Design and Implementation of Lean Line Concept in PE-Pump Assembly Line

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Keywords: Lean Line, VSM, Customer Takt, Ergonomics, Line Balancing

Abstract:

The project was taken up in an automobile fuel injection pump manufacturing assembly line. An aluminium housing which passes through twenty two different work stations arranged in a sequence gets assembled with different components and comes out as an assembled fuel injection pump ready for performance test. Such assembly lines were not very productive as they were established fifteen years back at which lean line concepts were not yet matured and lot of non value additions were part of the line. This project was selected to make the assembly line highly productive as cost reduction was one of the major focuses of the company. Scope of the project is to improve the productivity, reduce the space and lead time there by over all cost can be reduced.

The methodology used in this project is lean line design. Current state of value stream is mapped (VSM), identified all the NVA's (Non value additions) and eliminate/ reducing it using lean tools and techniques like VSM, Line Balancing, Stab Chart, Customer Takt, Kan Ban, Ergonomics, Time Study etc.. results were validated through trial runs. Study during experiment revealed that the non productiveness is mainly due to excessive number of operators and improper balancing of line. More lead time is due to unnecessary lengthy stations and conveyors, inventories in the line, no control on production process. All such wastes were reduced using scientific methodology, lean concepts and validated the results.

The salient features of this project include optimisation of number of operators required in a line for defined Customer takt, Flexible line to operate for different customer takt, reduction in cycle time, improved ergonomics in layouts, minimised material movements, short lead times, reduced inventory. Benefits of this project are productivity improvement by 66%, space reduction by 50% and lead time reduction by 75%.

Layout - before lean line concept

Layout - after lean line concept