



LEAN PRODUCTION FACILITY LAYOUT

BACKGROUND

The production facility layout is as important as the technology it houses and has a significant impact on business performance. The layout must be modified and improved continuously. Only then can the waste associated with a poor layout be eliminated or reduced. Still, changes to the existing layout are rarely taken into consideration when planning for production improvements. Instead the focus is on processes, materials and people, and the layout is most often out of scope.

CHALLENGES

There can be many reasons to why the existing production facility layout isn't optimal. The existing facility may impose restrictions on the choice of a good layout, existing layout may not have provisions for future expansion or changes to the product mix, layout planning is entrusted to unqualified persons, poor preventive maintenance results in machine breakdown which further leads to more machines/equipment on the shop floor to keep up with demand, related laws and local restrictions have changed and prevent an optimal layout from a production perspective and so forth.

There are many challenges to be faced when improving the production facility layout. For example, improving the production facility layout is often time-consuming and costly. One of the reasons is that it is often complicated to constructively discuss and compare different layout options. The process is often prone to subjectivity due to missing facts and data. It is important to understand that planning for changes to the layout requires specialised skills, experience and understanding of the production process.

FOCUS AREAS

Waste associated with a poor production facility layout can be identified, classified and minimised as well as creating tremendous savings potential. Lean principles, Kaizen methods, and re-engineering approaches can be applied when physically arranging or rearranging the production facility layout to improve the flow of raw material, through production to shipping. The right Lean Solutions can improve safety and reduce production lead-time.

AREAS OF WASTE OFTEN IDENTIFIED IN PRODUCTION FACILITY LAYOUTS:

TRANSPORTATION & HANDLING

Long distance between workstations, extra handling (e.g. raw material not stored at working height, limited accessibility to work in process), blocked pathways.

INVENTORY

Making products before they are needed (e.g. batching of products because process steps are not connected or because set-up times are long), having more floor space than required.

MOVEMENT

Material and tools not stored at point of use, excess walking (e.g. to check, adjust or refill stations on the machine), lack of standards (e.g. looking for items because they do not have a defined place), unnecessary motion because of tools and machines being shared.

WAITING

Complex layout causing delay in material supply and delivery, long set-up times, poor communication (e.g. due to long distances between workstations).

OVER-PRODUCTION

Producing without a demand (e.g. because of no visibility of customer demand, long set-up times, attempt to avoid long set-up times, having more floor space than required...).

OVER-PROCESSING

Unnecessary processing (e.g. using complicated storage systems when simpler ones would be sufficient, creating advanced computer layout models when a simple drawing would be enough).

DEFECTS

An inefficient layout leads to more transportation, handling and storage of goods which increases the risk of mistakes causing scrap.

LEAN SOLUTIONS

Optimising the production facility layout is a key component to improving the overall production process. Well-designed and optimised production layouts support the production process with appropriate infrastructure and layout.

We implement Lean Solutions to production facility layouts in a similar way to other areas. The solutions must fit the challenges.

PULL

- Enable FIFO at the batch level
- Reduce inventory levels throughout processes
- Avoid over-production
- Increase visibility of bottlenecks in the process

ONE PIECE FLOW

- Enable FIFO to a single product / service level
- Create transparency of the real process lead time
- Reduce lead time
- Reduce inventory levels throughout process
- Increase quality
- Reorganise the processes in the right sequence

TAKT

- Process transparency
- Balanced distribution of the workload across resources
- Process flexibility
- Ability to plan resource capacity and / or improve forecasting
- Optimal efficiency in resource utilisation

ZERO DEFECTS

- Enables problem root cause analysis and solving
- Prevents problems snowballing through the process
- Increases quality
- Enables an open culture of problem solving vs. finger pointing



TANGIBLE IMPROVEMENTS

LEAD TIME

- Lean capital equipment plant layout reduced manufacturing process lead time by 45% on all three line outputs
- Optimised cylinder plant layout reduced distance material travels by 30%

QUALITY

- Change in glass manufacturing plant production layout and process reduced first pass failures by 60%

COST

- New plastics packaging plant Lean layout reduced inventory by 60% (worth USD 1,710,000) from old plant's layout's requirements
- Greenfield industrial equipment production facility Lean layout reduced land needed by 25%
- Optimised floor space utilisation avoided costs of USD 130,000-1,300,000 annually
- Lean layout project in food manufacturing plant improved capacity thereby avoiding an investment of USD 6,750,000 in additional machinery



Should you be interested to know more about our Lean services regarding this topic, then please contact us:

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