

Master of Business Administration - MBA Semester II**MB0044 – Production & Operations Management - 4 Credits****(Book ID: B1133)****AssignmentSet- 1 (60 Marks)****Note: Each Question carries 10 marks. Answer all the questions.****Q1. Explain in brief the origins of Just In Time. Explain how JIT is implemented.**

Answer: JIT can be considered to be a philosophy of manufacturing founded on the principles of elimination of all waste and thereby increasing productivity. When the philosophy is applied at workplace, the approach results in providing parts in just right quantities at the right time. This results in economy of material and time thus lowering the costs and increasing productivity. Since no extra parts are available, production of only good parts is forced on the system. JIT has been extended to mean continuous improvement. These principles are being applied to engineering, purchasing, accounting and data processing also. We will see how JIT helps in implementing Lean Production systems. In these days when technology is able to provide us with highly accurate equipments which have high capacities and the business has become global meaning that both suppliers and customers are widely accessible. To remain competitive, cost efficiencies have become compulsory. JIT helps in this process. It is extended to the shop floor and inventory systems of the vendors also. One of the main challenges for JIT is frequent changes in production schedules owing to the changes in demand. This causes the procurements plans to change. In the present day scenario where most manufacturing concerns depend upon a number of suppliers, who in turn may outsource parts and services, disruptions have a cascading effect.

However, there is a limit to the agility that a company can build into the system. Communication right through the supply chain helps in reducing inventories and keeps the flow lines smooth. Success of JIT depends upon a lot of preparation and committed implementation.

Implementation of JIT JIT, like TQM and other developmental measures is possible only with top management commitment and a learning culture in the organisation. The main handicap to any programme is the resistance by the organizational members even at the top, to make changes. This resistance may take the form of noncooperation and may enlarge to become sabotage. These show up at the implementation stage. So, communication of the goals to be realised and the objectives of each team should be made effectively. Initially, a milestone chart will help in establishing the various steps to be taken and correcting the activities as the process is on. It is the best way of ensuring success.

It is well to remind at this stage, that JIT is not a destination, but an ongoing continuous improvement programme in the process of achieving Total Quality Management.

1 Prerequisites for Implementation Like any advanced method of production and quality improvement some pre requisites are needed to be in place so that implementation is easy and the results identifiable. The following table gives the requirements from the design process to the measurement of performance.

a) Design flow process

1. Link operations
2. Balance workstation capacities
3. Relayout for flow
4. Emphasise preventive maintenance
5. Reduce lot sizes
6. Reduce setup and changeover times

b) Total Quality Control

1. Worker responsibility for quality
2. Measure – SQC
3. Enforce compliance
4. Failsafe Methods
5. Automatic inspection

c) Stabilise schedule

1. Level Schedule
2. Under utilise capacity

d) Kanban Pull

1. Demand Pull
2. Back flush
3. Reduce Lot sizes

e) Work with vendor

1. Reduce lead times
2. Frequent deliveries
3. Project usage requirements
4. Quality expectation

f) Reduce Inventories

1. Look for other areas
2. Stores
3. Transit
4. Carousels
5. Conveyors

g) Improve Product Design

1. Standard Product Configuration
2. Standardise and reduce number of parts
3. Process design with product design
4. Quality Expectations

The above activities lead to

A. Solving problems concurrently

- (i) Root Cause
- (ii) Solve Permanently
- (iii) Team approach
- (iv) Line and specialist responsibility
- (v) Continual education

B. Measuring Performance

- (i) Emphasise improvement
- (ii) Track trends.

when above requirements are met, we are very nearly achieving JIT.

2 Shop Floor Control Realistic planning and scheduling taking into consideration the frequency with which set ups have to be changed to manage material flow without building up inventories, leads to JIT manufacturing. SMED – single minute exchange of dies – gives flexibility for production process. Advocated by Shigeo Shingo, this method calls for designing and making fixtures and toolings – which are instrumental in changing setups so that changes to be effected within a minute. The declamping and clamping elements should be made for this purpose.

Application of Kanban, wherever suitable is another mechanism for controlling flow of material.

Maintenance of machines and periodic shop floor inspection to verify that processes are delivering components within the tolerances specified.

3 Purchasing The essence of JIT purchasing lies in treating the purchaser as a participant in your activities. Cooperative relationship leads to the development of the supplier who understands our requirements and in situations where he confronts any difficulty, he should be in a position to approach the company for its solution. Being open and trusting helps the organisations to identify the problems and go to the source which is like implementing TQM. Every problem or discovery of a defect is considered an opportunity which the supplier and the company – to get a deeper understanding of the problem and the solutions will solve not only that problem, but also one that were hidden. It is also the practice of many companies who procure a large number of parts – manufactured from their vendors to have supplies made to the assembly in specific quantities to meet the needs just in time. Self certification by the vendor is resorted to for ensuring quality of the material. The actual users are given autonomy to demand from the supplier the quantities required as well as the time of its need. Any change in demand is conveyed and complied. This requires cooperation and trust between

he supplier and the customer. This is how JIT purchasing works.

4 Vendor Managed Inventory The very purpose of JIT is to reduce inventory at all places in the supply chain. Inventory is considered a waste – because inventory is created by using materials, machines and efforts of persons. All of these are resources which have already been used up and that portion of it which is not consumed and sent up the value chain causes a drag on the system. However, inventories are inevitable because uncertainties exist at every stage, making it necessary to provide a buffer so that demands do not go unfilled. The challenge is to keep it to the minimum. To make this happen the calculations involving forecasts of the market demand, the capacities of the equipments, worker absenteeism, suppliers' lead times, the quality of the produced components, etc. Each of these will have many factors which affect them. JIT depends upon accurate assessment of them and based on the decisions taken, activities are initiated. These should result in holding materials as small a number of components or products as feasible to maintain flow of material without disruption. Many companies make their suppliers hold their inventories and request them to make timely supplies. This may come at a cost.

Q2. Bring out the historical background of Value Engineering. Elucidate three companies which have incorporated VE with brief explanation.

Answer: Value Engineering / Value Analysis basically it is a methodology by which we try to find substitutes for a product or an operation. It can be conducted both internally and externally. The concept took shape during the Second World War. The thinking process calls for a deep study of a product – the purpose for which it is used, the raw materials used, the processes of transformation, the equipment needed etc. and question whether what is being used is the most appropriate and economical. This applies to all aspects of the product.

For example, let us consider a component needs a round brass rod as raw material in size 21.5 mm. Diameter. It has seven operations – cutting, drilling, and chamfering boring. Milling, plating, and polishing, Value analysis considers all aspects of each of these and investigates whether any of them can be substituted by another material, a different size, a different tool, a different machine, a different cot sequence, a different tool for an operation, a different chemical, a different concentration, a different voltage, shorter time or processing. Studies can be conducted to verify whether any operation can be eliminated.

Simplification of processes reduces the cost of manufacture. Every piece of material and the process should add value to the product so as to render the best performance. Thus there is an opportunity at every stage of the manufacturing and delivery process to find alternatives which will increase the functionality or reduce cost in terms of material, process and time. It should be remembered that we are not seeking a cost reduction sacrificing quality. It has been found that

there will be an improvement in quality when systematic value engineering principles are employed.

GEC started Value Engineering in 1947 when a substitute for asbestos for flooring had to be found. Specialized dealers could provide an equally good 'material' at a lesser price. Initially the practitioners were the people in charge of purchasing who tried to locate substitute material which would be equally good, if not better, at a lower price. This is the first and basic approach to value engineering. As the concept percolated to the manufacturing departments, engineers applied the same principles and found that they could use alternate materials which were cheaper giving the same performance. It was also found that dimensions and tolerances could be altered without affecting the performance of the part or the product. The investigations took them on the path of eliminating some operations. The focus was on the value of each bit of material, each operation. This approach led to the design-stage. Nowadays, the principles of Value Engineering starts at the product concept and design and is carried down the 'value chain'. The aim of value engineering is to effect economies by investigating every opportunity and discovering new materials, methods to achieve high quality performance. The aims of Value Engineering can be listed as under

1. Product Simplification
2. Better and less costly materials
3. Improved product design.
4. High efficiency in the processes
5. Economy in all activities

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