TOYOTA PRODUCTION SYSTEM
“ONE - BY - ONE CONFIRMATION”

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INTRODUCTION OF THEME:
TPS, ONE-BY-ONE CONFIRMATION

Often professionals say that they want to learn about TPS because they want to attain a specific result. They say:

- "We want reduced labor and material costs," or
- "We want increased productivity," or
- "We want higher quality," or
- "We want better employee motivation."

Many professionals have been lead to believe that transplanting the "mysterious secrets" of TPS into their American businesses will solve all of the problems their companies are facing.

So, today, I am going to tell you the "secret" of TPS, from my experience. This secret can be applied to:

- Any industry
- Any work-site situation
- Any culture

The "mysterious secret" of TPS is **common sense.** You have probably heard this "mysterious secret" from your parents and teachers, since the time you were born. It is the basic principle of: **"Do it right the first time!"** Now, you know everything!

But, seriously, let me explain a little further, how "to do it right the first time." It is through **"ONE-BY-ONE CONFIRMATION:"**

- From the smallest detail of a process
- To the most complex scope of your company

Now, you know the whole secret! It is just common sense!

How did Toyota discover this mysterious common sense secret of ONE-BY-ONE CONFIRMATION?

In 1934, in the early days of the development of Toyota's first vehicle, Kiichiro Toyoda decided to duplicate the Chevrolet six-cylinder engine. Under the direction of

Kiichiro Toyoda, the Toyota group worked from the experience they had in simple castings for the loom business. However, the intricate coring for the intake and exhaust chambers was beyond their experience.

They quickly studied other foreign and domestic systems to develop suitable cores, and modeled their designs after those they had studied. Kiichiro's group rationalized that by using these best practices of foreign and domestic methods, they would be able to sustain consistency.

Eventually, the casting process began to improve, and many castings (maybe 300) were produced. The machinists anxiously awaited to process these castings on the newly acquired equipment. They proceeded to immediately process and stockpile the completed, shiny machined heads as evidence of their skill and fine equipment.

However, the first engines made with these heads failed to achieve the expected performance. Kiichiro had not verified, from the beginning, if the actual production castings met the required design shape to produce the horsepower target.

This created a big concern for Kiichiro. Should he order his workers to re-work the castings to save the potential loss? What would you have done?

Kiichiro realized that his initial focus had not been narrowed down to basic system verification, or one-by-one confirmation. He recognized the costly lesson of not confirming the quality at each step of the process. This did not just mean quality of zero defects. This also meant verification of each process in relation to the preceding and following processes, as a whole system.

He realized that he must stop the perception of "It's OK to just repair poor quality!" If not, his company would repeatedly suffer from

- rework,
- repair, and
- thus, low quality.

He took a stand that has become a Toyota trademark. This was the beginning of learning "how to wait." Confirming processes one-by one, step-by-step, and not proceeding with the next step until requested, was the original start of the "just-in-time" philosophy, which I will talk more about later.

AVOIDING "MURI"
THROUGH STANDARDIZED WORK

So you ask, "How do I provide a work environment that encourages one-by-one confirmation?" I say, "By avoiding 'MURI,' or UNREASONABLENESS, through STANDARDIZED WORK."

First, a STANDARD CONDITION must be defined to assure quality. Then every process and function must be reduced to its simplest element for examination.

Next the process must be standardized to achieve the STANDARD CONDITION. These simple work elements, or STANDARDIZED WORK sequences, must be set up and combined, one-by-one. In manufacturing, this includes:

- Work Flow, or Logical directions to be taken,
- Repeatable Process Steps and Machine Processes, or Rational methods to get there, and
- Takt time, or Reasonable lengths of time and endurance allowed for a process.

STANDARDIZED WORK encourages the close, one-by-one examination of

First, Ergonomic and Safety questions

Second, Quality issues

Third, Productivity, and

Finally, Cost benefits

When everyone knows the STANDARD CONDITION, and the STANDARDIZED WORK and sequences, the results are clear:

- Employee morale is heightened,
- Higher quality is achieved,
- Productivity is improved, and
- Costs are reduced.

These simple elements can be isolated and changed quickly, as needed. STANDARDIZED WORK is COMMON SENSE. It is not a Toyota phenomenon:

- A speaker uses STANDARDIZED WORK, called an outline
- A chef uses STANDARDIZED WORK, called a recipe
- A coach uses STANDARDIZED WORK, called a game plan

AVOIDING "MURA"
THROUGH JUST-IN-TIME SYSTEMS

So you say, "OK, I have put into place the strictly defined STANDARDIZED WORK. But how do I make it flexible, while avoiding "MURA," or "INCONSISTENCIES" in the system?"

My answer: Through JUST-IN-TIME Systems.

JUST-IN-TIME Systems are based on

- Little or no inventory,
- Supplying the production process with the right part, at the right time, in the right amount, and
- First-in, first out flow.

JUST-IN-TIME systems create a "pull system." In a "pull system," each department withdraws from the preceding departments, and ultimately from the outside supplier. Simply told:

- The Assembly line "makes a request to," or "pulls from" the Paint Shop, which pulls from Body Weld.
- The Body Weld Shop pulls from Stamping.
- At the same time, requests are going out to suppliers for specific parts, for the vehicles that have been ordered.
- Small buffers accommodate minor fluctuations, yet allow continuous flow.

The connection of information flow within this Parts and Material Flow becomes the NERVE CENTER of the Production System. As requests are met, the supplied parts are used in a first-in, first-out flow, which enables quality to be tracked.

When a preceding process does not receive a request, it does not make more parts. If parts or material defects are found in one process, the JUST-IN-TIME SYSTEMS force the problem to be quickly identified and corrected.

The JUST-IN-TIME SYSTEM reinforces ONE-BY-ONE CONFIRMATION, in which

- **Quality** is confirmed at every step, through first-in, first-out flow,

- **Cost** is reduced by eliminating the need for warehousing, as well as the expense of scrapping warehoused parts that are found to be defective. The need for extra labor costs is also eliminated.
- And maximum **productivity** is a result when the right parts and materials are supplied at the right time and in the right amount.

This includes Total Productive Maintenance of machinery.

The 3 M's I have just reviewed bring a more complete perspective to improving manufacturing.

First, MURI focuses on the preparation and planning of the process, or what can be avoided proactively. And, then, MURA focuses on implementation and the elimination of fluctuation at the operations level, such as quality and volume.

The third — MUDA — is discovered after the process is in place and is dealt with reactively. It is seen by variation in output. It is the role of Management to examine the MUDA, or waste, in the processes and eliminate the deeper causes by considering the connections to MURI and MURA of the system. The MUDA – waste – and MURA – inconsistencies – must be fed back to the MURI, or planning, stage for the next project.

The continuous cycle of self-examination allows for the outcomes to continuously improve. This brings in Management's responsibility:

- to provide and improve a flexible system, and
- to connect the workforce and the customer.

A key to providing a flexible system, is not to be afraid to stay in a "ready for anything" mode. Holding large buffers does not allow you to "be ready for anything."

The JUST-IN-TIME concept, I have just described, allows for flexibility. But it is the Human Factor that makes it flexible, while keeping it consistent.

Your workforce determines the success or failure of your plant, or business. It is your people, not the machinery

- Who have the common sense and experience to recognize when something is not right, and change it,
- Who can think and solve problems,
- Who are the representatives of the car-buying public, and bring this insight onto the job with them everyday.

It is the people in your workforce who, when given the authority and power, will look for ways to:

- Utilize the JUST-IN-TIME system to
- Improve the STANDARDIZED WORK processes, and, thereby,
- ELIMINATE WASTE.

It is your people who will implement ONE-BY-ONE CONFIRMATION. And it is up to you, as Management, to encourage your people – AND YOURSELVES – not to be afraid to "stay ready for anything."

THE CUSTOMER

Now, you are saying, "Yes, but my systems are already in place. Sure, if I could start from scratch, I could 'do it right the first time.' But my business is already running at full speed! What can I do at this point?"

Kiichiro Toyoda was faced with that situation in 1936. He had hurriedly competed to win a truck contract with the government and had not set up his systems "right the first time."

After winning the contract, he had to backtrack and fix problems as they arose. However, in addition to fixing the problems, he tracked and examined the problems and began putting improvements in place that would keep these problems from recurring. He used what, today, we would call "kaizen" — or improvement — teams.

In the first year, Kiichiro made 800 improvements, in his systems that had already been running at full speed.

Improvement can be started at any point, no matter what or where problems occur. You can do this by:

- Encouraging your workforce to practice one-by-one confirmation, then
- Listening to your workforce,
- Trusting your workforce, and
- Supporting your people.

You must recognize the value of "the customer on the line." Your workforce is not only

- Your company's bridge to your CUSTOMER and

- Your suppliers' bridge to the CUSTOMER, but also
- They **are** customers, who want everything "done right the first time."

When everyone "does it right the first time," it translates into

1. High quality, which is built-in
2. Highly motivated employees —because they are proud of what they do, and
3. Satisfied, repeat customers.

As a result, this ultimately translates into:

- Increased Productivity, and
- Reduced Cost.

Process-by-process, part-by-part, vehicle-by-vehicle:

- EVERYONE wants to "do it right the first time," and
- Everyone wants to be encouraged to "do it better the next time."

MANAGEMENT'S CHALLENGE

I have a departing thought that I would like you to consider as you set out to improve your companies' outcomes. Consider the Deming Cycle, we know as "Plan, Do, Check, Action," or "P.D.C.A.".

The "Plan - Do - Check" part of this cycle is pretty clear. But the "**Action**," part, to me, is the will or motivation of Management. Management must:

- Keep challenging the organization
- Look at the result, and see a better way, and
- Lead the organization to **plan** again, **do** again and, again, **check** the outcome.

I would further draw a connection between P.D.C.A. and the 3 M's.

- **PLAN** means to avoid **MURI,** or unreasonableness
- **DO** means to avoid **MURA**, or to control inconsistencies
- **CHECK** means to avoid **MUDA**, or to find waste in outcomes
- **ACTION** indicates the will, motivation, and determination of the Management

Toyota's founders had the desire to find a better way, like ONE by ONE CONFIRMATION, and to establish a company culture for future generations.

THEN, AND TODAY, THAT IS COMMON SENSE! THAT'S THE SECRET!