
Logistics Management Institute

Improving U.S. Coast Guard
Inventory Management
Establishing a Comprehensive Consumable
Item Management Strategy

CG403MR2

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James H. Reay

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Improving U.S. Coast Guard Inventory Management: Establishing a Comprehensive Consumable Item Management Strategy

Executive Summary

The U.S. Coast Guard's logistics objective is to emplace a logistics support system that improves customer service, reduces inventories at all levels, and ensures more effective inventory investment by providing total visibility of key assets. The Coast Guard is taking three major steps to realize that objective:

- ◆ It is streamlining its logistics support organization by combining selected Headquarters elements of the naval engineering, electronics engineering, and logistics management divisions with its two nonaviation supply centers to form a new Engineering Logistics Center (ELC).
- ◆ It is developing a new automated information system for the center's business processes.
- ◆ It is developing a better process for managing Coast Guard-unique consumable items.

In this task, we have focused on the third step.

Organization streamlining, changes in support philosophy, and declining budgets generate the need for an effective and efficient consumable item management capability. In an earlier report, we recommended that the Coast Guard partially meet that need by participating in a Department of Defense program designed to improve the management of all its consumable items by consolidating that management under a single organization — the Defense Logistics Agency (DLA).¹ We recommended that the Coast Guard participate in the program — not as the only solution but as one element of an improved approach to providing consumable material to afloat and ashore units.

As the result of our current analysis, we recommend the Coast Guard implement a revised consumable item stockage decision logic that has DLA management as the first choice, followed by a set of Coast Guard-managed contracting alternatives, and Coast Guard central stockage as the last choice. We recommend that the revised stockage decision logic be implemented in phases with the current inventories of non-engineering-related items as the first candidates and later expanded to other groups of items including new consumables for new equipment and systems.

¹LMI Report CG403MR1, *Improving U.S. Coast Guard Inventory Management: Should the Coast Guard Participate in the DoD's Consumable Item Transfer Program?*, George L. Slyman and James H. Reay, July 1995.

Consolidating two supply centers and the Headquarters technical staff elements into the ELC will produce personnel savings mandated by the Coast Guard's streamlining program. It will also create an organizational structure whose primary focus should be on engineering and integrated planning support to equipment and systems rather than on receiving, storing, and issuing items. Transferring consumable items to DLA will help overcome some of the mandated reduction at the ELC and will aid in refocusing the business processes from those of a traditional supply center to the ELC's life-cycle management responsibilities. Transferring consumable items to DLA management is not a way to generate more personnel savings or to reduce the ELC operating budget. Additional savings are possible but in a different way.

Savings to Coast Guard units and reductions in inventory investment should result from implementation of our recommended consumable items management strategy. The management strategy includes:

- ◆ Taking advantage of DLA's cost savings initiatives. DLA's near-term and mid-term corporate plan calls for reducing management costs, using material-cost-reducing contracts, and passing the savings on to customers in the form of reduced surcharge rates and lower item prices.² Items transferred to DLA — the first choice in the stockage decision logic — will be managed under the plan and should be available to the units at lower prices.
- ◆ Implementing business procedures akin to those in DLA's corporate plan but tailored to the Coast Guard. For those items retained by the Coast Guard, the supply centers need to implement the DLA-type business procedures (and the ELC perpetuate and improve on them) for the afloat and ashore units to realize budget savings comparable to those expected from DLA-managed items. Those cost savings initiatives include Coast Guard-managed contracting actions such as contractor logistics support, direct vendor delivery, and long-term requirements contracts.
- ◆ Incorporating improved management techniques. Revised inventory stratification and reporting procedures, variable criteria for reviewing and retaining active and inactive inventory, and linking repair parts to equipment essentiality should result in lower investment in inventory.

If the Coast Guard manages the consumable items using the stockage decision logic we propose, and implements cost-beneficial initiatives similar to those in the DLA 1995 corporate plan, we estimate slightly more than \$8 million in savings over the period FY97 through FY01.³ The actual savings will depend on the number of items transferred and the number managed by the supply centers using the cost-beneficial procedures. Because the review and transfer process takes time to implement and implementation is a continuing process, the potential savings to the units will be difficult to target to a particular budget year.

²Defense Logistics Agency, *Corporate Plan*, 1995 Edition.

³The estimated savings are based on the dollar value of Coast Guard-managed items from our report CG403MR1, op. cit.

Those savings will occur incrementally over time. Therefore, we recommend the Coast Guard let the normal budget process work to cover the changes in costs, and not try to identify specific areas or fiscal years in which to apply budget reductions or shifts before they are realized.

In summary, we recommend the Coast Guard adopt a comprehensive consumable item management strategy — one that includes transferring some items to DLA, and for those items retained by the Coast Guard, using customer-oriented contract types for supply support, focusing management on equipment and system essentiality, and establishing a requirements-to-inventory stratification reporting system. We believe the results will contribute significantly to achieving the Coast Guard's logistics objective. We also believe that the specific recommendations presented in this report can be implemented with the personnel and financial resources available to the current supply centers and planned for the new ELC and within the oversight structure evolving in the Coast Guard's organizational streamlining initiatives.

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CHAPTER 1

Overview

INTRODUCTION

In the first phase of this study, we analyzed the cost of the Coast Guard's managing Service-unique consumable items and compared that to the cost of having the Defense Logistics Agency (DLA) manage those items.¹ Although the cost comparison indicates some savings may be realized from transferring the items to DLA, we also found other factors — organizational restructuring, responsibility realignments, and support philosophy changes — that create a need for a consumable item management capability in the Coast Guard but one that differs in features and focus from the one in place now. We recommended the Coast Guard continue evaluating the benefits of transferring nonaviation, consumable item management to DLA, but with a greater focus on that program as one element of a more comprehensive consumables inventory management strategy rather than as an all-or-nothing choice.

OBJECTIVE

Our objective in this task is to recommend a comprehensive consumable item management strategy that will support the Coast Guard's future supply program initiatives. The strategy should incorporate transferring Coast Guard-unique consumable items to DLA management in a consumable item life-cycle management plan keyed to system and equipment essentiality and support philosophy. The Coast Guard should implement the strategy as part of the supply centers' information system modernization and organizational streamlining actions.

RESULTS

Our study results are presented in two reports: this one, CG403MR2, discusses the essential elements of a more comprehensive item management strategy, including transferring items to DLA as part of the strategy; the second,

¹LMI Report CG403MR1, *Improving U.S. Coast Guard Inventory Management: Should the Coast Guard Participate in DoD's Consumable Item Transfer Program?*, George L. Slyman and James H. Reay, July 1995.

CG403RD1,² describes procedures and data requirements for making the transfers.

In this report, we address several management issues critical to achieving the objective, the logic underlying the stockage decision process, new inventory management and oversight concepts, tailoring material support for best results, and linking consumable items to system/equipment management. In the companion report, we discuss tailoring the consumable item transfer program to the Coast Guard: the need for special criteria in the support arrangement, selecting items for transfer, and the memorandum of agreement. Each report presents applicable policy and management-related findings, conclusions, and recommendations, including potential functional benefits to be attained by improving the Coast Guard's overall management of consumable items.

In our research and analysis, we found that the elements that make up the comprehensive strategy compete with other work for resources. As a result, we believe the strategy should be planned over several years starting in FY97. However, we do not believe the work should be delayed until the new Engineering Logistics Center (ELC) is fully operational. We refer to the existing supply centers (Supply Center Baltimore [SCB] and Supply Center Curtis Bay [SCCB]) in our discussion for three reasons: they are the baseline for our projections on cost savings and changes in business practices; parts of some strategy elements are already being implemented there; and they are the organizations best able to judge how to set priorities, apply resources, initiate the plans and actions that enable the transition to the ELC, and imbed changes in its redesigned business processes.

Clearly, the management of consumable items is integral to planning inventory reduction, allowance redistribution, total materiel asset visibility, and ashore and afloat unit support. It will, in fact, continue to be a part of the supply centers' responsibility (and that of ELC), but in a process different from the current one. Our discussion of several critical management issues provides a perspective on positive decision alternatives in support of changes in managing consumable items. Our analysis places more emphasis on the total consumable item management process, and considers the consumable item transfer program as the first of the stockage decision choices in a new item's life-cycle support plan. For items currently in stock, we believe the program should be used to

- ◆ transfer to DLA the management of consumable items that are not engineering-related,
- ◆ force in-depth review of engineering-related insurance and non-demand-supported stocks of consumable items, and

²LMI Report CG403RD1, *Improving U.S. Coast Guard Inventory Management: Transferring Consumable Items to Defense Logistics Agency Management*, George L. Slyman and James H. Reay, April 1996.

- ◆ align managing engineering-related consumable items with the end item being supported and reflect the equipment and system essentiality in the techniques used for management.

We present the most beneficial approach for providing consumable item support to the Coast Guard's current units, ashore and afloat, and for planning to improve support to the new cutter and electronic platforms the Coast Guard will operate in the future. Much of our analysis is built on recent and continuing initiatives in other government activities and the private sector. We found that some of the proposals and approaches included in this report are, to some degree, in current plans and procedures. We believe, however, that the Coast Guard needs a comprehensive, documented strategy that addresses all aspects of consumables management, including Coast Guard-unique items, items provided by other elements of the Federal Supply System and commercial vendors, new items entering the inventory, and old items leaving the inventory.

SUMMARY

Our recommendations will assist Coast Guard managers in developing a comprehensive management program to improve consumable item support to Coast Guard customers. A narrow focus on transferring only some or all of the currently managed consumable items to DLA fails to address the longer term, and broader, issue of total support for new cutter and electronic equipment platforms entering service in the next 10 years. Each platform brings in new consumable items, and in the absence of an overall management strategy, the past will simply be repeated in the future. Changes in the allowances process, stock-level decisions about on-board versus shoreside material storage location, and afloat maintenance capabilities will affect whoever manages consumable items, how they are managed, and where they are located for maximum availability at lowest investment. Our report brings together the essential elements of a strategy focusing on improving total management of consumable items as a key aspect of meeting operational customer material support needs. Such a strategy provides the common link and point of convergence for improved material life-cycle support between the supply centers and their USCG unit-level customers.

CHAPTER 2

Management Issues

The objective of this study is to provide a comprehensive consumable item management strategy for the Coast Guard. A major element of that strategy is the process for transferring all or a portion of the Coast Guard-unique, nonaviation consumables to DLA. During our research, three management issues repeatedly surfaced as challenges to the strategy:

- ◆ Where are the savings?
- ◆ How is the extra cost to the units covered?
- ◆ Does this strategy fit with other logistics support initiatives?

We address those three issues in this chapter.

IDENTIFYING SAVINGS ASSOCIATED WITH A CONSUMABLE ITEM TRANSFER PROGRAM

Our analysis presented in the earlier report showed that, based on FY94 point-in-time data, the current costs of acquiring and managing nonaviation consumables under the supply centers and the projected costs under DLA management are approximately the same. That finding raises the question of the economic benefits of transferring any items to DLA. We believe that transfer can provide substantial cost benefits to the Coast Guard. We base that premise on DLA initiatives to reduce the future growth of customer costs and to reduce the operating costs it passes on to customers through the cost-recovery factor (surcharge). The DLA 1995 *Corporate Plan* describes that agency's commitment to "maintain customer price changes below the rate of inflation, to ensure an average price increase less than 1 percent per year between 1995 and 2001, and to reduce the operating cost-recovery portion of the customer price."¹ DLA's FY96 budget submission contains adjustments to the cost-recovery rate through FY97, which begins the implementation of the cost-containment initiatives.² Table 2-1 shows the projected reductions in the DLA surcharge for system- and equipment-related items through FY01.

¹ Defense Logistics Agency, *Corporate Plan*, 1995 Edition.

² Defense Logistics Agency FY96 – 97 *Budget Estimate Submission*, September 1994, p. 96.

Table 2-1.***DLA Surcharge for System- and Equipment-Related Items***

DLA cost recovery rate (percentage)	FY95	FY96	FY97	FY98	FY99	FY00	FY01
	39	38	35	32	31	29	28

Concurrent with the reduction in operating costs shown in Table 2-1, DLA has projected an overall increase in total customer prices substantially less than that anticipated on the basis of official inflation rates. That reduction to expected price increases is based on the implementation of a broad range of improvement initiatives in acquisition, materiel management, procurement, automatic data processing (ADP) equipment modernization, transportation, and new technologies.³ Table 2-2 shows DLA's factors for projecting future customer price increases (includes the effect of the cost-recovery factor and the material sales costs) using an FY95 baseline with and without the planned management initiatives.⁴

Table 2-2.***Future Price Projections***

Customer price factor	FY95	FY96	FY97	FY98	FY99	FY00	FY01
With management initiatives	1	1.00	1.010	1.03	1.04	1.050	1.06
Without management initiatives	1	1.04	1.075	1.12	1.15	1.175	1.21

The data indicate a substantial reduction in projected customer price growth based on DLA's implementation of its management improvement initiatives. The price factors reflect the growth of the acquisition cost of material and the cost of operating the materiel management organizations providing the logistics services. Savings achieved through DLA's successful implementation of its management initiatives will accrue to DLA customers with no additional investment on their part. If the Coast Guard retains management of the nonaviation consumables and the cost of that management, including the actual material costs, continues to be based on supply center operating costs and official rates of inflation, the total budgeted cost to the Coast Guard for consumables management could be expected to increase at rates similar to DLA's projected costs without management initiatives. However, if the Coast Guard supply centers were to implement a comprehensive consumables management improvement initiative similar to the DLA program, they would probably realize savings similar to those projected by DLA. Because the Coast Guard supply centers are part of the streamlining plan to establish an ELC with modernized information system support, the new, more integrated organization may improve on DLA's

³ FY95 – FY97 factors from DLA's budget; FY98 – FY01 projected from DLA's *Corporate Plan*. Data from that plan are based on DLA's Program Objective Memorandum (POM) 1996 – 2001 submission.

⁴ DLA *Corporate Plan*, op. cit.

management initiatives and generate additional savings to pass on to customers in the way of reduced costs or below-inflation price increases.

In Table 2-3, we compare a projection of the total Coast Guard costs to manage the nonaviation consumables (supply center material sales plus management costs) with DLA's projected costs (charges to customers ordering material), using the FY94 baseline developed in our July report.⁵ Table 2-3 projects Coast Guard material sales to customers without the DLA customer price initiative improvement factors shown in Table 2-2.⁶

Table 2-3.
Cost Comparison Projection (Transferring Management to DLA)
(\$ millions)

Cost component	FY95	FY96	FY97	FY98	FY99	FY00	FY01
Supply center material sales	13.8	14.35	14.85	15.52	15.99	16.39	16.96
Supply center management costs	4.60	4.39	4.15	4.15	4.126	4.126	3.85
Total CG costs		18.74	19.01	19.68	20.11	20.51	20.82
	18.40						
DLA customer costs	17.88	17.88	18.06	18.42	18.60	18.79	18.98
CG/DLA difference			0.95	1.26	1.51	1.72	1.84

Note: Some numbers may not add exactly due to rounding.

On the basis of the comparison in Table 2-3, substantial (and increasing) future cost reductions (savings) can be realized by transferring management responsibility for nonaviation consumables to DLA. If the initiative for transferring the consumables management were to occur at the beginning of FY97, the cumulative cost avoidance, i.e., the reduced cost to the operating units, would be approximately \$7.3 million from FY97 to FY01. Even a conservative (50 percent) estimate of DLA's ability to achieve its cost-reduction targets would produce a substantial savings for Coast Guard units buying the items from DLA. It is equally significant that the Coast Guard, along with all other DLA customers, will get those savings with no increase in personnel or other productivity enhancements.

Table 2-3 shows potential savings from transferring management to DLA; Table 2-4 shows potential savings from retaining a management capability.

⁵LMI Report CG403MR1, op. cit. During our review, Coast Guard officials questioned our use of certain obsolescence and inflation factors in computing supply center costs. They felt the supply centers' surcharge, fixed at 5 percent for most items, has the same dampening effect on sales price as DLA's cost savings projections for those factors. In response, we have eliminated the questionable factors from this comparison. The Coast Guard-projected management costs shown are based on the cost elements in CG403MR1 less those factors.

⁶Material sales are projected on the basis of FY94 sales plus the Coast Guard surcharge of 5 percent. Supply center management costs reflect estimated consumables management personnel reductions associated with the ELC activation. Customer costs reflect DLA's initiatives.

However, this alternative requires the Coast Guard to implement cost-saving initiatives in its consumable item management program. Table 2-4 compares the projection of Coast Guard material costs for continuing to manage nonaviation consumables with and without implementing a comprehensive consumables management improvement program. In that comparative analysis, we use the cost-improvement factors developed by DLA. As shown in Table 2-4, if the Coast Guard were to initiate a management improvement program corresponding to that of DLA, it could achieve cost benefits of approximately \$8.1 million in the FY97-to-FY01 period. Savings would accrue in reduced funding for material purchases in operating unit budgets. However, implementing the cost-saving initiatives will require policy changes and additions and expansions to the ELC processes and will entail a concerted management commitment and, over time, a realignment of resources to attain those savings. Because DLA can spread the up-front costs of implementing management improvements across a much broader base of items, the cumulative cost of implementing these initiatives is nearly transparent to DLA's customers. While making the investment in a program containing the DLA initiatives for a relatively small number of items may not seem prudent, the initiatives are an integral part of the comprehensive strategy and critical to its success

Table 2-4.
Cost Comparison (Adopting DLA Initiatives)
(\$ millions)

Cost component	FY95	FY96	FY97	FY98	FY99	FY00	FY01
Supply center material sales without initiatives	13.80	14.35	14.85	15.52	15.99	16.39	16.96
Supply center material sales with initiatives	13.80	13.80	13.94	14.22	14.36	14.50	14.65
Supply center management costs	4.60	4.39	4.15	4.15	4.126	4.126	3.85
Total CG costs without initiatives	18.40	18.74	19.01	19.68	20.11	20.51	20.82
Total CG costs with initiatives	18.40	18.19	18.09	18.37	18.48	18.63	18.5
Potential savings			0.92	1.31	1.63	1.88	2.32

Note: Some numbers may not add exactly due to rounding.

We believe that if the Coast Guard were to implement an effective comprehensive consumable item management program as described in this report, it could realize savings comparable to those projected by DLA. If such a program is not initiated, we believe that the transfer of non-engineering-related consumables is a prudent choice to gain the savings DLA forecasts. Of significance to program analysts and budget managers is the fact that either choice produces savings in the units' future budget requirements.

COVERING INCREASES IN OPERATING UNIT COSTS

Currently, item management costs accrue to the appropriated operating budgets of the supply centers. If any or all of the consumables were transferred to DLA, the costs of managing those items, currently borne by the supply centers, would migrate to the Coast Guard operating units in the form of an increase in the cost-recovery factor (surcharge) charged by DLA to all its customers to cover DLA's total operating expenses. On the basis of FY94 surcharges, the increase would amount to an additional 30 percent above the cost of the same items obtained from the supply centers.⁷ In FY94 costs, that overall increase would have added about \$4.08 million to the units' overall operating expense budget requirements.

During our research, we found that the general feeling is that the supply centers would be expected to take an operating budget decrease to provide the additional funds to the units to cover the anticipated increase. The prevailing rule of thumb was represented as, "If you transfer the work, you transfer the resources." The second aspect of the rule of thumb is the notion that the resources would likely be taken "up front," i.e., before the actual transfers occur.

We believe that attitude, if applied rigidly to the consumable item transfer program, fosters a desire to maintain the status quo and actually undermines the potential for achieving the benefits of an improved item management strategy. We realize that the issue of an increase in the units' costs has to be addressed and rationalized to make the program acceptable. Because the potential benefits accrue to the whole Coast Guard, we also believe the cost benefits of the proposed transfer of items to DLA should be examined from a total Coast Guard perspective, and the following different options for dealing with the increase in operating units costs should be considered:

- ◆ *Reduce supply center operating funds.* The most direct approach to resolving the problem would be to identify the current supply centers' costs for managing consumables and transfer that funding to the operating units. As we have already determined, current direct consumables management costs (the two largest being personnel and storage costs) at supply centers are nearly equal to the projected increase in DLA surcharges if all items were to be transferred. However, this option has a number of distinct disadvantages:
 - ▶ The supply centers have already programmed significant personnel reductions as part of the establishment of the ELC, and the programmed personnel reductions are incorporated into the cost projections in Table 2-4. The supply centers will have difficulty concurrently supporting the transition to the ELC structure and effectively performing the ELC mission if substantial additional reductions are imposed. Because the

⁷The FY94 annual sales of the Coast Guard-unique consumables to operating units was \$13.80 million. Adding DLA's surcharge to that cost would increase the cost to the units to about \$17.88 million, an increase of 29.5 percent.

ELC's internal organization for management differs considerably from that of the current supply centers, isolating additional personnel and operating cost reductions to consumables management may be difficult and could result in eliminating resources crucial to the ELC's mission requirements.

- ▶ Identifying and segregating physical storage costs of the consumable items would be difficult. Since consumables occupy a relatively small percentage of warehouse space, actual savings in storage costs are not easily achieved since no warehouses would be closed or taken out of service, as part of a consumables transfer. In constructing the supply centers management costs for our earlier report,⁸ we found that the SCB-leased warehouse is both the most expensive per square foot and the most efficiently designed. Increasing productivity is a way to increase benefits from the design efficiencies. Recent actions such as relocating higher demand items from the SCCB warehouse and centralizing the distribution of Coast Guard Standard Work Station II components are the increasing return on investment. Additionally, the availability of an efficient warehouse makes material-consolidation and distribution projects a viable business practice, and presents a logical way to implement inventory reductions.
- ▶ The transfer of consumables to DLA is unlikely to occur at a single point in time. Thus, a transfer of funds between the supply centers operating accounts and the units operating accounts would require phasing, potentially over several budget years. Accurately calculating the actual material requirements of individual units in advance is extremely difficult. As a result, pinpointing a funding increase in advance of the need becomes nearly impossible in the absence of an accounting system that can record supply costs by type of item and source of supply. Even after-the-fact fund allocation to cover increased costs of item management transfers requires such a capability in the unit-level finance system if accuracy is an objective. The current unit-level finance system uses a four-digit element of expense (object class) code to identify the type of supplies but not the source of supply and would have to be changed to isolate the actual increases in a unit's costs.
- ◆ *Use available supply fund resources to offset operating unit cost increases.* As part of its operation, the Coast Guard supply fund maintains an account of operating cash to finance payments for future delivery of material, including "pipeline" deficits. If the Coast Guard transfers consumable items to DLA, some portions of the supply fund operating cash may be available to offset increased operating unit costs. This option requires the Coast Guard to evaluate supply fund policy underlying the size and purpose of the cash account:
 - ▶ The cash balance the supply fund is required to have to fund financial obligations is usually based on a standard factor, i.e., a fixed number of

⁸LMI Report CG403MR1, op. cit.

days of cash disbursements. The supply fund cash balance only has to be sufficient to fund minimal material obligations (projected deliveries). The Coast Guard should analyze the cash account balance to determine whether the level of funds being held exceeds the minimum quantities required to finance material deliveries. If the Coast Guard is currently maintaining cash balances to fund material obligations in excess of the standard number of days of cash disbursements, the cash management policy should be revised to reduce overall cash requirements, and the account balance should be adjusted to the lower level.

- ▶ If the Coast Guard elects to transfer items to DLA, the supply fund cash requirement decreases as the material is transferred. This reduced requirement occurs because the cash requirement is based on the relationship of material sales income to disbursements at the time of material deliveries. As both sales and disbursements decrease, the quantitative value of the cash balance requirement decreases proportionally, and those dollars become available to offset unit cost increases.
- ◆ *Use the normal Coast Guard budget process to adjust cost increases and decreases.* As the ELC stabilizes and items are transferred to DLA — from current inventory and new item stockage decisions — as part of the usual business processes, normal budget development and reviews can be used to identify any reductions in supply center operating costs related to those transfers. At the same time, increases could be made to unit operating budgets to accommodate the normal increases from inflation and unit purchases of consumables from DLA. That option may require more precise budget guidance in the short term and possibly central management of a “reserve” for specific units experiencing significant increases that can be directly attributed to transferred items. The normal budget process eliminates the need for funding “transfers” between accounts and reflects the overall zero-sum gain or loss to the total Coast Guard budget. Additionally, because the consumable item management initiatives — described in the preceding section and shown in Table 2-3 — apply to all DLA-managed items, they have the effect of reducing a unit’s total budget requirements for consumable items or, if the unit’s budget is not reduced, of providing a built-in reserve of the dollars needed to cover the added surcharges.
- ◆ *Obtain funding credits from DLA for sales of material.* Current DLA consumable item procedures require that on-hand inventory be transferred from the losing inventory manager to the gaining inventory manager without reimbursement. The basic logic for that procedure lies in the fact that adjustments between DoD Military Services and DLA can be made within boundaries set in appropriations and DoD can adjust Service budgets to accommodate the effects of the consumable item program on their operating

expense ceilings. The Coast Guard must ask DLA for an exception to that procedure under which it would receive some form of reimbursement for such transfers:

- ▶ Since up to \$33 million worth of Coast Guard consumable on-hand inventory would be subject to transfer to DLA without reimbursement, DLA would receive a funding “windfall” as it sold transferred inventory to Coast Guard operating units; i.e., DLA would accrue cash from sales of on-hand inventory but would fund replacement of the issued material with obligation authority. Accrued cash from sales would not be disbursed until the end of the “financial lead-time” as the replacement material is delivered. Said another way, the replacement pipeline is financed through obligation authority, not supply fund cash.
- ▶ Since the Coast Guard has to fund deliveries of material contracted prior to the effective transfer date and may also have an unbudgeted increase in customer funding to pay for material being ordered from DLA, the Coast Guard could face a shortfall of appropriated funds until annual operating expense budget adjustments “catch up” to the impact of the transfer actions. DoD has precedents for permitting DLA to grant funding credits to losing inventory management activities and operating customers to offset funding shortfalls.

We believe that if the Coast Guard decides to transfer to DLA all or a significant portion of the nonaviation consumables, each of the alternatives outlined above should be examined as part of the collective solution for accommodating potential increases in operating unit costs, however, allowing the normal budget process to adjust for cost increases is the most manageable solution.

CONSISTENCY WITH OTHER COAST GUARD INITIATIVES

Any decision to transfer items to DLA must be consistent with, and complementary to, other Coast Guard initiatives. The broadest initiatives are those laid out in vision documents such as the *Engineering Logistics Concept of Operations (ECONOP)* and the *Finance and Procurement Concept of Operations (F&P CONOP)*. More specific initiatives are reflected in plans to

- ◆ reduce cutter manning levels,
- ◆ bring new cutters into the fleet crewed at a preventive-maintenance-only support philosophy,
- ◆ introduce new naval and electronic systems and equipment in both afloat and ashore units,

- ◆ focus the ELC on naval and electronics engineering logistics processes, and
- ◆ expand the oversight and control of inventory outside the ELC's local warehouses.

Transferring consumable items to DLA management as a separate program or as part of the comprehensive strategy must support both the broad and the specific initiatives. Of all current initiatives, reducing cutter manning levels has the potential for creating the most immediate and taxing of the inventory management challenges. Because of that initiative and a limited on-board maintenance capability, the supply program manager is likely to consider central storage and management of portions of the substantial inventory of material that is now stored aboard cutters and other boats.

Consolidation of cutter inventories will require significant on-shore storage space and more of the ELC inventory managers' attention. Furthermore, to gain any savings from the initiative, the storage space must be sufficiently modern and automated to permit continued and improved support to the cutter fleet. As the initially offloaded inventory is drawn down, the savings to the Coast Guard come from having a lower inventory replacement cost and a more effective inventory control, distribution, and transportation process. To the extent consumable items transferred to DLA free warehouse space at the modern storage facility in Columbia, Md., its utilization as a central storage location offers the potential for savings. Additionally, using the labor-related efficiencies of that warehouse for the cutter inventory should lower the requirement for moving storekeepers from the cutters to other shoreside storage sites and create cost-avoidance opportunities. We recognize that more detailed analysis is needed to consider all the cost aspects of centralizing the cutters' inventory and to identify offsetting increases to the expected savings. We believe the consumable item management strategy is part of the solution to the reduced manning and on-board maintenance capability initiatives, and the effect of those initiatives should be considered in any planning for implementing elements of the strategy.

As a critical element of the overall management strategy, the program to transfer consumable items to DLA supports the other Coast Guard initiatives equally through improvements stemming from the stockage decisions, inventory oversight and reporting, implementation of DLA-type management initiatives, and application of systems and equipment essentiality coding. Those improvements are the essence of the comprehensive consumable item strategy, and we discuss each in detail in the following chapters.

We believe the "comprehensive" aspect of the consumable item strategy provides for the current Coast Guard initiatives and, at the same time, serves as the basis for other cost saving and response-related improvements in the future.

CONCLUSION

While the consumable item transfer program can be viewed as having a goal of saving money, its main benefit to the Coast Guard is that it allows resources to be redirected to more cost-beneficial activities. The threat of the ELC losing additional resources may lead to a suboptimal decision. Just as the ELC furthered the Coast Guard's "streamlining" (resource reduction) goals, establishment of better consumable item management can further the ELC goal of organizing and managing processes that focus on the units' most important support requirements.

DLA's cost savings initiatives offer the Coast Guard units real savings. By incorporating similar initiatives in managing consumable items retained under the ELC's control, the Coast Guard can match the cost-reductions forecast in DLA's *Corporate Plan*. Those savings and the savings realized from ELC-related personnel reductions should be projected as overall operating expense savings in the normal budget process as the plan for implementing the initiatives evolves. An overall budgetary assessment of the effect of DLA's projected reductions in its customer cost-recovery rates (surcharges) against the more than 100,000 items currently supported by DLA for the Coast Guard would indicate that total reduced costs for Coast Guard units will more than offset the increases resulting from transferring any or all of the 11,000 Coast Guard-managed consumables to DLA.

Several alternatives are available to cover extra costs to the units. The least desirable alternative appears to be a direct reduction in the supply centers' budgets because of its dampening effect on implementing an item transfer program and other DLA-type initiatives that produce longer term cost savings. Two alternatives — using supply fund cash or gaining credits from DLA — are linked to the item transfer decisions and schedule. Both require policy changes and negotiation time. Either of those alternatives would delay the initiation of the transfer program if covering the units cost increase is a precondition to implementation. Because cost changes — increases and decreases — are normal operational support events, they produce budget requirement adjustments. To overcome the program managers' fears of a significant effect on the budget, specific budget guidance should be issued and a special procedure set up to accommodate any significant shortfall a unit identifies as coming from the extra surcharge cost. Considering the number of units that use the items, the relatively low frequency of orders, and the period of time over which the transfers will occur, the likelihood of successfully pinpointing and preempting the impact on a particular cutter, group of shoreside units, or operating program is low.

The comprehensive consumable item management strategy — with the item transfer program as one of its key elements — supports the Coast Guard's near-term and long-term initiatives. It can be part of the baseline capability for other improvements in procedures, processes, and decisions that the Coast Guard intended in creating the ELC and its organizational focus on naval and electronic-engineering-related logistics support.

RECOMMENDATIONS

Either a transfer of all consumable items to DLA or their retention under Coast Guard management presents an opportunity for savings. However, to realize those savings in either case, the Coast Guard must implement DLA-type cost-savings initiatives. We recommend the Coast Guard proceed to implement the cost-saving initiatives as a near-term objective and as part of a longer term management strategy. We also recommend that to gain the savings at the unit level from DLA's initiatives, the Coast Guard implement the transfer program with DLA and have DLA manage its non-engineering-related consumable items.

While the Coast Guard might realize some cash or credits from the transfer of consumable items to DLA, the most straight-forward and manageable approach to funding any unit-level cost increases is to use the normal budget process. We recommend the Coast Guard take that approach to meeting budget requirements that may develop from such transfers.

The consumable item transfer program and the other elements of the comprehensive consumable item management strategy support the Coast Guard's short-term and long-term initiatives. We recommend the full complement of elements described in the remainder of this report and in the companion report be adopted in the supply centers' business processes and that those elements be imbedded in the ELC's routine business practices.

As the organization and functions of the ELC materialize, the Coast Guard should continue to examine its workload to determine whether its total range of material management responsibilities truly represent the best use of scarce resources. In the past, workload has sometimes been accepted to ensure utilization and protection of existing personnel and facilities. If the ELC focus is directed primarily toward supporting essential platforms and equipments, the Coast Guard should reevaluate the merits of the consumable item management workload arising from central support of blank forms, technical publications, and general-purpose items. That reevaluation does not mean that such workloads are unimportant or should not be performed. It does mean that use of organic ELC resources may not be the optimal approach to meeting these responsibilities. The dilemma faced by Coast Guard managers is their inherent desire to maintain a significant, flexible material support capability in the face of continuous reductions in personnel and other resources. That challenge mandates a thorough and objective evaluation of both current and future workloads to select the most productive applications of available resources. The comprehensive consumable item strategy provides the means for performing those evaluations.

CHAPTER 3

The Stockage Decision Process

The stockage decision process offers a logical sequence for dealing with essential questions about the consumable items needed to support a system or equipment during its serviceable life. The questions — why, what, and where to stock and who manages the stock — precipitate answers that lead to establishing the inventory and to the methods for getting items from the inventory. Management oversight of the stockage decision process outcome includes a formal reporting structure and the performance measures that indicate the effectiveness of the policy and progress toward meeting its goals and objectives. In this chapter, we provide an overview of the stockage decision process to highlight the essential questions and to lay out a management oversight structure. In succeeding chapters, we discuss specific aspects of the decision process in greater detail.

STOCKAGE QUESTIONS

Why to Stock

Quantities of on-hand and on-order stocks are maintained to ensure uninterrupted availability of material for issuance to customers. Additional stocks (safety levels) are also maintained to compensate for fluctuations in procurement lead-times and changing demands, and to ensure the capability to supply unforecasted critical needs (insurance items). The quantities, i.e., the stock levels, are based on projected demands from the time material is issued until the point at which replacement stocks arrive from material suppliers and the cycle begins again. Stockage models are used to compute purchase quantities, to terminate unneeded purchases, to identify quantities of material to retain in stock, and to calculate quantities of stocks for disposal.

What to Stock

In the past, deciding what items to stock was relatively simple. If an item was expected to experience future demands, however sporadic, it was stocked. If an item was not expected to have demands, it might still be stocked depending on the criticality of its possible future need. Clearly, the decision was biased toward stockage. More recent research reports propose the use of algorithms to evaluate the full range of alternatives for stocking or not stocking an item and subsequently to quantify stock levels. To some degree, such algorithms may be included in future Fleet Logistics System (FLS) software. Pending such longer term opportunities, management decisions, independent of computer system

changes, can move the Coast Guard closer to more-effective approaches to material stockage.

Where to Stock

For most of the modern era of inventory management (i.e., since World War II), once an item was selected for stockage, it was purchased before the anticipated first demand date and placed in a central warehouse awaiting requisitions from users. Variations of this approach were developed to position material at two sites: central warehouses (wholesale) and near the users (retail). The fundamental principle of materiel management was, "If an item is expected to have future requirements, it will be stocked in the organization's supply system." The key measurement of effectiveness was "supply availability;" that is, the percentage of time that a requisitioned item is available for immediate issuance "off the shelf."

How to Manage the Stock

Following World War II, literally dozens of DoD activities throughout the world were responsible for managing various material commodities. Although many activities were closed after the war and throughout the 1950s, each Service retained a core of 5 to 10 major inventory control points (ICPs) and numerous physical distribution depots. Duplication of responsibilities across Service lines were largely ignored. For example, the Army might purchase and store the same rifle or combat boot as the Marine Corps, often from the same manufacturer. Economies of scale in purchasing were not exploited, a situation that existed throughout the federal government.

By the mid-1950s, government agencies recognized the significant duplication of effort, particularly in the management of material inventories and related services. The government initiated programs to develop standard item catalogs and stock numbering across all federal departments. In 1961, DoD established the Defense Supply Agency (DSA) to manage items of supply used by more than one Service and to oversee the Federal Supply Catalog. Later, DSA's name was changed to the Defense Logistics Agency to recognize expanded responsibilities for the food, medical supplies, clothing, fuel commodities, material disposal, contract management, warehouses, and ultimately, materiel management of nearly all consumable items used by DoD. DLA also provides significant support to other federal agencies such as the Department of Veterans Affairs and the Department of Transportation (Federal Aviation Administration and Coast Guard).

By the late 1960s, the government widely accepted that it could achieve major savings by eliminating duplicate items and consolidating its purchases of larger volumes of material. In 1971, a DoD task force paper concluded that, "Operations can be performed more efficiently and responsively through increased uniformity, standardization, and/or integration on an inter-functional or inter-

Component basis."¹ The concept of "one item, one manager" was developed; it requires a single material manager for each item of supply to develop requirements; make purchases; and deal with depot maintenance, storage, distribution, and disposal. By 1980, with some minor exceptions, most items used by federal agencies were assigned to single managers responsible for government-wide procurement and material management. The Coast Guard was a principal participant in that initiative. As a result, today, more than 100,000 consumable items are used jointly by the Coast Guard and one or more of the Military Services and managed by DLA. Currently, about 11,000 non-aviation consumables, unique to the Coast Guard, are managed and stocked by Supply Center Baltimore (SCB) and Supply Center Curtis Bay (SCCB).

Management of the Coast Guard's consumable item inventory can be significantly improved through the implementation of more effective inventory management models. The 1993 LMI report on inventory models described a series of proposed computational improvements for the selection of items for stockage, demand forecasting, and stock retention.² Certain of those proposals have been identified for implementation as part of the Supply Center Computer Replacement (SCCR) initiative. Others are planned for inclusion in the FLS modernization program. Implementation of such programs would be a significant step toward improving the Coast Guard's inventory management effectiveness and should be aggressively pursued.

STOCKAGE CONCEPTS

Traditional Procedure

Traditionally, the decision to stock material inventories of consumable parts used for systems or equipment (hardware) has been based on the expectation that an item would fail to function properly or would cause an end item of equipment or perhaps an assembly within the equipment to malfunction. In the past, initial stockage decisions were based on the experience of technically knowledgeable personnel estimating that a given part would fail within a given period. More recently, computers enable technicians to record detailed histories of item failure patterns for different categories of hardware items, thus creating a historical baseline for predicting future failures. In most instances, once an item has been in use for a specified period of time, calculations of future requirements are made on the basis of the history of demands (requisitions) received from using customers rather than on the basis of the technical estimates of failure. Numerous mathematical models are used in various government activities (and in private-sector concerns) to attempt to project probabilities of future use based on

¹Jeffrey A. Jones, Materiel and Distribution, Assistant Deputy Under Secretary of Defense (Logistics), paper prepared for publication "Changing the DoD Logistics Infrastructure," undated.

²LMI Report CG201RD6, "Improved Inventory Models for the United States Coast Guard Requirements Determination Process," George L. Slyman and Dennis L. Zimmerman, October 1993.

past demands. An extensive review of such models is contained in our report on improved inventory models. The report states that one of the first decisions inventory managers must make in determining the best way to provide supply support is whether or not to stock an item. Coast Guard policies and procedures include a decision process that examines cost, customer support, and item characteristic factors in deciding whether items are to be centrally stocked. Generally, items that have experienced at least one demand per year for the past two years are coded for stockage. Stockage is also permitted for "insurance" items on the basis of long lead-times, essentiality and criticality, or other factors.³ At the Coast Guard supply centers, those decisions, over time, have resulted in the on-hand stockage of more than \$32 million of nonaviation consumable item inventories.

Current Procedure

Developments in inventory management theory and practice in the private sector over the past decade have raised significant questions as to whether central material stockage is the most desirable (or cost-effective) approach to maintaining customer satisfaction and improving the performance of the inventory management process. Conventional wisdom prescribes that a high off-the-shelf availability of material across a broad range of items is the most desirable standard of good performance. Many private-sector and public-sector inventory managers acknowledge that classic supply availability metric to have two notable flaws. First, customer demands occur so randomly that to maintain high supply availability across the total range of items requires large quantities of material. The second flaw, which derives from the first, is that obtaining increasingly higher percentages of supply availability requires disproportionately greater investments in inventory. Perhaps a third axiom recently derived from these two points is that alternatives to central stockage may actually provide greater responsiveness and increased customer satisfaction at a lower cost.

Current inventory theory now contends that having material delivered to the customer's desired point of use as close as possible to the time of need results in greater customer satisfaction than does the traditional supply-availability-based stockage. Thus, the response time of the supply system replaces off-the-shelf supply availability as the key measure of performance. Unlike supply availability, response time objectives can be attained through approaches other than centrally stocking large quantities of material. Reducing response time — that is, reducing both the time it takes the supply system to obtain material from the supplier and the time it takes to deliver it to the customer — becomes a key measure of performance. Rapid transportation, on-demand repair or manufacture, and extensive visibility of redistributable assets throughout the system may become more important factors than increasing on-hand stocks.

These recent developments in inventory theory require a new perspective for inventory managers. As an example, DLA's focus has changed from the

³U.S. Coast Guard, Commandant Instruction M4121.2, (Draft) *Uniform Supply Operations for Coast Guard Inventory Control Points*, undated p. 2-9.

traditional "stock, store, and issue" functions to emphasis on customers' needs and improving the process of delivering logistics support.⁴ That change means adopting "world-class" commercial and government practices, promoting technological advances, determining the true cost of doing business, and using performance measures that reflect the logistics system's responsiveness to customers' needs. By examining current inventory management practices in this way, it becomes evident that continued reliance on central stocks of inventories as the principal approach to supply support may be both outmoded and excessively costly. Such is particularly the case for the lower cost, consumable items that tend to be more readily available from commercial sources and are often amenable to more dynamic contracting techniques.

However, we cannot make the transition to these new methods of managing inventories quickly, nor should we pursue a "one-size-fits-all" approach. The alternative to inventory investment is not zero investment. Rather, we must devise a more balanced approach based on specific performance and cost factors to leverage all available resources. As always, we must also formulate a comprehensive plan of action — i.e., a strategy for managing consumable items — that includes a formal approach to overseeing the results of the stockage decision.

Today, stockage decisions are more complex than ever before. Those decisions no longer merely include a one-time choice to stock or not to stock; they must comprise a significant range of item management choices designed to minimize system response times at the least total cost. Nor should stockage decisions be made solely on an item-by-item basis. By examining significant groupings of items, managers are assisted in determining stockage status for comparable items. Characteristics such as essentiality, commercial availability, probability of future demand, end-item applicability, unit cost ranges, and commodity groupings are useful in determining the composition of such groupings and the supply support alternatives or stockage categories. The inventory stratification process results in an organized presentation of data for management review, evaluation, and decision support.

MANAGEMENT OVERSIGHT

Material inventories are managed better when the manager has recurring access to a display of approved requirements and the assets applicable to those requirements. Current practices tend to emphasize early and continuous analysis of critical factors to establish approved material requirements and to express requirements and assets as dollar values rather than as item quantities. To deal with the various outcomes of the stockage decision process, the total inventory is subdivided or "stratified" into meaningful categories, each of which has different characteristics and requires different management approaches. Generally, at the first level of stratification, items are aligned as repairable or consumable to distinguish between those items subject to repair and reuse (reparables) and those consumed in use or whose separate identification is lost when they are

⁴DLA's Corporate *Plan*, op. cit.

incorporated into a higher assembly during the repair process (consumables). Although the following discussion focuses on stratification of consumables, the underlying concepts are also applicable to reparable.

Stratifying the Inventory

To analyze total material inventories effectively with the intent of improving management and reducing costs, a structural information hierarchy must be created to stratify (group) both material requirements and inventory values in a manner useful to management. Those groupings can then be analyzed on the basis of group characteristics to establish performance goals and ultimately to examine the effects of management initiatives. The diagram in Figure 3-1 describes such a hierarchy.

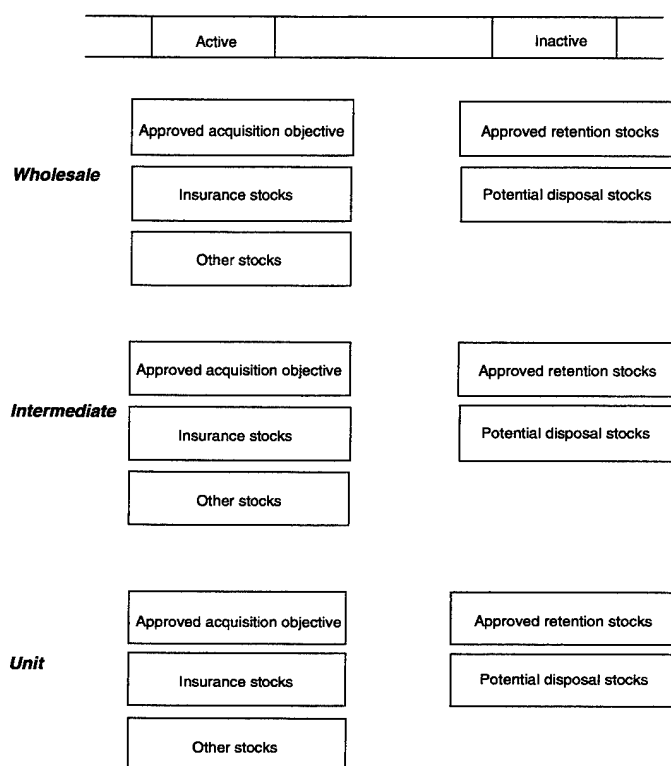


Figure 3-1.
Consumable Item Inventories

Definitions

The following terms are applicable to the stratification process:

- ◆ *Consumable item inventories.* Inventories of material that is normally consumed during use or whose separate identification is lost by its being incorporated into a higher assembly during the repair process. Consumable

inventories also includes reparable items normally repaired at maintenance activities below the depot level (field-level reparables).

- ◆ *Active inventory.* Material that is expected to be consumed within the budget year or that is still needed to satisfy normal operational requirements.
- ◆ *Inactive inventory.* Material on hand above the approved acquisition objective. Stocks may be retained because it is more economical to retain them than to dispose of them. Stocks may also be retained to support a future specific mission or contingency requirement. Inactive stocks also include material held temporarily awaiting disposal actions.
- ◆ *Approved acquisition objective.* Inventories of material authorized for initial stockage or for replenishment when it is issued to using activities. It generally includes material projected for issuance through the end of the budget year plus approved stock levels.
- ◆ *Insurance stocks.* Includes that portion of the approved acquisition objective inventory for which no future demand is projected but the essentiality of the item(s) requires material to be on hand to satisfy unprojected demands.
- ◆ *Other stocks.* That portion of the approved acquisition objective authorized for stockage to support special allowances or to satisfy other specifically documented requirements.
- ◆ *Approved retention stocks.* Inventories for which replenishment purchases or repair action is not approved, but current on-hand inventories will be retained in stock.
 - ▶ *Economic retention.* Material held in inventory based on a projection of future demand beyond the budget year.
 - ▶ *Contingency retention.* Material held in inventory, not qualifying for retention as economic retention, but held for specific mission or contingencies above approved acquisition objective requirements.
- ◆ *Potential disposal stocks.* Material that has been declared excess to known requirements by the owning activity but is awaiting reutilization screening, demilitarization, or some other administrative action before being transferred to disposal facilities.
- ◆ *Wholesale inventories.* Material under the direct control of Coast Guard supply centers. Generally, wholesale material is not yet designated for specific intermediate or retail requirements.
- ◆ *Intermediate inventories.* Material held in supply fund accounts designated to support specific maintenance or related activities. Material is positioned at locations near the point of use.

- ◆ *Unit inventories.* Material owned and stored by the supply elements of afloat or ashore operating units.

Using the matrix of inventory categories described above, the Coast Guard can implement a comprehensive inventory reporting process to support stockage policy and material positioning improvements more effectively. Such initiatives can target objectives to minimize overall stockage, assist in positioning material to maximize customer responsiveness, help optimize transportation resources, and more effectively use storage facilities. Further, by establishing a summary inventory reporting process, management acquires an information tool to track inventory trends over time, to quantify the effects of program and budget decisions, and to validate the effects of management initiatives. While stratification reports are valuable sources of information, they are not, by themselves, management reports. Requirements and inventory stratification data, to be useful to management, must be analyzed and the results selectively presented in suitable forms, i.e., graphs and tables. The analyses should identify and highlight areas of management interest and areas needing attention, such as asset or requirements imbalances, trends in requirements and assets, changes in lead-times, and progress toward overall management goals.⁵ We recommend that the Coast Guard institutionalize the use of such analysis tools and products as part of the consumable item management improvement program.

Inventory Reporting Mechanics

We suggest the Coast Guard initiate a comprehensive inventory reporting process using the following guidelines:

- ◆ Every Coast Guard activity, both ashore and afloat, that holds material inventories should be included in the report, either by direct reporting or by central extraction from the unit's automated system files. Ideally, reports should be automated, using verifiable supply or financial records at reporting activities. As an alternative, small or nonautomated activities should use basic PC spreadsheet programs for reporting. The Coast Guard should develop standard reporting formats.
- ◆ The reporting structure should be based on stockage categories, standard budget and funding codes, commodity groupings, or a combination of all three; in any case, it must be uniform throughout the Coast Guard. Repairable items and consumables can be reported together but not as consolidated totals. If Coast Guard implements an essential system or equipment management program, inventories also can break out essentiality groupings by item. Reports of approved acquisition objective and retention inventories should include corresponding stock-level requirements, e.g., safety level, lead-time, order quantity. A proposed model for an initial standard item inventory stratification reporting record is described in Appendix A. As a more comprehensive Coast Guard approach to the stratification process

⁵Under Secretary of Defense for Acquisition and Technology, DoD Manual 4140.1-M, *Secondary Item Stratification Manual*, June 1995, p.1-2.

evolves, the DoD *Secondary Item Stratification Manual* can be a useful reference guide and a beginning point model for implementing the more comprehensive procedures.

- ◆ Material pricing should follow standard Coast Guard policy.
- ◆ Reports should be provided and compiled at least annually, preferably as of the end of each fiscal year, if they are primarily used in budget planning. Reporting more frequently permits inventory analysis against current-year goals and supports budget redistribution decisions.

Effectively Using Management Information

Successfully changing business practices to achieve improved performance is always a difficult undertaking in any large organization. Both government and private-sector managers who have succeeded in this endeavor have consistently used new technology to obtain the necessary management information to support decisions and to track the results of their actions. Our research for the July 1995 report⁶ clearly showed that Coast Guard consumable item managers did not have the readily available information they needed to make critical decisions. Nor did we find that quantitative management information on the use of Coast Guard supply center resources was available in a timely and useful fashion. Obtaining basic information on supply center personnel and operating costs and summary information on material inventories and annual expenditures was a time-consuming, mostly manual effort. Furthermore, senior managers were not overly confident in the validity of the data. Without credible management information to support executive decision-making, the Coast Guard cannot readily improve its logistics management process. While current development efforts provide some improvement in information system support, the major changes are to be delivered in the FLS project. Current plans envision standard, automated, inventory reporting capabilities as part of the FLS implementation scheduled for completion in the year 2000.

Because of the time lag for FLS, we recommend establishing an interim reporting process based on the current "Mini-TAV" (total asset visibility) initiative,⁷ combined with reporting from financial sources or ad hoc reporting. With such an interim reporting process, the Coast Guard will be able to implement the inventory stratification process early. More important, a sizable part of the Coast Guard's inventory investment will be visible to upper management in a structure that will facilitate analysis and decision-making.

Today's desktop computer technology and communications capabilities using commercial telephone and data networks support the development of highly capable executive management information system (EMIS) and minimize the

⁶LMI Report CG403MR1, op. cit.

⁷A Coast Guard Logistics Management Division project that collects item inventory data from selected cutters' automated supply systems and displays those data in several formats for Headquarters program managers and supply center inventory managers.

costs of such systems. Both database and information-display software are readily available from commercial sources with little need for in-house programming support. When desired, however, desktop systems can easily be linked to main-frame operating systems. With available in-house functional personnel augmented initially by contractor support, the Coast Guard can emplace an effective management information capability in a relatively short period. Such development, however, requires full management attention and emphasis.

To meet the Coast Guard's near-term needs, an initial focus on development of an inventory reporting capability as described above appears both feasible and appropriate. A prototype inventory information system would provide a model for future development and, at the same time, demonstrate the usefulness of such an initiative.

Development of Technical Automated Data Processing Capabilities in Support of Management Information Requirements

The Coast Guard has embarked on a comprehensive modernization of its logistics ADP systems. In support of the supply centers, the ongoing SCCR initiative is modernizing the automated materiel management and related functions by upgrading the supply centers' primary software and hardware. SCCR does not, however, focus on substantial functional improvements to current logistics processes. The longer term FLS is the principal vehicle for functional process improvement of major supply center functions. Current plans call for FLS implementation in the year 2000 at a projected cost of about \$50 million to \$100 million.⁸ Both SCCR and FLS are critical elements of the Coast Guard's ability to meet the logistics support challenges into the 21st century.

While the FLS architecture includes both executive information and performance measurement modules, a full definition of these requirements has yet to be developed. The hardware architecture of both SCCR and FLS does not necessarily fully support a flexible, top-level management information system. The preprogrammed reporting approach characteristic of large-scale computers is most useful for repetitive, large-volume detail and transaction-oriented reports. We believe the information and performance report capability envisioned for FLS can and should be enhanced through use of commercially available desktop computer hardware and software as well as through connectivity with data repositories available from DoD.

We recommend the Coast Guard initiate a project to develop the desktop computer prototype of the EMIS. We believe that putting an EMIS in place early will aid in developing and refining a more comprehensive management oversight system for use with FLS and refining the data that will be available in a central file or various files.

⁸U.S. Coast Guard, Office of Acquisition, *Fleet Logistics Support Briefing*, 26 January 1995.

With a minimum investment in hardware, telecommunications capability, and off-the-shelf commercial data management and reports-generation software, the Coast Guard can begin developing a useable, management-level supply information capability. In some cases, ongoing initiatives such as the "Mini-TAV" project could be incorporated into the overall EMIS. However, the initial phase should result in a conceptual system description, including scope and implementation milestones.

Concurrent with the development of the in-house system, enhanced connectivity with DoD through the Defense Logistics Services Center, the Defense Automatic Addressing System Office, and DLA's weapon system management program could provide the core of a more comprehensive EMIS. We emphasize that the EMIS should not be viewed as an ADP project but rather as a tool to develop the functional requirements for improved visibility of management information. The EMIS should be developed and operated by functional managers. It should use the mainstream supply management systems as a source of data but should provide managers with the easily accessible, flexible capability to extract, manipulate, summarize, and analyze selected information in real time. With currently available, user-oriented software, desktop computers give managers a wealth of analysis capability unheard of only a few years ago. As additional requirements are identified, the EMIS expansion should be synchronized with the development of the FLS to ensure compatibility and to eliminate duplication of effort.

CHAPTER 4

Alternatives for Managing Coast Guard Consumable Items

Development of a standard inventory report will permit a significantly more structured analysis of Coast Guard inventories at all levels of the supply system. Part of that analysis may focus on the validity of the types and quantities of material retained in inventory. Additionally, viewing inventories in a structured fashion, highlighting active versus inactive stocks, demand-based versus insurance items, or supply center versus unit stocks, can assist managers in determining the soundness of investing in inventory as opposed to pursuing other ways to satisfy customer requirements.

Today, the Coast Guard obtains consumable material support from numerous sources. Substantial numbers of items are purchased locally by using activities; many other items are obtained from DLA or the General Services Administration as part of the Federal Supply System. A relatively small number of items are centrally managed by the Coast Guard supply centers. Centrally managed items are either stocked on the basis of past demands or "insurance" levels, or are not stocked and must be procured as demands occur. Each category of stockage requires different management approaches to achieve improved customer support at least cost.

If the Coast Guard decides to retain significant numbers of consumables, management officials must determine whether initiating significant improvements in managing those centrally stocked items is desirable or feasible. The more items the Coast Guard transfers to DLA, the less cost-effective a process upgrade will be if that upgrade is based on a cost per item under Coast Guard management. Conversely, process changes that improve response time or reduce inventory investment and holding costs can be cost-effective over time, even for a reduced number of items under Coast Guard management. DLA has already committed to a broad range of process improvements from which the Coast Guard will benefit with no additional investment. Concurrent with major initiatives to improve consumables, DLA has programmed substantially reduced costs for item acquisition and for the surcharge it needs to operate the supply system. DLA can do so because its costs can be spread over a broad customer base through minimal surcharge increases, which are offset as improvements are implemented, thus minimizing the cost impact on individual customers. To match the scope of the planned DLA improvements, the Coast Guard will have to commit more time to inventory management planning, analysis, and reporting and add or expand contracting procedures. Putting those capabilities in place also will require an investment of money and personnel.

In this chapter and in Chapters 5 and 6, we discuss many of the improvements already underway at DLA and, at the same time, explore possibilities for initiatives that can be applied at the Coast Guard supply centers for consumable items retained for central management and for those items entering the Coast Guard system in the future. We believe that to make an informed decision on the future approach for consumable items, Coast Guard managers should be aware of DLA's program for improving consumable item management and understand the effort needed for the Coast Guard to begin similar initiatives.

VARIABLE MANAGEMENT APPROACHES

By grouping or stratifying inventories into meaningful categories, the Coast Guard can improve the materiel management process and establish quantitative performance goals. This section introduces a number of approaches for improving management and reducing costs for the group of consumables centrally stocked by the supply centers. In a broader context, the decision process described below can also be used to assist management in evaluating other workloads under the new ELC organization.

To initiate the continuous reevaluation of the consumables inventory, the Coast Guard must adopt specific, understandable, and attainable inventory management objectives. Although those objectives may be articulated in different ways, they involve two basic tenets. First, on-hand inventories should be minimized, and second, central stockage by the supply centers should be the last (not the first) support alternative to be considered. By embracing these precepts, the Coast Guard can begin to implement a comprehensive consumables management improvement initiative using a decision matrix for demand-based and insurance-coded "active" consumables that supports the basic objectives. The filter criteria diagram shown in Figure 4-1 illustrates such a decision tool.

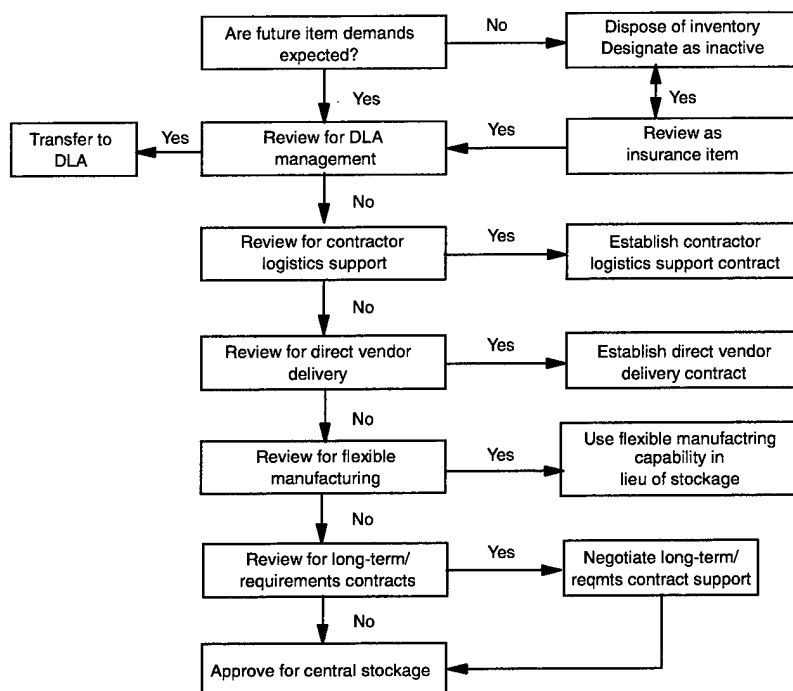


Figure 4-1.
Stockage Decision Filter

Figure 4-1 illustrates a review process that management should establish to guide stockage decisions for currently stocked items and items being introduced for stockage during the provisioning process. The information in Figure 4-1 is not all-inclusive; rather it is a model to be tailored to specific Coast Guard situations. By substituting other workload areas such as centralized stockage of ship-board inventories, management of technical publications and forms, or supply support for the Coast Guard standard workstation in place of consumable items in the above matrix, management can begin to explore alternatives other than using ELC resources to perform those missions. Undoubtedly, current policies may suggest a similar review process as part of normal inventory manager procedures. However, our experience indicates that most ICPs do not have aggressive programs in place to enforce a rigorous and continuous management review. Further, for such reviews to be effective, management must signal its intent to achieve quantifiable results from the review process. Such intent can be indicated most pointedly through the establishment of target goals for each element of the review process.

We recommend that the Coast Guard adopt this model as part of the mechanism for instituting a comprehensive consumable item management improvement initiative and that it be applied to items currently stocked. The first priority should be to identify non-engineering-related consumable items for transfer to DLA management. We also recommend that the supply program manager prescribe regular stockage reviews on all items and that quantitative goals be developed and linked to those reviews.

While these types of objectives tend to be resisted by item managers, they have been found to be an effective tool to encourage systematic management action. Documenting the results of such reviews relative to attainment of established goals and insisting on periodic reports of progress are particularly important.

MANAGING ACTIVE INVENTORY

Demand-Based Stockage

Generally, much of the approved acquisition objective portion of the inventory stratified at the several echelons of the supply system is stocked on the basis of past demand history. A number of options are available for improving the management of demand-based items. Many computational models are available to improve the forecasting of demands and the calculation of stock levels.¹ Because implementing these models usually requires significant changes to ADP systems, these improvements are often a longer term solution. Nevertheless, they should be pursued.

In the shorter term, a number of macro-level analytic approaches can be beneficial to a better understanding of the inventory and, hence, a better ability to manage it. One basic approach is to compare the size of the material inventory to the overall platforms and equipment force structure. Generally, over time, the size of the inventory should parallel the number of platforms and equipment in use, particularly during periods in which new equipment is being introduced into the inventory or other end items are being phased out. Another way to review this relationship is to develop a force structure factor based on operating tempo (e.g., ships steaming hours or equipment operating cycles) and track it over time as a management indicator to compare against inventory growth or reduction trends. The numbers of unit-level maintenance personnel can be a useful "check" factor to help validate the size and growth trends of the inventory.

Private-sector companies concerned with managing inventories traditionally use a sales-to-inventory ratio as a measure of performance effectiveness. While that factor is not fully applicable to government activities such as the Coast Guard, which must maintain certain inventories for insurance, safety, and other purposes regardless of the potential for sales, the sales-to-inventory ratio is a useful analysis factor particularly for demand-based items. A review is clearly appropriate if items categorized as demand-based are not experiencing a significant turnover rate.

Movement of inventory between the several categories is another significant indicator of the overall inventory status. During periods in which new equipment is being introduced, the size of the approved acquisition objective may increase relative to the total inventory. Conversely, a major phaseout of end items

¹ LMI Report CG201RD6, op. cit.

may affect the size of retention stocks or potential disposal material. The ratio of retention stocks to disposal inventories may also be significant if managers are holding more inventory for longer periods even if the numbers of end items are significantly decreasing. The ratio of supply center stocks by essentiality or end-item codes, for example, to unit-level inventories in the same categories is another useful management indicator. Significant changes in that ratio indicate to management that changes are occurring and that those changes could affect both customer satisfaction and overall inventory investment. The supply-center-to-unit ratio, when examined for the same type of commodity, also tells managers something about the positioning of material within the total system. Perhaps the most basic inventory indicator is simply the overall size of the inventory over time. Once several years of data history are established, the supply program manager should track inventory growth or reduction as a key performance measure since inventory investment, along with personnel cost, is one of the major consumers of Coast Guard resources.

Demand-based inventory generally offers a greater number of alternative methods of support than central stockage. However, to use those alternative methods effectively, inventory managers must make major changes in their business philosophy. That transformation requires a change from measuring success by numbers of requisitions filled to measuring it by the ability to provide the most efficient and timely support regardless of supply source. The transformation also may require changing sources of supply to other government activities or to commercial providers. Success must be measured, not in terms of stock availability at central warehouses but rather on response times, end-item operational rates, customer prices, and overall customer satisfaction. Segments of the inventory should not be reserved to Coast Guard sources merely because of traditional commodity ownership or prior support difficulties. Conversely, some items may continue to require close Coast Guard control, including central stockage. Every segment of the inventory should be continually reevaluated on the basis of the new measures of success.

Non-Demand-Based Stockage

While stockage based on historical demand is the prevalent reason for maintaining inventory, legitimate reasons exist for maintaining active non-demand-based stocks. Generally, those stocks are categorized into two groups — insurance and other stockage.

Insurance items are those for which no future demand is expected but whose criticality or essentiality or its application require guaranteed availability of replacement stocks. The other stockage category commonly includes material stocked as part of the end-item provisioning process based on estimates of future requirements, or material stocked to support specific maintenance programs or other special projects.

Management of insurance items can be improved by regular review of item requirements and stock levels. Coast Guard policy requires insurance levels to

be set on the basis of installed population and material lead-times. Frequently, however, insurance levels for some items are "automatically" set equal to on-hand stocks. Because those items have only infrequent, sporadic demands, there is little incentive to reduce inventories or to catalog the item as inactive. The insurance item review should encompass the following types of considerations:

- ◆ Are the items end applications or next-higher assembly still in the active inventory?
- ◆ Has the end-item density changed appreciably?
- ◆ Are demands occurring at greater rates?
- ◆ Are the overall numbers of insurance items increasing?
- ◆ Is the technical assessment of the items' essentiality up to date?
- ◆ Are insurance stocks physically positioned for the most-effective support?

Inventory managers must be able to separate insurance stocks and retention stocks. Insurance stocks should be maintained in minimum quantities, usually in central locations, for highly critical items. Normally, the economic considerations for stockage (cost to order, cost to hold, and cost to dispose) are not factors in insurance stockage. The criticality of the end item or higher assembly application is the primary element in maintaining insurance stocks; therefore, inventory managers should not stock large numbers of insurance items for any specific end item and, in fact, should have quantitative goals for reducing the number of insurance items and the total value of insurance inventories. Insurance stockage should not be based on the mere existence of an end item or merely to justify the retention of stocks. Management goals should emphasize periodic reviews of the numbers of insurance items and require annual redocumentation of the insurance item justification.

Active inventories not categorized as demand-based or insurance fall into the "other" category. Those items are usually justified on the basis of engineering estimates provided as part of the provisioning process, retail/unit allowances tailored to ashore or afloat requirements, stockage of repair parts used in the maintenance process, or support for special projects. Improving the management of the "other" category requires a proportionally greater application of personnel resources since item stockage is often based on subjective judgment or nonmathematical factors.

Because "other" stockage objectives may not always be validated by standard inventory models, management must place greater emphasis on periodic requirements reviews and tracking of trends both in the value of this inventory and the numbers of items involved. Like other stockage categories, it is important to set quantitative goals for numbers of item reviews and to track progress toward reducing both the number of items stocked and the overall item value. By isolating the subsets of the "other" category in management reports,

inventory managers can track the quantitative item and value measures even though the overall inventory may be increasing. Reducing the proportion of "other" stockage relative to the total inventory may be a valid "macro" objective. More specific actions regarding the introduction of new "provisioning" items are discussed in Chapter 6 as part of provisioning responsibilities and performance.

MANAGING INACTIVE INVENTORY

The Coast Guard inventory management process must distinguish between active and inactive inventory. Fundamentally, active items are subject to replacement upon issue and inactive items are not. Thus, by simply moving an item from the active to inactive group, the manager precludes future investment cost. That simple regrouping is particularly important in inventories that include large numbers of items with low or sporadic demand. The General Accounting Office (GAO) has consistently found instances in government inventories of significant purchases of excess material. On some occasions, material is declared excess even before its delivery from the supplier. In these days of reduced inventory management personnel and increasing dependence on computer-generated purchases, correct item categorization is a basic and easily applied management tool.

When inventory is stratified, material in the inactive category is usually divided into two basic groups: approved retention stocks and potential disposal stocks. The former are normally subdivided further into economic retention and contingency retention stocks. Economic retention criteria are applied to items expected to have future demands. Ideally, economic retention quantities are calculated using computational models that consider cost to hold, cost to dispose, and other economic factors.

Approved Retention Stocks

In our report on inventory models, we recommended using economic retention models at Coast Guard supply centers.² We believe implementing those models in the automated system modernization projects — SCCR and FLS — bases stock retention on actual inventory costs and analysis-based future need rather than on personal opinion or belief that inactive stocks represent "sunk costs" and therefore cost nothing to keep.

Management must emphasize the need for continuous review of economic retention stocks with a minimum annual review cycle. Even if economic retention models are not in place, more basic analysis can be performed. Retention quantities are often developed using years-of-supply factors, which are determined by dividing the value of the items of on-hand inventory by their projected annual demand. The Coast Guard has established a standard years-of-supply maximum of 5 to 7 years, giving item managers a simple comparison to help size

²LMI Report CG201RD6, op. cit.

acceptable economic and contingency retention quantities. More precise retention quantities should be developed by estimating the expected life span of the specific end items for which retention stocks are held. Current standards should be reviewed for updating and used only on an exception basis.

Stocks held for contingency purposes pose a more difficult management problem than those held for economic reasons based on expected future demands. Valid contingency stockage quantities are not readily justified on the basis of known demand factors.³ Quite often, contingency stock levels are set by item managers and usually reflect the quantity of stock on hand rather than an auditable, quantifiable estimate of future requirements.

We recommend the supply program manager establish a clear, restrictive definition for Coast Guard contingency stocks to preclude the category from becoming a hideaway for items that managers want to avoid making a disposition decision on. We also recommend that contingency stocks be reviewed at least annually to revalidate continued retention and that the results of those reviews be documented.

Contingency stock reviews should focus on ensuring that

- ◆ supported end items are still in the active inventory,
- ◆ retention quantities are reasonable,
- ◆ material being retained supports the latest contingency plans,
- ◆ material is in a serviceable condition, and
- ◆ the age of retained material is not beyond a useful life span.

Potential Disposal Stocks

Potential disposal stocks are those for which there is no known Coast Guard requirement. Reutilization screening procedures are established by applicable regulations. Managers must be particularly careful not to delay the process of removing unneeded material from the supply system. Historically, item managers and equipment specialists have been evaluated on their ability to provide material to meet requirements but were not penalized for holding too much stock. Thus, a built-in bias toward stock retention has been created. Often, that bias results in the retention of too much older, unneeded stock at the cost of tying up management attention and physical resources that could be better applied to newer material entering the inventory. By requiring periodic reviews, setting goals for timely item screening, and establishing tailored standards for retention quantities, the natural bias toward retention can be at least partially mitigated.

³In DoD, contingency stocks are often considered as war reserves and quantities computed using wartime consumption rates.

For many years, inactive inventory was considered one of the "costs of doing business." Current inventory management concepts challenge that viewpoint. The value of the inactive portion of material inventory is one gauge of the ability of the supply system to predict future demand effectively and thereby to help validate future purchases and inventory retention quantities. Unfortunately, Coast Guard material demand patterns are often unpredictable and erratic. If future demands were readily predictable, of course, managers would have little need to hold inactive inventory. However, they need to understand the basic contributing factors to inactive inventory in order to understand how to manage this segment.

A study of the causes of inactive inventory in DoD may help put some light on this issue.⁴ This study found a number of causative factors contributed to inactive inventories as shown in Table 4-1.

Table 4-1.
Sources of Inactive Inventory in DoD

Characteristic	Percentage of items in inactive category
Demand decline	12
Invalid requirements	10
System phaseout	14
Bought inapplicable	18
Data errors	10
Miscellaneous factors	26
Customer returns	
Quantity discounts	
Life-of type buys, etc.	

While the percentage shown in Table 4-1 are illustrative and may not be directly applicable to the Coast Guard, they describe the variety of causes of inactive inventory and suggest targets of opportunity for improvement. Managers must understand the causes of inactive inventory and focus in particular on those elements that may be improved through greater management attention.

One of the most effective approaches to reducing inactive inventory is to assure that unneeded procurement actions are terminated prior to material delivery. Traditionally, both inventory managers and procurement officers are reluctant to terminate contract deliveries even if the material is no longer required. Conventional wisdom asserts that termination costs usually exceed the value of the material being delivered. More modern theory, however, disputes that contention. Material stockage costs, which recur annually, are now considered the primary cost-reduction target. Inventory managers must concentrate on

⁴DoD Inventory Review Task Force, Office of the Under Secretary of Defense (Logistics), *Final Report to the Deputy Under Secretary of Defense (Logistics)*, April 1995, p. 4-1.

declining demand patterns and system phaseout schedules; must react quickly to force structure changes, equipment deactivation, modifications, unit realignments, and equipment redistribution. They must also receive such information in a timely manner. Periodic validation of data input to item records is also an important management tool. As indicated by the DoD information shown in Table 4-1, inaccurate or incomplete item data can result in substantial acquisition or retention of inactive inventory.

Modernization of end items and equipment may also create substantial increases in inactive inventory as material is returned from ashore and afloat units. Unauthorized material returns may pose a particularly burdensome workload on both item manager and storage resources. Item managers must also fully consider the validity of current economic and contingency requirements before authorizing any returns. For that reason, the Coast Guard policy governing returns of serviceable material from the units to supply centers should be particularly stringent.

The decision to establish the ELC's organization structure around equipment specialist and inventory manager teams should benefit information exchange and decision-making. This alignment particularly supports managing inactive inventory and performing reviews for retaining and disposing of stocks, and deciding the instructions to send to units reporting serviceable excess material.

CHAPTER 5

Tailoring Material Support

Material managers have traditionally focused on the product of their efforts, that is, acquiring material, processing receipts, storing material, and issuing that material. This orientation led to emphasis on policies, procedures, and uniform standards that measured success in terms of how well the organization performed its tasks. In this setting, managers naturally came to assume that the more goods that were held in the system and flowed through it, the more effective the overall supply operation. That assumption led to primary management emphasis being placed on large inventories, the most costly element of the material support process.

Reorienting management's attention to customer needs and the best way to satisfy those needs surfaces a new management approach and considerably increases the options for meeting objectives.¹ At the heart of the new approach are several basic attributes of the material support system that help categorize customer needs.² By recognizing and tailoring support processes to best respond to those attributes, consumable item management becomes more effective and costs are reduced. Basically, the material support system attributes are as follows:

- ◆ *System orders.* Material requirements for supporting equipment installations and initial operation.
- ◆ *Inventory replenishment.* Requirements to replace consumed material.
- ◆ *Rapid response.* Short cycle time to meet specific, often high-priority, needs.
- ◆ *Nuts and bolts.* Repair parts supporting the maintenance process.
- ◆ *Slow movers.* Infrequent and sporadic demand items.
- ◆ *Bulk material.* Large quantity and heavy weight/cube items.

Those attributes are, in effect, another way of segmenting customer requirements into various groups to provide the tailored support that is most responsive and cost-effective. Of course, one customer's requirement for an item may carry a different attribute than another customer's requirement for the same item. Also, the same item may have a different attribute each time it is required by the same customer. In essence, supply support can be situational, and its response can be dictated by the item or the customer. By recognizing that, in general, item requirements fall into some common groupings, managers can apply

¹J.B. Fuller, J. O'Connor, and R. Rawlinson, "Tailored Logistics: The Next Advantage," *Harvard Business Review*, May – June 1993, p. 95.

²Fuller, p. 90.

appropriate support resources for maximum customer satisfaction at least cost. Establishing the groupings and analyzing the requirements for material in each grouping leads to development of customized processes to match the needs of each item (customer) category. For example, *rapid response* items needed by a cutter preparing to get underway may require accelerated order processing, premium transportation, and special handling but seldom involve large quantities of an item. Conversely, *inventory replenishment* stocks for cutters returning from extended operations should not require special handling or premium transportation but may merit large-volume stockage, long-term contracts, and positioning of inventory near user sites.

The Coast Guard adopted the customer focus in establishing responsiveness as the primary measure of supply effectiveness³ and made it the first principle in the engineering logistics concept of operations.⁴ Focusing on the customer is an objective in the supply centers' business plans and perpetuates into the ELC's strategic plan. The challenge is to translate the idea of focusing on the customer into operating processes and business practices. To do so requires that old ways must be changed and new ways created to deal with various situations and customer needs. Creating, improving, or expanding business practices can result in substantial improvements in overall management of consumable items. The techniques may be old, but the idea of providing better support by tailoring material support to meet the unique needs of specific customers is part of the new "customer focus" theme.

Consumable item management can be improved in innumerable ways. In this chapter, we describe several that we believe are suitable for the Coast Guard, can be accomplished within its resources, and offer benefits at equal or lesser cost than the current process.

TAILORED SUPPORT OBJECTIVES

The basic principle associated with a tailored material support program is to address specific customer requirements by providing solutions to their problems and thereby improved service at lower cost.

Optimizing the supply centers' services begins with the establishment of the following key objectives:

- ◆ Adapt services to address customer characteristics
- ◆ Reengineer support programs to provide only those that meet customer needs
- ◆ Apply best business practices from the public and private sectors.

³U.S. Coast Guard, Commandant Instruction 4000.5, *Coast Guard Logistics Doctrine*, January 1991.

⁴U.S. Coast Guard, Commandant Instruction 4100.7, *Coast Guard Engineering Logistics Concept of Operations*, May 1994.

TAILORED SUPPORT GOALS

To achieve the objectives, the Coast Guard must imbed more precise goals in policies governing material support, programs responsible for material support, and systems executing material support. The goals are appropriate for each level of logistics support and require managers to

- ◆ focus policy, process, and systems changes on meeting customer needs;
- ◆ select sources of supply that provide best value to the customer;
- ◆ use national purchasing power whenever possible;
- ◆ implement new products or services to meet changing customer needs;
- ◆ ensure planned improvements are effectively executed;
- ◆ apply new technologies only to improve customer satisfaction;
- ◆ streamline processes;
- ◆ eliminate non-value-added activities; and
- ◆ define and track measurable results.

The objectives and goals for tailored logistics support provide a framework that Coast Guard managers can use to develop a comprehensive consumable item-management improvement program tailored to meeting customer needs.

The categorization described above can be used in developing the automated decision support systems depicted later in the technology portion of this report (page 5-13 and Appendix B). By looking at item characteristics and using modern, often automated, decision tools, the Coast Guard can apply its personnel and investment resources more efficiently.

DIRECT VENDOR DELIVERY

Inventory managers have long followed the common practice of requesting that suppliers send selective shipments of new material directly to the using customer. That approach has been most often used for items on backorder, or for one-time purchases, where central stockage is not anticipated. More recently, direct vendor delivery (DVD) has evolved as a technique for broader application to

reduce or even eliminate central stockage of items for which a direct delivery contacting agreement can be implemented with a reliable supplier. Initiating DVD on a larger scale requires several steps:

- ◆ *Selecting candidate items.* Most often, higher volume items are the primary DVD candidates although low-volume items in supply classes with substantial commercial usage should also be considered.
- ◆ *Determining customer characteristics.* For example, larger maintenance activities with greater volume of requirements and more stable workloads can be prime users of DVD support.
- ◆ *Identifying vendors.* Once potential DVD items are identified, local, regional and national vendor databases should be screened and matched. Vendors interested in establishing DVD relationships should be contacted for possible contract actions.

Despite a traditional cultural bias against DVD, government procurement agents are discovering a greater willingness on the part of suppliers to enter into DVD arrangements and often with terms more favorable than those for delivery to central warehouse sites. Heightened competition in commercial markets has increased supplier willingness to provide direct service in exchange for longer term customer relationships. Through greater use of DVD, orders placed by requisitioners can be directly forwarded to the supplier using indefinite delivery contracts whenever possible. Contract terms can require item demand and payment information be provided to the appropriate government activity.

During our research, we were told that the Coast Guard supply centers used direct-delivery contracts to meet critical material required dates and that orders of this type would continue to be placed as conditions dictated. However, we received no indication that the supply centers planned to implement DVD as a significant part of the material support process. We believe the Coast Guard should take advantage of the market climate to expand direct delivery for unit inventory replenishment orders whenever doing so decreases response time and reduces supply center inventory investment.

To begin a comprehensive DVD program, the Coast Guard may wish to initiate a test program involving selected groups of higher volume, multiple-user items. For example, DLA has set a target of 50 percent DVD support by 1997. The Coast Guard supply program manager should set a similar goal for reviewing all items for possible DVD application.

LONG-TERM CONTRACTING RELATIONSHIPS

A companion initiative to DVD is the establishment of substantially more long-term relationships with commercial suppliers. Traditionally, the requirements and procurement processes have treated each individual material purchase as an independent action. Procurement officials preferred that approach

as the ultimate method to promote competition and to maintain an "arms-length" relationship with commercial suppliers. Today, however, economic reality and private-sector practices have modified traditional thinking. While competitive contracting remains a primary consideration, longer term relationships with winning contractors have proved beneficial to both government and industry. Also, despite some negative rhetoric, no significant legal impediments to these longer term arrangements appear to exist. Experience in other government agencies with long-term contracts has produced significant benefits, including dramatic reductions in procurement lead-time and substantial unit price decreases. Often, grouping purchases of several different items with one supplier as part of the long-term arrangement enables the buyer to receive the benefits of larger volume buying and increased market leverage. Additionally, consolidating purchase actions often significantly reduces the workload of the procurement officer.

A variation of long-term contracting is called "corporate contracting." It may involve the supply centers' establishing central contract vehicles for item or commodity groupings for use by operating/unit customers. We believe the Coast Guard supply centers should initiate a program to screen for long-term contracting potential all consumables retained for Service management.

SELECTIVE STOCK POSITIONING

Physical movement and storage of material significantly affect resource requirements. Material movement costs cover actual shipping costs and also increases in pipeline investment when the required material is not positioned effectively to minimize customer response times. Through a comprehensive review of current and planned physical inventory positioning, the Coast Guard can implement policies to ensure that stocks are readily accessible to primary customers with the minimum amount of time and shipping cost. Stock positioning decisions should be justified and documented on the basis of customer response time goals and total stockage, distribution, and transportation cost factors. Stock positioning decisions should not be made merely on the basis of the availability and location of warehouse space. Stocks having a sole user are particularly amenable to effective positioning close to the using activity.

Supply center visibility of all supply system assets is essential to effective use of available inventories. Recent GAO criticism of Coast Guard inventory management practices has highlighted this issue.⁵ Item managers should review supply sources and customer usage patterns at least annually to exploit more effective stock-positioning opportunities. The Coast Guard should consider physically segregating stocked insurance items and contingency retention stock, consolidating them in so-called "lights out" warehouses that would only be accessed to remove them for shipment. Physical inventories and other routine

⁵General Accounting Office, *COAST GUARD CUTTERS, Actions Needed Now to Ensure Better Management of Parts and Supplies*, GAO/RCED-95-62, January 1995.

storage management activities would be substantially reduced or eliminated. Low-cost, government-owned facilities should be used whenever possible.

We recommend that as a follow on to relocating fast-moving items from SCCB to the Columbia, Md., warehouse, the supply centers should jointly develop an overall stock-positioning concept plan to make maximum effective use of all physical storage facilities. As a part of this plan, the Coast Guard should develop an analytical database to begin tracking overall customer usage patterns, cross-referencing customer geographic locations, item usage, storage-location information, and related information necessary to improve material positioning. Implementation of this concept would lower total warehousing costs by reducing energy consumption and personnel requirements and would concentrate higher cost resources at locations primarily handling active material.

DIRECT CONTRACTOR LOGISTICS SUPPORT

Today, as technology changes at an unprecedented rate, the ability to provide material support for current and evolving technology, equipment, and systems, as well as a broad range of aging equipment, becomes more difficult and costly. As equipment remains in the inventory for longer periods, the current process for item introduction, provisioning, and parts replenishment inevitably results in greater expenditures for more inventory, technical data, and overall management. Logistics managers are continuously asked to "do more with less." At the same time, management's objectives are refocusing toward end-item operational objectives rather than toward simply running an efficient purchasing office or warehouse. Those pressures, manifested to a large extent in the Coast Guard, indicate new and perhaps radical solutions to ensuring effective material support of Fleet operations.

Prior to the 1980s, virtually no major private-sector companies provided broad-based logistics services. Companies focused on parts sales, trucking, warehouse management, purchasing, freight forwarding, or other separate functions. By 1994, however, companies offering a full range of logistics services were doing about \$10 billion worth of business per year. By the year 2000, the value of that business is expected to grow to about \$50 billion.⁶ At the same time, agencies throughout the federal government are under intense pressure to reduce personnel and cut costs. Government agencies with substantial logistics infrastructure must consider outsourcing portions of their material support functions.

Successful transition to a significant level of direct contractor support of material entails much more than merely making the effort to write the contract and phase out the organic infrastructure. Materiel managers must assume a new role as an equal partner in a strategic supplier relationship. While the vast bulk of commercial suppliers still function as vendors in the traditional bid-buy

⁶Stephen Barr, "Delivering the Goods," *Chief Financial Officer Magazine, Special Report*, August 1994, p. 53.

relationship, the strategic partnership requires a closer, more sophisticated alliance. That relationship will only be successful if managers on both sides "do things right." These relationships can be very fragile and often deteriorate because of the lack of leadership and close management attention. Some basic "rules of engagement" are as follows:⁷

- ◆ Recognize that the relationship must be "managed" by both buyer and seller
- ◆ Identify key personnel within the buyer and seller organization
- ◆ Measure results regularly
- ◆ Establish continuous improvement goals
- ◆ Focus on causes and correct problems as they occur
- ◆ Determine how risks will be handled
- ◆ Set the conditions for ending the relationship
- ◆ Ensure that both the buyer and seller give preferential treatment in return for being given preferential treatment.

While the Coast Guard's acquisition rules may require some modification to those principles, they are good general guidelines for setting up and operating a long-term material support arrangement with commercial suppliers. We recommend the Coast Guard explore this support option for portions of the consumable items centrally managed by the supply centers.

We reviewed representative industrial and commercial suppliers and found that they can provide a significant portion of the commodities or type items currently managed and centrally stocked by the supply centers. Although we did not examine either the supply centers or any unit's procurement histories, the commercial distributors may actually be current vendors for Coast Guard purchases. The Coast Guard should select a representative range of consumables at each center to test for possible commercial supply support. Selection of the candidate items for a test of direct commercial material support is a critical aspect of the initiative. Both low-demand and active items should be included as well as a representative range of item prices. This proposal should not be construed as merely a suggestion to recategorize these items for local purchase. Rather, a more structured management approach should be devised by taking the following steps, for example:

- ◆ Survey the ability of several mainline commercial parts providers to provide Coast Guard items.

⁷Dr. Robert Monczka and James Morgan, "Strategic Alliances Carry Supplier Relationships Beyond Good Partnerships," *Purchasing Magazine*, 18 August 1994, p. 58.

- ◆ Identify small but representative item groups to use for a test of the viability of this approach. Identify groups of common hardware as well as electronics and mechanical/hydraulic parts. Include various degrees of criticality, demand pattern, and price ranges.
- ◆ Establish a test period of six months to one year.
- ◆ Establish a long-term contract with selected test suppliers, using indefinite-delivery contracts or other appropriate contracting methods.
- ◆ Have customers continue to submit requisitions and have test managers process them off line, making the test transparent to customers.
- ◆ Order through electronic commerce standards, using electronic media; pay bills electronically or with a credit card.
- ◆ Use the DoD FEDLOG (federal logistics data on compact disk) and/or commercial parts cross-referencing on line/CD-ROM (compact disk-read-only memory) databases such as Parts-Master or Haystack⁸ to identify test items.
- ◆ Make material deliveries directly to the customers and document performance feedback. Have the contractor provide the required item technical support to customers, i.e., identification of substitute items, performance specifications, deficiency reports, and warranty processing.
- ◆ Establish supplier performance goals and include them in the contract. Benchmark the performance against supply center performance for test commodities and similar items.
- ◆ Maintain detailed records of supplier performance and total costs for use in evaluating the test.

For Coast Guard-managed consumables, direct support from a commercial material provider appears to be a viable alternative to continued centralized item management by the supply centers. Testing such a process would help managers decide where such an alternative would improve support and be cost-effective. The primary objective of this approach should be to improve consumable item management and to be useful in reorienting the process to one that both satisfies the customer and provides end-item support.

CONTRACTING ALTERNATIVES

As part of the effort to improve overall management of consumable items, supply managers must develop new relationships with other functional managers. One critical relationship occurs between the supply and procurement

⁸Parts-Master and Haystack are commercial parts-referencing software/databases that are already available at Coast Guard supply centers.

managers. Although the two communities have a long-standing association, it has generally been one in which the supply manager gave a requirement to a procurement manager who then purchased a product that met the requirement. In many supply-procurement relationships, the association is characterized as, "We toss the requirement over the wall, and they toss back whatever they bought."

In the new relationship that has to occur in Coast Guard supply, the supply manager must take the lead in working with the procurement manager to improve the total purchasing process from the inception of the purchase requirement to material delivery. Part of that responsibility involves supply managers becoming world-class customers of the procurement process. Supply managers must clearly articulate their support needs and the Service standards to their procurement counterparts. That cooperative approach often requires establishing joint management review of common objectives and increasing day-to-day interactions between supply managers and procurement officers to ensure common pursuit of the same goals. For example, supply managers must specifically quantify a supply performance objective such as reduce total lead-time by 30 days, identify the procurement lead-time portion of the total cycle, and gain the procurement manager's support in achieving the objective by making it a procurement performance objective. That approach is taking the lead in a positive and measurable way and should result in improved response to customer needs.

The approved Coast Guard *F&P CONOP/Strategic Information Resources Management Plan* (SIRMP) prescribes that finance and procurement activities are to be committed to close partnerships with their customers.⁹ The document opens the door for the supply managers to actively cultivate the relationship. The F&P CONOP sets out customer requirements from the procurement perspective but notes that procurement's customers do not always know their requirements.¹⁰ Statements such as this challenge the supply managers to emphasize the strengthening of the supply-procurement relationship. The F&P statement of "logistics" requirements is as follows:

- ◆ *Full cost of doing business.* Implementing improved accounting procedures, user-friendly systems, and cost-effective services whether in-house or contractor provided.
- ◆ *Flexibility in procurement.* Reducing formality/restrictions within the procurement process, reducing procurement administrative and review times, and simplifying interfaces with vendors.
- ◆ *Timeliness of information and reports.* Improve use of technology, real-time information with high degree of accuracy, sharing of common data.

⁹U.S. Coast Guard, Director of Finance and Procurement, F&P Design Team, *Finance and Procurement Concept of Operations/Strategic Information Resources Management Plan*, 30 March 1994, p. iii.

¹⁰*Ibid.*, p. 99.

The F&P CONOP also proposes establishing a better cross-functional relationship and pursuing standard ADP systems. Clearly, both the procurement and logistics communities within the Coast Guard have comparable goals and objectives. In the following two subsections, we describe how these mutual objectives should be pursued.

Near-Term Alternatives

In the near term, the Coast Guard can initiate policy and procedural improvements that require few or no systems changes and that would enhance the procurement of consumable items. For example, while procurement policy prescribes a "best-value" approach to awarding contracts, the procurement official does not always have access to the full range of information relevant to a "best value" decision. Inventory managers should document factors such as contractor delivery performance, product quality, and product reliability from the supply perspective. Information should be documented, particularly that for higher cost and larger volume repetitively bought items. This information should be automated and be easily accessible by procurement officials.

We recommend the Coast Guard establish a joint supply-procurement initiative to identify other government agency and private-sector procurement business practices and review their applicability for Coast Guard use. That effort should also ensure that Coast Guard takes full advantage of recent updates to the Federal Acquisition Regulation (FAR). Procurement officers should be requested to evaluate and negotiate commercial-type arrangements that may be beneficial to the supplier and consequently less costly to the government. Such arrangements include partnering with industry in soliciting the types of contract agreements in which replacement parts are not paid for until they are installed by contractor technicians, specifying commercial packaging and standard quantities in lieu of government specification packing or odd quantities, delivering parts directly to government users bypassing government storage depots, and electronically transferring payment to the supplier upon shipment from the point of origin. Arrangements such as these provide incentives to suppliers for reducing unit costs and overhead charges.

We recommend that the Coast Guard spares and repair parts contracts incorporate clauses to require contractors to jointly share drawings, specifications, or other technical data when needed. The Coast Guard should discontinue purchasing data and drawings for material it has purchased but instead purchase the rights to access and use such data and drawings. All such data should be provided electronically. Also, Coast Guard technicians should ensure that drawings and technical data procured as part of the acquisition of a new system are not reprocedured in replenishment buys.

In cases in which long-term/indefinite-delivery contracts or similar instruments are executed, safety-level stock requirements should be minimized or eliminated. Procurement officers should be requested to negotiate predictable or guaranteed delivery lead-times.

We recommend that all postmanufacturing testing and evaluation requirements for consumable items be eliminated from procurement contracts except for specific items that technical personnel have certified require mandatory testing. Contracts should specify the requirement to meet commercial performance standards. The decision to test should be item-specific and recertified at each procurement action. Coast Guard policy should mandate that supply and procurement officials fully exercise government warranty rights. Further, where it is applicable, contracts should include requirements for suppliers to make warranty terms and expiration dates explicit. The Coast Guard should explore new technologies such as two-dimensional bar codes or other tagging methods to ensure the ready availability of warranty information. This would permit monitoring of warranty information throughout the distribution process. A central automated database of warranty information should be developed for access by supply and procurement officials.

The development of contracting synopses represents a significant volume of procurement workload and is a segment of the administrative lead-time requirement. The synopsis is the documentation of a purchase requirement in the *Commerce Business Daily*. We recommend that the Coast Guard ensure that synopses are prepared only for purchases above the regulatory dollar value limits and that maximum use is made of standard electronic commerce (electronic data interchange [EDI] and computer bulletin board) capabilities to limit printing and waiting times.

In many instances, under current practice, the contracting process for replenishment support does not begin until the need for a specific item and quantity is identified. That process, however, can be accelerated and streamlined. One useful way to do so is to begin the contracting process in anticipation of future requirements. Since long-term equipment support often requires repetitive buying of the same or similar items over the life of the end item, contracting should begin for some items/commodities when the item configuration is stabilized and the long-term support need is identified. That technique may be applied to specific items or groups — family buys of like or related items — and still remain in compliance with the requirements of open competition. When an item is cataloged and a future requirement is anticipated, inventory managers should request their procurement officer to review the option of processing an "open" synopsis, that is, a continuously standing request for contractors to become Coast Guard suppliers. The synopsis may be processed annually and after each contract award.

For requirements within certain dollar limitations, we recommend the Coast Guard pursue the option to conduct a "closed" solicitation, which is defined as the government soliciting potential sources who have previously submitted proposals within a competitive range and a limited number of new sources from a *Quality Suppliers Registry*. To be listed in the *Quality Suppliers Registry* contractors are required to meet specific criteria of delivery performance, favorable product warranties, and contractor capability.

Another potential area for reducing administrative lead-time is the review of contractor rates for overhead and general and administrative costs included in a proposal. That review may require rate examination by a contracting field activity before a proposal can be accepted by a contracting officer. That process is often repetitive for purchases from the same company and can be time-consuming in the prenegotiation phase. As part of a "quality vendors" program, yearly or multiyear rates may be established for vendors of various product categories. In some cases, long-term rates (3 to 5 years) could be acceptable for contracts during that period. To further streamline the process, rate information could be made available to contracting officers on an automated database. Inventory managers should work in concert with procurement officers to determine the applicability of these techniques to reduce acquisition lead-times.

In some cases, extensive administrative lead-time is being devoted to cost and pricing analysis, especially when review dollar thresholds and levels of approval are arbitrarily established by local policies or regulations. In some cases, those traditional local policies are not fully taking into consideration the actual need for reviews (i.e., previous item histories or similar recent purchases) on a case-by-case basis. We recommend the Coast Guard take action to eliminate local/agency policies that require price/cost reviews at less than federal policy thresholds. Lower levels of management should be empowered to approve simplified analysis (comparisons with similar buys) whenever that action is in the best interest of the government.

We also recommend the Coast Guard review the level of authority thresholds for approval of documents generated in the requirements determination and acquisition contracting processes. In many cases, excessive requirements for management approval often delay the process while adding little or no value, particularly for lower cost consumables. Although the purchasing process clearly needs some level of authority and accountability, the Coast Guard should seek the lowest level of empowerment to facilitate reducing administrative lead-times and eliminating non-value-added rework. Regulations and policies requiring a high level of approval should be reviewed to ensure that objectives can be met more efficiently.

Finally, we recommend the Coast Guard review its current in-house use of personnel resources applied to contract administration functions. The DLA Contract Management Command (DCMC) has expressed an interest in expanding its support of civil agencies. The Coast Guard should ensure that only Coast Guard-unique, critical contract administration services are assigned to Coast Guard personnel. It should consider transferring noncritical Coast Guard contract administration to DCMC whenever practical. However, current DLA policy may require transferring personnel resources to support contract management workload received from civil agencies. The Coast Guard should weigh the costs/benefits of such resource implications on a case-by-case basis. Such actions could be particularly pertinent for contract postaward surveillance and contract administration functions for consumable items, areas in which DLA has substantial expertise.

Long-Term Alternatives

In the long term, the Coast Guard should emphasize development of the capability to share data across supply, procurement, and other functional areas through use of common, automated databases. The development of computer systems along functional lines (supply, maintenance, procurement, wholesale/retail) should be replaced by a more comprehensive approach using common databases and fully integrated applications. Electronic data access, including visibility of contractor databases, for required characteristics, configuration and performance information, for all items the Coast Guard uses and manages, would minimize dual data entry requirements, improve data accuracy, eliminate duplication, and substantially reduce both supply and procurement processing times. Planning for activation of the ELC envisions such a business process improvement.¹¹

We recommend that as an initial step, the current Coast Guard update its information resources management program to require future ADP systems development along these lines. Further, both supply and procurement long-term plans should include the functional requirement for an integrated management information tracking system that integrates the material purchase/contract process from the point of requirements development to the point of material delivery. That system should permit automated monitoring by individual purchase request and summary groupings of the full material acquisition cycle from preparation of purchase requirement to solicitation, contract preparation and award, delivery tracking, payment, quality assurance, and historical records. The Coast Guard's SCCR project provides the functional baseline for this requirement. As an additional step, we recommend that the Coast Guard develop an automated on line database that captures individual consumable-item contractors' performance history such as delivery milestones achieved and individual item quality profiles for each supplier. That data repository would be accessible on line to all Coast Guard inventory managers and procurement officers and would provide both preaward references for potential sources and postaward referrals for contractor performance during all contract phases.

EMERGING TECHNOLOGY APPLICATIONS AND OPPORTUNITIES

Data structure and transmission standards, electronic translators, and expanded message transaction formats are among the technologies emerging in system modernization projects throughout the government and industry. In Appendix B, we discuss these and other technology applications of importance to the Coast Guard supply system and the Service's integrated logistics management program. Incorporating technology applications in supply system plans expands the opportunities for improving support performance and reducing costs.

¹¹ U.S. Coast Guard, Engineering Logistics Center, Chapter 4, *Business Process Redesign*, "Procurement of Goods and Services, Document B-F31," 6 August 1993.

Making the technology applications key elements of logistics data exchange brings life-cycle management and cost/benefit analysis goals to reality. The downside is that the expense of doing so may be too great for the Coast Guard to do on its own. The high cost of independently developing technology applications discourages integrating them into business processes.

DoD technology-related projects for exchanging data electronically, modernizing logistics system standards, processing logistics information, and using automatic identification tags justify continued development on their ability to forecast future savings. Other technology projects involving digitized technical drawings and expert system logic for decision support rely on increasing individual productivity and ensuring quality to underwrite their cost. The Coast Guard, which currently has a minimal participation in the DoD projects, should continue that participation to ensure being positioned to take advantage of the work DoD completes. The key issue is when and how the Coast Guard takes the technology application and makes it a part of its business process. The small unit automated requisitioning (STAR) project is an ongoing example of using a DoD project as a baseline for Coast Guard supply system improvement.¹²

We believe the technology applications are relevant to improving consumable item management. While they will benefit managing consumables, they offer more to the processes managing high-cost and critical reparables and those measuring support performance. To be of maximum value to the Coast Guard, the technology applications we discuss in Appendix B should be integrated into the top-level logistics strategic plan and perpetuated in logistics organizations' business strategies at each level of the support system.

¹² The STAR project has origins in an application of satellite communication technology for requisition transmission developed by the Navy for the Persian Gulf War. The Coast Guard successfully tested satellite communication technology on selected cutters and uses that communication mode where appropriate. The STAR is being extended throughout the Coast Guard for ashore units using more conventional electronics technology to reduce user effort and off-line transmissions and improve requisition management.

CHAPTER 6

Relating Consumable Items to Equipment/System Management

In Chapter 5, we described several specific actions that will enable the Coast Guard to improve the management of its consumable items by tailoring material support to the situation. Improved management can also occur with the establishment of a significantly greater linkage between the management of consumables and the support of the end items of equipment that are the primary material emphasis of the field operating commanders. Quite often, major equipments are lost from service for lack of a simple consumable repair part rather than because of the failure of the more complex, high-cost, reparable assemblies. Although the supply center may have excellent overall support statistics in terms of off-the-shelf availability of consumables, its ability to support the operation or maintenance of a given equipment effectively at a given time may be less than desired. Many times, managers do not have adequate quantitative measures to determine the true effect of wholesale materiel management processes on actual customer satisfaction.

DoD's SECONDARY ITEM WEAPON SYSTEM CONCEPT

Background

While the concept of a cause-and-effect relationship, with measurable performance objectives, between reparable and consumable spare parts and their end-item applications was recognized much earlier, DoD's formal acknowledgment did not occur until the mid-1980s. Operations research analysts had developed numerous mathematical representations of the relationship of material parts availability to end-item readiness as early as the 1960s, but a comprehensive concept of operations for use of these principles as part of the military logistics support process was first documented by the Secretary of Defense in Secondary Item Weapon System Management Concept, published in June 1985.¹

Prior to 1985, DoD's management of materiel was largely item- or commodity-oriented, with little direct consideration of the impact of item management decisions on end-item readiness. The weapon system concept focuses increased management attention on those items that affect operational capability. It assists in justifying material expenditures by linking material support to operational requirements, and it provides managers with better information to use in making decisions on resource allocation. Weapon system management

¹DoD, Casper Weinberger, Secretary of Defense, "Secondary Item Weapon System Management Concept," 26 June 1985.

also provides tools for measuring performance against specific end-item support goals. That performance measure represents a distinct improvement over traditional supply availability goals, which only address off-the-shelf support capability. The DoD weapon system concept establishes the following 13 target areas to be developed as basic capabilities; taken together, they constitute an overall weapon system management approach:

- ◆ Item application files linking spares and repair parts to end-item applications
- ◆ Item stock levels computed by weapon system
- ◆ Multiechelon requirements stockage models
- ◆ Integrated, consistent, provisioning and replenishment requirements computations
- ◆ Asset visibility to the lowest supply echelon
- ◆ Coding and recording demand data by end-item application
- ◆ Interchange of program data, item demands, and resupply time data across service lines
- ◆ Performance tracking across weapon systems/end items
- ◆ Positioning of essential weapon system items nearest point of use
- ◆ Capability to redistribute essential weapon system items systemwide
- ◆ Development and submission of replenishment budgets on a weapon system basis
- ◆ Tracking and monitoring budget execution on a weapon system/end-item basis
- ◆ Development of a mechanism to trade optimally among acquisition, repair, and distribution resources.

Applicability to the Coast Guard

In January 1995, the GAO criticized the Coast Guard for significant deficiencies in management of parts and supplies aboard cutters.² In part, those criticisms centered on lack of information on quantities, types, and values of spares and repair parts in the overall inventory. GAO also targeted the fact that the Coast Guard had insufficient knowledge of shortages and excesses aboard

²General Accounting Office, op. cit., pp. 1 – 2.

cutters.³ As indicated by GAO, it is difficult to determine whether Coast Guard cutters have a shortage or an excess of parts, whether the parts are readily available when needed, or whether inventories are properly positioned for optimal support.

Clearly, the Coast Guard requires comprehensive actions in response to the GAO findings. As a first step, applicable elements of the weapon system concept should be documented and included in Coast Guard supply operations planning and policies. Implementation of appropriate elements of the weapon system management concept and the inventory reporting process described earlier in this report could substantially satisfy the GAO criticism. Virtually all of the weapon system capabilities have some Coast Guard applicability. In certain cases, general concepts should be tailored to specific Coast Guard conditions. Some areas have already been explored by Coast Guard management initiatives and are included in the *Logistics Master Plan*.⁴ Some are dependent on longer term ADP systems modernization implementation. We recommend the Coast Guard develop a comprehensive equipment/system strategy modeled after DoD's weapon system/end-item support strategy, incorporate that strategy as a supply program management objective, and detail it in the ELC's business goals.

DLA'S WEAPON SYSTEM SUPPORT PROGRAM

SCB has recently initiated a test of the applicability of DLA's weapon system support program to those DLA-managed consumable items used by the Coast Guard. Even though the test covers a limited number of Coast Guard items and end equipments, it is an excellent start toward improving the management and support performance of items for which the Coast Guard receives material support from DLA. This initiative requires the assignment of weapon system designator codes for end-item equipments/systems used by the Coast Guard and the assignment of item-essentiality codes that describe the criticality relationship between Coast Guard-used, DLA-managed, national stock numbered items and Coast Guard end items. For test purposes, the Coast Guard is using Navy service codes as part of the weapon systems designator coding process. Weapon system designation and essentiality codes are provided initially and updated through a series of transaction formats prescribed by DLA. As the current test expands to cover all DLA-managed weapon-system-type items, the Coast Guard should work closely with DLA to establish unique Coast Guard-identifying coding, to automate the output of required transactions, and to receive appropriate management reports. Supply centers should also work with DLA managers of the Defense Automatic Addressing System Office's Logistics Information Processing System (LIPS) to develop end-item-oriented transaction summary reports covering all consumables, both Coast Guard and other government agency managed. Such reports would be useful in focusing logistics managers on the full

³Ibid., p. 3.

⁴U.S. Coast Guard, Office of Engineering, Logistics and Development, Report of the Engineering Logistics Steering Committee, *Logistics Master Plan*, 1993, 2 February 1993.

spectrum of end-item support and giving the Coast Guard the means to maintain oversight of all supply support to its units from DLA.

By participating in the DLA weapon system program, the Coast Guard gains the same level of support afforded to the Military Services. Currently, it receives an acceptably high level of overall support from DLA. Supply availability for all DLA-supported Coast Guard items in the first quarter of FY95 was 87.2 percent. That percentage is based on 36,495 requisitions processed. However, since overall supply availability may not directly translate to desired levels of support for specific end items, the Coast Guard must have access to all of the weapon system support management information currently provided to DoD customers of DLA. With that information the Coast Guard can direct priority attention primarily at the most essential items and critical problem areas. Further, because DLA managers give priority attention to weapon-system-related items, full participation by the Coast Guard in this DLA program should afford material support equal to that provided to DoD customers for the more essential items.

COAST GUARD EQUIPMENT / SYSTEM SUPPORT PROGRAM

The DLA Weapon System Support Program model appears to be applicable to Coast Guard-managed consumable items as well. We recommend that as part of achieving the vision of world-class logistics support as described in the *Logistics Master Plan*, the Coast Guard implement its own version of a secondary item weapon system support program. Such an initiative requires, as a first step, segmenting the item inventory into equipment/system support item and non-equipment/system support item groupings. An item essentiality coding structure consistent with that used for the weapon system support program should be implemented to permit the allocation of inventory management resources to high-payoff, more critical items.

The supply centers currently have implemented equipment/system management on a limited scale. In preparation for the ELC organization structure, the supply centers' management processes should be converted to an equipment/system support strategy. As inventory managers are diverted from individual, day-to-day item processing responsibilities, those resources should be reoriented to end-item support tasks. Those responsibilities would include the process of planning, organizing, and coordinating the efforts of responsible organizational elements and individuals, beginning with the acquisition and continuing through the life cycle to ensure operational readiness of the equipment or system through effective, timely, and economical logistics support.⁵

⁵Office of the Under Secretary of Defense (Acquisition), Defense Management Review Report, *ICP Consolidation Study*, Volume II, Appendix E, July 1990, pp. 15 – 16.

Equipment/System Manager Responsibilities

The equipment or system managers are responsible for the following actions:

- ◆ Performing support capability studies
- ◆ Serving as the focal points for material support of assigned equipment or systems
- ◆ Participating in the preparation of the integrated logistics support plan
- ◆ Keeping informed of overall material support status of assigned equipment or systems by tracking and analyzing systems readiness, deficiencies, and failure rate reports; evaluating support problems and devising corrective actions; ensuring timely and adequate action by appropriate functional elements
- ◆ Maintaining liaison with operating commands and other activities on material support issues; ensuring operating/retail material requirements are properly quantified and communicated to integrated materiel managers
- ◆ Maintaining liaison with all functional elements involved in equipment or systems support, including item management, technical support, requisition processing, maintenance, and sustaining engineering
- ◆ Participating in the development of depot maintenance programs
- ◆ Exercising surveillance over organic or commercial material production.⁶

Provisioning Manager Responsibilities

Both the operational effectiveness and resource availability in the Coast Guard supply system are highly influenced by the introduction of new equipment and systems into the end-item inventory. Today's equipment tend to be more complex and technologically advanced but are also generally more reliable than earlier items. At the same time, maintenance concepts have changed dramatically; equipments that might once have been subject to substantial amounts of on-site repair are often maintained through remove-and-replace strategies, with a lesser requirement for field stocks of consumable repair parts. Additionally, the numbers of field engineering and maintenance personnel can be expected to diminish significantly. Conversely, over the next decade, a number of new classes of ships and boats as well as numerous new reparable equipment or systems will result in the introduction of many new consumable items. The provisioning process — the introduction and stockage of these new items — requires specific attention as the Coast Guard attempts to improve its overall consumable item management. Policies, procedures, and systems changes

⁶Ibid., p. 16.

should be specifically oriented to attaining provisioning improvement objectives. Generally, those objectives should be to

- ◆ create optimal parts packages at minimal cost,
- ◆ reduce the proliferation of new items,
- ◆ maximize utilization of existing inventories, and
- ◆ effectively support end-item readiness objectives.

When a new equipment or system is developed and acquired or when existing equipment is improved, it must be supported from the time of introduction until replenishment support based on observed demand patterns can be determined. The Coast Guard requires that support items be available to using units prior to, or concurrent with, the delivery of the new equipment or system. Requirements for material must often be predicted in the absence of field experience with the new end items. The basic provisioning process has remained mostly unchanged for the past 25 – 30 years. Fundamentally, initial supply support requirements are identified, contracted for, procured, and delivered concurrently with the end item. While timely and accurate consumable item support is unquestionably essential to maintaining the operational status of critical (and expensive) systems and end items, it is appropriate that the Coast Guard take a new look at the methods for achieving the required initial material support.

Planning for ELC implementation requires the updating and improvement of business processes as well as the implementation of modern automated systems.⁷ Numerous opportunities are available for such improvements within provisioning and related processes such as cataloging, allowance development, and technical data management. Coast Guard planning envisions that in the future, the provisioning process will be heavily automated, receiving electronic information feeds not only from end users but also from support and operations activities. Routine tasks will be automated and the provisioner will spend less time on data management and much more time on management analysis.⁸

As part of the required business process improvement efforts, Coast Guard provisioners must be afforded the means to deal with the traditional impediments to successful material support as new equipment and end items are introduced. In general, these impediments to success are

- ◆ acquisition planning independent of provisioning actions,
- ◆ inconsistent objectives between systems engineering and provisioning,

⁷U.S. Coast Guard, Chief, Office of Engineering, Logistics and Development, Memorandum to the Chief of Staff, Subject: *Engineering Logistics Center Implementation Plan*, 29 June 1994, p. D-5.

⁸USCG Engineering Logistics Center, Business Process Redesign, Chapter 2, Document B-C5PROV, 26 April 1993.

- ◆ an inflexible provisioning process that frustrates innovation and compressed acquisition strategies,
- ◆ failure to obtain feedback to measure provisioning success, and
- ◆ lack of life-cycle perspective.

Of all the processes associated with supply management, material provisioning is most oriented to support of equipment and systems. As part of the preparation for activation of the ELC in 1996, the Coast Guard should ensure that provisioning managers, as members of the ELC equipment or system teams, are ready to act as key focal points for integration of supply support into the engineering logistics process. As the new ELC structure evolves, provisioning managers should adjust their focus from the day-to-day production and control of documentation to the broader perspective of interaction with platform and equipment managers. To make that changeover successfully, the Coast Guard will have to eliminate non-value-added, manual processes wherever possible and adopt automated approaches to processing technical information.

Much of the management improvement planned for the provisioning process depends on the implementation of ADP enhancements as part of the FLS modernization. However, the evolution of the ELC structure provides a unique opportunity for the Coast Guard to effect certain cultural changes that are not totally system dependent. For the provisioning process to deliver the best material support package available at least cost with least item proliferation, provisioning managers must be fully interactive with other related processes, including end-item technical data generation, requirements determination, configuration management, reliability engineering, acquisition strategy development, maintenance planning, and life-cycle cost assessment. The current management emphasis on full implementation of integrated logistics support (ILS) concepts and strategies, and use of logistics support analysis procedures are excellent starting points for improving provisioning. However, the Coast Guard must take advantage of the opportunity presented by the ELC organizational change to redirect sufficient training and career development resources to foster flexible and innovative provisioning managers. Specifically, such a management initiative should do the following:

- ◆ Ensure that provisioners are fully capable of using ILS and systems engineering methods
- ◆ Increase the understanding of retail- and unit-level logistics requirements and processes
- ◆ Involve provisioners in the acquisition cycle starting with the acquisition concept development phase and extending through customer satisfaction
- ◆ Fully integrate maintenance planning results into the provisioning process

- ◆ Integrate cataloging, technical data management, and provisioning into a single discipline
- ◆ Provide provisioners with meaningful criteria for selecting among different material support alternatives (e.g., direct contractor, OGA, or organic support.)
- ◆ Promote approval of material investment targets that maximize material readiness and support at least cost.

Only after provisioners are afforded a continuing management commitment to a life-cycle approach to consumable material support will significant improvements be realized. We recommend that as part of this commitment, the Coast Guard revise or emphasize its policies as follows:

- ◆ Provisioning planning should commence at the concept exploration and definition phase of acquisition. At that stage, provisioning issues should focus on maximizing use of nondevelopmental items and providing technical and usage data electronically.
- ◆ Supply support by OGAs or commercial contractors should be given priority consideration during support item source selection.
- ◆ A maximum two-year demand development period should be enforced for items for which central stockage by the Coast Guard is anticipated.
- ◆ Readiness-based-sparing models should be used whenever possible; however, if demand-based computational models are used for consumable requirements during the demand-development period, safety-level stocks should not be authorized.
- ◆ Items should be stocked as insurance only in extreme circumstances. When such stockage is required during provisioning, supply center quantities should be limited to one replacement unit.⁹
- ◆ Delivery of consumable material should be phased-in during the demand-development period based on end-item delivery schedules.
- ◆ Follow-on provisioning (reprovisioning after the demand-development period based on increases in end-item density) should not be authorized. Requirements after the demand-development period should be satisfied through the replenishment process.
- ◆ New equipment acquisition contracts should specify Coast Guard electronic access to contractor-maintained digitized technical data and drawings in lieu of the acquisition of technical data. In the near term, for a selected new end item, the Coast Guard should initiate a controlled test using automated,

⁹ A minimum replacement unit (MRU) is the quantity of an item required for replacement during a maintenance action. Normally an MRU is one unit.

on-line access to contractor technical documentation to demonstrate the viability of that concept.

- ◆ Facilitate equipment/system contractors' electronic access to the federal catalog system and contract for provisioning screening whenever practical.
- ◆ If contractor direct support for consumables is obtained during the demand-development period, the transition to organic support in the replenishment phase should occur only on an exception basis and be fully justified and documented.
- ◆ During the demand-development period, the latest equipment/system programs and densities should be maintained; procurement should be deferred if program uncertainties occur.
- ◆ Provisioners should maintain an automated database of contractor and government engineering estimated usage and failure factors for each consumable item to support future material purchases.

Progress toward these objectives has already been achieved in the implementation of more sophisticated computational models for material allowance quantities and the use of logistics support analysis methods (Military Standard 1388).

We recommend that management emphasize these policy considerations. That emphasis will be valuable in improving the Coast Guard's provisioning process.

Provisioning Performance

Another area requiring greater attention is the development and maintenance of provisioning performance measures. In the past, provisioning requirements have been sometimes considered a major contributor to inventory growth and excess stockage. That belief has been difficult to assess. Usually, the absence of performance standards and data-tracking deficiencies greatly inhibit evaluation of the provisioning process. While measuring provisioning performance may be considered more of an art than a science, we believe it is necessary to do so and recommend the Coast Guard develop standard provisioning assessment factors and quantify and document provisioning performance. We also recommend an automated management information database be implemented to record assessments, support analysis, and provide information for new or re-provisioning programs. At a minimum, assessment criteria should include the following:

- ◆ *Numbers of support items screened during the provisioning process.* Statistics on the total number screened and assignments by source (OGA, commercial support, Coast Guard-managed, and local procurement) should be maintained.

- ◆ *Accuracy of provisioning requirements.* Document initial provisioning requirements quantities (engineering estimates) compared with actual item usage during the demand-development period.
- ◆ *Meeting provisioning milestones.* For items managed by the Coast Guard, track the elapsed time from the initial identification of Coast Guard responsibility to the first delivery of material.
- ◆ *Accuracy and availability of provisioning technical documentation.* Annually, track numbers of provisioning items requiring documentation, numbers of items for which provisioning documentation rights are made available by the contractor, numbers of items for which documentation is procured, and numbers of items for which documentation is required but not available.
- ◆ *Performance Measures.* For each Coast Guard-managed item provisioned, quantify the value of the inactive inventory at the beginning of the provisioning process and the value of inactive material at the end of the demand-development period. Document causal factors such as design changes or end-item program density changes.

Because of the Coast Guard's close relationship with DoD particularly as part of the process of introducing new equipment and systems with common application with the U.S. Navy, we believe the Coast Guard should continue full participation in DoD's Provisioning Policy Group to foster interchange of ideas and common solutions of mutual problems.

CHAPTER 7

Epilog

The Coast Guard logistics system exists to keep its units ready to perform the various missions assigned the Service. Until the reason for the system's existence changes, managing consumable items will be an inherent and necessary part of the supply function. However, the approach to managing them should evolve from one that is primarily concerned with ordering, storing, and issuing a relatively small but important number of Service-unique items. As the new ELC consolidates naval and electronics engineering logistics management and makes customer service its primary objective, the consumable item management process should develop an orientation to equipment and system readiness, and establish the most cost-effective network of supply sources for the required level of readiness. The Coast Guard supply program manager should set policy and goals for managing consumable items and continually evaluate results against those goals. The ELC can play a significant role in assisting the supply program manager in maintaining oversight of consumable item support to the Coast Guard units afloat and ashore.

In this report, we discussed the critical elements that go in to managing consumable items. We described them in the context of a management strategy rather than an all-or-nothing program. We did so because the elements will take time to establish, and to tie them together in a strategy will help ensure progress and help understand the part each element plays.

Our recommendations addressed the critical elements. We discussed the stockage decision process and its complexity as a lead-in for recommending the Coast Guard establish an inventory stratification and reporting procedure that more effectively displays information for management oversight. We presented the alternatives for managing various categories of consumable items with "transfer to DLA management" as the first choice in the decision logic. We recommended incorporating the decision logic in managing consumable items starting with the items currently stocked, particularly the non-engineering-related ones.

Shifting from an "ordering, storing, and issuing" culture to one that selects a supply source based on responsiveness and cost-effectiveness requires more flexibility in contracting support, early contracting involvement in supply decisions, and joint evaluation of performance results. We considered tailoring material support as the foundation of the new culture and the basis for a supply - procurement relationship that sets mutually beneficial goals without losing sight of the true end goal — response-oriented customer support.

Tailoring support means making decisions early in the equipment or system life cycle on how the material needed to keep it operational will be supplied. The

focus is the end item: how it is maintained, and what to stock, where to stock it, and who manages the stock to support maintenance. Engineering estimates and provisioning models provide the earliest answers to "what to stock." The essentiality (of the end item and the consumable item's relationship to the end item), expected urgency of need, and magnitude of the required investment drive the centralized versus decentralized decision on "where to stock." The "who manages" decision offers the greatest latitude because it branches to "how to manage."

Our recommended stockage decision logic started with DLA management as the first choice and then looked to Coast Guard-managed, centrally established contracting alternatives — contractor logistics support, direct vendor delivery, flexible manufacturing, long-term requirements contracts — before reaching Coast Guard central stockage as the final choice. Beyond the decision for DLA management, the answers to "who to manage" and "how to manage" brought in tailoring support based on the operating requirements and maintenance support plan for the equipment or system. Setting the consumable item supply method based on the equipment or system essentiality also assists in shifting from the traditional culture of central stock or local purchase that too often left the unit's storekeeper or maintenance technician burdened with researching the item to order, finding a vendor, making the purchase, and ensuring the quality.

In summary, implementing a comprehensive consumable items management process entails a commitment to a new strategy and adjustment to the culture so that it clearly and continually focuses on customer service, responsiveness, and performance goals well beyond the traditional focus on supply availability. The Coast Guard's logistics system exists to keep its units operationally ready. Consumable items are important to keeping equipment and systems operating. Effectively managing those consumable items needs to be a part of an overall strategic plan that chooses the best support alternative based on the importance of the end item to the unit's mission performance. We believe the comprehensive strategy for managing consumable items proposed in our report can and should be implemented as a key part of the Coast Guard's strategic logistics plan.

APPENDIX A

Stratification Data Record Format

Stratification Data Record Format

Table A-1.
Inventory Stratification Record

Data Group	A/N	Record position
National stock number	N	1 – 13
Year/month (e.g., 306=June 1993)	N	14 – 16
Material acquisition cost	N	17 – 24
Standard price	N	24 – 31
Unit of issue	N	32 – 33
Acquisition advice code	A/N	34
Weapon System item essentiality code	A/N	35
Due-out quantity	N	36 – 41
Safety level	N	42 – 47
Administrative lead time	N	48 – 53
Procurement lead time	N	54 – 59
Economic order quantity/procurement cycle	N	60 – 65
Non-demand-based requirements	N	66 – 71
On-hand serviceable	N	72 – 77
On-hand unserviceable	N	78 – 83
Contract due-in	N	84 – 89
Purchase request due-in	N	90 – 95
Approved retention	N	96 – 101
Potential reutilization	N	102 – 107
Quarterly forecasted demand	N	108 – 113
Quarterly forecasted returns	N	114 – 119
Demands (recurring, past 12 months)	N	120 – 125
Demands (nonrecurring, past 12 months)	N	126 – 131
Demand frequency (requisitions per year)	N	132 – 137

Note: This format is presented as an example of a record that could be used by the Coast Guard to begin development of a stratification management information database. Other data elements could be added as required. Data are presented as a transaction record indicating its potential use to transmit information sets to

APPENDIX B

Emerging Technology Applications and Opportunities

Emerging Technology Applications and Opportunities

Today, as many managers are well aware, emerging technologies provide a major source of opportunities to improve performance and reduce costs. Unfortunately, the transition from scientific theory to practical application is often a tedious and costly venture. Further, although the potential for improvements based on the implementation of new technologies is dramatic, initial investment funding is often limited to promote insertion of new applications into mainstream operations.

In the past, the U.S. Coast Guard has successfully taken advantage of technology investment already made by the Department of Defense or other government agencies. The Coast Guard has successfully adopted the compact disk-read-only memory (CD-ROM) technology in the FEDLOG (federal logistics data) process for proliferating large volumes of current federal cataloging information. Linear (one-dimensional) barcoding is used to provide item identification in material shipping and storing. While the approach of adopting already developed methods helps minimize initial costs, it predestines Coast Guard to delays in taking advantage of available, leading-edge technology. Despite fiscal limitations, the Coast Guard should pursue several technology-based logistics process improvements. Use of those technologies should not, however, be pursued simply to adopt new technology. The Coast Guard should first ensure that the functional need for the particular technology is well understood and documented in its strategic plans and is well founded in specific policy objectives. Such an approach will help minimize investment in unnecessary technology-driven ventures.

ELECTRONIC DATA INTERCHANGE APPLICATIONS

Transaction Structure and Transmission

In 1984, the Department of Defense initiated a program to modernize the process by which logistics organizations communicate information among the various functions. The current process — Military Standard Logistics System (MILS) — was implemented in 1962 and has become seriously outdated by technological advances in computers and telecommunications. MILS has proliferated

to the civil agencies in systems such as the Federal Standard Requisitioning and Issue Procedures. DoD's new program, the Modernization of Defense Logistics Standard Systems (MODELS), has five specific goals:¹

- ◆ To support additional information requirements beyond current electronic data formats that limit transactions to 80 characters of data
- ◆ To improve accessibility of logistics information, thereby permitting dramatic improvements in on-line databases
- ◆ To increase data flexibility by eliminating fixed transaction formats and using table-driven software to interface unlike applications
- ◆ To improve the flow of logistics information thereby improving both information accuracy and adding to the functional capabilities of logistics communications
- ◆ To increase communications capabilities by taking advantage of modern communications speeds and volumes through use of commercial data formats and networks.

As these goals indicate, the MODELS initiative envisions both technical and functional improvements to logistics information management. Although MODELS is under development by DoD, the implications of its potential improvements extend to all federal agencies involved in integrated materiel management. Under MODELS, the basic transaction formats developed in the 1960s are being reformatted into variable-length electronic data interchange (EDI) formats using the syntax and standards of the American National Standards Institute (ANSI). The new variable-length standards contain all of the data currently provided in fixed-length records plus significant new data required to improve the functional applications of electronic transactions. Further, the ANSI record formats are substantially more compatible and usable by modern relational computer databases, making logistics management data more accessible to logistics managers. DoD has progressed in the MODELS initiative to the point at which all current logistics standard transaction formats are converted into EDI formats, processing procedures for the EDI formats are fully documented, and some functional enhancements are incorporated into the new EDI structure. The next step for DoD is the reprogramming of logistics systems to process the new EDI transactions. Clearly, this is the most complex and expensive stage of MODELS development. It is uncertain how and when DoD will complete this portion of the program.

With the up-front expense for MODELS development already covered, the Coast Guard can take advantage of the capability and should proceed to update its logistics processes to achieve EDI capabilities. Regardless of DoD's implementation strategy, the Coast Guard should update its own automated systems to receive and output EDI transactions using the ANSI formats and procedures already documented by DoD. Ultimately, these new procedures will be required

¹ Defense Logistics Systems Management Office, MODELS Brochure, 1990, p. 2.

to obtain support from DoD for Defense-managed items as that Department converts to EDI standards. There is a window of opportunity for the Coast Guard to build on the work already completed by DoD but to avoid the delays being experienced by DoD as it attempts to develop standard systems across the Military Services and the Defense Logistics Agency. Implementation of commercially compatible EDI transaction processing capability will become increasingly significant as the Coast Guard develops closer support ties with the private sector.

A specific advantage of the EDI technology is the flexibility to construct variable transaction formats that mirror the specific needs of individual users, unconstrained by rigid, fixed-length formats. This capability would permit a substantial simplification of requisition and other transactions currently prepared by retail customers. For example, today, Military Standard Requisitioning and Issue Procedures (MILSTRIP) formats require the retail requisitioner to enter 80 columns of information on each input format. Much of the information in that format is of little or no value to the field activity and therefore receives little review or editing. This may lead to exceptions and errors that are often returned to the customer or to supply center managers for manual review. The implementation of flexible EDI requisition formats would permit modification of the automated data processing (ADP) system to require field activities to enter only pertinent information, such as stock number, shipping address, or the item quantity. Other information would be provided later in processing from a central data repository.

While the changeover to EDI technology is clearly a long-term initiative, as an initial step, the Coast Guard should form an ad hoc working group representing the supply (supply centers and units), maintenance, and procurement communities within the Coast Guard logistics system to devise a comprehensive logistics EDI implementation strategy. Such a strategy would help focus EDI implementation to the most productive and cost-beneficial targets.

Logistics Management Information

In addition to the MODELS program, opportunities now exist for the Coast Guard to participate in substantial improvements in obtaining and using logistics management information through other key DoD initiatives. For several years, DoD has pursued an initiative to obtain significantly greater visibility of material assets in store, in transit, in maintenance, and in the hands of using activities. This initiative, called total asset visibility (TAV), actually consists of several different programs under development by several DoD activities. Two segments of the TAV program should be of particular interest to the Coast Guard. The first is the Logistics Information Processing System (LIPS), and the second is the Global Transportation Network (GTN).

The Coast Guard, along with many other non-DoD organizations, has long used the Defense Automatic Addressing System (DAAS) Office to process materiel requisitions and status transactions between Coast Guard activities and with DoD supply sources. As part of its modernization program, DAAS has recently

brought the LIPS capability on line. LIPS is a highly capable, high-volume, relational database system designed to provide greatly improved storage and retrieval of logistics management information. As a DAAS customer, the Coast Guard is fully eligible to use the LIPS capability. However, it should ensure that specific data aggregations and management products unique to its requirements are recognized by DAAS managers. Further, as the LIPS capability is upgraded, the Coast Guard should ensure continuing compatibility between its systems and the LIPS. Initially, developers of Coast Guard systems' modernization efforts should be made fully aware of LIPS capabilities. Further, the functional requirements for full interface between LIPS and new Coast Guard systems should be identified and negotiated with DoD. As a first step, the Coast Guard should review LIPS capabilities to support its management information requirements through on-line interface with the LIPS database.

The second TAV development of particular interest to the Coast Guard is the GTN. It is under development by the United States Transportation Command (USTRANSCOM) as a command and control information system. As part of GTN, an intransit visibility (ITV) module is being developed as a comprehensive database of shipment information, including both government and commercial carrier shipment status, and other scheduling information. While USTRANSCOM has thus far focused its efforts on DoD cargo, ITV has great long-term potential for use by the Coast Guard for visibility of material in transit from DoD as well as commercial sources. The key to making ITV information readily accessible to all potential users is the development of a standard automated TAV user interface. DoD plans indicate that such an interface will probably evolve from the integration of the user requirements for LIPS and GTN.² As the Coast Guard ADP system modernization requirements are developed, system designers should be made aware of the requirement to provide for an interface capability with both LIPS and GTN. As in the case of LIPS, Coast Guard functional requirements, once defined, should be reviewed with appropriate DoD activities.

Automatic Identification Tags

As part of its TAV initiative, DoD has identified automatic identification technology (AIT) as one of the key elements in obtaining accurate and timely information on material assets, whether in storage, in maintenance or in transit. In the past, the Coast Guard has followed the lead of DoD in the adoption of linear bar-coding as the initial methodology to capturing logistics data connected to both physical material and paper transaction documentation. The success of bar-coding as a passive means of material identification is well documented both in the government and the private sector. Today, however, automatic identification technology has evolved into a suite of tools for facilitating data capture, aggregation, and transfer. As such, its potential benefit is greatest when integrated with logistics computer systems and compatible across functional areas, i.e., supply and maintenance. The variety of available technologies, however, makes choosing the most appropriate devices a difficult management dilemma. AIT

²USTRANSCOM, *Defense Intransit Visibility Integration Plan*, February 1995, p. iv.

now includes a variety of devices, including bar codes, magnetic stripes, integrated circuit cards, optical laser cards, radio frequency identification tags, and other magnetic storage media.³ AIT has evolved into an integral and essential part of the larger process of asset visibility, control, and management. Originally, barcoding technology was viewed only as a method for automating the written identification of material in storage or in shipment. Commercial activities, particularly in retail sales, transformed the bar codes into a critical segment of "point-of-sale" capturing of customer demand data.

In determining future AIT directions, the following general requirements should be considered:

- ◆ AIT devices should be capable of automatically capturing item identification and transaction data and then supporting comparison of those data against pre-positioned data in an interfaced automated information system.
- ◆ AIT devices should be capable of carrying and transferring data necessary to create a record in a functional database.
- ◆ AIT devices should be sufficiently flexible to accommodate both DoD and commercial standards/formats.
- ◆ AIT devices should be able to be fully integrated into the overall automated logistics process.
- ◆ AIT devices should be able to support data transfer across functions, i.e., supply, maintenance, and procurement.
- ◆ AIT devices, when integrated with supported automated information systems, should be able to assist in reconstituting transactions.
- ◆ AIT devices should support ANSI EDI standards.⁴

Although all AITs may not satisfy each general requirements, these criteria are useful in assisting managers in the selection of specific devices or technologies to meet future requirements. By first establishing the functional requirements to be satisfied by an AIT, much of the difficulty in choosing among the varied technologies available can be substantially reduced. Clearly, no single AIT device can satisfy all of the Coast Guard's requirements within cost limitations. However, by a comprehensive, up-front review of specific needs, the Coast Guard can obtain maximum capability at least cost using a minimum number of different technical solutions. Premature investment in AIT is often costly and unproductive. It is essential that the Coast Guard thoroughly review and document functional applications for AIT prior to the deployment of actual devices. This is particularly necessary in order to quantify the number and types

³Deputy Under Secretary of Defense (Logistics), *DoD Total Asset Visibility Implementation Plan*, (Draft), 20 April 1995, p. 7-1.

⁴*Ibid.*, p. 7-3.

of AIT devices required and to ensure the development of viable interfaces between the AIT data-collection point and using ADP systems.

CONTINUOUS ACQUISITION AND LIFE-CYCLE SUPPORT APPLICATIONS

Flexible Manufacturing

The Continuous Acquisition and Life-Cycle Support (CALS) concept has been heralded as a breakthrough approach to the eventual elimination of the current paper/document-oriented business processes. In practice, actual returns on investment for CALS applications have been disappointing. Within DoD, numerous CALS demonstration programs, despite substantial investment, have yet to attain widespread application. Several areas show significant potential.

One subset program under CALS, Flexible Computer Integrated Manufacturing (FCIM), involves automated production of small quantities of manufactured parts using digitized drawings and specifications linked to automated manufacturing equipment. This process can serve as an alternative to stocking seldom-required or out-of-production repair parts or other consumables. Because the Coast Guard tends to keep equipment operational for a long time, it requires long-term support of out-of-production end items and equipments. FCIM is particularly beneficial as an alternative to life-of-type stock purchases. Additionally, by purchasing technical data and drawings in digitized form to support future as-required production of repair parts in limited quantities, significant costs for both purchase and storage of inventory can often be avoided.

Because there is only marginal profit in flexible manufacturing of slow-moving, noncommercial items such as many of those items required by the Coast Guard, FCIM contracts are often executed for groups of items, sometimes combining high- and low-demand item groups. This approach has the added benefit of reducing procurement workload but may require cultural changes by both supply and procurement officials. Planning for FCIM also requires early identification and purchase of technical data for candidate FCIM items. The Coast Guard should consider developing several pilot FCIM consumable item projects to explore this alternative to stockage. Additionally, the Coast Guard should coordinate with DoD to use common FCIM contract and support arrangements.

Technical Data Storage and Transfer

A second potential for improved productivity and substantially reduced costs in applying CALS-type technology is in the area of electronic data repositories and transfer of technical data in digitized form. While the Coast Guard has begun exploring use of electronic management of drawings and other technical information in engineering applications and in support of allowance

documentation, little has been initiated in logistics business applications. The primary media for use and storage of technical data in areas such as item identification, interchangeability and substitutability, contracting, procurement, packaging, and quality assurance continues to be hard-copy files. DoD has made significant progress in implementing the capability to store and retrieve digitized technical data and engineering-type drawings in particular. The Coast Guard can capitalize on DoD's progress and use technologies already in use by DoD activities.

The Coast Guard should develop a joint logistics and procurement initiative to adopt DoD's Joint Engineering Data Management and Information Control System (JEDMICS) capability to automate engineering data repositories and technical data files used in support of material procurement actions. JEDMICS is an already operational system for storing, retrieving, managing, and distributing technical data in standard digital formats. By adopting the DoD system, substantial time and resources required to develop a Coast Guard-unique capability are eliminated. While some preliminary discussion of this opportunity has already occurred between Coast Guard personnel and the JEDMICS program office, a more substantial joint effort is warranted. For a minimum investment, installation of JEDMICS at initial Coast Guard supply center sites could be effected, possibly satelliting with existing DoD repositories. The benefits of this type of capability are significant. JEDMICS dramatically increases data availability, facilitating engineering control of technical data in support of parts acquisition and remanufacturing. Increased competition, reduced administrative lead-times, faster receipts, better and faster response to engineering changes and redesign, and overall technical data cost reduction can be achieved. By using the JEDMICS capability, the Coast Guard will be in a position to transition to procurement of digitized engineering data and drawings for new material acquisitions and, in many cases, to forego the expensive purchase of actual drawings, substituting purchase of on-line access to data rights and continuously updated source information. While we do not recommend a total one-time transfer of current hard-copy files to a digitized database, the Coast Guard implementation of JEDMICS would permit a phased and selective updating of current data and drawings to the more modern and useable digitized form.

AUTOMATED DECISION ASSISTANCE SUPPORT SYSTEMS

In the future, as the Coast Guard's engineering logistics center (ELC) comes on line, the supply centers face substantial reductions in inventory management and related support personnel. Remaining personnel resources will be spread thin, especially as new classes of ships and equipment come into the inventory during the next decade. Recent advances in automated "expert systems" technology offers a way of partially offsetting personnel reductions, particularly the loss of experience and expertise as older employees select retirement options.

For several years, numerous government and private-sector activities have attempted to find practical applications for artificial intelligence concepts under study in computer laboratories. While we are some time away from practical,

true artificial intelligence, significant progress has been made in the development of expert systems that help capture the knowledge and skills of more experienced employees and assist in making management decisions by guiding workers, particularly those less experienced, through an orderly decision-making process. As an example, the Defense Logistics Agency has developed its Automated Item Manager Support (AIMS) system to assist in purchasing decisions by allowing queries against a full range of data associated with making a material buy. By outlining alternative buy decisions in a structured fashion, AIMS also helps train new managers on how to decide when and how much to purchase. Other locally developed decision support systems for areas such as item provisioning and disposal decisions have permitted greater personnel productivity and saved considerable work hours.

The Coast Guard should survey automated logistics decision support programs under development within both the Coast Guard and DoD. Some of these systems may be readily adaptable to Coast Guard use, particularly as the ELC structure is further defined. A Coast Guard policy statement on the use of logistics decision support systems should be developed and made a requirement in future software applications.

MANAGING TRANSPORTATION COSTS

The costs of transporting material from the manufacturer to the Coast Guard supply centers and shoreside storage locations (first destination), and from there to Coast Guard operating units (second destination) are often considered a "sunk" cost of doing business. In most procurements, first-destination costs are imbedded in the cost of material and are not readily visible to inventory managers. However, more recently, as cost-reduction pressures become more intense, transportation expenses are being viewed as a suitable target for aggressive cost-reduction initiatives. Deregulation of the transportation industry and the emergence of world-class transporters, such as Federal Express, United Parcel Service, and Schneider National trucking have opened up substantial new opportunities to reduce delivery cycle time and transportation costs. Additionally, dramatic technology advances in tracking of in transit material offer significant approaches to improving asset visibility. For example, many trucking companies today are installing satellite-based two-way messaging systems on their truck fleets. Shipment tracking is standard procedure for many transportation companies.

Coast Guard inventory managers can readily take advantage of these new opportunities to improve asset visibility if material procurement contracts specify this requirement. To take full advantage of these targets for improvement in material transportation, the Coast Guard must first ensure full visibility of transportation costs. Material procurement contracts should include separate identification of transportation and handling charges. Supply centers should document and track these expenses and insist that procurement personnel negotiate best-value costs for material-handling and transportation costs as well as for the actual material-costs. Supply depots should track shipping costs for second-

destination shipments and provide automated reports to inventory managers cross-referencing shipping costs to material release orders. Management reports should regularly provide transportation expenditures aggregated by commodity groupings. Use of premium transportation should be generally limited to higher priority requirements. However, the Coast Guard's analysis of transportation resources should transcend the transportation portion of the supply support cycle. Today, commercial transportation costs are decreasing substantially more rapidly and in greater increments than material procurement, storage, and maintenance costs. This means that material stockage decisions that trade off transportation expenditures for reductions in other segments of logistics costs, such as storage and repair cycle investments, are generally wise management actions. As an initial step, a transportation cost report should be devised and included as a requirement in the supply centers' Activity Management Report.

As the Coast Guard increases its attention on minimizing transportation costs, it should test the approach of negotiating material procurement costs at the point of origin rather than the point of destination. This concept separates material costs from transportation and handling costs, and permits the Coast Guard to negotiate blanket contracts using transportation specialists such as Federal Express to pick up material at manufacturer or distributor locations and deliver them directly to Coast Guard users or storage depots. This approach also permits the Coast Guard to mandate earlier asset visibility, using standard EDI data sets, at the point of origin for vendor-initiated shipments.

To take full advantage of the ITV capability in GTN, as well as similar capabilities being used by commercial carriers, Coast Guard supply operations policy should be modified to require development and use of a capability to track material shipments through the transportation pipeline. Through use of commercial EDI transaction formats, data can be collected and made available to functional managers at every level of the logistics system. The Coast Guard can gain this capability and avoid major systems development costs by negotiating with DoD to use its systems and facilities for data handling and storing, and open accessing by Coast Guard managers.

APPENDIX C

Glossary

Glossary

ADP	=	automatic data processing
AIMS	=	Automated Item Manager Support
AIT	=	automatic identification technology
ANSI	=	American National Standards Institute
CALS	=	Continuous Acquisition and Life-Cycle Support
CD-ROM	=	compact disk-read-only memory
DAAS	=	Defense Automatic Addressing System
DCMC	=	DLA Contract Management Command
DLA	=	Defense Logistics Agency
DoD	=	Department of Defense
DSA	=	Defense Supply Agency
DVD	=	direct vendor delivery
ECONOP	=	Engineering Logistics Concept of Operations
EDI	=	electronic data interchange
ELC	=	engineering logistics center
EMIS	=	executive management information system
EOQ	=	economic order quantity
F&P CONOP	=	Finance and Procurement Concept of Operations
FAR	=	Federal Acquisition Regulation
FCIM	=	Flexible Computer Integrated Manufacturing
FEDLOG	=	federal logistics
FLS	=	Fleet Logistics System

FY	=	fiscal year
GAO	=	General Accounting Office
GTN	=	Global Transportation Network
ICP	=	inventory control point
ILS	=	integrated logistics support
IRM	=	information resources management
ITV	=	intransit visibility
JEDMICS	=	Joint Engineering Data Management and Information Control System
LIPS	=	Logistics Information Processing System
LMI	=	Logistics Management Institute
MILS	=	Military Logistics Standard System
MILSTRIP	=	Military Standard Requisitioning and Issue Procedures
MODELS	=	Modernization of Defense Logistics Standard Systems
MRU	=	minimum replacement unit
NSN	=	national stock number
OGA	=	Other government agency
PC	=	personal computer
PLT	=	procurement lead-time
POM	=	Program Objective Memorandum
SCB	=	Supply Center, Baltimore
SCCB	=	Supply Center, Curtis Bay
SCCR	=	Supply Center Computer Replacement
SIRMP	=	<i>Strategic Information Resources Management Plan</i>
STAR	=	small unit automated requisitioning

TAV = total asset visibility
USCG = United States Coast Guard
USTRANSCOM = United States Transportation Command

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