

The Application and Challenge of Shigeo Shingo's Quality Management Concept

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Keywords: Shigeo Shingo; Quality Management; TQM

Abstract: Dr. Shigeo Shingo was perhaps the greatest contributor to modern manufacturing practices. While his name has little recognition in the western hemisphere, his teachings and principles have formed the backbone of efficient engineering practices. In applying his experience and expertise in the field of industrial engineering, Dr. Shigeo Shingo was able to provide a better way of life for both the operators and the corporations. His policies have gained reputation through results in manufacturing among the companies that have implemented these teachings.

1. Introduction

Shigeo Shingo (1909-1990), born in Saga City, Japan, was a Japanese industrial engineer who distinguished himself as one of the world's leading experts on manufacturing practices and the Toyota Production System. Shigeo Shingo, who as an external consultant had been teaching Industrial Engineering courses at Toyota since 1955. Shigeo Shingo is the author of numerous books including: *A Study of the Toyota Production System; Revolution in Manufacturing: The SMED System; Zero Quality Control: Source Inspection and the Poka-yoke System; The Sayings of Shigeo Shingo: Key Strategies for Plant Improvement; Non-Stock Production: The Shingo System for Continuous Improvement; The Shingo Production Management System: Improving Process Functions.*

2. Significant contribution to TQM

1. Poka-Yoke Techniques to Correct Defects + Source Inspection to Prevent Defects = Zero Quality Control.

This famous equation is the essence of Zero Quality Control Concepts formulated by the Japanese quality guru, Dr. Shigeo Shingo. Dr. Shigeo was one of the greatest influences on Japanese quality control and his contributions to quality improvement revolutionized the Japanese industrial sector and consequently influenced the industries in the west.

2. Dr. Shigeo Shingo put forward three different detection methods:

(1) Broken detection: refers to the secondary products from the qualified products. This method is also sometimes called "quality inspection".

(2) Information testing: refers to using the data obtained from the testing to control the production process to prevent the occurrence of secondary products.

(3) Traceability detection: refers to the conditions necessary to confirm the high-quality production before the event occurs.

3. Quick preparation method

Dr. Shigeo Shingo pointed out that the equipment debugging is divided into internal debugging and external debugging of two parts. That is the basis of his Single Minute Exchange of Dies (SMED) replacement mode.

The SMED system has now become a key technology of Toyota's production system, which is widely used in all walks of life in Japan, greatly promoting the change of production mode. This system was later introduced to Europe and the United States.

4. Zero defect quality control

Dr. Shigeo Shingo believes that the traceability detection and boka correction system can achieve zero defects, and cited Panasonic's washing machine branch factory as an example. A drain assembly line operated by 23 workers set a defect-free production record for one month. This was achieved mainly because of the assembly of boka correction tools to prevent defects.

3. The Shingo Prize

Founded in 1988, The Shingo Prize is a production quality award to commemorate Shigeo Chongfu (Shigeo Shingo), one of Toyota's production mode creators, and is known as the "Nobel Prize in manufacturing" (Figure 1).

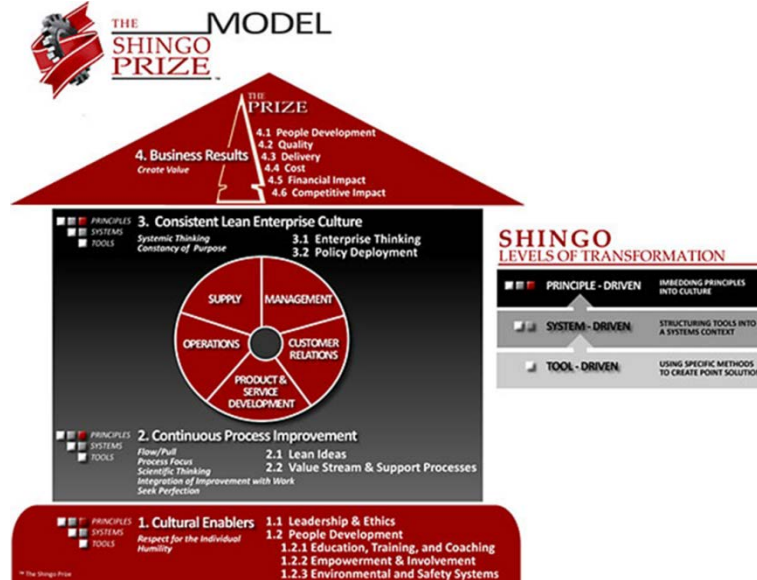


Figure 1. The Shingo Prize Model

The model of the Shingo Award is based on the lean management model advocated by Dr. Shigeo Shingo, which expounds the transformation and application of a traditional enterprise into a lean enterprise, including three levels of transformation and application: tool use, system driving and essential change. In the model of Shingo Award, a complete lean system is constructed from four aspects.

As the first aspect considered by the Shigeo Award Model, Cultural Enablers is the grassroots of the Shigeo Award Model. A good corporate culture foundation enables the organization to start a lean transformation journey with a good start, and eventually form a lean culture.

Continuous Process Improvement (CPI) is the second aspect considered in the Shigeo Award model. In this phase, the organization drives continuous improvement through the understanding, development, and application of a range of lean tools, techniques, and concepts.

Enterprise Culture is the third aspect considered by the Shigeo Award model. The realization of a lean organization depends on the fact that leaders, managers, and employees of all functional departments at every level of the organization have a common and consistent lean culture. All the principles and norms in the organization need to be integrated using the holistic, dynamic and closed-loop system thinking method. System thinking is a process in which all lean principles can be unified and coordinated, so that the organization can promote continuous improvement according to consistent goals.

Business Results is the last aspect considered by the Shigeo Award model. The operating results of an organization are generally divided into six major areas: personnel development, quality, delivery,

cost, financial benefits, and competitiveness. The operation of an organization is a process of value creation.

In general, the Shigeo Award model is a widely used success model. On the one hand, organizations achieve the transformation of lean management models through the systematic approach enumerated in the Shigeo Award model. On the other hand, when some companies occasionally try to use certain lean tools. When encountering obstacles, regardless of their current state, they can use the Shigeo Award model as a guiding map and have more confidence to complete the transformation and achieve a better future.

4. The Shigeo's quality management concept in schools

1. Application

The basic concepts of Poka-Yoke and zero-defect quality control can be applied to strengthen the construction of school quality monitoring system. The perfect teaching quality monitoring system consists of five subsystems: teaching quality planning system, teaching quality control system, teaching quality evaluation system, teaching information feedback system and teaching quality supervision and guarantee system.

1.1 Teaching quality planning system. To implement the monitoring of teaching quality, the establishment, adjustment and improvement of the monitoring system should be planned in advance, which will ensure the quality of the established system itself. To achieve the expected effect of teaching quality, set monitoring goals, and solve problems in the process of education and teaching at different levels, so as to promote the goal of teaching quality monitoring.

1.2 Teaching quality control system. The teaching quality control system should be a multi-channel, all-round, three-dimensional top-to-bottom cycle control system. The system is mainly controlled by theoretical teaching and practical teaching in the teaching process.

1.3 Teaching quality evaluation system. The teaching quality evaluation system is to carry out effective inspection, supervision and control of teaching work according to the deployment of teaching management documents and teaching quality planning system to ensure the benign operation of teaching activities.

1.4 Teaching information feedback system. There are two channels for the collection and feedback of teaching information, inside and outside the school. On-campus information includes macro and micro levels. Off-campus information mainly includes graduate tracking survey information, two-way communication and information feedback with employers, talent market demand information, and social research.

1.5 Teaching quality supervision and assurance system. The school teaching supervision committee works under the direct guidance of school leaders. On the one hand, it plays a role in monitoring the work quality and teaching quality of the teaching process. On the other hand, it provides targeted information for teachers to improve their teaching work.

2. Challenges

2.1 The teaching quality monitoring system is not perfect

At present, the school management still adopts the traditional management mode. Too much pursuit of theoretical knowledge in the classroom, the teaching content is very dull, which seriously restricts the students' innovative ability and practical ability.

2.2 The quality of teaching management personnel is low

The teaching management staff are all teachers, lack of teaching management experience, and the level of the management team needs to be improved. There is a lack of scientific and comprehensive evaluation system and evaluation methods, and the monitoring of the completion effect of teaching tasks is neglected.

2.3 Insufficient investment in teaching quality monitoring

Since teaching quality is a very complex task, it cannot be done by manual work alone. It is necessary to modernize the monitoring of teaching quality. Insufficient funds are a big headache, and

the limited funds have not been well utilized, which is a serious problem. There are certain problems in the quality control work.

5. Conclusion

Dr. Shigeo Shingo was perhaps the greatest contributor to modern manufacturing practices. The impacts of his principles form the backbone of modern manufacturing fundamentals. It is undoubtedly the kind of recognition that is deserved by one of the world's prominent industrial engineers – Dr. Shigeo Shingo. We are teachers. As a Chinese saying goes: Teachers are the engineers of human soul (spirit or mind). We shall learn from Dr. Shigeo Shingo to realize POKA-YOKE in education management. Since human is the body of flesh and blood, they often makes mistakes. POKA-YOKE is the embodiment of humanized management, which lead us to set up models or standard in advance to cultivate students. POKA-YOKE is the wisdom of management. An excellent kind of management is to simplify difficult issues into smaller ones and to proof-mistake simple details into none.

All things done in Education management is responsible for students, more specifically, for all things about students in their life span.

References

- [1] <http://crunch.ivey.uwo.ca>
- [2] <http://www.dti.gov.uk>
- [3] <http://www.geocities.com/parthadeb/smed.html>
- [4] http://www.inventorysolutions.org/def_jit.htm
- [5] <http://www.library.tuiasi.ro/ipm/vol12no12/mechanical.html>
- [6] <http://www.pori.tut.fi/spic/files/quality/esitykset-2001-11-29/shingo-paper.pdf>
- [7] <http://www.shingoprize.org>
- [8] http://www.strategosinc.com/just_in_time.htm?source=overture.