METRIC

NOTICE OF CHANGE

MIL-HDBK-402
NOTICE 1
28 August 1989

MILITARY HANDBOOK
GUIDELINES FOR THE IMPLEMENTATION OF THE DoD PARTS CONTROL PROGRAM

TO ALL HOLDERS OF MIL-HDBK-402:

1. THE FOLLOWING PAGES OF MIL-HDBK-402 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
3-1	22 May 1989	3-1	29 June 1988
3-2	29 June 1988	3-2	REPRINTED WITHOUT CHANGE
3-3	22 May 1989	3-3	29 June 1988

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-HDBK-402 will verify that page changes and additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the military handbook is completely revised or canceled.

Custodians:
Army: AT
Navy: AS
Air Force: 01
DLA: ES

Preparing Activity:
Army: AT

(Project MISC-0113)

Review activities:
Army: AL, AR, AV, ER, GL, ME, MI, MR
Navy: OS, SH, YD
Air Force: 11, 23, 99

AMSC/NA

AREA MISC

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

CHAPTER 3

OBJECTIVES

This chapter discusses five objectives of the Department of Defense (DoD) Parts Control Program (PCP) and gives rationale for these objectives.

3-1 INTRODUCTION

MIL-STD-965 (Ref. 1) states, "The DoD Parts Control Program has as its objective the achievement of design to cost and life cycle cost savings and cost avoidances.". To achieve this objective, it is necessary to reduce the proliferation of parts by promoting the use of standard parts to assure that military materiel uses reliable parts purchased at an economical price. By reducing the proliferation of parts, operational effectiveness will be improved, resources will be conserved, and costs will be avoided. These objectives, as well as standardizing the procedure for applying parts control among DoD components and contractors, are discussed in this chapter.

3-2 REDUCE PROLIFERATION OF PARTS

Prior to the implementation of the PCP, the number of parts in the military supply system was continuously increased by rapid and repeated addition of new parts. Unfortunately, many of these "new" parts were just old or equal parts with new identification. This proliferation resulted in excessive life cycle costs and eventually led to the PCP.

The overall reduction in parts enhances substitutability, simplifies logistic support, and in many instances improves system or equipment reliability. Fewer parts translates to savings in procuring, testing, warehousing, transporting parts, and data management, which includes the costly preparation and maintenance of engineering drawings and other required parts information.

3-3 IMPROVE OPERATIONAL EFFECTIVENESS

The increasing complexity of military electronic, mechanical, and energy conversion systems has forced acquisition activities to include specific reliability, maintainability, and interoperability goals in system specifications and test plans. These goals have broadened the scope of design tradeoff decisions to include operational effectiveness rather than be limited to production costs. This improvement in operational effectiveness should permit reduction in operating and support (O&S) costs of military equipment and systems, which were frequently 10 to 20 times the original acquisition costs. The PCP increases system reliability through its increased use of standard, proven reliable parts. Standard reliable parts and equipment improve maintainability, interoperability, and reduce training through supply system simplification. Interchangeability is also enhanced.

System effectiveness has been described as a function of performance, reliability, and availability. As part of an acquisition strategy insuring an effective blend of optimization incentives, standardization, and life cycle cost analyses, parts control has proven to be an extremely effective program for improving operational effectiveness.

3-3.1 MAINTAINABILITY*

Maintainability is defined in DOD-HDBK-791(AM) (Ref. 2) as "a measure of the ease and rapidity with which a system or equipment can be restored to operational status following a failure or retained in a specified condition.". Many specialty areas of development effort impact the maintainability characteristic of a specific item. They include design standards for ease of maintenance, environmental aids, safety and human factors input, self-correcting characteristics, redundancy, standardization, minimizing downtime, life cycle costing, logistic supportability, test, diagnostic and training aids, mobility and recovery characteristics, and parts control.

3-3.2 AVAILABILITY

Operational availability, which includes the availability of parts, subsystems, and systems, is increased through a series of events that results when proliferation of parts is reduced. Reduced proliferation means larger buys of fewer part types. These larger buys of fewer part types result in more parts of higher reliability being available to maintenance technicians. This availability of reliable

Supersedes page 3-1 of MIL-HDBK-402

*This subparagraph has been adapted from Ref. 3

parts means fewer failures, and fewer failures and having reliable repair parts available when there are failures mean increased subsystem availability, which in turn means increased system availability. Additionally, transportation and handling delays are reduced when there are fewer parts, a fact which in turn also increases availability.

3-3.3 INTEROPERABILITY

Interoperability requirements are important in joint command operations and in operations with allied forces. Improvements in system interoperability can result if cross-servicing problems and ideas for solutions are fed back to the parts control and system design personnel. The system requirement documentation can then be modified to insure that the problems are overcome. A few examples follow of how interoperability can be improved:

1. Communication capability is enhanced by having tactical radios capable of operating at the same frequencies.

2. Capability to maneuver is enhanced by having vehicles, ships, and aircraft that operate on common fuels.

3. Shooting capability is enhanced if test firings, documentation of firing tables, identification markings, etc., are complete so that shortages of ammunition can be overcome by pooling stocks.

In the area of parts standardization, fuel delivery nozzles should be compatible with allied fuel filler receptacles; slave cables should fit the slave receptacles on allied vehicles; tractor fifth wheels and electrical and brake connections should be compatible with allied semitrailer king pins and electrical and brake connectors and systems.

3-4 MAINTAIN SOURCES OF SUPPLY

Maintaining sources of supply for repair parts is essential for effective operation of the military supply system. Failure to procure required parts in a timely manner can have extremely adverse effects on the maintenance of systems or equipment. For example, systems or equipment could become inoperative, and in an attempt to make the system or equipment operable, inferior parts could be used when required parts are unavailable, which could result in possible safety hazards or field failures. Also failure to procure parts competitively results in excessive cost. Past experience shows that sources of supply for large volume buys of parts can always be found, but sources for small volume buys of parts may vanish.

Maintaining sources of supply is important in all commodity areas. Parts from diminishing sources are deleted from Government Furnished Baseline (GFB) parts lists to insure availability of parts for the 10-20 year period during which military systems require support.

REPRINTED WITHOUT CHANGE

3-5 COST AVOIDANCE

One way to obtain significant cost avoidance is by application of the PCP as an integral part of the acquisition process for support of systems and equipment. As stated by the Secretary of Defense in his memorandum (Ref. 4) entitled *Spare Parts Acquisition*, "The PCP fosters standardization, which leads to greater demand for standard parts, reduction in varieties of parts in inventory, resultant increased production runs, and competition through multiple sourcing.".

Cost avoidance stemming from reduced proliferation of nonstandard parts is generated by elimination of the series of events following the acceptance of a new part. Sample avoided costs follow:

1. Documentation (drawings and specifications)
2. Testing (functional capability and reliability)
3. Cataloging
4. Obtaining a national stock number and establishing logistic records
5. Separate procurement actions
6. Separate product assurance handling
7. Separate warehouse space in supply depots and in the locations of parts in the field
8. Transportation
9. Maintenance training
10. Maintenance manuals.

Average cost figures for various federal supply classes have proven useful in working out cost-benefit analyses and cost avoidance reports. Methodology for calculating first year and life cycle cost benefits will be discussed in Chapter 7.

As stated previously, by using the PCP, the cost of documentation, testing, logistics, and maintenance of nonstandard parts can be kept to a minimum. Also, since the Military Parts Control Advisory Group (MPCAG) support is funded by the Defense Logistics Agency (DLA), MPCAG support is a free service to the military services and their contractors. This valuable resource can be instrumental in saving millions of dollars annually by showing how existing standard documentation can be reapplied to defense programs.

Examples of cost avoidances that have been adapted from Ref. 3 follow.

3-5.1 DOCUMENTATION

If nonstandard parts are used in the design of new equipment, the original equipment manufacturers (OEMs) are required to submit all documentation on the parts. Through parts control efforts, design contractors are offered an opportunity to use standard parts lists already documented in federal, military, industrial, or other related specifications and standards. This will save the

contractor time and money in preparing new drawings. For example, a representative from the Air Force Systems Command stated that "without the parts control effort, the F-15 program would have required development of over 8,200 contractor detailed part drawings at a cost of about 8 million dollars. Since military specifications were available, this cost was avoided.".

3-5.2 TESTING

Testing of nonstandard parts is a cost driver that can be minimized through the use of standard parts. The military services often require their contractors to test or have tested those nonstandard parts used in a new design to assure that such parts will meet the performance requirements of the equipment. Part manufacturers have indicated that their investment in testing a new part can range anywhere from $5000 to $75,000. For example, the testing of a new integrated circuit device has been estimated to cost up to $100,000. However, items described in military specifications are required to perform satisfactorily under military operating conditions, stress, and environments. Normally, the cost of testing military standard parts is included in the price of the part since manufacturers voluntarily test their parts for Government approval and listing in the Qualified Products List (QPL). Since military specification parts are widely used, the cost of testing is amortized over thousands of standard parts produced and sold by the manufacturer.

3-5.3 LOGISTICS

A new drawing of a nonstandard part brings with it specific parts to be eventually entered and maintained in the logistic system to support military equipment in the field. Proliferation occurs when the same or similar nonstandard parts are described in different contractor or service agency specifications or drawings and the parts are assigned different National Stock Numbers (NSNs). To combat this situation, a centralized effort to control selection of parts for new designs will avoid the cataloging of unnecessary items in the Government supply system and the periodic need for item reduction studies to purge the supply system.

Drawings for nonstandard parts list an average of seven different items per drawing, according to a survey performed by the National Aerospace Standards Committee (NASC) in 1971. This is the result of the tendency for drawings of part types to be tabulated lists of similar parts differing slightly because of lead lengths, plating, antifungous coatings, or mounting dimensions. The entry of only one new item into the DoD inventory through the provisioning process can be a long-term supply investment because the average life of an item in the supply system is over 10 years. According to a Navy study performed in 1978, management of one NSN including bin space for that 10-year period would be $3080, or $308 per year, plus the initial cost of the item. When a nonstandard part type is approved, it adds at least three of the seven new supply items to the inventory.

However, when standard parts are used, new documentation is not needed, i.e., potential NSNs are prevented by avoiding nonstandard parts. Therefore, the three supply items from the nonstandard part drawings will not enter the DoD system.

3-5.4 MAINTENANCE

The variety and quantity of different nonstandard electronic part types used in an electronic system can significantly increase field failures and drive life cycle support costs up when failed devices must be located, removed, and replaced. Estimates of the cost of a field maintenance action range from $225 to $408 per action. Improved quality through parts control could significantly avoid substantial maintenance costs.

3-6 STANDARDIZE PROCEDURES FOR PARTS CONTROL

For many years DoD components have had their own peculiar procedures pertaining to contractual requirements. This practice is unpopular with many DoD contractors because they have contracts with different components, e.g., Army, Navy, or Air Force, and must perform the same requirement to several different procedures. This practice inherently results in preparation of unnecessary documentation, confusion due to procedural differences, and unwarranted expenditure of funds. To avoid this practice in the application of the PCP, standard procedures must be established among the DoD components. This can be accomplished by following the guidelines of this handbook when applying the requirements of MIL-STD-965 to acquisitions.

REFERENCES

1. MIL-STD-965A, *Parts Control Program*, 13 December 1985.
2. DOD-HDBK-791(AM), *Maintainability Design Techniques*, 17 March 1988.
3. *Project Managers' Cost Cutter Pamphlet for the DoD Parts Control System*, MPCAG, undated. (Prepared by the Defense Electronic Supply Center, Dayton, OH.)
4. MEMORANDUM, *Spare Parts Acquisition*, Secretary of Defense, 29 August 1983.

Supersedes page 3-3 of MIL-HDBK-402