

MD Alignment

Are Alignments on Trucks and Buses a GREEN procedure or a Money Drain (Part 7)

Ok we've discussed Toe, Camber, Caster and Drive axle alignment. So what's left to explore about alignment? Actually there are several more items to consider. Let's talk about steer axle set back and that will lead us right into Toe on Turns or Ackerman angles.

Axle set back, in alignments, refers to a measurement to determine if the steer axle is mounted square to the frame. This can be accomplished in several ways. Hunter Alignment equipment for example uses degrees of angle and we find that an acceptable range is +/- .06 degrees from zero. With a tape measure an acceptable range is +/- 1/16 inch from zero.

If the axle is out of square with the frame several dynamics come into play. First of all, with Caster (the front to back tilt of the King Pin) and King Pin inclination (the inboard tilt of the top of the King Pin that is cast into the axle) as you turn the wheels right or left the Camber changes in both front tires but not identically. In addition, having one tire trailing the other while driving straight causes un-equal drag resulting in a pull in the direction of the trailing tire. There is also the force from the Caster trying to make the tires return to straight relative to the axle beam. That force would also be in the direction of the trailing tire. The drag produced in the trailing tire often causes cupping in that tire.

This brings us to the final dynamic. When you turn the wheels right or left the toe changes toward toe out. The angle change is referred to as Toe on Turns or Ackerman angles. All steering axles used on trucks and buses have this characteristic. What happens if the axle is out of square and you set the toe with this condition, is the toe will not progress toward toe out uniformly in both directions. For example, if the axle is set back on the right side of the truck, when you turn the steering wheel to the left toe will gradually change to toe out. However if you turn the wheel to the right, the toe will first toe in slightly and then start to toe out.

If the set back on the steering axle is not correct all the geometry built into the axle is out of phase and handling and tire wear are put at risk. Unfortunately, most



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alignment techs are not aware of this problem and either don't measure it or, if their system does measure it, are not trained to correct it.

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