

TOYATA PRODUCTION SYSTEM
(KANBAN SYSTEM)
- A CASE STUDY

Toyota Production System is one of the items in which Toyota Motor Co. instructs the suppliers. This system is also called the Kanban system and has become well-known internationally for its small quantity of stocks and thorough rationalization.

Toyota Production System has two major features, “Just-in-Time Production” and “Jidoka (Automatic line stopping when something goes wrong)”.

The ideal state for producing goods is the one where machines, equipment and men perform waste less operations which serve nothing but to increase added value. “Just-in-time production” was thought out to convert this ideal state into practical one everywhere, between each operation, each process, each line and each shop. In other words by “Just-in-time production” each process can supply necessary parts in necessary volume at necessary time. On the other hand “Jidoka” means that whenever an abnormal or defective condition arises, machines, equipment or general conveyor lines can be supported by the judgment of these machines, equipment and line workers themselves. In short “Jidoka” lies emphasis not on operating machines to full extent but on making them stop by themselves as soon as machining defects happen in order to take necessary actions.

To make “just-in-time production” and “Jidoka” flexible to a workshop following conditions are devised:

Process On	11	10	9	8	7	6	5	4	3	2	1
Name of the process	TMC	Goods store	Test-ing	Assy - line	Stock store	Wash-ing	Mach-inning finis-hing	Sto-rage	Fin - Removal	Die-Cast - ing	Die Prepara-tion
Circulation of Kanban											
Transportation	(Truck)	Conveyor	Trolley	(within line)	(Lift)	(within line)			(Within Line)		
Shop	Toyota	Assy. Shop	Machine Shop	Fin Removal Shop			Casting Shop				

TMC – Toyota Motor Company

An example of Kanban System (Pull System)

- 1) Hourly production at every process is leveled with respect to volumes and specifications of products.
- 2) Attention is paid to prevent over production
- 3) Occurrence of abnormality can be easily identified by some means of indication (buzzer or lamp)

Toyota Production System employ “Kanban” or a form of order card as working device. This is the reason why the production system is called “Kanban System”

This system connects a supplier as a production process with each of Toyota’s plans and realizes to minimize the work in process inventories, which every process in a shop used to keep in considerable volume formally.

A real example of such production control system has been explained. The Fig. Shows the production, process and uses of “Kanban” at the company a supplying carburetors.

The production process consist of the following steps:

- | | |
|--------------------|----------------|
| 1) Die Preparation | 2) Die Casting |
| 3) Fin Removal | 4) Machining |
| 5) Washing | 6) Stock Store |
| 7) Assembly Line | 8) Goods store |

Production order is given by “Kanban” or order cards which a subsequent process bring to the preceding process. The preceding process produces what the subsequent process demands for. For instance, as one can see in the third frame of Fig., the washing process brings a order cards to the preceding machining process when washed products stock reaches below the prescribed level by the demand from the subsequent assembling process. The machining process starts processing as soon as it receives the order card. “Kanban” or order cards are circulated not only in a company but also between different companies. Dispatch of carburetors of the company A is begun by the order card from the engine assembly division of Toyota Motor Co. Then an order is given to the assembly process for the types of carburetors that were removed from stock shelf and dispatched. In this way orders are given to the preceding processes like chain reaction.

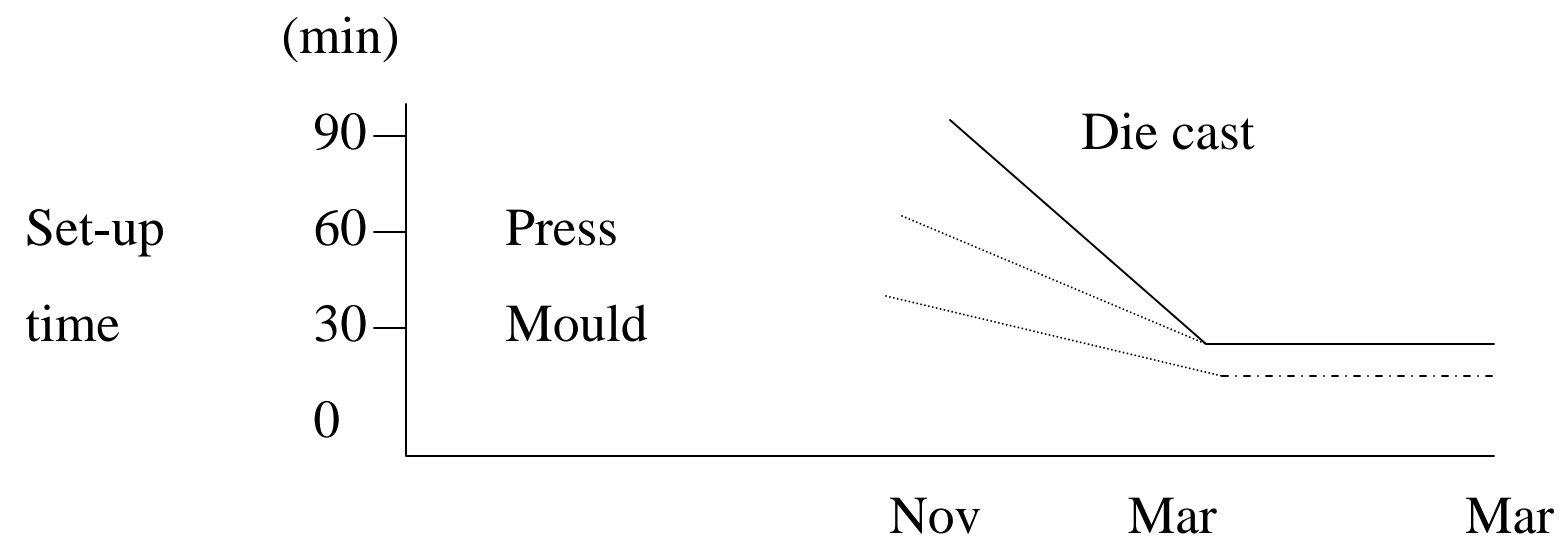
As one may have already noticed, following requirements must be met by production processes in order to apply this “Kanban System” efficiently.

1. A production line must realize much shorter setup time than commonly can respond to production order given every four hours or every hour for different kinds or specifications of products.

(Example) Shortening of die setup time

- a) It used to take fifty minutes to change a die of a resin moulding machine. By improvement on twenty four points it now takes three minutes.

- b) Formerly it had taken 90 minutes, 60 minutes and 26 minutes respectively to set up 50 die casting machines, 250 small stamping machines and 5 resin moulding machines. At present it take less than one minute each.



2. Minimising the production of defectives

A subsequent process given an order for producing such small quantity of work-in-process inventory as follows:

- a) On small stamping line: 100 units
- b) On machine processing line: 10 units
- c) On assembly line: 5 units

and when a defective is produced, it is necessary to reproduce the substitute from raw materials (which needs much time and cost). So production of defective cannot be allowed. Reliability as high as that required for electronics industry parts is expected to the machining processes.

3. Thorough preventive maintenance

For minimising the production of defectives it is demanded not to repair the machine tools and equipments after they break down, but to reform these processing facilities themselves as well as to examine them regularly. In short, preventive maintenance and reformative maintenance are mandatory.

4. Observation of operation standards

As the products change in kinds and specifications each hour, a superintendent must clearly show the operation standards on each product to the workers, and must check whether operations are being performed as ordered.

As one may have been aware, Toyota guides the suppliers in applying “Kanban System” not for spreading the usage of “Kanban” itself but for leveling up their production control, quality control or workers’ capabilities, and strengthening the management system. At the time of this case study among 200 suppliers of Toyota 175 were applying the “Kanban System”.

CONCLUDING REMARKS

Toyota has promoted mutual prosperity with 200 component suppliers under the basic principle of long term and stable transaction.

AND TOYOTA continues to maintain and improve the relationship with the component suppliers following this basic spirit.

For this reason Toyota will go with assisting the component suppliers in management as well as quality control. And TOYOTA expects the suppliers to strengthen the management system of their own and to supply the products of excellent technology and quality without presuming upon or being too much dependent on the principle of long term and stable transaction. And Toyota would like to carry on business with overseas suppliers with processes of excellent technology and management foundation.