

Scrub Rattle Bang Bang

By Gordon Koppang

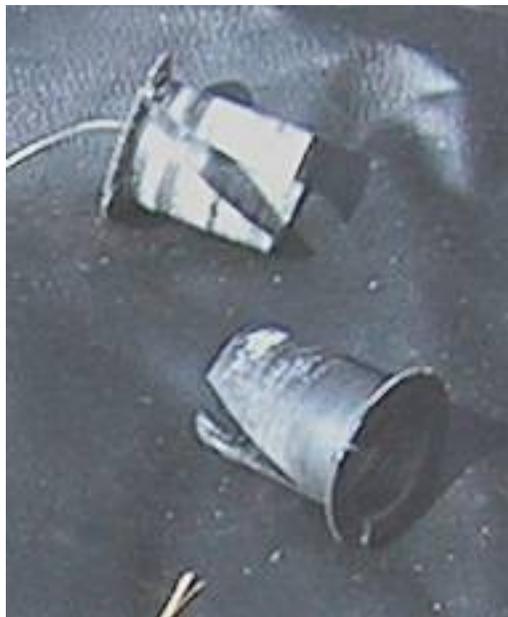
As delivered from factory, my Rhoades Car 4W1P scrubbed the front tires down to the cases in three and a half months! When my friend and retired motorcycle mechanic, Scott Bennett first had a look at the RC's front wheels, he noticed that they were "toed-in" quite a bit. He adjusted the tie-rod so that the wheels were closer to a neutral position, but was not able to "dial it in" with any precision because of the amount of play in the steering spindles.

Recently, we had a chance to remove the spindle from the frame and locate the source of all that play.



The kingpin bolt as it passes through the frame, the rubber damper and the spindle. Visible at the bottom of the spindle is a white ring of plastic.

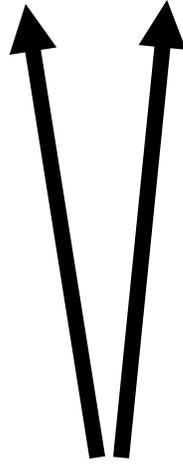
This picture was taken when the bike was fresh out of the crate.



Here are the plastic bushings located at the top and bottom of the spindle. They're not thick enough to stabilize the spindle on the kingpin bolt.

The kingpin bolt has a $5/8^{\text{th}}$ outside diameter. The inside diameter of the spindle measures $11/16^{\text{s}}$. That $1/16^{\text{th}}$ inch gap is only partly filled by the plastic bushings. The

uncontrolled movement of the spindle on the kingpin bolt translates into a hellish amount of uncontrolled wheel movement. How can a little bit of play on the kingpin bolt result in so much wheel movement?



A small rocking motion of the spindle and axle translates into a much larger motion when measured at the outer circumference of the tire.

Scott's temporary solution was to place plastic bushings on the kingpin bolt and wrap them good and snug with a few turns of masking tape. Then he put the fattened-up bushings back in the spindle. I believe the permanent solution is to replace the tape with a material called "shim stock." It comes in sheets of various thicknesses and is usually made of brass, bronze, or nylon. When putting everything back together, we added a washer between the bottom of the spindle and the bracket that it's bolted into. This reduced the uncontrolled up and down movement of the spindle on the kingpin bolt.

With the spindle bushings all taped up, the 4W1P was literally transformed (I'm not kidding)! This is the most significant improvement in the function of the RC since I replaced the completely inadequate plastic seat! The front-end calmed down considerably. Since the steering was rattling loose before, that's no surprise. What did surprise me was how much smoother the ride is, and how much quieter! I had grown used to it, but rattling and banging over every imperfection in the road made a lot of noise.

A simple solution, and all it took was a persistent mechanic and a penny's worth of masking tape. Thanks, Scott!