



LEAN MANUFACTURING:

WHAT IS IT AND HOW CAN THE EFTA HELP YOU

WHAT IS LEAN MANUFACTURING?

Lean Manufacturing is simply a philosophy that demands that you look at the waste generated in your business and take all steps to eliminate it. BUT waste is not simply defined as materials wasted in your manufacturing process but encompasses all forms of waste generated. Generally they are described as the 7 wastes and defined as follows

WASTE TYPE	DESCRIPTION
1. Overproduction	Producing too much too soon resulting in poor workflow and excess inventory
2. Defects	Errors in paperwork, product quality problems, poor delivery performance
3. Unnecessary Inventory	Excessive storage of products or information resulting in high costs
4. Inappropriate Processing	Using the wrong machines, procedures or systems when a simpler approach is more effective
5. Excessive Transportation	Excessive movement of people or materials resulting in wasted time and effort
6. Waiting	Periods of inactivity for people or goods resulting in poor workflow and long lead times
7. Unnecessary Motion	Poor workplace organisation resulting in poor ergonomics e.g. excessive bending, stretching or movement

The **LEAN THINKING PROCESS** requires companies to identify what they do that does not **ADD VALUE** to a product and **ELIMINATE ACTIVITIES THAT DO NOT ADD VALUE**

The total cost of a product is made up of three parts

- The cost of value adding activities which are essential to the production of the product and are difficult to reduce or eliminate
- The cost of non value adding activities which are those activities not necessary in the production process and known as waste
- The cost of non value adding activities which are necessary but that in the eyes of the final consumer do not make a product more valuable



One way to start the journey to LEAN is to understand what **OVERALL EQUIPMENT EFFECTIVENESS (O.E.E.)** your production equipment is running at, as this will often give you a clue as to where waste is being generated in your manufacturing process. O.E.E. is a total measure of machine performance that relates the availability of a process, to the productivity and quality produced. It measures the ability of the process to carry out **VALUE ADDING ACTIVITY**.

To calculate OEE you need to have the following figures available

1. Actual Run Time Against time available
2. Actual run speed against optimum run speed
3. Actual waste generated

Using these three figures and multiplying them together will give you your OEE figure. There are 3 components that comprise the OEE ration

1. Availability of the Process

The availability of the process is the theoretical time available **less planned downtime** e.g. meal breaks, planned maintenance, planned holidays. After calculating planned availability, unplanned downtime is subtracted. Included in unplanned downtime is breakdowns, make ready etc

$$\text{Availability} = \frac{\text{Planned Run Time} - \text{Downtime}}{\text{Planned Run Time}} \times 100\%$$

2. Productivity of the Process

The productivity of the process is the measure of how much the machine produces against how much it could produce in theory.

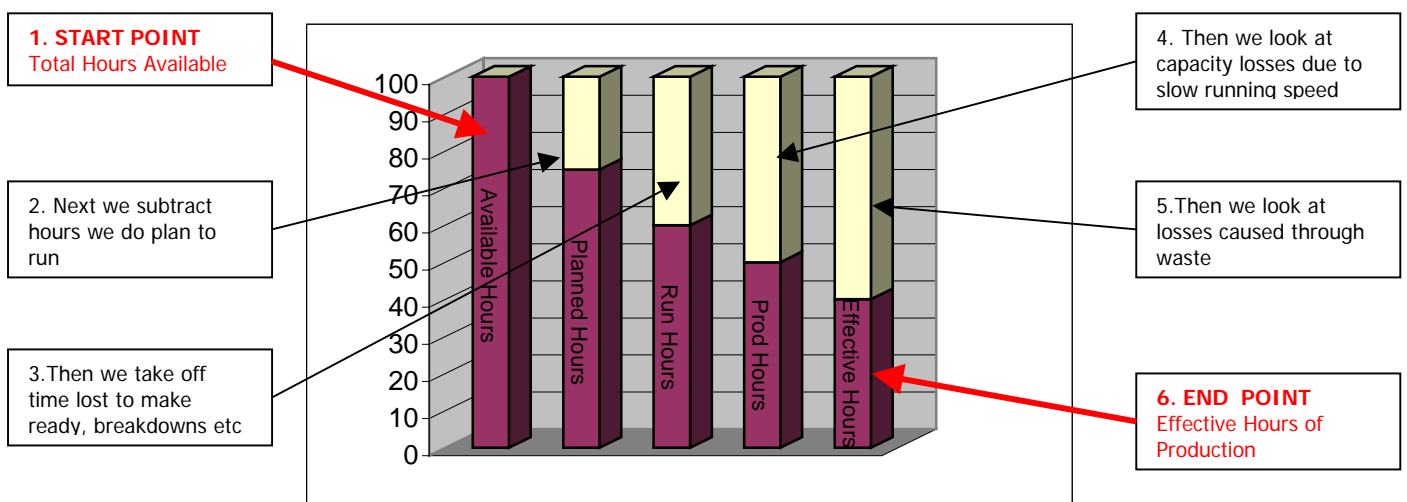
$$\text{Productivity} = \frac{\text{Actual Output}}{\text{Theoretical Output}} \times 100\%$$

3. Quality of the Process

The quality of the Process is determined by assessing the total amount produced then subtracting rejected production. This would include make ready waste, quality adjustments, run waste and other rejected product

$$\text{Quality Rate} = \frac{\text{Total Output} - \text{Rejects}}{\text{Total Output}} \times 100\%$$

Waterfall charts are a useful tool to understand where the greatest losses occur and graphically show where improvement activities should be focused



An Example

1. Availability

We had planned to run 120 hours in the week (5 X 24 hours) we had no planned holidays and no planned breakdowns.

Unfortunately during the week the machine broke down and was out for 8 hours, 2 machine minders were ill and that lost us another 16 hours and the order plan involved a lot of short run and 15 hours were spent making ready so our actual hours running were 81

Calculation
$$\frac{120-39 (81)}{120} = \underline{\underline{67.5\%}}$$

2. Productivity

The machine has an optimum run speed of 400 m/min but we worked out that when it was running it was averaging 370m/min

Calculation
$$\frac{370}{400} = \underline{\underline{92.5\%}}$$

3. Quality

8% of what we produced was waste therefore 92% was good production

Our OEE was therefore

$$\underline{\underline{.675 \times .925 \times .925 = 58\%}}$$

So whilst each figure did not look too bad overall this was not a very good performance

We can see from these figures that our biggest problem was availability – in this case absence and make readies and therefore any improvement programme we undertake should be focussed in this area.

Improvement Programmes

There are many programmes that you can look at but underlying all improvement programmes is the 5S programme which targets order, neatness and standardised procedures as essential elements to have in place prior to attempting any other improvement programme. EFAT run a number of workshops on this so please contact Lesley Hide on hiding@efta.co.uk for more information.