

### ③ Lean System & Innovation.

(I)

Lean System :-

Waste minimization & Optimization of  
Work flow

↓  
By minimizing Wastes

TIMWOOD

Transportation  
Inventory  
Motion  
Waiting  
Over processing  
Over production  
Defects

Principles

- perfect first time quality
- Waste minimization
- Continuous Improvement
- Flexibility

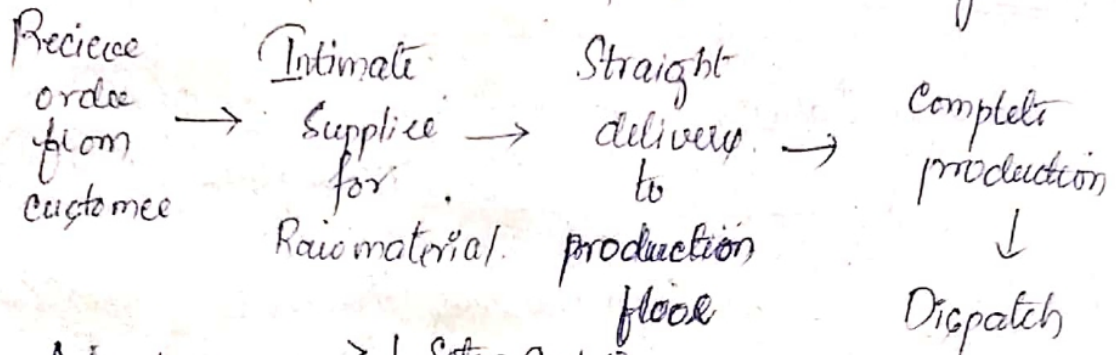
Characteristics

- > Zero waiting
- > Zero inventory
- > Continuous flow of  
Production

II

## JIT (Case Study)

Produce product as they are required by customer



### Advantage

- > ↓ Setup Cost @ production line
- > Active participation of Supplier.
- > Avoiding wastage of <sup>excess</sup> production when ~~due to~~ change in customer taste, preferences & needs occur.
- > Avoiding blockage in W.C.
- > Reduction in Piling up of Inventory
- > Reduction in Storage Cost
- > Reduce Space requirement
- > Lower production Cost i.e Overall Cost of product

### Disadvantage

- > High dependency
- > ↑ Ordering & admin cost
- > chances of disruption production due to non arrival of Supplies

## Ways to Resolve JIT problems (To remove disadvantage)

### Kanban Card (Japan)

System used to pull work authorization through production system

### Working Cells

Small ~~clusters~~ <sup>Sweepers cells</sup> of machines which can be run by single machine operator.

Performance <sup>should not be</sup> measurement JIT

Machine Utilization

Direct labour Efficiency Tracking

price  
price rate  
Tracking

Accounting in JIT → As goods are directly delivered at production floor, there is a need of specialised accounting.

### BACKFLUSHING

↓  
Find total production completed in a month

↓  
Calculate raw material required per production unit

↓  
Total RM supplied for production

### Kaizen Costing

(III) (Δ for better) Japanese language  
all level of employees participation  
→ Continuous Improvement  
→ Elimination of waste in production  
→ Benefit in Small Values  
(Zen Ltd Case study)

Mobile &

Car - Maruti Ltd

(IV)  
5s (Implemented @ Work place area)

#### 1) SORT (SEIRI)

- Removal of unnecessary things from work area

#### 2) SET IN ORDER (Seiton)

- Systematic arrangement of necessary things

3) SHINE (SEISO)

Keep work area clean & safe. → Colin

4) STANDARDIZE (SEIKETSU) → Scissors

Process measures established & best practices in work area.

5) SUSTAIN (SHITSUKE)

Continue the above things in disciplined way.

Casestudy :- Y & E Chartered accountants.

(V)

TPM (Total Productive Maintenance).

Equipment maintenance to achieve:- CONTINUOUS

- ✓ No breakdown — Availability 90%
  - ✓ No defect — Quality 99%
  - ✓ No Small Stop — Performance 95%
- Similar but not same FLOW OF PRODUCTION

8 pillars of TPM (Supper Refineries Ltd Casestudy).

1. Autonomous maintenance — ↓ Specialised maintenance
2. planned maintenance — Proactive maintenance
3. 8ly maintenance — Zero defects
4. Focused Improvement
5. Early Equipment mgt (
6. Training & Education — Employee working their
7. Safety, healthy, Env't — Employee working their
8. Office TPM — Backend

## Performance measurement in TPM (OEE)

Overall Equipment Effectiveness (OEE) - Barometer to measure whether T.P.M is effective or not)

| <u>Availability</u>                                                         | <u>Performance</u>                                                                             | <u>Quality</u>                                                               |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| No stops<br>(Equipment failure,<br>Breakdown Setup,<br>adjustment)<br>- 90% | No Small stops<br>or<br>Slow running<br>(Idling &<br>Minor Stoppage<br>reduced speed)<br>- 95% | No defects<br>(Reduced<br>Yield,<br>Quality<br>defects &<br>Rework)<br>- 99% |

## Cellular manufacturing (U-manufacturing)

A manufacturing process that produce facilities of parts within a single line or CELL of machine operated by machinists who work only within the line or cell.

A cell is a small scale, clearly defined production unit within a larger factory

- A sub section of JIT & Lean System is Cellular manufacturing. It encompasses group technology.

The goals of Cellular manufacturing are

- To move as quickly as possible
- make a wide variety of similar products
- making as little waste as possible

(VII)

## Six Sigma

is the Statistical measure used to ensure quality of products & Services

- 99.9999% or 0.002 defects per million
- measure use to ensure quality of P&S services
- Customer Satisfaction.
- Goal of Perfection.

DMAIC

For existing process

Define  
Measure

Analysis

Improve → Existing process

Control

Casestudy

DMADV

For New Process

Define

Measure

Analysis

Design → New process

Verify

ASPL

RTP May 18/19

Derby Gray.

VIII

## Innovation

Process Innovation

B.P.R

↓  
Process Innovation means the implementation of a new or significantly improved production or delivery method (including significant changes in techniques, Equipment & /or Software).

Production → Delivery → Support Service

BPR

Nokia

Radical Redesign (Complete new way) → Dramatic Improvement → End to End Business process (without 3<sup>rd</sup> party involvement) → Fundamental rethinking

Principles of BPR

- Organise around outcomes
- Have those who need the results of a process perform the process
- Treat geographically dispersed resources as though they were centralised
- Link parallel activities instead of integrating their results
- Put the decision point where the work is performed & build controls into the process

## Main Stage of BPR

### Process identification

Each task performed being re-engineered is broken down into a series of processes.

### Process rationalisation

Process which are Non value adding to be discarded.

Case study :- Ford Motor Ani

### Process reassembly

Reengineered processes are implemented in the most efficient manner.

### Process Redesign

Remaining processes are designed.