

10 Ways For A Maintainer To Manage Parts-Investment-Productivity (PIP):
Going From Worst To Best Practices
By Ron Giuntini

Parts availability is a primary driver of the downtime duration of a maintenance event; if a maintainer has the parts available, they don't have to "hang-around" waiting for parts to be delivered and having to make "excuses" to the equipment operator that they will not complete their maintenance task in the time promised. As a result of a maintainer's performance being primarily evaluated on equipment uptime, a maintainer who is provided with little "adult supervision" will "behave badly" by having lots of "stuff" for "just-in-case" maintenance events. Maintenance organizations that "behave well" optimize Parts-Investment-Productivity (PIP), output/input, by maximizing equipment availability (\uparrow output) and minimizing parts investment (\downarrow input).

This article will discuss 10 ways, from worst to best, in which a maintainer can manage PIP; the first few ways are driven by simpler approaches, which lead to lower levels of PIP. As we get closer to #10, a maintenance organization becomes more sophisticated in managing PIP; they will have the potential to manage parts investment "just right." Also note that in order to achieve a higher PIP, more sophisticated approaches are required to be used; more "cutting-edge" contracts with suppliers and more advanced parts planning & control information software.

1. **PIP: (\downarrow availability)/(\downarrow parts)**

The simplest way to manage PIP is to order parts only when needed; no parts are stored. This approach only creates a part requirement if there is a work order to be completed. A maintenance organization can keep parts at a minimum, but downtime durations will be very high. This may make a bean counter happy, but the operators will find it unacceptable. There may be exceptions to the rule. For example, an organization may have redundancy in almost all equipment, so that process flows are not adversely impacted when a piece of equipment goes down; management had made the decision to invest in a additional capital goods, rather than in maintenance expenditures.

2. **PIP: (\uparrow availability)/(\uparrow parts)**

Another simple way of managing PIP is to use the "eye ball" method; a maintainer takes a stroll through the stockroom and does a "real time" analysis "in the head" and forecasts future parts demands and estimates parts supply. There is typically no perpetual inventory system; all parts are received as period expense items. Orders are placed with a supplier for part numbers and their "required" quantities. This can work reasonably well for smaller organizations with highly experienced maintainers who have "seen it all," but this can lead to excess investment because a maintainer will be

“hedging its bet” to assure high equipment availability by ordering “that little extra.” Maintainers have elephant memories and they will remember that on “June 19, 1993,” when part number ABC was not available they encountered much political flack due to the equipment downtime duration; they decided from that point on to be “flush with parts so that they never have to go through that painful experience again.

3. **PIP: (↑availability)/(↑parts) or (↓availability)/(↓parts)**

As we go up the “food chain” regarding PIP, another way to manage investment is the two-bin system; parts are stored in fixed locations and when inventory goes down to a certain physical level, its time to reorder parts. Again no computerized system is required. The pitfall of such a system is that the replenishment quantity has to be manually changed when demand patterns change; this is ripe for many problems, especially when it was an experienced maintainer who established the original quantities and a less experienced maintainer currently is managing the two-bin system. The less experienced maintainer just doesn’t have the “collective memory” needed to manage such an informal system.

4. **PIP: (↔availability)/(↓parts)**

The next technique is the fixed reorder point. This technique requires supply records, open POs and inventory, to be stored and a manual forecast to be inputted. This is the most popular technique used in parts planning. Parts inventory is often reduced, with at least a status quo for equipment downtime. The danger of this technique, as was for the two-bin technique, is that the manual input for the forecasted demand is dependent upon the knowledge of the maintainer inputting the data; “garbage in, garbage out.”

5. **PIP: (↔availability)/(↓parts)**

The fixed reorder point “cousin” is the dynamic reorder point; all is the same except that the demand input is statistically forecasted based upon historical demand. With statistical forecasting variances from actual being too high for 50% of the parts and too low for the other 50%, there is some opportunity to decrease investment, but availability will most likely stay the same.

6. **PIP: (↑availability)/(↓parts)**

Dependent requirements planning is a technique that takes maintainers to a new level of sophistication. In this technique, planned equipment work activity is inputted into a schedule and the information goes through a “where used” which identifies all the parts required to perform the planned maintenance event. The technique then reviews supply records and recommends an order quantity based upon several parameters. This approach does begin to achieve an ideal PIP of increased availability and decreased parts investment. Be cautious in using this technique, for it

requires much work for initialization and on-going maintenance.

7. **PIP: (↑availability)/(↓parts)**

Condition-Based Monitoring (CBM) as the demand input for a parts planning technique is a great way to get close to “nirvana” regarding PIP. CBM inputs is a dynamic process that is constantly providing “real world” condition data as demands for a planning system. If properly administered, the CBM inputs will provide the maintainer sufficient time to order parts before they fail. Of course the maintenance organization must have access to CBM hardware, software and links to the “back office” system. Few operators currently have such a link-up, but that is changing rapidly as service suppliers are managing the CBM system and providing “back office” systems as “Software As A Service (SAAS).”

8. **PIP: (↑availability)/(↓parts)**

Vendor Managed Inventory (VMI) outsources the storage/ownership of parts to a supplier until the maintainer requires the part. The supplier locates the parts at the maintainer’s site; this eliminates the acquisition of parts being out of period with their use. This approach shifts the risks of not buying the right part, in the right condition and in the configuration, to the parts supplier. Obviously one of the main risks regarding this technique is that the supplier does not perform well in stocking the right parts; contractual agreements can resolve such issues.

9. **PIP: (↑availability)/(↓parts)**

Product-Availability-Based Productivity-Assured Services (P2S) is becoming a best practice for PIP. A supplier assures to deliver a level of performance that impacts equipment downtime frequency and/or duration. For example the supplier may assure a parts fill rate of 98% in order to favorably impact equipment availability. The maintainer pays a fixed price per product-unit per period for parts. The suppliers owns all the parts. If the supplier doesn’t perform as promised, the supplier incurs a “penalty”. This technique often requires longer period contracts and a supplier/customer relationship that says, “If I succeed, you succeed, but if I fail, you also fail.” For several industry sectors, including the military services (called Performance Based Logistics), this type of arrangement has seen material improvements in PIP.

10. **PIP: (↑availability)/(↓parts)**

One of the more intriguing approaches at obtaining parts, is through the cannibalization of equipment, either “hot” (product to eventually be put back into service) or “cold” (product is retired and will not be put back into service). Some organization take a product-unit, which is impaired and utilize the unit as a source of parts. This can work reasonably well for sourcing low

demand item, such as a housing casting, but it may not be a valid approach for higher moving consumables.

Overall, there are many techniques that can be used by maintainers to improve PIP. Several of the above techniques can be utilized concurrently; eye-ball for low value/short lead time non-repairable items, fixed reorder point for mid-value non-repairables, dependent demand planning for moderately critical repairables, and CBM for critical repairables. These techniques can be looked upon as a bunch of arrows in a quiver that can be used for specific maintenance events. The smart maintainer, in order to obtain a high PIP, will always adapt to different techniques as their business changes.