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January 1997

# DEFENSE INVENTORY

## Spare and Repair Parts Inventory Costs Can Be Reduced



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United States  
General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

B-275462

January 17, 1997

The Honorable William J. Perry  
The Secretary of Defense

Dear Mr. Secretary:

This report discusses how the military services can reduce their spare and repair parts storage and holding costs by consolidating and/or disposing of inventory that is not needed to meet current operating and war reserve requirements or is requested infrequently.

The scope and methodology of our review are described in appendix I.

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## Background

The Army, the Navy, and the Air Force have about 632,000 line items of spare and repair parts inventory, valued at \$83.5 billion,<sup>1</sup> that are available for general issue.<sup>2</sup> The majority of the general issue spare and repair parts items are stored at a few major locations that are managed and operated by the Defense Logistics Agency (DLA), with the remaining being stored at hundreds of other service-managed locations. To illustrate, over 95 percent of the value of the Army's general issue inventory is stored at 7 major locations and the remaining 5 percent is at 110 other locations. The Navy stores 81 percent of its inventory at 6 locations, the other 19 percent at 52 locations. The Air Force's storage pattern is similar to the other services. About 96 percent of its inventory is stored at 6 major locations and the other 4 percent at 105 locations. At the DLA storage locations, DLA performs the receipt, storage, and issue functions and bills the services for performing these functions. The services are also billed for the storage space assigned to them for their items. The storage costs range from \$0.48 a square foot to \$5.15 a square foot depending on whether it is open or covered storage. DLA's accounting system tracks storage costs only in total by type of storage space assigned, not item-by-item.

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## Results in Brief

Most of the services' inventory items stored at nonmajor locations are in small quantities. In fact, over 53 percent of the items were in quantities of

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<sup>1</sup>The value was determined by multiplying the inventory quantity shown in the inventory master data files by the unit price.

<sup>2</sup>General issue inventory is available for issue to the services' customers. It does not include inventory stored at contractor or the services' maintenance facilities, inventory reserved for special projects, or war reserve inventory.

3 or less, while only 25 percent were in quantities of 11 or more. However, the inventory at the nonmajor locations is valued at over \$8.3 billion.

The need for many of the items stored at nonmajor locations is questionable. Of the \$8.3 billion of inventory at the nonmajor locations, \$2.7 billion of it was not needed to meet the services' current operating and war reserve requirements. Our analysis also showed that many of the Army items<sup>3</sup> were infrequently issued over the 2-year period ending August 1996. Over 53 percent of the items at nonmajor storage locations had no issues and an additional 33 percent of the items had less than five issues during the same 2-year period.

Maintaining inventory that is not needed is expensive and does not contribute to an effective, efficient, and responsive supply system. Based on our analysis, we estimate the services could save about \$382 million annually in inventory holding costs by eliminating inventory at nonmajor locations that is not needed to meet current operating and war reserve requirements.

## Services Have Small Quantities of Inventory Stored at Numerous Locations

The Army, the Navy, and the Air Force own and manage about 632,000 line items of general issue spare and repair parts. These items have an inventory quantity of about 108 million, an inventory value of \$83.5 billion, and are stored at 229 different locations by service as shown in table 1.

**Table 1: Storage Locations, Quantities, and Value of Army, Navy, and Air Force General Issue Inventory**

Dollars in millions

Service	Number of storage locations	Number of line items	Quantities	Value
Army	117	83,759	42,234,665	\$10,185.8
Navy	58	310,762	33,557,388	33,696.8
Air Force	111	237,460	32,288,896	39,596.9
<b>Total</b>	<b>286<sup>a</sup></b>	<b>631,981</b>	<b>108,080,949</b>	<b>\$83,479.5</b>

<sup>a</sup>The same item may be stored at more than one location. As a result, the 286 storage locations actually represent 229 separate and distinct storage locations.

Even though the services' general issue inventories are stored at numerous locations, the vast majority of the items are concentrated at a few major

<sup>3</sup>Information was not readily available from the Air Force and the Navy to determine the number of inventory issues on an item-by-item basis at each storage location.

locations. As shown in table 2, the value of the general issue inventory at the other-than-major storage locations is relatively small. However, it is still worth over \$8.3 billion.

**Table 2: Value of General Issue Inventory by Type of Storage Location**

Dollars in millions

Service	Major storage locations				Other storage locations			
	Number	Inventory			Number	Inventory		
		Line items	Quantity	Value		Line items	Quantity	Value
Army	7	81,747	39,464,486	\$9,642.2	110	11,159	2,770,179	\$543.6
Navy	6	239,781	16,631,104	27,359.3	52	154,069	16,926,284	6,337.5
Air Force	6	222,972	30,680,542	38,163.0	105	19,097	1,608,354	1,433.9
<b>Total</b>	<b>19</b>	<b>544,500<sup>a</sup></b>	<b>86,776,132</b>	<b>\$75,164.5</b>	<b>267</b>	<b>184,325<sup>a</sup></b>	<b>21,304,817</b>	<b>\$8,315.0</b>

<sup>a</sup>The same line item could be stored at both a major and nonmajor storage location. For that reason, the sum of line items at the major and nonmajor storage locations is greater than the number of line items shown in table 1.

Our analysis of the items stored at nonmajor locations showed that the majority of items had small quantities on hand. As shown in table 3, over 53 percent of the items (147,232 of the 276,750) had an on-hand inventory of 3 or less, while about 25 percent of the items (69,173 of the 276,750) had quantities of 11 or more.

**Table 3: Number of Items Stored at Nonmajor Locations by Frequency of Inventory on Hand**

Service	Number of line items <sup>a</sup>	Number of items stored at nonmajor locations with a quantity of:					
		1	2	3	4-6	7-10	11+
Army	14,532	4,657	2,282	1,230	1,923	1,162	3,238
Navy	242,087	76,715	35,083	18,693	32,029	19,310	60,257
Air Force	20,131	3,247	3,856	1,469	3,374	2,547	5,638
<b>Total</b>	<b>276,750</b>	<b>84,619</b>	<b>41,221</b>	<b>21,392</b>	<b>37,326</b>	<b>23,019</b>	<b>69,173</b>

<sup>a</sup>Because some items are stored at multiple locations with different quantities on hand, the number of line items in tables 2 and 3 will not agree.

## Some Inventory at Nonmajor Storage Locations Is Not Needed and Is Issued Infrequently

Our analysis of the general issue inventory at nonmajor storage locations showed that over \$2.7 billion of it was excess to the amount needed to meet current operating and war reserve requirements. For these items, there was sufficient inventory on hand at the major storage locations to meet the peacetime operating and war reserve requirements. If the items are not needed to meet current operating and war reserve requirements, then the question is why the services continue to store them and incur the inventory storage and holding costs.

Table 4 shows the extent of the inventory at nonmajor storage locations that is not needed to meet current operating and war reserve requirements.

**Table 4: General Issue Inventory at Nonmajor Storage Locations Not Needed to Meet Current Operating and War Reserve Requirements**

Dollars in millions			
Inventory at nonmajor storage locations that is excess to current operating and war reserve requirements			
Service	Number of line items	Inventory quantity	Inventory value
Army	4,735	897,638	\$169.2
Navy	95,989	11,945,962	2,398.0
Air Force	2,981	298,260	176.7
<b>Total</b>	<b>103,705</b>	<b>13,141,860</b>	<b>\$2,743.9</b>

The following is an example of inventory at a nonmajor storage location that is not needed to meet current operating and war reserve requirements. An Army truck engine for a commercial cargo vehicle, unit price of \$7,010, has a current operating and war reserve requirement of 214. There are 360 engines on hand at 4 major storage locations and an additional 543 engines on hand at 2 nonmajor storage locations. The truck engine and its container occupy about 53.6 cubic feet and the total storage space occupied by the 543 engines at the two nonmajor locations is 29,104 cubic feet. Because the quantity of engines at nonmajor storage locations is not needed to meet the current operating and war reserve requirements, these engines could be disposed of, storage space could be freed up, and storage costs could be reduced.

Our analysis of the general issue inventory at nonmajor storage locations also showed that many of the items are issued infrequently. DLA classifies inventory items that have not been requested in the past 24 months as dormant. DLA routinely requests the services to review their dormant stock to determine if the stock is still needed. Our analysis of the frequency of inventory issues at nonmajor storage locations showed that over 53

percent of the Army items,<sup>4</sup> with an inventory value of \$144 million, had no issues for the 2-year period ending August 1996. Another 33 percent of the items, with an inventory value of \$132 million, had 5 or fewer issues during the same 2-year period. The fact that the number of items issued from these storage locations is relatively small raises the question of why the Army continues to store the inventory items there. Table 5 shows the frequency of issues for the Army’s general issue inventory items at the nonmajor storage locations.

**Table 5: Frequency of Army Inventory Issues for the 2-Year Period Ending August 1996**

Service	Number of items <sup>a</sup>	Number of items with:				
		0 issues	1-5 issues	6-10 issues	11-15 issues	16 or more issues
Army	11,159	5,950	3,695	894	416	541

<sup>a</sup>The number of line items will not agree with the total number of issues because the same item may be stored at more than one location and could have had a different number of issues at each location. In such cases, the number of issues would be cumulative.

The following example illustrates the type of items that are stored at the nonmajor storage locations and have not had any issues during the past 2 years.

- An electronics unit, unit price of \$12,532, which is used on the multiple launch rocket system has an on-hand balance of 11 at 4 nonmajor storage locations. This item has not been issued from the four locations during the past 2 years. Therefore, there is no need to maintain these items at the four storage locations and incur storage costs.

## Maintaining Unneeded Inventories Is Expensive and Does Not Contribute to Supply Effectiveness

Maintaining inventory that is not needed or is issued infrequently is expensive. DLA’s charge for covered storage is \$5.15 a square foot. The charge is not based on the space the particular item occupies but rather the square footage assigned to it. To illustrate, if a pack of washers is being stored in a bin, the storage cost is based on the bin size and not the number of washer packs in the bin. Therefore, if washers are being stored at numerous locations, a storage cost is charged at each location even though all the washers could be consolidated into one location.

According to DLA officials, the Base Realignment and Closure Commission’s reductions in force structure have resulted in the depots

<sup>4</sup>The Navy and the Air Force does not maintain inventory issue data by storage location. As a result, we could not determine the number of issues for the Navy and the Air Force items stored at nonmajor storage locations.

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experiencing considerable increases in materiel returns and redistribution orders. As a result, the Department of Defense's storage space occupancy goal of 85 percent<sup>5</sup> is being exceeded by some depots.

In an attempt to address this problem, DLA performed a study to identify ways to free up storage space and reduce storage costs by disposing of items that are not needed. The DLA Defense Distribution Region West's analysis of 3,130 dormant line items of inventory at its storage facilities showed that by eliminating the dormant line items, over 126,000 square feet of storage space could be freed up and the services could save an estimated \$989,000 in storage costs—an average savings of about \$316 per line item.<sup>6</sup> It should be noted that the DLA analysis only covered one of its regions and only addressed the dormant stock. It did not address those situations where inventory quantities could be consolidated into fewer storage locations. Therefore, the potential savings in storage costs would be much greater on a DLA-wide basis.

During our visit to a storage location, we noted numerous examples where storage bins capable of holding many items contained only a few. Our analysis of the services' inventory data showed that 31 percent of the 276,750 items stored at nonmajor locations had only 1 unit on hand. In total, 53 percent of the items stored at these locations had three or less on hand. In addition, the same items were also stored at other locations and the on-hand quantities at all the locations often exceeded the current operating and war reserve requirements. The following examples illustrate the inefficiencies of storing small quantities of items, many of which are unneeded, at multiple storage locations.

- One \$2.96 nonmetallic bumper that is used on the main gun of the Bradley fighting vehicle was the only item in a standard, small storage bin. The bin, which occupies 1.83 square feet of space, can hold 259 nonmetallic bumpers. Based on the least expensive form of covered storage of \$5.15 per square foot, it costs the Army \$9.42 a year to store the \$2.96 item. Our review of Army inventory records showed that there are 1,675 stored at 2 other locations. The Army's requirement for this item is 1,271. Therefore, 404 of the items are excess to the Army's needs. Additionally, over the past 2 years, there have been only three issues of this item and

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<sup>5</sup>When the storage occupancy rate exceeds 85 percent, warehousing efficiency is affected as items must be moved and relocated in order to make room for incoming items. In turn, the frequent movement of items can result in items being lost or misplaced.

<sup>6</sup>The storage cost savings (\$989,000) divided by the number of dormant line items (3,130) equals a line item cost of about \$316.



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none of the issues were from the storage location where the single item was stored.

- Two small bolts, unit price of \$9.30, were being stored in a bin capable of holding 200 bolts. The bolt, which is used on the MQM 107 target drone, is also stored at 2 other locations and the total on-hand quantity is 499 versus a current operating and war reserve requirement of 8. During the last 2 years, there has only been 1 issue for 20 of the bolts and that was from a storage location other than the one visited.
- One ring spacer with a unit price of \$0.93 was being stored in a bin that could accommodate 177 spacers. This item, which is used on the engine for the OH-58 helicopter, is also stored at 2 other locations and the on-hand quantity is 137 versus a current operating and war reserve requirement of 102. In the past 2 years, there have been two issues for a total quantity of six, none of which were from the storage location visited.
- Two nonmetallic grommets with a unit price of \$2.33 were being stored in a bin that can accommodate 20 items. The item, which is used on air delivery equipment, is also stored at another location and the total on-hand quantity is 480 versus a current operating and war reserve requirement of 54. During the past 2 years, there have been 4 issues of the grommet for a total quantity of 20. None of the issues were from the storage location visited.

DLA officials said that from a cost-effectiveness and supply responsiveness standpoint, it is not necessary to store items at multiple locations. They said that the services should not be concerned where the stock is physically located if DLA can meet the services' response requirements. However, under the services' current inventory stocking policies, the services direct where the items are stored. Consequently, this does not always result in the most economical and cost-effective storage decisions. The DLA officials believed that if the decision as to where the stock should be stored was vested with DLA, better stocking decisions would be made and storage costs would be reduced. Based on our analysis of the number of items stored at nonmajor storage locations, the number of items not needed to meet current operating and war reserve requirements, and the number of items that are issued on an infrequent basis, we would agree that better decisions are needed concerning where inventory should be stored.

In addition to the cost to store inventory, the services incur holding costs. The services calculate a variable holding cost on an item-by-item basis to

identify those items that are more economical to stock than not to.<sup>7</sup> Using the services' data, we estimate that the services could save about \$382 million in holding costs by eliminating inventory at nonmajor locations that is not needed to meet current operating and war reserve requirements as shown in table 6.

**Table 6: Annual Inventory Holding Cost for Items Not Needed to Meet Current Operating and War Reserve Requirements**

Dollars in millions		
Service	Number of line items	Annual holding cost
Army	4,735	\$57.7
Navy	95,989	319.5
Air Force	822 <sup>a</sup>	4.5
<b>Total</b>	<b>101,546</b>	<b>\$381.7</b>

<sup>a</sup>The Air Force only calculates holding costs for consumable items; the other services calculate holding costs for repairable as well as consumable items. For this reason, the number of Air Force items shown above does not agree with the number of items shown in table 4.

## Recommendations

We recommend that the Secretary of Defense direct the service secretaries to:

- Begin to consolidate the warehousing of identical items that are not needed or infrequently issued at fewer storage locations. This can be accomplished over time by filling item requests by depleting the stock at a particular location or locations, disposing of unneeded items, and not restocking the items at those locations.
- After consolidating the warehousing of items not needed or infrequently requested, determine whether all storage facilities are needed. If facilities are no longer needed, take actions to close them.

## Agency Comments

The Department of Defense concurred with a draft of this report. It said that DLA was coordinating with the military services to reengineer the distribution system with the objectives of providing greater responsiveness to the customer and increasing efficiencies in receiving, storing, and shipping spare parts inventories. The Department also stated that these increased efficiencies should reduce the number of required storage facilities. To accomplish these objectives, the military services will be requested to review the items stored in multiple locations, which are

<sup>7</sup>The annual holding cost for an item represents the unit cost of an item multiplied by the variable cost to hold factor (cost of funds invested in inventory, losses due to obsolescence, other inventory losses, and storage costs) multiplied by the quantity on hand.

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either not needed or infrequently issued in order to identify opportunities for consolidation.

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As you know, 31 U.S.C. 720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Reform and Oversight and the Senate Committee on Governmental Affairs not later than 60 days after the date of this report. A written statement must also be submitted to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Secretaries of the Army, the Navy, and the Air Force; the Commander of DLA; and the Director, Office of Management and Budget. Copies will also be sent to the Chairmen and Ranking Minority Members, House Committee on Government Reform and Oversight, Senate Committee on Governmental Affairs, House and Senate Committees on Appropriations, House Committee on National Security, Senate Committee on Armed Services, and House and Senate Committees on the Budget.

Please contact me on (202) 512-5140 if you have any questions concerning this report. Major contributors to this report are listed in appendix II.

Sincerely yours,



Mark E. Gebicke  
Director, Military Operations  
and Capabilities Issues

# Scope and Methodology

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We reviewed and analyzed master data files from the Army, the Navy, and the Air Force to identify the number of spare and repair parts they manage. From these files, we determined the on-hand inventory available for general issue and the storage locations of the general issue inventory. We arrayed the inventory by storage location and dollar value in descending order to identify natural break points for determining which storage locations should be considered major storage locations and which nonmajor.

Using the above information for the inventory at the nonmajor storage locations, we determined whether the on-hand inventory was excess to the current operating and war reserve requirements. In making this determination, we first applied the inventory at the major storage locations to the requirements. In those cases where the inventory at the major locations was not sufficient to satisfy the requirements, we then applied inventory from the nonmajor storage locations. Any remaining inventory at these storage locations was considered excess to the current operating and war reserve requirements.

We used the item transaction history data files, which show all requests for an item for the past 24 months, to assess the frequency of requests for items at the nonmajor storage locations. We then compared the results of this analysis to a similar analysis of frequency of request for the same items at the major storage locations in order to determine the extent that items at the nonmajor storage locations are infrequently requested.

We also interviewed service and DLA officials and reviewed internal studies and reports to determine their views on the potential for consolidating and/or eliminating inventory items that are not needed or are infrequently requested.

Our review was conducted between March and November 1996 in accordance with generally accepted government auditing standards.

# Comments From the Department of Defense



ACQUISITION AND  
TECHNOLOGY

OFFICE OF THE UNDER SECRETARY OF DEFENSE

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02 JAN 1997

Mr. Mark E. Gebicke  
Director, Military Operations and Capabilities Issues  
National Security and International Affairs Division  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Gebicke:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "DEFENSE INVENTORY: Spare and Repair Parts Inventory Costs Can be Reduced," dated November 19, 1996 (GAO Code 703136/OSD Case 1254). The Department concurs with the report.

The Department agrees that items in non-major storage locations should be consolidated to the maximum extent possible. The Defense Logistics Agency, in coordination with the Military Services, is working to re-engineer the distribution system in the continental United States. The objective of that initiative is to provide greater responsiveness to the customer as well as increased efficiency in receiving, storing and shipping. These increased efficiencies in the distribution arena should reduce the storage facilities required by the Military Services. The Military Services will be requested to review the items that are stored in multiple locations which are either not needed or infrequently issued in order to identify opportunities for consolidation.

The DoD appreciates the opportunity to comment on the draft report.

Sincerely,

John F. Phillips  
Deputy Under Secretary  
of Defense (Logistics)



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