

## Race Sulkies - present and future

At the time of writing, Monkey King's American-made Harmer sulky is once again concentrating participant's minds on the potential of different sulky types and styles to enhance the performance of the harness horse.

As with improved race track design, improved sulky design ALLOWS horses to go faster with the same effort and with reduced risk of injury. They in no way force the horse to higher speeds - that's the driver's job!

Poor sulky design, as with poor track design, *does* force the horse to travel slower. Poor track design does it with increased pain and injury, poor sulky design does it with increased effective load.

Historically, small tracks and sub-optimal sulky designs have ensured that the performance and quality of our horses has seldom challenged those in North America.

But things are changing! Now we have Tabcorp Menangle Park, a 1400 meter track of comparable performance to the best 1400 - 1609 meter tracks in the world. And ever so slowly, we are inching our way toward more efficient race sulkies.

Outside of harness racing, sulky design over the last decade has advanced by leaps and bounds - to the extraordinary stage where a single 42 kg dog (not a racing breed such as a greyhound) pulling a 97 kg driver on a paved public road, has reached 64.8 kilometers per hour (1:29 mile rate)! Now the dog was galloping, while harness horses must use a slower and less efficient gait, but all the same, the Standardbred is about ten times the size and power of the dog, and is usually pulling a lesser load than the 115 kg (driver and sulky) that the dog was pulling.

Furthermore, the dog sulky in this case was using jog cart wheels because it was designed as the cart equivalent of an SUV - able to travel fast and comfortably *off-road*. What could it do if it were equipped with race wheels, pulled by a racing breed of dog, and the driver actually encouraged the dog to go fast, as harness horse drivers are won't to do on the race track? About 70 kilometers per hour, would be my guess.

But it will be several generations, if ever, before such advanced sulkies - let alone their successors - are allowed in harness racing, so we will look at what may be possible, given the entrenched conservatism which has been characteristic of harness racing, world-wide, since WWII.

For the foreseeable future it looks as if we will be stuck with the 2-shaft rule, which ensures that race sulkies will be less animal-friendly, heavier and slower than the alternative, which is the dorsal hitch.

It is worth noting that other equine organisations, such as the Australian Carriage Driving Society, started off with even more vehement opposition to the use of single shaft dorsal hitch vehicles than the harness racing world. They believed that the type was dangerous, prone to injure the horse, etc, etc. However, when presented with strong evidence that their fears were groundless, they had the good grace and good sense to not only withdraw their opposition, but to actively encourage the participation of the dorsal hitch sulkies in competition, as these words of a competitor attest:

[I've just come back from competing in the NSW Show Driving Championships. Thought you'd be interested in the type of reception I got at this show, as it quite surprised me. I drove Rose and Chelsea in pairs in 3 events. After competing in the first event, I was introduced to the state President, Tony James, who wanted to have a close look at my vehicle. He said he was amazed by how innovative it was and said there should be an article on the design in the ACDS](#)

## Race Sulkies - present and future

journal. He lifted it, and was amazed to see how light it was. He then commented how ingenious the swingle bar on the shoulders was, 'obviously designed for animals of different heights' ! He then read your name plate and asked what types of dogs could pull it. The attitude shift sure was a surprise! Lots of people wanted a photo of the 2 animals hitched together, saying things like... "You could travel all over Australia and never see a sight like this." People commented on how well behaved Rose and Chelsea were, and that it looked like they really enjoyed themselves. I was the only competitor in the multiples class. Which suggests to me not many other people are finding a cart that makes driving in multiples easy!! Where as mine arrives with 2 animals in a 1.6 litre 2 door car. That has to be impressive.

But we have a chance to compare like with like. In 1989 harness racing legend, Stanley Dancer, set a whole bunch of world mile records in a pairs sulky in the USA. The pairs bike that Dancer used was traditional design with a pole, such as those used on street carts for more than a century before. Dancer was a driver of outstanding ability and he had top quality horses to time trial on what were then the world's best tracks.

In 1992 Queensland interests commissioned the design and construction of a pairs sulky with which to attack the world records set by Dancer. The Australian pairs sulky utilised the dorsal hitch (attached to the horse just behind the withers). It was this country's first attempt at Pairs sulky design since an ignominious effort in 1918. It broke ALL of Dancers records, all world pairs records, and five times posted a faster time than the previous fastest time of the faster of the two horses hitched to it. No previous pairs sulky had done that even once!. Furthermore, it set two outright track records - again a feat unprecedented by any pairs sulky - and broke at least one if its world mile records with a pair of un-raced horses!



### < Vic Rassmussen in the Hittite Special in which he set a world record at its first start.

It was by far the most successful new sulky design since NASA Project Engineer, Joe King, introduced the dorsal hitch race sulky in the USA circa 1967. Prior to that, the dorsal hitch sulky had mainly been seen in European circuses, where its unmatched maneuverability made it invaluable within the confines of a circus tent:

## Race Sulkies - present and future



**Dorsal hitch German circus sulky**

Strange to say, that very maneuverability was used as an excuse to ban the dorsal hitch race sulky in 1974. It was held - quite erroneously, in my view - that the horse could turn around under the shaft and look the driver in the eye, and this was deemed to be a danger in standing start races. Now not only did the King sulkies compete in standing start races without even one horse turning under the shaft, but - had it been a legitimate concern - there is an obvious, simple and cheap fix: a "Keep Straight" strap running from the shaft to a belly band like this one:



**Dog driver, Caren Landis, New York, USA, with an Australian-made Regal Springtail MkII sulky fitted with the "Keep Straight" strap.**

## Race Sulkies - present and future

But be that as it may, experience suggests it will be monstrously difficult to change this industry once it's made up its mind on such "radical" approaches as the 2,700 year-old dorsal hitch. I believe the present generation will have to die, and a new generation grow up familiar with the dorsal hitch in other applications, before significant progress on that front will be made.

So then, what options are left to us in the area of sulky design?

- a) Suspension.
- b) layout - the offset principle
- c) materials
- d) long-narrow-versus short-wide sulky design
- e) peripheral features such as wheels, the hitch etc.

**Suspension:** In the 4th century AD, the British were using the first chariots in the world with a suspension, which allowed the driver to sit down in comfort while traveling at speed off-road. That chariot weighed around 200 kg and looked like this



In 1997 the world's first commercially successful light (33 kg) work sulky with independent suspension was introduced in Australia. It won its inventor membership of the prestigious Australian Technology Showcase - the only horse-drawn vehicle of any description to be so honoured. It dramatically reduced the discomfort caused by working horses at speed on poor track surfaces.

In 1998 application was made in Australia for the approval in racing of a race sulky fitted with a similar suspension. Twelve years later, the sulky (pictured below) has neither been approved nor banned. In the meantime, the manufacturer has scrapped the tooling and moved on into less difficult areas.

## Race Sulkies - present and future



**The sulky in the center of this photo has the independent suspension, the others do not.**

Meanwhile, the benefits of independent suspension in light harness vehicles continues to impress:

“Like riding on air!” John Tapp

‘My friends are looking for ways to get shocks on their easy entry carts. They are jealous of my air ride. We amaze people when we go flying by.’ B. Farley, Michigan, U.S.A.

‘These carts are just so exceptionally different and so much of an improvement over traditional sulkies’ D. Ratschan, LA, California. Nov. 10, 2002.

‘We went on this dirt road through the bush on the way back that was all boulders, tree roots and potholes. She went for a gallop and it was such fun! She steers beautifully and I felt in control. That cart you designed is so perfect though. It takes the bumps so well. It was amazing.’ N. Cassettari, Frenchs Forest, Sydney, May 3, 2004.

“I bought a Brumby last week, it arrived on Wed, and I can’t understand why my horse is getting thin, I have been stopping for a half hour break every three hours and giving him a 9 hour break overnight :-)

“**Truly an amazing ride for the driver**, I am hoping it is eases the workload on the horse as much. If it does, it will pay for itself in no time through fewer visits to the chiropractor and less down time recovering from back problems. This probably applies for me as the driver as well :-)

Many thanks, Phil”

## Race Sulkies - present and future

- and so on.

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**Layout:** Up to 1989, Australian horses had set but two world records over the mile. In both cases they had broken the previous world record by a margin of 0.2 seconds. In 1989, and using the Australian designed (and patented) offset design, a horse broke all world mile records in his category, on all track sizes, did it on the smallest and therefore slowest of standard track sizes, and broke the half mile track record by 3.4 seconds, a little matter of **seventeen times** better than the margin by which any previous Australian horse (and we include here Popular Alm and Scotch Notch) broke a world mile record.

Naturally, this being the “clever” country, such astounding performance improvements earned the full wrath of the harness racing establishment, and the offset carts were banned the very next year - just after they were approved for ordinary racing. And it wasn't only administrators who were vehemently opposed to the new types. Large numbers of participants lobbied administrators to ban the new bikes on the basis that they couldn't afford to buy new sulkies.

Compare that experience with the new American-made Harmer bike. Approved in weeks not years, selling for about twice the price of the most expensive local sulkies (i.e. \$7,000 to \$10,000 a piece), and - according to Brett Pelling (via Adam Hamilton on “In the Gig” on 21/2/10) so superior in performance that trainers are simply wasting their time showing up with anything else. No talk of the expense of replacing old sulkies with the new. No talk of “unfairness”. No mention of the manufacturer's appalling record of catastrophic sulky failures (a recall notice of all three hundred and sixty eight Harmer Evolution Model 6.8 offset sulkies was issued by the USTA on June 14, 2005) and wheel failures (HRNZ withdrew approval of the Harmer so-called “carbon fibre” wheels due collapses on 28 August 2008):

- and so on. Does this mean that Australian harness racing has turned over a new leaf? That new sulky technologies - even from such a manufacturer - will be welcomed instead of fought? A cynic might say, “Only if the new technology comes from overseas!” We shall soon see, because - as I write - a new Australian cart that has been in development and testing for about 12 months awaits final approval.

But back in 1990, the new Aussie carts were taken to America, winning seven of their first nine starts in December 1990 - two of the starters running new lifetime best records and one the fastest mile of the day. America, naturally enough, couldn't get its hands on the new technology fast enough, and today all North American manufactures offer an offset sulky, and argue in the media which among THEM invented the concept!

Every track in Australia, including Tabcorp Menangle Park, is underbanked for 1:50 mile rates, and thus, for any two-shafted sulky, the offset concept offers greater performance advantage than any other layout.

**Materials:** Prior to 1979, every race sulky in Australia was fitted with wooden shafts, today none of them are. There are basically two approved shaft materials being used on race sulkies now:

- i) Stainless steel tube. First approved in 1979, now ubiquitous in Australia, and unknown in North America and Europe.
- ii) Chrome- molybdenum tube. Used in the Harmer sulky.

## Race Sulkies - present and future

Chrome molybdenum tube is not as tough as the grade of stainless used in the first approved Australian carts and in the Australian-technology sulkies made in the USA, but it is tougher than the cheaper and weaker grades of stainless tube subsequently approved by the Australian Harness Racing Council.

The Harmer sulky is variously reported to be 8 to 12 kg heavier than leading Australian sulkies, which are about 22 kg. In this it is closer to a typical North American race sulky, which weighs about 36 kg, and employs generally similar construction and design.

Materials science is improving rapidly, and the writer has fabricated new nanotechnology-based steels of enormous strength-to-weight ratio. Such materials presently suffer from complex and difficult manufacturing and fabrication difficulties, but these will undoubtedly be overcome in time, with the result that race sulkies will become both stronger and lighter than the best of current products.

***Long-narrow versus short-wide sulky design.*** This is a key technology. Except for Australia and New Zealand, all other significant harness racing countries use the short-wide cart, as did Australia and New Zealand prior to 1910. Short and narrow showground tracks, and a preponderance of half mile tracks, favored the long-narrow carts which eventually became compulsory. They were then, and they are now, slower and less efficient than the short-wide carts. Today we have the tracks to accommodate the short/wide carts and we could even accommodate them on our half-milers by universally adopting the offset principle to make a cart just as short, but somewhat less wide, than northern hemisphere sulkies. Such a sulky might look like this:



**Prototype next generation Australian Race Sulky**

## Race Sulkies - present and future

If Australia were to adopt such a vehicle, we presently enjoy a considerable advantage over American carts in particular - lightness! Ever since we took the first offset Australian-made race sulkies to America in 1990, we have demonstrated that we can build lighter AND stronger sulkies than any but the very expensive carbon-fiber types made in Europe. The US-designed sulky on Monkey King, for example, is reported to be 36 to 55 per cent heavier than top-line Australian-made sulkies.

So then, we could move to sulkies which could be lighter, faster and far cheaper than north American brands, and which are made of long-lasting stainless steel, instead of powder-coated steels which corrode on exposure to the atmosphere.

Or we can wait until the next generation takes over - assuming there's a harness racing industry left for them to take over.

J.S. Walsh