

## 6.5: Some important “Times” to be familiar with-

**Throughput time** is the time between the beginning – the very first operation in the process until the product is actually completed at the end of the process. Remember that this includes not only the process time, but also any waiting time, inspection time, time spent on rework and movement.

**Lead time** is the amount of time between when the customers order is received and when the product is completed and ready to ship.

**Cycle time** is the rate at which the operation is actually producing each unit. If you stood at the end of the process and measured the time between completion of each unit, that is the true cycle time.

**Takt time** is a calculated value which determines the rate at which a firm needs to process their product in order to meet customer demand. It can be calculated by:

$$\frac{\text{available production time}}{\text{demand}}$$

### ✓ Example 6.5.1

A firm operates 8 hours per day (480 minutes). Their daily demand is 120 units. They can calculate their takt time required to meet this demand:

$$(8 \text{ hours} \times 60 \text{ min}) / 120 = 4 \text{ min.}$$

The firm must produce **one product every 4 minutes**. This is also known as the drum beat of the operation. They must produce one product at least every 4 minutes to meet customer demand. If demand increases it may be required to use continuous Improvement tools to change the takt time or possibly add additional equipment.

The above calculation shows that an assembly line must have a takt time of 4 minutes in order to produce 120 units per day. What if customer demand rose sharply? What would need to happen to increase the output?

#### **Solution**

The takt time would need to decrease (actually run faster). A takt time of 3.0 minutes would produce an output of  $480 \text{ min} / 3 \text{ min} = 160$  units. A takt time of 2.0 minutes would produce 240 units per day.

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