8 types of waste

1. Overproduction 2. Inappropriate processing: use unnecessary expensive high-precision equipment. 3.Waiting: Unbalanced workstations make operators to wait 4. Transportation: excessive movement of product between processes that causes damage and deterioration of product. 5.Motion: unnecessary effort related to bending,stretching,lifting. 6. Inventory. 7.Defects. 8.underutilization of employees failure of the firm to learn from employee’s knowledge.

Just-in-time philosophy

Belief that waste can be eliminated by cutting unnecessary capacity or inventory.

Supply chain consideration

Close Supplier Ties: need suppliers to ship frequently

Small Lot Sizes: small lots have low average level of inventory

Process considerations

Pull method of work flow: Customer demand activates the production of a good.

Quality at the source: defects are caught and corrected where they are created.

Uniform Workstation loads: assembling the same type and number of units each day.

5S: A methodology for organizing, cleaning, developing a productive environment.

Sort: separate needed items from unneeded. Straighten: Neatly arrange what is left, organize the work area. Shine: Clean and wash the work area and make it shine. standardize : cleaning and sorting. Sustain: sustain to perform first four S.

Toyota Production System: 1.All work must be completely specified as to content, sequence, timing and outcome. 2. every customer-supplier connection must be direct 3. Pathway for every service and product must be simple and direct. Works flow to specific person or machine. 4. Any improvement to the system must be made in accordance with the scientific method, under the guidance of a teacher at lowest possible organization level.

Current state map: how a process is currently down.

Future state map: eliminates the source of waste identified on the current state map.

Lean: maximize the value added by each of a company’s activities by removing waste and delays from them.

A3: remove waste. 1.Background 2.Current Condition 3. Goal Statement 4.Root-cause Analysis 5. Counter measures 6. Effect Confirmation 7.Follow-up actions.

Takt time: average time between the start of production of one unit and the start of the next.

Cycle time: time it takes to complete the production of one unit from start to finish.

Lead time: time it takes for one unit from making order to receive payment.

Throughput time: a product from raw materials to finished goods.

Measures of Capacity and Utilization

Output measures of capacity: applied to individual processes within the firm or firm provides small number of standardized services and products. Not for large amount of product mix

Input Measures of capacity: for low volume, flexible processes. Problem: demand is invariably expressed as an output rate.

Utility: degree to which equipment, space or the workforce is currently being used.

Sizing Capacity Cushions: = 100% - Average Utilization rate

Expansionist Strategy: expand ahead of demand,minimizes the chance of sales lost to insufficient capacity.

Wait and see strategy: lags behind demand.

Linking Capacity and other decisions: the capacity cushion may change with change in any area.

Estimate Capacity Requirement: what capacity should be to meet forecasted demand of the firm’s customers

Setup time: time to prepare a device, machine, process or system.

Demand patterns: Forecasting demand for a product, repeated observations of it in their order of occurrence form a pattern.

Demand Management Options:

Complementary products: similar resource requirements but different demand cycles.

Promotional Pricing, prescheduled appointments, reservation, revenue management(varying price for different customer segments. Backlogs: accumulation of customer orders that manufacture has promised for delivery at some future date. Backorders and stockouts: backorder: order be filled later.

Deciding what to forecast:

Level of Aggregation: cluster several similar services in a process, then derive forecasts for individual items.

Units of Measurement: forecasts begin with service or product units

Forecasting technique: judgement methods: opinions customer survey and sales estimates into quantitative estimates.

Casual methods:use historical data on independent variables to predict demand

Time-series analysis: relies on historical demand data

Trend projection with regression: hybrid between time-series and causal method.

Cumulative sum of forecast errors: add. MAD: absolute value MSE:MAD squared. MAPE: error/actual Naive forecast: next period = this period. Horizontal patterns

Forecasting process:1.Adjust history file. 2.Prepare initial forecast 3.Consensus meetings and collaboration 4.revise forecast 5.review by operating committee 6. finalize and communication.

7 principles of theory of management

1. The focus should be on balancing flow, not on balancing capacity.2.Maximizing the output and efficiency of every resource may not maximize the throughput of the entire system.3. An hour lost at a bottleneck or a constrained resource is an hour lost for the whole system.4.Inventory is needed only in front of the bottlenecks to prevent them from sitting idle and in front of assembly and shipping points to protect customer schedules.5. Work, which can be materials, information to be processed, documents, or customers, should be released into the system only as frequently as the bottlenecks need it. 6. Activating a non-bottleneck resource (using it for improved efficiency that does not increase throughput) is not the same as utilizing a bottleneck resource (that does lead to increased throughput).7. Every capital investment must be viewed from the perspective of its global impact on overall throughput (T), inventory (I), and operating expense.

Throughput time: total elapsed time from start to finish.

Reliving bottleneck: keep bottleneck resource as busy as practical.

Theory of Constraints: A systematic management approach that focuses on actively managing those constraints that impede a firm’s progress toward its goal.

Cycle time x #worker = process time. Utilization = 1/#worker. Lead time = days inventory help between WIP