

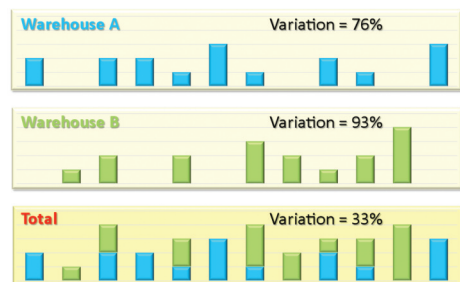
## SWINGS AND ROUNDABOUTS

**If you have two warehouses or branches, whether or not you sell something on any given day will be a hit or miss affair**

You might sell an item in Warehouse A on a day but nothing from Warehouse B, or the reverse. However you are more likely to be selling the product when you look at the total of the two warehouses.

Statistically speaking, this can be described via a concept called a Coefficient of Variation. It compares the level of variability (standard deviation) for a time series versus the average value over time. The bigger the number, then the greater the swings in demand you will observe.

So for example, in the illustration there are three days where no sales at all occur for Warehouse A and four days where no sales occur for B. However you will note that across A and B, something sells on every day. In Warehouse B on any given day you might sell one, two, three, four or even nothing. The Coefficient of Variation, the level of variability, for Warehouse B is 93 percent. Warehouse A does not have quite the level of variability at 76 percent. However, when you sum the two time series the variability shrinks to just 33 percent, much lower.



This sort of scenario is of course very common across many parts and many branches. In fact, as the number of branch warehouses goes up, it would not be surprising to see perhaps 50 percent to 100 percent variability at individual branches and just 10-20 percent variability at a central DC. As you get to the lower demand type products the variability at each branch will go up even further too. We could talk about a concept called the 'sum of variances' rule, but hopefully this is sufficient introduction for now.

### So where should you carry the safety stock?

Given this sort of phenomena, it is obviously better to carry the safety stock higher up the supply chain at a central DC or hub where you get lower relative variability. If you ignore lead times in the above example then clearly you would stock less than half the safety stock if you could manage all the risk at a central place as opposed to at each branch.

The problem of course is that customers will not come to your central DC all the time so you really need to place stock and manage the risk (or at least some of it) at each branch. The key question is how

much risk do you want to cover and where, and at what cost? It would help if you can model alternative supply chain configurations easily. Even better, if your inventory management software can dynamically reconfigure supply chain linkages based on the economics and demand profiles of each item.

### Optimising Stock Levels and Locations

If you can resupply a branch in just a day then the level of stock can be reduced to just what you might sell in a day. If however you choose to or can only resupply the branch in a week or a month, then much more protection is usually needed.

The trick is to have stock level calculations which can take into account all the variables which might impact on the right decision. These include:

- The variation in order sizes for each item. If you normally sell just one or two for real retail demand but very occasionally 10 or 20 for a stockist's order, you can probably ignore the big orders wanting 10 or 20 and order these in specially when needed.
- Remembering that while you might normally resupply an item into a branch every month or two, you can still do a full replenishment in just a day or so. In that way you get economically appropriate inventory levels, but without compromising service levels.

There are other variables to consider (up to twenty or more), but ideally these can all be automatically handled via your inventory management system.

### You don't want to fall off

There are however some things that you absolutely want to avoid. If you source product directly into a branch then you expose that warehouse to all the vagaries of what your supplier might do including:

- Supplier lead time variability. This compounds the demand variability for the branch as you could expose the branch to demand variability over not just days but perhaps weeks or months.
- MOQs and Pack Sizes. These can cripple you, forcing you to stock even several years of stock if suppliers delivering to branches still insist on MOQs or Pack Sizes that are too high.

Clearly in this case you want to try to stock at a central warehouse and then break the stock up for distribution to smaller branches. However, sometimes that will not work - for example if you have a glass product that does not handle that well, or a bulky product that costs a lot to move. In these cases, direct delivery can make a lot of sense.

Again however you want to handle all these



decisions as automatically as possible. Ideally your inventory management system should optimise the supply chain path, alternate supplier choices, stocking location, pricing and packing arrangements, product life cycle positioning and product type variations so you get the desired service level; without compromising inventory levels and return on assets or risk having too much excess stock.

### There will be ups and downs

While the above theory can be understood, it can all break down if you have not got the right system, process and people helping you make quality decisions on an ongoing basis. With tens of thousands of products or even hundreds of thousands, you simply cannot use some very rough rules of thumb and other simplistic approaches. It is critical therefore to have the following if you really are to achieve anything like an optimum result:

- A system that can handle all the detail as automatically as possible, across the twenty odd variables that really should be considered.
- The ability to tune it all via a set of policies that reflect how you would wish things to be handled had you the time to properly consider all the necessary variables and their implications.
- People capable of operating at this product portfolio level.
- A process that can handle pockets of excess when they arise - and they will. Ideally your system will automatically recognise excess well in advance and help you move it where it is more likely to sell.

Finally, you need something that can be adjusted to suit the prevailing business conditions - for instance, the right supply chain for a product today might not be the right one for tomorrow.

Is it time to review the way in which you manage the swings and roundabouts that manifest themselves across your product range and across your branch network?

**For further information consult**  
[www.horizoninventory.com.au](http://www.horizoninventory.com.au) or  
 email [info@horizoninventory.com.au](mailto:info@horizoninventory.com.au)