CHAPTER 7

CASE STUDY - IV

This section deals with the details about the case company and products, current state map with environmental data, Fuzzy QFD application for prioritization of wastes and important proposals and development of future state map.

7.1 ABOUT THE CASE COMPANY

The case study was conducted in an automotive component manufacturing company located in Tamilnadu, India. The case organization has implemented quality strategies and is aspiring to attain world class status. A cross-functional team with five executive members was formed in order to carry out this case study. Nearly, two month has been spent by the researcher for studying the manufacturing processes followed for producing the automotive product. This study enabled the researcher to execute the case study in an effective manner.

7.2 NEED FOR CASE STUDY

There existed a need for the organization to construct VSM for streamlining the processes. Based on the interest extended by the research team and cross functional team members, it has been decided to consider environmental data in VSM.
7.3 DEVELOPMENT OF CURRENT STATE MAP WITH ENVIRONMENTAL DATA

The current state map developed for the camshaft is shown in Figure 7.1.

The orders are being received from the customers on a monthly basis. The customer demands are stable throughout the year without any fluctuations. About 2620 products are required by the customers on every day. The production control department transmits the instructions daily to production supervisor. The production supervisor transmits the instructions to various personnel on a daily basis. A total of 7 processes are involved in manufacturing the product. The first process is cutting. It involves one operator. The cycle time for this process is 36 minutes. The changeover time between the successive products in this process is twenty four minutes. The company operates on three shifts per day (each shift of eight hours duration with 30 minutes lunch break (inclusive).

The available production time is calculated as follows:

Available time = Total production time - Planned down time

\[ \text{Available time} = (60 \times 8 \times 3) - (30 \times 3) \]

\[ = 1350 \text{ mins} \]

Uptime is calculated using equation 1

\[ Uptime = \frac{\text{Actual operating Time}}{\text{Available Time}} \]  (7.1)
Figure 7.1 Current State Map
\[ Uptime = \frac{Actual\ operating\ Time-Change\ over\ time}{Available\ Time} \times 100\% \]

Uptime for Cutting process is shown here

\[ Uptime = \frac{1350 - 24}{1350} \times 100\% = 98.2\% \]

The inventory carried over between cutting and rough turning is 20 units. One operator is need for rough turning process. The changeover time between cutting and rough turning is 20 minutes. Similarly, the computation was performed for all remaining processes. The total cycle time for manufacturing the product is 286 minutes whereas the total lead time is 15,440 minutes. The products are being delivered to the customers on a monthly basis. They maintain a high finished products inventory of 260 units because of the monthly/daily delivery scheme.

7.4 Fuzzy QFD Application for Prioritization of Wastes and Important Proposals

The identified wastes in our study include workplace cleanliness, reduction of defects, reduction of change overtime, unnecessary operation, and reduction of material usage. The identified improvement proposal includes deployment of 5S, PokaYoke, Process capability Study, removal of inspection, Environment Health and Safety (EHS). Fuzzy QFD has been used for prioritization of wastes and improvement proposals. Figure 7.2. Shows the developed Fuzzy QFD.
The highly prioritized wastes include ‘unnecessary operation’, ‘reduction of material usage’ and ‘workplace cleanliness’. The prioritized techniques include ‘removal of inspection process’, ‘Environment, Health and Safety’ and ‘deployment of 5S’.
7.5 DEVELOPMENT OF FUTURE STATE MAP

The identified wastes and improvement proposals are shown in Figure 7.3. The identified techniques for waste elimination will be incorporated in the future state map. The future state map enables the implementation of improvement proposals for eliminating wastes, thereby streamlining the processes. The future state map is shown in Figure 7.4.

![Figure 7.3 Wastes and Improvement Proposals](image-url)
Figure 7.4 Future state Map