb Belrose

What I heard from all of my interviewees was that the material component of a handmade bicycle does not matter compared to the skill, experience and philosophy of the builder. Yes, there is a bike that is the lightest in the world, and next year there will be a new record holder. But the lightest bike in the world is not necessarily the best bike in the world. We can rate a product based on tangible things like weight, strength and stiffness, but the inherent value of an object is its ability to achieve an objective.

Each rider has a different objective for his bicycle. We all have unique bodies, movements and motivations in life. A 16-pound time trial bike is not the perfect bike for a person picking up groceries after work, and a lugged French style porteur bicycle is not going to win the Giro d'Italia in 2011.

A handmade bicycle is an expression of identity and craft. It can be made from almost anything, but what is far more important is finding the builder who can manufacture the bike that will serve you well.

The following text comprises excerpts from interviews with a few of the people who have dedicated their lives to producing the best bicycles in the world. I am confident that their stories and philosophies will be more interesting and valuable to you than the lackluster essay I was going to write about composites and alloys.

Ira Ryan ~ Steel

Why do you build with steel?

On a bare bones, minimalistic level, even if you are building frames as a hobby, you can do it with a vise, a bunch of files, a hacksaw, a simple workbench or a kitchen table and a plywood jig. It doesn't take big machines and expensive equipment and fancy

fixtures and jigs to make things; you just have to be ingenious in how you approach it and problem solve.

How is steel different from other framebuilding materials?

I think steel is a totally different ball of wax. With carbon fiber and aluminum you see a lot of shapes that are hot one year and then the next year it's like, "That's so 2008, you don't want to use that shape down tube." I think there is a lot of hype. In a world that seems to be saturated with bikes that are carbon fiber and aluminum, everyone is obsessed with having the stiffest bike and the lightest bike, but no one really gives as much credit to a bike that is comfortable or a bike that serves its purpose to the highest degree that it possibly can.

What about oxidation? Do you have to think about rust when you build or design a steel bike?

Unless it affects the properties of the material, I don't see an issue. Steel has an organic property to it. There's something inherently romantic about the fact that if you left an unpainted steel frame on the beach, in four years it would be rotted. It would go back to the elements, it would go back into the earth. I'm into the dust into dust religion thing. Somehow I just connect with it more than something that doesn't rust or doesn't corrode or doesn't oxidize.

Do you think that the bicycle industry relies too much on gimmicks?

That's part of that market. When you look at any industry—electronics, the newest smart phones, cars or vacuum cleaners—they want the latest, they want all of these features and they want it to be sexy and they want it to be new. It's human nature. There are people who are naturally attracted toward that. They want to be on

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Craig Calfee, photo by Jason Finch

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top of it. And that's fine, but I think that there's a lot to be said for dependability and durability and something that is built for you. If you want something that is special and you want something that fits your freakishly dimensioned body, sometimes a handbuilt bike is the only way to get there. That's something that Trek can't do.

Craig Calfee ~ Carbon Fiber/Bamboo

What's your attraction to working with carbon fiber?

Carbon fiber has pretty much the best structural properties to build a bicycle with. That means stiffness-to-weight ratio, formability and vibration dampening. It beats metals hands down on all of those fronts. While metals have plenty of advantages, mainly a long history of fabrication technology and development that has trickled down basically into anyone's garage, carbon fiber has really only been developed since the end of WWII. That newness is attractive to me as an inventor, or as a creative person, because it hasn't been done before.

Was that part of your attraction to bamboo? Like, when you saw a stand of bamboo did it just register in your brain as bike tubing?

My inspiration since day one, as a kid, was that I spent a lot of time in the woods back East. I'd ride my bike in the woods and, along the way I invented mountain biking like so many other people did. I've been inspired by how trees look and branches and leaves and pretty much anything that is alive and grows. The structure that they evolved to is pretty interesting. It's a deep subject when you look at things like biomimicry and how trees decide what shape they need to be to resist wind.

Bamboo is one of those really interesting materials because it comes out of the ground in an incredibly efficient form, as a round tube, and it happens to be light, incredibly tough and it grows like a weed.

When you start looking beyond the structural part, which already impresses anyone familiar with working with tubing, you start to think about it economically, not just in dollars and cents but also the effort required to turn it into something useful. Digging dirt is a lot of work and mining ore is a lot of work. Yes, there are industrial scales and we've been doing it for 5,000 years, but still, when you look at it, it is a lot of work. With bamboo, which is just growing out of the ground, it's like, "Well, here we go. It's right there." It's pretty inspiring to try to make use of that. And that's where I've been coming from for a long time.

Is it hard to work with a material that does not have a predictable form?

You have to cooperate with bamboo and understand that you can't go to the store and buy 1 3/8 outside diameter bamboo. It's not round, it's not straight and you just have to use those parameters when thinking about how to set it up and miter it and all of that. It's definitely harder, but once you accept the limitations and the challenges, you design accordingly. And that's a lot of fun. How do you come up with a system that accepts the idiosyncrasies of this material that grows out of the ground?

When I first saw one of your bikes, I couldn't stop staring at it. There's something compelling about bamboo.

There is an interesting aspect to bamboo, and I'm trying to



Carl Strong, photo by Loretta Strong

figure out why people are so attracted to it. I think it relates to why singlespeed bikes have become so popular. It's a parallel reason, and it boils down to the understanding of a machine. Our world has become a lot more complicated in the last 10 years. There's a lot of information, a lot of distraction. I think that there is this need to free the clutter of your mind. So you look at a singlespeed bike and you say, "Oh, there's a cog, there's a sprocket." And then you turn the crank and the wheel turns around. Done. Let's go. That simplicity is appealing, and the same goes for bamboo frames. You look at the bike and there's the stuff that grows out of the ground that is now a bike. It looks like it's lashed together with some fiber. You instantly understand it, how it's made and how it could possibly work.

With a metal bike, we've seen steel tubing for centuries and we really understand it just from familiarity, but we don't really understand metals intimately. Like I said before about mining of the ore and somehow turning it into metal, then how do you take this metal and turn it into a tube? The average person has no idea how to do any of that.

Now take carbon fiber and it's a whole other level removed of understanding. First of all, what is carbon fiber itself? You don't even know where it comes from. And how do you form it into all of those swoopy shapes? What's epoxy anyway? It's just so removed from what we're really familiar with, that you just say, "Okay, whatever..." Bamboo is like, "Oh, yes! I understand that. Let's talk about that. Let's think about that."

Carl Strong ~ Steel/Titanium/Carbon

What are some positive attributes of building with steel?

Steel is the best balance of all the elements a person would look for in a frame. It's the best balance of strength and lightness compared to cost. There's a lot of material available so it's easy to tailor the bike to a specific use or a specific customer with a specific set of priorities. There's a ton of flexibility. It's really practical but if a customer has a priority in performance, then you can get performance out of it, too.

I'm always trying to figure out what material to fit a person into. Typically the biggest considerations are going to be durability, weight and cost. With steel, all of those elements are balanced very nicely against one another. Now, if you compare that to more of an art bike like a Richard Sachs or a David Kirk or something, then that changes the whole game. But in my case, where I don't do lugs and I don't do fillets, I focus specifically on performance. My bikes are TIG welded, they're less expensive in relation to other materials, whereas a Richard Sachs is gonna cost \$4,000 bucks, which is almost as much as one of my carbon bikes.

Then when you compare that to titanium, what you get is that titanium is lighter than steel and it's going to be more durable, typically, as a frame because the material can handle a lot more abuse, there's no paint on it so you don't have to worry about that and it's corrosion-resistant. So if a person is thinking over a longer period of time, where the service life of the bike is 10 to 20 years, or weight savings is important to them, or if money is no object, then suddenly titanium becomes a good choice.

Then you can take that one step further with carbon fiber. Carbon fiber will be the lightest, it will be the stiffest, but it's the most expensive. So if you are a person whose priorities are lightness



David Levy, photo by T. Herb Belrose

and stiffness—which would typically be a racer, more so than anybody, which most of my customers are not—then carbon fiber is the way to go, if you have the budget.

Is there a different sensation working with carbon fiber as opposed to metals?

I'm known for TIG-welded frames, and people almost think of me as a welder rather than a framebuilder, but as a framebuilder it's a bike like any other bike even if it's a different material. I think my approach to it is exactly as it would be to a metal bike. There are a couple of added techniques and the material is different, but from a framemaking standpoint to me it is the same.

Is there anything else that you think handmade bicycle clientele should know about materials?

Whenever you are comparing materials, you can only compare apples to apples. It wouldn't be fair to compare a mass-produced, molded carbon fiber bike made in Taiwan to a handmade, tube-to-tube, carbon fiber frame. One of the things that really muddies the waters is when a builder like me says, "Well, you can get a lighter stiffer bike out of carbon than you would out of titanium." You won't get that out of a Taiwanese carbon fiber bike.

And a good steel frame is a million times better than an okay titanium frame. At the end of the day, it's all about where the rubber meets the road.

David Levy ~ Steel/Titanium

Did you start out as a steel builder?

I started building in '85, and there were not any readily available titanium options at that point in time.

Did you make a smooth transition into titanium?

Probably as smooth as you could make that transition. I spent 4 1/2 years building steel bikes. To understand how bicycles go together I learned about geometry and just figured out the whole concept of how bicycles worked. And then from there I went into titanium and, to be able to make the transition, I spent about a year doing classes and just immersing myself in the different materials.

Is it common for people stepping out of steel into a new material to dedicate themselves like that to learning a new craft?

My background is in art, as far as my actual education, so I tend to have that classical art approach to learning things. You learn the basics and they become the building blocks that you work from. Look at an artist like Picasso. The guy was an amazing draftsman who could do incredible life-like drawings before he ever did any of the cubist stuff that he became famous for. The same sort of building blocks makes the most sense as far as trying to master things.

Is there a form or aesthetic to titanium that is different from steel?

When I go back and I look at my aesthetic, I have a form-follows-function attitude. Because of that the simplicity of the finish has always attracted me. I really appreciate that the finish of a titanium bike that rolls out of here, most of the time, is what we describe as a satin finish. It's basically made by a whole series of fine scratches, which is what you are going to do with your bike if you



use it. There's something appealing to me about putting a finish on that is going to look good for years and years.

The durability of titanium appeals to me as well. The yield strengths are high, and the fatigue characteristics are so desirable.

Did you feel drawn to building bikes at an early age?

Yeah, totally. I started racing bikes when I was 14. I got bit by the bug. I built my first bicycles at that point. Not road bikes, we were doinking around with this new thing called bicycle motocross that had just come out on the West Coast. I grew up in Iowa and you couldn't get a BMX frame. My dad had a friend with an old crashed airplane back behind his shop. Me and my buddy, Mike, used to go out there and cut tubes out of it and I'd oxy-acetylene weld them together. We built a couple of BMX bikes.

You cut apart an airplane? How did you miter the tubes?

With a grinder and a file.

How did you know how to do that?

When I was 12 my dad gave me an oxy-acetylene torch. It's actually the torch that I still use today. The whole metal working thing was easy and fun for me. So it wasn't a big deal to do that kind of stuff. I always just kind of figure shit out.

Nick Crumpton ~ Carbon Fiber

Can you talk about some of your early bikes and methods?

Early on it was all steel. It was mostly fillet brazed. Why fillet brazed over lugged? Probably because at the time the aesthetic of

a nice small fillet just looked nice. I liked it. It was also the idea of doing time trial bikes and mountain bikes with aero-shaped tubes, which I did quite a few of early on, so lugs were a moot point anyway.

When did you start working with carbon fiber?

The idea of making a customer a tailor-made carbon frame landed in my head in about 2000. At the time, I had been working a high-tech day job for a few years. I was really trying to make a go at being a custom framebuilder, and in 2000 it was like, "There is no way I'm going to be even close to paying the mortgage here building steel frames." Think about the market for custom steel frames then versus today.

Carbon was getting common then, but it's nowhere near as common as it is today. But you could see the handwriting on the wall; it was headed that way. The idea was to figure out how to make custom geometries in carbon, and that would be my ticket into building and making a living. I was both right and wrong. I was right in that when I figured that out I was able to make a living as a builder. We've been in the black since day one. But I was wrong thinking that you couldn't do it with steel because this resurgence started happening. All of a sudden, custom framebuilders can actually make a living again working with steel in this country. For the longest time, if you weren't Tom Kellogg or Richard Sachs, you were going to have a hell of a time convincing someone to buy your bike. At least as far as I knew, I was buried in my cube at work and didn't have my finger on the pulse of the industry. But I think it was pretty dead at that point.



Richard Sachs, photo by Nick Czerula

I think it was tense for a lot of builders.

Yeah, through the '90s into 2000, the mass-produced stuff really came up. We can sit here and talk about what kind of crap comes out of Asia all day long, but the reality is that it's not really that crappy. It's just generic, and there's a difference.

What kind of opportunities did carbon fiber present to you?

At that time there were very few options. I am not over here making tubes, so let's back up. I'm a framebuilder. I'm not a carbon tube-maker, and there is a huge difference.

The first couple of frames I made were out of tubing that was just commercially available and it didn't have a laminate schedule that was suitable for making tubes of a bike frame. While the bike was strong and durable, it rode like crap. It had no torsional rigidity. You could get some pretty incredible speed wobbles going on a fast descent. Not because of bad geometry or asymmetrical forks, it had everything to do with tubes that couldn't resist twisting.

Then I had to go to a tube-maker and lay down a ton of cash to get tubes made the way that I needed them because they wouldn't just make you a down tube. They wanted to sell you 600 feet of that tube. And the down tube is different from the top tube and the seat tube.... To answer your question, there was no flexibility early on. It was tough.

The opportunity was to go invent it and figure it out.

Richard Sachs ~ Steel

When did you start working with steel?

I started at the beginning when I went to England in 1972.

Has it been fulfilling to work in tube design?

Kind of. A lot of the things I've been working on for the last 10 or 15 years have to do with the fact that I have always worked alone, by choice, and I've always worked with steel because that's the material I inherited when I entered the trade. But forget about why I entered the business. For most of the '80s and '90s, it was clear that the industry was going the non-ferrous route and framebuilders, season by season and generation by generation, were becoming less in number. The essence of this thought is that the "materials people," who were our supply chain, were giving up because when the big companies started doing aluminum and any other material except for steel, they didn't have the demand to create new things for the work we were doing, which was handmade framebuilding.

By the time the '90s rolled around, I felt like there hadn't been anything new developed for my niche in a long time. In the old days, and I'm not that old, it was like everything started with framebuilders and went back down. The framebuilders were at the vanguard, they were the important part of the equation. Whatever happened at the framebuilder's shop eventually got co-opted by the industry and then you'd see factory bikes using design elements that were part of framebuilding.

When the materials' supply was Columbus or Reynolds or whoever, I was seeing that framebuilders were off in the margins somewhere. The mainstream was Trek and Cannondale. It became clear that there was nothing left to develop for framebuilding because there was not enough people building frames to develop things for. I didn't really want to be using leftover inventory or obsolete inventory that was new 10 years ago but hadn't been improved upon since.

I said to myself, "Find a way to convince our suppliers to make



stuff and, even if it was a white lie, convince them to make stuff to keep the trade alive and keep the niche going.” The driving force was to keep me alive and to make stuff that other people could use.

I felt like, by the late '90s, it's time to invest. So I came up with framebuilding parts. It didn't happen all at once, but it eventually did happen.

What are the characteristics of steel that you enjoy as a building material?

There aren't any characteristics that I enjoy about it. It's just what I use and what I'm comfortable with. I'm confident that it's a good material. It's probably the best material for me, and it's the best material for people who pay me to make them bikes. Unlike other people, and I'm not trying to put quotes into anyone's mouth, but I don't think of steel as being from the past. I think of it as being a part of the process or a part of the package rather than the process or the package.

The most important component of the bicycle is my ability and my experience. The type of steel I use almost doesn't matter. It's what I do with it. It's not easy for me to separate everything and make the material its own subject.

You have your own line of tubing. What are you looking for when you design a tube?

I'm not looking for any characteristics. I just want a tube. The important thing is to have a tube that hasn't been lying on a shelf somewhere for 20 years. What I found over time was that the quality of the steel most of us were being served up kept getting lower.

I never felt that bikes were less for using it. It was more like, “Is this all there is?”

So when you talk about characteristics, I simply wanted steel the way I remembered it, but a high-quality manufacturing of it. In the course of all of that, I also wanted to make the diameters larger and the gauges thinner, so that we weren't just making a remake of some tube that was involved in '70s or '80s framebuilding. I wanted to keep the material steel, but I wanted to find a way to make it palatable for 21st century framebuilding operations.

It wasn't like I tweaked the alloy. Christ, I don't even think about the alloy. I leave that up to the tubing company. I just wanted a 21st century version of a tube set that would make people think, “Steel, hmm... that's pretty cool.”

You build bikes one way, but a lot of builders are creating a niche based on a desire for customized things and high artistic design.

That's true, too. I go hot and cold on that subject because they are, quote unquote, custom things and high designs, but they are also bikes, they're also vehicles. They're going on the open road with cars. You really want to make sure that your overly ornate, stainless steel, hee-hawed-out head badge city bike is going to stay together when you go down that hill. I kind of tiptoe around it. Sometimes I get overly vocal on the side of safety and liability and experience. And sometimes I think I'll just shut the hell up and let these guys do their thing and if they're around in two years or 22 years, all the better.

I'm pretty excited that so many people are making so many bikes, no matter how many different ways they're making them. As long as the bikes stay together, I don't care how many sculptors they mine their design elements from or how many Mondrian paintings they copy to get a paint scheme on their bike. It's still a bike, if they can make it work out, good for them. 🌀