



Beyond MRP

ASR - Transforming Parts and Materials Availability for ERP, Lean and TOC implementations

Presented by:

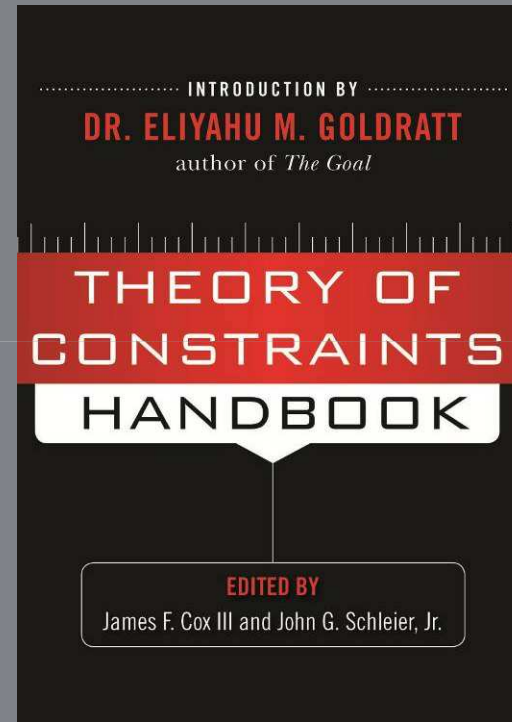
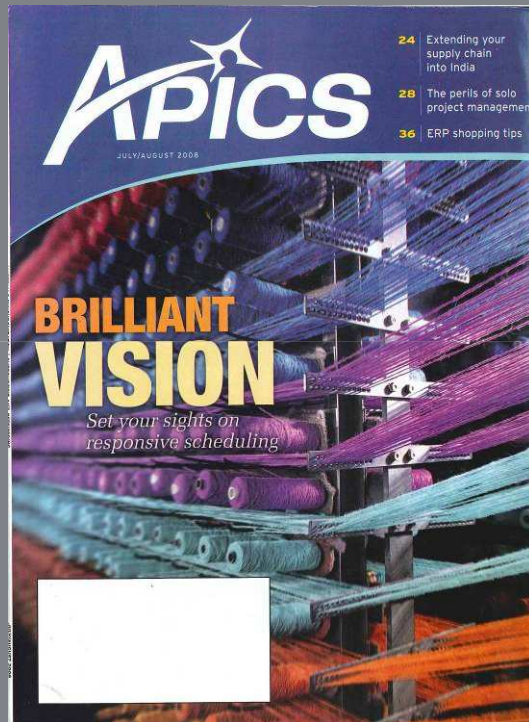
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The Thoughtware People ®

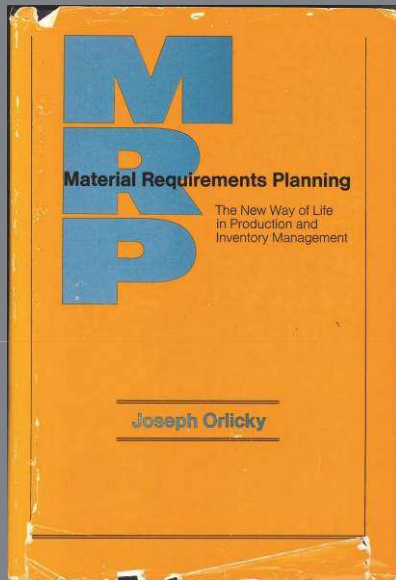
Where did this Come From?

- Work with Mid-range and upper mid-range discrete manufacturing enterprises. (\$50M to \$1B range);
- Deep, complex or broad BoM structures. 20,000 to over 100,000 BoM records;
- 10,000 to over 80,000 open supply order records;
- 5,000 to over 50,000 demand order records;

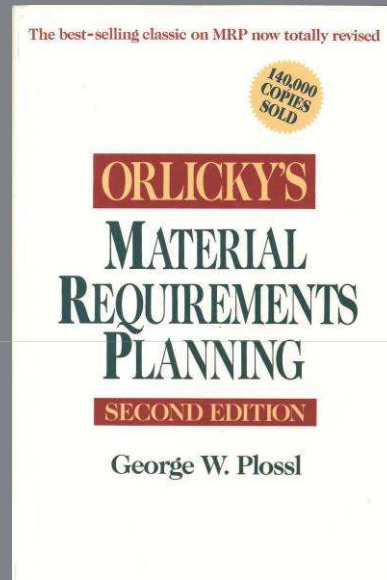
Initial Reaction



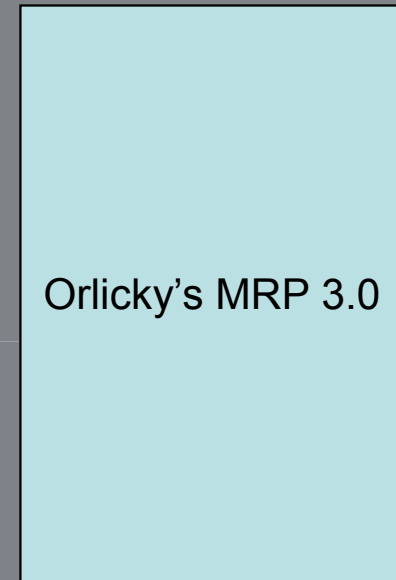
The Next Big Thing?



1975



1994



2010

165,000 copies



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A Good Problem Summary

“ Inventory buffers are at all-time lows, forecast error is on the rise and a legacy of make-to-stock manufacturing strategies is crippling the ability of producers to respond to increasing volatility in demand and supply. ”

AMR Report (Demand Driven Manufacturing, 2007)

 **AMR Research**
Bold Ideas. Compelling Research. Pragmatic Advice.

Materials Requirements Planning (MRP)

- The conventional materials planning tool throughout the world is MRP
- Inside of every modern ERP system is an MRP module
- 79% of ERP buyers also buy and implement the MRP module
- MRP was conceived in 1950s and commercially coded and formalized in the 1970s for the issues and business rules of the day and...
- ...it hasn't changed
- What has changed?

Variability and Volatility

- Global sourcing and demand
- Shortened product life cycles
- Shortened customer tolerance time
- More product complexity and/or customization
- Demands for leaner inventories
- Inaccurate forecasts
- Material shortages
- More product variety
- Long lead time parts/components

The “New Normal”

“ Constant volatility, variability and variety will become the ‘New Normal’ even through the economic recovery and subsequent cycles.”

Cambashi, Inc. (Managing Extreme Volatility, Variability and Variety, October 2009)



Today's Rules & Tools are Failing

- MRP is failing in the “New Normal”
 - Old Rules, Shortcomings and Lack of Execution Capability lead to
 - Unacceptable Inventory Performance
 - Unacceptable Service Level Performance
 - High Expedite Related Expenses and Wastes

Ever heard of this conflict?

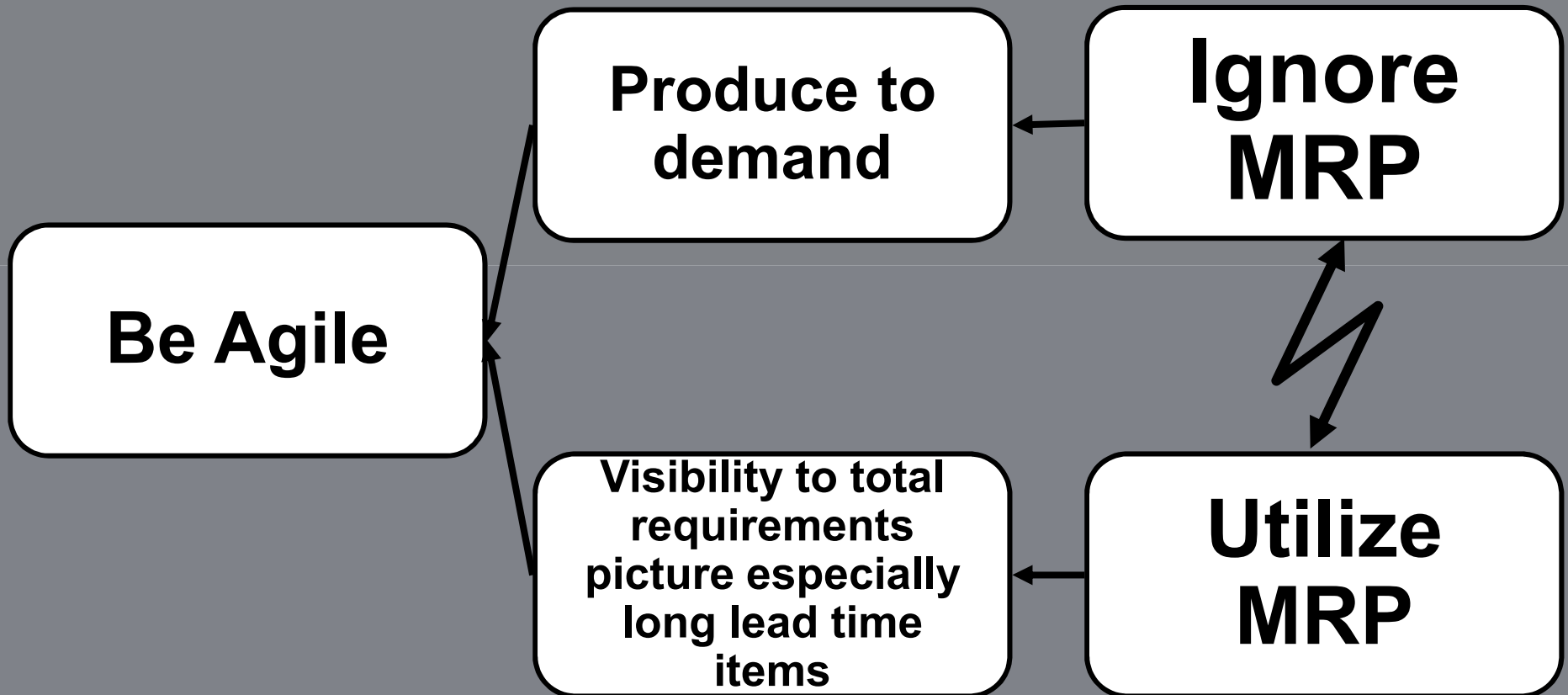
**Ignore
MRP**



**Utilize
MRP**



What's Drives the Conflict?



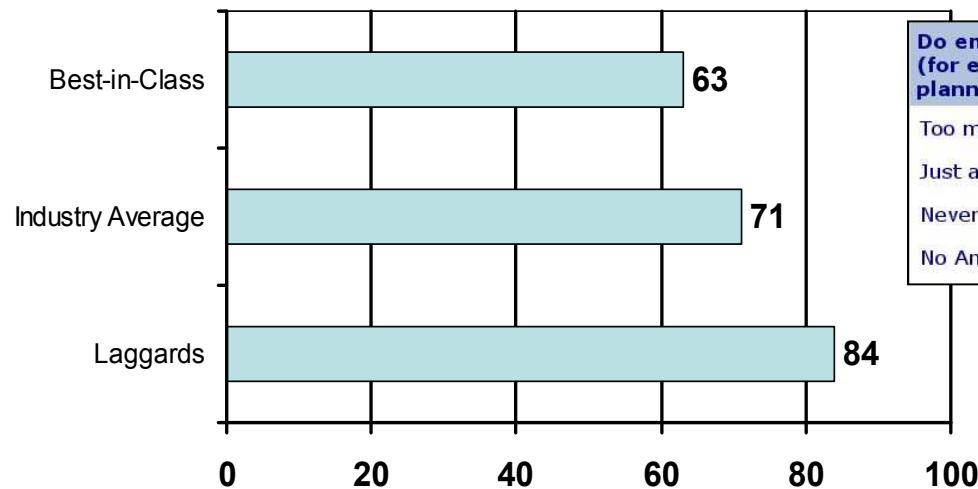
What happens when people get
stuck between a rock and a hard
spot?

They compromise!

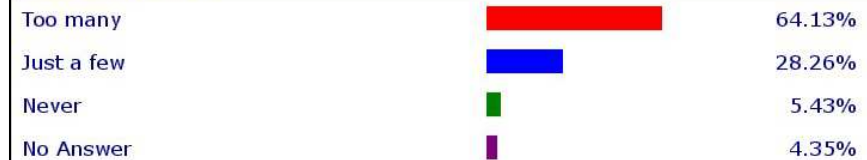
Manual Work-Arounds

- Excel® sheets and Access® based mini-systems

Companies Using Spreadsheets for Demand Management



Do employees develop "workarounds" using spreadsheets and Access databases (for example) because they feel they can't work effectively within the formal planning system?

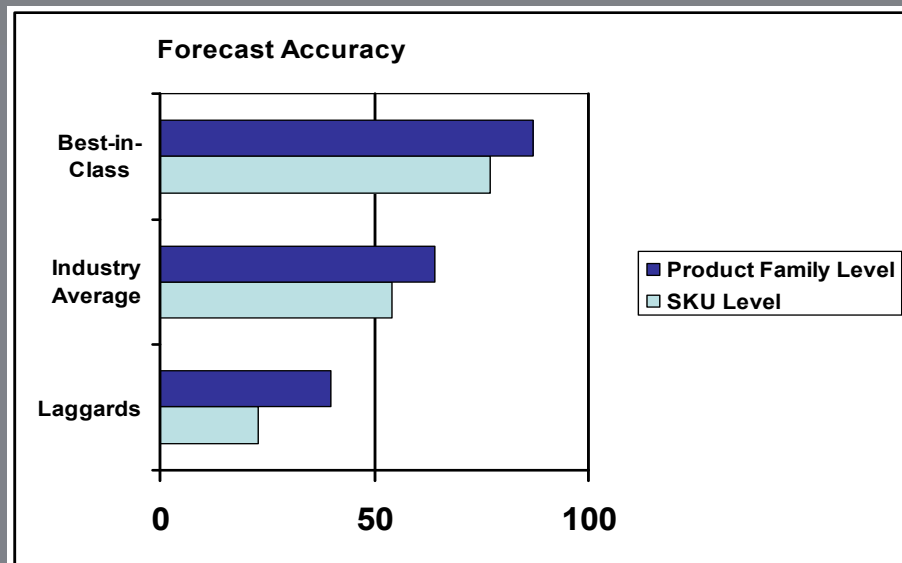


Online Survey by www.beyondmrp.com (2008)

Aberdeen Group (Demand Management, November, 2009)

Better Forecasting

- Forecast accuracy is declining
- Complex BoMs are more susceptible to error
- Push-based tactic



Aberdeen Group (Demand Management, November, 2009)

“Metrics or planning methods grounded in past occurrences are like driving your automobile by looking in the rear view mirror. This focus may not help in determining what will occur in the future across channels and market segment, or adequately support a more demand-driven environment.”

Cambashi, Inc. October 2009. “Managing Extreme Volatility, Variability and Variety” Cummaquid, MA: Cambashi, Inc., project reference U2934

Manual Re-order Points

- Kanbans and supermarkets become unmanageable in environments with thousands of components
- Rarely adjusted
- No netting – requires kanbans everywhere
- No true available stock picture

“..very difficult to control in more complex environments. In higher variety environments it forces inventory to be held almost everywhere even if it is infrequently used and it is not dynamic with changes to the environment (static buffers)”

AMR Alert Article (*Take Lean Thinking to the Next Level*,
November 16, 2006)

 **AMR Research**
Bold Ideas. Compelling Research. Pragmatic Advice.

“ Kanban cards and heijunka boards become unmanageable when there are hundreds or thousands of products and components. The pragmatist needs software to support lean manufacturing (in large global manufacturers with many manufacturing sites and lines).”

AMR Report (*Demand Driven Manufacturing*, 2007)

 **AMR Research**
Bold Ideas. Compelling Research. Pragmatic Advice.

Can Big Software Solve the Problem?

ERP Companies will not solve the issue

- Work-arounds prove the point
- Completely re-build their planning suite
- ERP companies don't understand MRP AND demand driven approaches well enough to know what needs to stay and what needs to go
- Conflicts with “solutions” that they are pushing (advanced forecasting algorithms)

Big Software Solutions Too Generic

“ Out-of-box ERP tools are too generic to address the complexity of the demand management in terms of representation of multiple levels of the bills of materials, collaboration with several internal and external entities, configuration options and outsourced manufacturing related complexities. ”

Aberdeen Group (Demand Management, page 15, December 2009)

Aberdeen *Group*

The Solution - Actively Synchronized Replenishment (MRP 3.0)

“Actively Synchronized Replenishment represents the most significant breakthrough in materials management since the invention of MRP.”

Carol Ptak, former CEO of APICS, former VP of Supply Chain at Peoplesoft and author of three MRP books



Rethinking The Rules

“ Becoming a demand-driven manufacturer requires rethinking integration of manufacturing into enterprise and supply network business processes, the right metrics, and enterprise manufacturing intelligence and agile execution techniques. ”

AMR Report (Demand Driven Manufacturing, 2007)

 **AMR Research**
Bold Ideas. Compelling Research. Pragmatic Advice.

What is ASR?

ASR is a solution designed to overcome the challenges and compromises that manufacturers encounter when using conventional MRP (and DRP) systems in today's highly volatile and variable supply chain environment.

MRP

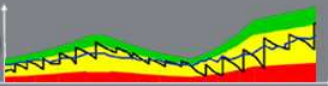
DRP

TOC

Kanban

Innovation

ASR



Actively Synchronized Replenishment

- Builds on traditional “Replenishment” pull concept
- New approaches and rules for:
 - Inventory analysis
 - Materials planning
 - Materials execution
- It is a prerequisite to effectively utilize pull-based operational execution methods like Lean and Drum-Buffer-Rope

Five Components

1. Strategic Inventory Positioning
2. Buffer Sizing and Zoning
3. Dynamic Adjustment
4. Pull-Based Supply Generation
5. Highly Visible and Collaborative Execution

Strategic Inventory Positioning

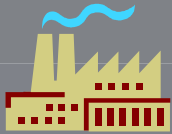
- Complex environments require careful considerations
- Factors that are considered include:
 - Customer Tolerance Time (CTT)
 - The Variable Rate of Demand
 - The Variable Rate of Key Sources of Supply
 - Inventory Flexibility and Product Structure
 - Protection of critical operational areas

Choose Appropriate Parts for Buffering

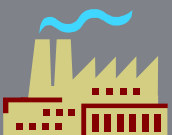
Purchasing

Critical and long lead time parts and even some critical NON-Stocked parts

Supplier 1



Supplier 2



Supplier 3

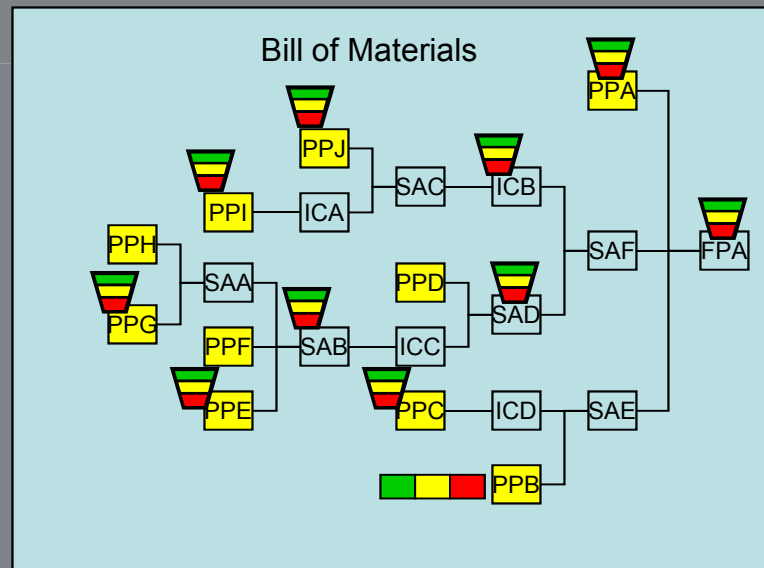


Purchased Parts List



Operations

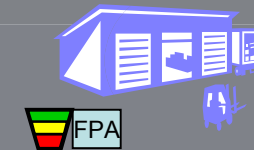
Critical manufactured parts, sub-assemblies and finished stock



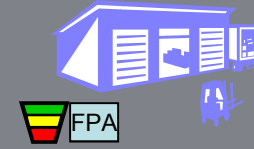
Fulfillment

Finished stock

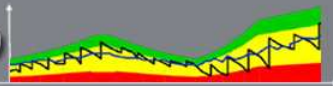
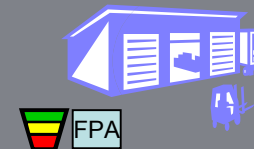
Region 1



Region 2



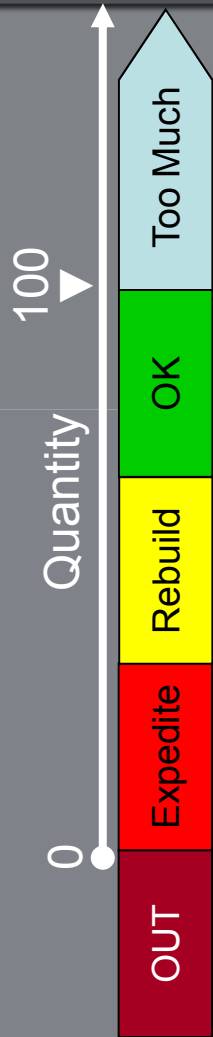
Region 3



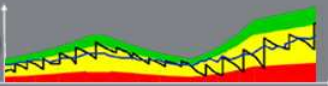
Group Parts into Buffer Families

- Parts are grouped by critical like attributes
 - Variability (high, medium, low)
 - Lead time (long, medium, short)
 - Make or Buy
- The group traits above are combined with individual part traits to create a unique level and zone for each part
 - ADU (Average Daily Usage)
 - Lead time
 - Order multiples

Buffer Zoning



- Buffers are sized based on the combination of Group and individual part traits
- Chosen Part buffers will be managed based on an intuitive color coding system.
- Buffers have 5 zone statuses. (OTOG, Green, Yellow, Red, Out)
- The zones create visible priority for planning AND execution.



Group and Individual Part Buffer Settings

Buffer Profile

Buffer profile A10


Description:


Inventory Alert Level: % of Top of Red


Order Spike Alert Level: % of Top of Red

Default Order Cycle: days Calculate Order Cycle from part order minimum?

Profile Definition

 Order Cycle Factor: number of order cycles in the Green zone
Green Zone Base: % of lead time days

 Order Cycle Factor: number of order cycles in the Yellow zone
Yellow Zone Base: % of lead time days

 Safety Zone: % Red Zone Base
Order Cycle Factor: number of order cycles in the Red zone
Red Zone Base: % of lead time days

The R+ Alert is equal to Top of Yellow

OK Cancel Apply



Parts


Number	Type
FPA	A10
ICA	A11
ICB	A11
ICC	A11
ICD	A11
PPA	A11
PPB	A11
PPC	A12
PPD	A11
PPE	A11
PPF	A10
PPG	A12
PPH	A10
PPJ	A10
SAA	A10
SAB	A10
SAC	A10
SAD	A10
SAE	A10
SAF	A10

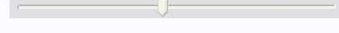
Part: FPA

Part More Properties Inventory Management Buffer Sizing Bill of Materials User Defined Fields

Replenished Part Buffer Levels Override

Top of Green:  

Top of Yellow: 82% 

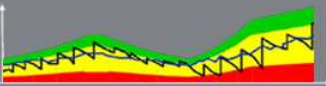
Top of Red: 45% 

Today's SAF: 100%

Create a new part

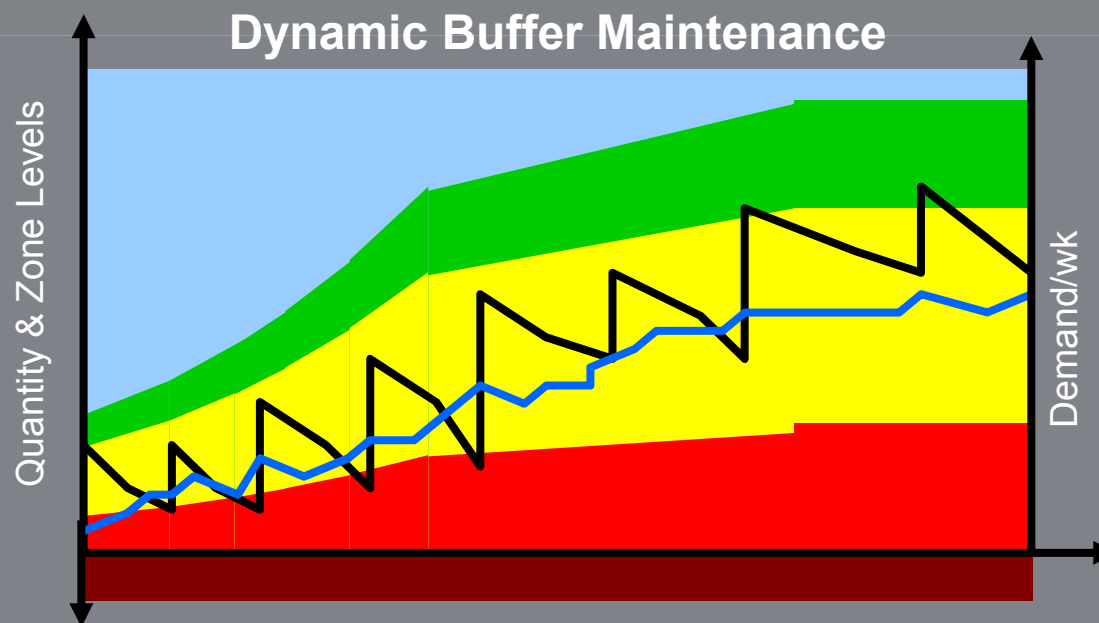
OK Cancel Apply

BoM depth: 7 parts 21 active parts total in database



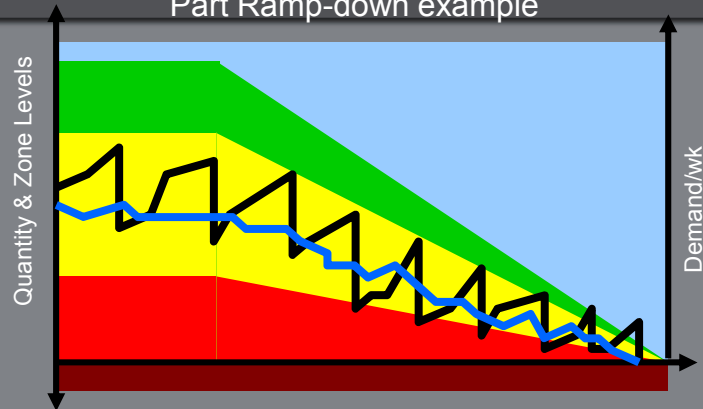
Dynamic Adjustment

- Over a rolling past horizon certain traits can trend up or down. You decide the sensitivity by the length of the horizon

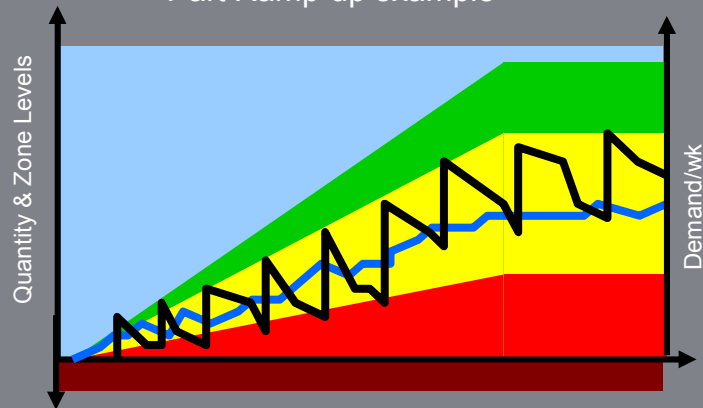


Planned Adjustments

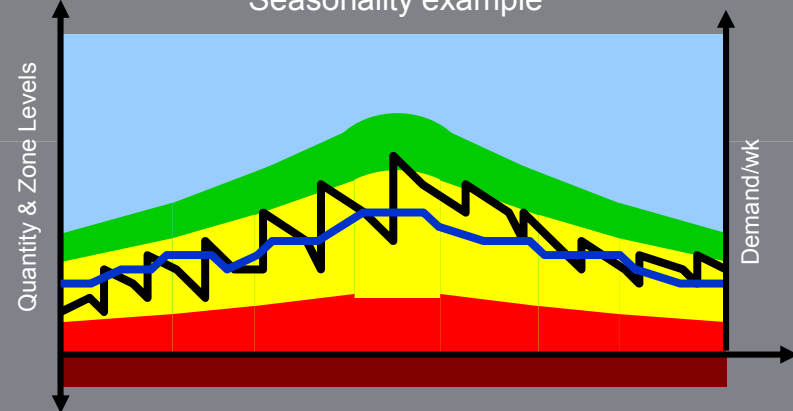
Part Ramp-down example



Part Ramp-up example

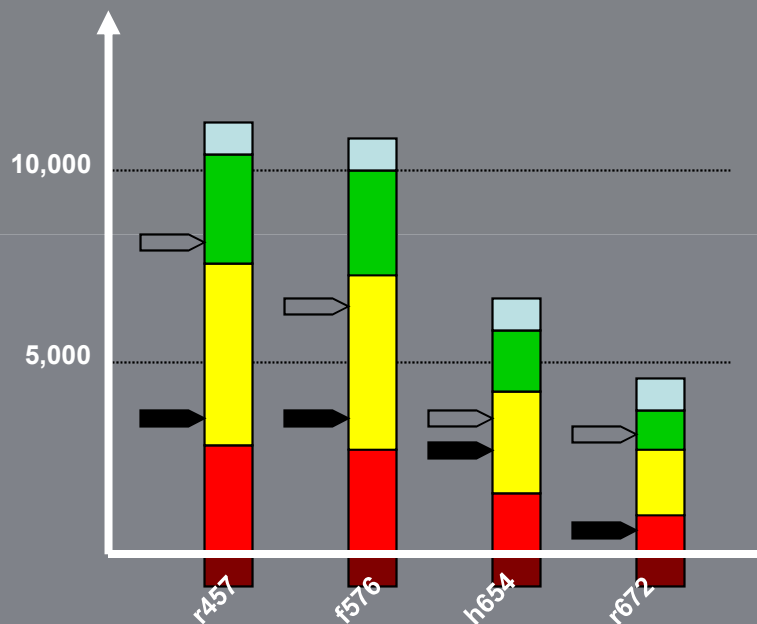


Seasonality example

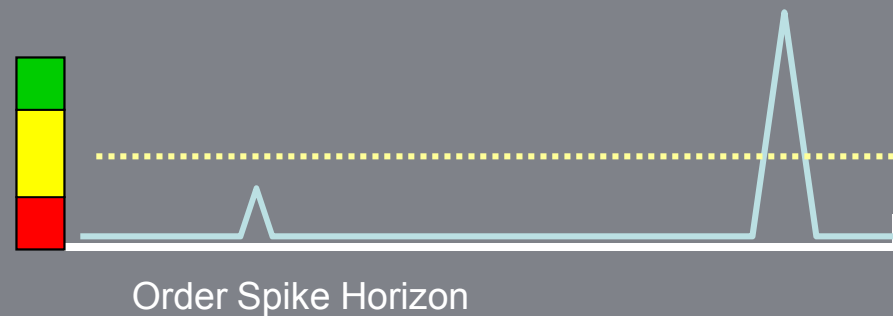


Supply Generation

Supply generation is based what zone the available stock equation places the part



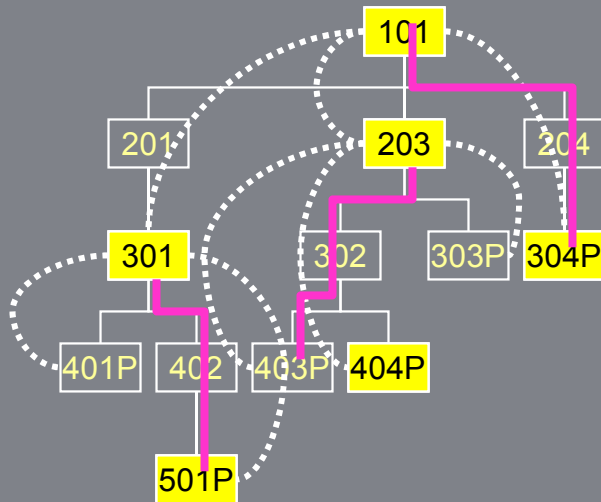
Part	Open Supply	On-hand	Available Stock	Recommended Supply Qty	Action
r457	4253	4012	8265	0	No Action
f576	2818	4054	6872	3128	Place New Order
h654	317	3721	4038	2162	Place New Order
r672	2120	1732	3852	0	Expedite Open Supply (Execution)



True pull-based signal with open supply, on-hand, any unfulfilled demand and qualified spikes factored in

Realistic Lead Times

- ASR de-couples the Bill of Material at all stock positions. It stops the explosion through each leg when it hits a “stock buffer” position.
- ASR uses the *longest unprotected leg* (“ASR lead time”) to:
 - Determine the part’s buffer size.
 - Generate the realistic due date for the replenishment of the part.



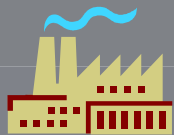
This means that independent planning, purchasing and scheduling with more realistic lead times will occur between these buffered parts in the BoM.

What it Looks Like Conceptually

Purchasing

Critical and long lead time parts.

Supplier 1



Supplier 2



Supplier 3



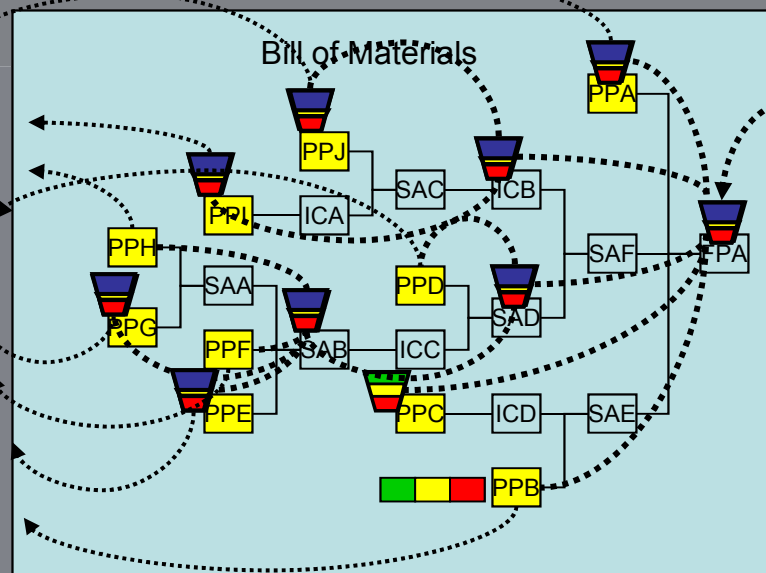
Purchased Parts List

- PPE
- PPG
- PPB
- PPD
- PPA
- PPI
- PPC
- PPJ
- PPF
- PPH

Manufacturing

Critical manufactured parts, sub-assemblies and finished stock.

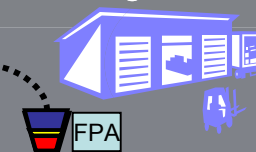
Bill of Materials



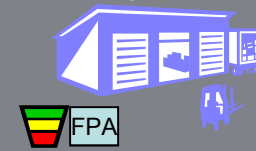
Fulfillment

Finished stock.

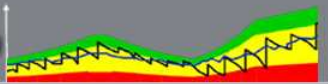
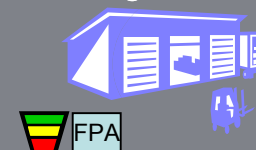
Region 1



Region 2



Region 3



Execution Components

- The longer the execution horizon, the more necessary execution management tools become. **Priority by due dates do not adequately convey real-time priority!**
- Highly visible action boards and/or messages that indicate:
 - Projected stock out Alerts for parts where projected consumption will result in a stock out prior to receipt of incoming supply;
 - Inventory Alert for parts that are currently stocked out or in danger of stocking out;
 - Lead Time Alerts to prompt personnel to check up on the status of critical non-buffered parts.

What Execution Looks Like

Purchased Items

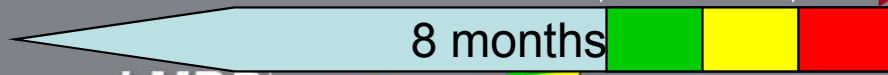
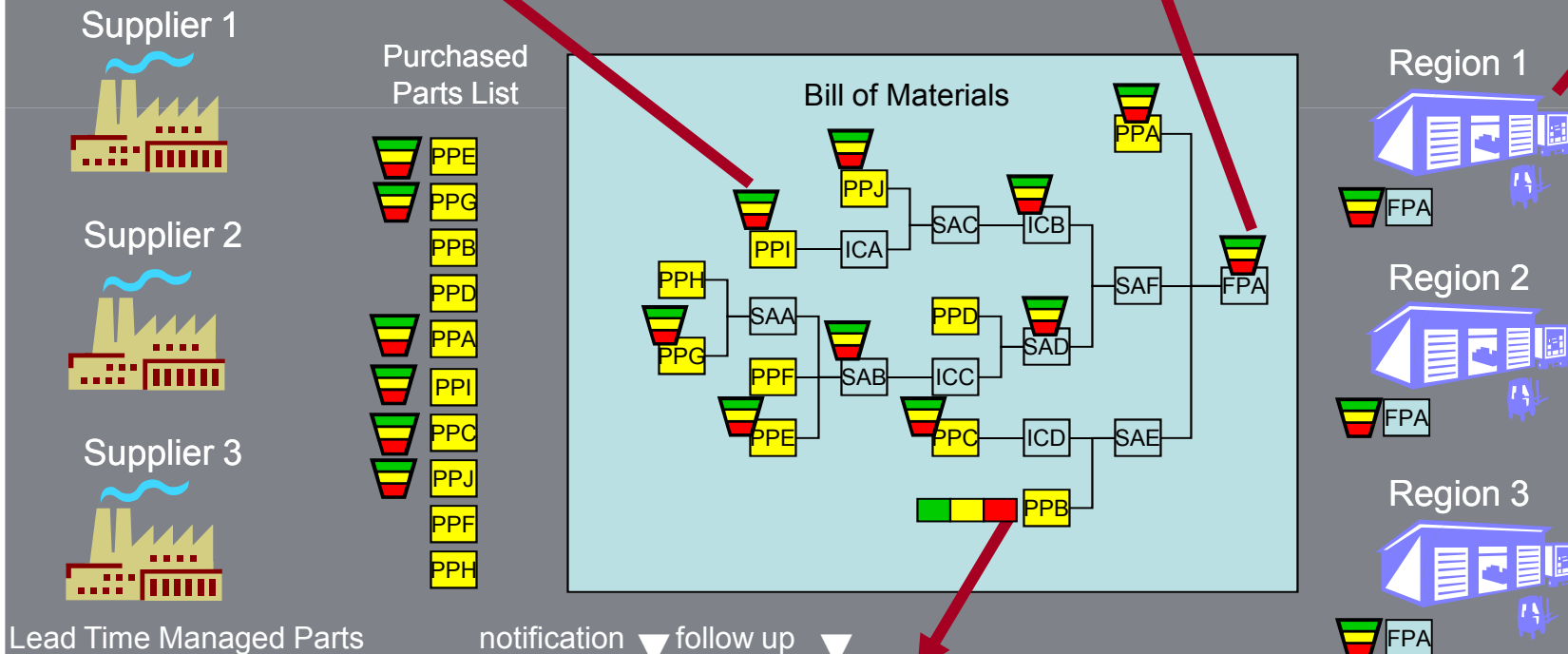
Order #	Due Date	Buffer Status
PO 820-89	05/12/09	Critical 13%
PO 891-84	05/12/09	Med 39%
PO 276-54	05/12/09	Med 41%

Manufactured Items

Order #	Due Date	Item #	Buffer Status
WO 819-87	05/24/09	FPA	Critical 13%
WO 832-41	05/22/09	SAD	Critical 17%
WO 211-72	05/22/09	ICB	Med 34%

Distributed Items

Item #	Location	Buffer Status
FPA	Region 1	Critical 11%
FPA	Region 2	Med 41%
FPA	Region 3	Med 36%



Beyond MRP

