

MANAGEMENT

OBJECTIVE(S)

[Return to Table of Contents](#)

Acquire, maintain, safeguard, distribute, and administer the inventory needed to support the entity's mission, goals, and objectives. Minimize the cost and maximize the utility of the items acquired.

BACKGROUND

Inventories include goods purchased for resale, internal usage, or consumption. Inventory management is a complex matter, involving governing laws, operating rules and regulations, administrative law rulings, recommended practices, designated procedures, and specific conflict-of-interest provisions. In addition to all of these compliance issues, the entity must also ensure that "enough but not too much" inventory is available. Management controls over the recording, reporting, and safeguarding of inventory items are also necessary.

At the statewide level, inventory management is centralized under the General Services Commission.

At the entity level, the nature and scope of the inventory management function depends upon the needs of the entity. A small entity with one location that has few inventory items other than office supplies will have a different structure than an entity with multiple field offices and varied supply needs.

The degree of coordination and communication between these various levels of inventory management can have a material effect on the efficiency, economy, and effectiveness of individual entities and on the state as a whole.

Inventory management is a part of the materials management process, which includes procurement, fixed assets, maintenance, and transportation as well. See the modules on [Procurement](#) and [Fixed Assets](#) for further information.

DEFINITIONS

(in alphabetical order)

Pertinent definitions are provided in the statutes and rules listed below:

- Vernon's Texas Code Annotated (VTCA), §§1.101 - 36.26; Business and Commerce Code (Uniform Commercial Code)
- Vernon's Texas Code Forms Annotated (VTCFA), Uniform Commercial Code For
- Vernon's Texas Civil Statutes (VTCS), Title 20, Article 601b, State Purchasing and General Services Act
- Texas Administrative Code (TAC), Title 1, Part V, Chapters 113, 115, and 117

OVERVIEW OF THE PROCESS The basic phases of the inventory management process are:

- **Determine inventory needs; create a plan to fill those needs.**
- **Determine the nature, scope, and location of inventory management in the organization structure.**
- **Identify, document, and implement the policies, procedures, and controls needed to implement the plan.**
- **Plan and schedule inventory acquisitions.**
- **Purchase the inventory (see [Procurement](#) module).**
- **Receive, inspect, inventory, and store the items.**
- **Distribute the inventory items.**
- **Dispose of damaged, obsolete, and unneeded items.**
- **Record and report inventory transactions.**
- **Monitor and evaluate the inventory management process.**

PROCEDURES

Suggested procedures, organized according to the elements of a finding, are listed below. They should be expanded or tailored to fit the specific entity being reviewed.

Note: The following procedures and the process described above are normative, rather than prescriptive. That is, they represent "average" or baseline thinking since they assemble information which repeatedly appeared in the various resources used to prepare this module. Do not be too hasty or literal in applying a given criterion or procedural step to a specific entity. While omissions or variations may be obvious, judgment must still be used to determine whether such omissions or variations are material.

Review criteria:

Specific criteria

The criteria related to the basic phases of the inventory management process are as follows:

Determine inventory needs; create a plan to fill those needs

Identify any statewide strategies, goals, and objectives that are directly or indirectly related to inventory management. An example of an indirect statewide strategy related to inventory might be a requirement, intended to reduce harm to the environment, that state agencies purchase only recycled paper. Link the entity's inventory goals to these statewide strategy, goals, and objectives.

Inventory management goals and objectives should be documented and should address the full range of inventory management functions, including planning, organizing, controlling, performing, reporting, and evaluating.

Goals for inventory management should consider internal as well as external, client-focused enhancements. Internal enhancements include strategically locating remote storage sites. Client-focused enhancements might include surveying customers for their input on type, quantity, and storage locations of inventory.

Possible inventory management goals include:

- Minimize stock outs.

- Minimize distribution time.
- Minimize cost of inventory.
- Minimize cost to hold.
- Maximize turnover of stock.
- Achieve economies of scale.
- Identify appropriate stock level.
- Receive, inspect, and distribute 100% of stock.
- Maintain stock records, account for, and control 100% of stock items.
- Perform inventory counts and reconciliation with stock records at regular prescribed intervals.
- Manage obsolescence.

Determine the nature, scope, and location of inventory management in the organization structure

Consider establishing a central inventory authority with responsibility for policy-making and oversight of inventory resources. The central inventory authority should also be responsible for management and direction of the full spectrum of inventory activities.

The chief inventory official should have prior experience. Staffing should be adequate to meet goals and objectives.

Locate the central inventory management function at a level that provides sufficient authority, independence, and safeguards to foster the goals and objectives of the inventory program. Define the accountability, responsibility, and authority of central inventory management, authorized delegation by central inventory management, and exclude blanket exemption for any entity.

Require adherence to inventory law and to central inventory rules, policies, and procedures when delegation is extended. Direct central inventory to monitor all delegated inventory activities.

Identify, document, and implement the policies, procedures, and controls needed to implement the plan

At the statewide level, develop and adopt rules and regulations needed to carry out the laws applicable to inventory management.

At the entity level, review state and federal laws, rules, and regulations and determine entity policies and procedures that are needed in order to comply with these laws, rules, and regulations.

Written instructions should exist to govern the activities that any centralized inventory management delegates to other departments and entities, including the manner

in which such activities will be reported to and monitored by central inventory management.

Rules at both statewide and entity levels should be management-oriented and address the full range of inventory activities, including planning, reporting, storage, standards and quality assurance, issue and receipt control, inventory control procedures, and salvage and disposal. Documented rules, policies, and procedures should be distributed to all staff who participate in inventory management.

Adequate segregation of duties should exist among personnel responsible for accounting, purchasing, record keeping, and custody of stock. Posting to inventory subsidiary records, posting to the general ledger, and reconciliation of inventory to the general ledger should also be performed by different personnel.

The central inventory function should screen, authorize, and administer requisitions entity-wide and should determine if needed inventory items are available through state and federal surplus property agencies. Likewise, the entities need to have access to any centralized inventory data bases. This facilitates the transfer of surplus items and reduces the number of items that must be purchased new.

Possible controls include:

- An operating manual which is simple and easy to understand.
- Classification of inventory items with positive identification using standard nomenclature or part numbers.
- An appropriate warehouse, including the necessary storage and materials handling aids and a material location system.
- A computerized perpetual inventory record, reflecting all inventory transactions.
- An effective cost control check for all inventoried items.
- A review of slow-moving items and a procedure for disposal of excesses.
- Assignment of stocking location, bins, etc., by bays or grids (i.e. not by stock number).
- Stock rotation policy should be established for all items [i.e. First-In, First-Out (FIFO), Last-In, First-Out (LIFO)].

Employees should be trained in all aspects of receipt, supply, storage, material handling equipment, and safety.

Plan and schedule inventory acquisitions

Determining how much inventory needs to be on hand is a matter of balancing the need to have the item readily available and the need to minimize the costs to carry the item in stock. The number of items required, the time it takes to acquire them, and the costs to acquire and maintain them must all be analyzed to determine the optimum inventory order quantity and balance.

Inventory needs can be forecasted using one of several methods:

- Fixed period average requires calculating usage for period of time divided by the number of months.
- Moving average uses most recent data by dropping the oldest monthly data and adding the most recent monthly data.
- Weighted moving average involves weighing periods of time based on "criticality of ordering and time period" weighing most recent or cyclic period heavier.
- Exponential smoothing compares monthly forecast against monthly actual to determine acceptable inventory. Weight is based on last month's data.
- Multiple exponential smoothing includes a "forecast error" to compensate for a less than perfect forecast.

The Economic Order Quantity (EOQ) formula can be used to balance all fixed and variable inventory costs to determine the optimum order quantity.

- $EOQ = \text{Square root of } 2 \left[\frac{\$ \text{ cost of processing order (annual usage)}}{(\text{inventory carrying charge \%})(\text{unit cost})} \right]$
- The \$ cost of processing an order and the inventory carrying charge % are constants.
- The inventory carrying charge % represents total value of inventory in comparison to personnel, energy, warehousing, and insurance costs.
- EOQ balances ordering cost with carrying cost.

Purchase the inventory (see Procurement module)

Receive, inspect, inventory, and store the items

The receiving department should fully check all incoming materials by:

- Reconciling the packing slip with the materials received.
- Checking for concealed damage.
- Reporting variances in quantity ordered versus quantity shipped. Quantities less than those indicated on the purchase order may be accepted; however, quantities more than those indicated on the purchase order should be approved by the requisitioning department and the buyer.
- Forwarding completed packing slip and freight bill to purchasing for reconciliation with the purchase order.
- Inspecting the material in a non-technical manner for conformance to manufacturer brand names, model numbers, and catalog number.
- Conducting a technical inspection in accordance with requirements in the purchase specifications and user department inspection procedure, or industry standard applicable to the product such as those published by the American Society for Testing and Materials.
- Completing a material discrepancy report and forwarding it to the buyer when one or more of the following conditions exist:
 - Damage or a discrepancy is revealed in receiving or inspecting the shipment.

- Subsequent inspection reveals a latent defect that is a supplier responsibility.

Storage planning should consider the following principles:

- Take advantage of full cube capacity of storage space.
- Include ample room for aisle space.
- Match the size of material handling equipment with the storage job at hand.
- Store fast moving items nearest the loading dock or issue counter.
- Move all items the fewest number of times.
- Store bulky and heavy items nearest the loading dock.
- Ship and receive from separate loading docks.
- Provide adequate security at all times.
- Place warehouse office space, restrooms, and personnel lockers in peripheral areas.
- Plan column and stanchion spacing.
- Provide for one or more oversized doors.
- Anticipate future needs.
- Consider the closed stores system: physically securing the entry against unauthorized persons and requiring an established accounting document for all materials and supplies entering and/or leaving the facility.

Distribute the inventory items

Stores are sites where inventory is actually resides. Stores may be the central warehouse, entity warehouses, or storerooms.

Proper stores management procedures should include:

- Economy: maintain the value of items in stock at the lowest practical levels in order both to economize the use of working capital and to minimize the costs of storage.
- Identification: systematically defining and describing all items in stock.
- Receiving: accepting, from all sources, all items which are used in the government unit.
- Inspection: examining incoming items for quality and quantity.
- Internal Distribution: receiving demands from users, selecting the items required, and either handing them over or sending them out to the users. It also may involve the packaging of items to be issued, the loading of vehicles, and the operation of an internal fleet.
- Stock Records: documenting, on a daily basis, the details of individual receipts, issues, and stock balances.
- Stock Control: continuously arranging receipts and issues to ensure that stock balances are adequate to support the current rate of consumption, with regard to economy.
- Stocktaking: physically verifying the quantities and condition of goods in stock.
- Storage: managing stockrooms, warehouses, and stockyards; operating handling and storage equipment; and safekeeping and protecting stock.

Consider using an inventory category system which includes:

- exempt stock
- critical material
- basic material
- material for major projects bills of materials (BOMS)
- special project material BOMS
- cyclical review material
- maintenance material
- replacement material
- spare parts
- department controlled material
- inactive material
- other material

Consider using a commodity catalog which includes:

- details on ordering supplies
- the index and how to use it
- an explanation of the prices shown (i.e. unit of issue, unit price, etc.)
- item number
- back orders (a situation caused by stock-outs)
- how to return items to the warehouse
- pick-up and delivery policy
- publication schedule for the commodity catalog
- pertinent comments on the quality of the items in stock
- location of all warehouses or storerooms

Consider using an inventory classification system which classifies each material used by the organization by:

- dollar value
- lead time for reorder

Example: Use the ABC Classification System:

- Class A: represents 10% of the items and 70% of the value; high dollar issue items; requires low inventory but tight inventory controls to avoid stock out.
- Class B: represents 20% of the items and 20% of the value; moderate dollar issue items; requires frequent, periodic inventory check.
- Class C: represents 70% of the items and 10% of the value; low dollar issue items; avoid stock out of items.

Dispose of damaged, obsolete, and unneeded items

Define and identify damaged, obsolete, and unneeded items.

Comply with the state and federal surplus property laws, rules, and regulations. In general, they require that useable surplus items be offered first to other government and/or non-profit entities before being disposed of through public auction and/or

sale.

Require disposal of excess or surplus property. The disposal process should include:

- segregation and special handling of hazardous material (i.e. lithium batteries, etc.)
- controls for ensuring excesses do not consume high-cost storage space

Record and report inventory transactions

Inventory activity should be adequately supported through the following documentation:

- Requesting department should have signed approval on supply requisitions.
- Supply issues should be acknowledged by the receiving division.
- Receiving reports should be matched with purchase orders prior to receipt of goods and signed by authorized personnel before being posted to the records.
- Supporting documentation for adjustments to perpetual records should be retained.
- Adjustments should be approved by someone independent of the custodial and record keeping functions.

Policies and procedures for records retention should include:

- establishment of retention periods
- documentation of record retrievability standards
- disposal procedures

General criteria applicable to financial reporting on inventory balances are as follows:

- Inventories reported on the balance sheet actually exist at that date (Existence Assertion).
- Inventories that should be included in the financial statements are included and there are no undisclosed inventories (Completeness Assertion).
- Inventories represent assets to which the entity has legal rights or, if held in a fiduciary fund type, then the third party for which the inventories are held has legal rights (Rights Assertion).
- Inventories are included in the financial statements at appropriate amounts -- at the lower of cost or market value using FIFO, LIFO, or average cost (properly valued)-- and that the accounting records do not include inventory transactions of the subsequent fiscal year (allocated to the proper period) (Valuation or Allocation Assertions).
- Inventories are properly classified, described, and disclosed in the financial statements (Presentation and Disclosure Assertions).

Monitor and evaluate the inventory management process

At least annually evaluate the various inventory management processes for economy, effectiveness, and efficiency. This information should be used to enhance or modify current processes. Require preparation of regular managerial reports which should identify trends for inventory received, amounts used, total volume of inventory on hand, and number of returns for damage or non-compliance with quality standards.

Suggested Performance Measures:

Input indicators:

- the number of requisitions received

Output indicators:

- the number of requisitions filled
- total volume

Outcome indicators:

- amount of backlog
- number of items returned
- under 2-5% stock out ratio
- under 25% carrying charge
- four to six inventory turns per year determined as follows:

$$\text{Inventory Turns} = \frac{\text{Annualized Cost of Issues}}{\text{Annualized Monthly Inventory Investment}}$$

**Assess Condition:
Determine the actual
process used**

Conduct interviews, observe operations, and identify and collect available documentation in order to gain an understanding of the entity's actual inventory management process and controls. Included in the actual process are both official/unofficial and formal/informal processes and controls. An official process may exist even if it is not documented. Possible procedures include, but are not limited to:

- Determine where the inventory management process resides in the entity, who participates in the process, and how the participants are selected.
- Obtain and review any manuals, policies, and forms that could document any phase of the inventory management process, including its relationship to entity goals, objectives, strategies, and plans.
- Determine if and how management consciously selects and employs the assumptions, criteria, methods, processes, and techniques used in the inventory management process. Obtain and review available documentation on the assessment of risks, costs, and benefits.
- Determine how the entity plans for its inventory management, including forecasting methods.
- Observe and review quality assurance, inspections, and testing process.
- Review supply management procedures.
- Visit site(s) where inventory is stored procedures for access security, receiving, storage, and distribution.
- Observe the physical inventory taken by entity's personnel.
- Review inventory record-keeping system (including computerized system) for reflection of all transactions.

In addition to gaining an understanding of the actual process, you should also try to find out:

- how the participants views the actual process
- what parts of the process they see as successful or unsuccessful and why
- what they think is important about the process and why

This information may help identify causes and barriers.

**Determine the strengths and
weaknesses of the
actual process**

Using the tailored criteria, the understanding of the entity's process gained above, and the procedures in this section, analyze the actual process to determine if it:

- is designed to accomplish the management objective (this module, page 1)
- has controls that provide reasonable assurance that the process will work as intended
- is implemented and functioning as designed
- is actually achieving the desired management objective(s)

Suggested procedures for each of these four analysis steps are detailed below. In executing these procedures, remember to identify and analyze both strengths and weaknesses.

Identify and review the steps in the actual process to determine if the process is

designed to accomplish the management objective(s). Possible procedures include, but are not limited to:

- Determine if all major steps in the criteria are included in the actual process. If steps are missing, determine if their absence is likely to have a materially negative effect on the inventory management process at the entity you are reviewing.
- Determine if all the steps in the process appear to add value. If there are steps that do not appear to add value, try to get additional information on why they are included in the process.
- Review the order of the steps to determine if it promotes productivity.
- Review the level of technology used in the process to determine if it is up-to-date and appropriate to the task. Besides computer, electronic, communications, and other mechanical technology, you should also consider what kinds of management technology are used (Gantt charts, process maps, decision matrices, etc.). See the [appendix](#) to the module on Problem-Solving and Decision-Making for more information.

Identify the controls over the process and determine if they provide reasonable assurance that the process will work as intended. These controls should be appropriate, placed at the right point(s) in the process, timely, and cost effective. Possible procedures include, but are not limited to:

- Draw a picture of the process, the controls, and the control objectives (see the graphic of the procurement process in the [Introduction](#) for an example). Flowcharts of the inventory management process can help identify inputs, processes, and outputs.
- Determine if the control objectives are in alignment with the overall management objective(s) (this module, page 1).
- Identify the critical points of the process (i.e., those parts of the process most likely to determine its success or failure or expose the entity to high levels of risk) and the controls related to them. Consider whether the controls are:
 - in the right location within the process (input, operations, output)
 - timely (real time, same day, weekly, etc.)
- Compare the cost of the control(s) to the risk being controlled to determine if the cost is worth the benefit.
- Determine what controls are in place for monitoring and evaluating the overall effectiveness of the inventory management process and making sure that changes are made in the process if it does not yield the desired results.
- Identify, describe, and assess the process used to gather input from employees who might reasonably discover flaws in the process.
- Determine if inventory is adequately protected against theft, loss, or misuse by limiting access to authorized personnel.
- Determine if inventory is protected against spoilage or obsolescence by records showing minimum and maximum quantities. Determine if obsolete or unusable inventory is promptly removed from inventory records.
- Determine how often a physical inventory occurs and whether the results are documented and compared to inventory records to provide a basis for future

- review of mathematical accuracy and reasonableness.
- Review job responsibilities to determine if adequate segregation of duties exists among staff responsible for accounting, purchasing, inventory record keeping, and custody of stock.
- If a computerized inventory system is used, determine if controls exist which provide reasonable assurance that transactions with errors are rejected from further processing (e.g., transactions are prevented from updating the files/data base).

Review observations, interviews, documentation and other evidence and design specific audit procedures as needed to determine if the process and/or the controls have been implemented and are functioning as designed. Depending upon the objectives of the project, these procedures may include both tests of controls and substantive tests, more information on which is found in *The Hub*, p. 2-B-8, et. seq.. Possible procedures include, but are not limited to:

- Determine if any evidence of management override exists.
- Walk through the actual process, i.e., follow a transaction through the people and documents involved, and compare to the official process.
- Take a sample from a physical inventory observation and trace to the detail listing supporting the amount reported on the annual financial report.
- Review supporting documentation for supply requisitions and receiving to determine if requests are approved, receiving reports are matched with purchase orders, and receiving reports and adjustments are authorized.

Review and analyze any reports used by the entity to monitor the outcome(s) of the inventory management process and/or any other information available to determine if the process is actually achieving the desired management objective(s) (this module, page 1). Possible procedures include, but are not limited to:

- Analyze these process reports over time for trends.
- Discuss any apparently material negative or positive trends with management.
- Determine if and how management acts upon these trend reports and what changes, if any, were made in the process or controls as a result. Some process refinements, especially those affecting entity mission, goals, and outcome measures, may need to wait until the next appropriation cycle.
- Review managerial reports which track amount of inventory used, total inventory on hand, and number of returns for non-compatibility. Determine how management uses the results of these reports to modify its inventory management system.

Determine causes

Determine what circumstances, if any, caused the identified weaknesses in the inventory management process. Possible procedures include, but are not limited to:

- Determine if the participants in the inventory management process understand the entity's mission, goals, and values and support them through their management of the inventory management process.
- Determine if the participants understand both the purpose of and their role in the inventory management process.
- If the process occurs at multiple locations, determine if there is a process

- for ensuring adequate communication and coordination among them.
- Determine if the relationship between the inventory management process and other entity processes is clear.
- Determine if the inventory management process has adequate human, dollar, time, and asset resources. If they appear inadequate, determine if entity resources have been allocated according to the materiality of the inventory management process relative to other entity processes.
- Determine if the entity has considered using alternative resources such as industry associations, non-profit organizations, academic institutions, or other governmental entities to meet its resource needs.
- Determine if resources available to the inventory management process have been allocated and used in a manner consistent with the importance of that resource to the inventory management process.
- If there are negative trends in the reports used to monitor the outcome(s) of the inventory management process, determine if these reports are communicated to and used by the appropriate parties to modify the process.

Determine what internal or external constraints or barriers, if any, must be removed in order to successfully overcome these weaknesses. Possible procedures include, but are not limited to:

- Determine if any key employees are unwilling to change the process and why they are unwilling.
- Review the applicable entity, state, or federal laws or regulations to determine if any of them prevent the necessary changes from being made in the process.

Determine effect

Compare the actual entity process to a recommended alternative process(es) and determine if each weakness in the entity process is material. Alternatives can be developed by using the criteria contained in this module, applying general management principles to the process, using the processes at comparable entities, etc. Materiality can be measured by comparing the dollar cost, impact on services (either quantity or quality), impact on citizens, impact on the economy, risks, etc., of the actual process to the recommended alternative process(es). Measurements can be quantitative, qualitative, or both. Possible procedures include, but are not limited to:

- Identify performance benchmarks (industry standards, historical internal data, other comparable entities, etc.) for the process in question and compare to actual performance. Measure the difference, if possible. Include the cost of the additional controls or changes in the process.
- Estimate the cost of the actual process and the alternative process(es) and compare.
- Estimate the quantity and/or quality of services provided by the actual process and by the alternative process(es) and compare.
- Identify the risks associated with the actual process and with the alternative process(es). Measure and compare the risks.

Develop recommendations

Develop specific recommendations to correct the weaknesses identified as material in the previous section. In developing these recommendations, consider the tailored criteria, kind of process and control weaknesses identified, causes and barriers, effects, and additional resources listed at the end of this module. Possible procedures include, but are not limited to:

- Identify alternative solutions used by other entities.
- Identify solutions for removing barriers.
- Provide general guidelines as to the objectives the solution should meet, then the entity can tailor the solution to its specific situation.
- Provide specific information, if available, on how the recommendation can be implemented.

RESOURCES**Articles**

Arcelus, F. J. "Delay of Payments for Extraordinary Purchases." *Journal of the Operations Research Society* 44:8:785-796, August 1993. Location: The University of Texas, Perry-Castañeda Library (658.05 OP3).

Bollapragada, Srinivas. "Component Procurement and Allocation for Products Assembled to Forecast: Risk-Pooling Effects." *IBM Journal of Research and Development* 37:4:523-537, July 1993. Location: The University of Texas, Engineering Library (621.305 IN8).

Cushing, Barry E. "Evidence on the Determinants of Inventory Accounting Policy Choice." *Accounting Review* 67:2:355-367, April 1992. Location: The University of Texas, Perry-Castañeda Library (HF 5601 A6).

Gerchak, Yigal. "On the Effect of Demand Randomness on Inventories and Costs."

Operations Research 40:4:804-808, July-August 1992. Location: The University of Texas, Perry-Castañeda Library (658.05 OP3).

Kanniainen, Vesa. "The Cost of Holding Inventories and the Demand for Labour and Capital Under Corporate Taxation." *Canadian Journal of Economics* 23:1:226-236, February 1990. Location: The University of Texas, Perry-Castañeda Library (330.5 C16).

Karmarkar, Uday. "Getting Control of Just-In-Time." *Harvard Business Review* 67:5:122-132, September-October 1989. Location: The University of Texas, Perry-Castañeda Library (HF 5001 H3).

Lindahl, Frederick W. "Dynamic Analysis of Inventory Accounting Choice." *Journal of Accounting Research* 27:2:201-227, Autumn 1989. Location: The University of Texas, Perry-Castañeda Library (657.05 J827).

McGavin Edward J., Leroy B. Schwarz, and James E. Ward. "Two-Interval Inventory Allocation Policies in a One-Warehouse N-Identical Retailer Distribution System." *Management Science* 39:9:1092-1108, September 1993. Location: The University of Texas, Perry-Castañeda Library (658.05 M312).

Moinzadeh, Kamran. "An Inventory Model of Immediate and Delayed Delivery." *Management Science* 39:5:536-549, May 1993. Location: The University of Texas, Perry-Castañeda Library (658.05 M312).

Mossetti, Giovanna. "Inside Money: Output and Inventories in a Business Cycle." *Canadian Journal of Economics* 23:2:381-400, May 1990. Location: The University of Texas, Perry-Castañeda Library (330.5 C16).

Primrose P. L. "The Value of Inventory Savings." *International Journal of Operations and Production Management* 12:5:79-93, May 1993. Location: The University of Texas, Perry-Castañeda Library (Call Inter-Library Loan Office, 495-4134).

Robinson, Lawrence W. "The Cost of Following the Optimal Inventory Policy." *IIE Transactions* 25:5:105-109, May 1993. Location: The University of Texas, Engineering Library (T 55.4 A5).

Song, Jing-Sheng. "Inventory Control in a Fluctuating Demand Environment." *Operations Research* 41:2:351-371, March-April 1993. Location: The University of Texas, Perry-Castañeda Library (658.05 OP3).

Stevenson, Robert T. "25 Ways To Analyze and Selectively Reduce Inventories." *CPA Journal* 60:10:93, October 1990. Location: The University of Texas, Perry-Castañeda Library (HF 5601 N54).

Williams, Scott. "An Inventory Control Solution for On-Site Warehousing." *Industrial*

Engineering 24:9:29-31, September 1992. Location: The University of Texas, Perry-Castañeda Library (658.505 IN22).

Windsor, Sean. "The Life of Audit Sampling Techniques to Test Inventory." *Journal of Accountancy* 171:1:107-110, January 1991. Location: The University of Texas, Perry-Castañeda Library (HF 5601 J7).

Books

Note: Entries followed by an asterisk (*) contain guidelines, models, and/or programs for conducting inventory-related audits.

Aft, Lawrence S. *Production and Inventory Control*. San Diego, CA: Harcourt Brace Jovanovich Publishers, Incorporated, 1987. Location: The University of Texas, Perry-Castañeda Library (TS 160 A36 1987).

Albert Ramond and Associates. *Controlling Production and Inventory Costs*. Englewood Cliffs, NJ: Prentice-Hall, Incorporated, 1978. Location: The University of Texas, Perry-Castañeda Library (HD 47.5 A35 1978).

American Production and Inventory Control Society, Inc. *Inventory Management Reprints*. Falls Church, VA: APICS Professional Bookstore, 1984-93. Location: The University of Texas, Perry-Castañeda Library (HD 40 I575 1984).

American Production and Inventory Control Society, Inc. *Material Requirements Planning Reprints*. Falls Church, VA: APICS Professional Bookstore, 1984-93. Location: The University of Texas, Perry-Castañeda Library (HD 40 M365 1986).

Banks, Jerry. *Procurement and Inventory Systems Analysis*. Englewood Cliffs, NJ: Prentice-Hall, Incorporated. Location: The University of Texas, Engineering Library (TS 160 B25 1987).

Camp, Robert C. *Benchmarking, The Search for Industry Best Practices that Lead to Superior Performance*. White Plains, NY: Quality Press, 1989. Location: The University of Texas, Perry-Castañeda Library (HD 58.9 C36 1989).

Committee of Sponsoring Organizations of the Treadway Commission. "Inbound, Operations, Outbound." In *Internal Control -- Integrated Framework: Evaluation Tools*. New York, NY: Committee of Sponsoring Organizations of the Treadway Commission, September 1992. Location: SAOLibrary and Methodology Project Information Resource Folders.

Emmelhainz, Margaret A. *Electronic Data Interchange: A Total Management Guide*. New York, NY: Van Nostrand Reinhold, 1990. Location: The University of Texas, Perry-Castañeda Library (HF 5548.33 E54 1990).

Fogarty, Donald W. *Inventory Management: Basic Models and Systems*. Falls Church, VA: American Production and Inventory Control Society, 1983. Location: The University of

Texas, Perry-Castañeda Library (TS 157 F64 1983).

Friedman, Ronald S. *Inventory Opportunity Questionnaire*. New York, NY: American Management Association, 1982. Location: The University of Texas, Perry-Castañeda Library (HD 40 F74 1982).*

Fuller, Thomas H., Jr. *Microcomputers in Production and Inventory Management*. Homewood, IL: Business One Irwin, 1987. Location: The University of Texas, Perry-Castañeda Library (HF 5548.2 F84 1987).

Grieco, Peter L. *Behind Bars, Bar Coding Principles and Applications*. Palm Beach Gardens, FL: P. T. Publications, 1989. Location: American Production and Inventory Control Society, Inc., 500 W. Annandale Road, Falls Church, VA 22046; Stock #03924.

Hall, Robert W. *Zero Inventories*. Homewood, IL: Business One Irwin, 1983. Location: The University of Texas, Perry-Castañeda Library (TS 160 H3).

Hax, Arnold C. *Production and Inventory Management*. Englewood Cliffs, NJ: Prentice-Hall, Incorporated, 1984. Location: The University of Texas, Perry-Castañeda Library (TS 155.8 H38 1984).

Horn, Jack. *Efficient Inventory Control and Management with EDP*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1970. Location: The University of Texas, Perry-Castañeda Library (658.787 H783E).

Hohenstein, Louis C. *Practical Stock and Inventory Techniques That Cut Costs and Improve Profits*. New York, NY: Van Nostrand Reinhold, 1982. Location: The University of Texas, Perry-Castañeda Library (HD 40 H63 1982).

Janson, Robert L. *Handbook of Inventory Management*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1987. Location: The University of Texas, Perry-Castañeda Library (HD 40 J36 1987).

Jenkins, Creed H. *Complete Guide to Modern Warehouse Management*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1991. Location: The University of Texas, Perry-Castañeda Library (HF 5485 J39 1990).

Mather, Hal. *Bills of Materials*. Homewood, IL: Business One Irwin, 1987. Location: The University of Texas, Perry-Castañeda Library (HD 40 H36 1987).

Mather, Hal. *How to Really Manage Inventories*. New York, NY: McGraw-Hill, Inc., 1984. Location: The University of Texas, Perry-Castañeda Library (HD 40 M37 1984).

McLeavey, Dennis W., and Seetharama L. Narasimhan. *Production Planning and Inventory Control*. Boston, MA: Allyn and Bacon, 1985. Location: The University of Texas,

Engineering Library (TS 176 M374 1985).

Miller, Martin A. *1991 GAAS Guide*. New York, NY: Martin Accounting Publications, Inc., 1991. Location: SAO Library.*

Orlicky, Joseph. *Material Requirements Planning, The New Way of Life in Production and Inventory Management*. New York, NY: McGraw-Hill Book Company, 1975. Location: The University of Texas, Perry-Casteñeda Library (TS 155.8 074).

Peterson, Rein, and Edward A. Silver. *Decision Systems for Inventory Management and Production Planning*, 2nd Edition. New York, NY: John Wiley and Sons, 1985. Location: The University of Texas, Perry-Castañeda Library (HD 40 P48 1985).

Plossl, George W. *Production and Inventory Control: Principles and Techniques*, 2nd Edition. Englewood Cliffs, NJ: Prentice-Hall, Incorporated, 1985. Location: The University of Texas, Perry-Castañeda Library (TS 160 P55 1985).

Reinfeld, Nyles V., ed. *Handbook of Production and Inventory Control*. Englewood Cliffs, NJ: Prentice-Hall, Incorporated, 1987. Location: The University of Texas, Engineering Library (TS 157 H36 1987).

Salvendy, Gavriel. *Handbook of Industrial Engineering*. New York, NY: John Wiley & Sons, Inc., 1982. Location: The University of Texas, Engineering Library (T56.23 H36 1982).

Silver, Edward A. and Rein Peterson. *Decision Systems for Inventory Management and Production Planning*. New York, NY: John Wiley & Sons, Inc., 1985. Location: The University of Texas, Perry-Casteñeda Library (HD 40 P48 1985).

Smith, Bernard T. *Focus Forecasting, Computer Techniques for Inventory Control*. Essex Junction, VT: Oliver Wight Limited Publications, Inc., 1986. Location: The University of Texas, Perry-Casteñeda Library (HD 55 S48 1984).

Tersine, Richard J. *Principles of Inventory and Materials Management*, 3rd Edition. New York, NY: North-Holland Publishers, Incorporated, 1987. Location: The University of Texas, Perry-Castañeda Library (TS 160 T4 1987).

United States Small Business Administration, Office of Business Development. *Inventory Management*. Washington, D.C.: United States Small Business Administration, 1989. Location: The University of Texas, Perry-Castañeda Library (DOCS SBA 1.32/2:MP22).

Walton, Mary. *The Deming Management Method*. Kirkwood, NY: The Putnam Publishing Group, 1986. Location: The University of Texas, Perry-Casteñeda Library (HD 38 D439 W35 1986).

Wight, Oliver W. *The Executive's Guide to Successful MRP II*. Essex Junction, VT: Oliver Wight Limited Publications, Inc., 1985. Location: The University of Texas, Perry-Casteñeda Library (TS 155.8 T538 1993).

Young, Jan B. *Modern Inventory Operations, Methods for Accuracy and Productivity*. New York, NY: Van Nostrand Reinhold, 1991. Location: The University of Texas, Perry-Casteñeda Library (TS 160 Y68 1991).

Zeithaml, Valerie A., A. Parasuraman, and Leonard L. Berry. *Delivering Quality Service, Balancing Customer Perceptions and Expectations*. New York, NY: The Free Press, 1990. Location: The University of Texas, Perry-Casteñeda Library (HF 5415.5 Z45 1990).

Data Bases

ABEST (Agency Budgets & Strategic Plans)

ABEST data are compiled by the Legislative Budget Office and include information on the following:

- budget requests
- input, output, and efficiency measures
- capital expenditures
- budget recommendations
- quarterly and year-to-date performance measures
- classified positions
- entity strategic plans
- statewide strategic plan

ABEST information is maintained dating from 1992 and projecting forward to 1994 and 1995. In-house contacts on ABEST are Dean Duan (4829), Tom Tharp (4912), and Sherry Varnado (4716).

UTCAT (On-Line Catalog of the General Libraries of UT-Austin)

Search parameters used to identify these holdings include:

- S (subject) for books
- S (subject) and SK (subject keyword) for periodicals
- T (title) and TK (title keyword) for books and periodicals
- PT (periodical title) and PK (periodical title keyword) for periodicals

An S (subject) search in the books data base or an SK (subject keyword) search in the periodicals data bases lets you scan all subjects related to inventory control/management, such as "inventory control--methods" or "inventory control--surveys." This lets you focus the subject of your search.

Regardless of subsidiary data base, a TK (title keyword) search lets you scan bibliographic entries for all books or articles which have the words "inventory control" or "inventory management" in their titles.

Note: Books, academic periodicals, and business periodicals are accessed in different subsidiary databases in UTCAT. While all SAO employees can access the main UTCAT data base, access to the periodicals data bases is limited to holders of current identification from either UT-Austin, UT-Dallas, or UT-Pan American.

Human Resources

The following staff members have specialized training or ongoing interest in inventory:

SAO Employee	Title/Function
Bill Addison Andrew Knight	
Bill Addison Amy Graves Babette Laibovitz, MPA Linda Lansdowne, CPA Bruce Truitt	Module Writers/Editor
Barbara Hankins, CPA Jeannie Henderson, CPA Randy Townsend, CPA	Reviewers

Periodicals

Note: Indexes and abstracts of periodicals in bold-faced type are available in the SAO Library via ABI/INFORM.

Accountant's Magazine

Published monthly by the Accountants' Publishing Company (Scotland)
Location: The University of Texas, Perry-Castañeda Library (HF 5601 A22)

Accounting and Finance

Published monthly by the Accounting Association of Australia and New Zealand
Location: The University of Texas, Perry-Castañeda Library (HF 5601 A254)

Accounting Review

Published monthly by the American Accounting Association
Location: The University of Texas, Perry-Castañeda Library (HF 5601 A6)

Accounting Today

Published biweekly by Lebhar Friedman, Incorporated
Location: SAO Library

Advances in Business Marketing and Purchasing

Published monthly by JAI Press, Incorporated

Location: The University of Texas, Perry-Castañeda Library (HF 5410 A263)

APICS: The Performance Advantage

Published monthly by the American Production and Inventory Control Society

Location: The University of Texas, Perry-Castañeda Library (HD 69 P7 A642)

CMA: The Management Accounting Magazine

Published bimonthly by the Society of Management Accountants of Canada

Location: The University of Texas, Perry-Castañeda Library (H 1 C647)

CPA Journal

Published monthly by the New York Society of Certified Public Accountants

Location: The University of Texas, Perry-Castañeda Library (HF 5601 N54)

CPA Letter

Published monthly by the American Institute of Certified Public Accountants

Location: SAO Library

Credit and Financial Management

Published monthly by the National Association of Credit Management

Location: The University of Texas, Perry-Castañeda Library (HF 5565 N3)

Decision Sciences

Published bimonthly by the American Institute for Decision Sciences

Location: The University of Texas, Perry-Castañeda Library (HD 69 D4 D3248)

FASAB News

Published monthly by the Financial Accounting Standards Advisory Board

Location: SAO Library

GAAFR Review

Published monthly by the Government Finance Officers Association

Location: SAO Library

GAO Journal

Published quarterly by the United States General Accounting Office

Location: SAO Library

Government Accountant's Journal

Published quarterly by the Association of Government Accountants

Location: SAO Library

Harvard Business Review

Published bimonthly by the Harvard Business School

Location: SAO Library

IBM Journal of Research and Development

Published annually by International Business Machines, Incorporated
Location: The University of Texas, Engineering Library (621.305 IN8)

IIE Transactions

Published monthly by the American Institute of Industrial Engineers
Location: The University of Texas, Engineering Library (T 55.4 A5)

Industrial Engineering

Published monthly by the Institute of Industrial Engineers
Location: The University of Texas, Perry-Castañeda Library (658.505 IN22)

Internal Auditor

Published monthly by the Institute of Internal Auditors
Location: SAO Library

Internal Auditing

Published quarterly by Warren, Gorham, and Lamont
Location: SAO Library

International Journal of Operations and Production Management

Published monthly by MCB-University Press, Limited (UK)
Location: The University of Texas, (Call Inter-Library Loan Office, 495-4134)

International Journal of Physical Distribution and Materials Management

Published monthly by MCB-University Press, Limited (UK)
Location: The University of Texas, Perry-Castañeda Library (HF 5415.7 I55)

International Journal of Production Economics

Published monthly by Elsevier
Location: The University of Texas, Engineering Library (TA 177.4 E53)

International Journal of Purchasing and Materials Management

Published quarterly by the National Association of Purchasing Management
Location: The University of Texas, Perry-Castañeda Library (-Q- HF 5437 A2 J6)

Journal of Accountancy

Published monthly by the American Institute of Certified Public Accountants
Location: SAO Library

Journal of Accounting and Public Policy

Published quarterly by North Holland Publishers
Location: The University of Texas, Perry-Castañeda Library (HJ 9701 J687)

Journal of Accounting Research

Published quarterly by the Graduate School of Business, University of Chicago
Location: The University of Texas, Perry-Castañeda Library (657.05 J827)

Journal of Business Finance and Accounting

Published quarterly by Basil Blackwell, Limited (UK)
Location: The University of Texas, Perry-Castañeda Library (HG 1 J581)

Journal of Business Forecasting Methods and Systems

Published bimonthly by Graceway Publishing Company, Incorporated
Location: The University of Texas, Perry-Castañeda Library (HB 3730 J65)

Journal of Risk and Insurance

Published by the American Risk and Insurance Association
Location: The University of Texas, Perry-Castañeda Library (368.05 J827)

Journal of Systems Management

Published monthly by the Association for Systems Management
Location: The University of Texas, Perry-Castañeda Library (658.05 SY91)

Journal of the Operations Research Society

Published monthly by the Operations Research Society of America
Location: The University of Texas, Engineering Library (658.05 OP3)

Lists of Parties Excluded from Federal Procurement Programs

Published monthly by the United States General Services Administration
Location: The University of Texas, Perry-Castañeda Library (DOCS GS1.29 MONTHLY MFICHE)

Management Accounting

Published monthly by Straker Brothers, Limited (UK)
Location: The University of Texas, Perry-Castañeda Library (HF 5686 C8 C684)

Managerial Finance

Published quarterly by Barmarick Publications, Limited (UK)
Location: The University of Texas, Perry-Castañeda Library (HG 1 H332)

NASACT News

Published bimonthly by the National Association of State Auditors, Comptrollers, and Treasurers
Location: SAO Library

National Contract Management Journal

Published quarterly by the National Contract Management Association
Location: The University of Texas, Perry-Castañeda Library (HD 3858 N372)

National Public Accountant

Published monthly by the National Society of Public Accountants
Location: The University of Texas, Perry-Castañeda Library (657.05 N213)

National Underwriter Property and Casualty - Risk and Benefits Management

Published weekly by the National Underwriter Company
Location: The University of Texas, Perry-Castañeda Library (MFICHE 8944)

Operations Research

Published monthly by the Operations Research Society of America
Location: The University of Texas, Perry-Castañeda Library (Q 175 O63)

Practical Accountant

Published monthly by Faulkner and Gray
Location: SAO Library

Production and Inventory Management Journal

Published quarterly by the American Production and Inventory Control Society
Location: The University of Texas, Perry-Castañeda Library (HD 69 P7 P75)

Production and Inventory Management Review and APICS News

Published monthly by TDA Publications
Location: The University of Texas, Perry-Castañeda Library (HD 69 P7 P76)

Public Contract Law Journal

Published monthly by the American Bar Association, Contract Law Section
Location: The University of Texas, Law Library (LAW K 16 U19)

Purchasing

Published monthly by Cahners Publishing Company
Location: The University of Texas, Perry-Castañeda Library (658.705 P9711)

Purchasing World

Published monthly by Technical Publishing Company
Location: The University of Texas, Perry-Castañeda Library (HF 5437 A2 P83)

Risk Analysis

Published quarterly by the Society for Risk Analysis and Plenum Publishing
Location: The University of Texas, Perry-Castañeda Library (T 174.5 R55)

Risk Management

Published monthly by the Risk and Insurance Management Society
Location: The University of Texas, Perry-Castañeda Library (HG 8059 C7 N312)

SAM Advanced Management Journal

Published quarterly by the Society for Advancement of Management
Location: The University of Texas, Perry-Castañeda Library (HD 28 S622)

Sloan Management Review

Published quarterly by the Sloan School of Management, M.I.T.
Location: The University of Texas, Perry-Castañeda Library (HD 28 S56)

Today's CPA

Published bimonthly by the Texas Society of Certified Public Accountants
Location: SAO Library

**Professional Associations and
Research Entities**

Academy of Management
Columbia, South Carolina
(803) 777-5969

American Accounting Association
Sarasota, Florida
(813) 921-7747

American Institute of Certified Public Accountants
New York, New York
(212) 596-6200

American Management Association
New York, New York
(212) 586-8100

American Production and Inventory Control Society
Falls Church, Virginia
(800) 444-2742

American Purchasing Society
Tempe, Arizona
(602) 752-6276

American Risk and Insurance Association
Bloomington, Illinois
(309) 454-6900

American Society for Decision Sciences
Atlanta, Georgia
(404) 651-4000

Association for Investment Management and Research
Charlottesville, Virginia
(804) 977-6600

Association for Systems Management
Cleveland, Ohio
(216) 243-6900

Association of Government Accountants
Alexandria, Virginia
(703) 684-6931

Bureau of Business Research, UT Graduate School of Business
Austin, TX
(512) 471-1616

Cornell University Graduate School of Business and Public Administration
Ithaca, New York
(607) 255-2327

Council of State Governments
Lexington, Kentucky
(606) 231-1939

Financial Executives Institute
Morristown, New Jersey
(201) 898-4600

Financial Management Association
Tampa, Florida
(813) 974-2084

Financial Managers Society
Chicago, Illinois
(312) 578-1300

Government Finance Officers Association
Washington, D.C.
(202) 429-2750

Governmental Accounting Standards Board
Norwalk, Connecticut
(203) 847-0700

Harvard Business School
Cambridge, Massachusetts
(617) 495-9400

Institute of Industrial Engineers

Norcross, Georgia
(404) 449-0460

Institute of Internal Auditors
Altamonte Springs, Florida
(403) 830-7600

Institute of Management Accountants
Montvale, New Jersey
(201) 573-9000

Institute of Management Sciences
Providence, Rhode Island
(401) 274-2525

Institute of Professional Accounting
Graduate School of Business, University of Chicago
Chicago, Illinois
(312) 702-7743

International Federation of Purchasing and Materials Management
Bergen, Netherlands
(310) 2208-99797

National Association of Credit Management
Columbia, Maryland
(410) 740-5560

National Association of Purchasing Management
Tempe, Arizona
(602) 752-6276

National Association of State Auditors, Comptrollers, and Treasurers
Lexington, Kentucky
(606) 276-1147

National Association of State Purchasing Officials
Lexington, Kentucky
(606) 231-1906

National Contract Management Association
Vienna, Virginia
(703) 448-9231

National Institute of Business Management

New York, New York
(800) 543-2053

National Institute of Governmental Purchasing
Falls Church, Virginia
(800) 367-6447
National Purchasing Institute
Bethesda, Maryland
(301) 951-0108

National Society of Public Accountants
Alexandria, Virginia
(703) 549-6400

Operations Research Society of America
Baltimore, Maryland
(410) 528-4146

Risk and Insurance Management Society
New York, New York
(212) 286-9292

Sloan School of Management
Cambridge, Massachusetts
(617) 253-2659

Society for Risk Analysis
McClean, Virginia
(703) 790-1745

Texas Association of Certified Public Accountants
Dallas, Texas
(214) 689-6000

Texas Association of Certified Public Accountants, Austin Chapter
Austin, Texas
(512) 452-9439

United States General Accounting Office
Washington, D.C.
(202) 512-6000

Universal Public Purchasing Certification Council
Falls Church, Virginia
(800) 367-6447

University of Georgia Institute of Government
Athens, Georgia
(706) 542-2736

University of Texas at Austin Graduate School of Business
Austin, Texas
(512) 471-5921

Related Modules and Reports

Budgets
Fixed Assets
Organization Structure
Risk Assessment
Procurement

SAO Report 2-109: *Texas Surplus Property 1991*
SAO Report 3-048: *Texas Surplus Property 1992*
SAO Report 1-078: *Texas Department of Criminal Justice -- Certification of the In-House Cost Estimate for the Food Service Division's Ferguson Unit*

Training

External seminars are provided by the American Production and Inventory Control Society (APICS) for the areas listed below. Such training leads to examination and being Certified in Production and Inventory Management (CPIM), Certified Fellow in Production and Inventory Management (CFPIM), and Certified Integrated Resource Management (CIRM):

- Capacity Requirements Planning and Production Activity Control
- Customers and Products
- Inventory Management
- Just-In-Time Management
- Logistics
- Manufacturing Processes
- Master Planning
- Material Requirements Planning
- Support Functions
- Systems and Technologies

Auditing the Materials Management Function: Fixed Assets, Inventory, Procurement
In-house training developed by Bill Addison and Janet Reynolds
Location of materials: Methodology Project Team