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CONTACT ME

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Death Wobble on 2006 Sterlings

First, a description of the issue: The Death Wobble is an oscillation of the steering wheel usually 8 to 10 inches in movement. Normally it occurs between 45 to 55 MHP (70 to 90 KPH). It usually does not exhibit itself until the front tires have been on the vehicle 30,000 to 50,000 miles. Sometimes the driver can drive thru the speed range and it will clear up. Most times not. It can also be set off by a bump in the road at any speed.

Second, mechanics of a wobble in the steering wheel: Turning the steering wheel in normal operations moves the output shaft of the steering box and that moves the pitman arm, the drag link and finally the spindle and tire. In reverse, if something can force a movement back up this linkage, for every one degree the pitman arm moves the steering wheel will move 18 degrees because of the gear ratio in the steering gear box. If the steer tires move side to side (turn left to right and back) uncontrolled, if the front springs flex up and down uncontrolled or

allow the steer axle to move side to side or front to back unregulated, a wobble will be induced into the steering wheel.

Normal controlling factors: Toe, caster, camber, KPI, shocks, springs, shackles, drag link angles, pitman arm length, gear box design and other factors including frame angles and tire construction contribute to the stability of the steering system.

More details: In this particular situation, several fleets have contacted me over the last couple of years and indicated that the vehicles are all 06 Sterlings and the problem has existed since they were new and no solution has been found. The 05 Sterlings and earlier did not have this issue. They have tried realignments and modified settings, replaced king pins and front springs. Reinforced springs and gone to heavier shocks. Changes brands of tires, burned incense and prayed at the Temple and so far I have not heard of a satisfactory solution. Proper alignment using tight specs and procedures have minimized the problem on some vehicles but no single cure has been found to date.

What I think is happening: I believe the wobble is a product of the front tires steering left to right and back. The lack of control is due to air in the steering gear box. Since air can compress, any contamination of the hydraulic fluid with air can result in a rebound oscillation in the steering wheel. Where is the air coming from and why does it trap in the gear box? The fluid reservoir on this model truck is a short, fat container. I believe that the draw on the system can lower the fluid level enough to cause air to be sucked into the lines. The gear box is set at an angle with the top of the box tilted to the rear of the truck and both supply and exhaust lines are on the back and top sides of the box. (see pic) In this configuration, any air in the system can trap in the box and will not self bleed because all the exits are below the top of the box. It should be noted that previous models of this truck did not place both supply and exhaust lines on the bottom side of the gear box.

In the 80's and 90's Peterbilt had a similar setup and in order to control this issue two modifications were used. One, the fluid reservoir was taller and slimmer. This gave a greater column height which prevented the fluid draw down and protected the system from air contamination. Two, a bleed screw was placed on the top side of the gear box so that any air captured was easily vented.

Why does this problem seem to focus in that particular speed range? Of all the stabilizing forces in the front end of the truck that control toe the final two are

drag and centrifugal force. At lower speeds, there is a built in drag in the front tires that is created by the intersection angle of the KPI on the foot print of the tire. This intersection on the inner 1/3 of the footprint causes more drag to be placed on the outer portion of the footprint which causes the tire to press toward toe out. (see illus) At about 45 MPH (70 KPH) a truck size tire spins up fast enough to create a centrifugal force capable of stabilizing the tires. Under those conditions the tire will flex toward zero toe and over come the drag force in the foot print. This change of toe must be controlled or dampened or a wobble can manifest itself.

Obviously, if another force attempts to create change in the toe, such as a bump in the road, a wobble can also be started.

Why does this seem to occur when the tires have some wear on them and not when they are brand new? New tires have more flex in the rubber and more available movement in the deep tread. As the tire ages, the heating and cooling cycles created during operation cause the tire to harden and wear down the tread. This reduces the ability of the tire to contain the wobble in the tire. The movement is then transmitted into the steering system and the air in the gear box amplifies it. Tests have shown that tires that are expressing this problem on the Sterlings can be moved to other brand vehicles and the tires handle and wear just fine. This indicates that the problem is not coming out of the tire.

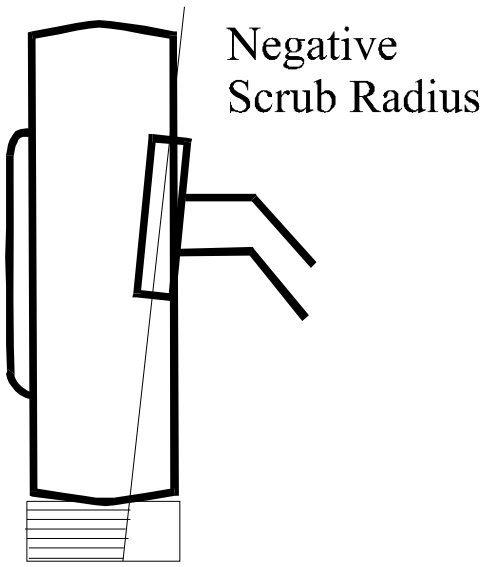
How to manage this problem: One option is to run tires until this condition becomes a problem and then move those tires to another vehicle and put new ones on the Sterling. Another idea, that I have not heard has been tried, is to use a Monroe or Gabriel hydraulic steering stabilizer. These are readily available and in common use on RV's.

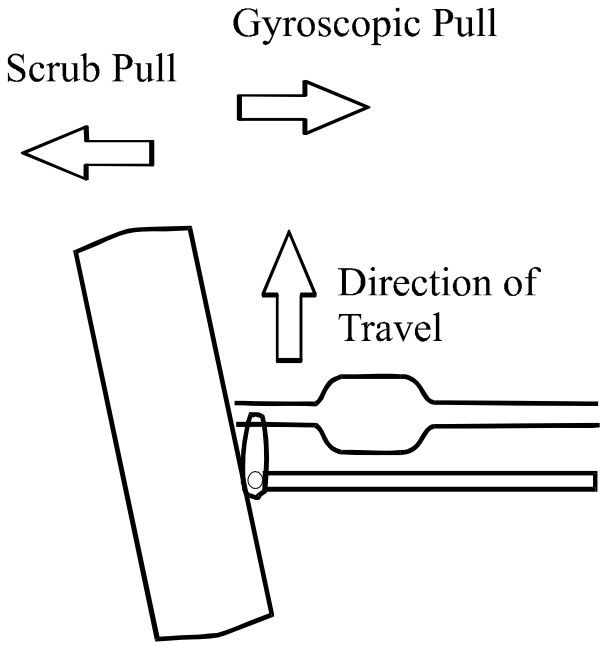
Both hoses on one side (Back/Bottom)

One hose top one bottom

Short reservoir

Tall Reservoir

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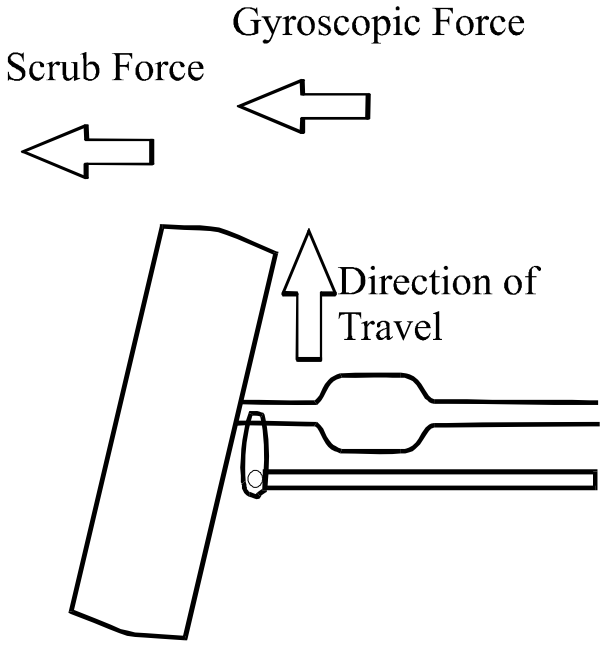
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