Axle keeps karts on the straight and narrow

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Karts are seemingly simple in the extreme. They usually have a single-cylinder engine, no gearbox, the steering of a ride-on lawnmower, no suspension and a solid rear axle.

This can be considered good and bad at the same time. Maybe we will go from bad to soul-searching, because the simplicity introduces all manner of tinkering with the kart to get it to handle and get around the race track in the shortest time.

The good side of simplicity is that it cuts costs and keeps many things common to all competitors.

The soul-searching side is caused by the solid rear axle. Every road car has a differential to allow the two drive wheels to rotate at different speed, particularly turning a corner when the inside wheel rotates slower than the outside one.

However, in a kart, with its solid rear axle, both wheels turn at the same speed. This is fine for travelling in a straight line but when it comes to turning a corner, things change (or in fact don't) and the kart wants to keep travelling straight.

The fixed wheels resist turning and the only way the kart can go around a corner is for the inside wheel to spin relative to the track surface.

To get around this, karts have an extreme steering geometry design at the front that allows the outside front of the kart to fall slightly when turning into a corner, allowing the inside rear wheel to lift off the track.

With no drag on the inside wheel trying to spin, the kart turns the corner relatively freely — a simple solution to a complex problem due to a simple design.

Not the complete solution, however, because there are many other features on a kart set-up that can affect handling. The major adjustable items are tyre pressures, wheel positioning on the axles (both front and rear) and the seat position.

Whatever the outcome, it still gives everyone something to talk about at the end of the day.
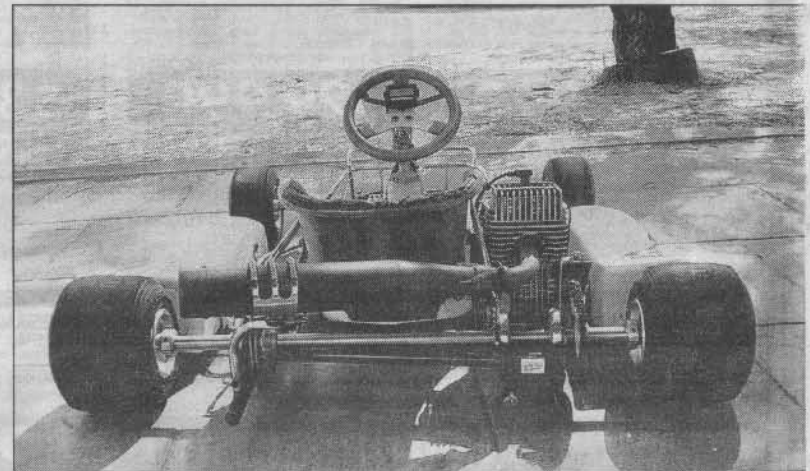
Unlike a car, a kart's rear wheels are connected by a solid axle.