Sets, Kits, and Outfits:

Pioneer, Minefield Marking, and Demolition Tool Sets

By Alan Schlie

This is the second of four articles on sets, kits and outfits. This article focuses on pioneer tool sets and minefield marking and demolition tools. The first article discussed tool sets for the construction trades; the third will be on bridging, diving, lighting, and fire-fighting tools; and the fourth will feature tools for technical trades and topography.

Pioneer tool sets have remained relatively unchanged since the Korean Conflict. The only modifications in the past decade have been to eliminate tools not used during combat training center rotations. Yet the commercial tool industry has made some innovative changes to the old "pick and shovel" for ergonomic and manufacturing reasons, as well as to increase productvity, and we have updated the Army's tool sets to incorporate these innovations.

Materials

Plastics have captured a large share of the manufacturing market, especially as a material for tools, cases, and handles. Flexibility of use and ease of manufacturing are only two of the reasons. The capability to mold plastics in various colors and imprint messages in the material are other reasons for their popularity. For example, good wooden handles are expensive to manufacture and are becoming hard to find; therefore, many users don't replace handles, they just buy new tools. In the new pioneer sets, most of the tools with handles use a plastic-fiberglass composite patented by the NUPLA® Company. Tools that don't have cushioned grips to reduce the transmission of shock to the arms have ribbed vinyl grips to reduce hand slippage.

Set Descriptions

The **Squad Pioneer Tool Set (Light)** is available in two versions. If the squad vehicle is a truck or a Bradley, the set weighs 400 pounds and is packed in two high-impact plastic, olive-green Hartigg® storage and transport cases measuring 68 inches long by 15 inches wide by 15 inches high (they resemble coffins). When the squad vehicle is an M113 armored personnel carrier, the tools are packed in two aluminum boxes specially designed to replace the seats. The tool set weighs 500 pounds.

Components of the two sets are identical and include a selection specifically prepared for the combat engineer who "drops" in on the target. Components include the MAX®, a multipurpose tool that can be configured as a shovel, axe, rock pick, clay spade, rake, or hoe, which takes up less space and weighs less than the individual tools. Normal D-handle shovels and pick-mattocks are provided for more serious excavations. The shovels have a serrated point, which easily cuts through sod and small roots but also works well in rocky soil. A picket pounder and a smaller picket cap speed wire emplacement and save sledge-hammer handles. As added protection, the sledgehammers and axes have thick rubber cuffs at the juncture of the handle and head. The machete is replaced by the Woodsman Pal®—a 17-inch swinging tool with a machete edge and a brush hook. It comes with its own sheath and sharpening stone. Mine/countermine tools include mine probes, mine-marking bonnets, minefield-marking tape, engineer tape, parachute cord, trip-wire grapnels, and steel tie wire.

New items are two *Tactical Rappelling Kits* and the *Nail-Driver Kit*. Each Tactical Rappelling Kit contains 75 feet of 3/8-inch-diameter Kermantle® rope, a figure eight, rappelling harness, an anchor strap, carbiners, Prusik cord, snap links, and a carrying bag. Although these kits increase the squad's



Squad Pioneer Tool Set (Light)



Platoon Pioneer Tool Set

deployment options, they also increase training and inspection/certification requirements.

The .27 caliber *Nail-Driver Kit* contains heavy and medium loads sufficient to drive various pins, studs, and nails into steel and concrete. A variety of straps, couplings, and clips can be used to hang demolitions on bridge piers, stringers, or bunker walls; or to run demolition firing lines. The nail driver—which comes with its own cleaning brush, oil, and carrying case—can also be used for framing or sheathing buildings; constructing bunkers; installing electrical wire; or posting signs, pictures, or notices. Units may need to revise their security and safety procedures to properly store this kit.

The **Squad Pioneer Set (Land Clearing and Building Erection)** will be used in squads of corps wheeled, composite, airborne, and light battalions; squads of combat heavy battalions; squads of port opening and pipeline companies; and in utility sections. This set contains hand tools not found in other sets that are used to clear land and erect buildings. In addition to the tools contained in the Squad Pioneer Set (Light), this set has additional shovels, a single-bit axe, a double-bit axe, pinch and pry bars, rakes, a felling lever, a vise, a seven-piece grip pliers kit and wrenches, marking flags, special hooks, a 1-ton ratcheting chain hoist, ratcheting tie-down straps, rooftop anchors, and full-body support harness kits (for working on roofs or other off-the-ground projects).

A number of optional tools are available, based on mission need and the commander's authorization. Some of these are in the 4-ton, hand-operated hydraulic ram set for moving, spreading, lifting, and positioning large structural members. Inflatable bag jacks, air inflators and gauges, bottle jacks, and electrical extension cords may be required for some construction and recovery tasks.

Although each engineer squad is authorized a chain saw by separate line identification number (LIN), supporting items are in the squad pioneer tool sets: a file set to sharpen the chain; a pair of camouflage-patterned safety chaps to protect legs from cuts; a clear polycarbonate, antifogging face shield to replace the goggles; a five-gallon safety can for the gas-oil mix; and timber wedges to assist in felling trees.

The **Platoon Pioneer Tool Set**, which is used by most combat engineers, is being reassigned to units authorized the Squad Pioneer Tool Set (Land Clearing and Building Erection). This set provides squads with tools needed infrequently or that are too costly to equip each squad.

The centerpiece of the Platoon Pioneer Tool Set is a Model 763 Bobcat® skid steer with combination bucket, auger, paving breaker, and forklift attachments. The 46-horsepower diesel engine provides the skid steer a 1,500-pound operating capacity, a hydraulic flow rate of 15 gallons per minute at 3,000 pounds per square inch, and a road speed of 7 miles per hour. The bucket's capacity is up to 12.9 cubic feet and has a lift pin height of 114 inches. The auger unit comes with variable extension and augers of 12-, 24-, and 36-inch diameters. It can auger to depths of 8 feet, and two side-by-side 24-inch holes can easily be connected for a fighting position. The forklift, which has 42-inch-long tines that adjust to widths up to 48 inches, reaches high enough to offload pallets and pickets from the cargo bed of a HEMTT. The hydraulic breaker can be positioned for vertical or horizontal strokes of the moil point, asphalt cutter, tamper, or picket driver. A concept evaluation in June 1997 determined that using the skid steer and picket driver reduced squad emplacement times for triple-standard concertina wire by 40 percent. Other attachments can be obtained for specific missions at the commander's discretion.

Additional sledgehammers, rakes, shovels, pry bars, engineer tape, and tie-down straps are included to support squads in specific tasks. New tools include clay picks, tarps, a bungee cord kit, RoboGrip® pliers, hand-held star bits and chisels with grips/guards to protect hands from misplaced hammer blows, drum deheader, vise, stapling hammer, pole- and tree-climbing kit, log jacks, and peavey. To support tasks that require chain saws, there is an electric chain-saw

sharpener, abrasive blades, depth gauge, calipers, and goggles.

A portable, gasoline-powered, 1.75-ton winch with 3/16-inch cable is provided for logging, skidding, recovering, ferrying, erecting, assembling, and disassembling tasks. Additional pulleys, wire rope, clips, thimbles, swivel hooks and anchor shackles allow a variety of applications for the winch. A hydraulic cable cutter, pocket socket kit, log chain, and cable-pulling clamps complete the list of tools to support working with wire rope.

The **Platoon Pioneer Tool Set (General Labor)** also has been revamped. It now provides noncombat/construction engineer platoons with pioneer tools needed to develop a defensive perimeter. It is suitable for a bridge platoon, equipment platoon, headquarters and headquarters company, or any other nonengineer platoon or company. The set contains shovels and picks for 28 soldiers, plus axes, sledgehammers, posthole diggers, bow saws, rakes, machete/brush hooks, picket pounders, and hatchets. Hand files, goggles, chain-saw chaps, bolt cutters, marline, engineer tape, adjustable wrenches, hacksaws, combination saws, hammers, pliers, tape measures, and twine are also included. In some cases, this set eliminates the requirement for the platoon or company to maintain a complete squad carpenter set. The Platoon Pioneer Tool Set is transported in four Hardigg® cases and weighs 400 pounds.

Either the old or the new NSN can be used for the Platoon Pioneer Tool Sets to meet the requirement of the LIN, which gives unit commanders the option of retaining the old sets or purchasing new sets as needs arise and funds become available. Units that retain old sets still meet all readiness reporting criteria. However, some items in the old sets will be replaced by like items in the new set, such as tools with NUPLA® handles, and will not need to be procured with the new set.

The **M133 Hand-Emplaced Minefield Marking Set (HEMMS),** NSN 9905-01-019-0140, is unique in the sense that it is not subject to the 5-year review cycle. The employment, operation, and maintenance of the HEMMS are contained in Technical Manual (TM) 5-9905-200-01. Changes to the set may be requested on a DA Form 2028, *Recommended Changes to Publications and Blank Forms*, sent directly to the Commander, U.S. Army Communications - Electronics Command, Fort Monmouth, New Jersey. The HEMMS is a means of guiding friendly forces safely through or around our scatterable or conventional minefields. It consists of a line of poles containing flashing lights connected by fluorescent orange tape to temporarily mark minefields. However, if the minefields are to be left in place longer than 15 days, the HEMMS should be replaced with Minefield Marking Set #2.

Components are considered to be part of the end item; as such, they must be with the end item whenever it is issued or transferred between property accounts. A complete set will mark 700 to 1,000 meters of fence. The set can be reused until there are too few parts to mark 400 meters of fence; at that time, partial sets should be combined. *Remember to install new batteries in the lights before using the set.* The HEMMS is available through the common table of allowance at one per active Army category I company, two per active Army combat engineer company, and one per unit as required for training. The set weighs 175 pounds and is transported in a plywood box.

The **Demolition Equipment Set (Electric and Nonelectric Initiating)** is currently being revised. The introduction of modernized demolitions initiators, which are basically nonelectric initiators, will not eliminate electrical circuit components yet, because they are still available in the supply system. New items that may be added are explosively formed penetrator kits, linear-cavity charge kits, linear-shaped charge kits, or conical-cavity charge kits adapted from the M303 Demolition Set. Of particular interest are the means of attaching charges to various surfaces—zip ties, bungee cords, telescoping poles and stands, and adhesives/tapes. Sound-suppressed nail drivers may be needed in combat units to

Unit Responsibilities

The Platoon Pioneer Tool Set introduces a number of training, transporting, and maintenance issues that units must resolve. The skid steer operator has not been identified, and there is no training course available in the Army school system. Units must designate operators and provide training for them and the mechanics. This will include a combination of on-the-job training, the Bobcat® operator course that comes with the set, and the local dealership's assistance. There are 92 dealerships around the world that are ready to provide help, but the key to operator proficiency is stick time.

The set includes boxes for storing and transporting hand tools, but there is no trailer to transport the skid steer and attachments. For the time being, the skid steer, which weighs 5,368 pounds, and the attachments, which weigh 2,200 pounds, must share a ride on other unit transporters.

Because commanders had expressed an immediate need for the skid steer based on its recognized utility, a decision was made to proceed with two courses of action. First, the skid steer would be included in the Platoon Pioneer Tool Set, and a national stock number (NSN) would be obtained. This action allows commanders to purchase and retain the set if they have a requirement and funding. Secondly, systems development and operational requirement documentation would proceed along the normal course, eventually providing for a separate LIN, development of maintenance data, inclusion of a dedicated transporter, and normal procurement and fielding.

Revised Tool Sets

NSN	Description	LIN Number	GSA Price
5180-01-447-2200	Carpenter's Squad Box Tool Kit	W34648	$1,724.25
5180-01-447-2199	Carpenter's Platoon Box Tool Kit	W34511	2,848.95
5180-01-441-2123	Base Maintenance Woodworking Tool Kit	T16988	9,164.33
5180-01-461-8105	Electrician's Squad Tool Kit	W36977	7,541.10
5180-01-461-8110	Mason Squad Tool Kit	W44923	6,153.69
5180-01-467-4679	Pioneer Squad Light Tool Kit	W59240	5,281.25
5180-01-467-4691	Pioneer Squad Light Tool Kit/M113 Units	W59240	7,562.50
5180-01-467-4685	Pioneer Squad Land Clearing and Building Erection Tool Kit	W48348	7,875.00
5180-01-467-4677	Pioneer Platoon Manual Labor Tool Kit	W48074	51,875.00
5180-01-467-4684	Pioneer Platoon General Labor Tool Kit	W48211	6,750.00
5180-01-461-8170	Plumber's Platoon Tool Kit	W48759	7,817.86
5180-01-461-8108	Plumber's Squad Tool Kit	W48622	5806.45
5180-01-467-4676	Plumber's Tool Kit	W49033	3,225.00
5180-01-441-2125	Multisaw and Drill Tool Kit	NA	3,758.61
5180-01-441-2124	Pneumatic Nailer and Compressor Tool Kit	NA	2,868.64
5180-01-441-2122	Table Saw and Router Tool Kit	NA	2,537.08
5180-01-436-8537	Cordless 18-Volt Power Tool Kit	NA	2,117.66

create anchorage points. How to transport the demolition specialist's tools of the trade is also under consideration. While the demolition materials are a Class V item and not considered part of the set, there are a multitude of new techniques—including binary mixes, explosive cutting tapes and sheets, and explosive water-metal liner combinations—and delivery concepts.

Since the first of this series of articles on sets, kits, and outfits was published (*Engineer*, August 1999, page 54), NSNs have been obtained for all of the tool sets. Units may obtain the complete set at the present time; however, the old sets must be retained until all set components have been given NSNs and a supply catalog is published. As of the September 1999 *Consolidated Publication of Component Lists* (EM0074, CD-ROM), only the LINs for the Squad and Platoon Carpenter's Sets list supply catalogs for both the old and new NSNs.

Since the first article, there also have been changes to the Plumbing and Pipefitter Sets. Each individual plumber will be authorized a *Plumber's Tool Kit* (*Field Maintenance*), LIN W49033, NSN 5180-01-467-4676, for maintenance and repair as well as installation of new plumbing pipes and fixtures. The *Pipefitter's Tool Kit* (*1/8-inch to 2-inch-Diameter Pipe*) and *Plumber's Supplemental Tool Kit (2 1/4-inch to 4-inch Diameter Pipe*) will be placed at platoon (or team) level based on the mission need to install, replace, or repair pipe.

The modified table of organization and equipment authorizations for various sets may change as requirements are realigned.

Summary

As always, input from the user is necessary to continue to create tool sets that help soldiers accomplish their missions. Send your ideas and comments to the Director of Combat Developments, Engineer Division, Organization Branch (Tom Knotts or Alan Schlie), 320 Engineer Loop, Suite 141, Fort Leonard Wood, Missouri 65473-8929. Telephone numbers are commercial (573) 563-6191, DSN 676-6191, and fax (573) 563-4089/5056. The e-mail address is *schliea@wood.army.mil.*

Mr. Schlie is a force development analyst with the Directorate of Combat Developments, U.S. Army Engineer School. A retired command sergeant major, he has served in various capacities in Europe, Korea, and CONUS throughout his career.