



## Understanding OEE

Overall Equipment Effectiveness (OEE) is an important tool in the pharmaceutical, packaging and food processing industries. In fact, in any capital intensive business OEE improvement is a critical methodology to drive improved efficiency, higher quality and reduced cost.



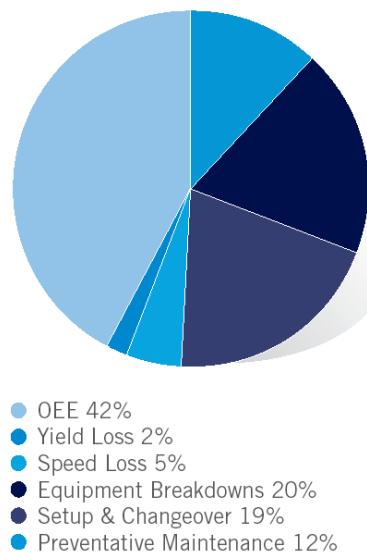
"Accurate OEE measurement makes it possible to identify the correct approach and select the appropriate improvement tools and techniques."

## UNDERSTANDING OEE (OVERALL EQUIPMENT EFFECTIVENESS)

**OEE WAS FIRST USED BY SEIICHI NAKAJIMA, THE FATHER OF TOTAL PRODUCTIVE MAINTENANCE, IN DESCRIBING ONE OF THE FUNDAMENTAL MEASURES TO TRACK PRODUCTION PERFORMANCE.**

OEE tracks the value-added productivity of equipment. It is a measure of the number of good (shippable) units produced compared to the quantity which should be produced based on the scheduled time and the specified equipment rate.

On average, plants waste up to 40% of their capacity through stops, speed losses, interruptions and defects.



Despite investments in manufacturing planning and control systems most plants have a poor overall performance rate. Plant managers often don't know the true performance of the factory and may be unsure of how to improve it. Implementing OEE measurement tools and techniques provides a much clearer understanding of where improvements can be made.

There are many ways to improve OEE performance. Some of these improvements may require substantial financial investments, while others can be achieved at minimal cost. With accurate OEE measurement it is possible to pick the projects with the quickest returns.

Accurate OEE measurement makes it possible to identify the correct approach and select the appropriate improvement tools and techniques.

### WHY MEASURING DOWNTIME IS NOT ENOUGH !

While many companies focus on Downtime Losses as a measure of equipment performance, an OEE approach will quickly make it apparent that there are also other forms of losses on most manufacturing lines.

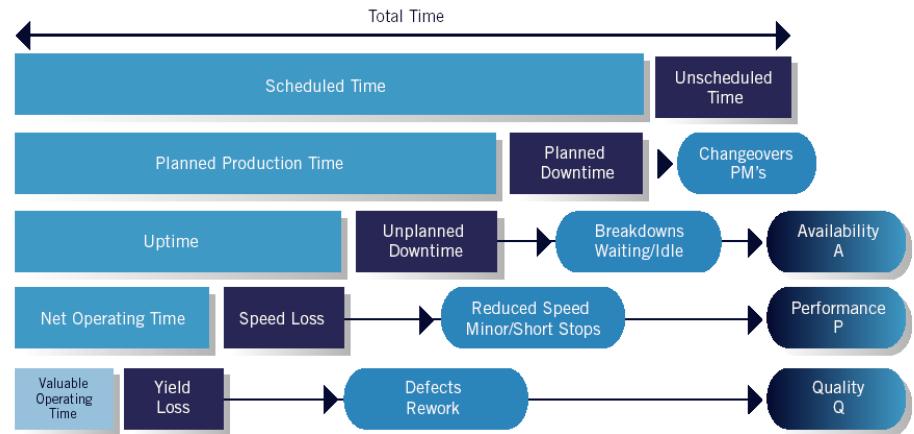
Downtime measurement alone ignores the losses due to reduced speed and minor stoppages, as well as the sensitivities of the equipment to different product types. Some products can be more difficult to make and have more breakdowns and quality problems. OEE captures all the losses and ensures that no performance improvement opportunities are ignored.

### 15 STEPS TO A SUCCESSFUL OEE PROGRAM

1. Identify the Project Team.
2. Communicate the program objectives.
3. Establish the current OEE level.
4. Validate existing data.
5. Carry out Activity Analyses and identify bottlenecks.
6. Evaluate work methods and staffing.
7. Analyse maintenance planning and execution.
8. Compare existing performance to industry 'best practices'.
9. Identify and quantify the OEE opportunities.
10. Define the target OEE performance.
11. Identify the actions and resources.
12. Develop an Implementation Plan with specific milestones.
13. Communicate the plan and set-up project boards.
14. Set up a regular measurement and review process.
15. Identify the mechanisms which will sustain the improvements.



"There is always enough times to fix a problem, but rarely enough time to prevent it."



#### OEE DEFINITION

The preferred definition of OEE accounts for all scheduled time and includes planned downtime as an opportunity area.

#### OEE

$$\text{OEE} = \frac{\text{Uptime}}{\text{Scheduled Time}} \times \frac{\text{Units Processed}}{\text{Design Rate} \times \text{Uptime}} \times \frac{\text{Good Units}}{\text{Units Processed}}$$

Percentage of time equipment is available to produce product

Actual Rate of Production as a percentage of design rate

Percentage of product which is good (shippable)

$$\text{OEE} = A \times P \times Q$$

#### OEE SOFTWARE TOOLS

A number of software tools exist to capture manufacturing performance data and display OEE performance graphically.

Selection of an appropriate OEE software tool is critical to the success of any OEE initiative.

A mistake to be avoided is the belief that this tool will drive OEE improvement - remember that any OEE software application is just a tool, and if not harnessed correctly will merely measure OEE, not improve it.

Development of Functional Specifications and detailed Application Requirements are vital elements in the success of selecting an appropriate package to support an OEE Improvement program.

#### WORLD CLASS OEE

When discussing OEE, a question commonly heard is - "What is 'World Class' OEE performance ?"

When applied to OEE, it is common to see 85% OEE quoted as 'World Class'.

But what does this mean for a typical manufacturing process - is 85% OEE a realistic goal which should be set for a typical manufacturing process ?

In practice, in order to arrive at a meaningful OEE goal the three elements of OEE need to be assessed separately.

While benchmark performance levels for the 'Quality' and 'Performance' components of OEE are readily available, what about the 'Availability' factor ?

'Availability' is probably the least well understood factor in OEE and is highly dependant on maintenance regimes, changeover frequency, and SKU count.

Depending on these, and other operating parameters, an OEE as low as 50% could very well still reflect 'World Class' performance.



[www.oeesystems.com](http://www.oeesystems.com)

**OEEsystems**  
Gurtnafleur Business Park,  
Clonmel,  
Co. Tipperary,  
IRELAND

Tel. : +353-(0)52-70384  
Fax : +353-(0)52-81987

**OEEsystems**  
Stansted Centre,  
Parsonage Road,  
Takeley, Essex,  
CM22 6PU

Tel. : +44-(0)1279-874240  
Fax : +44-(0)1279-874347