PRINCIPLE 8 – PRODUCTION LEVELING
Heijunka is the leveling of production by both volume and product unit. It is a production planning method where total volume order for a period of time being mixed and planned to run with the same amount and mix everyday.
P8 – PRODUCTION LEVELING

BENEFITS

- Flexible to make what the customer order as when they order it.
- Reduce risk of unsold goods.
- Balance use of labor and machines.
- Smooth demand on upstream process and the suppliers.
- Minimizes inventory
- Minimizes Capital
- Minimizes labor
To eliminate

- MUDA – Non-Value Added
- MURA – Over burden
- MURI - Unevenness
Basic leveling

Basic leveling is the core for all resource planning

- Takt Time
- Equipment Needed
- Material Needed
- People Needed
- Process Stability (standardized work)
P8 – PRODUCTION LEVELING

INITIATIVES

- Single Minute Exchange Dies (SMED)
- Mixed Model Production
- Kitting
- Just-In-Time
- Production Scheduling
Set-up time and lowering Batch size a Prerequisite to leveling
SMED

Quick changeover provides us with the opportunity to changeover more often, which:

- Creates smaller batch sizes
- Which lowers required inventory
- Which allows for better quality control
- Which reduces waste.
- Provides greater flexibility
- Reduce lead time
- Provide On-Time Delivery
- Which give us total cost reduction and competitive advantage.
P8 – PRODUCTION LEVELING

JUST IN TIME

JIT Philosophy
Supply the right material or information, at the right time, at the right place, and in the right quantity when it is needed by customer.

JIT Objective
Reduce inventory
“Flow whenever possible, Pull whenever must”.

JIT Benefits
- Avoid shortage of supplies
- Avoid overproduction
- Reduce inventory cost
- Force improvement of the process

JIT’s 4 Principles – At Leanest State

- Pull: 1 Piece Flow Continuously
- Inventory: Zero Inventory
- Takt Time: Follow Customer Takt Time
- Batch Size: 1 piece per Batch
Conceptually, JIT is a shift from Traditional Batch & Queue Production to 1 Piece Continuous Flow Production. Ideally JIT is when products are 100% on-demand with zero inventory.

- **Traditional Batch & Queue**
  - Schedule each process and push to the next.

- **Push or Scheduled**
  - Upstream process replenishes what downstream customer took away.

- **Supermarket Pull (Kanban)**
  - Pull from a feeder in sequence.

- **Sequenced Pull (Broadcast)**
  - Defined lane with standard WIP between unlinked processes in FIFO sequence.

- **FIFO Sequenced Flow**
  - Physically link process steps with no inventory between.

- **Continuous Flow (1 pc Flow)**
  - Ideal State of Lean
Process 1 should not make its components until Process 2 uses up its original supply of components from Process 1.

When original supply at Process 2 is down to safety stock, a signal is triggered to Process 1 to start producing.

Pull System Tools:
1) Kanban
2) Supermarket
3) Small Batch
4) Milk Run
5) Material Handler
6) Takt Time
7) One piece Flow Work Cell
Production Leveling Is...

Adapting production to variable demand:

Customer Demand

Avg. Daily Demand = Target Production

Quantity

Time
Model Mix

Monthly Schedule
(3200 units)

Model “A”
1600 units

Model “B”
800 units

Model “C”
800 units

Daily Schedule
(160 units)

Day

1 2 3
A B C A B C A B C
40 40 40 40 40 40 40 40

Day

10 15 20

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Traditional Production (Unleveled)

Monday Production

Tuesday Production

Wednesday Production

Thursday Production

Friday Production

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Why Level Production?

- Smooths demand on upstream operations
- Foundation for pull systems
- Minimizes inventory
- Minimizes Capital
- Minimizes Labor
- Creates maximum flexibility to changes in demand