

Repairing Fire Suppression Systems and Batteries Saves Money and Time

A maintenance company refills fire suppression system cylinders and charges vehicle batteries instead of replacing them.

■ By Capt. Lawrence B. Smith and Warrant Officer James M. Manuelson

While deployed in support of operations at Camp Buehring, Kuwait, B Company, 64th Brigade Support Battalion, 3rd Armored Brigade Combat Team, 4th Infantry Division, saved the Army money by recharging and repairing vehicular fire suppression system (FSS) cylinders, portable fire extinguishers, and batteries. B Company's FSS shop is federally certified and equipped to recharge and repair all of these systems.

FSS History

The military first introduced fire suppression systems on ships. Those systems used water to extinguish on-board fires. Because of the modest hauling capacity of the Army's ground vehicles, carrying water to extinguish fires is not ideal, so the Army began using chemical extinguishers.

The first halon extinguisher, developed in 1839 by Henri Victor Regnault, contained carbon tetrachloride. Halon is an excellent dousing agent; however, it has the potential to cause kidney and liver failure in humans. In the early 1950s, the Army and the DuPont chemical company developed a gaseous flooding agent, Halon 1301, which was a more stable version of Regnault's product. Halon 1301 is the same chemical used in today's portable fire extinguishers found on watercraft, aircraft, and ground vehicles.

Current FSSs have proven very effective, and the requirement for every vehicle to have one is growing. Each ground vehicle requires

different chemical variants, making procurement, stocking, and support from manufacturers difficult. Further complicating the issue is the fact that the same FSSs often have different manufacturers.

The FSS Shop

Since FSS cylinders are so unique, replacing the discharged cylinders and valves can be extremely expensive. It costs \$4,032.18 to replace a 20-pound FSS cylinder that is used in an M2A3 Bradley fighting vehicle. However, it costs only \$77 for B Company to refill an FSS cylinder, saving the Army \$3,955.18 per system.

At Fort Carson, Colorado, the 3rd Armored Brigade Combat Team's home station, the FSS shop refills an average of nine cylinders a week in support of the entire installation. The shop has saved the Army millions of dollars since its inception in 2012. While deployed at Camp Buehring, the unit saved the Army tens of thousands of dollars.

The shop's positive impacts go beyond just cost savings; the work it does also offers a considerable reduction in repair cycle times. For instance, the average requisition wait time for an FSS cylinder through the Army supply system is 20 to 24 days. Not having an operational FSS cylinder renders a vehicle not mission capable, degrading combat power and jeopardizing mission accomplishment.

This is where the FSS shop's maintenance solution offers such a distinct advantage. It takes an average of only two days for the FSS shop to conduct

the refill operation. Shortly thereafter, the unit has the FSS back and operational with a significantly reduced effect on unit readiness.

The Battery Shop

While deployed, B Company's ground support equipment section maintained the only battery repair and refurbishment shop in theater. A substandard battery maintenance program in a unit can lead to the premature failure of vehicle batteries, resulting in costly replacements. Battery failures also reduce the maintainers' effectiveness and impede scheduled maintenance efforts.

As a proactive countermeasure, B Company revitalized its battery maintenance management program to better support forward deployed operations. The company built a battery repair and refurbishment shop at a cost of \$37,892.41, which was easily recouped over time. This shop was equipped with a variety of high-tech tools, including analytical testers and charging systems.

The shop employed an assembly-line method and was capable of refurbishing and recharging up to 12 batteries a day, depending on the batteries' condition. Given this design, the unit could run the shop with only one operator, although for safety reasons employing two was preferred. Absolutely no cost was associated with the process, assuming the batteries were still serviceable and could take the charge.

The shop supported a wide variety of tracked and wheeled vehicles, in-

cluding combat platforms of all types, heavy equipment transporters, palletized load systems, heavy expanded-mobility tactical trucks, and humvees. The shop's standard operating procedures outline the safety, preventive maintenance, testing and diagnostics, charging, and replacement measures associated with all vehicle battery types.

The shop's technicians could recondition and recharge flood-cell (wet cell) and Hawker absorbed glass mat batteries. Flood-cell batteries typically last two years on tracked vehicles and three years on wheeled vehicles. Hawker batteries offer a longer life span—up to 54 months if properly charged before installation.

Most of the brigade's batteries are Hawker batteries because of their extended life span and maintenance-free attributes. Since it is a sealed battery, conducting repairs or maintenance beyond recharging is unauthorized, making the shop an even greater asset to operations in theater.

Despite the comparatively long life span of a Hawker battery, prolonged storage and normal aging can degrade its ability to hold a charge, while other factors such as electrical problems can result in similar challenges.

The noncommissioned officer-in-charge of the FSS and battery shops stated that most of the premature battery failures were caused by operator errors, such as leaving lights and radios on overnight, insufficient run times, and exposure to extremely cold weather. These factors heavily contribute to accelerated battery replacement.

Battery Shop Procedures

Discarding and stockpiling batteries in need of replacement in the hazardous waste storage area (HWSA) was the norm prior to implementing the battery shop. After the shop opened, dead batteries could instead be recovered and recharged. Units across Camp Buehring could order battery work through B Company, saving the units and the Army money and time.

Once a job request from a supported



Spc. James Bowman charges batteries that will be issued to various units in Afghanistan on Aug. 7, 2014. (Photo courtesy of the 10th Mountain Division Sustainment Brigade)

unit was received, a shop Soldier evaluated the battery for cold cranking amperage and voltage. The technician then determined whether the battery needed discharging or reconditioning. After making this determination, the technician placed the battery on a pallet charger and left it to charge for 24 hours.

The following day, the technician tested the battery with the battery analyzer to ensure it maintained the charge. If it did, then the shop issued the battery to a supported unit through a one-for-one swap. The shop successfully refurbished and recharged approximately 75 to 80 percent of the batteries it received.

If the shop could not recharge the battery because of prolonged storage, age, or another reason, it disposed of the battery in an environmentally conscious manner by working with the HWSA at Camp Buehring.

Through ingenuity and with determination, warrant officers of the unit designed these shops, procured the required equipment, and ensured Soldiers received the proper training and certifications. Thanks to their

hard work, the FSS and battery shops saved the Army millions of dollars and greatly reduced repair cycle times. Given the requirement to maintain expeditionary readiness with reduced budgets, these shops were vital to the 3rd Armored Brigade Combat Team and other units at Camp Buehring.

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