

## **Why The Howard Precision Steer Wheel Control System Achieves Superior Heavy Vehicle Directional Stability Over All Other Systems**

The exclusive Precision Steer Wheel Power Centering feature keeps the steer wheels tracking exceptionally straight until the vehicle driver initiates a steering input. When the driver releases the steering input, the steer wheels are Precision Power Centered and kept tracking exceptionally straight, thereby relieving the vehicle driver from making almost constant tedious steering corrections to maintain directional control. The amazing improvement in directional stability is greatly appreciated by the heavy vehicle drivers because of the dramatic reduction in driving fatigue and overall improvement in heavy vehicle highway safety.

**For additional information on the exclusive Howard Precision Steer Wheel Control System please contact:**

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## **Exclusive Breakthrough In Heavy Truck Directional Stability Greatly Reduces Driving Fatigue And Improves Heavy Truck Highway Safety**

A breakthrough in heavy truck highway safety has been achieved by new technology that greatly reduces the heavy truck driving fatigue, that is responsible for a considerable number of large truck highway crashes.

The new technology advances the state of the art in the directional control of heavy trucks and busses to a level of perfection that is entirely new to the heavy vehicle industry. The new Precision Steer Wheel Control Technology works in harmony with the conventional power steering technology. Each system provides an important function that the other system does not provide. For example, the power steering system is designed to assist the heavy truck driver when steering away from the on-center straight-ahead position. Wherein, the new Precision Steer Wheel Control System is designed to assist the driver when going straight, thereby greatly reducing the tedious repetitive driver steering corrections required to keep a heavy truck under directional control, making a considerable reduction in heavy truck driving fatigue.

The new technology completely solves the loss of heavy vehicle directional control during a steer wheel tire blowout. This has been verified by the actual occurrence of steer wheel tire blowouts on heavy trucks, busses and recreational vehicles that were equipped with the new technology.

Additionally, the new Precision Steer Wheel Control Technology solves the costly long-standing premature steer wheel tire wear problem that is caused by the unstable behavior of the steer wheels that conventional steering geometry cannot be made to control.

Heavy truck and bus operators that are using the new Precision Steer Wheel Control System on some of their heavy vehicles, are universally reporting as much as a (75,000) seventy-five thousand mile increase in steer wheel tire mileage, that will more than pay for the new technology during the productive service life of a heavy vehicle.

Making a dramatic reduction in driving fatigue will have a positive effect on driver retention.

# **The Development History Of The Howard Precision Steer Wheel Control System**

## **The Design Objective**

**To advance the state of the art in heavy vehicle directional stability to greatly reduce driving fatigue and related catastrophic heavy vehicle highway accidents.**

## **Design Assumptions and Problems That Needed to be Overcome**

It was considered that over the many years the very creative heavy vehicle design community had made amazing technical contributions in the function and reliability of heavy over-the-road vehicles. It was also considered that the same creative talent had achieved virtually all that could be achieved to improve the heavy vehicle drivability with variations in the geometry of the steer wheels. For example, to achieve steering wheel returnability after turning a corner, the spindles (king pins) were slanted aft at the top to achieve a turning-lift effect so that when the vehicle driver released the steering wheel, the weight of the vehicle would return to the lower most position. Thereby, returning the steer wheels to the on-center straight-ahead position where the turning-lift effect is diminished and does not provide the direly needed stabilizing effect on the steer wheels. Slanting the spindles aft at the top end, also creates a steer wheel castering effect that results in highly adverse crosswind driving characteristics. Because with each crosswind gust the lateral force of the wind caused the steer wheel to caster steer the vehicle downwind, requiring almost continuous driver

steering corrections to maintain directional control, resulting in a major cause of driving fatigue. Because slanting the king pins aft at the top end to achieve the turning-lift effect also creates steer wheel castering, the term caster angle was used, thereby giving rise to the mistaken belief that steer wheel castering was beneficial to the directional stability of a motor vehicle, when in fact steer wheel castering makes no contribution to directional stability. In addition to the lack of stability, there were two additional major operational problems related to the unstable behavior of the steer wheels. The long-standing puzzling excessive steer wheel tire wear problems, and the loss of directional control during a steer wheel tire blowout.

It was reasoned that a suitable heavy vehicle precision steer wheel control component would make a major contribution to solving all of the steering and controllability problems that simply could not be solved by the geometry of the steer wheels. The time had come for advancing the state of the art in safer heavy vehicle stability and control technology.

Tests were conducted on heavy trucks, buses, and recreational vehicles using precision instrumentation. It was observed that with a highway speed of sixty-five miles per hour, when the center line of the steer wheel contact patch was off-center by as little as ten one-thousandths of an inch, the vehicle would make a lane change in ten to twelve seconds. From this, it was reasoned that the steer wheels needed to be controlled in the on-center position with great precision, except when the vehicle driver was intentionally steering away from center. When the driver releases the steering wheel, the

Howard Power Center Precision Steer Wheel Control System returns the steer wheels to the on-center position with enough force to maintain directional stability in all driving modes, especially during adverse driving conditions such as strong crosswinds and rutted and slanted road conditions.

Over the many years, aftermarket providers have attempted to improve heavy vehicle drivability with so called stabilizer devices that only nibbled at the problem and simply did not provide precision steer wheel control.

## **The Heavy Vehicle Operational Problems That Are Solved By The New Technology:**

- The Howard Precision Steer Wheel Control Technology completely does away with the heavy vehicle operational problems that cannot be solved by variations in the steering geometry.
- The Howard Technology completely solves the puzzling steer wheel tire cupping and excessive tire wear problem. Operators are reporting a 75,000 mile increase in tire mileage that will more than pay for the new technology.
- The Howard Technology completely does away with the steer wheel tire blowout controllability problem. With more than five thousand Howard Precision Steer Wheel Control Systems in service, there have been a surprising number of steer wheel tire blowouts reported by heavy vehicle drivers that were amazed at the easy straight line controllability.
- The Howard Technology makes a dramatic reduction in driving fatigue and related heavy vehicle catastrophic highway accidents.
- The Howard Technology does away with road wander and steering wheel pull on crowned and slanted roads.