Continuous Improvement Toolkit

Flow Process Chart
& Process Chart
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**
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.
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

- **VA** (Step 1)
- **ENVA** (Step 2)
- **NVA** (Step 3)

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

Track **performance measures** such as time, distance traveled and error rates
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
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
- Decision
- Longer-term storage (or when storage is larger than a container)
- Inspection while operating
- Operating while transporting
- 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

Take samples → To QC station → Inspect samples → Enter results into spreadsheet → Wait report to be printed
Suppliers Invoice Processing

Flow Process Chart

Material-Type Charts

Shows what happens to a product or item as it moves

- Enter invoice into system: 15 minutes
- Match invoice to PO: 10 minutes
- Send for authorization: 5 minutes
- Wait payment authorization: 60 minutes
- Back to Accounts: 5 minutes
- Pay the supplier: 30 minutes
Flow Process Chart

Equipment-Type Charts

Shows how a tool or an equipment is used

Use of an office copy machine

Waiting to be turned on  Warming up  Waiting to place papers  Waiting to press the copy button  Producing the photocopies
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.
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.
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

1. Identify problem areas and **improvement opportunities**

2. 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

Waste paper in storage → Transfer to mixer → Pulping and mixing → Convey to forming machine → Forming → Drying

Inspecting and counting → Staking for packing → Packing → Transfer to storage → Egg trays in storage
Flow Process Chart

Process Chart

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

![Diagram of a process chart](image-url)
Flow Process Chart

Process Chart

vs.

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

### Process Chart

<table>
<thead>
<tr>
<th>Step #</th>
<th>Time IN MINS</th>
<th>Distance IN METERS</th>
<th>Process description</th>
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</thead>
<tbody>
<tr>
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</table>

**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**

<table>
<thead>
<tr>
<th>Step #</th>
<th>Time IN MINS</th>
<th>Distance IN METERS</th>
<th>Process description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>X</td>
<td>Enter invoice into system</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>X</td>
<td>Match invoice to PO</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>85</td>
<td>Send for authorization</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td></td>
<td>Wait payment authorization</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>85</td>
<td>Bring back to Accounts</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>X</td>
<td>Pay the supplier</td>
</tr>
</tbody>
</table>
# Flow Process Chart

## Example – Supplier Invoice Processing

<table>
<thead>
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<tr>
<td>6</td>
<td>30</td>
<td></td>
<td>Pay the supplier</td>
</tr>
</tbody>
</table>

| 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

<table>
<thead>
<tr>
<th>Number of steps</th>
<th>2</th>
<th>2</th>
<th>1</th>
<th>1</th>
<th>0</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (IN MINS)</td>
<td>45</td>
<td>10</td>
<td>10</td>
<td>60</td>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>Distance (IN METERS)</td>
<td>–</td>
<td>170</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>170</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th></th>
<th>Number of steps</th>
<th>Time (IN MINS)</th>
<th>Distance (IN METERS)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of steps</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Time (IN MINS)</td>
<td>45</td>
<td>10</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Distance (IN METERS)</td>
<td>–</td>
<td>170</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

- **Cycle time** = 45 + 10 + 10 + 60 = **125 minutes**
- **Distance traveled** = **175 meters**
- **Value-added time** = \( \frac{45}{125} = 36\% \)
Flow Process Chart

Key Metrics

Annual Labor Cost = [Process time in hours] × [Variable cost per hour] × [Number of times process performed per year]
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

Hidden factors
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

Start
- De-Reeler
- Lubricator
- Cupper
- Body Maker 8
  - Trimmer
  - Washer
  - Dropout
  - Fallen?
  - Scrap
- Body Maker 7
  - Trimmer
  - Washer
  - Dropout
  - Fallen?
  - Scrap
- Body Maker 6
  - Trimmer
- Body Maker 5
  - Trimmer
- Trimmer
- Body Maker 4
  - Trimmer
- Coater
  - Delay?
  - BDI
  - Coater
  - Delay?
  - BDI
  - Coater
  - Delay?
  - BDI
  - Decorator
  - Overvarnish
  - BRC
  - Decorator
  - Oven
  - Auto Sampling
  - Inspection
  - Cold Room
  - LSM 1
  - LSM 2
  - LSM 3
  - LSM 4
  - LSM 5
  - LSM 6
  - IBO
- Light Tester
  - Light?
  - AV Camera
  - Rogue Can
  - Rogue Can Detector
  - Dropout
  - Fallen?
  - Scrap
- Dropouts
  - Scrap
  - Scrap
  - Scrap
- Pickup to Warehouse
  - End

Can Making Process