

DEPARTMENT OF THE ARMY
U. S. Army Corps of Engineers
Washington, D. C. 20314-1000

CEMP-CE

Regulation
No. 25-345-1

31 January 91

Military Publications
SYSTEMS OPERATION AND MAINTENANCE DOCUMENTATION

1. Purpose. This regulation establishes general policies for preparing documentation and providing other support related to the operation and maintenance of facilities designed and constructed by the US Army Corps of Engineers.

2. Applicability. This regulation applies to HQUSACE/OCE elements, major subordinate commands, districts, laboratories, and separate field operating activities having any type of military design and construction responsibilities and/or support for others' design and construction responsibilities.

3. References.

- a. AR 25-30
- b. AR 37-100
- c. AR 210-50
- d. AR 415-15
- e. AR 420-10
- f. ER 415-345-38
- g. AFR 89-1

4. General. Technical documentation and training support shall be provided on each new facility designed and constructed by the Corps of Engineers for its customers. The provision of this documentation and training support for major rehabilitation, alteration, and renovation projects shall be considered and established on a case-by-case basis. The efficient operation and effective performance of maintenance on complex facilities

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systems and subsystems require adequately prepared operation and maintenance (O&M) documentation together with the proper training of operations and maintenance personnel. This requires Corps/User interface throughout the design, construction, post-construction/transition stages of all complex stand alone facilities (e.g., waste treatment, water treatment, industrial process, major medical facilities, armament production, large heating/cooling plants, flight simulators and laboratories). Complex systems within major facilities (e.g., Heating Ventilation and Air Conditioning (HVAC), elevator, Energy Management Control Systems (EMCS), security systems, uninterrupted power systems (UPS) and fire protection systems) should also be included.

5. Guidance.

a. The need for this O&M documentation should be identified on the DD Form 1391, Military Construction Project Data, during project development and early coordination with the Users for MILCON and in the Memorandum of Understanding (MOU) for work for others. On turn-key projects the contract must provide for complete O&M documentation by the design/construct contractor.

b. For complex facilities as described in paragraph 4, Major Subordinate Commands and Districts should require the Architect-Engineer (A-E) to prepare basic O&M documentation such as the design master equipment list (DMEL), the technical concept narrative (TCN) for the systems O&M manual and training requirements (within the guidelines given in AR 25-30). Appropriate identification of this responsibility must be stated in the A-E contract. Sample A-E contract clauses are set forth in Appendix A. Costs of preparation will be apportioned between design and construction funds. Costs during the design process are to be funded from the AMSCODE 3200 account "Design (Major Construction)" for the Army and P313 funds for the Air Force. Costs for A-E activities after award of a construction contract are to be charged against P6100 account, "Major Construction (Public Works)" in accordance with AR 37-100 for the Army and P-321 (CONUS), P-331 (OCONUS), P-341 (Unspecified Minor) in accordance with AFR 89-1 for the Air Force. If the design is done by in-house personnel then the Division or District is responsible for preparing that portion of the the O&M documentation required by the designer. (Air Force requirements for O&M manuals are described in Engineering Technical Letter (ETL) 89-2: Standard Guidelines for Submission of Facility Operating and Maintenance Manuals. This is attached as Appendix B.)

c. Finalizing basic O&M documentation and training of Government or contractor O&M personnel must be the responsibility of the construction contractor. When such a determination is made and specified in the construction contract, training of user or contractor operating personnel and finalization of O&M documentation will be funded using project funds.

d. The responsibility for operation and maintenance of facilities equipment and systems during the warranty period can remain with the construction contractor if such services are procured as an option to the construction contract and appropriate O&M funds are used. MCA and MCAF project funds cannot be used for operation and maintenance of facilities. If the determination is made to include an option to require the construction contractor to perform the facility O&M during the warranty period, then identification of this requirement must be stated in the A&E contract for initial design services, so that appropriate documentation may be prepared.

6. O&M Documentation. Preparation of the O&M documentation is a two-step operation shared by the A-E and the construction contractor. The A-E initiates documentation during the design phase and the construction contractor updates and completes the O&M documentation, including equipment manufacturers data, and conducts training during the construction and transition phases. Documentation required based on "complex" or routine facilities includes:

	<u>Routine</u>	<u>Complex</u>
. Technical Concept Narrative		X
. System Operations and Maintenance Manual		X
. Master Equipment List		X
. Training Plan with Training Concept/Specifications		X
. Equipment O&M and Repair Manuals	X	

a. Technical Concept Narrative (TCN). The A-E shall develop a TCN intended primarily for use by the construction contractor responsible for development of the facility systems O&M manuals. The TCN describes the use, operation and interrelationship of the facilities various operational systems and subsystems. A description of the theory of operations of

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the facility system and equipment will be provided to the extent necessary for journeyman understanding. System electrical-mechanical requirements and their application will be covered by these manuals and will include design factors and assumptions used in designing the system. As an example, the following type of information should be included for HVAC systems: the U factors of walls, roofs, and floors that separate conditioned from unconditioned spaces; the outdoor temperature and solar and wind conditions assumed; assumptions made with regard to the number of people to occupy various areas and any equipment or exhaust fans expected to be installed; anticipated lighting levels; and indoor environmental conditions to be maintained. In most cases an adequately prepared final design analysis will meet the requirements for the TCN.

b. Systems O&M Manuals. The construction contractor (when specified) is to develop systems O&M manuals for use by the Government or contract personnel in operating and maintaining the facility. The systems O&M manual will be an extension of the TCN. It will describe in detail the equipment provided in the construction contract. Anytime the construction contractor provides a system or portion of a system that differs from the original design, he will be responsible for revising all portions of the draft OM manual, including those originally prepared by the A-E. The manuals shall contain as a minimum an index of the contents of the manual, the functioning of the system, operating instructions, maintenance instructions, trouble shooting and repair instructions, spare parts list, special tools and test equipment list, safety precautions and warranty information. Appendix A gives a more detailed description of the information required.

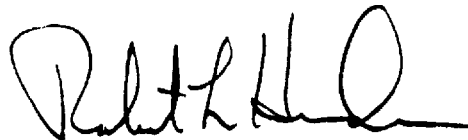
c. Master Equipment List (MEL). The construction contractor will update and complete the DMEL by adding the name of the manufacturer, model number, capacity, and other equipment data for each item identified on the DMEL.

d. Training. The A-E will provide a proposed training concept and schedule and develop contract specifications for those items of equipment and systems for which the contractor is to provide formal training. Requirements for training should be broken down as to the number of hours of operator training and the number of hours of maintenance training for both classroom instruction and hands-on equipment instruction. The A-E shall also identify the number and types of special skills that will be required. If requested by the user during project development, video taping and the training can be included in the construction contract. Effective training requires close coordination with the DEH or BCE during both the design and construction phases of the project.

e. Equipment O&M and Repair Manuals. Continuing attention is needed on specifying appropriate requirements for O&M data in the construction contracts for projects other than those outlined in paragraph 4. Existing regulations require the construction contractor to provide operating instructions describing the starting and stopping procedures which include the sequence of both electrical and mechanical device activation, maintenance instructions and schedules, repair instructions, spare parts data, schematic drawings of the electrical and mechanical systems to include circuit and piping diagrams and training of operators, etc.

7. BCO Reviews. All contract packages should be thoroughly reviewed during the Biddability, Constructability, Operability (BCO) review to assure O&M requirements are appropriately addressed.

FOR THE COMMANDER:



ROBERT L. HERNDON
Colonel, Corps of Engineers
Chief of Staff

2 Appendices

App A - Sample Architect-
Engineer (A-E) Statement of
Work

App B - Standard Guidelines for
Submission of Facility Operating
and Maintenance Manuals