HUFF

OzHPV inc.

Sept-Oct 1999 - Volume 2 - Issue 5

Letter from the Editor

Apologies for the late distribution of the the July- August HUFF. We had some techinical difficulties and plan to bundle it with this issue so you don't miss out.

Have you got something worth printing in HUFF? We are in need to articles, pictures etc relating to HPV's and welcome your input. Maybe you've recently made a trip you could tell us about or have a building project or new machine you could tell us about. We'd love to also have info on the much less talked about side of HPV's, Aircraft, Boats etc.

We plan to set aside time at the upcoming OzHPV Challenge on the 6th & 7th November an AGM as there will be many members not normally able to attend the normal meetings there. It will include elections, some positions being vacant for some time and badly in need of input.

Would you consider helping out in this way.

Timothy Smith

Wheels for recumbent bikes.

This article discusses wheels for recumbent HPV's: cost, size, materials, and hubs/gears. You'll probably have your own opinions and I don't pretend that this is the last word on the subject!

The most commonly used materials for bike rims are steel and aluminium. If you're making a recumbent from old diamond frame bike parts, the wheels will most probably be steel.

For Steel rims: strong, inexpensive if bought as part of a second hand bike.

Against steel rims: in the wet, rim brakes on steel are almost useless, heavy, limited choice of section.

Continued Page 8...

"Treading Lightly"

by Wayne Kotzur

Oz HPV is presently engaged in preparing the script for a history and promotion of human powered vehicles. We have been fortunate to receive some matching funding From ACT Sport & Recreation, and a video presentation from the Sydney Recumbent Riders (19th June 1999). The script aims to educate the public and to raise the profile of OzHPV. It explores the developmentof the recumbent, the world wide recent blooming of manufacturers and seeks to exhibit as many types as possible. If you have any quality videomaterial of recumbents - even if promotional or experimental - we would love to here from you. The video will also expose the public to alternative cycling with small sections on practical vechiles (loadcarriers, trikes trailers etc) and the development of velocars.

Please feel free to contact Wayne with further suggestions for inclusion or the availability of useful audio-visual material. Ph/fax 02 6236 8265 C/Post Office Gundaroo, NSW, 2620 (wkotzur@dynamite.com.au)

Tentative schedule

INTRODUCTION

Historic development of cycles explaining the great diversity.

The weeding out of inferior designs.

The sheer practical acceptance of the bike.

The rise of the car.

The rise of the urban city- interview Peter Newman concept of car dominated cities.

The thirty year decline in practical bike use/restricted access/reduction in types of cycle available in bikeshops.

Continued Page 5...

In this issue

Skycycle

For most of us HPV's consist of road cycles of some sort but there are many other pedal powered machines including boats, submarine's and aircraft. I am particularly interested in HPA's and an overjoyed to be in contact with the Skycycle project from the Burnie TAFE College in north Western Tasmania. For the last few years I've been collating information on the history of HPA's in Australia (if you can help in any please please get in contact) and have been surprised how far back this history goes.

In 1900 G.S Richardson designed and built a 9.14 m wingspan pedal-operated glider during 1908 in Penguin, Tasmania. Flight was attempted during 1908, from a hill at the eastern end of Penguin, but finished with a crash onto Watcombe Beach. The pilot sat on a bicycle, which was suspended beneath the wings by several struts. The main struts were connected to the centreline of the wing structure, while other struts were attached to both leading and trailing edges. Flying wires were also attached to each wing tip. Presumably the pilot was to provide the energy to turn the propellers as well as steer and ride the bicycle during the ground run.

There have been quite a few others that appear to have been made in an attempt at the Henry Kremer prize/s including a twin exhaust turbine delta wing aircraft in 1963 by a guy only known as Knipe. Also in 1979 students at RMIT made a copy of Paul McCready's Gossomer Dragonfly and achieved some flights, but to my knowledge no official record attempt was made. I have sketchy reports of a few other attempts but most seem to end with little success. Successful HPA's are tricky to get right.

This brings us on to 1990 when the first prototype Skycycle was completed.

This craft, described as a 'push bike' on wings is a low cost ultra-light flying machine which is powered by pedalling.

The main aim of the project is to improve the learning process for engineering students which is a demanding and relatively rigid course of study and the sky-cycle project introduces and element of challenge, camaraderie and fun into learning. When the aircraft has finally 'had it's days' it will be passed on to the Queen Victoria Museum in Launceston for display fully assembled.

The first prototype had detached ailerons and internal cable controls for the pilot. Cautious towing trials began but it crashed whilst being towed from about 4 metres altitude in October due to aileron flutter and the right wing tip tucking under.

In 1992 design changes continued with the Skycycle , allowing only one test outing, in early June. A best flight of about 300 metres was achieved but sustained flight was still not really possible.

1993 saw the Skycycle with a new fuselage boom and cockpit were made to save weight and to improve pilot comfort. The wingspan was increased to 28 metres with the addition of wingtip extensions and drive changed from direct gear drive to a chain drive system. All these changes resulted in a most successful test outing on lst June, 1993, when two flights of 800 metres each were made straight after each other. The flights could have been longer except that we ran out of runway!. This was the first evidence of sustainable flight.

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Results were so encouraging that the steps required for making an official attempt have been put into action and, depending on suitable conditions, the plan from then on was to go for an Australian record.

A lot ask why did you choose females to pilot the aircraft? The reason being that the various existing records for Human Powered Flight set by male pilots are considered to be beyond the scope of the project at this stage. (The Male world record for a man-powered aircraft is the Daedalus at 117 km flying from Crete to the island of Santorini across the Aegean in 1988)

The present female world record distance is 6.83 km set by Lois McCallin of the early Daedalus team in Jan 97, using the Michelob Light Eagle, a fore-runner of the Daedalus design. At present there is no official Australian record for any distance for either male or female.

Design

The aircraft is controlled by a conventional model radio control set with the addition of an extra battery because of voltage loss with the wires travelling such long distances, driving 1/4 scale sized servos at the control surfaces. The calculations claim an 89% efficiency for the propeller design, and it must be working at near this value to be getting our present results. The variable pitch propeller is designed to turn at 120 rpm, whilst the pilots generally work at a cadence of about 80 rpm, necessitating a 1.5 to 1 speed increase in the gearing ratio. I was amazed to hear it took 2 people a whole year to make just 2 blades of the propeller (hollow; balsa ribbed and balsa skinned, covered in 3/4 oz glass cloth) which shows just how much effort is needed to get a machine right.

All major stress bearing structures are formed from carbon fibre. Fibreglass (2 layers of 4 oz) was used for the cockpit tub shell and kevlar thread was used as internal diagonal bracing ties in the wings. Covering material was 3 mm foam sheet for the leading edge surfaces of the flying surfaces, with the rear upper wing surface covered in 1.6 mm foam, and the lower rear 60% wing covered in clear mylar. Profilm was used to cover the rear open surfaces of the cockpit, and the windscreen was clear mylar. Epoxy glues were used in all spar constructions, and PVA was used for wood and foam contacts. The foam sheeting used for the wing coverings was attached using doubled-sided tape; it provided an excellent, quick and light bond!

So how does it fly?

I have yet to see it in action but looking at the video of many of it's flights at Wynyard airport, it certainly does fly well. I know of at least 2 complete 'write-offs' so is a credit to the persistence of the team in keeping the project alive. As it usually fly's quite slowly crashes are less serious for the pilot than with many other aircraft but one looked particularly disturbing in it's early car tow trials because of the initial small wing span and therefore high speed. Being radio controlled it's possible for the aircraft to be piloted by a chase

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vehicle (and often was from the back of a ute) to let the on board person get the feel of the machine. Communication is possible with the pilot through voice activated headsets. Due to its light structure, the plane is rather flexible in flight and has to be flown in very light to zero winds, usually very early morning when the air is dense as well. Due to the flexible nature of the very light structure it takes quite a time to counter it going off course.

You can read more, see pics and small video clips on the internet web site at http://sunsite.anu.edu.au/community/ozhpv/skycycle/skycycle.htm

Ouch!

Dimensions

* Aircraft weight and wing span: initially 39 kg at 23 metres span; now 37 kg at 28 metres span.
* Wing area: initially 17.5 sq metres; now 22 sq metres
* Fuselage boom length: 7.85 metres
* Tailplane span: 3.6 metres
* Rudder height: 2.7 metres
* Propeller diameter: 3.0 metres
* Flying speed - Approx. 25km/hr

Timothy Smith

Trike front wheel alignment

..... The only time I have experienced any shimmy was when I'd forgotten to tighten a steering rod end, after the hasty replacement of a damaged rod, and the bolt fell out on a down hill run! Now we use self locking nuts.

I've had trikes with both toe in and toe out, and the only real indication of misalignment has been more tyre noise on cornering. The recommended amount of toe in for GREENSPEED trikes is 0 to 2mm. However this should be measured WITH THE RIDER ON THE TRIKE!

The best way of measuring it is to use a TRAMMEL. This has two pointers on a bar which sit against the back of the tyres at axle height. A mark is made on each tyre with a pen, the trike rolled forward 1/2 a wheel revolution, and the marks compared against the trammel pointers. This method eliminates any inaccuracies due to wheel run out etc..

If the adjustment will not hold firm over at least a few months of normal riding, without hitting anything, then I would be looking for the cause. However I do not have much experience with trikes other than our own, and I guess all makes are different in the way they behave, despite having similar appearances.

Fortunately my employees LOVE road testing each trike to the max, before it's packed and shipped :-)

Ian Sims, Greenspeed.

Darryl Shelswell from Queensland has been toying with a few "Tour easy' look-alikes, the latest being a tandem.

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This bike was sited in Qld at a recent ride.

... "Treading Lightly"

RENAISSANCE

Intellectual questioning of car use - quotes from Ivan Illich.

International HPVA promotion of speed and human power records.

The dupont prize for aircraft some work on watercraft.

Activism growth to access freeways/ public transport/ Bugs/ reclaim the road & critical rides.

Health aspects recognised - interview head of BFA Dr Harry Owen.

RACING

Racing pedigree.

Restrictions in design ignored - low racers and trikes evolve advantages including disabled use. (racing chairs and handcrankers)

Lots of shots.

COMMUTING

Flat cities/open roadnetworks - classic bikes like netherlands.

Mixed mode - station parking - folders.

Trikes come back.

Velocars and fairings weather and traffic protection needs to be videoed.

TOURING

Classic touring bike and mountain bikes.

The open position recumbent bike and low geared trike.

Advantages of recumbents for touring needs some shots to be set up.

PRACTICAL ALTERNATIVE TO THE CAR

Classic trademen trike and its decline.

Continued use in third world transport & load carying.

Asian & European pedicabs long john.

Modern version of pedicabs.

Recumbents, tandems & trailers.

Family use.

Latest Internet information

* Ian Sims has recently updated the Greenspeed web site with an enormous amount of information. Check it out at http://www.greenspeed.com.au/

* The Trisled web site is now up and running. http://www.trisled.com.au/

* ED. I've been getting together a web site for those building recumbent cycles and looking for information on how to build specific components. The site contains mostly links to other web sites and is updated very regularly so why not check out http://www.geocities.com/Yosemite/Falls/1738/index.htm

* Ian Humphries has been over to Interlaken, Switzerland for the WHPVC on his Greenspeed Race trike (hope we hear a report from him sometime) but there's a collection of Interlaken99 photos well worth a look at http://mitglied.tripod.de/pa_eng/wm99.htm
(Ed I'm sure I saw a pic of his trike there)

* Wonthaggi HPV Grand Prix now has a new web address http://www.wonthaggisc.vic.edu.au/

* HPV Canterbury - based in Christchurch, New Zealand mentioned in an earlier HUFF now has a new web site. http://www.converge.org.nz/hpvcanterbury/

* Kingswood College has an excellent web site featuring their Trike for entry in the RACV Energy breakthrough 24-hour endurance race.
http://hpv.alphalink.com.au/

* HPV bulletin Board
http://pluto.beseen.com/boardroom/m/19718

For Sale

Mild Steel Weld-on brackets to attach 40 O.D. Bottom bracket shell to 35mm square tube. These brackets are made in 2.5MM mild steel and are available for $12.00 Aus per pair plus p & h from Steve Nurse, phone (03) 94818290 or see website http://www.eisa.net.au/~cesnur/page2.html

Windsocks 10 cm dia by 50 cm long, two available @ $20 each one darkish but should do well with reflective tape etc, the other is bright colours great as a "'hey I'm here!!" much like a flag.

Contact Ray Hembrow 20 Murchison St Carina 4152, Brisbane 07 3843 2729 after 6.00 pm

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Sited at the last Qld meet an electric powered 1 wheel drive sociable tandem designed by Dr Pat Howden.

Racing Scene

Lars Teutenberg sets new HPV world record

August 11, 1999-

With 81,158km (50.42 miles) in one hour Lars Teutenberg set a new hour world record for HPVs. The Cologner overtook the performance of the Canadian Sam Wittingham (set in 1998) by around 2,022 km and laid claim to being the first human to travel over 80 km in one hour from his own muscle power.

On the Adam Opel Test Center in Dudenhofen the 29-year-old EC/Bayer rider started around 8 o'clock. With ideal conditions of 68ºF and zero wind Teutenberg traveled over 17 laps on the 4778 meter-long circular test track. While riding Teutenberg achieved a top speed of almost 90km/h. This heated the interior of his record ride to tropical temperatures of 95-104ºF and almost 100% humidity.

The basis for this "milestone of cycle racing history", as described by Andre Gronen, is the full-faired recumbent bicycle "White Hawk": an aerodynamically optimized recumbent bicycle with carbon fiber fairing and frame. A joint development of the IKV (Institute for plastics processing in Aachen) and the Vector Racing Teams/RC Speedbike, the bicycle is barely 41 pounds, 35 inches high and only 18 inches wide.

The white cigar presents a tiny front surface and optimal aerodynamics. Rider Teutenberg has only few centimeters of freedom of movement in the head, shoulder and bottom area. Also the handlebars rest close to the fairing.

Inspired also was the press director of Opel, Karl Wall. "OPEL has always had a special connection to the bicycle, and has finally proved it after 100 years", explains Wall, himself a passionate racing rider.

Three years after his first hour world record (78,037 km) Teutenberg, proud father of a five-week-old daughter, Lin, is again a world record holder under the organization of the RSC Speedbike. The rider already holds three world records (1000km, 12 and 24 hours), and is consideredas the "Formula-1 of muscle power", as graphically described by team leader Guido Mertens.

On the same day a record attempt over 100km had to be aborted due to rain. But this is not a reason to complain about misfortune for the crew around Teutenberg and Mertens. They will soon continue on the record hunt. Speed is addictive...

Shoalhaven Recumbent Riders

After moving from WA to Jervis Bay, NSW
I am looking for any recumbent riders in my area with a view to getting something going as far as a club, rides, mutual help etc is concerned. If you are in this area please contact me. The Jervis Bay/Shoalhaven area is around Nowra NSW 2 1/2 hours south of Sydney and about the same east of Canberra.

I'd also like to get something going in the Audax area as well.

Andrew hooker

andrewhooker@geocities.com

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Coming Events

WA HPV Riders: (formely WA Recumbent Riders) Meeting every second Sunday 9:00 AM at Gino's Cafe, (or across the street from it) on South Terrace, Fremantle (it's on the cafe strip). If you are in the Perth area and have a recumbent or are interested in recumbents, be there! We're there a couple of hours eating breakfast, drinking cuppacino and talkin' 'bents. E-mail Geoff Law geofflaw@bigpond.com or Gary King gary@oceandigital.com.au Ph (08) 93411381 if you have queries.

Sat 25th to Mon 27th September: We'll be doing a ride on the long weekend from Perth to Toodyay and nearby towns. That'll be 200-300km of scenery, rolling hills, archery and fruitcake shops. Contact David Doust for more info. David.DA.DOUST@centrelink.gov.au

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Sydney Recumbent Riders: Social gatherings, rides and demo days are usually held on the 3rd Saturday or Sunday of every EVEN month. Contact Ian Humphries. (02) 9550 2805 (home) (02) 9845 3988 (w)

Sunday 26th September. PARRAMATTA PARK meeting at 9am, chatting until 11am, then riding to Homebush for a FUN spin around the OLYMPIC site. The car park spiral ramps will be especially fun on a trike ;-) Return to Parramatta via same route or by Train. Easy social pace. Optional early start - ride with me from Newtown to Parramatta, leaving Newtown approx 7:30am. There will be news and photos of the World HPV Championships. Contact Ian Humphries. (02) 9550 2805 (home) (02) 9845 3988 (w)

Queensland Recumbent Enthuasist Group:

Ist week in October, Bike Week, starting the week with The Great Brisbane River Bike Ride. Ride starts and finishes at the Botanical Gardens. Entry fee applies, hopeing for a TEAM entry. The Bicycle Queensland will be hosting this event. Contact Darryl Shelswell Ph 0732033025, Ray Hembrow 20 Murchison St Carina 4152, Brisbane 07 3843 2729 after 6.00 pm or email David Johnston davej@ecn.net.au

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Melbourne Recumbent Riders: Contact Stephen Nurse cesnur@eisa.net.au or Phone 039481 8290 ah

Sunday 12th September: 10am. Meet Opposite the Botanical Hotel (Melway Map 2L Ref C2) for a ride to Williamstown via Southbank and the Yarra bike punt (melway 56, c1). Return via Sth Melbourne to start point.

Sunday 17 th October: Vic Health Herald Sun People's challenge, 140kM round trip from Ballarat: entry forms in the Herald Sun.

October Sunday 24th : Meet at meet at Hawthorn Bike Track, Melway 59 E3, (Carpark at end of Robinson Rd.) from 12:30 for a barbecue lunch, ride to Sth Yarra along bike paths at 1:45 to watch the the Grand Final Criterium of the Sun Tour Proffessional Bike Race (50 laps of King's Domain starting from 2:30 pm to 3:45 pm.) No fixed arrangements for returning to the start point, Steve will probably ride to the start point and go straight home after the criterium. Also on the same date the Round the bay in a day, 210km, enter through Bike Vic. http://www.bv.com.au/

Industrial Design & Technology Teachers Assn. (INTAD) Pedal Prix in Queensland

Friday 3rd, Sat 4th September: Mecedes Benz Driver Training Centre, Norwell Rd Norwell. Friday is set aside for vehicle scrutineering and testing. Sat is the 6 hr endurance race starting at 9am. Contact Darryl Shelswell Ph 0732033025, Ray Hembrow 20 Murchison St Carina 4152, Brisbane 07 3843 2729 after 6.00 pm or email David Johnston davej@ecn.net.au

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The Australian International Pedal Prix

Scrutineering: Friday 17th September, 24 hour Endurance race: Saturday 18th, Sunday 19th September Held at Sturt Reserve, Murray Bridge, South Australia. More info at http://www.nexus.edu.au/TeachStud/aipp/

Solar Bike Challenge

Event starts in Alice Springs 18th Oct Finish Adelaide 23rd Oct (Must be downhill). An event held every 2 years in Australia. Clearly one of the most accessible forms of solar racing, attracts a diverse range of entries - from standard bicycles with a solar engine attached to the latest in streamlined energy-efficient designs. The event, which runs in conjunction with the World Solar Car Challenge and World Solar Gliding Challenge pushes competitors to the limit as they tackle the 1526km from Alice Springs to Adelaide. More details http://www.wsc.org.au/

The Biggie!! OzHPV Canberra Challenge 6th & 7th November. Venue Sutton Rd Driver Training Centre.

RACV Energy Breakthrough

Friday 19th - Sunday 21st November: This is designed to provide opportunities for students, teachers, parents and local industry to work together to design and construct a vehicle, a machine or an innovation in technology which demonstrates an energy breakthrough. The program is jointly managed by the Department of Education, the RACV, Central Goldfield Shire and the Country Education Project (Inc). The weekend of extra activities start with a Mardi Gras on the friday night and rolls into a full festival including the *EnergyExpo* with the Energy Breakthru the central focus. More info at http://avoca.vicnet.net.au/~energybr/#anchor37683

Tasmania Recumbent Enthuasist Group: Not a lot has been happening as a group but there are quite a few individuals progressing on their home-builts and more new contacts made. Contact Timothy Smith Devonport Ph 0364234559 or Richard Hoad Ph 0362787247 in Hobart.

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Wheels for recumbent bikes...

If you're buying a new recumbent or want to make a good job of the one you're making, aluminium rims are the go.

For Aluminium rims: Light, rim brakes on aluminium grip well even in the wet, a wide range of sections are available including deep, aerodynamic / strong sections.

Against aluminium rims: Cost. Aluminum rims cost from about $25.00 to $78 Aus each, with the deeper, more aerodynamic sections costing the most.

Size: recumbent bikes and trikes normally use smaller wheels than equivalent-use diamond frames. Why?

On bikes, at least part of the steering mechanism is above the front wheel. Large front wheels on recumbent bikes force the sitting position to be too high for starting off or easy balancing.

Small back wheels on recumbent bikes allow the installation of a simple spoiler / holdall behind the seat.

Small front wheels on delta trikes improve braking and allow the rider to sit closer to the ground, improving the handling and stability. (In all cases, same wheel size back and front on HPV's means you have to carry fewer spares)

Disadvantages of small wheels :

Cost. Small wheels have a small circumference and must be driven at a high rpm to get the bike to the high speeds recumbents can achieve. The hubs necessary to achieve this rpm on a 20" bike have a minimum of 11 of teeth on their smallest gear and are expensive. (Large, 26" & 27" wheels need 14 teeth on their smallest gear to get the same result and wheels of this type can be found at council clean-ups and on inexpensive second-hand bikes). There are homebuilder's (ie inexpensive) ways around using a costly hub to drive a small wheel fast and these include: making a large front chainring, (80 teeth), this size complements a rear wheel with inexpensive gearing, building a gearbox out of an old 3 speed hub gear and using an intermediate gear to step up the ratio.

Suspension: "The Bicycle and the Bush" states that "in riding over stones, gravel or other rises, a large wheel passes over the obstacle more smoothly", ie small wheel bikes have less of a suspension effect than large wheels. By adding on-frame suspension to the bike this disadvantage can be minimised. Moulton bikes were the first to feature small wheels and on-frame suspension and it's claimed that these bikes go faster because less of the rider's energy is wasted by accomodating bumps. The rise in popularity of fully suspended mountain bikes means its now possible to build bikes with suspension at reasonable cost. Of coarse the more you are riding on smooth baved roads, the less suspension becomes an issue.

Wheelbase also has an effect on suspension: the closer the wheels to the rider, the more bumps will be felt. (Bikes such as the Bike E compensate for small tyre size by having the wheel a long way from the rider where movement of the wheel twists the rider through a small angle)

Standard Sizes:

Standard sizes for bike wheels include 16, 17, 18, 20, 22, 24, 26, 27, 28", (some have metric equivalents) and of these, 20" (bmx), 26" (mountain bike) and 27" (racer) are the most common. If you're making a bike, you should consider using one of these three sizes wheels first:

It's possible to buy spare parts almost any where and, Specialist suppliers such as Greenspeed stock a large range of high quality, low rolling resistance tyres in these sizes at reasonable cost. Steve Nurse

Reference: The Bicycle and theBush, by Jim Fitzpatrick, ISBN 0 19 554231 2,

The new T-shirt logo for the Qld HPV Enthusiasts Group.

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