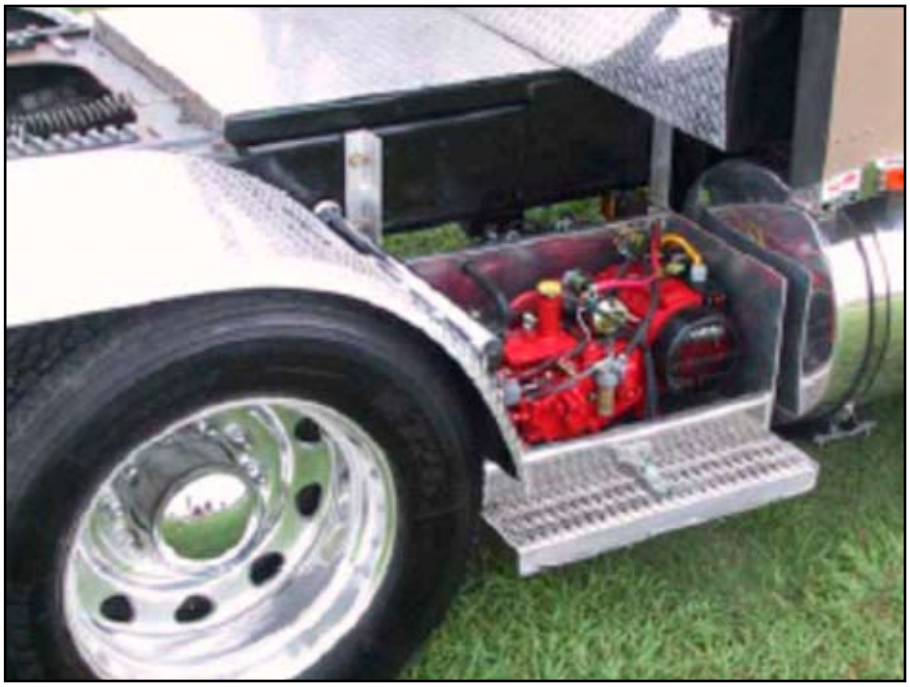
Cab Comfort Units Reduce Idling of Heavy-Duty Trucks and Buses

Background

Throughout the United States, it is customary for freight haulers to idle the engines of their heavy-duty trucks for climate control (heating and cooling) while they are sleeping or resting on long distance runs. This idling reduces fuel economy, increases vehicle maintenance costs, increases emissions, and leads to a negative image of the trucking industry. Similarly, other vehicles like tour buses may idle for long periods while waiting for passengers. Although over 20 states now have anti-idling regulations, it is estimated that diesel truck and bus idling wastes over 700 million gallons of fuel per year and produces significant levels of emissions (8 million tons of CO_2, 130,000 tons of NO_X, and 80,000 tons of CO). Fortunately, many of these problems can be solved without sacrificing driver and passenger comfort by using cost-effective, environmentally friendly cab comfort units, which eliminate the need for long-term idling.

The U.S. Department of Energy (DOE) commissioned Argonne National Laboratory (ANL) to complete an independent analysis on the energy and environmental effects of truck idling. ANL concluded that each hour a cab comfort unit is used saves about 0.6 gallon of fuel because it is typically at least 4 times as efficient as a large idling diesel engine. Use of the cab comfort unit also extends the life of the engine and increases the mileage between oil changes. In any given year, it is not uncommon for long-haul truck drivers to travel 150,000 miles and to idle for about 1500-2000 hours. Depending on the fuel consumption rate, idling the heavy vehicle costs over $2.50 per hour in fuel use, $0.02 in preventive maintenance (oil changes) costs, and another $0.10 in overhaul costs. A cab comfort unit would therefore save almost $2.00 per hour of idling. This represents a typical savings of over $3,400 annually.



Auxiliary power unit

The Technology

ANL's analysis has led DOE, the Department of Transportation, the Department of Defense, and the Environmental Protection Agency to team with manufacturers, heavy vehicle manufacturers, and trade

associations to increase the use of cab comfort units to reduce idling emissions, decrease petroleum use, and increase the profit margins for heavy vehicle owners. These efforts have ascertained that several types of cab comfort units are efficient, inexpensive to operate, and widely available. They include auxiliary power units and generator sets (both full service), as well as direct-fired heaters and air conditioners (both partial service). These units can enhance driver comfort and convenience while typically reducing average annual fuel and maintenance costs by about $3,400 per truck. This leads to a payback period from under 1 year to approximately 3 years based on purchase costs ranging from $1,200 to $7,000 for units providing partial to complete services. Additionally, full-service cab comfort units provide back-up alternators and air conditioner compressors for emergencies. Full-service units weigh about 400 pounds and occupy 24 inches of frame rail space. The Energy Policy Act of 2005 includes a weight waiver for these units.

Commercialization

Substantial market penetration of cab comfort units has taken place in recent years. Heaters have the largest market, with two manufacturers competing for annual sales of well over 50,000 units. Tens of thousands of full-service auxiliary power units have also been sold. Wal-Mart recently purchased 7,000 units. In addition, numerous demonstrations have been completed. DOE's Advanced Vehicle Testing Activity funded several, including one in which Schneider National equipped trucks with Webasto heaters. Improvements in fuel economy and reductions in engine idling time were so positive that the carrier began equipping all of its new trucks with auxiliary cab heaters. In another project, Espar installed a combined heating and cooling system in at least 20 International trucks operated by Wal-Mart. A third demonstration involved Caterpillar's MorElectric Technology, a full-service system that eliminates idling and increases on-road efficiency as well. Yet another demonstration showed the feasibility of cab comfort unit installation as original equipment on a truck manufacturer's production line. Other entities such as Texas' TERP program, California's Carl Moyer program, and members of the West Coast Diesel Collaborative are offering financial incentives for installation of cab comfort units. Additionally, the Idle Engine Manufacturers Association has been formed to further the adoption of its members' equipment.

Benefits

Cab comfort units

- Are at least 4 times as efficient as the main engine
- Reduce idling emissions by 80%
- Save $3,400 in diesel fuel and maintenance costs per vehicle per year
- Extend intervals between oil changes and engine overhauls

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