

The “Average” Question –

A frequently asked question about DDMRP

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Why do you claim that when an item’s buffer profile is properly set, the average on-hand position should be the total red zone plus half of the green zone?

Critical DDMRP Review Points:

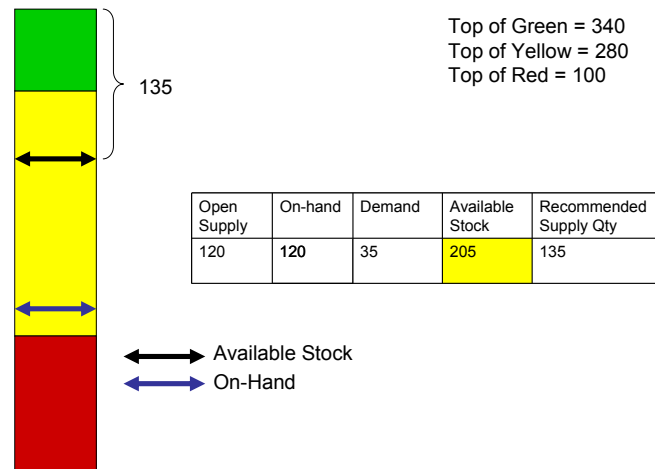
Supply orders are triggered by the available stock equation falling below the top of the yellow zone. The available stock equation has three inputs:

1. Open Supply or On Order
2. On-Hand
3. Sales Order Demand Due Today in the Past and Qualified Spikes in the Future

The Available Stock Equation

Open Supply + On-Hand - Sales Order Demand Due Today in the Past and Qualified Spikes in the Future.

One of the new things that DDMRP brings to the planning table is something called the “available stock equation.” Understanding how the different components of the available stock equation work together is crucial in being able to grasp how we get to the average on-hand inventory position.



When in the available stock equation yields a quantity in the yellow zone, a supply order will be recommended for a quantity to bring the available stock up to the top of the green zone. The green zone defines the average order frequency when the quantity is divided by the Average Daily Usage (ADU).

In our example above the available stock position is at 205 units. That number is arrived at by adding the open supply of 120 to the on-hand of 120 and subtracting the sales order demand that is qualified (in this case 35). An available stock position of 205 places is well into the yellow zone of the buffer. That means an order recommendation should be created from the current available stock position (205) to the top of the green zone (340). That means the order recommendation is 135.

Most of the time an item that is chosen for buffering will have all three components of the available stock equation present (on-hand, open supply and qualified demand). This means that when available stock drops below the top of yellow, on hand will be less than available stock. How much less? In a properly managed buffer the more open supply there is then the less on-hand there tends to be (they complement each other). Remember the green zone defines your average order frequency. With smaller green zones (relative to the yellow zone which is usage

over full ASR Lead Time)¹ you will have more open supply orders within the lead time of the part. This “pushes” the current on-hand down and extends the buffer (in the form of in-coming supply) into the in-bound supply chain. Think of the open supply as an incoming conveyor belt – a conveyor belt that is still part of the buffer/available stock equation.

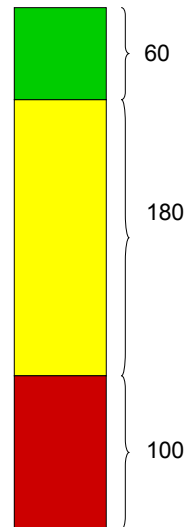
If on-hand was greater than available stock it may be signaling heavy qualified order spike activity or a draining or ramp down period with a planned adjustment factor at play (no open supply, only on-hand minus qualified demand).

If on-hand was equal to available stock then that means that there is no open supply AND no qualified demand. If this persists for a prolonged period that means the buffered item is not moving. It may be necessary to re-evaluate whether this item should be buffered or the circumstances behind why it is not moving.

Getting to the Average On-Hand Inventory Position

Once again, understanding how the different components of the available stock equation work together is crucial in being able to grasp how we get to the average on-hand inventory position.

Example: The lead time of a part is 18 days with an average daily usage of 10. The green zone set to 30% of usage over lead time. Let’s say that the total Red zone is set at 100 pieces. That means that the yellow zone will be 180 units. And the green zone will be 60 units. We will reorder the part every 6 days on average. This means that we will typically have 3 open supply orders in play at any one time when the available stock equation is green. No more than three (assuming average demand) because the available stock would go over top of green or on-hand would have be significantly depleted. (See time line below).



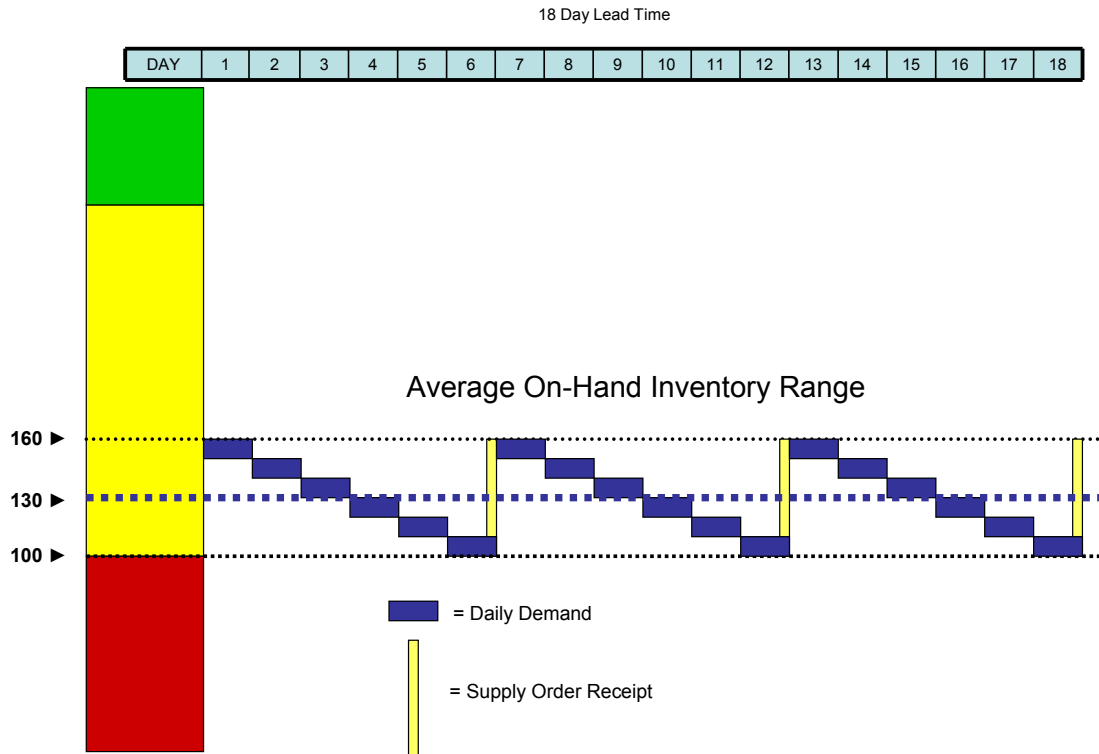
Example

Top of Green = 340
Top of Yellow = 280
Top of Red = 100
ADU = 10
Lead Time = 18 days

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Supply Order	60						60						60					

So let’s say that after completing the daily plan and accepting orders a planner might have 3 open supply orders for **at least** 60 units each. That means there would be **at least** 180 units of open supply when the available stock is in green. That would push on-hand to 160 pieces. Now we still have six days of demand left. If ADU held out we would drain down to 100 before we got a resupply of 60 bringing our on-hand up to 180 again. This means in a perfectly average world we would range between 100 and 160 on hand with an average of 130. Total Red (100) + half of green (30) = 130.

¹ ASR Lead Time is the longest unprotected lead time chain in a bill of material. ASR Lead Time chains terminate at any stocked position. For more information on ASR Lead Time see Chapter 23 in Orlicky’s Material Requirements Planning 3/E (Ptak and Smith, McGraw-Hill, 2011)



Thus, if the buffer profile is set properly; the average on-hand position will be red zone plus one half of green zone.

Make sure you pick up all of our white papers on DDMRP!

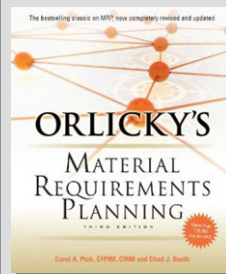
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Praise for the new Orlicky's Material Requirements Planning (Ptak and Smith, McGraw-Hill, 2011)

"It is in short the best book in this subject area that I have ever seen."
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William M Hewitt

"Carol and Chad: as one of the original MRPer, I applaud you and thank you for your work, and for advancing, with this book, our science more than any other has done in many years."

Bob Reary

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