

**INVENTORY ACCURACY & AUDITS
FOR ENTREPRENEURS**

Presented to

FATE FOUNDATION

By

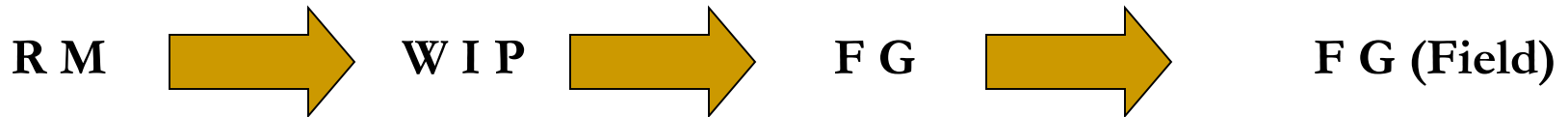
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OBJECTIVES

- **Inventory System Defined**
 - What is Inventory
 - Inventory Control & Accuracy
 - Cycle Counting
 - Physical Inventory
 - Inventory Costs
 - Functional Questions on Inventory Management
 - How much to order?
 - When to order?
 - What is the total cost?
- **Purpose of Inventory**
- **Prerequisites for Good Inventory Control and Accuracy**
- **Benefits of Physical Inventory Vs Cycle Counting**
- **Steps in Cycle Counting**
- **ABC Analysis**
- **Establishment of Inventory Accuracy Goals**
- **J I T System**

INVENTORY SYSTEM

- **Inventory** is the stock of any item or resource used in an organization and can include: raw materials, consumables, finished products, component parts, supplies, and work-in-process. A physical resource that a firm holds in stock with the intent of selling or transforming into a more valuable state.



- An **inventory system** is the set of policies and controls that monitor levels of inventory and determines what levels should be maintained, when stock should be replenished, and how large orders should be.
- **Inventory Record Accuracy (IRA)** is a measure of how closely official inventory records match the physical inventory. Why is IRA extremely important for an organization?

Financial Reasons:

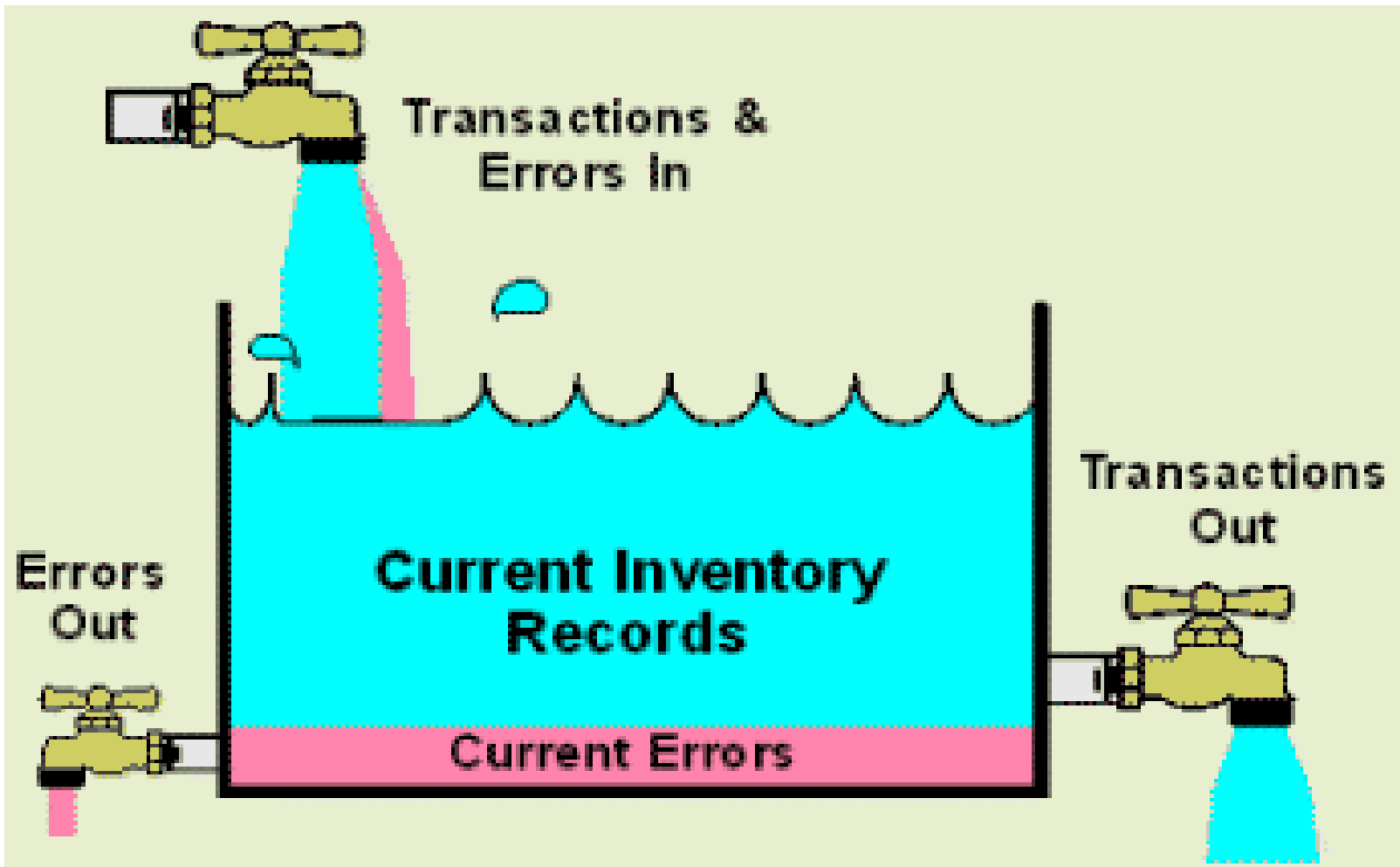
- **Investors want to know that the stock book value is accurate.**
- **Lenders who loan money with inventory as collateral want to protect their loan.**
- **Taxation often depends on inventory value. Overpayment of taxes reduces profits and underpayment incurs penalties.**
- **Poor accuracy begets more inventory and requires more capital. Inventory is often the largest consumer of capital for an enterprise.**

Operational Reasons:

- **Stockouts interrupt production and create delivery delays.**
- **People waste hours looking for misplaced or missing items.**
- **When stockouts are frequent, inventory rises to compensate. This unnecessary inventory requires space and capital.**
- **Inventory turnover reflects overall manufacturing efficacy.**
- **Stockouts increase cost in a hundred ways and sap the time and energy of everyone.**

METHODS FOR IMPROVING INVENTORY ACCURACY

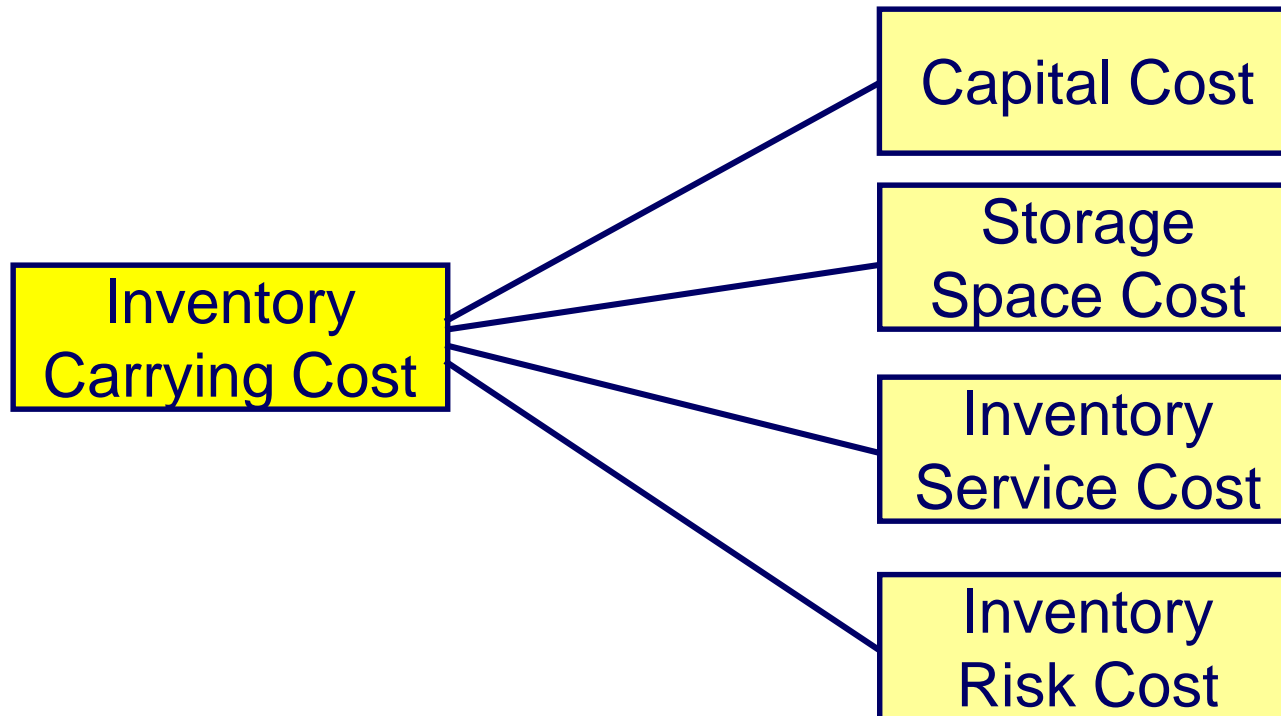
- **To improve inventory record accuracy, the error creation rate (i.e. errors per week, month, etc.) must be less than the error removal rate. To increase accuracy we can decrease errors flowing in or increase the removal rate.**
- **Methods to improve accuracy include Cycle Counting, Physical Inventory, Transaction Reduction and Process Improvement. An optimal approach uses them all.**
- **Physical Inventory-- In a physical inventory, normal operations cease while a physical count of every item is conducted. The counts are compared to inventory records and, when necessary, the records corrected.**
- **Cycle Counting-- A small number of items are physically counted, daily, on a random or semi-random basis. The physical count is compared to the inventory record. When necessary, the records are corrected.**
- **Process Improvement-- Process Improvement examines the transaction processes. Changes are identified that reduce the probability of error.**
- **Transaction Reduction-- The most effective way to reduce errors is to reduce the number of transactions. Fewer transactions introduce fewer errors.**



INVENTORY TOTAL COSTS

- **Holding (or carrying) costs**
 - Costs for storage, handling, insurance, etc
- **Setup (or production change) costs**
 - Costs for arranging specific equipment setups, etc
- **Ordering costs**
 - Costs of someone placing an order, etc
- **Shortage costs**
 - Costs of canceling an order, etc

Inventory Carrying Costs



Inventory Costs always:

- Vary with level of inventory and length of time item is held
- Typically expressed as annual percentage of item's value
- Range from 20% to 40% of item's value

Capital Cost

Cost associated with a foregone alternative use of the capital.

- also referred to as opportunity cost
 - ✦ the potential benefits obtained from another financially productive alternative
- often the largest component of inventory carrying cost
- usually set to the firm's hurdle rate
 - ✦ minimum rate of return expected on new investments

Storage Space Cost

- **Warehouse facilities**

Variable expenses –vary with the amount of inventory in the short run. (Excludes fixed rent, depreciation, allocated costs, etc.)

- **Material handling, such as labor**

- **Maintenance cost**

- **Utility costs**

Inventory Service Cost

- Includes taxes and
- Insurance for risk of loss or damage.

Inventory Risk Cost

- **Possibility that the inventory's Net realizable value may decline due to:**
 - **obsolescence**
 - ✦ equal to the original cost less salvage value
 - **deterioration**
 - **damage**
 - **shrinkage (theft)**

Reasons for Incurring carrying Costs

- Economies of scale (or batching economies)
- Price and quantity discounts
- Transportation rate discounts
- Production economics
- Uncertainty about customer demand
- Lead time delays
- Disruptions in supply
- Stockpile during “off-seasons”
- Scheduled shutdown
- Seasonal weather disruptions
- Smooth production
- Contract negotiation – possible labor stoppages

Functional Questions on Inventory Management

- How much to order? – Economic Order Qty
- When to order? – Reorder Level
- What is the total cost?
 - Holding/Carrying Cost
 - Ordering Cost (Processing, shipping, handling)
 - Shortage Cost (Lost Sales, Back-order Cost, Redundancy)

PURPOSES OF INVENTORY CONTROLS

1. To maintain continuity of operations
2. To meet variation in product demand
3. To allow flexibility in production scheduling
4. To provide a safeguard for variation in raw material delivery time
5. To take advantage of economic purchase-order size
6. Improve customer service and satisfaction
7. Economies of purchasing (savings in purchases)
8. Economies of production (reduces idle time and costs)
9. Transportation savings (reduces transportation cost per unit)
10. Hedge against future dislocation
11. Unplanned shocks (labor strikes, natural disasters, surges in demand, etc.)
- 12.
13. To maintain independence of supply chain

Prerequisites for Good Inventory Control & Accuracy

- **Attitude:** Top down management support
- **Process Definition:** Define and document opportunities for errors and implement changes to eliminate or reduce them
- **Procedure Documentation:** defined processes to document the procedures the employees will follow to maintain inventory integrity. The procedures documented here should not be limited to inventory issues; they should be the complete procedure including quality, physical aspects, and safety. This documentation should be as clear and comprehensive as possible. It should be written for a specific task within a specific job responsibility, it should include everything the employee needs to know to complete the task and nothing else. Enforce compliance to all procedures and distribute to all employees.

- **Employee Training:** Set a training schedule that will go through all the procedures with groups of employees. Set a training schedule to go through all the procedures with groups of employees. Make notes for possible future revisions of the procedures. Set a timetable for publishing and putting into effect revisions (every quarter or six months)
- **Employee Testing:** Institute formal testing of employees on the procedures and steps as documented.
- **Monitoring Processes for Compliance:** begin to monitor the processes for compliance to the procedures immediately. Any actions observed which do not comply with the written procedures must be addressed immediately with the employees involved. As stated earlier, the written procedures are the only way to perform the task.

- **Setting Standards:** Set minimum accuracy and inventory control standards wherever feasible. Research to ensure the standards set are high enough yet still achievable. Since these are enforceable standards it is critical to set them correctly. Setting standards requires tracking of the accuracy of the inventory tasks being performed which makes it more viable when you have several people performing the same tasks.
- **Tracking Accuracy:** This is an organizational and individual feed back mechanism. To check the success profile. Accuracy tracking should be communicated to staff in a positive manner; it is a tool to facilitate improvement in inventory processes and efficiency in people.
- **Accountability:** Time has been spent to document the procedures, provide the training, and the testing. If someone is not following the procedures they must be dealt with by applying appropriate disciplinary action.

- **Count, Count, Count:** Year-end physical inventories are tools used by accountants and do very little for inventory accuracy and success. One should count inventories on a continuous basis (cycle counting) to maintain high levels of accuracy. This is one of the best ways of identifying problem areas on a timely basis and providing an environment conducive to continuous improvement. The way inventories are counted and the frequency of counts should be designed for specific type of operation.
- **Re-evaluate:** Organizations should regularly reevaluate processes and procedures. Results of the cycle count program should point the organization in the direction of areas where enhancements are needed. Business conditions often change and new processes are added which will require additional evaluation.

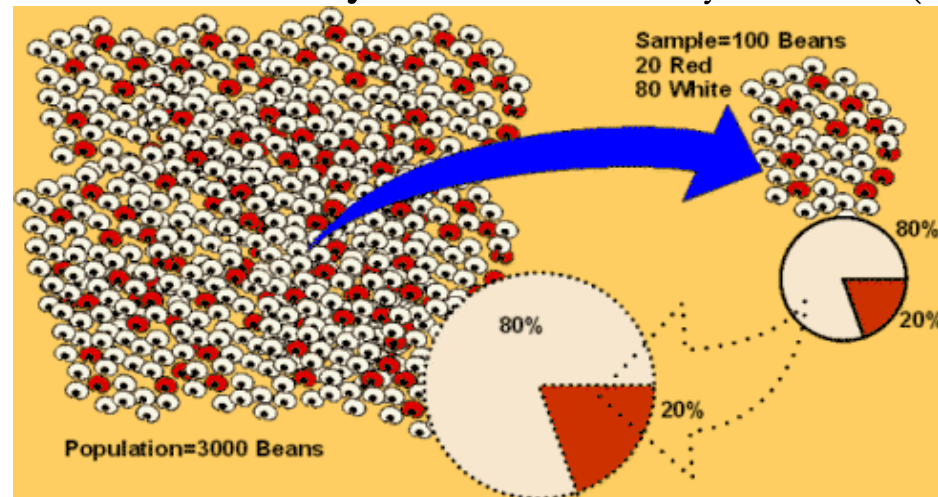
Other Prerequisites

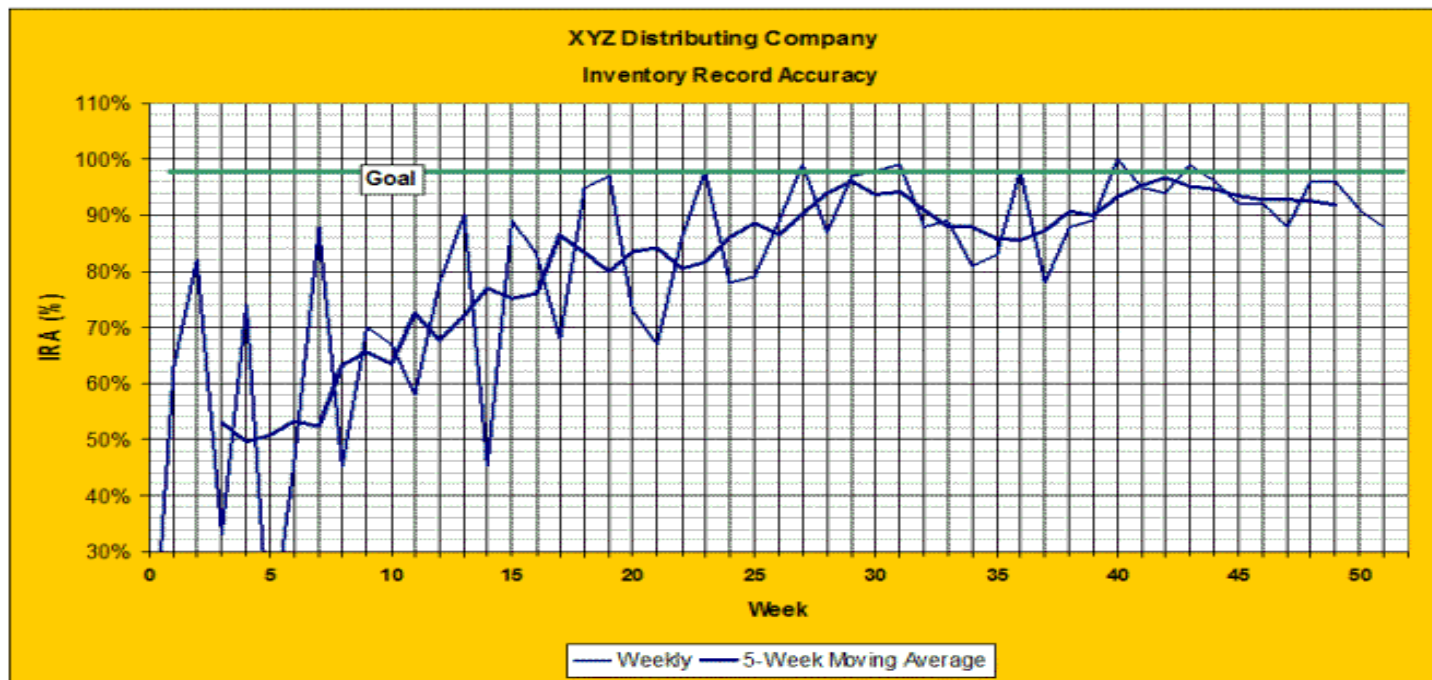
- Dedicate positions for managing inventory.
- Control employee turnover.
- Be prepared to dismiss or reassign employees.
- Don't be afraid to put Checks in place.
- Ensure good Storage Areas
- Know your inventory system.

The end result in accuracy improvement will be directly related to the effort put forth to achieve it. Building a sound consistent inventory accuracy plan will get people in the habit of being accurate, as the entire organization gets in the habit of being accurate you will find the accuracy plan starts to run itself. Until then, it will require a lot of work by those implementing it.

Cycle Counting

- Cycle counters select a small sample of inventory items for audit each day. The selection is random or semi-random. When they find errors, they immediately correct them. Cycle Counting removes errors from the system, much like a physical inventory, but has significant advantages. Cycle Counting uses the principle of **statistical inference**, just as in opinion polling. In figure below, we take a random sample of 100 beans out of the "population" of 3000 beans. If 20% of those beans are red, it infers that 20% (600) of the population is also red.
- Imagine each bean is a different inventory item and the red beans are items with erroneous records. If we cycle count 100 items (beans) and correct any errors in the records, we have **estimated the accuracy** of our inventory records (80%) and **removed 20 errors**





Above figures shows the **results of a typical cycle counting program**. IRA percentages in the first five weeks showed an accuracy of about 52%. As the program removed errors from the system, **accuracy increased to about 96% by week 28**. The drop in accuracy from week 28 through week 35 indicates some **change in the system**. Fewer counts, perhaps, or volume may have increased or new employees may have introduced more errors.

Corrective action was taken about week 36 and accuracy rose again until about week 40. From week 40 through week 52 the system is stable at about 93%. **To improve further, the organization must reduce the input error rate, reduce transaction volume or increase the number of weekly cycle counts.**

Steps in Cycle Counting

To **improve error detection** and reduce the number of counts required, several techniques are available.

- **Segregate By ABC--** A-B-C classification applies to cycle counting as well as to other areas of inventory management. The highest cost and most important items (A-Items) get counted more often.
- **Zone The Counts--** this technique groups daily counts into the same zone or area to reduce travel time for the counters.
- **Zero on Book Condition--** This guarantees either a fast count or an error for correction.
- **Zero on Shelf Condition--** Another guaranteed fast count or error discovery.
- **Negative Balance--** A guaranteed error discovery.

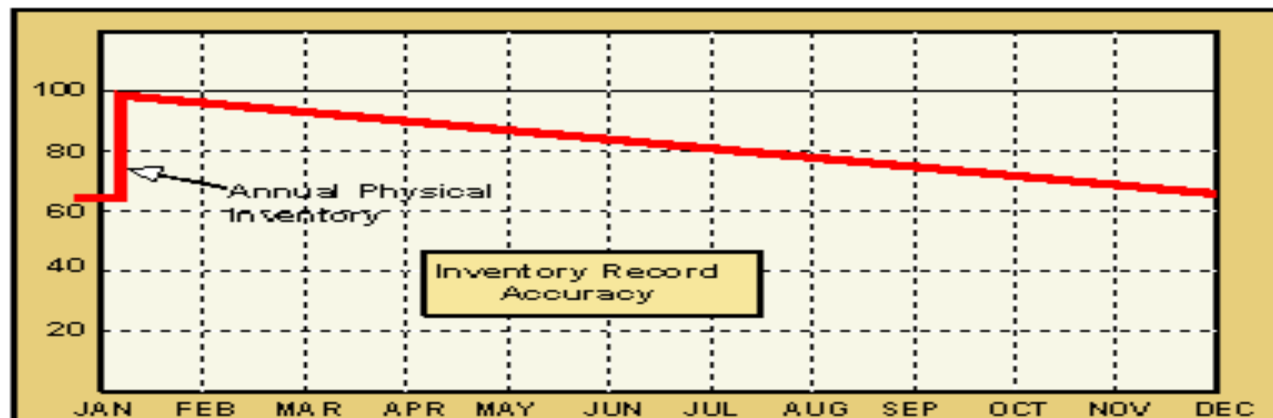
Advantage of Cycle Counting

Cycle Counting Can...

- **Achieve Very High Accuracies - usually above 90%**
- **Level the Workload – using fewer experienced people**
- **Reduce Inventory – few mistakes in item identification**
- **Continuously Measure Inventory Accuracy**
- **Function without Interruption of Operations**
- **Facilitate Process Improvement**
- **Eliminate The Annual Inventory Audit**

Physical Inventory

- In a physical inventory audit, normal operations cease while every inventory item is identified and counted. The physical counts are then compared to records and, where necessary, the record is corrected.
- Most firms conduct the physical inventory for financial reasons. However, it also has the effect of correcting errors and **improving cycle count programs**. Within a few days, **accuracy can increase, quickly and dramatically to 98%+**.
- Then, as figure below shows, **accuracy begins to drop the moment operations resume**. Transactions introduce errors. At one year, accuracy will drop to the initial level, other factors being equal.



- Figure shows an initial IRA of 63%. Such a low figure is not too unusual. After the annual inventory in January, IRA rose to about 99%. It then steadily declined to the original 63% by the following December. This gives an **overall average of about 80%**.
- This could be improved by taking a physical inventory every six months. However, this is expensive and frustrating for people. It still gives only a 90% average IRA and this is insufficient comparatively. It is undesirable even in manual systems.

Some problems with this approach are:

- Inefficient use of employees; temporary help is usually required.
- Errors cannot be tracked and fixed because of time constraints.
- The operation typically must be shutdown for a physical inventory to be taken.
- There is little, if any, increase in record accuracy.

■ 1) The Pareto's principle

- The Pareto 's principle, enhanced by Vilfredo Pareto (1848-1923) on the basis of the Italian wealth distribution observation (20 % of the population possess 80 % of the wealth) was since generalized to the company world.

- So we shall find very often the following examples:

- 20% of articles generate 80% of the sales turnover,
- 20% of the product families represent 80% of the inventory,
- 20% of the suppliers represent 80% of the global amount of purchase...



2) The ABC classification, heir of the Pareto principle

- The ABC method results directly from these observations. It allows to identify priorities.



Goal

- First, it is necessary to define what is the goal of the analysis. Once the goal is clearly identified, the data on which to base the analysis are easily recognizable. For example:
- identify articles generating the highest (A class) or the weakest (C class) rotation in a warehouse,
- identify product families representing the major part of an inventory (A class),
- balance the products returns to warehouse causes,
- classify the suppliers according to the global purchase volume,
- classify the product families according to sales turnover....

■ 2.2) Data

- The data then must allow the observation of a sufficient and representative history. Generally used data are annual data. The advantage is to avoid seasonality or activity distribution phenomena (holidays, closings, strikes...) being able to distort the analysis.

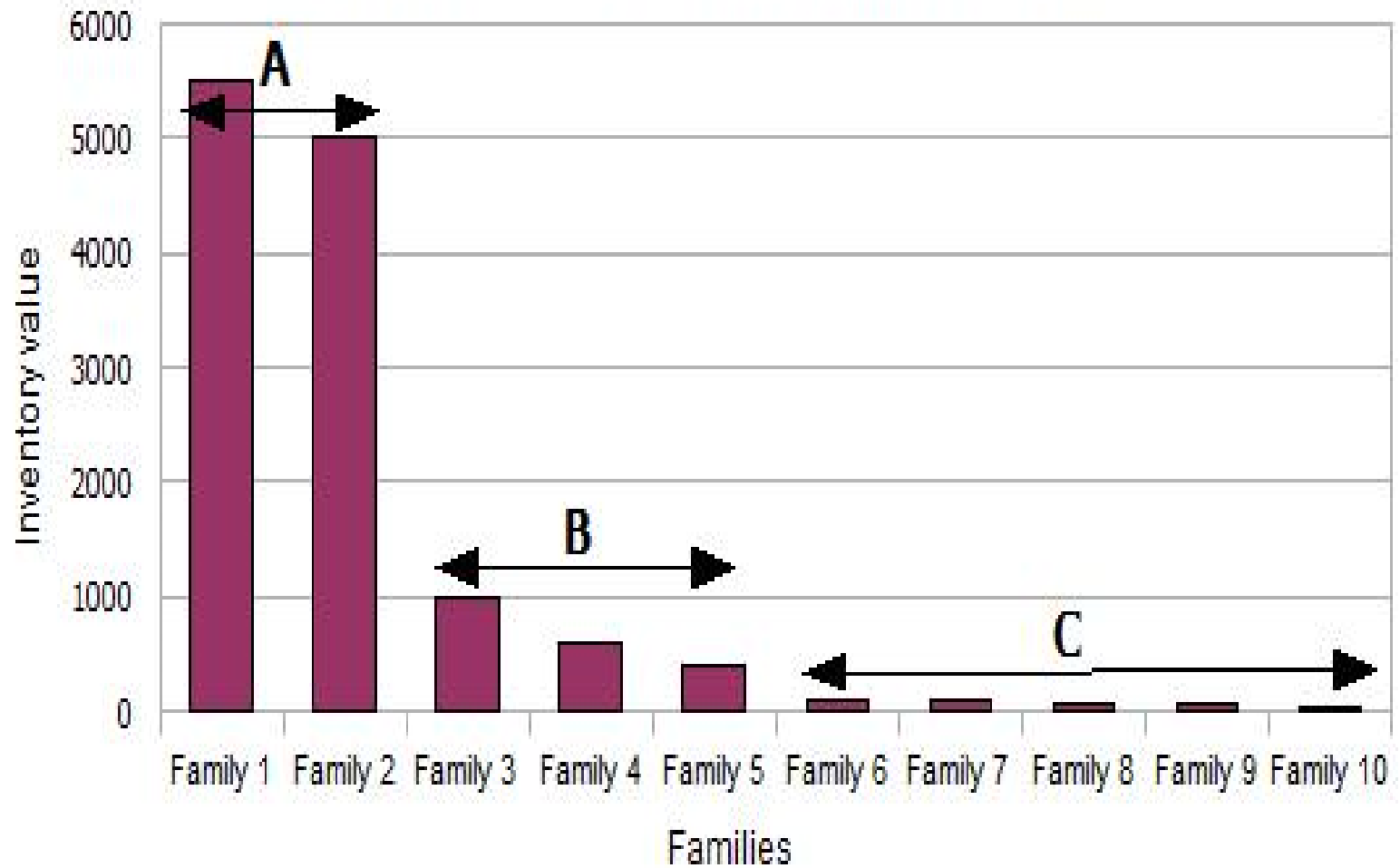
■ 2.3) Realization

- To facilitate the understanding we will use the following data as example.

	Inventory valorization	% of total inventory valor	% accumulated	Class
Family 1	5500	43%	43%	A
Family 2	5000	39%	82%	A
Family 3	1000	8%	90%	B
Family 4	600	5%	94%	B
Family 5	400	3%	97%	B
Family 6	95	1%	98%	C
Family 7	90	1%	99%	C
Family 8	70	1%	99%	C
Family 9	50	0%	100%	C
Family 10	30	0%	100%	C
Total	12835	100%		

- *First step* : classify the studied data in decreasing order. In our example, classify the product families in decreasing order of inventory value.
- *Second step* : calculate the % of the total represented by each item. In our example, calculate the % of the total inventory value represented by each product family.
- Third step : accumulate the %.
- Fourth step : identify the classes according to the % obtained
- A (from 0% to about 80%), which generally represents 20% of the studied items (articles, families, suppliers, return to warehouse motives...),
B (from about 80% to about 95%), which generally represents 30% of the studied items,
C (from about 95% to 100%), which generally represents 50% of the studied items.
- In our example :
A class from 0% to 82%
B class from 82% to 97%
C class from 97% to 100%

Inventory ABC Classification by inventory value / family



Results

- This analysis thus allows us to have a clear and objective vision of the studied subject. It also gives priorities to the efforts of a company human resources.
- For example, for a purchaser : control more particularly the A class suppliers,
- For a supply planner : check more frequently the A class articles supply,
- For an inventory manager : set up frequent cycle counting on the A class products in terms of rotation.
- **ABC Classification**
- **A Items:** very tight control, complete and accurate records, frequent reviews
- **B Items:** less tightly controlled, good records, regular review
- **C Items:** simplest controls possible, minimal records, large inventories, periodic review and reorder

■ Establishment of Inventory Goals

When stock is based on a year end count:

- (a) Good planning so that work carried out carefully and systematically – early issue of stocktaking instructions with consideration of feedback from staff
- (b) Division of the stock-take into manageable areas for control purposes
- (c) Proper instructions for counting, weighing, measuring, checking
- (d) Proper cut-off arrangements
- (e) Identification of defective, damaged, obsolete, slow moving stock
- (f) Identification of stock on premises owned by third parties and of client's stock held by outside parties
- (g) Proper control over issue of blank stock sheets and the return of completed and unused stock sheets
- (h) Identification of stock held subject to reservation of title
- (i) Identification of stocks and especially of high value items

- (j) Controls of stock movement during the stock count
- (k) Controls to ensure all stock is counted, and, at that, once only
- (l) Nomination of people responsible for each aspect of the count
- (m) Appropriate treatment for sealed containers, dangerous goods, goods with special problems

Note: items (d), (e), (h), are also important for stock based on records

*HOPE YOU ENJOYED THE
LECTURE.*

THANK YOU

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