

MEAT MARKETING SERIES: INVENTORY MANAGEMENT THROUGH BUFFERS

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MEAT MARKETING SERIES: INVENTORY MANAGEMENT THROUGH BUFFERS

► INTRODUCTION

Inventory management is a key factor in building any meat business.

Inventory management is a key factor in building any meat business. As explained in a previous meat publication,¹ the key prerequisite for making money marketing meat is having the right product available at the right time.² We need to do this without carrying more inventory than we need, as inventory ties up cash and can spoil. We also need to do this without knowing the precise demand of each product or SKU. As such, managing inventory to maintain product availability for customers is a key part of wholesale meat marketing success.

It is important to note that this inventory management publication is aimed at meat marketers who are inventorying meat for direct delivery to wholesale customers. For meat marketers who are using larger distribution networks in multiple regions, additional inventory management considerations exist, even though the buffering principles described here are the same or similar. In-depth examples and explanations for managing a larger distribution network can be found in Chapter 4 of *Orlicky's Material Requirements Planning*.³

¹ foodsystems.msu.edu/resources/meat_marketing_series_selling_the_whole_animal_and_managing_variability

² This assumes that a market exists at the price you are charging.

³ Ptak, C. A., Smith, C., & Orlicky, J. (2013;2011). *Orlicky's Material Requirements Planning* (3rd ed.). New York: McGraw-Hill.



The Need

Any inventory management strategy must satisfy three key prerequisites to be successful.

First, the strategy must always (or almost always) maintain product availability for the customer.

When meat is not available, customers are not able to buy, and we face two consequences: (1) We miss out on potential sales and income. (2) We run the risk that our customers will look elsewhere and find a better deal.

Second, the strategy we use must minimize the amount of inventory that we carry.

Carrying perishable inventory comes with two equally important problems: (1) It ties up cash with product that you have paid for but haven't yet sold. This lowers your business return on investment and blocks growth. (2) There is a real risk that you could lose product to spoilage. The risk of spoilage puts pressure on marketers to lower

their prices to move product quickly. Lower prices hurt margins and force us to devote time and effort (business capacity) to marketing efforts on low-margin, soon-to-spoil products. This is often an unmeasurable opportunity cost.

Third, the strategy must be relatively simple to implement, with very little in the way of extra work or expensive software.

Most of us run small businesses, and as such, we don't have cash lying around for a new computer system and we are strapped for time and focus. And many businesses that do have expensive new inventory software find that, while the software saves some time in management, we end up spending more time managing, fixing, or otherwise bootstrapping the software. With everything a business has to manage, adding another task (even a small one) can be a problem.

Planning for a World That We Don't Understand

Existing inventory management methodologies involve varying degrees of complexity. Most of these methodologies require predictions of future demand and focus on minimizing shipping costs. When we work from a paradigm of forecasting and cost minimization, the results can often be less than stellar.

While sophisticated forecasting technologies exist, the cost to access such programs is often prohibitive in terms of actual cash outlay and the person-hours required to implement the programs.

Even if we can employ these sophisticated technologies, we often find that the marginal return for our time, focus, and money is less than appealing. The truth is that even the most complicated predictive methodologies give only guesses. The more you spend, the more educated your guesses become, but they are still guesses.

Buffers: No Clairvoyance, No Problem

If the truth is that the task of predicting the future ranges from difficult to impossible, then our behavior should reflect the fact that we don't understand exactly what future demand for our meat products will be. Successful small meat marketers manage buffers, not forecasts. A buffer is an inventory position that will last long enough to take a replenishment from your meat plant with some safety stock besides. Vendors make mistakes or are slow, customers can be fickle, trucks break

down ... what can go wrong will go wrong, often at the worst possible time. The buffer is designed to insulate your business from the inherent variability of the outside world. If each unpredictable event or change in demand sends your business into chaos, the result can be more stress, higher costs, and fewer customers. Buffers help us anticipate a range of alternate futures and put inventory in the right place so that customers will get what they want when they want it—and we can preserve our sanity.

The Step-by-Step Buffering Method

Go through this process for each of your product SKUs. (See "Putting Carcass Management Into Practice," on page 6 for an example.)

1. Set the Buffer Size. This is an easy calculation:

$$\text{BUFFER SIZE} = (\text{Average Demand per Demand Period}^4 + \text{Transportation Lead Time}^5 + \text{Production Lead Time}^6 + \text{Order Lead time} + \text{Safety Stock}^7)$$

2. Replenish the Buffer. In buffer management, we focus on replenishing the buffer. The easiest way to do this is to simply use your sales numbers as a proxy for reorder and set a time each week to replenish the inventory.

3. Manage the Buffer. Over time, demand can change. Because of this, it is important for us to periodically revisit inventories to make sure that we are not holding too much or too little. A simple method for managing our inventory is the red/yellow/green method. Basically, we divide the buffer into thirds. When inventory is in the top third, it is in the green zone. When inventory is in the middle third, it is in the yellow zone, and in the bottom third, the red zone. If products are consistently entering the red zone in each replenishment period, this is a signal to meat marketers that demand has increased and we need to do another buffer calculation. The same is true if inventory stays in the green zone too often: Demand has probably changed, and we need to consider decreasing the inventory level.

4 The demand period is the time between stock replenishments. It could be daily, weekly, monthly, or yearly. See the replenishment section for recommended replenishment frequency.

5 This is the lead time between the day a product is ready to ship and the day of its actual delivery to your dock.

6 This is the lead time between the day you deliver animals to a plant and the day that product is ready to go.

7 This calculation is a modification of material presented by Dr. K.J. Youngman, available here: dbrmfg.co.nz

JANE THE MEAT MARKETER:

PUTTING CARCASS MANAGEMENT INTO PRACTICE

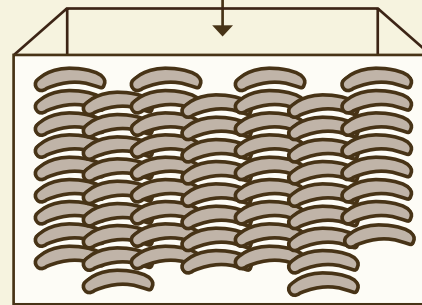
1. Jane Sets the Buffer Size

Jane sells meat to various retail and wholesale buyers in her region. She has a central facility where she stores her meat products. The goal of Jane's inventory management strategy is to maintain availability for her customers without holding so much stock that she is afraid of spoilage or has cash flow problems. Jane wants to take the emotion out of her decisions, and as such, she wants an easy, scientific inventory management methodology that she can implement without too many headaches. She heard about the buffering method and decided to try it for a few of her SKUs.

She starts with frozen Italian sausage and a demand period of 1 week. Jane knows that she sells about 1,000 pounds per week on average. When she puts in an order, it takes her meat plant 1 week to produce the product, and shipping from the plant to her cold storage facility takes 3 days. Jane usually likes to wait up to 2 weeks to save herself money on shipping—she gets 25% off when she ships 2 pallets at a time (1,000 lbs. per pallet). Jane's plant also gives her an extra 5% off processing if she orders a minimum of 2,000 lbs. Overall, Jane saves up for a big batch and produces frozen Italian sausage once every 2 weeks.

So, Jane's average demand is 1,000 lbs., the production lead time is 1 week (1,000 lbs.), her order lead time is 2 weeks (2,000 lbs.), and her transportation lead time is 3 days (450 lbs.). She knows that every now and then, the truck breaks down or the plant is late on shipment, so she will need an extra 1,000 lbs. of product in case there is a delay. Overall, Jane's buffer size for frozen Italian sausage is 5,450 lbs.

Average Demand per Demand Period		1,000 lbs./week (143 lbs./day)	
Transportation Lead Time		3 days (450 lbs.)	+
Production Lead Time		1 week (1,000 lbs.)	+
Order Lead Time		2 weeks (2,000 lbs.)	+
Safety Stock		1,000 lbs.	+
Buffer Size		5,450 lbs.	



Jane's Buffer Size Calculation

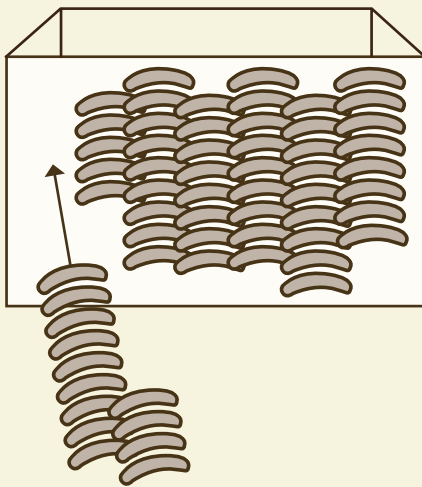
1,000 lbs./week (translates to ≈ 143 lbs./day)	Average Demand per Demand Period
3 days (translates to ≈ 450 lbs.)	Transportation Lead Time
1 week (translates to 1,000 lbs.)	Production Lead Time
2 weeks (translates to 2,000 lbs.)	Order Lead Time
+ 1,000 lbs.	Safety Stock
5,450 lbs.	Buffer Size

JANE THE MEAT MARKETER:

PUTTING CARCASS MANAGEMENT INTO PRACTICE (continued)

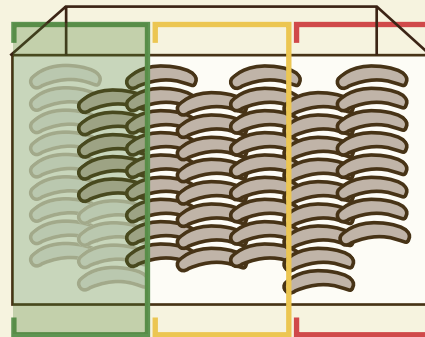
2. Jane Replenishes the Buffer

Jane orders frozen Italian sausage once every two weeks. She has learned that buffering inventory management methodologies require her to order not when inventory gets low but on the same day every two weeks. She is practicing a method called **fixed-time variable-reorder quantity**. In practice, Jane uses her sales numbers as a proxy for reorder, simply ordering the amount she has sold in the most recent demand period. When she sells 2,000 lbs., she orders 2,000 lbs. When she sells 1,500 lbs., she orders 1,500 lbs. The result is an easy purchasing decision that, combined with the buffer, minimizes Jane's inventory while serving her customers what they need when they need it.



3. Jane Manages the Buffer

Jane is very busy. Between sales, customer service, employee management, and financial management, she doesn't have much time to get bogged down looking at spreadsheets or doing calculations. As such, she uses the red/yellow/green method to help focus her attention only on the SKUs that are running too much or too little inventory. Now, Jane has a no-nonsense way to make scientific decisions on her inventory and focus her attention only on the SKUs that require additional management analysis. She saves time and can devote her attention to other business problems, secure in the knowledge that she is paying attention to the important issues in her inventory management.



Inventory consistently in the **green shows decreased demand**, reduce the buffer.

Inventory consistently in the **red shows increased demand**, increase the buffer.

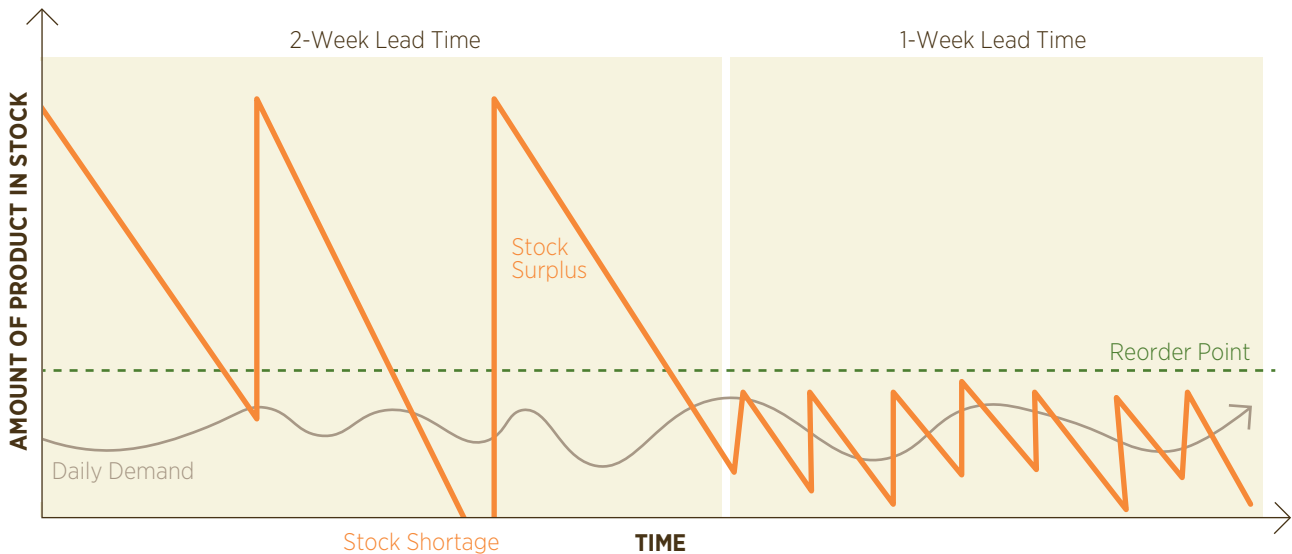
JANE THE MEAT MARKETER: REPLENISHMENT

Jane is reordering frozen Italian sausage once every two weeks. She saves a considerable amount of money on shipping, and the plant gives her a break on a larger batch. The savings are nice, but do they really help Jane's business overall? She takes some time to think about her situation and starts to doubt the efficacy of her savings. First, shipping costs for her product are a small percentage of the overall cost involved in getting the product to market. If she pays \$3.49 per pound for pasture-raised pork trim and another \$0.79 per pound for processing, her total bill for 1,000 lbs. could be more than \$4,000. Did getting 25% off a \$200 truck expense really help her? The same question can be asked of Jane's processing savings. Is 5% off for 20% of the expense of bringing pastured pork to market really the best way to improve business profitability?

Jane does some thinking and realizes that she might be able to reduce the cash needs of her business by one-third or one-half if she reduces her lead time and processes product every week. See Figure 1 for a comparison of 1-week vs. 2-week lead time.

Jane is amazed by the amount of cash she is able to free up from her system without reducing her product's availability to customers. The cash savings came at a good time because Jane just got her first order from a large customer that pays slowly. This will ensure that she can open the new account with relatively few headaches and without going to the bank for a new operating loan.

FIG. 1: Inventory Graph of 2-Week vs. 1-Week Order Lead Time



Replenishment: The Relationships Between Cash Flow, Inventory, and Lead Time

As shown in the previous section, Jane the meat marketer is a cost-conscious business manager. Whenever she has a chance to lower her costs, she takes it. Cost-conscious behavior is a good thing when it comes to managing a business. However, when it increases lead time for replenishment of your stock, reducing costs can be counterproductive. When operating any distribution business (or component of a business), it is important to recognize that cash on hand is often a constraint on business growth or, at very least, a major factor in return on investment for the distribution component.⁸

⁸ store.extension.iastate.edu/Product/lf5-pdf

Conclusions

For marketers interested in selling local meat, managing inventory is one of the most important aspects of their business. Too much inventory and we tie up cash in perishable inventory. Too little inventory and we risk missing out on sales and disappointing customers. Buffering inventory, as highlighted above, is a simple way for small businesses to make inventory decisions that can lead to increased revenue, better return on investment, and lower operating costs.



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CRFS envisions a thriving economy, equity, and sustainability for Michigan, the country, and the planet through food systems rooted in local regions and centered on Good Food: food that is healthy, green, fair, and affordable. Its mission is to engage the people of Michigan, the United States, and the world in applied research, education, and outreach to develop regionally integrated, sustainable food systems. CRFS joins in Michigan State University's pioneering legacy of applied research, education, and outreach by catalyzing collaboration and fostering innovation among the diverse range of people, processes, and places involved in regional food systems. Working in local, state, national, and global spheres, CRFS' projects span from farm to fork, including production, processing, distribution, policy, and access.

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