

UNITED STATES MARINE CORPS
Logistics Operations School
Marine Corps Combat Service Support Schools
Training Command
PSC Box 20041
Camp Lejeune, North Carolina 28542-0041

AOM 6302

STUDENT HANDOUT

GENERAL MECHANIC'S TOOL KIT

LEARNING OBJECTIVES

1. Terminal Learning Objectives:

a. Given components of a general mechanic's tool kit, demonstrate or describe as appropriate, the procedures required to properly use a representative tool from each tool group in the kit, per information contained in TM 10209-10/1. (6.3.1)

b. Without the aid of references, given components of tools located in the Tool Set, Common No. 1, describe or demonstrate, as appropriate, the intended application of each tool, per information contained in TM 10209-10/1. (6.3.2)

2. Enabling Learning Objectives :

a. Given the components of a general mechanic's tool kit, per information contained in TM 10209-10/1, demonstrate or describe as appropriate, the procedures required to properly use a/an:

- (1) split box wrench, (6.3.1a)
- (2) adjustable wrench, (6.3.1b)
- (3) ratchet wrench, (6.3.1c)
- (4) universal joint drive socket, (6.3.1d)
- (5) hinged handle, (6.3.1e)
- (6) hex head key wrench, (6.3.1f)

- (7) common flat screwdriver, (6.3.1g)
- (8) crosstip screwdriver, (6.3.1h)
- (9) offset screwdriver, (6.3.1i)
- (10) open end wrench, (6.3.1j)
- (11) box wrench, (6.3.k)
- (12) drive pin punch, (6.3.1l)

b. Without the aid of references, given components of the Tool Set, Common No. 1, per information contained in TM 10209-10/1, describe or demonstrate, as appropriate, the intended application of a:

- (1) torque wrench, (6.3.2a)
- (2) slide hammer, and (6.3.2b)
- (3) rivevter kit. (6.3.2c)

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COMPONENTS OF THE GENERAL MECHANIC'S TOOL KIT

TOOLBOX. The mechanics toolbox is used for storing and carrying a variety of hand tools.

MEASURING TOOLS

1. Machinist Rule

a. The machinist rule has different scales. On one side we find graduations of $\frac{1}{32}$ inch. On the other side you will find graduations of $\frac{1}{16}$ and $\frac{1}{8}$ inch.

b. The machinist rule is used to measure short linear dimensions.

2. Precision Tape Measure

a. The measuring tape is six feet long and is graduated in major increments of one inch. The smallest graduation is $\frac{1}{32}$ inch.

b. The tape is used for measuring linear dimensions,

but because of its flexibility, it may also be used to measure the circumference of round objects.

3. Gap Setting and Thickness Gages

a. The gages in the kit are of two types:

b. The gap setting gage has angular wires that are graduated in size from 0.022 to 0.040 in diameter.

c. The thickness gage is used to measure space between objects, normally in making precision adjustments or when fitting parts. It is used by moving the blade in and out during the measurement. When a slight drag is felt, the thickness of the blades being used is the width of the space between the two objects.

TURNING TOOLS

1. Wrenches are the first turning tool which we will discuss.

a. Open End Wrenches (Double) Flare Nut

(1) There are two sets of wrenches in this tool kit. One set is metric graduating in size from 9mm to 21mm. The other set is USCS (United States Customary

Standard) they graduate in size from 1/4 to 13/16 inch.

(2) These wrenches are used for fuel lines, they are designed with a split box. This split box resembles a box wrench with a section cut out of it.

b. Box Wrenches (Double)

(1) The box wrench set included in the tool kit consists of two wrench sets, each having a different size box on each end. These wrenches range in size from 3/8 to 3/4 inch. The other set consists of four metric wrenches ranging from 10mm to 19 mm.

(2) Box wrenches are safer tools to use than open end wrenches since they will not spread and slip off the work.

c. Combination Wrenches

(1) There are two sets included in the tool kit. One set is graduated from 5/16 inch to 1 inch. The other set is graduated from 10mm to 24mm.

(2) Combination wrenches are desirable in the mechanics tool kit because of their versatility, eliminating in many cases the need for handling two wrenches during the performance of a particular job.

(3) These tools should be wiped clean before storing in the toolbox.

d. Adjustable Open End Wrench

(1) This wrench comes in a variety of sizes, however those included in this kit are of two sizes; an eight inch wrench with an opening of 0 to 15/16 inch, and a twelve inch wrench with an opening of 0 to 1-15/16 inch.

(2) When using this tool, be certain that it is adjusted snugly against the flats of the bolt or fitting and positioned in such a way that when torque is applied it will be on the fixed jaw of the wrench. If the wrench is positioned incorrectly, it may damage the jaw.

e. Pipe Wrench

(1) The adjustable pipe wrench has two jaws which are not quite parallel. The outside jaw, which is adjustable, is made with a small amount of play which will apply a wedging grip on the pipe or surface when the wrench is turned in the direction of the moveable jaw. This is the only wrench that will take a bite on round objects.

(2) Keep in mind when using this tool that it will always leave marks on the work surface. Never use this tool as a substitute to turn nuts or bolts.

f. Socket Wrench Sets. Socket sets are sized by their drive, socket dimension, and the number of points. The general

mechanics tool kit contains two sets of socket wrenches, including driving accessories and special bits.

six
point

twelve
point

- (1) There are two 3/8 inch drive socket sets in this tool kit and other various components as listed below:
 - (a) One set consists of seven, twelve point sockets ranging from 1/4 inch to 5/8 inch.
 - (b) The other set consists of seven metric six point sockets ranging from 8mm to 14mm.
 - (c) A universal joint drive socket. This socket is used when straight access is not possible and the work must be accomplished at an angle.
 - (d) Ratchet drive handle six inches in length.
 - (e) Hinged handle, seven to ten inches long.
 - (f) There are two socket wrench extensions included in

the 3/8 inch drive socket set; a 3 inch and 6 inch extension. They provide a deep reach capability for those hard to reach places.

(2) Now we will examine the 12 point 1/2 inch square drive socket set.

(a) Twelve, standard depth sockets, sized in sequence from 9/16 inch through 1-1/8 inches.

(b) Ten, deepwell sockets, sized in sequence of 1/16 inch increments from 3/8 through 15/16 inch.

(c) Twelve, metric standard depth, sized in sequence from 14mm to 27mm.

(d) Ten, metric deepwell sockets, sized in sequence from 10mm to 24mm.

(e) A ratchet handle (reversible, 1/2 inch square drive, nine inches long.

(f) Hinged handle. This tool provides additional leverage that may be needed to break bolts or nuts loose.

(g) Extensions. There are two socket wrench extensions in the kit; five and ten inches in length.

(h) Universal joint socket. This tool is used to reach around an object to remove or install common size nuts or bolts.

g. Special Wrenches

(1) Socket head key set (Allen wrenches). These wrenches are used on bolts or screws with hexagon recessed heads, such as set screws. There are two sets included in the tool kit, one standard set and one metric set.

(2) Plier Wrench (vise grip pliers). Although this tool is usually considered a plier, it is closely related to the pipe wrench with adjustable jaws. Use this tool for the same purpose as

the pipe wrench only on the smaller items. Remember it will score the surface on which it is used.

(3) Crow Foot Wrench. This tool is used to remove or install waterproof ignition harness fittings used on military gasoline spark ignition engines. Because we now have an all diesel engine powered fleet of vehicles, you will not use this tool often.

2. SCREWDRIVERS. The screwdrivers included in this kit are of three types and are sized by their tip dimension and shank length.

a. Crosstip. There are five crosstip screwdrivers in the kit.

(1) Sizes

(a) Tip size No. 1, three inches long.

(b) Tip size No. 2, one and 1/2 inches long.

(c) Tip size No. 2. four inches long.

(d) Tip size No. 3, six inches long.

(e) Tip size No. 4, eight inches long.

(2) Crosshead screws are used extensively in automotive vehicles. The advantage of the cross slot is that it provides twice the screwdriver contact as the common screw; therefore, greater torque can be applied to the screw without danger of the slot stripping out.

b. Common Flat Tip (Straight Slot).

There are five flat tip screwdrivers in the kit.

(1) Sizes

(a) A 5/16 inch tip width, with a shank 6 inches in length, and a wrench grip.

(b) A 3/8 inch tip with a shank 8 inches long and a wrench grip.

(c) A 3/16 inch tip with a 1-1/2 inch shank.

(d) A 1/4 inch tip with a 4 inch shank.

(e) A 1/4 inch tip with a 1-1/2 inch shank.

(2) Screwdrivers should always be selected to match the screws on which they are to be used. If the match is incorrect the screwdriver may slip, causing personal injury or damage to the screw slot.

c. Offset Screwdriver (Common)

(1) Many times there is a requirement to turn a screw and it is impossible to make a straight approach because of confinement, so we have an offset common screwdriver included in the kit for just such occasions.

(2) When using the offset screwdriver be sure to exercise care when positioning it in the screw slot to prevent damage.

GRIPPING AND HOLDING TOOLS

1. Pliers are generally designed for gripping, holding, cutting, bending, and for other

special purposes. The tool kit contains different types of pliers, as follows:

- a. Slip Joint Pliers. There are two pairs of adjustable slip joint pliers in the kit.
 - (1) Angle nose tongue and groove, self-gripping pliers, ten inches long.
 - (2) Straight nose common pliers with cutters, eight inches long.
- b. Side Cutting Pliers. There is one pair of side cutting pliers included in the kit.
- c. Long Nosed Side Cutting Pliers. These pliers are used for reaching into confining spaces, cutting soft wire or holding small parts.
- d. Diagonal cutting pliers. These pliers are used to cut and

remove cotter pins and for spreading the ends of cotter pins after they have been installed.

- e. Special Purpose Pliers. These pliers are designed to remove and install brake shoe retracting springs.

- 2. Pliers should be inspected regularly and if the grip's serrations are worn or damaged, they should be replaced.

- 1. HAMMERS

- a. Machinists ball peen hammers have a round ball on one side and a flat face on the other. They are designed this way so that they can be used for all general purpose impact work which a mechanic might need to do. This kit contains two ball peen hammers in the following sizes:

- 1 4 ounces

- 2 16 ounces

- b. Hammers should be inspected frequently for face and handle damage which may mark the surfaces on which they are used or cause injuries.

2. DRIFT PIN PUNCHES. There are three types of punches included in the kit.

- a. These punches are used to drive out tapered or straight dowel pins. The tapered punch may also be used to align holes in components to be fitted or bolted.
- b. When using these punches, remember to select them carefully for proper size, center them on the pin to be removed, select the proper size hammer and strike the pin squarely. Drive pin punches should be inspected frequently, as constant use is apt to bend the punch or mushroom the tip. Replace them if they are damaged.

3. COLD CHISEL

- a. The cold chisel is used to cut cold metal, cut off rivets or small nuts and bolt heads.

- b. Chisels must be inspected before, during and after use. Be sure there are no burrs or chips and that the chisel is sharp.

SPECIAL PURPOSE TOOLS

1. BRAKE ADJUSTING TOOL. This tool is used to make brake shoe adjustments on drum brake mechanisms.

2. PRY BAR. At times, leverage is required to move or position small components such as gears and shafts. A tapered pry bar is included in the kit for that purpose.

3. MAGNETIC RETRIEVING TOOL. This is an extension magnet that can be used to retrieve parts, bolts, foreign metal objects or tools which may be dropped in confined places.

4. FLASHLIGHT. The kit also includes a plastic, clear lensed, waterproof flashlight, with two batteries and two spare bulbs which are stored in the base of the flashlight.

5. KNIFE. A utility pocket knife with a cutting blade, screwdriver and wire gripper blade is included for a variety of uses.

6. FILES. Files are essential in the mechanics tool kits for a number of reasons; to remove burrs, sharpen tools, to remove small amounts of metal, and to smooth surfaces. There are three different types of files in the kit.
 - a. Flat file for work on flat surfaces.

 - b. Round file for work inside of a radius or hole.

 - c. Triangular file (three corner) for working in corners.

7. BATTERY TERMINAL TOOLS
 - a. Battery Terminal Puller. This puller clamps over the cable terminal and, by turning a

screw the clamp is pulled away from the battery post.

- b Terminal Clamp Spreader. This tool is used to spread battery cable clamps for reinstallation.

- 8. ELECTRICAL CIRCUIT TESTER. This tester is called an ice pick type because of its sharp point that will penetrate the insulation of wiring. It has a wire lead with a spring clip attached. The tester is used to check for available voltage. If the circuit is complete and battery voltage is available, a light in the handle illuminates.

- 9. WIRE TWISTER PLIERS. These pliers are used to twist wire to lock nuts and bolts in place where vibration is a problem.

- 10. The one quarter inch socket set is used to loosen or tighten small nuts and bolts as on instrument panels and data plates.

CLEANING TOOLS

The cleaning tools provided in this kit consist of:

1. WIRE BRUSH (STEEL). This brush has a wooden handle and is intended to remove rust, paint and scale.
2. PUTTY KNIFE. The putty knife is used as a scraper to clean smooth surfaces, such as mating surfaces, and in preparation for gasket installations.
3. PAINT BRUSH. This brush is used for cleaning parts in liquid cleaners such as solvent.

PADLOCK. Always keep your tool kit locked.

10. CONTROL AND SERVICEABILITY OF TOOLS

a. The tool items that have been provided in the general mechanics tool kit have been selected as a result of an analysis of every task which the organizational maintenance mechanic has to perform.

b. The Marine Corps has established mandatory guidelines which govern the control of tools. These guidelines are outlined in MCO P4790.2 (MIMMS Field Procedures Manual) and indicate two areas of consideration:

(1) Inventory. The MCO directs that each tool kit be inventoried in accordance with appropriate SL-3 (in this case SL-3-00456A) when the tool kit is issued to the mechanic, quarterly while it is in their custody, and when the kit is turned in.

(2) Serviceability inspection. The order also requires that an itemized serviceability inspection be conducted on each item in the kit at the same intervals, and that any item found damaged or missing be replaced.

(3) Within the SL-3 is an inventory sheet for the general mechanics tool kit. The inventory sheet consists of the following:

(a) Item number. Numbers are assigned in sequence and are for reference purposes only.

(b) Stock number. This column provides the National stock number for each item.

(c) Item identification. In this column, the name of the item is provided in alphabetical sequence.

(d) Unit of measurement. This column provides the measurement standard for each item.

(e) Quantity used in unit. This column lists the total quantity of an item.

(f) Month. This section is divided into twelve columns. Each column has a space at the top to enter the first letter of the month the inventory is conducted.

(g) Remarks. This column is used to enter information relative to the item. For example; item No. 3, is a wire brush. If this item is missing from the tool kit, or is unserviceable, but has been placed on order, the supply document number would be entered in the column.

(h) The last page of the inventory sheet provides a space for the signature of the person conducting the inventory, date of the inventory, signature of the person supervising the inventory, and a legend that describes the symbols used to annotate the inventory sheet.

(i) Replacement for missing or unserviceable tools will be requisitioned upon completion of the inventory.

(j) Excess tools will be returned to the supply system.

(k) A copy of the completed inventory will be maintained in the tool kit, or in a file folder maintained by the tool NCO or commodity manager in a secure area.

REFERENCES :

TM 10209-10/1
SL-3-00456A
SL-3-10025A