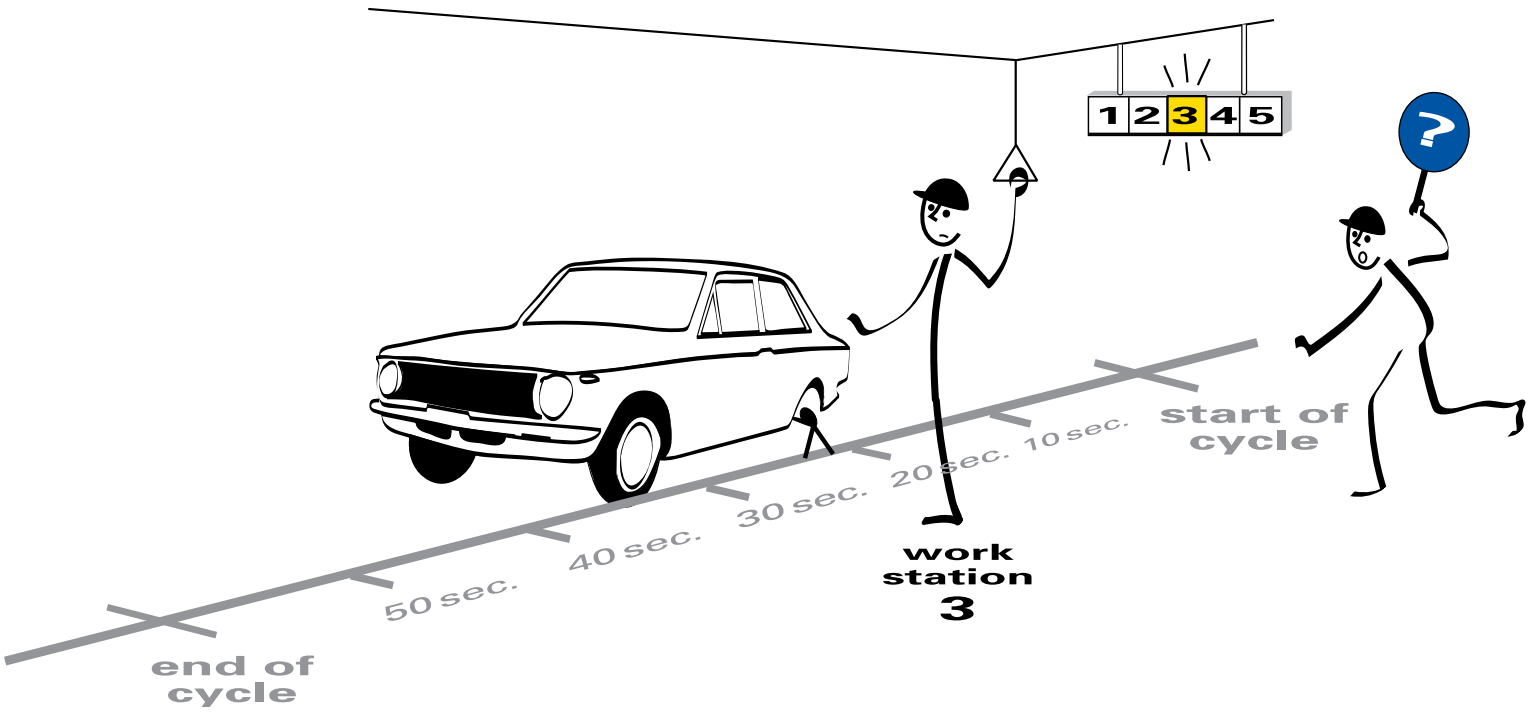
Lean Enterprise Institute

How Standardized Work Integrates People with Process



John Shook explains why he thinks "the Toyota Way is a socio-technical system on steroids" that brings together people (social) and processes (technical) to bear on purpose — and how standardized work demonstrates this integration.

By John Shook

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How Standardized Work Integrates People with Process

> "I like to say that the Toyota Way is a socio-technical system on steroids. A test for all our lean systems is the question of how well we integrate people with process (the social with the technical). Nowhere does that come together more than in the form of standardized work and kaizen."
>
> — John Shook

This quote summarizes a critical point in understanding the "why" of the lean practice of standardized work. This eBook, based on a three-part series in the *Lean Post*, expands on this thinking, drilling down into the meaning of standardized work and how it embodies both the technical and social dimensions of work at the micro-level at all times.

In part one, Shook explains the fundamentals of standardized work by sharing and expanding on the five elements that organizations most often misunderstand when implementing standardized work.

1. **Don't confuse standardized work with work standards.**
2. **Don't confuse standardization with commonization.**
3. **Don't impose standardized work without providing a structured improvement process — a clearly defined, unambiguous means of improving it (kaizen).**
4. **Practice, practice, practice.**
5. **Don't forget the critical role of the leader/manager.**

In part two, he shares an at-a-glance outline of standardized work, showing how it serves — or should serve your lean thinking and practice, as viewed through the lens of LEI's Three P framework of Purpose, Process, and People.

In part three, he offers an illustrated example of how standardized work integrates the social (people) and the technical (process).

5 Fundamental Misunderstandings about Standardized Work

So, how is your standardized work implementation going?

Responses to that question usually paint an ugly picture. Here's what I frequently hear:

"We just don't have the discipline Toyota has to make standardized work work."

"We put it in place, but the people don't follow it."

"We have trouble transferring good standardized work from one worksite to another."

"We are good at determining the One Best Way, but people always insist on doing it their way."

"People just don't want to follow it. They like to do their own thing."

"We put in an audit process, but the auditors don't follow the audit process."

I like to say that the Toyota Way is a socio-technical system on steroids. A test for all our lean systems is how well we integrate people with process (the social with the technical). Nowhere does that come together more than in the form of standardized work and kaizen.

> "Leaders, be warned: You cannot simply dictate this from on high. You are in trouble as soon as you find yourself chasing compliance in pursuit of standardized work."

By that, I'm saying much more than just pointing out that our corporate-level lean initiatives should involve both Engineering and Human Resources departments, each initiating programs to elevate the technical and the social dimensions of work. I am talking about how work design simultaneously embodies both dimensions at the micro-level. When a worker bolts in the seat belt in the factory or an office staffer processes a requisition in the office, the work will be driven by both the technical and social aspects of the job design.

Leaders, be warned: You cannot simply dictate this from on high. You are in trouble as soon as you find yourself chasing compliance in pursuit of standardized work. You are chasing your tail, and you'll never catch it. Rather than controlling compliance details, examine why the worker does not follow the standardized work. Ask, "Why can't you follow the standardized work?" The answer to that question — asked not accusingly but in a spirit of pure inquiry — will invariably lead you to unexpected places, usually quite far from the employee.

Understanding Standardized Work

First, I'll present five neglected, misunderstood, or forgotten aspects of standardized work. Then, we'll explore how to think about standardized work for non-standard work, things like service industries, knowledge workers, creative work, and management. Finally, I'll provide a kind of "outline" that might help as a guide for you to think about establishing standardized work in your organization, centered around these five neglected aspects of standardized work:

1. Don't confuse standardized work with work standards.
2. Don't confuse standardization with commonization.
3. Don't impose standardized work without providing a structured improvement process — a clearly defined, unambiguous means of improving it (kaizen).
4. Practice, practice, practice.
5. Don't forget the critical role of the leader/manager.

1 Don't confuse standardized work with work standards

As a practical matter of getting started with standardized work, you must first clarify your work standards. Never confuse work standards with standardized work. Other terminology often used for "work standards" includes "quality standards," "specifications," "engineering specifications," or "quality specifications."

Work standards are established during product and process development. They comprise the work that must be accomplished for the product to be produced to achieve the product's or service's design intent. Changes to work standards require an engineering design review, so manufacturing companies usually have an "Engineering Change Request" process in place. (And, by the way, it's also a process that is often full of problems and waste, and so is a good process to choose for one of your first efforts at business process kaizen). So, in standardized work, Toyota usually calls work standards "Quality Standards."

Some examples include:

- Assembly – apply xx pounds of torque
- Processing – heat treat at xxx degrees for x hours
- Healthcare – provide xx medication at xx dose
- Coffee – xx seconds for an espresso shot
- Journalism – a weekly column of xxx words

For each of the above, kaizen (improvement) is also possible, but through a different process than the typically incremental improvements of standardized work and a suggestion system. Those are work standards.

Toyota-style standardized work for the frontline production operator is a matter of three basic elements: (1) timing, (2) sequence, and (3) a standard amount of stuff that is in process at any given time.

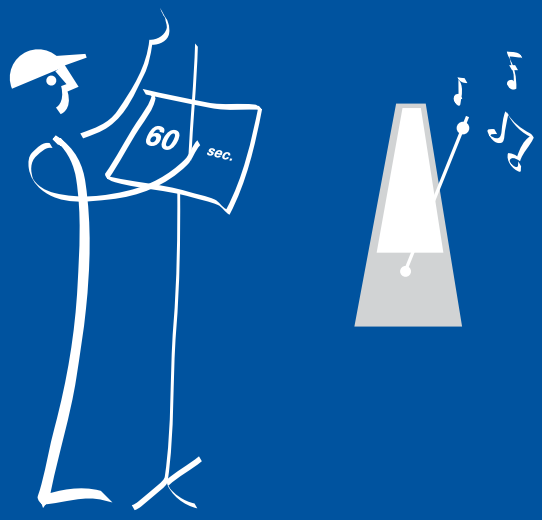
1. **Takt time** and **cycle time** (TT vs. C/T): In other words, timing — the timing demanded by your customer and the timing constraints of your processing capability
2. **Sequence** (including layout and man-machine combination with process capacity sheets and standard work combination table): In other words, determining the optimum order of producing the product or service — first do A, then B, then C
3. **S-WIP**: In other words, the amount of in-process "stuff" that is required, no more, no less. That stuff may be material, parts, or information.

With those standards established, the operator has the essential elements to make it possible (with training, practice, and support) to complete the work successfully. From there, the operator can easily learn to identify problems. And from there — with proper training and support — can solve problems and make improvements. Finally, with the standardized work in place, now the operator can do plan-do-check-act (PDCA) problem-solving.

> "Before you can begin with standardized work, you must clarify your work standards."

Toyota's "Mr. Standardized Work," Mr. Isao Kato, has hammered this point for many years: "Before you can begin with standardized work, you must clarify your work standards." Too often, this edict has fallen on deaf or not-ready-to-listen ears. This distinction is fully institutionalized in Toyota production operations, so Toyota operations people hardly even need to concern themselves with it. At your company, you will probably need to do a lot of detailed work to make the distinctions clear, and you may need to add "required output" to the list for a fourth basic element of work standards.

Takt Time



takt time = $\frac{\text{available production time per day}}{\text{customer demand per day}}$

example: $\frac{27{,}600 \text{ sec.}}{460 \text{ pieces}}$ **= 60 seconds**

results:
- **Customer is buying this product at a rate of one every 60 seconds.**
- **Target rate for producing a product**

The available production time divided by customer demand.

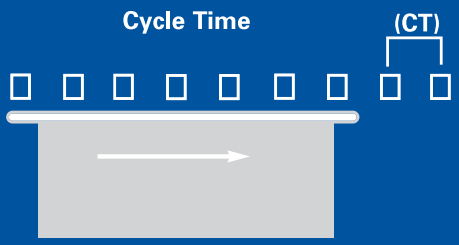
For example, if a widget factory operates 480 minutes per day and customers demand 240 widgets per day, takt time is two minutes. Similarly, if customers want two new products per month, takt time is two weeks.

The purpose of takt time is to precisely match production with demand. It provides the heartbeat of a lean production system.

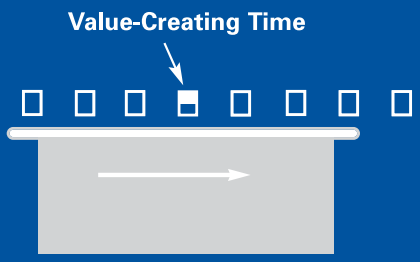
Source: *Lean Lexicon, Fifth Edition*

Cycle Time

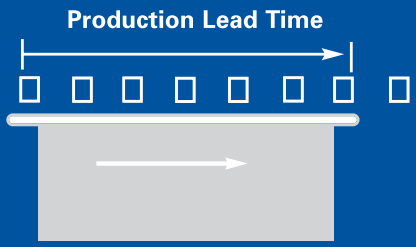
The time required to produce a part or complete a process, as timed by actual measurement.



How often a part or product actually is completed by a process, as timed by observation. Also, the time it takes an operator to go through all work elements before repeating them.



Time of those work elements that actually transform the product in a way that the customer is willing to pay for.



The time it takes one piece to move all the way through a process or a value stream, from start to finish. Envision timing a marked part as it moves from beginning to end.

Usually: VCT < CT < PLT

2 Don't confuse standardization with commonization

Standardization means a given operation has a standard practice or routine that must be followed and serves as the baseline of comparison that the individual doing the work can use to discern normal from abnormal. With that baseline, a foundation for PDCA is established, making improvement possible.

Commonization, on the other hand, means that a given operation is done the same way everywhere, which is where concern with "best practice" and seeking "one best way" comes in. Toyota refers to it as yokoten. For example, an assembly job that entails bolting in a seat belt or the process for communicating a scheduling change in a dentist's office — commonization is doing those jobs exactly the same in every location by every worker. (See my "Teachable Moment" column.)

Our aim with standardized work is the former: the establishment of a baseline of operation from which improvement is possible. There are, of course, many occasions when commonization is also desirable. But, the real prize here is getting each person to follow their standardized work so that every time they do the job, they do it in the same way. Then with that baseline, they can observe the process for correctness, easily identify abnormalities, and readily generate improvements.

> "Our aim with standardized work is to establish a baseline of operation from which improvement is possible."

As a leader, if you can achieve this in all your operations, you should be very happy. Of course, then, you may also wish to pursue commonization as needed. But, my wager is that once you have each worker engaged in pursuing improvements in his or her own standard work, you will find your dissatisfaction that different workers may do similar jobs a little differently to be much less of a concern.

Many companies allow this concern to become an excuse for not turning their employees loose with kaizen and not charging them with making suggestions to improve their own work. Instead, such managers choose to worry about keeping track of and communicating "best practices."

My bet is that if you do unleash the creativity of your people, you will quickly stop worrying about the fact that worker A in plant B may perform the operation a little less efficiently than worker B in plant A.

Plan, Do, Check, Act

A Common Version of the PDCA Wheel

An improvement cycle based on the scientific method of proposing a change in a process, implementing the change, measuring the results, and taking appropriate action (see illustration). It also is known as the Deming Cycle or Deming Wheel after W. Edwards Deming, who introduced the concept in Japan in the 1950s.

The PDCA cycle has four stages:

Plan: Determine goals for a process and needed changes to achieve them.

Do: Implement the changes.

Check: Evaluate the results in terms of performance.

Act: Standardize and stabilize the change or begin the cycle again, depending on the results.

Source: *Lean Lexicon, Fifth Edition*

3 Don't impose standardized work without providing a structured improvement process — clearly defined, unambiguous means of improving it (kaizen).

You will have no or limited success with standardized work unless you also institute a process (whether or not labeled formally as a "suggestion system") that gives individuals doing the standardized work a way to make suggestions in how to improve the work — kaizen. The essence of kaizen comes down to the people who do the work making suggestions on how to improve it. In other words, you can't do standardized work without kaizen, and you can't do kaizen without standardized work.

> "You can't do standardized work without kaizen, and you can't do kaizen without standardized work."

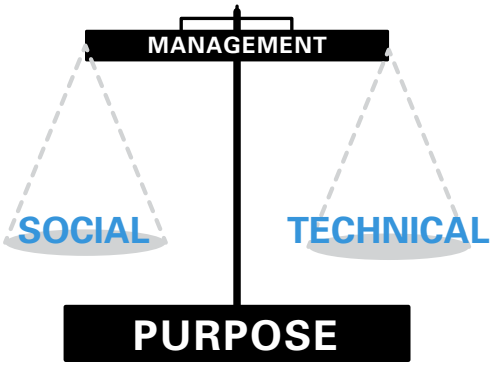
Standardized work and kaizen are two sides of the same coin — if you try to have one without the other, you will encounter one of two types of serious problems. To explain and explore:

Standardized work without kaizen:

- Employee motivation is killed, human creativity wasted
- Problems repeat, unidentified, unsolved, and unabated
- Employees don't take the initiative, so improvement stops
- Operations — like economies, like companies, like cultures, like species — either progress or decline.

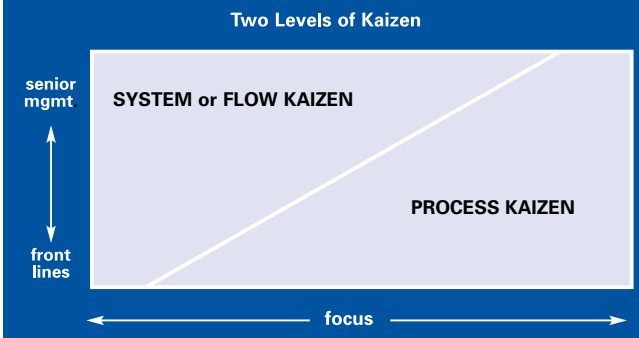
Kaizen without standardized work:

- Chaotic change, the saw-tooth effect of progress and regress
- Problems repeat, PDCA not followed, no root cause analysis
- Progress that is impossible to identify, improvement stops
- Kaizen, an expression of the scientific method, requires a baseline of comparison.



These two sets of problems bring us back to the thesis I've been hammering in this space for months: The technical/process and the socio/people sides of the standard work equation are equally important. Separate them and expect to find trouble.

Kaizen



Continuous improvement of an entire value stream or an individual process to create more value with less waste.

There are two levels of kaizen (Rother, Mike, and Shook, John. 2018. *Learning to See, 20th Anniversary Edition*. Boston: Lean Enterprise Institute):

1. System or flow kaizen focusing on the overall value stream. This is kaizen for management.
2. Process kaizen focusing on individual processes. This is kaizen for work teams and team leaders.

Value-stream mapping is an excellent tool for identifying an entire value stream and determining where flow and process kaizen are appropriate.

Source: *Lean Lexicon, Fifth Edition*

4 Practice, Practice, Practice

For some reason, most of the time, most of us come to see our day-to-day work as mundane. I guess it's because we do it every day.

But is that necessary? Craftsmen do their work every day. Artists paint or sculpt every day. Athletes run or swim every day. Musicians play every day. But we choose to put our daily work in a different, lesser category. The focus that lean thinking puts on frontline work changes our attitude toward work. It elevates it to a higher level of visibility and importance. For example, in my recent column about Starbucks, I suggested, "…think of the best bartender or waiter/waitress you've ever seen. Remember marveling at how he or she could handle orders coming from all directions without missing a beat."

Mastery of any skill requires diligent practice. When I was there, Toyota typically followed a sequence whereby workers would first master one job, then move to the preceding and following jobs, eventually mastering each job of the team. When I was at the Takaoka Plant, the process of learning each of the five or so jobs in a team took several years.

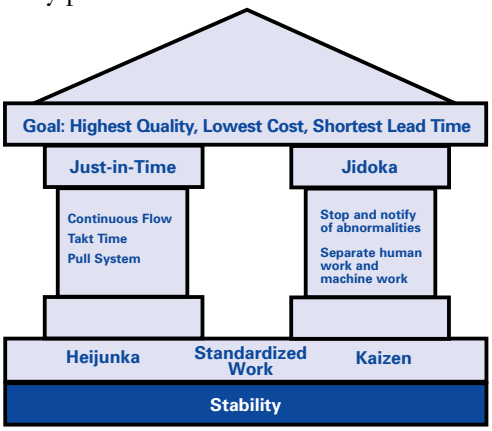
> "The focus that lean thinking puts on frontline work changes our attitude toward work. It elevates it to a higher level of visibility and importance."

In the book *Outliers*, author Malcolm Gladwell offers evidence to support the argument that mastery of any skill requires about 10,000 hours of practice. Musicians, athletes, artisans, artists, professionals of any discipline can all be observed as requiring this 10,000-hours hurdle. Gladwell provides several examples that reminded me of some of my own favorites:

- Tiger Woods, working with a coach to rebuild his swing from the ground up following his first Master's win, possibly the greatest victory ever in golf.
- Michael Jordan may have been about the most talented player of all time. Still, every observer and Michael himself emphasizes that the real distinguishing factor was that he practiced harder than anyone else and was the most prepared.
- Sonny Rollins, after (that would be AFTER) achieving stardom as one of the very top saxophone players in the jazz world, took three years off from performing to take his playing to a new level. Practicing alone every day on the Williamsburg Bridge in New York City, he blended his notes with the passing traffic, so no one heard his new sound until he felt it was ready. As a result, his song and album "The Bridge" were instant classics.

There is a saying in Japanese, "Three years on a rock," meaning that it takes about three years to deeply learn any subject of substance.

- When I was at Toyota, there was a saying that one could understand the basic concepts of TPS in three hours, learn to "explain" the basic concepts of TPS in three days, and be proficient in "actualizing the concepts" of TPS in three years.
- In Toyota's engineering and R&D world (entirely independent from the rest of the company, with even its own separate Human Resource Development Department!), it was commonly stated that "it takes ten years to make an engineer."
- For quick reference, Gladwell's 10,000 hours would ordinarily translate into about four years of essentially full-time effort, or longer if pursued at a more leisurely pace.



Toyota Production System "House"

Of course, while the specific numbers that Toyota (or Malcolm Gladwell) puts on these things is interesting, it's not exactly the point. The point is: what do you think? What fundamental thinking regarding skill development informs your organization's approach, system, and methods of developing your people?

(Toyota's training, especially for employees who work on or around the front lines, is heavily informed by the Training Within Industry (TWI) program they learned from the United States following the Second World War. I'll offer a little more information about TWI in the next section, but if you don't know about TWI, learn it!)

5 Don't Forget the Critical Role of the Leader/Manager

When I encounter managers struggling with getting standardized work firmly established, their questions and concerns always center around the worker, around how to get the worker to follow the standardized work. Usually, however, bigger problems are always found well before getting to the worker, often beginning with the role of the leader, especially the immediate frontline supervisor.

Frontline supervisors won't change their behavior from compliance officer to support for success unless (1) the new expectations are made clear, (2) the requisite training is provided, and — last but not least — (3) time allocation is provided. What that adds up to, of course, is standardized work for the supervisor.

My first encounter with standardized work was in January 1984 at Toyota's Takaoka Plant. I was fortunate to be provided the experience of six learning-packed weeks working production jobs in each of the major auto processes: stamping, body welding, paint, final assembly (followed by time in the production control office learning kanban calculations, observing training, and learning other similar support operations). All my leader/mentors were outstanding, patiently (mostly patiently) teaching me each job. It was in final assembly that I had my most intense experience with standardized work and the role of the team leader.

I was too tall for the job I was assigned on Toyota's Corolla assembly line. I'm six feet tall, and Toyota's guidelines in Japan would ordinarily have placed me in other jobs rather than getting in and out of a Corolla 500 times a day. But, they made an exception in my case since I was to perform that particular job for only one week, and the job was among those that were being readied for trainees from NUMMI who would begin arriving a few months later.

In addition to being relatively tall, my legs are long for my height. So, I found it hard to do the job exactly as instructed, which was to enter and exit the vehicle in the highly specified proven, safe, and effective manner — butt first. So, I quickly found my workaround, which was

Training Within Industry (TWI)

A series of training programs developed during WWII enabling U.S. companies to hire and train huge numbers of new workers to replace those who had gone to war.

TWI had three main training programs, collectively referred to as "J" programs:

- Job Instruction taught supervisors and experienced workers how to teach people how to do work with reduced defects, less scrap and rework, fewer accidents and less tool and equipment damage.
- Job Methods taught workers to make improvements methodically by making the best use of people, machines, and materials to produce greater quantities of quality products in less time.
- Job Relations taught supervisors how to handle people problems effectively and fairly by gathering facts, weighing them, making a decision, taking action, and checking results.

While TWI concepts were forgotten in the U.S. amidst post-war prosperity, struggling Japanese companies, including Toyota, adopted them. In fact, TWI's Job Instruction program is still the primary training tool used by Toyota's team leaders worldwide. In recent years, a TWI revival movement has appeared in the U.S. and other countries.

Source: *Lean Lexicon, Fifth Edition*

John Shook working the assembly line at Toyota's Takaoka plant.

to enter right-leg-first. Entering right-leg-first was no problem in and of itself, but it meant that my legs would get stuck in an awkward position. Nevertheless, it seemed OK to me and was "easier" or preferable to me than doing it the prescribed way.

(This all falls under the heading of "knack." When Toyota teaches standardized work, in addition to stipulating the sequence of work elements — as noted previously under the three elements of standard work — they teach each work element using the TWI Job Instruction methodology. However, many elements of the job require a certain "knack" to accomplish satisfactorily. People generally assume "knack" to be an individual thing that can't be specified. But, the TWI and standard work approach stress that "knack" can and should be standardized and can therefore be improved.)

My team leader observed what I was doing. He watched for a while, his brow steadily furrowed, and soon asked me why I couldn't do it as I had been instructed; that is, according to the standardized work instructions. I explained that it was easier for me to do it my way. He listened, unconvinced, and observed me awhile longer. Then, he asked me to try it the "right way" again, explaining that he was fearful that I would hurt myself if I kept up with my improvised repetitive motion over and over day after day. Perhaps my way seemed easier to me at the time, but the position I was maintaining to do the work would surely cause strain, which would injure me over time. I complied with his instructions and tried again doing the job the standard way, but, sure enough, I found it very hard to perform the work that way. So, I explained that I would really have to go back to doing it my way. He said, OK, for now, again clearly unconvinced, with concern on his face, and again stood there observing me as I did the job.

Then, as I did the job as he continued to observe, I began to feel his observation, and my awkward work slowly attracted a crowd. Before long, the group leader (my team leader's boss), some adjacent team leaders, and others I didn't know were all standing there, watching me work. I didn't have time to worry much about it. My takt time and cycle times were about 56 seconds, and I usually had no extra time to chat or divert my attention as I did my job. (On average, vehicles would pass through that had different option content, so some would require well over 56 seconds, some less — the cars were arranged in a sequence, a heijunka sequence that assured that two high-content vehicles never succeeded each other. There would always be a lower content vehicle that required less time in between.)

Then I noticed that the group of observers huddled, akin to an American football huddle, engaged in intense discussion. Then, as they broke their huddle, my team leader tapped me on the shoulder, instructed me to step aside, and took over my job. He and the others had come up with a NEW way to do the job, neither the original standard work way nor my improvised method, which they all agreed would injure me if I kept it up. My team leader tried out the new procedure, and I joined the others in observing. When the new method seemed to work to his

and the others' satisfaction (many heads nodding approval, but still many furrowed brows as well — this was important stuff), he asked me what I thought. I gave his suggestion a try. Sure enough, the new procedure worked for me and to the satisfaction of the impromptu task force. The other observers had included, I discovered later, a safety specialist.

So, safety comes first, and there are aspects of successful work design that don't necessarily appear on the various standardized work worksheets. Simply, the team leader (frontline supervisor) must understand the work deeply. But most importantly, first, we must observe the work closely to ensure it is safe and effective. Then, we'll work on efficiencies, improvements, and other problem-solving. And, beginning to end, we are going to … observe the work … very … closely.

More on Leaders

I've been discussing the key role of the frontline supervisor, but there also is a role here for senior leadership. Too often, standardized work is viewed as one of those mundane things and is taken for granted. People assume that standardized work is working, and if it isn't, well, people should just do their jobs better.

> "When I worked at the Corolla plant in Toyota City, roughly *half* of the team leader's time was made available to help his team members when they got into trouble."

But, *everyone* has a role to play here. Engineering needs to design work that is easy to perform in a standard way and easy to improve. Middle management needs to support the frontline supervisor, ensuring they have the time to support the workers. When I worked at the Corolla plant in Toyota City, roughly *half* of the team leader's time was made available to help his team members when they got into trouble. And he had only five or so workers to support. So, here is where you should be asking yourself here, "Do we make that kind of support available to our workers?" As I visit companies, it is very rare that I see this kind of commitment to support the frontline supervisor in supporting the worker.

> "At some point, every high-level objective comes down to a matter of how someone on the front lines performs their work …"

Senior managers need to take the time to understand what standardized work really is and how it is nothing if not a mechanism to enable them to achieve their corporate objectives. At some point, every high-level objective comes down to a matter of how someone on the front lines performs their work — this is where, as the saying goes, the rubber meets the road. Until it's reflected in someone's standardized work, any corporate objective or initiative is just talk or words on a piece of paper.

So, we must take responsibility to ensure that the worker learns, is supported, and has every opportunity to complete the standardized work every time he or she performs the work. Providing that support is the role of the leader: *Much less policing of compliance to enforce standardized work; much more support to enable success.*

Standardizing Non-Standard Work

Now that we've established a baseline understanding of basic, Toyota-style, standardized work for production workers, what about standardized work for non-standard work?

This topic is less a matter of a "here's how Toyota does it" and more of a question to explore together. I think of standardized work in three levels (this is similar but different to the Toyota view):

1. **Level 1** – repetitive production-type work, which is the type of work we've been exploring in this column
2. **Level 2** – supporting repetitive work, which we considered in the section "Don't Forget the Role of the Leader/Manager."

3. **Level 3** – knowledge-based or service or project-based work, for which success is still a matter of
    - Timing
    - Sequence and content (including "knack")
    - How much "stuff" is needed to complete the work
    - Output

No matter the type of work, *standardized work is all about plan-do-check-act (PDCA)*, establishing conditions in which PDCA is possible, and then carrying out structured learning and improvement cycles. That is called science, the scientific method. Do we think science isn't creative? Hah — perhaps it often isn't, but it should be!

Standardized Work is the Basis for Kaizen

So, what shall we make of this discussion of standardized work? Two motivations drove me to write a bit extensively about standardized work. The first is to emphasize that standardized work is a fundamental building block for any lean system but remains woefully misunderstood, misapplied, and often disregarded. I think one reason it's neglected relates to my second motivation.

Second, I want to emphasize that well-designed standardized work will recognize all the social factors that go into producing good quality in a repeatable way. Poor work design could easily lead to a mistake by the worker and a subsequent quality failure. The work design must produce the required output, as defined by the technical requirements, the specifications, and as specified by the engineering design of the product. That comes first. But, the work design must also include the "human factors," the considerations that make it possible to do the job the right way and even difficult to do it the wrong way.

These two points bring us back to the thesis that the technical/process and the socio/people sides of the standard work equation are equally important. You can't separate them.

Look at your standardized work and structured improvement process (kaizen) — that is where you will find your culture!

Team Leader

At Toyota, an hourly worker who leads a team of five to eight other workers; called hancho in Japanese.

Team leaders in the Toyota Production System form the first line of support for workers, who—unlike their counterparts in traditional mass production organizations—are at the heart of improvement activities with responsibility for problem solving, quality assurance, and basic preventive maintenance.

Team leaders do not take disciplinary action and do not have a fixed production job. Rather, they provide support by knowing all the jobs performed by their team members so they can relieve workers, fill in for absentees, or help workers who need assistance or are falling behind. They respond to problems such as line stops, andon calls, and take a lead role in kaizen activities. They also use standardized work audit sheets to do daily checks of team members to make sure people are following standardized work and to surface problems.

Source: *Lean Lexicon, Fifth Edition*

Standardized Work at-a-Glance

This outline shows how standardized work serves your lean thinking and practices, as viewed through the lens of LEI's Three P framework of Purpose, Process, and People, which can guide you as you establish standardized work processes.

Purpose

1. Establishes a baseline for improvement.
2. Creates a means of realizing attainment of organizational goals at the front lines, where the organization's real work takes place.
3. Serves as a means of engaging the people who do the work, enabling you to encourage the desired level of engagement required of the worker. (In other words, remember why you want to establish standardized work.):
    - Commitment, not compliance
    - Improvement, not steady-state — There is no steady-state!
    - Creativity, innovation, problem-solving — Improvement of the standardized work
    - Initiative, not merely following orders

Process

1. Builds from work standards.
2. Ensures safety, quality, performance.
3. Enables observation and process study.
4. Includes three Basic Standardized Work Elements:
    - Takt Time and cycle time (TT vs. C/T): In other words, timing — the timing demanded by your customer and the timing constraints of your processing capability
    - Sequence (including layout and man-machine combination with process capacity sheets and standardized work combination table): In other words, determining the optimum order of producing the product or service — first do A, then B, then C.
    - S-WIP: In other words, the amount of in-process "stuff" that is required, no more, no less. That stuff may be material, parts, or information.
5. Establishes a standard process for making changes (i.e., Suggestion System)

People

1. Offers a means of engagement, involvement, ownership
2. Views each worker as an entrepreneur
3. Incorporates Quality Control and Six Sigma
4. Forms basis for training
    - TWI – Training Within Industry
        - If you don't know about this program, learn about it!
        - Job Instruction (JI), Job Methods (JM), Job Relations (JR)

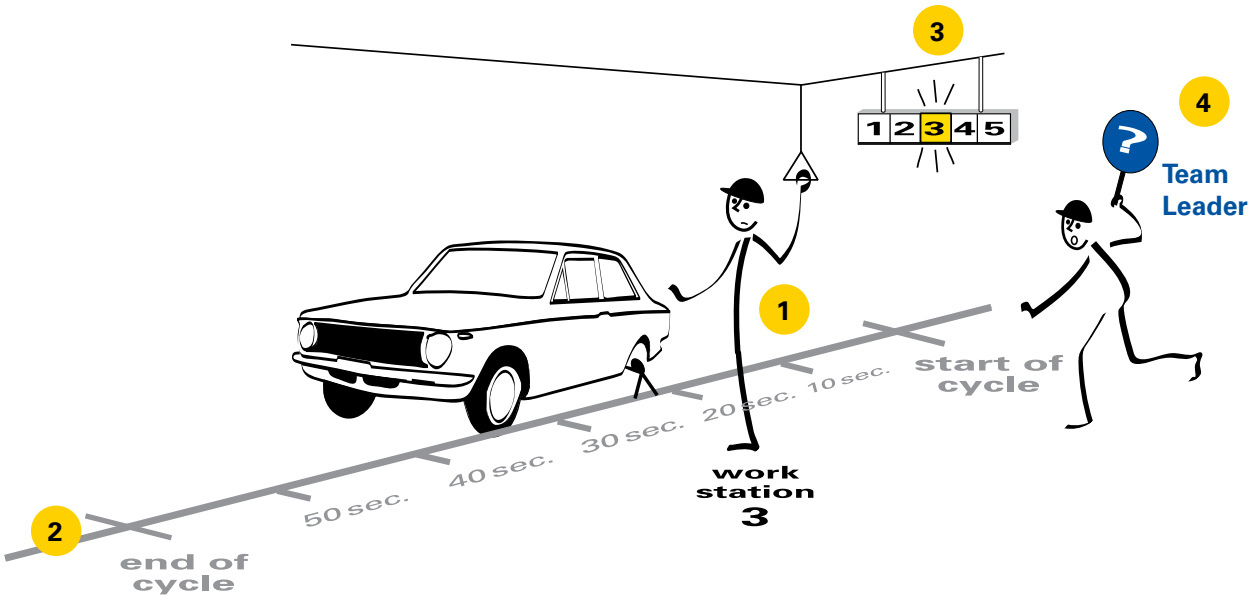
          (In Toyota's case, standardized work and kaizen training has replaced JM, but companies would be well-advised to consider starting with JM, then consider Toyota-style standardized work later.)
    - Skills Matrix – A plan for every person!
    - Practice, practice, practice
5. Includes standardized work for non-standard work
    - Three levels of standardized work
      Level 1 – doing repetitive production-type work
      Level 2 – supporting repetitive work
      Level 3 – doing knowledge-based or project-based work
    - Standardized work kaizen for creative or knowledge work
    - PDCA (Lean Product and Process Development by Al Ward)
6. Requires coaching, questioning (right questions), not telling, and making people think and take responsibility
7. Assigns greater and greater responsibility to the operator

The Standardized Work Equation

And remember: The technical/process and the socio/people sides of the standardized work equation are *equally* important. Well-designed standardized work represents the *technical* and *human* dimensions of the work in *equal measure*.

Illustrating the Socio-Technical Components of Standardized Work

The Fixed-Position Stop System illustrates how standardized work includes technical (process noted in black) and social (people, noted in blue) elements as noted in the below illustration. Source: *Lean Lexicon, Fifth Edition*



The fixed-position stop system was pioneered by Toyota to solve three problems:

1. The reluctance of production associates to pull the signal cord if the entire line would be stopped immediately.
2. Unnecessary line stoppages to deal with minor problems that could be resolved within one work cycle.
3. The need to stop the line at the end of a work cycle rather than mid-way through the cycle to avoid the confusion — plus the quality and safety problems — inherent in restarting work tasks part of the way through a cycle.

The fixed-position stop system is a method of jidoka, or building in quality, on manual processes along moving assembly lines.

1 **Technical:** Problem-solving happens within cycle time or line will stop until problem is fixed.

Social: Operator has the responsibility to raise problems.

2 **Technical:** Cycle time for tasks to be completed is defined and visualized on the shop floor.

Social: Operator can visually see ahead or behind, and get immediate feedback if successful on job.

3 **Technical:** Andon is the method/tool to signal for help.

Social: If operator is behind they have a mechanism to pull and signal for help.

4 **Technical:** Team Leader can clearly see where help is needed with the Andon.

Social: Team Leader is available immediately and has the problem-solving skills to provide help.

Standardardized Work Process Study Sheet

The Process Study Sheet is used to define and record the time for work elements in a process.

Process Study Sheet

Process Study	Process:	Product:									Observer:		Date/Time:	Page /
Process Steps	OPERATOR												MACHINE Cycle Time	Notes
	Work Element	Observed Times										Repeatable		
		1	2	3	4	5	6	7	8	9	10			

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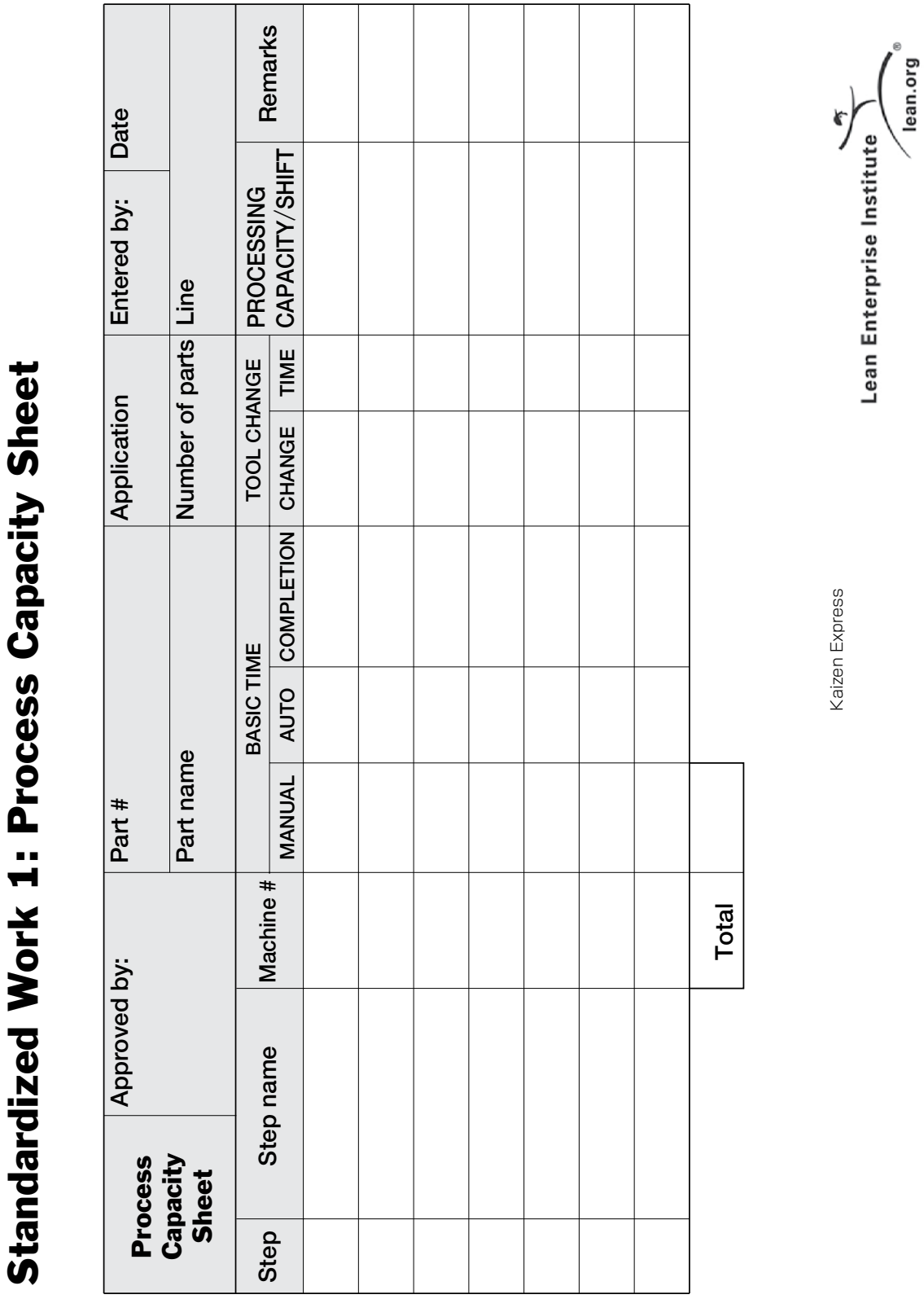
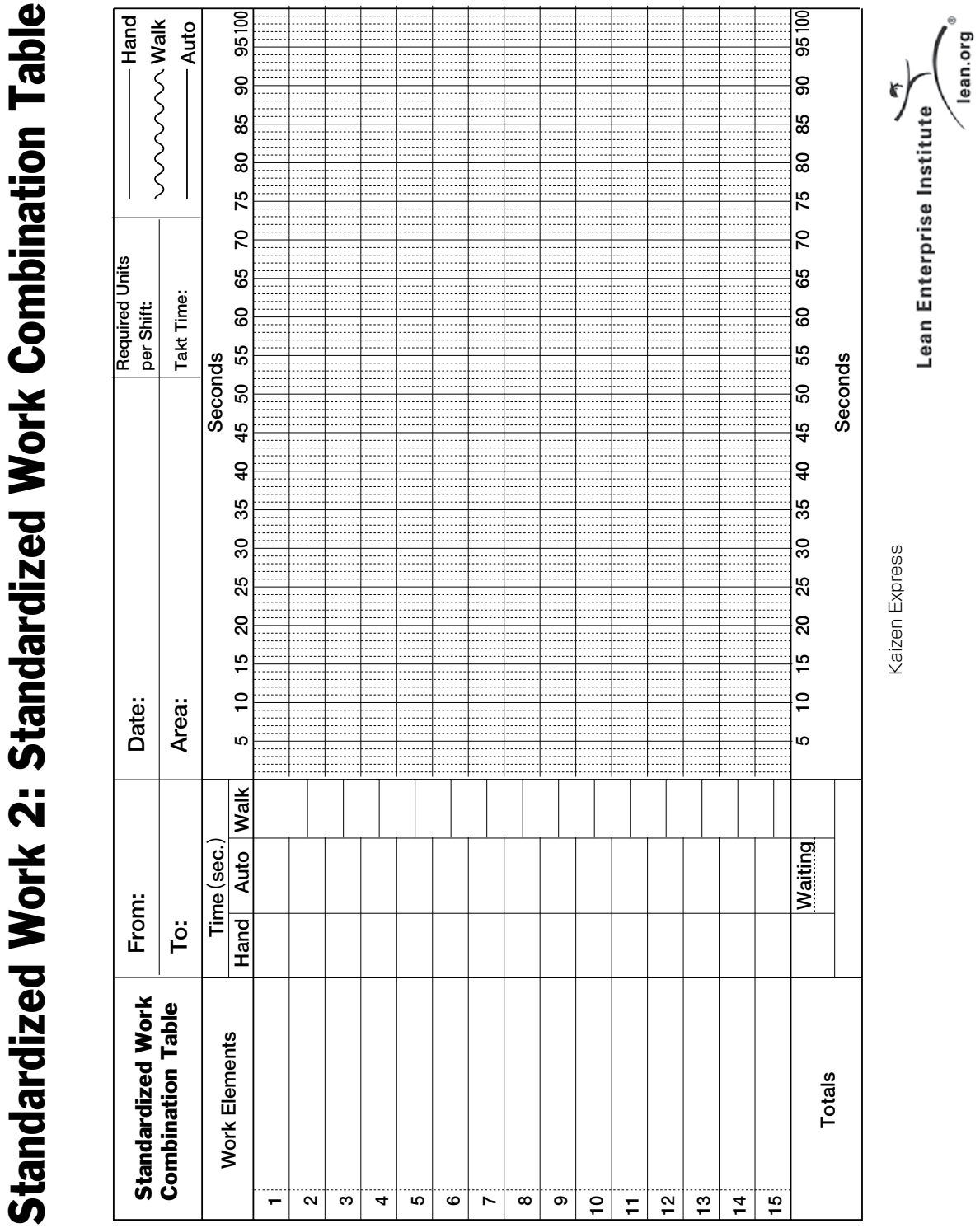
Standardized Work Process Capacity Sheet

The Process Capacity Chart is used to calculate the capacity of each machine to confirm true capacity and to identify and eliminate bottlenecks.



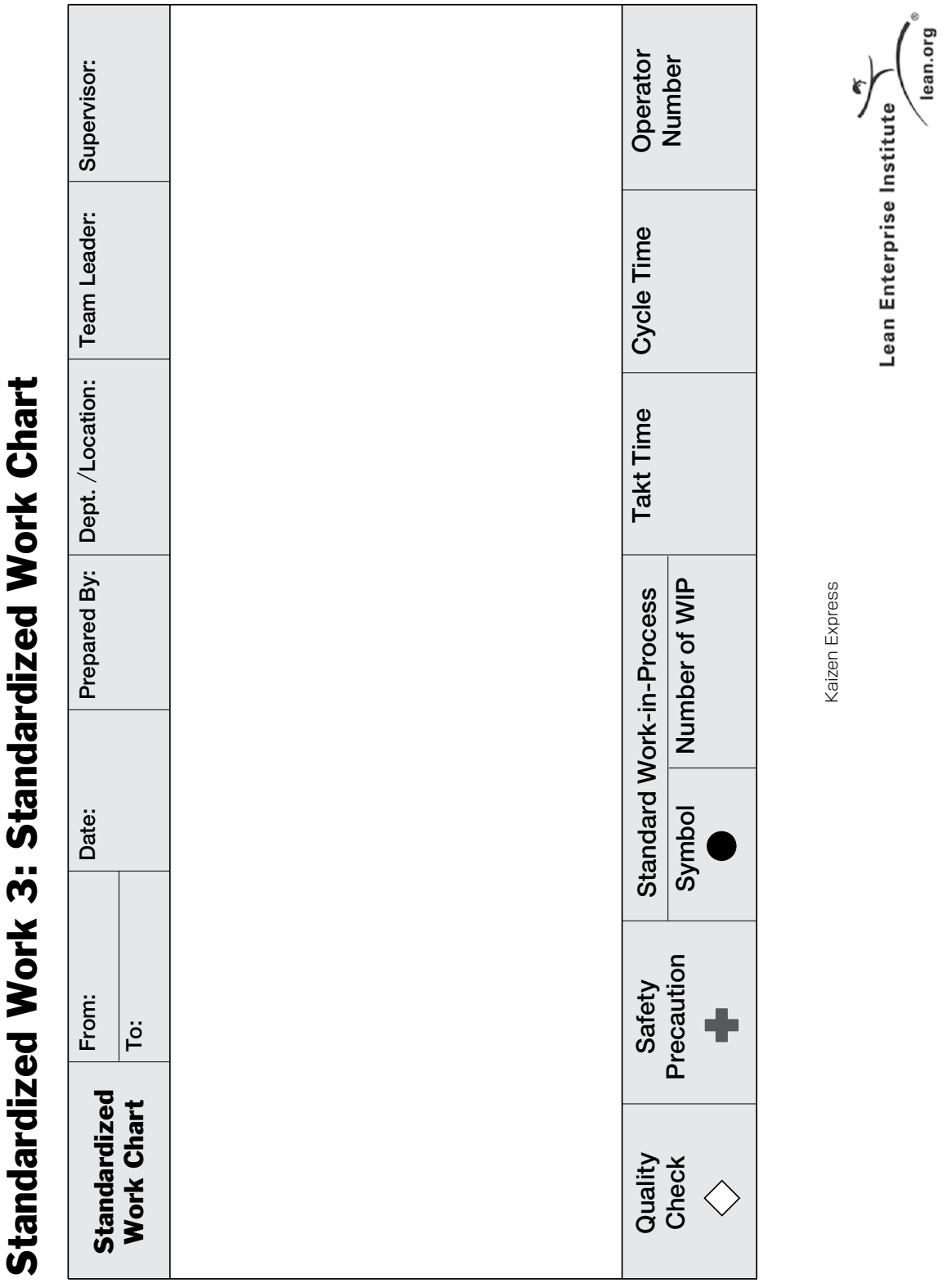
Standardized Work Combination Table

The standardized work combination table shows the combination of manual work time, walk time, and machine processing time for each operation in a production sequence.



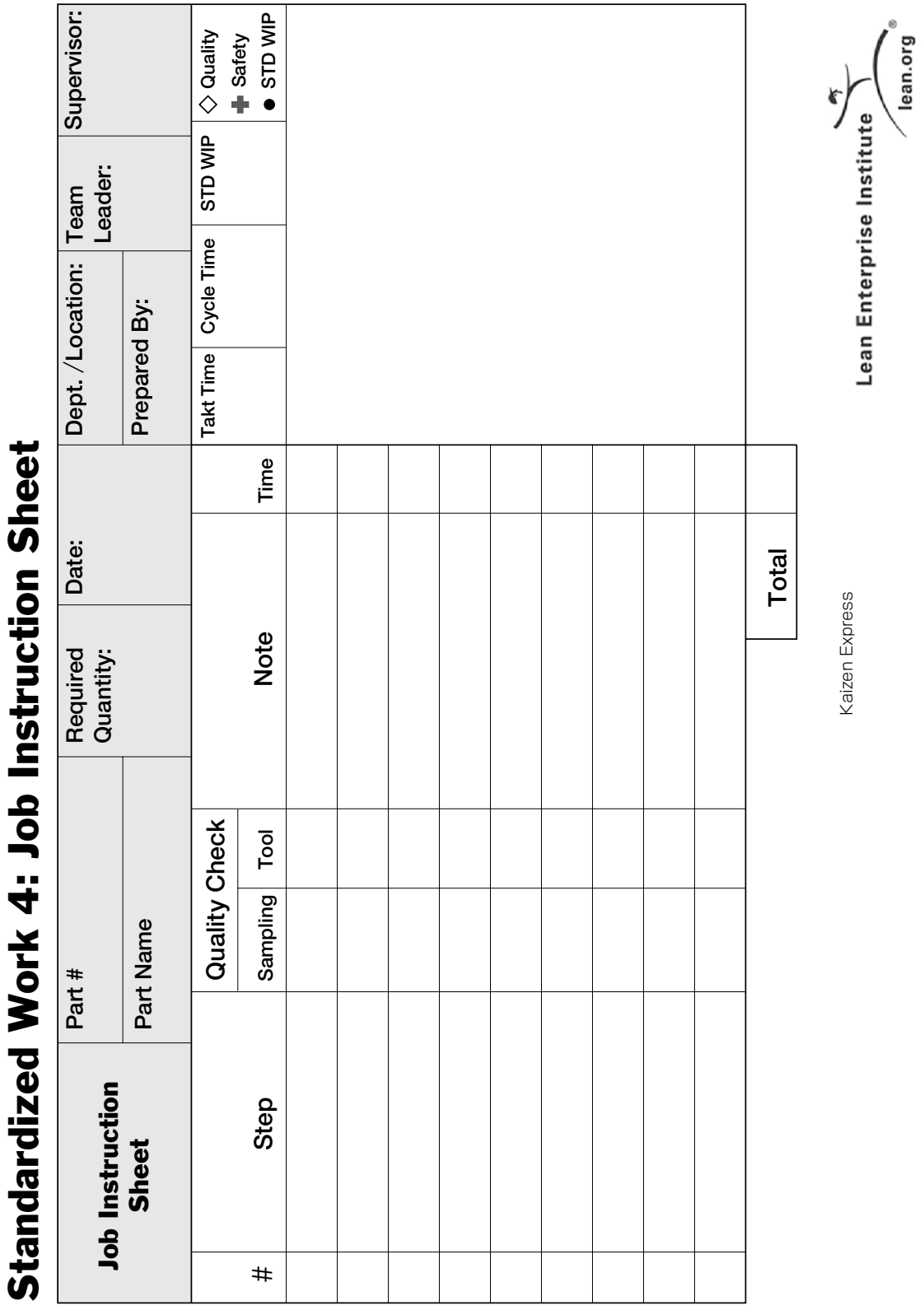
Standardardized Work Chart

The standardized work chart shows operator movement and material location in relation to the machine and overall process layout. It should show takt time, work sequence, and standard WIP .



Standardized Work Job Instruction Sheet

The job instruction sheet is used to train new operations. It lists the steps of the job, detailing any special knack that may be required to perform the job safely with utmost quality and efficiency.



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About The Lean Enterprise Institute

The Lean Enterprise Institute, Inc, was founded in 1997 by management expert James P. Womack, PhD, as a nonprofit research, education, publishing, and conferencing company. As part of its mission to advance lean thinking around the world, LEI supports the Lean Global Network (leanglobal.org), the Lean Education Academic Network (teachinglean.org), and the Healthcare Value Network (healthcarevalueleaders.org).

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