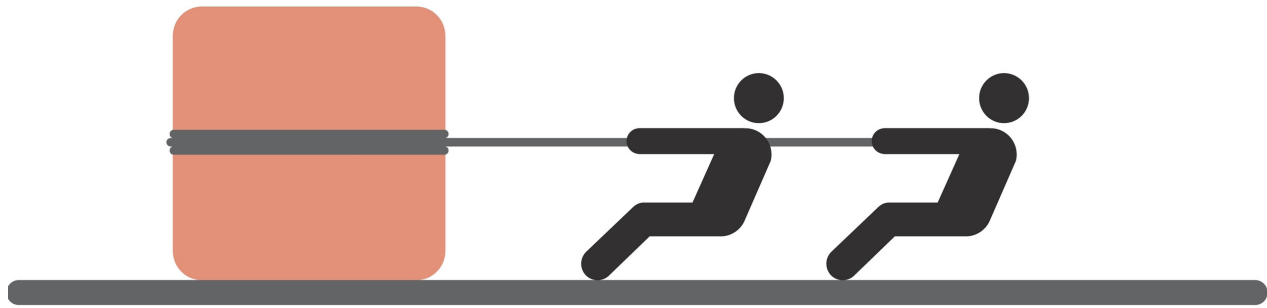


KANBAN



DEFINITION

- a signal from a customer to a supplier, to produce
- a visual (manual or electronic) information management system used to achieve JIT/pull production by signaling upstream operations to deliver what is needed, when needed, in the quantity needed
- the Japanese word meaning “signboard” or “signal”
- a scheduling system for Lean manufacturing developed in the 1940’s by Toyota’s Taiichi Ohno, to improve efficiency by regulating the supply of components/ tracking production within a factory, using an instruction card sent along the production line

MINDSET AND FOUNDATIONAL PRINCIPLES

Kanban, a component of a Lean Production System, represents a shift in the old way of thinking from producing parts based on availability of raw material or past scheduling, to producing parts based on a consumption. With Kanban, material is pulled through the system in response to upstream operation’s (internal and external customers’) need. As customer orders deplete supply,

a manual or electronic Kanban card or signal triggers a production order; in turn, depletion of raw material triggers a Kanban card or signal to be sent to the external supplier.

Kanban Prerequisites

In order to introduce a Kanban pull system, waste and bottlenecks must first be removed from processes. For this reason, Kanban is not a technique to be introduced early in a CI initiative. Value Stream Mapping is used to uncover bottlenecks (such as unplanned equipment downtime, long changeovers, and defects), that impede flow and create waste in processes; then, Lean tools such as TPM, SMED and Mistake-proofing are employed to address/ eliminate them.

Other tools (including Heijunka/line balancing, problem-solving, and 5S/visual workplace), are embedded in the Kanban process and pulled into the system as Kanban is implemented. (Refer to past Words of the Month on [Heijunka](#), [Problem-Solving](#), and [5S](#) for more detail on these techniques).

Along with a complete understanding of the value stream, foundational concepts and principles of Kanban, and a reliable implementation plan, a successful Kanban implementation is best supported by environments with repeatable processes, little product variation, steady customer demand, and reliable suppliers.

KANBAN

THE SIX (6) RULES OF KANBAN

Adherence to these rules allows inventory to be removed from systems; thereby, uncovering underlying, systemic process issues so they can then be addressed.

1. Never pass on defective products (downstream to the next process)
2. Take only what is needed (from the upstream process)
3. Produce the exact quantity required (by the downstream process)
4. Maintain a level rate of production
Adjust the pace of work to match the customer's consumption rate (takt time); this reduces unevenness in the production process, minimizes overburdening, and promotes flow
5. Fine-tune the rate of production
Continually check for waste to ensure the process is running optimally and is reflecting changes in demand.
6. Stabilize the process / rate of production
...so that it can be standardized and perform consistently and predictably. Note that the number of Kanban should minimize over time.

Keep in mind! While these rules are straightforward in the realm of manufacturing, they can equally be applied in the office, IT, and other admin environments. Don't overlook these areas for opportunities to improve workflow!

MAIN TYPES OF KANBAN SYSTEMS

The main devices used in a typical Kanban System are those listed here, each named for the function it provides:

- **In-process Kanban:** controls the amount of WIP allowed in a process
- **Production Kanban:** authorizes the workstation to produce a fixed number of products (based on the amount consumed from the previous process)
- **Replenishment Kanban:** signal from inventory that a specific item has been used up and needs to be replaced (i.e., raw material, or manufactured, finished, or procured good)
- **Supplier Kanban:** signals to an outside supplier that materials are due for delivery
- **Transportation Kanban:** authorizes the movement of a full container to the downstream workstation

KEY ATTRIBUTES OF A KANBAN SYSTEM

Kanban implementation is facilitated by a handful of tools used to track, monitor, manage, and record the process. Listed here is a brief description of each:



Supermarkets

A supermarket connects supplying and consuming processes by helping level production signals sent to the supplying process.

Kanban Cards

A Kanban card is a visual representation signifying a request for an item of work to be done. Kanban cards are created for permanent or single-use (the latter is best used dealing with products for which inventory doesn't need to be maintained), and every product on the line must be controlled with a Kanban card.

Sample Kanban Card

ABC Company		
	Part Number: 88495Y	Supermarket Location: A-1
Front	Part Description: Rivet	
	Container Type: Box	
	Container Quantity: 5000	Card 2 of 22
Back		
Part Number: 88495Y		
Supplier Name: Acme Rivet		
Supplier Contact: Rosie the Riveter		
Phone: 920-999-9999		
Fax: 920-888-8888		
Master PO: 40A5522		

Kanban Boards

A Kanban board is a visual representation of a value stream map that allows team members to attach and move Kanban cards or signals through the board as they track progress in managing project tasks. Once a specified level of demand is attained, the cards are removed and delivered to the production area to authorize production.



KANBAN

Kanban Equations/Elements

The standard formula for calculating the number of Kanban (or signals), required for an item to be held in a supermarket is seen here.

$$\#KB = (ADD \times (RF+LT+ST))/CQ$$

#KB = Number of Kanban; ADD = Average Daily Demand;
RF= Run Frequency; LT = Lead Time;
ST = Safety Time; CQ = Container Quantity

Keep in mind variations need to be considered when calculating elements of the equation (Daily Demand, Lead time, Safety time, etc.), such as, fluctuations in seasonality, overtime, set-ups, PM's/downtime, breaktime, absenteeism, etc. For a quick review of Calculating Kanban Lot Sizes, click on this recent [Lean Micro-lesson](#).

Bin Systems

In bin systems, bins are used as Kanban cards. Bins are filled with parts; whenever one bin becomes empty, it is placed in a designated area and acts as a signal that it needs to be replenished.

Kanban Resizing

Kanbans need to be resized based on variations in demand, i.e., in response to seasonality.

GOALS AND BENEFITS

There are many advantages to using a Kanban pull production system as a way to help manage daily work; when successfully applied, Kanban results in a workplace that has:

- Aligned production processes with customer demand/current operating conditions
- Optimized/controlled/reduced inventory/stock in the system
- Eliminated shortages
- Improved workflow
- Increased time to market and customer satisfaction
- Reduced overproduction, lead time, downtime, waste, and costs
- Increased first pass yield
- Visualized and communicated workflow
- Improved efficiency, flexibility, communication, and responsiveness

KANBAN IN THE WORKPLACE / TAKING IT BACK HOME

With its simple application, Kanban has become more widely used over the years, going beyond manufacturing to other industries including IT/Software development, healthcare, education, and more. Used as a project management tool, Kanban can help students, teachers, job seekers, sales and medical professionals, project planners, executive assistants, etc. organize daily tasks and schedules.

In the context of project management, it is also important to mention that Kanban, along with Scrum, are two of the most commonly used Agile project management methodologies in today's Lean workplace. For a more focused look at AGILE, check out last month's [Word of the Month](#).

What do printing, animated filmmaking, streaming music, and fashion retailing all have in common? The global organizations behind these services all embraced Kanban to achieve staggering results. [Click here](#) to read the article, "How Kanban Systems are Used in New Cutting-Edge Industries ...HP, Pixar, Zara and Spotify," by James Gordon.

KANBAN, RHYMES WITH

Bonbon.

Suzanne was first to show up for Monday morning's staff meeting when she heard a new bonbon supplier would be stopping by. As a self-proclaimed connoisseur of all things confectionary, she had no intention of missing out on any possible samples or new connections. However, she was blatantly confused when the only stranger in the room was wearing a Kanban Konveyors shirt accompanied by an array of colorful plastic tubs of varying sizes. It was then her coworker leaned over and corrected, today's visitor was a Kanban supplier, not a bonbon supplier. Disappointed but not defeated, Suzanne, as any true aficionado, instead reveled in the fact that she had brought her own bonbon sample to enjoy with her afternoon coffee. Ah yes, Joyeuse Monday after all. C'est bonbon.

INSIGHTFUL QUOTE ON KANBAN

"The aim of Kanban is to make troubles come to the surface and to link them to Kaizen activity."

Taiichi Ohno