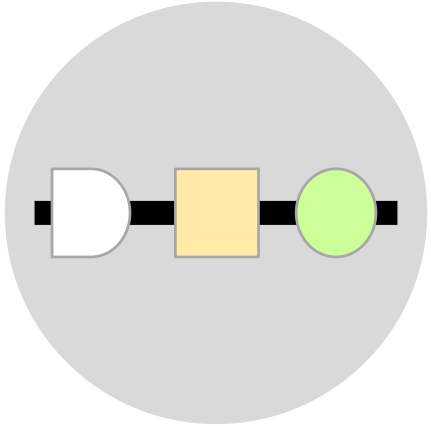
Continuous Improvement Toolkit

Flow Process Chart

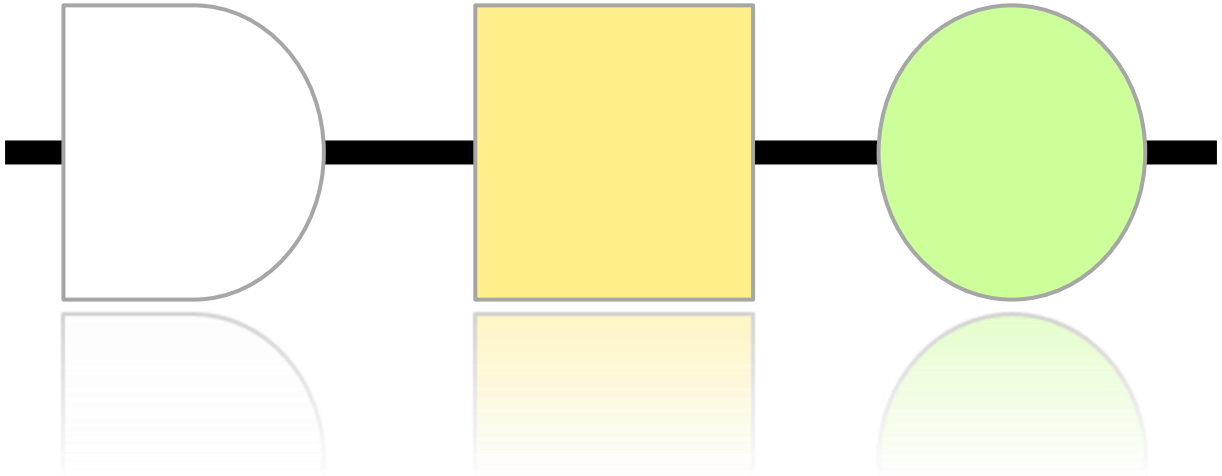
& Process Chart



The Continuous Improvement Map

Flow Process Chart

A symbolic representation that illustrates the **sequence of activities** within a process



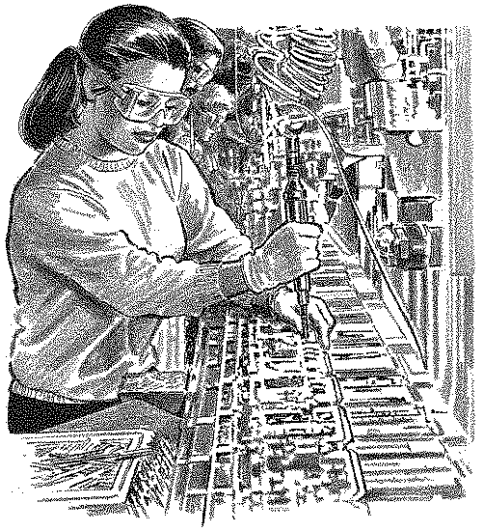
Flow Process Chart

Used to **analyze and record** the activities that make up a process to determine which steps add value and which do not

Allows us to focus on the value-added activities

Flow Process Chart

Often **includes** the activities of an individual, a team, a machine, a computer system, or combinations of all



Flow Process Chart

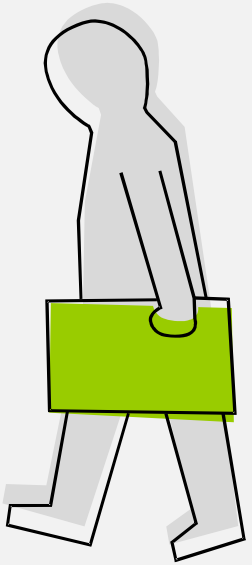
Preferred over other process mapping techniques when the process is **sequential** in nature and contains few decision points

Some time it referred to as **Process Sequence Chart**

Flow Process Chart

A useful feature of the flow process chart is that it can be **drawn up as the process is happening**

So it provides an **accurate** description of the process



Flow Process Chart

By watching and recording, a person for example can follow a part, noting how and when it is produced, moved, checked and stored

This ensures that what is actually happening **gets recorded**

Flow Process Chart

Later when analyzing the process, some steps become obvious **candidates for improvement**, such non-value-adding activities, long delays and excessive transportation

Flow Process Chart

Used to show all the **operation**, **inspection**, **storage**, **transportation,** and **delay** activities that exist in a process

- From the receiving through the plant to the shipping
- From order-taking through scheduling to delivery
- From raw material through production to the hands of the customer
- From concept through detailed design to product launch

Flow Process Chart

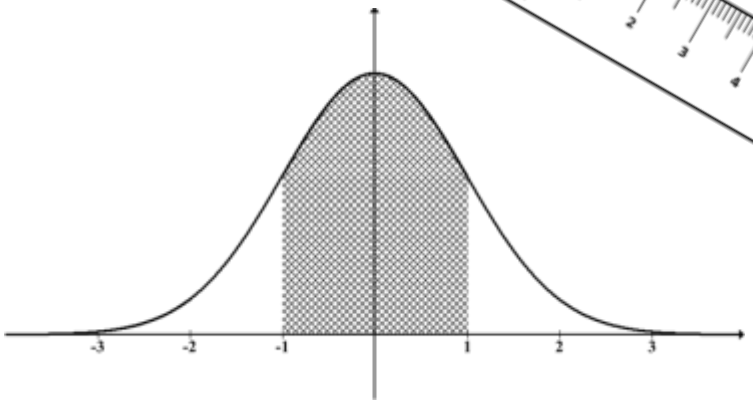
Can be used to **analyze** value-added and non-value added activities

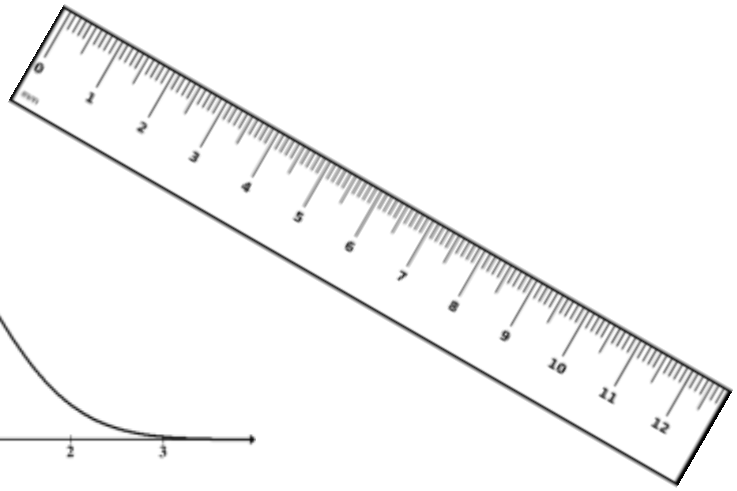
Helps identifying waste, long delays and other non-value-added activities

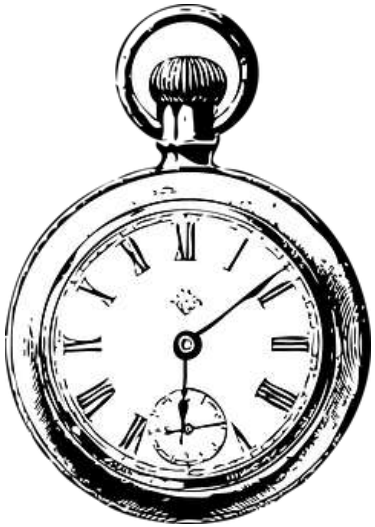
Flow Process Chart

Benefits

Track **performance measures** such as time, distance traveled and error rates







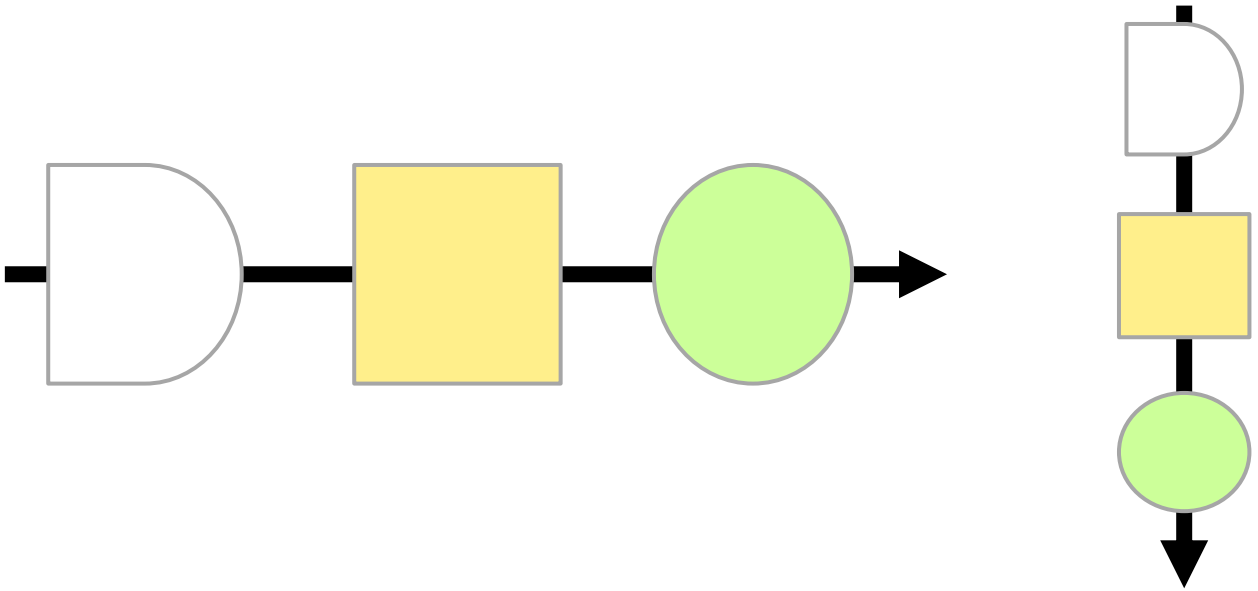
Flow Process Chart

Benefits

Costing the present and future charts will be required to **justify** any future improvement proposal

Flow Process Chart

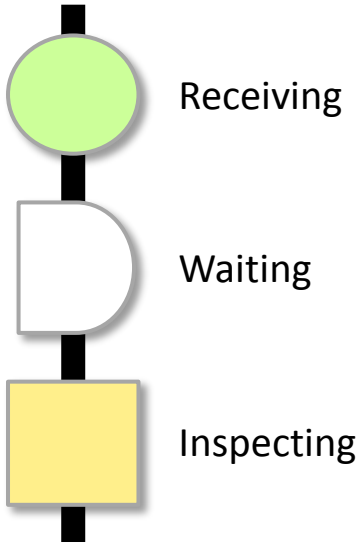
It **records the steps** of a process along a vertical or horizontal line



Flow Process Chart

The process activities are displayed using common **symbols** along with **text**

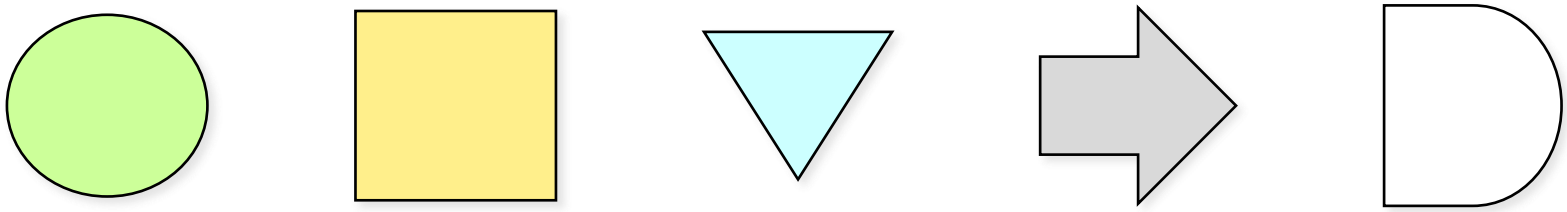
Symbols to indicate the type of activities being undertaken



Text to briefly describe the activities

Flow Process Chart

Common symbols are . . .



Operation | Inspection | Storage | Transport | Delay

These symbols have been **accepted** by many Lean practitioners and organizations

Other categories and symbols can be used depending on the situation

Flow Process Chart

Common symbols are . . .

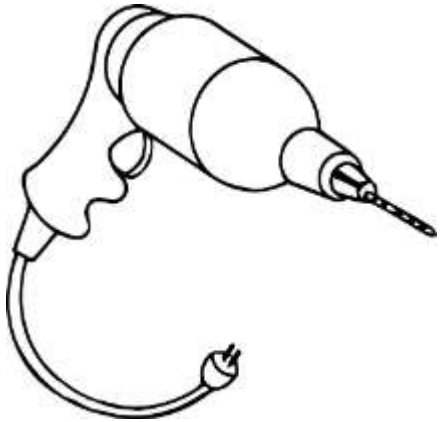
Operation	Produce, add, change, or process something.
Inspection	Checking of items for quality and/or quantity.
Storage	The storing of items until later time.
Transport	The movement of items or people between areas.
Delay	The temporary waiting of something or somebody.

Flow Process Chart

Common symbols are . . .

Operation Produce, change, add or process something.

Examples: Drilling a hole in metal and serving a customer at a call center.

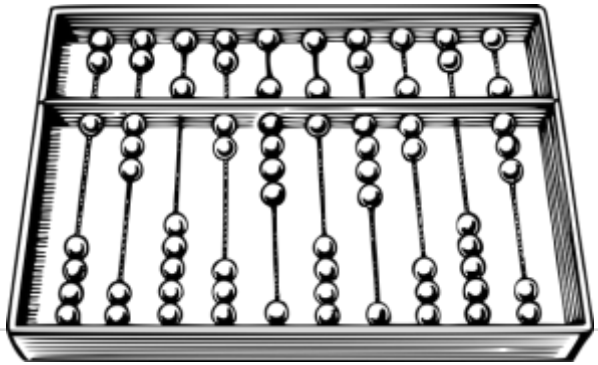


Flow Process Chart

Common symbols are . . .

Inspection Checking of items to ensure correct quality and/or quantity. Does not add or change anything.

Examples: Checking for defects, measuring the dimensions of a product, counting a received products, and getting feedback from a customer.

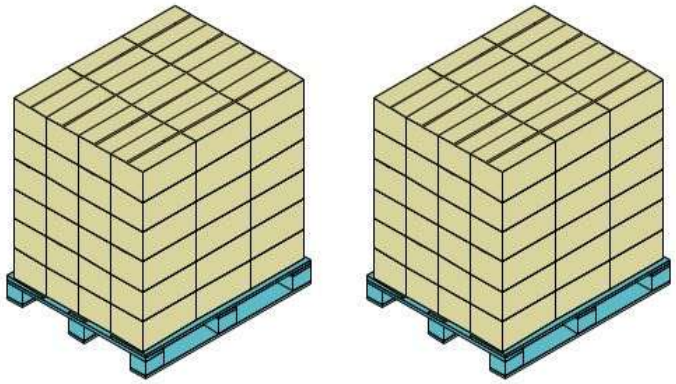


Flow Process Chart

Common symbols are . . .

Storage The storing of something until later time.

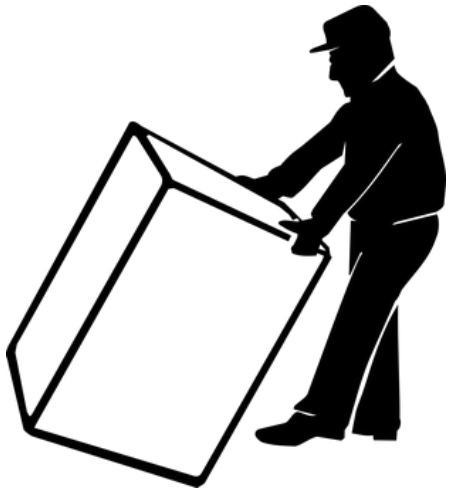
Examples: Storing of finished goods in a warehouse, and storing of the received supplies in a storeroom as inventory.



Flow Process Chart

Common symbols are . . .

Transport The movement of people, materials, documents, tools, or other items from one location to another.



Examples: A forklift moving pallets from a warehouse into a loading bay, a conveyer carrying a partially completed product from one machine to the next, and a customer walking from sales floor to cashier

Methods can be:

- Truck
- Forklift
- Crane
- Trolley
- Conveyer
- Hand

Flow Process Chart

Common symbols are . . .

Delay The temporary waiting of something or somebody.

Examples: The time spent waiting for maintenance and repair activities, and the time the customer spent waiting in a queue.

Flow Process Chart

Value-Added Activities and Waste

Operation | Inspection | Storage | Transport | Delay

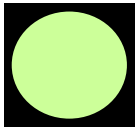
Only **operations** will add value (**BUT not all operations!**)

Inspection, storage, delay, and transportation activities will add no value from the **customer's viewpoint**

Flow Process Chart

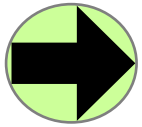
Other symbols . . .

Rework or scrap point



Inspection while operating

Decision



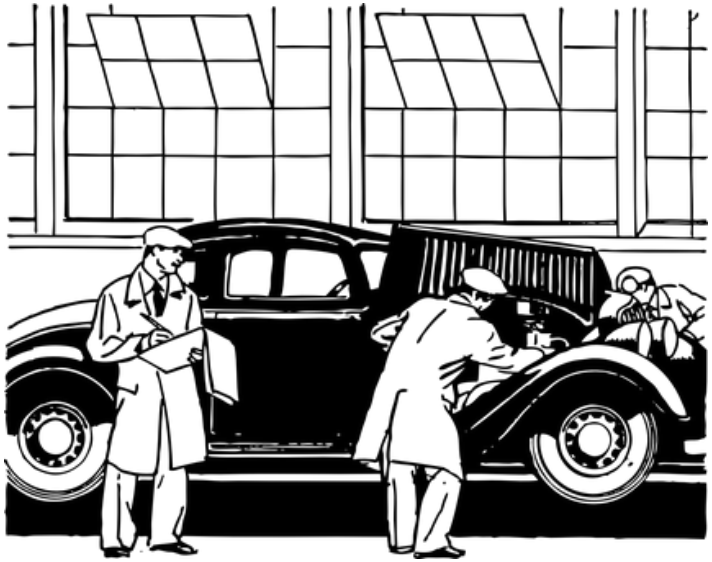
Operating while transporting

Longer-term storage (or when storage is larger than a container)

Operating while being in storage

Flow Process Chart

Care should be taken when **choosing the right category**, as a delay of a machine could be an inspection made by an operator or a transportation activity



Flow Process Chart

There are three **common types** of flow process charts, based on what is being charted . . .

Man-Type Charts

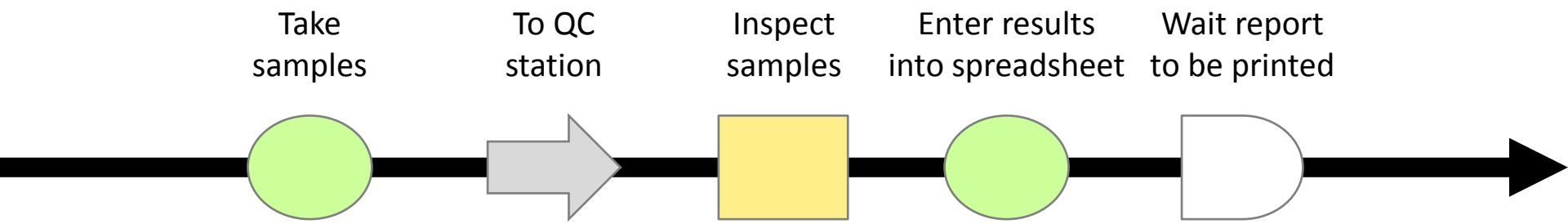
Material-Type Charts

Equipment-Type Charts

Flow Process Chart

Man-Type Charts

Shows the actions of a person or group of people

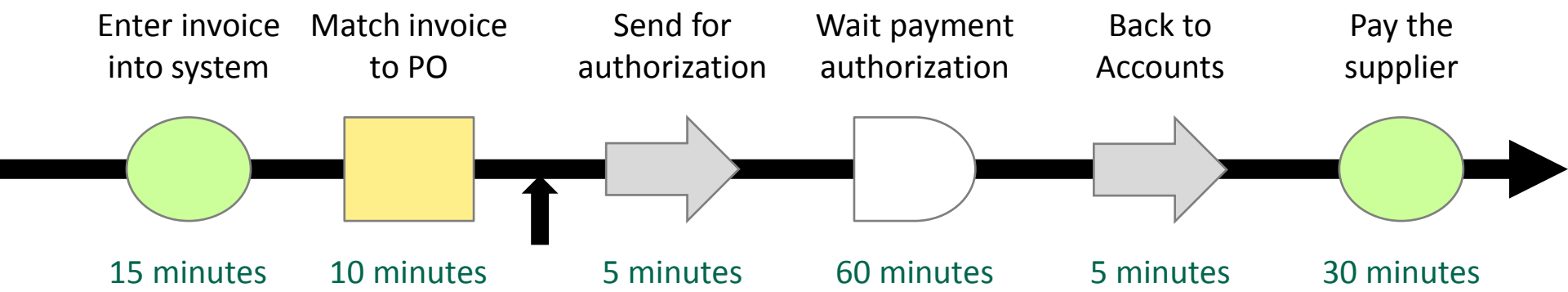


Samples Inspection

Flow Process Chart

Material-Type Charts

Shows what happens to a product or item as it moves

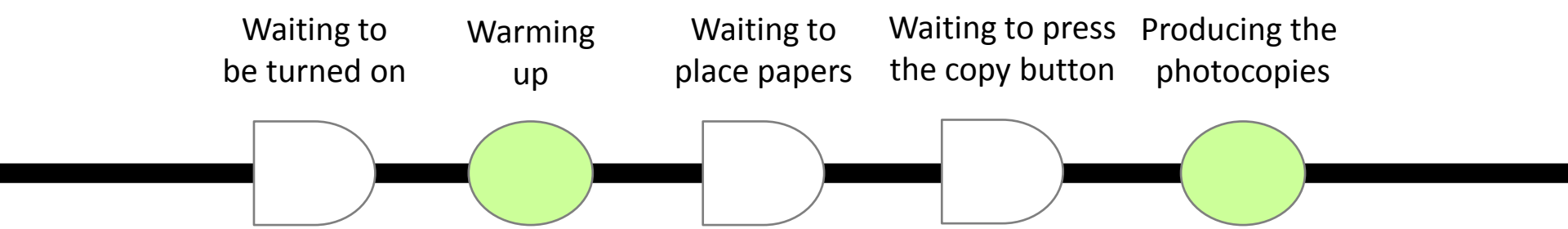


Supplier Invoice Processing

Flow Process Chart

Equipment-Type Charts

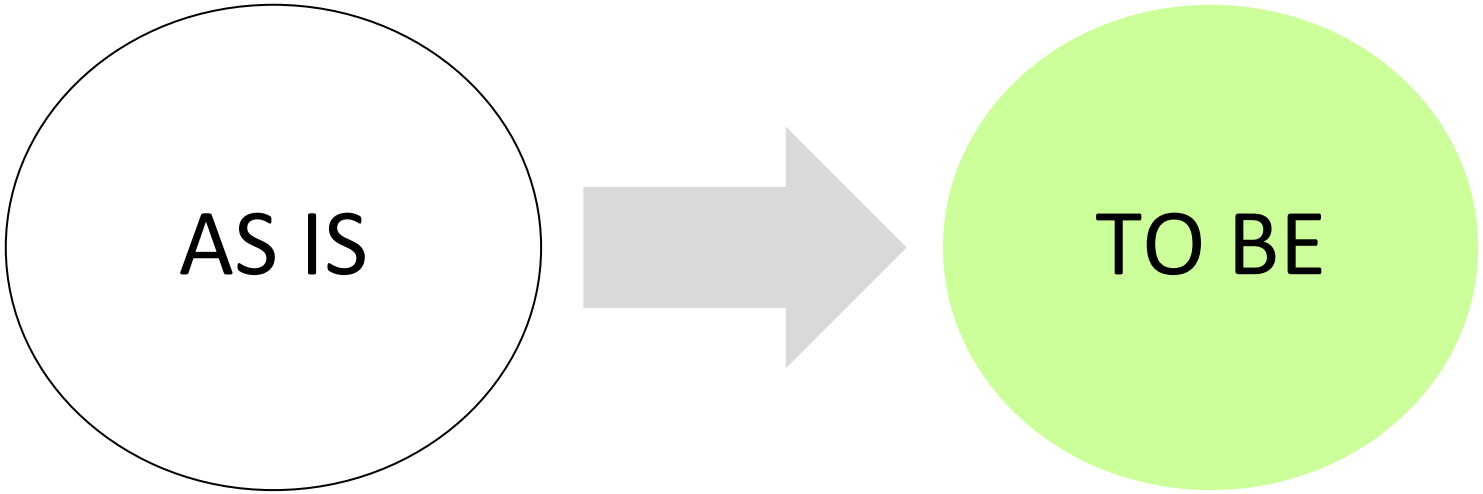
Shows how a tool or an equipment is used



Use of an office copy machine

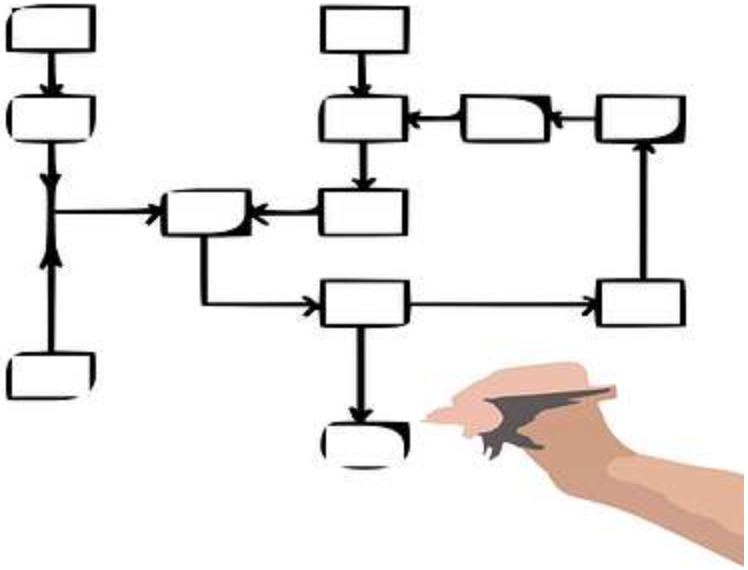
Flow Process Chart

A good practice is to chart the **present process** as well as the **future (proposed) process** in order to drive change and continuous improvement



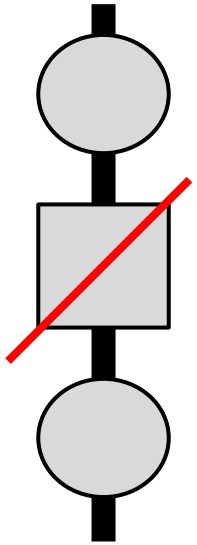
Flow Process Chart

The typical approach is that the present method is recorded on a chart **through direct observation**, and then the improvement will be proposed on a second chart

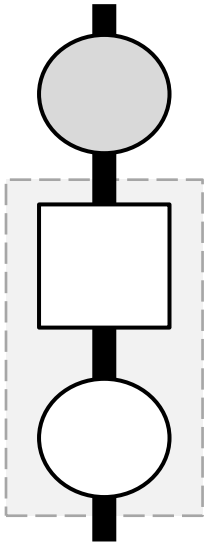


Flow Process Chart

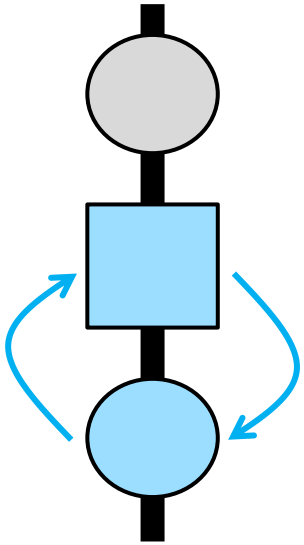
When charting the future chart, each step is subject to . . .



Elimination



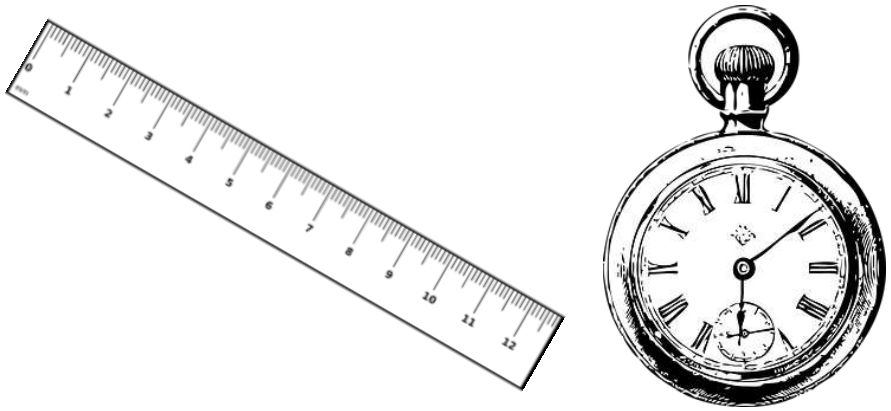
Combination



Change sequence

Flow Process Chart

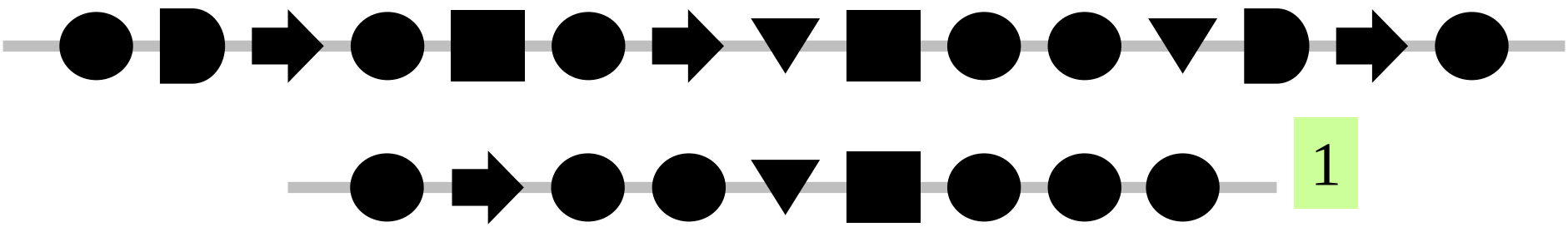
The time for each process step and the distance travelled should be **calculated**



The reduction of both will help in cost reduction and will **justify** any improvement proposal

Flow Process Chart

Improvements can be achieved as a result of the reduction of the number of steps, the reduction of the time for any of the steps, and the reduction of the distance travelled



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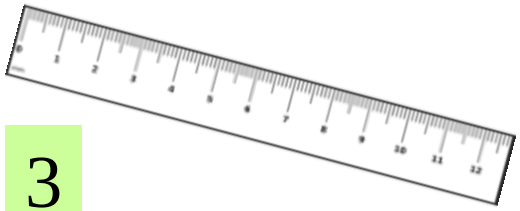


3

2

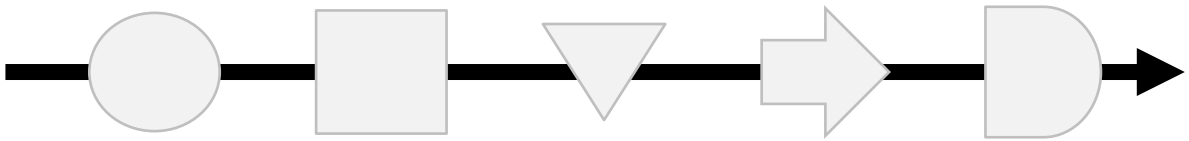
Flow Process Chart

How to Construct a Flow Process Chart

With your team, **describe the process**, the scope and the boundaries

Observe the process, then record the process activities as they happen

Draw on a line the process activities as observed using the standard set of symbols

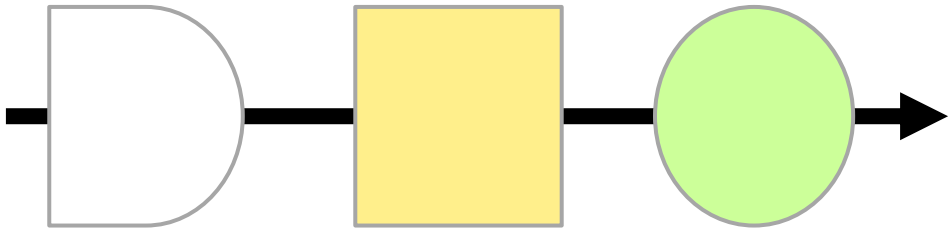


Flow Process Chart

How to Construct a Flow Process Chart

Label each process step with a brief description using as few words as possible

Add further **details** as necessary including the distance travelled, error rates, and the time take to perform each activity

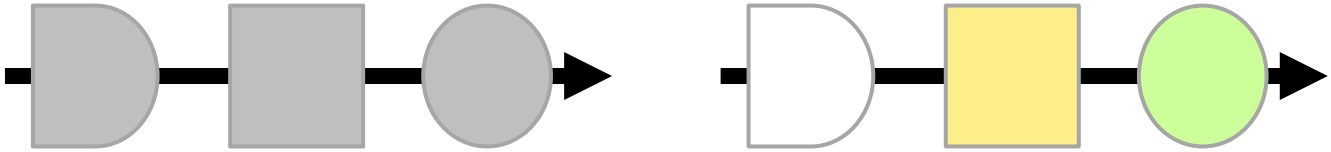


Flow Process Chart

How to Construct a Flow Process Chart

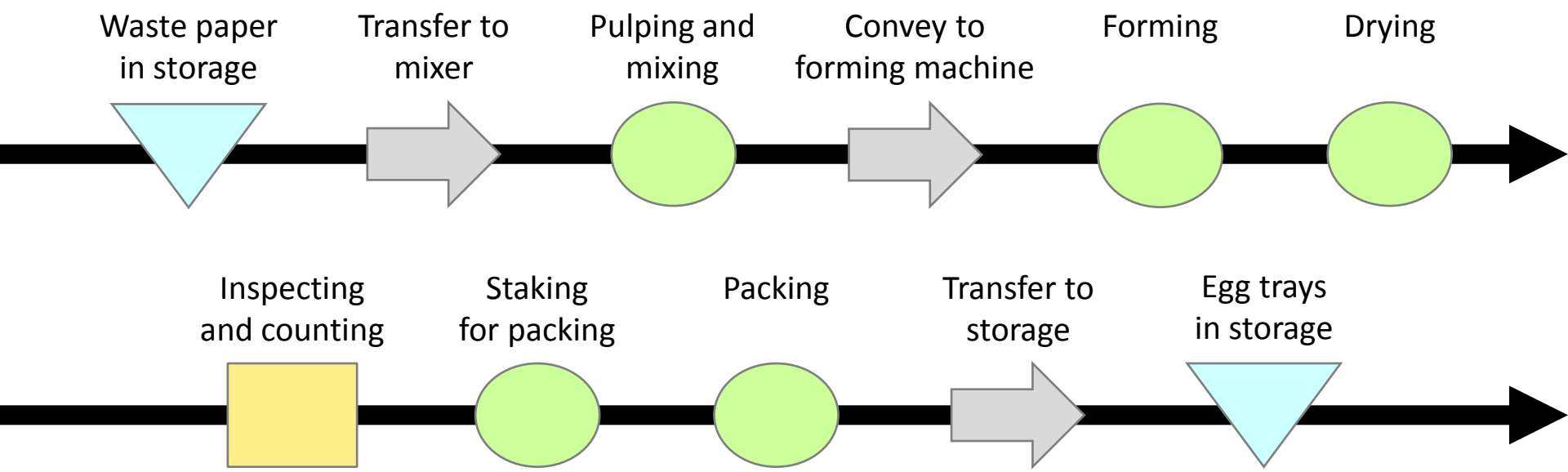
Identify problem areas and **improvement opportunities**

Come up with the **proposed chart** trying to reduce waste and increase the percentage of the value added activities



Flow Process Chart

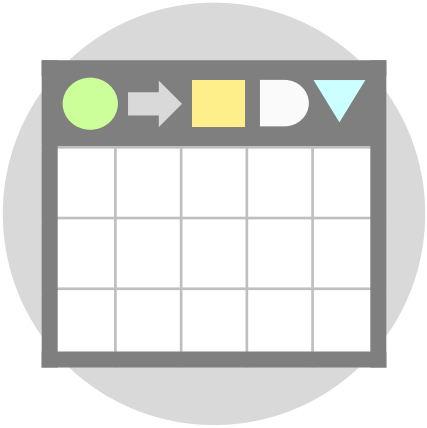
Example – The Present Method of an Egg Tray Production Process



Flow Process Chart

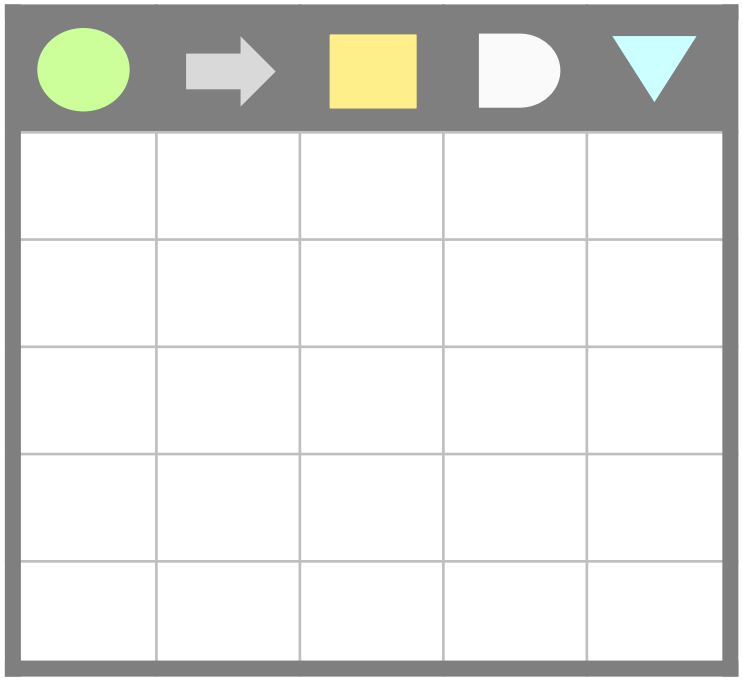
Process Chart

Presenting the process activities and the related information in the **form of a table**

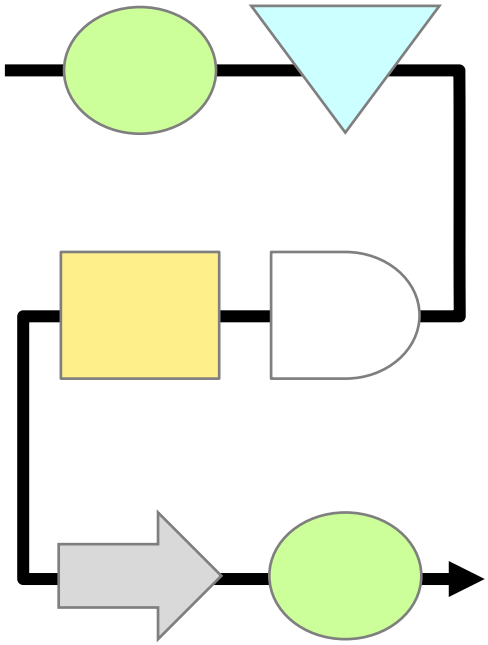


Flow Process Chart

Process Chart



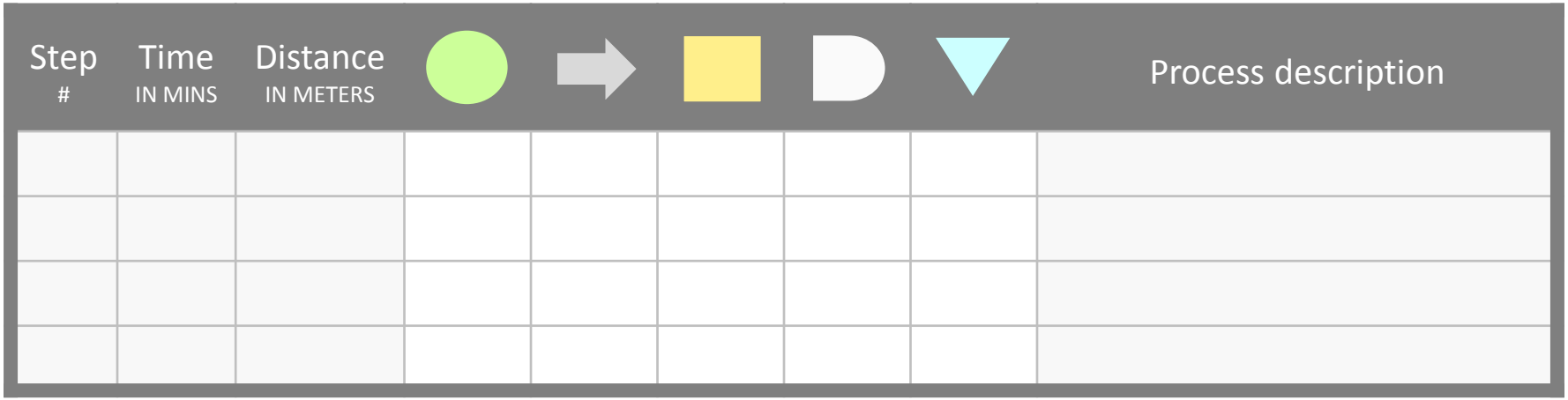
vs.



Allows to provide further information about each process step (time, distance, etc.)

Flow Process Chart

Process Chart



Helps estimating key metrics such as:

1. Distance travelled and process cycle time.
2. The percentage of the value added activities to the total activities.
3. The value-added time.

Flow Process Chart

Example – Supplier Invoice Processing

Step #	Time IN MINS	Distance IN METERS	●	→	■	D	▼	Process description
1	15		X					Enter invoice into system
2	10				X			Match invoice to PO
3	5	85		X				Send for authorization
4	60					X		Wait payment authorization
5	5	85		X				Bring back to Accounts
6	30		X					Pay the supplier

Flow Process Chart

Example – Supplier Invoice Processing

Step #	Time IN MINS	Distance IN METERS	●	→	■	D	▼	Process description
1	15		X					Enter invoice into system
2	10				X			Match invoice to PO
3	5	85		X				Send for authorization
4	60					X		Wait payment authorization
5	5	85		X				Bring back to Accounts
6	30		X					Pay the supplier

Number of steps	2	2	1	1		**6**
Time (minutes)	45	10	10	60		**125**
Distance (meters)	–	170	–	–		**170**

Process Chart Summary

Flow Process Chart

Key Metrics

Number of steps	2	2	1	1	0	**6**
Time (IN MINS)	45	10	10	60	0	**125**
Distance (IN METERS)	–	170	–	–	–	**170**

Cycle time equals the sum of all times and delays, except for the activities that can be done in parallel

Distance traveled equals the sum of all the distances

Value-added time = Operation time / Total time

Flow Process Chart

Key Metrics

						Totals
Number of steps	2	2	1	1	0	**6**
Time (IN MINS)	45	10	10	60	0	**125**
Distance (IN METERS)	–	170	–	–	–	**170**

Cycle time = 45 + 10 + 10 + 60 = 125 minutes

Distance traveled = 175 meters

Value-added time = 45 / 125 = 36%

Flow Process Chart

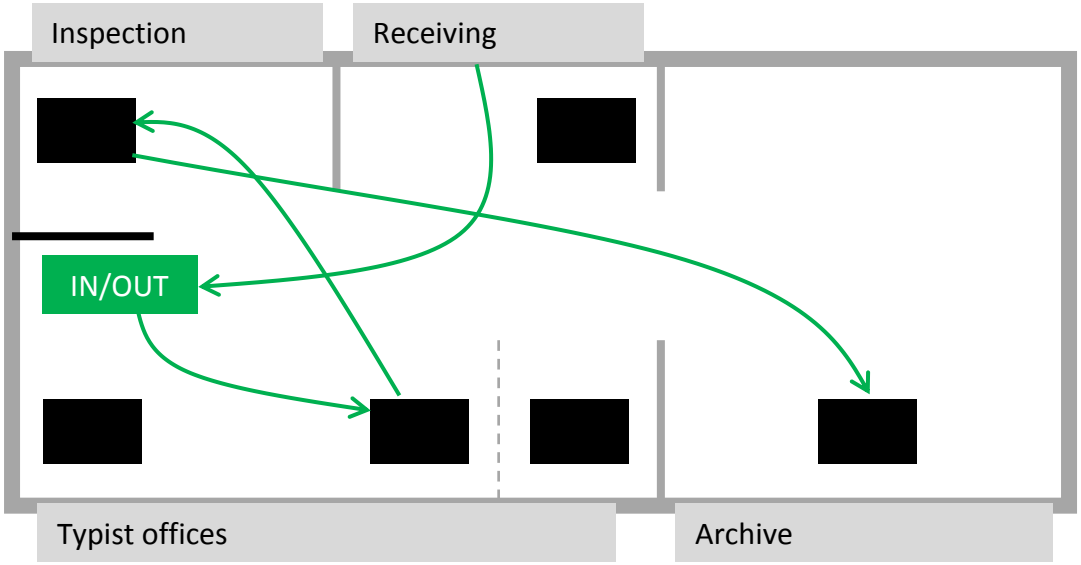
Key Metrics

$$\textit{Annual Labor Cost} = \left[\textit{Process time in hours}\right]\left[\textit{Variable cost per hour}\right]\left[\textit{Number of times process performed per year}\right]$$

Flow Process Chart

Further Information

Process charting is sometimes used in conjunction with **flow diagramming**



A Flow Diagram

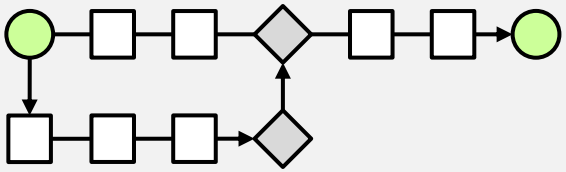
A drawing that is used to analyze the movement of materials, items or people

Flow Process Chart

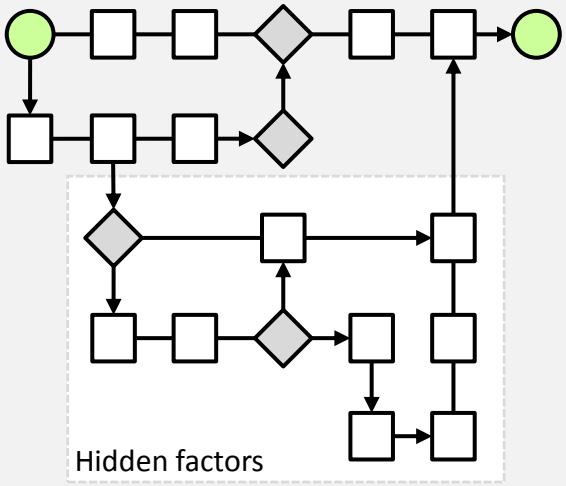
Further Information

What do we think of a process is not necessary what it actually is . . .

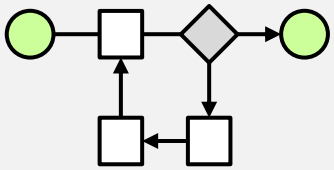
What you think it is



What it actually is



What you would like it to be

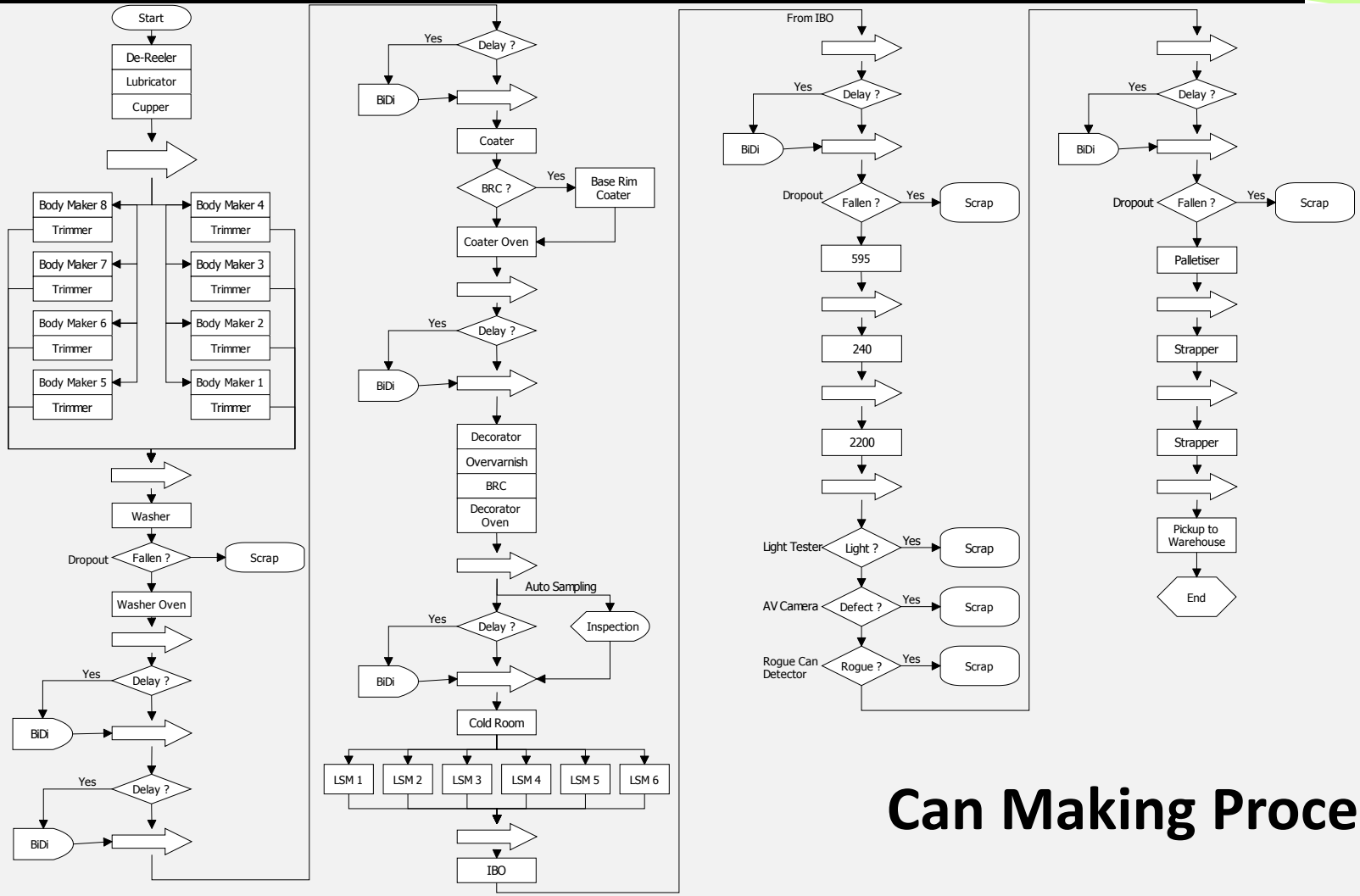


Flow Process Chart

Common Process Problems

Non-value adding steps	Errors and rework	Duplication
Bottlenecks	Long cycle times	Excessive delays
Missing steps	Too many inspections	Complex procedures
Departure from procedure	Dead ends	Costly steps

Flow Process Chart



Can Making Process