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One-Piece Flow

Agenda

1. One-Piece Flow: What is it ?
2. One-Piece Flow purpose and benefits ?
3. One-Piece Flow Approach
4. One-Piece Flow Advantages
5. One-Piece Flow Disadvantages
6. Takeaways

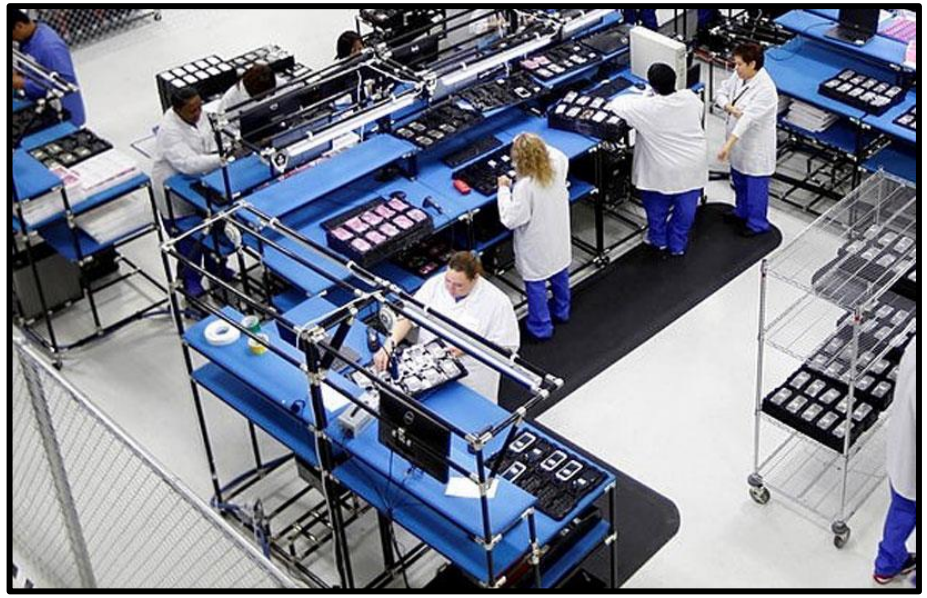
Introduction

What is it ?

One-piece flow cultivates a **smooth, connected flow between each of the manufacturing steps** by targeting the flow within the work cell.

The One-piece flow method moves a **single piece at a time** between operations in the cell.

It maintains the **lowest level of WIP** by only ever working on one item at a time.



Introduction

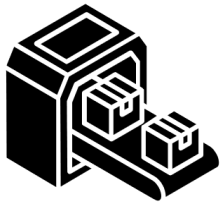
Purpose and Benefits ?

This cellular manufacturing method relies on work cells to facilitate flow, with production flowing from one cell to the next and **no work-in-process (WIP) in between.**

Reduces inventory and **improves** flexibility

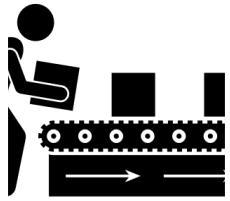
One-Piece Flow

Types of Work Cells:



Functional Cells

We design these cells with **equipment** to complete a specific function. Functional cells are not inherently Lean.



Mixed Model Cells

We lay several operations out in the cell in a **series**. Products made in these cells are similar and rely on **quick changeover** times for a smooth workflow.

Product-Focused Cells

We consider these to be the ideal Lean manufacturing cell. Processing steps are arranged in the **order of operations,** and we ran only **one type** of product through the cell at a time.

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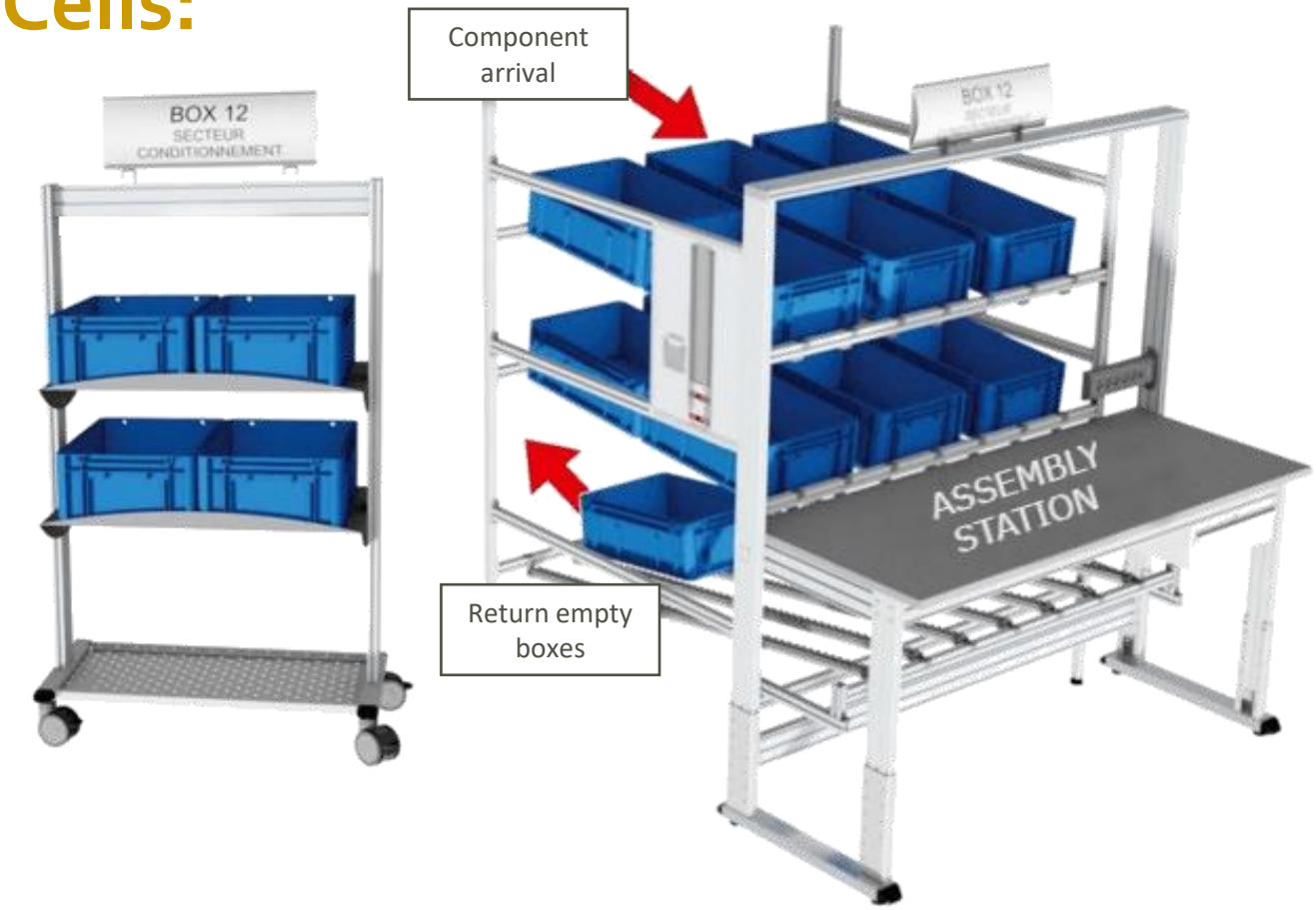

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Types of Work Cells:

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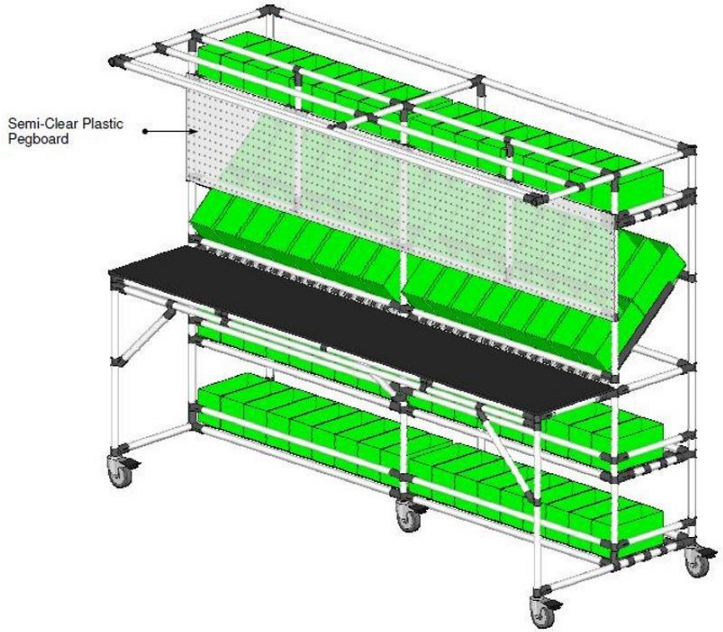

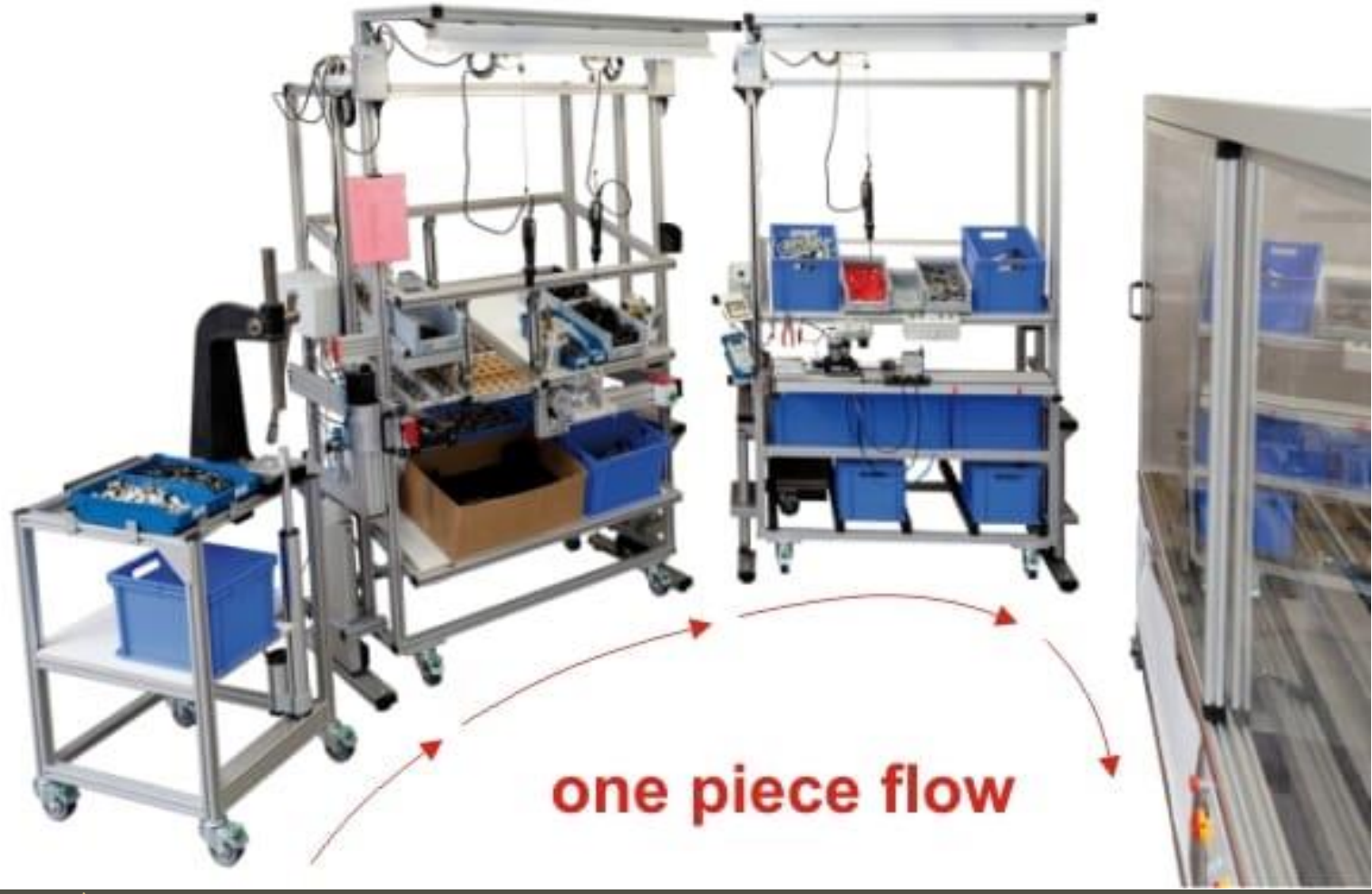

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Types of Work Cells:

One-Piece Flow

Approach to One-Piece Flow:

- **Select the products:** Which products belong together in a cell? Remember, one-piece flow will not work if machine changeovers take too much time.
- **Engineer the process:** What process steps we must include? What equipment is necessary? How many workstations should we house inside the cell?

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Approach to One-Piece Flow:

- **Define the infrastructure:** How is material being handled? Should there be a limit placed on WIP? How is production scheduled? This may be a time to implement other Lean tools like Line Balancing, Kanban and determine Takt time.

- **Lay out the cell:** Because cells are completely self-contained, once we have determined the operators, equipment and machines needed, we are now trying to optimize the space.

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Approach to One-Piece Flow:

- **Define the infrastructure:** How is material being handled? Should there be a limit placed on WIP? How is production scheduled? This may be a time to implement other Lean tools like Line Balancing, Kanban and determine Takt time.

- **Lay out the cell:** Because cells are completely self-contained, once we have determined the operators, equipment and machines needed, we are now trying to optimize the space.

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Advantages of One-Piece Flow:

- Improves safety
- Builds in Quality
- Improves Flexibility
- Improves scalability
- Reduces inventory

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Advantages of One-Piece Flow:

- Improves productivity
- Simplifies material replenishment
- Frees up floor space
- Makes kaizen take root
- Improves morale

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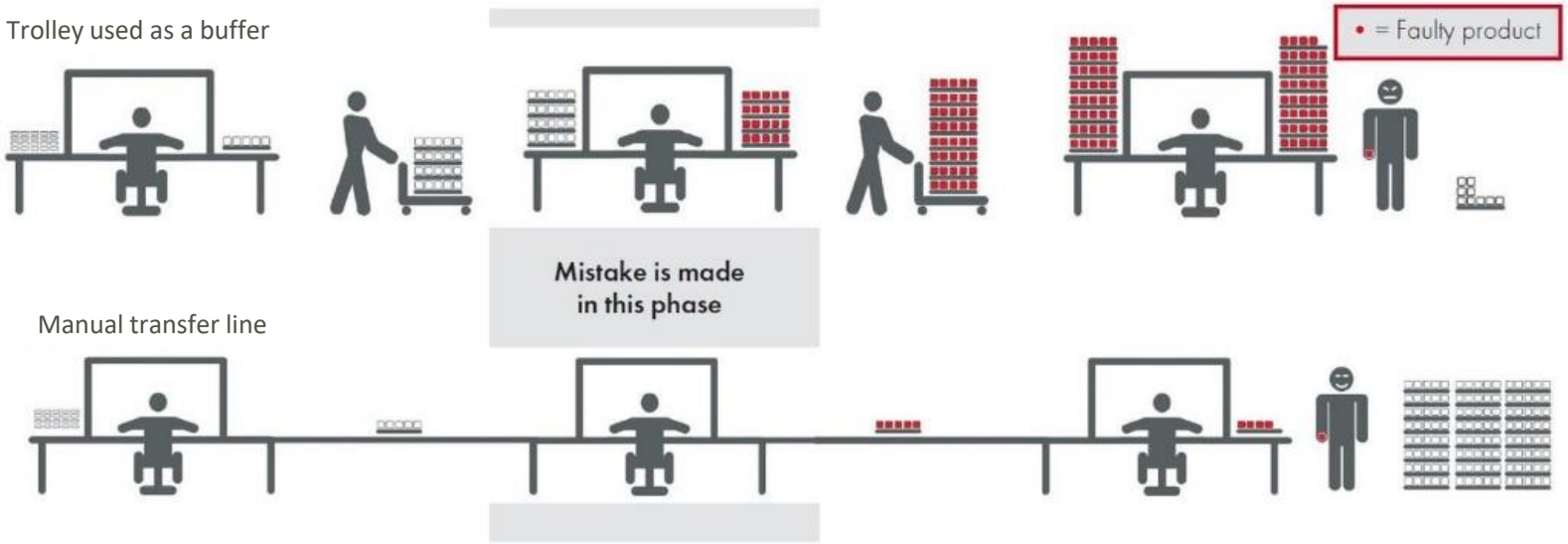
Advantages of One-Piece Flow:



The risk of batch production: Too late when faulty products are detected.

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Disadvantages of One-Piece Flow:

- **High Setup Cost**: It needs more workstations, area, resources & equipment than batching.
- **Low Variability in Process**: Will only work in processes with a low degree of variation & complexity.
- **Control Mechanism**: More sophisticated control systems than batching are required to monitor.
- **Manpower**: Might need a higher workforce if automation is not present.

LEARNING HUB

The Buggy Factory

Takeaways

- Requires a proper **Process analysis** and **optimize crews. Requires** solid estimation of **cycle times** and **takt time**.
- Is strongly recommended to do a robust **added-value analysis** to optimize tasks.
- The **Standard Work Instructions (SWI)** will provide the Control to sustain improvements.
- It should be a **low variation of final output** at each step of the process for One-Piece flow to work properly.
- It requires **expertise in** the planning of floor layout, breakdown of cells, control systems, high-tech equipment & automation.

Thank You

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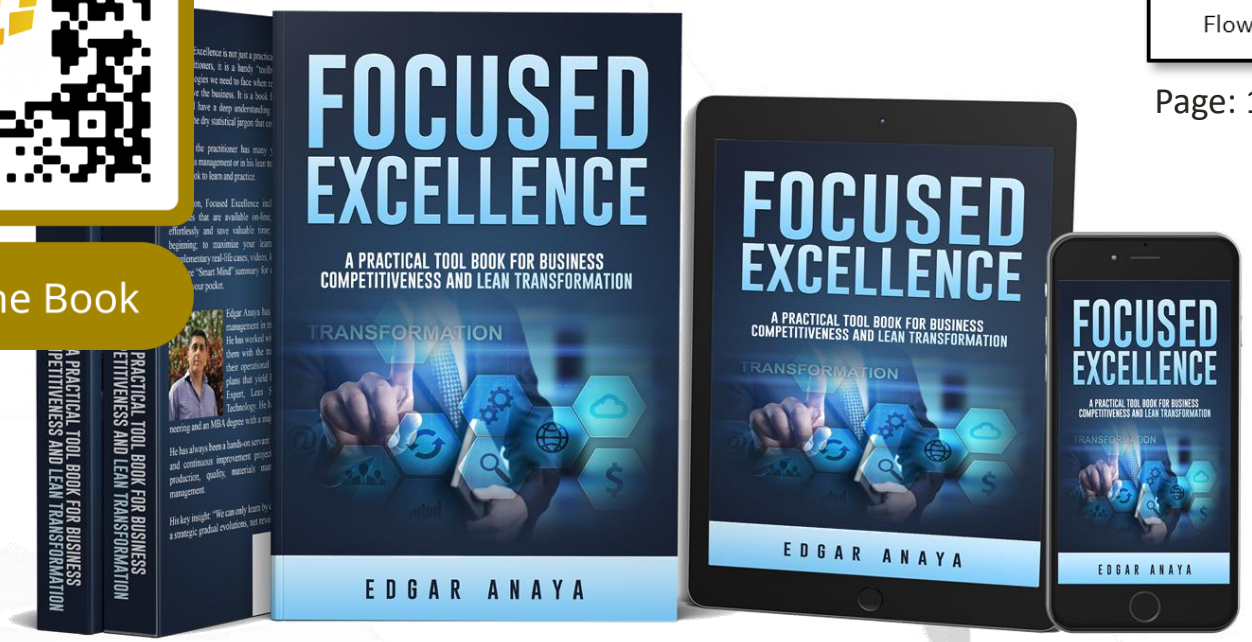

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Reference: Focused Excellence by Edgar Anaya

A Practical Tool Book for **Business Competitiveness** and **Lean Transformation**