

Buying A Recumbent Tandem—A Report On Our 2002 Rans Screamer Experience

Ver 1.3

by Louis Du Brey



My daughter and I out for a ride!

Thank you to Mark Livingood for helping me edit the report.

Forward

The report uses hyperlinked text, the text in blue print, to jump to other information on the Web. Make sure you are connected to the internet before clicking any of the hyperlinks. Clicking on the link will open a window in your internet browser or email program. I may make updates to this report from time to time and you can revisit this link, <http://www.hearingoffice.com/bike.htm>, to check for revisions.

This is a report on the Rans Screamer we bought in January 2002. I have included several pictures to accompany my discussion on how the bike was configured and solutions to problems that developed after riding the bike. This report may be helpful if you are thinking about purchasing a recumbent tandem, a tandem with a custom build, or a tandem equipped with Vision's Independent Pedaling System (IPS).

I wrote this in part because when we started shopping for a tandem I had trouble finding reviews about recumbent tandems. One posting about the Rans Screamer that I found helpful was [Alex Wetmore's \(alex@phred.org\)](mailto:alex@phred.org). You can read about his bike by clicking, <http://www.phred.org/~alex/bikes/>. Once there, click on the Rans Screamer link.

Since the initial release of the report, some readers have written that they were upset that we had problems. They shouldn't be upset. We're not! This was not why I wrote the report. This report is not a rant about Rans or any of the other vendors who supplied parts. I think that if you are satisfied with an out of the box Screamer, ie stock bike, all the power to you. As you read the report, you'll quickly learn that we didn't want a stock bike. I didn't think that a stock bike was equipped for our needs, and buying the bike as a custom build was a lot cheaper than buying a stock bike and taking parts off and trying to sell them. I also think that there are other teams out there that want more than a stock bike and will learn some things from the report. Here is what we did and how we did it. We love our bike and recommend the builder and the parts selection. The bike wouldn't have been possible without different vendors and a builder to put it all together. Read the report and take what you can from it.

Purchasing Our Bike

Three years ago we, my wife and I decided to buy a new tandem. We wanted to include uprights and recumbents in our search. We live in a small town, Klamath Falls, OR, and the closest larger cities are Portland and Sacramento. The search was narrowed down to a [da Vinci](http://www.davincitandems.com/) (<http://www.davincitandems.com/>) upright and a [Rans Screamer](http://www.rans.com/Bikes/screamer.htm) (<http://www.rans.com/Bikes/screamer.htm>). Since this would be our third tandem we had learned a few things along the way. One of the things that I have learned as a Captain is that I don't particularly enjoy having my knees jerked by stokers who suddenly stop pedaling. I wanted a bike with independent pedaling. Through our search we learned that only two such systems are available. The da Vinci system, called independent coasting or IC, uses a third bottom bracket and spindle that adds a second freehub to provide independent pedaling/coasting and a huge gear range. The second is made by [Vision Recumbent Bicycles](#) (*this link is no longer active as Vision Recumbents is no longer in business!*) who also manufactures and markets the Vision brand of recumbent bicycles and tandems. Their Independent Pedaling System (IPS) uses a clutch-like engagement system at the cranks which is created by using BMX freewheels threaded-on to the right side of the stoker's and captain's cranks. The freewheels are standard 16 tooth BMX freewheels spot welded to prevent the inside race from coming off during pedaling.

We looked 400 miles North, South, and East in our search for a daVinci and recumbents fitted with IPS to test ride. As it turns out, most local bike shops (LBS) don't stock tandems because of the investment associated with stocking different sizes and slow inventory turn rates. Finding a Rans Screamer to test ride proved most difficult and ultimately we could not find a dealer with one in stock. We were able to test ride a [DoubleVision](http://www.visionrecumbents.com) (<http://www.visionrecumbents.com>) (*this link is no longer active as Vision Recumbents is no longer in business!*) and BikeE tandem, but I did not like these bikes. I am not going to talk much about the BikeE since they went out of business in August but in general, we found it to be uncomfortable. However, regarding the DoubleVision, it's worth noting right up front that Vision has a great system in place to ensure LBSs can get a tandem to potential buyers for test rides at little or no cost. If you want to test ride a Vision tandem and your favorite LBS doesn't have one in stock, you or the shop should drop [Rick Comar](#) (*this link is no longer active as Vision Recumbents is no longer in business!*) (RickyC@VisionBikes.com) (*this link is no longer active as Vision Recumbents is no longer in business!*) an email or call toll free 877-433-4273. Rick will arrange to get a bike to the shop. But, as I mentioned, I wasn't happy with the DoubleVision. We felt the frame flexed more than we liked. We were also able to locate and test ride a da Vinci in Portland and loved it and subsequently ordered a custom-made da Vinci from [Todd and Brian](#) (info@davincitandems.com).

Having owned this tandem for a while now, I would have to say this is the nicest upright riding tandem we've owned. The only problem that we found with the da Vinci was putting our friends on the bike for longer rides. Many don't like the upright position after a few hours riding. So, with that in mind, a while back we were in Ashland, OR shopping and having a good time with friends. While our wives were off doing their shopping we headed to bike stores. I went into one LBS and standing in the corner was a Screamer—imagine my surprise! I took it out for ride with the owner and then test rode it by myself. What an easy bike to ride! I came back next week with my wife and we test rode the bike. She had problems staying in the rear seat. As she pedaled, she just kept sliding forward off the seat. By the time the seat was moved forward enough to prevent slipping, her knees hit the back of my seat. I am 6'3" and she is 5'7". This was a travel tandem that dealer was discounting at a great price. The dealer tried several adjustments, but Heidi, my wife, just was not comfortable. In the end we decided not to buy the bike and to do some more research to see if we couldn't find a solution to the seating issues.

I started reading messages from the [tandem@hobbes news group \(http://www-ac.s.ucsd.edu/home-pages/wade/tandem.html\)](http://www-ac.s.ucsd.edu/home-pages/wade/tandem.html) and [recumbent cycles \(http://in.dir.yahoo.com/recreation/sport/cycling/Recumbent Bicycles/\)](http://in.dir.yahoo.com/recreation/sport/cycling/Recumbent Bicycles/) news groups, and discovered that the seating issue had come up before with taller captains and shorter stokers. The solution was an XXL frame.

Over the years Rans built three different sized Screamer frames. The early versions of the Rans Screamers — the standard sized frame — was shorter and made using the da Vinci IC system. Later they built an XL frame which today is called the standard version. The XL frame was the size we rode in Ashland. Finally there were small runs of XXL frames, which had 3" added to the captain's boom. This was the frame we needed. Adding 3" to the boom moved my seat forward enough so that Heidi could stay in her seat and not hit the back of my seat with her knees. However, we really wanted an IC Screamer, but the available frames were too short. Another problem was that the IC Screamers, like the XXL frame, were impossible to find. IC Screamers haven't been built for five years. So, what to do?

Through our research we came to know and begin working with [Kelvin Clark \(anglezoom@aol.com\)](mailto:Kelvin.Clark@anglezoom.com) at [Angletech Cycle \(http://www.angletechcycles.com/\)](http://www.angletechcycles.com/) Kelvin was very informative and professional to work with. He was interested in answering our questions, great about returning phone calls, and freely shared his knowledge with us. After the first contact, he sent me his complete catalogue that same day and I received it the next—I couldn't believe the service! Kelvin suggested we use the [Vision \(http://www.visionrecumbents.com\)](http://www.visionrecumbents.com) *(this link is no longer active as Vision Recumbents is no longer in business!)* independent pedaling system, IPS to meet our requirement for independent pedaling. Interestingly, in my research I found recumbent

dealers divided on the IPS. They either loved it or hated it! There was no middle ground. But, Kelvin assured us that an XXL frame could be fit properly with an IPS and that it would be fine. However, we still needed that XXL frame and this presented yet another challenge.

In 2002 Rans shifted production of the Screamer frame overseas. There would be no more U.S. made Screamer frames. Call me a snob, but I wanted a U.S. made frame. With this in mind, Kelvin talked to Rans and they agreed to make one more XXL frame in Kansas. Since the overseas frames weren't due for another two months, this was great! Unfortunately, Rans would not make it with the IC system, but that's another story. So, with our frame now on order I talked to Kelvin about other issues that were important to us. These included good shifting and braking, bulletproof wheels, and timely delivery. As an added benefit of buying a 2002 frame, the tandem would be fitted with disc brakes and the new Rans seats. As the tandem continued to take shape, Kelvin designated this model of the Screamer the GLX27D, notwithstanding a few other changes and upgrades that I requested. As part of his specifications Kelvin included a Meks suspension fork designed for tandem use. I was reluctant at first to use a suspension fork since my wife and I have a combined weight over 430 lbs. However, Kelvin said the fork was tandem rated and would work well for our team. Moreover, the bike would be thoroughly tested before being disassembled for shipping. When the bike arrived, I would install the seats and pump up the tires.

Now for the contract. Having a contract that specs the parts and design is a necessity. Even with having a line item description of the parts, some changes and adjustments may occur during building. Without a written contract to work off, you don't really know what's going on. If you get involved with a LBS or builder that won't do this, expect to have problems. There's just too much going on in a LBS or design shop to just expect everything will be remembered without writing it down. Kelvin asked for 10 weeks to build the bike and I asked that he include a clause for late delivery. I based this on [Santana's](#) policy where they will deduct \$100 from the bill for each week that one of their custom-ordered tandems ships after the delivery date. Kelvin agreed to the clause, wrote up the contract, and I sent the money.

Kelvin did a great job of staying in touch with me during the building process. We've ordered bikes before only to watch the delivery date come and go without getting the bike. No phone call, email, post card etc. . . I'd call the store and ask what

Solving Problems



happened and they'd tell me that they were too busy or forgot to call me. The late fee clause encourages communication! In the end, the Screamer did not arrive on time, but some of the problems I felt were out of Kelvin's control. Because of his good communication, I compromised on some of the late fees.

Our bike arrived on a snowy day in April. Several days later the snow melted and we took the Screamer out for the maiden voyage.

There was a little drop, maybe 1", in the pavement when we entered on to the highway. When we went over this, I heard a noise at the front fork. I stopped and checked the fork, but I could not see what caused the sound and we continued on our ride. A short while later we had a problem with the drive chain slipping off the granny gear when we shifted going up a hill. We stopped and put the chain back on and continued on our ride. On our way back home as we shifted into the big front chain ring there was a sudden jerk in the pedals and the captain's drive chain fell off. We pulled off the highway and found that the rear chain had slipped off the big ring and was stuck between the big ring and timing ring. I also noticed that the captain's front chain pulleys were bent. Apparently, when the drive train suddenly seized I was

applying enough pedal pressure to bend the “L” bracket that holds the captain’s pulleys to the frame. Luckily, the timing chain slipped off after the pulley bent otherwise I am sure that I would have broken the bracket or the frame. Once back at home I checked the front fork again. The loud noise I heard earlier turned out to be the suspension fork’s crown coming in contact with and cracking the front fender that was

Rear chain stuck between the timing ring and big ring on the stoker’s crankset.

Captain’s timing chain was knocked off the timing ring when the rear chain over shifted off the big ring.



Cracked front fender mount caused because the front fork compressed too much.

fixed to the lower part of the fork. It seems as the fork’s sliders moved into the legs to absorb the bump the fork’s crown came down like a jack-hammer and smashed the plastic fender’s aluminum mounting bracket where it attached to the brake bridge on the composite fork leg assembly. What a hell of a maiden voyage! I called Kelvin and talked to him about what had happened.

The problem with the chain coming off the granny gear was fixed by adding a [N](#)

[Gear Jumpstop](http://www.gvtc.com/~ngear/) (<http://www.gvtc.com/~ngear/>). The Screamer uses the 1-1/8" clamp version and cost \$10.00. The device attaches to the front derailleur post and guides the chain on to the granny gear automatically. It was easy to install and we've never had another problem with dropping the chain in the granny gear. I highly recommend getting one if you have the same problem.



Jump stop installed

Before I could begin working on the overshifting problem, I had to straighten the L bracket that held the Captain's pulleys. The bracket bent when the drive chain wedged between the 48 tooth and timing gear. I didn't take pictures of the bent bracket.

I removed the bracket from the frame and checked for frame damage. Luckily there was no problem with the frame. I then removed all the pulleys from the bracket and straighten the bracket in a vise. When I put the bracket back on, I inverted it on the mount. I didn't take pictures of the original installation, but if you look at the picture at the beginning of the Problem Solving section might be able to see how the original installation was done. The reason I inverted the bracket was to decrease the amount of mechanical advantage that the timing chain had on the top pulley. Originally the bracket was mounted so that one end of the L mounted the top pulley and the other end mounted to the frame. I wanted to get the top pulley closer to where the bracket attached to the frame. I don't know how important this change was, but we never bent the bracket again, even though we had problems with the over shifting again. I also felt

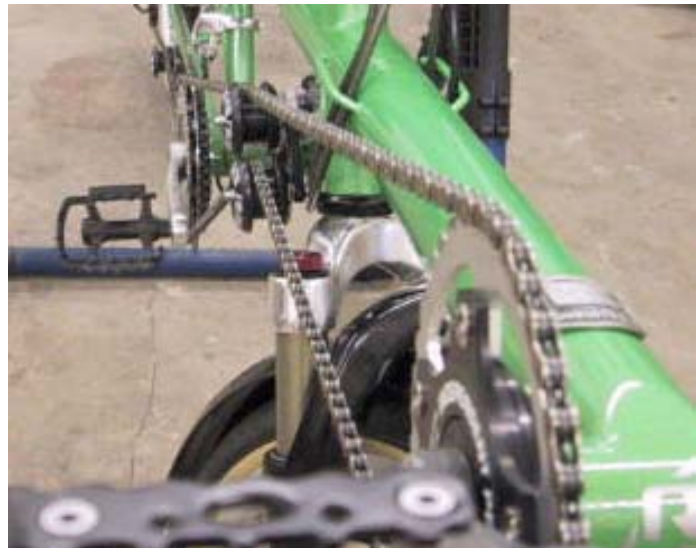


Revised L bracket installation



The revised L bracket installation locates the top pulley bolt close to the frame, but shouldn't be a problem

that this installation improved the chain line so that there was less hump as the chain ran from the stoker crank to the captain crank. This installation placed the bolt that holds the top pulley very close to the down tube. If the pulley was smashed against the frame, the bolt would hit the frame. I didn't think this was that great of a problem, but I acknowledge that the bolt is close to the frame.



The timing chain comes off nearly straight from the top of the stoker's crank to the captain's crank

The over shifting problem was intermittent and more difficult to troubleshoot. I tried the typically adjustments for the front derailleur. The only way that I could prevent the chain from coming off was to adjust the front derailleur, a FD 443, to just barely shift the chain on to the big ring. Doing this produced unacceptable noise from the chain rubbing on the derailleur cage. Every time I tried to reduce the rub, the chain would over shift at some point on our ride. I changed the derailleur to an XT 751. I liked this derailleur because the shifting was more precise. Our front chain ring setup was 24/36/48, which was similar to a MTB. The 751 derailleur was designed for mountain bikes and the cage fit our setup better. While the 751 improved the shifting, we still had problems with chain rub. With the bike in the repair stand, I was amazed at the side run out of the stoker's crank. I talked with Kelvin again, and decided to measure the stoker's side run out. Kelvin told me that acceptable tolerance for side run out was .030" or less. If you have an interest in how this was measured, I posted a 7 second high resolution video showing the crank run out on our IPS Screamer. The video shows two backward rotations of the crank with a dial indicator placed against the tip of a 48 tooth ring. I measured .050—.053" of run out. This was approximately 1/16". It looked like more, but the dial indicator did not lie. As you will see, this was recorded with the crank in an unloaded condition. There would be more run out in a loaded, stoker and captain actually pedaling, condition.

Later, after I shot the video, I found out that the measurement should be done on the timing gear using a 36 tooth ring. The video doesn't show me measuring here, but when I did measure it was .033-.035". The amount of side play you will see on the video didn't change. While .003-.005" doesn't seem like very much out of spec, watch the video! To the naked eye, it looks like the rings move 1/4" easily!

Click [here](#) go to the link on my site to download or view the IPS run out measurement video.



This side thread directly on to the crank and faces outside on the bike



This side faces towards the bottom bracket. There are two spot welds that prevent the inside race from moving off during pedaling

How Does The Vision IPS Work?

The Vision IPS system used on our Screamer works differently from the da Vinci system used on our upright tandem. The Vision IPS uses BMX freewheels which thread on to the right side of the stoker and captain cranks. The freewheels are standard 16



Stoker's crank sitting through the outside plate. You can see the holes where the inside plate bolts will pass through the freewheel.



The outside plate bolts to the inside plate with 5 bolts and sandwiches the freewheel.

tooth BMX freewheels except that spot welding was done to prevent the inside race from moving off during pedaling.

Once the freewheel is threaded to the crank, the crank slides through the center of the outer plate. The freewheel is then sandwiched between two plates. The outside plate holds the timing gear. The inside plate has mounts for the three chain rings. The two plates bolt through spaces between the freewheel teeth to complete the sandwich.

Kelvin sent me two new freewheels. The first one did not change the side run out at all. The second one dropped the run out to .024" This variability comes from the way the freewheels were threaded and how they thread to the crank arms. There was noticeably less run out with the second freewheel when viewed with the naked eye.

I wanted to take an additional step to make sure that the rear chain could never over shift. I talked to Kelvin about building a bash ring. Bash rings are popular on MTB's to prevent damage to the front chain rings when going over obstacles and to also



Inside view of the stoker's crank with the bash ring installed.



Outside view of the stoker's crank with the bash ring installed.

prevent the chain from popping off due to vibration. We weren't doing any stump jumping, but I wanted to prevent the chain from ever over shifting. Kelvin machined the teeth off of a 53 tooth ring so that I could bolt it to the outside of the 48 tooth ring. He did a very nice job on the ring and it looks very good. The over shifting problem was solved. Still need to know more about Vision's IPS? Click this link: <http://www.visionbikes.com/Images/IPS130.pdf> (*this link is no longer active as Vision Recumbents is no longer in business!*) to view Vision's technical pdf for the IPS. *Note, I have a copy of this original pdf and would be happy to email it on request*

The bash ring was such a good idea that I think it would work with any out of spec freewheel to solve an over shifting problem. Having gone through this troubleshooting process, I can see why some dealers hated the IPS. We like independent pedaling and think that the Vision IPS will now work fine for us.

Kelvin sent stiffer springs for our front fork. The Meks fork uses a spring and elastomer for suspension. There is no oil or air in the fork. I have shown a picture below of the guts of the fork removed so that I could exchange the springs.



The fork includes a pre-load adjustment to compress the spring about 3/4" for fine tuning the ride. I am still working out the adjustment on this fork before installing a new fender. What really appealed to me about the Meks fork wasn't the suspension, but the disc brake mount. Rans introduced a 2002 Screamer frame equipped with a rear disc mount, but failed to make their rigid fork with disc mounts. Go figure that one out. Since the front wheel is a 20", using a disc brake prevents us from heating the rim while braking and causing a front tire blowout.

Since we've been talking about the brakes, let me say that the Avid mechanical disc



View of the rear disc brake. Note the short end on the brake cable. Avid posted a notice that the cable end should be short to prevent accidental contact with the disc.

brakes work very well. Kelvin installed the large 203 mm. discs. The brakes stop our team quickly and I feel very confident using them.

I wasn't sure just how good the Avid's discs would be so I asked Kelvin to mount a backup. He mounted a rear Avid V brake that we control with a thumb shifter on the stoker's seat.



Thumb shifter mounted to the stoker's seat and used to operate the avid V brake



This V brake mount was already on the rear chain stay

I liked a thumb shifter instead of a bar end shifter because the brake housing doesn't pass through the stoker's hand grip. I ran the cable housing forward through the chain stays. I experimented with placing the lever on the captain's bars, but I was afraid that I might forget to release it timely when descending. I also tried using the disc brake as a drag, but it overheated quickly. Avid has since advised against using the disc brake as a drag. In the end, we found that the disc brakes worked very good by themselves. We don't use the V-brake when descending, but it makes a great parking brake. We will probably keep the brake on for this reason.

Another advantage of the 2002 Screamer frame was the newly designed quick release seats. There was no longer an inverted "U" channel mounted to the top tube with quick release levers to hold the seat on. The picture below shows the new seat mount. I

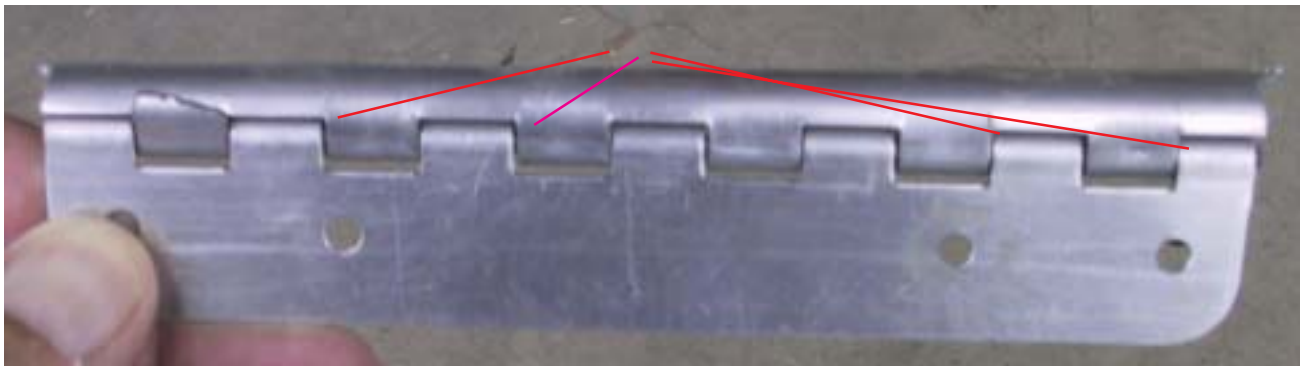


New Rans seat mount

removed it from top tube so that it was easier to see.

A thin aluminum rail was bolted to the top tube to guide the seat and prevent the seat from spinning. The seat clamp was notched to slide on this rail. A single lever was used to release the tension and make quick seat adjustments.

A couple months after the bike arrived, we noticed that the stoker's rear seat was noisy. The bike was ridden about 600 miles at that time. I lifted the seat to oil the hinge and found that the hinge was cracked about 1/3 of the way through. The captain's seat hinge was also damaged.



This was the hinge on the stokers seat. You can see the big crack on the left side, but there were also small stress cracks starting at both ends of the hinge.



Left, This was the captain's seat. The hinge did not crack, but you can see that the hinge was distorting.

I contacted Kelvin and he sent new seats and hinges. The report from Rans was that the hinges had not been heat treated. We have nearly the same number of miles on the replacement seats and they look to be holding up well.

Since receiving the bike, we added an X-eyed, (<http://www.x-eyed.com>), under seat rack. These racks may be hard to find new since X-eyed stopped producing them this year. We added additional support to the rack because the rack was designed for the older Rans seat mount. Since the new seat mount no longer uses a “U” channel on the top tube, I added 3/4” hose clamps to the chain stays and attached them with 3/8” clamps directly to the rack. I was afraid that if the rack was not clamped to the chain stay, the rack would swing back and forth on the top tube.



X-eyed rack secured to the chain stay with hose clamps. I used only one clamp on each side to prevent the rack from spinning.



X-eyed rack mounted to the top tube.

We’ve had zero wheel problems. We opted for Phil Wood hubs, 48 spokes rear and 36 front. The rear rim was a Sun Rhyno Lite spoked with DT Alpine III butted spokes. I have yet to take the wheel off for truing!

In summary, I wouldn’t own a tandem without independent pedaling. I like the IC system best. Maybe Rans will bring it back? IC offers a huge gear range and doesn’t suffer from run out issues. I hope you found this information helpful. We are enjoying the custom bike that Kelvin built for us and look forward to riding it for many years.

Louis

Updated Information August 16, 2004

I have been away from active touring for the past two years. Shortly after purchasing our Screamer, I decided to pursue a professional doctorate in my current field, Audiology. There have been no long tours as a result of my study habits. We were able to do some smaller rides, and I continued to commute to work daily. Over the past two years, I have tracked the download statistics on this document. Between the high and low resolution versions, the document averages 600 downloads per month. It is not uncommon for me to occasional get an email from reader thanking me for the information. I just returned from my graduation ceremony in Phoenix and vacation last week. Since my long study days are done, I thought an update to the original document was in order.

Status Of IPS Drives

Early last month I was visiting with [Kelvin Clark at Angletech Cycles](#) about the demise of Vision Recumbents and the state of IPS systems for future Screamers. I am happy to report that Kelvin recently purchased a new supply of the IPS. I am not sure of the supplier. Kelvin reported that these new IPS's had improved run out tolerances when compared to previous versions. New buyers of the Angletech Screamer will continue to be able to purchase bikes with IPS systems for near future. This is great news for old customers as well.

Bill Cook, owner of [Barcroft Cycles](#) also email me with IPS information. He is also using the IPS system on their tandem, Barcroft Columbia, as an option. He told me that [JB Importers](#) purchased the IPS system to use on their Sun Tandems. As a result, the IPS system is available to everyone again. I was able to find a link on the JP site here: http://www.jbimporters.com/nondealer/search.phtml?search_text=IPS and also here: <http://www.jbimporters.com/nondealer/product-closeup.phtml?id=21929>

Second Seat Hinge Failure

As noted earlier in this document, we had problems with the initial seat hinges that came with our bike. These were immediately replaced with heat tempered hinges. These second set of hinges were ridden for approximately 1200 miles before failing again. The most noticeable symptom was increased squeaking when pedaling. Earlier this month I was preparing the bike for a tour on the Olympic Peninsula. We were going to celebrate my graduation by revisiting Port Angeles and Sequim WA. During the most recent rides, I had noticed the bike seemed noisy--there was a lot of squeaking! That night before loading the bike in the van, I decided to check the seat hinge again. The captain's hinge looked fine, except that the edges of the hinge were compressed. The stoker's hinge was badly damaged with cracks developing on both



This was the hinge on the stokers seat. You can see the big crack on the left side

ends.

I was disappointed to find this again. I emailed Kelvin that night, Friday, and told him about our plans to tour the Peninsula. Since we were planning on going to the Peninsula after graduation, there was still a week left before we would need to ride the bike. On Monday Kelvin called us while we were on the road and arranged to have newer replacement hinges shipped to my wife's parents house in Seattle. We were leaving the car there and flying to Arizona for the week before beginning our vacation on the Peninsula. True to his word, Kelvin had the new hinges shipped to the in-laws in time for us to continue our vacation.

The New Hinges

The new hinges are different from the first two sets.

The new hinges are significantly thicker

The new hinges are highly polished when compared to the dull aluminum finish of the previous two sets

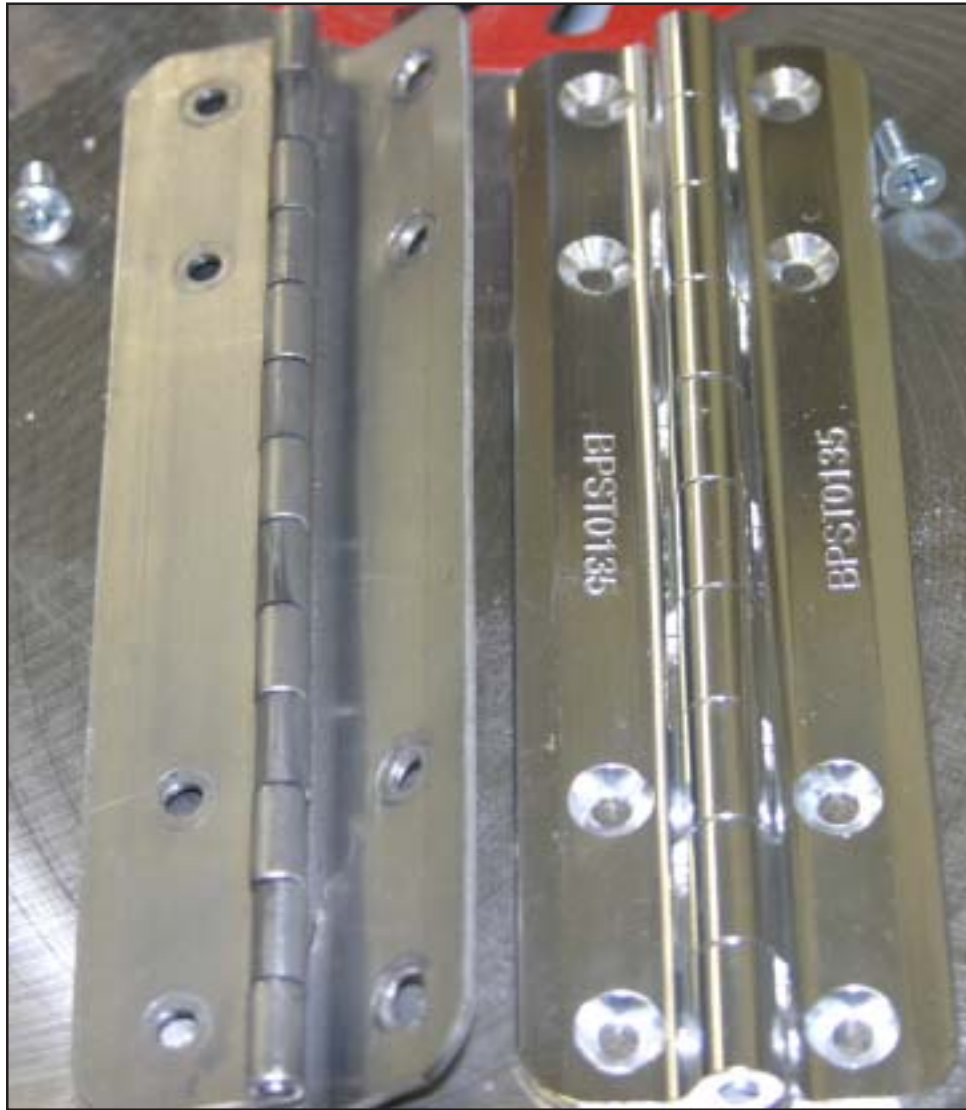
The old hinges installed with pan head screws and the new with countersunk screws

The new hinges will lay completely flat when placed on a table. It is not possible to flatten the old style hinges as the hinge is offset.

The new hinges have a part number, BPST0135, stamped on the inside surface. The old hinges had no identifying part number.



Old hinge design on the left and new on the right. Note that the old style hinge will not lay flat and is significantly thinner than the new style. The new style hinge is highly polished compared to the old style.



Old style hinge left and new style right. Note that the mounting screws fit into countersunk holes on the new hinge. Also, old style hinges were installed with pan head screws.



Part number clearly stamped on the new style hinge.