

Remembering What Ohno and Shingo Said

By Bob Emiliani

Publish date: May 2006 Superfactory www.superfactory.com
--

[The Center for Lean Business Management LLC](#)

Two people closely involved in the creation the Toyota Production System had a lot of concern that people might misunderstand it. Here's a reminder of some key points they made.

While the foundation of Toyota Production System (TPS) was laid by Sakichi Toyoda (jidoka) and his son Kiichiro (Just-in-Time), Taiichi Ohno, who rose to the level of Executive Vice President of Toyota Motor Corporation, is widely credited with making TPS a reality. Shigeo Shingo, a consultant to Toyota, famous for his work on single-minute exchange of dies (SMED), was an important contributor. Eiji Toyoda, former President of Toyota Motor Corporation, and Saito Naichi also played key roles [1]. And let's not forget the many nameless team members whose efforts also helped make TPS come alive.

Mr. Ohno wrote a book titled: Toyota Production System in 1978. The book was translated into English and published by Productivity Press in 1988 [2]. The focus of Ohno's book was to describe the thinking behind TPS, at a high level and with very few specific examples, and primarily intended for an audience of senior managers.

Mr. Shingo wrote a book titled: A Study of 'Toyota' Production System from Industrial Engineering Viewpoint, 1980 [3]. Shingo's intended his book to compliment Ohno's book, but with greater focus on the method of implementation and for an audience of mid-managers and professional workers such as industrial engineers [4].

Shingo's book was translated into English by the Japan Management Association and distributed by Productivity Press in 1981. Since the English translation of the book had poor grammar and many spelling errors, Norman Bodek, then the president of Productivity Press Inc., obtained rights to revise the English translation [5], and published it in 1989 [6]. Despite its shortcomings, the original translation is a valuable resource for understanding many important details about the Toyota Production System.

These two books are essential reading for anyone who is serious about understanding TPS [7]. Purchase them both and read them again and again.

Both Ohno and Shingo were very concerned that people would misunderstand TPS. So in their respective books, they tried to make sure that readers would come away with an accurate understanding of TPS. As we all know, however, many people misunderstand or misapply TPS. So it is with that in mind that we present selected passages from these two books as reminders of what Ohno and Shingo said, accompanied by some commentary.

Ohno's Words [2]

- "The Toyota production system, however, is not just a production system. I am confident it will reveal its strength as a management system..." (page XV)

Commentary: Ohno is saying: don't take the word "production" literally. However, that is exactly what most people have done, and thus they think of TPS as just a "manufacturing thing." To

Ohno, TPS is a management system for the entire organization, not solely the production part of the business. It can work in any business, because TPS is a principle-based management system. Comprehend your situation and apply the principles, as well as the associated tools and methods.

- “We kept reminding ourselves, however, that careless imitation of the American system [of production] could be dangerous.” (page 1)

Commentary: Likewise, we should remind ourselves that careless imitation of TPS is dangerous.

- “The basis of the Toyota production system is the absolute elimination of waste.” (page 4)

Commentary: For many managers, the basis for implementing TPS is to improve operating efficiency and increase the stock price. Most managers who think this way achieve little success with either operating efficiency or stock price. Ohno sees it the other way around: eliminating waste lowers costs, and what follows from that is improved profitability and higher stock price. Remember, people are not waste.

- “...the workers themselves should push the stop button to halt production if any abnormality appears.” (page 7)

Commentary: While the context is stopping a machine in a production environment when a problem occurs, these same words surely apply to administrative processes as well.

- “Although young and eager to push, I decided not to press for quick, drastic changes, but to be patient.” (page 11)

Commentary: Managers usually turn to TPS when a crisis emerges and will naturally lack patience for many things – including people’s resistance to change. Being patient does not mean you won’t quickly get where you want to be. Being impatient means you may never head in the direction you want to go.

- “We must understand these situations in-depth before we can achieve a revolution in consciousness.” (page 15)

Commentary: The causes of overproduction, defects, etc., must be thoroughly understood by managers. Doing so will enable you to clearly see things that you were previously unable to see.

- “...the Toyota production system has been built on the practice and evolution of this scientific approach [5 why’s method of root cause analysis].” (page 17)

Commentary: It seems that many managers disdain the application of scientific methods in business – especially for management (vs. production or engineering) problems. They may think: “Who has time for science? We’re running a business!” Just look at Toyota and see what can happen when you apply scientific methods to identify and understand a problem, apply countermeasures, and then test the countermeasures to determine if they eliminate the problem from recurring.

- “The Toyota production system clearly reveals excess manpower. Because of this, some...people have been suspicious of it as a means of laying off workers. But that is not

the idea. Management's responsibility is to identify excess manpower and utilize it effectively." (page 20)

Commentary: Managers who lay people off as a result of continuous improvement make a grave error because it undercuts worker participation in future improvement activities. Who would want to participate in continuous improvement activities if it may cost them their job? Since layoffs resulting from continuous improvement are commonplace, this helps explain why most companies have little success with Lean. Instead, managers must re-deploy excess workers to other value-creating activities. Remember, the literal definition of "kaizen." It means: "change for the better" (in a multilateral context).

- "...the most important point in common between sports and work is the continuing need for practice and training. It is easy to understand theory with the mind; the problem is to remember it with the body. The goal is to know and do instinctively. Having the spirit to endure the training is the first step on the road to winning." (page 25)

Commentary: Ohno is comparing TPS to sports – a human activity that requires an immense amount of practice if one is to successfully compete at the highest levels. To be good at TPS – as an associate, supervisor, or manager – you must practice it daily in order to "know and do instinctively." Do company executives have the spirit to endure the training? Do they view two days of TPS lessons in the classroom as training? Or, do they view regular participation in shop floor and office kaizen as the training?

- "We use the computer freely, as a tool, and try not to be pushed around by it. But we reject the dehumanization caused by computers and the way they can lead to higher costs... we want information only when we need it... An industrial mind must be very realistic... (page 48). In business, excess information must be suppressed." (page 50)

Commentary: Computer systems are a tool that can be easily misused. We should not be ruled by them because we might start to think people are not needed to run the business. Only people can identify and eliminate waste. Computer systems are expensive in at least three ways: acquisition and maintenance costs; belief that all the information is accurate and useful for running a business; and people become distracted by useless data and excess information and thus fail to move TPS forward.

- "I urge all managers, intermediate supervisors, foremen, and workers in production to be more flexible in their thinking as they go about their work." (page 115)

Commentary: Ohno is urging people to be more creative and open to new ideas as they perform their respective activities. Don't limit this great advice to production personnel. Flexible thinking also means managers must move beyond the numbers to run a business, and do a better job incorporating non-quantitative data in decision-making. In TPS, the reasons to take action often can not be expressed in a spreadsheet. Instead, you have to go to the place where the work is performed and see for yourself.

Now let's review some of the things that Mr. Shingo had to say.

Shingo's Words [3]

- "... Toyota production system is the production system, and kanban system is nothing but the means of carrying out the production system and only a controlling system. Because kanban system has come up as a big merit of Toyota production system, even in Japan,

there is misunderstanding that Toyota production system is kanban system, and only the external phase [just the part that people could see] was initiated, resulting in failure or having little effect in many cases.” (preface, page 14)

Commentary: People mistakenly think TPS is the same as kanban system. It is not. Blindly imitating kanban system without understanding the overall intent of TPS – both human and technical – will cause problems.

- “(a) Process [is] the course through which material is changed to the product. The content consists of four phenomena: processing, inspection, transportation, and storage. (b) Operation [is] the course through which man and machine work upon the product. In Europe and America, the term ‘operation’ is used also for ‘processing’ in process, but in this book the term ‘operation’ will be defined to the case of (b)... Toyota production system is explained based on such recognition. Consequently, ‘process’ and ‘operation’ are not in parallel relation...” (preface, pages 16-17)

Commentary: In TPS, “process” and “operation” are different. This distinction, which Shingo explains in detail, must be thoroughly understood.

- “If Toyota production system is reviewed from the standpoint of fundamental production control system, the system must be applicable to factories in any country, as a universal production control system, being adapted to the characteristics of each plant, and I believe that big results could be expected. I sincerely hope that the enterprises in each country would recognize the essence and apply the system effectively by considering the characteristics of their own plant, without being misled by the external phase only.” (preface, page 18)

Commentary: TPS is not simply a production system for the automotive industry. It can work in any factory – and now we know service enterprise as well – with adaptations if needed. Shingo advises caution: do not be misled by external appearances, because they do not inform you of the true intent of TPS.

- “Regarding the abovesaid points [clarifications of what is meant by waste caused by overproduction, operation ratio of machine, and visible control] the plants which practices Toyota production system in its real sense and understand the fundamental idea can be all right, but those which only listened to the lecture or read the explanation and imitate simply are liable to fall into the abovesaid misunderstanding.” (preface, page 24)

Commentary: TPS is learned mostly by doing, not by reading or listening to someone lecturing about it. Most organizations try to imitate TPS and do not truly understand it. As a result, many important aspects are misunderstood or not understood at all.

- “...in order to implement plant improvements, it is quite important to understand the mechanism of production functions correctly. Misunderstanding of the fundamentals might not always lead to effective improvements. Therefore cautions must be necessary for this point.” (page 6)

Commentary: To most people, addressing the symptom of a problem and not its root cause(s) is acceptable evidence of improvement. Shingo says we must first understand production activities as a network of processes and operations in order to achieve effective improvements.

- “Therefore, this SMED system is one of the fundamental method that had an important meaning for the development of Toyota production system.” (page 70)

Commentary: Without SMED (single minute exchange of dies), there is no TPS. The principles of SMED also apply to production activities in service businesses.

- “Now you might think that Toyota Motor is wearing a smart suit, so you would intend to purchase one, and bought a suit called ‘kanban system’ but your body was bubbled-up so fat that you could not wear it. Therefore, it would be necessary to improve formation (improvement of production system). Besides, you must definitely understand the meaning of basic health (consideration to eliminate useless items thoroughly). This is the way I talk to people.” (pages 93-94)

Commentary: Shingo likes to give analogies to help people understand the true meaning and intent of TPS. Kanban system is not something you can simply buy and fit into your existing “fat” production system. You would first have to improve the health of your production system by eliminating waste.

- “It is stated that one of the great mainstays of Toyota production system is ‘Just in Time.’ But, if the language should be translated into Japanese it would be ‘timely or well timed....’ ‘Just in Time’ involves the meaning that each process must be supplied with required items, at the required time and in the required quantity... This thinking is the proper understanding.” (pages 98-99)

Commentary: Shingo is concerned that people take the meaning of “Just in Time” literally, so that the only aspect they are concerned about is time. Of course, people must supply processes at the required time, but they must also be concerned about supplying the process with the required items in the required quantity – and to the required location.

- “When you get appendicitis, relieve the pain by ice-cooling it from the outside. This method is useless, so Toyota production system proceeds thus: Treat appendicitis by operation and cut-off the affected part. Therefore, appendicitis would never recur life-time. Namely, execute basical solutions to prevent recurrence... When troubles occur, grab the actual cause even stopping the line and prevent repeated recurrence for the future.” (pages 107,109)

Commentary: It is useless to treat the symptom of problems. So when problems occur, understand the root cause and apply countermeasures that completely prevent recurrence. Recognizing a problem and understanding its actual causes is so important to the proper functioning of TPS of that it is OK to stop the work.

- “...but does [MRP] involve the followings of the Toyota production system? - Remarkable shortening of time for exchange of dies and toolings - Through that reduction of time, accomplish small lot production - Perform one piece flow operation consistently from parts processing to the assembly process - Considering order production and adopt the method of receiving products from latter processes It is doubtful whether that system [MRP] deeply considers the improvements of the fundamental points of the control system itself.” (pages 296-297)

Commentary: Shingo is questioning if material requirements planning (MRP) software systems support or contradict TPS. Shingo concludes (25 years ago) that MRP is inconsistent with TPS

because it does not support single minute exchange of dies, small lot production, one-piece flow, and pull systems – and continuous improvement of these elements of production control.

- “But, the thing which is most important and requiring time is as follows: The top managements must have a clear understanding and earnest will to achieve the final aim, and besides, the most important point is to have the entire plant realize and understand, especially, realization and understanding of the people at the production site must be obtained. This is the key point that would lead to success or failure.” (page 333)

Commentary: Senior managers must understand TPS thoroughly, which can only be achieved through direct participation. It is their responsibility to inform workers about TPS so that they realize and understand the purpose of what they are doing and why it needs to be done. Not doing so will lead to failure.

In closing, these two great books contain essential insights into the correct understanding and application of Toyota production system that serious students of TPS will enjoy reading over and over again... in support of actual doing.

Bob Emiliani is President of The Center for Lean Business Management, LLC and an associate professor in the School of Technology at Central Connecticut State University in New Britain, Conn. Bob has worked 20 years in manufacturing and service industries, and has implemented Lean principles and practices on the manufacturing shop floor, in supply networks, and in higher education. David Stec is Vice President of The Center for Lean Business Management, LLC, and an Assistant Professor in the School of Technology at Central Connecticut State University in New Britain, Conn. David has 15 years experience in the aerospace industry, and has implemented Lean principles and practices on the manufacturing shop floor and in supply networks. Bob and David are co-authors of the 2003 Shingo Prize winning book *Better Thinking, Better Results*, which chronicles The Wiremold Company's Lean transformation from 1991 to 2000. For more information, please visit <http://www.theclbm.com>. Copyright © 2006 by The CLBM, LLC.

Notes:

[1] T. Ohno with S. Mito, *Just-In-Time For Today and Tomorrow*, Productivity Press, Cambridge, MA, 1988, p. 75

[2] T. Ohno, *Toyota Production System*, Productivity Press, Portland, OR, 1988

[3] S. Shingo, *Study of 'Toyota' Production System from Industrial Engineering Viewpoint*, Japan Management Association, Tokyo, Japan, November 1981, distributed by Productivity Press, Inc., Cambridge, MA

[4] For even more detail, see Y. Monden, *Toyota Production System: An Integrated Approach to Just-In-Time*, Engineering and Management Press, Norcross, GA, 1998

[5] N. Bodek, *Kaikaku: The Power and Magic of Lean*, PCS Press, Vancouver, WA, pp. 63-65, 67-68, 147, 188

[6] S. Shingo, A Study of the Toyota Production System, Productivity Press, Inc., Portland, OR, 1989

[7] The original 1981 English translation of Shingo's book can be purchased online through used bookers such as alibris.com, barnesandnoble.com, or amazon.com.