

**BY ORDER OF THE COMMANDER
OKLAHOMA CITY AIR LOGISTICS
COMPLEX**

**OKLAHOMA CITY AIR LOGISTICS
COMPLEX INSTRUCTION 21-103**

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Maintenance

***EQUIPMENT-MAINTENANCE/
INSPECTION AND DOCUMENTATION***



COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This publication implements AFSCMAN21-102. The publication establishes responsibilities and procedures for the Air Force Technical Order (AFTO) Form 244/245, Industrial/Support Equipment Record or computer-generated equivalent, for equipment delayed discrepancies, corrective actions, record service, periodic and special inspections, record inspection status and historical data in accordance with (IAW) Technical Orders (TOs), Air Force Occupational Safety and Health (AFOSH) Standards (Stds) and local standards. It provides guidance and procedures throughout the Oklahoma City Air Logistics Complex (OC-ALC) 21-103. This instruction prescribes responsibilities and provides general instructions for Preventative Maintenance (PM) and Predictive Maintenance (PdM) of Support Equipment (SE). This includes recording the cost of equipment repair and modification IAW AFSCMAN 21-102. The instruction applies to all personnel within the Oklahoma City Air Logistics Complex (OC-ALC). In the event of conflicting guidance, the most stringent requirements will take precedence. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the Air Force (AF) Form 847, Recommendation for Change of Publication; route AF Forms 847 from the field through the appropriate chain of command. This publication may be supplemented at any level, but all supplements must be routed to OPR for coordination prior to certification and approval or this publication may not be supplemented. The authorities to waive wing/unit level requirements in this publication are identified with a Tier (“T-0, T-1, T-2, T-3”) number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain

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SUMMARY OF CHANGES

This Publication has been significantly updated and must be reviewed in its entirety. (1) There have been multiple additions, deletions, and rewording to procedures, specifically in **Chapter 2**, (2) Multiple Orgs and e-mail addresses have been updated, (3) A full chapter (**Chapter 10**) has been added, (4) References and Versions have been updated, and Forms have been added. Removed references to FEMWEB and replaced with updated instructions on the use of FEM. Updated AF Instruction and form references.

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Chapter 1

AFTO FORM 244, DOCUMENTATION REQUIREMENTS

1.1. AFTO Form 244 General Information and Documentation Requirements.

1.1.1. Overdue Test, Measurement and Diagnostic Equipment (TMDE). Owing work center shall not use the AFTO Form 244/245 to document overdue calibrations. Use the AFTO Form 350, Repairable Item Processing Tag, for this purpose.

1.1.2. AFTO Form 244/245 entries will only be in black (pencil or ballpoint pen), unless otherwise specified.

1.1.3. Minimum signature consists of the first name initial, last name (not necessarily in this order), and employee number, or USERID or equivalent/FAA (Federal Aviation Administration) certification number. Electronic signatures may be used in lieu of these requirements.

1.1.3.1. The OC-ALC may use a production stamp in place of the employee number.

1.1.3.2. Contractors will use their FAA certification number or equivalent in place of the employee number.

1.1.4. All “symbol” block entries will be made in red.

1.1.5. Red symbol entries will never be erased, even when entered in error.

1.1.6. All “date” entries will be eight digits in order of year, month, and day (yyyymmdd) i.e., 20010306.

1.1.7. Documents will be legible, complete, correct, and clean.

1.1.8. Equipment owners are authorized to maintain the AFTO Form 244 in a file or book for their equipment (e.g., DIPE) in a central location such as the supervisor and/or work leader’s office. It is the user’s responsibility to review equipment documentation prior to use to ensure that all inspections are current and any discrepancies have been identified on the AFTO Form 244, Part V.

1.1.9. Specific inspection criteria for any equipment will be IAW equipment/general TOs, Original Equipment Manufacturers (OEM) manual, AFOSH Standards, engineering documents, similar equipment inspection work cards, or local instructions.

1.1.10. Entries will be documented in a sequential order (i.e., either “top-to-bottom” or “left-to-right”).

1.2. AFTO Form 244 Block Identification.

1.2.1. AFTO Form 244, part I, provides a means to identify the SE for which the form is maintained.

1.2.1.1. Block 1. Enter the nomenclature/model number (e.g., air compressor/MC2A).

1.2.1.2. Block 2. Enter the assigned AF registration/serial number. Leave blank if not applicable.

1.2.1.3. Block 3. Enter the identification number (a locally defined equipment-type identifier, for DIPE enter the Oklahoma City (OC) number), if assigned. Leave blank if not assigned.

1.2.1.4. Block 4. Enter the field number. Leave blank if not applicable.

1.2.1.5. Block 5. Enter the Work Unit Code (WUC) if one is assigned. Leave blank if not applicable.

1.2.1.6. Block 6. Enter the assigned organization/work center (e.g., 76 AMXG/MXAATA).

1.2.1.7. Block 7. Enter the date the form was initiated to the 'left' of the word "TO." Once the form is closed out or the equipment is turned into supply/salvage enter the close out date to the right of the word "TO" (e.g., "20040430 TO =" new/current form, "20040430 TO 20041230" = closed out form).

1.2.1.8. Block 8. Leave blank if not applicable. This block may be used for 76 MXSG/CC specific requirements.

1.2.2. AFTO Form 244, part II, provides a means to document the accomplishment of daily or prior to use (Daily/PU) specific operator maintenance (OM) or inspections as outlined on the AFMC Form 306, Preventive Maintenance Instruction (or equivalent), OEM manual, commercial off-the-shelf (COTS) manual, checklist, work card or applicable weapon system peculiar TO and AFOSH std. Daily/PU is defined: These actions are to be reviewed prior to use. Signing off on these actions means you have accomplished all actions required prior to the use of the equipment and you have read, understand, and will accomplish those actions required during and after use. These actions are to be reviewed by each shift using the equipment with appropriate actions being accomplished as directed by the AFMC Form 306. These actions and associated sign offs need only be accomplished once per calendar day on those days the equipment is used regardless of multiple shift use.

1.2.2.1. Time Column. Enter the time (in 24-hour military time) the service/prior to use inspection was accomplished. If the unit is equipped with a running time meter, the metered time may be entered in place of the time of day. For SE inspected at hourly intervals, enter the daily/accumulated time.

1.2.2.2. Inspector's Initials Column. Enter the first initial, last initial of the individual completing the inspection.

1.2.2.3. Date Column. Enter the date (yyyymmdd) the inspection was accomplished.

1.2.3. AFTO Form 244, part III, provides a means to document the accomplishment of specific OM or inspections other than Daily/PU as outlined on the AFMC Form 306 (or equivalent), OEM, COTS manual, checklist, work card, or applicable weapon system peculiar TO and AFOSH std. These actions must be accomplished at their set interval regardless of equipment usage. Due-by dates are defined by the last time the action was accomplished plus the defined interval. Actions are required to be accomplished within that interval.

1.2.3.1. Inspection Requirement. In this column, enter the type of inspection due (e.g., weekly, monthly, etc.), periodic inspection, special wheel bearing packing, lubing etc. Any specific operator inspections/maintenance, other than Daily/PU, will be documented in part III. Initials for the technician performing specific OM will not be required in part III.

1.2.3.2. Interval. In this column, enter the next scheduled inspection interval (e.g., 30-, 60-, and 180-day, or 500-hour, etc.).

1.2.3.3. Date Due. In this column, enter the next inspection due in the next open date due block.

1.2.3.4. Date Completed. Enter the hour/date inspection was completed. Enter a new inspection due date in next Date Due block.

1.2.4. AFTO Form 244, part IV. This form provides a means to document a quality control or supervisory review of the form. Supervisors may also designate, in writing, an individual who will satisfy the review requirement. The letter will be maintained by the work center supervisor. Ensure all the applicable blocks are filled out correctly, operator specific PM inspections are being accomplished on time and documented, and discrepancies corrected are signed off correctly. The interval for this review is every 6 months. This section will not be used for documenting inspection of completed maintenance actions.

1.2.4.1. Employee Number. Enter reviewer's employee number or first name initial, last name and grade (preferred method) or production stamp.

1.2.4.2. Date. Enter the date (yyyymmdd e.g., 20010306) the review was accomplished.

1.2.5. AFTO Form 244/245, part V. This form provides a means to document equipment discrepancies and corrective actions. The following conditions will be recorded in this part of the form.

1.2.5.1. Delayed discrepancies that cannot be corrected as part of the maintenance actions in progress will be scheduled for follow-on maintenance actions.

1.2.5.2. Use a Red X when an inspection renders the SE unsafe or unserviceable.

1.2.5.3. Overdue inspection, including portions of inspections not accomplished during the scheduled inspection (e.g., work card and/or work card items not completed by the end of the due period).

1.2.5.4. Overdue time change, Master Configuration Lists (MCLs) and Time Compliance Technical Orders (TCTOs).

1.2.5.5. Discrepancies discovered by the operator during operation of the system/equipment.

1.2.5.6. Part V will be completed as follows:

1.2.5.6.1. Block 9—TO. Enter the TO number or manufacturer's manual number/title that covers the item identified in block 1.

1.2.5.6.1.1. If a TO or AFOSH std is used, enter the document number.

1.2.5.6.1.2. If an OEM manual or COTS manual is used, enter the manual number or title.

1.2.5.6.2. Block 10—NSN. Enter the assigned National Stock Number or part number for item identified in block 1. Leave blank if not applicable.

1.2.5.6.3. Block 11 and Block 12. These blocks are left blank, unless approved for use by Major Command (MAJCOM).

1.2.5.6.4. Date Discovered. In this column, enter the date the discrepancy is discovered; the original date is brought forward to the new form when entries are carried forward from an old form.

1.2.5.6.5. Discovered By. In this column, the individual discovering the discrepancy will include his/her minimum signature.

1.2.5.6.6. Sup Doc Number. In this column, enter the base supply document number(s). This block is not required for units using Maintenance Information Systems (MIS) or if directed by the maintenance group commander. When two or more supply document numbers are needed to adequately define base supply support for repairing a discrepancy, add all additional supply document numbers needed to correct the discrepancy after the statement of the discrepancy. If necessary, use of the next open discrepancy block is authorized. If the next block is used all adjacent blocks will be lined through. As these requisitions from base supply are received by the requester, draw a single line through the document number to show its receipt.

1.2.5.6.7. Symbol. In this column, enter the applicable red symbol for the discrepancy.

1.2.5.6.8. Discrepancy. In this column, enter the discrepancy or maintenance action required. Only one defect will be entered in each block for each job control or work order number; however, use as many blocks as necessary to completely describe a single discrepancy.

1.2.5.6.9. Job CON/WO Number. In this column, enter the job control or work order number assigned to the discrepancy.

1.2.5.6.10. Corrective Action. In this column, enter the description of the corrective action taken. For Red X and Red Dash discrepancies, include TO (including page and paragraph/figure number or function number), if applicable, or equivalent, in the "Corrective Action" block and enter the date in the "Date Corrected" block. Depot Industrial Plant Equipment (Depot Industrial Plant Equipment [DIPE]) is excluded from this requirement since the TO reference is listed on the equipment. Maintenance group commanders may specify additional minimum TO reference. If more space is needed to make this entry, use the next open block.

1.2.5.6.11. Date Corrected. In this column, enter the date (yyyymmdd e.g., 20010306) the discrepancy is corrected.

1.2.5.6.12. Corrected By. In this column, the individual who corrects the discrepancy will sign his/her signature in this block.

1.2.5.6.13. Inspected By. In this column, the individual clearing a Red - (dash) or Red X will enter his/her minimum signature in this block and last name initial over the Red symbol in the symbol column.

1.2.6. AFTO Form 245. This form provides a continuation to part V of the AFTO Form 244. This form will be completed using the same instructions as provided for part V of the AFTO Form 244.

1.3. AFTO Form 244 Symbols.

1.3.1. Symbol entries will be made in RED to make the important warning signals stand out clearly. All manually entered symbols must be entered in RED, except black name initials placed over the RED symbol.

1.3.2. Red X entries on the AFTO Form 244, for support equipment, can only be cleared by the shop supervisor/work leader or appointee (designated in writing).

1.3.3. RED (X) Symbol.

1.3.3.1. A Red X indicates that the SE is considered unsafe or unserviceable and will not be used until the unsatisfactory condition is corrected and symbol is cleared.

1.3.3.2. **EXCEPTION.** SE with a Red X condition may be operated as necessary to troubleshoot or repair the discrepancy.

1.3.4. RED – (Dash) Symbol.

1.3.4.1. A RED Dash indicates that a required scheduled inspection, special inspection or operation check is overdue.

1.3.4.2. Also used to indicate that the condition of the equipment is unknown and a more serious condition may exist.

1.3.5. RED / (Diagonal) Symbol.

1.3.5.1. A RED Diagonal indicates that an unsatisfactory condition exists on the equipment but is not sufficiently urgent or dangerous to warrant discontinuing use of the equipment.

1.3.6. Changing RED Symbols (After an Original Entry).

1.3.6.1. Symbols/Initials once entered will NEVER be erased even if entered in error.

1.3.6.2. Reasons for changing a RED symbol:

1.3.6.2.1. Condition is more serious than previously entered.

1.3.6.2.2. Condition is less serious than previously entered.

1.3.6.2.3. Symbol/Initials were entered in error.

1.3.7. Clearing RED Symbols:

1.3.7.1. The black last name initial entered over the symbol in the “Symbol” block indicates that the individual whose name appears in the signature block related to the particular entry has accomplished the required maintenance or has inspected the equipment, work accomplished, or system specified and has found the deficiency cleared.

1.3.7.2. The individual who signs off a RED symbol for a specific maintenance task must be authorized, familiar with the task, and knowledgeable of the technical orders required to accomplish the task.

1.3.7.3. When the initial is entered, consider the discrepancy indicated by the symbol cleared and discrepancy has been corrected.

1.3.7.4. When a Red Dash or Red Diagonal is entered in error on a discrepancy or work document, the individual discovering the incorrect entry enters the following statement in the “Corrective Action” block: “Symbol/Initial entered in error, discrepancy and correct symbol/initial reentered on page ___, item ___,” or “Symbol entered in error, no discrepancy exists,” and enter their minimum signature. When required, re-enter the discrepancy, and correct symbol in the next open “Discrepancy” block on the form.

1.3.7.5. If the erroneous symbol is a Red X, the individual discovering the incorrect entry will enter the applicable statement identified in [paragraph 1.3.7.4](#). If they are authorized to clear these symbols, they will complete the “Inspected By” block and initial over the symbol. If they are not authorized to clear these symbols, they will sign the “Corrected By” block. The individual authorized to clear these symbols will place their last name initial over the symbol and complete the “Inspected By” block.

1.3.7.6. If the erroneous item is an initial, clear the discrepancy by entering “Initial entered in error, see Page ___ Item ___,” sign the “Corrected By” block and reenter the discrepancy in the next open block.

1.4. AFTO Form 244 Maintenance and Disposition Instructions.

1.4.1. When carrying the “Discovered By” block forward, print the first initial, last name and grade of the individual that originally discovered the discrepancy.

1.4.2. When closing out the AFTO Form 244, the current date will be entered in block 7 (following the “TO”) and carried forward (CF) will be entered in the Date Completed block of part III followed by the closer’s initials. For each open discrepancy, enter in the corrective action block CF and the closer’s first name initial, last name and grade.

1.4.3. Completed AFTO Form 244/245 or computer-generated equivalent will be kept on file by the shop supervisor for one-year. AFTO Form 244/245 or computer-generated equivalent will be destroyed after one year.

Chapter 2

EQUIPMENT MAINTENANCE

2.1. Maintenance Concept: This chapter provides guidance for maintenance procedures and practices to ensure reliability and mission support capability of Depot Industrial Plant Equipment (DIPE), Non-DIPE, and On-Condition Maintenance (OCM) equipment.

2.2. Maintenance Program Determination.

2.2.1. Types of Equipment. The 776th Maintenance Support Squadron (776 MXSS) and 76 MXSG/MXDE Engineering, with the aid of the maintenance groups, determines which equipment requires specific operator maintenance (OM) and the equipment to be included in the preventive maintenance (PM) and predictive maintenance (PdM) programs, and Corrective Maintenance (CM) managed by the 776 MXSS.

2.2.1.1. DIPE is defined as permanently affixed/fixed location equipment not readily movable or other equipment as determined by the 776 MXSS Equipment Specialists. DIPE will be identified with an identification number (OC number). The following criteria will be applied to determine if equipment will be included in the maintenance management PM and/or PdM program.

2.2.1.1.1. Equipment creating an unsafe or hazardous environment if failure occurred, due to lack of PM and/or PdM, will be included.

2.2.1.1.2. All weapon-specific equipment having specific PM and/or PdM requirements delineated by an applicable TO will be included.

2.2.1.1.3. Equipment subject to breakdown repairs that are expensive compared to PM and/or PdM will be included.

2.2.1.1.4. Equipment critical to production and where failure would result in costly downtime will be included.

2.2.1.1.5. Equipment not critical to the depot maintenance process (e.g., small drill press) that can be repaired without regard to downtime or equipment availability should be excluded.

2.2.1.1.6. Equipment of small dollar value, where the cost of PM and/or PdM is likely to exceed the cost of replacement upon failure, should be excluded.

2.2.1.2. **Attachment 10** contains a list of examples of items that will be excluded. The list is not all inclusive and **EXCEPTIONS:** can/may be made.

2.2.1.3. Non-DIPE is defined as any support equipment that is not classified as DIPE and does not have an OC identification number, AFSCMAN21-102, *Depot Maintenance Management*, Chapter 15.

2.2.1.4. OCM is defined as depot machinery and shop equipment that does not have periodic, recurring inspections and does not have an OC identification number.

2.3. Preventive Maintenance.

2.3.1. PM consists of equipment maintenance actions performed on a periodic basis according to a specific set of instructions and a predetermined time schedule. The objective of a PM is to protect the equipment capability and investment by removing causes of failure and making adjustments to compensate for normal wear before failures occur.

2.3.2. PM for OC-ALC equipment will be performed by the operator, 776 MXSS or contractor personnel, on a periodic basis according to a predetermined schedule. The description of operator PM and level of accomplishment is as follows:

2.3.2.1. Operator PM consists of two categories, general and servicing, and is performed by the operator on each shift (or if only used periodically) upon the initial starting of equipment.

2.3.2.1.1. General Operator PM applies to all equipment to ensure serviceability of equipment prior to use. This consists of a review of equipment documentation for current status (AFTO Form 244, DD Form 1577-2, Unserviceable [Repairable] Tag-Material, or the user interface to Facilities and Equipment Maintenance [FEM] System, if applicable) and a Daily/PU visual inspection of equipment for conditions such as malfunctions, damage, cleanliness, proper lubrication, and potential safety/fire hazards. Any of these conditions that cannot be corrected by the operator will be called to the attention of the supervisor for corrective action. No daily certification of this inspection is required to be documented on AFTO Form 244. Equipment will be cleaned and lubricated at intervals consistent with equipment care and good housekeeping standards.

2.3.2.1.2. Servicing Inspection includes, but is not limited to, maintenance of a critical nature which, if neglected, could result in costly equipment damage or create an unsafe condition. The performance of this maintenance will be documented on AFTO Form 244, Part II, for daily specific operator PM and Part III, for all other specific PM requirements. The inspection requirements are listed on the AFSC Form 306 (or equivalent), applicable equipment/general TO and AFOSH Stds, commercial operator manuals, etc.

2.3.2.1.3. The shop supervisor/appointee (appointed by letter) will monitor both general and specific operator maintenance to ensure accomplishment by reviewing the AFTO Form 244 for accuracy and completeness. The supervisor/appointee will document the review on Part IV of the AFTO Form 244 every six months (paragraph 1.2.4.).

2.3.2.2. 776 MXSS PM is performed by the Plant Management Flight (776 MXSS/MXDVA) and the Metrology and Calibration Flight (METCAL) Flight (76 MXSS/MXDCA) on a scheduled basis (e.g., monthly, quarterly or yearly).

2.3.2.3. PM performed on DIPE by contractors will be tracked and documented on the AFTO Form 244 or in the FEM System.

2.3.2.3.1. Existing contracts include the requirement for the contractor to document PM on the AFTO Form 244 and in the Facilities and Equipment Maintenance (FEM) System.

2.3.2.3.2. All new contracts that are awarded are to include the requirement for the PM to be documented in the FEM System.

2.4. Predictive Maintenance. Work is a process of using electrical and mechanical testing and diagnostic devices to predict when a piece of equipment is deviating from its normal operating parameters. It is also designed to protect equipment capability and investment by removing causes of failure and making adjustment to compensate for normal wear before failure or an unsafe condition occurs. The Predictive Maintenance Team will provide necessary trending data and analytical reports to management and initiate a work order in the FEM system.

2.4.1. Predictive Maintenance Includes:

2.4.1.1. Infrared Thermography: Infrared thermography can detect electrical anomalies such as loose connections, overloaded circuits, and failed motors. It can also detect failing bearings, steam systems, coupling and alignment problems, air leaks, fluid levels, and blocked heat exchangers.

2.4.1.2. Oil Analysis: Immediate benefits are from the decrease in oil purchases by changing the oil based on condition versus changing the oil based on time. Impending equipment failures such as failed bearings and gears can be detected.

2.4.1.3. Vibration Analysis: The vibrations that exist in all rotating machinery have unique “signatures”. Detailed analysis makes it possible to identify abnormal signals and determine appropriate corrective action.

2.4.1.4. Ultrasonic Analysis: Identifies various types of leaks, e.g., compressed air, process gases, vacuum, steam, hydraulic and refrigerants. These are used to trend mechanical operations and detect electrical discharges such as corona, tracking and arcing.

2.4.1.5. Laser Alignment: Positioning two or more machine components so that their rotational centerlines are collinear at the coupling point under operating conditions. The PdM team may assist technicians with the operation of laser shaft alignments.

2.4.1.6. Motor Analysis: Identifies and analyzes electrical defects using all major electric tests including surge, polarization index, DC hipot, megohm, and winding resistance. It also identifies power quality issues, machine and motor performance and estimates energy savings, detects voltage levels and unbalance, rotor cage condition, efficiency, under/over current, harmonic and total distortion, torque ripple, and load history.

2.5. Responsibilities.

2.5.1. Maintenance groups (76 AMXG, 76 CMXG, 76 MXSG, 76 PMXG, 76 SWEG) will:

2.5.1.1. Submit a primary and alternate Contract Maintenance Liaison (CML) to 76 MXSG/MXDEQ, which will be reviewed annually for accuracy. The most current copy of this appointment letter will be maintained on the 76 MXSG SharePoint site located at: <https://org2.eis.af.mil/sites/22249/SitePagesR/Home.aspx>.

2.5.1.2. Complete an Automated DD Form 2875, System Authorization Access Request (SAAR), at <https://dd2875.robins.af.mil/NewForm.aspx>) for managing FEM work orders for tasks accomplished by contractors on DIPE within their group. This will ensure that FEM accurately reflects equipment status (i.e., Red X, Red / & Red -) at all times.

- 2.5.1.2.1. The Contracting Officer Representative (COR) and the primary or alternate contract requestor (primary or alternate person listed as having requested the contract action) will be responsible for ensuring that contractor maintenance is satisfactorily accomplished and the equipment is in serviceable condition before accepting the equipment. If the original primary and or alternate contract requestors are no longer responsible for that equipment then the COR shall communicate with equivalent replacement contract requestors. When the maintenance is accomplished by contractors required to use FEM, but the contractor does not have access to FEM, documentation for the acceptance of work accomplished by contractors will be forwarded by the COR. The COR will forward the documentation to the group primary or alternate CML or to the primary or alternate contract requestor for one-time maintenance contracts. The primary or alternate person receiving the documentation will then attach this documentation to the asset via either FEM or obsolete and close the work order(s) in FEM.
- 2.5.2. Engineering organization within the applicable maintenance groups will:
- 2.5.2.1. Complete Parts I and II of AFSC Form 388, Machine Tool and Equipment Historical Record, and forward, with a copy of maintenance/parts manuals or applicable TOs, and a completed OC-ALC Form 493, Lockout/Tagout (Control of Hazardous Energy) worksheet (if required by AFMAN 91-203) to Production Support (776 MXSS/MXDXA) for DIPE only (see [Attachment 2](#) for complete instructions). Use 776 MXSS/MXDXA Equipment Specialists workflow e-mail address 776mxss.mxdxa.equipmentspecialist@us.af.mil for routing electronic versions or deliver in person to the Equipment Engineering office in Building 3001, located at Post 2U73.
- 2.5.2.1.1. Failure to provide these items will result in the rejection of the request and the assignment of an OC number in FEM.
- 2.5.2.2. Notify 776 MXSS/MXDXA when modifications have been made to TOs that affect DIPE maintenance requirements. Use 776 MXSS/MXDXA Equipment Specialists workflow e-mail address 776mxss.mxdxa.equipmentspecialist@us.af.mil.
- 2.5.2.3. Notify 776 MXSS/MXDXA when modifications need to be made to the contents of the AFSC Form 306 for DIPE in their organization. Use 776 MXSS/MXDXA Equipment Specialists workflow e-mail address 776mxss.mxdxa.equipmentspecialist@us.af.mil.
- 2.5.2.4. Ensure any modifications made to equipment, such as installation of safety guards, interlocks, etc., are brought to the attention of 776 MXSS/MXDXA. Subject modifications can then be incorporated into the AFSC Form 388 and the appropriate PM requirements can be determined. 776mxss.mxdxa.equipmentspecialist@us.af.mil
- 2.5.2.4.1. Equipment Modifications that affect the safety, environment impact, operation, maintenance plans, or production capability of an asset shall be coordinated with 76 MXSG/MXDEQ equipment utilizing OC-ALC Form 115.
- 2.5.2.5. Ensure that all engineering requests/inquires relative to equipment in the FEM system reference the 76 MXSS identification number (e.g., OC number) assigned to the particular piece of equipment.

2.5.2.6. Determine if equipment that is no longer in use for an extended period (e.g., intermittent workload) will be needed for future workload.

2.5.2.6.1. If the equipment is not going to be needed to support future workloads, it must be either transferred to another organization or turned into DLA Distribution Services (formerly known as the Supply/Defense Reutilization Marketing Office [DRMO]).

2.5.2.6.2. If the equipment is needed to support future workloads, it must be determined whether Maintenance Support and/or Operator PM will be continued or suspended.

2.5.2.6.2.1. If PM is to be suspended, notify 776 MXSS/MXDXA via the 776 MXSS/MXDXA Equipment Specialists workflow e-mail address 776mxss.mxdxa.equipmentspecialist@us.af.mil. The FEM equipment record will be changed to reflect a not in use (NIU) and Red X status.

2.5.2.6.2.2. When equipment is returned to service, notify 776 MXSS/MXDXA so that PM can be re-established. Use 776 MXSS/MXDXA Equipment Specialists workflow e-mail address 776mxss.mxdxa.equipmentspecialist@us.af.mil.

2.5.2.6.2.3. Ensure corrosion preventive measures are accomplished, as needed, while not in use.

2.5.2.7. Determine required PM actions and frequencies for non-DIPE and provide the requirements to the shop supervisor on AFSC Form 306, applicable equipment/general TO, commercial operator manual, work card, or checklist. If the AFSC Form 306 is used, the forms will be maintained by the applicable engineering organization.

2.5.3. The maintenance group shop supervisor/appointee will:

2.5.3.1. Depot Industrial Plant Equipment (DIPE).

2.5.3.1.1. Assist 776 MXSS/MXDXA in determining required PM actions and frequencies.

2.5.3.1.2. Ensure there is an operator AFSC Form 306, Preventive Maintenance Instructions (or equivalent) on or near the applicable DIPE prior to putting the DIPE into service/use. If missing, contact 776 MXSS/MXDXA to receive a replacement via the Equipment Specialists workflow e-mail address 776mxss.mxdxa.equipmentspecialist@us.af.mil. For DIPE with specific operator PM that is put into service/use prior to receiving the AFSC Form 306 from 776 MXSS/MXDXA, ensure that the guidance (manual, technical order, AFOSH standard, etc.) is with the equipment and that the accomplishment is documented on the AFTO Form 244, Parts II and/or III.

2.5.3.1.2.1. Supervisor/operator will verify that PM tasks contained on the AFSC Form 306 can be accomplished prior to placing the DIPE into serviceable use condition for production. Any condition which cannot be corrected by the operator will be called to the attention of the supervisor to facilitate correction by Maintenance Support Group (MXSG).

2.5.3.1.3. Ensure all specific operator maintenance is performed by the operator/appointee at the frequencies prescribed on the AFSC Form 306 and documented on the AFTO Form 244, Part II and/or Part III, IAW paragraphs **1.2.2 and 1.2.3** of this instruction.

2.5.3.1.4. Accomplish the supervisory review of the AFTO Form 244 IAW paragraph 1.2.4..

2.5.3.1.5. Monitor the user interface to FEM daily and ensure all equipment with past due PM (Red X condition) is removed from service by tagging the equipment with a DD Form 1577-2. For equipment other than hoists and cranes, PM is considered past due when the due date exceeds the month due or by one frequency cycle, whichever is less. For hoists and cranes, PM is considered past due on the first day of the month following the month documented on the sticker on the item.

2.5.3.1.6. Use FEM to initiate repair trouble calls and set priority of work orders (**paragraph 3.5.4**).

2.5.3.1.6.1. Priorities. FEM will contain the red symbols for maintenance support and contractor repair actions on DIPE except contractor repair actions by contractors that are not required to use FEM. These symbols will be monitored using FEM and cleared when the work order is closed. Documentation of these trouble call/work orders on AFTO Form 244/245, Part V will not be required.

2.5.3.1.6.2. Priority Code 5 = Red X. This is repair work that demands immediate response to prevent injury to personnel due to a safety hazard. Equipment will be immediately removed from service by temporarily tagging with an AF Form 982, Do Not Start Tag, until Maintenance Support determines the need for and accomplishes lockout tag out in accordance with Air Force Manual (AFMAN) 91-203, Air Force Consolidated Occupational Safety Standard.

2.5.3.1.6.3. Priority Code 4 = Red X. This is repair work that demands immediate response to correct critical workload stoppage or involves risk of major damage to government property. Equipment items in this category will be removed from service and tagged with a DD Form 1577-2.

2.5.3.1.6.4. Priority Code 3 = Red /.

2.5.3.1.6.4.1. Red / = This is repair work of a routine nature that is not significantly urgent to warrant removing the equipment from service.

2.5.3.1.7. Send an e-mail notification to 776 MXSS/MXDXA when DIPE is removed or relocated via the Equipment Specialists workflow e-mail address 776mxss/mxdxa.equipmentspecialist@us.af.mil . Relocation notification will include the identification number (e.g., OC number), building/post location, routing symbol, and point of contact. Removal notification will include the identification number (e.g., OC number) and point of contact.

2.5.3.1.8. Notify production engineering office when modifications need to be made to the contents of the AFSC Form 306 for DIPE in their organization.

- 2.5.3.1.9. Release equipment, in a timely manner to 76 MXSG or contractor personnel, to ensure that PM and Corrective Maintenance (CM) are completed promptly and as scheduled.
- 2.5.3.1.10. Ensure the accomplishment of calibration on Precision Measurement Equipment (PME) items (gages, meters, etc.) attached to DIPE is accomplished IAW TO 00-20-14, Air Force Metrology and Calibration Program, section 3.
- 2.5.3.1.10.1. Remove DIPE from service and attach a DD Form 1577-2 annotating "Overdue Calibration" to equipment.
- 2.5.3.1.10.2. The supervisor/work leaders of the owning/using organization will ensure serviceability and remove/discard the DD Form 1577-2 after the PME technician has completed the calibration actions.
- 2.5.3.1.11. Ensure an AFTO Form 244/245 is maintained for DIPE under their control that has specific operator PM identified (an AFTO Form 244 is not required on DIPE that does not have specific operator PMs documented on AFSC Form 306).
- 2.5.3.1.12. Notify production engineering office when DIPE is no longer in use for an extended period (e.g., intermittent workload). Attach a DD Form 1577-2 with the annotation "NOT IN USE; ALL PM SUSPENDED" to the DIPE in a visible location.
- 2.5.3.1.13. Notify production engineering office when not in use DIPE needs to be returned to service. The DD Form 1577-2 will remain on the DIPE and the equipment will not be used until all PMs are accomplished and the form is removed by 76 MXSS maintenance organization.
- 2.5.3.1.14. Notify the Bioenvironmental Engineering Flight (BEF) 72 AMDS and Environmental Compliance Office (76 MXSG/MXDEU) and when a change occurs in parts processed, media, and/or hazardous material used in the process (e.g., blast media, chemicals) which changes the occupational health assessment as reported in the shop's current Industrial Hygiene Assessment letter from BEF. IAW Air Force Instruction 32-7086 Oklahoma City Air Logistics Complex Supplement (AFI32-7086_OC-ALCSUP), Hazardous Materials Management, chemicals/HAZMAT must be approved before being brought on base.
- 2.5.3.2. Non-DIPE.
- 2.5.3.2.1. Coordinate with Production Engineering Office to determine required PM actions and frequencies. The PM requirements will be referenced on AFSC Form 306, applicable equipment/general TO, and AFOSH standards, commercial operator manual, work card, or checklist.
- 2.5.3.2.2. Ensure the applicable PM requirements are on or near the equipment. If missing, contact your Production Engineering Office to receive a replacement.
- 2.5.3.2.3. Ensure all specific operator maintenance is performed by the operator/appointee at the prescribed frequencies and documented on the AFTO Form 244, Part II and/or III, IAW paragraphs **1.2.2** and **1.2.3** of this instruction.
- 2.5.3.2.4. Accomplish the supervisory review of the AFTO Form 244 and document in Part IV, IAW **paragraph 1.2.4** of this instruction

- 2.5.3.2.5. Annotate all unscheduled discrepancies on the AFTO Form 244/245, Part V, IAW paragraph 1.2.5. of this instruction.
- 2.5.3.2.6. Use FEM to initiate repair trouble calls and set priority of work orders for repairs that cannot be accomplished by the owning work center (**paragraph 3.5.4**). Documentation of these trouble call/work orders must be annotated on AFTO Form 244/245, Part V. (**Note:** If the trouble call/work order is cancelled by 76 MXSG, the original write-up is still valid until appropriate actions are taken to fix the discrepancy.) The original write-up will be cleared by the individual/organization who accomplishes the repair IAW **Chapter 1**. Priorities are as follows:
- 2.5.3.2.6.1. Priority Code 5 = Red X. This is repair work that demands immediate response to prevent injury to personnel due to a safety hazard. Equipment will be immediately removed from service by temporarily tagging with an AF Form 982, until MXSG determines the need for and accomplishes lock-out tag-out IAW AFMAN 91-203.
 - 2.5.3.2.6.2. Priority Code 4 = Red X. This is repair work that demands immediate response to correct critical workload stoppage or involves risk of major damage to government property. Equipment items in this category will be removed from service and tagged with a DD Form 1577-2.
 - 2.5.3.2.6.3. Priority Code 3 = Red X or Red /.
 - 2.5.3.2.6.3.1. Red /. This is repair work of a routine nature that is not significantly urgent to warrant removing the equipment from service.
- 2.5.3.2.7. Ensure the accomplishment of calibration on PME items (gages, meters, etc.), attached to Non-DIPE is completed IAW TO 00-20-14, Air Force Metrology and Calibration Program, Section 3.
- 2.5.3.2.7.1. When necessary remove Non-DIPE from service and attach a DD Form 1577-2 annotating “Overdue Calibration” to equipment.
 - 2.5.3.2.7.2. The supervisor/work leaders of the owning/using organization will ensure serviceability and remove/discard the DD Form 1577-2 after the PME technician has completed the calibration actions.
- 2.5.3.2.8. Ensure all discrepancies are signed off in accordance with **Chapter 1**.
- 2.5.3.2.9. Ensure AFSC Form 306 is developed by Group Engineering if inspection requirements are not identified in other approved tech data sources and AFTO Form 244/245 is maintained for equipment under their control.
- 2.5.3.3. OCM Depot Machinery and Support Equipment.
- 2.5.3.3.1. In conjunction with production, engineering functions will review and document which equipment items require only OCM. An OCM equipment master listing, signed by the approving engineering office and production supervisor, will be maintained by the production supervisor.

2.5.3.3.2. Ensure all unserviceable/repairable OCM equipment are removed from service and tagged with a DD Form 1577-1, Unserviceable (Condemned) Tag-Materiel, or DD Form 1577-2 with the discrepancy and work order number (if applicable) annotated on the back of the form.

2.5.3.3.3. Use FEM to initiate repair trouble calls and set priority of work orders for repairs that cannot be accomplished by the owning work center ([paragraph 3.5.4](#)). Priorities are as follows:

2.5.3.3.3.1. Priority Code 5 = Red X. This is repair work that demands immediate response to prevent injury to personnel due to a safety hazard. Equipment will be immediately removed from service by temporarily tagging with an AF Form 982, until MXSG determines the need for and accomplishes lock-out tag-out IAW AFMAN 91-203.

2.5.3.3.3.2. Priority Code 4 = Red X. This is repair work that demands immediate response to correct critical workload stoppage or involves risk of major damage to government property. Equipment items in this category will be removed from service and tagged with a DD Form 1577-2.

2.5.3.3.3.3. Priority Code 3 = Red /.

2.5.3.3.3.3.1. Red /. This is repair work of a routine nature that is not significantly urgent to warrant removing the equipment from service.

2.5.3.3.4. Ensure the DD Form 1577-2 is removed and discarded when the discrepancy has been corrected.

2.5.4. 776 MXSS/MXDCA will:

2.5.4.1. Perform the following tasks on newly acquired DIPE:

2.5.4.1.1. Assign and permanently attach a MXSG identification number (e.g., OC number) and annotate the number on the AFSC Form 388. Coordinate with the predictive maintenance team for insertion of the applicable predictive maintenance technologies and actions required.

2.5.4.1.2. Add DIPE to FEM by the identification number (e.g., OC number), noun, model, serial number, national stock number, priority code, manufacturer, location, owning organization, date installed, purchase date, and acquisition cost as available. This is the FEM Equipment File, which is a facsimile of the AFSC Form 388.

2.5.4.1.3. Develop required specific operator, 776 MXSS/MXDVA, 76 MXSS/MXDCA, or contractor PM on new equipment as needed by utilizing sources such as TOs, vendor's manuals, industrial standards and other available data. AFSC Form 306 (or equivalent) or FEM will be used to document these instructions.

2.5.4.1.4. Add a statement to FEM, that will print on all work orders, warning the technicians of occupational health hazards associated with materials used in the process the equipment will be used for, as identified by the supervisor.

- 2.5.4.1.5. Develop PM automated scheduling through FEM for the MXSG shops or the contractor shop (if available) that is responsible for performing the PM actions. For contractors required to use FEM, but do not have access to FEM, the PMs will be scheduled for the maintenance group ([paragraph 2.5.1.1.1](#)). A shop identifier (Crew ID) will be created in FEM for the MXSG shops, contractor, or maintenance groups as appropriate.
- 2.5.4.1.6. Place a copy of the operator AFSC Forms 306 (or equivalent) on applicable DIPE and identification tag on all DIPE.
- 2.5.4.2. Perform the following tasks on existing DIPE:
- 2.5.4.2.1. Review requests to modify the contents of the AFSC Form 306 for DIPE received from the maintenance group engineering organizations and implement modifications as needed (776 MXSS/MXDCA has final determination concerning the contents of the AFSC Form 306 for DIPE).
- 2.5.4.2.2. Accomplish all FEM updates and inventory changes except work order record completion which is accomplished by the 776 MXSS shop, the contractor shop (if available) that is responsible for performing the PM actions or, for contractors who do not have access to FEM, by the maintenance group ([paragraph 2.5.1](#)).
- 2.5.4.2.3. When equipment is to be removed for turn-in, delete the item from FEM.
- 2.5.4.2.4. Provide necessary analysis and status reporting to management.
- 2.5.5. The METCAL Flight (76 MXSS/MXDCA) and/or the Plant Management Flight 776 MXSS/MXDVA) will:
- 2.5.5.1. DIPE.
- 2.5.5.1.1. Perform PM, PdM, and CM according to the work schedule in FEM.
- 2.5.5.1.2. When work is completed, finalize the FEM work order IAW MXSG OI 21-100. Provide feedback to 776 MXSS/MXDCA concerning changes that need to be made to the AFSC Form 306 (or equivalent) or to FEM records (equipment location changes, PM action changes, materials needed to accomplish the PM actions, etc.). The shop supervisor or work leader will use the FEM “PM/BOM Request Modification” page to generate a FEM work order to 776 MXSS/MXDCA.
- 2.5.5.1.3. Initiate a trouble call for repair in excess of normal PM.
- 2.5.5.2. Non-DIPE and OCM.
- 2.5.5.2.1. Review CM work orders and determine if requested repairs are justified. If the work order is not justifiable, the reporting work center will be notified in writing.
- 2.5.5.2.2. Accomplish CM on justified work.
- 2.5.5.2.3. When work is completed, finalize the FEM work order IAW MXSG OI 21-100.
- 2.5.6. OC-ALC Contract Support Office (OC-ALC/OBC) will:
- 2.5.6.1. Include the Equipment Engineering office (76 MXSG/MXDEQ) in multi-function team (MFT) meetings for DIPE.

2.5.6.2. Coordinate the development of service contract purchase request (PR), including the Performance Work Statement (PWS), for contracts that include DIPE in collaboration with 76 MXSG/MXDEQ.

2.5.6.3. Schedule a post award meeting with 76 MXSG/MXDEQ, 776 MXSS/MXDXA, Contracting Officer Representative (COR), and contractor to verify data in the FEM contracting module, job plan accuracy, and PM work order scheduling.

Chapter 3

FACILITIES AND EQUIPMENT MAINTENANCE SYSTEM

3.1. FEM System Definition. The FEM system is an approved United States Air Force (USAF) Computerized Maintenance Management System (CMMS). This system is used to track maintenance accomplished by MXSG or contractors on DIPE, Non-DIPE and OCM. This system contains all DIPE equipment records, maintenance history, and Non-DIPE, OCM work order maintenance history.

3.2. Responsibilities. The maintenance group shop supervisor/appointee will:

3.2.1. Monitor FEM daily and ensure all DIPE with past due PM (Red X condition) is removed from service by tagging the equipment with a DD Form 1577-2. For equipment other than hoists and cranes, PM is considered past due when the due date is exceeded by one frequency cycle or 60 days, whichever is less. For hoists and cranes, PM is considered past due on the first day of the month following the month documented on the sticker on the item.

3.2.2. Use FEM to initiate DIPE repair trouble calls and set priority of work orders.

3.2.3. Use FEM to initiate Non-DIPE and OCM repair trouble calls on discrepancies that cannot be repaired by production. These trouble call/work orders will be documented on AFTO Form.

3.2.4. Prepare and forward to 776 MXSS a computer generated work request (trouble call/work order) via FEM:

3.2.4.1. The following information will be provided:

3.2.4.1.1. Equipment identification number (for DIPE).

3.2.4.1.2. Equipment location (for non-DIPE and OCM).

3.2.4.1.3. Owning organization symbol.

3.2.4.1.4. Phone number.

3.2.4.1.5. Description of the problem with the equipment.

3.2.4.1.6. Skill required.

3.2.4.1.7. Priority.

Chapter 4

LOCALLY MANUFACTURED OR DEVELOPED/MODIFIED SUPPORT EQUIPMENT

4.1. General. Overarching definitions and descriptions of Support Equipment (SE) are outlined in TO 00-20-1, Chapter 7 and Appendix A. For the purposes of this chapter, the term SE will refer to items of equipment designed, developed, manufactured and/or modified by a local element within the OC-ALC that perform a mission support function, except that which is an integral part of mission equipment. This chapter is not applicable to any item that is managed or configuration controlled by local or remote item managers, item specific TO or has been assigned a permanent NSN. Overarching guidance for inspection requirements, servicing inspection, operator inspection, scheduled inspections/lubrications, acceptance inspections and transfer inspection requirements for SE can be found in TO 00-20-1, Chapter 7 and augmented throughout this document as necessary for local implementation.

4.2. Duties and Responsibilities. The respective production group engineering and planning offices will have approval authority for locally manufactured, modified, developed, or special end item unique support equipment, as well as, their inspection requirements and intervals not published in technical data.

4.2.1. Production group shop supervisors will:

4.2.1.1. Submit all requests for locally manufactured, modified, and developed SE with the appropriate documentation (as defined in AFI 21-101, AFSC SUP, Chapter 10, including the intended use) to their production group planning office for validation, tracking, and documentation.

4.2.1.2. Ensure the preventive maintenance inspections, as documented on the SE end item AFSC Form 306, have been accomplished and properly documented on the AFTO Form 244, IAW Chapter 1 of this instruction.

4.2.1.3. Ensure the AFTO Form 244 and AFSC Form 306, where required, are on or near the SE end item.

4.2.1.4. Ensure all locally manufactured, modified, developed SE requiring no preventive maintenance are documented on an approved OCM listing.

4.2.1.5. Use FEM to initiate repair trouble calls and set work order priorities for SE end item repairs that cannot be accomplished by the owning production group.

4.2.1.6. Verify all locally manufactured, modified, developed SE end items are marked with a locally assigned tracking designation. If not, request supporting Production Group Planning Office provides as needed.

4.2.1.7. Verify load and/or torque ratings are clearly visible on the SE end item where required. If not, request supporting production group engineering office mark as needed.

4.2.1.8. Identify all SE end items no longer required to support current mission requirements to supporting production group planning office for reallocation, storage, or disposal.

4.2.2. Production Group Planning Office will:

4.2.2.1. Review the requests for locally manufactured, modified, developed SE received from production supervisors for compliance with current workload task needs, quantity and availability of non-locally manufactured, modified, developed equivalent SE. If suitably equivalent non-locally manufactured, modified, developed equivalent SE exists or requested SE end item is not required to support the specified task then the request will be returned to the requesting supervisor with explanation of determination.

4.2.2.2. Forward all approved and necessary requests for locally manufactured, modified, developed SE with complete documentation package to supporting production group engineering office for determination of requirements for level of engineering design, preventative maintenance, operator inspections and method of periodic repair/maintenance.

4.2.2.3. Review all SE end item documentation (drawings, sketches, material lists, costs estimates, etc.) received from the supporting production engineering office, assign a local stock number and process for procurement/manufacture.

4.2.2.4. Determine the source of fabrication and forward the SE end item documentation package, including local stock number, as needed, for manufacture or modification.

4.2.2.5. Where requested SE end item may affect weapon system form, fit, or function coordination with the supporting Lifecycle Management Center (LCMC) System Program Office (SPO) is required to be maintained in the SE documentation package.

4.2.2.6. Forward completed SE end item to supporting production group engineering office for validation of design characteristics, fabrication methods and development of final operator inspections, preventative maintenance requirements, including the preparation of an AFSC 306, where required.

4.2.2.7. Ensure a copy of all AFSC Form 306s received from the supporting production group engineering office are forwarded to the requesting production group shop supervisors.

4.2.2.8. Ensure all locally manufactured, and modified on work control documents prior to being released for continuous use not requiring significant modification or technical oversight.

4.2.3. Production group engineering office will:

4.2.3.1. Establish and manage a local designation tracking system that uniquely identifies all requests for locally manufactured, modified or developed SE end items. Provide access to this local tracking system to the supported production planning office and production support offices for reference and interrogation or provide supporting data upon request.

4.2.3.2. Review all requested locally manufactured, modified, developed SE documentation packages for technical accuracy, compliance with other overarching directive and consistency with requested tasks for lifting, loading, restraining, and/or torque requirements.

4.2.3.3. Assign a local tracking designation and establish an engineering request file, identified with the local tracking designation, to house all pertinent documents for the locally manufactured, modified, or developed SE end item request. Electronic files and local tracking designation may be used in support of this directive.

4.2.3.4. Based on documentation package received, prepare a level-of-effort technical analysis to determine the minimum technical data required to support the manufacture or modification required to complete the SE end item construction. This analysis will identify material requirements, special fabrication methods, assembly interconnections, load ratings, torque values man-machine interfaces. For limited effort requirements this analysis can be captured as a list of salient characteristics or shown on a simple sketch. More complex assemblies, materials, fabrication methods or technical data requirements may require the development and management of engineering technical drawings. In either case, the complete analysis and supporting engineering drawings, and/or sketches to produce the list of salient characteristics will become part of the official engineering request file.

4.2.3.5. Based on documentation package received, determine if specific PM inspections are required.

4.2.3.5.1. If no PM is required, document on the engineering analysis package and SE end item that "No PM Required".

4.2.3.5.2. If PM is required, document the requirements in the engineering analysis package, develop and attach an AFSC Form 306 to the engineering analysis package.

4.2.3.6. Retain copies of all approved locally manufactured, modified, developed SE requests, drawings, analysis and AFSC Form 306, if applicable. These documents will be reviewed and documented every two years.

4.2.3.7. Upon request, evaluate and document existing locally manufactured, modified, developed SE end items not previously approved by engineering. Document the review/analysis as if this were an original request for manufacture or modification.

4.2.3.8. Perform system safety analysis on all locally manufactured, modified, and developed SE; forward those with unmitigated potential risk to person or government property to OC-ALC Safety Office for coordination.

Chapter 5

HOIST INSPECTION AND DOCUMENTATION

5.1. General. This chapter establishes responsibilities and procedures for use, inspection, maintenance, testing and safe operation of hoists (electric, chain, pneumatic and portable hand-operated). This instruction pertains to all organizations using hoists.

5.2. Duties and Responsibilities.

5.2.1. Supervisor/Appointee will:

5.2.1.1. Attend initial supervisor training course provided by the Tinker AFB Education Office (72 FSS/FSDE) on proper use and care of hoists.

5.2.1.2. Use a lesson plan to train all personnel utilizing hoists on proper procedures and inspections. The training will include at a minimum: familiarization with all operating controls of the hoist, instructions in the operations to be performed, warnings on the hoist, instructions on inspections to be performed, and emphasis on the restriction of lifting loads that are heavier than the lowest rating of the hoist/supports. Document the training in the Training Scheduling System/Production Acceptance Certification (TSS/PAC).

5.2.1.3. Ensure personnel accomplish and document Daily/PU and monthly inspections.

5.2.2. Employees will:

5.2.2.1. Attend initial training course taught by supervisor/appointee on the proper use and care of hoists.

5.2.2.2. Perform and document Daily/PU and monthly inspections on AFTO Form 244 as required.

5.2.2.3. Consult with their supervisor before handling the hoist whenever there is a doubt concerning safety. If adjustments or repairs are necessary, or any defects are known, report promptly to the supervisor.

5.2.3. Production Engineering Office will:

5.2.3.1. Determine hoist requirements to include capacity and clearance.

5.2.3.2. Establish an OC number on newly acquired hoists in accordance with [Chapter 2](#).

5.2.4. Facility Engineering Flight (76 MXSG/MXDEJ) will:

5.2.4.1. Determine or obtain maximum load capacity data (safe working loads) on hoists, hoist supports, connecting fixtures, and portable hoists.

5.2.4.2. Design the supporting structure including tripod, trolley, monorail, crane or facility beam to withstand the loads and forces imposed by the hoist.

5.2.5. Equipment Engineering Flight (76 MXSG/MXDEQ) will determine or obtain test procedures on hoists, hoist supports, connecting fixtures, and portable hoists. The testing load should be in accordance with AFMAN 91-203.

5.3. Inspection. A visual inspection will be performed by the operator or designated person Daily/PU. A more thorough monthly visual inspection of all hooks, ropes, and chains that are accessible to the operator will be accomplished by the supervisor or an individual properly trained and designated. A person is designated if they have been properly trained with the training documented as prescribed in **paragraph 5.2.1.2** The daily/PU inspection shall be documented on the AFTO Form 244, Part II, and the monthly inspection shall be documented on the AFTO Form 244, Part III IAW Chapter 1. The AFTO Form 244 will be kept in a location readily accessible to the supervisor, operator, and appropriate maintenance personnel. Reference the applicable AFSC Form 306 (or equivalent) or FEM for inspection requirements. (**Note:** If any discrepancies are noted, immediately discontinue use of the equipment, tag unit out of service, and notify the supervisor who will, in turn, call the appropriate maintenance personnel.)

5.4. Annual Certification/Inspections. The certification/inspections will be performed by MXSG and documented in FEM. FEM for inspection requirements.

5.5. Removal and Installation of Fixed Hoists.

5.5.1. Hoists that have been removed from a monorail will be secured to prevent pilferage by placing them in a locked container or area.

5.5.2. Hoists will be load tested at the time of installation and following repairs such as replacement of the motor or gears, or adjustment/replacement of the friction brake assembly or components. If a hoist is moved and re-installed, it must be recertified prior to use. Hand-operated hoists will not be disassembled if gears are factory sealed.

5.5.3. Only authorized maintenance personnel will remove or install hoists from the hoist support beam for which it is certified.

5.6. Use of Hoists.

5.6.1. The hoist will not be loaded beyond its rated load except for test purposes. When component parts of a lifting system (e.g., crane, jib, bridge, sling, lifting fixture) have different load limits stenciled on their surfaces, the lowest load stenciled on any component will be the maximum certified load limit.

5.6.2. For proper operation of hoist, refer to AFMAN 91-203.

Chapter 6

LIFTING AND RESTRAINING DEVICES INSPECTION AND DOCUMENTATION

6.1. General. This instruction establishes responsibilities and procedures for inspection, maintenance, testing, and safe usage of lifting/restraining devices. This instruction pertains to all lifting and restraining devices.

6.2. Responsibilities.

6.2.1. 553rd Commodities Maintenance Squadron/Commodities Tubing and Cable Shop, (553 CMMXS/MXDRAD) will:

6.2.1.1. Serve as the load test inspection facility for Tinker AFB.

6.2.1.2. Locally manufacture and repair wire rope slings.

6.2.2. 553rd Commodities Maintenance Squadron/Textile and Life Support Shop (553 CMMXS/MXDRAA), will manufacture and repair synthetic cloth webbing slings.

6.2.3. Production Supervisors/Appointee will:

6.2.3.1. Attend Hoist and Sling Training, Course Code MTEMAS0130900SU - Hoist (Underhung) and Slings for Supervisors Course, provided by the 72 FSS/FSDE Tinker AFB Education Office. Supervisor will ensure all personnel who use slings and lifting/restraining devices are properly trained and that this training is documented in TSS under course MTESAF9700108BR - Hoist and Sling Training for Employees Course. Training will include specific instruction for specialized lifting devices, if required.

6.2.3.2. Ensure that all slings and lifting/restraining devices are properly identified by drawing number and/or manufacturer's part number.

6.2.3.3. Ensure that all slings and lifting/restraining devices are marked with the maximum capacity for which it is to be used. Ensure personnel do not exceed the maximum capacity of the lifting device when used.

6.2.3.4. Ensure the accomplishment of the daily/prior to use, monthly, and annual inspection requirements IAW technical orders, commercial manuals, TO 35D6-1-106, Aircraft and Engine Slings (General) and Restraining Devices, and AFMAN 91-203. Specific operator inspections will be documented on AFTO Form 244, Parts II and III, IAW Chapter 1.

6.2.3.5. Assign separate serial numbers where multiple identical synthetic cloth webbing slings without identifying numbers exist. The serial numbers shall be written on the synthetic cloth webbing slings with a permanent marker. Duplicate slings that are not of the synthetic cloth webbing type shall be routed to 553 CMMXS/MXDRAD using an AFSC Form 137 for the attachment of a metal tag showing the assigned lab number.

6.2.3.6. Initiate AFSC Form 137, Routed Order, and route item to 553 CMMXS/MXDRAD for load testing and 553 CMMXS/MXDRAD for Non-Destructive Inspection (NDI) IAW applicable directives (e.g., original equipment manufacturer manuals/support equipment TOs, TO 35D6-1-106, AFMAN 91-203, local manufacturer drawings). If the NDI requirements exceed the capabilities of the NDI facility in 553 CMMXS/MXDRAD, the device may be routed to other NDI facilities.

6.2.3.7. Route items that are authorized for repair to 553 CMMXS/MXDRAD.

6.2.3.8. Obtain engineering approval prior to purchasing any sling/restraining device. Engineering approval shall also be obtained prior to the modification of any sling/restraining device.

6.2.3.9. Remove from service any sling or lifting/restraining device that that does not meet the inspection criteria detailed in AFMAN 91-203. Oil or fuel soaked synthetic cloth slings must be replaced.

6.2.4. Users will:

6.2.4.1. Perform applicable pre-use and periodic inspections in accordance with AFMAN 91-203 and TO 35D6-1-106.

6.2.4.2. Use slings and lifting/restraining devices only for the purpose they are intended and in a manner consistent with AFMAN 91-203 and applicable technical orders.

6.2.5. Applicable engineering offices will:

6.2.5.1. Assign engineer(s) that are knowledgeable in sling design and related directives to determine load test and NDI requirements for all slings and lifting/restraining devices. Slings shall be designed IAW American Society of Mechanical Engineers (ASME) and American National Standards Institute (ANSI) Standard B30.9, Slings, and other applicable standards.

6.2.5.2. If periodic load test is not required, provide a written statement to the shop supervisor stating that only NDI is required on all locally manufactured and/or non-TO referenced slings.

6.2.5.3. Maintain or create drawings and specifications that include load test diagrams, rated capacities, material requirements, manufacturer's code, NSN, part number and other pertinent data.

6.2.5.4. Determine individual component test requirements if the entire lifting/restraining device cannot be tested as an assembly.

6.2.5.5. Determine if damaged slings or lifting/restraining devices are repairable. If so, determine proper repair procedures.

6.2.5.6. Determine specific NDI acceptance/rejection criteria for slings and lifting/restraining devices, when such information is not available in existing technical data.

6.2.5.7. Provide technical assistance, upon request, regarding specialized sling use.

6.3. Certification Procedures.

6.3.1. Prior to the expiration of the load test due date, the using organization shall provide the sling or lifting/restraining device and all its components to 553 CMMXS/MXDRAD. A completed and signed AFSC Form 137, all supporting technical data, including load test diagram, if applicable, must also be provided to 553 CMMXS/MXDRAD prior to testing/certification.

6.3.2. The 553 CMMXS/MXDRAD shall perform annual inspections of all slings or lifting/restraining devices prior to load test or NDI, as directed by specific TO.

6.3.3. Component parts found defective during prior to use, daily, unscheduled, monthly or annual inspections shall be repaired and/or tested in accordance with applicable directives (e.g., original equipment manufacturer manuals/support equipment technical orders, TO 35D6-1-106, AFMAN 91-203, local manufacturer drawings).

6.3.4. The 553 CMMXS/MXDRAD shall accomplish the required load tests as outlined in ASME/ANSI B30.9. Load tests shall be performed as directed by specific TO, AF blueprint/drawing, "X" drawings, or by AFSC Form 202, and documented.

6.3.5. New or repaired slings and lifting/restraining devices must be load tested prior to being placed in service, unless factory certification is obtained from the manufacturer. Crash recovery slings that are infrequently used shall not require annual load testing; however, these devices must be inspected annually IAW TO 35D6-1-106.

6.3.6. If the sling or lifting/restraining device fails the initial load test and repair is authorized by TO 35D6-1-106 or applicable engine/support TO, 553 CMMXS/MXDRAD will route item to the appropriate shop for repair. After repairs are made, load testing will be repeated.

6.3.7. The 553 CMMXS/MXDRAA may manufacture new straps IAW applicable drawings or technical data for non-expendable synthetic cloth webbing slings that do not pass inspection or load test. Load testing will be repeated after the repair.

6.4. NDI Requirements.

6.4.1. If required, will be performed after load test. Specific NDI acceptance/rejection criteria shall be obtained from appropriate technical data or locally developed procedures.

6.4.2. The 553 CMMXS/MXDRAD shall disassemble sling components and lifting/restraining devices as necessary to enable NDI of those critical parts specified by the applicable engineering section.

6.4.3. Unless applicable engine/support equipment TOs state otherwise, ferromagnetic materials shall be tested using the Magnetic Particle Method IAW American Society for Testing and Material (ASTM) E1444, Standard Practice for Magnetic Particle Examination. Non-ferromagnetic materials shall be tested using the Fluorescent Penetrant Method IAW ASTM E1417, Standard Practice for Liquid Penetrate Testing.

6.4.4. Slings and lifting/restraining devices with rubber/plastic coated attachment fittings are exempt from NDI requirements per TO 35D6-1-106 and shall be load tested IAW ASME/ANSI B30.9.

6.4.5. Local NDI may be performed on extremely large lifting/restraining devices in the absence of TO requirements with written authorization from the applicable engineering section.

6.4.6. The 553 CMMXS/MXDRAD shall reassemble items that pass NDI. If an item fails NDI, and repair is authorized, 553 CMMXS/MXDRAD shall route item for repair or replacement of components. Load test, if required, and final NDI will be performed after repair or replacement of components.

6.4.7. If an item fails load test/NDI and cannot be repaired, 553 CMMXS/MXDRAD will notify the appropriate supervisor. The applicable engineering section will be contacted for assistance in determining the proper action.

Chapter 7

TRAILER INSPECTION AND DOCUMENTATION

7.1. Background. Preventive Maintenance (PM) consists of equipment maintenance actions performed on a periodic basis according to a specific set of instructions and a predetermined schedule. The objective of PM is to protect the equipment investment by removing causes of failure and making adjustments to compensate for normal wear before failures occur.

7.2. Description of PM. PM for all OC-ALC-owned trailers will be performed by 776 MXSS. It will be done on a periodic basis IAW criteria defined in the applicable TO guidance for each specific type of trailer (engine, rail, flatbed or special purpose).

7.3. Operator PM.

7.3.1. Operator PM consists of two categories, general and specific, and is performed by the operator prior to towing or upon the initial use of the trailer. The supervisor will ensure operators are aware of and trained to perform PM prior to towing or initial use.

7.3.1.1. General Operator PM is a prior-to-use visual inspection of the trailer for conditions such as malfunctions, damage, cleanliness, proper lubrication, and potential safety/fire hazards. This inspection does not require documentation on the AFTO Form 244. Problems that cannot be corrected by the operator will be annotated on the trailer's AFTO Form 244, Part V, and called to the attention of the supervisor for corrective action. When trailers are considered unsafe to operate, immediately contact 776 MXSS for repair.

7.3.1.2. Specific Operator PM includes, but is not limited to, maintenance of a critical nature, which, if neglected, could result in costly equipment damage or create an unsafe condition. The inspection requirements are listed on the AFSC Form 306, checklist, work cards or applicable technical orders. This inspection will be documented IAW [Chapter 1](#).

7.3.1.2.1. The specific daily inspections will be conducted by the person using the trailer each time the trailer is used (moved from one location to another). The accomplishment of these inspections will be documented on AFTO Form 244 upon the first use of the day.

7.4. Monitor Maintenance. The trailer user/owner will monitor general and specific operator maintenance to ensure accomplishment.

7.5. Six Month Scheduled PM. If a 6-month scheduled PM is required, the users must off load trailer, remove all foreign objects and deliver the unit to 776 MXSS. The AFTO 244 must be annotated with required PM in accordance with [Chapter 1](#).

7.6. Unscheduled Maintenance or Wheel Bearing Pack (WBP). When unscheduled maintenance or WBP is required, users must off load trailer, remove all foreign objects, and deliver it to 776 MXSS. The AFTO Form 244 must be properly annotated with required maintenance and/or discrepancy in accordance with [Chapter 1](#).

7.7. Repair Centers. The 76th Maintenance Support Group is the primary repair center for trailers. Engine trailers that accompany incoming aircraft engines will be off loaded prior to any inspections or repairs then required PM and CM will be coordinated with 776 MXSS. The repair center will be responsible for intermediate PM (e.g., monthly, semi-annual or annual) inspections and other required maintenance.

7.8. Trailer Configuration Changes or Modifications. The user/owner will provide the trailer repair center with information on any trailer configuration changes or modifications as they occur.

7.9. Trailer Painting Requirements. Trailers will be painted in accordance with the specific equipment TO or TO 35-1-3, Corrosion Prevention and Cleaning, Painting, and Marking of USAF Support Equipment (SE). The specific equipment TO will take precedence.

7.10. Responsibilities.

7.10.1. Operator Responsibilities. Prior to towing or using each trailer, the user will:

7.10.1.1. Ensure AFTO Form 244, and AFSC Form 306, applicable equipment/general TO, commercial operator manual, work card or checklist are attached and required PM is current. If the PM is not current, the user will annotate the AFTO Form 244 IAW Chapter 1. If the forms are missing, the user will notify 776 MXSS to obtain a new AFTO 244, then perform and document the prior-to-use inspection.

7.10.1.2. Perform visual inspection IAW the AFSC Form 306, checklist, work cards or applicable TOs.

7.10.1.3. Annotate the AFTO Form 244 IAW Chapter 1.

7.10.1.4. Trailers with discrepancies, which render trailer inoperable or unsafe, will not be used. If trailer is loaded, it will be unloaded, freed of foreign objects and brought to unserviceable staging area, or notify AGE dispatch with location and asset identification number for pick-up.

7.10.1.5. Ensure cotter pin or safety locking pin is inserted in the pintle hook at all times.

7.10.2. 776 MXSS will:

7.10.2.1. Maintain and repair all OC-ALC-owned trailers .

7.10.2.2. Establish and maintain a trailer maintenance schedule to ensure that all maintenance is complied with.

7.10.2.3. Ensure trailers are identified and marked with a locally assigned identification number (OC number). Trailers will be marked in accordance with the specific equipment TO or TO 35-1-3. The specific equipment TO and/or Work Cards will take precedence.

7.10.2.4. Determine when trailers require complete or touch-up painting for corrosion control.

7.10.2.5. Ensure that AFSC Form 306, Preventive Maintenance Instructions, are provided with the AFTO Form 244 and is attached to each trailer.

7.10.3. Trailer PM and CM will be documented on the AFTO Form 244 IAW Chapter 1. PM is considered past due when the due date is exceeded by one frequency cycle or 60 days, whichever is less.

Chapter 8

MOBILE MAINTENANCE STANDS/FIXTURES/CARTS/PLATFORMS/TABLES/ CABINETS AND DEXION CARTS SECURING

8.1. General. Mobile maintenance stands/fixtures/carts/platforms/tables/cabinets and dexion carts will be secured by setting all brakes and locking devices, if so equipped. If not equipped, the owning organization will determine the need for securing devices.

8.1.1. Any item that requires securing devices will be retrofitted with locks and/or brakes. A minimum of two securing devices will be installed and operational. Approved chocks can be used as a temporary securing device until permanent devices are installed. Locking devices will be set while in use or in storage.

8.1.2. All B series maintenance stands will be modified by the addition of a safety chain to be latched across the access opening side of the platform when employees are working on the platform with the **EXCEPTION:** to B series maintenance stands that have a safety entry gate installed. The chain is designed as an awareness tool only, not as fall protection. The safety chain is designed to alert employees when they are close to the open edge of the platform and may be in danger of stepping off of the platform.

8.1.2.1. Employees will not take any action to remove or bypass this safety device in an effort to render it unserviceable. The safety chain will not be used as a seat.

8.1.2.2. Should a safety chain be found damaged/unusable, the employee who discovers the discrepancy will annotate the AFTO Form 244, Part V, with a Red X IAW Chapter 1 and the stand will be considered unserviceable until the discrepancy is corrected.

8.1.2.3. It is not necessary to latch the safety chain when descending the stand or when personnel are not present on the platform.

8.2. Push Carts. Securing devices will not be required on manual push carts that are being used to transport aircraft parts from one location to another. These carts will not be towed.

Chapter 9

OVERHEAD CRANE OPERATIONS

9.1. Roles and Responsibilities.

9.1.1. OC-ALC provides:

9.1.1.1. Initial training for all operators to consist of testing on material covered and hands on evaluation (AFMAN 91-203, Chapter 12).

9.1.1.2. Management of Preventive Maintenance and Inspection (PMI) program based on the manufacturer's preventive maintenance recommendations, for non-real property listed cranes. These cranes will be identified as DIPE, will have an OC number, and will be managed in FEM.

9.1.2. 72d Air Base Wing/Civil Engineering (72 ABW/CE) provides:

9.1.2.1. Management of PMI program, based on the manufacturer's preventive maintenance recommendations, for real property listed cranes.

9.1.3. OC-ALC/OBH Workforce Development Office provides:

9.1.3.1. Overhead crane instructor/evaluators to train unit designated overhead crane trainers.

9.1.3.1.1. Unit overhead crane trainers training will be documented in TSS under course MTEMAS0006273BR - Overhead Crane Skills Evaluator Training.

9.1.3.2. Maintains the Complex's three year overhead crane skill evaluations checklists.

9.1.3.3. Houses the Complex's three-year overhead crane skill evaluation checklists on the OC-ALC/OBH SharePoint site: <https://org2.eis.af.mil/sites/22464/OBT/SitePagesR/Home.aspx>.

9.1.4. Unit designated overhead crane trainers will:

9.1.4.1. Be trained and qualified by the OC-ALC/OBH overhead crane evaluator/instructor.

9.1.4.2. Complete the MTEMAS0006271CB – Safe Operation of Cranes and Hoists CBT prior to being scheduled for the MTEMAS0006273BR - Overhead Crane Skills Evaluator Training Course.

9.1.4.3. Complete an annual overhead crane physical

9.1.4.4. Conduct initial overhead crane training and three-year overhead crane skill evaluation of unit personnel using skill evaluation worksheets found on the OC-ALC/OBH SharePoint site <https://org2.eis.af.mil/sites/22464/OBT/SitePagesR/Home.aspx>.

9.1.4.5. Ensure personnel attending overhead crane training have completed all prerequisites.

9.1.4.6. Ensure that unit initial overhead crane training and three year overhead crane skill evaluations are documented in TSS.

9.1.5. Supervisors will:

9.1.5.1. Select the most qualified employees (as noted by AFMAN 91-203) to be trained as crane operators. Personnel selected for training must be scheduled for initial crane operator training through the unit training monitor. Once an employee has completed the required training, it must be documented in the TSS.

9.1.5.2. When an employee is selected to operate the crane from the cab or pulpit, send the designated employee's name, social security number, and organizational routing symbol to the 72d Aeromedical Squadron Occupational Medicine Flight (72 AMDS/SGPO) requesting an annual overhead crane physical. (**Note:** Employee is not required to have an annual physical if they will only be operating the crane with the remote control.)

9.1.5.3. Ensure crane operators follow safe and good housekeeping practices.

9.1.5.4. Evaluate each task to determine required PPE and ensure employees comply with the required PPE.

9.1.5.5. Provide an annual overhead crane operator safety briefing to qualified crane operators using the Overhead Crane Operator Annual Safety Briefing Outline (**Attachment 9**). The briefing will focus on safely operating overhead cranes IAW applicable standards. Ensure the briefing is documented in TSS under course MTEINP0006275BR – Overhead Crane Annual Safety Briefing.

9.1.5.6. Use the guidelines provided in AFMAN 91-203 to disqualify an operator when evidence of physical defects or emotional instability exists which could render a hazard to the operator or others, or in the supervisor's opinion, could interfere with the operator's performance.

9.1.5.7. When adjustments or repairs are needed for non-real property listed cranes (identified as DIPE, have an OC number, and managed in FEM), or if it has any known defects, use FEM to initiate a repair trouble call IAW **Chapter 2, para 2.5.3.1.6** of this document.

9.1.5.8. When adjustments or repairs are needed for real property listed cranes, or if it has any known defects, report to the 72 ABW/CE work order desk at 734-3117.

9.1.6. Training Monitors will:

9.1.6.1. Coordinate with the unit's designated overhead crane trainers to conduct initial overhead crane training and three year overhead cranes skill evaluations.

9.1.6.2. Contact the OC-ALC/OBH Workforce Development Office to request training for unit designated overhead crane trainers.

9.1.6.3. Ensure the employee's initial overhead crane operator training and three year overhead crane skill evaluations are entered in TSS under the specific three-year overhead crane skill evaluation course number.

9.1.6.4. Ensure the employee's annual safety briefing is conducted by the employee's supervisor and completion is entered in TSS under course MTEINP0006275BR - Overhead Crane Operator Annual Safety Briefing.

9.1.7. Overhead Crane Operators will:

- 9.1.7.1. Successfully complete crane operator training prior to operating an overhead crane and complete a three-year overhead crane skill evaluation for the specific type of overhead crane being utilized.
- 9.1.7.2. Be briefed by supervision on the annual overhead crane operator safety briefing using the Overhead Crane Operator Annual Safety Briefing Outline in **Attachment 9** of this instruction. A completion for this briefing will be documented in TSS under course MTEINP0006275BR - Overhead Crane Operator Annual Safety Briefing.
- 9.1.7.3. Pass physical examination annually as required, meeting the requirements in AFMAN 91-203 Chapter 12.
- 9.1.7.4. Be disqualified when evidence of poor physical condition, physical defects, seizures, or emotional instability exists which could render a hazard to the operator or others, or in the opinion of the examiner or supervisor, that could interfere with the operator's performance IAW AFMAN 91-203, Chapter 12.
- 9.1.7.5. For non-real property listed cranes (identified as DIPE, have an OC number, and managed in FEM) perform and document inspections IAW **Chapter 2** of this document.
- 9.1.7.6. For real property listed cranes, perform an operational inspection before use of a crane as follows:
- 9.1.7.6.1. The first employee to use the crane for the day will use OC-ALC Form 105, Overhead Crane Operator Inspection Checklist (Attachment 7), to inspect the crane and ensure it is safe for use.
 - 9.1.7.6.2. The checklist may be laminated and securely attached to the remote or pendant control for convenience. Personnel may use wax pencils or dry erase pens to annotate satisfactory/unsatisfactory/not applicable on the checklist.
 - 9.1.7.6.3. Once the inspection is complete and the crane is found to be operating satisfactorily, personnel will document the inspection on the AFTO Form 244.
 - 9.1.7.6.4. Employees are instructed to annotate any discrepancies found on the AFTO Form 244. Suspend all operations immediately if any of the items indicated on the checklist with an asterisk (*) are observed to be in an unsatisfactory condition. In addition to suspending the operation when any unsafe condition is observed, immediately notify the workplace supervisor.
 - 9.1.7.6.5. The AFTO Form 244 will be maintained with the remote control if the crane is so equipped.
- 9.1.7.7. Not engage in operation of the crane hoist when physically or otherwise unfit.
- 9.1.7.8. Consult their supervisor before handling the crane hoist whenever there is doubt as to the safety of the crane, and may refuse to operate the crane until the safety problem is corrected.
- 9.1.7.9. Be familiar with the crane hoist care. If adjustments or repairs are necessary, or any defects are known, report promptly to the supervisor and refuse to operate until the crane is adjusted or repaired.

9.1.7.10. Ensure cables and slings are inspected and current prior to use. (**Note:** Only wire cables or web slings will be used; no ropes or chain slings.) Damaged or unserviceable slings must be destroyed to prevent reuse and disposed of as refuse.

9.2. Maintenance of Overhead cranes.

9.2.1. Maintenance of non-real property listed cranes (identified as DIPE, have an OC number, and managed in FEM). Perform and document inspections IAW **Chapter 2** of this document.

9.2.2. Maintenance of Overhead Real Property Cranes. The PMI program is based on the manufacturer's recommendations, AFMAN 91-203, Occupational Safety and Health Administration (OSHA) 1910.179, Overhead and Gantry Cranes, and other applicable standards. All PMI will be documented as noted in **paragraph 9.4** of this document and will be maintained by Civil Engineering (CE) indefinitely as historical records IAW Records Information Management System (RIMS).

9.2.2.1. All maintenance and periodic inspections are accomplished by Civil Engineering (CE) personnel as shown on **Attachment 8**, Overhead Crane Maintenance and Inspection Schedule. Requests for maintenance will be called into the CE Work Order Desk at 734-3117.

9.2.2.2. When an overhead crane (bay) is locked out, the bays on either side of it must also be locked out to prevent re-energizing of the crane. The Maintenance Operations Center (MOC), 736-2500, will be informed by those locking out the bays. The MOC will then contact the appropriate tool cribs informing them to refrain from issuing remote controls until the locked out crane is once again operational.

9.3. Historical Records.

9.3.1. For non-real property listed cranes (identified as DIPE, have an OC number, and managed in FEM) historical records will be maintained IAW **Chapters 1 and 2** of this document.

9.3.2. For real property listed cranes, the AFTO Form 244 will be used to document the preoperative/daily inspection conducted by the operator, and maintenance conducted by CE. The form will be kept on file by the shop for a minimum of one year.

9.3.3. For real property listed cranes, the AFTO Form 95, Significant Historical Data (or electronic equivalent) will be used to document the monthly and annual/periodic inspections and significant repairs and test conducted by CE. The AFTO Form 95 is maintained indefinitely by CE for the lifespan of the equipment and must be readily available.

9.4. Training/Safety Briefings. Initial overhead crane operator training, overhead crane training prerequisites, overhead crane safety briefings, and three year overhead crane skill evaluations will be documented in TSS.

Chapter 10

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

10.1. Test, Measurement and Diagnostic Equipment (TMDE). Management and the Air Force Metrology and Calibration Program (AFMETCAL).

10.1.1. TMDE Overview. TMDE is defined as devices used to maintain, evaluate, measure, calibrate, test, inspect, diagnose, or otherwise examine materials, supplies, equipment and systems in order to identify or isolate an actual or potential malfunction, or determine if they meet operational specifications established in technical documents. TMDE ranges in scope from equipment used to measure voltage, electric current, capacitance, temperature or waveforms, to equipment used to measure vibration, force, pressure, vacuum, liquid flow, length, or flatness in accordance with (IAW) AFMETCAL Program, TO 00-20-14 and Air Force Instruction (AFI) 21-113.

10.1.2. The AFMETCAL, establishes policies and guidance to ensure the reliability, safety, and accuracy of systems, subsystems, and equipment. The program certifies measurement standards and equipment, professional metrologists, Precision Measurement Equipment Laboratory (PMEL) and Metrology and Calibration Flight (METCAL) facilities, calibration data and integrated planning processes. The AFMETCAL program requires TMDE is traceable to national standards or nationally accepted measurement systems through an unbroken chain of comparisons reflecting stated uncertainties. To accomplish this traceability, the AFMETCAL program requires AF users to obtain calibration services from PMEL/METCALs, the Air Force Primary Standard Laboratory (AFPSL), or an AF approved calibration source.

10.1.3. TMDE Management/Compliance. Proper management of TMDE ensures compliance with the AFMETCAL program directives. Compliance with the program is mandatory. Users of the TMDE must be aware of AF calibration requirements.

10.1.4. One of the more prevalent contributors to calibration deficiencies is the government's acceptance, of commercial off-the-shelf systems that are not in compliance with the AFMETCAL prescribed program. Failure to develop, as part of acquisition and design planning, a maintenance concept that addresses periodic calibration will result in costly delays and rework in order to bring the system into compliance with calibration requirements. A disciplined approach for acquisition of new TMDE must be established, to include maintenance and calibration support.

10.1.5. Right sizing the TMDE inventory should also be considered. TMDE not in use, should be turned into supply. Keeping outdated pieces of TMDE in work centers adds unnecessary inventory costs, and may contribute to noncompliant TMDE issues. It is possible to consolidate TMDE if multiple organizations/facilities share common needs. A TMDE Crib methodology, similar to the management of common hand tools, will reduce the number of TMDE coordinators and reduce ownership costs.

10.1.6. Performance measures should be put into place to measure the overall success of the TMDE Management Program. For example, TMDE Area Audits provide on-site assessments and give management insight into each work center's compliance with TO 00-20-14, and provides data to improve the overall health of the program.

10.1.7. OC-ALC metrology and calibration support is provided by two distinct organizations. Tinker AFB has a contractor-operated Type IIA PMEL and an organic METCAL. The PMEL supports common portable TMDE and provides regional metrology services for the central Continental United States (CONUS). METCAL, assigned to the 76th Maintenance Support Squadron, provides on-site metrology services for TMDE embedded in or closely associated with Industrial Production Equipment (IPE) as well as regional support for liquid flow TMDE.

10.2. Requirements. The AFMETCAL Program is a hierarchical system of calibration laboratories, personnel, equipment, and procedures to ensure systems and equipment measurements are safe, accurate, uniform, reliable and traceable to either the National Institute of Standards and Technology (NIST) or AFMETCAL-approved sources. All TMDE used to make or verify meaningful (quantifiable) measurements shall be calibrated.

10.3. Roles and Responsibilities.

10.3.1. Group Commanders/Directors shall:

10.3.1.1. Appoint a Group TMDE Coordinator and alternate in writing. Copies of these appointment letters will be maintained at the group level.

10.3.1.2. Establish a training program for the responsibilities and procedures outlined in TO 00-20-14, and this instruction for all organizations (e.g., TMDE coordinators, employees, shop supervisors, and engineering) that possess, use, maintain and support TMDE. This program includes specific training for personnel with the appointed authority to approve and sign limited calibration documents and certification labels. These personnel are identified on the Special Certification Roster (SCR).

10.3.1.3. Approve individuals placed on the SCR with the authority to approve limited calibrations. Individuals placed on the SCR to approve limited calibrations require knowledge of the measurement requirements for weapon system maintenance and the industrial production processes the TMDE is used to evaluate.

10.3.1.3.1. The SCR is a management tool providing supervisors a clear and concise listing of personnel who are appointed to perform, evaluate, and/or inspect work of a critical nature. Approval of limited calibrations is a critical step in determining the suitability of precision measurement instruments for use in weapon system maintenance and industrial production processes.

10.3.1.4. Establish written procedures to ensure that out-of-tolerance reports from PMEL/METCAL and limited certification requests receive adequate engineering analysis. These procedures ensure recall analysis is performed for TMDE found out-of-tolerance and that limited certification of the TMDE will not compromise the operational safety, suitability or effectiveness of the product or process.

10.3.1.5. Establish procedures to ensure all TMDE utilized during the maintenance of aircraft, engine, or component assemblies is documented for recall purposes. At a minimum, this document will include the TMDE identification number, serial number, date, employee name and traceability data (example, Inventory Tracking Number [ITN], Job Order Number [JON], Work Control Document [WCD], etc.).

10.3.2. Group TMDE Coordinators shall:

10.3.2.1. Serve as liaison between PMEL/METCAL, Group offices, and all Shop TMDE Coordinators and ensure that all items are maintained, calibrated, and certified.

10.3.2.2. Maintain SCR identifying persons having authority to approve and sign limited calibration documents and certification labels.

10.3.2.3. Ensure an annual inventory of assigned TMDE is performed using the TMDE Master Listing. Report additions, deletions, and corrections to the appropriate PMEL/METCAL scheduler.

10.3.3. Shop TMDE Coordinator Responsibilities.

10.3.3.1. TMDE Coordinators act as the focal point for managing the TMDE calibration requirements for the owning/using work center.

10.3.3.2. The TMDE Coordinator will:

10.3.3.2.1. Attend training (both initial and annual refresher) and maintain a TMDE coordinator file that includes:

10.3.3.2.1.1. Name of primary TMDE coordinator and alternate.

10.3.3.2.1.2. Current TMDE Master ID Listing.

10.3.3.2.1.3. TMDE Quarterly Master Equipment Schedule.

10.3.3.2.1.4. Test equipment hand receipts from PMEL/METCAL unless a Central Collection Point (CCP) has been established. In such case, PMEL/METCAL-issued hand receipts will be kept on file at the CCP. The CCP will issue a local hand receipt to the TMDE coordinator. (**Note:** TMDE Owners/Users and TMDE coordinators have access to and be familiar with contents of TO 33K-1-100-1; TO 33K-1-100-2; TO 00-20-14; any applicable Calibration and Measurement Summary [CMS] TOs; TO 00-25-234 General Shop Practice Requirements for the Repair, Maintenance, and Test of Electrical Equipment; TO 33-1-32, General Instructions for Input Power Wiring of Electrical/Electronic Support Equipment; and the SCR or equivalent document identifying persons designated as calibration limitation approval authority).

10.3.3.2.1.5. A copy of, or link, to the base instruction or OC-ALC supplement, if applicable. Any customer handout(s) that might be provided by PMEL/METCAL.

10.3.3.2.2. Establish procedures for turn-in and pick-up of TMDE requiring calibration.

10.3.3.2.3. Coordinate requests for No Periodic Calibration (NPC), Limited and Special Calibrations, and requests to condemn/repair TMDE.

10.3.3.2.4. Coordinate emergency calibration requirements IAW TO 00-20-14, paragraph 3.7.a.

10.3.3.2.5. Review quarterly TMDE schedules and annual master ID lists within five duty days of receipt from servicing PMEL/METCAL. Distribute TMDE calibration schedules to process owners so calibration downtime can be included as an integral part of the production planning process.

10.3.3.2.6. Forward any corrections to the servicing PMEL/METCAL within three duty days to have the PMEL Automated Management System (PAMS)/Management Information System (MIS) updated.

10.3.3.2.7. Take necessary actions to minimize the late delivery of TMDE for scheduled calibration. Servicing PMEL/METCAL will notify Owing Work Center (OWC) of overdue TMDE under established procedures.

10.3.3.2.8. Use FEM or PAMS to track and control TMDE processed for maintenance.

10.3.3.2.9. Ensure TMDE submitted for calibration has all required documentation complete, the AFTO Form 350 (as applicable) provides adequate malfunction description and accessories/items required for calibration accompany the TMDE to include batteries (as applicable).

10.3.3.2.10. Ensure classified TMDE is protected IAW AFI 31-401.

10.3.3.2.11. Ensure TMDE shipped off base for calibration or repair and return, is shipped by traceable means and IAW AFI 24-203.

10.3.3.2.12. Maintain a file consisting of all supporting documentation for each type of shipment.

10.3.3.2.13. Safeguard any Item Unique Identification (IUI) marks during calibration/TMDE activities to the extent possible. In the event the Unique Item Identifier (UII) is damaged during calibration activities, the TMDE Monitor will notify the responsible Equipment Custodian and/or TMDE Coordinator to replace the mark with the same UII.

10.3.3.2.14. For deployment purposes, ensure equipment, tools, and HAZMAT items are properly identified, prepared, and documented IAW AFI 10-403.

10.3.3.2.15. Return all TMDE specified as PMEL/METCAL or AFPSL responsibility in any applicable CMS TOs or TO 33K-1-100-2 to the PMEL/METCAL upon receipt from supply, when scheduled for calibration, or for unscheduled maintenance. Identify TMDE not listed in any applicable CMS TOs or TO 33K-1-100-2 to the PMEL/METCAL for calibration determination action. Commanders and supervisors of all activities owning and using TMDE requiring calibration are responsible to ensure this TMDE is not used unless it has been calibrated and that it is removed from service once the calibration due date has expired. **EXCEPTION:** to this statement only as covered by paragraphs **3.4.10 through 3.4.18** of Air Force TO 00-20-14.

10.3.3.2.16. Consider alternative of limited calibration, Calibrate Before Use (CBU), or No Periodic Calibration (NPC) status, where possible. Calibration limitations are approved by the user's shop chief or designated seven-level craftsman/civilian equivalents. Users must identify individuals authorized to approve limitations and sign or initial certification labels on the Special Certification Roster or equivalent document. TMDE coordinator and calibration limitation approving official are two distinctly separate duties.

10.3.3.2.17. Deliver TMDE to the PMEL/METCAL with all ancillary equipment (e.g., preamps, power supplies, adapters, cables or probes) needed for the calibration. PMEL/METCAL personnel will advise the user when an item is not sufficiently complete to allow full calibration and may return the item without action if the ancillary equipment and/or technical data are not readily available.

10.3.3.2.18. Provide proper care, handling, cleanliness and transportation of TMDE (see paragraph 3.8 of TO 00-20-14). If the TMDE is used on a liquid system (fuel trucks, hydraulic console, liquid flow stand, etc.), ensure Test Instrument [TI]) has been drained prior to scheduling into the PMEL/METCAL. Also ensure the PMEL/METCAL has a copy of the MSDS for the fluid used, if present.

10.3.3.2.19. Ensure notes contained in the SPECIAL block of the certification labels are read and understood.

10.3.3.2.20. Maintain technical data file for equipment owned. Provide technical data with the TMDE when requested by the PMEL/METCAL. The TMDE User will ensure adequate maintenance and technical data for each item of TMDE are available and that the technical data accompany their TMDE whenever they are deployed.

10.3.3.2.21. Request assistance from the base PMEL/METCAL for calibration of individual items of TMDE that require equipment and technical skills normally in the PMEL/METCAL. Also request PMEL/METCAL help when specified in applicable weapon system or equipment CMS TO. Ensure that TMDE used as component parts of systems or subsystems are not removed for calibration unless the system, subsystem, maintenance or CMS TO requires it.

10.3.3.2.22. Identify and/or coordinate any requirements for limited or special calibrations with the base PMEL/METCAL. Comply with procedures for **EXCEPTIONS:** from periodic calibration as specified in paragraph 3.2 of TO 00-20-14. Place authorizing signature or initials on AFTO Form 99 or AFTO Form 398 IAW Section 5 of TO 00-20-14. This is to be done for TMDE that has received limited or special calibration when returned from the PMEL/METCAL, or for TMDE that is to be exempted from periodic calibration.

10.3.3.2.23. Perform organizational maintenance on assigned TMDE. This responsibility applies to stock listed and nonstock listed TMDE in all federal supply classes.

10.3.3.2.24. Remove AFTO Forms 108, 394, 99 or 398 from units returned to supply stocks and notify PMEL/METCAL of the turn-in. AFTO Forms 108, 394, 99, or 398 on items withdrawn from supply are invalid except for those on Redistribution Order actions. AFTO Forms 65 and 66 stay on equipment.

10.3.3.2.25. Leave all condition tags and other documentation including warranty tags (except the receipt) on TMDE forwarded to the PMEL/METCAL for initial calibration or acceptance testing and retain shipping containers. The initial calibration is a serviceability check on items from a vendor, technical repair center, or other base. Discrepancies found by the PMEL/METCAL during initial calibration are reported to the users so they can submit deficiency reports back to the source of supply. A calibration procedure can serve as a guideline for an acceptance check.

10.3.3.2.26. Provide facilities meeting temperature, humidity, and power requirements IAW this TO for TFCU or other PMEL/METCAL mobile calibration operations.

10.3.3.2.27. Ensure that torque-indicating devices, specified as PMEL/METCAL responsibility in TO 33K-1-100-1/-2 or any applicable CMS TO, are sent to the PMEL/METCAL for scheduled calibration or unscheduled maintenance. Torque indicating devices are considered TMDE and PMEL/METCALs are assigned the primary responsibility for calibration and repair.

10.3.3.2.28. Identify special weapons unique requirements and applicable guidance (such as Nuclear Certified Equipment [NCE] IAW AFI 21-204, Nuclear Weapons Maintenance) which could impact calibration, calibration interval, documentation, etc., to the PMEL/METCAL. (**Note:** For NCE the calibration interval must not exceed the interval published in the individual TOs listed).

10.3.3.2.29. Ensure that medical equipment is referred to the appropriate support activity IAW AFI 41-201, Managing Clinical Engineering Programs, AFI 41-209, Medical Logistics Support and TO 33K-1-100-1.

10.3.3.2.30. Ensure that Skydrol fluid pressure gauges are calibrated using a Skydrol fluid pressure standard. The gauge user is responsible for calibrating these gauges.

10.3.3.2.31. Ensure adjustments/potentiometers that are sealed with an AFTO Form 255, "Notice Certification Void When Seal is Broken" are not reset. Any unit discovered with a broken AFTO Form 255 shall be removed from service and submitted for recalibration.

10.3.3.2.32. Ensure that components of complex TMDE (test stands, checkout consoles, etc.) are properly identified to the PMEL/METCAL as part of the system and not removed for calibration merely because the components are listed individually in TO 33K-1-100-2. Removal of these components for calibration is accomplished only as specified in the calibration authority. Complex TMDE components that require calibration are calibrated in place, if feasible. Components that require calibration by the PMEL/METCAL are calibrated in accordance with the provisions of a CMS or TO 33K-1-100-2. Typical items are pressure gauges, panel meters, power supplies, frequency meters, etc. To preclude excessive down time, each component is calibrated at the shortest interval listed for any of the components, or at a multiple of the shortest interval, if this multiple does not exceed its own listed interval (example, if the shortest interval is four months, an item with a nine-month interval may be checked every four months or it may be shortened to eight months and checked every other time).

10.3.3.2.33. Provide PMEL/METCAL with mission impact statements for Awaiting Parts (AWP) follow-ups.

10.3.3.2.34. Perform all periodic maintenance or inspections as directed by maintenance TOs.

10.3.3.2.35. Notify PMEL/METCAL of the date items are removed from War Reserve Materiel (WRM; TO 00-20-14, paragraph 3.4.6.) packages or from Contingency Equipment **EXCEPTION:** (CEE; TO 00-20-14, paragraph 3.4.7.) storage and placed into use. Complete the date due block of the certification label using the calibration interval listed in TO 33K-1-100-2 or applicable CMS at the time the item is removed from the WRM package. PMEL/METCAL may be contacted for assistance in calculating the date due. Date due is dependent upon calibration interval stated in the TO 33K-1-100-2 or applicable CMS.

10.3.3.2.36. Ensure all forms, labels, and calibration correction charts received with the TMDE from the PMEL/METCAL are complete. Notify the supporting PMEL/METCAL of errors encountered.

10.3.3.2.37. Identify all TMDE designated as WRM, Contingency Equipment **EXCEPTION:** (CEE) or subject to deployment. This information shall be provided to servicing PMEL/METCAL to be included on master inventory.

10.3.3.2.38. Provide PMEL/METCAL information regarding the use made of Radiation, Detection, Indication, and Computation (RADIAC) equipment to permit PMEL/METCAL to determine calibration interval. To be precise, is it Non-Destructive Inspection (NDI) equipment, disaster preparedness, or medical equipment?

10.3.3.2.39. Remove batteries from Federal Stock Class (FSC) 6665 RADIAC equipment sent to a PMEL/METCAL that does not affect the calibration of the unit.

10.3.3.2.40. Maintain warranty information on all TMDE and document start and stop dates and other warranty conditions.

10.3.3.2.41. Coordinate with PMEL/METCAL (or organization identified as having calibration responsibility for the TMDE) prior to upgrading TMDE firmware or operational software. Firmware/software upgrades may impact TMDE calibration thereby voiding the usability of the previous calibration. (**Note:** Operational software refers to software provided by the TMDE manufacturer required for basic instrument control, or to provide basic software utility functions.)

10.3.3.2.42. When notified by the PMEL/METCAL of an “out-of-tolerance” TMDE item, the owning work center determines the impact of the “out-of-tolerance” condition on shop production and what steps, if any, they should take (customer notification, recall of production items, etc.).

10.3.3.2.43. Prior to the ‘lease/borrow’ of TMDE:

10.3.3.2.43.1. Coordinate with PMEL/METCAL to verify there is no existing TMDE that can be used to satisfy the requirement. Provide the PMEL/METCAL with the expected duration of the ‘lease/borrow’ arrangement.

10.3.3.2.43.2. If TMDE is ‘lease/borrowed’, comply with the requirements of TO 00-20-14, paragraph 4.9.

10.3.3.2.43.3. Coordinate with the organization responsible for calibration prior to replacing See Individual Component Listing (SICL) test stand Next Higher Assembly (NHA) components with spares. A recalibration may be required.

10.3.3.2.43.4. Inform PMEL/METCAL if noise dosimeters, sound level meters, or acoustic calibrators are used in the "AF Occupational Noise and Hearing Conservation Program". Those items used in support of the "AF Occupational Noise and Hearing Conservation Program" is identified by the User and calibration is performed IAW the shortest calibration interval listed in the appropriate Calibration Authority (see TO 00-20-14, Par 3.1.2 Calibration Authority Precedence, or AFI 48-127, Occupational Noise and Hearing Conservation Program).

10.3.3.2.43.5. Ensure pipettes are clean and free of bio hazards or other hazardous materials before sending to PMEL/METCAL. The OWC must certify the pipette is free of contaminants on an attached AFTO Form 350 tag or other official form.

10.3.4. TMDE Owners and Users Responsibilities.

10.3.4.1. TMDE Owners and Users. As determined by the AFMETCAL Program, TMDE users make quantitative measurements as directed by applicable AF directives which have an effect on the accuracy and/or reliability of AF systems and calibrated subsystems.

10.3.4.2. TMDE Owners and Users shall:

10.3.4.2.1. Identify equipment and processes that incorporate TMDE and plan for calibration downtime as an integral part of the production process.

10.3.4.2.2. Appoint a TMDE coordinator, both primary and alternate.

10.3.4.2.3. Process owners should analyze out-of-tolerance reports from the TMDE coordinator to determine if product recall is required. Upon review, forward all recommendations to the applicable production management. Recommendations requiring recall or similar actions, should be elevated to the squadron leadership.

10.3.4.2.4. Analyze limited certification requests and reports from the TMDE coordinator to ensure that the TMDE is suitable for the process application with the limited certification and does not compromise the operational safety, suitability and effectiveness of the process. Upon review, forward all recommendations to the applicable TMDE monitor and ensure the limited calibration is approved by responsible personnel identified on the Special Certification Roster.

10.3.4.2.5. Ensure in-use TMDE is calibrated at regularly scheduled intervals specified in applicable CMSs, TO 33K-1-100-1 and TO 33K-1-100-2. (T-1). **Note:** Authorized calibration **EXCEPTIONS:** are identified in TO 00-20-14, applicable CMS, and TO 33K-1- 100-2.

10.3.4.2.6. Remove TMDE from service when the calibration due date has expired or the validity of the calibration is in question (example, a torque wrench that has been dropped should be removed from service and re-calibrated).

10.3.4.2.7. Request approval from AFMETCAL through the local/supporting PMEL/METCAL prior to obtaining calibration of AF TMDE from non-AF sources.

10.3.4.2.8. Provide proper care, handling, cleanliness and transportation of TMDE IAW equipment specific TOs and manuals and TO 00-20-14.

10.3.4.2.9. Ensure vehicles used to transport TMDE are equipped to provide full protection to TMDE from damage that may occur from weather, vibration or shock IAW applicable TO's and/or commercial manuals.

10.3.4.2.10. Process owners/engineers should evaluate and approve proposed TMDE substitutions to ensure that the equipment substitution meets or exceeds the original TMDE specifications without affecting the operational safety, suitability, or effectiveness of the process or product.

10.3.4.2.11. Process owners/engineers should consult with PMEL/METCAL to identify equipment needed to replace obsolete or poor reliability TMDE and/or consolidate existing or outdated TMDE with new equipment.

10.3.4.2.12. Obtain user/owner's signatures on limited or special certification labels using the SCR to ensure that the signature is authorized.

10.3.4.2.13. Remove batteries from equipment prior to storage (refer to TOI 33-1-35, Inspect Federal Stock Class Equip and Install Warning Decal, for further guidance).

10.3.4.2.14. Ensure all newly assigned TMDE items are sent to PMEL/METCAL prior to use.

10.3.4.2.15. Ensure all TMDE items have a valid certification label (AFTO Form 99, 108, 394, 398 or No Calibration Required [NCR] sticker).

10.3.4.2.16. Prior to use of TMDE, ensure the calibration of the TMDE is current and meets the minimum required accuracy for the intended use as specified by TO or other authorized AF directive. If the TMDE has a limited certification (yellow; AFTO Form 99, Limited/Special TMDE Certification/AFTO Form 398, Limited TMDE Certification), ensure the certification label has been signed in the "User Approval" block. Certification is not valid unless this block has been signed by a person listed on the SCR.

10.3.4.2.17. Perform any required "prior to use" inspections and maintenance of the TMDE such as cleaning, oiling, or greasing as required by AF technical data or manufacturer's data. The AFTO Form 244, Industrial/Support Equipment Record, shall be used on TMDE requiring scheduled inspections other than calibration. Examples include: fan, filter, battery, oil, cleaning, or other preventive type inspections or maintenance. The AFTO Form 244 is not used to document calibration actions.

10.3.4.2.18. Coordinate with appropriate TMDE coordinator to ensure TMDE is always available for inspection, particularly TMDE stored in locked tool cabinets.

10.3.4.2.19. Consult with appropriate supervision before substituting TMDE for another type specified by TO or other directive. The engineer for the affected process must be involved in the decision to substitute TMDE.

- 10.3.4.2.20. Ensure compliance with TO 33K-1-100-2-CD-1, TMDE Calibration, Interval Technical Order, and Work Unit Code Reference Guide, applicable Calibration Measurement Summaries (CMS), and TO 00-20-14, in the use, care, handling, transportation and calibration of TMDE.
- 10.3.4.2.21. Control and maintain TMDE IAW TO 33-1-27, Logistic Support of Precision Measurement Equipment.
- 10.3.4.2.22. All support sections responsible for storing and handling TMDE will comply with TO 33K-1-100-2-CD-1 and TO 00-20-14, requirements for the use, care, handling, transportation and calibration of TMDE owned by the section.
- 10.3.4.3. TMDE Designated as USER Calibration Responsibility.
- 10.3.4.3.1. Calibrate, certify, and repair TMDE specified in any applicable CMS or TO 33K-1- 100-2 as USER at the specified interval. If the USER organization does not have the capability, obtain calibration and maintenance support from the lowest echelon organization having the capability. If no other organization has the capability, the PMEL/METCAL may assist by providing training, workspace, technical assistance or support, as resources allow. Refer to 00-20-14 for further procedures.
- 10.3.4.3.2. All TMDE owned/in use by OC-ALC organizations that is designated as “USER” calibration responsibility is loaded and managed in FEM. New TMDE that is designated as “USER” calibration responsibility should be added to FEM by contacting 76 MXSS/MXDXA and providing required information for FEM entry. USER Calibration TMDE calibrated by the Type IIA PMEL/METCAL is be tracked in PAMS as an alternative to FEM.
- 10.3.4.3.3. Document all personnel performing USER calibrations are properly trained and qualified on the tasks they are performing. Qualified personnel require certification to perform the calibration in Training Scheduling System (TSS) or another suitable training record.
- 10.3.4.3.4. Perform calibrations using authorized technical data IAW TO 00-20-14, paragraph 3.1.2.
- 10.3.4.3.5. Document maintenance actions in FEM or PAMS as applicable.
- 10.3.4.3.6. Comply with OC-ALC or equivalent quality program.
- 10.3.4.3.7. Ensure calibrations are completed in an environment (temperature/humidity) that supports the specifications of standards and devices under test.
- 10.3.4.3.8. Track due dates of TMDE designated USER and requiring re-calibration. Use FEM or PAMS to manage TMDE designated as “USER” calibration responsibility in AF calibration authorities. USERS will ensure TMDE is not used unless calibrated. USERS will remove the TMDE from service once the calibration due date has expired.
- 10.3.4.3.9. Perform all applicable User Procedures IAW TO 00-20-14.
- 10.3.5. TMDE Acquisition or Local Purchase Responsibilities.

10.3.5.1. Program managers will coordinate metrology/TMDE requirements with AFMETCAL during the acquisition process IAW AFI 21-113 and AFI 63-101_20-101.

10.3.5.2. Prior to the 'local purchase' of TMDE:

10.3.5.2.1. Coordinate with PMEL/METCAL to verify there is no existing TMDE that can be used to satisfy the requirement as soon as a part number or model number is available.

10.3.5.2.2. Coordinate with PMEL/METCAL to determine if the item is already listed in a CMS or TO 33K-1-100-2.

10.3.5.2.3. Assist PMEL/METCAL in completing the Request for Calibration Responsibility Determination upon purchase per Section 5 of TO 00-20-14 and provide the necessary commercial data.

10.3.5.2.4. Provide funding for resources needed to support locally procured TMDE. This includes funding for repair and calibration when locally procured TMDE is beyond the support of the local PMEL/METCAL.

10.3.5.2.5. Follow the guidance in AFI 64-117, AF Government-Wide Purchase Card Program, when using a Government Purchase Card to locally purchase TMDE. PMEL or METCAL must approve, in writing, all purchases of TMDE in accordance with AFMETCAL Program procedures as well as all purchases of TMDE repair services from non-organic repair sources.

10.3.5.2.6. The user is responsible for providing the PMEL/METCAL any items required for maintenance and calibration of any item locally purchased. Before buying any items locally, the potential owner will contact the PMEL/METCAL to determine if PMEL/METCAL support will require any additional equipment, supplies or data (see user responsibilities in TO 00-20-14, Section 3).

10.4. Care of TMDE.

10.4.1. Those responsible for owning and using TMDE must ensure its proper handling, transportation to and from designated drop off points, care, use and cleanliness. These are important factors in ensuring that TMDE performs reliably within specified tolerances for the duration of the established calibration interval.

10.4.2. Physical characteristics of TMDE. Physical characteristics of TMDE range from sturdy to fragile. The sturdy can be outer cases with shock suppression mountings. The fragile can be components that can be damaged by a slight jolt, scratch, or static electricity. Special handling instructions for specific items are prescribed in maintenance TOs when handling requirements exceed normal practice. Electrostatic Discharge (ESD) control procedures are described in MIL- HDBK-263B Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies, and Equipment, MIL-STD-1686C, Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment, and TO 00-25-234.

10.4.3. Items of TMDE are handled as "delicate instruments" regardless of outer physical appearance.

10.4.4. TMDE that is too heavy or awkward to be carried by one person may require team lifting or mechanical assistance IAW AFMAN 91-203 Air Force Consolidated Occupational Safety Instruction.

10.4.5. Items of TMDE are handled individually unless the item's size and physical characteristics allow it to be held in one hand.

10.4.6. External cords, cables, accessories and special connectors are secured to the case before movement.

10.4.7. **All unmated connectors are kept covered with moisture-proof and vapor-proof caps. EXCEPTIONS:** are when stored in environmentally controlled areas or if subject to use on a daily basis. Unmated connectors on units that contain circuitry susceptible to Electrostatic Discharge (ESD) damage is covered with conductive caps. Do not substitute the use of tape for the caps.

10.4.8. Metal-to-metal contact with TMDE items is avoided unless the total instrument is contained in a protective case.

10.4.9. Only TMDE awaiting work, in delay status or delivery to the customer is stored in the PMEL/METCAL receiving and shipping areas. If a portion of the area is used for other purpose(s), the area is well marked as to status or purpose of use.

10.4.10. All TMDE is stored on shelves or racks unless the physical characteristics prevent this type storage. Items of TMDE constructed so that the instrument is completely contained in a case may be stored on metal or wooden shelving without further protection. Care must be taken to protect protruding dials, knobs, or meter faces. TMDE not constructed in cases is protected from damage by use of suitable containers and appropriate padding. Containers, protective caps and coverings, and padding are not required for equipment in work or subject to use on a daily basis. Items of TMDE completely contained in packing cases may be stored on the floor.

10.4.11. TMDE is removed from service if it has been subjected to overloading, mishandling, gives suspect results, or otherwise determined to be defective. Properly tag and store the TMDE to prevent further use until it can be scheduled for repair or calibration.

10.4.12. Transportation of TMDE. Transportation of TMDE by trained personnel using a regularly assigned and specially configured vehicle will provide the maximum degree of protection to the equipment. Physical characteristics of individual TMDE will dictate the extent of protection required during transportation. In general, protection from the elements and excessive shock and vibration is all that is required for TMDE in a protective case. Padding protection between items on the same vehicle may be required to protect knobs, dials, and meter faces from damage if the load shifts.

10.4.13. Cleaning TMDE. The user will clean the exterior of all TMDE immediately before transporting to the PMEL/METCAL. TMDE may be returned to the user for cleaning. When an item is disassembled in the calibration area of the PMEL/METCAL and found to be dirty internally, the calibrating technician will return the item to the cleaning room. Dust removal may be done in the calibration area by vacuuming only. Use ESD approved systems when vacuuming ESD sensitive internal circuitry/equipment to remove dust. Techniques for cleaning electronic equipment are provided IAW TO 00-25-234. These techniques may also

be applied for electromechanical and physical standards when applicable. Oxygen TMDE is certified as clean by the user prior to shipment to the PMEL/METCAL. (**Note:** Oxygen gauges will contain the warning OXYGEN-USE NO OIL printed on the face of the gauge by the manufacturer or by use of the OXYGEN-USE NO OIL decal part number 69A52267, TO 15X-1-102, General Care and Cleaning of Oxygen Gauges and Oxygen Device Related Test Equipment), or an equivalent statement of oxygen service. If the gauge does not have the OXYGEN-USE NO OIL warning or decal or equivalent statement of oxygen service printed on the face or affixed to the gauge, the PMEL/METCAL will not include the “Not Oxygen Clean” statement on the certification label.

Chapter 11

AEROSPACE GROUND AND SUPPORT EQUIPMENT

11.1. Roles and Responsibilities.

11.1.1. MXSG will: Maintain, schedule and inspect AGE, IAW TO 00-20-1, and equipment specific TOs in support of depot production and back shop maintenance activities. Pick-up, service, deliver, and repair and perform approved modifications, TCTOs, inspect assigned AGE and perform corrosion control tasks.

11.1.2. AMXG shall ensure that all equipment is FOD free, all attachments are installed properly (e.g., rails, covers, safety pins) prior to calling into Dispatch for pick up or re-spot to another location. AMXG shall not move or relocate any equipment with a Red X condition for aircraft use. AMXG shall not tamper with or remove “PM DUE” or “RED X” stickers or markings on any equipment to include the AFTO Form 244. AMXG shall not remove bleed air hoses or connections from bleed air carts due to safety. AMXG shall not move or relocate equipment from the AGE yard ready line without prior coordination and approval from the MXSG AGE Flight.

11.2. Aerospace Ground Equipment Movement. MXSG shall accomplish AGE movements.

11.2.1. Movement Requests: Aircraft maintenance will initiate AGE movement requests to Dispatch by telephone or radio. MXSG shall assign requested AGE movements to drivers. When ready line assets are not available, MXSG shall query FEMS checking in-use locations for asset availability for possible re-spot actions. MXSG shall coordinate with the MOC on all re-spot movements. The MOC has final authority on all AGE priorities and movements. MXSG shall deliver/pick-up AGE at the Maintenance, Repair, and Overhaul Technology Center (MROTC). AMXG shall request MROTC support movement 24 hours prior to requirement. AMXG AGE assets will only be dispatched to AMXG owned ramps and facilities. AMXG will submit to MXSG a list of facilities, ramps, and equipment IDs for reference as needed.

11.2.2. When customer requested equipment is not available, AMXG shall submit work stoppage to 76 AMXG GSE Support 76AMXG.GSESupport@us.af.mil email stating the equipment requirement with location. AMXG shall notify the MOC of work stoppage and request a “Call Out” to search for required equipment.

11.2.3. Facilities and Equipment Management System (FEMS) Update: MXSG shall enter movement actions into FEMS after completing each assigned AGE movement.

11.2.4. Aircraft Launch Support: MXSG shall ensure there are sufficient number of drivers to support both Functional Check Flights (FCFs) and daily routine movements. AGE drivers must be able to react to a FCF priority move within 10 minutes. AGE driver shall report to FCF aircraft stand-by upon request. If driver stays with aircraft for 30 minutes or longer then AGE dispatch shall contact the MOC for request to exit the FCF stand-by. The MOC shall determine if driver may vacate FCF until further notice.

11.3. Hydraulic Test Stands (HTS). AMXG shall assign designated HTS, both electric and diesel, by field identification number to each aircraft squadron. MXSG shall only dispatch designated HTS to assigned AMXG squadron unless prior approval by MOC. HTS picked up from customer shall be considered clean/pure unless the customer identifies suspected contamination by entering a discrepancy into the AFTO Form 244. HTS loaned out to un-assigned AMXG squadron will be sample tested for possible contamination and released for use upon satisfactory results. MXSG shall service all HTS with clean/purified hydraulic fluid when supplied from 55-gallon drum or non-hermetically sealed containers. MXSG shall purify all HTS where system CM was performed or suspect contamination. Purification shall be verified using hydraulic sampling process and results from MXSG laboratories. HTS will not be dispatched to the customer without satisfactory sample results. AMXG may add hydraulic fluid from 1 quart or 1 gallon hermetically sealed containers only.

11.3.1. Hydraulic Test Stands will be assigned to each weapon system for their use. At any time if there are not enough hydraulic test stands for the customer use, the AGE dispatcher will notify the 76 AMXG MOC and/or 76 AMXG Pro Super for direction. The only time AGE will deliver a unit to a customer not assigned to them will be under that direction.

11.4. AGE Maintenance and Scheduling. MXSG shall accomplish, in accordance with applicable technical order data and work cards, scheduled periodic maintenance actions prior to or on its established due date.

11.4.1. AGE Schedule: MXSG shall schedule all PM/CM requirements within FEMS. MXSG master AGE inventory shall contain a schedule that identifies primary tasks due on each day of a Julian calendar year. AMXG shall release all equipment identified with PM due or CM defect. MXSG shall ensure, at a minimum, 75% of all AGE listed in FEM is operational at any given period of time.

11.4.2. AMXG shall provide a Minimum Equipment Listing (MEL) to MXSG for each aircraft squadron's support requirements. AMXG shall review and update annually. MXSG shall reference the MEL to monitor equipment levels and make recommendations to AMXG equipment custodians for additions and deletions.

11.5. AGE Inventory Additions and Deletions.

11.5.1. AGE Additions: AMXG shall contact MXSG with any requested equipment additions. MXSG shall review equipment to determine if AGE or SE in accordance with technical order 00-20-1. AMXG shall submit an AFSC Form 388 with all the required equipment information for AGE that will be added to FEMS. MXSG shall determine the equipment field identification number to be used for FEMS and stenciling or equipment.

11.5.2. AGE Deletions: MXSG shall make recommendations for equipment turn-in based on inventory levels, equipment condition and criteria in technical order 00-25-240. National Stock Number (NSN) Listed AGE equipment designated for turn-in, AMXG equipment custodian shall complete the AFTO Form 375 Selected Support Equipment Repair Cost Estimate and submit to AFSC/HQ/A4 for coordination with item manager at Robins AFB. Equipment item manager shall provide disposition for equipment disposal or repair. Non-NSN listed AGE equipment for turn-in will be determined by equipment custodian and owning AMXG squadron. MXSG shall complete equipment preparation for disposal/turn-in actions when requested by equipment custodian.

11.6. Corrective Maintenance.

11.6.1. AMXG shall report CM defects to the AGE dispatcher for pick up or repair. AMXG shall submit a FEMS workorder for CM repair defects on aircraft dock stands.

11.7. Time Compliance Technical Order (TCTO). AFMC AGE Functional shall notify MXSG AGE Flight and production controllers upon receiving a Higher Headquarters (HQ) TCTO directing maintenance actions. MXSG shall adhere to the TCTO directives and meet the time constraints set forth to ensure all work on designated AGE is completed by the rescission date.

11.8. AGE Liquid Oxygen (LOX)/Gaseous Oxygen (GOX) Carts. AMXG shall properly annotate the AFTO Form 134 Aviation Breathing Oxygen Servicing Trailer Log (Liquid/Gaseous) and AFTO Form 244 on each cart upon completing aircraft service.

11.9. Trailer Maintenance.

11.9.1. General Purpose Trailers: MXSG shall perform PM/CM on general purpose trailers. MXSG engineers and equipment specialist shall determine PM intervals when there is not a technical order to support the equipment. MXSG shall maintain chassis only on cargo style general purpose trailers. AMXG shall be responsible for upkeep on storage box and internal facility of cargo trailers. AMXG shall be responsible for install/removal and maintenance of any fixtures or adapters that are attached to any trailer without prior coordination and approval from MXSG.

11.9.2. Fuel Bowser Maintenance: MXSG shall perform PM/CM on assigned fuel bowsers. This includes flushing contaminated bowsers once drained/empty and clear of FOD. AMXG shall reclaim all clean aircraft fuel. MXSG shall be responsible for pumping or draining of waste aircraft fuel.

11.10. Record Keeping. MXSG production controller scheduler shall maintain and update scheduled maintenance records for the life of the equipment in FEMS while in possession of the equipment.

11.11. AGE Blasting and Painting. AMXG shall perform strip and paint functions for up to one piece of AGE equipment per month. MXSG shall ensure an AGE Corrosion Control and Prevention Program is maintained and a field number system is established IAW TO 35-1-3, TO 1-1-8, TO 1-1-691, AFMC instructions equipment specific TOs. Develop and implement a tracking system to prioritized complete repainting for AGE equipment based on a “worst is first” principle. All AGE will be scored annually during periodic scheduled maintenance inspection.

JEFFREY R. KING, Major General, USAF
Commander, OC-ALC

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

- AFI 21-102, *Depot Maintenance Management*
- AFI 10-403, *Deployment Planning and Execution*, 20 September 2012
- AFI 21-113, *Air Force Metrology and Calibration (AFMETCAL) Management*, 3 June 2016
- AFI 21-204, *Nuclear Weapons Maintenance*, 17 December 2015
- AFI 24-203, *Preparation and Movement of Air Force Cargo*, 13 July 2017
- AFI 32-7086, *Hazardous Materials Management*, 4 February 2015
- AFI 33-360, *Publications and Forms Management*, 1 December 2015
- AFI 33-363, *Management of Records*, 1 March 2008
- AFI 41-209, *Medical Logistics Support*, 6 October 2014
- AFI 48-127, *Occupational Noise and Hearing Conservation Program*, 26 February 2016
- AFI 63-101_20-101, *Integrated Life Cycle Management*, 9 May 2017
- AFI 64-117, *Government Purchase Cared Program*, 22 June 2018
- AFMAN 91-203, *Air Force Consolidated Occupational Safety, Fire, and Health Standards*
- AFI 13-213, *Airfield Driving*
- AFI 91-207, *The U.S. Air Force Traffic Safety Program*
- TO 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*
- TO 00-20-14, *Air Force Metrology and Calibration Program* TO 00-25-240, *Uniform Repairable/Replacement Criteria for Selected USAF Support Equipment (SE)*
- TO 35-1-3, *Corrosion Prevention and Control, Cleaning, Painting, and Marking of USAF Support Equipment (SE)*
- TO 1-1-8, *Application and Removal of Organic Coatings, Aerospace and Non-Aerospace Equipment*
- TO 1-1-691, *Cleaning and Corrosion Prevention and Control, Aerospace and Non-Aerospace Equipment*
- AFSCMAN 21-102, *Depot Maintenance Management*, 16 March 2015
- ANSI/ASME Safety Standard B30.2, *Overhead and Gantry Cranes*, 2011
- ANSI/ASME Safety Standard B30.9, *Slings*, 2010
- ANSI/ASME Safety Standard B30.11, *Monorails and Underhung Cranes*, 2010
- ANSI/ASME Safety Standard B30.16, *Overhead Hoists*, 2012
- ASTM E1417, *Standard Practice for Liquid Penetrant Testing*, 2013

ASTM E1444, *Standard Practice for Magnetic Particle Examination*, 2012

CFR 1910.184, *Slings*, 3 October 2013

MIL-STD-HDBK-263B, *Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts (Excluding Electrically Initiated Explosive Devices)*, 31 July 1994

MIL-STD-1686C, *Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment (Excluding Electrically Initiated Explosive Devices)*, 25 October 1995 OSHA 1910.179, *Overhead and Gantry Cranes*, 3 February 2004

TO 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*, 15 June 2013

TO 00-20-14, *Air Force Metrology and Calibration Program*, 30 September 2013

TO 00-25-234, *General Shop Practice Requirements for the Repair, Mint, and Test of Electrical Equipment (ATOS)*, 25 March 2018

TO 15X-1-102, *General Care and Cleaning of Oxygen Gauges and Oxygen Device Related Test Equipment (ATOS)*, 22 Jul 2017

TO 33-1-27, *Logistic Support of Precision Measurement Equipment—6625 Electrical and Electronic Properties Measuring and Testing Instruments, 6630 Chemical Composition Determining Instruments, 6635 Physical Properties Testing Equipment, 6640 Laboratory Equipment and Supplies, 6645 Time Measuring Instruments, 6650 Optical Instruments, 6650 Geophysical and Astronomical instruments, 6670 Scales and Balances, 6675 Drafting, Surveying and Mapping instruments, 6680 Liquid and Gas Flow, liquid level and Mechanical Measuring Instrument*, 17 August 2013

TO 33-1-35, *Inspect Federal Stock Class and Install Warning Decal*, 30 November 2012

TO 34-1-3, *Inspection and Maintenance of Machinery and Shop Equipment*, 8 October 2012

TO 33B-1-1, *Non-Destructive Inspection (NDI) Methods, Basic Theory*, 1 January 2013

TO 35-1-3, *Corrosion Prevention and Control, Cleaning, Painting, and Marking of USAF Support Equipment (SE)*, 5 August 2013

TO 33-1-32, *General instructions-Input Power Wiring of Electrical and Electronic Support Equipment*, 22 December 2016

TO 33K-1-100-1, *Calibration Procedure—Maintenance Collection Codes and Calibration Measurement Summaries*, 30 November 2017

TO 33K-1-100-2-CD-1, *TMDE Calibration Notes, Calibration Interval, Technical Order and Work Unit Code Reference Guide*, 30 November 2017

TO 33K-1-100-2, *PMEL Only—TMDE Calibration Notes, Calibration Interval, Technical Order, and Work Unit Code reference Guide Addendum*, 1 October 2018

TO 35D6-1-106, *Aircraft and Engine Slings (General) and Restraining Devices*, 24 August 2013

TO 36-1-121, *Standardization of Lunette and Pintle Hook (Type I, Class I and II) Towing Attachments*, 24 August 2007

TO 36-1-191, *Technical and Managerial Reference for Motor Vehicle Maintenance*, 17 July 2013

Prescribed Forms

OC-ALC Form 105, *Overhead Crane and Operator Inspection Checklist*

Adopted Forms

AF Form 55, *Employee Safety and Health Record*

AF Form 483, *Certificate of Competency*

AF Form 847, *Recommendation for Change of Publication*

AF Form 982, *Danger Tag: Do Not Start*

AFSC Form 137, *Routed Order*

AFSC Form 306, *Preventive Maintenance Instruction*

AFSC Form 388, *Machine Tool and Equipment Historical Record*

AFTO Form 65, *Aluminum Barcode*

AFTO Form 66, *Polyester Barcode*

AFTO Form 95, *Significant Historical Data*

AFTO Form 99, *Limited/Special TMDE Certification*

AFTO Form 108, *TMDE Certification*

AFTO Form 244/245, *Industrial/Support Equipment Record*

AFTO Form 255, *Certification Void if Seal is Broken*

AFTO Form 350, *Repairable Item Processing Tag*

AFTO Form 394, *TMDE Certification*

AFTO Form 398, *Limited TMDE Certification*

DD Form 1577-1, *Unserviceable (Condemned) Tag-Materiel*

DD Form 1577-2, *Unserviceable (Repairable) Tag-Materiel*

DD Form 2875, *System Authorization Access Request (SAAR)*

OC-ALC Form 493, *Lockout/Tagout (Control of Hazardous Energy Worksheet)*

Abbreviations and Acronyms

551 CMMXS/MXDRAD—551st Commodities Maintenance Squadron/Commodities Tubing and Cable

552 CMMXS/MXDRAA—552nd Commodities Maintenance Squadron/Commodities Life Support and Textile

72 ABW/CE—72d Air Base Wing/Civil Engineering

72 AMDS/SGPO—72d Aeromedical Squadron Occupational Medicine Flight

72 FSS/DPE—72d Force Support Squadron Education and Training Flight

76 AMXG—76th Aircraft Maintenance Group

76 MXSG—76th Maintenance Support Group

76 MXSS—76th Maintenance Support Squadron

76 MXSS/MXDCA—76th Maintenance Support Squadron Metrology and Calibration (METCAL) Flight

76 MXSG/MXDEQ—76th Maintenance Support Group Equipment Engineering Section

76 MXSG/MXDP—76th Maintenance Support Group Production Support Branch

76 PMXG—76th Propulsion Maintenance Group

776 MXSS—776th Maintenance Support Squadron

776 MXSS/MXDVA—76th Maintenance Support Squadron Plant Management Flight

776 MXSS/MXDXA—776th Maintenance Support Squadron Support Flight

AF—Air Force

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFOSH—Air Force Occupational Safety and Health

AFPSL—Air Force primary Standard Laboratory

AFSC—Air Force Sustainment Center

AFSCI—Air Force Sustainment Center Instruction

AFTO—Air Force Technical Order

AFMETCAL—Air Force Metrology and Calibration Program

ANSI—American National Standards Institute

AOC—Account Organization Code

ASME—American Society Mechanical Engineers

AWP—Awaiting Parts

BEF—Bioenvironmental Engineering Flight

BOM—Bill of Material

CBU—Calibration Before Use

CCP—Central Collection Point

CE—Civil Engineering

CEE—Contingency Equipment Exception

CF—Carried Forward

CFR—Code of Federal Regulations
CML—Contract Maintenance Liaison
CM—Corrective Maintenance
CMS—Calibration and Measurement Summary
CMMS—Computerized Maintenance Management System
CONUS—Continental United States
COR—Contracting Officer Representative
COTS—Commercial Off The Shelf
DAILY/PU—Daily or Prior To Use
DIPE—Depot Industrial Plant Equipment
DRMO—Supply/Defense Reutilization Marketing Office
ESD—Electrostatic Discharge
ETMS—Education/Training Management System
FAA—Federal Aviation Administration
FEM—Facilities and Equipment Maintenance
FSC—Federal Stock Class
IAW—In Accordance With
IPE—Industrial Plant Equipment
ITN—Inventory Tracking Number
JON—Job Order Number
MAJCOM—Major Command
MAS—Maintenance Action Sheet
MCL—Master Configuration List
METCAL—Metrology and Calibration Flight
MFT—Multi-Function Team
MIS—Maintenance Information Systems
MOC—Maintenance Operations Center
NCE—Nuclear Certified Equipment
NCR—No Calibration Required
NDI—Non-Destructive Inspection
NHA—Next Higher Assembly
NIST—National Institute of Standards and Technology

NON-DIPE—Non-Depot Industrial Plant Equipment
NPC—No Periodic Calibration
NSN—National Stock Number
OC-ALC—Oklahoma City Air Logistics Complex
OC-ALC/CC—Oklahoma City Air Logistics Complex Commander
OC-ALCOI—Oklahoma City Air Logistics Complex Operating Instruction
OCM—On-Condition Maintenance
OEM—Original Equipment Manufacturer
OI—Operating Instruction
OM—Operator Maintenance
OPR—Office of Primary Responsibility
OSHA—Occupational Safety and Health Administration
OWC—Owning Work Center
PAMS—PMEL Automated Management System
PDM—Predictive Maintenance
PM—Preventive Maintenance
PME—Precision Measurement Equipment
PMEL—Precision Measurement Equipment Laboratory
PMI—Preventive Maintenance and Inspection
PPE—Personal Protective Equipment
RADIAC—Radiation, Detection, Indication, and Computation
RIMS—Records Information Management System
SCR—Special Certification Roster
SE—Support Equipment
SICL—See Individual Component Listing
SPO—System Program Office
TCTO—Time Compliance Technical Order
TI—Tinker Instruction
TI—Test Instrument
TMDE—Test Measurement and Diagnostic Equipment
TO—Technical Order
TSS—Training Schedule System

WBP—Wheel Bearing Pack

WCD—Work Control Document

WRM—War Reserve Material

WUC—Work Unit Code

Terms

Bridge—The part of a crane consisting of girders, trucks, end ties, footwalks, and drive mechanism which carries the trolley or trolleys.

Bridge Travel—Crane movement in a direction parallel to the crane runways.

Cab Operated Crane—A crane controlled by an operator in a cab located on the bridge or trolley.

Crane—A machine used for lifting and lowering a load and moving it horizontally, with the hoisting mechanism being an integral part of the machine.

Crane Operator—An employee who is qualified to operate an overhead crane.

Floor Operated Crane—A crane that is pendant or nonconductive rope controlled by an operator on the floor or an independent platform.

Overhead Crane—A crane with a moveable bridge carrying a moveable or fixed hoisting mechanism and traveling on an overhead fixed runway structure.

Remote Operated Crane—A crane controlled by an operator not in a cab or pulpit. It is controlled by any method other than pendant or rope control (i.e., radio, voice, remote hydraulic control).

Trolley—The unit which travels on the bridge rails and carries the hoisting mechanism.

Trolley Travel—The trolley movement at right angles to the crane runway.

Real Property Cranes—Cranes that were installed as part of the original design of the facility, or do not have OC numbers.

Attachment 2

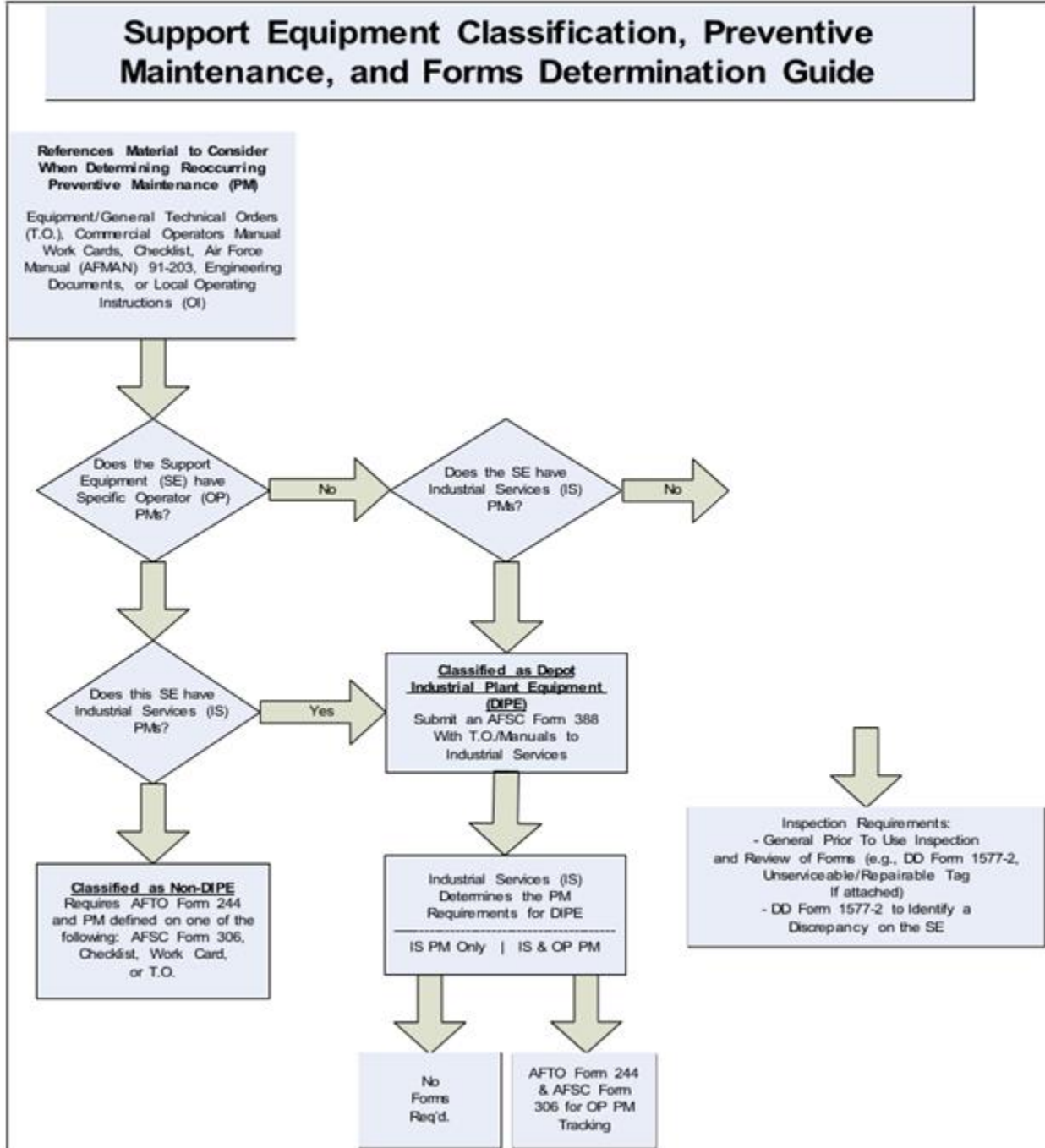
COMPLETION INSTRUCTIONS FOR AFSC FORM 388, MACHINE TOOL AND EQUIPMENT HISTORICAL RECORD

Figure A2.1. Completion Instructions For AFSC Form 388, Machine Tool and Equipment Historical Record.

<u>PART</u>	<u>ENT</u>
PART 1	
1. Nomenclature	Enter the manufacturer’s equipment number and, if available, the equipment type for more complete identification.
2. Manufacturer	Enter name of manufacturer.
3. Model Number	Enter manufacturer’s model number.
4. Serial Number	Enter the serial number of the equipment (as shown on the serial plate).
5. Size/Capacity	Enter the size or capacity of the equipment.
6. Cost	Enter initial cost or price as listed in the federal stock catalog.
7. Date Purchased	Enter month and year purchased.
8. NSN	Enter appropriate federal stock classification and national stock number.
PART 2	
Production Section	Enter the designation of the appropriate production section or Account Organization Code (AOC).
Building Number	Enter the building number where equipment is located.
Zone Code	Enter the code of the zone in which the equipment is located, if applicable.
Column	Enter the designation column nearest the equipment.
Reference to Column	Enter the coordinates and distances of the equipment from the nearest column.
Date Installed	Enter date of installation.
Point of Contact	Name and extension of individual familiar with equipment.

**Attachment 3
SUPPORT EQUIPMENT**

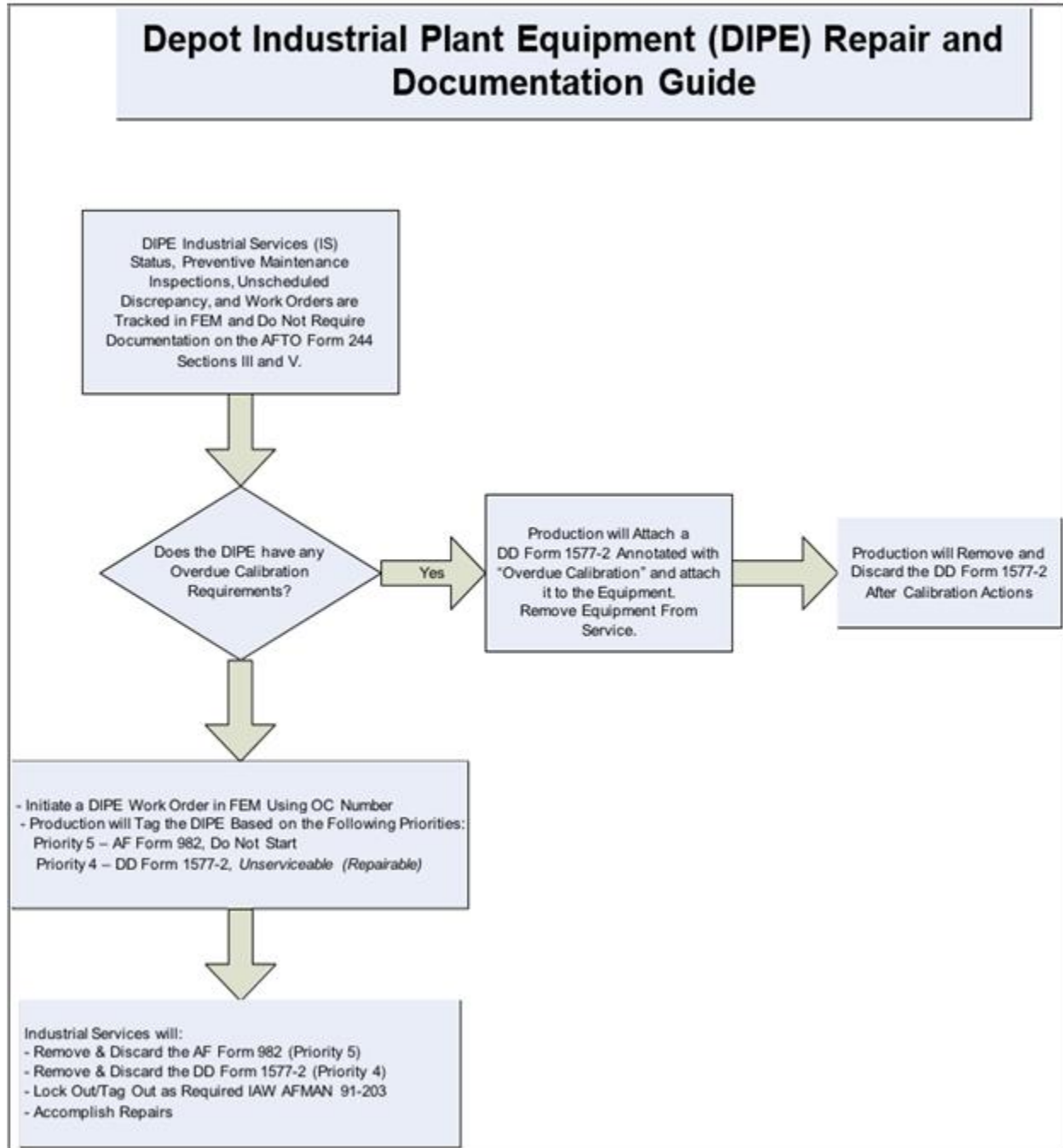
Figure A3.1. Support Equipment.



Attachment 4

DEPOT INDUSTRIAL PLANT EQUIPMENT (DIPE) REPAIR AND DOCUMENTATION GUIDE

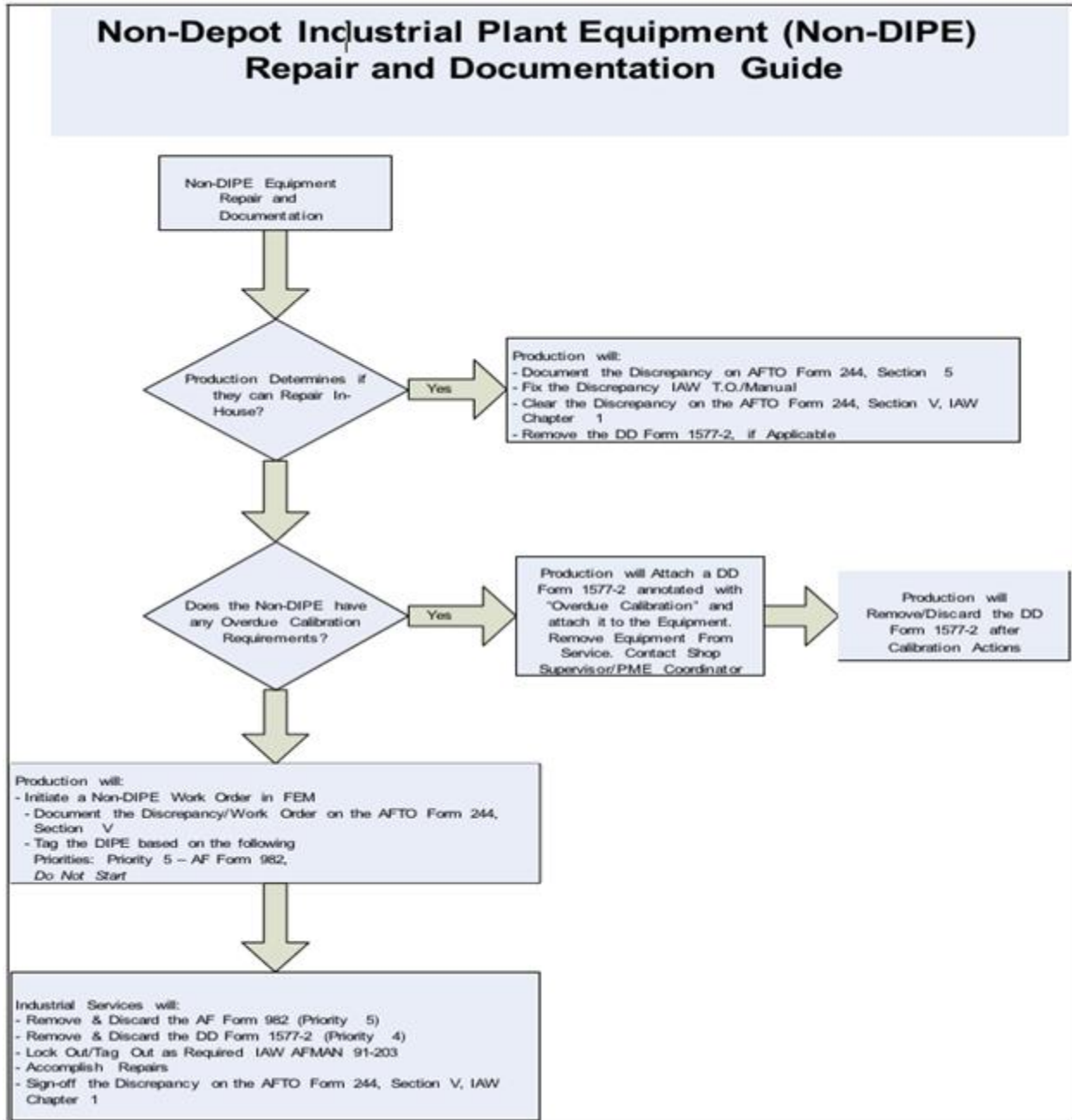
Figure A4.1. Depot Industrial Plant Equipment (Dipe) Repair and Documentation Guide.



Attachment 5

NON-DEPOT INDUSTRIAL PLANT EQUIPMENT (NON-DEPORT) REPAIR AND DOCUMENTATION GUIDE

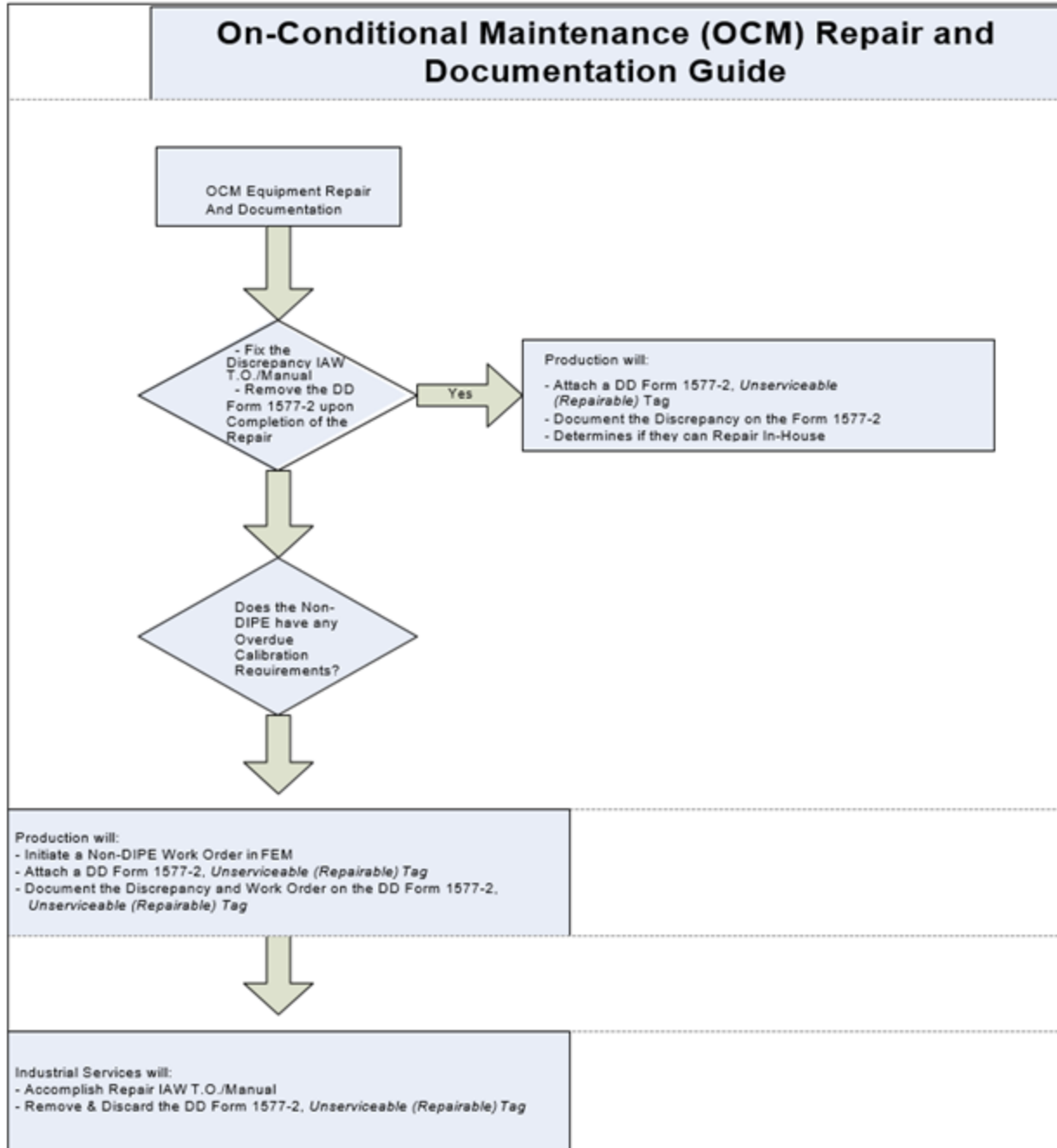
Figure A5.1. Non-Depot Industrial Plant Equipment (Non-Deport) Repair and Documentation Guide.



Attachment 6

ON- CONDITIONAL MAINTENANCE (OCM) REPAIR AND DOCUMENTATION GUIDE

Figure A6.1. On- Conditional Maintenance (OCM) Repair And Documentation Guide.



Attachment 7

OC-ALC FORM 105, OVERHEAD AND MOBILE CRANE OPERATOR INSPECTION CHECKLIST

Table A7.1. OC-ALC Form 105, Overhead and Mobile Crane Operator Inspection Checklist.

OVERHEAD CRANE OPERATOR INSPECTION CHECKLIST			
<p>INSTRUCTIONS: Before first use of the day, inspect all applicable items. Suspend all operations immediately if any of the items indicated below with an asterisk (*) are observed to be in an unsatisfactory condition. In addition to suspending the operation when any unsafe condition is observed, immediately notify your supervisor.</p>			
AREAS OF CONCERN	Satisfactory	Unsatisfactory	N/A
Do these items pass inspection?			
WALK AROUND			
* Wire Rope/Reeving -Check for broken strands or crimping.	✓		
* Lower Block & Hook -Loose or missing bolts or screws.	✓		
* Hook Safety Latch -Ensure presence of latch. Spring tension must ensure contact with the hook.	✓		
General Appearance -Missing pieces, loose or hanging parts.	✓		
* Safety Guards (cab operated cranes only) -Presence of safety guard on conductor rail. Plexiglass protector from buss bar to include coupling housings.			✓
* Walks/Ladders/Handrails -Presence of and no loose or missing parts.			✓
CONTROLS			
* Push Button Station -Cracked or broken housing. No missing or damaged buttons.	✓		
* Proper Marking -Weight limit is stenciled on hoist or crane.	✓		
* Lever Type Controllers (cab operated cranes only) -Operable and undamaged.			✓

* Remote/Radio -Presence of antennae and no broken or missing parts. Battery check.			✓
* Start/Stop Button -Proper operation.	✓		
* Proper Support for Pendant Button Control -Presence of support cable or chain with slack in control power cord.	✓		
OPERATIONAL			
* Brakes -Must stop with coast to avoid swinging load.	✓		
* Limit Switch -Proper operation of upper and lower switch. Ensure hook does not reach the floor.	✓		
* Hoist Travel -Smooth up and down operation without hesitation.	✓		
* Trolley Travel -Proper direction and operable.	✓		
* Bridge Travel -Proper direction and operable.	✓		
* Electric Disconnect -Turn off power to crane and make sure it is inoperable.	✓		
* Emergency Egress System and Fire Extinguisher (cab operated only)			✓
* Safety Lights, Horns, Sirens, or Alarms -Perform operational check to ensure proper working order	✓		
OC-ALC Form 105, 1 July 2014		Previous versions are obsolete	

Attachment 8

**OVERHEAD AND MOBILE CRANE OPERATIONS MAINTENANCE AND
INSPECTION SCHEDULE**

Table A8.1. Overhead and Mobile Crane Operations Maintenance and Inspection Schedule.

MAINTENANCE REQUIRED	WHO	REGULATION	FREQUENC
Hoist hooks – Visual	Operato	AFMAN 91-203	Daily
Hoist Chains – Visual	Operato	AFMAN 91-203	Daily
Funct. Op Mech, - Visual	Operato	AFMAN 91-203	Daily
Crane hooks	Operato	AFMAN 91-203	Daily
Wire ropes	Operato	AFMAN 91-203	Daily
Chains	Operato	AFMAN 91-203	Daily
Brakes	Operato	AFMAN 91-203	Daily
Funct, Op Mech.	Operato	AFMAN 91-203	Daily
Controls	Operato	AFMAN 91-203	Daily
Upper limit switch	Operato	AFMAN 91-203	Daily
Fire extinguishers (if entering the cab)	Operato r	AFMAN 91-203	Daily
Hoist running ropes – Visual	Operato	AFMAN 91-203	Daily
Safety lights, horns, sirens or alarms	Operato	AFMAN 91-203	Daily
Fire extinguisher	Operato	TAFBI 32-2001	Monthly
Tasks are defined on Maintenance Action Sheets (MAS)	CE	AFMAN 91-203 AFMAN 91-203 Manufacturer	Frequencies are defined on Maintenance Actions Sheets (MAS)

Attachment 9

OVERHEAD AND MOBILE CRANE OPERATOR ANNUAL SAFETY BRIEFING OUTLINE

A9.1. Overhead Crane Operator Annual Safety Briefing Outline.

A9.1.1. References. Be familiar with and know where to find them for future reference.

A9.1.2. AFMAN 91-203, Civil Engineering

A9.1.3. AFMAN 91-203, Materials Handling and Storage Equipment

A9.1.4. ANSI/ASME B30.2, Overhead and Gantry Cranes

A9.1.5. ASME B30.11, Monorails and Underhung Cranes

A9.1.6. OSHA 1910.179, Overhead and Gantry Cranes

A9.1.7. AFI 91-203_OC-ALCSUP, Air Force Consolidated Occupational Safety Instruction

A9.2. General Information.

A9.2.1. Know the characteristics of the particular crane you are operating.

A9.2.2. Be alert; do not be distracted. Always keep your eyes on a moving load. The operator IS ALWAYS responsible for the lift and movement of the load.

A9.2.3. Good housekeeping is a must.

A9.2.4. Ensure PPE is used and is in good repair.

A9.2.5. Inspect your machine daily before operation.

A9.2.6. Always have a fire extinguisher on hand and know how to use it.

A9.2.7. Take signals from only one person and use standards signals (refer to AFMAN 91-203 for hand signals).

A9.2.8. Never exceed the rated capacity.

A9.2.9. Make a “dry run” in tight areas.

A9.2.10. Always maintain at least 2 wraps of wire rope around the drum.

A9.2.11. Use Tag Lines on loads.

A9.2.12. No “horseplay;” Don’t be a “cowboy.”

A9.3. Pre-Operational Inspection. Operators must inspect equipment daily before use, using the OC-ALC Form 105, and document the inspection and any discrepancies on the AFTO Form 244. Report any unsafe condition to workplace supervisor and do not operate crane until repaired.

A9.3.1. Know the location of the disconnect switch and be sure that it is readily accessible and not blocked.

A9.3.2. Check the wire rope by lowering the block to the lowest level and looking for kinked, crushed, cut, broken strands, or bird caged wiring.

A9.3.3. Make sure the wire rope is properly seated in its drum and sheave grooves without any slack or overlapping.

A9.3.4. Check hooks for cracks, bending, twists or wear. Safety latch must be present. Ensure latch is fully operational. Hooks should rotate freely in block assembly without any grinding.

A9.3.5. Sheaves should rotate freely without any grinding from the bearings. The sheave guard must be unbroken and intact. No part of the sheave guard should be in contact with the wire rope or sheave.

A9.3.6. Check the block assembly for structural damage or cracks in any components.

A9.3.7. Make sure all buttons are labeled correctly.

A9.3.8. Operate all buttons to ensure they release immediately and do not stick.

A9.3.9. Check bridge and trolley brakes for hold and no drift. Also must coast to a stop to prevent load from swinging.

A9.3.10. Check upper and lower hoist limit switches.

A9.3.11. Operate the crane and hoist for several feet in each direction that it travels. Listen for any unusual noises. Look for any jerky movements.

A9.3.12. Trolley and trolley direction and speed must be smooth and operate at all speeds.

A9.3.13. Do not operate a crane or hoist if limit switches, steel ropes, chains, or other components are worn or in disrepair.

A9.3.14. Last but not least, ensure no obstructions will interfere with the normal motion of the hoist, cab, or bridge.

A9.4. Safe Operation Principles.

A9.4.1. Operators must be thoroughly familiar with all applicable standards.

A9.4.2. Do not exceed the rated load capacity of the crane, hoist, chain, slings, or other components.

A9.4.3. Slings, load chains, and other lifting devices must be fully and securely seated in the hook before moving a load. Remove slack from the sling, chain, or cable before lifting a load.

A9.4.4. Ensure PPE is in good repair and used (hard hat, steel toe shoes, safety glasses or goggles, gloves, etc.).

A9.4.5. Workers in the direction of travel must be warned to move and remain clear of a lifted move at all times.

A9.4.6. Do not suspend loads over personnel.

A9.4.7. Under no circumstances may anyone ride the hook or load.

A9.4.8. Directional movement should be made smoothly and deliberately. Avoid rapid movements in any direction. Operate crane at full speed.

A9.4.9. To avoid swinging loads:

A9.4.9.1. Locate the hoist directly above the lifting point of the load before lifting;

A9.4.9.2. Lower loads directly below the hoist;

A9.4.9.3. Keep hoisting ropes vertical; A9.4.9.4. Do not pull or push the load; A9.4.9.5. Use Tag Lines as necessary.

A9.4.10. Take up slack slowly to reduce dynamic stress.

A9.4.11. You may jog load into position if necessary.

A9.4.12. No unauthorized side pulls are allowed.

A9.4.13. Maintain 2 wraps of wire rope around the drum at all times.

A9.4.14. When lifting loads, test the hoist brakes by returning the switch to the "OFF" (neutral) position after raising the load a few inches off the floor. If the brakes do not hold, lower the load and do not operate the crane. Report the failure immediately and DO NOT USE until repaired. Disconnect power and have it Locked Out/Tagged Out.

A9.4.15. Ensure loads are lifted high enough to clear obstructions before moving the bridge or trolley. Whenever possible maintain a minimum clearance of one foot above the loads and to the sides. Raise the load only to the height necessary to clear lower objects.

A9.4.16. Never pull a hoist by the pendent cable.

A9.4.17. Never leave the controls unattended while a load is suspended. If it becomes necessary to leave the controls, lower the load to the floor.

A9.4.18. Know where the disconnect switch is located and make sure that it is readily accessible and not block.

A9.4.19. If loss of electrical power occurs, place controls in the "OFF" position to prevent unexpected startup upon restoration of power.

A9.4.20. Never operate a crane or hoist that has been Locked Out/Tagged Out or if you feel it is unsafe to operate.

A9.4.21. Keep visual contact with signalman at all times.

Attachment 10**76 MXSG LIST OF UNSUPPORTED EQUIPMENT**

- A10.1. Slings, lifting cables & spreader bars.**
- A10.2. Manual hose reels.**
- A10.3. Motor pool supported equipment.**
- A10.4. Fixtures, safety cable guns, tooling & tools managed by the tool crib (EXCEPTION: some large Torque Wrenches that require preventive maintenance)**
- A10.5. Non-process refrigerators and ice makers.**
- A10.6. Mass communication/notification devices such as break horns and shop speakers.**
- A10.7. Factory sealed equipment related to Fall Protection Devices (FPD) such as Skyhook vacuum systems, retractable FPD reels, etc.**
- A10.8. High pressure bulk gas systems (will support the low pressure side)**
- A10.9. Hand held dryers & blowers**
- A10.10. Power trees.**
- A10.11. Small diaphragm pumps.**
- A10.12. Small drill presses.**