CONTROLLING INVENTORY REPLENISHMENT

Best Practices, Total cost modeling

December 15, 2011

Pedro Rodriguez

Dr. James A. Rappold

Supply Chain Sciences

Supply Chain Sciences

- ***Management consultancy specializing in helping companies create, deploy, and sustain supply chain strategies, tactical and operational processes and decision support systems***
  - *Supply Chain strategy, organization design, planning and execution*
    - *Working capital and inventory optimization - InvOpt.com*
    - *Integrated supply chain planning and execution, S&OP*
  - *Productivity (overhead, labor, equipment utilization, transportation and warehousing)*
  - *Education and training for executives, managers and individual contributors*
  - *End-to-end Supply Chain organizational, process and ERP-systems assessments, Supply Chain forensics*
- ***Decision Support Systems and Processes***
  - *Inventory and service optimization online software (SaaS)*
  - *MRP configuration and optimization to support business objectives and imperatives*
  - *Business intelligence, demand and supply analysis*

Supply Chain Sciences

InvOpt.com

elvoryTower.com

Under development

Outline

- *Best practices for inventory replenishment*
  - *General considerations*
  - *Basic replenishment choices: Push vs. Pull*

- *Total Cost modeling*
  - *Model total cost, key dimensions involved*
  - *Examples:*
    - *Fortune 500 food manufacturing company*
    - *$3B hydraulic equipment manufacturer*

Outline

- ***Best practices for inventory replenishment***
  - ***General considerations***
  - ***Basic replenishment choices: Push vs. Pull***

- *Total Cost modeling*
  - *Model total cost, key dimensions involved*
  - *Examples:*
    - *Fortune 500 food manufacturing company*
    - *$3B hydraulic equipment manufacturer*

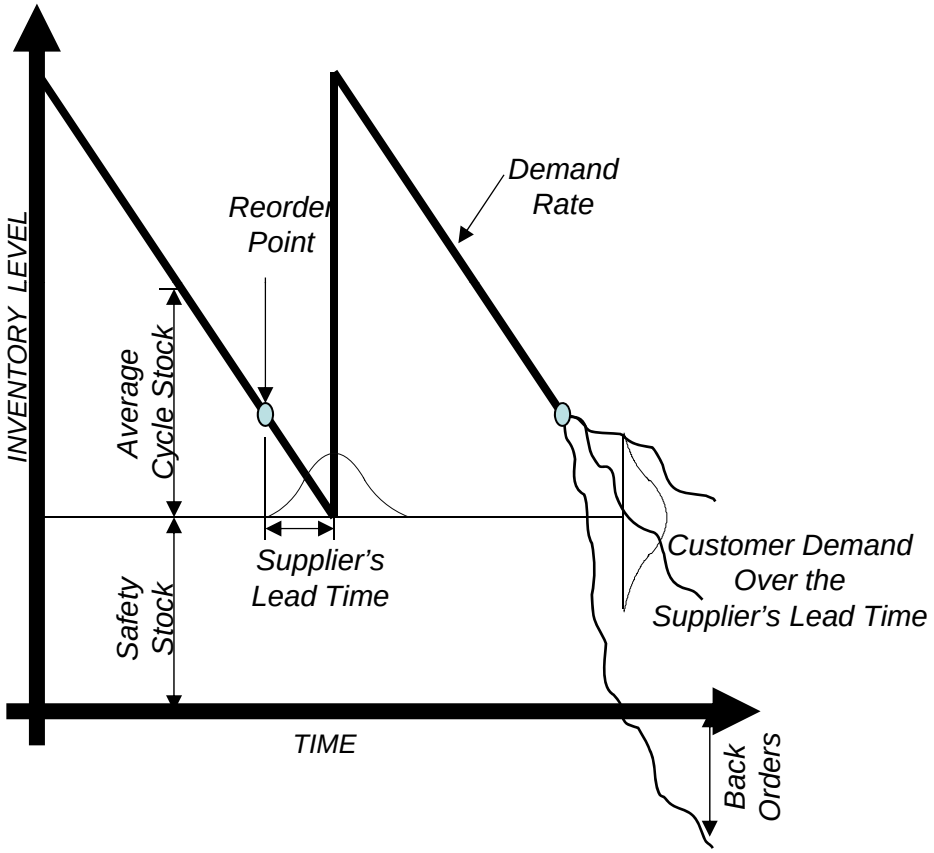
Inventory replenishment considerations

- ***Strategic considerations***
  - *Sourcing Choice*
    - *Supply type choice → make vs. buy, outsource, offshore*
    - *Supplier selection and management (strategic sourcing)*
  - *Supply performance*
    - *Quality, delivery (from plants or suppliers)*
    - *Technology, product development collaboration*
    - *Total cost view*
  - *Centralized vs. Local planning*
    - *Total performance vs. local performance, impact of KPIS*
    - *Information systems robustness, team capability and structure*

- *Once the strategic choices are made, we are left with the **tactical considerations for inventory replenishment***
  - *One of the key considerations is the **release policy choice***

Release policy choice: Pull vs. Push

- *Pull*
  - *Replenishment controlled by **past activity** (consumption) when on hand inventory + scheduled receipts < ROP*
  - *ROP = Avg LT Dem + SS*
- *Push*
  - *Replenishment triggered by **"expected" future requirements** when on hand + scheduled receipts < f(Forecast , Orders, LT) + SS*



Release policy best practices

- *Avoid "religious" approaches to planning*
  - *None of the release choices is better than the other. They are just tools that should be applied to the right groups of items*
- *Push implies that we know or can know something about the future*
  - *In general, it requires more work (tight demand planning, review of exception messages, etc)*
- *Pull implies that the future will be similar to the past*
  - *If applied to wrong set of items, will cause continuous expediting and more work than push*
- *Best-in-class planning teams use **both** methods*

How do pull items look like?

- ***Short replenishment lead time***
  - *Due to the reactive nature of ROP, with long lead times, recovery from shortages is very costly due to the lack of visibility and late shortage notices.*
- ***Low structural changes to average demand***
  - *Not well suited for seasonal, positive or negative trends, new products*
- ***Low demand uncertainty***
  - *Same as lead time, reactive nature*
- ***Reliable supply***
  - *Pull systems are especially sensitive when supply OTD and quality fail due to their tight interdependence and low buffering*
- ***Low cost***
  - *Example: planning of very inexpensive hardware / fasteners might not require the "active" push planning by buyers/planners, just put on pull with sufficient safety stock and lot size, a very low investment in inventory buys tons of productivity*

How do push items look like?

- ***Any lead time (in theory)***
  - Long lead times will significantly deteriorate performance the higher the forecast error at replenishment lead time
- ***Any structural changes to average demand***
  - *Better suited for seasonal, positive or negative trends, new products. Assuming that we really know something about the future….*
- ***Demand uncertainty***
  - *Push systems only work better in regards to demand uncertainty **IF** demand planning processes significantly reduce the forecast error, otherwise, both choices work equally bad…*
- ***Reliable supply***
  - *Push systems are more able to accommodate just in case buffers and other "pads". This saves sometimes from costly expedites, but poor quality and delivery will always significantly deteriorate total cost performance independently of the choice of pull vs. push*
- ***Better suited for medium and high cost items***
  - *It is just a matter of productivity, what do you rather plan "tightly" a $50,000 mining pump or a $0.01 screw?*

Outline

- *Best practices for inventory replenishment*
  - *General considerations*
  - *Basic replenishment choices: Push vs. Pull*

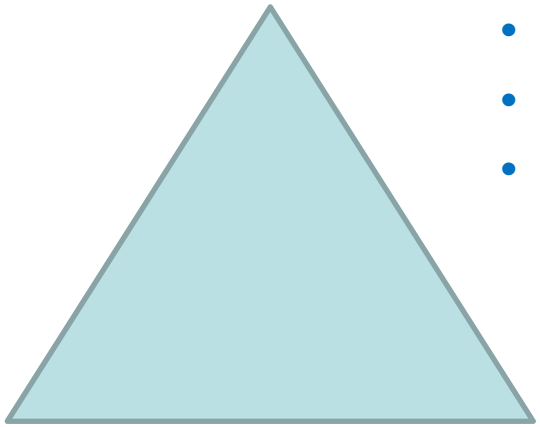
- ***Total Cost modeling***
  - ***Model total cost, key dimensions involved***
  - ***Examples:***
    - ***Fortune 500 food manufacturing company***
    - ***$3B hydraulic equipment manufacturer***

Modeling total cost

To model and manage total cost, there needs to be an in-depth understanding of the key trade-offs for the particular business

Service

- *On time performance, fill rate within a specific time*
- *Quality*
- *Technology*
- *Technical, other support*



Productivity

- *Overhead / support*
- *Direct labor*
- *Transportation*
- *Material*
- *Warehousing*

Capital Invested

- *Fixed Assets*
- *Working Capital*
  - *Inventory*
  - *Payables*
  - *Receivables*

Example 1: Large food manufacturer

- ***Background***
  - *One of the largest food manufacturers in the World, 30 plants in US. Three types of products: Dry, refrigerated and frozen*
  - *Unpredictable performance on inventory, transaction costs and raw material availability. Continuous variances to budget.*
  - *Needed to find the total lowest way to replenish raw materials*

- ***Approach / Best Practices***
  - *Established centralized PFEP / TLC team*
  - *Analyzed cost of lack of service (shortages), cost of inventory and impact to productivity (warehousing, transportation, direct labor, overhead requirements)*
  - *Implemented a closed loop inventory and service optimization process and software*
    - *Central teams assigned to work with all local/plant teams. Education and training*
    - *Review all key planning parameters monthly, strategies and assumptions every quarter. Automated monitoring of performance weekly*
- ***Results***
  - *Increased material availability (3%)*
  - *Lower inventory investment (7%)*
  - *No impact to direct labor productivity, lower transportation (optimal lot sizing) and warehousing costs (lower inventory of perishable items)*

Example 2: Hydraulic equipment manufacturer

- ***Background***
  - *Largest residential and pro-channel pump manufacturer in USA*
  - *Highly seasonal demand, non-integrated planning processes*
  - *$4.5M expedited freight (flying castings and electrical motors from Asia and Mexico) with an all-time high inventory investment*

- ***Approach / Best Practices***
  - *Implemented a total landed cost calculator with assumptions validated and approved by all key teams in the business. Changed sourcing KPI (from PPV to TLC)*
  - *Established second sources for key materials (higher material purchasing cost, significant lower lead times)*
  - *In-sourced some key components, improving productivity, availability and quality*
  - *Implemented SIOP and Integrated planning from demand to production to materials. Level load to minimize the total cost to supplying high volume finished goods through different seasons*

- ***Results***
  - *Lower expedited freight ($550,000)*
  - *Lower inventory investment (10%)*
  - *Increased direct labor productivity by 11%*

Thank You

Questions?

Supply Chain Sciences

APICS CHICAGO CHAPTER

Contact us at:

prodriguez@supplychainsciences.com
jrappold@supplychainsciences.com