

How to eat an elephant

or how to start your MRO inventory optimisation project.

Brian Oxenham, February 2015

Making your first steps in an MRO inventory optimisation project can be daunting. There may be tens of thousands of lines of inventory worth millions of dollars supporting a multi-million dollar operation. Alarm bells are ringing, there are embarrassing, extended equipment outages, ever-increasing stock levels and spiralling expenditure. Where do you start?

There is no single approach that fits all scenarios but here we outline a logical method that can be the basis of your plan.

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First you will need some transactional data illustrating what is actually happening in your stores. Your ERP or EAM system is the most likely source of this information so you will need to be able to extract information for analysis. Basic spreadsheet and database tools are of use but to make good progress in a short time, specialist analytic tools are more likely to provide the results you need and will prove to be more cost effective.

MRO inventory is usually segmented for analysis purposes. The obvious broad classifications are slow-moving and fast-moving inventory lines. A more subtle segmentation looks at item value, demand rate and lead time. Again a specialist application can enable many more complex and targeted segmentations to be quickly constructed.

You may be tempted to charge in looking for quick wins through big reductions in your existing inventory. But while clearing out the stock room can look good in a report heading, the real immediate benefits can be limited and the future effects of poorly planned reductions can be disastrous. Whatever the status of your inventory may be now, what is done is done, the money has already left your business and you are unlikely to see much, if any of it, back again through stock disposal. Overstocks are just a painful reminder of history, and blindly reducing inventory levels by 30% or more will not have a corresponding effect on the associated fixed costs. However, one effect that it will have is to alienate maintenance staff who in turn will find ever more imaginative ways to circumvent the system and obtain what they want in spite of your best efforts.

It is better to focus initially on the changes that will make a difference to your current costs and future operations; these are primarily looking at both expenditure and the optimum service levels required to support assets.

Stop the rot: control expenditure

Initially it is sensible to find out where the money is going right now. This might be through examining high stock turn, low value items or high value lower stock turn items. Some items will be obvious from your ERP data; using analytic tools will enable you to identify them quickly and consistently.

“...find out where the money is going right now.”

Look carefully at the high expenditure items to find out whether wastage (or perhaps theft) is driving expenditure. Can an engineered solution or change in operational practice reduce consumption rates? If this is not an option, explore how procurement might be improved to buy in at lower cost through better price negotiation or larger order quantities. Frequently high stock turn items are generic and they have multiple sources of supply so the market place is competitive with short lead times. Furthermore, bundling these commodity items into aggregated supply contracts with third party vendors may also realise cost savings.

It is well worth investigating whether any items have been inadvertently duplicated within inventory. Two line items with medium consumption levels can remain ‘under the radar’ but if they are functionally the same item, the consolidated demand rate might cause you to treat them differently. In some instances inventory lines of duplicate items simply languish since they are incorrectly described and are not recognised or consumed by maintenance staff. Consolidating these items can result in a short-term saving as existing inventory stocks of ‘forgotten’ inventory are consumed.

The relatively simple exercise of identifying and widely publicising a list of your top 100 items (by expenditure) at regular intervals can pay dividends through increasing awareness, which in turn modifies behaviour. Similarly, personalising expenditure by letting people know, on a rolling basis, the total cost of the items they are drawing from stores is useful.

Focussing on ‘off inventory’ buying can also yield benefits. Should the items required actually be ‘on inventory’ so that they can be better managed?

Understanding which suppliers you are spending your money with across your business as a whole can identify opportunities for optimising supply contracts on the basis of volume to yield expenditure reductions. Making “Top 20” supplier information (both by spend and stock held) available to everyone can change the way people view and negotiate with those suppliers.

Your attention should also be on items with *excessive stock duration*. If demand information indicates that current stocks of a line item will not be consumed for over 25 years yet the assets supported only have a projected life of 10 years, you might want to scrutinise it more closely. Look at the ratio of stock duration to lead time. Particularly for commodity items with shorter lead times, do you really need perhaps 180 days stock of an item that is available on a 5 day lead time ?

Don't necessarily expect to be able to sell off the items that aren't needed, but excess stock can often be redeployed to other points in the business where they will be consumed, resulting in a cost avoidance saving for the business as a whole.

All these steps reduce the day-to-day outflow of cash leaving the business.

Fix the roof: check your insurance

Whilst cash outflow is important, never lose sight of the fact that much of your MRO inventory is held as insurance against business risk. Specifically it is held to minimise outages of equipment after breakdowns have occurred. Having parts on hand means faster recommissioning, but there is a balance to be struck: your objective now is to minimise lost opportunity costs without spending too much on inventory. To do this you need to go through a structured process of agreeing service levels for each inventory line, which in turn drives minimum stock levels. Because the business risk is to production, not the store room, this task cannot be done by stores/procurement personnel in isolation. The customer (maintenance and operations) have to justify and communicate clearly the service levels that they need.

Your inventory segmentation exercise should have identified a group of fast moving, lower value items with short lead times, and a blanket service level policy may be appropriate for them. A high proportion of inventory usually falls into this group. With appropriate analysis tools and knowledge of demand rates and required service levels, minimum stock levels can be automatically calculated for large swathes of this inventory. Once this is done then it is a matter of managing by exception and, where there is an identified difference, resetting ERP minimum stock levels so that desired service levels are achieved. Involvement of maintenance and operations personnel in this part of the process is fortunately minimal.

Whilst the bulk analysis method works well for items like consumables, the lower stock turn and higher value items—often classed as insurance spares—require closer scrutiny. These items commonly have higher vulnerability to extended lead times and a restricted source of supply, frequently just a single OEM. These are the items whose unavailability becomes a drama that leads to high

“...much of your inventory is held as insurance against business risk ”

profile, extended outages. These sensitivities mean that more detailed analysis is required, taking full account of business risk, to set appropriate minimal stock levels that protect asset availability. The blanket service level approach is simply not adequate here: minimum stock levels depend on a combination of factors such as the production loss risk associated with each asset and the item's mean time between failures (MTBF) in each deployment environment.

This level of analysis is unlikely to be provided by your ERP system; it calls for specialist tools and strong input from maintenance and operations personnel. It is inevitably more labour intensive as items are analysed on an individual basis, but getting it right can pay huge dividends because the cost of risked downtime can dwarf the spending on inventory. Where there is a difference between the calculated risk-based minimum stock levels and those currently within the ERP, they need to be changed and stock levels adjusted accordingly.

The structured method used to attack this aspect of the work is usually executed by carrying out a high level equipment criticality assessment and then targeting items that support those equipments in order of equipment down time cost risk. Reviewing items grouped by bills of material can help speed up this process tremendously.

The process will inevitably identify further excess stock (that potentially also can be redeployed) as well as short comings. Your final inventory may be larger or smaller than before, but it will definitely be different.



Changing MRO inventory profile

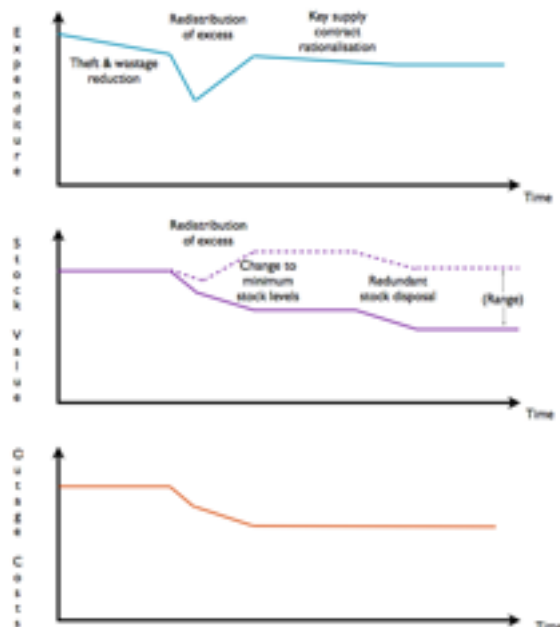
Muck out the stables

With expenditure under control and agreed service levels being met, you can move on to tidy up the mess left behind by previous generations. This involves the identification and disposal of redundant items, the consumption of excess items and appropriate redistribution where excess inventory cannot be used locally. This is best done with the use of appropriate specialist analytical tools that have been designed for the job. Once cash flow is now under control, and maintenance and operations staff can see that service levels are meeting requirements, this task can be completed without fear of compromising plant availability.

Inevitably during this phase attention focuses on slow moving items but holding slow moving items isn't necessarily bad. Your risk based minimum stock level calculations will have made this quite clear.

Data analysis tools can go a long way to help you identify and grip these problems but there is no substitute for boots on the ground doing physical walk-downs of the stores. Data isn't always 100% accurate so comparing the information seen on screen with real activity can be most illuminating.

The changes you should expect to see with your MRO inventory and its impact upon your business are typified by the following graphs.



Close the stable door

The final phase is ensuring that your systems and processes are fit for purpose going forward. You don't want to carry out all this work only to find your organisation slips back to where you were after just a few months or years.

The work in this phase includes reviewing economic order quantities, managing maximum stock levels and establishing run-down stock profiles towards end of equipment life. If they are required, larger data quality improvement and cataloguing exercises are conducted at this point. As this work proceeds, further opportunities will come to light so expect it to be an iterative process.

"..further opportunities will come to light..."

Maintaining optimum inventory levels means that you must build a dynamic ability to respond to operational and supply changes, so that any future changes in operational requirements or lead time forecasts feed through into changes in inventory control levels in a timely fashion.

The fundamentals that should underpin all your MRO procurement and inventory management activities through life, not just during a rationalisation exercise, are those of visibility, compliance and control.

Visibility

- How much is being spent ?
- With which suppliers ?
- By whom in your organisation ?
- For what ?

Compliance

- Put contracts and agreements in place and buy against these to maximise value.

Control

- Ensuring compliance, agreeing expenditure in advance and stopping maverick expenditure. Putting processes in place where these are lacking.

Finally, if you are embarking upon an outsourcing strategy, with a third party organisation taking over the running of your stores, the work outlined above still needs to be done. You are very unlikely to maximise value from this new form of business arrangement if you are not acting as an informed service buyer and cannot articulate your need to the level of detail required.

Summary

Adopting the process described above will give you a basic plan for rationalising your MRO inventory. Initially it will focus on reducing ongoing expenditure and then it will drive down excess and redundant inventory stocks.

- Examine expenditure - identify wastage and theft, look for duplicates.
- Focus on off-inventory buying.
- Identify high spend suppliers at corporate level and renegotiate terms where appropriate.
- Look at stock durations; relocate excess stock to higher consumption points.

- Agree service levels for fast moving stocks. Reset minimum stock levels.
- Carry out an equipment criticality analysis.
- Re-evaluate minimum stock levels for critical equipment inventory
- Relocate excess stock and address deficits.
- Dispose of redundant stock.

- Establish processes to lock in benefits.

To carry out this work efficiently and quickly, consider using a bespoke inventory analysis tool to assess your ERP inventory data.

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