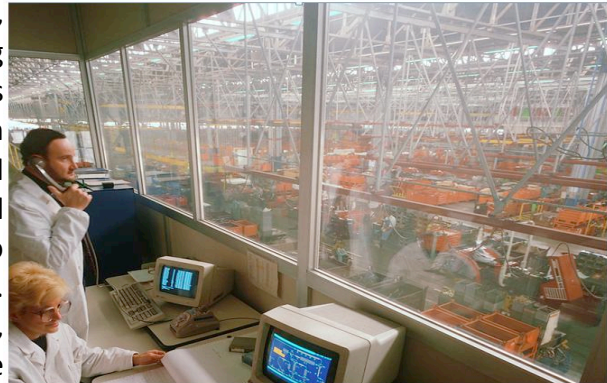


# Continually Improving Efficiency

When faced with tough economic times, manufactures are now more than ever, realizing the importance of capturing efficiency metrics associate with lines and plants as a whole. With the cost of energy/materials on the rise and consumer spending down, efficiency plays a vital role in improving a plant's production process to help sustain and surpass acceptable margins. With this in mind the question now becomes, what can we "the plant" do to achieve the largest and quickest return on investment? The answer, OEE/DTM solutions or Overall Equipment Effectiveness complimented by a Downtime Management System.



$$\text{OEE\%} = \text{Availability\%} \times \text{Performance\%} \times \text{Quality\%}$$

$$\text{Availability\%} = \frac{\text{Operating Time}}{\text{Scheduled Time}}$$

$$\text{Performance\%} = \frac{\text{Actual Production Speed}}{\text{Theoretical Production Speed}}$$

$$\text{Quality\%} = \frac{\text{Number of Quality Products Produced}}{\text{Total Number of Products Produced}}$$

OEE covers three key indicators: performance, quality, and availability. OEE information, when combined with many other metrics, such as resource utilization, mean time between failures and speed loss gives an easy way to collect, categorize and use factory floor information.

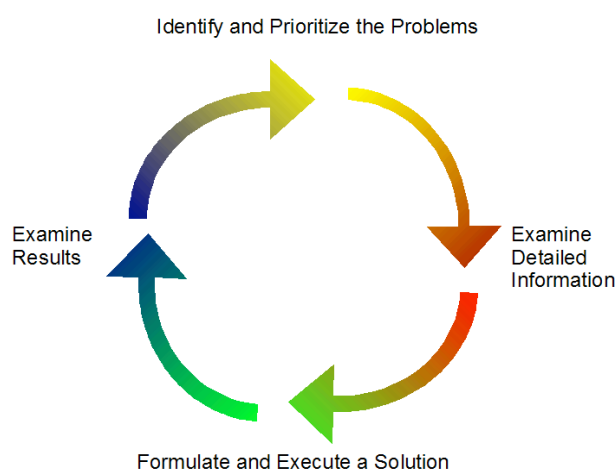
Data collection and display is an essential step in the ongoing effort to improve a plant's production process. Once production data is captured it can then be used to determine the root causes of inefficiencies and help determine the best solution, thus unlocking the hidden potential that already exists on the factory floor.

Most of a factory's inefficiencies can be attributed to one of the six big losses (blue are the Big Losses and red are the corresponding OEE Losses):

- **Breakdown - Downtime Loss**
  - Unplanned maintenance.
  - General breakdowns.
  - Equipment failures.
- **Set-up & Adjustment - Downtime Loss**
  - Major adjustments.
  - Warm-up time.
  - Cleaning.
- **Small Stops - Speed Loss**
  - Obstructed flow.
  - Component jams.
  - Misfeeds.
- **Reduced Speed - Speed Loss**
  - Material shortages.
  - Under design capacity.
  - Operator inefficiency.
- **Startup Rejects - Quality Loss**
  - Scrap.
  - In-process damage.
  - Incorrect assembly.
- **Production Rejects - Quality Loss**
  - Scrap.
  - Rework.
  - In-process damage.

OEE/DTM solutions will help identify these losses with a very fine degree of granularity. Granularity comes in the form of detailed downtime definitions and contextualization. Detailed downtime definitions are provided by the Down Time Management (DTM) part of the solution. Just knowing that a machine is not running is not enough; users must know the reason why that machine is not running. DTM can provide the exact reason for a machine status as well as how long it was in this state, if the status was planned and if the status is related to other possible statuses. Contextualization for each of the problems can be determined on both a macro and micro scale using context information like shift, order, material, production line or machine. Problems identified on the macro scale can be further detailed on the micro level by examining the context of the information. For example, a manager notices that the OEE performance rate on a production line is beginning to drop. Examination of the DTM information shows that one machine is being stopped by periodic small jams. These jams take 15 seconds of operator intervention to solve multiple times during a shift and over the course of a shift add up to fifteen minutes of lost production time. With this information maintenance can be scheduled for the very next downtime to bring production back up to full speed. All of this data enables the factory staff to improve on areas that cut production costs, improve on-time delivery and manage downtime to increase output/productivity and quality.

Worldwide the accepted estimate for the average OEE level is between 45% and 60%; whereas truly efficient factories strive for a world class rating of 85%. To reach a world class rating a software solution that provides clear real-time information combined with a continuous cycle of improvement is required. An effective OEE solution supplies real-time information and a clear transparency into the production process making it possible for effective management decisions as well as provide the shop floor with monitoring tools it needs to immediately see inefficiencies. However, the OEE system is only a tool. In order to see vast improvement and truly unlock the hidden potential it must be used correctly.



Management should use the information it collects to identify and prioritize specific problems so they can be monitored more closely. Once a clear idea of the problem is identified then a solution can be decided upon and implemented for the shop floor. Afterwards the cycle of data collection begins again. After each iteration on the improvement cycle the OEE rating should increase a little until the target goals of world class manufacturing are achieved.

Hyla Soft offers OEE solutions that can calculate all the standard OEE algorithms as well as custom algorithms. These results are automatically displayed in a variety of easily configurable charts for easy analysis. Once the rates are calculated the interfaces provided in the solution gives users endless possibilities on how they want to display and compare data. Such features

include advanced charting, on the fly custom calculations, contextualize based on production shifts/production line and much more.

Hyla Soft also delivers solutions focused on DTM which stands for Down Time Management. DTM deals with monitoring the individual status of equipment/production line. DTM can help enhance OEE by recording all significant cost metric data associated with equipment downtime in a manufacturing plant. Once the system has captured the data, it can be used for analysis by managers and line supervisors to help them make more informed decisions to lower the cost of downtime and to realize greater savings. Hyla Soft USA DTM solutions make it possible to capture all the necessary data, apply the right aggregation, and provide user interfaces for the visualization/analysis.