

# Technical Guide On

## “Heijunka”



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## **1.Disclaimer**

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## **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](http://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. What is Heijunka ?

Heijunka is a technique for reducing unevenness in a production cycle, which in turn reduces waste. It's a Japanese term that means "leveling" and is a main lean manufacturing method. It was first used by the Toyota Production System (TPS) to develop production efficiency. Toyota realized that production in batches is not sustainable and system unable to respond to irregular orders without facing uneven productivity levels, inconsistent quality, and overburdening of machines and employees.

In United States , Heijunka is often referred to as production leveling, but the two terms have the same goal: reducing unevenness in production by avoiding batching, which results in smaller inventories, lower capital costs and less overburdening of employees.

Heijunka allows to produce products at a steady pace, allowing to react to fluctuations based on your average demand. It is done in two (2) ways : leveling by volume and leveling by type or product

*Leveling By Volume* : Heijunka directs to level the production by the average volume of received orders. For instance, if custom apparel company gets 500 orders of gray shirts each week, but the number of shirts fluctuates by day during the week, leveling production by volume provides the best chance to control inventory. Let's say 200 shirt orders received on Monday, 100 on Tuesday, 50 on Wednesday, 50 on Thursday and 100 on Friday. Leveling demand using Heijunka suggest to produce an inventory of 100 shirts every Monday. Each day after that, make 100 shirts a day.

*Leveling by Type or Product*: Say apparel company receives multiple types of orders for colored T-shirts each week. One week you get orders for orange (O), red (R), gray (G) and blue (B) shirts. A typical mass production company would want to minimize waste that revolves around equipment changeover, so the production schedule might look like this: OOOOORRRRGGBB.



Now consider the customer frequently change the order or volume or customer , then this would be difficult for the company following mass production to figure how to make shirt with more demand while shirts of other colors are in inventory.

To avoid this type of waste, a Heijunka production schedule might look like this: OORGB OORGBOR, popular items are in a buffer inventory adding emphasis to ensure changeover times are efficient.



### 3. Implementation of Heijunka

Following are the factors affect the Heijunka Implementation:

*a-Flexibility:* To implement Heijunka , production must be comprised of multiple types of products in any given time. For instance , to produce shirts with 3 different logos in 30 minutes production time. It means screen printing machine need to be changed twice in that time frame.

*b-Stability:* A stable production process is critical for Heijunka to be effective. For example , verifying the average amount of shirts each color that needs to be produced in each time frame ensure the production remains steady.

*c-Predictability:* Where it is not possible to know the exact volume , forecast the customer demand.

Heijunka implementation starts with knowing takt time and following concept are considered:

*i-Takt Time:* it is the time taken to make a product from start to finish. Knowing the takt time assists in determining the appropriate pace or interval for your production schedule.

*ii- Volume Leveling :* when production is based on long term average demand and keep a buffer stock of inventory based on variability , production schedules and shipping speeds/

*iii- Type Leveling:* Essentially visualizing production flow , producing every product each day while focusing on changeover flexibility.

*iv- Buffer Inventory :* it mean having a certain amount of product ready for shipment at the start of each production cycle.

*v- Heijunka Box:* it is a way to visualize leveling and schedule of production.

#### 3.1 Heijunka Box

It is visual tool for scheduling production that is level by type or volume. It can be a physical tool or a virtual using a software program. The box is divided into grid pattern with rectangular boxes. Columns represent specific time periods and rows represent the type of the product need to be produced.

The box contains cards or Kanban in various slots that indicated which type and in what quantity that product to be manufactured in specific time frame. Using the Heijunka box , manufacturer implement the production sequence and distribute the production evenly.

For example, if a shift starts at 8 a.m. and the card withdrawal interval is every 30 minutes, this means that after every half an hour, the material handler takes the appropriate number of cards and gives them to the production process.

Each box or slot in the Heijunka box indicates the timing of information flow and material. The cards in each box represent one pitch of production for one product type.

*Pitch is the amount of time needed to make one batch of product.* Pitch can be calculated by multiplying takt time by the pack-out quantity. For example, if the takt time is 1 minute, and the pack-out quantity is 30, then 1 minute x 30 units = a pitch of 30 minutes.

In our diagram, the pitch for the orange shirts is 30 minutes, and there is one card in the box for each time interval. The pitch for the grey shirts is 15 minutes, so there are two cards in each box. The red shirts have a pitch of 60 minutes, so there is one card in every other box.

Now, assume that blue and black shirts share a production process with a pitch of 30 minutes. The demand suggests a ratio of two black shirts to every one blue shirt. This gives one card of black in each of two boxes and then one blue card in third and so on.

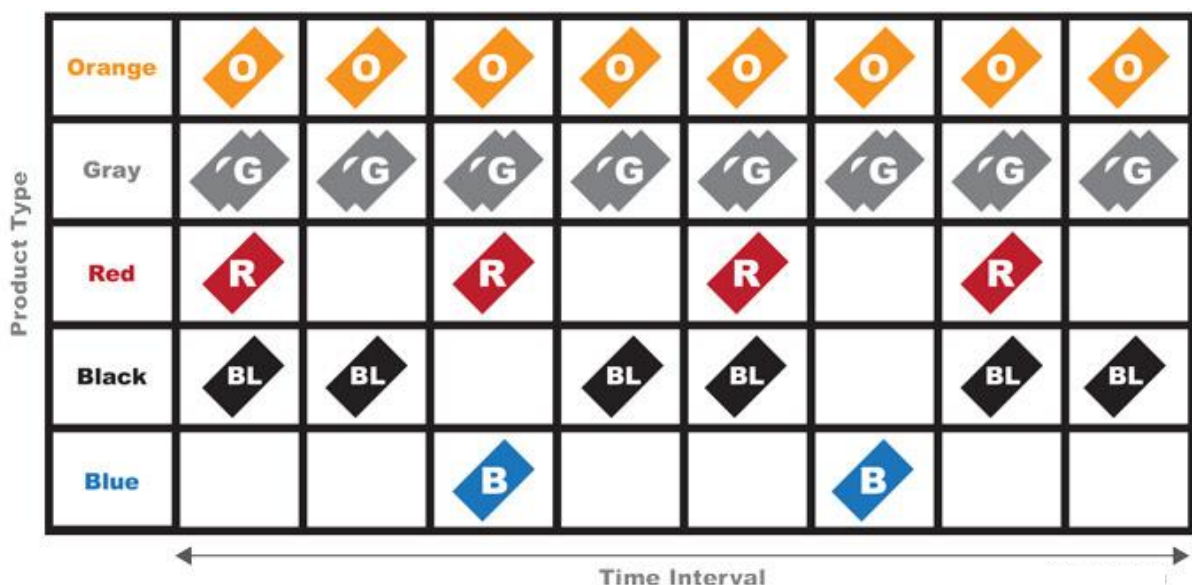


Figure: Heijunka Box

## 4. Benefits

Manufacturers wants to meet the customer demand smoothly without facing any problem. Matching production rate to customer demand as closely as possible helps create a production process with minimal waste. Heijunka focuses to minimize the waste during the processes and assists in meeting the customer demand.

- Excess inventory in the warehouse is one of the problems with which industry have to deal with especially when the customer requirement keep on changing. Heijunka strives to eliminate overproduction resulting in less excess inventory.
- Heijunka helps to increase the adaptability when customer demand changes.
- It assist in achieving stable and more predictable production
- Less stress on workforce and machines