

Sidecar Obsession

Forum member Chris Canning suggested I write some of my sidecar's build story, which he thought might be interesting for the mechanically minded. So I've done what follows.

There are two possible stories. One about the technical challenges experienced and another about what I'm calling 'The Agony and the Ecstasy' of the 5 year journey from idea to on-the-road. This latter story has been published in my club's newsletter over the years since 2015 and comprises 9, yes 9, articles. Now my club know me, but this worldwide forum doesn't, so the 'Agony' article would not be as meaningful. Thus, here is the first part of a story for those who are, as Chris says, 'mechanically minded', along with some touches of 'agony'.. maybe,....we'll see.

In 2016/17 my son Pete provided sketches for a sidecar following my brief for a space frame body with nose cone along the lines of the Ariel Atom (Pete's a Senior Designer at Tesla). The first engineer did a brilliant job in scaling up from the drawings and his aluminium work and welding is beyond reproach. Where things came unstuck was his insistence on cable actuation for the hub-centric steering, which (predictably) failed to work on road tests. By the time he very reluctantly agreed to change to rigid linkage (as I'd said was necessary) the working relationship was shot to bits.

So I pulled the plug, researched alternative builders and eventually commissioned Paul Lumley to sort it out. www.lumleyengineering.co.uk

There are a number of challenges to building the kind of sidecar outfit I wanted. So let's start with:

STEERING and SUSPENSION.

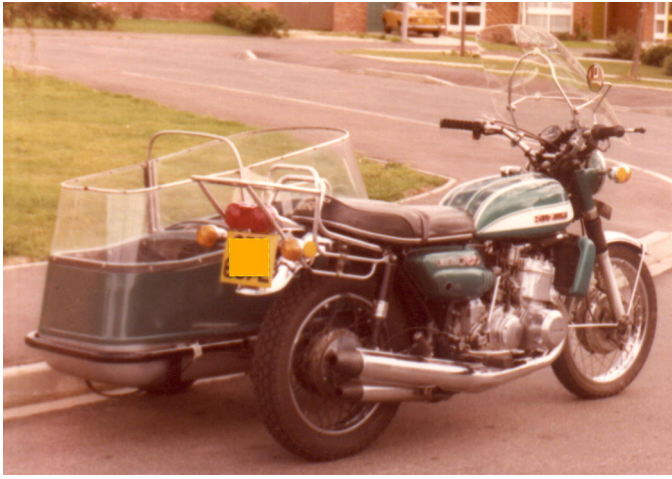
Setting the scene

Traditionally outfits (aka rigs) use either existing telescopic forks or leading link forks.

Telescopic forks as standard have too much trail for sidecar use so can be limb dislocating heavy to steer and they flex too. Think of someone pressing very, very hard on the **side** of your knee. Even your leg won't bend that way! So teles are very prone to steering wobble, which is not only on the disturbing end of annoying but can be downright dangerous.

Leading links are the norm. They steer so much better but generally need strong damping to damp out wobbles, sometimes speed related, sometimes bump induced.

I rode my first outfit in 1968 being an Ariel Red Hunter 500cc single with a platform sidecar so that I could transport my KTS Special sand racer to the beach at Wallasey, Liverpool. Sand racing was so much more fun than studying. Then I built my second outfit in 1975 to accommodate our first Baby Sue. I knew little about set-up and just left suspension and steering as bog standard i.e. on telescopic forks. It was hugely entertaining, wobbles 'n all. I was young, rash and carefree then!



My 1972 Suzuki GT 750 Mk1/Watsonian Child/Adult

Leap forward 28 years to 2000 and my third outfit. This had leading links. Professionally built by Jim d'Arcy of Charnwood (no longer in business). It was an awesome outfit, yet could, on occasion, suffer from fearsome wobbles and very noticeable tracking on road imperfections like banding, despite two steering dampers. It could change lanes on its own!! Looked the jobby tho' and was very fast.



My Suzuki Hayabusa with Charnwood Super Sport Sidecar

And now I'm on my fourth. A custom build to my specification.



The K1200R with Blade Sport (named after my son Peter Blades-Nixon)

John Blades Nixon © 2021

Sidecars are highly addictive once you're past the 'Oh god, it doesn't steer!' moment. The bug got me again in late 2014. Internet research into modern outfits unearthed a buzzing sidecar scene in Europe with many exciting, modern rigs, quite unlike the UK, which favours the 'heritage' style. I decide to visit an enthusiasts' gathering called 'DJ Day' in Annecy, France, hosted by Jean-Louis, sidecar builder 'extraordinaire' (www.dj-sidecars.fr). Key to my interest was his style of sidecar. These wider 'chairs' are used in sidecar rallying, in which the sidecar person (aka 'le singe' ..'the monkey') is able to engage in the riding process to assist handling, like racing outfits. And this is where I got to see hub-centric steering in the flesh.



Suzuki GSX and DJ Sport Sidecar. Notice width of chair facilitates weight transfer and the twin 'wishbones' by the front wheel. Photo: DJ Construction © 2017

Options for sidecar outfits.

So far then we have **Telescopic forks**, **Leading Links** and **Hub-Centric**. Two more options exist for builders. One is to modify the '**Triple Trees**', or forks & yokes, to change trail and the second is *genuine Hub Centre*. It also has to be said that many, many builders both amateur and professional have developed radical systems, most of which relate to the following in some way or other.

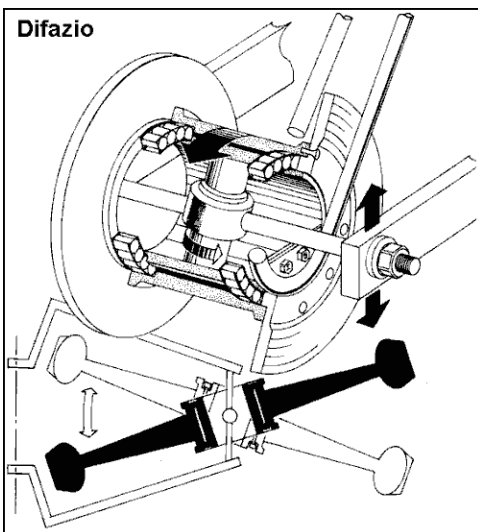
Bear in mind at this point, an outfit's set-up has to cope with very different loadings compared to a solo bike. Really quite extreme lateral forces, so keeping the front tyre flat on the road in corners and resisting flex in the supporting structure is critical.



Fairly typical leading link forks. Susceptible to tyre 'lift' and 'flex', but good for steering lock. Photo: DJ Construction © 2017



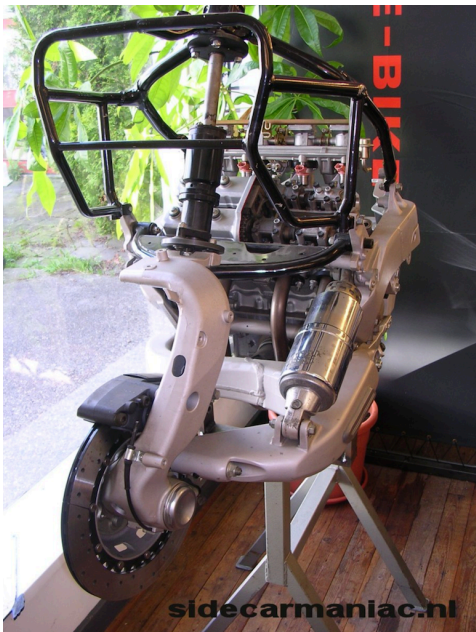
DJ's Hub-Centric layout. Much less prone to 'lift & flex', but wishbones can restrict lock on one side. DJ Construction © 2017



Difazio Hub-Centre design. Illustration: Craig Davis © 2012
Note this is proper, in my opinion, Hub Centre as the 'King pin' is within the hub itself.

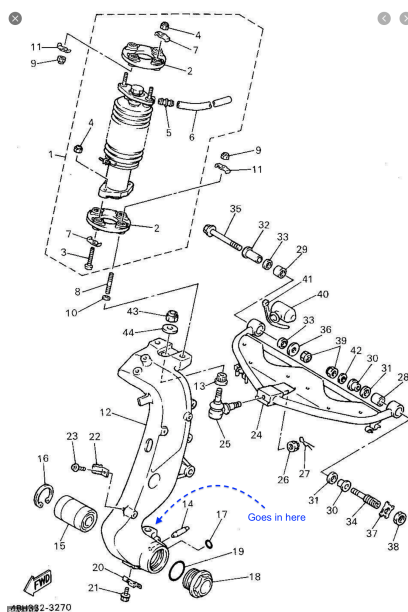
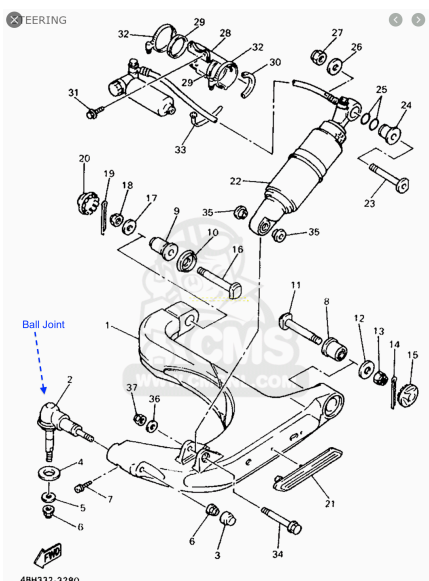


Difazio steering as fitted to Ducati. Photo: Keith Williams © 2010



Yamaha GTS Steering and Suspension

Photo Courtesy of: https://www.sidecarmaniac.nl/gts/gts_frontend.jpg



As I see it, this Yamaha design, sometimes called Hub Centre is, in my terms, 'Hub Centric'. If you look at the exploded parts diagrams you can see the pivot is not *in the hub*, it's a ball joint that sits just behind the axle and hub carrier.

Notice too how the axle support arm(s) or wishbone(s) restrict steering lock on both Difazio and Yamaha and indeed as it does on hub-centric designs shown here.

So, I've ridden all of these designs except Difazio and Yamaha, and taking things in the round I make the case that:

- Teles are not ideal as explained.
- Modified Triple Tree/Triple Clamp set-up is better but not as good as the other options in my experience.
- Leading Links are good but generally need damping.
- Hub-Centric is very good but quite difficult to do – my choice, more later.

- Hub Centre is probably best of all but potentially expensive and would likely need to be built very strong, much stronger than on a solo, for reasons of lateral forces.

Next time: The challenges of building my Hub-Centric steering and suspension.