

# Fact Sheet

## WINTER COMBAT ENGINEERING

### ACCOMPLISHMENT

The Corps of Engineers R&D program has provided innovative solutions to the difficult engineering problems that soldiers face in winter. Several off-the-shelf technologies have been modified, tested, and fielded, thereby significantly improving the Army's capability to excavate fighting positions, to emplace obstacles, and to construct and maintain lines-of-communications in all weather and terrain. Quick-fix solutions that enabled engineer equipment to function in cold regions were provided by using existing equipment and manpower resources. Specific fielded materiel solutions include a ripper bucket that allows the Small Emplacement Excavator (SEE) to excavate frozen materials, a ripper tooth that improves the Combat Engineer Vehicle (CEV) and D-7 tractor's excavating capability, and engineer equipment outfitted to plow snow and improve mobility.

### BACKGROUND

The cold regions of the world provide the most severe challenges to military activities. As seen during recent deployment to Bosnia and Macedonia, low temperatures and frozen ground dramatically reduce equipment performance, resulting in significant cost or performance penalty for many activities. Combat engineer units are required to excavate fighting positions and obstacles and to construct and maintain lines of communication in all weather and all terrain. Digging seasonally frozen ground can be a significant problem even for mechanized units, since their most effective tool, the D-7 tractor with a ripper, is no longer available at the division level. Existing equipment for this task, the SEE with a standard bucket, and the Armored Combat Earthmover (ACE), both have problems penetrating frozen ground. Also, in the past, the Army has not been greatly concerned with snow removal over lines of communication or at support/staging areas. As a result, no engineer vehicles are specifically outfitted to move snow. Existing engineer equipment, such as the SEE with a front-end loader or the ACE with its bulldozer blade, will not move snow efficiently.

### TECHNOLOGY

The SEE-fitted ripper bucket excavates frozen ground where the frozen surface layer cannot be penetrated by standard buckets. Field demonstrations have shown that the ripper bucket outperforms the standard equipment assigned to engineer units in digging and excavating frozen ground. A ripper tooth can easily be mounted on a blade-equipped engineer tractor, such as the CEV, D-7 and JD410 tractor, which doesn't have a rear-mounted ripper to accomplish ripping tasks. A SEE-designed snowplow can be easily mounted on a SEE without any modification and has proven to be an extremely effective snowplow for clearing roads as well as staging areas, parking lots, and other facilities. A HMMWV-designed snowplow is easily mounted on the HMMWV and has proven to be very successful in plowing roads, helipads, and other facilities.



*Ripper tooth mounted  
on a bulldozer blade.*

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May 1997



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