DoD Manual 4140.01, Volume 2

DoD Supply Chain Materiel Management Procedures: Demand and Supply Planning

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Approved by:	Robert H. McMahon, Assistant Secretary of Defense for Sustainment

Purpose: This manual is composed of several volumes, each containing its own purpose. In accordance with the authority in DoD Directive (DoDD) 5134.12 and DoD Instruction (DoDI) 4140.01:

- The manual implements policy, assigns responsibilities, and provides procedures for DoD materiel managers and others who work within or with the DoD supply system consistent with DoDI 4140.01, and establishes standard terminology for use in DoD supply chain materiel management.
- This volume describes procedures for the DoD supply chain materiel management processes associated with demand and supply planning.

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SECTION 1: GENERAL ISSUANCE INFORMATION

APPLICABILITY. This volume applies to OSD, the Military Departments (including the Coast Guard at all times, including when it is a Service in the Department of Homeland Security by agreement with that Department), the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the DoD (referred to collectively in this issuance as the "DoD Components").

SECTION 2: RESPONSIBILITIES

2.1. ASSISTANT SECRETARY OF DEFENSE FOR SUSTAINMENT (ASD(S)). Under the authority, direction, and control of the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)), the ASD(S) oversees the DoD supply chain planning process.

2.2. DOD COMPONENT HEADS. The DoD Component heads:

a. Share information on their supply chain requirements with their supply sources (e.g., vendors, maintenance activities, or contingency contracting organizations) to support cost-effective collaborative planning with end-to-end visibility of DoD materiel across the DoD supply chain.

b. Use demand and supply planning to optimize DoD supply chain resources. Collaborate with supply chain support providers and customers to efficiently and securely meet mission requirements.

c. Plan and provide resources for all elements of the DoD supply chain to meet customer demand. Develop and establish risk management and support strategies to meet future DoD supply chain requirements for the future.

2.3. SECRETARIES OF THE MILITARY DEPARTMENTS AND DIRECTOR, DEFENSE LOGISTICS AGENCY (DLA). In addition to the responsibilities in Paragraph 2.2., the Secretaries of the Military Departments and the Director, DLA (the Director, DLA is under the authority, direction, and control of the USD(A&S), through the ASD(S)):

a. Ensure that new items that are acquired to carry out mission requirements are properly cataloged, classified, and coded according to Sections 2451-2454 and 2456-2458 of Title 10, United States Code, as described in Volume 8 of this manual.

b. Establish and maintain, within authorized funding, a war reserve materiel program for secondary items that are required in accordance with DoDI 3110.06.

SECTION 3: PLANNING

3.1. SUPPLY CHAIN PLANNING AND EXECUTION. The DoD Components will:

a. Provide for and manage an integrated planning infrastructure that addresses demand and supply planning and the supply chain processes of source, make and maintain, deliver, and return (this process is discussed in Volumes 3- 6 of this manual). Establish and communicate DoD supply chain plans that:

(1) Provide for support strategies as described in Volume 3 of this manual.

(2) Execute a sales and operations planning framework (described in Volume 12 of this manual), over an appropriate planning interval (e.g., long-term, annual, monthly, weekly) so that all available resources are used to efficiently meet DoD supply chain requirements.

(3) Address mitigating risks to avoid any disruptions to the DoD supply chain.

b. Collaborate with maintenance, distribution, or transportation managers and customers to determine optimal support strategies that meet documented performance requirements. For example, those requirements that are being acquired under a contract with a commercial vendor or those requirements that are filled by an organic supply source and supplied to another component under a performance based agreement. The DoD Components will:

(1) Use a performance-based logistics (PBL) strategy that considers performance attributes of consistency, responsiveness, flexibility, cost, security, equipment reliability, and asset allocation. The DoD Components will specify performance requirements in PBL contracts with commercial suppliers who manage items for the DoD. For items managed by organic sources of supply, requirements must be delineated in performance-based agreements between suppliers and their customers.

(2) Establish support strategies that satisfy customer performance requirements by:

(a) Setting parameters or goals for computing inventory levels that meet documented performance requirements at minimum total cost in accordance with Section 6 of this volume.

(b) Collaborating with customers on their future needs when classifying and coding items for requirements in accordance with Section 5 of this volume.

(3) Maximize the use of DoD-owned inventory (across all DoD Components) on all contractual or support arrangements and partnering agreements before procuring inventory items from commercial sources.

(4) Protect critical program information within a research, development, test, and evaluation program throughout the military life cycle of the defense system, in accordance with DoDI 5200.39.

(5) Protect critical components of trusted systems and networks throughout the system or network life cycle in accordance with DoDI 5200.44.

(6) Emphasize metrics and steps to ensure that the spares pipeline is not subordinate to ongoing acquisitions of items from commercial sources that are procured in support of mission requirements.

c. Establish DoD supply chains that support time-definite delivery and quality of order fulfillment (e.g., right quantity, right condition, and right documentation). DoD Components will:

(1) Establish supply chains that meet readiness-based customer support goals for weapon system items.

(2) Design supply chains with the flexibility and resources to compensate for volatility of customer demand, the supplier cycle fluctuations, and identified risks while meeting customer needs.

(3) Work with customers to reduce the scale of the logistics supply chain in military operations and, thus, reduce the risks from interruptions in the supply chain process and the interception of supplies.

(4) Plan and provide resources to support the elements of the DoD supply chain to meet customer demand. The DoD Components will:

(a) Ensure that the inventory is the right size to efficiently meet customer demand in accordance with Section 8 of this volume.

(b) For items stocked, plan inventory to provision new materiel in accordance with Section 4 of this volume. Determine peacetime, wartime, and high tempo operating condition replenishment stock levels by location (i.e., stockage location and echelon) to efficiently satisfy customer demands.

(c) Consider planning factors described in Joint Publication 4-0, including total supply chain costs (e.g., inventory holding, materiel handling, transportation, and the cost to protect the supply chain from tactical and operational interruptions).

d. Use DoD asset visibility capabilities to maximize existing inventories, DLA-managed assets, or component-owned assets at storage locations throughout DoD. They will:

(1) Use asset visibility in all issuable or potentially issuable condition codes and requirements of retail supply activities to satisfy requirements across the supply chain.

(a) Use retail-level activities that will provide the materiel manager with the asset and requirements information needed to make decisions on procurement, maintenance, and lateral redistribution of supplies as described in Volume 5 of this manual.

(b) Consider using knowledge of wholesale and retail assets to compute materiel stockage requirements levels when multi-echelon requirements computation processes are used as described in Section 8 of this volume. Where cost effective, retail level supply activities will make their asset quantities (excluding assets in the hands of the user) visible to the requirements computing system of the managing DoD Component to support the process.

(2) Provide the Combatant Commands with visibility of materiel assets on hand, in transit, and on order to their area of responsibility that helps them with:

(a) The information needed for in-theater operational planning and for repositioning or redirecting of assets to support critical operations.

(b) In-theater joint deployment and distribution operations centers to effect cross-docking of assets between units, increase asset visibility, improve movement of materiel to and within theater, and move materiel out of theater.

(3) Provide the Military Departments headquarters, subordinate units, and the weapon system managers of retail-level assets and requirements within their respective Military Departments with sufficient visibility of materiel to assess their capability to support operational and contingency plans and to support weapon system readiness.

(4) Participate in the DLA In-Storage Visibility Program and minimize restrictions on the use of available consumable inventories to offset other component's orders and to fulfill open backorders for consumable materiel. Exceptions include:

(a) Forward-deployed and overseas units with limited or prohibitively costly access to transportation resources.

(b) Contingency locations that cannot divert manpower to support redistribution of consumable materiel.

(5) Use visibility of assets in all condition codes transferred to the DLA Disposition Services to recall serviceable items instead of initiating a procurement or depot repair action for those items.

3.2. DEMAND AND SUPPLY PLANNING.

a. Materiel managers will:

(1) Establish and manage a demand planning process that accumulates and forecasts customer demand for products or services at the appropriate category, organizational level, and time interval in accordance with Section 7 of this volume.

(2) Establish and manage a supply planning process that plans for acquiring and maintaining the inventory needed to meet customer demand.

(3) Use all applicable planning information including operating programs, customer requirements, supply chain resources, and total assets in their demand and supply planning to maximize supply chain productivity.

(4) Consider the context and perspective of joint theater operations for demand and supply planning as directed in Joint Publication 4-0.

b. The DoD Components will:

(1) Work to integrate supply chains to optimize demand and supply planning.

(2) Ensure that all supply chain work centers and organizations understand their impact on supply and demand balancing.

(3) Use the procedures for accessing and sharing information used in demand and supply planning in Volume 7 of this manual.

SECTION 4: PROVISIONING

4.1. PROVISIONING PLANNING. Provisioning planning begins with program initiation for planning and acquiring initial spares to support a new or existing weapon system, subsystem, or major end item and continues through the system acquisition.

a. Materiel managers and primary inventory control activities (PICA) will work with program managers to:

(1) Address logistics requirements and related supply chain costs (e.g., materiel, storage, and transportation) within the total life-cycle systems management. Ensure the coordination of provisioning requirements and initial materiel support activities via provisioning conferences.

(2) Document technical and logistics data that is relevant to end item supply support and make this data accessible to DoD and commercial materiel managers who are responsible for provisioning, follow-on support, and evaluation of supply chain performance. Provide timely access to provisioning data required to identify, acquire, and assess support items.

(3) Catalog items repeatedly used, bought, stocked, or distributed in accordance with Section 2451 of Title 10, United States Code. Generally, catalog new items before first units are equipped in accordance with the procedures in DoD Manual (DoDM) 4100.39. Assign demilitarization, essentiality, critical item control, and other item-level specific codes in accordance with the procedures in DoDM 4100.39.

(4) Assign demilitarization coding to component items of new weapon systems or major end items in accordance with Volume 1 of DoD 4160.28-M. Materiel managers will ensure the assignments are made early in the development of new weapon systems or major end items before any new component item is released to a non-military activity.

b. When the DoD Components are the preferred source of supply for a new major system, they will integrate provisioning requirements and activities into the system acquisition process in accordance with performance based agreements with program managers.

c. Items not associated with the acquisition of a new major system may be provisioned (e.g., items newly introduced into the supply system and items associated with the modification of a system or the introduction of a new subsystem or component). In such cases, materiel managers, together with user representatives, will set support goals according to Section 5 of this volume, and evaluate various supply support strategies for the provisioning of these items (e.g., organic and contractor) as described in Volume 3 of this manual. Special procedures for introducing new clothing and textile items are in Volume 9 of this manual.

4.2. PROVISIONING DATA MANAGEMENT.

a. When materiel managers acquire provisioning technical documentation (PTD) and engineering data for provisioning (EDFP) needed for future procurement of system components and parts, they will:

(1) Familiarize themselves with the data requirements in Government Electronics and Information Technology Association Standard 0007 and Military Handbook 502A. For the acquisition of parts for which the government does not have data with rights to use in a specification or drawing for competitive acquisition, refer to Subpart 217.7504 of the Defense Federal Acquisition Regulation Supplement (DFARS).

(2) Tailor the EDFP to get electronic 3-dimensional model based data, product engineering drawings, or commercial drawings. Generate and accept the PTD and the EDFP, preferably in digital format.

(3) Provide program managers with applicable data requirements and deliverables for incorporating into the solicitation for acquiring end items.

(4) Receive contractually acquired PTD and EDFP deliverables from equipment manufacturers. Materiel managers will work with technical and procurement personnel to verify that the PTD and EDFP are sufficient to support procuring additional required support items that are required. Identify any data deficiencies and ensure that they are corrected during the provisioning review process if possible, or before the contract for the procurement of the end item expires.

(5) For joint Military Service acquisition programs, establish uniform PTD and EDFP requirements. The materiel manager of the lead DoD Component will coordinate provisioning requirements with the supporting DoD Components to avoid unnecessary duplication of data, formats, procedures, and operations.

b. Materiel managers will use provisioning data to:

(1) Assign source, maintenance, and recoverability (SMR) coding according to Section 5 of this volume.

(2) Complete provisioning screening of the range and quantity of support items necessary to operate and maintain an end item of materiel for an initial period of service.

(3) Review for parts standardization.

(4) Review for potential interchangeability and substitutability.

(5) Assign item names as prescribed in DoDM 4100.39.

(6) Assign item management codes as prescribed in Volume 2 of DoD 4140.26-M.

(7) Prepare item identifications for assigning national stock numbers (NSNs) as prescribed in the Federal Logistics Information System technical procedures at the DLA Website, referenced in DoDM 4100.39.

(8) Prepare allowance and issue lists.

(9) Determine requirements for items.

(10) Procure spares, repair parts, and supplies for initial support, unless initial support is procured by the program manager.

c. For non-developmental items, materiel managers will, where possible, use contractor commercial data products provided contractually to satisfy provisioning data requirements. Whenever economically feasible, materiel managers should adopt commercial off-the-shelf software to exchange product data and adopt open-source commercial product data exchange.

d. During acquisition, materiel managers will ensure that provisioned support items are coded and reviewed for shelf-life considerations and assign a shelf-life code according to the DoD Shelf-Life Item Management Program as described in Volume 5 of this manual. Identify shelf-life characteristics of support items using the procedures and codes identified in Volume 1 of DoDM 4140.27. Materiel managers should also identify and potentially use non-hazardous, non-shelf-life, longer shelf-life, or recycled items where possible.

e. During provisioning, materiel managers will ensure that the manufacturer or engineering support activity performs a criticality determination for each new item. Aviation and ship items that have flight safety critical characteristics have additional requirements outlined in Volume 11 of this manual.

4.3. PROVISIONING SCREENING.

a. Materiel managers and PICA will work with program managers to reduce the variety of parts and associated documentation required by weapon systems or end items through provisioning screening.

b. DoD Components will coordinate with the Integrated Materiel Management Committee, in accordance with Volume 3 of this manual, on the uniform DoD-wide guidance for improving the overall efficiency and effectiveness of procedures and program controls for consumable items subject to item management coding and non-consumable items subject to non-consumable item materiel support codes within the DoD and other applicable federal agencies as needed.

c. During the provisioning process, the DoD Components will:

(1) Screen manufacturers' part numbers and other reference numbers in accordance with DoDM 4100.39 to prevent unnecessary or duplicate items from entering the supply system.

(2) Fill the requirement from existing stocks or through normal replenishment procurement when provisioning screening reveals that a support item or an acceptable substitute item is already established (i.e., already assigned a NSN). This additional provisioning requirement must be coordinated with the materiel manager.

(3) Facilitate electronic access to Federal Catalog System files by contractors who are performing under current weapon system development or production contracts.

(4) Use the DLA Information Services for additional screening support as needed and to enter new state-of-the-art technology into the supply system by developing new cataloging nomenclature and descriptive methods.

4.4. TRANSITION SUPPORT. When transitioning from initial contractor support to organic supply support is required, materiel managers will develop:

a. A transition schedule based on design stability and supply support concept compatibility with maintenance concepts and other logistics support elements including logistics data.

b. Schedules from contractor to organic supply support transition that are consistent with the system and equipment logistics support plan. Consider phased support to allow for the cost-effective transition to organic supply support.

c. Transition plans to transfer some or all of the support for weapon system from organic assets, including supply support for established items, when a contractor provides supply support.

4.5. PROVISIONING REQUIREMENTS DETERMINATION.

a. Provisioning Procedures for Organic Requirements.

(1) DoD Components will compute requirements for provisioned items using the latest end item program or delivery data and projected mature maintenance replacement rates. When using interim contractor support for computing DoD Component requirements for provisioned items, materiel managers will identify the necessary usage data to be collected and delivered by the contractor in a format compatible with the automated system used in the U.S. Government's requirements determination process.

(2) Procuring partial quantities of computed requirements for the provisioning of selected spare and repair parts may be deferred when program uncertainties or other circumstances during the provisioning period of these items make such calculated risks acceptable in the context of available resources and readiness goals.

(3) The DoD Components will retain documentation that portrays how contractor and U.S. Government factors were evaluated and used to determine provisioning requirements.

(4) Extend provisioning requirements based on engineering data through the demand development period (DDP) as addressed in Section 7 of this volume.

(5) Contractors and depot maintenance managers may recommend the range and quantity of support items required to be provisioned.

(6) When an established item is managed by a DoD Component other than the provisioning one, the DoD Component using the item registers the requirement with the materiel manager by submitting supply support requests (SSRs) for consumable items, in accordance with

Volume 1 of DoD 4140.26-M, and by submitting non-consumable item materiel support requests (NIMSRs) for reparable items, in accordance with DoDM 4140.68.

(7) The SSR and NIMSR process is designed to provide materiel managers with an estimate of the time-phased requirements necessary to provide support items for weapon systems as they are activated. The SSRs and NIMSRs submitted to the materiel managers should include a forecasted 12-month requirement, identify how the requirement to provide support items is computed, and should be based on average program requirements during the DDP. Materiel managers may adjust the computations for support item requirements that have been submitted by DoD Components on the basis of affordability, but these adjustments must reflect the dollar savings and the impact on system or equipment readiness resulting from the adjustment.

(8) After the DDP for support items is complete, any pre-planned increases in end item density or operating usage should not be the basis for further procurement of initial spares. Those requirements will be considered replenishment spares and should be satisfied using the provisioning requirements process.

b. Provisioning with Readiness-Based Sparing (RBS). To determine the inventory investment required for the fielding of a new weapon system, the DoD Components will use RBS methods, where feasible. Paragraph 8.3 of this volume contains the procedures for computing RBS inventory requirements.

(1) DoD Components will use tools that implement RBS methods for provisioning new weapon systems to determine the optimum range and quantity of items required at all stockage and user locations to meet approved weapon system readiness goals.

(2) DoD Components will retain procedural control over RBS tools and processes.

(3) RBS methods will consider end item population build-ups during provisioning for demand and supply planning.

(4) DoD Components will establish quality standards to measure the effectiveness of RBS provisioning performance, RBS tools, and process improvement initiatives in the implementation of RBS methods.

c. Provisioning with Demand-Based Sparing (DBS). When use of RBS is infeasible, the DoD Components will use DBS methods. Paragraphs 8.4 and 8.5 of this volume contain the procedures for computing wholesale and retail DBS inventory requirements. For provisioning with DBS, the following limitations apply:

(1) DBS methods may be used for non-weapon system support provisioning where readiness requirements for systems or end items are not stated, where data is not available for input to RBS models, or where the application of RBS methods is not cost-effective.

(2) When using DBS methods, minimize the costs of achieving a targeted supply performance goal.

(3) Total provisioning stockage computed by DBS methods will not exceed 1 year of projected demand at each echelon in question.

(4) With DBS methods, no safety level quantities are authorized for provisioning.

(5) When anticipated demands are insufficient to justify stockage by DBS methods, only limited-demand or insurance items will be stocked.

4.6. PROCURING PROVISIONED SUPPORT ITEMS.

a. When the procurement of provisioned support items is selected as the preferred source of supply, DoD Components will:

(1) Create interactive support management plans that enable incremental scheduling and implementation of provisioned items support of weapon systems and equipment, based on configuration indenture and delivery of weapon systems and equipment.

(2) Develop and implement:

(a) Provisioning retail procurement levels based on end item density factors and site activation schedules.

(b) Provisioning wholesale procurement levels based on the average number of end items supported each month calculated for the time-weighted average month's program.

b. The procuring DoD Component may award a contract for long lead time items for provisioned items support using multiyear contracting, as outlined in Subpart 217.172 of the DFARS for long-lead time support items:

(1) To obtain limited quantities of long lead time items at not less than minimum economic rates.

(2) Which require early ordering to ensure timely delivery due to their complexity of the items' design due to complicated manufacturing processes, or limited production.

c. When procuring support items for DoD stocks, DoD Components will:

(1) Use phased-in procurement process to acquire support items based on weapon system or end item program development and delivery schedules.

(2) Use procurement lead times during the acquisition of support items before the fielding of an organically supported weapon system or end item.

d. DoD Components should issue orders for the procurement of provisioned support items incrementally so the funds are obligated based on the procurement lead time required to ensure the support items arrive for the scheduled initial outfitting support dates. When issuing orders incrementally is uneconomical, the procuring DoD Component may use an alternative method to ensure the support items arrive for the scheduled initial outfitting support dates.

e. DoD materiel managers, with product support managers and product support integrators selected by program managers, will:

(1) Integrate the acquisition of initial spares and replenishing spares into the requirements of production contracts.

(2) Acquire replenishment parts concurrently with parts being produced for the end item.

(3) Follow the guidance for contracts with provisioning requirements in Subpart 217.76 of the DFARS.

4.7. PROVISIONING PERFORMANCE MEASURES.

a. When DoD Components are the preferred source of supply, they will develop and maintain provisioning performance measures.

b. In accordance with DoDI 4140.01, DoD Components will include measurement criteria in these customer-oriented and performance-oriented measurement goals:

(1) Assessment of provisioning contribution to readiness or other PBL objectives in program performance agreements.

(2) Accuracy of provisioning buys, projected use versus actual use.

(3) Ability to meet provisioning milestones.

(4) Accuracy of provisioning documentation.

(5) Inventory efficiency, as measured by minimal inactive inventories.

SECTION 5: ITEM CLASSIFICATION AND CODING FOR STOCKAGE REQUIREMENTS

5.1. ITEM CLASSIFICATION CODING. The DoD Components will use:

a. Essentiality coding to identify secondary items needed to sustain weapon system readiness.

b. Controlled inventory item (CII) codes and critical safety item (CSI) codes to identify secondary items in need of special handling and control as prescribed in Volume 11 of this manual.

c. Acquisition advice codes (AACs) to identify how an item is managed at wholesale level of supply as:

(1) Stocked by a Military Service or DLA (either with readiness-based or demand-based requirements).

(2) Stocked with non-demand-based requirements by a Military Service or DLA.

(3) Non-stocked.

(4) Stocked by a commercial supplier for direct vendor delivery.

(5) Variations of how an item is managed as defined in Volume 2 of DoD 4140.26-M.

d. Reason for stockage codes (RSCs) to identify how an item is managed at the retail level of supply.

5.2. SMR ASSIGNMENT. To classify the source of supply, reparability, and recoverability of items, the DoD Components will:

a. Assign the uniform SMR codes in accordance with DoDM 4100.39, DoDM 4140.68, and Volume 6 of DoD 4140.26-M.

b. Coordinate coding decisions among the users to maximize inter-Service maintenance and supply support for end items used by multiple Military Departments.

c. Use SMR coding to classify items as “consumable,” “field-level reparable,” or “depot-level reparable.”

5.3. ESSENTIALITY ASSIGNMENT.

a. The Military Departments will:

(1) Ensure when generating weapon system application files that component items receive essentiality codes and those codes are accessible to materiel managers.

(2) Ensure the weapon system group codes and item essentiality codes listed in Paragraphs 5.3.b.(2) through 5.3.b.(3) are assigned and maintained. The Military Services may change group and essentiality coding to meet operational needs.

(3) Validate the weapon system group codes and item essentiality codes for their weapon systems periodically and provide any updates to respective materiel managers. Annually reconcile their essentiality codes against codes in the DLA weapon system support program and resolve identified discrepancies.

(a) Provide equipment application data to DoD materiel managers and the DLA Weapon System Support Program within 90 days of a change in an item's criteria or when items or weapon systems become obsolete. When a weapon system is being removed from active service or foreign military sales, notify the DLA weapon system support program manager of the phase-out schedule to allow DLA to align its essentiality coding and requirements computations with that schedule.

(b) When a change to the equipment application data results in a computer-generated rejection notice, research, correct, and resubmit the application data within 90 calendar days of the date of rejection.

b. The DoD Components will:

(1) Allocate management resources for each item based on its essentiality coding.

(2) Use the weapon system group codes in Table 1 to indicate how essential each weapon system or end item is to the mission of the Military Service and for inter-DoD Component exchange of weapon system data.

Table 1. Weapon System Group Codes

Code	Description
A	Highest Priority Mission-Essential. Only a limited number of weapon systems are designated Code A.
B	Lower Priority Mission-Essential.
C	Not Mission-Essential.

(3) Use one of the five item essentiality codes in Table 2 to indicate the degree to which failure of a secondary item that is part of an end item affects the ability of the end item to perform its intended operation and for inter-DoD Component exchange of item essentiality data.

Table 2. Item Essentiality Codes

Code	Description
1	Failure of the item renders the end item inoperable.
3	Failure of the item does not render the end item inoperable
5	Item does not qualify for the assignment of Code 1, but is needed for personal safety.
6	Item does not qualify for the assignment of Code 1, but is needed for legal, climatic, or other requirements peculiar to the planned operational environment of the end item.
7	Item does not qualify for the assignment of Code 1, but is needed to prevent the impairment or temporary reduction of operational effectiveness of the end item.

5.4. RSC ASSIGNMENT.

a. Purpose.

(1) The Military Departments and DLA will assign an RSC that identifies the rules that are applicable to the categorization of all secondary item inventories held at retail supply activities. That categorization applies to secondary item inventory that is held at retail supply activities without regard to the ownership or funding sources for the inventory.

(2) Within their materiel management systems, the Military Departments and DLA may use the specific codes listed below or any data element or combination of data elements to delineate inventory levels for secondary items held at retail supply activities.

b. Category Codes.

(1) Stocked Readiness. This demand-supported RSC is for an item with readiness-based requirements levels.

(2) Stocked Demand. This demand-supported RSC is for an item with demand-based requirements levels.

(3) Stocked Numeric. This non demand-supported RSC is for an item with demand that is available on a limited and intermittent basis (e.g., a seasonal item) and does not warrant demand-based requirements levels but does warrant the stockage required to meet demand-based requirements.

(4) Stocked Provisioning. This non-demand-supported RSC is for an item specifically stocked to support a newly introduced end item until requirements are forecast entirely upon actual demands. That period of assignment of non-demand based RSC may not exceed 2 years after actual demand for the item is established. The requirements objective that is established for these items is based upon the asset positioning policy and anticipated usage developed during the provisioning process.

(5) Stocked War Reserve. Stock specifically held to support a wartime requirement. The stock for an item can be divided between this category and any other demand-supported or non-demand-supported RSC.

(6) Not Stocked. This category is for items with no established requirements levels. Inventory or usage data may or may not exist for this category of items; however, orders placed on sources of supply are to satisfy customer backorders and not to replenish requirements levels.

(7) Other. This category is meant to be a temporary assignment (i.e., 90 days or fewer), until another RSC is assigned.

5.5. REVIEW REQUIREMENTS. As part of their internal control programs, DoD Components will have procedures dealing with item classification and coding:

a. The objective of the procedures will be to classify and code items accurately and properly.

b. The procedures will apply document analysis, direct observation, and sampling to ensure:

(1) DoD Component logistics systems are using the latest coding structures.

(2) DoD Component operating staff applying the codes have knowledge of the codes, their assignment, and their use within the DoD Component.

(3) DoD Component operating staff are trained on item classification and coding in accordance with DoD and DoD Component manuals.

(4) Code assignments are up-to-date and accurate.

c. DoD Components will review and update code assignments, if required, as follows:

(1) SMR code assignments for reparable items whenever repair costs become greater than 75 percent of their replacement costs (i.e., the sum of the cost to order and the acquisition price). If the item is no longer procurable (e.g., obsolete item), its SMR code should not be updated to a consumable item.

(2) SMR code assignments for consumable items whenever an item is experiencing a significant level of field repair and has a high annual demand value that indicates repair is a viable and cost effective alternative to procurement.

(3) Item essentiality code assignments whenever a change in weapon system configuration is replacing or deleting items.

(4) CII codes whenever there is a change to the item's tolerance, fit restrictions, application, nuclear hardness properties or other characteristics which affects the technical identification of the item.

(5) CSI codes whenever a design change may affect the item in accordance with Paragraph 6.2.k.(8) in Volume 11 of this manual.

(6) AAC codes whenever the materiel manager changes how the item is acquired or managed in accordance with the procedures in DoDM 4100.39.

(7) RSCs at a retail supply activity whenever the materiel manager changes how the item is managed.

d. To ensure the accuracy of item code assignments, DoD Components will:

(1) Sample SMR codes at least every 5 years in accordance with DoDM 4100.39.

(2) Sample item essentiality codes at least every 3 years.

(3) Conduct CII code reviews in accordance with Paragraph 5.2.c. of Volume 11 of this manual at least every 5 years.

(4) Sample AACs at least every 5 years.

SECTION 6: SUPPORT GOALS FOR SECONDARY ITEMS

6.1. SUPPORT GOALS. DoD materiel management activities (e.g., organic or commercial inventory control points (ICPs) and retail supply activities) that manage secondary items will establish and use support goals that apply as an integral part of the process to compute stockage requirements and asset allocation. DoD Components will:

a. Establish support goals for all DoD secondary items to ensure the supply system uses resources that are available to meet RBS weapon system targets, weapon system and equipment performance objectives, and unit readiness objectives at the lowest cost. Establishing these goals is required regardless of the source or method of support (e.g., organic, inter-governmental, private contractor, and partnership)

b. Establish base support goals for the performance agreements that are negotiated with customers or, if no agreement exists, for the enterprise metrics that have been adopted for support.

c. Establish support goals to provide logistics managers with weapons system and unit readiness capability-based quantitative targets in order to meet in supply planning and asset allocation and to achieve goals while minimizing costs.

d. Use support goals to assess the performance of the DoD supply chain and to evaluate the effectiveness and benefits of process improvements to the supply chain.

e. Establish and maintain rules for calculating performance measurements against established support goals.

f. Set target support goals that reflect both peacetime and wartime needs. Synchronize support goals with the programming and budgeting process to ensure consistency with management decisions made to set priorities and to commit resources to achieve those priorities in the establishment of stockage requirements and asset allocation.

g. Quantify support goals that apply to item populations (i.e., organizational, commodity, equipment, or weapon system) to permit cost tradeoffs.

h. Establish individual item goals when they are required to meet specific customer requirements or when they are generated by a process that considers cost tradeoffs in meeting a population readiness or other established support goal.

i. Emphasize timely receipt of items ordered by customers of the supply system to achieve responsive, consistent, and reliable support and contribute to the overall confidence of customers in the DoD supply system. All organizations in the supply chain should emphasize the importance of time in support goals for their respective logistics functions.

6.2. SETTING SUPPORT GOALS.

a. In setting support goals that encompass the total responsiveness of the supply system, the DoD Components will consider both the performance they can expect from having the right materiel in inventory and the time to deliver materiel in response to a customer order.

b. For items essential to weapon system performance, support goals for inventory performance will support the readiness goal of the weapon system throughout its life cycle (e.g., operational availability and mission capable rates). DoD Components will:

(1) Set weapon system readiness goals with weapon system managers or operational commands.

(2) Set inventory performance goals to:

(a) Meet readiness goals of a weapon system throughout its life cycle.

(b) Balance stock positioning goals in order to minimize total costs.

(c) Synchronize distribution, integrity, and security requirements with inventory planning efforts.

(3) Set goals to manage supply chain risk management for critical components of critical systems essential to weapons systems performance in accordance with procedures on the protection of mission critical functions to achieve trusted systems and networks in Section 8 of Enclosure 2 of DoDI 5200.44.

c. For items not essential to weapon systems or for items for systems that are not categorized as weapon systems, DoD Components will base support goals for inventory performance on the time that is needed to fill a customer's order and whether that order is requisitioned to an ICP or is considered a demand request to a retail supply activity. Those time goals may be established by organizational, commodity, equipment, or weapon system groupings in order to apply them to the computations for individual item requirements.

d. Program managers or materiel managers will negotiate support goals with the commercial sources that are providing contractual support for secondary items under contracts for the provision of direct materiel support to DoD activities. Program managers or materiel managers should include in their negotiations contractual support goals that the commercial sources can use to size their inventories used to support contract performance. Program managers or materiel managers will consider overall inventory performance goals when negotiating contract performance requirements with commercial sources that are providing support for secondary items.

e. For timely delivery and process improvement in responding to requisitions to the ICPs, the DoD Components will use negotiated time-definite delivery standards or, if no standards exist, the general delivery standards described in Volume 8 of this manual.

f. The DoD Components will provide an automated capability to store and retrieve support goals and related item data that permits historical performance analysis at an enterprise, group, or item level. Include data for items supported from both organic and commercial sources. Maintain this capability throughout the life cycle of the supported end item or for as long as the DoD Component deems necessary.

SECTION 7: FORECASTING CUSTOMER DEMAND

7.1. DEMAND FOR FORECASTABLE AND NON-FORECASTABLE ITEMS.

a. DoD Components will use demand frequency and demand variability to identify items (or groups of items) as forecastable or non-forecastable.

b. The conditions for identifying a non-forecastable item are:

(1) No demand history or forecasts exist for the item as the occurrence of demand is based solely on the potential of a catastrophic event.

(2) Demand for the item is considered limited:

(a) The item is not new to the supply system but historical demand for the item is too infrequent to support the use of any quantitative forecasting model.

(b) The item is new to the supply system and neither engineering estimated demand nor forecasted demand based on an analogous technique utilizing "like items" is available.

(3) Historical demand for the item is not limited but is intermittent or has high volatility to the extent that any quantitative model for the demand of the item would not produce viable forecasts.

c. DoD Components will use quantitative techniques to assess the forecastability of items under their cognizance. At a minimum, an item's demand intermittency, volatility segmentation, and level of collaboration will be used.

(1) To judge demand intermittency and volatility for an item, DoD Components should have a minimum of 2 years of historical demand for the item, preferably 5 years.

(a) Each DoD Component will select the time period for dividing historical demand (e.g., by month, by quarter) for purposes of determining demand intermittency and volatility.

(b) If 2 years of historical demand is not available, DoD Components may use the demand history for a similar item or engineering estimates for the item that have been simulated over 2 years.

(2) To quantify demand intermittency of the item, DoD Components will calculate the percent of total historical demand periods that have non-zero demand. DoD Components should use Table 3 to segment items by their demand intermittency.

(3) To quantify demand volatility, DoD Components will use the demand coefficient of variation (CV) or a similar statistical measure of variance. CV is calculated as the ratio of the standard deviation of the demand to the average demand and is normally expressed as a percentage. When using CV to segment items by their demand volatility, DoD Components

should use the construct in Table 4, or a similar construct if using a different measure of variance.

Table 3. Segmenting Items by Demand Intermittency

Intermittency Segment	Description	Suggested Percentage of Demand History
Limited	Almost no periods of demand	Less than 10%
Uneven	Few periods of demand	Between 10% and 60%
Erratic	A fair number of periods of demand	Between 60% and 85%
Continuous	Many periods of demand	Greater than 85%

Table 4. Segmenting Items by Demand Volatility

Volatility Segment	Description	Suggested CV Percentage
Low variance	The demand history for the item has little volatility as the standard deviation of demand is less than the average demand.	Less than 75%
Medium variance	The demand history for the item has volatility but the standard deviation of demand is near the average demand.	Between 75% and 125%
High variance	The demand history for the item is highly volatility as the standard deviation of demand is greater than the average demand.	Greater than 125%

(4) The DoD Components should use Tables 3 and 4 to identify forecastable and non-forecastable items:

(a) DoD Components should treat items with low variance and continuous or erratic demand and items with medium variance and continuous demand as forecastable.

(b) DoD Components should treat items with limited demand as non-forecastable and items with high variance as non-forecastable unless their demand is continuous.

(c) DoD Components should treat items with medium variance and uneven demand as non-forecastable, if feasible.

(d) DoD Components may treat items with medium variance and erratic demand, and items with low variance and uneven demand as either forecastable or non-forecastable depending on the accuracy of the forecast produced by the DoD Component's quantitative models and level of collaboration for those items.

(e) Table 5 illustrates the results of procedures in Paragraphs 7.1.c.(4)(a) through 7.1.c.(4)(d).

Table 5. Segmenting Items as Forecastable and Non-Forecasting Based on Demand Intermittency and Volatility

		Intermittency			
		Continuous	Erratic	Uneven	Limited
Volatility	Low variance	Forecastable	Forecastable	Forecastability dependent on accuracy	Non-forecastable
	Medium variance	Forecastable	Forecastability dependent on accuracy	Non-forecastable	Non-forecastable
	High variance	Forecastability dependent on accuracy	Non-forecastable	Non-forecastable	Non-forecastable

(5) The DoD Components may deviate from the percentages shown in Tables 3 and 4 based on a documented analysis showing how different percentages provide better customer support.

d. When determining stockage requirements for non-forecastable items, DoD Components should use, if feasible, either the computations for non-forecastable items or the computations for non-demand-based requirements prescribed in Section 8 of this volume.

7.2. USE OF ENGINEERING ESTIMATES.

a. During the DDP for an item introduced as part of a new end item, DoD Components will use engineering estimates to forecast demand because there is no historical data available that can be used to forecast demand for the item.

(1) The DDP will extend from the initial date of organic support for a new end item to a point when demand can be forecasted using actual demands. For items initially under a warranty, the DDP starts at the end of the warranty period.

(2) If a representative operating time already exists, the DDP can be no more than 1 year. Otherwise, the DDP will normally not exceed 2 years. If at the end of the 2 year DDP, sufficient representative operating time has not been attained for the item, the DDP for the item may be extended up to 3 more years, for a total DDP of 5 years.

(3) If the end item incurs sufficient operating time during the period prior to organic support (that is, during the period of interim contractor support) and contractor's usage data is available, DoD Components may choose to use that data to forecast demand and eliminate the need to establish a DDP.

b. In establishing and using a DDP for an item, DoD Components:

(1) Should establish a DDP that is measured against an equipment operating standard (e.g., hours, miles, and rounds) instead of calendar time. If that is not possible, use a traditional calendar-based DDP.

(2) Will statistically validate actual usage of the item during the DDP. If actual usage data is not statistically valid, the materiel manager will continue to base estimates for the demand of the item on both engineering estimates and actual usage data for the item until statistically valid data is obtained.

(3) Whether using a calendar-based or operating standard-based DDP for the item, adjust demand forecasts with actual usage data when sufficient representative operating time exists or after 5 years (the maximum DDP).

c. During the DDP, DoD Components should combine actual usage with engineering estimates for the item when actual usage begins to occur.

(1) For example, a DoD Component with a 2-year DDP for an item may start with the engineering estimate as the forecast but after 6 months use ¾ of the engineering estimate plus ¼ of the actual usage as the forecast. Then after 1 year, the DoD Component may use ½ of the engineering estimate plus ½ of the actual usage as the forecast and, after 1 year and 6 months, use ¼ of the engineering estimate plus ¾ of the actual usage as the forecast. Finally, after 2 years, the Components would use the actual usage as the forecast.

(2) When combining actual usage with engineering estimates to forecast demand for an item, DoD Components will use a technique that produces the most viable forecast during the DDP of the itme.

7.3. USE OF QUANTITATIVE MODELS.

a. For forecastable items, DoD Components will use quantitative models to forecast demand for these items.

b. To forecast the demand expected to be placed on the supply system for forecastable items within a specified time, DoD Components may use models that consider only historical demand or models that combine future program data with historical demand or failure data for the item. DoD Components will:

(1) Retain sufficient historical demand or failure data and program data for forecastable items to continue using the current model to forecast demand, or will allow activities to transition to another model to forecast demand for these items.

(2) Where feasible, capture actual customer demands and usage of forecastable items at the point of sale and, along with collaborative forecasting, use the demand and usage to update future demand forecasts for these items at each echelon of supply.

(3) Maintain records of historical failure data with maintenance replacement data or supply requisition data for forecastable items. Record demand data, including reparable

generations and maintenance replacements, in a timely manner on the records of the intermediate level supply point.

c. Since no universal model exists for forecasting demand for all items, DoD Components will:

(1) Select the best models for forecastable items based on cost and performance trade-offs and ease of implementation. Cost of forecastable items is evaluated in terms of value of inventory and performance of forecastable items is evaluated based on business outcomes (e.g., number of backorders, average response time, supply availability, numbers and value of procurements, and numbers and dollar value of repair actions for reparable items).

(2) Will use demand to build forecasts to compute item requirements levels except for atypical demand occurrences and selected foreign military sales items. Materiel managers will:

(a) Use data filtering to identify and exclude or adjust atypical data for items that might unduly influence the forecast of the item, when using models that rely on historical data to forecast the demand of the item.

(b) Exclude foreign military sales for items that are not under cooperative logistics supply support arrangements.

(c) Include demand for items that customers identify as non-recurring to the extent that the materiel manager is able to demonstrate that a particular quantity of non-recurring demands of items will improve its forecasts.

(3) As explained in Paragraph 7.2., use engineering estimates to forecast future demand for items at the beginning of the demand development period as needed. After the demand development period, DoD Components will use actual demand data, augmented with program data, to forecast future demand for items. However, DoD Components will use engineering estimates if:

(a) An item has insufficient representative operating time to adjust the forecast with a valid statistical technique; or

(b) An engineering problem or forthcoming design change of the item means past demands are not indicative of future demands.

7.4. BASICS IN ESTABLISHING AND IMPROVING A FORECASTING PROCESS.

Besides identifying forecastable items and using quantitative models, DoD Components will consider the elements in Table 6 when establishing their forecasting process.

Table 6. Basics in Establishing and Improving a Forecasting Process

Element	Basic requirement	Advanced capability
Demand History	DoD Components will retain a 5 year history of customer demand for purposes of developing and testing forecasting quantitative models.	DoD Components will retain up to 15 years of history to develop and testing forecasting models.
Quantitative Models	DoD Components will use multiple models to account for level of demand, trends, seasonality, and volatility. Examples are: • Moving average • Moving average adjusted by operating tempo models • Exponential smoothing models • Regression models	If basic models prove lacking, DoD Components should investigate and incorporate, where appropriate, models that deal with more complicated demand patterns. Examples are: • Seasonal and trend models • Multivariate regression models • Croston model • Asymmetric threshold models • Transition models • Conditional volatility models • Support vector regressions • Neural networks
Program Data	DoD Components may include projected operational data, such as flying hours, sortie rates, steaming hours, rolls fired, and number of troop, or maintenance data, such as maintenance schedules and bill of materials, in their forecasts if the data can be shown to add accuracy.	The Component's process will evaluate the accuracy of projected operational data and adjust forecasts accordingly.
Parameter Setting and Diagnostics	The Component's process has provisions to change parameter setting with quantitative models and diagnostic capabilities to identify where changes are necessary.	The Component's process includes tests for autocorrelation, heteroscedasticity, unit roots, normality of residuals, outliers, etc.

Table 6. Basics in Establishing and Improving a Forecasting Process, continued

Element	Basic requirement	Advanced capability
Life Cycle	DoD Components will consider where an item is in its life cycle as part of its forecasting process: • Move from engineering estimates to quantitative models during the item introduction phase • If applicable, use end item densities to adjust forecasts during the end of life phase	The Component's process considers sub-phases with the three major life cycle phases of item introduction, sustainment, and end of life.
Quality Control	Materiel managers will flag variances in demand forecasts which are outside established parameters for management analysis and action.	The Component's materiel management system will flag for management analysis and action variances in demand forecasts which are outside established parameters.
Adjustments	Using their materiel management system, materiel managers will have the capability to adjust forecasts affected by: • erroneous, incomplete, or inapplicable data • the introduction or phase-out of weapon systems or equipment for items whose demand is significantly affected	Adjustments to forecasts are captured in a way that allows for the evaluation of forecast accuracy and bias before and after the adjustments.
Collaborative Input	The DoD Components will provide collaborative input to wholesale source of supply when such collaborative provides for more accurate forecasting of item demand than simple history.	To guard against over or under forecasting item demand by customers, DoD Component forecasting processes will provide for the evaluation of and adjustment of collaborative input in a manner that improves forecast accuracy.
Sales and Operations Planning	The process will support a business management decision framework with a limited or basic capability as defined in Volume 12 of this manual.	The process will support a business management decision framework with an advanced capability as defined in Volume 12 of this manual.
Training	Individuals responsible for the application of quantitative models used to forecast demand should have basic training on statistical algorithms and heuristics used to forecast demand.	Individual responsible for the application of quantitative models should have advanced training on statistical algorithms, heuristics, and data mining techniques that can be used to forecast demand.

7.5. COLLABORATION.

a. To improve the accuracy of demand forecasts, materiel managers and supply providers will collaborate with their customers to project future demand for items. Demand forecasts for items can be supported with demand forecasting models, special one-time events, or factors that will systematically change the item's demand.

(1) Program collaboration involves the collection of program data from customers for use in computing a demand forecast. In support of program collaboration, DoD Components will:

(a) Maintain records of past and future program data that provides actual quantitative measures of operation of the system or end item (e.g., the actual and planned number of hours flown or operated, component reliability experience, expected operating environment, the weapon system or end item density, or the number of overhauls or scheduled depot maintenance actions accomplished or planned).

(b) Use estimates of operations where actual program data is not available.

(c) Follow procedures in Volume 7 of this manual for storing and accessing weapon system data.

(2) Customer demand collaboration involves the submission of expected future demand from customers. For formal collaboration between materiel managers and their customers, the using DoD Components should use tools such as SSRs, special program requirements (SPRs) or the DLA Demand Data Exchange (DDE) Program.

(a) The DoD Components sponsoring new consumable item applications will use SSRs to pass forecasted wholesale and retail requirements to the respective materiel managers. The procedures governing SSRs are located in Volume 6 of DoD 4140.26-M.

(b) The using DoD Components may submit SPRs to the materiel manager to forecast special program or project requirements that are non-repetitive and may not be forecasted based on historical demand data.

1. SPRs will not be used for subsistence, war reserve, provisioning, and other requirements based on recurring demand.

2. SPR will be submitted as far in advance of the date required as practical, at least 90 days, to allow for sufficient time for materiel managers to act to acquire the assets needed to fill the special requirement.

3. When submitting SPRs, DoD Components will use the detailed procedures on the SPR process in Chapter 2 of Volume 2 of Defense Logistics Manual (DLM) 4000.25.

(c) The DLA DDE program allows DoD customers to provide DLA materiel managers with a projected supply plan that consists of demand quantities for future months for customer-selected items.

1. The DLA DDE program may be used for recurring demand requirements, subsistence, and other special one-time or project requirements listed in Chapter 2 of Volume 2 of DLM 4000.25.

2. The future months in the submitted supply plan may be as short as 12 months and as long as 60 months. The DLA DDE program will accept projected supply plans for 60 months where zeros are entered for those months with no plan data.

3. When submitting a projected supply plan via the DLA DDE program, DoD Components will use the detailed procedures on the DDE projected supply plan in Chapter 2 of Volume 2 of DLM 4000.25.

(d) A using DoD Component can submit item future demand quantities as either an SPR or as input to a DDE program but not both.

(3) Collaborating DoD Components will have internal control programs to ensure that the information they are receiving or submitting is as accurate as possible and can be used to improve the accuracy of demand forecasts.

(a) The program for submitting DoD Components will consist of internal controls and supporting documentation that ensure the appropriateness and accuracy of SPR and DDE submissions, correlate requisitions with related SPRs and DDEs, and ensure timely and accurate documentation of significant changes in demand forecasts.

(b) The program for DoD Components receiving SPRs and DDEs will consist of internal controls that ensure SPR and DDE data does not increase forecast error and the investment in inventory to support SPRs and DDEs does not lead to excessive growth of demand forecasts.

(c) A key internal control for receiving collaborative data is the value added to demand forecast accuracy by program collaboration and by customer collaboration. Value added metrics for each should serve as the basis for assessment the overall effectiveness of collaboration and for identifying areas where collaboration needs to be improved.

(4) DoD Components will:

(a) Use the standard procedures and electronic data interchange conventions in Chapter 2 of Volume 2 of DLM 4000.25 for SPR and DDE projected supply plan processing.

(b) Follow the standard accounting methods, electronic data interchange conventions, and procedures in Chapter 13 of DLM 4000.25-2 for the SPR and DDE projected supply plan process.

(5) For items that one wholesale materiel manager uses but for which another wholesale materiel manager has buy or repair responsibility for the Department, the using materiel manager will provide the managing materiel manager with demand forecast data for the item.

b. To improve the responsiveness and reliability of suppliers, DoD materiel managers should collaborate on expected future requirements with vendors who perform contracts to provide long term supply support through strategic sourcing and planned direct vendor delivery contracts.

(1) DoD materiel managers should work with the vendors on:

(a) The best way for the DoD Components to communicate future requirements to vendors.

(b) A way for vendors to notify materiel managers of any problems that require mutual resolution.

(2) DoD materiel managers will establish and maintain internal controls to monitor the accuracy and variability of expected future requirements transferred to vendors and, thereby, ensure the continuity and stability of supply while alerting vendors of the flexibility required to provide the requisite contractual support.

7.6. VALUE ADDED ANALYSIS.

a. DoD Components will determine the value that their demand forecasting process adds to the simplest of forecasting models, namely, the naive forecast, which is last period's demand.

(1) For purposes of analyzing demand forecasts and setting targets, the forecast value added metric is the differences in forecast accuracy and forecast bias percentages between the naïve forecast and the forecast produced by the DoD Component's forecasting process. DoD Components can also analyze forecasts and set targets by using the relative absolute error (RAE) metric to calculate the ratio of the actual forecast error and the forecast error for the naïve forecast.

(2) For purposes of identifying their value added to forecast accuracy and forecast bias to Deputy Assistant Secretary of Defense for Logistics, the DoD Components will use a period of 1 year.

b. Each DoD Component will use its value added analysis to evaluate its forecasts, set its targets for its forecasts, and to identify item forecasts that need improvement.

(1) Where the naive forecast produces better forecast accuracy (RAE >1) or forecast bias than the forecast out of the DoD Component process, the value added is negative and the DoD Component should improve their forecasting process.

(2) Where the forecast out of the DoD Component process produces better forecast accuracy (RAE < 1) or forecast bias than the naive forecast, the value added is positive and the

DoD Component need only seek improvement if the value added indicates that the forecast accuracy and forecast bias were not at the DoD Component's internal target.

(3) If a DoD Component is using periods less than a year for internal value added analyses, that is, months or quarters, the DoD Component may need to use more than one period to judge value added.

(4) When evaluating value added metrics, DoD Components may choose to segment their forecastable items into similar grouping based on characteristics such as demand frequency, demand value, weapon system application, etc.

(5) A DoD Component may set its value-added target based on a goal for its value added across all forecastable items, goals for items in value added ranges (either positive or negative ranges or both), or combinations of those goals. If a DoD Component sets a forecast target in terms of forecast accuracy or forecast bias, it may use value added analysis to determine if the target is realistic and achievable.

(a) To gauge the feasibility of potential targets, DoD Components may use value added distributions to establish minimum and maximum target thresholds for the quantitative models that they use within their forecasting process.

(b) When judging the relative performance of their forecasting process against goals, DoD Components should not only consider percentage and percentage point differences in value added metrics but also actual dollar value and quantity differences, particularly at the item level.

SECTION 8: MATERIEL STOCKAGE COMPUTATIONS

8.1. RIGHT SIZING INVENTORIES. To minimize total supply chain costs while supporting customer requirements, the Military Departments and DLA will use the methodologies in this section as well as the methodology prescribed in Section 9 of this volume for war reserve materiel.

8.2. COMPUTATIONAL METHODOLOGIES

a. Categorization and Use of Computational Methodologies.

(1) The DoD Components will categorize stockage requirements and associated levels of inventory as either wholesale or retail.

(a) The DoD Components will manage retail assets regardless of ownership under the retail inventory policies delineated in this section.

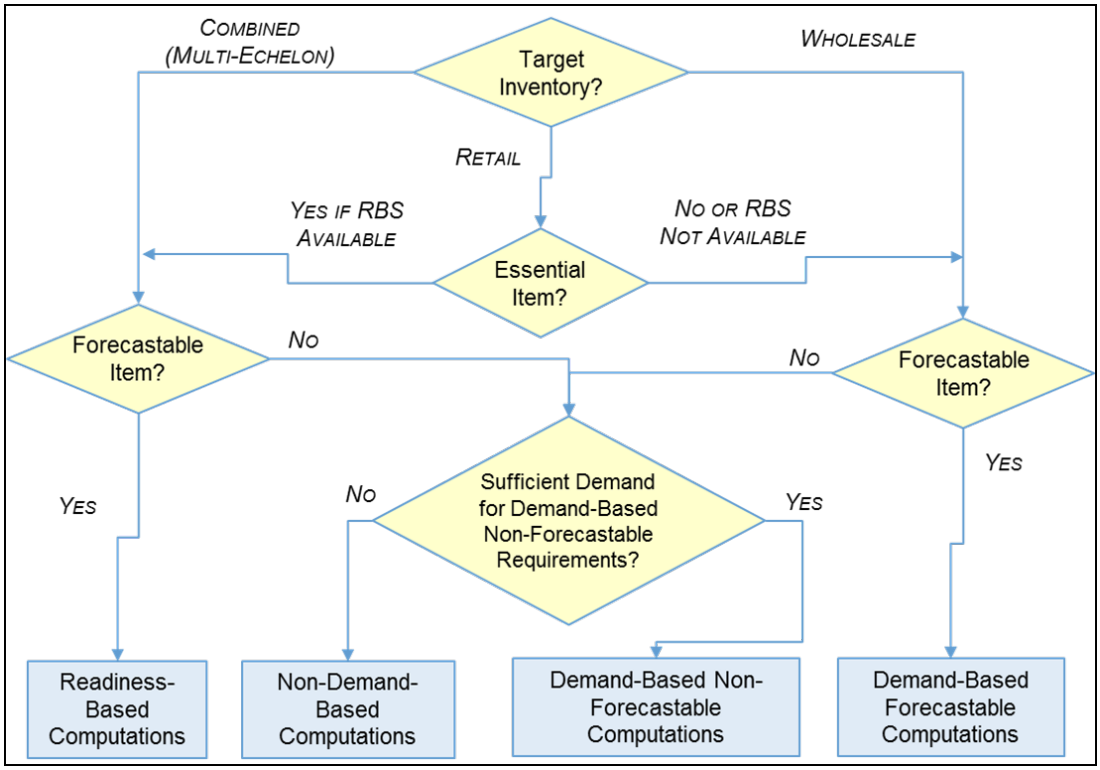
(b) The DoD Components will manage wholesale assets regardless of where positioned under wholesale inventory policies delineated in this section.

(2) To compute peacetime wholesale and retail stockage requirements for secondary items, the DoD Components will use readiness-based, demand-based, and non-demand-based methodologies in this section of the volume (see Volume 6 of this manual for guidance on the requirements computations of ammunition items).

(a) The methodologies and models will be compatible with those developed to achieve optimum stockage during provisioning. The methodologies and models that the DoD Components use to categorize stockage requirements and related levels of inventory should share comparable target objective functions, data elements, and computational techniques.

(b) As shown in Figure 1, the DoD Component's selection of the specific methodology used to compute stockage requirements for a secondary item will be based on the type of item (reparable or consumable), the supply performance goal (weapon system readiness or time to fill a demand), and the demand forecastability for the item.

Figure 1. Application of Computational Methodologies



b. RBS Methodologies.

(1) For weapon system items, materiel managers will use RBS modeling, when possible, to:

(a) Optimize their inventory to achieve weapon system performance objectives.

(b) Optimize support across both the wholesale and retail supply echelons.

(c) Account for the indenture level of items being spared, the essentiality of items to the operational design of the weapon system, and the levels of maintenance for the items and their higher assemblies.

(2) When RBS modeling is not possible for weapon system items and DoD Components must use DBS models, materiel managers and weapon system managers must establish time goals for those models through a collaborative process that links those time goals to the readiness goals of the particular weapon system.

(3) For secondary items that have support goals related to weapon system readiness, the DoD Components will compute requirements with RBS models that relate range and depth of stock to their effect on the operational availability of the weapon system. They will use models

that optimize support to achieve weapon system readiness goals for the least cost or maximize weapon system readiness for a specified level of funding.

c. DBS Methodologies.

(1) For secondary items that have time goals, the DoD Components will use DBS methodologies:

(a) Compute requirements for secondary items with time goals using sparing models that relate range and depth of stock to a target time.

(b) Include both the time to fill immediate issues and the time to fill back orders of these secondary items, minimizing the expected customer wait time.

(c) Use models that optimize stockage of secondary items with time goals to achieve the target time for the item at the least cost or minimize the expected fill time of the item within a specified budget.

(d) Project secondary item requirements and assets with enough lead time to place the order and receive the item before the time that it is actually needed.

(2) For depot-level reparable items, DoD Components will apply these additional procedures when using DBS methodologies:

(a) Compute the total requirements for each reparable item assigned so that an item may be:

1. Supplied to authorized using activities at the DoD organizational level (e.g., post, base, field, or ship) if failure of a reparable component prevents an end item or weapon system from achieving its mission.

2. Provided to replace a reparable item that has been determined to be beyond economical repair during the depot-repair process as described in Chapter 2 of Volume 11A of DoD 7000.14-R, or that may not be repaired within the same length of time as its next higher assembly.

(b) Project serviceable and unserviceable asset quantities for reparable items by month or quarter which will allow the projection of repair requirements and procurement of repair requirements in the same computation. Consider serviceable returns in requirements computations from both the asset and requirements perspectives described in Volume 6 of this manual.

d. Computational Considerations.

(1) To accommodate backward scheduling when managing items using an enterprise resource planning system, inventory requirements will be expressed in days of supply to allow for proper timing of procurement and repair actions as well as the proper sizing of procurement and repair quantities.

(2) DoD Components will adjust their computational parameters as necessary to account for items associated with an end item that is being phased out or that has a decline in demand.

(3) DoD Components will project stockage quantities to satisfy item requirements for national and international cooperative logistics supply support arrangements item requirements.

(4) When a DoD Component is using actual or projected assets to compute requirements for depot-level reparable items, DoD Components will:

(a) Use asset visibility capabilities to make serviceable assets and those that need repair at all supply levels (organic or commercial) visible and available to the materiel manager (supply system) to satisfy requirements at both the wholesale and retail levels. Ensure assets are visible and use them to offset requirements (retail or wholesale).

(b) Establish retail supply management system procedures (except afloat) to facilitate total system asset management. Where possible for the applicable materiel manager, retail systems should produce a daily summary of the supply transactions that affect the demand base or stock status of materiel.

(5) For depot-level reparable items with daily summary transaction summaries, materiel managers will use actual consumer demands to make requirements computations, procurement decisions, and stock positioning decisions.

(a) This requirement applies to DoD Component-owned inventory at contractor-operated retail activities as well as inventory within the DoD Component supply management systems.

(b) Materiel managers at the retail level will maintain item accounting (as opposed to dollar value inventory accounting) for all items they have determined require daily summary transaction listings.

(6) For reparable assets held at the retail level, items may be placed in rotatable pools or positioned near expected consumers.

e. Information Exchanges.

(1) For reparable items managed and used by more than one DoD Component, PICAs and secondary inventory control activities (SICAs) should collaborate through information exchanges to gain the following benefits:

(a) Reduced stock-outs between the PICA and SICAs.

(b) Reduced PICA and SICA excess stocks.

(c) Lower levels of investment in inventory across DoD.

(2) If requested by the PICA, SICAs should provide the following:

(a) The demand forecast data for the item, both weapon system and non-weapon system forecasted demand. This data will assist the PICA in sizing its inventory to deal with any deviations from historical data.

(b) The requisition response time objective for the item by weapon system. This data will assist the PICA in sizing its inventory to provide the levels of support needed by the SICAs.

(c) The number of retail assets above the retail requisitioning objective by item. This information will assist the PICA in offsetting inventory requirements and reducing the procurement of unneeded assets.

(3) Using SICA data, PICAs should be able to compute the items' buy or repair requirements with the goals of attaining the users' weapon system availability objectives within the maximum requisition response times. Based on those computations, PICAs should be able to advise SICAs of the achievable requisition response time that is achievable for each item, and SICAs should be able to determine the impact of the achievable requisition response times that is achievable on cost and weapon system availability.

(4) If requested by a SICA, PICAs, which do not rely on information exchanges, should be able to advise SICAs of the achievable requisition response time for each item, and SICAs should be able to determine the impact of the achievable requisition response times on cost and weapon system availability.

8.3. RBS COMPUTATIONS.

a. Usage Where RBS models are available, DoD Components will use the RBS models' optimization logic to compute the total requirements for the items essential to a weapon system.

(1) To support RBS computations, each Military Service will establish a secondary item application or configuration file for each of its weapon systems. The Military Service will show the indenture structure and essentiality of all reparable and consumable items that are part of the weapon system, whether peculiar to that system or common to other systems.

(2) Each Military Service will:

(a) Use computations in an RBS model to maximize weapon system performance required to support unit mission effectiveness for a given level of investment or minimize investment for a target level of weapon system performance.

(b) Use RBS models to compute requirements levels for replenishing stock for different echelons of supply and different locations within echelons to minimize total costs, not just inventory costs.

(3) Preferably, DoD Components will manage weapon system-essential items on the basis of multi-echelon RBS models in the authorized objective quantities of stockage that the models determine are appropriate for the particular weapons-system at issue.

(a) Where multi-echelon RBS models are not yet available, DoD Components will:

1. Base wholesale stockage of weapon system-essential items either on demand-based requirements with readiness-oriented time goals (e.g., goals that support weapon system availability targets) or on limited-demand or non-demand-based requirements.

2. Base retail stockage of weapon system-essential items on demand-based requirements that have their support goals driven by weapon system readiness or on non-demand-based requirements.

(b) When a weapon system is being phased out of service, the owning Military Service will inform materiel managers of the phase-out schedule. Before phase-out is completed, materiel managers will initiate item reduction studies in accordance with Volume 9 of this manual to control the costs of maintaining item assets supporting the weapon system in the supply system.

(4) A DoD Component may elect to use a single echelon RBS model to compute retail stockage or allowance quantities for weapon system-essential items at individual retail locations. The model will use expected wholesale resupply times to represent wholesale stockage.

b. Capabilities. The optimization logic within an RBS model will be capable of:

(1) Setting RBS levels by item or by group of items with similar characteristics. The computation of RBS levels for an item common to more than one weapon system should consider the total demand for that item and the contribution of the levels to the readiness goals of all respective weapon systems.

(2) Computing optimal item stock levels in a dynamic environment. Where possible, DoD Components will compute item requirements to account for conditions when variables such as rapidly changing sortie rates, operating programs, maintenance capabilities, item usage rates, or transportation resources impact the operating unit's materiel requirements and readiness.

(3) Providing an item's minimum stock level equal to its pipeline quantity, that is, the quantity needed to cover demand while item stocks are being replenished. When funds are insufficient to get the desired support objectives, the RBS model must be capable of overriding the minimum constraint to attain the optimum mix of stock to maximize weapon system availability for the funds actually available to obligate the desire support objectives.

(4) Producing a list of item requirements to be satisfied initially by the application of serviceable assets, unserviceable reparable assets, and applicable due-in assets. The repair requirement is that portion of the total requirement that is satisfied by repair of unserviceable reparable assets. The replenishment requirement is the deficit remaining after the supply of available assets is exhausted.

c. Applications. Where data availability and model capabilities permit, DoD Components will:

(1) Use RBS models to compute combined requirements for a range of weapon systems to minimize the total inventories of items supporting those weapon systems at individual locations. The RBS models should have the capability to compute those requirements to availability goals that differ by weapon system so that the goals of weapons systems with higher priority missions may be targeted at levels higher than those with lower priority missions.

(2) Use RBS models to directly compute both the range and depth for all echelons of supply, (i.e., models with the multi-echelon capability) to:

(a) Account for the hierarchical structure of supply or maintenance activities from the customer or consumer level, through the intermediate level, to the depot or wholesale level.

(b) Trade off the wholesale level of supply with the retail level by modeling the impact of the requisition response time on the retail response time to customer demand.

(c) Account for the transportation and materiel handling cost effects of differences in wholesale stock locations and positioning by echelon.

(d) Cover demand-related pipeline and safety-level requirements and, to avoid unnecessary procurement or repair actions, apply the same constraints as demand-based wholesale safety levels to the safety-level portion of an item's wholesale stock level.

(3) Use RBS models with a multi-indenture capability that:

(a) To the extent practical, link each item to its next higher assembly in the weapon system application by modeling the impact of a lower-level assembly (an item whose next higher assembly is another item or subassembly) on the availability of its next higher level assembly or assemblies.

(b) Uses an item indenture structure to tradeoff between items at the first level of indenture (i.e., items whose next higher assembly is the weapon system) and items at lower levels of indenture needed to repair those items. In that way, the impact of each item on each level of indenture, and ultimately on the weapon system itself, is portrayed; and the requirement for the highest level assembly will not be based on assuming 100 percent of its lower level assemblies are available. Models for non-demand-based items may be excluded from the indenture structure requirement.

(c) Interfaces with the field-level reparable or consumable item computation so that a link may be established to consider the impact of the availability of those items on their next higher assemblies and ultimately on the availability of the weapon system, and its procurement or repair requirements may be computed using that link.

d. Special Considerations.

(1) Where data availability and model capabilities do not directly compute range and depth for all echelons, a single echelon RBS model that uses expected wholesale resupply times will determine retail stock levels required to support weapon system availability goals.

(a) The process that sets wholesale support objectives and later expected resupply times should consider the impact those times have on retail stock levels and transportation costs.

(b) When funds are insufficient to attain desired wholesale support objectives, the expected resupply time must be extended. The wholesale echelon must be capable of passing the expected change in the resupply time to the retail level so that weapon system availability may be assessed.

(2) The DoD Components will track actual weapon system performance to determine the impact of budget and funding decisions on actual operational availability and to calibrate their models' predicted support statistics with actual program data.

e. Readiness Assessments.

(1) Military Services with RBS models will be able to:

(a) Compute end item readiness assessments and requirements.

(b) Measure the effects of various levels of investment in spare parts on end item readiness.

(c) Measure the effects of proposed budget adjustments on end item readiness.

(d) Assess end-item readiness on the basis of various levels of stockage (e.g., assess the capability derived from assets on-hand or assets planned to be repaired or procured).

(e) Differentiate between items that are essential to a weapon system and those that are not and to differentiate among degrees of essentiality.

(2) Models used for end item readiness assessment purposes may be different from those used for requirements determination for purposes of expediency or ease of processing. However, their algorithms must be similar in terms of the logic and computational objectives and must produce comparable results.

8.4. WHOLESALE DEMAND-BASED SPARING COMPUTATIONS. Wholesale demand-based sparing computations provide for cost-effective levels of on-hand and on-order inventory by balancing materiel, ordering, and holding costs against supply performance goals established with customers. DoD Components will apply these inventory requirements levels or their commercial software equivalents when computing demand.

a. Requirements Objective.

(1) The requirements objective for a wholesale demand-based item establishes the target quantity for replenishing the item's level of stock through procurement or repair.

(2) When an economic order quantity (EOQ) and reorder point (ROP) model is used to compute wholesale demand-based sparing item requirements, the requirements objective is the sum of their EOQ and ROP.

(3) When a time-phased planning model or materiel requirements planning (MRP) and distribution requirements planning model is used to compute these requirements, the requirements objective is not explicitly considered as the model works backward from the demand plan to develop EOQ and ROP requirements for supply planning.

b. EOQ.

(1) Section 2384a of Title 10, United States Code, and Section 3310 of Title 41, United States Code, mandate that DoD Components will procure supplies in a quantity that will result in the most advantageous total and unit cost to the government and that does not exceed the quantity reasonably expected to be required by the Component.

(a) The total cost of a procurement includes the cost of ordering inventory and the cost of holding inventory.

(b) The quantity reasonably expected to be required normally would be a quantity required for 2 years in accordance with the authorized budget cycle. However, that upper limit may be overridden in accordance with Paragraph 8.4.b(2).

(2) In accordance with the mandate, DoD Components will:

(a) Use EOQ methods to set target order quantities that minimizes the total of the cost-to-order and cost-to-hold inventory as defined in the Glossary. To accommodate actual constraints on procurement resources, storage space, or obligation authority, DoD Components may apply constraints in order to minimize costs.

(b) Compute target order quantities using either the standard Wilson EOQ, a variation of the Wilson EOQ (e.g., recognizing back orders, quantity discounts, or real world constraints), or an EOQ-equivalent method consistent with time-phased demand planning within an enterprise resource planning system (e.g., part period balancing algorithm or dynamic lot size creation).

(c) Annually validate and update the cost-to-order and cost-to-hold inventory, which are used to set order quantities. Update immediately when a significant change occurs.

(d) Maximize the use of indefinite delivery and indefinite quantity contracts to reduce delivery times and the cost of ordering inventory in accordance with Part 16.504 of the Federal Acquisition Regulations.

(e) Limit EOQs to a maximum equal of 24 months of demand and a minimum equal to the demand over the item's administrative lead time (ALT) or 1 month of demand, whichever is greater. The EOQ minimum may be reduced if a lesser quantity may be ordered economically. The EOQ maximum may be overridden if the head of the procuring activity certifies in writing that the acquisition is necessary for any of these reasons:

1. To achieve an EOQ that is not forecasted to result in an on-hand inventory in excess of 3 years of operating stocks and the need for the item is unlikely to decline during the period for which the acquisition is made.

2. To maintain the industrial base or for other reasons of national security.

3. To satisfy a minimum purchase quantity imposed by the vendor.

4. To make a life-of-type (LOT) buy. When production sources of an item are no longer available, materiel managers will classify the item as LOT and the total issues anticipated during the life of the end item are forecasted and procured at the wholesale level.

a. Materiel managers should explore alternatives for diminishing manufacturing sources addressed in Volume 3 of this manual before a LOT buy.

b. When LOT buys are necessary, timing for the procurement should be one acquisition lead time away.

c. LOT buys should not be confused with lot size. The latter refers to the size of the EOQ.

(f) Adjust EOQ quantities for items associated with an end item that is being phased out or with declining demand accordingly.

(g) Use only the demand to be satisfied through procurement to compute EOQs for reparable items. That excludes demand to be satisfied through repair.

(h) Adjust target order quantities to account for known minimum vendor production or procurement quantities.

(i) When converting order quantities to periods in time-phased supply planning, round to the period that minimizes the cost-to-order and cost-to-hold inventory.

c. ROP.

(1) DoD Components use the ROP to identify when an order should be placed to replenish stock for an item. It is the level of inventory needed to sustain operations until replenishment stock is delivered. In the case of time-phased demand and supply planning, it is the point in time a lead time away from when the supply plan will not be able to fill the demand plan.

(2) DoD Components should consider the item's procurement lead time, quantity, safety level by location, repair cycle level, if applicable, and any non-demand-based levels.

(3) When DoD Components interpret the ROP as a level of inventory and an item's ROP is the sum of its acquisition lead time quantity; variable safety level; and repair-cycle quantity, if applicable, DoD Components:

(a) May procure demand-based items when the assets on hand and on order are equal to or less than the ROP.

(b) Consider non-demand-based requirements (e.g., war reserve or planned program requirements) as additives to the ROP level.

(4) When DoD Components interpret the ROP as a point in time and an item's ROP is the sum of the acquisition lead time period and the safety level coverage period, DoD Components:

(a) May procure demand-based items when the assets on hand and on order in the supply plan are equal to or less than the demand during the ROP period.

(b) Consider war reserve or planned program requirements as additives to the demand during the ROP period.

d. Procurement Lead Time Quantity or Period.

(1) DoD Components use the procurement lead time as a forecast of the likely future interval between identifying a requirement and receiving the materiel. It consists of two consecutive time periods: ALT and production lead time (PLT).

(2) DoD Components will maintain a historical file of ALTs and PLTs for all secondary item procurements. Exclude historical observations that are not representative of future performance. The exclusion may be based on the materiel manager's knowledge, experience, and judgment or may result from an automated decision process.

(3) DoD Components will provide methods for calculating realistic minimum and maximum ALT and PLT requirements to ensure inventory management personnel can identify unusually long or short lead times. The materiel manager will decide how to use the data derived through such methods.

(4) DoD Components will aggressively pursue the lowest possible acquisition lead times by employing innovative methods of pursuing minimum acquisition lead times. DoD Components will emphasize the adoption, where applicable, of lead-time reduction methods which have proven successful in either the private or U.S. Government sector (e.g., multi-year contracting, just-in-time procedures, indefinite quantity requirements contracts, phased deliveries, and gradual reduction of vendor required delivery dates).

(5) For purposes of computing a ROP or for supply planning, DoD Components will use the procurement lead time quantity equal to the expected demand over a procurement lead time. For reparable items, DoD Components will:

(a) Base the expected demand in the lead time quantity computation on attrition or condemnation rates and rates for new future demand and exclude demand satisfied by repairs.

(b) Determine activities authorized to condemn reparable items in accordance with DoDM 4140.68.

(c) Project the quantity of assets that are expected to be condemned over the applicable forecast period.

e. Levels for Reparable Items.

(1) Repair is the preferred source of supply for reparable items.

(2) For reparable items, DoD Components should only use procurement to replace unserviceable items condemned during repair, to meet new demand that will not have the return of an unserviceable asset, or to support obsolete equipment through a life of type buy.

(3) Requirements computations associated with reparable item repair are economic repair quantity, repair point, and repair cycle level.

f. Economic Repair Quantity. Use economic repair quantity in production planning to determine total quantities of unserviceable assets to induct into depot-level maintenance, unless another quantity is specifically justified on a line item basis. To the extent possible, base economic repair quantities on inventory requirements, not maintenance workload requirements.

g. Repair Point. When serviceable assets for a reparable item reach the sum of the demand over the repair cycle time, the safety level and any additives (such as war reserve stocks), DoD Components will induct unserviceable assets into depot-level maintenance.

h. Repair Cycle Level (RCL). DoD Components will:

(1) Set an RCL equal to the minimum number of serviceable assets needed to support demand while unserviceable assets are undergoing depot-level maintenance.

(2) Compute the RCL as the expected demand over a repair-cycle time. Appendix 8A provides instructions on how to measure repair-cycle time.

i. Safety Level (SL).

(1) As a buffer against backorders caused by fluctuations in demand over lead times, repair cycle times, attrition rates, and in other variables, DoD Components should stock safety stocks. Those stocks should decrease as fluctuations in demand decrease.

(2) In setting wholesale safety stocks, DoD Components will use a computational objective that seeks to find the level of safety stock that either:

(a) Minimizes the total variable cost of achieving a specified time goal, or:

(b) Minimizes fill time, subject to a budget constraint and delivering materiel from locations determined to minimize total supply chain costs. Variable costs consist of the cost-to-order, the cost-to-hold inventory, and an implied shortage cost of not achieving a specified time goal.

(3) To dampen overstatement of SL requirements due to imprecise SL models and avoid unnecessary procurement or repair actions, DoD Components may constrain an item's SL to a maximum of three standard deviations of lead-time demand or the lead-time demand, whichever is less.

(a) For weapon system items, the maximum lead-time demand may be waived in cases in which creditable evidence exists that its application significantly impairs weapon system support.

(b) If waiving the maximum lead-time demand increases the total cost, the DoD Component must justify the added cost for the item based on the need to improve weapon system support to meet a readiness goal that is set with a weapon system manager or operational command.

(4) To limit long fill times for customers, the DoD Components may constrain an item's SL computation limiting the expected fill time in the computation to less than or equal to a given maximum time.

j. Non-Forecastable Items. Non-forecastable items typically demonstrate limited demand, highly variable demand quantities or highly intermittent demand frequency. For these items, DoD Components will employ the criteria given in Section 7 to determine forecastability. DoD Components will set inventory levels for items identified as non-forecastable, using business rules that consider:

(1) For items with sufficient demand history, establish a minimum and maximum stockage level, based on trade-offs between inventory investment and performance levels. The minimum and maximum levels are derived from the range of an item's observed demands, time between demands, and unit cost. The levels may also consider current on hand and due-in inventory along with the volume of purchase requests generated. The minimum level is the ROP for the item and the maximum level is the requirements objective for the item.

(2) For items with insufficient demand history, formulate ROPs and reorder quantities or their equivalent time-phased planning quantities that consider:

(a) Associated weapon system density and item applicability across multiple weapon systems.

(b) Stage of weapon system and item life cycle, to more effectively inform reorder quantities for new items and to attrite on-hand balances for items at the end of the life cycle.

(c) Projected changes in operational demand or maintenance patterns.

(d) Operational costs such as ordering, holding, and obsolescence costs.

(3) To prevent excessive stockage of non-forecastable items, the total inventory value of the stockage levels will be limited by the performance target(s) that the DoD Component selects for its non-forecastable items.

(4) Materiel managers may forego the use of minimum and maximum stockage level business rules in this paragraph and apply requirements levels based on other factors when appropriate, such as criticality of the item or weapon system and customer collaborative input.

8.5 RETAIL SPARING COMPUTATIONS.

a. Retail Requirements.

(1) DoD Components will use retail demand-based or RBS computations to minimize the quantity of materiel placed on order and in storage in the DoD supply chain by balancing costs against supply performance goals established with customers. RBS computations are addressed in Paragraph 8.3.

(2) When possible, materiel managers will use an automated capability to compute requirements and a "what-if" capability to evaluate changes in demand, order and shipping times, cycle times, and other factors and a capability to rapidly re-compute levels as changes occur in retail demand based requirements.

(3) To compute its retail demand-based requirements, a DoD Component may apply one or more of the following approaches:

(a) An EOQ and ROP model.

(b) An MRP model.

(c) An endurance model that sets requirements or allowances to cover expected demand over a time frame based on the customer's operating requirement. An example of an operating requirement would be the customer needs to be supported for 30 days in a deployed environment.

1. In computing endurance requirements, a DoD Component should use the expected demand for the operational environment, which may be different from the most recent demand the customer is experiencing in his current environment.

2. To maximize support while reducing cost for customers operating within the same proximity, a DoD Component may choose to compute a consolidated allowance.

b. Operating Level (OL).

(1) DoD Components will use the OL as a retail EOQ and, as such, a function of the cost-to-order and cost-to-hold retail inventory. A DoD Component may use the term lot size for its OL.

(a) When the order is a requisition placed on the wholesale inventory, the cost-to-order is the cost of requisitioning materiel.

(b) When the retail level is replenished by materiel pushed from the wholesale level according to a time-phased demand plan, the target push quantity is the OL and is a function of the cost-to-push and cost-to-hold retail inventory.

(2) DoD Components will use the standard Wilson EOQ formula or variations of it to compute the OL when future demand is assumed constant. When future demand varies according to a planned schedule of time-phased requirements, such as demand supporting a depot maintenance program, materiel managers may use a dynamic variation of the EOQ model to compute target order quantities. In addition:

(a) In computing an OL for a reparable item, use the demand rate for resupply from external sources, rather than the total demand (e.g., maintenance replacements).

(b) Limit an OL to a maximum of 12 months. Adjust an OL for items associated with an end item that is being phased out or with declining demand.

(3) Based on the criticality of the operation being supported, a DoD Component may set the OL equal to one for associated allowance.

c. Order and Shipping Time Level (OSTL). The order lead time for an item is its OSTL. DoD Components will calculate the OSTL as the anticipated number of maintenance replacements that require supply from external sources during the item's OST.

d. Retail SL. DoD Components will use safety stocks to guard against backorders while a retail level is being replenished.

(1) To determine the degree of risk associated with a retail item being out of stock, the SL considers the probabilities, when applicable, that:

(a) The repair-cycle time will be exceeded.

(b) The order and shipping time (i.e., order lead time) will be exceeded.

(c) The maintenance replacement rate will exceed the forecasted SL.

(d) A number of maintenance replacements, anticipated for repair at the activity, will require resupply from external sources.

(2) Materiel managers will calculate the retail SL computation to protect against being out of stock. In their calculations, materiel managers will find the level that minimizes the total variable cost of achieving a specified performance goal or maximizes performance of the item, subject to budgetary constraints. Materiel managers will calculate variable costs of the item as the cost-to-order, the cost-to-hold the inventory, and an implied shortage cost of not achieving a specified performance goal of the item.

e. Retail ROP.

(1) DoD Components will use the ROP to determine when an order should be placed to replenish the stock for an item. Demand-based items may be requisitioned or locally procured when the assets on hand and on order are equal to or less than the ROP.

(2) Materiel managers will calculate the ROP for a demand-based consumable item as the sum of the item's OSTL, SL, and any applicable non-demand-based levels.

(3) Materiel managers will determine ROPs for reparable items as a function of maintenance replacements and tailor ROPs to individual item characteristics based on conditions existing at the individual retail-level supply points, considering factors such as:

(a) Forecasted rate of maintenance replacement.

(b) The percent of total maintenance replacements locally repaired.

(c) The applicable standard for field repair-cycle time.

(d) The percent of total maintenance replacements not locally repaired.

(e) The order and shipping time.

(f) The cost to order materiel and the cost to hold inventory.

(4) For allowances with an OL equal to one, the ROP should be computed allowance quantity less one.

f. Local RCL for Reparable Items. DoD Components will calculate the RCL as a function of the anticipated number of maintenance replacements that will be repaired locally and the item's local repair-cycle time.

g. Requisitioning Objective.

(1) Materiel managers using an EOQ and ROP model will calculate the requisitioning objective for a demand-based item as the sum of its OL and retail ROP. They will:

(a) Take a replenishment action establishing a requisition or local procurement when the asset position reaches the ROP.

(b) Establish the replenishment order quantity equal to the requisitioning objective minus the asset position.

(2) Materiel managers using an MRP model should calculate the MRP equivalent of a requisitioning objective for reporting their retail inventory in accordance with Volume 10 of this manual. They will:

(a) Take a replenishment action according to their supply plan.

(b) Establish the replenishment order quantity as their MRP EOQ plus any penetration into their MRP target quantity at the time of the order.

(3) For materiel managers using an endurance model, the allowance quantity is the requisitioning objective. They will:

(a) Take a replenishment action when the asset position breaches the allowance quantity.

(b) Establish the replenishment order quantity equal to the difference between the allowance quantity and the asset position.

h. Combined Wholesale and Retail Demand-Based Computation.

(1) If a DoD Component is responsible for managing both wholesale and retail inventories at a location, it may elect to generate a single combined level of inventory using demand-based computations.

(2) The retail computations in this section apply to the demand-based computations for retail portion of the combined level of inventories.

(3) The DoD Component will ensure that a sufficient portion of retail inventory is protected/reserved to meet performance goals for supporting local customers and is not used to support world-wide demand, that is, its issue to other customers is blocked unless approved by the local customers of that retail inventory.

8.6. NON-DEMAND-BASED REQUIREMENTS.

a. Numeric Stockage. For essential items with insufficient demand for demand-based stockage and are not candidates for commercial support, materiel managers will:

(1) Stock at the wholesale level a numeric stockage objective (NSO) equal to the quantity required to meet an explicit customer requirement documented within the last 5 years or, when no such requirement exists, quantities no more than ten minimum replacement units for items with an acquisition price less than or equal to $100 and five minimum replacement units for items with an acquisition price greater than $100.

(a) Materiel managers will assume that minimum replacement unit is one individual unit unless its weapon system's application dictates a higher number. For a DLA-managed item, the using Military Service will communicate the higher application number to DLA.

(b) To defer or avoid reinvestment costs, materiel managers will develop ROP rules for NSO items that, when accounting for investment cost and risks of being out of stock, may result in a fractional portion of the NSO as the ROP instead of a standard policy of the NSO less one.

(2) Stock at the retail a minimum that is consistent with the operational environment and the relative essentiality of the item. These guidelines apply:

(a) Stockage of limited-demand items is authorized primarily during the initial period of operation of a unit, an activity, or a piece of equipment while demand data for the inventory is being accumulated.

(b) In some operational environments, a continuing need may exist to stock some items that do not and are not expected to qualify as demand-based items.

(c) Paragraph 8.6.a.(1)(b) applies to the replenishment of NSO items at the retail level.

b. Insurance Stockage.

(1) Materiel managers may stock essential items with no failure or demand forecast as non-demand-based insurance items at the wholesale level.

(2) For an item that is procured and stocked for insurance purposes, materiel managers may stock a quantity required to meet an explicit customer requirement documented within the last 5 years or, when no such requirement exists, a quantity of no more than two minimum replacement units.

(a) Materiel managers will assume that the minimum replacement unit for insurance stock items is one individual unit unless its weapon system's application dictates a higher number. For a DLA-managed item, the using Military Service will communicate the higher application number to DLA.

(b) Materiel managers will replenish insurance items when a unit is issued.

c. Planned Program Stocks.

(1) Materiel managers are authorized to use non-demand-based stockage to satisfy non-recurring requirements evolving from one-time programs.

(2) Materiel managers will calculate the authorized stockage as the sum of the approved programmed requirements only. No safety-level or lead-time quantities are authorized to be utilized in calculations.

(3) Planned program requirements are supplemental to any demand-based requirements objective for an item.

d. Validation of Non-Demand Based Stockage. For non-demand-based stockage items at the retail level, these procedures apply:

(1) Except for items being provisioned, the initiator and the DoD Component approval authority will annually validate the continued need for range and depth of stock.

(2) For items being provisioned, the using DoD Component will validate the non-demand-based stockage levels when concluding the demand development period.

(3) If required, the using DoD Component may establish a more frequent review and validation of non-demand based stockage items.

(4) Materiel managers will promptly delete the authorization for requirements that are not validated, and identify and dispose of assets on hand according to the materiel retention and transfer procedures in Volume 6 of this manual.

8.7. NON-STOCKED ITEMS.

a. No stockage level is authorized.

b. Materiel managers will initiate the procurement of non-stocked items upon receipt of a valid requisition request at the wholesale level or a demand signal. At the retail level, materiel managers will initiate the requisition quantity of non-stocked items upon receipt of a valid demand request and normally limit it to the customer demand quantity. Exceptions are allowed on an individual item basis, but must be held to a minimum.

APPENDIX 8A. CYCLE TIME MEASUREMENTS

8A.1. PROCUREMENT LEAD TIME MEASUREMENT.

a. DoD Components will measure ALT:

(1) Beginning when an item's wholesale asset level is reduced to the ROP and a purchase request is initiated to ensure the new stock arrives as the assets on hand reach the safety level.

(2) Ending on the date the contract is awarded and signed by both parties.

(3) ALT will include the time periods required for identifying the requirement to buy; reviewing, approving, and documenting the purchase request; reviewing technical data and documentation; and processing and executing the award of a contract.

b. DoD Components will measure PLT:

(1) Beginning on the date the contract is awarded and signed by both parties.

(2) Ending when the material is received and delivered to the requiring activity by the vendor.

(a) When the vendor delivers all materiel simultaneously, the receipt confirmation date is the end of PLT.

(b) When the contract provides for incremental deliveries, the date of confirmation of the first significant delivery (about 10 percent of the contract requirement) is the PLT for the first incremental delivery in future contracts with incremental deliveries. Other dates of incremental deliveries for line items on the same contract may be used in setting the delivery schedule for future contracts with incremental deliveries.

(c) When incremental deliveries are not part of the contractual requirements, the confirmation date is when all materiel is delivered by the vendor; however, the resulting PLT may be treated as non-representative.

(3) PLT may be based on estimates from contractors when appropriate; historical information for representative procurements, provisioning technical documentation, or estimates are based on the best judgment of acquisition personnel.

8A.2. REPAIR CYCLE TIME.

a. DoD Components will measure:

(1) Repair cycle time in terms of either the field repair cycle or the depot repair cycle, since these are the two mutually exclusive processes by which an unserviceable item is returned to a ready-for-issue condition.

(2) Field repair cycle time for an unserviceable item repaired at the organizational or intermediate level of maintenance has been processed through the field-repair cycle. Field repair cycle times apply to field level reparable items and may apply to depot level reparable (DLR) items if they are repaired at the organizational or intermediate maintenance level.

(3) Depot repair cycle time for an unserviceable item that was beyond the repair capability of the organizational or intermediate level of maintenance and that was repaired at the depot level has been processed through the depot repair cycle. Depot repair cycle times only apply to DLR items.

b. Supply condition codes listed under federal condition codes in Appendix 2.5 of DLM 4000.25-2 apply to assets as they go through the stages of the repair cycle.

8A.3. FIELD REPAIR CYCLE.

DoD Components will measure field repair cycle time as follows:

a. Beginning with the date the initial request for the repair of an unserviceable item is entered into the supply system as measured by the date of the organizational or intermediate maintenance activity's repair work order.

b. Ending with the date an unserviceable item has been restored to serviceable and issuable condition by the organizational or intermediate maintenance activity and is recorded as such on supply records, or the date when an unserviceable item is determined to be beyond the repair capability of an organizational or intermediate maintenance activity, measured by:

(1) The date the organizational or intermediate supply records indicate the repaired item is serviceable and issuable;

(2) The date of the organizational or intermediate supply activity's turn-in document; or

(3) The closing date of the organizational or intermediate maintenance activity's repair work order.

8A.4. DEPOT REPAIR CYCLE.

a. Depot Repair Cycle Time.

(1) For requirements computations of depot repair cycle time, the method chosen by the individual DoD Component for computing repair cycle levels will determine if both retrograde time and repair turnaround times or only repair turnaround time are used for depot repair cycle time.

(2) DoD Components should exclude awaiting parts (AWP) time, awaiting maintenance time, or awaiting carcass time from depot repair cycle time for computations of requirements. For purposes of exclusion, recurring delays in getting parts to perform repair should not be considered AWP time; non-recurring delays should be considered AWP time.

(a) Examples of recurring delay are:

1. The normal time to get a part from local retail supply.

2. The time to get a part that is infrequently used for repair, not stocked locally, but is immediately available from its wholesale source of supply.

(b) Examples of a non-recurring delay:

1. The time to get a part that is normally stocked locally but is out-of-stock and must be requisitioned from the wholesale source of supply.

2. When a part needed for repair is not available in the DoD supply system and must be procured by its wholesale source of supply.

b. Retrograde-Time Segment. DoD Components will calculate retrograde time as the sum of base-processing time and in-transit time.

(1) Base-processing time begins when an organizational- or intermediate-level maintenance activity turns into supply an unserviceable DLR asset it cannot repair and it ends when the asset is turned over to transportation.

(2) In-transit time begins when transportation receives the ready-for-shipment unserviceable DLR and ends when the receipt of the unserviceable asset by a distribution depot or maintenance contractor is recorded by the materiel manager.

(3) The beginning date for retrograde time is measured by either:

(a) The date of the organizational or intermediate supply activity's requisition (turn-in) document number.

(b) The closing date of the organizational or intermediate maintenance activity's repair work order.

(4) The ending date for retrograde time is measured by:

(a) The receipt date in the transaction that updates the ICP records; or

(b) The receipt date notification by the commercial or inter-Service depot maintenance activity in its status notification to the ICP.

(5) Materiel managers will track and identify retrograde time as an item completes the base-processing and in-transit times.

c. Repair-Turnaround Time Segment. DoD Components will calculate repair-turnaround time as the sum of transfer-to-maintenance time, maintenance-shop time, and transfer-from-maintenance time.

(1) Awaiting carcass time may occur before or after transfer-to-maintenance time and before maintenance-shop time, but is excluded from both of those times.

(2) Maintenance managers will track and record the repair turnaround time for an item as it is processing through the transfer-to-maintenance, maintenance shop, and transfer-from-maintenance times.

d. Transfer-to-Maintenance Time. DoD Components will calculate the transfer-to-maintenance time segment beginning with the request to pull the unserviceable asset from storage and ending when the organic or contractor maintenance activity receives it. Transfers from depots to contractor facilities include transportation time.

(1) The beginning date is measured by the date of the request to transfer an unserviceable reparable item from the depot's supply activity to an organic or contractor maintenance activity.

(2) The ending date is measured by the date of receipt of the unserviceable DLR item at the organic or contractor maintenance activity.

e. Maintenance-Shop Time. DoD Components will calculate the maintenance-shop time segment beginning when maintenance receives the unserviceable DLR and ending when the availability of the serviceable asset is formally received in storage (AWP and awaiting maintenance times may occur during the segment, but are excluded).

(1) The beginning date is measured by either:

(a) The date the condition code is changed from unserviceable (reparable) to suspended (in work) on the ICP's records;

(b) The in work date (or receipt date) identified by the commercial or inter-Service depot maintenance activity if no order is required; or

(c) The order date identified by the commercial or inter-Service depot maintenance activity if an order is required.

(2) The ending date is measured by:

(a) The date the depot maintenance activity identifies that the item has been restored to serviceable condition; or

(b) The date of the contractor's shipment notice, (i.e., shipment status or invoicing, receipt, acceptance, and property transfer reparable receiving notification or property transfer identified in accordance with Volume 2 of DLM 4000.25), indicating a commercial maintenance activity restored the item to serviceable and issuable condition.

f. Transfer-from-Maintenance Time. DoD Components will calculate the transfer-from-maintenance time segment beginning when the maintenance activity formally identifies the availability of the serviceable DLR and ending when the serviceable asset is received in storage and is recorded on the records of the ICP. Instances in which an ICP directs shipment of a repaired asset directly to a customer to fill an outstanding demand should not be included in the development of standards of demand or the monitoring of those standards. Transfers from contractors' facilities to depots include transportation; transfers to customers do not. Transfer-from-maintenance time does not apply when contractors act as DoD distribution depots, storing materiel and issuing it directly to customers.

(1) The beginning date is measured by either:

(a) The date the depot maintenance activity documents that the item has been restored to a serviceable condition; or

(b) The date of the contractor's shipment notice (i.e., shipment status or invoicing, receipt, acceptance, and property transfer reparable receiving documentation or property transfer identified in accordance with Volume 2 of DLM 4000.25) indicating that the contractor has restored the item to a serviceable and issuable condition.

(2) The ending date is measured by the date a depot supply activity receives an item in serviceable and issuable condition from a commercial or inter-service depot maintenance activity, as recorded on the ICP's records.

SECTION 9: SECONDARY ITEM WAR RESERVE REQUIREMENTS

9.1. MEETING STRATEGIC OBJECTIVES FOR WAR RESERVES. The DoD Components will:

a. Size, manage, and position war reserve materiel to maximize flexibility to respond to a spectrum of regional contingencies, while minimizing the DoD investment in inventories.

b. Use peacetime operating stocks, training stocks, materiel available through industrial preparedness planning, host-nation support agreements, bilateral military agreements, and commercial sources to:

(1) Offset their investment in inventory to meet war reserve requirements.

(2) Reduce the risk of funding shortfalls.

(3) Ensure the warfighter receives the latest in materiel technology.

c. Only war reserve stocks for items that cannot be procured and made ready for deployment within required timeframes will be held in wholesale war reserve stocks. To ensure that sufficient wholesale war reserve stocks are held, materiel managers should also consider the risk of stock non-availability from the sources listed in Paragraph 9.1.b.

9.2. COMPUTING WAR RESERVE MATERIEL REQUIREMENTS

a. Policies related to the computation of war reserve materiel requirements are in DoDI 3110.06.

b. As part of their biennial program objective memorandum (POM) and annual budget estimate submissions, the DoD Components will provide information on the methodology used to implement the requirements outlined in Paragraph 9.1.a. and assign war reserve funding priorities.

c. The DoD Components will use an automated capability to:

(1) Identify, compute, and source war materiel requirements.

(2) Build tailored supply support packages for rapid delivery of war reserve materiel requirements to deploying or deployed forces.

d. For specific commodities where a DoD Component has been formally designated as the lead agent and assigned responsibility for war reserves, other using DoD Components will compute requirements and identify them to the lead agent. The lead agent will combine those requirements into a consolidated requirement for war reserve materiel programming and budgeting. The lead agent will notify the using DoD Components of any shortfalls in program requirements, funding or both.

GLOSSARY

G.1. ACRONYMS.

AAC	acquisition advice code
ALT	administrative lead time
ASD(S)	Assistant Secretary of Defense for Sustainment
AWP	awaiting parts
CII	controlled inventory item
CSI	critical safety item
CV	coefficient of variation
DBS	demand-based sparing
DDE	demand data exchange
DDP	demand development period
DFARS	Defense Federal Acquisition Regulation Supplement
DLA	Defense Logistics Agency
DLM	Defense Logistics manual
DLR	depot level reparable
DoDD	DoD directive
DoDI	DoD instruction
DoDM	DoD manual
EDFP	engineering data for provisioning
EOQ	economic order quantity
ICP	inventory control point
LOT	life-of-type
MRP	materiel requirements planning
NIMSR	non-consumable item materiel support request
NSN	national stock number
NSO	numeric stockage objective
OL	operating level
OSTL	order and shipping time level

PBL	performance-based logistics
PICA	primary inventory control activity
PLT	production lead time
POM	program objective memorandum
PTD	provisioning technical documentation
RAE	relative absolute error
RBS	readiness-based sparing
RCL	repair cycle level
ROP	reorder point
RSC	reason for stockage code
SICA	secondary inventory control activity
SL	safety level
SMR	source, maintenance, and recoverability
SPR	special program requirement
SSR	supply support request
USD(A&S)	Under Secretary of Defense for Acquisition and Sustainment

G.2. DEFINITIONS. These terms and their definitions are for the purpose of this issuance.

acquisition. Obtaining logistics support, supplies, or services under a contract, an ordering agreement with a commercial vendor, a partnering agreement between a depot and a commercial vendor, an acquisition agreement or under a cross-servicing agreement. This includes purchasing (whether for payment in currency, replacement-in-kind, or by exchange for equal value), renting, leasing, or any method of temporarily obtaining logistics support, supplies, or services.

advance procurement. Defined in Subpart 217.103 of DFARS.

ALT. The time interval between initiation of a purchase request and the date of signature of a contract.

assembly. In logistics, an item forming a portion of equipment that can be provisioned and replaced as an entity and which normally incorporates replaceable parts or groups of parts.

autocorrelation. Correlation between the elements of a series and others from the same series separated from them by a given interval.

cataloging. The process of uniformly identifying, describing, classifying, numbering, and publishing in the Federal Catalog System all items of personal property (items of supply) repetitively procured, stored, issued, or used by federal agencies.

carcass. Reparable part that can be rebuilt or repaired.

coefficient of variation. A measure of variance given by the ratio of the standard deviation of the demand and the mean of the demand. The formula is:

$$coefficient\ of\ variation = \frac{standard\ deviation\ of\ demand}{mean\ demand}.$$

collaboration. The exchange of information to:

Improve demand forecasts based solely on historical demand.

Improve planning for targeted and expected support between PICAs and SICAs.

consumable item. An item of supply or an individual item (except explosive ordnance and major end items of equipment) that is normally expended or used up beyond recovery in the use for which it is designed or intended.

cost-to-hold. The sum of the annual charge for funds invested in inventory, storage costs and losses due to obsolescence, inventory losses, misplacement, theft, or damage. For purposes of computing order quantities, cost-to-hold is expressed as a percentage of the inventory value being held in storage and considered synonymous with cost to store.

cost-to-order. The sum of the administrative expenses involved in procuring or requisitioning and issuing a single lot of one item regardless of the number of units ordered, their weight, cube, or dollar value. The major tasks contributing to the cost-to-order calculation include requirements determination, order or requisition preparation and recording, receipt processing and stowage of materiel, accounting for the transfer of funds between the ordering activity and the source of supply, and in the case of a requisition filled from a distribution depot, issue processing. For purposes of computing order quantities for time-phased demand, cost-to-hold is synonymous with lot size independent cost.

Croston model. A forecast strategy for products with intermittent demand consisting of two steps. First, separate exponential smoothing estimates are made of the average size of a demand. Second, the average interval between demands is calculated. This is then used to predict the future demand.

customer wait time. Defined in Volume 10 of this manual.

daily summary transaction listing. Daily listing of supply transactions affecting the demand base or stock status of materiel.

DDP. The period of time extending from the date of preliminary operational capability to the time when spare and repair parts requirements can be forecasted based on actual demands using statistically valid methods.

demand. An indication of a requirement, a requisition or similar request for an item of supply or individual item. Demands are categorized as either recurring or non-recurring.

demand-based requirements. Requirements resulting from a computational process that uses forecasted demand to determine stockage quantities needed to meet a goal targeted at filling a percent of demand or at satisfying demand within a given period of time.

demand forecasting. The prediction of demand for an item or group of items for a future period of time.

demand-supported items. Items stocked based on forecasted usage. Demand-supported items are stocked on the basis of economic or essentiality considerations.

distribution. The operational process of synchronizing all elements of the logistic system to deliver the right things to the right place at the right time.

DLA Logistics Information Service. A field activity of the DLA located at Battle Creek, Michigan, it serves as the custodian of federal logistics data for suppliers and supply items. DLA Logistics Information Service assigns NSNs, disseminates logistics information, and serves as the U.S. National Codification Bureau.

DLM. A set of manuals that prescribe logistics management responsibilities, procedures, rules, and electronic data communications standards for use in the DoD to conduct logistics operations in functional areas such as supply, maintenance, and finance.

DLR. An item that is designated for repair at depot level, or that is designated for repair below the depot level for which condemnation authority must be exercised by the cognizant depot-level repair activity.

economic repair quantity. The quantity derived from a mathematical technique used to determine the optimum (lowest) total variable costs to repair and hold inventory.

EDFP. Technical data that provides definitive identification of dimensional, material, mechanical, electrical, or other characteristics that depict the physical characteristics, location, and function of the item. Also referred to as supplementary provisioning technical data and supplemental data for provisioning, all of which are equivalent to the term form, fit, and function data defined in subpart 27.401 of DFARS.

end item. A final combination of end products, component parts, or materials that is ready for its intended use (e.g., ship, tank, mobile machine shop, or aircraft).

engineering support activity. The organization designated to provide engineering or technical assistance including the development of technical data and engineering criteria, engineering representation, guidance, and decisions.

EOQ. The quantity derived from a mathematical technique used to determine the optimum (lowest) total variable costs to order and hold inventory. Synonymous with procurement cycle level.

enterprise resource planning. Commercial business process management software that allows a DoD Component to use a system of integrated applications to automate its supply chain

materiel management activities, such as planning, purchase, and service delivery as well as

essential item. A support item or a repair part whose absence renders the supported system or end item inoperable.

essentiality code. Designation for a weapon system or end item that is used to indicate the measure of an item's military worth in terms of how its failure (if a replacement is not immediately available) would affect the ability of a weapon system, end item, or organization to perform its intended functions. In stockage models, it is the number by which the shortage cost parameter is multiplied to reflect the differences in military worth among items.

exponential smoothing. Statistical technique for detecting significant changes in data by ignoring the fluctuations irrelevant to the purpose at hand. In exponential smoothing (as opposed to in moving averages smoothing) older data is given progressively-less relative weight (importance) whereas newer data is given progressively-greater weight.

field-level reparable item. An item that is normally repaired below the depot level of maintenance and for which condemnation authority may be exercised below the depot level.

forecast accuracy. A measure of the percentage difference between the forecasted and the actual demand. The forecast accuracy for an item is computed as one minus the absolute or unsigned value of the item's forecast error over the item's demand expressed as a percentage. The formula is:

$$forecast\ accuracy\ for\ item\ i = 100\% * (1 - {abs|fd_i - ad_i|}/{ad_i})$$

where *abs|x|* is the absolute or unsigned value of *x*, fd_i is forecasted dollar demand for item *i* for the forecasted period, and ad_i is the actual dollar demand for item *i* for the period. If ad_i is zero and fd_i is also zero, then the forecast accuracy for the item is 100%. If ad_i is zero but fd_i is not zero, then the forecast accuracy for the item is 0%.

The mean or aggregate demand forecast accuracy for a set of items is computed as one minus the quotient of the sum of the absolute or unsigned values of the forecast error across the items and the sum of demand for the items expressed as a percentage. The formula is:

$$mean\ forecast\ accuracy\ = 100\% * \left(1 - {\sum_1^n abs|fd_i - ad_i|}/{\sum_1^n ad_i}\right)$$

where *n* is the number of items in the set and *abs|x|*, fd_i, and ad_i as above.

forecast bias. A measure of the over or under percentage difference between the forecasted and the actual demand. The forecast accuracy for an item is computed as one minus the signed value of the item's forecast error over the item's demand expressed as a percentage. The formula is:

$$forecast\ bias\ for\ item\ i = 100\% * {(fd_i - ad_i)}/{ad_i}$$

where fd_i is forecasted dollar demand for item *i* for the forecasted period, and ad_i is the actual dollar demand for item *i* for the period. If ad_i is zero and fd_i is also zero, then the forecast bias for the item is 0%. If ad_i is zero but fd_i is not zero, then the forecast bias for the item cannot be computed.

The mean or aggregate demand forecast basis for a set of items is computed as the quotient of sum of the signed values of the forecast error across the items and the sum of the demand for the items expressed as a percentage. The formula is:

$$mean\ forecast\ bias = 100\% * \left(\sum_1^n (fd_i - ad_i) \Big/ \sum_1^n ad_i\right)$$

where fd_i and ad_i *as above and n* is the number of items in the set.

forecastability. The ability to forecast demand for an item using a quantitative model or collaborative demand data from customers. The demand forecast for a forecastable item can be used to set readiness-based requirements levels or demand-based requirements levels for the item.

forecastable item. An item whose future demand can be predicted using a quantitative model or collaborative demand data from customers.

heteroscedasticity. Data with unequal variability across a set of second, predictor variables.

ICP. An organizational unit or activity within the DoD supply system assigned the primary responsibility for the materiel management of a group of items either for a particular Military Department or for the DoD as a whole. In addition to materiel management functions, an ICP may perform other logistics functions in support of a particular Military Department or for a particular end item (e.g., centralized computation of retail requirements levels and engineering tasks associated with weapon system components).

indenture. Structure to identify the tradeoff between items in tiers of use for weapon system assembly. The first level of indenture is for items whose next higher assembly is the weapon system itself. Items at lower levels of indenture are needed to repair the first level of indenture items. In that way, the impact of each item on each level of indenture, and ultimately on the weapon system itself, is portrayed; and the requirement for the highest level assembly will not be based on assuming 100 percent of its lower level assemblies are available. Models for non-demand-based items may be excluded from the indenture structure requirement.

implied shortage cost. The derived cost of a shortage of stock based upon a forecast of the number of days of delay in the availability of materiel.

individual item. A single instance of a stock-numbered item, a single assembly, or a single subassembly.

initial spares. Spares stocked to support a newly fielded weapon system or a modification of a weapon system.

insurance item. A non-demand-based, stocked, essential item for which no failure is predicted through normal usage. However, if a failure were to be experienced or a loss should occur through accident, abnormal equipment or system failure, or other unexpected occurrence, lack of replacement item will seriously hamper the operational capability of a weapon system.

item management code. The process of determining whether items of supply in federal supply classifications assigned for integrated materiel management qualify for management by the individual Components other than DLA or General Services Administration.

intermediate supply. Any level of inventory between the consumer and wholesale level of inventory and considered a retail level or echelon level of inventory.

inventory. Materiel, titled to the U.S. Government, held for sale or issue, held for repair, or held pending transfer to disposal.

item essentiality. A measure of an item's military worth in terms of how its failure (if a replacement is not immediately available) would affect the ability of a weapon system, end item, or organization to perform its intended functions. In stockage models, it is the number by which the shortage cost parameter is multiplied to reflect the differences in military worth among items.

item identification. A collection and compilation of data to establish the essential characteristics of an item that give the item its unique character and differentiate it from other supply items.

item of supply. A category of items identified by a NSN with the same form, fit, and function. The individual items (units) included in this category could be manufactured by multiple sources.

just-in-time. Inventory management methodology that minimizes on-hand stockage levels by ordering and receiving good only as they are needed.

limited-demand item. A non-forecastable item that has limited demand but either has sufficient historical demand to warrant demand-based stockage or qualifies for non-demand-based numeric stockage based on its essentiality. That is, the item qualifies for stockage because the lack of a replacement would seriously hamper the operational readiness of a weapon system.

losses due to obsolescence. Losses resulting from forecast error and obsolescence to include deterioration.

LOT buy. A one-time procurement, when all cost effective and prudent alternatives have been exhausted, for the total future requirement of an item that is no longer expected to be produced. The procurement quantity is based upon demand or engineering estimates of wear out rates or item malfunction or failure of the item to sufficiently support the applicable equipment until phased out.

maintenance replacement. The replacement of an unserviceable reparable item by a serviceable one. Unserviceable items include items that are replaced due to malfunction or those that have reached the end of an administratively determined removal interval for preventive maintenance or safety considerations.

material. Property that may be consumed or expended during the performance of a contract, component parts of a higher assembly, or items that lose their individual identity through incorporation into an end-item. Material does not include equipment, special tooling, special test equipment or real property.

materiel. All items necessary to equip, operate, maintain, and support military activities without distinction as to its application for administrative or combat purposes, excluding real property, installations, and utilities. Materiel is either serviceable (i.e., in an issuable condition) or unserviceable (i.e., in need of repair to make it serviceable).

materiel management. That phase of military logistics that includes managing, cataloging, demand and supply planning, requirements determinations, procurement, distribution, overhaul, and disposal of materiel.

materiel manager. Any DoD activity or Defense Agency that has been assigned materiel management responsibilities for the DoD and participating federal agencies. The term includes responsibilities performed by either wholesale materiel managers or retail materiel managers: managing, cataloging, demand and supply planning, requirements determination and definition, procurement, distribution, overhaul and repair of reparable materiel, and disposal of materiel.

materiel obligation. That unfilled portion of a requisition (for a stocked or a nonstocked item) that is not immediately available for issue, but is recorded as a commitment for future issue. Synonymous with "back order".

mean demand. The average demand for item for a period of time (e.g., month or quarter). For purposes of determining forecast ability, the formula for computing mean demand is:

$$mean\ demand = \overline{d} = \sum_{i=1}^{n} d_i/n$$

where n is the number of periods with demand, d_i is the quantity for demand i, and $\overline{d}$ is the mean demand.

minimum replacement unit. The minimum quantity of an item normally replaced during a maintenance action, often the quantity of a component used for each end item.

modification. A U.S. Government-approved change in the configuration of a part or item that offers a benefit to the U.S. Government by correcting deficiencies, satisfying a change in operational or logistic support requirements, or effecting a life-cycle cost savings.

MRP. A

naïve forecast. The forecast produced by using last period's actual demand as the predicted demand without adjusting the demand or attempting to establish causal factors. The accuracy, bias, and error for the naïve forecast are computed using the same formulas used for other forecasts and are compared against the accuracy bias, and error for forecasts generated by more sophisticated techniques.

neural networks. Artificial intelligence technique that mimics the operation of the human brain (nerves and neurons), and comprises of densely interconnected computer processors working simultaneously. A key feature of neural networks is that they are programmed to learn by sifting data repeatedly, looking for relationships to build mathematical models, and automatically correcting these models to refine them continuously.

non-consumable item materiel support codes. Alphanumeric codes assigned to non-consumable items, which indicates the degree of materiel support (numeric) or repair responsibility (alpha).

non-demand-based requirement. A requirement resulting from a determination process that is not based on forecasted demand, but qualifies for stockage based on other criteria. Types of non-demand-based stockage are insurance stockage and numeric stockage. For purposes of this issuance, LOT buy requirements and program-based buys are considered non-demand-based requirements even though they are based on future predicted usage but that usage may not be determined from historical demand.

non-forecastable item. An item whose future demand cannot be accurately predicted using a quantitative model due to its intermittent or volatile demand pattern.

not stocked. An item for which there is no established requirements objective. Inventory or usage data may be available; however, stock replenishment would not be initiated.

NSN. The 13-digit stock number replacing the 11-digit federal stock number. It consists of the 4-digit federal supply classification code and the 9-digit national item identification number. The national item identification number consists of a 2-digit National Codification Bureau number designating the central cataloging office (whether North Atlantic Treaty Organization or other friendly country) that assigned the number and a 7-digit (xxx-xxxx) nonsignificant number. The number is arranged: 9999-00-999-9999.

OL. The quantities of materiel or operating stocks required to sustain operations in the interval between replenishment shipments.

organic support. The capability of a Military Service or a Defense Agency to sustain logistics operations through U.S. Government organizational structures.

OSTL. The quantities of materiel required to sustain operations during the interval between the initiation of a replenishment requisition and receipt of the requisitioned materiel.

outliers. Data point that falls far from most other points.

PBL. Logistics that delineate outcome performance goals of weapon systems, ensure that responsibilities are assigned, provide incentives for attaining these goals, and facilitate the overall life-cycle management of system reliability, supportability, and total ownership costs.

performance-based agreement. A product support agreement that has performance tied to the system, the subsystem, or the component level that describes measurable service and performance level parameters based on customer requirements and expectations.

phased support. An approach whereby a contractor provides interim support for new acquisitions until the U.S. Government attains an organic capability. Phasing may be done by support level (e.g., organization, intermediate, or depot), by subsystem, by design-stable components, or other criteria.

PICA. The service or agency ICP designated as the single activity within the DoD responsible for providing materiel support.

PLT. The interval between the date of signature of a contract execution and the receipt of the first significant delivery of the purchased materiel into the supply system.

POM. The final product of the programming process within the Department of Defense. The Components POM displays the resource allocation decisions of the Military Departments in response to and in accordance with Strategic Planning Guidance and Joint Programming Guidance. A POM has a 5-year projected blueprint of each organization's proposals for updating DoD programs. Each Military Department, Defense Agency, and United States Special Operations Command submits it to the Secretary of Defense for approval. The approved POM defines the programs to be funded by the Military Department and by the Defense Agency budgets described in greater detail in the FMR.

preliminary operational capability. The attainment of the capability for equipment or systems to be used by operational units and to function in a manner that is preliminary to, but in support of, the achievement of an initial operating capability.

procurement lead time. The amount of time from initiation of a purchase request until receipt of the first significant delivery of purchased materiel into the supply system. The sum of the ALT and PLT.

product support integrator. The integrator of required logistical support processes to ensure that level of support is obtained through PBL agreements. The designated product support integrator for a given PBL arrangement may be an original equipment manufacturer, a commercial (private) entity, a U.S. Government (organic) entity, or a combination of a public and private partnership.

provisioning. The management process of determining and acquiring the range and quantity of support items necessary to operate and maintain an end item of materiel for an initial period of service.

RAE. A value-added metric, which is the ratio of the actual forecast error and the forecast error for the naïve forecast. The RAE for an item is computed as the absolute or unsigned value of the item's actual forecast error for the forecasted period over the absolute or unsigned value of the item's forecast error if a naïve forecast was used to forecast demand for the period. The formula for computing the RAE for an item is:

$$RAE\ for\ item\ i = abs|f_{actual}d_i - ad_i|/abs|f_{naive}d_i - ad_i|$$

where $abs|x|$ is the absolute or unsigned value of x, $f_{actual}d_i$ is the actual forecasted dollar demand for item i for the forecasted period, ad_i is the actual dollar demand for item i for the period, and $f_{naive}d_i$ is the naïve forecasted dollar demand for item i

The RAE for a set of items is computed as quotient of the sum of the absolute or unsigned values of the actual forecast errors across the items and the sum of the absolute or unsigned values of the naïve forecast errors across the items. The formula for computing the RAE for a set of items is:

$$RAE\ for\ a\ set\ of\ items = \sum_i^n abs|f_{actual}d_i - ad_i| \Big/ \sum_i^n abs|f_{naive}d_i - ad_i|$$

where n is the the number of items in the set and $abs|x|$, $f_{actual}d_i$, ad_i, and $f_{naive}d_i$.

RBS. A requirement determination process that computes the levels of secondary item spares needed to support a weapon system readiness goal at lowest cost.

RBS tool. An analytical capability primarily used to set the levels of secondary item spares needed to support a weapon system. Examples of other applications that an RBS tool can support include:

Assessing the inventory investment required for the fielding of a new program (e.g., weapon or subsystem).

Negotiating supplier PBL agreements.

Assessing the impact of reliability, maintainability, or supportability improvements on weapon system readiness.

Planning and developing budgets.

Conducting what-if exercises related to levels of secondary item spares needed to support weapon system deployments.

RCL. The quantity of reparable items required to sustain operations during the repair cycle that commences when a maintenance replacement takes place and ends when the unserviceable asset is returned to stock in a serviceable condition. That includes stages such as removed from the weapon system, awaiting shipment, in-transit, in pre-repair screening, in process of repair, and being returned to serviceable stock. Exclude from RCL any extraordinary awaiting-parts delays and any intentional extended-transit, storage, or repair-process delays from the repair cycle.

readiness. A measure or measures of the ability of a system to undertake and sustain a specified set of missions at planned peacetime and wartime utilization rates. Examples of system readiness measures are combat sortie rate, fully mission capable rate, and operational availability. Measures take account of:

The effects of system design, reliability, maintainability.

The characteristics of the support system.

The quantity and location of support resources.

reparable item. An item of supply subject to economical repair and for which the repair (at either depot or field level) is considered in satisfying computed requirements at any inventory level. Synonymous with repairable item.

replenishment. Actions to resupply an inventory when it reaches the ROP.

representative procurement. A procurement for replenishing wholesale-level stock, such that the procurement action is routine in nature or the circumstances affecting the procurement are expected to occur on a continuing basis.

requirement. When used in association with a stockage computations in this volume, the inventory quantity computed as part of supply planning to satisfy a future need for item stocks. As prescribed in this volume's stockage computations, those needs can be either readiness-based, demand-based, or non-demand-based; can be at the wholesale or retail echelon of supply; and can directed at satisfying peacetime or wartime customer demand.

requirements computation. Any mathematical calculation performed to support requirements determination functions.

requirements objective. For wholesale stock replenishment, the maximum authorized quantity of stock for an item. It consists of the sum of stock represented by the EOQ, the safety level, the repair-cycle level, and authorized additive levels.

requisition. An order for materiel initiated by an established, authorized organization (i.e., a DoD or non-DoD organization that has been assigned a DoD activity address code) that is transmitted either electronically, by mail, or telephoned to a supply source within the DoD or external to the DoD (the General Services Administration, the Federal Aviation Administration, or other organizations assigned management responsibility for categories of materiel), according to procedures specified in Chapter 4 of Volume 2 of DLM 4000.25 and DLM 4000.25-1.

requisition response time. The mean time between the date that the wholesale ICP receives a requisition and the date ready-for-issue assets are available to satisfy the requisition.

requisitioning objective. The maximum quantity of materiel to be maintained on-hand and on-order to sustain current operations and core war reserves. It consists of the sum of stocks represented by the OL, SL, repair cycle, if applicable, the OSTL, and authorized additive levels.

resupply time. The mean time between the date that a retail activity submits a requisition to the wholesale system and the date it receives the requisitioned materiel.

retail. Level of inventory below the wholesale level, either at the consumer level for the purpose of directly providing materiel to ultimate users of the materiel or at the intermediate or region level for the purpose of supplying consumer levels or ultimate users of the materiel in a geographical area.

retail-level supply. Those secondary items stored within DoD intermediate and consumer levels of supply down to and including, but not limited to, these activities: the Army to authorized stockage list; the Navy to shipboard and shore stations; the Air Force to logistics readiness squadrons; and the Marines to base supply and the marine expeditionary force supplies. Retail-level supply does not include secondary item materiel in the hands of end users.

right-sizing inventory. The balancing of the costs of purchasing, managing, storing, and maintaining inventory with the readiness cost of understocking inventory subject to anticipated inventory changes.

ROP. The point when an item's inventory position (i.e., on-hand stock plus stock due in minus stock due out) reaches or breaches, and this reach or breach event triggers an order to replenish stock.

RSC. The categorization of an item that indicates the reason or basis for stockage at the retail level of inventory. Those categories reflect the stockage computation or decision rule applicable, and in some cases are used for inventory stratification and supply management purposes.

secondary item. An item of supply, includes reparable components, subsystems, and assemblies, consumable repair parts, bulk items and material, subsistence, and expendable end items, including clothing and other personal gear. It does not include major weapon systems, munitions, and equipment and other property under DoDI 5000.64.

serviceable. The condition of an individual item of supply when it can be issued to fill a customer demand.

SL. The quantity of materiel required to be on hand to permit continued operation in the event of a minor interruption of normal replenishment or a fluctuation in demand.

spare. When used in reference to stockage computations in this issuance, an individual item stocked in case another individual item of the same type is worn out, broken, or lost. Examples are:

A reparable item used in connection with the maintenance of an end item or weapon system is commonly referred to as a reparable repair part but may be referred to as a spare part.

A consumable item used in connection with the maintenance of an end item or weapon system is commonly referred to as consumable repair part but may be referred to as a repair part.

SSR. A transaction identifying requirements for consumable items that is submitted by the DoD Component introducing materiel or a weapon system to the materiel manager.

standard deviation of demand. A measure of the variance of demand. For purposes of determining forecast ability, the formula for computing the standard deviation of demand is:

$$standard\ deviation\ of\ demand = \sqrt{\frac{\sum_{i=1}^{n}(d_i - \overline{d})}{n}}$$

where n is the number of periods with demand, d_i is the quantity for demand i, and $\overline{d}$ is the mean demand.

storage costs. The variable costs of storing materiel. A storage cost factor is not variable (and therefore not considered) if the factor would remain the same after eliminating 50 percent of the stored materiel. Use one percent of the annual average value of the relevant inventory for storage costs unless actual variable storage costs are available.

supplier. Organic or commercial sources for items of supply.

supply chain. The sequential activities associated with providing materiel from a raw material stage to an end user as a finished product.

supply support. The management actions, procedures and techniques necessary to determine requirements to acquire, catalog, receive, store, transfer, issue and dispose of spares, repair parts, and supplies. Supply support includes provisioning for initial support, as well as acquiring, distributing, and replenishing inventories. Proper supply support management results in having the right spares, repair parts, and all classes of supplies available, in the right quantities, at the right place, at the right time, and at the right price.

support vector regressions. Supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis.

system acquisition process. Process of providing a new or improved materiel capability in response to a validated need.

total variable cost. The sum of the variable cost-to-order, variable cost-to-hold, and implied shortage cost. Procurement cycles and safety levels are determined through minimizing these costs for any given group of items in an inventory.

uneven demand. The feature of an item's demand that has periods of very low or zero demand followed by spikes in demand.

unit roots. Stochastic trend in a time series where, if present, a systematic pattern is unpredictable.

unserviceable. The condition of an individual item of supply when it is in need of repair to make it serviceable.

value added. Increased or improved value, worth, functionality or usefulness.

value added analysis. As applied to demand forecasting in this volume, an analysis of the value added by a DoD Component's forecasting process, expressed as the forecast accuracy and bias percentage points gained by the process forecast over the accuracy and bias of the naïve forecast.

The value added for forecast accuracy is the accuracy of the forecast produced by the Component's forecasting process minus the accuracy of the naïve forecast.

The value added for forecast bias is the absolute value of the bias of the naïve forecast minus the absolute value of the bias of the forecast produced by the Component's forecasting process.

The value added for forecast error is the error of the forecast produced by the naïve forecast minus the error produced by the forecast from the Component's forecasting process.

weapon system availability. As used in materiel management, the percent of time that a weapon system does not have a materiel failure that prevents it from performing its intended mission or missions.

wholesale. The highest level of DoD Component supply. At this level, requiring activities procure supplies, repair supplies, and maintain stocks to resupply retail levels of supply and to fill consumer demands not filled by retail levels of supply. DoD Component wholesale supplies must be Government-owned but may be organically or commercially managed. Synonymous with wholesale supply, wholesale level of supply, wholesale echelon, and national inventory.

wholesale stock. Stock, regardless of funding sources, over which the materiel manager has asset knowledge and exercises unrestricted asset control to meet worldwide inventory management responsibilities. Synonymous with national inventory.

Wilson EOQ. Used to calculate the optimal quantity that can be purchased to minimize the cost of both the holding inventory and the processing of purchase orders. Variations include recognizing back orders, quantity discounts, or operational constraints.

REFERENCES

Defense Federal Acquisition Regulation Supplement, current edition

Defense Logistics Manual 4000.25, Volume 2, "Defense Logistics Management Standards: Supply Standards and Procedures," June 5, 2012[1]

Defense Logistics Manual 4000.25-1, "Military Standard Requisitioning and Issue Procedures (MILSTRIP)," June 13, 2012[2]

Defense Logistics Manual 4000.25-2, "Military Standard Transaction Reporting and Accountability Procedures (MILSTRAP)," June 13, 2012[3]

DoD 4140.26-M, Volume 1 "DoD Integrated Materiel Management (IMM) for Consumable Items: Operating Procedures for tem Management Coding (IMC)," September 24, 2010, as amended

DoD 4140.26-M, Volume 2, "DoD Integrated Materiel Management (IMM) for Consumable Items: Item Management Coding (IMC) Criteria," September 24, 2010, as amended

DoD 4140.26-M, Volume 6, "DoD Integrated Materiel Management (IMM) for Consumable Items: Supply Support Requests (SSRs)," July 18, 2014, as amended

DoD 4160.28-M, Volume 3, "Defense Demilitarization: Procedural Guidance," June 7, 2011

DoD 7000.14-R, "Department of Defense Financial Management Regulations (FMRs)," Volumes 1-15, dates vary by volume

DoD Directive 5134.12, "Assistant Secretary of Defense for Logistics and Materiel Readiness (ASD(L&MR))," May 25, 2000, as amended

DoD Instruction 3110.06, "War Reserve Materiel (WRM) Policy," June 23, 2008, as amended

DoD Instruction 4140.01, "DoD Supply Chain Materiel Management Policy," December 14, 2011, as amended

DoD Instruction 5000.64, "Accountability and Management of DoD Equipment and Other Accountable Property," April 27, 2017, as amended

DoD Instruction 5200.39, "Critical Program Information (CPI) Identification and Protection within Research, Development, Test, and Evaluation," May 28, 2015, as amended

DoD Instruction 5200.44, "Protection of Mission Critical Functions to Achieve Trusted Systems and Networks," November 11, 2012, as amended

DoD Manual 4100.39, "Federal Logistics Information System (FLIS) Procedure," March 8, 2017, as amended

DoD Manual 4140.01, Volume 3, "DoD Supply Chain Materiel Management Procedures: Materiel Sourcing," February 10, 2014, as amended

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[1] Available on the internet at http://www.dla.mil/HQ/InformationOperations/DLMS/eLibrary/Manuals/publications/dlm/dlm_pubs/

[2] Available on the internet at www2.dla.mil/j-6/dlmso/elibrary/manuals/dlm/dlm_pubs.asp

[3] Available on the internet at www2.dla.mil/j-6/dlmso/elibrary/manuals/dlm/dlm_pubs.asp

DoD Manual 4140.01, Volume 5, "DoD Supply Chain Materiel Management Procedures: Delivery of Materiel," February 10, 2014

DoD Manual 4140.01, Volume 6, "DoD Supply Chain Materiel Management Procedures: Materiel Returns, Retention, and Disposition," March 8, 2017, as amended

DoD Manual 4140.01, Volume 7, "DoD Supply Chain Materiel Management Procedures: Supporting Technologies," February 10, 2014, as amended

DoD Manual 4140.01, Volume 8, "DoD Supply Chain Materiel Management Procedures: Materiel Data Management and Exchange," February 10, 2014, as amended

DoD Manual 4140.01, Volume 9, "DoD Supply Chain Materiel Management Procedures: Materiel Programs," October 17, 2016, as amended

DoD Manual 4140.01, Volume 10, "DoD Supply Chain Materiel Management Procedures: Supply Chain Inventory Reporting and Metrics," March 9, 2017, as amended

DoD Manual 4140.01, Volume 11, "DoD Supply Chain Materiel Management Procedures: Inventory Accountability and Special Management and Handling," March 8, 2017, as amended

DoD Manual 4140.01, Volume 12, "DoD Supply Chain Materiel Management Procedures: Sales and Operations Planning," March 22, 2016, as amended

DoD Manual 4140.27, Volume 1, "Shelf-Life Item Management Manual: Program Administration," July 6, 2016

DoD Manual 4140.68, "Integrated Materiel Management of Nonconsumable Items," September 2, 2014, as amended

Federal Acquisition Regulation, current edition

Government Electronics and Information Technology Association (GEIA) Standard 0007, 2008[4]

Joint Publication 4-0, "Joint Logistics," October 16, 2013

Military Handbook 502A, "Department of Defense Handbook Product Support Analysis," March 8, 2013[5]

United States Code, Title 10

United States Code, Title 41

[4] Available on the internet at http://www.techstreet.com/TechStreet

[5] Available on the internet at http://quicksearch.dla.mil//