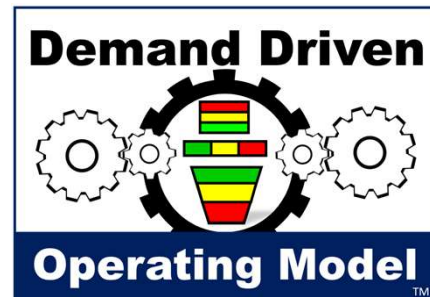


# The Nine Basic Assumptions of the Demand Driven Operating Model

Discussing the Foundation for a Flow Based Operating Approach



1

## Professional Development Reminder

**1** CEU per webinar



**1 Professional Development Point!**

Each attendee gets a certificate of participation.



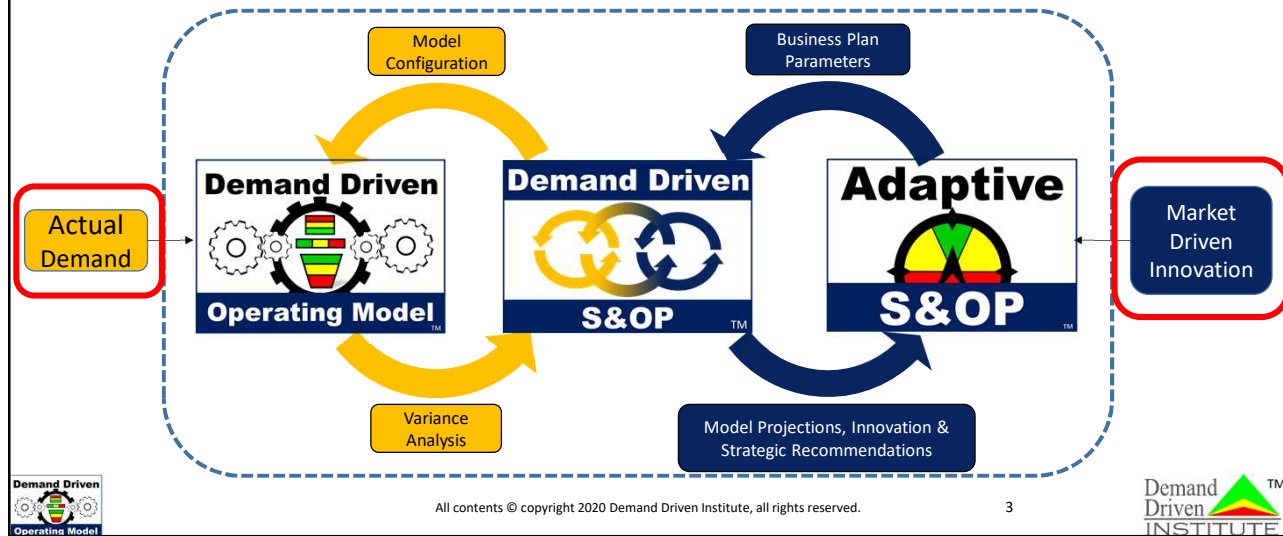
All contents © copyright 2020 Demand Driven Institute, all rights reserved.

2

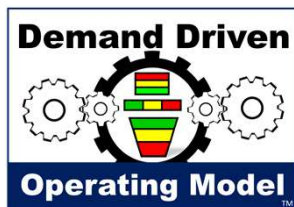


2

# Demand Driven Adaptive Enterprise Model



3



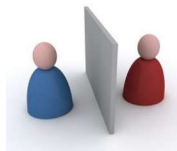
## A Flow Based Operating Model

Combines elements of MRP, DRP, Lean, Theory of Constraints, Factory Physics and Six-Sigma.

Paces operations to **actual demand**



Strategically places **decoupling points** for lead time compression and variability (bullwhip) mitigation



Strategically places **control points** for schedule synchronization



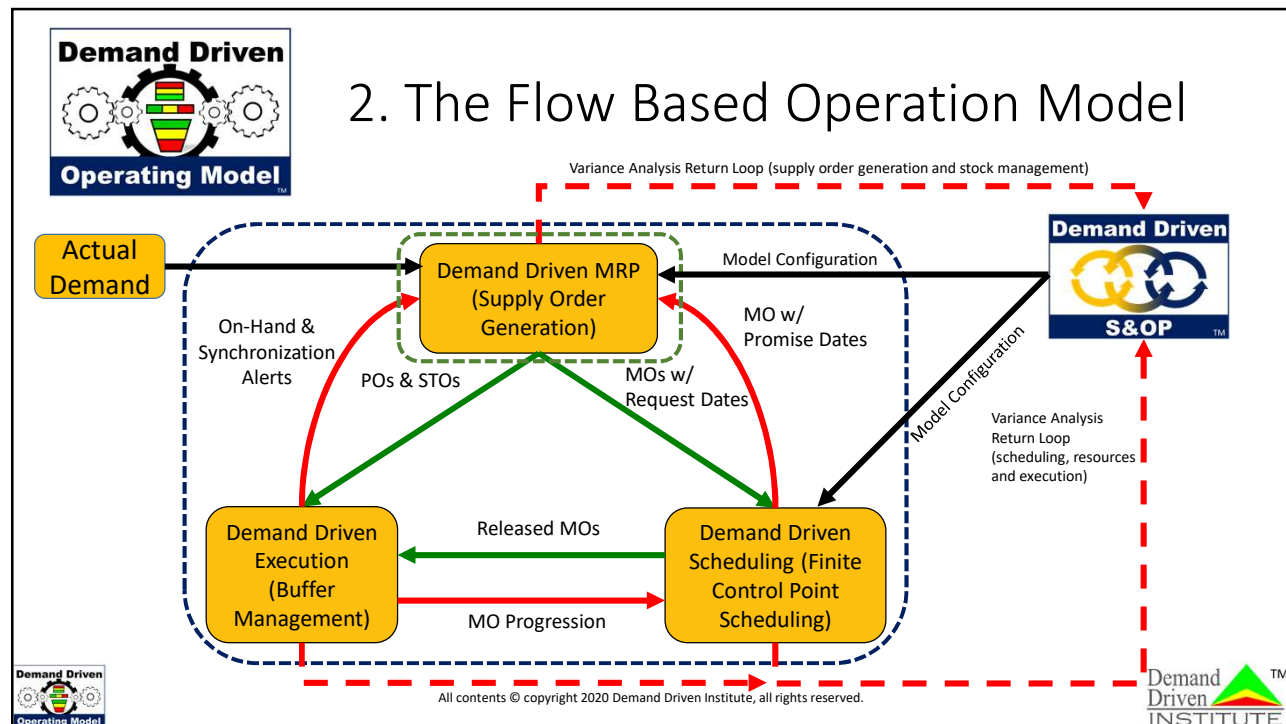
Protects decoupling and control points through stock, time and capacity buffers



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



4



5

**Assumption #1: Assets must be as closely synchronized to actual demand as possible**

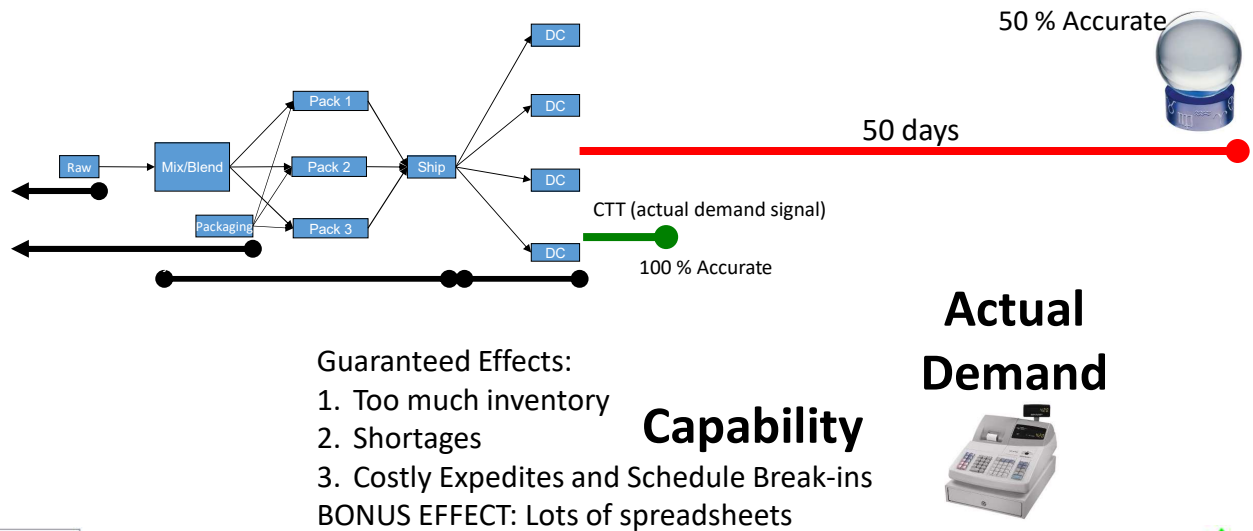
The cost of being wrong has grown dramatically with the rise of complexity and volatility.

Three universal rules about forecasts:

1. They start out wrong
2. The more detailed the more wrong they are
3. The longer out in time they go the more wrong they are

6

## The Fallacy of Long Planning Horizons



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



7

## A More Accurate Demand Signal

### Conventional MPS-MRP Planning

Planned orders create supply orders in anticipation of need over a longer planning horizon



### DDOM Supply Order Generation

Only qualified sales orders within a short range horizon qualify as demand allocations



Versus



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



8

## MPS-MRP Was Not Designed for Long Uncertain Planning Horizons

MRP ONLY produces a realistic schedule when its three basic assumptions are valid:

1. Demand is known and does not change
2. There is sufficient time to accomplish all of the required activities within CTT (the demand time fence is supposed to be set to equal CTT)
3. There is no variability in execution (everything must go right)

Which brings us to...



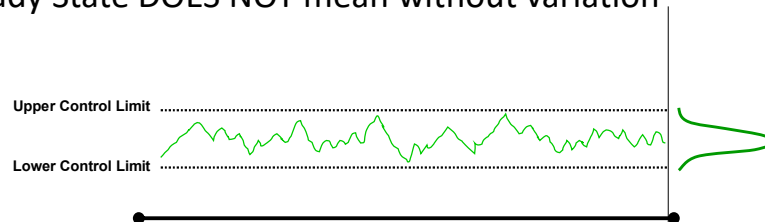
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



9

Assumption #2: Variability cannot be eliminated but its impact on system flow can be effectively controlled and mitigated

- FACT: Normal and random variation exists in any process
- FACT: A process is still deemed in STEADY STATE as long as the variation is within the calculated control limits
- FACT: Steady State DOES NOT mean without variation



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



10

## Probability of Simultaneous Availability

- Anytime a step requires at least two inputs it is subject to the service level of both of those inputs.
- The more inputs the worse the effect on the ability of that step to start on time and quantity
- Remember MRP assumes full allocation in its plan.
- More complex environments are much more susceptible to this issue.

# of component items	Service Level	
	90%	95%
1	0.9	0.95
2	0.81	0.902
3	0.729	0.857
4	0.656	0.814
5	0.59	0.774
6	0.531	0.735
7	0.478	0.698
8	0.43	0.663
9	0.387	0.63
10	0.348	0.599
11	0.313	0.569
12	0.282	0.54
13	0.254	0.513
14	0.228	0.488
15	0.206	0.463
20	0.121	0.358
25	0.071	0.26



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



11

## Delays Accumulate – Gains do not

Many components can have very good availability, but it only takes one to have serious implications for the parent item.

Component Number	Availability Level	Probability of Simultaneous Availability
1	95.0%	95.0%
2	72.0%	68.4%
3	98.0%	67.0%
4	97.0%	65.0%
5	99.0%	64.4%

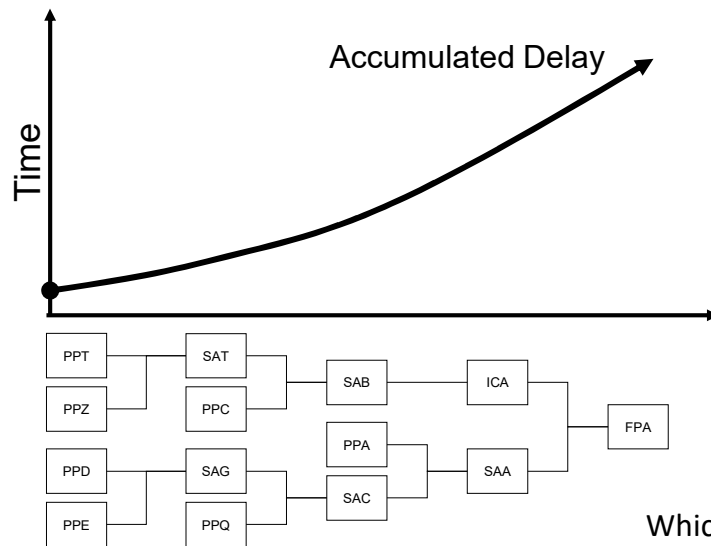


All contents © copyright 2020 Demand Driven Institute, all rights reserved.



12

## Accumulated Delay



Which brings us to...



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



13

## Assumption #3: Constant and precise synchronized planning and scheduling across all materials and resources is pointless

- Detailed MRP and shop-floor schedules are ALWAYS precisely wrong.
- There is no precisely right schedule no matter how much money you spend on software or time you spend on spreadsheets.
- Constantly rescheduling to attempt to account for variation in execution introduces MORE variability and subsequent confusion.
- Instead, variability must be absorbed at buffered positions (time, stock and capacity) to mitigate its effects on critical scheduled resources and customer commitments.

Which brings us to...



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



14

## Assumption #4: Some level of inventory is required at some stage in the supply chain

What do we know?

1. Inventory cannot be entirely eliminated.
2. At the same time, inventory should not be everywhere.
3. Cumulative lead times exceed customer tolerance times in almost every industry
4. Long planning windows actually disconnect supply and demand

Conclusion:

The choice of where to place inventory is highly strategic since it determines the customer lead time and the level of working capital.

The proper management of these inventory positions will largely determine the operational success of the chain.



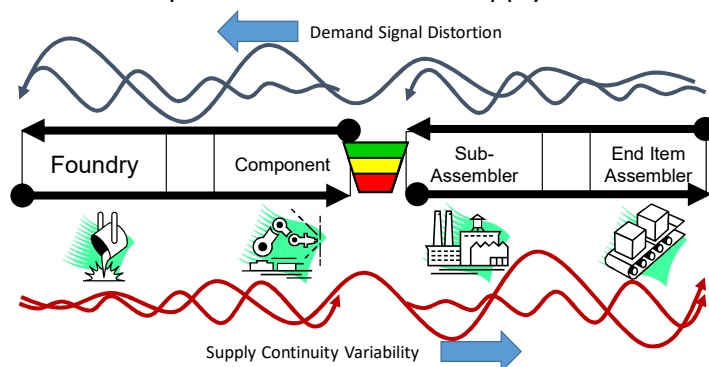
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



15

## Strategic Decoupling

Strategically places decoupling points of inventory within the product structure and supply chain.



This stops the transfer and amplification of variability in BOTH directions where it matters most.

Planning horizons shorten AND lead times compress.



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



16



## Six Tests for Stock Buffer Success (promote and protect flow)

- Decoupling Test
- Bi-Directional Benefit Test
- Order Independence Test
- Primary Planning Mechanism Test
- Relative Priority Test
- Dynamic Adjustment Test



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



17

## Do Safety Stock and Order Point Cut It?

Buffer Success Criteria	Safety Stock?
It must decouple the supply side lead time	NO
It must provide benefit for both sides of the buffer	NO
It must be order independent	YES
It is the primary planning mechanism	NO
It clearly depicts relative priority between orders	NO
It must be dynamically adjusted based upon rate of use changes over a user defined horizon	RARELY

Buffer Success Criteria	Order Point?
It must decouple the supply side lead time	YES
It must provide benefit for both sides of the buffer	NO
It must be order independent	YES
It is the primary planning mechanism	YES
It clearly depicts relative priority between orders	NO
It must be dynamically adjusted based upon rate of use changes over a user defined horizon	NO



No demand consideration and  
often incorporates a safety  
stock mechanism



Which brings us to...

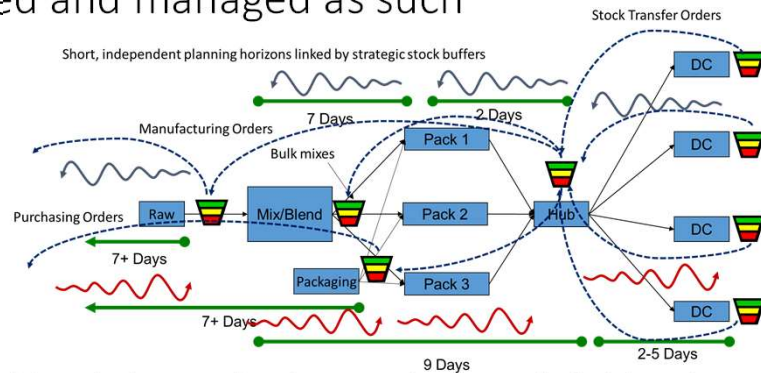


All contents © copyright 2020 Demand Driven Institute, all rights reserved.



18

## Assumption #5: Inventory is an asset and should be treated and managed as such



- The decision of where to place inventory is a strategic decision – it must be placed at points that protect and promote flow.
- Once the placement has occurred, careful management is required to make sure that the inventory position continues to be an asset to flow.

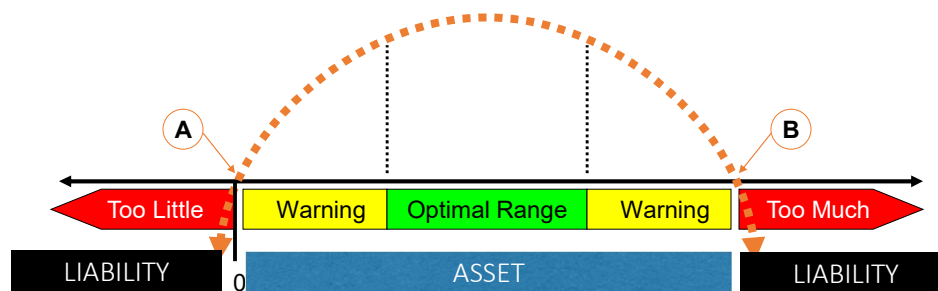


All contents © copyright 2020 Demand Driven Institute, all rights reserved.



19

## Two Universal Points of Inventory

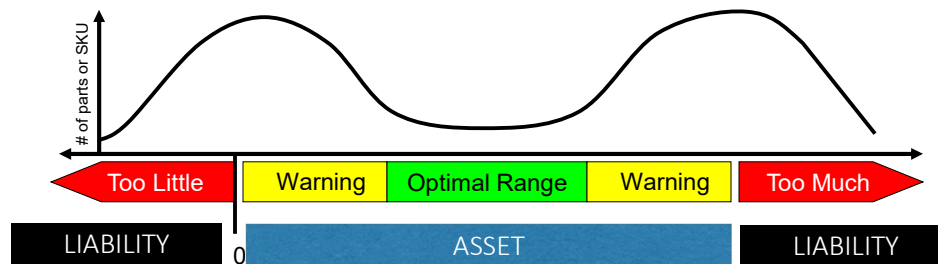


All contents © copyright 2020 Demand Driven Institute, all rights reserved.



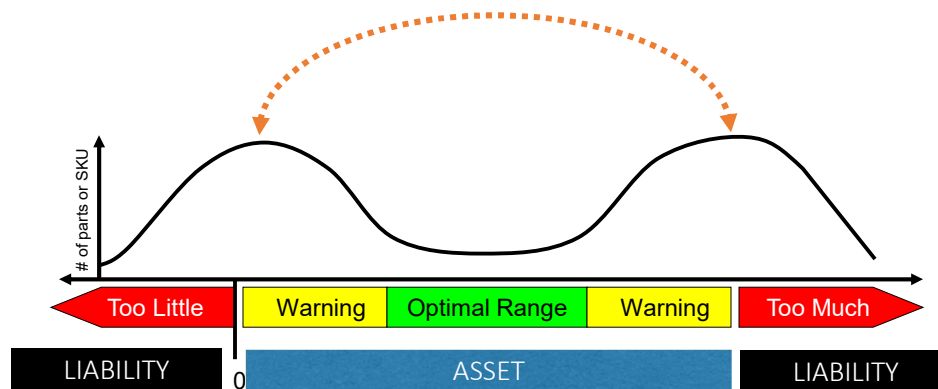
20

## The MRP “Bimodal” Distribution



21

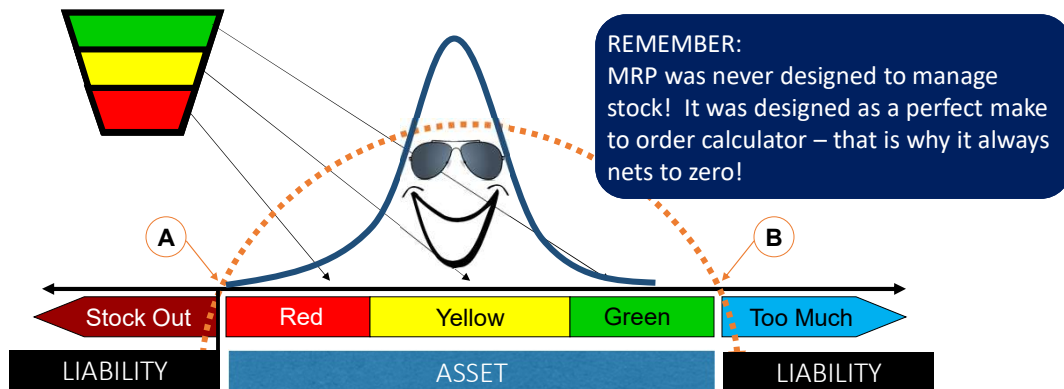
## The Oscillation



22

## DDMRP Buffer Zones

The size of the buffer is the summation of three calculated zones.



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



23

Assumption #6: Some level of protective capacity MUST exist in any environment with multiple interacting resources

- The perfectly balanced line is still a mythical creature with an enormous price tag for most companies.
- Resources have disparate levels of capacity relative to their respective required tasks and volume.
- This disparity means that precaution must be taken against misusing or wasting points of additional capacity.



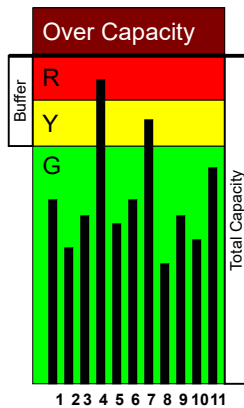
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



24

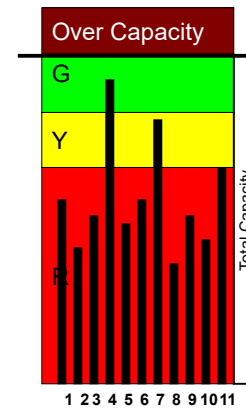
## Two Different Views on Capacity

### Flow Centric



- Capacity buffers protect control and decoupling points and offer opportunity for additional cash contribution (tactical capability)
- Utilization metrics rooted firmly in erroneous cost assumptions lead to the misuse of protective capacity.

### Cost Centric



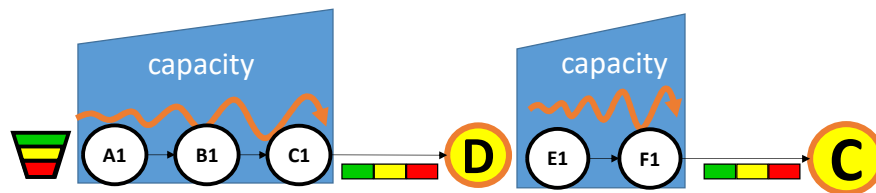
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



25

## Capacity Structure Considerations

- Commitment to invest in flexible labor and/or sprint capacity to prevent floating bottlenecks



- As variability grows in dependent systems capacity should be structured and/or aligned to deal with it.

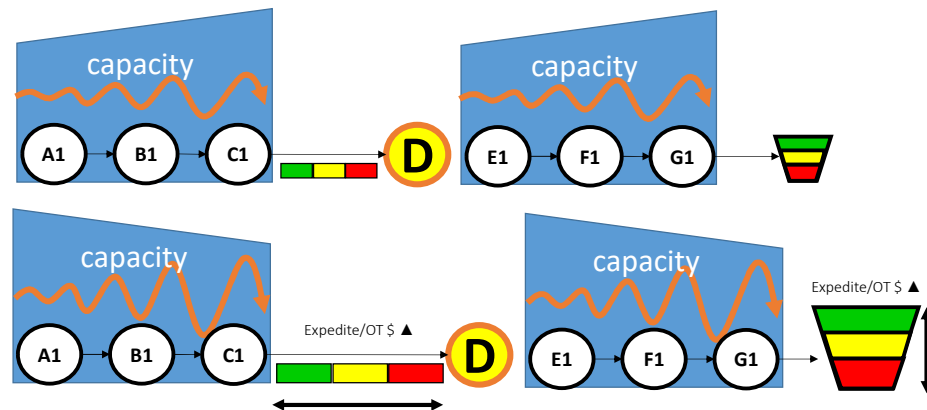


All contents © copyright 2020 Demand Driven Institute, all rights reserved.



26

## Trade-offs Between Capacity, Time, Stock and Expenses



Which brings us to...



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



27

## Assumption #7: Batching decisions should be based on flow considerations instead of cost considerations

- Batching is reality in most industries (especially CPG & FMCG)
- Typically industry uses batch sizes that are unrelated to demand
  - Economic Order Quantities
  - Minimum Run Sizes
  - Minimum Order Quantities
  - Minimum Freight Policies
  - Minimum Order Cycles
- What typically drives these batch sizes? Flow or Cost?



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



28

# The Demand Driven Batching Rule

## Batch for FLOW NOT UNIT COST

- Flow is tied to actual demand, cost is not
- When things flow well, cost is under control – the inverse is NEVER true
- Cost is a measure of performance over a past period – if that past period had good flow performance then there is a favorable impact to cost!
- NOTHING is ever truly utilized without considering ACTUAL demand



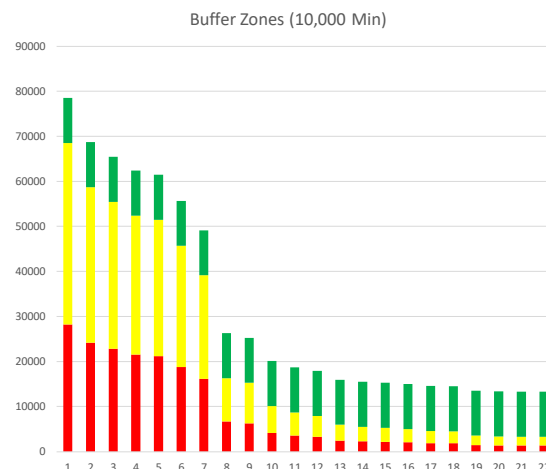
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



29

## What Does Batch for FLOW Mean in a DDOM?

- Batching for FLOW also means capacity is considered (we can't set our batches so that we create capacity constraints due to set-ups)
- In a DDOM each process batch is typically tied to the replenishment of a strategic stock buffer
- Order minimums affect the zonal profile of a buffer (Green zone impact)



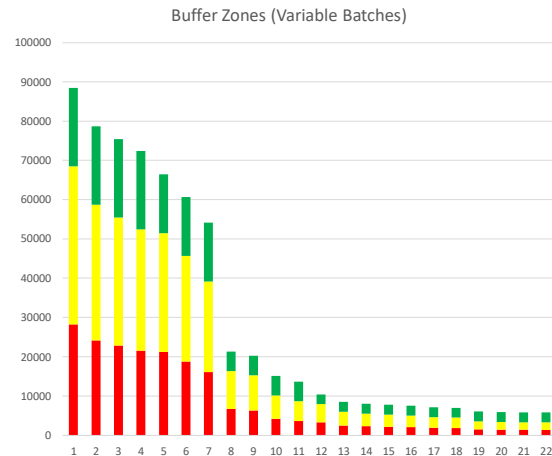
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



30

## What Does Batch for FLOW Mean in a DDOM?

- Some batches can increase while others can decrease
- This negates additional set-ups due to smaller batches on lower runners
- Reduces number of set-ups due to schedule break-ins
- Lowers total average inventory
- Better aligns capacity and space usage to actual market consumption rates



All contents © copyright 2020 Demand Driven Institute, all rights reserved.

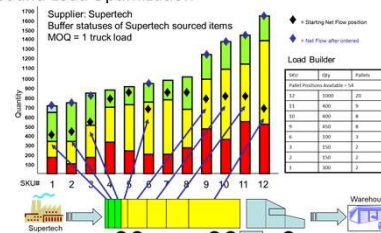


31

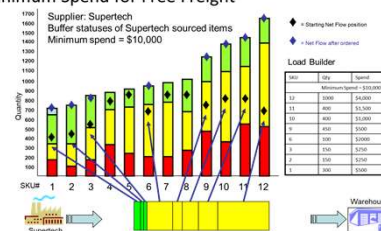
## Batching for Flow with Prioritized Share

- An allocation schema for grouping supply order generation across multiple items
- Based on the Net Flow equation (DDMRP supply order generation equation)
- Based on certain limitations or constraints to be managed (freight, spend or space)

### Inbound Load Optimization



### Minimum Spend for Free Freight



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



32



## Assumption #8: A key DDOM objective is to maximize periodic contribution margin (tactical relevant range)

Periodic Contribution Margin = Total revenue minus variable costs and period operating expenses

	Metric Objectives	The Message Behind the Objective	
Operational	Operational Reliability	Execute to the model, plan, schedule and market expectation;	
	Operational Stability	Pass on as little variation as possible;	
	Operational Speed/Velocity	Pass the right work on as fast as possible;	
Tactical	Tactical Improvement & Waste Reduction (Opportunity \$)	Identify and prioritize obstacles and/or conflicts to flow	
	Tactical Expense Control	Spend minimization to meet the requirements of the market and the DDOM design.	
	Tactical Contribution	Maximize system return according to relevant model factors and tactical opportunities (volume and rate)	

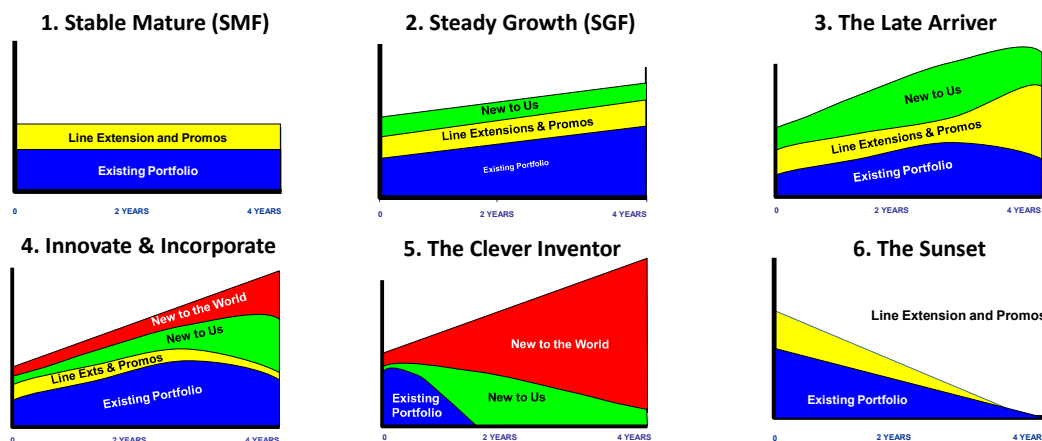


All contents © copyright 2020 Demand Driven Institute, all rights reserved.



33

## Assumption #9: Capability must be tied to the expected future for the company



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



34

## DDOM Questions for Each Portfolio Model – 4R's

- Rate – what are the expected future volumes?
- Resource – what are the resources required?
- Return - how can the contribution margin relative to the required resources be maximized?
- Risk – what are the risks to the above?



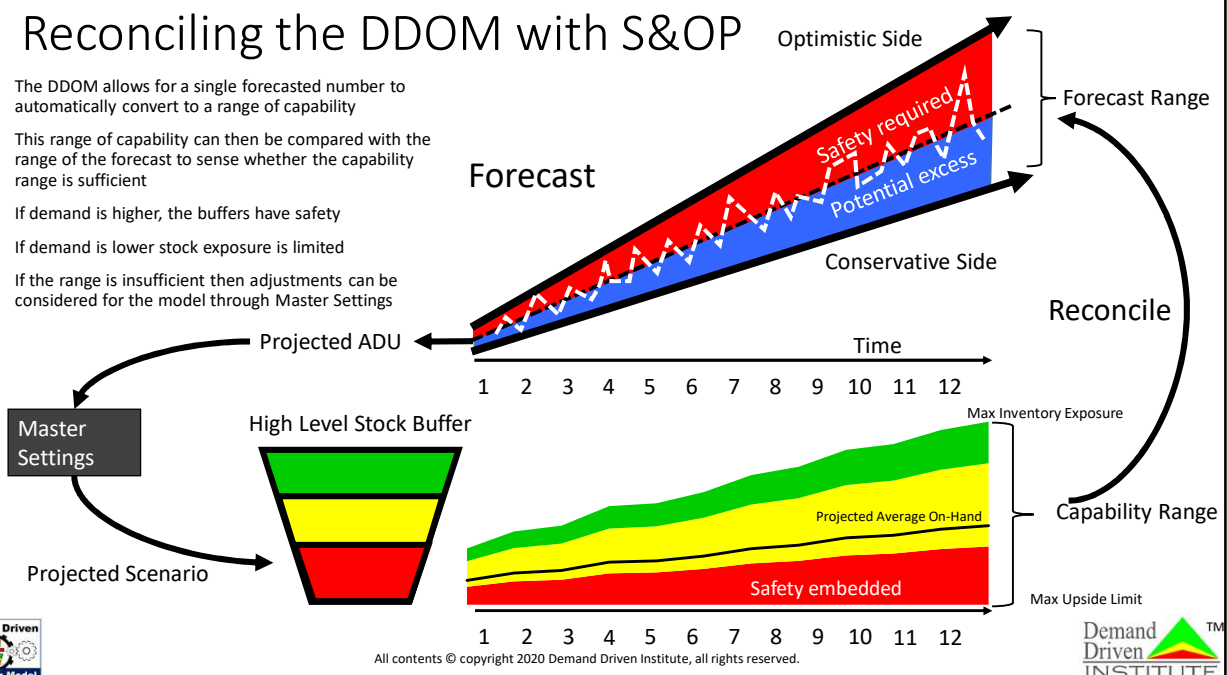
All contents © copyright 2020 Demand Driven Institute, all rights reserved.



35

## Reconciling the DDOM with S&OP

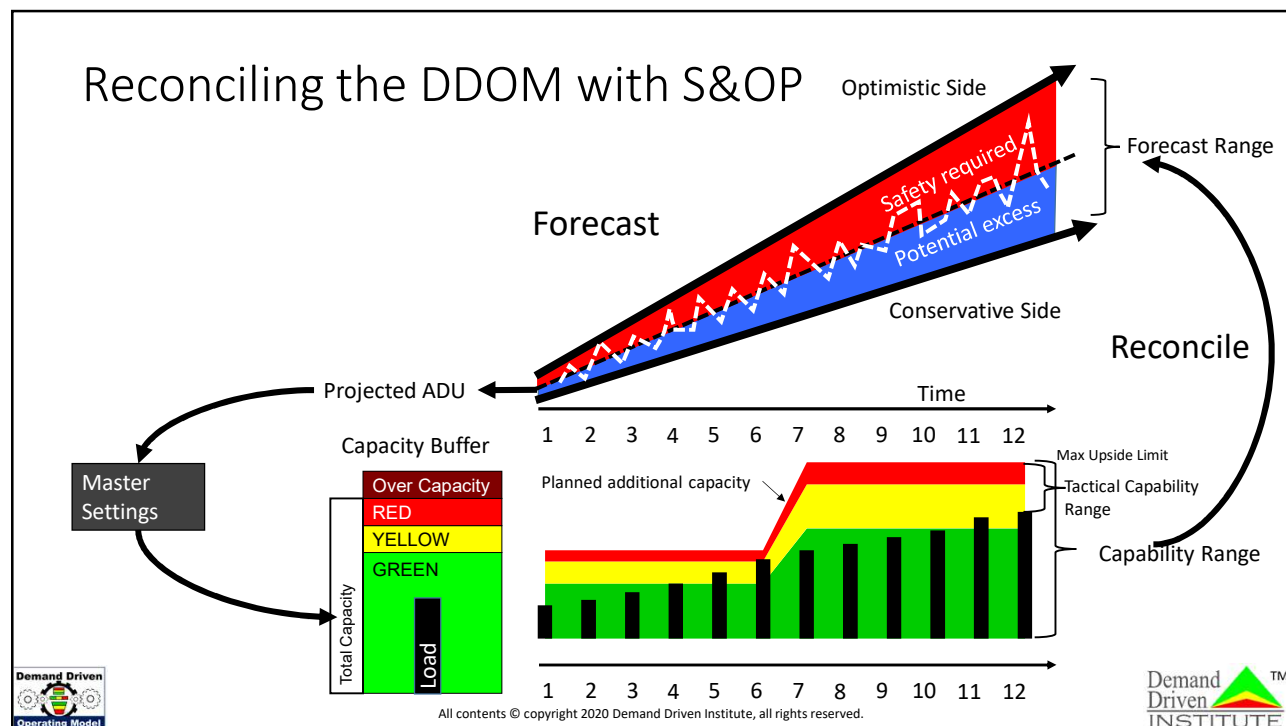
- The DDOM allows for a single forecasted number to automatically convert to a range of capability
- This range of capability can then be compared with the range of the forecast to sense whether the capability range is sufficient
- If demand is higher, the buffers have safety
- If demand is lower stock exposure is limited
- If the range is insufficient then adjustments can be considered for the model through Master Settings



All contents © copyright 2020 Demand Driven Institute, all rights reserved.



36



37

## Conventional Scheduling & Execution vs. DDOM





- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Early release of production orders</li> <li>• Batching for resource efficiency</li> <li>• Release with shortage</li> <li>• Past due on release</li> <li>• Critical resources lumpy loads</li> <li>• Floating bottlenecks</li> <li>• Constant rescheduling/optimization</li> <li>• Expediting</li> <li>• Late deliveries</li> <li>• High inventory</li> </ul> | <ul style="list-style-type: none"> <li>• No early release</li> <li>• Batches are built for flow</li> <li>• No release with shortage</li> <li>• No scheduling in the past</li> <li>• Finitely scheduled critical points</li> <li>• No floating bottlenecks</li> <li>• Very little rescheduling</li> <li>• Expediting only to buffer status</li> <li>• Few late deliveries – buffer status</li> <li>• Maintains low WIP levels</li> </ul> |
|---|---|

38

## Remote Learning Opportunity

# NOW ON SALE

## INTRODUCING SELF-STUDY BUNDLES

 + 	<ul style="list-style-type: none"> <li>• Demand Driven Planner (DDP)™ self-study access and courseware</li> <li>• Sample exam and solution key</li> <li>• Two DDPP™ certification exam attempts</li> <li>• Lifetime access to updated videos and courseware</li> </ul>	<b>\$650*</b>	<b>ENG</b> <b>ESP</b>
<small>* DDI Affiliates can provide you discount codes that will provide a further price reduction of \$100 – \$200 USD (depending on your location)</small>			
 + 	<ul style="list-style-type: none"> <li>• Demand Driven Leader (DDL)™ self-study access and courseware</li> <li>• Sample exam and solution key</li> <li>• Two DDLP™ certification exam attempts</li> <li>• Lifetime access to updated videos and courseware</li> </ul>	<b>\$650*</b>	<b>FRA</b> <b>ITA</b>
<small>* DDI Affiliates can provide you discount codes that will provide a further price reduction of \$100 – \$200 USD (depending on your location)</small>			

## INDIVIDUAL REMOTE EDUCATION AND TESTING



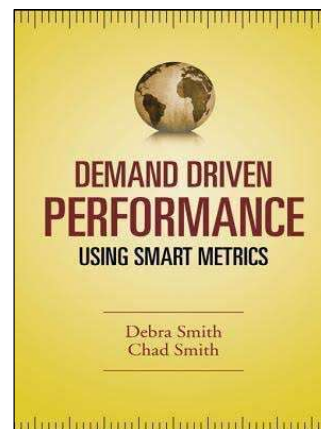
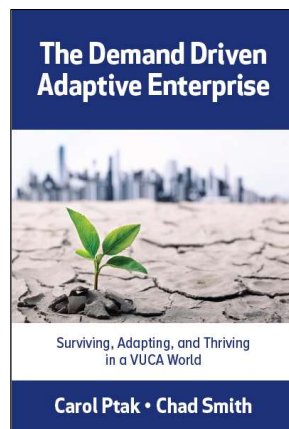
All contents © copyright 2020 Demand Driven Institute, all rights reserved.

39



39

## Learn More About the DDOM



All contents © copyright 2020 Demand Driven Institute, all rights reserved.

40



40