Topic: Lean and Demand Driven MRP

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Lean Finds a Friend in Demand Driven MRP (DDMRP)

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The Demand Driven Institute (DDI) was founded by Carol Ptak and Chad Smith, co-authors of Orlicky's Material Requirements Planning, Third Revised Edition in order to proliferate and further develop demand driven strategy and tactics in industry to enable a company to transform from "push and promote" to "position, protect and pull."

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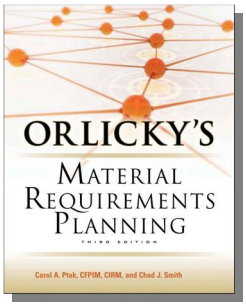
Lean Finds a Friend in Demand Driven MRP (DDMRP)

Chad Smith and Carol Ptak

With the upcoming release of our book Orlicky's Material Requirements Planning, Third Edition, we thought that we would try to address some inevitable questions with regard to how DDMRP will complement the Lean methodology.



We understand that the title of the book may not seem like it would appeal to the typical Lean advocate. However **we wrote this book specifically to enable pull systems and to minimize waste.** In the book we introduce a breakthrough methodology that is a reliable and thoroughly tested bridge between the worlds of Lean and traditional planning. With DDMRP, both not only survive but mutually thrive with respect to how materials and inventory is positioned, planned and executed.

Lean and Technology

When it comes to materials and inventory planning and execution Lean advocates often get accused of being anti-technology. Do Lean advocates really want manufacturing companies to entirely abandon the promise of technology? The answer should be yes when that technology is wasteful, confusing and not reflective of reality. Unfortunately, that has been the situation for quite some time with regard to traditional MRP and DRP systems. **Point 8 of the Toyota Production System** states: "*Use only reliable, thoroughly tested technology that serves your people and processes.*"[1] Until now the prevailing materials and inventory planning and execution technology, while thoroughly tested, has been largely inappropriate to serve the people and processes in companies transforming to a demand driven approach. The proliferation and sustainability of Lean implementations has been negatively impacted by the lack of appropriate supply chain materials planning and execution technology.

Several analyst reports have concluded that there is tremendous potential for the incorporation of better planning and visibility software into Lean implementations. Manufacturing needs Lean to survive in the more complex environment of the 21st Century. Lean needs an effective demand driven materials requirements planning approach to bring that vision to reality.

What if there was an appropriate technology? What if a reliable, thoroughly tested blueprint for demand driven planning and execution of supply chain materials with high degrees of visibility could be introduced to the MRP world? Furthermore, what if that blueprint also was extremely appealing to the MRP World? Sound impossible? It's not; it is reality and it is producing significant results in short periods of time for early adopters.

The MRP versus Lean Conflict

One of the reasons the above statement may sound impossible to Lean advocates is due to the fact that they find themselves frequently in conflict with people that code, buy and use traditional formal planning systems - MRP. MRP and Lean seem to have been at odds with each other from the beginning. The existence of this conflict has been well documented in the last 10

[1] Liker, J. (2004). *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. McGraw-Hill

years. However, what has not been well researched and documented is what is really behind that conflict. Typically, the conclusions about which side is right in the conflict are biased based on who is underwriting the research. Is it as simple as “Push” versus “Pull”? We think not. To characterize the conflict that way is to hide in the noise and guarantee an unacceptable answer.

The typical MRP versus Lean conflict goes something like this:
Many Lean implementations attempt to abandon MRP and other formal planning tools. Why? Because they are seen as inappropriate, transaction intensive, non-value added, even antithetical, to what Lean is trying to accomplish. This causes tremendous friction between planning personnel and those pushing to eliminate these systems. Lean facilitators and advocates often see MRP as an **overcomplicated** and wasteful dinosaur that simply doesn’t work in the demand driven world.

Planning personnel, however, see it a completely different way. They believe that without the ability to see the total requirements picture, critical blind spots will exist in the planning process which will lead to shortages, expedites and even excessive inventory positions. They see the simple pull approach for managing materials and inventory as a gross **oversimplification** for the complex planning and supply scenarios that are the norm in today’s more volatile environment.

The conflict really has at least three unique dimensions that we detail in the book. Those dimensions are:

- Planning versus Execution
- Complexity versus Simplicity
- Dependence versus Independence

With regard to the above conflict, what if both sides are right? What if in many environments today the traditional MRP approach is too complex AND Lean’s approach is too simple? Where would that leave us? It leaves us in a situation where we oscillate between the two options depending on the political wind employing a constantly changing and unsatisfactory number of work-arounds and compromises. Executives get frustrated, in-fighting escalates, efforts are sabotaged, more money and time is spent and our improvements deteriorate to lip-service. Sound familiar?

Einstein once said, "Any intelligent fool can make things bigger and more complex. It takes a touch of genius -- and a lot of courage -- to move in the opposite direction." He also said, “Everything should be made as simple as possible, but not simpler." How prophetic.

Can traditional MRP be overly complex? WITHOUT A DOUBT. Most people in manufacturing companies don’t even fully understand what the planning system is or how it does what it does. Every day planners are drowning in oceans of data and action messages. The hard coded rules are rooted firmly in the old “Push and Promote” methodology that make it ill suited to today’s more volatile and service oriented world. Furthermore, “fixing” or “cleaning up” the system seems to be a never-ending, transaction intensive and expensive journey.

Can Lean be an oversimplification? When it comes to materials and inventory planning the answer in many environments is YES. Oversimplification is defined as: “To simplify to the point

of causing misrepresentation, misconception, or error"[2] By failing to provide visibility to critical dependencies and relationships with regard to supply, demand, on-hand inventory and product structure, the Lean toolset can attempt to oversimplify many environments. The larger, more complex and variable these environments are, the more likely that Lean's simple kanban controls and lack of material planning is an oversimplified approach.

The Quest for FLOW

Let's start at a place where both sides can agree. Now more than ever a decisive competitive edge can be achieved by companies with a high degree of flow through and to their customers. The better the flow – the better the service levels and use of working capital. The better the service levels and working capital – the better the bottom line. In our book we declare the first law of manufacturing as:

All benefits will be directly related to the speed of flow of materials and information.

Additionally, Adam Zak, co-author of *Simple Excellence,* in an interview with Joe Dager of Business 901 recently said, "My sense is that flow, however you define it, is probably something like the Holy Grail…to the degree that through our supply chain we can minimize the disruption to flow, then we're creating something that is to the next higher level: to the next higher level of quality, to the next level of lower cost, to the next level of customer satisfaction."

Do MRP advocates disagree with this? Certainly not! Materials and processes that flow reliably are the easiest to plan and manage. Shorter lead times inherently make plans more accurate. However, do the traditional MRP approaches have deficiencies that hurt flow – undeniably YES.

Does Lean have the complete toolset for fully protecting and improving flow at the plant, enterprise and supply chain level in a more volatile world? There seems to be something missing. Reductions in inventory have made supply chains too brittle to be able to sense and adapt to changes in demand.

Prerequisite #1: Pace to Actual Demand

To protect and improve flow, a company must safeguard at least two critical objectives. First, a company must be able to align its effort and resources as close as possible with actual demand. This is especially true when today's global manufacturing and supply landscape is more volatile than ever, making the penalties of guessing wrong very costly. Second, making things that are not required by the market impedes flow by unnecessarily consuming capacity, materials, cash and space. This is the basic definition of waste!

This is not meant to say that a company has to move to a pure make-to-order environment. The company has to be able to fulfill and replenish critical positions as close as possible to actual consumption without frequent service disruptions. Pacing as close as possible to demand is the objective that Lean advocates are typically focused on – it's **point 3 of the Toyota Production System**. In order to do this Lean uses simple and visible tools like supermarkets, kanbans and heijunka boards and focuses on increasing the responsiveness of resources to the signals generated by these tools.

[2] www.thefreedictionary.com

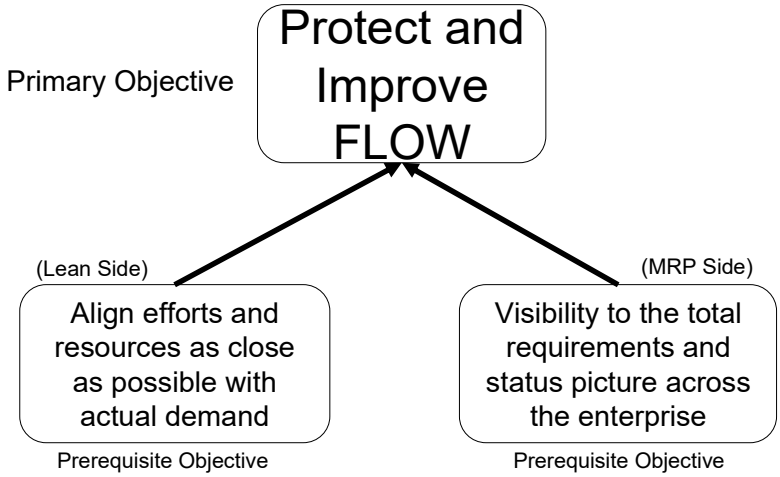
Prerequisite #2: Visibility to the Bigger Picture

Additionally there is another requirement for flow. A more complex company cannot hope to protect flow while minimizing working capital without visibility to the total requirements and status picture across the enterprise. This is especially true in environments with long lead time parts, extended supply chains, irregular orders and complex bills of material. This visibility is typically the objective for traditional MRP systems. By definition, MRP takes demand signals (typically forecasted), explodes bills of material pegging against each item on hand, performs gross to net calculations and recommends the launch of supply orders (manufacturing, transfer and purchase orders).

Inventory and Flow

So, with regard to flow, is all inventory waste? We don't think so. Inventory can be a waste under two conditions. First, when there is not enough inventory in the right place there are disruptions and flow breaks down. Second, when there is too much inventory in the system, lead times expand as materials and capacity are tied up, expedites begin and, once again, flow breaks down. **Effectively positioning and managing inventory (planning and execution) is vital for flow.** Minimizing the cash and capacity we have consumed in inventory while promoting flow is vital for good return on capital.

When it comes to inventory planning and execution both Lean and MRP have weaknesses in today's more volatile and complex environments. Lean's reliance on replenishment kanbans with little to no visibility or connectivity at the plant, enterprise and supply chain level is a problem for flow. Traditional MRP's antiquated and complex rules governing demand and supply order generation creates unrealistic plans and schedules which is also a huge problem for flow.



To protect and improve flow a blend of simple visible pull signals AND the computational and connective power of technology is necessary. This isn't a compromise for the two sides to live in peace; it must be a harmonious integration where both and create a stronger solution together. When this happens then we can best determine:

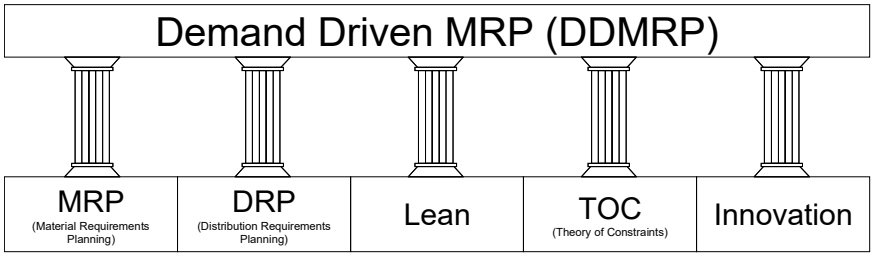
1. Where to place inventory to promote flow but minimize working capital;
2. How to size and dynamically adjust those strategic stock positions;
3. How and when to replenish them;

4. How to effectively see priority across the enterprise (or supply chain) with regard to all materials and inventory demand and supply signals.

What if there is a way to define a solution (rules and tools) that is not overly complex or overly simple? What if there is a way to take key and relevant aspects of both points of view and create an elegant blueprint that will work for and enhance both sides' objectives? This solution must provide both a level of sophistication that can provide more visibility from a planning and execution perspective while at the same time promote simple, clear and highly visible signals across the enterprise. This is the goal for the Demand Driven MRP (DDMRP) framework.

The Solution

In the book, Orlicky's Material Requirements Planning, Third Edition (McGraw-Hill, 2011) the blueprint is revealed for fundamentally and practically migrating MRP and DRP from the world of "Push and Promote" to the world of "Position and Pull." This is called Demand Driven MRP (DDMRP). You can download a sample of the book at: www.demanddrivenmrp.com.



DDMRP is a proven multi-echelon demand and supply **planning and execution** methodology. Multi-echelon is how the DDMRP solution integrates multiple tiers (including the bill of material) in the supply chain in order to provide end to end integrated planning and execution visibility. DDMRP was invented in order to mitigate the effects of variability and volatility on manufacturing operations and supply chains and promote visibility and velocity.

DDMRP is an unprecedented no compromise fusion of relevant MRP and DRP tactics combined with the pull-based approaches and signals of Lean and the Theory of Constraints. DDMRP includes planning and execution innovations for better lead time compression and execution visibility. It takes Lean's waste reduction focus and visibility for execution and combines it with a new set of demand driven planning tactics that provides unprecedented planning visibility across an enterprise and supply chain.

Demand Driven MRP (DDMRP Critical Components)	
5 Zone Buffers	Provides easy status and relative priority visibility for planning and execution at all levels
Dynamically Adjusted Buffers	"Flexes" buffer positions based on changes to consumption
Planned Adjustments to Buffers	Accounts for seasonality, product introduction/deletion/transition
Globally Managed Buffer Profiles	Parts/SKU are grouped by like attributes for ease of management
Decoupled BOM Explosion	Creates a unique blend of dependence and independence for planning
ASR Lead Time Calculation	Lead time determination based on the BOM's longest unprotected sequence
Order Spike Protection	Highlights and accounts for problematic sales orders based on a threshold and horizon
Material Synchronization Alert	Identifies specific misalignments between child supply and parent demand
Multi-Location Buffer Status Visibility	Relative status visibility across a distribution net for like parts/SKU
Lead Time Managed Parts	Managing critical non-stocked items through timed alert zone
Matrix BOM + ASR Lead Time Analytics	A revolutionary lead time and working capital compression approach across all BOMs

About the Authors:

Carol Ptak is currently a partner with the Demand Driven Institute, and was most recently at Pacific Lutheran University as a Visiting Professor and Distinguished Executive in Residence. Previously, she was vice president and global industry executive for manufacturing and distribution industries at PeopleSoft where she developed the concept of demand driven manufacturing (DDM). Ms. Ptak spent four years at IBM culminating in the position of SMB segment executive. cptak@demanddriveninstitute.com

Chad Smith is the co-author of Orlicky's Material Requirements Planning, Third Revised Edition (McGraw-Hill, 2011). In 1997 Chad co-founded Constraints Management Group, LLC (CMG). Since the late 1990's Chad and his partners at CMG have been at the forefront of developing and articulating the concepts behind Demand Driven MRP as well as building DDMRP compliant technology (Replenishment+®). Additionally, Chad is an internationally recognized expert in the application and development of the Theory of Constraints (TOC), getting his formal training at the Avraham Y. Goldratt Institute Academy and working under the tutelage of Dr. Eli Goldratt, author of The Goal, for several years. csmith@demanddriveninstitute.com

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