Are Alignments on Trucks and Buses a GREEN procedure or a Money Drain (Part 3)

In this section I want to explore the process used to measure wheel alignment on medium and heavy duty vehicles. Most of the systems used for this purpose have their roots in the car market. It seems everyone who can make a light duty system feels it is appropriate to enlarge the clamps and add to the software to make measuring a truck or bus possible.

Unfortunately, Medium and Heavy Duty vehicles need to be ten times better aligned than cars. We are held to this standard by miles (kilometers) and dollars (or whatever currency you use). Rather than continuing to convert from my standard units of measure to whatever else might be appropriate, I ask your understanding and I will just use mine in an effort to make this less complicated. Thank You.

In order to explain the standard of performance difference between the two classes of vehicles consider this. A car gets two new steer tires and an alignment for a combined cost of about $250. A truck gets the same thing for a cost of about $1500. The car travels 30,000 miles in about 2 years and the tires show irregular wear. Well it has been two years and many things could have caused this so no one gets excited. The truck travels the same distance in 2 months and the owner of the truck gets very excited. The money paid for the products and the service combined with short time to irregular wear changes the satisfaction on the part of the customer.

Understanding that there are significant differences between the two classes of alignments, I want to focus on what I consider to be the two most important alignment measurements and mistakes I feel conventional alignment systems make in the process. The two settings are Toe and Drive Axle alignment. Both of these will produce feathered wear on the steer tires if not done properly.

Conventional alignment systems have traditionally measured the vehicle in what is called a “relaxed” position. The use of turn plates and alignment racks place the vehicle in a convenient position for the purposes of measurement and adjustment but do little to insure that the measurements obtained accurately reflect the conditions while driving.

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Toe, for example, has a tendency to change toward a toe out condition as load increases on the steer axle and as the vehicle drives forward. Tests have shown that 60% of vehicles with toe set appropriately on turn plates will be toed out when driving. This means that the difference between an "As Driven" toe measurement and a "Relaxed" toe measurement have a significant effect on alignment. The stack of tolerances in the components that make up the steering assembly can allow changes of toe up to 3/8 of an inch in a well maintained front end.

Drive axle alignment has similar problems. Combining bushing movement, air suspension flex and the tension between the frame and one or two drive axles can cause alignment changes under power or load that are unexpected.

Both of these settings are further complicated because the traditional process aligns the vehicle stationary and adjusts the settings sitting still until they meet the acceptable specs. This does not take into account the changes that will occur when the vehicle leaves the artificial conditions of the rack and creates its normal tension between the components in a "Driven" condition. We find that it is necessary make adjustments and then move the vehicle out and back into the shop to re-measure under the new conditions to verify that the alignment is correct.

At the heart of the argument, I have never seen a truck wear out tires on an alignment rack. They wear them out on the road. The measurements I want are the ones as close to what they are when the vehicle is driving.

This desire for "As Drive" is also reflected in the TMC RP 642 Guidelines for total Vehicle Alignment.

Next week I will talk about 'Factory Specs".

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