Recumbent Issue No. 74 March/April 2003 Cyclist News



2002 John Riley

Max Ahmady and his new Maxraya compact

2003 Season Preview

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Editorial License



2003—Here We Come

By Bob Bryant

elcome to the 2003 recumbent riding season. The RCN Crew (myself, John Riley and Ron Schmid) all went to Las Vegas for Interbike to get a preview of the 2003 offerings. We spent a wonderful day in the hot sun in Blue Diamond, Nevada, riding recumbents, talking to old friends, and meeting new ones.

Despite our down economy, there's a lot happening in the recumbent world. We're seeing some changes in the recumbent market, commercial offerings and trends. John Riley has a complete 2003 season preview report as the feature story in this issue.

Here is a quick run down of the recumbent market segments as I see them.

Compact LWB

Despite the loss of the world's largest recumbent maker, BikeE, things are looking up for 2003. HP Velo has introduced a replacement for the BikeE RX in their Spirit model with dual suspension and disc brakes. The other high end compact LWB is the Cannondale (whose future is in question as I write this in mid-January — see page 8 of this issue). The Scooterbike surfaced once again at Interbike. It'll be interesting to see if they actually make it into dealer showrooms.

As BikeE was in decline, Sun Recumbents came on very strong. In fact, the EZ3 (outselling the very popular EZ1 by a slim margin) is reported to be the best selling recumbent in the USA (and perhaps the world).

Long Wheelbase

LWB were expensive until the introduction of the Sun EZ Sport and Limited models. These are by far the best LWB bargains we've ever seen in the recumbent world. These exciting and affordable new models are taking selling very well. Easy Racers is still considered the Gold standard for LWB OSS. There are some other fine specialty builders as well. We like what we've seen from Rotator and Lightfoot. RANS has new handlebars on their LWB OSS bikes and new pricing on the V2. Just as we were going to press, we heard from Longbikes, whose Slipstream LWB USS will be available by the time you read this. The frames are now built in Taiwan and painted and built up in Colorado. LWB offerings have never been so good.

American SWB Goes Euro

The overwhelmingly most popular SWB of the last season were the Bacchettas. If you haven't seen them before, be sure to get a copy of our last issue (RCN 73). Bacchetta has taken the basic American style SWB OSS recumbent, much like a Vision, RANS or Burley-and evolved the design. They've stretched the wheelbase; stiffened the OSS unit (using the incredible TerraCycle FlexStem which every SWB should have); adapted Euro "U" style "tweaner" bars for a low and more stretched out OSS position (which can be perfect for a host of rider sizes-I love it); and finally designed a seat based (and improved) on other successful designs, and updated to fit better

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when reclined.

Keep in mind that this is evolution. Bacchetta is hot this year. Perhaps another manufacturer will take the hint and evolve the SWB further.

For those of you who prefer the classic American SWB styles that we've been the mainstay of this segment of the market for the past few years, the good news is that they're very refined with excellent values.

Trikes

2003 just might be the year of the trike! The trike market is very hot - many enthusiasts have gone to three wheels for safety, balance or to experience that human powered sports car kind of feel.

2003 is set to be an incredible year for trike designs and values. In the tadpole arena there are new, more affordable Catrike, WizWheelz and Wicks models (just before press time Wicks announced a new folding tadpole trike that will sell for \$1500! We'll provide more details as they become available); updated and highly refined Greenspeeds; and the tiny, sleek and low ICE Trice Micro. This market is segment has never been more competitive and such great designs.

In the delta arena the big news is the new aluminum EZ3 with 3x20-inch wheels and a disc brake on each wheel. The seat height is lowered, and bottom bracket raised. It's a few pounds lighter, but still no featherweight. This trike is due out in the Spring and should be an exceptional bargain.

Tandems

The recumbent tandem world has just been turned upside down. Sun has introduced a fine,

2003 Editor's Choice Awards

CLWB

Best New CLWB HP Velo Spirit Best CLWB Value Sun EZ1/EZ1 SC Lite

SWB

Best SWB OSS Bacchetta Giro Best SWB USS HP Velo Street

Machine

Best New SWB Bacchetta Corsa Best SWB Value RANS Rocket

OSS (tie) Vision

R40 USS

Best Lowracer HP Velo Speed

Machine

Best Highracer Bacchetta Ti Aero

LWB

Best New LWB

Sun EZ Sport Limited

Easy Racer Gold/ **Best LWB OSS**

Ti Rush

Best LWB Value Sun EZ Sport Best LWB USS Longbikes Slipstream

Trikes

Best New Trike Sun EZ3 ICE Trice (tie) **Best Tadpole**

Greenspeed

Best Tadpole Value WizWheelz (tie)

Catrike Speed

Best Delta Hase

Best Delta Value Sun EZ3 (steel

or new aluminum Best Trike OSS Windcheetah

Best Trike USS Greenspeed

Tandems

Best Tandem OSS RANS Screamer Best Tandem USS Double Vision Best Tandem Value Sun LWB

well equipped LWB OSS recumbent tandem for under \$2,000. Rumor has it that an aluminum version is in the works. The RANS Screamer is looking fine, and the Double Vision has been improved after some failure concerns last season. Though fine tandems, neither can compete with Sun's value.

Other tandem ideas can include the ICE and Greenspeed tandem trikes, and perhaps even better yet, the Hase and Penninger 5-wheel trike adapters. These allow owners to take the front wheel off of one trike, and quick-release it onto the rear axle of another single trike. Hase even offers a trail-a-trike for kids.

So if you are in the market for a recumbent, there are some neat new bikes to consider. If not, we've got lots of great new reviews and RCN issues coming your way! ◆



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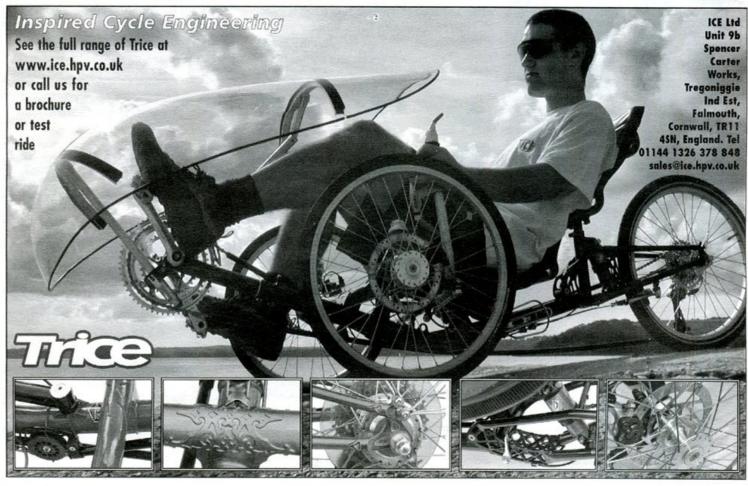
August 1-3, 2003
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August 15-17, 2003
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Warrenton, Oregon
ijoyful1@aol.com and www.ohpv.org

For hpv race schedules, see: www.wisil.recumbents.com/ wisil/events.htm and http://recumbents.com/hpra/

RCN Letters?

RCN Letters will retun in RCN 75. Due to space limitations, and the reference nature of this particular issue, we chose not to print letters in this issue.





Above: Penninger at Interbike (John Riley) Middle: Bacchetta Giro and panniers (John Climaldi) Hostel Shoppe

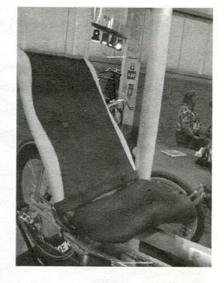
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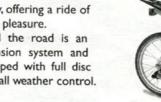
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RCN Special Report



Interbike 2002

by John Riley johnriley1@rogers.com

he big recumbent news at Interbike, North America's largest bicycle trade show, was the arrival of the non-recumbents. These bikes with no name are somewhere in between recumbents and uprights. Giant and KHS both showed semi-recumbent bikes with thick, heavy-looking frames. And recumbent maker RANS has joined Vision with their own in-between design.

The Vision and RANS designs bracket the offerings from Giant and KHS, with the Vision design being closer to an upright and the RANS design being closer to the recumbent style. Both the RANS and Vision designs are unsuspended and have small tube frames, making them look more bicycle-like. Neither has a back rest. For all the talk about comfort connected with these designs, only the RANS has a large seat. The others have conventional bike seats.

The big trends for the mainstream bike makers seem to be toward more road bikes and a continued emphasis on comfort. There was even some recognition of the needs of commuters. Bikes designed for commuters are a mainstay of the European market, but they have been virtually absent from North America. One former mountain bike maker, Joe Breeze, showed a complete line of city bikes with the Breezer name. According to Joe, the basis for the new company is a reawakening to cycling as basic transportation. As an urban cyclist, these bikes were very appealing to me. They come outfitted with lights (Nexus hub generator), fenders, a rack, a rear wheel security lock (these are great!) a riding position that is a cross between the original MTB's and European commuter bikes-and they have Shimano Nexus 7 internal hubs and chainguards. A trio of small folding bicycles also rounds out the line.

The big companies all talk about comfort on the road, all the while avoiding the obvious recumbent solution.

The vacancy left at the most accessible and easy-to-use end of the recumbent spectrum by the disappearance of BikeE may or may not be filled by the following candidates:

- There are the EZ bikes from Sun/J&B.
 Cycle Genius continues to be aggressive about value in this market.
- The HP Velotechnik Spirit, which arrived mid-season, has full suspension and an attractive price and some neat options.
- The Maxarya design also comes in a full suspension version, and could set a new standard for low weight and value. There were rumors before the show about the possibility of a lower spec, less expensive version of the
- Cannondale, and this may still happen, but not this season.
- The Scooterbike, a Euro design that's been seen at the show for several years, but never quite made it into North Ameri can distribution, looks like it may finally make it.

Meanwhile, at the performance end of the spectrum, Bacchetta showed the final production version of their titanium framed Aero model, and introduced the Corsa, a high spec version of their big wheel steel bike with an M5 hardshell seat. RANS introduced a high spec aluminum version of the Velocity Squared. Vision, which had a big year last year will all new frame designs, is fitting a hardshell Euro seat on some of their performance bikes. Prices have been lowered on many Vision performance models. The Dutch Optima bikes again have US distribution (last seen here as Yellowbikes).

Greenspeed has redesigned their steering and added a seat with more curves, including a lumbar curve, on one model.

BigCat/Catrike has suspended production of the Catrike Road and introduced the Catrike Speed, a compact aluminum trike that will retail for \$2,000.

What's New for 2003

(shown at Interbike)

RANS — Before the show there were rumors that RANS would introduce a version of the Tailwind with a 26-inch rear wheel. The prototype was seen at some dealer events late in the Summer. According to Randy Schlitter, in the end, the feeling was that there was too much overlap with the Velocity Squared. The solution RANS came up with was to put lower spec components on the steel Velocity frame, delete the fairing, and set the Velocity Squared price at \$1,249 (XL: \$1,299). This bike comes with a TruVative Elita crank and a SRAM 7.0 9-speed component group.

The Velocity Squared Formula is an aluminum version of the Velocity frame fitted with top end components including SRAM X.0 shifters, Ultegra cranks, and HED wheels. To save weight, the seat has a carbon fiber pan and thin closed cell foam pad. The price is set at \$3,199 (XL: \$3,249).

The Velocity bikes have a new standard riser and bar set, but with new optional bar and riser choices from RANS, a half dozen different combinations are possible.

The \$3,399 Screamer Sport is a new, lower priced version of the RANS tandem. It comes with a TruVativ Elita Isis Drive tandem crank, SRAM 7.0 9-speed shifters and brakes, and an ARAI rear drum brake that is controlled by the stoker. The Screamer and Screamer TR models continue. The TR model comes with S&S frame couplers. These two models are also available in a special XXL size that extends captain sizing by four inches.

The Wave goes away, but the Tailwind gets SRAM 5.0 shifters and brakes, TruVativ Elita Isis Drive Crank, powdercoat finish, and a lower price of \$899.

The Tailwind, Rocket and Vivo still have the old seat mount, but the Rad-Loc mount is optional on the Tailwind and Rocket. The seat supports are now black. They have a longer flute tube so the same supports will work on all the bikes. They have a new end treatment.

RANS has a new design for the seat back mesh. It's fastened with straps and buckles instead of zip-ties, and has protective cordura strips down the sides, which were vulnerable to damage. There's a small pocket in the seat back.

RANS has new stem/riser/handlebars that are standard on the V2 and V2 Formula and optional on all other LWB models. According to Randy Schlitter, "The option range is quite large, there is three different risers and bars, the intent is to allow the perfect fit for each rider."

RANS has some new accessories made from stiff closed cell foam. A small cylinder shaped container fits in a water-bottle cage and is useful for carrying small items. A seat back brief case has quick release buckles and a padded interior compartment for a laptop computer. The current RANS TailPack bag continues, but he rectangular soft-sided commuter bag is discontinued.

RANS entry into the semi-recumbent segment has the working title of Fusion. As of show time, the name had not been checked for infringements. The bike was shown with both 26/20 and 26/26 wheel combinations. Their bike is the only one of the semi-recumbents with a large, comfortable seat. There is no backrest, but the seat has a lip at the back that keeps the rider from sliding off the back. In a brief test ride, it seemed that it was possible to



The pricey compact Cannondale with new fairing, rack and bags (John Riley)



The \$649 HP Velo Wavey SWB OSS (John Riley)

develop power by hunching forward (thus closing the hip angle) and pulling on the bars. Price is expected to be in the \$600-800 range.

RANS has had two different seat models with differing seat base and back angle bends. RANS has never made a big deal of it, to the

extent that even many dealers were unaware. The seats on SWB bikes have been seven degrees more open than the seats on LWB bikes. As of show time, it had not been decided if that distinction was going to continue.

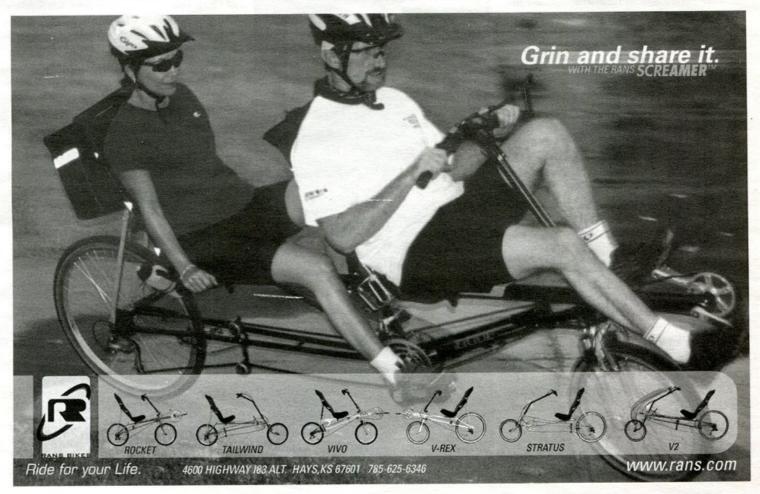
Bacchetta - According to Bacchetta, "Made in the USA, the Aero's frame is custom built by Americas most experienced titanium fabricator, Ti Sports, which has been crafting titanium for 40 years. Considered the 'magic metal' by cyclists, titanium is stronger than steel, light as aluminum and simply won't corrode."

The final production version of the 22 pound titanium framed AERO made its debut at Interbike. Specs include an M5 carbon seat, Kinesis 650c Carbon Airfoil fork, American Classic bottom bracket, FSA CarbonPro cranks, Ultegra derailleurs, Velocity Spartacus 650c wheels and Vredestein Fortezza tires. MSRP is tentatively set at \$3,950.

A higher spec version of their big wheel steel bike is called Corsa. This 26 pound bike comes with an M5 fiberglass seat, Kinesis 650c Carbon Road fork, Alex ALX300 Tri 650c wheels, Kenda Concept tires, and the same BB, cranks and derailleurs as the Aero. The price is set at \$2600.

Vision — All the above seat steering bikes bikes now feature the TerraCycle GlideFlex stem and are available with either a flat handlebar, or the "H" bar previously found only on the R65.

A solid Euro style seat has been fitted to



Vision's top performance bikes, the R45, R65 and R68. The big wheel 65 also gets a carbon fiber fork and Ritchey wheels.

The paint is now a multi-layer powder coat. Semi- translucent and metallic top coats over a chrome-like paint base layer are said to give brilliant, lustrous colors. This will be topped off with new graphics.

Prices are mostly lower, in some cases by a large amount. The MSRP on the R45 is now \$2,099, a \$396 drop. The R55 is now \$2,499, a \$496 drop. The big wheel R68 titanium Saber was \$5000 and is now \$3,800. The R40 SWB goes up to \$1,129, but there is no longer an additional charge for OSS; this is true for all the models with a steering option.

HP Velotechnik — Their new model, the Spirit, had actually hit the US market before Interbike. This compact bike has adjustable full suspension, Tektro mechanical disk brakes and SRAM 3x8 DualDrive. It comes in one size that is said to fit people from 5' to 6'7" by means of a quick adjust seat. As with other HP Velotechnik products, there is a full range of accessories and upgrades, including an under seat luggage rack. MSRP is \$1495 (watch for an upcoming RCN review).

The Street Machine GT now comes with a Meks carbon fiber suspension fork with 2" of travel and mounts for a disk brake. The extensive options sheet includes an upgraded rear shock, hydraulic rim brakes, mechanical or hydraulic disc brakes, and a lighter carbon fiber seat. MSRP is \$1,870.

With Tektro mechanical disk brakes, the Speedmachine is now \$2,349.

HP Velotechnik also offers the Wavey, a high bottom bracket SWB model with 20-inch wheels and no suspension for \$649.

Sun/EZ - The Gardner Martin (Easy Racers) designed EZ series from Sun/J&B Importers now includes a LWB CroMo steel tandem. It has a 48 spoke tandem rear wheel, American Classic hubs, Sun tandem rims, and dual disc brakes. Wheelbase is 91 inches. Seat heights are 28 inches. The seats are as on the other EZ series bikes. The production model will be the same as the show bike, but with the rear bottom bracket moved back two inches (accommodate a taller captain) and the frame will have a larger main tube. The MSRP is \$1,895.

The Sun EZ3 delta trike is the best selling Sun/EZ model. It's most likely the best selling recumbent in the world today, outselling the base model EZ1 by a thin margin. Sun is working on an an aluminum framed version of the EZ3 for a mid-season introduction (see more info in the EZ3 review).

Easy Racers — Easy Racers has some pricing changes. The Tour Easy is now \$1,995, but includes the KoolBack seat and 27-speeds (formerly options). Rear disc brakes will also be optional on Easy Racer models for 2003.

Gardner Martin is working on a new racing

bike (not for sale) called the "Reverse Rocket," where the rider sits facing rearward and rides via video camera (we're not kidding-ed.).

Fast Freddy Markham has teamed up with Craig Calfee. The two are working on a new carbon fiber LWB recumbent. Word is that the



Adam Potter and the Cycle Genius ALX 20 (John Riley)

Bigha Coming

"It's an appliance. A high end easy to use <cycling> appliance" -BJ Strass

The new Bigha 'cycling appliance'is a high end product that will be sold mostly direct to the customer. The price is slated to be \$2,500 and the bike will be shipped nearly fully assembled. According to Bigha, bikes will be available in March.

It's built in the USA and comes in four sizes. The bike has rear suspension that will have a shock and preload custom tailored for the individual rider. The frame is extruded aluminum frame. The seat is unique. It's got new aluminum framed plastic seat that easily adjusts with just one screw. "You sit on the seat rather than in it, " according to Bigha's BJ Strass.

The Bigha bicycle will come with a unique electronics package. There will be a computer that has a screen about the size of a Palm Pilot. The bike will include built in LED head and tail lights, fenders and rear turn signals. The lights will have automatic sensors that turn them on and off. All of the Bigha electronics will be charged by one battery mounted in the rear section of the bicycle. The wiring is run internally through the frame.

For those of you who haven't heard. BikeE went out of business, and several of the key folks went to work for Bigha. Bigha is an outdoor recreation company (in contrast to a recumbent manufacturer).

For more information, contact: www.bigha.com

bike could weigh as little as 20 pounds.

Burley - All bikes now have a lace up mesh back new seat. The Limbo, Django and Canto get TruVativ cranks and Shimano Alivio rear derailleurs. The Canto gets SRAM MRX Pro shifters. The Limbo gets a Cane Creek air shock. The Django is now a silver- blue metallic, the HepCat is yellow, and the Taiko is orange.

Burley showed their new retro style upright Runabout commuter bike. The "B" headbadge is Burley's original logo from when the coop was formed 25 years ago. There are four models, with drivetrains from Dura Ace, Ultegra and on down to a SRAM Spectro S7 internally geared commuter model.

Cannondale - Vice President Scott Montgomery and Director of Technical Services David Campbell were emphatic about Cannondale's continued commitment to the recumbent market in the wake of some internet rumors to the contrary. Campbell said the launch of the bike was one of their smoothest product launches ever, and that sales had exceeded projections. A stout new retrofitable underseat rack will be available soon. New recumbent models are in the works for 2004, according to Campbell.

In a late update, Bicycle Retailer and Industry News' January 1, 2003 issue had an article entitled: "Cannondale Suffers Under Losses, No Cash, Unpaid Bills." The article said that, "in mid-December, Cannondale temporarily furloughed most of its factory staff - upwards of 550 people." It also stated that Cannondale's stock is selling at 97 cents per share, down from its 52-week high of \$4.60. We're not sure what this means for the recumbent division. Let's hope for the best.

Cycle Genius - The 2003 line is made up of three aggressively priced compact models. The ALX - 20 Squared has a MSRP of \$959. Frame is 7005 aluminum with a CroMo steel fork. Brakes are Avid mechanical disks with Speed Dial 5 levers. Other components include TruVativ Elita cranks (30/42/55), SRAM 5.0 shifters with a SRAM 7.0 rear derailleur and a Shimano Sora up front, and aero rims with 100 psi Kenda Kwest tires. Wheels are dual 20-inch (406).

The other two models have 20 inch (406) rear wheels and 16 inch (305) front wheels. The \$629 STX-24 has a CroMo and hi-ten mix steel frame, alloy bars and stem, alloy rims and two-tone fade paint. The \$449 CGX-3.0 has the same frame, but less expensive components. It also has a molded foam seat bottom rather than the mesh base, and a steel stem and handle bar.

Maxarya — This new bike from Canadian designer, Max Ahmady, was on display in the SRAM booth. The compact aluminum framed bike will come in two versions. The Ray-1 will have rear suspension with a coil, oil and gas shock, and mid-drive derailleur gearing

giving 24 speeds with a SRAM 7.0 group. The price will be \$1,195. The Ray-1X will have front and rear suspension and upgraded components, including a Cane Creek shock and 27 speed SRAM DualDrive gearing. The price will be \$1,665. Bikes should be available soon.

Scooterbike — This suspended compact European design has been lurking in the background at Interbike for several years. It even briefly appeared in the Neiman Marcus catalog. Now it looks like it may finally have an American distributor, Byus America of Portland, OR.

The bike comes in four versions with prices at \$799 for the Sporty, \$1,199 for the Deluxe, \$1,449 for the Pro, and \$3,599 for the Sports. The Sporty has Magura Julie disk brakes and a Rohloff 14 speed internally geared hub. The bikes come in two sizes (wheelbases of 50" and 58"). There is also a delta trike version that manages to keep the rear suspension. The trike also comes in two sizes and is priced at \$3,499.

MicWic — This company from the UK was at the show last year, but owing to a family illness, had to put their plans for North America on hold. Things are again moving forward, and their unique back- to-back tandem will be produced in Michigan. The bike was designed with 24 hour tandem racing events in mind, but is said to be a good touring bike as well.

Hase Spezialrader — This maker of twowheels-in-back delta trikes has introduced the Trets, a 7-speed, two wheel, recumbent trailer bike for children ages 3-12.



The Beanz tandem with stoker hand power (John Riley)



Paul Hollants and the HP Velo Spirit dual suspension compact LWB with fairing (John Riley)

The all-arounder Lepus has been upgraded with a lighter, stiffer rear triangle and a new seat bracket. This trike has rear suspension, and an adjustable ride height.

The sporty Kettwiesel delta trike now has an optional titanium boom that weighs half as much as the steel boom.

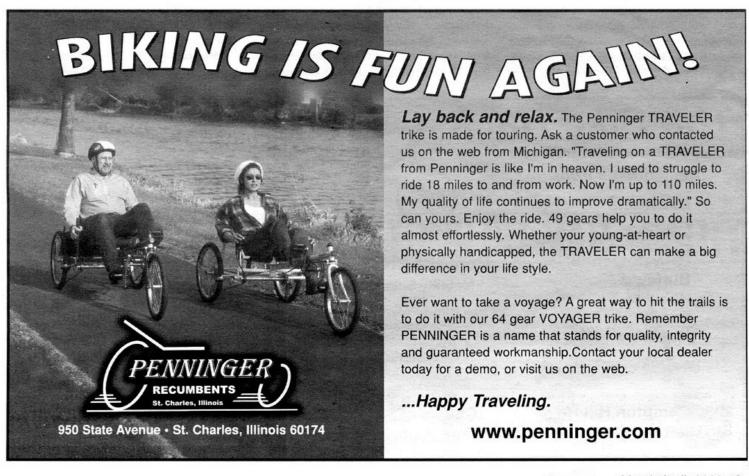
The Pino is a two wheel tandem that has a recumbent position in the front and a conventional riding position in the rear. The person in the rear steers. The frame has been completely redesigned and is now longer. The front seat is lower and further back and the rear seat tube is more vertical

A children's bottom bracket allows children just over three feet tall to ride in the front. An extra freewheel allows for independent pedaling. The freewheel can be locked to allow the riders to pedal together.

A large two-legged kickstand is said to allow the front rider to get on and off without someone having to hold the bike steady. The stand is said to fold up automatically when the riders start off. A low rider luggage rack is also available.

Beanz - This new company showed a delta trike and a SWB tandem. The trike and the rear position on the tandem allow the rider to power with their arms and legs both. Designer Greg Bean says that by pulling on the bars while pushing with your legs, significantly more power can be produced.

Greenspeed - Ian Sims is always on the look-out for ways to improve his line of tadpole (two-wheels-in-front) trikes. The latest revisions involve the steering linkage. It was discovered that the frame cross member was twisting under hard braking. With the steering rods attached ahead of the kingpins, this caused the wheels to toe out slightly, which resulted in brake steer. The steering linkage was completely redesigned. Links now attach





John Schlitter and the Bacchetta Corsa (John Riley)



The 2003 Greenspeeds (John Riley)

behind the kingpins and they no longer cross under the seat. Links now attach to the bars at a point above the frame for increased ground clearance.

A new model that has yet to be named will ship with the new lumbar curve seat. Sims will monitor customer reactions, and this modification may eventually appear on other models.

Velocity, the Australian rim maker, is doing "Sims Rims", small diameter rims designed especially for the trikes. The main goal of the

smaller rims was to make it easier to mount and remove the tires. With small wheels, there is not much room to get the tires on and off the rims, so these new rims have a slightly deeper well. The tire bead is pushed into this well to facilitate getting the bead over the edge of the rim on the opposite side. Since the trikes have hub brakes, there is no flat braking surface on the rims. With either hub or disk brakes, Greenspeed custom hubs are available on the front.

A Mueller Windwrap fairing that tilts forward for entry is also available. Mark Mueller's personal trike was seen at demo day with a full fabric fairing attached to the Windwrap.

A sports tandem is now available. Seat backs are at 30 degrees rather than the usual 40 degree angle.

BigCat/Catrike — Paulo Camasmie says that he has suspended production of the Catrike Road to concentrate on a new model, the Catrike Speed. This sub 30 pound compact trike has a 6061-T6 aluminum frame, and an MSRP of \$1,995. The front wheels are 16-inch (305) and rear is a 20-inch (406). Seat back angle is 37 degrees and a head rest is provided. The seat is integral with the frame. Brakes are Shimano Deore mechanical disks.

Crank-It — The final production version of the Crank-It Mountain Quad was displayed at the Rohloff booth. The aluminum frame now has curved tubes. There is a bracket on the rear to take either a BOB trailer or a rack. The suspension has 3" of travel and the rear is articulated. The brakes are Hope hydraulic discs on quick release hubs.

Velocity — This Canadian company showed a leaning trike that has electric assist. The monocoque frame and body will be a vacuum bagged proprietary Kevlar and carbon fiber

composite.

Mission Cycling Technologies-This Minnesota company showed a very sophisticated delta trike. The trike features side-stick steering and semi-independent rear suspension. The main frame is aluminum. The drivetrain incorporates Kevlar reinforced urethane belts connected to a Rohloff 14 speed hub gear.

What's New for 2003 II

(not shown at Interbike)

Greengear/Bike Friday—Doubleday folding SWB recumbent tandems are now shipping. The SatRDay has the following updates: The USS bars are newly redesigned and the OSS stem/riser has been updated. The forward chain adjustment problem has been taken care of with a tandem eccentric bottom bracket (allows micro adjustments in the chain tightness). There is a new cushier seat base cushion. Rohloff 14-speed internal hubs and disc brakes are now available options.

ICE/Trice-There are new models and variations from this UK trike producer: The XXL is a narrow track version of the XL. A longer wheel base will allow for more seat recline and a composite hard shell seat. The XXL is outfitted with 20-inch wheels all round.

The ICE Monster is a Micro front end with a 26-inch rear wheel, composite seat, standard drive train parts and good range of gears without the need for hub gears.

Turner - Milt Turner sent this update, "All of our bikes will have a 2-inch main tube (including Graphite model)." Milt also said they're working on a tandem. A deluxe version of the T-Lite is available with Ultegra parts this year.

Turner will be offering a tilt-forward Mueller fairing option, as well as a rear tailbox fairing option.

Lightfoot Cycles — Lightfoot will offer a new big and tall rider trike called the MAG-NUM XXL. It's designed for riders over 350 pounds and up to 7' tall.

Features and options for the Lightfoot line continue to expand. The Rhinocerack is a removable over-the-wheel front rack, with a 30 pound load rating. Lightfoot will offer takeapart frames for most models early in the year as well as expanded power-assist options.

Other 2003 projects include a modular allweather aerodynamic fairing system and a composite aero cargo box for the Courier trike.

Barcroft - Pantour hubs are now an available option. The front wheel drive Barcroft Oregon lowracer is now available on a limited basis. Since each bike will be custom, the cost will vary, but according to Bill Cook, they will probably average just under \$3000. Weight will be in the 26-29 pound range, depending on seat and gearing options. Wheels are 20-inch, which keeps the bike length down a size that is legal for UCSF-sanctioned time trials.

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Call us at 1-800.711.BIKE www.thebikerack.com based company is importing LoGo trikes from Western Australia and distributing them from their base in Oxnard, CA.

These new narrow track tadpoles look similar to other Australian trikes, but the LoGo design is actually a bit more like the UK-built Trice, with its elevated front crossbeam and triangulated rear end.

LoGo Trikes USA is currently selling direct. Prices start at approx. \$2,500.

Hotmover — This Australian trike manufacturer offers the following 2003 updates: disc brakes, front suspension, and a power assist option. This updated trike folds in half for easier transport.

WizWheelz - Rumors of an upscale aluminum model and a tandem persist. Rumor has it that Las Vegas' Penn Jillette (Penn & Teller) will be getting a custom pink trike tandem.

Longbikes - In early January, we heard from Longbikes. The bikes that are in production are the Eliminator SWB, Eliminator tandem, the Duplex LWB tandem and the Slipstream LWB. Slipstream frames are now built in Taiwan by the same factory that builds Greenspeed GTO and RANS frames. The first batch should be stateside by the time you read this. Avid disc brakes are now standard on the Slipstream. updated website The <www.tandembike.com> should have all of the 2003 models and specs.

Components/Accessories

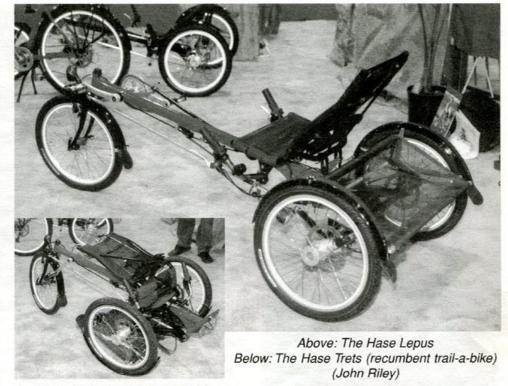
(Shown at Interbike)

Schwalbe Tires — The high performance Stelvio is now available in 16 x 1-1/8 (28-349) and 20 x 1-1/8 (28-451). The latter is the size used on the front of Easy Racer SS models.

The Stelvio continues to be available in 20 x 1-1/8" (28-406), 18 x 1-1/8" (28-355), 26 x 1" (25-559) 26 x 3/4" (20-571) and 26 x 7/8" (23-571). It's also available in a variety of widths in the 700c size (622).

The 700c Stelvio now includes a new Armaduro puncture protection belt that is said to also reduce rolling resistance. Smaller sizes have a Kevlar belt. All use a dual compound rubber.

The Marathon, a long-distance tire with a



Hase Lepus delta trike folded (John Riley)

Kevlar belt, is now available in 16 x 1.50" (40-305), 20 x 1.75" (47-406), 24 x 1.50" (40-507) and 24 x 1.75" (47-507). The 26 x 1.90" (50-559) is now available with a black skin wall with reflective strip.

The Marathon continues to be available in 16 x 1.75" (47-305), 16 x 13/8" (37-349), 18 x 1.50" (40-355) and the popular 20 x 1.50" (40-406).

The new-last-year Marathon Slick is now available in 20 x 1.35" (35-406) and a narrower 700c size (30-662). It continues to be available in a wider 700c size (37-662) and two 26inch widths (35-559, 47-559).

The Marathon Plus is available in 26-inch (559) and 700c (622) sizes. It features a 5 mm thick layer of elasticized rubber beneath the tread that is said to offer excellent puncture resistance to thorns and glass shards.

Schlumph Innovations — The Speed Drive and Mountain Drive bottom bracket mounted two-speed planetary gear systems are now joined by the High Speed Drive that is said to combine the advantages of both. The 27 tooth chainring of the High Speed Drive turns with a 1:1 ratio in direct drive. In high-speed mode the chainring rotates at a 2.5 times faster rate (1:2.5 ratio). This means that the 27 tooth chainring works like a 67 tooth chainring.

In the existing Speed Drive model, the 27 tooth chainring works like a 45 tooth chainring when shifted (1:1.65 ratio). Chainrings from 27 to 53 teeth are available.

In the existing Mountain Drive system, a 45 tooth chainring works like an 18 tooth





Lightning's carbon fiber crankset (John Riley)



RANS trick new seat bag (John Riley)

chaining when shifted (2.5:1 ratio). Chainings from 34 to 65 teeth are available for the Mountain Drive.

Mini Foot Pump — This German designed tire pump comes in two versions. The single chamber model weighs 9 ounces and stands 5.5 inches tall when packed. It comes with a built-in 140 psi gauge. The dual chamber model weighs 17 ounces and is 6 inches tall. It has a built-in 260 psi gauge, release valve, and sophisticated valve attachment. The smaller of the two chambers allows the pump to reach higher pressures so that it can be used both as a tire pump and a shock pump. Both come with a presta valve adaptor, a needle for





The MicWic back-to-back tandem (John Riley)

fork shocks or sports balls and a nylon bag.

The pumps have a wire loop to allow you to stabilize the pump with one foot while you pump on a small pad with the other.

Pantour — Suspension hubs are now available for the front and rear, with a half inch (12 mm) of travel. Disc brake suspension hubs for the front (with one inch of travel) and rear are also available. The front hub is available in a Prolite version. The Prolite is a smaller diameter and weighs 160 g, vs. 220 g for the standard front hub. Pantour offers a variety wheels built up with their hubs.

Shimano — A new small drive wheel group was announced, but not displayed at the show. The Capreo has a medium cage derailleur and a 9-26 cassette. It will be available as a complete group or mix-and-match.

Shimano also showed a new 3x8 hub that is similar to the SRAM 3x8/9 (3 internal gears + 8-speed cassette). The shifters are Rapid Fire style, and there is no quick release axle. This unit is due to be unveiled mid-season.

Crank Brothers EggBeater—These popular pedals get upgraded for 2003. There are now Titanium options: The Ti gets a Ti spring; the Twin-Ti gets a titanium body; and the Triple-Ti has a titanium axle, wing and body and retails for \$400. Crank Brothers has also licensed their design to Look, which will offer the new 4x4 model at \$139. Look engineers have added a second bearing to improve longevity.

Velocity Rims — In addition to the Sims rims for trikes, the high performance Spartacus rims will be available in 20-inch (406) and 26-inch (559) sizes. They have the same spoking pattern as the Spartacus and Spartacus Pro

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models. In the 700c (622) and 650c (571) sizes those wheels use the Deep-V rim; 30 mm tall and 19 mm wide in profile. The new wheels will use a rim that is wider and has a lower profile called the Aeroheat (24 mm wide and 22 mm tall in profile). It will come in 20 spoke front, 24 spoke rear with black sealed bearing Velocity hubs, black 14 guage stainless steel spokes, and black Aeroheat rims with machined sidewalls. The spacing on the rear hub will be 135 mm.

Cateye LED Headlights — Cateye has introduced a new OptiCube lens improves LED brightness. These new lights allow for a true headlight use. They offer more than 100 hours of run time on four AA batteries. We saw the EL-300 (5 LED = 400 candle power, \$36) and EL 200 (2 LED = 110 candle power, \$26) and EL 100 (1 LED, \$19) models at the show. All were quite impressive.

Planet Bike — has introduced the Spot, a tiny one LED headlight, and the Spot 3, a 3 LED headlight.

Rolf Prima Wheels — Rolf wheels were previously built by Trek. Rolf has since left Trek and formed a new company. One of the product designers is Blair Winter, formerly of Burley (recumbent designer). Rolf Prima will mainly specialize in full size performance wheelsets using paired spoke technology. There is a small wheel set designed in conjunction with Dahon (folding bicycles) called the Micro. The 20-inch Micro wheels have 16-spokes on the rear wheel, 14-spokes on the front. The wheels weigh 1150 grams and have a special ultra light 225 gram rear hub, and a 54 gram front hub.

Hokey Spokes — These spoke mounted LED light blades can be programed to to display your own text message. They come preprogrammed with a variety of patterns.

Techwind Panniers by Angletech — With the blessing of Glen Brown and Karl Abbe, Angletech has just completed arrangements to bring Tailwind Panniers to market again. Though not at the show, Angletech announced



The 2003 Vision Saber R65 with Euro seat (John Riley)

the availability of new front and rear aerodynamic panniers. The Techwind's have a reduced frontal drag by 7% over traditional designs. The square profile tail to catch tailwinds which help you ride down the road faster. The interior compartmentalization comes by way of color keyed stuff sacks and other updated features.

Zzip Designs — The long time fairing manufacturer has a new SWB fairing called the Tiger. This fairing is 6-8" shorter, weighs 1.25 pounds and should fit most SWB and trike models.

Terracycle - This company is going into recumbent accessories and parts. Terracycles has just invested in a \$60,000 machining center. They now have 4 lines: GlideFlex folding stems, Easy Reacher underseat racks, Super Adjustable handlebar risers, and OSS handlebars. They are working on ergonomic seatbases and tailsocks for introduction next spring.

The Taiwan GlideFlexes are currently being outfitted on new Bachettas and the Vision OSS bikes. The aftermarket GlideFlexes are available through dealers are USA made. These have a smoother, less wrinkly finish and are a bit lighter. They come in either black or silver (other colors available) in steerer/riser diameters (1" or 1-1/8" steerers, 1" or 7/8" riser tubes).

The Easy Reacher racks for the Easy Racer TE/GR/TiR have been well received. They are working on versions for other brands. All will have the CNC'd clamps and the removable rails that plug in from the sides.

The handlebars and risers are designed to meet the demand for greater OSS steering comfort. Terracycles believes that every rider is different in their ideal hand/arm position, and that the market is ready for more steering options. The bars themselves are pretty simple: a classic OSS bar with two bends. Both standard and

custom bars are available. Bars are black powdercoated aluminum and are reamed for barcon shifters.

The Super Adjustable steering risers are designed to be adjustable to a wide range of possibilities. Mounts and guides clamp onto the riser tube - so you can position things anywhere you want. The risers can be ordered with either a long or a short stem.

Laurie Smith (ERRC) is working with Pat Franz at Terracycles on the tailsock: a lightweight clip on rear fairing system. It w will be a quick on/off, very light weight system for painlessly adding a few mph. We should have the Tour Easy version ready early spring with other brands to follow.

Terracycles also has a LWB recumbent on the drawing boards for introduction at some point in the future.

Mueller Human Power — T he Mueller product line has new options for trikes, SWB, and remote steering LWB recumbent models. These can all be purchased with a swing forward option that allows the fairing to move forward so the rider can get on and off the vehicle easier.

They also have a fairing for the Cannondale Recumbent and other compacts. Mueller also has a full length front fairing for the Sun EZ series bikes and trikes. For those who are interested in body socks, they have the fairings and supports for body socks for the RANS Velocity Squared, Greenspeed and other tadpole trikes. Coming soon is new mounting system for the RANS LWB, a body sock for Easy Racers Tour Easy, Gold Rush, and Ti Rush. Mueller also has an interactive compatibility chart at their website: http:// windwrap.com.

Lastly, Mueller bought the remaining stock of fairings for all BikeE models (including the tandem). •



The Sun Sociable Quad (John Climaldi)



The new Scooterbike (John Riley)



The HP Velo Spirit (John Climaldi)

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Recumbent Trikes



The ICE Trice Explorer-watch for our review later this year



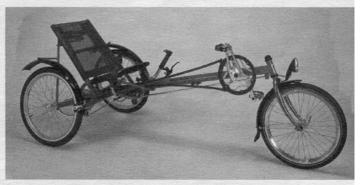
The legendary AVD Windcheetah trike



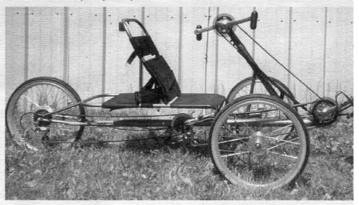
The Greenspeed GTO



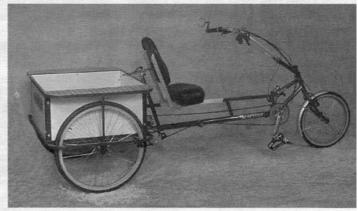
Rick Higginson on the RCN Penninger test trike



The sporty 34-pound Hase Kettwiesel delta trike



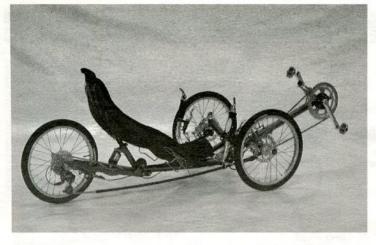
The Angletech Quadraped (hand and foot crank)



A Lightfoot delta truck



The Mission delta trike (John Riley)





The WizWheelz Terratrike—an excellent buy at \$1,895

The ICE Trice Micro

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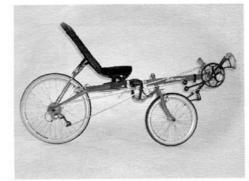
The Burley Hepcat SWB



The R50 Vision full suspension SWB



The classic RANS V-Rex SWB



The Vision R40 SWB USS



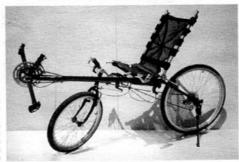
A trick 20/16 Rotator Tiger (Harry Wozniak, Wheel & Sprocket)



The Bacchetta Strada



The Bacchetta Giro



The Haluzak Horizon



The TerraCycle TerraZa



The Angletech Altitude/Boulder Galaxy



The carbon fiber Lightning R84



The RANS Rocket



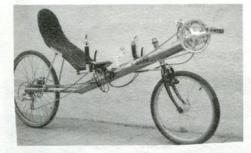
The HP Velo Speed Machine



Barcroft Oregon Lowracer



The Barcroft Virginia SWB with fairing



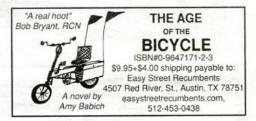
The Reynolds T-Bone 26/20. This bike is also available in a 26/26 or 700/700



Above: The Turner T-Lite Left: The Greengear SatRDay folding SWB OSS (or USS)







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The Sun EZ1 SC Lite



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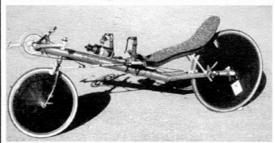


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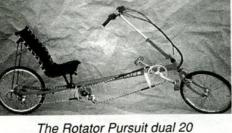
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bob@recumbentcyclistnews.com



Above: The Rotator Pursuit dual 700c Middle right: RANS Tailwind Far right: Turner LWB USS





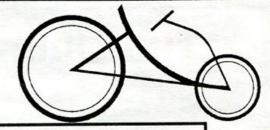
The Burley Canto/Taiko LWB







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- RCN 70 Lightfoot Ranger, Rotator Pursuit 700, Cycle Genius, Pantour
- RCN 69 Cannondale recumbent; Greenspeed GTO, Wicks bike/trike
- RCN 68 Easy Racer Fold Gold, RANS Vivo, Rocket, Tailwind
- RCN 67 2002 Buyers' Guide
- RCN 66 Vision Saber, BikeE E2 Barcroft Dakota, Bentech kit build

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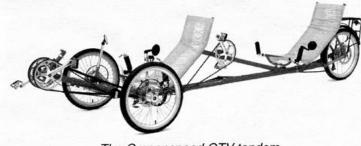
Recumbent Trikes



The Barcroft Columbia



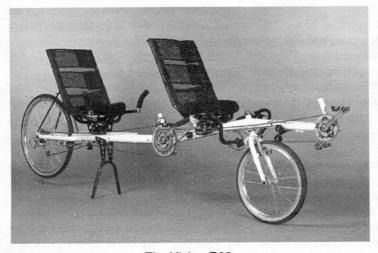
The RANS Screamer



The Greeenspeed GTV tandem



The new Sun tandem will sell for less than \$2,000 (John Climaldi)



The Vision R82



The ICE Trice Expedition

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The Best Selling Recumbent in the World: The Sun EZ 3

By Rick Higginson

It might be a surprise to many, but one of the hottest selling recumbents on the market right now isn't a bike. It's the Easy Racers EZ-3 tricycle. Current reports are that EZ-3s are selling almost as fast as the shops can get them in. One might speculate that the biggest factor driving this sales success story is the EZ3's relatively low price of \$725. Consumers tend to be a bit suspicious of something that seems too low in price—especially a recumbent bicycle.

I took an EZ-3 out for a test ride, not being really sure what to expect from a 'bent trike with such a low price. Granted, I've a favorable disposition towards the EZ line of recumbents, as my wife rides an EZ-1, and purposed to give it as objective a review as possible.

Systems

Frame and Fork — The EZ-3 is a delta configuration (two wheels in back) trike, based in part on the proven frame design of the EZ-1 bicycle. The frame and configuration from the seat forward is nearly indistinguishable from its two-wheeled sibling.

Thinking logically, this contributes to the price break on the EZ-3, as the designers and builders did not need to invest capital to either design a specific forward frame, nor to gear up a new production line for this part of the trike.

The frame is constructed of hi-ten TIG welded steel. The fork employs hi-ten steel blades coupled to a CroMo steer tube. The rear portion of the frame, supporting the split rear axle and intermediate drive shaft, is beefy and does not leave the rider wondering if the trike will be strong enough. One might even consider it over-engineered in that department, but frankly, Id rather have a frame that was too strong than one that wasn't strong enough. Easy Racers has not specified a rider weight limit for the EZ-3, but based on their track record with the EZ-1, and the appearance of this frame, I'd guess that few potential riders would come close to over stressing the frame.

Paint — The EZ-3 is available in either blue or red powder coat finish, matching the color choices available for the EZ-1. The samples I've inspected in the shop are smooth and nicely finished. The EZ-3 decal decorates the top tube near the headset, identifying the trike without being garish.

Steering — The EZ-3 uses the steel handlebars common to many of Easy Racers recumbents. Reminiscent of the ape hanger handlebars of years past, the over-seat steering configuration provides not only a solid steering feel, but also a convenient location for bottle cages, with the two pairs of brazeons attached to the handlebars. Adjusting the handlebar height and angle requires a set of allen wrenches, but a fair range of position is available to accommodate the needs and tastes of most riders.

Weight — The stock weight of the EZ-3 tips the scales at 52 pounds, merely 13 pounds heavier than the EZ-1 SC. This is around what one would expect for a trike of this configuration and load capacity. Considering the price, I really expected the EZ-3 to weigh more.

Drivetrain — The EZ-3 employs a basic 21-speed drivetrain utilizing lower end Shimano components. At the price of the EZ-3, the lower-end components are to be expected. SRAM shifters accomplish the gear selection adequately. A floating idler keeps the slack side of the chain efficiently and quietly guided away from the ground. The EZ-3 uses an intermediate shaft just forward of the rear axle, coupling the power to the right rear wheel axle through a pair of fixed cogs and a very short loop of chain. This is a point of careful adjustment, since tightening this final drive chain too much can lead to noise, drag, and vibration, as we learned on the test ride.

Braking — A Promax Linear pull brake is mounted to the front fork, while a Promax mechanical disc brake is mounted to the intermediate drive shaft in the rear (not on the rear wheels). While braking was adequate, I found the feel of the rear disc somewhat annoying. I could feel vibration when the brake was applied. This has to do with the secondary chain's lag as the brake slows the intermediate shaft, which slows the chain, which slows the rear axle, which slows the rear wheel.

The EZ-3 is the locking tab on the front brake handle. Depressing the button locks the front brake — which then acts as a parking brake — so your trike won't roll away on you. Knowing that the trike won't roll during such actions can be very reassuring, and may help prevent mishaps. The brake lock is released simply by squeezing the lever again.

Wheels and Tires — Like its two-wheeled sibling, the EZ-3 sports the 20" (406 mm) rear/16" (305 mm) front wheel combo. The Kenda Kontact 16 x 1.75" front tire is mounted to a 28 hole alloy rim with 14 gauge stainless steel spokes. While Sun specifications call for an alloy bolt on hub, my test trike was equipped with a quick release hub instead.

The 20 x 1.75" Kenda Kontact tires on the rear are mounted to a pair of 36-hole alloy rims with 14 stainless spokes. Sealed bearing alloy trike hubs are used to mount the wheels to the axles. These tires should be fine for casual riding, but for any kind of distance or touring, I'd be inclined to change over to a high pressure road slick for the decreased rolling resistance.

Comfort

Seat — The seat base is a Lycra covered foam

combined with the Sun's imported version of the Easy Racer Koolback seat back. This is a proven seat that produces a secure, comfortable seat for riders of various sizes and body shapes. The Sun EZ seat bases don't have the same layered and contoured foam as the USA-built Easy Racer seats. Only heavier riders and those who plan to spend long stints in the saddle should notice.

The entire seat assembly slides forward and back to adjust for rider height, clamping into position using two quick release levers beneath the seat base. The seat back recline angle can be easily adjusted by pulling two locking pins from the telescoping supports and sliding the supports to the desired position. This is nice in that no tools are required to accomplish a quick field adjustments to fine tune the position while out on a ride.

Ergonomics — This is another place where the EZ-3 excels. Once properly adjusted for the individual rider, everything is right where it needs to be. The low bottom bracket should minimize foot numbness for the majority of riders, while the compact LWB design minimizes potential interference between the feet and the steering.

For those using water bottles, the handlebar braze-ons will place the bottles in easy reach, as opposed to fumbling for a bottle either behind or below the seat, especially convenient for replacing the bottle while moving. The handlebar design provides ample options for mounting accessories such as cyclocomputers and headlights without having to perform extensive modifications, and keeps them accessible during the

The EZ-3 sits higher than the other similar trikes. This aspect is going to weigh heavily in the selection process for many potential buyers. Riders with physical difficulties that might make it problematic to get into or out of a low trike will appreciate being able to get in and out of the EZ-3s saddle unassisted. In traffic, the higher position will make some riders more comfortable, feeling more visible than they would feel on a low trike.

Ride/Handling

Stability — Any higher center of gravity trike is going to lose some points in this field. All trikes have a tendency to want to tip in a tight turn at speed, and the higher the center of gravity (CG), the lower the speed required to lift the inner wheel in the turn. If the rider leans into the turn, this can be combated, but it is a characteristic that must be remembered and respected, lest the rider find him or herself falling to the outside of a turn towards a painful landing. While the EZ-3 was the best steering and tracking trike of those that I've tested so far, it is also the one most likely to tip in a turn, simply because of its higher CG. A new rider should take some time to get the feel of the trike in the turns, and to not exceed the safe speed of any particular turn. That said, the EZ-3 was the easiest trike to keep on a straight line, and the least squirelly feeling at faster speeds. It also has the tightest turning radius of any.

With the right wheel being the drive wheel, the front wheel can be turned to a 90 degree angle, and the trike will literally pivot in place. The right wheel will drive forward, while the free spinning left wheel will turn backwards. You can turn the EZ-3 around on a trail or path that is no wider than the trike is long. I probably looked pretty silly doing so, but I was having a good time spinning circles in place on the EZ-3.

Speed/Efficiency — I can't imagine anyone buying an EZ-3 with the thoughts of high performance. While the EZ-3 was easy to ride and rolled right along, you're not going to break any records on it. Between its weight and the higher forward profile, you're presented with some inhibition to any really fast riding. But again, speed isn't why you ride an EZ-3 style of trike. This is the kind of trike you're going to get if you want to ride for fun, fitness, and run some errands. It has a practical efficiency apart from the ability to go fast. When measured in utility potential, the EZ-3 gains points. The EZ-3 is an efficient vehicle for the student, commuter, or shopper.



The author rides our EZ3 test trike



The EZ3's rear axle, jackshaft/ mid-drive and rear disc brake. The new 2003 upscale aluminum version will have 3 disc brakes, one on each wheel (Rick Higginson)



The EZ3 has twin 20-inch (406 mm) rear wheels and a 16-inch (305 mm) front wheel. The new 2003 aluminum version will have 3 20" wheels. This will not be a second model. Much like the EZ1 SC Lite is to the EZ1 (Rick Higginson)

My wife took a spin on the EZ- 3. She didn't notice any real difference in pedaling difficulty due to the added rolling weight. She did comment on the cornering ability (she rides an EZ1 SC Lite) in constrast to her bike.

User Friendliness — This is perhaps one of the most user friendly recumbents I've ever ridden. For anyone not sure about recumbent riding, the trike is an ideal introduction to the position of bent riding, since its difficult to fall over. The EZ-3 steers simply and confidently, and about the only thing that the rider needs to get accustomed to is the aforementioned speed in the turns. You don't need a few slow spins around the bike shop parking lot to feel confident in riding an EZ-3. Get on and ride, and you're on your way. Go ahead and put the clipless pedals on to maximize your pedal power, since you don't have to unclip for a stop. If grandma can walk, she can ride this trike, its that easy.

Fun Factor — The EZ-3 may not be as high on the fun-o-meter as the sporty handling tadpole trikes. Comparing the EZ-3 to those is something like comparing the family sedan to a Porsche or a sporty coupe. It's still a fun ride, but you're not going to get as much wow factor from it.

Owning/Purchasing

Versatility — The EZ-3 leans more towards the utility trike market. Its suitable for recreational rides and human powered errands, and fits these roles very well. It could serve as a touring trike, though I'd be inclined to make a few upgrades before any kind of distance riding.

Shipping/Assembly — Sun has more potential dealers than any other recumbent manufacturer (parent company is J&B Imports who sells bike parts to bike shops; nearly every bike shop has their with color pics of their recumbent line).

If you'd rather, Easy Racers will sell you an EZ3 direct. For assembly reasons, it's probably best to buy a recumbent from a local dealer (if possible).

Quality/Durability - While the EZ-3 is still a new model, both Sun and Easy Racers bikes have very good track records. The original owner receives a lifetime warranty on the frame, while other components carry limited warranties. The basic no frills design based on the time proven EZ-1, incorporating many common parts, and an extensive dealer network, should make owning an EZ-3 about as stress free as owning a trike can get.

Cost/Depreciation — According to my local bike shop, the EZ-3 is their hottest seller from a nicely varied selection of recumbents, including tricycles. At \$725 MSRP, it costs less than many lower level recumbent bicycles, and considerably less than most recumbent trikes. If the popularity of the EZ-3 holds anywhere near its current level, its a reasonable

bet that the value of second hand EZ-3s should remain high.

Options/Accessories - Sun offers many accessories for the EZ-3. There is a fender set, under-seat pannier rack, rear messenger bag (See RCN 72), a new rear basket (fits all EZ seat backs) and a new lightweight canopy.

A new 30" fairing will be available from Sun/J&B dealers in late spring. Zzip Designs fairings will fit and are available. They will require "T" bracket upper mounts and bolt-on lower mounts.

My suggestion for bike shop options would be a set of high-pressure tires, such as the Kenda Kwest to lower rolling resistance. We installed a set of these on my wifes EZ-1, and were very pleased with the results. The EZ seats accommodate most hydration packs just fine, and the handlebars provide ample space for cyclocomputers, headlights, and other such after-market accessories that the individual rider may need or want.

Market Competition — Peers for this trike barely exist. The closest competitor is the Haluzak Triumf, costing more than double that of the EZ3. Pricier competitors are available from: Hase, Penninger and Lightfoot.

My Analysis

Verdict — The biggest detractor that I found on the EZ-3 would be the final drive and disc brake combo. This is probably more of a concern to recumbent enthusiasts than it would be to the casual rider for whom the EZ3 was designed. This new upper line aluminum EZ3 will have three disc brakes (one per wheel).

Dollar for dollar, the EZ-3 is easily the best value in a recumbent tricycle currently available, its higher seating position and profile will make it a battle to keep it out of the granny trike category. Those with sporty aspirations may overlook it in favor of the sportier low slung trikes (or wait for the new aluminum EZ3). However, this doesn't mean that delta trikes cannot be sporty or performance oriented. The Hase Kettwiesel is a 34 pound performance delta and there is that new aluminum EZ-3 coming soon.

I like the EZ-3. Perhaps part of that is the image and preconceptions of it versus the other trikes I've ridden and reviewed. With the sportier trikes I reviewed, I went into the test rides with the idea of quick, fun sprints and having a blast zipping around on them. In some ways, the realities just didn't live up to my expectations (which, granted, may have just been too high).

In contrast, with the EZ3, my expectation was for a relaxed and mellow ride. I received that, plus found that it picked up speed just fine, maneuvered nicely, and was still fun to ride. For those seeking to get in better shape, for those tired of feeling irrevocably tied to the internal combustion engine, for those who want a relaxed ride to help relieve stress, and

INFO AT A GLANCE

Specifications Model-Sun EZ-3 Type-delta trike Steering-OSS Wheelbase-56.5" Seat height-22" Bottom bracket height-n.a. Frame sizes—one-size-fits-most Weight-52 pounds

Weight limit-300 pounds

Frame-Hi-ten TIG welded steel Fork-Hi-ten blades with CroMo steerer Stem-240 mm alloy Handlebar-steel with 2 bottle braze-ons Seat-Sun/EZ mesh back foam base

Components

Crank-alloy 30/42/52 (w/steel rings) Bottom bracket-loose ball Headset-1" steel Derailleur (front)—Shimano Ty-32 Derailleur (rear)-Shimano Acera Shifters-SRAM MRX-200 Cassette-SRAM 11-28 7-spd. Chain-KMC Gear inch range-18-90 Wheels (front)-305 mm 16" Wheel (rear)-406 mm 20" Hubs-alloy bolt on Rims-Sun CR-18 Tires-Kenda Kontact Brake (rear)-Promax disc (mid-drive) Brake (front)-Promax V-style Pedals-Wellgo LU-982

Incidentals

Priced from-\$725-\$775 Warranty (frame)-Lifetime (orig. owner) Colors-red or blue

Exceptional value Strong frame design Comfortable, easily adjusted seat Stable steering Maintainable, common components

Con

High center of gravity Touchy final drive adjustment Mechanical disk brake feels odd Low-end components and tires may prompt some riders to upgrade

Contact

Sun Bicycles www.sunbicycles.com

Easy Racers Inc. www.easyracers.com Phone Tel. 831-722-9797

Ajo Bikes www.ajobikes.com Tel. 520-294-1434

C&C Inudstries sells an electric-assist kit for this trike e-mail: cg@visi.com

Brown Cycles offers a hand crank special needs version of the EZ3 Tel. 970-245-7939

for many others, the EZ-3 will offer an affordable solid option. I think we can expect to see many more of them out on the road in the coming years. •

A special thank you to Ajo Bikes in Tucson, Arizona for supplying our test trike. Frank at Ajo says that the EZ3 is his best selling recumbent model. Ajo is also doing electric conversions to the EZ3.

Late update:

Sun Set to Introduce EZ3 Aluminum Trike For 2003 Sun will be introducing a more upscale delta trike. An aluminum frame will replace the steel frame. The split rear axle will have 7-8 degrees of camber (canted rear wheels). The handlebars will be upgraded to aluminum (instead of steel). The seat slider, seat back and struts will all be aluminum.

The 16-inch front wheel will be upgraded to a 20-inch and there will be Shimano disc brakes on all three wheels. Gone is the jackshaft mounted single rear disc brake.

The trike will have upgraded components with Sun rims, a Shimano crank, and a SRAM 11-32 8-speed cassette shifted by a Deore rear derailleur.

The seat will be 2-inches lower and bottom bracket 2-inches higher. This new model should be ready to ship in April. •



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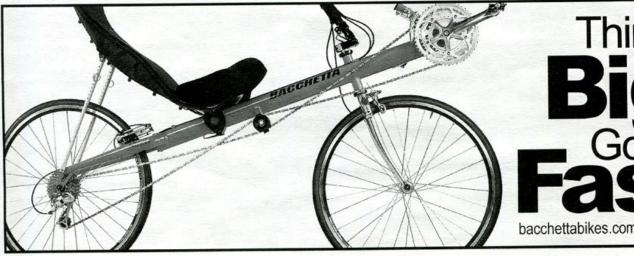
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www.stresscontrol.com/recumbents/



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2003 Recumbent Directory Models currently being sold in the USA

Price	eelers Model	Style	Components	Brakes	Wheels	Frame/Fork	Weight	Seat Type
Compac	t LWB/MWB (medium v	vheelbase)						
449	CycleGenius CGX	Compact OSS	SRAM 3.0 Mix, triple	V-s	20/16	CroMo & hiten	n.a.	mesh + foam
549	Sun EZ1	Compact OSS	Shimano/Sunrace	Tektro V-s	20/16	square hiten	#39	mesh + foam
629	CycleGenius CG24	Compact OSS	SRAM 3.0/5.0 mix	V-s	20/16	CroMo & hiten	#37.5	mesh + foan
		Compact OSS	SRAM/Shimano mix	Tektro V-s	20/16	square aluminum	#34	mesh + foan
795	Sun EZ1 SC Lite				20/16	CroMo	n.a.	mesh + foan
799	Scooterbike Sporty	Compact OSS RS	Shimano 9-speed	V-s				
899	RANS Tailwind	Compact OSS	Dotek/SRAM 5.0	SRAM 5.0 V-s	20/20	CroMo	#31	mesh + foan
959	CycleGenius ALX20	Compact OSS	SRAM 3.0/5.0 mix	Avid disc	20/20	square aluminum	n.a.	mesh + foan
1195	Maxaraya Ray-1	Compact OSS FS	SRAM ESP 7.0 mix	SRAM V-s	20/16	aluminum	#29	mesh + foar
1199	Scooterbike Dlx.	Compact OSS RS	SRAM DualDrive	V-s	20/16	CroMo	n.a.	mesh + foar
1449	Scooterbike Pro	Compact OSS FS	SRAM DualDrive	Linear	20/16	CroMo/susp.	n.a.	mesh + foar
			SRAM 3x8 DualDrive	disc	20/16	steel	#39	mesh + foar
1495	HPVelo Spirit	Compact OSS FS				Aluminum		shell
1580	Optima Hopper	Compact OSS	mix	n.a.	20/16		n.a.	
1665	Maxaraya Ray-1X	Compact OSS FS	SRAM DualDrive mix		20/16	aluminum	#31	mesh + foar
2200	Cannondale	Compact OSS FS	mix	disc-V-s	20/16	Aluminum/susp.	#40.25	mesh + foar
2500	Bigha	MWB/OSS RS	SRAM DualDrive	Avid disc	26/20+	Aluminum	n.a.	Alum/plastic
WR (lo	ng wheelbase)							
899	Sun EZ Sport	LWB OSS	Shimano Sora/Alivio	Alivio V	26/20	hiten steel	#40	mesh + foan
		MWB USS or OSS	Truvativ/Deore mix	V-s	26/20-16	CroMo	#37	mesh + foar
1129	Vision R40 MWB			3070	26/20-16	aluminum/CroMo	#35	mesh + foar
1199	Sun Easy Sport Ltd.	LWB OSS	SRAM/Shim. LX/XT	Alivio V				
1249	RANS V2	LWB OSS	Truvativ/SRAM 7.0	SRAM 7.0 V-s	26/20	CroMo	#33	mesh + foar
1249	Burley Canto	LWB or SWB OSS	Cyclone/Shim. Sora	Shimano V	26/20	CroMo	#34.5	mesh + foar
1399	Burley Limbo	LWB or SWB OSS	Cyclone/Shim. Sora	Shimano V	26/20	CroMo	#38	mesh + foa
1595+	Rotator Pursuit		SRAM Attack/105 mix	Tektro V-s	26/20	CroMo	#31-32	mesh + foar
	RANS Stratus	LWB OSS	SRAM 9.0/105 mix	Avid Arch Rival V-s	26/20	CroMo	#31	mesh + foar
1599			SRAM Attack/105 mix		20/20	CroMo	#31-32	mesh + foa
1735+	Rotator Pursuit	SWB OSS					#32	mesh + foa
1799	Burley Taiko	LWB or SWB OSS	Shimano Deore	Shimano V	26/20	CroMo		
1900	Cambie Recumboni	LWB OSS	Deore/Tiagra/STX	disc/V-s	26/20	CroMo	#36	shell + foan
1995	EZRacer Tour Easy	LWB OSS	SRAM/Shim./Sugino	V-s or SP	700/20+	CroMo	#30	mesh + foa
2100	Turner	LWB USS	Shimano 105	n.a.	26/20	CroMo	n.a.	shell + foan
2250	Lightfoot Ranger	LWB OSS	SRAM/Shim. Deore	Shimano V	26	CroMo	#40	mesh + foai
		LWB OSS	SRAM/Shim. Deore	Shimano V	26/20	CroMo	#40	mesh + foai
2250	Lightfoot Explorer			V-s	700/20+	aluminum/CroMo	#27	mesh + foa
2995	EZ Racer GoldRush	LWB OSS	SRAM/XT/Ultegra				n.a.	
\$3199	RANS V2 Formula	LWB OSS	SRAM XO/Ult./HED	V-s	26/20	aluminum		mesh + foar
\$3500	EZ Racer Fold Gold	LWB OSS FLD RS	XT/XTR/Ultegra	V-s or SP	700/20 +	aluminum/CroMo	#29	mesh or she
\$4700	Rotator Pursuit	LWB OSS	SRAM/DuraAce mix	Paul Motolite	20/20	titanium/CroMo	#21	mesh
\$5200	EZ Racer Ti Rush	LWB OSS	SRAM/Ultegra/XTR	V-s or SP	700/20+	titanium/CroMo	#27	mesh or she
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	hort wheelbase) include	ling Lowracers and H	ghracers mix Shimano Acera mix	n.a. n.a.	20/20 26/20-16	n.a. hiiten Steeln.a.	mesh + f	oam
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5649 5799 5999 51030 51129 51350+ 51399 51399	hort wheelbase) include HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo	SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS USS OF OSS SWB USS SWB USS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a.	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo CroMo CroMo/susp. CroMo	mesh + f #29 mesh + f #30-34 n.a. #36 #30	oam mesh + foa oam mesh + foa shell + foan mesh + foa mesh + foa mesh + foa
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\$649 \$799 \$999 \$1030 \$1129 \$1350+ \$1399 \$1450 \$1550 \$1599	hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex	SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB USS SWB OSS FS SWB OSS FS SWB OSS SWB OSS SWB OSS SWB OSS	ghracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Sora/105 Shimano Deore mix Truvativ/Deore SRAM 9.0/Shim. 105	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival	20/20 26/20-16 20/20 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo CroMo CroMo CroMo/susp. CroMo CroMo CroMo CroMo	mesh + f #29 mesh + f #30-34 n.a. #36 #30 #27 #29	oam mesh + foal oam mesh + foal shell + foal mesh + foal
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\$649 \$799 \$999 \$1030 \$1129 \$1350+ \$1399 \$1399 \$1450 \$1550 \$1559 \$1599 \$1599 \$1735	hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon	SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB USS SWB USS SWB USS SWB OSS SWB USS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Sora/105 Shimano Deore mix Truvativ/Deore SRAM 9.0/Shim. 105 Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20	n.a. hitten Steeln.a. CroMo hitten Steeln.a. CroMo CroMo CroMo/susp. CroMo CroMo CroMo CroMo CroMo CroMo CroMo CroMo CroMo	mesh + fi #29 mesh + fi #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28	oam mesh + foal oam mesh + foal shell + foan mesh + foal mesh + foal mesh + foal mesh + foal mesh or eu mesh + foal mesh
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\$649 \$799 \$999 \$1030 \$1129 \$1350+ \$1350+ \$1399 \$1450 \$1550 \$1599 \$1599 \$1599 \$1795 \$1795 \$1795 \$1795 \$1799 \$1850	hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada	SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS USS or OSS SWB USS SWB OSS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore SRAM 9.0/Shim. 105 Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s Shimano V Avid SingleD V-s/SP	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20 26/20 26/20	n.a. hitten Steeln.a. CroMo hitten Steeln.a. CroMo CroMo CroMo CroMo/susp. CroMo	mesh + f #29 mesh + f #30-34 n.a. #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28	oam mesh + foar oam mesh + foar shell + foar mesh or eu mesh + foar mesh + foar mesh mesh + foar mesh mesh + foar
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6649 6799 6999 61130 611350+ 61350+ 61399 61450 61550 61550 61559 615999 61599 61599 61599 61599 61599 61599 61599 61599 615999 61599	hort wheelbase) included HP Velo Wavey Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R45 SWB Vision R55 SWB Vision R55 SWB	Jing Lowracers and His SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB OSS SWB USS SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB OSS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore mix Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano mix SRAM/Shimano mix SRAM/Shimano mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Shimano Ultegra Shimano Ultegra Shimano 105/XT mix Truvativ/Shimano XT Truvativ/Deore LX mix	n.a. n.a. SRAM 7.0 V-s n.a. Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s x Avid SD5 V-s	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20	n.a. hitten Steeln.a. CroMo hitten Steeln.a. CroMo CroMo CroMo/susp. CroMo	mesh + fi #29 mesh + fi #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28.5 n.a. #26 n.a. #28.5 n.a. #31	oam mesh + foa oam mesh + foa shell + foan mesh + foa euro shell RANS mesh mesh or eu shell + foar mesh + foa euro shell mesh + foa euro shell shell + foar
6649 6799 6999 61030 61129 61350+ 61399 61399 61450 61550 61559 6159	Hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R45 SWB Optima SWB/lowrcer Wickster	Jing Lowracers and His SWB OSS SWB OSS SWB OSS SWB OSS SWB USS OSS SWB USS SWB OSS SWB OSS SWB OSS OSS OT USS OSS JUSS FS SWB OSS SWB USS SWB OSS SWB OSS SWB USS SWB OSS SWB USS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore mix Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM 9.0/Shim. 105 Truvativ/Deore mix SRAM/Shimano mix Shimano LX/105 mix Shimano LX/105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano XT/105 mix Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Utegra Shimano 105/XT mix Truvativ/Deore LX mi varies by level Shimano 105	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s Avid SD5 V-s n.a. Magura disc	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo CroMo CroMo/susp. CroMo	mesh + fi #29 mesh + fi #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #26 n.a. #28.5 n.a. n.a. n.a.	oam mesh + foa oam mesh + foa shell + foar mesh + foa euro shell RANS mesh mesh or eu shell + foar mesh + foa euro shell mesh + foa euro shell
6649 6799 8999 61030 61129 61350+ 61399 61450 61550 61599 6159	Hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R45 SWB Vision R45 SWB Vision R54 SWB Optima SWB/lowrcer Wickster TerraCycle TerraZa	SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB USS SWB OSS SWB USS SWB OSS SWB USS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore mix Truvativ/Deore mix Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM 9.0/Shim. 105 Truvativ/Deore mix SRAM/Shimano mix Shimano LX/105 mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano XT/105 mix Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Shimano 105/XT mix Truvativ/Deore LX mi varies by level Shimano 105 SRAM DualDrive mix	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s x Avid SD5 V-s n.a. Magura disc V-s	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 26/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20 26/20 16/16 26/20 26/20 26/20 16/16 26/20 26/20 26/20 16/20 26/20 16/20 26/20 16/20 26/20 16/20 26/20 26/20 16/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20 26/20	n.a. hitten Steeln.a. CroMo hitten Steeln.a. CroMo	mesh + f #29 mesh + f #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #28.5 n.a. #28.5 n.a. #31 #32	oam mesh + foa oam mesh + foa oam mesh + foa shell + foar mesh + foa euro shell mesh + foa euro shell mesh + foa euro shell shell + foar RANS
6649 6799 6999 61030 61129 611350+ 611399 61450 61599 61550 61599 61	Hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R54 SWB Vision R54 SWB Vision R54 SWB Optima SWB/lowrcer Wickster TerraCycle TerraZa Vision R55 SWB	SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB OSS SWB USS SWB OSS SWB USS SWB USS SWB OSS SWB USS SWB OSS SWB USS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore mix Truvativ/Deore ESRAM 9.0/Shim. 105 Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano mix Shimano LX/105 mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano LX/Ultegra Truvativ/LX/105 mix Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Shimano 105/XT mix Truvativ/Deore LX mi varies by level Shimano 105 SRAM DualDrive mix Truvativ/Deore XT	n.a. n.a. SRAM 7.0 V-s n.a. SRAM 7.0 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s x Avid SD5 V-s n.a. Magura disc V-s Avid Arch Rival V-s	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20 26/20 26/20 26/20 16/16 26/20 26/20 26/20 16/20 26/20 26/20 16/20 26/20 26/20 16/20 26/20	n.a. hitten Steeln.a. CroMo hitten Steeln.a. CroMo	mesh + f #29 mesh + f #30-34 n.a. #36 #30 #27 #29 #29 m.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #28.5 n.a. #31 #32 n.a.	oam mesh + foa oam mesh + foa oam mesh + foa shell + foar mesh + foa euro shell RANS mesh + foa euro shell mesh + foa euro shell shell + foar RANS mesh + foa
6649 6799 6999 61030 61129 61350+ 61399 61450 61599 61550 615999 61599 61599 61599 61599 61599 61599 61599 61599 615999 61599 61	hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R45 SWB Vision R54 SWB Optima SWB/lowrcer Wickster TerraCycle TerraZa Vision R55 SWB HPVelo Speedmach.	Jing Lowracers and Hi SWB OSS SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB OSS SWB USS	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Sora/105 Shimano Deore mix Truvativ/Deore SRAM 9.0/Shim. 105 Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano LX/105 mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano XT/105 mix Shimano LX/Ultegra SRAM 9.0/Shimano Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Shimano Ultegra Shimano Ultegra Shimano Ultegra Shimano Ultegra Shimano Ultegra Shimano ID5/XT mix Truvativ/Deore LX mi varies by level Shimano 105 SRAM DualDrive mix Truvativ/Deore XT SRAM/XT mix	n.a. n.a. SRAM 7.0 V-s n.a Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s x Avid SD5 V-s n.a. Magura disc V-s Avid Arch Rival V-s disc	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20 26/20 26/20 26/20 16/16 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo	mesh + f #29 mesh + f #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #28.5 n.a. #26 n.a. #27 #28 n.a.	oam mesh + foa oam mesh + foa shell + foar mesh + foa euro shell RANS mesh + foa euro shell shell + foar
6649 6799 6999 61030 61129 61350+ 61399 61399 61450 615999 61599 61599 61599 61599 61599	Hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R54 SWB Vision R54 SWB Vision R54 SWB Optima SWB/lowrcer Wickster TerraCycle TerraZa Vision R55 SWB	Jing Lowracers and His SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB OSS SWB USS SWB USS SWB USS SWB USS SWB USS SWB USS SWB OSS OT USS SWB USS SWB OSS OT USS SWB USS SWB USS SWB OSS OT USS SWB USS SWB USS SWB OSS OT USS SWB OSS OT USS FS SWB USS S	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore mix Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano mix SRAM/Shimano mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano LX/Ultegra Truvativ/LX/105 mix Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Shimano 105/XT mix Truvativ/Shimano XT Truvativ/Deore LX mi varies by level Shimano 105 SRAM DualDrive mix Truvativ/Deore XT SRAM/XT mix FSA/Shimano Ultegra	n.a. n.a. SRAM 7.0 V-s n.a. Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. 105 SP DP n.a. Avid Arch Rival V-s x Avid SD5 V-s n.a. Magura disc V-s Avid Arch Rival V-s disc Bacchetta SP DP	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo Cro	mesh + f #29 mesh + f #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #28.5 n.a. #26 n.a.	oam mesh + foa oam mesh + foa shell + foar mesh + foa euro shell RANS mesh mesh or eu shell + foar mesh + foa euro shell shell + foar RANS mesh + foa euro shell shell + foar RANS mesh + foa HP euro M5 euro (fg
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6649 6799 6999 61130 611350+ 61399 61399 615999 61599 61599 61599 61599 61599 61599 61599 61599 615999 615	hort wheelbase) included HP Velo Wavey Lightning T'bolt RANS Rocket Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R45 SWB Vision R54 SWB Optima SWB/lowrcer Wickster TerraCycle TerraZa Vision R55 SWB HPVelo Speedmach. Bacchetta Corsa Reynolds T-Bone	Jing Lowracers and His SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB OSS SWB USS SWB USS SWB USS SWB USS SWB USS SWB USS SWB OSS OT USS SWB USS SWB OSS OT USS SWB USS SWB USS SWB OSS OT USS SWB USS SWB USS SWB OSS OT USS SWB OSS OT USS FS SWB USS S	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore mix Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano mix SRAM/Shimano mix SRAM/Shimano mix Shim. Ult./105/Deore FSA/105/Ultegra SRAM 9.0/Shimano Shimano LX/Ultegra Truvativ/LX/105 mix Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Shimano 105/XT mix Truvativ/Shimano XT Truvativ/Deore LX mi varies by level Shimano 105 SRAM DualDrive mix Truvativ/Deore XT SRAM/XT mix FSA/Shimano Ultegra	n.a. n.a. SRAM 7.0 V-s n.a. Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s x Avid SD5 V-s n.a. Magura disc V-s Avid Arch Rival V-s disc Bacchetta SP DP V-s or disc	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 20/20 26/20 26/20 26/20 26/20 26/20 26/20 16/16 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo Cro	mesh + f #29 mesh + f #30-34 n.a. #36 #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #28.5 n.a. #26 n.a.	oam mesh + foar oam mesh + foar shell + foar mesh + foar RANS mesh + foar
6649 6799 6999 61030 61129 61350+ 61399 61399 61450 61550 61559 615999 61599 61599 61599 61599 61599 61599 61599 61599 615999 61599 61	hort wheelbase) included HP Velo Wavey Lightning T'bolt A10 Vision R40 SWB Turner T-Lite RANS Vivo Burley Django Lightning Phantom Bacchetta Giro RANS V-Rex Vision R44 SWB Vision R50 SWB Rotator Tiger Haluzak Horizon Greengear SatRDay Burley Hepcat Bacchetta Strada HPVelo StreetMach. Barcroft Dakota Haluzak Hybrid Rcr Vision R60 Saber Turner T-Lite Deluxe Barcroft Virginia GT Vision R54 SWB Vision R54 SWB Optima SWB/lowrcer Wickster TerraCycle TerraZa Vision R55 SWB HPVelo Speedmach. Bacchetta Corsa	Jing Lowracers and His SWB OSS SWB OSS SWB OSS SWB OSS SWB USS SWB USS SWB OSS SWB USS SWB USS SWB USS SWB USS SWB USS SWB USS SWB OSS OSS OF USS SWB USS SWB OSS OSS OF USS SWB USS SWB USS SWB USS SWB USS SWB OSS OSS OF USS SWB US	ighracers mix Shimano Acera mix Dotek/Shim./SRAM Shimano Alivio Truvativ/Deore mix Shimano Sora/Tiagra SRAM 7.0/Shim.Sora Shimano Deore mix Truvativ/Deore SRAM 9.0/Shim. 105 Truvativ/Deore LX Truvativ/Deore LX Truvativ/Deore mix SRAM Attack/105 mix SRAM/Shimano mix SRAM/Shimano mix SHAM/Shimano mix Shimano LX/105 mix Shimano LX/105 mix Shimano LX/105 mix Shimano LX/Ultegra SRAM 9.0/Shimano Shimano LX/Ultegra Truvativ/LX/105 mix Shimano Ultegra Truvativ/LX/105 mix Shimano Ultegra Truvativ/Shimano XT Truvativ/Deore LX mi varies by level Shimano 105 SRAM DualDrive mix Truvativ/Deore XT SRAM/XT mix FSA/Shimano Ultegra Campy/Shimano mix	n.a. n.a. SRAM 7.0 V-s n.a. Avid SD3 V-s n.a. SRAM 7.0 V-s Shimano V n.a. Deore V Avid Arch Rival Avid SD5 V-s V-s Tekro V-s V-s V-s Shimano V Avid SingleD V-s/SP V-s (opt. disc) V-s n.a. 105 SP DP n.a. V-s Avid Arch Rival V-s x Avid SD5 V-s n.a. Magura disc V-s Avid Arch Rival V-s disc Bacchetta SP DP V-s or disc	20/20 26/20-16 20/20 26/20-16 26/20-16 26/20-16 26/20	n.a. hiiten Steeln.a. CroMo hiiten Steeln.a. CroMo Cro	mesh + f #29 mesh + f #30-34 n.a. #30 #27 #29 #29 n.a. n.a. #28 #29 #31-34 #29 #28 n.a. #28.5 n.a. #28.5 n.a. #31 #32 n.a. n.a.	oam mesh + foa oam mesh + foa shell + foan mesh + foa euro shell RANS mesh mesh or eu shell + foar mesh + foa euro shell shell + foar RANS mesh + foa euro shell shell + foar RANS mesh + foa HP euro M5 euro (fo Optima she

\$4300 ⁵ \$4500 ⁵	Angletech MC ² GL81 Angletech MC ² SHO	SWB OSS	Profile/RaceFace/Rol		26/20	CroMo	#27	mach
4700	Rotator Tiger	SWB OSS	Shimano DuraAce	Paul Motolite		titanium/CroMo		mesh
5000	Turner Graphite	SWB OSS	n.a.		20/20		#21	mesh
5000	Angletech Alt.RBT14		Rohloff/Phil/Shimano	n.a.	n.a. 20/20	n.a.	n.a.	n.a.
53004	Lightning F40	SWB OSS full fairing				CroMo/Meks susp.	#32	RANS
5500	Lightning R84	SWB OSS full fairing	n.a.	n.a	700/20	CroMo	#32-34	mesh + foan
			Shimano Ult./White	n.a.	700/20	carbon fiber unibox	#20-22	mesh + foan
83004	Lightning F90	SWB OSS full faired	n.a.	n.a.	700/20	carbon fiber unibox	n.a.	mesh + foam
rikes (d	elta: two wheels in ba	ck and tadpole: 2 whe	els in front)					
725	Sun EZ3	delta OSS	Shimano/Sunrace	disc/V-s	20/16	square hiten	n.a.	mesh + foam
N.A.	Sun EZ3 Ltd.	delta OSS	Shimano Tiagra	3 disc	3x20	square aluminum	n.a.	mesh + foan
1500	Wicks folding	tadpole	Shimano 105 mix	n.a.	26/20	n.a.	n.a.	n.a.
1595	Rotator Comfort 3	delta USS	Shimano 105	V-s	3x20	CroMo	n.a.	mesh
1750	Sun EZ Quad	guad OSS	Shimano/Sunrace	Tektro V-s	20/16	square hiten+ alum.	n.a.	mesh + foan
1750	Haluzak Triumf	delta OSS	Shimano 8-speed	n.a.	20/16	n.a.	#46	
1895	WizWheelz TerraT	tadpole USS	Shimano Tiagra	Shimano disc	3x20	CroMo	#34	n.a. mesh
2000	Catrike Race	tadpole USS						
2495	Penninger Voyager	delta USS	Shim. Tiagra/Deore	Deore disc	3x16	aluminum	#30	mesh
2495			SRAM/Shimano/Phil	Shimano SP DP	3x20	CroMo	n.a.	mesh + foam
	SidewinderTadpole	USS RWS	SRAM/Shimano mix	disc	3x20	hiten	#33	mesh
2590	Hase Kett Wiesel	delta USS	Shimano 9-speed +	mesh. disc (opt. hyd.)		steel (ti opt.)	n.a.	Mesh
2675	Lightfoot Trike	delta LWB OSS	SRAM/Shimano mix	Shimano V	26/20	CroMo	n.a.	mesh + foan
2795	Penninger Voyager	delta USS	SRAM/Shimano/Phil	Shimano SP DP	3x20	CroMo	#50	mesh
2840	Optima Rider	tadpole	mix	n.a.	n.a.	n.a.	n.a.	euro shell
3280¹	Greenspeed GTR	tadpole USS	SRAM/Shimano mix	drum (opt. disc)	3x20	CroMo	#31	mesh
32924	Wicks Trimuter	tadpole USS	n.a.	drum	3x20	CroMo	n.a.	mesh
3422 ³	Windcheetah CS	tadpole OSS	Shimano 105	SA drum	26/20	aluminum	#32	carbon shell
3400¹	Greenspeed GTC	tadpole USS	SRAM/Shimano mix	drum (opt. disc)	3x20	CroMo	#40	mesh
3400¹	Greenspeed GTC	tadpole USS	SRAM/Shimano mix	drum (opt. disc)	3x16	CroMo	#31	mesh
34801	Greenspeed GTO	tadpole USS S&S	SRAM/Shimano mix	drum (opt. disc)	3x20/16	CroMo	#40	mesh
3615 ²	ICE Trice Classic	tadpole USS	Shimano mix	disc	26/20	CroMo	#38.5	mesh + foam
36222	ICE Trice Explorer	tadpole USS	Shimano mix	disc	3x20	CroMo	#38.5	mesh + foam
3630 ²	ICE Trice Pixie	tadpole USS	Shimano mix	disc	n.a.	CroMo	n.a.	mesh + foam
36701	Greenspeed GTE	tadpole USS	SRAM/Shimano mix	drum (opt. disc)	3x20	CroMo	#44	mesh
3690	Hase Lepus	delta USS RS	Shimano 27-speed	hyd. disc/hyd rim	3x20	CroMo(ti opt.)	n.a.	mesh + foam
38302	ICE Trice XL	tadpole USS	Shimano mix	disc	3x20	CroMo	#38.5	mesh + foam
38801	Greenspeed GTS	tadpole USS	SRAM/Shimano mix	drum (opt. disc)	3x20	CroMo	#36	mesh
38801	Greenspeed GTH	tadpole HC	SRAM/Shimano mix	drum (opt. disc)	3x20	CroMo	#40	mesh
4000	Angletech TriSpder	tadpole OSS	Shimano mix	SRAM VT500 drum	3x20	CroMo	#39	mesh
40001	Greenspeed GTX	tadpole trike USS	SRAM/Shimano mix		3x16	CroMo		
41383	Windcheetah SS			drum (opt. disc)			n.a.	mesh
44801	Greenspeed GLR	tadpole OSS tadpole USS	Shimano Ultegra/XT	SA drum	26/20	aluminum + carbon	#31	Carbon she
4600			18-spd. mix	n.a.	16/19	CroMo	n.a.	mesh
	Angletech Quadrpd		. Custom arm + leg	SRAM VT500 drum	3x20	CroMo	#44-47	mesh
4630 ²	ICE Trice Monster	tadpole USS	Shimano mix	disc	n.a.	CroMo	n.a.	euro + foam
47502	ICE Trice XXL	tadpole USS	Shimano mix	disc	3x20	CroMo	#38.5	euro + foam
4750°	ICE Trice Mini	tadpole USS	SRAM/Shimano mix	disc	3x16	CroMo	#27.25	euro + foam
4970²	ICE Trice Micro	tadpole USS	Shimano Ult./DuraAce	disc	3x16	CroMo	#29	euro + foam
ANDEM	S							
1895	Sun EZ Tandem	LWB OSS	Deore/Am. Classic	disc	26/20	CroMo	#59	mesh + foan
3250	Lightfoot tandem	LWB OSS	SRAM/Shimano mix	n.a.	20/20+	CroMo	n.a.	mesh + foan
3395	RANS ScreamerSP	SWB OSS	Race Face/Shim./7.0		26/20	CroMo	#48	mesh + foam
3695	Barcroft Columbia	SWB OSS	Shimano LX/XT/105	V-s	2x20	CroMo	#46	RANS
3800	Double Vision R82	SWB USS		Avid Arch Rival V-s	26/20	CroMo	n.a.	mesh + foan
34955	B-Friday Doubleday	SWB USS/OSS	SRAM/Shimano mix	V-s	20/20	CroMo	#52	
3999	RANS Screamer	SWB TDM OSS	Race Face/Shim./9.0					mesh + foan
4599	RANS ScreamerTR				26/20	CroMo	#48	mesh + foam
		SWB TDM OSS S&S	Race Face/Shim./9.0		26/20	CroMo	#47	mesh + foam
4595	Double Vision R82	SWB TDM USS	Vision IPS/XT	Magura	26/20	CroMo	#52-54	mesh + foan
57751	Greenspeed GTT	trike TDM S&S	Shimano mix	Hope disc	3x20	CroMo	#66	mesh
6400 ²	ICE Trice tandems	trike TDM USS	n.a.	n.a.	3x20	CroMo	n.a.	mesh

Greenspeed prices are in US dollars (based on an exchange rate of \$.58 per AUD) and include shipping to the USA and duty.

trike TDM Convert. Shimano mix

CroMo

n.a.

Greenspeed GTV

Listing Note: The above information is supplied to us by manufacturers. We surf the internet to find infor on popular models. There are other makes and models out there, though they might not be listed here. If we had the info, it would be printed. We do our best to list available models in the USA by prices in US dollars.

Shipping Note: If you buy from the factory, an airmail dealer or you special order, expect to pay shipping. If you buy off the showroom floor, you probably will not have to pay for shipping. UPS shipping on a two wheeler can cost \$50-\$100. Some manufacturers may charge for crating. Others may use over-the-road trucking companies for shipping. This usually makes for easier assembly, but can cost 2-3 times as much.

Optima Note: Since the demise of Yellowbikes, Optima is now selling in the USA through a distributor, www..nu-techcycling.com. There are 11 models, 36 variations of these models (different spec levels) at prices ranging from \$2220-\$3030 USD. See the above website or www.optima-cycles.nl for more information on what models are available in the states and your local dealers.

Windcheetah Note: The Windcheetah is available in two different models and an owner built kit. The prices are \$1,800 (ClubSport kit), \$3,300 (ClubSport) and \$3,990 (SuperSport), but we do not know if these prices include shipping to the USA (which can be quite expensive) or US customs duty.

#66

mesh

² ICE prices are in US dollars and include duty, and shipping. These prices are just a guideline as ICE will only ship a complete bike to a custom in the USA (dealers get only framesets). Also, dealers cannot sell ICE tandems (they are in the \$7,000 range and sold direct).

³ Prices include shipping and duty of 3.7%.

Prices do not include shipping and often set up.

There are several version of the Bike Friday SatRDay. The 9-speeds is priced from \$1,695. There are DualDrive 27-speeds and even a Rohloff model. The Doubleday is priced from

Recumbent Manufacturer Listings

RECUMBENT MANUFACTURERS

Angletech

Tel: 719-687-7475

Web: www.angletechcycles.com Products: Trikes & SWB OSS

ATP Vision

Tel. 206-467-0231

Web: www.visionrecumbents.com Products: SWB, MWB and tandem

Bacchetta Bikes

Tel. 785-625-5685

Web: www.bacchettabikes.com Products: SWB OSS recumbents

Barcroft

Tel. 703-750-1945

Web: www.barcroftcycles.com

Products: SWB OSS, tandem, & lowracer

Big Cat HPV

Tel. 407-293-1626 Web: www.catrike.com Products: Tadpole USS trike

Boulder Bikes

Tel. 303-823-5021

Web: www.boulderbikes.com Products: Full suspension SWB OSS

Burley Design Coop

Tel. 541-687-1644; 800-311-5294 Web: www.burley.com

Products: SWB and LWB OSS

Cannondale

Tel: 1-800-BIKEUSA Web: www.cannondale.com

Products: Compact LWB OSS full suspension

Crank-It

Tel. 888-747-2038 Web: www.crank-it.com

Products: Offroad quad & tadpole trike

Cycle Genius

Tel: 866-901-BIKE (2453) Web: www.cyclegenius.com Products: Compact LWB/MWB OSS

Easy Racers, Inc.

Tel. 408-722-9797

Web: www.easyracers.com Products: LWB OSS

Greengear/Bike Friday

Tel. 800-777-0258 Web: www.bikefriday.com

Products: Folding folding SWB and tandem

Haluzak

Tel. 707-544-6243 Web: www.haluzak.com

Products: SWB USS and delta trike

Human Powered Machines

Tel. 800-343-5568 Web: www.efn.org~cat

Products: SWB, LWB, & folder

Just Two Bikes

Tel. 800-499-1548 or 651-426-1548 Web: www.justtwobikes.com Products: FWD delta trike (folding)

Lightning Cycle Dynamics

Tel. 805-736-0700

Web: www.lightningbikes.com Products: SWB OSS and lowracer **Lightfoot Cycles**

Tel. 406-821-4750

Web: www.lightfootcycles.com Products: LWB OSS, trikes and a quad

Linear Recumbent

Web: linearrecumbent.com or peter@bicycleman.com

Products: LWB & CLWB folding recumbent

Longbikes

Tel. 303-792-2242

Web: www.longbikes.com

Products: LWB & SWB USS recumbent

Organic Engines

Tel. 850-224-7499

Web: www.organicengines.com Product: Trikes, SWB & trucks

Penninger Recumbents

Tel. 630-377-1696 Web: www.penninger.com

Product: Delta trikes, trike tandem

RANS Recumbents

Tel. 785-625-6346

Web: www.rans.com

Products: SWB, Compact, LWB & tandem

Reynolds Weld Lab

Tel. 603-432-7327

Web: www.reynoldsweldlabs.com Products: SWB semi-lowracer

Rhoades Car International

Tel. 1-615-822-2737 Ext. 16186 Web: www.4wc.com/?16186 Products: Four wheeled pedal cars

Rotator

Tel. 707-539-4203

Web: www.rotatorrecumbent.com Products: LWB and SWB & trike OSS

Scooterbike (BYUS America)

Tel. 503-675-1702 Web: www.byus.tw

Products: Compact LWB and delta trike

S&B Recumbent

Tel. 310-762-2243

Web: www.home.pacbell.net/recumbnt/ Products: SWB Delta trike & tandem

Sidewinder

Tel. 805-524-3022

Web: sidewindercycle.com

Products: rear wheel steer tadpole trike

Sun Bicycles

Web: www.sunbicycles.com Tel. See your local dealer

Products: LWB, MWB, tandem, trike & quad

TerraCycle

Tel. 800-371-5871

Web: www.terracycle.com

Products: SWB ASS and recumbent parts

Turner Enterprises

Tel. 520-290-5646

Web: www.turnerrecumbents.com

Products: SWB USS also new LWB USS model.

Wicks Aircraft

Tel. 800-221-9425

Web: www.wicksaircraft.com

Products: SWB USS & tadpole trikes

WizWheelz

Tel. 616-948-4693

Web: www.wizwheelz.com Products: Tadpole USS trike Worldwide Manufacturers

INTERNTATIONAL

Cambie Cycles (Canada)

Tel. 604-874-3616

Web: www.cambiecycles.com

Products: LWB OSS

Challenge

Web: www.challenge-ligfietsen.nl/

Product: Lowracers & Euro SWB

Greenspeed (Australia) Tel. +61 3 9758 5541

Web: www.greenspeed.com.au Products: Line of tadpole USS trikes

Hase Spezialrader (Germany)

Tel. ++49 2309 782582

Web: www.hase-spezialraeder.de Products: Delta & folding trike

Hotmover HPV

Web: www.hotmover.com Tel. 866-TRIKES-1 (866-8745371)

Products: Tadpole recumbent trike

HP Velotechnik

Tel. ++49 (0) 61 92 4 10 10

Web: www.hpvelotechnik.com Products: Euro SWB, MWB & lowracers

ICE (Inspired Cycle Engineering Ltd.) (UK)

Tel. (011 44) 1326 378848

Web: www.ice.hpv.co.uk Products: Tadpole trikes & tandem trike

Leitra DK ApS (Denmark)

Tel/ fax: +45 48 18 33 77

Web: www.leitra.dk

Products: Enclosed velomobile

Maxaraya Design and Mfg. (Canada)

Tel. 416-737-5745

Web: www.maxaraya.com

Products: Compact LWB, full suspension

A 81 - 14/1

Tel: 44 (0) 1793 852484

Web: www.micwic.com

Products: Back to back tandem

M5 Ligfietsen

Tel. +31 (0) 118 628759

Web: M5-ligfietsen.com Products: Lowracers

Optima

Web: www.optimabikes.com

Products: distributor for Optima bikes

Velo Nouveau/Burrows Engineering

Tel/Fax: 44 (0) 1603 721700 Product: SWB ASS

Windcheetah/AVD (UK) Tel. 0044 (0) 161 928 5575

Web: www.windcheetah.co.uk Products: Tadpole trike.

Zox

Tel. +49 (0) 91 31 - 7 19 73 - 21

Web: www.liegerad.com

Products: Euro FWD SWB/lowracer

ACCESSORIES

Angletech

(See mfr listing)

ATOC

Tel. 800-ATOC-021

Web: www.ATOC.com Products: recumbent rack trays, etc.

Draftmaster

Tel. 800-659-5569 Web: www.draftmaster.com Products: Receiver hitch bike rack

C&C Industries

Tel. 952-929-0313 E-mail: cg@visi.com

Products: ev kits and quad kit for Sun recumbents

TerraCycle

Tel. 800-371-5871

Web: www.terracycle.com

Products: OSS risers, handlebars, racks, tail fairings.

Zzip Designs Tel. 831-425-8650 Web: www.zzipper.com

Products: fairings and mounts

Recumbent Rack

Tel. 360-687-1232 Web: www.topperfloats.com Products: LWB rack tray

Sportworks

Tel. 888-661-0555 Web: www.sportworks.com Products: Recumbent racks for cars

Mueller Windwrap

Tel. 877-267-1645

Web: www.windwrap.com Products: fairings

Yakima

Tel.888-925-4621 Web: www,yakima.com

Products: Recumbent racks and trays

BUILDING PLANS (RECUMBENT)

Bentech

Web: www.bentechbikes.com Products: Recumbent plans, kits and parts

LaBent by LaDue

Web: www.radiks.net/~ladue/ Products: LWB OSS plans and kits

R.Q. Riley

Web: www.rgriley.com/bike.html Products: Recumbent plans



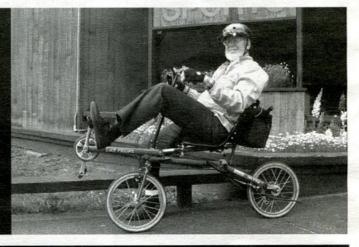
WHAT DO YOU DO ON A FRIDAY?

Larry and Ruth Knapman of Fairbanks, Alaska, told us: "We're hooked on recumbents, but just can't seem to get our BikeE or RANS Rocket crammed into suitcases or golf bag cases ..." Solution: a Bike Friday SatRDay, the original suitcase folding recumbent. Truly hooked, they became one of the first to own a DoubleDay

www.bikefriday.com 800-777-0258 (USA/Canada) 541-687-0487 (Int'l)

folding tandem recumbent, which they packed into two suitcases and took to the Netherlands in August 2002. Ask them how they fared:

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RCN Road Test



The Cambie Recumboni: Canadian Adventure Bike

By Bob Bryant

ambie Cycles is small and personable recumbent specialty shop located in Vancouver, British Columbia, Canada. Cambie is run by Brock Davis and Bob McPhie, both of whom have been interested in recumbents since the mid-1980 when Brock built an Easy Racer and soon after Expo '86 and the world's HPV's and racers gathered in Vancouver.

In the upstairs machine shop, Vancouver born Don Peters runs the Cambie machine shop. He builds LWB singles, tandems, SWB and Trail-a-Bents - each as custom bike to suit the customer.

Over the years, the Recumboni becomes more and more refined. It is now a beautiful example of what a long wheelbase over-seat steering recumbent can be.

Systems

Frame — The frame is built in the Cambie Cycles shop in Vancouver, Canada. The craftsmanship is excellent. The CroMo frame is TIG welded. The custom fittings have a high-end production look to them. The frame design is similar to that of an Easy Racer Tour Easy, though the Recumboni lacks the mid-frame cross brace. This frame is not as tall as the Tour Easy and seat height is lower. Another difference is that the Recumboni utilizes a 26-inch rear wheel which is arguably better for touring, while the Tour Easy still uses the taller 700c.

Fork — The Recumboni fork is a unicrown CroMo fork that is made especially for the bike in Taiwan for Cambi. The fork is painted to match the bike.

Steering - Cambie makes their own stem that is a cross between that of a Rotator and the Calhoun Evolution. An threadless headset adapts to the stem/riser to allow positioning of your favorite handlebar. The vertical adjustment is limited to about two inches.

The handlebar feel is more like that of a BikeE or RANS Stratus than an Easy Racer. The bars are a flaired slighly back. The stem will allow custom bars to be outfitted on the bike. The stock bars are wider than the fair-

S & S Couplers are an available option for about \$450 USD.

Drivetrain

Chain management — The Recumboni has a modified skate wheel type chain idler. The lower chain rides over the idler. The upper chain rides through a chain tube that runs from the rear wheel nearly to the crankset up front. The drivetrain runs smooth and quiet, though there is some chain tube vibration.

The Recumboni does not offer as wide of a gearing range because it doesn't have the spring-loaded idler. Our test bike had optional chain tubes, which kept my legs clean of grease. The chain rode smoothly over the idler and through the tubes with the predictable low hum of the chain in the tubes. The chain management of the Recumboni is excellent.

The drivetrain is a mix of Shimano Tiagra and Deore. The exceptions are an STX headset, a Shimano Tiagra crank and a Deore DX front derailleur. This is a model from several years back, but an excellent front derailleur.

Braking — The rear brakes is Shimano Deore V-brake. The front is a Deore disc (no extra charge). For 2003, Cambie will be spec'ing the Avid disc, which we consider an improvement. Cambie went to disc front brakes due to premature rim wear on the 20inch rims from the V-brakes (we've also experienced this, and think the discs are a great idea).

Wheels and Tires — The wheels are built by Cambie. The Sun CR18 rims are laced to Deore hubs. The tires are the durable Schwalbe Kevlar Marathon 1.5. While not the fastest rolling tire, they seem very durable. While our wheels remained true during the review, we developed a spoke creak on our first 20 mile ride.

Comfort

The seat is a very simple fiberglass shell or bucket design. It looks similar to one used on S & B recumbents, but is taller and has a very thick foam pad at the base, which is very cushy. The mounts were easy to adjust (RANS style seat back braces and an allen bolt tightener underneath (seat attaches like an old style RANS seat channel; the seat did not slip). The seat braces 1/2" dia. solid aluminum round

Though not breathable at all, the seat worked well on the bike. Being that Cambie is a custom shop, other seats could certainly be mounted. The RANS seat upgrade is available for about \$200 USD.

Ergonomics

The Recumboni has a very user-friendly upright riding position with above-seat steering. The riding position should be easy for most riders to get accustomed too. One item of note is that this is a very long bicycle. Even the small size frame is 7" longer than the comparable Easy Racer Tour Easy small size. This is really a bike best suited to a taller rider.

Ride and handling

Stability - The Recumboni has user-friendly and steady road manners to suit every type of rider. While the handling is not as refined as the Easy Racer series of bikes, it is very good. There is more tiller feel. The Recumboni actually feels a bit like a RANS LWB.

Maneuverability - This is a huge LWB, it is actually the longest LWB we've ever reviewed (76" WB). Despite the super sized bents are not that difficult to manage. You must just plan ahead and in some tight spots, lift the bike and pivot it around.

Performance — The Recumboni with optional Mueller Windwap fairing made this one of fastest recumbents we've tested in recent years. The Recumboni has a lower frame profile and a hard shell seat. The 1.5" road tires and wide Mueller fairing helped performance significantly. The Mueller is definitely the best choice for the Recumboni as it fits the wider bars. It will also work especially well for large or tall riders. The fairing mounts were cleanly designed and robust. The fairing fit like it was designed for the bike. Mueller's craftsmanship is excellent. The fairing had no glue splotches or edging delaminations or problems.

Owning

The Recumboni can be anything you want it to be. It would be at home on a daily commute, cross country tour or fast club ride. It's a long bike, which makes it difficult to turn around in tight quarters, but the low LWB design is easy to master. The size becomes an issue again when we consider lifting, hauling or storing the bike. It is a large package.

Options & accessories

Being that Cambie is a recumbent bike shop as well as a builder, they will have a good idea of what works (and what doesn't) as far as after-market options, custom drivetrains, hubs, brakes, etc.

Our test bike came outfitted with the following included options: an expertly fit rear rack, fenders, a kickstand and a chain tube, Mirrcycle rear view mirror and a Mueller fairing (and mounts).

This is the first time we've experienced the Mueller Windwrap fairing. The fairing on our Recumboni has an excellent integral mounting system in an aluminum cross brace that stiffens the fairing as it mounts. The edging is better than we have seen on other fairings. The upper shape is wider and flatter. Though this fairing worked very well, our advice on fairings is to use what best fits your bike.

Market competition

The Recumboni is direct competition for the RANS Stratus and especially the Easy Racer Tour Easy. One must also consider the new Sun EZ Sport Limited, and low priced V2 (now under \$1,300). While the Recumboni is a custom bike, and not a production bike - built in relatively small numbers

Verdict

The Recumboni is an excellent LWB OSS recumbent. You'll get a near custom build experience and you'll save some cash over the compeition (a similarly equipped Tour Easy is nearly \$2,400 shipped with similar equipment).

the U.S.A.

I still think that Easy Racers has a more refined steering geometry, and I prefer the Easy Racer handlebars (which could be adapted to this bike). Despite this, Cambie has a lot to offer. They are friendly folks building custom bikes to suit the rider. This is a level of service not found with any of the stock brands these days - and as we said, this bike, as equipped, is a bargain.

This Recumboni is a sweet bike. It's built to tour and is nearly ready to head off on a world tour adventure right out of the box. •



The Cambie accessories all worked wonderfully. Note the fenders, fairing and front disc brake



Note the wide Cambie bars behind the Mueller fairing. We liked the excellent custom Mueller fairing mounts.



Note the custom rack adapter. and rear fender

INFO AT A GLANCE

Specifications

Model-Cambie Recumboni Type-LWB Steering-OSS Wheelbase-70"(sml.)/73"(med.)/76"(lg.) Wheel sizes-26/20 Seat height-20" Bottom bracket height-13" Frame sizes-Small, medium and large Weight-35 lbs. (ours was over #40 with options)

Frame-4130 .035 CroMo Fork-CroMo Seat frame—Fiberglass shell/alum. track Seat material-Nylon Seat cushion—Foam base and seat back pad

Components

Crank—Shimano Tiagra 30/42/52 Bottom bracket-Shimano sealed Headset-Shimano STX Derailleurs (f/r)-Deore DX/Deore Shifters-Shimano Deore Cassette-Shimano 11-32 HG 50 9-spd. Chain-SRAM Gear inch range-23.5-118 Pedals—Platform Wheels (f/r)-406 mm 20"/559 mm 26" Rims-Sun CR18 Tires (f/r)—Schwalbe Marathon Kevlar 20" and 26" x 1.5 Hubs (f/r)-Shimano Deore Brakes (f/r)-Avid disc (ft)/V-brake (rr)

Incidentals

Price-\$1695 USD + approx. \$150 S/H RANS seat upgrade approx. \$200 USD; S & S couplers approx. \$600 USD. Warranty (frame)-Lifetime (frame) Colors-Black or custom Accessory mounts-Waterbottle cages Comes with: Fenders, racks, kickdstand and rearview mirror, Mueller fairing, chain tube (guard)

Pros

Custom built bike Excellent craftsmanship (Canadian built) Smooth riding tourer Very adjustable seat Lots of options and custom possibilities Comfy foam covered shell seat (perhaps the most comfy of its type)

Cons

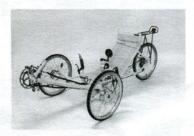
A long bike Not light weight Seat base is very cushy, perhaps overly Not enough vertical adjustment in the handlebar stem

Contact

Cambie Cycles Tel. 800-311-5294 Web: www.cambiecycle.com



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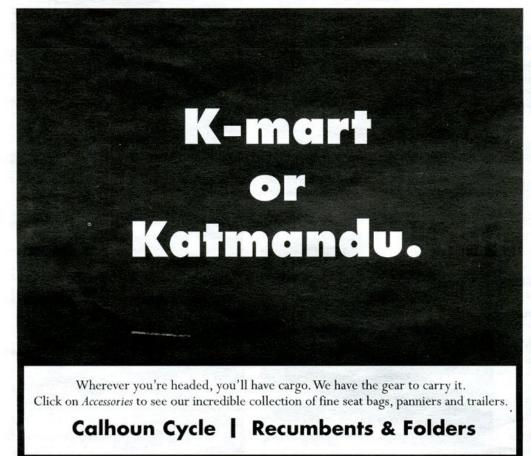
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How To Buy a Recumbent 2003

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Why Ride a Recumbent?

The first and foremost reason to consider a recumbent bicycle is comfort. When you ride a recumbent bicycle your body feels good-no pain. Your arms and wrists are totally relaxed, as they do not support your weight. Your neck and shoulders are relaxed because you're looking straight ahead. The recumbent seat offers full ergonomic back and base support. While riding a recumbent, you should not experience any pain, chafing, or numbness.

Another benefit of the recumbent seating position is a more open chest and diaphragm that makes for easier breathing. You'll be able to ride longer with less fatigue and arrive at your destination feeling refreshed. You'll have a better view of the road and your surroundings. Recumbents are great for touring and day rides.

Recumbent Costs

Recumbents can be expensive. They can cost nearly twice as much as a comparable upright bike. Entry-level bikes cost \$500 and up. Serious riders can expect to spend \$1,000-\$2,500.

Types of Recumbents

Because there are many different styles and variations of recumbent bicycles to choose from, becoming educated about recumbent bicycles is essential. There are recumbent designs for recreational riding, touring, commuting, and racing. There are two-wheelers, three-wheelers, tandems, pedal cars, and even pedal trucks. Keep in mind that most recumbents come from small manufacturers. There are currently only two diamond-frame bicycle manufacturers (Burley and Cannondale) who build recumbents.

Here are the basic types of recumbents:

Long Wheelbase (LWB)

These are the long, chopper-like recumbent models with wheelbases of 60 to 70 inches. They are the most popular type of recumbent available today. The reason is high user-friendliness and reasonably low cost. The LWB's pedals are behind the front wheel and often are closer to the ground. LWB's are great all-around recumbents and can be used for most anything. LWB's with overseat steering (OSS) are great for commuting, touring, day rides, and sport rides. They can also offer exceptional performance, as Lexan fairings are more effective and easier to mount.

There is a newer type of LWB that has a monotube frame, linkage SWB-like steering controls, and higher pedals. These are just as, if not more comfortable, but they do not perform as well and are not as user-friendly (higher pedals). It is becoming difficult to find LWB's with under-seat steering (USS).

The downside to the LWB is size, storage, transportability, and weight. LWB's are more difficult to find at dealers. Examples: Sun (EZ),

Easy Racers, RANS, Lightfoot, Rotator, and Burley.

Compact Long Wheelbase (CLWB)

(aka medium wheelbase or MWB)

The CLWB in its most popular form, is a more compact LWB with a smaller wheelset (20- inch rear/16-inch front) and a higher seat position. These make fine entry-level, city and commuter recum-bents, though performance is not their forte. Examples: Sun EZ, Cycle Genius, HP Velo Spirit, and Cannondale recumbent.

CLWB's tend to be heavier, have limited gearing (due to the small drive wheel, which can limit performance), and can have more rearward centers of gravity (more weight on the rear wheel; a performance detractor).

Short Wheelbase (SWB)

This design has become the choice of the sport riding enthusiast. The reasons are that SWB's are lighter, more compact, and have a more aggressive design. The wheelbase is shortened by placing the front wheel under or just in front of the rider's knees and by raising the pedals up to seat height (and higher). The wheelbases are up to 48 inches. This design can offer improved weight distribution, quick road bike-like handling, and lighter weight.

The downside is that the SWB can be twitchy (quick) handling and have a longer learning curve. They can also have heel interference with the front wheel during lowspeed turns. The higher pedals may require clipless pedals, and there is a greater likelihood for toe/foot numbness for some riders. These models may be best suited for more advanced riders. Examples: Bacchetta, RANS, Vision, HP Velo, Burley, Rotator, and

SWB Lowracer: Imagine being so low that your palms can touch the groundyou're stretched out, laid back with your feet up high. This is the very fast Euro lowracer. Lowracers were originally based on a lowered and more stretched-out SWB. They were initially only for closed-course racing. More streetable models are now appearing.

The downside to the lowracer is cost. They are difficult to find in the USA, and there may be fit concerns (short, very tall, and large riders). Safety on low models may be a concern for some. These bikes are very low, difficult to see from while riding in traffic, and more difficult for drivers to see them. Examples: HP Velo, Zox, Optima, M5, and Reynolds (semi-lowracer.

SWB Highracer: Though relatively new in the USA, these were popular in the late 1980's in Europe. These fast SWB's, with their large-diameter (26-inch, 650c, or 700c) performance wheels, slice through the wind. Lowracers and highracers have laid-back seats and high pedals. Examples: Vision Saber, Bacchetta Strada, Corsa, and Aero.

Trikes

Recumbent tricycles come in two varieties:

Tadpole (two wheels in front): Tadpoles have automobile-like steering and rear-wheel drive. They are very low to the ground. They are for sport riding, performance, racing, and touring. Examples: WizWheelz, Greenspeed, Catrike, and Trice.

Delta (two wheels in back): Deltas have one steered front wheel, and usually one of the two rear wheels is driven. Their seats are of average recumbent height (not usually as low as a tadpole). They are best for recreation, cargo, commuting, and touring (though some can be quite fast). Trikes can be more difficult to find. Examples: Penninger, Hase, and Lightfoot.

Tandems

There are double two-wheeled tandems, threewheeled tandems (trikes), and even fivewheeled tandems (linked trikes). Two-wheeled tandems can be found in user-friendly LWB and more enthusiast-oriented SWB configurations. Be sure that your braking is adequate (consider a drag-brake if you plan to tour over mountain passes).

The downside of tandems is storage, transportability, and often cost. Examples: Sun/EZ, RANS, Barcroft, and Greenspeed.

Ergonomics

There is no such thing as typical recumbent ergonomics. Some models have upright seats, others have-laid back seats. Some have low pedals (in the same position as a diamondframe bike) and others have very high pedals (up to 9 inches higher than your seat base).

Basic user-friendly ergonomics include a moderate seat height of around 20 or so inches off the ground, with pedals mounted noticeably lower (a similar height to a diamondframe bike). This design would place the rider in a fairly upright position which places much of the rider's weight on their bottom, which for some riders, can make for recumbent butt. This position is similar to driving a car.

As the pedal height is increased, the seat can be reclined more, thus taking some of the weight off the rider's bottom. Often, however, raising the feet can cause foot and toe numbness, may require clipless pedals; it can also take a second or two longer to get your feet to the pedals or back to the ground. When the pedals are raised way up and the seat is reclined way back (what we describe as an extreme position), there can also be neck fatigue, as one has to lower one's chin to look straight ahead. This is usually found on highperformance and racing recumbents and may not be suitable for average riders.

For new riders, the best place to start is a compact or LWB with low pedal height. If you're an athlete or more advanced rider or if you have a special need, finding the optimum riding position and model for you may take some time and patience.

Other Fit Notes

If you're 5'6" to 6" tall you can ride" most any recumbent. If you're shorter or taller than average, you should check out recumbents that come in multiple frame sizes. Shorter riders may want to check out LWB's, trikes, and SWB's with 16- inch front wheels. Models with full-size wheels may be too tall for you. Larger and/or taller riders might want to try LWB's and longer SWB's (those with wheelbases of 40 inches or more). Look for stiff, strong frames and low pedal heights with more moderate or open riding positions. Ask about weight limits, capacities, and warranties. Opt for fatter tires if possible (20- and 26-inch tires offer the most options).

Seats

There are three basic types of seats:

- Hammock mesh offers breathable comfort. Due to their design, a mesh base can make the bike difficult to hold up at a stop (even for a tall rider). Mesh seat bases tend to pinch the outside of of some riders buttocks. Mesh seat bases are rare these days.
- A molded seat with foam and cover offers a more firm base to push against, though it may be less comfortable. Euro molded seats have a distinct lumbar curve and are designed to for a very laid-back position.
- A combination seat includes a mesh back and a molded, foam covered base. This is a good compromise seat. This is the most popular style of recumbent seat.

Steering

There are two types of recumbent steering:

- Over-seat steering (OSS): This is the more common, normal, user-friendly, and performance-oriented (in most cases) type of steering. These are your basic upright handlebars that connect to a stem or riser into a head tube (or false head tube on some models).
- Under-seat steering (USS): These are the handlebars that are down at your sides underneath the seat. USS is considered more comfortable by many riders, though it can take more time to become accustomed to. USS adds more complexity to designs because of fork modifications and steering linkages.

Component Notes

The 26-inch (559 mm) rear wheel and 20-inch (406 mm) front wheel combination is the most popular. Reasons for using other sizes would be more performance (650c or 700c), lowering of the seat (combos using 20- and 16-inch wheels), or making a bike more compact (20/ 16 combos). Small wheels do not perform as well, wear more quickly, and have less gyroscopic inertia than their larger counterparts. Small rims and tire sizes can be more difficult to find.

Tires: Consider using fatter tires than you would normally use. The reason is that you cannot deweight your wheels when riding as you can on a diamond-frame bicycle. Fatter tires are more comfortable, less skittish to ride, and have fewer flats.

Nonstandard parts: Mid-drives, independent pedaling options, disk or hydraulic brakes, or other proprietary parts can complicate your bike and make service and parts replacement more difficult, time consuming, and costly. At the very least keep a cache of replacement parts in case of problems.

Suspension: A cushy ride can be wonderful and may spoil you. It works even better with small wheels (20-inch drive wheel). However, it complicates the bike (fender and rack mounting as well as obtaining acceptable gearing with a small drive wheel), is more expensive, and requires more maintenance. MWB's and LWB's can best utilize rear suspension. SWB's can best utilize front suspension (first) or full suspension.

Recumbent Performance

Though streamlined recumbents hold most of the human-powered speed records, recumbent bicycles are often a bit slower than their upright counterparts. The fastest recumbents are lowracers, highracers, faired SWB's, and LWB OSS models with front fairings (though not necessarily in this order). Which will perform best for you will depend on which type fits your body type, riding style, locale and how much bike you can handle (or adapt to).

First Ride

A recumbent may initially feel foreign to you: too sensitive, overly quick, or it may take you some time to get accustomed to the closer-to-the-ground position. These are traits of the recumbent newbie. The word to remember is RELAX! Lean back in the seat and enjoy the ride. Many problems can be traced directly to the habit of upper-body stiffness from riding your upright. Allow your body to relax and stay loose. Your next decision will be which design style to choose.

Recumbent Safety

About the safest, most user-friendly recumbent is a LWB OSS low-pedal model. Trikes can also be very safe, though the low rider position and added track width must be taken into consideration (though most riders report these are not problems).

SWB's have a higher pedals, potential heel interference with the front wheel, and a higher center of gravity. USS models can have more forward centers of gravity, which can quicken handling.

Compact (MWB) and some LWB models can have heavily loaded rear ends and lighter front ends. Correct bike sizing is crucial.

Low recumbents and those with very laidback seats are more difficult to see from and/ or be seen on. Tall SWB's can be more difficult to hold up at a stop (you should be able to plant your feet firmly on the ground at a stop). SWB's, lowracers, and highracers are more suitable to experienced recumbent cyclists.

All recumbent riders should use a rear-view mirror, as turning to look behind you is more difficult on a recumbent than on a diamond-frame bicycle. Riders should also use bicycle safety gear such as reflective clothing, a helmet, a horn, a safety flag, and lights when riding at night.

Dealers and Manufacturers

Take responsibility for your own recumbent education. Read publications, follow newsgroups, attend rides, and join a rider group. Carefully select a manufacturer and dealer. Finding a knowledgeable recumbent specialist dealer can be very helpful, although some wonderful small builders sell direct only. They are known by their reputations. Don't rely solely on dealers or manufacturers for your recumbent education. Though we recommend supporting your local dealer and RCN advertising specialists, dealers/manufacturers don't make any money unless they sell you a bike.◆

Recumbent Glossary

'Bent: Slang for recumbent.

Body stocking: A soft full fairing, usually made of Lycra or other stretchable fabric.

Bottom bracket: (BB) pedal axle & bearings.

Chain idler: A skateboard or rollerblade wheel or pulley that directs the chain through the frame.

Chain management: How the chain is managed, via idlers/tensioners though the chain path.

CLWB: (Compact LWB): See MWB.

Fairing: An aerodynamic windscreen designed specifically for recumbent bicycles.

Gear-inch range: Front chainring tooth count divided by the number of rear cog teeth multiplied by the measured drive wheel diameter. (high: large front to small rear/low: small front to large rear).

LWB: Long wheelbase 60"-70+", pedals usually low and behind front wheel, seat can be low or high. Mid-drive: A mid-ship mounted, wide-ratio, twochain drive system (usually a modified crank or cassette).

MWB: Medium wheelbase: This entry level model is similar to a LWB with a smaller wheelset and a higher seat.

OSS—Over-seat steering: Handlebars above the seat, knees or frame. A standard type of bicycle steering. Also called above-seat steering (ASS).

SWB: Short-Wheelbase 36+", pedals/pedals high and ahead of front wheel, usually higher seat. USS—Under-seat steering: Steering via handlebars beneath the seat.

X-Seam: A recumbent fit measurement that simulates the distance between the seat back/base out to the farthest reach of the pedal stroke. Sit with your back against a wall and measure from the wall to the bottom of your foot.

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The Back Page



A New Trend for Maintstream Bicycling?

by Bob Bryant

he bicycle industry has seemingly been looking for a way to tame the recumbent into something that they can market more easily and with less dealer and consumer education. They are looking for a bicycle style that is more normal and perhaps standard-offering recumbent-like benefits, but definitely not something called a recum-

Well, they're here and they're not recumbents - at least according to several manufacturers.

The European press has named this new style Easy Bikes (or EZB's). In the November issue of Bike Europe, the headline proclaimed, "Bicycle Industry Discovers New Seat Inclination." Along with photos of the new Giant, Gazelle and Sofa Bike Easy Bike models, appears a historial section lists the 1914 Peugeot, and 1921 J-Rad recumbents, and says, "The EZB seating position is not new at all. Peugeot built as early as 1914 a bicycle with a reclining seat."

Recumbent, non-recumbent, Easy Bike, EZB or whatever you want to call them what they are is half-recumbent, half-upright cruiser/city bikes. They are more upright than the historical recumbents shown in the article but widely known as "recumbents."

The new bikes have a more upright torso positioning, higher handlebars and some have a seat back brace. The lower (than an upright; higher than a recumbent) seat allows both feet to be on the ground while stopped.

Here are the models currently available in the U.S.A.:

Evox — CCM calls the Evox a "new breed of bike," and suggests that the Evox is a good way to, "discover the joy of a new position,"

on a bike that's "ergonomically styled for total comfort" is "clever," and "daring and bold." CCM's marketing manager recently told Bicycle Retailer, "It's not a recumbent, it's totally different." Hmmm.

The Evox is built in Canada by a large bicycle manufacturer, CCM (builder of Quetzal recumbents and many upright brands). The Evox is reminiscent of a heavier BikeE (BikeE style steering) with a larger wheelset (24/20) and a marginally comfortable seat.

The seat is an upright cruiser type saddle with a small back rest support. The seat itself is fairly comfy, but the riding position places much of the rider's weight on the seat and the seat was not really designed to be used in this position. The back rest itself is quite uncomfortable, though it helps to push against for power generation and especially hill climbing.

The larger wheelset, while an odd choice and size (24-inch), offers a smooth ride and good handling. One test rider told us that it was a definite improvement over the small wheeled CLWB recumbents, though also commented that the seat and backrest weren't that comfortable

Despite the seat woes, the Evox rode and performed better than expected. There are some rather cheap components that made for a noisy drivetrain. Other than this, we had no trouble with the Evox.

According to Evox, the bike is selling quite well. The high-end model was actually sold out in the fall. When questioned about the seat, a CCM rep did tell us that there would be updates to the 2003 model. The Evox sells for less than \$500 and there are lower priced models (including one for kids). I'm sure there is a market for a bike like this, but I don't really

think it will include current recumbent riders.

Giant's Revive - "It's not a recumbent! Don't call it that," Giant's Russ Okawa told Bicycle Retailer. Giant's Mark Langston told Bicycle Retailer, "So like a recumbent, the Revive's upright position eliminates stress on the back, neck and shoulders, while providing a wide range of view. The low saddle allows/ the rider's feet to easily touch the ground."

The Revive is snazzy looking - especially the artists conceptions. They have mag-like wheel covers that look like "Craeger" mag wheels on my friends Impala back in high school. The riding position is high, and the bike has a more substantial back rest, and a trick adjustable position stem/riser. The riding position is very upright.

The new Giant is offered in two models: The Revive with an 8-speed drivetrain and rear suspension; And the Nexus 7 equipped DX with its enclosed chain and full suspension.

KHS — While not in their 2003 catalog, a Revive-type semi-recumbent was spotted at the show. This bike didn't look as good as the Giant, though one of our testers (who rode both) said the KHS rode better.

Efun — While taking a pit stop at the Bacchetta booth at Interbike, I noticed the Efun folding semi-recumbent, rear suspension "cool rider." (Another name for Easy Bike?) This one folds, and won a design competition somewhere (a galaxy far, far away-ed.). Find out more on the coolrider at www.efunbikes.com.

Vision V72 - The name Vision is well known in the recumbent world, though last year they started marketing the V72 Thoroughbred. The V72 is a departure from the heavy cruiser-esque Giant, KHS and Evox bikes.

The V72 is an attractive, lightweight and high quality bike. Unlike the others, it has no back rest. This makes it different. It's more upright-like. Perhaps, in the Pedersen sense of the word. (If you don't know what I'm talking about, check out http://pedersenbicycles.com.)

The V72 is an excellent flat land and urban cruiser. Being able to come to a stop and plant your feet on the ground while remaining seated is a neat feature. Climbing requires recumbentlike technique, though there is no seat back to push against. The upright riding position places most of your weight on top of the seat, which is not ideally suited for long rides.

The V72 is an interesting and unusual bike with few peers. Lets hope Vision can find a market for it.

RANS Fusion — RANS' Randy Schlitter has been working on the laid back upright concept for years. Back in 1997 RANS' showed the dual 26 (wheels) ZeroG, a mix of MTB, comfort and recumbent technologies. The ZeroG never saw production.

For 2003, RANS is building a new version



The Giant Revive in Las Vegas (John Riley)



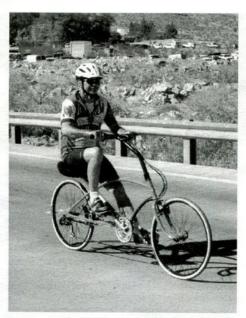
The Vision V72

of the ZeroG called the Fusion (a melding of upright and recumbent technologies). The RANS Fusion comes in two varieties, a 26/20 and a 26/26. The frame has swoopy curves like the Sun EZ Sport, but in a more compact frame. The Fusion rode very nice. The Fusion has a custom RANS seat base that is oversize, like that of a riding lawnmower. It spread the weight nicely. This model seemed to be the favorite of recumbent riders at Interbike. A trial production run is currently being done in RANS Hays, Kansas, facility.

Recumbents and the Bike Industry

The American bicycle industry is worth 4.2 billion dollars (bike dealers/IBDs and discount stores). The biggest growth segment of the industry is the "comfort bike" style. According to an article in the New York Times, "comfort bike" sales grew to 20.8% of the estimated 17 million bicycles sold in the United States last year."

The bad news - recumbents are not included in the"comfort bike" market or the above 20.8% growth. The recumbent market captures less than 1% market share-ouch! •



Dual 26" RANS Fusion (John Riley)

Bike With No Name Consensus

Here is a bit more about this new style of bikes: Performance — The erect body position seriously restricts performance. You'll be slower than on just about any upright or recumbent.

Comfort/Distance - With all of your weight on the upright bike saddle, you might be more comfy than on an MTB or road bike for the short term, but these bikes clearly aren't meant for long distance riding.

The models we tried that had back rests were not all that comfortable, though they do help somewhat in climbing.

Climbing — Riding these bikes on the flats works fairly well. We found hill climbing performance to be poor to average. You can't stand on the pedals, and many of them are either too heavy, or have too limited of gearing to climb hills efficiently. As with a recumbent, additional training and road time should improve your hill climbing.

Appearance — Beauty is in the eye of the beholder-it appears we've finally found a bike design geekier than the recumbent.

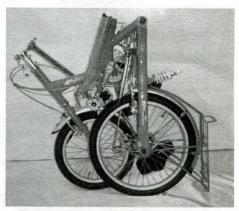
Verdict - I'm not sure what the market will be like for a bikes like these. We had a difficult time selling the two that we had here. I finally sold one for 50% of retail price. The other is still in my backyard (I'd sell it cheap).

The New York Times article called these new bikes, "a kindred spirit to the increasingly popular recumbent bicycles," which is far nicer than what has been written in the bicycle trade press or the "it's not a recumbent" comments from some of the manufacturers. Could they be trying to distance themselves from the recumbent image? It certainly appears that way.

Recumbent is not a dirty word. I'm not sure where this comes from. Perhaps our geeky pocket protector, scientific, nerdy heritage. The interesting thing is that average folks are buying recumbents these days. This makes me believe that those using the non-recumbent pitch.



The EFun (photo courtesy of EFun)



Efun folded (photo courtesy of EFun) don't really know their market.

Perhaps there is a market for these semirecumbents - occasional riders who live and ride on flat terrain, and who don't want buy a real recumbent (for whatever reason). With such excellent entry-level recumbent offerings. I can't understand who'd choose an "EZB."

Nobody in the recumbent industry we spoke with was overly optimistic about this new design (other than those selling them). So if this trend actually materializes and these bikes become popular - and I can manage to pull my foot out of my big mouth-you'll all be reading our new publication, Easy Biking News. •



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FOR SALE: 2003 ICE Trice Explorer RCN test trike, Loaded. Tel. 360-344-4079, bob@recumbent cyclistnews.com (WA/76)

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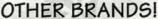


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Easy Racers: Our Customers Speak

SUBJECT: How Does That Thing Climb? April 4, 2001

Just a quick update on the Gold Rush Replica that I purchased about two months ago. Great!!! The weather in Cincinnati is just starting to break. I have over 900 miles on my trainer since February, and about 120 miles on the GRR. With the weather breaking the GRR should see about 150 miles a week.

The GRR becomes more of a blast the more I ride it. I did my first climb out of the river valley where our major bike path is located. Everyone warned me that I would be in trouble on a climb. So I was somewhat apprehensive as I started the 1.5- mile climb out of the valley.

First, I never got out of the middle chainring. I think I could have stayed in the large (53). I held between 13 and 17 mph for most of the climb. I never

dropped below 11 mph. I was very impressed. I have climbed this hill hundreds of times on my Trek OCLV and felt far worse at the top of the climb than on the GRR.

As a matter of fact, I felt great on the GRR!!! No back pain; nothing. The ride back down was a hoot. I had a friend with me (about 5 minutes behind me up the hill) as I descended down into the valley. I was hitting 40 mph without moving my legs, and using the brakes into the turns because I was not sure what to expect from the GRR at speed around the turns. My friend had to pedal like a madman and he still couldn't keep up. The GRR felt like a sports car going down the hill. What fun!!! I wish I had started



Double Century Man, Ron Bobb out training for the Terrible Two

this 30 years ago instead of my mid fif-

Best regards, Doug Pendery

SUBJECT: GRR Update April 25, 2001

This past Saturday I rode with a few friends that have conventional racing bikes (Wedgies; I think you call them). We climbed out of the valley up the Route 48 hill. This climb goes for about 1.5 miles. I pulled my friends up the hill at about 18 miles per hour and crested at over 20 mph. Needless to say they were out of their saddles trying to stay up. I must say I was winded, but so were they. Their comment was, "I guess your recum-bent doesn't have a problem going up hills."

In my younger days (about 8 years ago) I would have pushed myself to my limit to go 18 miles per hour up this hill on my Trek OCLV. My point is the GRR is a great recumbent. I enjoy going up hills on it more than my OCLV. I am more relaxed, my back doesn't hurt, and my legs aren't killing me from being out of the saddle trying to lever the OCLV up a hill.

By the way, we had a tailwind on one stretch of the ride. I managed to get up to 36 mph in the flats. Nobody passed me . . . It was a real hoot!!!

> Best regards, Doug Pendery

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