
Overall Labor Effectiveness (OLE):

Achieving a Highly Effective Workforce

A sound measurement framework is something every manufacturer would like to have. Yet today, most measurement systems focus on machinery effectiveness or production output. Manufacturers measure time and attendance carefully, but beyond that, few have a method of understanding the effective use of their workforce. This white paper will provide a description of Overall Labor Effectiveness™ (OLE) and discuss how to use it as a tool to improve the overall effectiveness of the labor force.

Why Labor Is the Next Frontier in Overall Manufacturing Performance

Manufacturers know the problem well. Entering the quarter with a sizable backlog, the management team is optimistic about steady revenues and high profits. Yet when the results are tallied, the profitability expected doesn't materialize. Postmortems show no important equipment failures, no labor issues that drained productivity, and profit nowhere near the level everyone thought possible.

The culprit? Beyond operating failures, very likely the problem can be traced to a host of workforce-related issues that accumulated as the plant ran at less-than-optimum capability. Some probable causes: The plant's hard assets weren't used efficiently due to difficulty scheduling the right resources when and where their specific skills were required. Absenteeism of critical individuals contributed to the problem. Undelivered or ineffective training hampered quality output and slowed production ramp ups — the same for changeovers and new product startups.

Factors like these are drawing attention to labor as the next critical manufacturing element to optimize in today's demand-driven world. During the past decade, manufacturers poured attention and resources into supply chain improvements as a way to increase competitiveness and profitability. It was a successful strategy, but now it's hitting the law of diminishing returns. Savvy managers have realized that their workforce can be the engine that drives supply chains and manufacturing in the quest to move to the next level of performance.

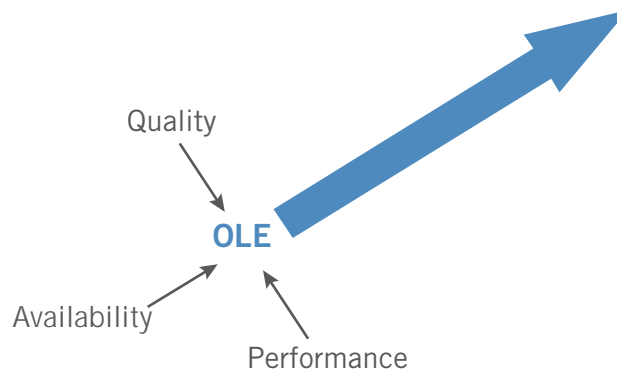
And the pressure is getting greater. For many manufacturing executives, dealing with a changing workforce, competing with offshore manufacturing, and maintaining profitability are factors of corporate survival — and these goals will be achieved only if they can optimize their workforce performance.

Defining Overall Labor Effectiveness (OLE)

Optimizing workforce performance requires new insight. Attaining that insight requires companies to establish methods of quantifying, diagnosing, and ultimately predicting the performance of their workforce — one of the most important and highly variable elements of manufacturing. That insight can be provided by Overall Labor Effectiveness (OLE).

Simply put, OLE is the analysis of the cumulative effect three workforce factors have on productive output:

- Availability: the percentage of time the workforce spends making effective contributions
- Performance: the amount of product delivered
- Quality: the percentage of perfect or saleable product produced



OLE is the key to understanding the effect the workforce has on manufacturing performance — and, most important, it provides a platform that helps diagnose and predict that performance.

OLE: A partner to OEE

OLE has a precursor in a metric known as Overall Equipment Effectiveness (OEE). Designed to ensure maximum output from machines, OEE has been a bellwether of performance for manufacturing managers in asset-intensive industries, such as chemicals and refining. To understand OLE completely we must understand OEE, the relationship between the two, and how they work together to raise overall manufacturing productivity and performance.

OEE is a formula that shows the overall performance of a single piece of equipment, or even an entire factory, and is governed by the cumulative effect of three factors: the equipment's availability (percentage of scheduled production time available), performance rate (percentage of parts produced compared to standard), and quality (percentage of saleable parts produced compared to parts started).

OEE takes a holistic view, and many managers feel it is the best tool for managing operations in the context of cost- and efficiency-focused manufacturing. OEE is an effective measure, but it doesn't tell the whole story. In today's demand-driven operations, many manufacturing environments no longer place a high value on flat-out volume production. Shorter cycles and more frequent changeovers — which reduce the OEE values — are more important, lessening the value of OEE as an indicator of manufacturing productivity.

The shortcomings of OEE as a stand-alone measure are related to the interactions of labor with equipment:

- In asset-intensive industries, such as refining, the ratio of employees to assets is very low. If a certified operator isn't available to start a machine, OEE looks negative — but impaired output was not caused by the machine's potential.
- OEE doesn't capture the interdependency of the direct and indirect workforce. For example, machine availability may be high, driving good OEE. A deeper look, though, may show that the maintenance staff is spending significant amounts of time to keep the machine running. As a result, other areas suffer indirectly, since maintenance resources are not available to them, which causes overall workforce productivity to drop. Similarly, attendance, scheduling, breaks, and other workforces issues are not directly captured.
- OEE doesn't work when there isn't a machine to measure. Many critical manufacturing processes don't have a machine to capture measurements from. For example, a welding station depends upon highly skilled (and difficult to recruit) workers performing a manual process.

Achieving a Highly Effective Workforce

- OEE does not have a comparable cost metric — and for good reason, as machines generally have predictable costs, such as depreciation and scheduled maintenance. Adding a labor element to an operation brings in three dimensions of variable costs. First, operators have different wage rates. Second, operators may earn premium wages, such as overtime, during production. Finally, a difference in cost attributed to performance against a standard may actually be caused by labor.

To get a true picture of operational performance, we also need to look at OLE, which provides insights into the critical elements of workforce preparation and execution. It helps managers see how the workforce influences profitable production and points to the root causes of ineffective labor utilization. In its own way, OLE can show how assets and employees come together to drive performance. Some examples:

- OLE provides the ability to analyze the labor impact at the operator, department, plant, and even corporate levels of the organization.
- OLE can expose the interaction of interdependent variables. Changes made to improve one area may have a negative impact elsewhere. For example, a process change makes it faster to get parts to the shop floor but complicates warehouse operations.
- Trends that individually are too small to be noticed are highlighted earlier because of their cascading effect on total performance.

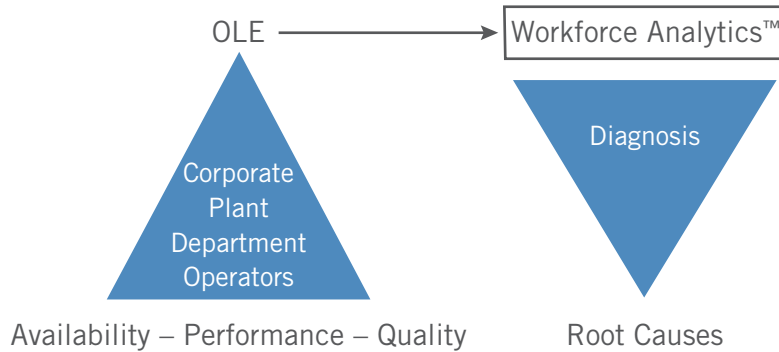
The familiar OEE factors — availability, performance, and quality — are the basic elements used in measuring labor effectiveness. But in measuring the contributions human beings make, it's useful to look deeper and consider additional factors.

OEE Element	OLE Element	Key Workforce Drivers
Availability	Availability	Utilization and absenteeism Scheduling of indirect activities
Performance	Performance	Availability of processes, instructions, tools, and materials Training and skills Indirect support staff
Quality	Quality	Employee knowledge Proper use of instructions and tools

Behind the OLE equation: Powerful diagnostics for improving workforce contribution

Effective labor contribution is accomplished when managers can see and manage the three OLE elements — availability, performance, and quality — in concert. A manufacturer can improve shop floor productivity, and therefore the level of profitability, by understanding the interdependency and trade-offs of these three factors and managing them in real time. Let's examine these elements:

The OLE Process



Availability

Clearly availability is a basic criterion, and utilization is the most important component of availability. There are many things that influence workforce availability, and therefore the potential output of equipment and the plant. For example:

- Absenteeism and utilization: Standard labor utilization measures — which include employee illness, approved or unapproved leaves, and times when people are unavailable due to training, meetings, or other company-defined activities — come into play here.
- Scheduling: Involves having the right skill at the right time. Beyond merely providing a worker, we must consider employee skills and certifications, as well as flexible work schedules.
- Indirect time: Includes material delays, idle time, shift changeover, and machine downtime.

Performance

This is the recording of output, which determines whether producing or delivering a product or service took as long as company labor standards indicated it would (whether tangible units are manufactured or specific services are delivered). Performance output includes:

- Availability of processes, instructions, tools, and materials: Shop floor issues, such as worn or misplaced tools, material shortages, or missing processes or instructions, will slow production and limit output — and likely have a negative impact on quality.
- Training and skills: Do employees know how to do the tasks they are assigned? Certainly these factors affect the ability to deliver the expected output throughout a complete shift or job run.
- Indirect support staff: A workforce that is insufficiently trained or skilled will require additional support staff, including supervisors, maintenance technicians, and quality assurance personnel.

With OLE analytics, interdependencies between factors are brought to the surface. Here's a scenario: Something disregarded on the shop floor as a minor availability issue shows up as a troubling performance shortfall. OLE analytics track the problem back to a failure to meet standard job times, which was caused by jobs that weren't started on time because the right employees weren't at their stations and ready for the work at hand. When performance consistently falls below expectations, OLE quickly highlights the root causes, including inaccurately set labor standards.

Quality

At the end of the day, we need to know if the output of production met specified quality levels. While quality is certainly a function of the materials used, it is impacted by important human factors:

- Employee knowledge: Do employees understand the quality drivers of their specific operations? Employee skills directly affect the quality of output. Knowledgeable operators know how to measure their work and understand how the processes operate, how variability affects quality, and what adjustments keep processes to spec as they run. They also know when to stop production for corrective actions, should quality fall below specified limits. Applying this type of knowledge reduces the amount of wasted work and cuts scrap and rework costs.
- Proper use of instructions and tools: Did workers use the right tools and follow the right procedures?

Moving from Administering Human Resources to Measuring the Workforce Investment: What OLE Can Tell Managers

Managers in the manufacturing industry have invested in workforce management tools, but until recently most money was spent to manage human resources from an administrative point of view.

The true power of OLE is its ability show cause and effect. It identifies problems that cut into profitability and shows how investments in human resources pay off. Examples of what managers learn from OLE include:

- Root-cause insights: For example, recognizing that a maintenance crew spent an inordinate amount of time in one production area, a manager sees that either a particular piece of equipment needs to be replaced or the operators are using it improperly. Digging further into OLE, the manager finds the root cause — a higher volume on the equipment that correlates to a change in incentive pay, which, unfortunately, promoted bad operational practices.
- Predictive measures: OLE can provide insight into the root causes of manufacturing inefficiencies. For example, seeing that overtime rose 10 percent in a recent period, a manager learns that when several new technicians were hired, the average skill level dropped and the average time spent per assembly rose 15 percent. Spending resources to improve the new-hire introduction program can be weighed against the incremental overtime costs of the new hires. Either way, the effect of additional new hires can be forecast better.
- Return on Investment from training: Measuring the effect of education is something everybody wants but few have been able to do. Using OLE, a manufacturer can pinpoint the root cause, invest in training, monitor specific increases in quality or performance, and recognize the improvement in productivity. Most importantly, the results of training can be monetized for ROI calculation and justification.

OLE can show how assets and employees come together to drive performance. Interdependent variables and difficult-to-identify relationships are exposed by a balanced key performance indicator such as OLE, showing how changes made to improve one area could have a negative impact elsewhere. Trends that individually are too small to be noticed are highlighted earlier because their cascading effect on total performance is recognized earlier. Executives throughout the organization have hard facts to help them analyze the effective contribution of the workforce and don't have to rely on anecdotal evidence.

A simple example

Imagine a manufacturer that has full employment, sufficient demand to run the factory at full output, and equipment that is in good operating order. It's a rosy outlook, but experience tells the plant manager that something is just not right. Margins are looking good, but given the opportunity, shouldn't they be better? How can OLE illustrate how the workforce is affecting profit potential? Let's consider some simple specifics for each element of OLE:

- **Availability:** Utilization is hampered by several items in the plant. First, absenteeism accounts for a capacity shortfall of approximately 2 percent each period. Also, poor material scheduling and movement causes about one hour of idle time per shift.
- **Performance:** Output is down somewhat. An insufficient number of technicians available to set up the equipment often means productive output is stalled at every changeover. The impact: lost productive time of about 5 percent.
- **Quality:** Given the shortfall of productive hours, the supervisors attempt to make up the lost time by running at higher production rates. The result: Quality begins to slip as the day wears on, and yields drop. The impact is a 4 percent loss of acceptable product.

The cumulative impact: The OLE value for the plant is 78.2 percent — a far cry from what the plant manager and his staff expected.

Category	Individual Performance	Total Individual Performance	OLE (Cumulative)
Availability			78.2% Effective Labor Use
Absenteeism	98%	85.8%	
Idle time	87.5%		
Performance			
Technician wait time	95%	95%	
Quality			
Speed and fatigue	96%	96%	

The takeaway is that this plant converted only 78.2 percent of the factory's potential for profitable output — potential that can never be regained.

Effective use of OLE uncovers the data that fuels root-cause analysis and points to corrective actions. Likewise, OLE exposes trends that can be used to diagnose more subtle problems. It also helps managers understand whether corrective actions did in fact solve problems and improve overall productivity.

The Call to Action: Using OLE to Master the Next Manufacturing Frontier

You get what you measure. Surprisingly, although manufacturers track time and attendance, they seldom have a method of measuring, or understanding, how the actions of the labor force directly influence profitability. Now that they have squeezed productivity from their supply chains, manufacturers are looking for ways to further increase competitiveness. Identifying ways to help the workforce become more productive affords that next big opportunity.

Using OLE concepts and backing them with the power of analytics provides a real-time method of recognizing the cumulative effect of workforce variables. It gives managers hard data to diagnose, correct, and improve the financial performance of manufacturing operations. Just as people influence performance throughout the operation, OLE data can quantify the effects of their actions. OLE addresses smaller details, such as on-time performance, and answers larger questions, such as whether a training budget is justified.

Three things will power the competitive advantage of the next generation of manufacturers:

- A stream of innovative products that excite customers
- Highly flexible and effective supply chains
- A highly motivated, effective workforce

OLE helps manufacturers develop a highly motivated, effective workforce by helping them identify where people need better processes, materials, training, or indirect support. It's a productivity tool for managers that helps them manage better as they convert labor dollars into profits.

To learn more about how OLE can benefit your organization, read the next white paper in our OLE series, Overall Labor Effectiveness, The Business Case for Labor Productivity. Visit www.kronos.com/FYO/Manufacturing.htm, and look under "Resources" to download the paper.



Experts at Improving the Performance
of People and Business™