Retarder; Secondary Braking system

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Retarder is an external brake frequently used in trucks. The purpose of the retarder is to assist in stopping the vehicle, controlling vehicle downhill speed on a steep grade, extending the life of the vehicle service brakes, and enhancing vehicle control. There are several retarder technologies currently available. Two major kinds are Hydraulic retarders and Electromagnetic retarders.

The hydraulic retarder:
Hydraulic retarders use the viscous drag forces between dynamic and static vanes in a fluid-filled chamber to achieve retardation. A simple retarder would use vanes attached to a transmission driveshaft between the clutch and road wheels. They can also be driven separately via gears off a driveshaft. The vanes would be enclosed in a static chamber with small clearances to the chamber’s walls (which will also be vaned). When retardation is required, fluid (oil or water) is pumped into the chamber, and the viscous drag induced will slow down the vehicle. The working fluid will heat up, and will usually be circulated through a cooling system. The degree of retardation can be varied by adjusting the fill level of the chamber.

Electromagnetic retarders:
The electric retarder uses electromagnetic induction to provide retardation force. An electric retardation unit can be placed on an axle, transmission, or driveline and consists of a rotor attached to the axle, transmission, or driveline and a stator securely attached to the vehicle chassis. There are no contact surfaces between the rotor and stator, and no working fluid. When retardation is required, the electrical windings in the stator are powered up from the vehicle battery, producing magnetic fields alternating in polarity. This induces eddy currents in the rotor, which slows down the rotor, and hence the axle, transmission, or driveline, to which it is attached. The rotor is engineered to provide its own air-cooling, so no load is placed on the vehicle’s cooling system, and the operation of the system is extremely quiet.