

Exploring The Causes and Effects of Oversupply Materials Through MRP: A General Review

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Abstract. This paper will address the phenomena arising from the oversupply materials that actually explode from the Material Requirements Planning (MRP). This system basically supports the operations especially the inventory control system and have become the most reliable in managing stocks effectively. MRP has all it years facing problems and challenges even though 35 years is far too long through adoption of supply chain management techniques. However, concerning the issue on oversupply materials still unresolved and require more in depth solution. The objective of this paper, as far as concern research on oversupply is not been investigated before and this may inject the new idea for the extension of literature on oversupply and MRP. The review will look into identifying the causes and effects of oversupply associating with MRP. How this problem has an impact on the operations efficiency especially the inventory control system?

Keywords: *Oversupply, Material Requirements Planning*

1. Introduction

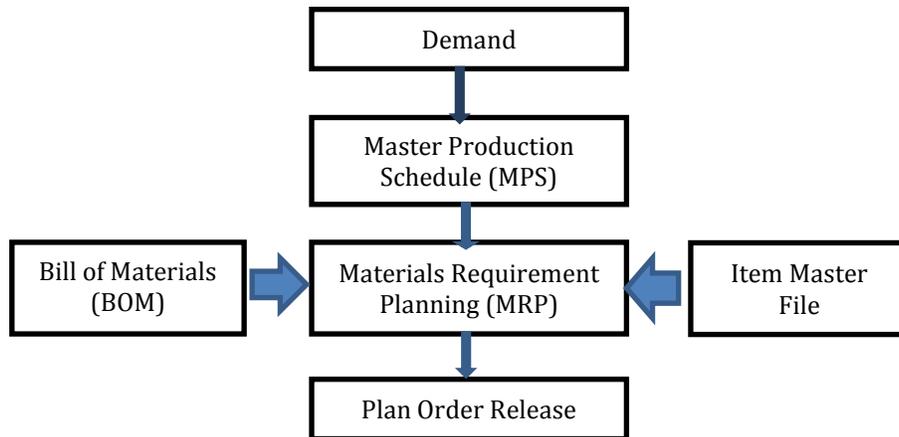
Lately low productivity, issues in supply chain uncertainty, lack of innovation strategies and intense competition from global perspective has aggravated a renewed interest in stock management in Malaysia. Managing inventory has been to keep sufficient stock to meet internal and external customer current and future demand for a product and at the same time to be cost effective. The high cost of inventory becomes important agenda for firms to focus ways to reduce costs such as efficient supply chain management and quality management. One of the ways the firms looks at by reducing uncertainty at various points along the supply chain and might curtail inventory problem. Managing assets viewed on raw materials, work-in-process, finished goods that actually require better inventory control system in order to reduce inventory problem spontaneously reduce costs associated to it. The determinants of corporate inventory policy, as far as concern to inventory, basically academic literature do focus more on production and procurement. The basic costs associated with inventory management, holding costs and ordering costs through Economic Order Quantity (EOQ) transaction approach. Beside that efficient inventory control system prefer to combat with problem associating with inventory such as material requirements planning (MRP) system, lean operating system; kanban, vendor managed inventory (VMI) and just-in-time (JIT) in determining the optimal corporate inventories. The spiral effect of this phenomena resulting effective and efficient inventory control system such as MRP and Enterprise Resource Planning (ERP) have been developed. At the same time, concept of relating an action of real time consumption upon receiving raw materials measured by inventory turnover through combine effort of vendor managed inventory and push & pull strategy. This philosophy alone is still incapable to overcome the irony of having oversupply issues that disrupt the supply chain and inventory figures that mislead the total accountable stock availability. Despite of shortcoming on these concepts and techniques either from theoretical or practical basically the effects on the overall operations management could be real. Base on this critical issues being brought up, the purpose in the present paper is to review the causes and effects of oversupply (if any) engaging with MRP system. The oversupply issue is totally new problem for the academics and prominent issues for the real business world.

2. Literature Review

Material Requirements Planning (MRP): The Material Requirement Planning is a system that called as planning tools involve in the materials planning from forecasting of the individual components, and production planning through a computerized inventory control. The purpose of any stock management is to emphasize on availability of materials when required, volume to bring in and the desired quantity to be ordered. This is necessary to ensure any sort of investment of funds would not be wasted due to unforeseen pile of stocks holding for so long. Optimizing the current resources with minimum costs especially for inventory becomes the main objective for any inventory control system by maintaining the lowest possible level of stocks. How it works? For a given demand quantity basically from the independent projected product quantity then this information will be imported or convert into master production schedule (MPS) refer to figure 1. The MPS helps to determine or to forecast demand for individual materials that are require assembling or producing for the desired finished product. At the same time such information will in turn to simulate the size of order, data containing order release and schedule for production. MRP integrates all production activities and business operations plan through a common platform of information data management. MRP and MRP II having the same function for the inventory management that incorporate all business operation. (Aggarwal 1985; Healy 1985; Burgon, et al., 1985 a, b; Plossl and Lankford 1984).

When and how many units of materials to order and process base on lead time depending on demand orders, production orders, current stock level and projection is the job of MRP that serve as a package to assist manufacturers. This system will make sure that manufacturer have enough components to cater the production orders. But then this system has some hiccups along the way and becomes a concern to practitioners and academicians (Hsieh and Kleiner, 1992; Anget al., 1994). This worry concern makes the organization that adopts this system sense of invaluable. Sales for MRP system showing a sign of positive growth widely across globe but the setting up and implementing basically sort of difficult process. (Manthouet al., 1996; Ritter, 1992). MRP as a whole has its hiccups in which many problems were notice during the implementation or running of this system (Smith, 1993; Turnipseed et al., 1992) and sometime the confident level been questioned and reported (Clode, 1993). The critical issues need to be addressed and amounting for deepest concern is the oversupply issues and was not investigated before.

Figure 1: Framework of Materials Requirements Planning

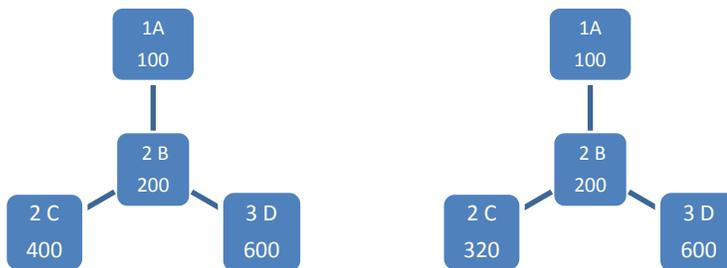


Oversupply: Oversupply of materials can be defined as excess stock reflected either in the form of logical and physical stock registered in the inventory control system such as MRP. This excess stock resulted from many activities along the system and supply chain. Logical oversupply in the MRP system telling the stock is sufficient to support production but in actual fact the stock physically none. What could be the causes of oversupply and how such event effect production and firms to certain extend?

Causes and Effects

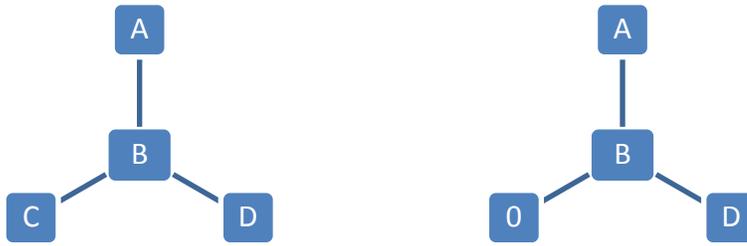
Back Flush Entry: This back flush entry basically involvesthe upper level (Low Level Code; LLC =0) of the product structure refer to figure 2 in which all the low levels (LLC = 1 & 2) will be up dated accordingly upon the entry of the upper level simultaneously. The product structure process recall such a way that every single unit of final product A requires 2 unit of work in process (WIP) B, every single unit of WIP B requires 2 unit of raw materials C combine with 3 units of raw materials D therefore for every single unit of A requires 4 unit of C and 6 units of D. Means in order to complete the whole back flush from the upper level, all components entry must be completed first without much delay before the entry done for final product of A unit. Refer to figure 2 for example to enter 100 sets of finished product A may require 200 units of WIP B and combine with 400 units of raw materials C and 600 units of raw materials D. Supposing one of the raw materials example C having a shortage of 80 units refer to figure... means the materials availability at 320 units instead of total 400. But according to the rule of thumb, in order to complete the back flush of 100 sets of finished product A, WIP B entry must be completed first of 200 units but WIP B able to be entered only for 160 units instead of 200 units that actually affected by the low level of raw material C. But the case would be different if still maintain the shortage at 80 units of C then all upper level still able to be entered as whole complete unit. Why this happen? How this happen? This definitely comes from the oversupply issue and was not reported during the physical inventory or was not registered or driven away by the MRP system yet still can complete. In order to proceed for the entry, stock creation into the system will be the wise decision and logical oversupply being realized in the inventory.

Figure2: Product Structure Comparison on Back Flush Stock Quantity



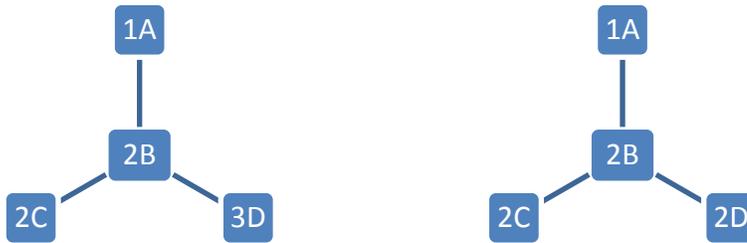
Bill of Materials explosion: Engineers are fully responsible on the design of a product from the technical point of view. Basically when concerning a product structure the development of materials list fully authorized by them. Upon getting done with materials list in accordance to the requirements of product structure design, timely to registered in the MRP system called as Bill of Materials (BOM) refer to figure 3. The maintenance into the system solely handles by them and hiccups along the process will deliberately affect the next process. For instance, the failure of certain keys to identify the upper level and lower level in the product structure will cause haywire of materials explosions in accurately and will signal to purchase for wrong materials instead. This so call failure eventually send a signal to purchase materials that seem do not reflect any requirement will develop oversupply in system logically.

Figure3: Product Structure Comparison for Materials Registered on BOM



Design Change cut-off: Design changes is refer to as the changes of materials type or per set quantity to one another that the changes of this design comes from the product structure or bill of materials (BOM) refer to figure 4. In normal cases it may take place for a new model development and there a some cases this action requires concurrent changes of materials type or per set quantity for existing models. The changes of materials is carry out by the engineers or technician who is directly involve in the product design and they are responsible to key in or registered the changes of the design into the MRP system via BOM refer to figure 4. The BOM list that represents the whole product structure in the MRP most likely to be updated time to time but the set back here is that the system has a problem to cut-off effectively for batch production lot concern. Most likely the original or initial materials that has been design changes with proper cut-off been brought into warehouse in which no longer requirement for future production and become oversupply in the system that eventually becomes either dead stock or slow moving items. Such action may results toward affecting the costly parts of an organization by holding unnecessary inactive stock along the way.

Figure 4: Product Structure Comparison for Materials Changes in per set Quantity



Invoice Receiving Entry Error: Raw materials delivered to manufacturer by vendors by using invoices or delivery orders. Materials are then confirmed by store personnel by counting back the stocks volume against the invoices in order to avoid any short landing or excess receiving. Despite of strict control procedure on materials handling when comes to entry of those invoices may lead to error partially contributed by store personnel or the MRP system itself. Back to the system, invoices entered depending on the purchase order (P/O) number generated in the MRP system. The P/O referencing number can be too old and still active in the MRP system and when deliberately entered as receiving mistakenly by the quoted materials eventually create oversupply in the system seems do not have the future requirement. Again logical excess been traced in the system. Discrepancy in Invoice and Physical materials receiving once again when the entry supposed to enter certain quantity base on P/O prerequisite in the MRP system and actual received could be more than reported then again it leads to oversupply physically. MRP system unable to track down or rectify the mistakes or error been done accordingly by logical manner. In order to rectify such occurrence force entry through creating new P/O or creating stock unconditionally which will block new P/O generation leads to oversupply in the system that do not conform to future requirement.

Physical Inventory Error: Firms do carry out physical inventory or stock take on a annual basis before the end month fiscal financial reporting closing. Inventory is a process to check and compare the validity of logical stock tally up with physical stock at any one time. Cases such hiding oversupply materials or never report for the excess materials become the main agenda for any organization. Reason for such action those oversupply materials for replacement due to defects and spoilage for future production. As for the excess or oversupply parts initially was not reported and somehow the store personnel manage to pull through without detected by the internal or external auditors by displaying the standard packing quantity with the logical stock containing more stock volume versus the labeled quantity. The reports will actually follow the quantity been reported by the inventory inspectors or auditors. After such event, the system will reflect the reported quantity displayed as per indicated at the labeled box containing oversupply materials. Supposing the affected box was channel to production and materials been utilized then again back flush entry process starts for designated quantity despite of incomplete raw materials.

Excess Quantity in Standard Packing: Occasionally materials been delivered by vendors through standard packing. Invoices received with specific quantity and entered into MRP system with prefix P/O number. For storehouse operation standard procedure for the materials received under standard packing will not been opened in order to verify the actual quantity and considered received in good condition as stipulated in the invoices. Again the invoices have to follow the standard procedure to enter into the MRP system based on the documents as printed quantity versus the labeled quantity printed in boxes. For instance if the quantity printed in invoice has quoted for 1000 units versus the box printed label therefore the MRP system will only recognize it base on the entry made on the designated P/O number against the invoices. Problem may arise due to excess quantity detected upon opening the standard packing resulting oversupply

physically found which could be more than 1000 unit in the store or production area. Decision has to be made either to send back to vendors or kept it at storehouse by force to create excess quantity back into MRP system and may block new or future P/O in MRP system. Sometimes such cases require hand to hand support by vendors to dispatch new invoices to cover the oversupply if there is future requirement to be considered. But extraordinary cases at production area might seem to end up disruption in the system in which any oversupply will not be picked up by the MRP system especially when to enter work in process (WIP) or finished product in MRP system. Once again the oversupply quantity trace at production area due to standard packing should have been reported to avoid unnecessary problem in the MRP system in which this system being more sensitive by not accepting the oversupply material. MRP system does recognize the actual entry done base on the volume recorded instead of logical explosion from the excess quantity. Production may keep some oversupply materials for future needs for the case of defects and spoilage which require them to purchase additional cost.

Discussion: Oversupply is being known as a plagued to inventory control system. Any excess quantity either logical or physical basically gives a signal of unhealthy towards effective stock management that drives the costly parts of an organization to worry. No doubt MRP system has been engaging to curb inefficient planning inventory and total supply chain but there are still hiccups in dealing with the oversupply issues till today. The most worried point is seeing the concern effected stock being treated as obsolete and is total wastage for the organization.

Managerial Implication: This study provides the practical and theoretical contribution which can help the managers and academics to look on to the hiccups and improvement required especially some of the points reflects on production line basically will get disrupted due to unforeseen logical stock availability versus the physical stock. For production to run depending on the stock availability and the MRP system will display the stock movement regardless of the multiple storage area. Production requires materials physically but no stock available but logically system does have stock. This reflects the logical oversupply in the MRP system merely accountable for production loss. On the other hand sales and shipment declaration could be affected due to inefficient of back flush entry eventually delays the shipment process. Inventory figure discrepancy will also lead production disruption to certain extends and having excess stock due the reasoning oversupply causes will lead to wastage or obsolete and is the costly parts of any organization. Oversupply materials could be in logical system or physically will block for generation of purchase orders to cater the future demands.

3. Conclusion

This review has shared information and brought an immediate attention dealing with oversupply materials directly linked from MRP system. As far concerning to this matter of inefficient stock management through the development oversupply issues as part of the costly process to organization. Managing stocks is crucial activity for any organization to uphold and insurance to cater for future demand uncertainty but not to avail that the oversupply being one of the important matters to be deal.

Recommendation: The future study may look on the oversupply materials that does not influence by MRP system directly but instead this time the causes from buying standard packing or multiple order quantity that the excess quantity no longer required for future usage or requirement. Beside that the other relevant causes of oversupply by setting up different work center and also the implementation of sales order stock versus free stock.

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