

Know How to Use Anti-Lock Brakes When Maneuvering Vehicles Aboard Ship

Editor's note: This article was compiled from material submitted by Lt. Craig M. Winters and CM2 Craig S. McClure of Beachmaster Unit One, Detachment Alfa. It contains additional information found on the Web, "How Anti-Lock Brakes Work" by Karim Nice. The site is www.howstuffworks.com/anti-lock-brake.htm/printable.

When you're driving down the road and a car suddenly pulls in front of you, what will you do? The natural tendency is to slam on the brakes to avoid a collision. Newer vehicles have the anti-lock braking system, or ABS, to enable drivers to stop quickly and to avoid skidding out of control. The tendency to "hit the brakes" when something suddenly appears in front of a vehicle is almost instinctive, and research has indicated even professional drivers cannot stop as quickly without ABS as everyday drivers can stop with ABS.

As Americans demanded safer cars over the years, one technological breakthrough was the advent of ABS, which quickly became a core technology for helping to make driving safer. Anti-lock brakes are designed to do away with the "screeching halt" and still enable a driver to stop quickly, but without experiencing the screaming tires of an uncontrolled slide while the brakes are locked.

Can ABS technology benefit those operating in a demanding military environment—are anti-lock brakes good for military vehicles? That will depend on proper ABS use and maintenance, as the following account illustrates.

A five-ton truck with ABS and assigned to an LPD-embarked beachmaster unit, was being moved from the upper vehicle-cargo-holding area down a steel ramp to be loaded onto a landing craft. The truck was backing down the ramp and was towing a water trailer that is also called a water "buffalo" or "bull." Other trucks and cargo surrounded the truck and trailer, and the driver had mere inches of clearance to maneuver his vehicle. A traffic controlman was assigned to guide the driver while he moved the truck and trailer.

As the truck and trailer backed down the well-deck ramp, the traffic controlman directed the driver to stop; the driver knew he had only inches of maneuvering room, so he quickly jammed the brake pedal. The truck and water trailer did not stop. Jamming the brake pedal made a relief valve release almost all air—as it was designed to do—within the braking system. However, anti-lock brakes include a pump that maintains pressure in the line and keeps brakes engaged as long as firm pressure is maintained on the brake pedal.

In this case of vehicle operation aboard the LPD, for some reason, pressure in the braking system was lost, and with it the ability to stop the truck quickly. The truck and trailer continued down the ramp while the driver frantically pumped the brakes; finally he was able to stop the truck and trailer. When the vehicles did stop, the water buffalo was at a 90-degree angle to the truck, and it had a hole where the truck's rear gate had punctured it. Fortunately, no one was injured.

Continuously pumping ABS brakes reduces their effectiveness; having to pump them in order

to stop indicates a problem within the system. ABS should do all the work in a situation where the driver has to stop suddenly—he needs only to apply the brake pedal firmly and hold it. While doing so, he might experience a “pulsing” feeling—this is normal since it results from the rapid opening and closing of valves in the system (some ABS systems can cycle up to 15 times per second). Nonetheless, the driver should continue to hold down the brake firmly and not pump it.

Anti-lock brakes are installed on military vehicles—as they are on civilian cars and trucks—to reduce the chances of the vehicle going into an uncontrolled skid. While not required, the U.S. Army retrofitted many of its older 900-series trucks with the ABS to enable them to operate on a variety of terrain, and newer Army two-and-a-half-ton and five-ton trucks have manufacturer-installed ABS.

ABS works when a wheel sensor transmits slip information to a computer, which determines if there has been a sudden decrease in the truck’s wheel speed. A relief valve attached to the truck’s air brake is activated when the wheel sensor detects sudden wheel-speed reduction, and then air is bled from the brake system; this keeps the brakes from locking. Another valve maintains pressure to keep the brakes engaged, therefore, in an ABS-equipped vehicle, you need not pump the brakes. Simply hold down the brake pedal firmly, and the properly functioning system will do the rest.

Meanwhile, when operating motor vehicles aboard ship, drivers must understand the difference

between anti-lock and regular brakes, and operate vehicles accordingly since maneuvering space is so limited. Shipboard vehicle operation often includes stopping “on the dime” because of the confined operating environment.

The beachmaster unit was the LPD’s only embarked unit having in its inventory five-ton trucks with ABS, and they experienced some difficulties stopping their five-ton trucks on the ramp leading to the well-deck. Understandably, all shipboard vehicles encounter minor tire slippage while braking on the ramp; this can be from the vehicle’s weight or from the ship’s pitch and roll. The beachmasters’ ABS-equipped, five-ton truck had caused safety concerns during well-deck operations. Other vehicles were able to stop “on the dime” while travelling the ramp. Certainly, highway-safety standards apply to military vehicles, too, but a larger concern lies with military vehicles’ use in their theater of operations—a shipboard environment presents its own unique demands and potential hazards.

Therefore, operating ABS-equipped vehicles aboard ship requires all drivers to know how to use the system. Rigid adherence to PMS is a must—a weak pump or even a minor leak that reduces brake-line pressure could result in a mishap. There can be no maintenance shortcuts or quick, temporary fixes—nor should there be when servicing brakes—whether they’re standard or ABS.

Knowing how to properly use anti-lock brakes will give a driver more control of the vehicle and reduce the chance for a mishap caused by a skidding vehicle. ☺

Navy photo by Philip A. Fortnam

Loading any motorized vehicles—small or large—onto an LCU or LCAC in a ship’s well-deck, poses risks, and must be done with the utmost attention to detail and situational awareness.