



▶ **Spigot Bearing**

Based on current transit customer usage calculations we have validated the life of the spigot bearing to increase 2X.



▶ **Thrust Screw**

The 160HD will have thrust screw that supports the back of the gear limiting its displacement



▶ **Gear Bending**

To increase the capacity of the gear teeth, the 160HD will be shot-peened. The process *adds residual* stress that contributes to increase the gear life

○ SPIGOT BEARING ENLARGED

○ LONGER LIFE CYCLE

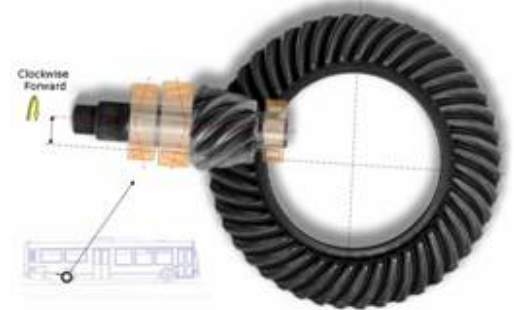
160 HD Heavy Duty Carrier

INCREASE USEFUL LIFE OF CARRIER?

The Issue: Premature Differential Failure.

During deceleration, when the retarder applies the braking torque, the ring gear drives the pinion, resulting in a high level of torque concentrated at the pinion gear support spigot bearing. Under this condition, the torque transfer as a result of the larger ring gear driving the smaller pinion gear are significantly greater than when the pinion gear drives the ring gear as designed due to drive ratio multiplication. A standard duty model 160 differential carrier often fails as a result of these high torque loads, which it was not designed to operate under. Extensive failure analysis identified the spigot bearing as the cause of most differential failures. Further analysis has identified ring gear and carrier side loading and movement as the actual cause of the pinion gear and spigot bearing failure. Gear flex and bending, especially under high retarder settings, causes deviations in gear tooth contact, resulting in unstable drive gears which allows axial movement and binding of the pinion gear and spigot bearing. High cycles of acceleration and deceleration torque amplify the failure cycle resulting in shorter drive axle life.

Hypoid Bevel Gear of Single Reduction Axle with Rear Engine



The Solution:

Sensitive to this situation, AxleTech and Truck Trailer Transit created a task force with the objective of developing a new product capable of surviving in the Transit Industry. Our 160HD is the solution.

Spigot bearing

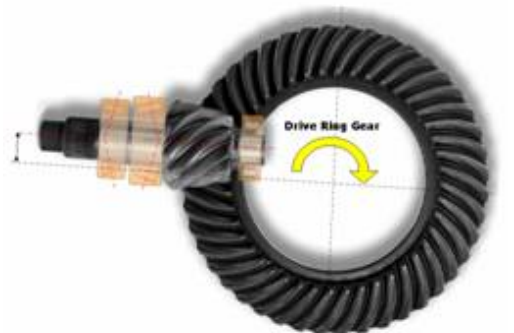
The challenge to increase the capacity of the bearing is the limited space. By changing the design of the differential case, we are able to install a bearing with an enhanced load capability significantly greater than the bearing you might already be using.

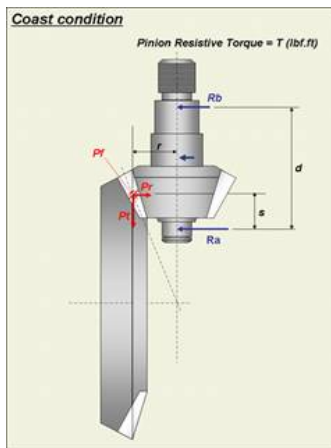
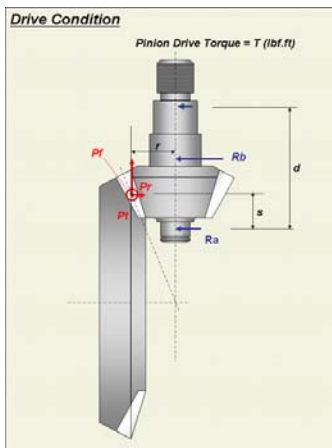
Gear Bending.

To increase the stability and capacity of the ring and pinion gears, the 160HD is built with shot-peened gear forgings. The process adds residual stress that contributes to increase the gear life .

Thrust Screw

During deceleration, unfavorable angles and dragging forces cause excessive separation of the gear respect to the pinion. This separation causes increased stress and wear on gear teeth. The 160HD has a thrust screw that supports the back of the gear and prevents side and axial movement of the ring and pinion.





The single reduction 160 carrier has been in production for over decades, long before the advent of the transmission retarder. The 160 model carrier was originally designed to provide quiet acceleration without speed retardation from low horsepower and low torque engines and transmissions.

Today's buses have constant torque engines operate at lower speeds, and transmissions that have increased gear ranges, locking torque converter clutches, and retarders. While they have increased fuel mileage, engine, transmission and brake life, they have caused the differential to become the weak link in the chain. AxleTech has engineered a new differential carrier designed to exceed the needs of the transit industry.

A newly designed carrier, optimized for acceleration and deceleration, through a new heavier duty large tapered bearing located immediately behind the pinion head which provides superior support while reducing spigot bearing and the outer bearing stress and work load levels.

Bearing lubrication is enhanced through channeling which results in lower operating temperatures which results in increased service life.

CARRIER INTERCHANGE

Meritor Part Number	Ratio	TTT Part Number
A1-3200-P-1706-342	Differential Assembly 3.42 Ratio	RR23160342HD
A1-3200-P-1706-456	Differential Assembly 4.56 Ratio	RR23160456HD
A1-3200-P-1706-489	Differential Assembly 4.89 Ratio	RR23160489HD
A1-3200-P-1706-538	Differential Assembly 5.38 Ratio	RR23160538HD
A1-3200-P-1706-563	Differential Assembly 5.63 Ratio	RR23160563HD
A1-3200-P-1706-614	Differential Assembly 6.14 Ratio	RR23160614HD

T-T-T

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