

Constraints Management Group

Protect Your Customers and Your Cash in an Economic Downturn with Actively Synchronized Replenishment



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By Jeff Herman

Cost, investment and waste are always important issues for a well-managed business but they never demand more attention than when the economy is weak or weakening.

Companies in this situation are always under pressure to protect their markets, while similarly under pressure to minimize the costs and investment needed to gain that protection. The current economic crisis has forced this to a new level where restrictions on short term credit compel companies to reduce borrowing requirements.

Managers have to make some difficult choices to ensure their organizations have enough cash to weather the storm. There is always uncertainty over whether cuts are reducing fat or cutting into bone and muscle. The distinction can be the key to survival of the tough times, and fundamental to positioning the company to capitalize on the eventual upturn.

When it comes to operating expense, there often seems to be a relatively intuitive understanding of the level of personnel required to keep operations functional. Managers understand that their organizations will suffer in the short term and even more in the long term if they do not maintain service levels to their customers.

In fact, the customer may be depending on high standards of service now more than ever—poor service from a supplier compels a customer to protect their own markets by carrying inventory, or risking the loss of their customers. A supplier that places its customer between a rock and a hard place at a time when competitors are fighting to maintain volume may not have that customer for very long.

Yet Inventory is somehow viewed differently.

It is very common to encounter a management edict to cut inventories across the company by a certain percentage; largely issued without regard to service levels. So, what is different between how we intuitively feel about operating expenses versus inventory?

Just like the investment in people and equipment, inventory is part of the overall business strategy. Either you invest in inventory or you invest in capacity or you choose not to service the market. This is especially important to understand now, when companies are looking to cut BOTH inventory and capacity.

Our experience is simply that management's intuition is not nearly as strong regarding the details of inventory's role in that strategy, as it is towards capacity's role.

An experienced manager often develops a "feel" for the impact a head count reduction can have in any part of the plant. But despite technologies such as MRP (Materials Requirements Planning), embedded within modern ERP systems, despite decades of argument and discussion between multiple

departments as to whether the company is carrying too much, or too little inventory, and despite the popularity of recent movements emphasizing inventory reduction, managers have very little practical intuition about inventory levels. The more complicated and integrated the supply chain and bills of material are, the more this issue tends to be exacerbated.

Certainly, managers understand that some inventory is necessary. But they also know that the tools they have traditionally relied on for synchronizing demand and supply along with their intuition and that of other highly experienced personnel, often leaves them with inventories that are completely out of alignment. It is quite common to have years' worth of inventories in some materials, parts and goods, while others are stocked-out with demand against them. Add multiple locations of the same stock to the equation and the situation grows worse; a part in stock with no demand in one location might be stocked out and in immediate and substantial demand in a different location.

Even in the best of times, with a strong economy, there is very real pressure to increase inventories to improve market satisfaction, alongside very real pressure to reduce inventories to reduce investment, free-up cash, and reduce costs associated with carrying inventory. This conflict is felt at the level of day to day, even hour-to-hour decisions made by managers, planners, and purchasers.

When the economy is on a downturn this pressure rises to a crescendo – one that can literally make the difference between survival and failure.

So how much is the *right* amount of inventory? This is the million dollar question. Sometimes, it's the 10- or 100-million dollar question. It's a question that has been asked by manufacturers for decades. And it's entirely the wrong question to ask first.

If a manufacturer elects to use inventory to protect their markets by providing high levels of availability, while carrying the lowest investment that is still aligned with that goal, then the first question management must answer is, **where** should that inventory be positioned to best meet both objectives?

Inventory held in the form of raw materials and purchased parts offers high flexibility in terms of being able to be converted into a wide range of goods and can isolate the manufacturing facility from variability and disruption from troublesome suppliers. But the lead time to convert those raw materials and purchased components into sellable products can often be longer than the market is willing to wait.

Inventory in the form of finished goods offers the fastest response to the market – same day, ideally – yet reflects a commitment to producing quantities of specific goods that typically reflects a forecast. Basing such decisions on forecasts almost inevitably leaves a company with the classic inventory problem: too much of some, too little of others, and not enough time to produce what's really needed.

And inventory in the form of WIP is rarely considered in more detail than that – it's simply Work in Process, at some stage of manufacture and already committed to an actual Sales Order. We carry too much, according to some opinions, not enough according to others; and in all the wrong places at the wrong times, according to most. Due to the well known consequences of too much WIP, it is rarely considered to be strategic in nature.

How do managers, today, answer the questions like:

Where should inventory be positioned to provide the best protection of service levels against supply and manufacturing line variability and market volatility?

Where should inventory be positioned to provide the best market response times (lead times)?

Where should inventory be positioned to protect critical resources?

Where should inventory be positioned such that a relatively small investment can provide the maximum protection of the above?

Most manufacturers not only cannot readily answer those questions, they do not even ask them. Yet the answer to the question “how much” is entirely a function of first knowing “where.”

Inventory at the Finished Goods level, when appropriate for the market, offers the potential for the ultimate response time – one day, one hour, even immediate. It provides some degree of immunization against variability in material supply and in manufacturing processes. Yet the investment can be substantial, the product mix may be out of sync with real demand and with materials and capacity committed to a product mix, plant responsiveness to an unpredicted mix can be inadequate.

At the raw materials level, inventory offers a high level of flexibility, with protection against supply variability while offering availability for whatever product mix is appropriate. A certain level of inventory can provide a higher eventual availability of the needed finished products as a much larger finished goods inventory. However, a long lead time from materials to finished products could in some cases cause the company to lose an entire market.

In manufacturing, a certain amount of WIP at a stage of manufacture might protect nothing but the simple downstream process; or, in a judicious location, a precision buffer can protect multiple downstream products from upstream variability while also supporting the performance of a key resource and facilitating a massively reduced lead time of a wide range of products. And the investment necessary can be a fraction of that needed to provide lesser availability at the finished goods level.

Even in a relatively simple manufacturing environment, most managers have little experience in thinking through the answers to the “where” questions.

But when the environment includes thousands of items (materials, parts, components, finished goods), very broad and/or deep Bills of Material, tens of thousands of component records, where routings are long and complex, and offshore supply lines impose weeks-long or months-long lead times and major levels of variability ... the scale of the challenge appears overwhelming, while the benefits of answering the questions correctly are magnified.

The challenge becomes clear when you consider that we’re talking here about the need to answer these questions not just at the conceptual level, but at the level of specific materials, parts, and products, even at the level of a specific step during the routing of a particular part or family of parts.

Now, the answers to these questions are absolutely the key to striking the *right* balance between simultaneously controlling costs and protecting your business opportunity with a strategic position and the “right-size” of inventory.

And of course the answers should not rely on “intuition.” Even in volatile environments with significant variability in supply, demand, and processes, the correct “thoughtware” – and if necessary, the correct software – is required to make a certain degree of precision possible.

The “thoughtware” incidentally, invites managers to step outside the usual boundaries. For example, adding a level to a Bill of material, which is counter to the guidance of every modern manufacturing philosophy, can simultaneously lead to reduced total inventory, compressed lead time, and improved service levels; but only if it’s the appropriate level of the correct parts. Too little – and the opportunity is wasted. The wrong parts – and the investment in inventory protects nothing.

So: how does a manager answer these questions?

The factors that dictate where to position strategic inventory include:

1. Customer Tolerance Time – the time the customer is willing to wait to receive the product or service. To go back to first principles ... why carry any inventory at all? In most cases it is because our customer is unwilling to wait through an entire procurement and manufacturing cycle. To fully understand the first factor of positioning inventory strategically, a business must recognize its different market segments, and the tolerance time; and whether there is an opportunity to gain a competitive advantage by offering significantly reduced lead times.
2. Protection against variability – protecting the customer and internal productivity requires that inventory be used to decouple all major sources of variability—supply, demand and internal resources—from key points in operations. It is common to encounter manufacturers where the lack of a single, even inexpensive component can cause major downstream disruption; and where attempts to “Lean” the processes and inventories down to levels that the potential becomes reality many times a day, to the detriment of service levels, productivity, expense and morale. Attacking the variability itself should be considered through the various prevailing process improvement methodologies but it often takes more time and a degree of focus than desperate times allow. In the short term, variability can be effectively minimized with the proper placement of inventory.
3. Divergence Points – for an organization to truly leverage its investment, it must have a very clear understanding of where the inventory of common parts in the BOM can be aggregated to provide for the greatest opportunity and flexibility to consolidate inventories and return more benefit for less dollars invested.

A new methodology known as ASR, or Actively Synchronized Replenishment, *begins* by answering these questions.

The first of four elements of ASR analyzes the manufacturing environment through a particular “lens,” to help managers identify or determine the most effective strategic locations for inventory. This “lens” provides a perspective on investment for alternative inventory positioning strategies, along with consideration of the factors above – customer tolerance time, protection against variability, protection of critical resources, and the leverage of divergence points. With regards to materials and inventory management, the objective is to simultaneously minimize and manage volatility and variability while promoting velocity and visibility throughout the enterprise.

For those materials, components and products that are chosen as strategically controlled parts, ASR then takes into account a wide range of factors—replenishment time, seasonality, demand and supply variability, etc.—to set an initial “Buffer stock” level. The emphasis here is on “initial” (stock level) because once in operation, *the ASR model dynamically adjusts the buffer stock levels to reflect actual rates of consumption and actual supply line variations that threaten availability.*

Stock is replenished directly in line with the rate at which it is being consumed. In many manufacturing and distribution environments the need for a forecast – and certainly, the common reliance on a forecast – *is almost entirely eliminated through this practice.* The implications of this alone are of course momentous for many organizations suffering the inevitable outcomes of producing to a forecast in uncertain times – too much of the wrong inventory, too little of what’s needed, and all the associated consequences. ASR also uses a unique approach to identify and qualify order spikes, another constant thorn in the side of planners.

As consumption rates increase during a new product introduction, the upside of a seasonal peak, or simply a sales growth trend, the buffer stock levels will increase to maintain the target level of protection. As consumption rates decrease on the downside of a season, or during a phase-out, or during a market downturn – the buffer stock levels will decrease to maintain the level of protection while carrying less inventory. In most cases forecasted information is only used as a factor to determine the **starting** model, and even here accuracy or precision is less important.

The question of “how much inventory to hold” is therefore completely resolved without ever being directly addressed – simply by having an initial level set, then allowing the system to adjust the level in line with actual consumption and real variability and volatility.

Experience has proven that ASR users, while focusing on improving customer performance, realize significant decreases in overall inventory.

This is due to a few key factors.

- The most effective inventory positions to best leverage the investment have typically never been previously identified (or even considered).
- When ASR goes “live,” companies often discover that while some important stock has run out or is in the “red zone” (meaning, the inventory level is low enough to threaten a stock-out), the stock level of many other products is substantially over the top of the target level (known as “OTOG – Over Top of Green”) and a candidate for being reduced.
- Actively managing the levels based on replenishment to the true demand rate carries with it policies and procedures that inhibit artificial inflation of demand, and over-production.
- A major contributor to the reduction is simply the “real-time” visibility that ASR introduces into the system.

For those strategic materials, components and products managed using the ASR approach inventory levels are divided into 5 distinct zones, using a simple but powerful color-based system to give buyers, planners and managers the status of all stocks that are designated for *active* management. Visibility of the Red Zone and therefore of potential stock outs is clear, so a user is notified – with enough time to

respond – when a particular buffer is drawing down more quickly than expected. This ensures that service is not disrupted by stock outs. By the same logic, when rates of consumption and current inventory levels do not call for replenishment, no unnecessary inventory is produced.

While the color system represents a highly visible color based system, often times a more discrete reference is required in order to further prioritize between parts that are both of the same color. In order to accomplish this discreet reference a percentage of the remaining buffer can be generated to go along with the color code.

ASR has proven very effective in ensuring the *right* investment is in place to protect the market – as essential in a market downturn as in a hot market.

However, an equal emphasis is placed on highlighting those materials, parts, components or products where the inventory is more than is needed to protect the market, and can safely be reduced. This is also an indication to planners that the market may be changing, or that the data used to set the initial inventory was significantly over-stated.

ASR users have also reported that by applying an effective inventory strategy and gaining control and visibility of parts, they can also reduce cost by eliminating the need for most expedites, unnecessary overtime and additional freight related to shipping partials.

The challenge of providing superb service to customers during a downturn, while minimizing the investment in inventories, is a very real one for many manufacturers.

The conventional response – cut inventories across the board – is not a good solution, offering the potential for serious long term harm to customer relationships. Yet for many manufacturers it is the only tactic in their book.

Actively Synchronized Replenishment is a no-compromise solution that changes the whole business model for a manufacturer in a downturn. Inventories are reduced substantially while fill rates increase to levels that competitors simply cannot match conventionally, even if they maintain punishingly high inventory levels. Lead times are compressed and responsiveness to volatile demands is increased, despite the reduced inventory, even in the face of high variability in the supply line and internal processes. Whole-plant productivity increases, while operating expense is reduced. The above effects define the true notion of “efficient.”

Equally important, the company is now positioned to capitalize on the eventual market upswing.

The improved competitive edge – lead time, service level, and responsiveness – can be used to take business away from competitors and increase market share. Cash is freed-up from inventory, to be available for whatever growth and strategic opportunities the company chooses to pursue. And when demand once again increases, even if it increases aggressively, the reaction and synchronization of strategic inventory buffers throughout the operation to the levels of demand means that inventories will remain under close control, and a small increase in inventories can be leveraged to support a larger increase in sales.

Your Next Step

If your company is living through the experiences in this report – the need to protect markets while being under pressure to minimize the costs and the investment needed to gain that protection – **you need to learn more about ASR.**

If your company has felt the impact of material, parts, component or finished goods availability problems - and especially if you have a challenging Bill of Materials structure, or if your Bills of Material have many components with multiple where-used - AND even more so, if these problems have persisted for more than just a few months - **you need to learn more about ASR.**

The gains reported in customers service and productivity, with reduced inventories and lead times, are simply too large to ignore.

And if shortages have been blocking efforts to implement a Lean or TOC Pull-based system, ASR could be the key to successful implementation.

Go to www.beyondmrp.com to learn more about ASR and review some case studies. Register for a public webinar or arrange for a dedicated webinar for your management team.

About the author ...

Jeff Herman is a Partner in Constraints Management Group, LLC (CMG)—an international consulting and technology enterprise which specializes in pull-based production, materials, supply chain and project control systems. Jeff and his partners at CMG have been at the forefront of developing and articulating the concepts behind Actively Synchronized Replenishment (ASR) as well as building ASR and Drum-Buffer-Rope (DBR) compliant technology.

Jeff is a certified expert by the Theory of Constraints International Certification Organization in the TOC fields of: Operations Management, Distribution Management, Project Management, Finance and Measures, TOC Thinking Processes, and Holistic Management.