

Hey, This Looks Different!

We switched to WordPress. All the articles we've published since 2001 are still there — they're just organized a little differently in few categories so they are easier to browse. The change will make it easier to keep the site updated and the newsletter published each week, and the new design loads faster on mobile devices, which has grown to make up 50 percent of the traffic to the site! There are still few small issues we are working out, but we are methodically fixing them all.

If you are a Premium Member, your membership is still valid and the same as before. We are using a different system to track memberships, so it will require a quick and easy password reset for your account when we turn on the new membership system and import the existing members. We have delayed turning it on until after the newsletter went out, because we thought it would be confusing to send you a password reset request with no explanation. Stay tuned for that.

This week's Bike of the Week is related to Stan Purdum's recent article, [Living to Ride Another Day](#). I usually ride very early in the morning here in Dallas, at around 5:15 a.m. I ride with front and rear lights and reflective clothing, and I actually feel much safer in the dark than I do during the day. A good bicycle headlight is equal to a car headlight, so you are very visible when you ride in the dark.

So what's with the broken frame and bent cranks? It isn't my bike. It's a friend of mine who often rides with me early in the morning, who will remain unnamed for now. Last week, he went out for a spin during a lunch break. A driver "didn't see" my friend on the bike and drove right into him at a low speed as the car driver rolled through his stop sign and started to accelerate.

My friend had no stop sign and the right of way. He was also running a flashing daytime headlight and a rear flashing taillight. He did everything right, and he still got hit.

He landed on his head, but was wearing a helmet and fortunately was able to jump right back to his feet. He did not suffer a concussion. (Helmets work!)

The driver admitted fault, and insurance is working everything out to reimburse him. Clearly, it could have been much worse.

Only about a month ago, a different friend and I decided to skip out on a group ride in Austin one Saturday morning and rode by ourselves instead. When we got back later that morning, we heard that someone on that group ride [had been killed while changing a flat tire](#). He was completely off the road in the grass, when two cars collided in an unrelated accident and crashed into him.

These two accidents have really gotten me thinking about the dangers of riding on the road. It doesn't feel nearly as abstract when someone you know is involved in an accident.

Do you worry about cars?

That's our question of the week, by the way.

Anti-Aging – Benefits of Training with Intensity

By Coach John Hughes

Intense exercise produces different physiological benefits than moderate exercise. Here's why you should incorporate the appropriate types of exercise for you at the appropriate times of the year.

Your muscles atrophy over time as you age. You have two different types of muscle fibers: slow-twitch, which fire slowly and have great endurance, and fast-twitch IIa and IIb, which fire explosively when you need power. You differentially lose muscle mass in the fast-twitch fibers because as you age you tend not to do activities that require a lot of power. (Slow and fast refer to the firing rate of the muscle fibers, not your cadence.)

You recruit muscle fibers progressively. When you ride at a moderate conversational pace you are using your slow-twitch fibers. When you exercise harder, e.g., climbing a hill, you recruit your fast-twitch IIa fibers, in addition to your slow-twitch fibers. When you exercise really hard, then you are also recruit your fast-twitch IIb fibers.

Your heart is a muscle, and as it ages the muscle fibers atrophy and your heart pumps less blood per beat. Your respiratory muscles also atrophy as you age. Your cardiac and respiratory muscles also lose elasticity.

When you exercise hard, you increase the demands on your slow-twitch, fast-twitch, cardiac and respiratory muscles, all of which then maintain more fitness. Your cardiac and respiratory muscles also maintain more elasticity.

Your enzymes decrease. Your muscles get energy through different processes: aerobic metabolism of fat, aerobic metabolism of glucose, anaerobic metabolism of glucose and the adenosine triphosphate – phosphocreatine system. Each of these processes requires different enzymes. Further, the amounts of enzymes produced for the different energy systems result from how much you use that system. If all you do is moderate exercise, your body only produces enzymes for aerobic metabolism, primarily the aerobic metabolism of fat as well as fewer enzymes for the aerobic enzymes of glucose. The result is that when you have to climb a hill, you have fewer fast-twitch IIa fibers to do the job and fewer enzymes to produce power for those fibers.

Through exercise, you can slow the loss of power from the fast-twitch muscles and the loss of enzymes.

Benefits of Training with Intensity

Exercising with intensity has the following physiological benefits, depending on the intensity:

1. More economical use of time.
2. Improve your pedaling economy.
3. Improve your cycling.
4. Repair effects of aging on your muscle cells.
5. Raise your anaerobic threshold.
6. Slower decline in your VO₂ max.

More economical use of your time.

For aerobic exercise, the American College of Sports Medicine (ACSM) recommends accumulating either a total 150 to 300 minutes of moderate exercise per week or a total of 75 to 150 minutes of vigorous exercise per week, or a combination. You could meet the ACSM's recommendations with vigorous exercise in half the time it would take for moderate exercise. Moderate cardio exercise is the most important; however, you can substitute appropriate intense exercise time for some of the moderate exercise time.

Improve your pedaling economy.

Your slow-twitch muscles and fast-twitch IIa and IIb muscle fibers don't naturally all fire at the same time. When you exercise at maximum intensity, i.e., sprinting, you're demanding as much instantaneous power as you can get from all of your muscle fibers firing. The result is improving the coordination of the sending of signals from the individual nerves to the individual muscle fibers. This is the same as dialing in the timing of the individual cylinders in your car engine. This means you increase your pedaling economy without using more fuel or oxygen.

Because sprints improve your pedaling economy, they will benefit most riders — from casual endurance riders to racers. Start with very small doses, i.e., two or three 20- to 30-second sprints in an endurance ride with plenty of recovery between each. To continue to improve, lengthen the sprints by 10 to 15 seconds and add another sprint or two.

Improve your power and speed.

In addition to improving your pedaling economy, intensity workouts will increase your power and, as a result, increase your cruising speed. You do this by training in the Sweet Spot.

The harder you ride, the more you overload your body, which stimulates more adaptation. However, the harder you ride, the more recovery you need both between hard efforts and between hard days. The need for more recovery limits the total volume of hard efforts. The Sweet Spot is the range that balances how hard you ride with the need for recovery to produce the most total overload on your muscles.

Repair effects of aging on your muscle cells.

Aging damages the cells in your muscles, which is especially severe, because they do not regenerate easily. They become weaker as their mitochondria, where energy is produced energy, diminish in vigor and number. Researchers at the Mayo Clinic tested different training protocols on two sets of participants. One group was age 18 to 30 and the second set of participants was age 65 to 80. The age groups had approximately equal numbers of men and women. The participants did not exercise regularly before the study.

The study found that intensity training increased the number of mitochondria where energy is produced but neither moderate cardio or strength training increased the number of mitochondria.

Raise anaerobic threshold.

Your anaerobic threshold is the point at which the production of lactate significantly exceeds the body's capacity to clear the lactate. When you exercise slightly above your anaerobic threshold, you improve your muscles' capacity to metabolize lactate as a fuel, thus increasing your anaerobic threshold. If you already have a high AT relative to your VO₂ max, then you may not see any increase in AT.

Increase VO₂ max.

VO₂ max, also called aerobic capacity, is the maximum amount of oxygen that your working muscles can utilize. Physiologists agree that declining VO₂ max as you age is the chief cause of declining performance. You can't deliver as much oxygen to your working muscles. Decline in anaerobic threshold is a distant second and loss of economy is third. According to one study of fit male cyclists, VO₂ max declined by 30.5% from age 60 to 69 and a further 15.6% from 70 to 79. The reason for the loss is simple. As riders age, most stop doing the intensity training necessary to slow the decline in VO₂ max. Continuing to include high intensity training in your riding results in about half as much loss per year of VO₂ max as just doing endurance training.

Physiologically the decline in VO₂ max is primarily due to the decline in your body's ability to deliver oxygen to your working muscles. How much oxygen your body can deliver is the result of stroke volume (how much oxygen your heart delivers per beat), specifically the size and contractility of the left ventricle. The left ventricle is a muscle and like any muscle that is not worked hard the power of the left ventricle declines. This loss is greater in men than women. Decline in maximum heart rate may also affect VO₂ max; however, studies of this yield inconclusive results.

My new eBook Anti-Aging: 12 Ways You Can Slow the Aging Process will be published next week. It describes in detail the pros and cons of gauging intensity by Rate of Perceived Exertion, Heart Rate and Power. It explains how to determine your anaerobic threshold (AT) or your functional threshold power (FTP) and includes a spreadsheet for you to calculate your own training zones. It explains how to do five different types of intensity workouts depending on your goals. It includes a year-round program of how to incorporate different types of intensity workouts into different phases of your training year.

Look for my 110-page Anti-Aging: 12 Ways You Can Slow the Aging Process next week.

Are Crankarms That Are Too Long Causing Your Knee Pain?

By Rick Shultz

Over the past 18 months, I have collected crank arm length data from my bike fit clients. During the bike fit interview process, most of my clients volunteer that they have had prior bike fits, but they are still in pain. Many have had refits and even been to chiropractors, but are still experiencing knee pain. Most of the issues I have resolved focus on the following (a) wrong cleat placement, (b) wrong saddle position and (c) wrong crankarm length.



Both (a) and (b) above can be fixed by an experienced bike fitter, (c) can be fixed by bicycle and component manufacturers placing shorter cranksets [crankarms] on most bicycles.

But first, a background story. Two and a half years ago, 3 best friends, all in their 70's, started cycling. They have known each other for decades and did everything together. After retiring, they started cycling. First were the shiny new bikes followed by what they thought was a good bike fit.

After riding for several months, they all developed severe knee pain. They initially attributed this pain to not having ridden before, but, when their pain got worse, they went back to their local shops for another bike fit. Fast forward another month and the pain in their knees got even worse. They were thinking of giving up on cycling when they decided to try one more bike fitting. Several of the San Diego teams that I do bike fitting for referred the three gentlemen to me.



There were two major problems I needed to immediately address. (a) their cleat placement was way off and (b) each of their crank arms were much too long for them. After fixing their cleats, I placed each of them on my Serotta Size Cycle. Using the 140mm to 185mm Vari-cranks, the resulting change is shown in the table to the right.

CLIENT	CRANK LENGTH BEFORE (mm)	CRANK LENGTH AFTER (mm)
1	175	170
2	172.5	165
3	170	160

Thirty days later I contacted them and they all said that their pain was gone and that they are enjoying cycling with friends and have even gone on several group rides!

Fast forward 6 months.

The fitting was such a success for client #1 that he called asking if he could bring his wife by for a bike fit. He said that 3 years ago, he bought her a new bike and that the bike shop had done a bike fit for her. The next day, they had planned a 10-mile ride. 2 miles into the ride, his wife couldn't pedal anymore, her legs had locked up. The next morning, she was in so much pain that she couldn't go to work. Her wrists hurt, her trapezius hurt, her shoulders, lower back AND knees hurt. He told me that he convinced her that her pain was due to this being her first bike ride in 20 years, so they tried it again the following weekend. This time she made it 1-mile before calling it quits. He said that her bike has hung in the garage for 3 years.

After fixing her cleats, I placed her on the Serotta Size Cycle and adjusted the Vari-cranks to 145mm. I saw a HUGE smile! She was spinning and cycling pain free. That was on a Sunday. He

called me the following Monday and told me that after the bike fit, they drove to Dana Point Harbor and rode 20 miles! He said he had trouble keeping up with her. She was spinning easily at 100 rpm, and that was on her first ride. The next morning, **no pain!** The following Sunday they started in La Jolla and did a 25-mile ride including the famous Torrey Pines grade! Both are now enjoying cycling together **pain free!**

CLIENT	CRANK LENGTH BEFORE (mm)	CRANK LENGTH AFTER (mm)
4	165	145 (cabb)

Knee pain is a common problem. The other problem is that most cyclists believe that pain is part of cycling. I partially fault the component manufacturers that aren't making crank arms short enough AND, I fault the bicycle manufacturers for putting on too long of crank arms.

So, exactly what length crank arm should I use?

Recommended Crankarm Lengths

Before we get to this, let me ask you a question. When is a 56cm frame not a 56cm frame? OK, trick question. As you can see on the table to the right, a given frame size (56cm in this case) comes in many different frame sizes. For example, although my preferred frame size is 56cm, I could ride several 'larger' 55cm frames. I could also fit on a 57, 58 and even 59cm. But, looking at my general recommendations on crank arm lengths, should I choose a 165, 170, or 172.5 crankset?

FRAME	STACK (mm)	REACH (mm)
TREK MADONE 9. H1 (56)	554	395
TREK MADONE 9. H2 (56)	582	387
GIANT TCR ADVANCED (M/L)	561	399
CERVELO R5ca (56)	580	387

The only way to really tell is via a comprehensive bike fit. Most bike fitters will adjust the saddle to correctly determine and set the max extension of the knee. Then, they move on to the saddle fore-aft followed by cockpit controls. But, what I have experienced fitting clients is that the max flexion of the knee is as (or more) important as max knee extension...and this is adjusted by crank arm length.

I have metrics on over 100 cyclists that I have helped by replacing their long crankarms with shorter ones. In every case, knee pain went away. The table to the right is a list of crank arm lengths that I have 'generally' advised cyclists with knee pain to install on their bikes.

FRAME SIZE (mm)	CRANKARM LENGTH (mm)
> 62	175
57-62	172.5
56	170
54-55	165
52-53	160
50-51	155
< 50	< 155

Other Studies

Andy Pruitt is one of the most respected bike fitters in the world and helped to develop the Specialized BG Fit system. Andy also states that cranks that are too long can cause injuries. This is because “the compressive and shear forces in the knee joints ‘go up exponentially’ due to the sharper knee bend. Cranks that are too short are not dangerous, however.” In his book Bicycle Design, Mike Burrows warned against using cranks that are too long to avoid knee problems and Sheldon Brown has written about crank length and how riding with cranks that were too long for him has caused him knee pain.[1]

There are 5 methods listed in [1] and I’ve added my own formula as well. I am 6’0” or 183cm and currently use 172.5mm crank arms on my 56cm bikes, and although I am a spinner, I could/should go to 170mm crankarms. My inseam is 89cm and 48.5cm femur length. Also, the manufacturers sizing charts say I should be on a 57cm or 58cm frame, but I prefer 56cm. Let’s see how close I am to their results...

NOTE: for the formulas below, use cm for height and inseam...

I am still testing the $[1.2 * \text{inseam(cm)} + 65]$ formula, go ahead and see if it works for you. I have tested on a dozen cyclists and this seems to closely match the new shorter paradigm. For an accurate determination of crank arm length, you will still need to do a comprehensive bike fit where the bike fitter looks at BOTH max flexion AND max extension.

Summary

Cycling is a culmination of micro-injuries and my paradigm errs on the side of caution. Think of your knees during a typical 2-hour ride and spinning at 85rpm. You have pedaled 10,200 circles. Four rides a week and you have pedaled 2,121,600 circles in a year. If anything is out of adjustment, some part of your body is going to absorb it, and that part is usually the knees.

You might feel fine at 25 years old, at 35, even 45, but, eventually, this will all catch up to you. It's better to be safe now than sorry later.

So, go ahead and check out a shorter crank. Your knees will thank you!

- [1] <https://ridefar.info/2017/02/crank-length-and-comfort-for-long-distance-cyclists/>
- [2] http://www.kneeclinic.info/knee_sports_injuries_cycling.php
- [3] <https://www.ncbi.nlm.nih.gov/m/pubmed/23898683/>
- [4] <https://www.cervelo.com/en-us/engineering-field-notes/a-new-spin-on-crank-length>
- [5] http://www.powercranks.com/cld.html?gclid=EAIaIQobChMI3ZmiuMah2QIVTZN-Ch0WAwGrEAMYASAAEgKp3_D_BwE
- [6] <https://kbaracing.wordpress.com/2012/01/31/a-word-from-cervelo-about-crank-arm-length/>

174 Hudson Convertible Pannier / Backpack Review

By Brandon Bilyeu

Convertible Pannier Backpack:





HOT!

- Quality materials and craftsmanship
- Reasonable price
- Classic good looks
- Laptop sleeve
- Lots of big pockets

NOT!

- Lack of internal storage compartments for small items
- Not waterproof
- Gets dirty in pannier mode, need to clean before converting to backpack mode

Cost: \$79

Colors: Grey

How Obtained: Review sample from company

Availability: Online www.prioritybicycles.com , www.brilliant.co

RBR Sponsor: No

Website: www.174hudson.com

Tested: 30+ hours

A Versatile Bag That Looks Good Too

174 Hudson is a new cycling accessory line from Priority Bicycles based in New York City (at 174 Hudson Street). Their first product offering is the Convertible Pannier Backpack. As the name suggests it can be used as either a pannier or a backpack and is designed so that the parts

for both setups are always with the bag. It is constructed out of a heavy waxed canvas which is a time tested material that is hard wearing and water resistant due to the wax. The canvas will age and build character over time as it is broken in and absorbs the abuse it will undoubtedly receive.

In backpack configuration there are two padded and adjustable shoulder straps as well as a sternum strap for a secure fit. There are accessory loops sewn into the front of the straps for easy mounting of lights or clipping your keys. The inside of the straps is mesh lined for breathability and less abrasive against clothing than the waxed canvas. I was concerned I would feel the pannier mount poking into my back but there is sufficient padding that I could not feel the mount at all. Overall I found the backpack to be very comfortable to wear and spent the majority of the time testing in this configuration.



Converting to pannier mode is quick and easy. All you do is unzip the flap covering the pannier rack mount, unbuckle the shoulder straps at the bottom, and stuff them into the pannier cover pocket. Then you clip the pannier on your rear rack, flip out the yellow locking knob, and use the two bottom shoulder strap buckles to secure the bottom of the pannier to the base of your rear rack. The laptop sleeve and a backplane stiffener keep the pannier rigid and out of the rear wheel spokes. I don't have a bike with a rear rack so enlisted a fellow bike commuter to test out this feature and he said it worked great as a pannier.

Even though the pannier testing was done in dry weather upon the return of the bag to me for further backpack testing it was very dusty and dirty from being so close to the rear wheel. So while the conversion from pannier to backpack is super easy you probably don't want to ride with the pannier to work and then throw it on your back to walk into the office. This is especially true for wet weather, though I would not recommend using this bag in the wet for anything but quick trips. While the waxed canvas provides some water protection the seams are not sealed and the cotton liner in the bag wicks any water that does get in. From my one hour commute I found that light drizzle would result in dampness inside the bag by the time I got to work and real rain would cause serious wetness of the contents.

Lots of Pockets

Storage comes in the form of a multitude of pockets of different sizes. For smaller storage the pack has external elastic rimmed water bottle pouches on each side and two front pockets with magnet closure flaps trimmed in vegan leather for some nice visual contrast. Above the two front pockets is a medium sized sleeve pocket piggybacking on the main compartment that is closed with a waterproof zipper. The main compartment is essentially the entire body of the bag and has a large waterproof zippered opening all along the top and down one side of the bag. This large compartment is expandable/collapsible by using a roll top and buckle, the side zipper being a nice touch to help give access to the very deep compartment (24 inches/61cm deep when fully unrolled). Inside the main compartment is a padded sleeve that can hold a 15 inch (38 cm) laptop.



All the pockets are lined with a black cotton for a soft interior, but the dark color makes it very hard to find items in the bag as it becomes a black hole. One element I feel could improve this bag is interior small pockets. For instance, I didn't feel comfortable putting my wallet in the side elastic or front magnet pockets so it went in the front sleeve pocket. When I needed to retrieve my wallet I had to fish around in this large pocket for a small item. It would be helpful if there were some zippered small pockets sewn into the interior of the larger pockets.

A Great Commuter Bag for Dry Weather

Overall I found the Convertible Pannier Backpack to be a very functional and stylish commuting accessory at a fairly reasonable price point. I love my bright yellow Ortlieb waterproof backpack, but the 174 Hudson kills it in the style department which means it can be used outside of cycling without looking silly. The main bike commuting drawback is that the bag is only water-resistant

and not fully waterproof. This means year round bike commuters will need a different bag in the wetter months of the year, but it will work great for fair weather commuters with just enough protection for the unexpected shower.

RBR Readers Respond – Your Tips on Customizing Cassette Gearing

Jim's Tech Talk

Ride total: 8,849

Your Tips on Customizing Cassette Gearing

Last week, we ran a tech Q & A, based on a question from reader Tom Lowry, who asked whether it's possible to use cassette gearing combinations other than what's available from the usual suspects, such as Shimano, Sram and Campagnolo. He wasn't happy with his Shimano 11-32 cassette and wanted to customize it by changing out the 11 for a 12 and adding a 30-tooth cog between his 28 and 32.

You can read the [original question and answer here](#).

Before the Q & A was published, I heard back from Tom, who thanked us for answering and continued, "Hopefully a cassette solution will come soon. FYI – my old cyclocross bike is now my gravel bike. I changed out the crank to a Praxis Alba 48/32 <https://praxiscycles.com/product/alba-m30/> and the cassette to a 12-30. With Ultegra 6700 derailleurs, this setup has been a good solution."

Nice way to get the gearing more to your liking, Tom. Good job. As one takes their road riding to the gravel, custom gearing for the bicycle and the gravel roads travelled makes a lot of sense because it takes more effort to ride the rough stuff.

Your comments

Once the Q & A ran, we received 14 comments with a lot more ideas for Tom on how he could actually customize his cassette. Thanks for sharing! Let's look at some of your clever solutions:

Drilling out the cassette cog carrier rivets

In my answer to Tom, I mentioned how the largest cogs on cassettes are usually riveted onto a carrier, which means you can't simply separate and replace them individually.

So, it was nice to hear from "Tom" in Minnesota who provided a [link to a blog post](#) where he shows how he drills out the rivets so he can remove and replace the individual cassette cogs on the carrier.

Miche makes individual cassette cogs

Then, three readers recommended Miche cassette cogs. Chris VandenBossche wrote,

“Miche makes Shimano-compatible cassettes made of individual cogs and they can be configured for more even gearing spacing. [Here's a link.](#)

Doug Kirk agrees. He explained, “I have purchased and put thousands of trouble free miles on a Miche 11-speed cassette with Shimano Ultegra components because I have no use for an 11-tooth cog and use the 16-tooth lots. My choice is 12-13-14-15-16-17-19-21-24-27-30.”

And, “Downtown Dave” added his thumbs-up on Miche and also mentioned another advantage of having individual cogs.

He said, “I've run 9 and 10sp Miche cassette cogs for over six years, on several different bikes, in conjunction with Shimano, SRAM, and SunRace shifters and derailleurs, and a variety of chainrings. I can run whatever gear ratios I want with Miche. An incredible variety of cogs is available, typically in one-tooth increments, and they are reasonably priced and widely available (see photo of cog board).

I'm not a racer, but I ride a lot, over 7,500 miles a year, about twenty 100+ mile days per (Minnesota) season. The Miche cogs shift accurately and well. And when it comes to maintenance, I'd much rather clean a cassette that comes apart.”

That's an excellent point about cleaning, Downtown Dave. A flat individual cog can be brushed and wiped clean quickly. The cogs on the carrier take much more effort.

A vote for 8-speed and another for Miche

Roadie David Frost chimed in with, “You can call me a retro-grouch, but I like 8-speed cassettes that are assembled from individual cogs. My “flat road gears” are single-tooth spaced with wider gaps at the low (more teeth) end.

Combined with my equally retro triple cranks, my gearing has worked well for rides throughout the highly varied terrain of the Pacific Northwest as well as Europe, from fast group rides and centuries+ to self-supported tours.

BTW, I don't notice any shift degradation by mixing Shimano, SRAM (both brands from disassembled 7- or 8-speed cassettes) and Miche cogs.”

Thanks, Dave! You pointed out something I hadn't thought of. Which is that if you're willing to go back in time with your equipment to previous components (still available on eBay.com, etc.), you can find cassettes with individual cogs that are customizable.

A callout for today's stock cassette options

Meanwhile, “Fixieguy,” doesn't have a problem with what's on the shelf today.

He explained, “A shift from 11T to 12T is 1/11 (9.09%) easier gear. A shift from 28T to 32T is 4/28 (14.3%) easier. If one had a 30T gear, from 28T to 30T would be only 2/28 (7.1%), less than the 11T to 12T change and not worth the difference in low gears. Cassette cogs increase in increments of 1, to 2 to 3 and then 4 teeth because as the cogs get bigger, the percent change decreases.

While a 4 tooth jump will feel significant in shifting down from e.g., a 12 to a 16 gear, shifting from 28 to 32 is considerably less significant. So I think that standard choices available make sense. That having been said, if I were to eliminate the 11 cog, like Tom wants, I’d prefer a cassette with 12,13,14,15,17,19,21,24,27,30,& 34 cogs. Using a 34T small chainring, a 34-34 gear would likely get me up anything.”

Ti cogs

The last word goes to a roadie named “Bill,” who recommended a company called ActionTec. All Bill wrote was “Single cogs up to 39T and he [provided the link](#). Curious, I followed the link and found that ActionTec makes titanium cassette cogs.

In case you haven’t purchased any titanium bicycle components, they are significantly more expensive than steel parts and much lighter. So you can build yourself a featherweight custom cassette if you don’t mind the price. One caveat, though, in my experience with ti cassette cogs, they didn’t last nearly as long as steel ones for me.

Using a 1200-Lumen Taillight in Daylight

by Stan Purdum

In “[Living to Ride Another Day](#)” in the March 8, 2018 Road Bike Rider newsletter about daytime running lights used by cyclist Dave Cardarella on his tandem bicycle, I said that one of his taillights is a “1200 lumen import.” I added that Dave had mounted it “on the left side of the left end of the stoker’s handlebar, on the bottom of the drop so as not to interfere with riding.”



Seeking to follow the advice of my own article, I went online looking for such a light for my bike. Dave hadn't specified a brand, but had mentioned that his light, which he purchased two years ago, is good in strobe mode for only about three hours on the rechargeable battery that came with it. Thus, he

purchased a second battery, and on rides lasting longer than three hours, he changes the battery in midride to have the light functioning for the whole time. Deciding that was inconvenient, I hoped to find something with longer battery life.

It's not common to find bicycle taillights putting out a whopping 1200 lumens, but Dave told me that what he used was sold as a headlight. He'd replaced the clear lens with a red one, which he'd purchased separately.

The Bright Eyes light

With that information, I found on Amazon a waterproof 1200-lumen rechargeable bicycle headlight made by [Bright Eyes with a 6400 mAh battery](#). That mAh stands for "milliampere hour"; a 1000 mAh battery is supposed to last about an hour, so the 6400 mAh battery should run for somewhere around six hours. The Bright Eyes product description on Amazon says it runs "5+ hours on bright beam." That sounded good to me, especially since in strobe mode, as I planned to use it in daylight, it should last longer than that.

When I searched for "1200-lumen bicycle headlights," several choices and brands came up, but searching for the red lens pointed me to the Bright Eyes light, since the only lens pack I found with a red lens was made to fit the Bright Eyes. The product description said the lenses could be used with "other similar bike lights," but after reading the Bright Eyes info, I settled on that light. On Amazon, the headlight had a 4.5-star rating (out of five stars), with more than 2,900 reviews.

I bought the light and the lens pack together for slightly less than \$50. They arrived within two days. The light came with a clear lens installed and a clear diffuser lens that could be swapped in if preferred. A plug-in charger was included, as well as a small LED taillight with a rubber mounting strap (it's bright, but there's no indication of how many lumens it puts out). The headlight kit also included an expansion strap that allows wearing the headlight on your forehead or mounted on the front of your helmet.

Adapting the light

Changing the lenses required removing four small screws with a provided allen wrench, but nothing in the printed directions explained that. I finally found the screws by peering down at the headlight from the back and seeing the screws — one in each corner, recessed in what appear to be baffles. Once found, the swap was easy.

As I expected, the bracket on the base of the light was positioned at a right angle to the light beam for mounting it on the handlebars, but since I wanted to mount mine on the outside end of my left handlebar drop — the leftmost and therefore most visible spot on my bike — I needed the bracket rotated 90 degrees to be parallel to the light beam. When I peeled back the gripping tape in the bracket, I found a single screw, which when loosened, allowed me to rotate the bracket. After that, mounting the light where I wanted it, with the light pointing directly to the rear, was a simple matter, using the provided rubber fasteners.

For now, I have used a cable tie to route the cable up my handlebar, past the left brake/shift lever. Next time I rewrap my bars, I'll put it underneath the tape. I mounted the battery by its Velcro straps on my top tube where it meets the head tube. The battery cable reaches easily from there to join the lamp cable in a waterproof socket. The kit also includes an extension cable if you wish to place the battery elsewhere on your bike.

After each ride, I recharge the battery by running an extension cord to my bike and plugging in the charger. I've not had time for a five-hour ride yet, but at the end of the three-hour rides I've done, the light was still going strong.

Now, the important stuff

The taillight is visible from a long way off, perhaps as much as a mile. I've only had time for two rides since mounting the light, but my anecdotal experience so far is that when riding on roads where lack of a shoulder forces me to ride in the traffic lane, vehicles are slowing down sooner as they approach me from behind, and when passing me, they are giving me wider berth. Even one guy in a sports car who passed me doing at least 60 in a 35-mph zone, moved over into the other lane.

As you know, there are no safety guarantees when pedaling on the road, but there's now no excuse for a driver coming from behind not seeing me.

Question of the Week

Do You Worry About Getting Hit by a Car?

- *I worry about cars, but feel that safe riding will protect you most of the time. (0 Votes)*
- I don't really think about it, and I don't worry about it much. (0%, 0 Votes)
- I feel that the risk is relatively low, and you just have to be careful. (0%, 0 Votes)
- I worry about cars and feel that with today's distracted drivers, you're never really safe. (0%, 0 Votes)
- I only ride a few specific places that I feel are safe and avoid other road riding. (0%, 0 Votes)
- Something else. (0%, 0 Votes)