KPI Measurement tool for Assembly Plant
KPI Measurement software module

Key Performance Indicators are measurable, definable metrics typically used to signify company goals. KPIs are considered to be primary metrics. Key Performance Indicators, when exposed and properly analyzed can be used to understand and improve manufacturing performance.

KPI provides a mechanism for companies to identify areas for improvement, create the metrics that will be used to analyze the process and the tools to support change to the future state. Lean manufacturing is a process. Companies that use KPIs in this context use them to improve every day.

In order to successfully leverage performance improvements based on KPIs there are three main precursors.

- Measurability
- Team acceptance
- Conformance to organizational goals

Measurability

The KPI must be measurable. The methodology of the measurement must be documented and accepted before the process begins. Understanding exactly what is to be measured will help determine how it will be measured. The effects of changes can be tracked through careful analysis of the benchmark KPI data. Goals and desires are often vague - key performance indicators are always very specific.

Team acceptance

Team buy in is often the difference between success and failure of many manufacturing projects. In regards to KPI it is critical. KPIs are typically the primary source of information regarding the performance of a process that is being monitored. In order to successfully use the data everyone needs to understand why the indicator was chosen and how it represents the underlying condition. Additionally, since the data will be used as an indicator of process performance, it is necessary that the entire team use it in the same way.
Conformance

General company goals and initiatives are at the heart of KPI. By determining a way to measure the success of a production process, companies are able to monitor change. When action is required, KPIs will provide advance warning. Successful KPI implementation means limiting exposed performance data to only key indicators. Often there may be a desire to measure the entire process. While this is understandable, the difference between KPI and other metrics must be understood and enforced.

KPI modules

Production line performance measurement to indicate in real-time the following calculated information:

- Total quantity target for each session
- Actual quantity achieved for each session
- Rate of completion for each session (percent efficiency)
- Use color to show when a changeover has exceeded the allowed amount of time or display run time in green when the process is running and downtime in red when the line is stopped. (Run Time, Down Time, Break Schedule)
- Real-time display of Pieces to Goal and/or Time to Goal is a great way to alert work groups of an impending changeover and help with planning. Operators can work toward reducing changeover time by performing external setup based on feedback from the display. For example, display variables can change from green to amber when there is 30 minutes or X pieces to job completion.
- Schedule and shift management module to allow management to allocate required workforce based on line requirement and forecast target.

Based on a three-field configuration, the Actual Count, Target Count and calculated Efficiency % are displayed simultaneously to help operators produce exactly what is required, when it is required. The solution offers web based access with notification of alerts to management on the status of the production line performance. Historical data can be stored and reviewed by management when required.
The above picture is an illustration of the expected KPI measurement statistic. The provided graph can be manipulated to provide graphical enhanced charts if required by the client.
KPI measurement for test machine (client pc, JIGS) is required to identify downtime and measure its effect on production.

- Total number of system failure (software and hardware)
- Total number of NG for a particular test machine
- Tracking of machine maintenance cycle
- Downtime detection and notification
- Show any or all variables associated with Overall Equipment Effectiveness in either their own dedicated field or scroll the values on a single display field. (OEE %, Availability %, Performance %, Quality %)

The above measurements will provide management with information on the reasons for downtime when system related failure occurs. This measurement is important for preventive maintenance actions to minimize system faults during production. An example of the illustrated display is shown in the following picture.

<table>
<thead>
<tr>
<th></th>
<th>Up</th>
<th>Down</th>
<th>Uncertain</th>
<th>Depender unavailable</th>
<th>Maintenance</th>
<th>On hold</th>
<th>Not monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP8012</td>
<td>21 hrs 35 min (100.00%)</td>
<td>0 hrs 0 min (0.00%)</td>
<td>0 hrs 0 min (0.00%)</td>
<td>0 hrs 0 min (0.00%)</td>
<td>0 hrs 0 min (0.00%)</td>
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<tr>
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<td>0 hrs 0 min (0.00%)</td>
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</tr>
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</table>

Statistic comparison and data analysis module.

- Analysis on abnormal condition and notification of such condition via POP-up message and email notification services. Phenomena based statistic and alerts will provide quality control division with the means to identify new problems or reoccurring random problems that result in leakage of defective products. Such problems are sometimes mistaken by operators as test system fault and the actual problem can be overlooked.
- Statistic comparison module for actual process and re-screening process to identify and analyze process with high failure rates based on process and test machine.
- Statistic comparison module for all process in production line to measure the efficiency of the production line based on process. Measurement variables are (total quantity processed, time for completion, rate of completion, PPM reject rate, number of rechecks)