

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

**MAINTENANCE AND CARE OF COMMON TYPE
MACHINE TOOLS AND SHOP EQUIPMENT
BEFORE, DURING, AND AFTER OPERATION**

Department of the Army, Washington, D.C.
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Section I. INTRODUCTION

1. Purpose. This bulletin provides operational techniques, practices, and procedures for care and maintenance of common machine tools and shop equipment before, during, and after operation to assure:

- a. Efficient and maximum use of the equipment.
- b. Adequate care to avoid expensive and untimely repair or replacement.
- c. A systematic collection of data to be used for planning maintenance and programming replacement of equipment.

2. Scope a. This bulletin contains standards of policies and procedures for care, maintenance, and preservation of machine tools and shop equipment in depot shops, mobile shops, and in the field.

b. General application of inspection, lubrication, and other preventive maintenance service procedures are contained herein.

c. When information contained in this bulletin is in conflict with previously published directives such as technical manuals, technical bulletins, etc., the standards set forth in those publications will govern.

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d. Installation safety rules will be observed in performing preventive maintenance services.

3. Procedures. a. Frequencies, procedures, and practices in this bulletin are guides which may be modified to meet local requirements.

Perform checks or tests as recommended by the equipment manufacturer or as set forth in the DA publication covering the specific item.

b. The officer in charge will:

- (1) Take positive action to remove the cause of recurrent maintenance problems as opposed to merely performing necessary repairs.

- (2) Assure that periodic inspection, spot checks, and services are made on all equipments.
- (3) Utilize technical publications, listed in DA Pam. 310-4, in conjunction with instructions of the manufacturer for operating and maintaining specific makes and models of equipment in establishing preventive maintenance procedures.
- (4) Train operating and maintenance personnel to improve their efficiency in maintenance procedures.

Section II. PROGRAMMING

4. General. A current and accurate inventory of machine tools and shop equipment is necessary for effective maintenance programming.

5. Planning. a. Considering the inventory and nature of the equipment, the officer in charge will set up a schedule for:

- (1) Use of the equipment.
- (2) Preventive maintenance service of the equipment.
- (3) Replacement of worn out and obsolete equipment.

b. Schedules will provide that::

- (1) Machine tools and shop equipment are serviced daily, weekly, and monthly when in use, and monthly when not in use.
- (2) The monthly servicing need not be every fourth week, but may be established as one of the weekly services regularly scheduled during a month.
- (8) Not all similar items will be out of use at one time.
- (4) Prior to becoming overage or uneconomically repairable according to published criteria or experience, the equipment is programmed for replacement.

6. Preventive Maintenance Service. As a means of assuring coverage, the officer in charge will maintain a record of assignments to the responsible personnel and verify the accomplishment thereof.

a. *Daily Preventive Maintenance Service.* Daily preventive maintenance service is normally provided by the equipment operator as follows:

- (1) *Before-Operation Service.* An examination to assure that the equipment is properly lubricated, fueled, and equipped for operation.
- (2) *During-Operation Service.* Constant alertness for any unsatisfactory performance, unusual noise or odor, abnormal instrument action, uneven operation, or any indication of malfunction.
- (3) *After-Operation Service.* An examination and servicing of the equipment to prepare for operation of the next day, and to correct deficiencies noted.
- (4) *Corrective Action.* Correction of any malfunction noted, or reporting it at once so correction may be made or equipment removed from use for pending repair.

b. *Weekly Preventive Maintenance Service.* Weekly preventive maintenance service is performed by the operator and crew assisted by organizational maintenance personnel. It is more thorough than the daily services, and it includes checks on performance as well as adequacy of the equipment.

c. *Monthly Preventive Maintenance Service.* Monthly preventive maintenance service is performed by operator and crew and organizational maintenance personnel, sometimes as

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sisted by personnel from direct support. The monthly service checks and corrects adjustments of the equipment, cleaning and lubrication of the equipment, and the replacement of minor parts. Do not replace parts as a routine matter, avoid unnecessary costly maintenance, and keep serviceable parts and assemblies in use until replacement is justified. If the equipment is found to need repairs not ordinarily performed during monthly services, take it out of use and send it to the depot shop for detailed examination and repair or rebuild.

d. Exceptions To After-Operation Services. Exceptions occur on occasion, as during prolonged inoperation of the equipment, or when it may be necessary to operate the equipment longer than the normal work shift. Subject to local determination, these services may be performed by organizational maintenance personnel or the relief shift operator as a "before operation" service.

7. Hand Tools and Special Tools Protect all hand tools from dirt, rust, and corrosion by periodic inspection and cleaning. Identify special tools with the specific equipment for which they are intended. Keep all special tools on a tool board or in the shop tool room. Stow all tools in their proper place so that interested personnel will know where to find them. TM 9-243 furnishes detailed information on use and care of hand tools.

8. Records. A good system of record keeping is essential for safe, efficient, and econom-

ical operation of equipment, and for planning and executing an effective preventive maintenance program. TM 8-750 contains efficient record information and explanation of record forms and their usage. The officer in charge will determine the types and usage of forms and records required for the specific preventive maintenance service. Forms most commonly used for preventive maintenance records are as follows:

a. DA Form 2402. This exchange tag accomplishes resupply by direct exchange.

b. DA Form 2404. This form is used as a maintenance work sheet for services, inspection, and diagnostic checkouts for readiness inspections.

c. DA Form 2405. This form is used as a maintenance register and controls repair work requested whether or not the work has been accomplished by the maintenance category responsible for the equipment.

d. DA Form 2407. Through proper preparation and use of this maintenance request form, organizational and direct support maintenance personnel may influence the capability and maintainability of the equipment.

e. DA Form 2408-1. This daily-monthly log shows the daily status of the equipment and provides records of hours operated, days nonoperative, and amounts of fuel or oil consumed.

When used as a monthly log, tile form provides a monthly record of the equipment's status.

Section III. PREVENTIVE MAINTENANCE PROCEDURE

9. General Machine tools and shop equipment are generally considered as fixed equipment, such as lathes, milling machines, drill presses, table saws, shapers, steam cleaners (some portable) and similar machines and along with other shop furnishings are considered to be under the scope of this bulletin. In the event of seeming conflict in, or lack of, maintenance instructions; maintain the equipment in the most economical manner for the job to be accomplished.

10. Inspection. To insure proper use, supply economy, and compliance with shop principles; machine tools and shop equipment must be sub-

jected to periodic inspections. Machine tools and shop equipment are subject to inspection as set forth in AR 420-82. Each category of maintenance will require that trained personnel consider all aspects of equipment use and insure inspection of a detailed technical nature of individual items. The officer in charge should make scheduled or informal inspections on a continuing basis (not of a detailed nature) to reveal major defects, carelessness, and causes of neglect. For command inspections see AR 750-8.

11. Operator and Crew Preventive Maintenance. Preventive maintenance services

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described below are of a general nature, and may not be applicable to all equipment. Experience will dictate which services may be eliminated and what additional services must be performed:

a. *Cleaning.* To keep machines clean use brush, wiping rags, and compressed air. Remove all debris at the end of each work shift.

Warning: Use extreme caution when applying compressed air for cleaning, since flying debris and small metal particles can be dangerous.

b. *Rust.* Protect machined and highly finished surfaces against rust. (This is particularly important on idle machines in areas of high humidity).

c. *Lubrication.* Lubricate machines according to specific instructions. Too much lubrication can be as harmful as too little. Do not attempt to force lubricants in sealed bearings.

d. *Vibration and Noise.* With machine running under no load, note unusual sounds which may indicate in balance or poor adjustment.

With machine under load, check for chatter caused by loose or worn ways, dull cutting tools, misalignment, or worn bearings.

e. *Switches.* Notice whether the machine starts and stops properly as the switch is thrown; if not, have condition corrected before using.

f. *Cutting Tools.* Inspect blades, cutting tools, drills, and other edged tools to assure that they are properly fastened, sharp, and without flaws. Replace or sharpen dull cutting tools.

g. *Grinding Wheels.* Grinding wheels must be free of oil or grease saturation and uneven wear. Inspect the wheel for cracks or chipped edges. Dress uneven wheels and replace cracked, chipped, or saturated wheels.

h. *Saw Blades.* Saw blades must be sharp and free of kinks. Inspect for missing or dull teeth. Do not leave blades under tension when not in use.

i. *Belts.* Inspect belts for frayed edges, cracks, breaks, and deterioration. See that each belt has proper tension to assure proper driving with no slippage.

j. *Nuts and Bolts.* Tighten loose nuts and bolts.

k. *Bearings.* Inspect bearings for overheating, binding, grating noises or shaft side play in the bearing.

l. *Wires.* Inspect all wiring for tight terminals and worn, cracked, or deteriorated insulation.

m. *Electric Motors.* Inspect the electric motors for excessive end play of the shaft, overheating, and proper operating speeds.

n. *Gages.* Visually check all gages to assure that the gage body or adapter threads are not distorted, glass cracked or broken, and that they are operating properly.

o. *Hoses.* Inspect the hoses for cracks, breaks, leaks, cuts, worn spots, and deterioration.

p. *Air Regulators.* Drain and blow out air regulators. Check for accuracy.

q. *Screens.* Remove and inspect air, oil, and other filtering screens; clean if necessary.

r. *Safety Devices.* Inspect all equipment to assure that safety devices, guards, and eye shields are not damaged, are attached, and working properly.

s. *Torches.* Service torches and welding equipment in accordance with manufacturer's instructions.

t. *Tanks.* Visually inspect all fuel, oil, and water tanks for dents and leaks.

u. *Hand Tools.* Inspect hand and special tools to see that they are available. Clean and stow the tools in their proper place after use.

v. *Paints and Accessories.* Cover and protect cans containing paint, thinner, and related material; return the material to its proper storage space after use. Clean painting equipment and accessories such as brushes, paint guns, agitators, etc., and stow in their proper place.

w. *Instructions.* Check to assure that applicable operating and maintenance instructions and charts are available, are clean and legible, and that proper warning signs are posted on dangerous or flammable materials.

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Appendix I REFERENCES

1. Army Regulations

- AR 420-22 Preventive maintenance.
- AR 420-82 Shop facilities.
- AR 420-83 Maintenance and service equipment.
- AR 750-1 Maintenance concept.
- AR 750 Organization, policies and responsibilities for maintenance operation.
- AR 7508..... Command maintenance management inspection.

2. Forms.

- DA Form 2402 Exchange tag.
- DA Form 2404 Equipment inspection and maintenance worksheet.
- DA Form 2405 Maintenance request register.
- DA Form 2407 Maintenance request.
- DA Form 24081 Equipment daily or monthly log.

3. Other Publications.

- TM 9-237 Welding, theory and application.
- TM 9-248 Use and care of handtools and measuring tools.
- TM 38750 Army equipment record system and procedures.
- DA Pam 310-4 Index of technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders.

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By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
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USAR: None.

For explanation of abbreviations used, see AR 820-0.

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