

IKS – Integrated Kanban System

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“JUST TELL ME WHAT YOU WANT AND I’LL MAKE THEM!”

Heard it before? A simple and reasonable enough statement from any shop floor supervisor, but one that has on a daily basis, frustrated the hell out of every operations management professional.

The answer is similarly simple:

- take the demand for a product over a period, lets say a month
 - calculate how many of each component part we need for that product (manufactured and purchased)
 - take away the quantity of each part we already have in our factory and have already ordered
 - work out how long it takes us to make or buy a quantity of each part
 - then work out when we need to start making those additional parts so that demand is always satisfied.
- which will give a schedule, day-by-day, of what we need to make and buy.

However, there are the complications, such as:

- we don’t only make one product we make 100’s or even 1000’s
- products may be segregated into product families but each family has a different process route and as such has different lead times
- scrap and rework at the different process stages can lead to late or under-supply
- suppliers and sub-contractors don’t deliver what they are supposed, when they are supposed - or don’t make what they are supposed to due to machinery breakdowns, people shortages, etc
- a change to the whole dynamics of the process due to new products and processes and Lean programmes that lead to reduced manufacturing lead times, reduce inventory levels,

reduced scrap and rework, etc.

- Plus many other factors set to make our planning lives difficult.

Over the years there have been a number of systems and solutions available to operations management to assist in deriving an answer to this conundrum and all its variability and complications.

PUSH MECHANISMS

Typical Material Requirements Planning (MRP) systems were computer packages derived from manual cardex systems that carried out the scheduling calculation to determine what was needed when. These systems had no resource capacity constraints associated with them and as such manufacturing resources became significantly overloaded, requiring teams of progress chasers to hunt out and push orders through the processes.

The natural evolution was to create Manufacturing Resource Planning (MRPII) systems which did try to take account of capacity constraints. However, the improved capability of the systems did not always lead to better scheduling information being delivered to line managers. These shortfalls were

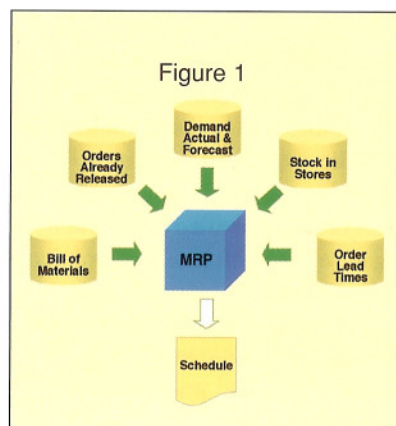
commonly associated with data capture and feedback to the computer system, a time consuming and often complex task. The MRPII systems often required complex interfaces with other business computer systems such as engineering, purchasing ordering, accounts, etc, which also lead to data management problems.

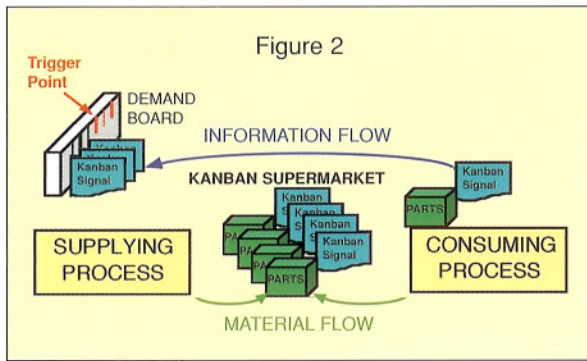
The data management and responsiveness issues associated with MRPII systems led to the development of Enterprise Resource Planning (ERP) systems. ERP attempts to do the same job as an MRPII system but takes advantage of developments in technology. However, this still PUSHES orders for component parts into the process chains with no easy way of being able to respond to day-to-day fluctuations in process performance - which commonly results in unpredictable inventory accumulations and deterioration in delivery performance.

PULL MECHANISMS

The focus on the Japanese approach to manufacturing through Kaizen and Lean programmes has led to the adoption of Kanban systems which PULL, as an alternative to the computer driven PUSH systems. Orders for component parts are released, based on usage downstream through the process chains.

Typically, a buffer (supermarket) stock level is established for a component part between each process stage. The buffer stock is divided into small chunks (at least 2 halves) each chunk of stock is assigned a ticket or Kanban. When the downstream (consuming) process takes a chunk of stock to be processed, the Kanban is returned to the upstream (supplying) process as a signal to indicate that the buffer stock needs to be replenished.





When a pre-defined number of signals have been received, manufacture is triggered - this trigger level being set so that the buffer stock level will not reach zero.

The simplicity of the underlying concept - ie, only replace what has been used, is embraced with enthusiasm at the shop floor level and provides flexibility to cope with day-to-day fluctuations in process performance.

The operations management role in a Kanban system is to use the information on:

- demand
 - cycle time
 - batch sizing
 - manufacturing lead time
- to determine the:
- size of the Kanban system (the size of the buffer stock)
 - number of Kanban signals required
 - trigger point to commence replenishment.

Demand will be satisfied within a known stock level without the need to constantly update masses of computer records every time the process parameters change.

However, some problems that are faced when running a manual Kanban

system include:

- Adjusting the buffer stock and No. of Kanbans as end product demand changes
- Difficulty in getting advanced warning of supply problems - the first indication often being when the supermarket buffer

is empty

- The Kanban system is established with higher buffer stocks to ensure no supply problems - but then adjusting stocks down in a controlled manner is difficult
- How to ensure all Kanbans are still live - eg no cards missing, especially when handling several hundred part numbers, etc.

Most companies operating a Kanban system still use MRPII/ERP as the main business system for strategic planning, forecasting capacity demands and capturing financial performance, etc. Kanban is then used as the call-out signal to the internal and external suppliers. Kanban sizing calculations are usually done by spreadsheet separate from main system. Therefore to update the Kanban system data needs to be extracted from the main business system and interpreted through the spreadsheet to make necessary adjustments. Also updating the main business system with data to satisfy financial performance analysis (eg. Stock/WIP on hand) has to be carried in addition to running the Kanban system. These tasks can be onerous and soften the advantages of running the Kanban system.

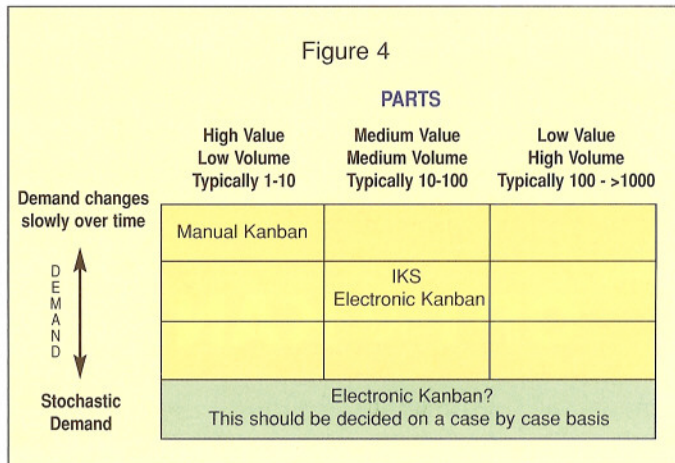
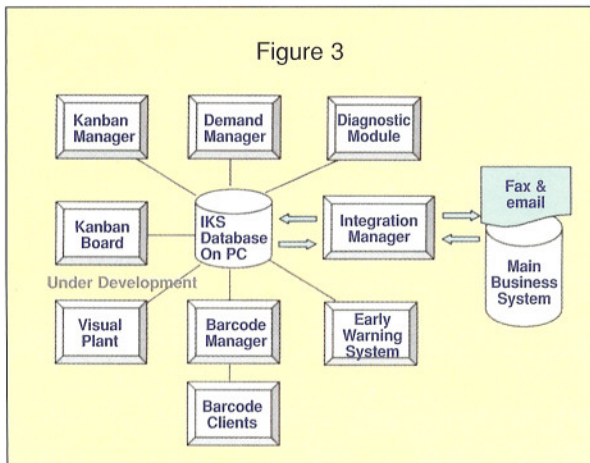
eKanban

Recently, a new software system has been developed that enables companies to reap the benefits of running a Kanban system for the day-to-day operation whilst maintaining and utilising data in the main business management system (MRPII/ERP) and having more robust Kanban management. Effectively a hybrid Push/Pull Mechanism bridging the gap between the two operations management approaches and offering the benefits of both systems.

The system is called IKS (Integrated Kanban System) and has been developed by Kanban practitioners through an association of European businesses. IKS is a Windows style PC based system requiring minimal installation and training, and dramatically enhances the manual Kanban system by:

- Determining the number of Kanbans in a loop
- Printing and managing the Kanban cards for each Kanban loop
- Monitoring the location and movement of Kanban cards
- Recommending adjustments to Kanban loops as end product demand changes
- Providing an early warning of potential supply problems
- Enabling diagnosis of each Kanban loop performance
- Displaying a computerised Kanban board giving visual management
- Integrating Kanban with the main business system so that data can be easily exchanged.

The system is divided into modules arranged as illustrated:



The type of business that can benefit from IKS is illustrated in the matrix on the previous page: IKS is a major contributor towards reducing inventory, shortening manufacturing and purchasing lead times and gaining greater control over purchased parts supply with almost no stock-outs and lower stock levels. It is designed as an

electronic tool to assist the operations management activities and enhance Kanban and business performance. At the direct operations level there is no difference in the running of the eKanban system compared to running a traditional manual Kanban system. The differences and improvements are experienced through reduced

inventory levels (higher stock turns), reduced manufacturing and purchase lead times, and improved delivery performance. Coupled with these more tangible measures all current users express an enthusiasm for the systems simplicity of operation and the confidence of assured supply it provides.

About the authors

Tony Campion, MIOM has been involved with a number of MRPII / ERP system implementations along with the implementation of Kanban through the supply chain. His early career began as an Operations Management practitioner with APV, BAE and Triumph and prior to becoming a Management Consultant, Tony was involved with Lean, starting out with Industry Forum then moving into a European Lean role for a first tier automotive supplier.

Phil Parry, MIOM has gained wide aerospace experience from his involvement in managing major operations improvement programmes. Much of his work involves promoting a more visionary approach to the development of operational logistics, continuous improvement and the introduction of lean manufacture focusing on cost, inventory and lead time reduction. Phil is also a member of the American Institute of Aeronautics and Astronautics.

Martin Ellis, MIOM has industrial experience from 15 years at Rolls Royce aero engines and Jaguar cars. He has been a Management Consultant for 10 years, with his initial consulting experience coming from working for Ernst & Young, and Arthur D Little, in the US and UK before he founded Optimised Operations Limited in 2001. He specialises in helping workforces develop and deploy their own operations improvement opportunities.

INTEGRATED KANBAN SYSTEM



SOFTWARE FOR LEAN
MANUFACTURING

KANBAN
more transparent
more efficient
much easier
with IKS

What is IKS?

IKS is an advanced easy to use software package which enables the fast efficient and successful implementation of complex Kanban systems throughout the supply chain. IKS supports Kanban users at all levels from system design and maintenance to daily management and control.

Why IKS?

The disadvantages encountered by manual Kanban systems are eliminated by IKS IKS increases the areas where Kanban can be successfully applied

- more parts
- variable demand
- long distances



Delivering Optimised eKanban Solutions

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