

Overall Equipment Effectiveness

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Overall Equipment Effectiveness is a standard measure for the productivity of equipment/assets. It measures the percentage of scheduled manufacturing time that an asset is fully productive. There are three sub-components of OEE: Availability, Performance and Quality.

The following terms are used to describe different elements of OEE calculations

Plant operating time: The time that the plant is open and available for equipment operation. $\text{Plant operating time} = \text{Sum of shift duration}$

Excluded time: Any period that should be excluded from efficiency calculations because the equipment is not intended to run. Examples are factory shutdowns and no demand. $\text{Excluded time} = \text{Sum of duration of asset status logs where status of class "Excluded"}$

Planned Time: $\text{Planned Time} = \text{Plant Operating Time} - \text{Excluded Time}$

Down Time: Any event that stops production during planned time. Examples: Breakdown, changeover, material shortage. $\text{Downtime} = \text{Sum of the duration of asset status logs where status of class "Downtime"}$

Run Time: $\text{Run Time} = \text{Planned Time} - \text{Downtime}$

Recovered Time: The duration equipment would have taken to produce the total quantity produced if operating at standard speed. $\text{Recovered Time} = \text{Quantity Produced} * \text{workcentre cycle time}$

Rework Time: Time booked to rework

Production Time: $\text{Production Time} = \text{Recovered Time} + \text{Rework Time}$

Speed Loss Time: The time lost due to a machine not producing at its rated speed. $\text{Speed Loss Time} = \text{Run Time} - \text{Production Time}$

Quality Loss Time: The time lost because a machine has made material that is reworked or subsequently rejected. $\text{Quality loss time} = \text{Sum of recoveries of material that has been scrapped} + \text{Rework time}$

Fully Productive Time: The time spent producing good quality output. $\text{Fully productive time} = \text{Production Time} - \text{Quality loss time}$

Availability: $\text{Availability (AV)} = \text{Run Time} / \text{Planned Time}$

Performance: $\text{Performance (PE)} = \text{Production Time} / \text{Run Time}$

Quality: $\text{Quality (QU)} = \text{Fully Productive Time} / \text{Production Time}$

OEE: $\text{OEE} = \text{AV} * \text{PE} * \text{QU} = \text{Fully Productive Time} / \text{Planned Time}$
