

# **Overall Equipment Effectiveness (OEE)**

## **A General Discussion on its Benefits**



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## Benefits of OEE / TEEP Management

OEE Management means much more than posting a monthly scorecard. Unfortunately, many companies attempt to perform top-level OEE calculations as a stand-alone key success metric, but without the ability to say much more about it.

An optimal implementation of OEE Management will inherently provide the structure and tools to drive the key results in favorable directions. The result will be improvements to the overall business and manufacturing processes as the organization strives to push the OEE metrics up.

### *Improved Profitability*

1. Reduced Manufacturing Cost – Driving variable costs down through waste reduction...

With a properly implemented OEE/TEEP measurement strategy, all levels of the organization have clear visibility to a universal scorecard as well as extensive cause detail for each performance gap. This ability allows leadership to put all players *on the same team*, systematically addressing the top causes of waste, and then proceeding down to the next item.

The result will be visible in improved variable costs and higher margins.

2. Take full advantage of Capital – Driving overhead costs down by utilization improvement...

The TEEP metric directly relates the utilization of capital equipment and facilities. When an operation fails to perform at planned or designed capacity, the result is that fixed cost allocation to each part produced must increase. The ideal target for TEEP should reflect an operation that runs 24 hours per day 365 days per year, and runs at world class OEE, say 85%.

Although ideal TEEP may not always be attainable, it must persistently remain on the radar screen. Generally operations management is challenged to deliver excellent OEE results. Given the OEE results, it is now up to senior leadership to take the steps necessary to achieve ideal TEEP.

Strategies for improving TEEP will target the Loading Metric and are based on a combination of increased sales volumes and/or consolidation of manufacturing capacity.

3. Reduction of Working Capital – Driving inventories down as processes improve...

It is commonly accepted that the primary purpose of work in process and finished goods inventories is to provide layers of protection against failures in the manufacturing processes. Successful Lean Manufacturing initiatives directly improve the reliability and responsiveness of these processes. Stated more directly, drive OEE improvements, then go back and reduce inventory targets accordingly. These reductions lead to immediate favorable cash flow as well as the reduction of associated carrying cost and property tax.

### *Increased Customer Satisfaction*

Successful realization of OEE Management techniques will lead to improvements of manufacturing processes on many fronts. The process characteristics that are most transparent to customers are throughput and quality. Throughput capability is readily visible via a supplier's ability to deliver on time – every time. External quality, the quality issues seen by the customer, is

generally accepted to be proportional to internal quality. Therefore, any improvement in internal reject rates will result in similar improvement as viewed by the customer. This relationship is valid regardless of attempts to *protect* the customer through extra inspection.

### ***Continuous Improvement Driver***

The aim of instilling the desire and impetus to improve the business is one that is difficult to accomplish. In reality, most organizations tend to easily fall back to the *tried and true* method of waiting until something breaks. If ownership for continuous improvement is to be passed to the responsible individuals and groups, then the results of their efforts must be highly visible and should be presented relative to improvement goals.

A comprehensive OEE Management strategy provides this needed framework by acting as the final arbiter of manufacturing success measures and speaking a common language across department and facility lines.

In addition to providing the key results, the best OEE methodologies will also provide a vast amount of underlying information as to when and where the waste is occurring. This access to the pulse of the process provides the path to improvement, as well as making day-to-day troubleshooting much more efficient and effective.

# Implementation of OEE / TEEP Management

## *Setting Goals for all Key Metrics*

During the last decade, much was written regarding the fact that setting numerical goals can be the cause of sub-optimization, or even sandbagging. Fortunately, this trend has passed and current philosophy, particularly applied to OEE, recognizes the critical nature of knowing where the business needs to be and pushing hard to attain that end. The reality of today's manufacturing is that worldwide competition will quickly cull out the players who are not able to *stay with the pack*.

A successful OEE / TEEP Management system will incorporate goals for each of the key metrics. Goals are not static numbers but rather a moving target that clearly emphasizes the need for continuous improvement. Continuous improvement, then, becomes not an optional activity but is a key responsibility for each person in the organization.

## *Access to Information; the Cornerstone for Improvement*

Clearly the most critical factor in being able to improve any business performance is to have access to timely and focused information. In addition to the above statement, the information must be tailored for the organizational level at which it is to be used. The challenge then becomes having access to timely, accurate data at a level of detail that corresponds to the task. Senior leadership must see the forest, but must have the optional capability to find the trees. Floor level personnel, conversely must clearly see the detailed measures for which they are responsible.

Historically, these varying levels of information have come from different sources, and therefore, do not present the same picture. A properly integrated system of OEE/TEEP information must present data relevant all organizational levels from top to bottom.

1. Typical Enterprise Level Scorecard data:
  - OEE / TEEP Trended by Month – relative to Goals
2. Internal Plant / Department Level Communication
  - OEE / Availability / Performance / Quality Trended by Day or Week – relative to Goals
  - Trended Pareto charting for most significant loss causes
3. Detailed Information for Problem Solving
  - Paynter Chart depictions of Waste Causes - Scrap and Downtime
  - Crosstab presentation of Waste Causes by Work Center, Part Number, or Order Number
  - Trended Performance information
  - Detailed History Reports showing every event

## *Continuous Improvement – All the Time*

The above discussion highlights the critical nature of two attributes: *Clear Goals* and *Extensive Information*. With these in place, CI (Continuous Improvement) is almost a natural extension. Even at best, though, the CI journey will not thrive without some mechanisms intended to keep the efforts moving. Although much information is in print regarding Lean Manufacturing and the CI process, the following key attributes illustrate the critical nature of the information system that provides the basis for improvement.

### 1. Periodic Review and Analysis

It is the responsibility of leadership to provide focus on CI through periodic review of the results. This activity would generally include key members of the team and would consist of:

- Review top-level OEE metrics vs. the goal lines. Failure to meet the goals triggers actions as discussed below.
- Trend analysis of individual work centers and part numbers to identify any new unfavorable trends. Any unfavorable trend also creates an action item.
- Search for proactive opportunities, typically directed at poor margin products and processes.

This monthly meeting should not take significant time but is critical to insuring that the process is ongoing and focused. A typical meeting might add 4 or 5 new action items.

### 2. Action Planning Process

In response to the direction of the periodic review team, another mid-level team now takes the responsibility for determining the appropriate actions to address the noted problem areas. Their charter is to perform further data analysis then determine the actions that are most appropriate to each issue. In the case of clearly defined problem areas, specific corrective actions may be directly assigned to individuals or groups. In the case of more complex problem areas, the Kaizen event is often an ideal option.

### 3. Kaizen Events

Kaizen events are arguably the single most effective Lean technique for insuring that CI is a way of life. These events, often designed around a one week 'blitz' schedule, rapidly improve the targeted work center or cell. The Kaizen Team is deployed quickly and includes borrowed resources from Engineering, Operations, Maintenance, Quality and other groups.

The Kaizen toolbox is extensive with the ability to implement Cellular Manufacturing, Kanban or Pull Scheduling, Work Leveling, 5S, Poka-Yoke and Autonomation, Total Productive Maintenance, SMED (Single Minute Exchange of Die), One Piece Flow, Standardized Work, Visual Manufacturing, and many others. Kaizen, then, becomes the central method by which Lean principles are put in place with great speed and efficiency.

Generally, the action planning team will provide the specific focus areas for each particular Kaizen to insure that the event addresses the problem areas. A successful Kaizen will find solutions for the assigned issues but will go much further by delivering additional improvements.

Kaizen events should be occurring on a fixed schedule that is a function of the availability of resources to staff the teams. Given this schedule, the action planning team now need only focus each event in the directions that are of most value at the time.

In conclusion, Continuous Improvement will succeed when it is driven by reliable consistent data sources and is championed by leadership. The resulting benefit will be evident in persistent improving trends of the OEE metrics.