Technical Guide On

“Kanban”

Small and Medium Enterprises Development Authority
Ministry of Industries & Production
Government of Pakistan
www.smeda.org.pk

HEAD OFFICE
4th Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road,Lahore
Tel:(92 42)111 111 456, Fax:(92 42) 36304926-7
helpdesk@smeda.org.pk

REGIONAL OFFICE PUNJAB	REGIONAL OFFICE SINDH	REGIONAL OFFICE KPK	REGIONAL OFFICE BALOCHISTAN
3rdFloor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road Lahore, Tel: (042) 111-111-456 Fax: (042) 36304926-7 helpdesk.punjab@smeda.org.pk	5TH Floor, Bahria Complex II, M.T. Khan Road, Karachi. Tel: (021) 111-111-456 Fax: (021) 5610572 helpdesk-khi@smeda.org.pk	Ground Floor State Life Building The Mall, Peshawar. Tel: (091) 9213046-47 Fax: (091) 286908 helpdesk-pew@smeda.org.pk	Bungalow No. 15-A Chaman Housing Scheme Airport Road, Quetta. Tel: (081) 831623, 831702 Fax: (081) 831922 helpdesk-qta@smeda.org.pk

Sep 2023

Table of Contents

1.Disclaimer

This information memorandum is to introduce the subject matter and provide a general idea and information on the said matter. Although, the material included in this document is based on data/information gathered from various reliable sources; however, it is based upon certain assumptions, which may differ from case to case. The information has been provided on AS IS WHERE IS basis without any warranties or assertions as to the correctness or soundness thereof. Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. SMEDA, its employees or agents do not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. The contained information does not preclude any further professional advice. The prospective user of this memorandum is encouraged to carry out additional diligence and gather any information which is necessary for making an informed decision; including taking professional advice from a qualified consultant/technical expert before taking any decision to act upon the information.

1.1 Introduction to SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in Employment Generation and Value Addition to the national income, through development of SME sectors, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectoral research' to identify Policy, Access to Finance, Business Development Services, strategic initiatives and institutional collaboration & networking initiatives.

Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of Business Development Services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need-based capacity building programs of different types in addition to business guidance through help desk services.

For more information on services offered by SMEDA, please contact our website: www.smeda.org

1.2 Industry Support Program

In order to enhance competitiveness of SMEs and achieve operational excellence, SMEDA established an Industry Support Cell (ISC) for provision of foreign technical support and knowledge transfer in collaboration with International Development Organizations. SMEDA's Industry Support Program (ISP) initially launched with Japan International Cooperation Agency (JICA) and actively engaged in reducing energy inefficiencies and improving production and quality of products with the support of Japanese Experts. Later on, similar activities with other international partner organizations like German Corporation for International Cooperation (GIZ), Training and Development Centers of the Bavarian Employers' Association (bfz), Germany, and United Nations Industrial Development Organization (UNIDO) were also successfully implemented.

2. Introduction

Kanban is a visual method for controlling production as part of Just in Time (JIT) and Lean Manufacturing. As part of a pull system it controls what is produced, in what quantity, and when. Its purpose is to ensure that you only produce what the customer is asking for and nothing more. It is a system of signals that is used through the value stream to pull product from customer demand back to raw materials

It assists in visualize work, maximize efficiency, and improve continuously. Work is represented on Kanban boards, allowing factory management to optimize work delivery across multiple teams and handle even the most complex projects in a single environment.

Pull Production – in pull production when a customer takes a product from the end of your production process a signal is then sent back down the line to trigger the production of the next part. Just as a supermarket fills the empty shelf each preceding process in the flow will request the parts that it needs from its preceding process. ***Pull production is controlled by use of Kanban.***

3. Working and Rules of Kanban

In simple words, Kanban is a signal back to proceeding operation to make the part.

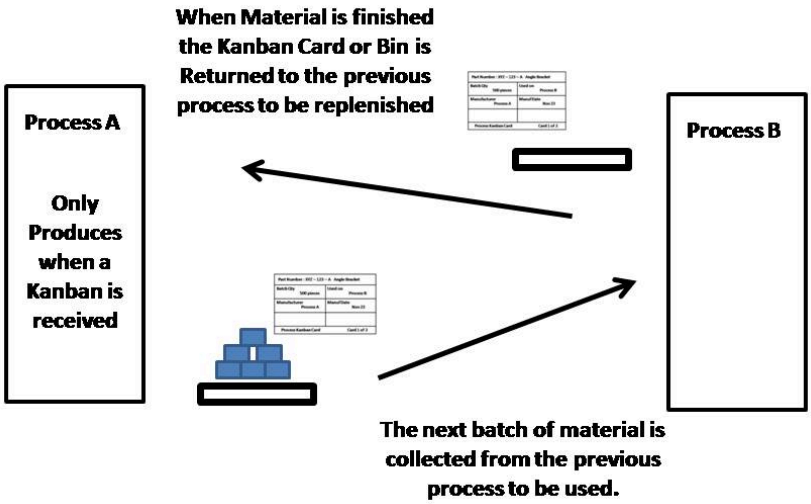

Fig 1: Kanban Process for a Single Product

Production is not simple , it comprises multiple processes ,manufacturing lines and products therefore proper working should be done in designing the Kanban system. However, regardless how complex the production is following Kanban rules needs to be followed:

- The later process collects product from the earlier process
- The later process informs the earlier process what to produce
- The earlier process only produces what the later process needs
- No products are moved or produced without Kanban authority
- No defects are passed to the later process

4. Types of Kanban System

4.1 Kanban Cards

Simple cars or paper sheet is attached to the batch of material. These cards do have details related type of product , its usage and quantity. For multiple cards system , it is mentioned how many like Card 1 of 5 on each card.

When a process is finished the attached Kanban card is returned to the previous process. The returned card is authorization to manufacture further the similar part. In multiple card system , the process is set in a way that set number of cards to be returned before the manufacturing of the next batch.

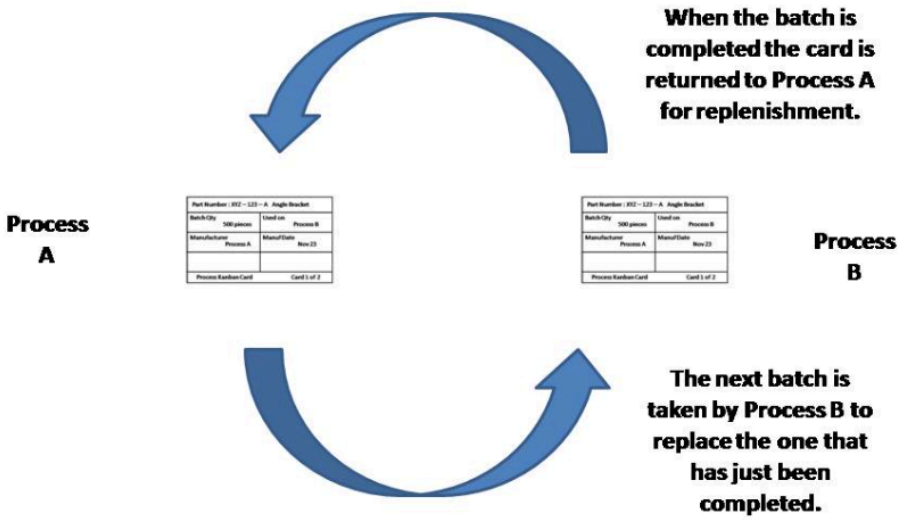

Fig 2: Two (2) Card Kanban System

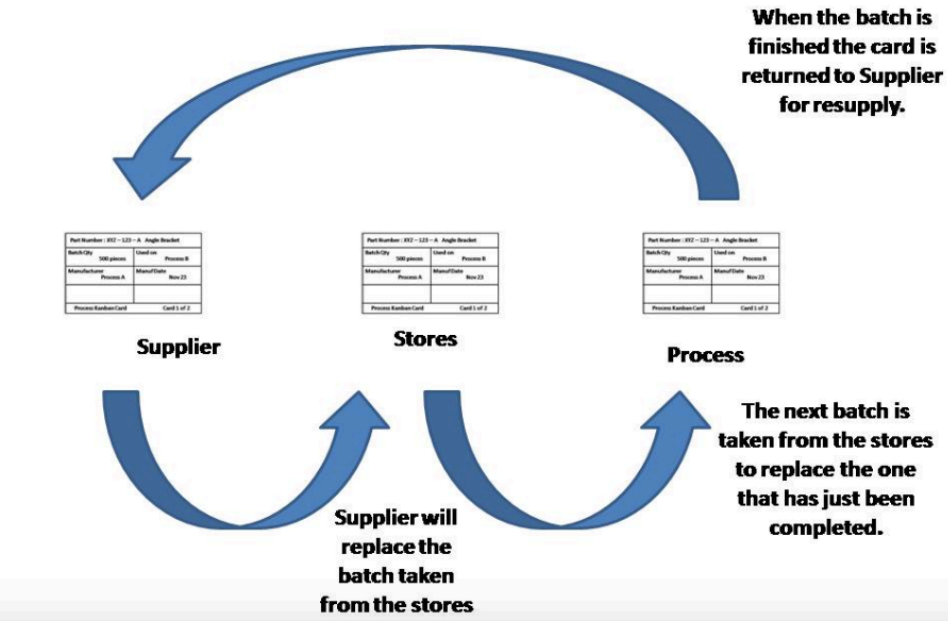

Fig 3: Three (3) Card Kanban System

4.2 Bin Systems

Bins are used in the same way as kanban cards. Instead of cards attached to the material , the containers in which parts are transported from one process to another become the kanban. The information mentioned on cards is labelled on these containers and when these containers become empty , they are returned backed indicating to initiate the manufacturing again.

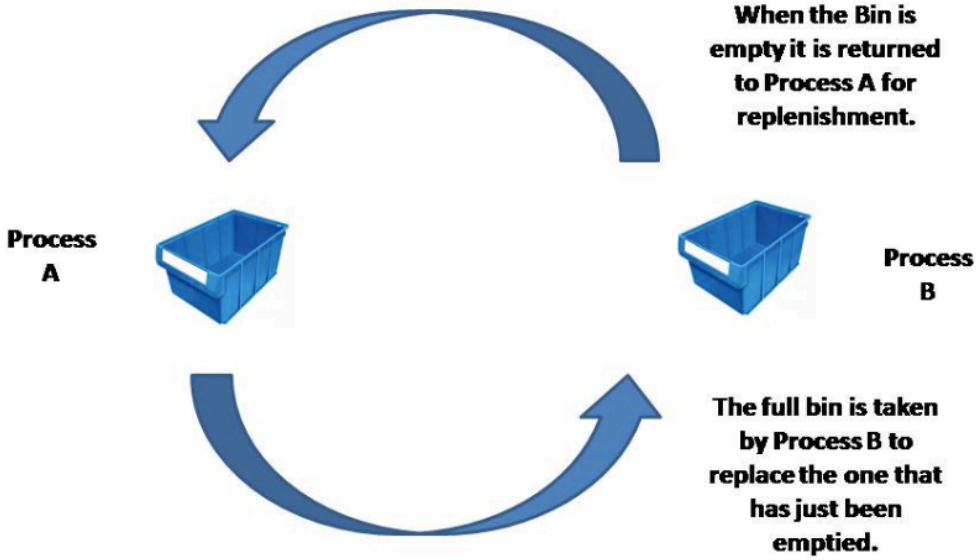

Fig 4: Two (2) Bin Kanban System

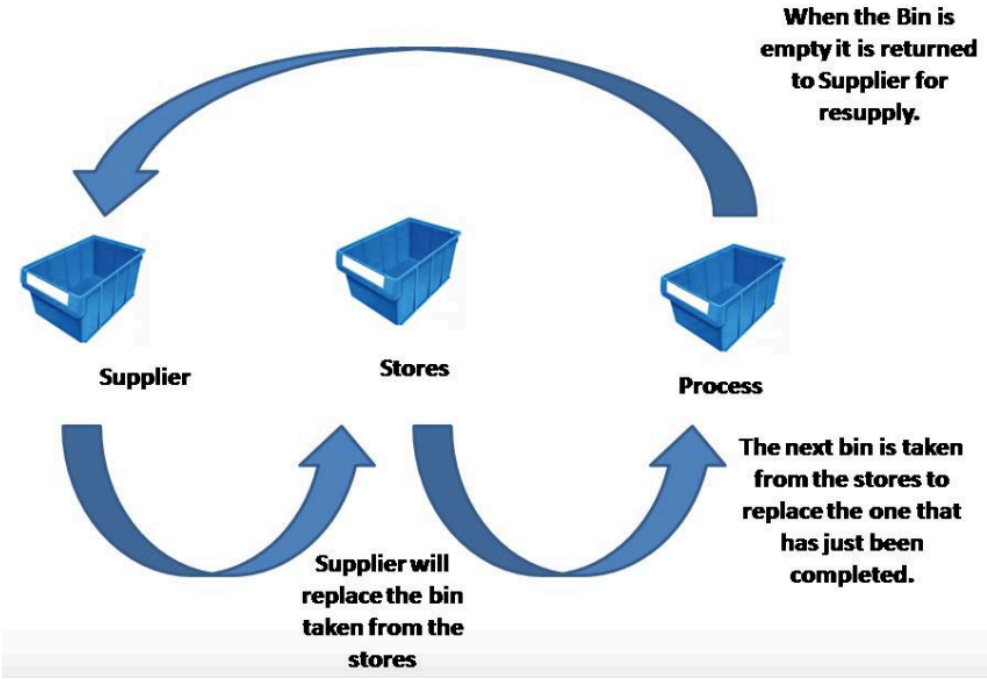

Fig 5: Three (3) Bin Kanban System

4.3 Constant Work in Progress (CONWIP) System

This system is like the supermarket shelves where the Kanban is the actual location of the shop floor. When a product is removed/sold from the location/shelve the empty space is the Kanban , indicating to do the previous process to make the location filled again.

This system works well where single product / pieces moves and within which variation is limited.

4.4 Electronic Kanban System

With technology available , paperless Kanban system are placed where bar code scanning is done or machines indicate that production is done to the previous step. In electronic base system , data is transmitted and processed in the same way as in any other Kanban system.

5. Calculation of Kanban Quantities

Main aim of Kanban is to try to reduce the stock and implement Just in Time philosophy. Therefore , calculation of quantity in each batch or bin is important.

$$\text{Kanban Quantities} = \frac{Daily\ Demand\ x\ Lead\ Time\ (days)}{Container\ Quantity} \text{ x Safety Factor}$$

Daily Demand: for daily demand use the actual data do not rely on rough guess or estimation to avoid shortage or over stocking. The more variation in the demand than use the larger safety factor to cope the problems.

Lead Time: Use actual data and if there is lot of variation in lead time then there must be issue with machine reliability. If lead times are long then go for large batches and must go to implement techniques to make the lead time short like Single Minute Exchange of Die (SMED)

Safety Factor: It depends how much confident are you regarding the system. If the machines are reliable then use 1 as safety factor if not then use the higher value. Higher safety factor will protect from stock out if the problem arise ,but will increase the stock holdings.

6. Implementation

Step 1 : Understand the basics of Kanban and get knowledge about its limitations before implementation.

Step 2: Next step is to map the workflow , identify the task involved and chalk down on the board.

Step 3: Visualize the workflow to identify the possible bottlenecks and delays

Step 4: Focus on the flow is the important thing. If the process always seem to stall , then add more people or look for solution to smooth the process flow.

It is the beauty of Kanban system that provides you to real picture of the processes.

Step 5: Always keep in mind that Kanban is used to minimize the work in progress (WIP), therefore , take necessary steps to limit the WIP. Optimal level of WIP helps you to improve quality and smooth speedy work flow.

Step 6: Kanban system purpose is to foster continuous improvement therefore , Kanban board should always be evolved and collect key metrices data to make data driven decisions.

7. Benefits of Kanban

- Better control over inventory
- Avoid over production
- Improved delivery speed
- Increase visibility of process flow
- Improved Customer Satisfaction