# MAS BEST PRACTICE SKILLS EVENT

#### LEAN AWARENESS WORKSHOP



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# **COURSE CONTENT**

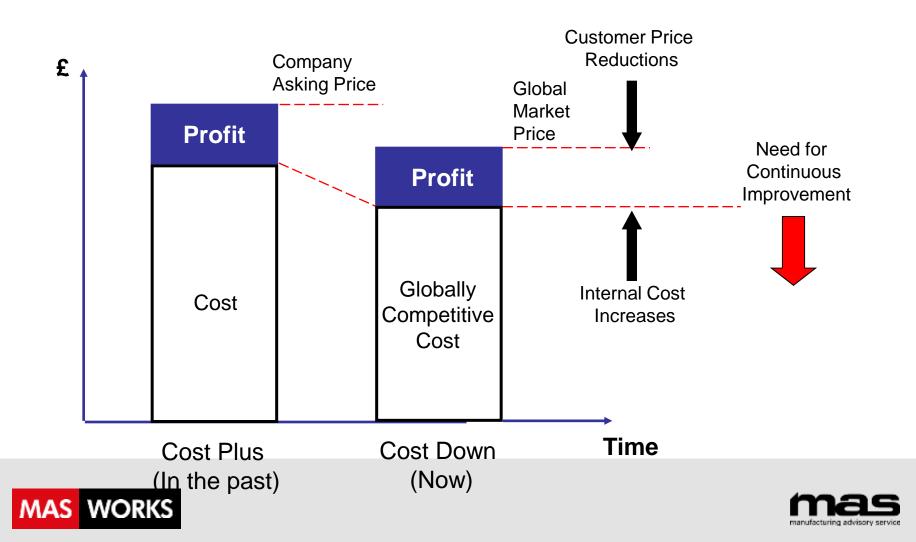
- Introduction
- The Need for Change
- Introduction to Lean and Continuous Improvement
- Waste
- Visual Management
- Kanbans
- Takt Time and Line Balancing
- Workplace Organisation (5S)
- Quality, Cost and Delivery
- Process Mapping
  - Flow Process
  - Value Stream







# **NEED FOR CONTINUOUS IMPROVEMENT**



## INTRODUCTION TO LEAN

WHAT IS LEAN?

Doing more and more with less and less by working smarter, not harder

LEAN IS A BUSINESS IMPROVEMENT TECHNIQUE FOCUSED ON DELIVERING VALUE TO THE CUSTOMER





#### WHAT IS CONTINUOUS IMPROVEMENT AND LEAN?

#### **Definition of continuous improvement:**

"the elimination of waste through continuous improvement activities"

#### **Overall aim of Lean:**

"To provide goods or services demanded by the customer, using only those resources that are absolutely necessary."





# **ORIGINS OF LEAN: A BRIEF HISTORY**

1798	Eli Whitney - interchangeable parts - muskets
1898	Frederick Winslow Taylor - scientific management "one best way", tools, skills, jobs, training
1909	Frank Gilbreth - motion study - brick layers
1913	Henry Ford - assembly line & 5 wastes
1923	Sakichi Toyoda – autonomation – maintenance on weaving machine
1927	Elton Mayo - teamwork & recognition
1945	W. Edwards Deming - assembly line (using stats)
1950	Taiichi Ohno - lean production





## **DEVELOPMENT OF KAIZEN**

Kaizen concepts pioneered by Japanese and American gurus'

The concepts enabled the Japan's automotive, electronic and computer industries to be very competitive globally to this date



Kai.....change / New

"Renew the heart to let it make good"

Zen.....Begin / Spirit

Kaizen = Continuous improvement





# **DEFINITION OF KAIZEN**

- A philosophy that emphasize that way of life be it working life, social life or home life need to be constantly improved
- A management tool adopted by Japanese industries to manage continuous improvement for the organization
- An improvement activity an ongoing improvement involving everyone, including both managers and workers





## PURPOSE AND BENEFITS OF KAIZEN

 Improvement is continuous, there's always change for the better as there is no end to improvement

 As a result, QCD (Quality, Cost, Delivery) measures get better and becomes competitive

 All levels of employees are involved in contributing and participating in Kaizen activities





## THE KAIZEN UMBRELLA



**SMED** 

**5S** 

**QC Circles** 

Discipline in the workplace

**TPM** 

**Process improvement** 

Kanban

**Quality improvement** 

Just-in-time

**Zero defects** 

**Small-group activities** 

**Productivity improvement** 

**New-product development** 





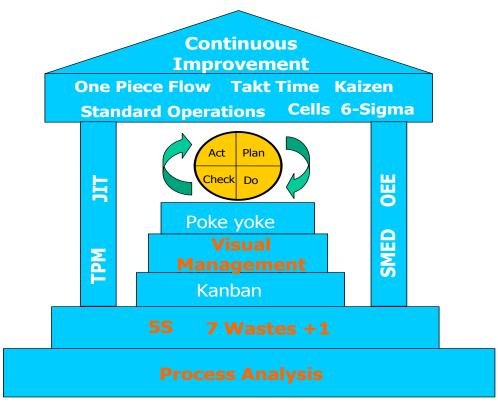
### **5 PRINCIPLES OF LEAN**

- Learn to define "value" through the eyes of the customer
- Identify all activities within the company that bring value to the customer and remove those activities which are wasteful
- Free up constraints to make the process FLOW
- Only make what is PULLED by customer demand.
- Continuously improve processes through constant elimination of waste.





# **HOUSE OF LEAN**



**Continuous Improvement Tools** 





### BENEFITS TO THE ORGANISATION

A low cost approach to improvement that allows companies to:

- Produce More Efficiently.
- Remove Unnecessary Cost.
- Improve Customer Lead Times.
- Control Inventory Better.
- Optimise Layout & Space.
- Deliver Better Quality & Service.





#### MAIN BENEFITS OF CONTINUOUS IMPROVEMENT

- Low cost solutions based on data and common sense
- Results measured against Quality, Cost and delivery (QCD) indicators
- Improvements are continuous
- Employee involvement
- Immediate ROI





#### PRINCIPLES OF CONTINUOUS IMPROVEMENT

- Elimination of waste
- Working in teams
- Staff involvement & empowerment
- Challenge fixed ideas
- Treat the root cause and not the symptoms
- Use your wisdom and not your money
- Do it now no excuses!
- Don't expect perfection straight away
- Improvement is infinite

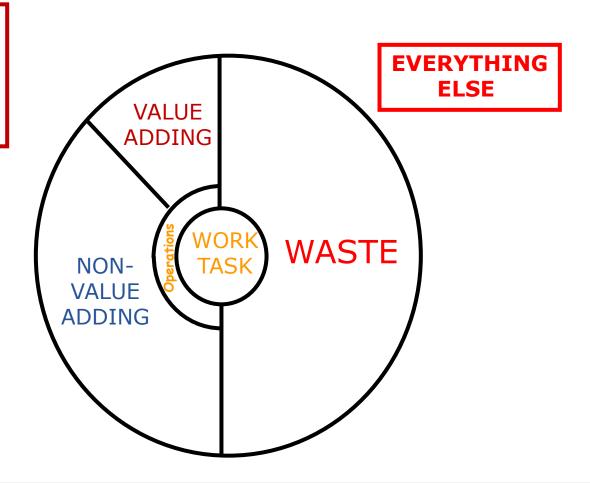




## **Division of Work**

Work that alters the nature, shape or characteristics of the product...towards what the customer wants

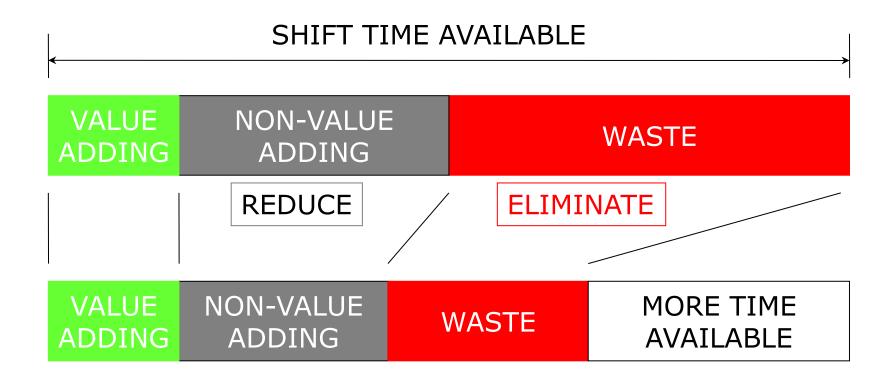
Work that does not add value but has to be done, at the moment, to allow us to add value.







# THE OBJECTIVE IS.....







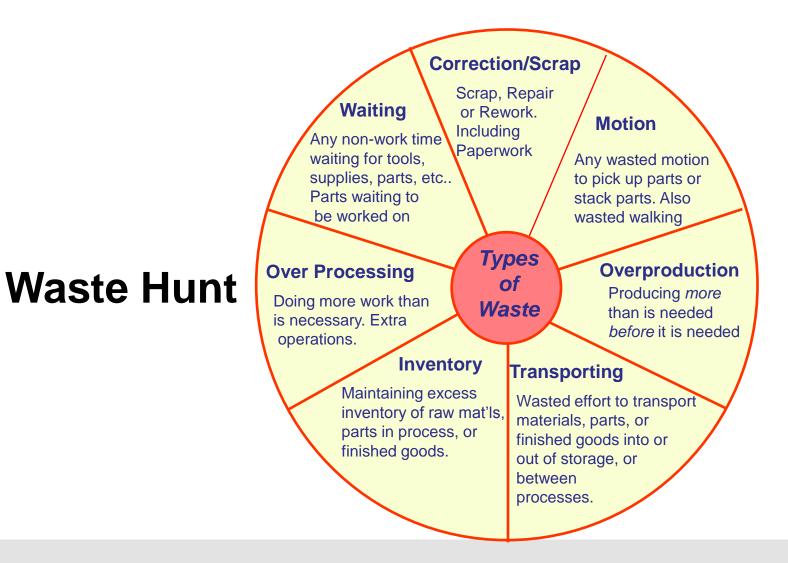
# THE 7 WASTES

"Understanding & identifying waste is the first step to reducing or eliminating waste"





### THE 7 WASTES







"Make your workplace into a showcase that can be easily understood by anyone at a glance"

Taiichi Ohno





## **GOOD FACTORY VISUAL CONTROLS**

- Red Tags
- Kanban
- Lines on the floor
- Min / Max lines
- Andon
- Hourly Boards
- Standard Operation Procedure











































Beware:

Visual Management can be mis-interpreted





#### **KANBAN**

#### What is Kanban?

A simple, clear, visual method of:

Delivering WHAT is required.

Exactly WHEN required.

In the QUANTITY required.

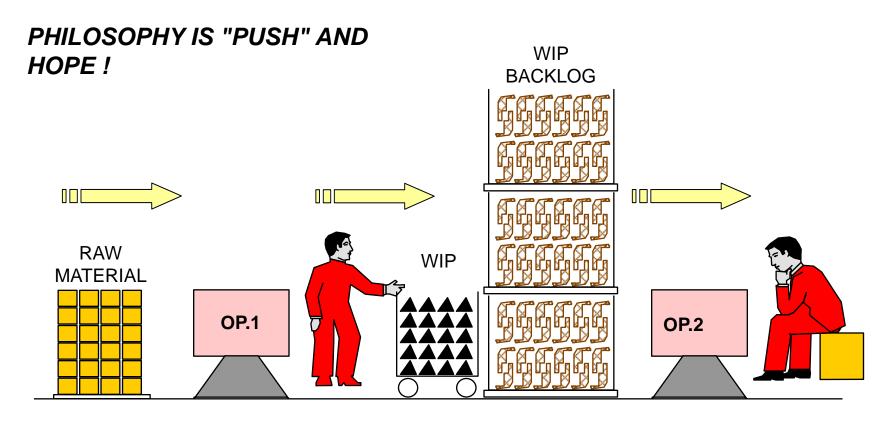
### A tool that:

- Supports Just In Time thinking.
- Is known as a PULL system.





## TRADITIONAL "PUSH" SCHEDULING



MUCH WASTED ACTIVITY IN EXPEDITING AND WAITING, PLUS LARGE WIP STOCKS, TRANSPORTS ETC!





# **PULL CONTROL SYSTEMS**

# Pull System = Kanban

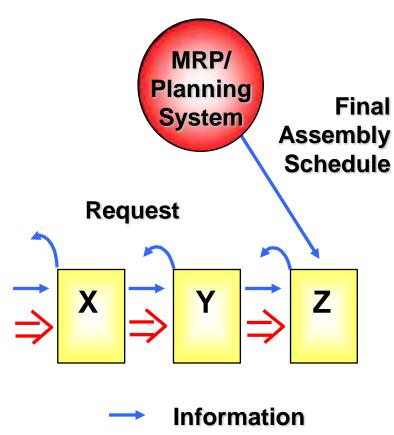
Make to the customer demand

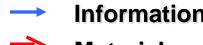
Work-centres are linked together

Tight linkages and close communication

Smokes out problems and issues

Can require less inventory, giving shorter lead-time



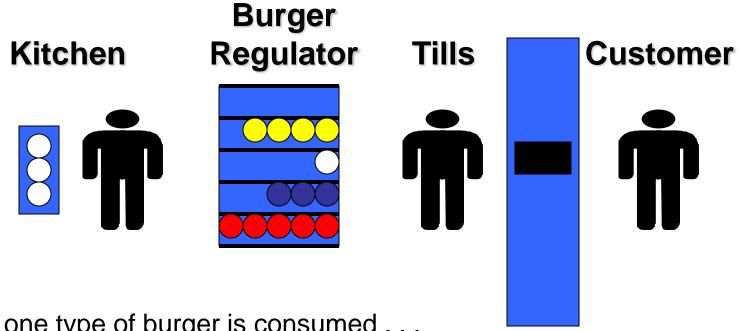








### KANBAN: A SIMPLE REAL EXAMPLE



As one type of burger is consumed . . .

They are removed from the regulator . . .

And then replenished by the kitchen . . .

Not made to a forecast and pushed at the customer

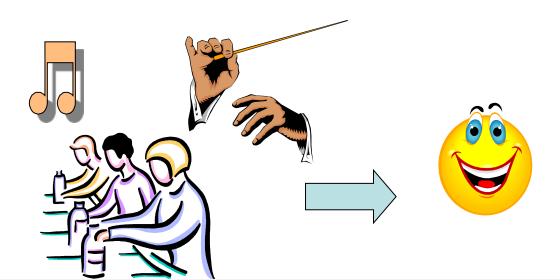




### **TAKT TIME**

TAKT: German word which translates into RHYTHM- BEAT.

Takt time is used to match the pace of work to the average pace of customer demand.



Rate at which a customer buys a product

"Seconds per unit"





### LINE BALANCING

The equalisation of work done in the various stations of a line so that cycle time is the same and no station has to wait.

Line Balancing enables one piece flow.

Cycle time

How long take produce a unit.

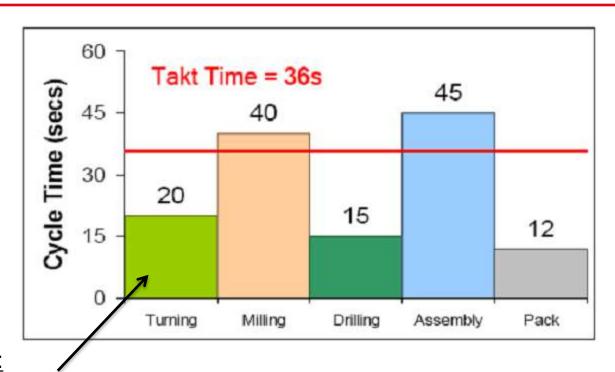
Takt time

Rate which each and every unit must be produced.





### LINE BALANCING



For example:

*Turning*: 180 widgets per hour (3600 seconds)

180 widgets in 3600 seconds

1 widget in 3600/180 seconds

1 widget in 20 seconds

#### Takt Time

Customer requires 100 widgets per

hour (3600 seconds)

1 widget in ? seconds

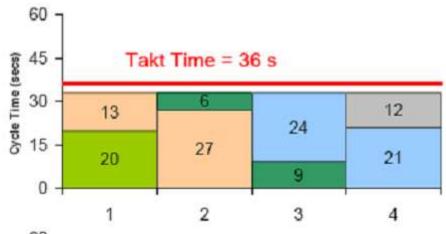
3600 / 100 = 36 seconds



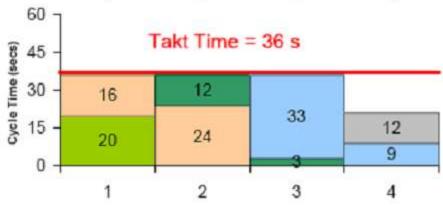


# **LINE BALANCING**

• Level Balance



• Balance to Takt







### **SUMMARY**

- Eliminate waste
- Re-sequence Operations
- Change Layout where necessary
- Balance Line
- This is a continuous cycle to achieve Customer and Cost requirements





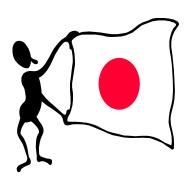
## OVERVIEW OF WORKPLACE ORGANISATION

# "A place for everything, and everything in its place"





# THE 5 S'S: DEFINITIONS





Seiri Sort ...the necessary from the unnecessary

Seiton Set ...locations and limits

Seiso Shine ...(or Sweep) the workplace

Seiketsu Standardise ...the first 3 S's

Shitsuke Sustain ...the improvements



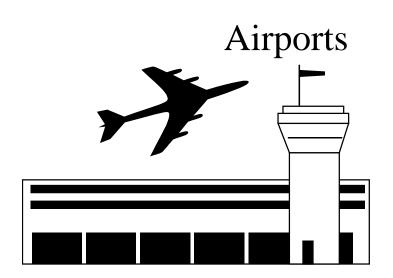


# **OVERVIEW**

Examples of places in the outside world where the workplace is well organised...



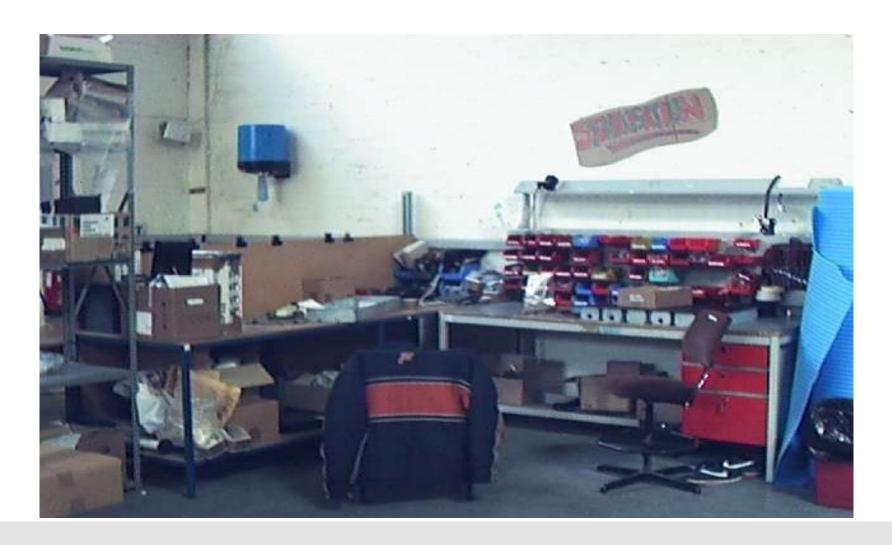








# **EXAMPLES .....BEFORE**







# **EXAMPLES....AFTER**





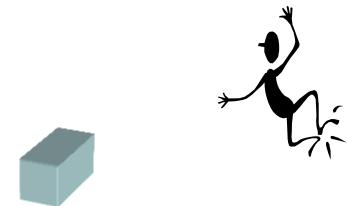


# **BENEFITS OF WORKPLACE ORGANISATION**

# 3 Main Benefits

- •Safety:
- •Efficiency:
- •Control:

... plus, a more pleasant place to work!









## WHY DO WE WANT 5S?

- •Establishes a standard within the Workplace.
- Better Environment.
- Effective production.
- Encourage Ownership and Teamwork.
- Customer Satisfaction & Peace of Mind.





# **5S EXAMPLE**









# **5S EXAMPLE**









# **QUALITY, COST AND DELIVERY**

## **Key Performance Indicators for an Organisation**







## STANDARDISATION IN OPERATIONS







## **DATA ANALYSIS**

# DATA ANALYSIS, WHY?

Measure where we are now.

- Identify the focus for Improvement.
- Monitor the impact of improvement.

#### **SPEAK WITH DATA!**





#### **KEY PERFORMANCE – 7 MEASURES OF QCD**

Not Right First Time (NRFT)

Delivery Schedule Achievement (DSA)

People Productivity (PP)

Stock Turns (ST)

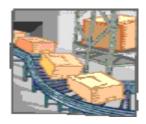
Overall Equipment Effectiveness (OEE)

Value Added Per Person (VAPP)

Floor Space Utilisation (FSU)











# **PROCESS MAPPING**

# "PROCESS"

"A set of inter-related activities through which specific inputs and tasks produce specific outputs."





## HIERACHY OF MAPPING

# Value Map

View the process from order to customer delivery

# **Process Map**

Work on a level of detail within a box of the value map

# **Workload Map**

•This is the real in- depth detail. Observation forms, work load analysis and understanding the full timing data

.





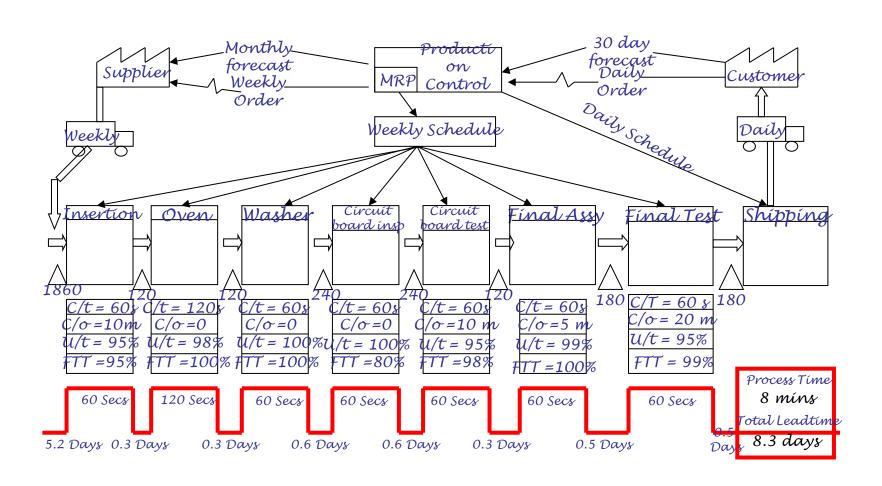
# WHAT IS VALUE STREAM MAPPING?

- Specify value by product or service
  - What does and does not create value for the customer
- Identify the value stream
  - The steps across the whole value stream
- Make flow
  - Remove interruptions, detours, backflows, waiting and rework
- Pull from the customer
  - Make what is required at the rate required
- Pursue perfection
  - Continually remove layers of waste





# **TYPICAL VALUE STREAM MAP**







### FLOW PROCESS ANALYSIS

Is a diagnostic tool which visually illustrates the flow of product or information through a process.

It provides a visual overview of the process – establishes the Current State.

It breaks the process down into 5 categories highlighting which activities are Value Adding, Non-Value Adding and Waste.





# **PROCESS MAPPING SHEET**

30%

MAS WORKS ments

Process Mapping Sheet								
Dep	t:				Date:			
Process: Plug Making Workstation 1								
No	Process Step	Operation	Inspection	Transport	Delay	Storage	Time (secs)	Distance (m)
1.	Remove base / pins from storage					*	10	
2.	Move to workstation 1			*			20	25
3.	Insert pins into base	*					65	
4.	Place base onto workbench				*		10	
5.	Remove fuse from storage					*	85	
6.	Insert fuse into base	*					40	
7.	Inspection		×	/			25	
8.	Transport to workstation 2			*			90	112
Total time and distance		105	25	110	10	95		137
<b>Grand Total Time: 345 s</b>								
Percentage of Total Time		30%	7%	32%	3%	28%		
Summary Graph ;Value Add, Non Value Add & Waste Percentages								

63%

7%

# **IDENTIFYING IMPROVEMENT OPPORTUNITIES**

# **Review the Process Mapping Sheet**

- Look at the 3 categories of Waste: Delay, Transportation and Storage.
- Using Problem Solving Tools and Techniques determine the Root Cause of why these Wastes are occurring and generate improvement ideas.
- Identify whether there are any opportunities to reduce the Non-Value Adding element of Inspection.





# **BENEFITS OF LEAN ADOPTION**

- Creates a better working environment
- Reduced turn round times
- Reduced work in progress
- Improved productivity
- Reduced floor space requirements
- Can be achieved with little capital investment







## for manufacturers

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