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TPS Manual - Chapter 1, Section 7

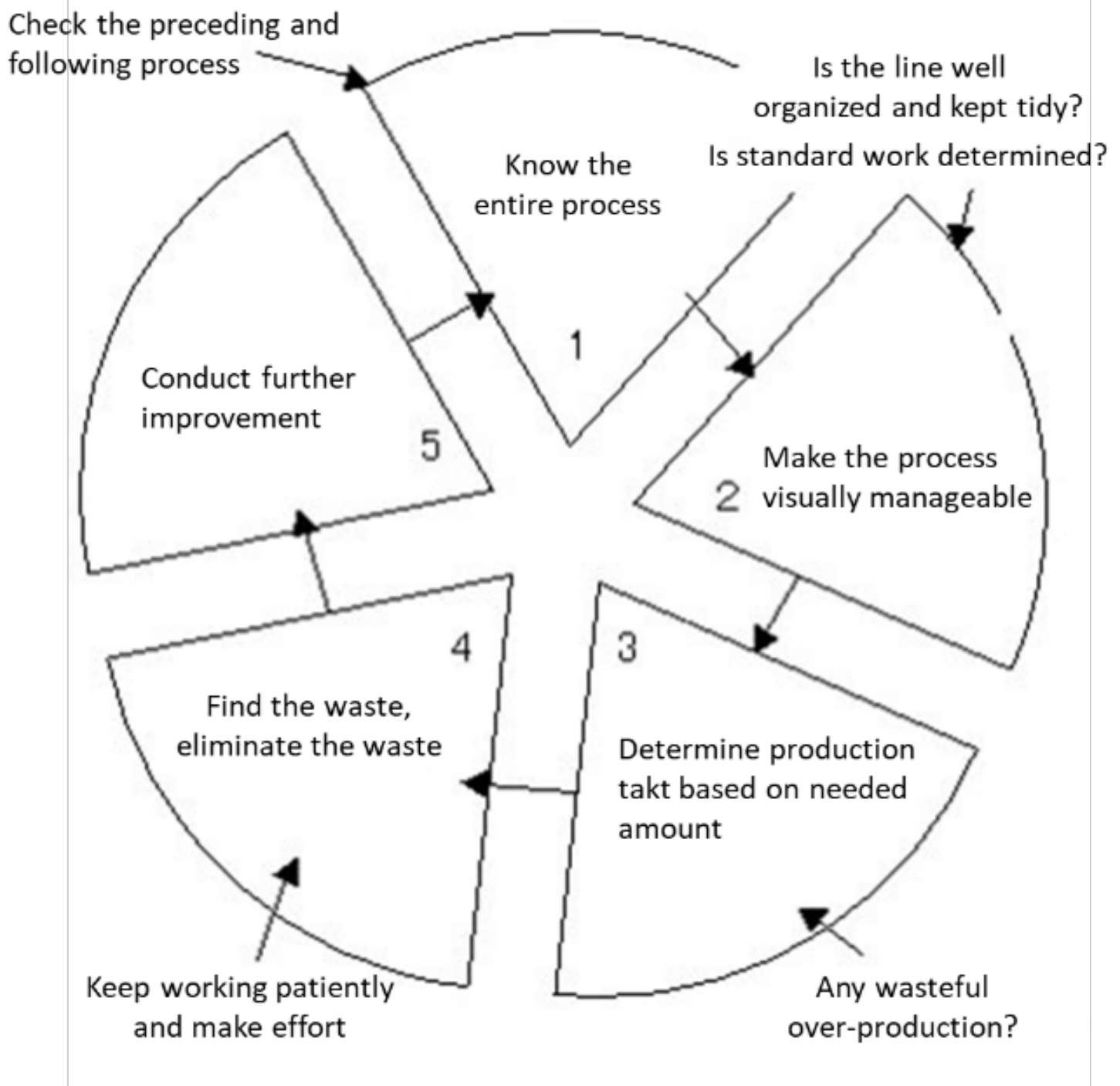
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Section 7 - Labor Reduction and Supervisors

Role of the Supervisor

It is said that "reducing the cost 10% is equivalent of doubling sales." The cost reduction activities at the manufacturing sites are essential, if neglected, it can shake the company's very foundation.

The role of the supervisor who is responsible for the actual practice of promoting the activities is very important and the weight of their contribution to a company is great.



Recognizing this, we are promoting TPS in Toyota's factories, and executing using the following method of analysis.

When following this circle, we would like to discuss what kind of resolve the supervisor should have when going through this cycle, and what they should do to make sure that Toyota's labor reduction routine is carried out, in a manner that complies with the company's goals.

There are two fundamental roles of the supervisor. The first is quality assurance (see Section 2 on Labor Reduction and Quality), and the other is to conduct improvement activities for labor reduction.

This is not as simple as you might think, because it contains elements that seem contradicto-

ry to each other at first glance. While you need to secure the quantity and quality, at the same time you achieve this with the minimum number of people and equipment.

By putting too much stress on securing the production quantity, they would most likely start thinking that they must avoid line stops at all costs from the beginning. So, the people, equipment, and stock would increase. Ultimately the cost will go up, as they have strayed from the original objective of the company's routine.

As hard as it may be, the supervisor is required to make effort to improve their production in a direction that satisfies both.

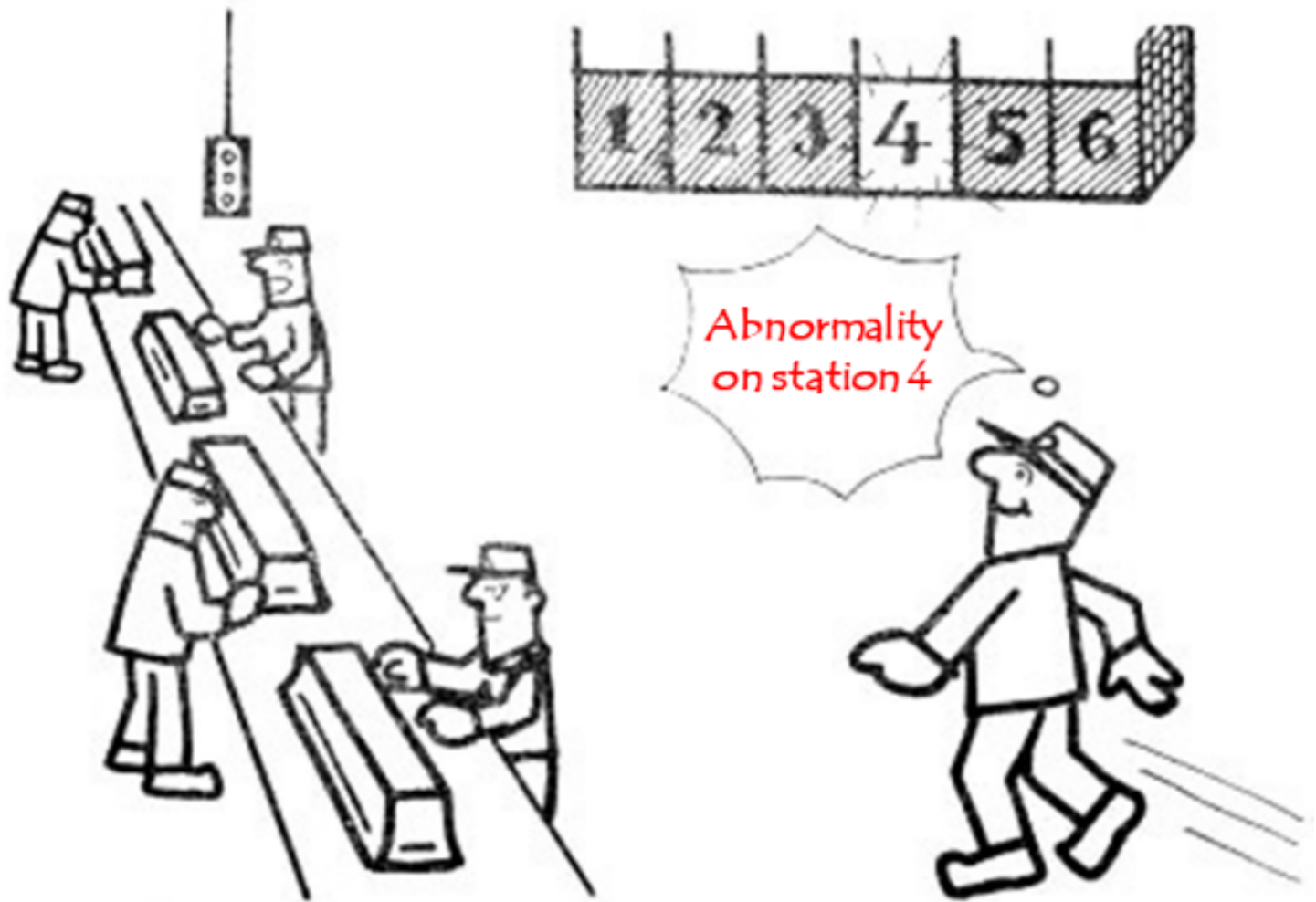
Management of Abnormalities

What methods should a supervisor use to apply improvement to the line so that goods that satisfy each of the quality, amount, and cost, are produced?

First, let's think about the manner of management. Even though we only thought of few, there are so many things that are subject to the supervisor's management. People, work distribution, teaching the "know-how" and quality, accomplishing or adjusting of the production plan, equipment, safety, inventory, arranging raw materials, setup, etc. It would be impossible to fulfill these at once by yourself.

In TPS, it is taught to standardize these elements, then focus on the exceptions that deviate from the standard. This is called the management of the abnormalities.

Standardization in terms of the operation phase is deciding on standard operating procedures and to follow them. In terms of material and stock management, it is to clarify their designated location and quantity. In the aspect of production instructions, it refers to "kanban," while, for safety, it's about criteria of handling. In short, standardization is to set guidelines for each phase of production process to determine how each task must be done by each operator.



By organizing every aspect of the manufacturing, setting the standards, and making sure people follow the standards, you can spot those which deviate from the standards as 'problems' and focus on solving them. The more thoroughly you apply this method, the more it becomes clear what the supervisor should do.

The first thing you should do as a supervisor is to organize the line you are responsible for.

To put this in a more detailed manner, this would mean establishing standards, deciding on where materials and parts are to be left, deciding on the production quantity, setting up kanban, and installing call buttons, line stop buttons, and andon.

Once the standards are set that show the supervisor's intention of "how to do the job correctly", then the supervisor must observe what has happened in the workplace as a result.

Then, supervisor needs to take necessary measures to correct the abnormalities that were not originally intended. It is important to distinguish what kind of activity is normal and what is abnormal.

Although the supervisor may have clearly defined the standards, if they cannot recognize

what is abnormal or neglect to correct these abnormalities, then they are not suitable to be a supervisor.

It is important to devise ways so that anyone can tell that there's an abnormality right away. Having an eye for abnormalities is the first step towards improvement. Let me explain this with some examples.

If everyone does their work according to standards, and there are zero defects, they are supposed to have the line's daily required quantity of products by the end of their working hours.

Since the distribution of work is not perfect, it is unlikely that well-balanced workload has been assigned to all the people from the beginning.

For example, operator A has a slight amount surplus. They are waiting every now and then. Or stocks are often piled up behind them. Or they begin to do tasks that are not included in their standard work. These are all abnormalities; operator A doesn't have enough work.

In another case, operator B doesn't finish their work within time. They stop the line. Or possibly, they cut corners and produce items with defects. Those are also abnormalities. Operator B has too much work.

If operator A can do worker B's job within time, then that means that the supervisor's method of teaching was unsatisfactory.

Operator C is helping a machine with an automatic feed. (This is an action outside of the standard operating procedures.) This is also an abnormality. When supervisor examines the abnormality, they find out that the machinery is wearing out. It produces defective products unless the operator puts their hands on it.

The supervisor should immediately contact the technicians or the maintenance personnel and have it fixed.

Behind the line, there are products that have no kanban (work order sign) on them. This, too, is an abnormality.

Probably a wrong pace was set to produce too quickly, or maybe all the people have too much time to spare, or they didn't stop producing items although the following process stopped receiving it as something wrong had happened (violation of the kanban standards). In any case, nothing of these should be ignored.

These are just a few examples. All of them should be considered by the supervisors who es-

establish the standards, to be abnormalities. In most cases, if the root cause of the abnormality is investigated, it would often turn out that the standard couldn't be kept because the standard itself was overburdening, the parts or the raw materials were defective, or the equipment was malfunctioning.

The occurrence of line stops, and defects are directly related to quantity and quality, so we can immediately tell that they are abnormalities.

Abnormalities which would increase the cost are overlooked or thought of as a secondary matter because they are small unnecessary activity or violations of the standards.

These are all important clues about improvement that lead to cost reduction. No matter how little they may seem, we need to avoid overlooking them.

Stopping the Line

The first step of improvement is to learn to see the abnormality. If you find the abnormality and clearly understand what is the problem, 50% of the problem is solved.

"This part is wrong. This has to be fixed." Once the problem is identified, various ideas how to fix the problem will be proposed by experts who have unique knowledge and skills. By gathering the collective knowledge of the operators, many methods will come out.

You then choose the least expensive, most effective solution and carry it out. "Making the abnormalities visible and noticeable" is an essential principle for proceeding with improvements, and is a very important matter that the supervisors must devote all their energies.

Next, we want to talk about the supervisor's attitude necessary for this. It is important that you should always be ready to stop the line anytime. This may be a difficult thing for the supervisor to do; but it is necessary.

When you don't hesitate to stop the line, you can recognize the problem with the production process and the poor quality of the preceding process. Also, by telling your operators "if you can't do it, then stop the line," you can encourage them to carry out the improvement activities more actively.

This may sound like a paradox; but the aim of stopping the lines is to improve them (stronger and better) into lines that don't need to be stopped. The purpose is eventually to build up an ideal line.

This is for this purpose that you stop the line with financial loss at stake. Therefore, when the line has been stopped, supervisor must do their best to solve the problem fundamentally

(root cause).

A supervisor who can't say "stop the line," as well as a supervisor whose line was stopped 2 or 3 times for the same reason both get an "F." Instead, to solve the problems those have become clear by stopping the line one after another and eventually improve the line as productive as unstoppable is the important attitude and mind set as a supervisor.

It must be kept in mind that "a line which does not stop is either perfectly good or extremely bad."

Implementing the Improvement

Next, we would like to talk about implementing improvements. What we've talked about so far is discovering problems. To improve the problem, there should be a variety of methods that can be considered.

In selecting the improvement plan, it is significant to begin with improvement of operations before starting the equipment improvement, as has been explained in Section 6.

When an improvement plan has been decided, and it's time to implement it, in many cases the results can't be known unless you try and see for yourself.

For example, you eliminate the unnecessary work and reduce one person from work that used to be done by four people, then redistribute the work on the remaining three, but there's an extra 0.1 person's work remaining. Things like that are common.

If you push it onto them, saying "you should be able to do this," you will provoke the opposition of the people; they will consider this to be labor intensification (unreasonable – overburden). You have no choice but to focus on how to eliminate this 0.1 person's work and to beat your brains out to find a solution. If you cannot resolve the issue on your own, you should consult your boss and your team. It is also useful to consult the technical staff.

In the improvement process, results are important. Once you set about the activity, work patiently until you finally achieve the reduction of 1.0 full person.

If you were going to save about 15 seconds of time, there are many things that can be considered like shortening the walking distances, having the parts storage location closer, making the pallets smaller, or possibly, changing the buttons to one-touch buttons (provided that you take measures to ensure safety in the same time), retrieving the products automatically, or hanging the tools from above; in short, the point is that you should narrow your focus, and continue to persistently think about what to do. In such a case, it is often that a tiny hint triggers a good idea.

Another important thing is that the improvement plan can be well established, because, once incorporated, the improvement must be standardized as a new work routine. In this sense, an improvement plan is useless if it is a haphazard plan that cannot be stabilized.

To stabilize the improvement, when improving the equipment, jigs and tools, or chutes, for instance, you should keep your eyes on them until they can be fully used in practice. In the improvement of standards, such as exchanging the cutting tool or arrangement of molds, just setting a new standard is not enough; it is necessary to practice it thoroughly, including some minor revisions, until all the operators fully master the new work standard.

When an improvement activity is completed, and the work standard is revised, it is time to start another improvement. We must return to the actual workplace once again, and search for abnormalities.

The role of the supervisor is to turn the circle of: Standardization – finding abnormality – investigation of the cause – improvement – standardization. By keep turning this circle, it is possible to fulfill the seemingly contradictory function, i.e., ensuring the quality and quantity and at the same time achieving the cost reduction.

Things to keep in mind as a Supervisor

Here, we will briefly talk about the conditions essential for the supervisor to fulfil their role.

The first one is observing the actual workplace constantly. A supervisor of the workplace who does not look at the line or who is indifferent to what is happening is not qualified to be a supervisor.

If they do not check the standards they determined, or cannot distinguish normal from abnormal, there is absolutely no possibility of improvement.

Second, a supervisor must control their team. This means supervisor must train the team so that they can work to the standard. As mentioned in the section on human relations, a good human relationship is not built by just earning the favor by being modest and reserved.

The supervisor who teaches and trains people who will eventually become their equals as supervisors one day, and the one who creates a strong work site as a result, is one who can be trusted as a leader from the viewpoint of their people.

In TPS, we ask this question: "Did you have to produce this inventory, or was it just produced impromptu?" No matter how much material or manpower is available, it is important that you do not produce if it is unnecessary.

Supervisor should have the leadership to control the team as they need, stopping the team working or giving them the green light. Effective improvement cannot be carried out without leadership.

Third; the supervisor should look at all things from a broad perspective to make a comprehensive decision.

No matter how much you say that it was an improvement to your own production process, if it negatively affects the preceding or subsequent processes, or if you must switch from carrying out a troublesome production process to outsourcing, from an overall view, this can never be judged to be improvement.

It's very important for every line supervisor to take into consideration when they are managing their own line, and constantly make overall judgements by looking at all things from a wide perspective.

The best supervisor is one who can do the standardization and promote improvement so that the line can work at its best performance even without them. The ideal supervisor can say: "Please remove myself from the line."

Supervisors Working on the Line.

In the end of this section, we would like to discuss the concept of a supervisor doing work in the production line.

We are asked: "Is it right or wrong to let the supervisor to participate in the line work?"

In TPS, the answer would be: "It is not good if supervisor is participating in the line work **all** the time; but at the same time, it is not that they do not need to do so at all."

A supervisor that works on the line every single day is not different than an operator. Such a supervisor cannot fulfill their main role of conducting management, improvement activities, or staff training.

On the other hand, a considerable surplus of people is needed to make it unnecessary for a supervisor to enter the line. Where a continuous effort is made for improvement, it is only natural that there are occasions in which supervisor must participate in the line work. Do not participate in the line reluctantly because they must do so.

As described in the first paragraph of this section, one of the important roles of the supervisor is improvement activity for labor reduction.

The reason why supervisor must be away from the line work is to see the overall situation, the ultimate purpose of which is to carry out the improvement activities. At the same time, however, to perform the improvement, supervisor must have full knowledge of the difficulty and procedures of the work.

For example, when new employees join the team, or the work process has been improved and the process has been revised, it is the supervisor who must show and train the best way with least unnecessary movements.

In addition, there are unnecessary, uneven, unreasonable tasks that cannot be recognized if supervisor is just looking at the line and does not join the practical working process.

Whether it's about guiding their people like this, changing procedures as they see fit, or searching for unnecessary activity, unevenness, or overburden in deep detail and applying improvement to them, there are times where they must work on the line to figure things out.

In this sense, when you have no choice but to work on the line because a worker is absent, it is a good opportunity.

The Supervisor must fill all roles



It makes a great difference whether the supervisor joins the production line work reluctantly, or willingly takes the chance to polish their skills and to find a possible improvement. This

would not only promote the improvement, but also maintain production in the event of the absence of a skilled operator.

Although you may think it is a stern way of thinking, when the chance occurs to join the line, supervisor must always participate in the line work, taking the advantage of learning, with a positive awareness of its significance for further improvement.

End of Chapter 1

We are running a series of experiments to see if we can duplicate similar learning and improvement curves that Toyota and their suppliers achieved. The 1973 TPS Manual explains Toyota's thinking in very simple manner that is easy to understand. The manual also references the TWI programs, but does not go into much detail. This may be because the programs were publicly taught (by JITA) and assumed to be common knowledge.

We are compiling an annotated version of the 1973 TPS Manual + sample implementation sequences that we have found to be most effective + step by step instruction on using the tools.

If you want to hear more about the experiments and when the results will be available, you can [sign up here](#). or contact me directly: Mark Warren (mark.tesla2@gmail.com)

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