MAINTENANCE PRACTICES-I

MODULE - 7

REFERENCE BOOKS: SHOP THEORY (REFERENCE BOOKS: SHOP THEORY (J. A Enderson & Tatro),EASA Module-07A Maintenance Practices (AIRCRAFT TECH BOOK CO) ,

7.2 Workshop Practices

1. Care of tools, control of tools, use of workshop materials;
2. Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.

FILES:

1. Be sure that the file has a handle.
2. See that the handle fits securely.
3. Never use a file without a handle.
4. Remove burrs and abrasions from the file handle before using it. They cause blisters.
5. Do not use a file as a hammer. Flying pieces of hardened steel can pierce human skin.
6. Striking a file with a hammer will also cause steel splinters to fly.
7. Using a file as a pry bar is a sure way of breaking it.
8. Keep files separated from each other and do not throw files against other files when returning them to the tool drawer.
9. Keep file teeth clear of pins.
10. Do not let oil and dirt collect in the gullets of the file.
11. A file that slips over the metal can cause skinned knuckles. HAMMERS:
    1. Always check the fit of the handle in the hammerhead.
    2. Make sure that the wedge is in place, and tight.
    3. Do not use a hammer with a broken or split handle.
    4. Always remove oil, grease, and dirt from the face and the· handle of the hammer
    5. Never use the face of the hammer to strike against another hardened tool.
    6. Use the right sized hammer for the job; an 8-oz hammer will not do the work of a 1 1/2-lb hammer

WRENCHES:

1. Keep wrenches clean; wipe off oil and grease before using the wrench.
2. Stop any machine before using a wrench. Whether it is to tighten, loosen, remove, or adjust, first stop the machine.
3. Be sure that the wrench fits the nut snugly.
4. An oversize wrench will slip and round off the corners of the nut.
5. Whenever possible pull on the wrench; don't *push.*
6. Stand with proper balance whenever it is necessary to pull hard on a wrench: one leg behind the other.
7. The design of a wrench provides sufficient length for safe leverage. Circumstances arise, however, when extra length must be added. When this happens, take extra safety precautions.
8. Do not hammer on the end of a wrench. This results in springing the jaws of the wrench and raising sharp, dangerous, and unsightly burrs on the end of the wrench.
9. Use an adjustable wrench only when a nonadjustable type is not available. The jaws of an adjustable wrench are not designed to withstand excessive pressure.

- Observe these safe hacksawing practices:

1. Grip the work in the vise so that the saw cut will be near the jaws (Fig. 2-23). ·
2. Apply pressure only on the forward stroke.
3. Start the saw cut with a light, even, forward stroke, holding the saw frame at an angle.
4. When the cut is established, hold the frame level and saw the full width of the job.
5. Take the longest stroke possible, but do not permit the blade-supporting pins to touch the jaw.
6. Use a blade having the proper number of teeth per inch to suit the job;

fine pitch for thin metal, coarse pitch for thick pieces.

- Follow these safe drilling practices:
  1. Think about what you are doing. Keep your mind on the job.
  2. Dress safely. Remove rings, watches, identification bracelets, and neckties. Roll up sleeves.
  3. Fasten the job or vise securely to the table.
  4. Remove tools, damps, wrenches, and so forth from the table before starting the drill.
  5. Remove drill drift from spindle or chuck key from the drill chuck immediately after use.
  6. When the drill becomes dull, resharpen it or replace it. Grind the drill correctly for the metal it is required to cut.
  7. As the drill breaks through the work. Relieve the down-feed pressure. Stop the machine before measuring or adjusting the job.
  8. Stop the machine before using a brush to remove chips and excess coolant.

CARE OF TOOLS

1. Each engineer is responsible for the acquisition and maintenance of his or her own common hand tool set.
2. Wrenches, spanners, socket sets, hammers, screwdrivers, pliers and the like are normally owned by the engineer while the maintenance organization owns and provide special tools required to maintain the aircraft and power plants.
3. The user of any tool has the responsibility to ensure the tool is in good working condition.
4. Tools must be kept clean.
5. A light coating of oil wiped on the tool after use helps prevent corrosion of steel tools.
6. Tools with moving parts should be kept clean and lubricated if necessary to perform as designed.

7. Engineers typically store their tools in sturdy tool boxes when not in use.
8. Special tools, especially precision instruments, are often stored in each tool's own custom made storage container
9. . A quick, visual inspection before use is needed.
10. Complicated or precision tools should be inspected, zeroed or calibrated, and operated in accordance with instructions that accompany the tool.
11. If ever in doubt about how to use a tool, the technician should seek assistance from an experienced colleague or the manufacturer of the tool.

DIMENSIONS, TOLERANCES, ALLOWANCES: The aircraft maintenance engineer works with consideration for dimensions, allowances and tolerances.

- **A dimension** is a measurable extent of some kind, such as length, width, or height. Aircraft components including hardware have dimensions that physically describe the item from a size prospective.
- **A limit dimension** is the maximum or minimum dimension of a machined part. When referring to the size of an item, nominal size is an approximate dimension that is used for the purpose of general identification.
- **The basic size** is the theoretical size from which limits of size are derived by applying allowances and tolerances.
- **The actual size** of a part is the measured size.
- **A tolerance** is the total amount by which a given dimension is alloyed to vary. Thus, if a basic size is known and the tolerance is known, one can measure the actual size of a part and know whether it is within tolerance. For Example, the diameter of a piston is 4.0 inches. This is its basic size. The tolerance established by the engine manufacturer is .005 inch. This means that if the piston is measured, its actual size must be between 3.995 inches and 4.005 inches to be within tolerance. If it

is not, the piston is rejected for use in the engine.

- Most tolerances are given as **bilateral tolerances**, meaning that the tolerance can be added to or subtracted from the basic size. However, there are parts where a **unilateral tolerance** is given by the manufacturer. This means that the basic size only has tolerance in one direction. For example, consider a piston again. Too large of a piston can cause it to seize in the cylinder during operation. A piston negligibly smaller than the basic size of the piston will perform adequately. So the manufacturer may state the basic size and give a unilateral tolerance of -.005. If the actual measured size of the piston is the basic size or within .005 inch smaller than the basic size, the piston is within tolerance.
- Any measurement of the piston that is greater than the basic size would be cause for rejection because there is no tolerance in that direction. Tolerance can be used when examining the dimension of a single part or it can be used when comparing the dimensional relationship between two parts, which is known as fit. When examining fit, clearance is the space between mating parts.
- There are different types of fits which reflect variations in the clearance between parts. Generally, one can refer to a loose fit or a tight fit, etc. But in machining, terms assigned to describe fit have specific meanings.
- **A clearance fit** is a fit that allows for sliding or rotating between mating parts.
- **An interference fit** is one in which the dimensions of two parts over lap - such as when a pin diameter is slightly larger than the hole in which it is to be inserted.
- **An allowance** is the minimum clearance space intended between two parts. The intentional difference between the maximum material dimensional limits of mating parts creates the allowance. A limit is the maximum or minimum dimension formed when maximum or minimum tolerance is considered. Note that the fit of two items may be slightly different depending on which standard is being used. Standards for

 hardware such as AN and MS have basically the same fits and

clearances but there may be small differences in tolerance

----------*THE END***----------**

Signature of the Instructor **Signature of Training Manager**