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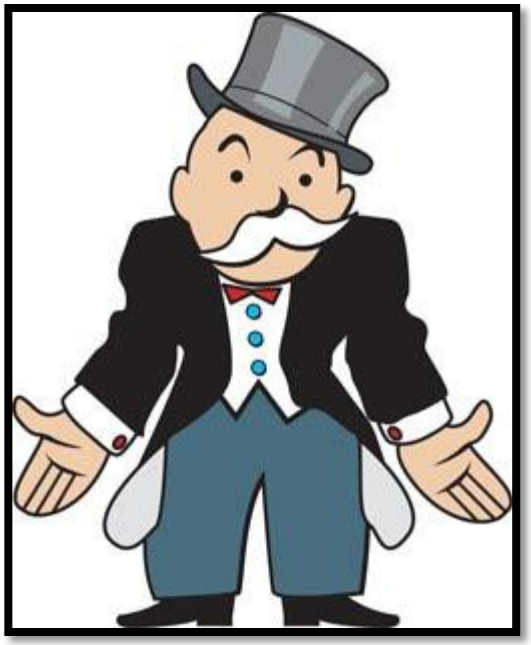

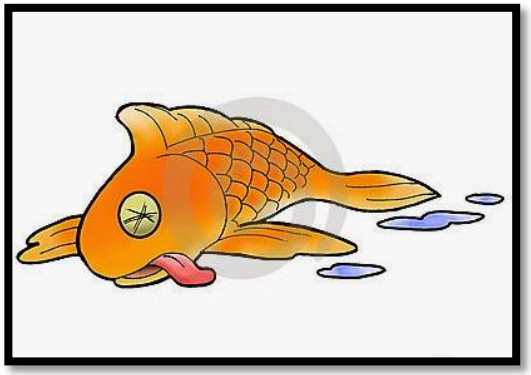

AHA Homebrew Con 2016

Supply Chain Strategies for Managing Inventory

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Memphis, TN

Why are we here today

What's in it for YOU !?!

- Increase Margin
- Grow your business with less cash
- Tools to give you a competitive advantage
- Reduce stress – have data driven plan for your inventory
- Prepared to deliver the best experience to your customers

Make You Inventory Super Heroes

Start with some light equations

$$
\begin{aligned}
C\frac{dv}{dt} &= I - g_{Na}m^3h(V - V_{Na}) - g_K n^4(V - V_K) - g_L(V - V_L) \\
\frac{dm}{dt} &= a_m(V)(1 - m) - b_m(V)m \\
\frac{dh}{dt} &= a_h(V)(1 - h) - b_h(V)h \\
\frac{dn}{dt} &= a_n(V)(1 - n) - b_n(V)n \\
a_m(V) &= .1(V + 40)/(1 - \exp(-(V + 40)/10)) \\
b_m(V) &= 4\exp(-(V + 65)/18) \\
a_h(V) &= .07\exp(-(V + 65)/20) \\
b_h(V) &= 1/(1 + \exp(-(V + 35)/10)) \\
a_n(V) &= .01(V + 55)/(1 - \exp(-(V + 55)/10)) \\
b_n(V) &= .125\exp(-(V + 65)/80)
\end{aligned}
$$

Just kidding. It is way too early in the morning for that after a craft beer festival!

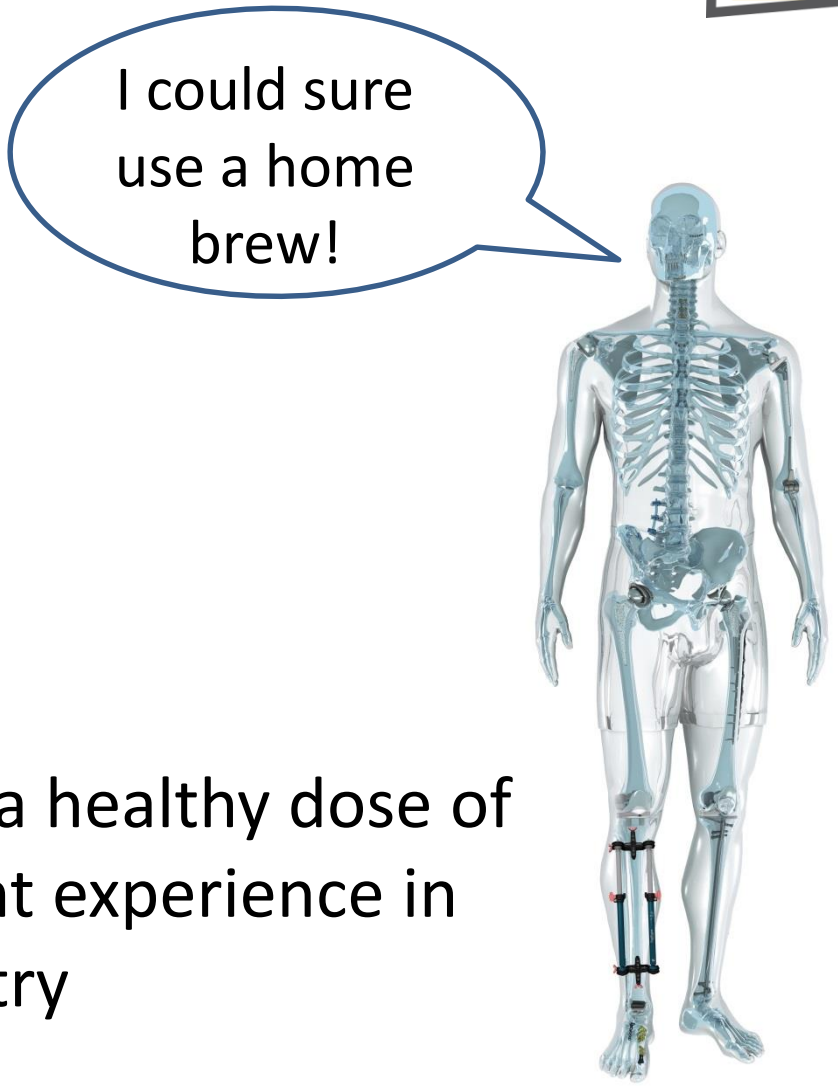
Overview

Building Blocks for Inventory Control

Who We are

(Our inventory street cred)

- Bernoulli Brew Werks
- Started in 2014
  - 3 engineers
  - 1 operations
  - 1 human resource
    - to keep us all in line…
- Local to Memphis, TN
- Avid home brewers with a healthy dose of supply chain management experience in the medical device industry



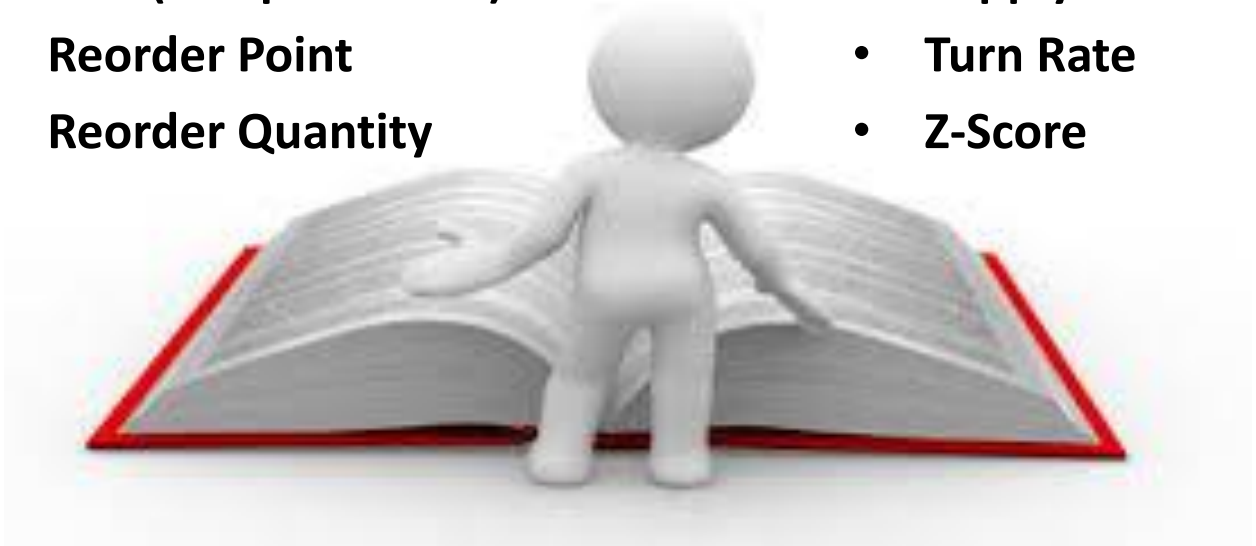
Audience

Can be applied to:

- Local Homebrew shops
- Online Homebrew shops
- Hybrid Shops
- Brewery/Homebrew Combinations
- Distributors
- Breweries
- Basically anyone managing inventory…

Lingo

- ABC Code
- Cycle Count
- Demand
- Forecast
- Kanban
- Lead Time
- POS (Not piece of….)
- Reorder Point
- Reorder Quantity
- Safety Stock
- Sales Data – You gotta have it
- Service Level
- Standard Deviation of Demand
- Standard Order Quantity
- Supply
- Supply Chain
- Turn Rate
- Z-Score



Inventory = Cash

I can just buy a pile of product and hope I have what the customer wants…True… but…

If you carry $50k of inventory turning at an average of 2x's per year… ($100k sales) by focusing on what to stock and when you could have the same $100k revenue but only carry $20k of inventory at any one time – a 5x turn rate ….

That's $30k in your pocket to reinvest in your business!!

With more cash available that is not all tied up in inventory…

- New location?
- Entry into the online space?
- Improved website for your already established online space?
- Expanded product offering?
- Business diversification?

I don’t need cash

Congratulations… that’s not us - But do you need improvements in?

Customer satisfaction
Inventory Freshness
Time Relief

Business Simplicity
Floor Space

I can just buy every time I need inventory!

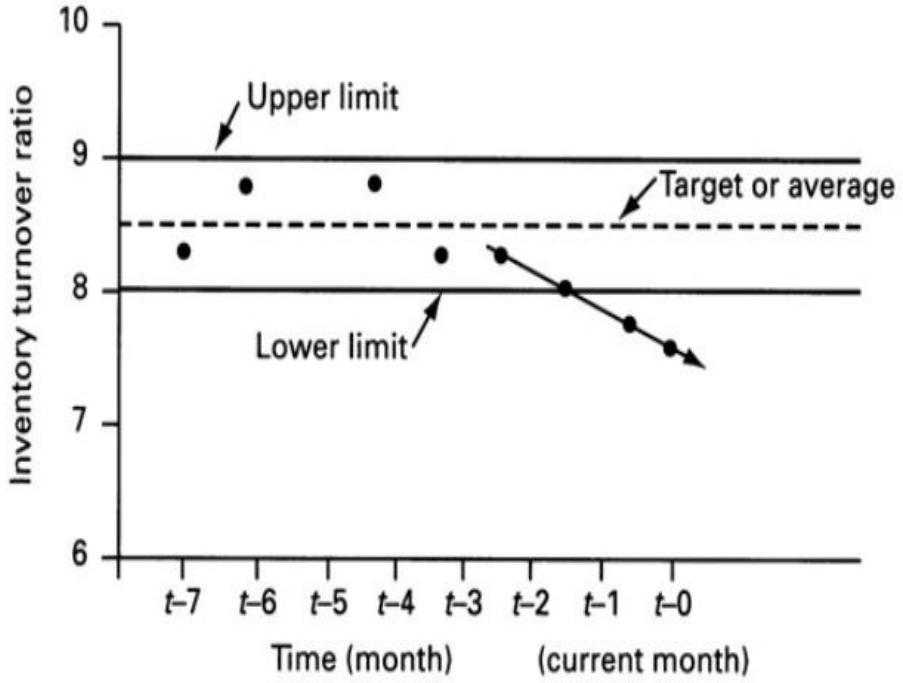
- Well….If you aren't concerned with margin, sure..
  - But shipments cost $ and time.

- Supplier engagement is critical to ensure you know your lead times, can bundle shipments, reduce inventory.

- What is your order cadence?
- Do you even have a cadence?
- Do you have a standard order quantity?
- Do you have a standard amount of stock to keep on hand?

Backorders Cash Flow Freight

- Backorders = Missed Sale
  - Customers could be lost
  - Revenue lost
- Cash Flow = $ Available to you
- Inventory = Reduction of Cash Flow
- Freight = Margin reduction



Breakdown of Supply Chain Basics

1. Data collection and analytics – Sales data
2. Determine your service level by item classification
3. Determine your lead times by supplier – order frequency
4. Develop your standard order quantity
5. Set your safety stock
6. Establish your reorder point
7. Manage your system – Systematic, FIFO, Cycle Counts, Data Maintenance, Kanban

Data Gathering & Analysis

Information Required

- You have to get your sales data.
- Whether you use shop keep, square, crumbles, excel, journal, or a beer napkin, you have to record your sales history to be able to serve your customers in the future.

Time Span of Information

- The sales data by sku over a given time period – 6 months at minimum and average those.
- Sales per SKU per Month

Service Level Desired

- ABC Codes – Choose your level of service based on the demand of your customers.
  - A = 99% of the time I want to have this product in stock if my customer asks
  - B = 90%
  - C = 75%

- You have to decide
  - Caution: The higher the service level, the more inventory you need to carry
- Balance it based on your business

Lead Times

The time from order place to order receipt

<u>Ensure you understand this</u>

If it takes your suppliers 1 week to deliver an order and
You order every 3 weeks,

Then you have a total
4 week lead time

Standard Order Quantity

- Setting a standard reorder quantity based on:
  - Lead Time x Average Demand over Lead Time
  - (+ Deficit to Reorder Point) will give you your re-order quantity

- For Example:
  - You sell an average of 25 airlocks per week and you order every 2 weeks with a 1 week delivery

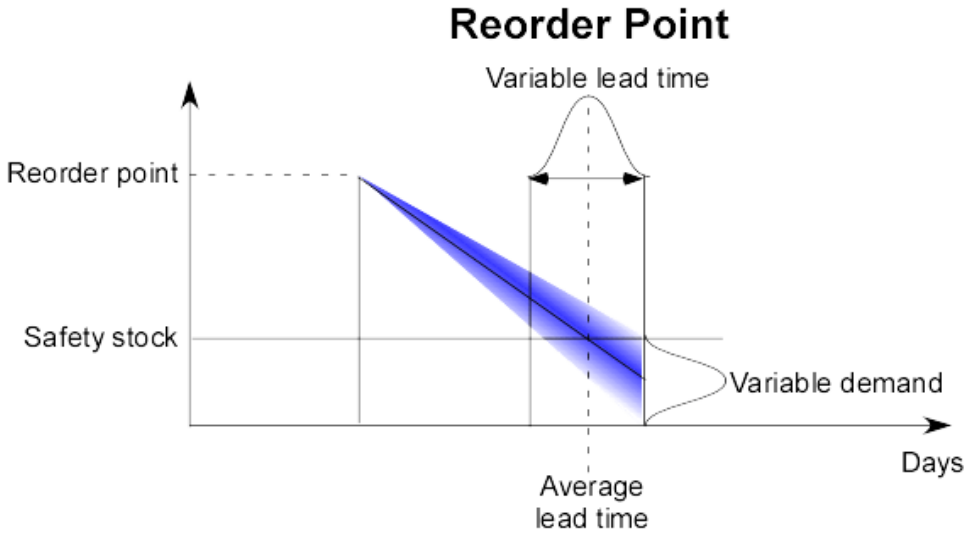
- Lead Time = 2w + 1w
- Avg Demand/Lead Time = 25 units/w

- Standard Order Qty =

3w x 25 units/w = **75 units**

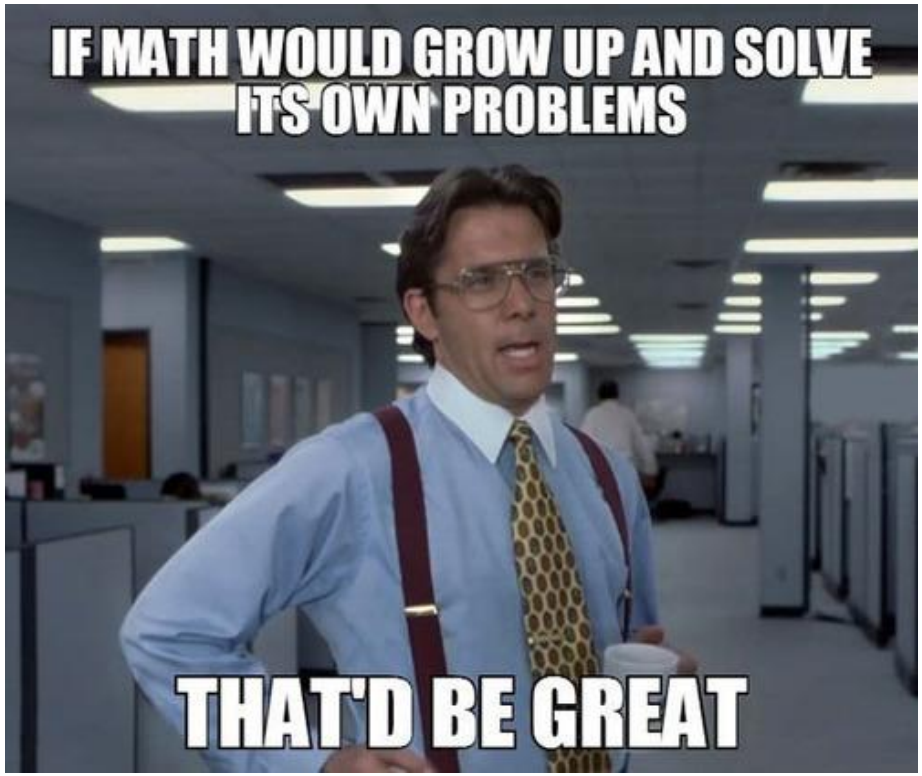
Safety Stock

- Safety stock???
  - I sell home brewing supplies. Not road cones and fire extinguishers….
- Keeping a minimum stock that covers the statistical demand variance.
- Safety stock is to protect yourself from the demand variation of your customers.
  - Have you ever just gotten stock only to have a non-normal sale of several bags of grain cause you to go right back out of inventory?



Safety Stock – How to calculate

Lead Time * Z score * Standard Deviation of Demand



Cheers – have a drink

We can do this!!

What is a Z-Score??

- Based on what you choose for your customers!
- Remember… the higher the service level typically means the more inventory you have to hold… $$$

Product Code	Service Level Desired	Z-Score
A	99%	2.33
B	98%	2.05
C	95%	1.65
D	90%	1.28
E	85%	1.04
F	0%	0

Re-order Point

- I order everything on every shipment!
  - Well you shouldn't…
- Set a Re-order point to where you only order when that item hits a certain level of inventory
- Re-Order Point = Order Quantity + Safety Stock

- For example:
  - Order Quantity is 100 cases of bottles
  - Safety Stock is 12 cases of bottles
    - Reorder Point = 112 (100+12)

Example of the System at Work

Replenishing your airlocks

- Order frequency = 3wk
- Lead time = 1 wk
- Current Stock = 60
- Demand per week = 25
- Standard Deviation of Demand = 1.2
- Item classification = A

What is your standard order quantity, reorder point, safety stock, and re-order quantity?

- Safety Stock = 4wk*2.33*1.2
  - 11 units
- Reorder Quantity = 4wk*25
  - 100 units
- Reorder Point = 100+11
  - 111 units

- This specific order would be:
  - 100 + (111-60) = 151 units

Summary of Tools

- Safety Stock = Zscore*Lead Time*Standard Deviation of Demand
- Order Quantity = Lead Time*Average Demand over Lead Time
- Reorder Point = Safety Stock + Order Quantity
- Re-order Quantity = Order Quantity + (Reorder Point – Current Stock)

Management Strategies

- 3 common methods for managing reorder
  1. Systematic

     Using an inventory software
  2. Kanban

     Visual Bin control
  3. Forecasted

     Predictive modeling

You can combine them too!

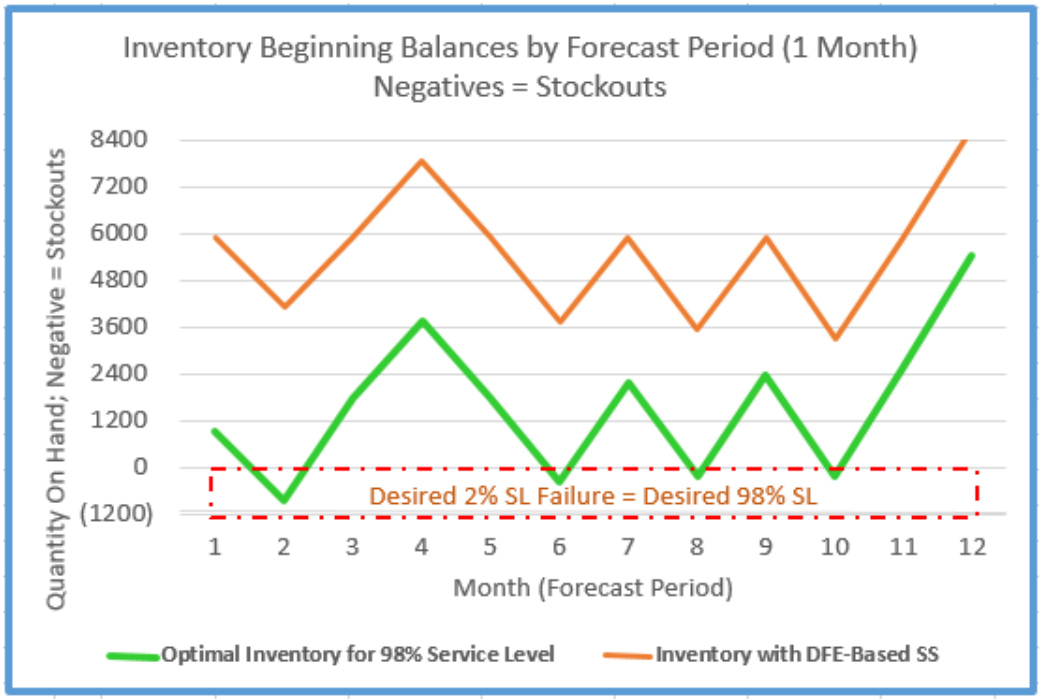
Kanban

- 2 bin system
- You finish a bin, turn a card in
- The card triggers another order of the standard bin
- The bin is sized as your re-order point + safety stock

- Highlights any inventory issues visually
- Reduces chances for miss counts or lost inventory affecting your customers.
  - You see the empty bin
  - Does take more space

Forecast

- Accounts for mix and bias of your product sales
- Predictive modeling for what inventory to purchase
  - Can account for seasonal demands
- If you are here already, you didn't need to listen to this seminar…Nor do we have time to get into this model!



Inventory Housekeeping

- Cycle count your stock
  - This is a killer of the system.
  - You think you have it but you don't
    - Your customer wants it – Your customer goes elsewhere….
  - Ensure you stock product to drive FIFO
- Refresh your data
  - Sales do change over time….
    - Must update sales data to understand the changes in customer
  - Verify you are getting all demand signals

Outcomes

Inventory Turns

- Free up that cash
- Fresher ingredients for your customers
- Less expired products
- Standardize your shipment expenses
- Schedule your deliveries
- Reduced space required to house inventory

Inventory Accuracy

- Increases visibility to inventory issues
- Cycle counts periodically reduce surprises
- Customers have what they want, when they want it

Email: Sales@bernoullibrews.com if you have further questions!


THANK YOU
THANK YOU!
THANK YOU