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ARMY LOGISTICS

Better Approach Needed to Identify Systemic Causes of Problem Parts

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The Honorable Earl Hutto
Chairman, Subcommittee on
Readiness
Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

In response to your request, we have reviewed the Army Aviation Systems Command's efforts to identify the root causes of the problems being experienced with the quality and availability of certain parts. This report contains recommendations to the Secretaries of Defense and the Army that should help in identifying the systemic problems.

We are sending copies of this report to the Chairmen of the House Committee on Government Operations, the Senate Committee on Governmental Affairs, the House and Senate Committees on Appropriations, and the Senate Committee on Armed Services; the Secretaries of Defense and the Army; and the Director of the Office of Management and Budget. Copies will also be made available to other parties on request.

This report was prepared under the direction of Henry L. Hinton, Jr., who can be reached on (202) 512-6226 if you or your staff have any questions. Other major contributors are listed in appendix I.

Sincerely yours,

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

Concerned about the frequency of reports that problems with essential parts were adversely affecting the operational readiness of many Army aviation systems, the Chairman of the Subcommittee on Readiness, House Committee on Armed Services, asked GAO to review the Aviation Systems Command's efforts to identify the root causes of the problems being experienced with the quality and availability of certain parts. More specifically, GAO assessed the extent of the Command's efforts to (1) use existing information systems to help determine systemic causes and (2) develop a proactive system for the early identification of parts with problems related to their quality or supply. GAO's examination focused on four helicopter systems: the Black Hawk, the Apache, the Chinook, and the Kiowa Warrior.

Background

The Aviation Systems Command, where GAO performed its review, uses the Deficiency Reporting System and other sources to gather information on parts with quality problems. The system contains information on problems with parts that affect aircraft safety, serviceability, durability, and reliability and information on problems with parts that do not meet materiel specifications. When a problem with quality is reported to the Command by an Army field unit, depot, or contractor, the case is assigned to the maintenance, engineering, or product assurance directorate for investigation. Upon completion of its investigation, the directorate is to forward information on the causes of the problem and actions required to correct it to the Deficiency Reporting System.

Problems with supply availability are captured in System Supply Support Status Reports, which contain a ranking of parts on the basis of a set of criteria. The main criterion is the number of requisitions for items whose lack causes equipment or weapon systems to be nonoperational. Based on the listing of problem parts, actions are initiated to expedite procurement and the delivery of the needed parts.

Results in Brief

The Aviation Systems Command's current management approach is to react to individual part problems to minimize the effect of these problems on readiness rather than to identify the systemic causes of the problems. When problems with parts surface, this reactive approach leaves managers with little choice but to take costly actions such as expediting procurements and deliveries on contracts.

The Command has the basic framework in place for collecting information that can be used to identify the systemic causes of problems with parts. However, the Command is not obtaining accurate and up-to-date data that is expressed in consistent, uniform terms.

GAO's review indicated that there had been no Command-wide proactive initiatives to identify systemic causes of problem parts. However, one activity within the Command has been evaluating a proactive system to avoid supply availability problems. This activity has demonstrated the potential for reducing parts' costs and improving readiness.

Principal Findings

Command Does Not Focus on Identifying Systemic Causes of Problem Parts

The Aviation Systems Command's approach has been to resolve individual problems with readiness as they arise, rather than to identify the systemic causes of the problems. As a result, by the time a part is causing problems with readiness, the options available to the Command to address the problems are limited. Essentially, the Command's only alternatives are to "buy its way out of the problem" by expediting procurements or deliveries on existing contracts or overhaul programs and/or by making emergency buys. For example, to resolve problems with readiness caused by 263 problem parts on four helicopter weapon systems, the Command expedited deliveries on existing contracts in 147 cases, expedited contract awards in 175 cases, expedited repair or overhaul in 51 cases, and made emergency buys in 17 cases.

Framework Is Available to Aid in Determining Systemic Causes

GAO found that the Aviation Systems Command already collects information necessary to identify systemic causes of parts with quality problems. However, in the information's current state, it is not useful.

The Deficiency Reporting System includes a list of "fault" codes, which are to be used to identify whose responsibility it is to fix the reported problems, and a list of "closing codes," which identify the required corrective actions. The completeness and accuracy of the information in the Deficiency Reporting System depend on input from the functional directorates, which are responsible for investigating the identified problems. GAO found, however, that the results of hundreds of investigations of parts' problems were not sent to the Deficiency Reporting

System. Additionally, some directorates did not use the codes; other directorates use different sets of codes; and there is no uniform set of definitions of what a particular code means.

Efforts to Develop Proactive Problem Identification Systems

The Aviation Systems Command is developing a program that it believes will be a proactive approach to improving the quality of its parts and to reducing operating and support costs. The program—called "Operating and Support Cost Reduction"—is expected to focus on reducing future operating and support costs by redesigning and/or reengineering existing parts that experience a high dollar volume of demands. These parts may or may not be experiencing problems with quality. Furthermore, the program focuses on individual parts rather than the systemic causes of problems currently being experienced.

With regard to supply problems, GAO found that one activity within the Command had been developing and testing a proactive system to promptly identify parts that are likely to develop problems with supply availability. These ongoing efforts allow weapon system managers to change the ranking of the factors they believe most affect the supply availability of their weapon systems. The item managers believe that by using different indicators, they can reduce the number of instances in which equipment is nonmission capable because of supply problems. For example, weapon system managers for 9 of 20 weapon systems ranked the number of negative months of supply[1] as a more proactive indicator of potential supply problems than the current primary indicator—nonmission capable-supply back orders.

Recommendations

Because the Department of Defense (DOD) has recently taken over functional responsibility for the Deficiency Reporting System, GAO recommends that the Secretary of Defense develop a strategy for identifying the systemic causes of problem parts that builds on the information and systems, such as the Deficiency Reporting System and the System Supply Support Status report, that are already in place. As a minimum, the strategy should

- ensure that the terms used to identify the causes of quality problems are defined and that the terms are applied consistently by those responsible for capturing the data,

[1]"Negative months of supply" indicate that parts are being used at a faster-than-anticipated rate and/or replenishment actions are not expected to generate sufficient stocks to meet projected demands. Therefore, actions are needed to preclude priority back orders from occurring.

- require the directorates that investigate quality problems to promptly forward the results of their investigations to the centralized data base in sufficient detail to keep the system accurate and up-to-date,
- ensure that supply managers are provided appropriate and timely data on quality problems or on issues pertaining to the parts they manage so that they will be aware of the identified problems and the corrective actions, and
- use the information in the centralized data base to develop trend data to identify functional areas requiring corrective actions.

GAO also recommends that the Secretary of the Army direct the Commander of the Army Materiel Command to test the proactive supply availability reporting system on an Aviation Systems Command-wide basis. If the test results prove beneficial, GAO recommends that the Commander of the Army Materiel Command determine whether the system should be established at the other Army buying commands.

Agency Comments

DOD generally concurred with GAO's findings, conclusions, and recommendations. DOD said that a strategy was needed for identifying root causes of problems with parts and indicated that by May 1, 1993, changes will be made to improve the currentness and accuracy of the Deficiency Reporting System. DOD acknowledged that the current coding in this system is too generic to be of use in defining systemic causes of problems and has assigned responsibility for standardizing the coding system to the Joint Logistics System Center.

GAO agrees that without changes, the current system cannot be used for determining systemic problems with parts' quality. However, if there were greater consistency in defining and assigning more specific codes and if all directorates used the same ones, the data could be used to develop trends over time and to identify particular functional activities where the Command could emphasize corrective action.

DOD stated that in January 1993, a new scheme for ranking various supply factors was incorporated into the system for the early identification of parts with supply availability problems. According to DOD, by the fourth quarter of fiscal year 1993, the Army Materiel Command will review the Aviation Systems Command's progress and determine whether the changes in the system should be adopted Command-wide.

Contents

Abbreviations

AVSCOM	Aviation Systems Command
DOD	Department of Defense
DRS	Deficiency Reporting System
S4	System Supply Support Status

Introduction

The Army Aviation Systems Command (AVSCOM), one of the Army's five national inventory control points, provides logistical, technical, and administrative support to the Army's aircraft fleet. The Command manages 122,000 "lines" (different inventory items) of inventory, processes over 9,000 requests for inventory parts a day, and initiates over 9,000 procurement actions annually.

AVSCOM's responsibility for ensuring that the Army's aviation fleet is fully and adequately supported includes determining what parts are required when and in what quantities. Inherent in this responsibility is the need for the early identification of parts that are experiencing problems or are expected to have problems—either from the standpoint of quality or quantity—so that action can be taken to correct the problems.

A part that is experiencing problems with quality may also experience problems with quantity.[1] For example, when parts wear out faster than expected due to design, manufacturing, or maintainability problems, there may not be sufficient inventory on hand to meet the increased demands. When this occurs, the item manager may have little choice but to buy more of the same parts in order to reduce the impact on readiness.

The impact of a problem with quality on supply availability may not always be apparent because the supply system is designed to adjust to increased demands by increasing the number of parts to be procured. Therefore, if the supply system has time to adjust to the increased demands, the part may not appear to be experiencing a problem with supply availability. Nevertheless, the Army ultimately buys more parts and incurs higher costs than necessary.

Systems Used to Identify Problems With Quality and Quantity

There are several data base systems designed to capture information on parts experiencing quality and supply availability problems. In addition to the data systems, AVSCOM relies heavily on users and ad hoc investigative teams to bring problem parts to the Command's attention.

[1]Parts with quality problems, as defined in this report, are parts with design, manufacture, or maintainability problems that preclude the parts from being used as intended. Parts with quantity (or supply availability) problems are defined as parts that are not maintained in sufficient quantities to meet the users' demands.

A major system used to identify parts experiencing quality problems is the Deficiency Reporting System (DRS).[2] This reporting system captures quality, maintenance procedure, or technical data problems that are reported to AVSCOM by field units, depots, and contractors. Depending on the nature of the reported problem,[3] the issue is assigned to the engineering, maintenance, or product assurance directorate for investigation to determine the corrective actions needed. Upon completion of the investigation, the results are to be entered into the centralized DRS.

In addition to using the DRS, each of the directorates maintains its own data base for accumulating information on the parts it investigates. These individual data bases represent, in many respects, segments of the data in the DRS.

The Command also has access to other information sources that, when used in concert with the DRS, can be used to help identify problems with various parts. These sources include the following:

- The Unscheduled Maintenance Sample Data Collection System provides data on the frequency, conditions, and causes of unscheduled maintenance for selected equipment parts.
- System Supply Support Status (S4) reports rank parts within a weapon system that are experiencing supply availability problems. The S4 report is used by weapon system supportability teams to determine which parts need immediate action to reduce the adverse impact on equipment readiness.
- Computer-generated Supply Control Studies provide item managers with detailed information on a part, including contract delivery schedules, inventory data, technical descriptions, and cataloging information. The studies also contain recommendations on whether the item manager should procure items, reduce contract quantities, or dispose of items based on past demands and projected requirements.
- Line of Balance Reports provide item managers with abbreviated versions of much of the same information shown in the supply control studies concerning scheduled deliveries from contracts, open procurement orders, parts requirements, and inventory supply levels.

[2]Subsequent to our review, functional responsibility for the DRS was switched from the Army to the Department of Defense (DOD). DOD has assigned responsibility for the standardization of the coding system used in the DRS to the Joint Logistics System Center.

[3]The engineering directorate investigates problems with parts that affect aircraft safety conditions or procedures. The maintenance directorate investigates problems with parts that affect aircraft serviceability, durability, or reliability. The product assurance directorate investigates problems with parts that do not conform to materiel specifications.

- Logistic Assistance Representatives serve as liaisons between Army units in the field and AVSCOM, providing technical assistance to the units and keeping AVSCOM apprised of any logistical and technical problems being experienced at their assigned field locations.
- Supportability Teams identify and resolve problems with supply availability on a weapon system basis. Their corrective actions usually entail initiating emergency buys, expediting contract awards, or expediting deliveries under existing contracts.

Objectives, Scope, and Methodology

Concerned about the frequency of reports that problems with essential parts were adversely affecting the operational readiness of many Army aviation systems, the Chairman of the Subcommittee on Readiness, House Committee on Armed Services, asked us to review the AVSCOM's efforts to identify the root causes of the problems being experienced with the quality and availability of certain parts. More specifically, he asked that we assess the extent of the Command's efforts to (1) use existing information systems to help determine systemic causes and (2) develop a proactive system for the early identification of parts with problems related to their quality or supply.

To address the assignment objectives, we reviewed pertinent DOD and Army regulations, policies, and internal studies pertaining to the process of identifying problem parts. We also interviewed AVSCOM officials from various functional areas such as materiel management, procurement, maintenance, engineering, and product assurance to obtain their views on what constitutes a problem part and how they identify these parts.

We also identified the data sources, such as the DRS and the S4 report, that are used to identify and track problem parts. We discussed the use of these various systems with AVSCOM officials to determine whether they use the systems to identify systemic causes.

We analyzed the data in the Command's deficiency reporting data bases to determine the magnitude of the parts problem and what actions had been taken to resolve it. We also discussed these issues with officials and reviewed information dealing with proposed changes to the existing system to make it more proactive. Our detailed data examinations focused on parts for four helicopter systems: the Black Hawk (UH-60), the Apache (AH-64), the Chinook (CH-47), and the Kiowa Warrior (OH-58D).

We performed our work from July 1991 through October 1992 in accordance with generally accepted government auditing standards.

Information Systems for Identifying Problem Parts Are Not Used to Determine Systemic Causes

Rather than determining systemic causes of quality or supply availability problems, AVSCOM attempts to resolve problems on a part-by-part basis. Further, information on problem parts is not always accumulated centrally or exchanged among the various reporting systems. Consequently, to get a complete status report on a particular problem part, the various data systems must be queried, and the information must be consolidated manually. This process undermines efforts to analyze trends to determine systemic causes of problem parts.

Determining the systemic causes of problem parts is also hampered by the lack of uniformity in the coding scheme and definition of terms AVSCOM uses to describe the contributing causes of the identified problems. For example, different directorates use different sets of codes to describe causes of problems and corrective actions required to address them. In other cases, directorates do not assign cause or corrective action codes. Also, comparisons of the directorates' individual data bases with the centralized system indicate that the directorates have not been prompt in providing information to the centralized system. Without complete, accurate, and up-to-date information that is provided consistently and specifically, AVSCOM will not have reasonable assurances that the magnitude of the parts problems or the root causes of the problems will be adequately identified and addressed.

Limitations of Existing Systems in Identifying Systemic Causes of Problem Parts

The DRS is a major reporting system that is intended to be used to capture information about parts' problems with quality. The completeness and accuracy of the data in this system depend on the information submitted by the engineering, maintenance, and product assurance directorates.

It is intended that the directorates provide the information developed through their investigations of problem parts to the DRS—a central data base that captures the information about problem parts and that can be accessed by those having a need for such information.

Each directorate also maintains its own data base on problem parts so that it will have the latest status of the progress being made on the parts it is tracking. Our review showed, however, that the information on problem parts that is developed by the directorates is not always forwarded to the DRS. As a result, the information in the directorates' data bases does not agree with the DRS information. For example, the maintenance data base lists 2,112 cases resolved and closed from 1989 to 1991, while our review of the DRS indicates that 263 of these cases are still listed as open.

Moreover, for the same period, the DRS shows 115 cases as having been sent to the maintenance directorate for resolution, but the maintenance directorate's data base contains no record of these cases. Our review of the engineering directorate's data base indicated that of the 1,019 cases shown as closed, 205 are still shown in the DRS as open.

Officials responsible for maintaining the data bases told us that one reason for the difference between the information shown in the directorates' data bases and that in the DRS is the 2- to 5-month time lag for entering the data in the DRS. Thus, to obtain more complete data on a particular problem part, one must query the individual data bases and manually consolidate the information.

Inconsistent Use of Codes

The DRS includes a "fault code" that is meant to identify whether it is the contractor's or the government's responsibility to resolve the reported problem and a "closing code" that is meant to identify the nature of the corrective action required. However, some directorates do not use the codes; other directorates use different sets of codes; and there is no uniform set of definitions as to what a particular code means. For example, we found the following procedures being used by different directorates:

- The product assurance directorate assigns fault codes, whereas the other two directorates do not. As a result, there are no fault codes recorded against many of the reported deficiencies.
- The product assurance directorate uses one set of closing codes that identify the functional area where corrective action is required (for example, procurement, contracting, engineering design, or maintenance). The maintenance and engineering directorates, on the other hand, use a different set of codes. Their closing codes—for example, informational, modification work order, and safety—do not identify the functional area where corrective action is required.

AVSCOM and DOD officials told us that the closing codes, as currently assigned and used, are not useful in determining systemic causes because (1) the codes are too general, (2) there are no clear definitions of and criteria for determining which code to assign, and (3) there is little consistency in how the codes are assigned.

We agree that closing codes as currently recorded cannot be used to determine systemic causes of problem parts. However, if directorates

were more consistent in defining, assigning, and using the codes, the data could be analyzed to identify trends. Over time, the Command could identify particular functional activities where it should emphasize corrective action. For example, if the trend data shows that a major reason for many problem parts is poor engineering design, the Command could target the engineering design function for further review.

As shown in table 2.1, because closing codes were inconsistently used, they could not be analyzed to identify systemic causes. Our review showed that the codes are arbitrarily assigned and that most of the codes do not reflect the nature of the problems. For example, the "information only" closing code used by the directorates for maintenance and engineering (in 99 percent and 92 percent of all cases, respectively) and the "null" closing code used by the directorate for product assurance (in 23 percent of all cases) do not describe any aspect of the problem or its solution.

Table 2.1: Number of Cases by Closing Codes (October 1986 to June 1992)

Closing code	Engineering directorate	Maintenance directorate	Product assurance directorate
Information only	1,905	19,749	Code not used by directorate
Issued safety message	148	56	Code not used by directorate
Changed maintenance function	40	56	Code not used by directorate
Modification work order	31	21	Code not used by directorate
Minor alteration	23	0	Code not used by directorate
Miscellaneous	21	34	Code not used by directorate
Contractor error	Code not used by directorate	Code not used by directorate	4,662
Null	Code not used by directorate	Code not used by directorate	2,815
Invalid	Code not used by directorate	Code not used by directorate	1,966
Maintenance	Code not used by directorate	Code not used by directorate	1,705
Design	Code not used by directorate	Code not used by directorate	568
Procurement error	Code not used by directorate	Code not used by directorate	251

In 1990, an AVSCOM study team attempted to use the fault codes in the DRS to identify the systemic reasons for the increases in nonconforming materiel being experienced by the Command. However, the team concluded that incomplete and inaccurate data in the DRS precluded it from successfully identifying systemic causes. Specifically, the team found that the inconsistent application of the fault codes had resulted in the improper classification of responsibility for addressing the problems.

Inadequate Information Exchange

Parts with quality problems can result in parts with supply availability problems. If a part fails more often than expected, demands for that part will increase. This increased demand, in turn, can result in the part's being in short supply. It is possible that parts that experience quality problems will not experience supply availability problems if the supply system has had time to adjust for the increased demands. In either case, the end result is the same—the quantity of items authorized to be stocked based on historical demands and projected usage will be larger than otherwise would have been required, and the number of items bought will be larger to satisfy that larger requirements objective.

Our review showed that information developed as part of the individual directorates' data bases or as part of the DRS was not routinely provided to AVSCOM's item managers who have responsibility for ensuring that sufficient stocks are maintained to meet customer demands. As a result, item management officials are not always aware of data that could alter their inventory management decisions. For example, because of design problems, the shaft-driven compressor on the Apache helicopter experienced higher-than-expected failure rates for several parts in the compressor. In response to these problems, AVSCOM initiated an engineering change proposal. When the item manager attempted to procure the part, she was advised by the contractor that the part being requested was considered obsolete and was no longer being manufactured. When the item manager inquired about procuring the newly designed shaft-driven compressor, the contractor advised her that testing of the new part had not yet received the required approval and that the part was therefore not available for procurement.

AVSCOM officials acknowledged that there was no routine process for providing item managers with information on parts with quality problems. They said that supply managers focused on problem parts only after the parts start to experience supply availability problems, as evidenced by nonmission-capable supply back orders.

By the time a part develops supply availability problems, the options available to the Command to address them are limited. Essentially, the only alternatives are to expedite contract awards, deliveries on existing contracts, field returns, or overhaul programs or to make emergency buys. These extraordinary efforts are costly in that they detract from the Command's ability to perform normal activities.

Table 2.2 shows the numbers and types of actions taken to resolve problems experienced with supply availability with Kiowa Warrior, Apache, Chinook, and Black Hawk helicopter parts between January and June 1992. Sometimes multiple actions were taken to resolve cases.

Table 2.2: Actions to Resolve Problems With Supply Availability With Kiowa Warrior, Apache, Chinook, and Black Hawk Helicopter Parts (January Through June 1992)

Weapon system	Number of parts involved	Expedited deliveries	Expedited contract awards	Expedited repairs/ overhaul	Emergency buys
Kiowa	20	18	15	7	1
Apache	50	24	18	0	8
Chinook	37	21	23	7	0
Black Hawk	156	84	119	37	8
Total	**263**	**147**	**175**	**51**	**17**

Note: The numbers of parts do not equal the numbers of actions in each row because more than one action might have been taken to solve the problem.

AVSCOM officials told us that they would prefer to have a proactive system, rather than a reactive system, for addressing supply availability problems. However, the number of instances that require immediate attention limits their ability to develop such a system. The officials went on to say that, ideally, more attention should be paid earlier to parts that are likely to become problem parts so that costly actions such as expedited procurements can be avoided. In this regard, they believe that, rather than wait for a part to experience nonmission-capable supply back orders, managers should develop indicators to identify future problem parts. As discussed in chapter 3, efforts are under way to develop such a system.

Effort to Develop a Proactive System for the Early Identification of Problem Parts

AVSCOM has developed and begun to implement a proactive system for the early identification of parts with supply availability problems. This effort recognizes the fact that, because of budgetary constraints, the Command will not have the resources to continue to do business as usual. Consequently, to the extent that the Command can identify potential problem parts earlier in the process, it may be able to take actions to avoid expending resources to expedite procurements, contract awards, and deliveries or to make emergency procurements.

AVSCOM has experienced difficulties in trying to develop a proactive system, referred to as the "Operating and Support Cost Reduction program," which is intended to find ways to improve the quality of its parts through the use of improved technologies. AVSCOM officials hope the system, once fully developed and implemented, will result in reduced operating and support costs. Our review indicated that the system currently envisioned by AVSCOM officials has organizational problems and may not focus on the parts experiencing quality problems.

Improving the Predictability of Problems With Supply Availability

The effort to improve the predictability of supply availability problems has centered on improving the S4 report. Our review indicated that S4 reports ranked problem parts using nonmission-capable supply back orders as the most important ranking element.[1] We found that the ranking scheme was reactive; that is, action was not taken until a problem had occurred. In an effort to make the system more proactive and useful to supply managers, one activity within AVSCOM was testing a new ranking scheme which would allow supply managers to determine which of the seven elements are more important to them in managing their parts. The managers could then weight the ranking elements in order of importance. The S4 system then would compute a priority ranking of the parts based on the relative importance of each ranking element. For example, the manager may give the "negative months of supply" element a weight of seven and nonmission-capable supply back orders a weight of two, indicating that for his particular weapon system, negative months of supply is three and one-half times more important than nonmission-capable supply back orders. The weights assigned to the ranking elements range from zero to nine, with nine being the most important.

Table 3.1 shows the priority of the ranking elements under the existing S4 ranking process, as compared to the ranking process being tested on 20

[1]The other ranking factors in order of priority were (1) number of priority back orders from overhaul facilities; (2) number of back orders; (3) number of negative months of supply; (4) number of demands; and (5) number of stocked, insurance, or essential items.

weapon systems. The table indicates that, under the proposed ranking process, weapon system managers for 9 of 20 weapon systems ranked the number of negative months of supply as a more proactive indicator of potential supply problems than the existing indicator—nonmission capable-supply back orders.

Table 3.1: Priority of Ranking Elements for 20 Weapon Systems Under the Existing and Proposed S4 Systems

		Proposed S4 rank				
Ranking element	Existing S4 rank	1 weapon system	1 weapon system	1 weapon system	7 weapon systems	10 weapon systems
Nonmission-capable supply back orders	1	2	1	3	3	1
Priority overhaul back orders	2	3	0	3	1	3
Total back orders	3	4	3	3	4	4
Negative months	4	1	1	1	2	2
Average monthly demand count	5	3	2	2	3	3
Stocked/insurance parts	6	4	4	4	4	4
Essential parts	Not used	4	4	4	4	4

Supply managers told us that the proposed ranking scheme would allow for a more proactive system of identifying problems. They said that this system could, in the longer term, significantly reduce the incidents of back orders and problems with supply availability by promoting actions before, rather than after, inventory stocks are depleted. They pointed out, however, that the Command's emphasis was still on identifying problem parts based on priority back orders. Because of this focus, item managers continued to spend most of their efforts on these parts.

We compared the ranking of the top 10 supply availability problem parts on the UH-60 weapon system using the proposed ranking scheme and the existing one to determine the effect that the change in the ranking scheme had on the priority given to particular parts. The comparison showed that the rankings for the first eight parts had few significant changes, but rankings for the last two parts were substantially different.

Weapon system managers want to be more proactive in identifying potential problems with parts' supply availability. Officials said that parts as far down the list as some of those we reviewed may not have been previously reviewed because the item managers generally focus on the top-ranking parts. A primary basis for differences in the priority ranking is that the prior system used nonmission-capable supply back orders as the

driving factor, whereas the new system uses a forward looking indicator—negative months of supply.

The developer of the new system told us that if the system is implemented on an Army Materiel Command-wide basis, it could result in

- increased equipment readiness by reducing the number of nonmission-capable supply back orders,
- fewer overhaul and repair line stoppages by reducing the number of high priority overhaul back orders, and
- increased supply availability by reducing the total number of back orders.

The developer of the new system said that in managing parts in support of the T53 turbine engines, using a proactive system similar to the new one had led to dramatic improvements in supply availability rates and to reductions in priority back orders. The official told us that the new ranking scheme is being tested by the supply system managers in the materiels management directorate.

Difficulties in Developing Proactive Systems to Improve the Quality of Parts

AVSCOM is trying to develop the Operating and Support Cost Reduction system to reduce operating and support costs by improving the processes for manufacturing and maintaining its parts. This system focuses on the use of new and improved technologies to redesign and/or reengineer repair parts. AVSCOM expects that when the system is fully developed and implemented, it will be a proactive, forward-looking program that will result in reduced life-cycle operating costs and improved quality.

AVSCOM officials told us that the parts selected for redesign and/or reengineering under the new system will be identified from the various data bases maintained by the AVSCOM directorates. The parts selected for redesign and/or reengineering consideration will be those with a high dollar volume of recurring demands. However, these parts may or may not be experiencing problems.

Although the system could reduce operating and support costs and could improve the quality of parts, it will not address the systemic causes of problems with quality that AVSCOM is currently experiencing. Furthermore, AVSCOM officials said that new system is still in the developmental stage and there are organizational problems that have not yet been resolved.

AVSCOM does have the capability, however, to develop a proactive system that would aid management in identifying the systemic causes of parts with quality problems. The DRS could serve as the framework for such a system. However, as discussed previously, the quality, accuracy, completeness, and timeliness of the data will have to be improved if the DRS is to be useful as a management tool for identifying problems with quality. With accurate, complete, and up-to-date DRS information, management could develop trend data that could be used to identify areas that should be investigated to determine the systemic causes of problems with quality.

In addition to the information in the DRS, other data needs to be accumulated and analyzed if the Army wants to develop a proactive system to identify systemic quality problems. For example, analysis of the differences between estimated and actual usage rates could indicate that parts are failing more frequently than anticipated. Investigation of the cumulative reasons for the premature failures could reveal a problem with quality that is related to a systemic issue.

Also useful would be an analysis of the reasons for delinquent deliveries. Investigation of these reasons could indicate that the contractor is having problems manufacturing the part due to poor specifications or design—again an indication of a potential problem with quality.

Conclusions and Recommendations

Conclusions

AVSCOM's efforts to identify problems with the quality of its parts have largely been carried out on an item-by-item basis. This approach, however, does not address the systemic causes of the quality problems. The Operating and Support Cost Reduction program, which AVSCOM is trying to develop, would focus on reducing future operating and support costs by redesigning and/or reengineering specific parts that experience high dollar volumes of demands. However, these parts may not be the ones experiencing quality problems.

AVSCOM has the basic framework in place for capturing historical information on parts with quality problems that could be used for trend analysis to identify problem areas that need further investigation. To fully develop a system that can be used for this purpose, the data in existing systems such as the DRS and other data bases need to be defined uniformly, specifically, and consistently by the directorates. Unless the data is kept accurate and up-to-date, capturing it serves no useful purpose in the identification of systemic, root causes of problem parts.

AVSCOM's effort to develop a proactive system that will quickly identify supply availability problems is a step in the right direction. The newly implemented system is expected to enable managers to take a more forward-looking approach toward the early identification of potential problems rather than focusing on parts that have already become problems.

The long-term benefit of a proactive system could be a reduction in the number of expedited procurements and contract awards that the Command currently employs to "buy its way out" of problems. To the extent that managers can take actions to preclude a problem, equipment readiness will improve, and the costs associated with taking expedited actions can be avoided.

Recommendations

Because DOD now has functional responsibility for the DRS, we recommend that the Secretary of Defense develop a strategy for identifying the systemic causes of problem parts that is built on the information and systems, such as the DRS and the S4, that are already in place. As a minimum, the strategy should

- ensure that the terms used to identify the causes of problems with quality are defined and that the terms are applied consistently by those responsible for capturing the data,

- require the directorates that investigate problems with quality to promptly forward the results of their investigations to the centralized data base in sufficient detail to keep the system accurate and up-to-date,
- ensure that supply managers are provided appropriate and timely data on problems with quality or on issues pertaining to the parts they manage so that they will be aware of the identified problems and the corrective actions, and
- use the information in the centralized data base to develop trend data to identify functional areas requiring corrective actions.

We also recommend that the Secretary of the Army direct the Commander of the Army Materiel Command to test the proactive supply availability reporting system on an Aviation Systems Command-wide basis. If the test results prove beneficial, we recommend that the Commander of the Army Materiel Command determine whether the system should be established at the other Army buying commands.

Agency Comments

DOD generally concurred with our findings, conclusions, and recommendations. It stated that a strategy was needed to identify root causes of problems with parts and indicated that by May 1, 1993, changes will be made to improve the currentness of the DRS.

DOD was concerned that the data on problems with parts' quality that is currently being collected in the DRS would not identify the systemic problems because it lacks specificity. DOD acknowledged that the current coding in the DRS system is too generic to be of use in defining systemic causes and has assigned responsibility for standardizing the coding to the Joint Logistics System Center.

We agree that without changes, the current system cannot be used to determine systemic causes. However, if there were greater consistency in defining and assigning more specific codes and if all the directorates used the same codes, the data could be used to develop trends over time that could identify particular functional activities where the Command should emphasize corrective action. For example, if over a period of time, the trend data shows that a major reason for many problems is poor engineering design, the Command could target the engineering design function for further review to identify the specific problems in that functional area.

DOD stated that in January 1993, a new scheme for ranking various supply factors was incorporated into the system for the early identification of parts with supply availability problems. According to DOD, by the fourth quarter of fiscal year 1993, the Army Materiel Command will initiate a review of AVSCOM's proactive system for the early identification of problems with supply availability and determine whether the new system should be adopted Command-wide.

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