START TO MEASURE OEE - QUICK START

This page is a "quick start guide" for measuring OEE. It provides a roadmap of key decisions and is organized in four parts:

- Define Project (things to decide before you start your OEE project)
- Capture OEE Data (everything you need to calculate OEE)
- Capture Detailed Loss Data (everything you need to calculate Availability, Performance, and Quality)
- Calculation Reference (a quick reference to the OEE calculations)

DEFINE PROJECT

Select Pilot Area — **Start with a pilot implementation on a single machine, cell, or line.**

Select a pilot area where your employees are engaged and motivated. Ideally, your pilot area will include employees who are interested in learning new things and applying ideas towards improvement. It is also much easier to start with a process that manufactures either one part or multiple parts with the same cycle time.

Pilot Area:

Identify Constraint — **OEE should be measured at the constraint step of your process (sometimes referred to as the bottleneck).**

Identify the constraint step of your process. Tip - WIP often accumulates at the constraint. On lines where equipment is balanced to run at identical speed, measure OEE at the step that does the primary work.

Constraint Step:

Measurement Method — **OEE measurement can be manual or automated.**

We recommend starting with manual OEE measurement. It reinforces the underlying concepts and provides a deeper understanding of OEE. Later, you may want to automate data collection to improve accuracy, track the Six Big Losses, and to generate top losses and other reports.

Method: ☐ Manual ☐ Automated

CAPTURE OEE DATA

Only three pieces of information are needed to calculate OEE: Good Count, Ideal Cycle Time, and Planned Production Time.

Good Count — **Good Count should only include parts that are defect-free the first time through the process.**

Identify how you will collect Good Count. For both manual and automated measurement, the ideal is to count good parts at the end of the process. For manual, look for a counter at this position, and for automated, a sensor.

Count Source:

Ideal Cycle Time — **Ideal Cycle Time is the theoretical minimum time to produce one piece (NOT a 'budget' or 'standard' time).**

Determine the Ideal Cycle Time of the constraint. The preferred method is to use nameplate capacity (the design capacity specified by the equipment builder). An alternate method is to perform a time study (measuring the absolute fastest speed the process can support).

Ideal Cycle Time:

Planned Production Time — **Planned Production Time is the total time that the manufacturing process is scheduled for production.**

Start with shift time and decide if certain types of planned stops during the shift will be excluded (i.e., will not count against OEE). Most companies exclude only breaks (including lunches) and meetings.

Exclude: ☐ Breaks   ☐ Meetings
☐ Changeovers   ☐ Planned Maintenance   ☐ Other:

CAPTURE DETAILED LOSS DATA

In order to leverage OEE to improve manufacturing productivity, it is essential to calculate the three OEE factors: Availability, Performance, and Quality. This requires two more pieces of information: Run Time and Total Count. Since in practice Run Time is calculated as Planned Production Time less Stop Time, we need to collect Stop Time.

Stop Time	Stop Time is defined as time where the manufacturing process is intended to be running but is not.

Decide how to record Stop Time. For manual measurement, a tick sheet is usually the easiest way to collect Stop Time (an alternative is to record start and end times for each stop). For automated measurement, the data collection system will automatically record Stop Time.

Method: ☐ Tick Sheet ☐ Start and End Times ☐ Automated

Decide the time threshold for recording stops. Any stop that reaches the Stop Threshold should be logged and included as Stop Time (an Availability Loss). Any stop shorter than the Stop Threshold is considered a Small Stop (and is captured by the Performance Loss calculation). A typical Stop Threshold is five minutes for manual systems and two minutes for automated systems.

Stop Threshold (minutes):

Total Count	Total Count can be measured directly, or Reject Count can be measured instead, and added to Good Count.

Decide if you will measure Total Count or Reject Count.

Measure: ☐ Total Count ☐ Reject Count

Identify how you will collect Total Count (or Reject Count). For both manual and automated measurement of Total Count, the ideal is to count all parts immediately before they enter the constraint. For manual, look for a counter at this position, and for automated, a sensor. Reject Count should be measured in the same place as Good Count (see above).

Count Source:

Changeover Policy	Measure Changeover Time consistently by defining the start and end points of each changeover.

Document your policy for measuring Changeover Time. Three common options are:

- ■ *First Good Part is measured as the time between the last good part produced (before setup) to the first good part produced (after setup).*
- ■ *Consistent Good Parts is measured as the time between the last good part produced (before setup) to the first instance of consistently producing parts that meet quality standards (after setup).*
- ■ *Full Speed is measured as the last good part produced at full speed (before setup) to the first good part produced at full speed (after setup).*

Policy: ☐ First Good Part ☐ Consistent Good Parts ☐ Full Speed ☐ Other

Stop Reasons	Stop reasons provide insights as to why the process has stopped – especially for unplanned stops.

Create a starting list of stop reasons. Here are some tips for maintaining a useful list of reasons. Start simple (10 reasons). Create a catch-all reason (All Other Losses). Make sure every reason is clear and unambiguous. Make sure every reason describes symptoms. Remove reasons that aren't regularly used. Add reasons if 'All Other Losses' is in the top ten losses.

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

CALCULATION REFERENCE

OEE = (Good Count x Ideal Cycle Time) / Planned Production Time

Run Time = Planned Production Time - Stop Time

Availability = Run Time / Planned Production Time

Performance = (Ideal Cycle Time x Total Count) / Run Time

Quality = Good Count / Total Count