

THAT MYSTERIOUS "BLACK BOX" CALLED OPT

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Optimized Production Technology (OPT), is a technological breakthrough in computerized planning and scheduling in manufacturing. OPT contends that only certain products in the system need to be accurately monitored. This concept stems from Pareto's principle, only a few of the products generate most of the profit. OPT identifies the bottleneck products that cost justify the investment in data accuracy.

OPT oversees the total manufacturing system as a money making machine. OPT uses the following three criteria to measure performance:

- Throughput:** The rate at which money is generated through sales.
- Inventory:** The money invested in purchasing things not been sold yet. (Not oil for machines, if not for resale.)
- Operational Expenses:** The money spent in turning inventory into throughput.

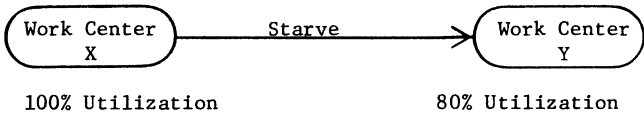
The optimum of the total is to simultaneously increase throughput while reducing inventory and operational expenses. The following chart shows how throughput, inventory and operational expenses relate to the financial measurements, net profit, return on investment, and cash flow.



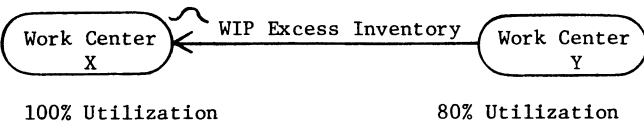
Simultaneous Direction of Change to Maximize Profit

There are no perfectly balanced plants and those who regard balancing a plant as a desired goal admit that plants are not going to be balanced in the near future. In unbalanced plants there are resources on which the demand exceeds their available capacity namely bottlenecks. There are others on which the demand is less than their available capacity - non-bottlenecks.

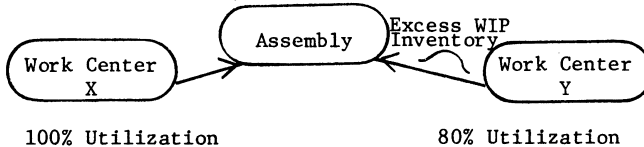
Situation # 1: For the flow from work center X to work center Y.
 Demand: 200 hrs./machine Demand: 160 hrs./machine
 Potential: 200 hrs./machine Potential: 200 hrs./machine



Situation # 2: For the flow from work center Y to work center X.
 Demand: 200 hrs./machine Demand: 160 hrs./machine
 Potential: 200 hrs./machine Potential: 200 hrs./machine



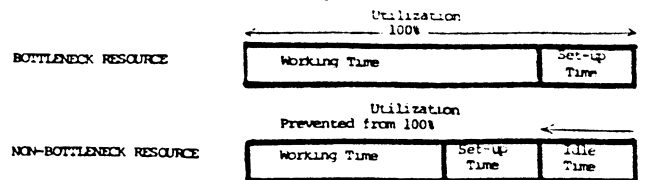
Situation # 3: When products from center X and Y are combined
 Demand: 200 hrs./machine Demand: 160 hrs./machine
 Potential: 200 hrs./machine Potential: 200 hrs./machine



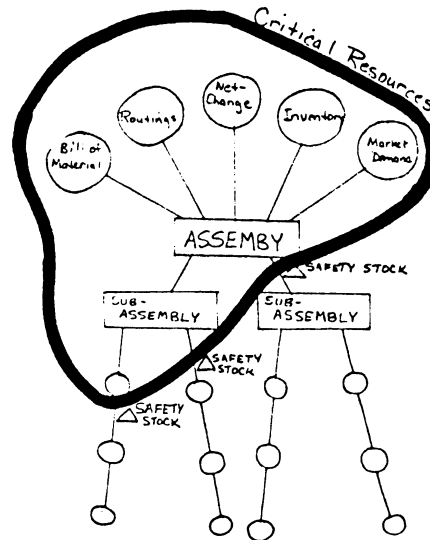
Situation # 4: For independent work centers with different market demands
 Demand: 200 hrs./machine Demand: 160 hrs./machine
 Potential: 200 hrs./machine Potential: 200 hrs./machine



In all cases X can work to 100% capacity but Y can only be effectively utilized 80% of capacity. Non-bottlenecks have some idle time in their cycle, whereas the bottlenecks have no idle time. For the bottleneck centers, it is important to minimize setup time by making batches as large as possible. On the other hand, saving time at non-bottlenecks just increases the idle time and cannot be used effectively.



Bottlenecks are the resources that cause que time and wait time. They determine the work in process and the level of inventory. Furthermore, the work in process inventory necessitates the carrying cost of inventory which is an operating expense. Therefore bottlenecks impact all three measurements of the money making machine, throughput, inventory, and operating expense.



In Materials Requirement Planning (MRP), the total bill of materials is monitored to 95 percent plus accuracy. OPT identifies the bottleneck resources and maintains high accuracy on them and their higher level items. These are called critical resources and they compromise less than one percent of the inventory items. Safety stocks should be maintained at the interfaces of critical resources. Even in the largest companies five bottlenecks is the usual maximum. Marketing professionals should be interested in OPT because it gives top priority to the forecast for data accuracy. Also, OPT indicates exactly where capacity is a bottleneck, so sales volume can be tailored to the flow of finished goods and adjusted to the specific mix of products.
 REFERENCES AVAILABLE ON REQUEST.