



Seven Common KPIs for Production Monitoring

Using Visual Management to Drive Productivity

White Paper

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Introduction

Strategic philosophies or practices such as Kaizen, Lean Manufacturing, Six Sigma, Total Quality Management and Continuous Improvement are used by many organizations to help improve processes, drive productivity and maintain a competitive edge in today's ever-increasing global economy. Despite varying concepts, each practice uses Key Performance Indicators (KPIs) to assess, analyze and track manufacturing processes. Even if an organization does not employ formal continuous improvement initiatives, efficiency gains can still be realized by borrowing lessons learned through the visual management techniques of those processes. This white paper discusses how visual management can drive productivity by leveraging seven common Key Performance Indicators (KPIs) for production line monitoring.

What are Key Performance Indicators (KPIs)?

KPIs are assorted variables that organizations use to assess, analyze and track manufacturing processes. These performance measurements are commonly used to evaluate success in relation to goals and objectives.

What is Visual Management?

Visual management is the process of displaying critical information such as KPIs that relate specifically to production output, efficiency and quality. By displaying this data on the factory floor, employees have a better sense of production levels and tend to strive for higher performance. Visual management also provides actionable information that allows supervisors to better monitor performance and determine, in real-time, areas that may need improvement. The overall result helps to drive productivity throughout the organization by increasing efficiency, quality and uptime. More information on this topic is outlined in Red Lion's *"Three Effective Visual Management Solutions"* whitepaper.

Seven Common Production KPIs

KPIs tend to vary by organization. A list of seven common production KPIs used on automated plant floors follow:

1. Count (Good or Bad)

An essential factory floor metric relates to the amount of product produced. The count (good or bad) typically refers to either the amount of product produced since the last machine changeover or the production sum for the entire shift or week. Many companies will compare individual worker and shift output to invoke a competitive spirit among employees.

2. Reject Ratio

Production processes occasionally produce scrap, which is measured in terms of reject ratio. Minimizing scrap helps organizations meet profitability goals so it is important to track whether or not the amount being produced is within tolerable limits.

3. Rate

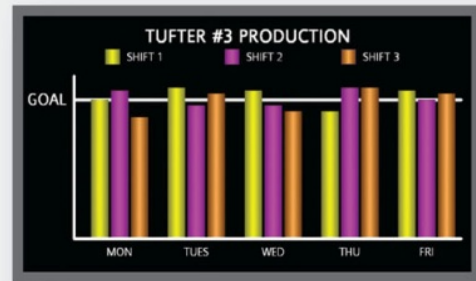
Machines and processes produce goods at variable rates. When speeds differ, slow rates typically result in dropped profits while faster speeds affect quality control. This is why it is important for operating speeds to remain consistent.

4. Target

Many organizations display target values for output, rate and quality. This KPI helps motivate employees to meet specific performance targets.

5. Takt Time

Takt time is the amount of time, or cycle time, for the completion of a task. This could be the time it takes to produce a product, but it more likely relates to the cycle



LINE	GOAL	PRODUCED	BAD	GOOD	SHORTFALL	PERCENT
1	1000	852	12	840	160	84 %
2	750	46	3	43	707	5 %
3	900	801	12	789	111	87 %
4	5000	4527	55	4472	528	89 %
5	1250	757	10	747	503	59 %
6	6500	5586	214	5372	503	82 %
7	5000	4489	76	4413	587	88 %
8	3500	75	2	73	3427	2 %



time of specific operations. By displaying this KPI, manufacturers can quickly determine where the constraints or bottlenecks are within a process.

6. Overall Equipment Effectiveness (OEE)

OEE is a metric that multiplies availability by performance and quality to determine resource utilization. Production managers want OEE values to increase because this indicates more efficient utilization of available personnel and machinery.

7. Downtime

Whether the result of a breakdown or simply a machine changeover, downtime is considered one of the most important KPI metrics to track. When machines are not operating, money isn't being made so reducing downtime is an easy way to increase profitability. Organizations that track downtime typically require operators to enter a "reason code" via keypad, pushbutton or bar code scanner so that the most common reasons can be reviewed at a later time.

Implementing Visual Management

To demonstrate how to implement visual management, let's consider a real-world example of how a contract packaging company uses KPIs to drive productivity. This organization employs workers that work in teams to assemble packages and determines quotes for new jobs based upon prior time studies. Considering the unique nature of every project, making a profit on a given job is dependent on the team's ability to set up the production line for a new run within the shortest period of time, as well as being able to maintain the assumed rate of production for the entirety of each job. To effectively accomplish this, real-time information is required to confirm if assumptions made during the quoting process are being met.

The packaging company installed large LED displays on each line to display conveyor speeds as well as the elapsed time during changeover periods. By implementing visual management, supervisors are now able to take immediate action when changeovers take too long or workers fail to meet required packaging rates. This deployment enabled the organization to substantially increase profitability and drive productivity with 10-15 percent faster completion times.

Driving Productivity

Managing productivity and profitability is a key role of plant managers and engineers in world-class manufacturing operations. The amount of increased productivity and profit an organization stands to gain depends quite largely on the company and its existing processes.

Consider any given line or machine within a production facility, and estimate the financial impact if output could be increased by 1, 5, 10 or even 20 percent. Now consider what the financial impact might

be if downtime could be reduced by as much as 15 percent. Even the slightest improvement can result in attractive returns. Plants with target KPI metrics should take the time to evaluate the numbers and examine how visual management could drive productivity across the organization.

Since many visual management systems are low cost, there is little risk involved for potentially large returns in process improvements and profitability. When evaluating savings potential, it is important to include all costs that may incur as a result of downtime. For instance, there are labor and utility costs, but what about scrap? Many continuous processes require machines run start to finish, so any interruption means scrap product. KPI monitoring helps to track such processes.

Using Visual Management for KPI Monitoring

Red Lion Controls provides industry-leading solutions for visual management of a wide variety of applications. Red Lion's visual management products range from simple large LED displays to the powerful ProductVity (PTV) Station. The PTV Station is a ready-to-deploy plant floor visual management system that seamlessly displays real-time KPI data and andon messages on large televisions to drive productivity. To learn more, please visit www.redlion.net/PTV.



The Red Lion Advantage

As the global experts in communication, monitoring and control for industrial automation, Red Lion has been delivering innovative solutions to customers for forty years. Our award-winning technology enables companies worldwide to gain real-time data visibility that drives productivity. Product brands include [Red Lion](#), [Sixnet](#) and [N-Tron](#). With headquarters in York, Pennsylvania, the company has offices across the Americas, Asia-Pacific and Europe. For more information, please visit www.redlion.net or call +1 (717) 767-6511. Red Lion is a [Spectris](#) company.



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