PathStone Group

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Process Observation

Agenda

1. Process Observation: What is it ?

2. OEE purpose and benefits

3. Phases

4. General Guidelines

5. Procedure

6. Limits and Disadvantages

7. Takeaways

Introduction

What is it ?

Is a useful tool for **measuring how much time** people spend on each part of a process.

Introduction

Purpose and Benefits

- The **improvement** of processes and procedures

- The improvement of plan, office, or service area **layout**

- Economy in **human effort** and the reduction of unnecessary fatigue

- Improvement in the use of **materials**, **machines**, and **manpower**

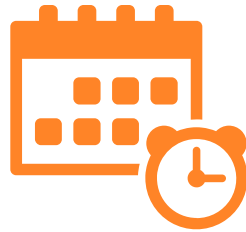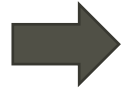- Development of better **physical working environment**

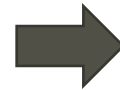PathStone Group

Process Observation

Phases:

Analisys

What is to be measured.
Identify steps (Process map).
Approach to the experts.
Draft standard time.

Measurement

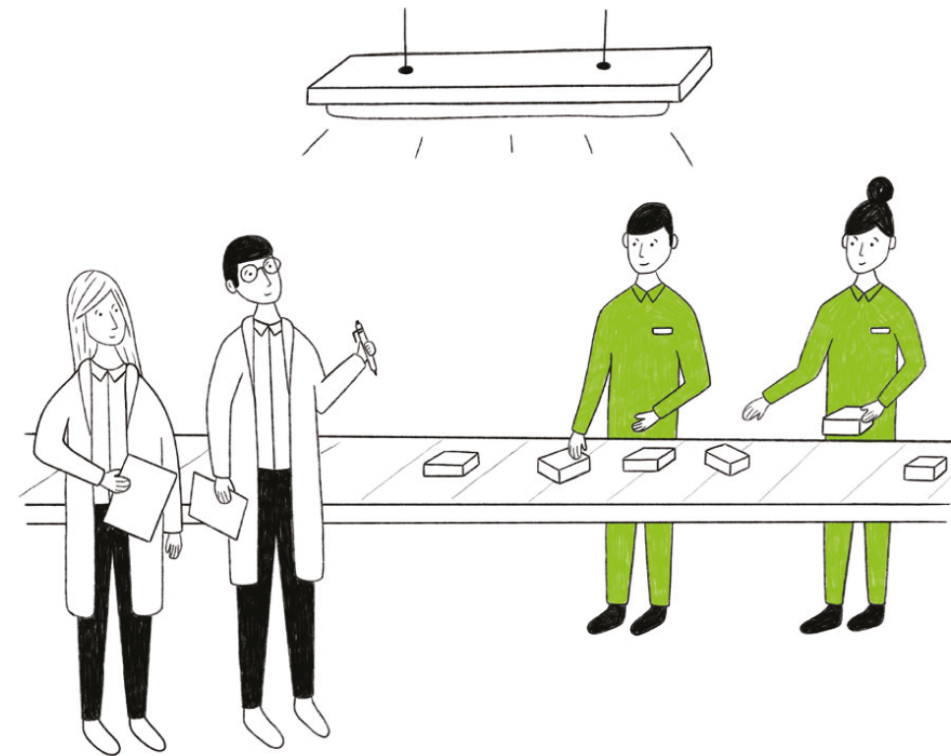Use of timing device.
Consider allowances.
Record several runs.

Synthesis

Use template to enter data.
Get results and validate them.
Determine Standard times.
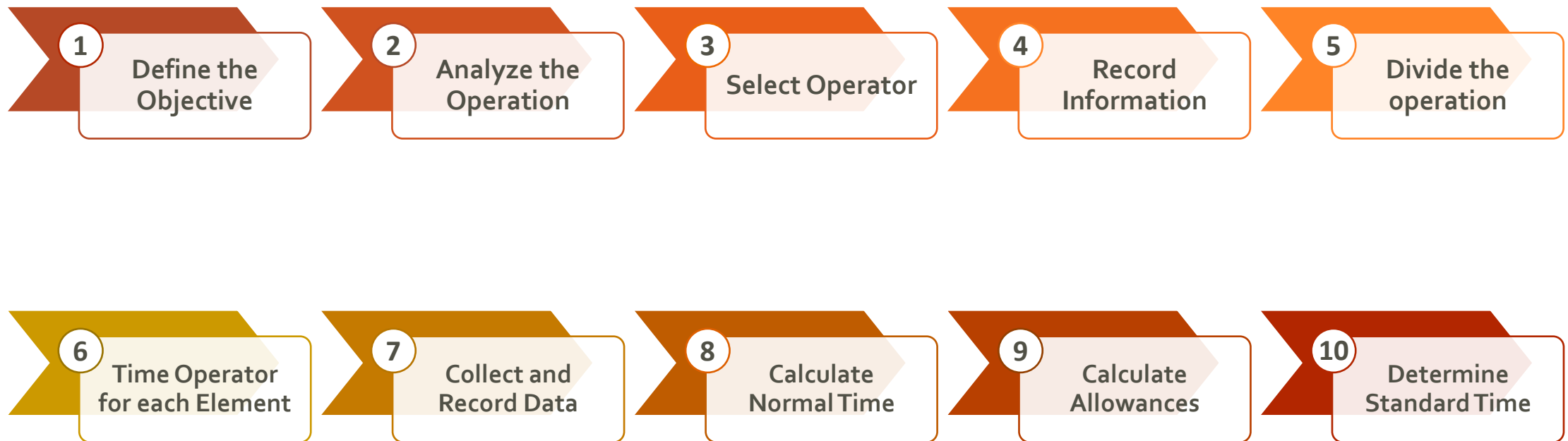
Process Observation

General Guidelines:

- Use the **largest sample** possible.

- Take **people's skills** into consideration.

- Try **not to record** while observation is executed.

- Beware the **Hawthorne Effect.**

- Do not lose sight of the **goal**.

Process Observation

Procedure:

1 Define the Objective

2 Analyze the Operation

3 Select Operator

4 Record Information

5 Divide the operation

6 Time Operator for each Element

7 Collect and Record Data

8 Calculate Normal Time

9 Calculate Allowances

10 Determine Standard Time

Process Observation

1 Define the Objective

Procedure:

This involves statement of the use of the result, the precision desired, and the required level of confidence in the estimated time standards.

The desired accuracy is often stated as a percentage of the average of the observed time. The sample size needed to achieve a certain level of accuracy can be computed using the formula:

Process Observation

Define the Objective

Procedure:

Sample size:

$$n = \left(\frac{zs}{ax}\right)^2$$

$$n = \left(\frac{zs}{e}\right)^2$$

Confidence Level	z value
90.0%	1.65
95.0%	1.96
95.5%	2.00
98.0%	2.33
99.0%	2.58

Where:

n = number of observations needed

x = mean of the observed time

a = allowable error as percentage of average time

e = maximum acceptable error

s = standard deviation of observed time

z = number of normal standard deviation needed for desired confidence

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Procedure:

A time study analyst wished to estimate the time required to perform a certain job. A preliminary work showed a mean of 6 minutes and a standard deviation of 2 minutes. The desired confidence is 95%.

What is the sample size needed if the desired error is (a) + 10% and (b) one-half minute of the sample mean?

Confidence Level	z value
90.0%	1.65
95.0%	1.96
95.5%	2.00
98.0%	2.33
99.0%	2.58

for (a)

$$n = \left(\frac{1.96(2)}{0.10(6)}\right)^2$$

$n = 42.68$ or 43 sample size

for (b)

$$n = \left(\frac{1.96(2)}{0.5}\right)^2$$

$n = 61.47$ or 62 sample size

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2 Analyze the Operation

Procedure:

Determine whether standard method and conditions exist and whether the operator is properly trained.

If need is felt for method study or further training of operator, the same may be completed before starting the process observation study.

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"As you can see, we've been able to significantly boost productivity by making everyone work much, much harder."

Process Observation
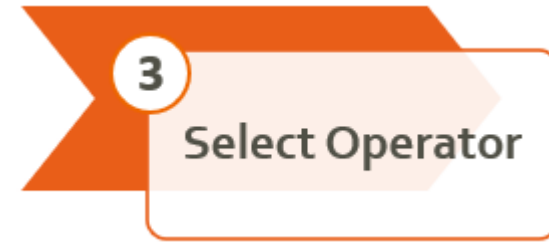
3 Select Operator

Procedure:

Select the operator

Process Observation

4 Record Information

Procedure:

The standard method, operation, operator, product, equipment, quality, and conditions.

Use the worksheet.

Process Observation

Procedure:

Divide the operation into reasonably small elements.
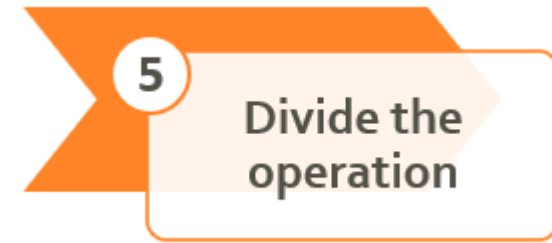
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Procedure:

Record the data for a few numbers of cycles. Use the data to estimate the total numbers of observations to be taken.

Distribution of different sample sizes

5 observations

10 observations

20 observations
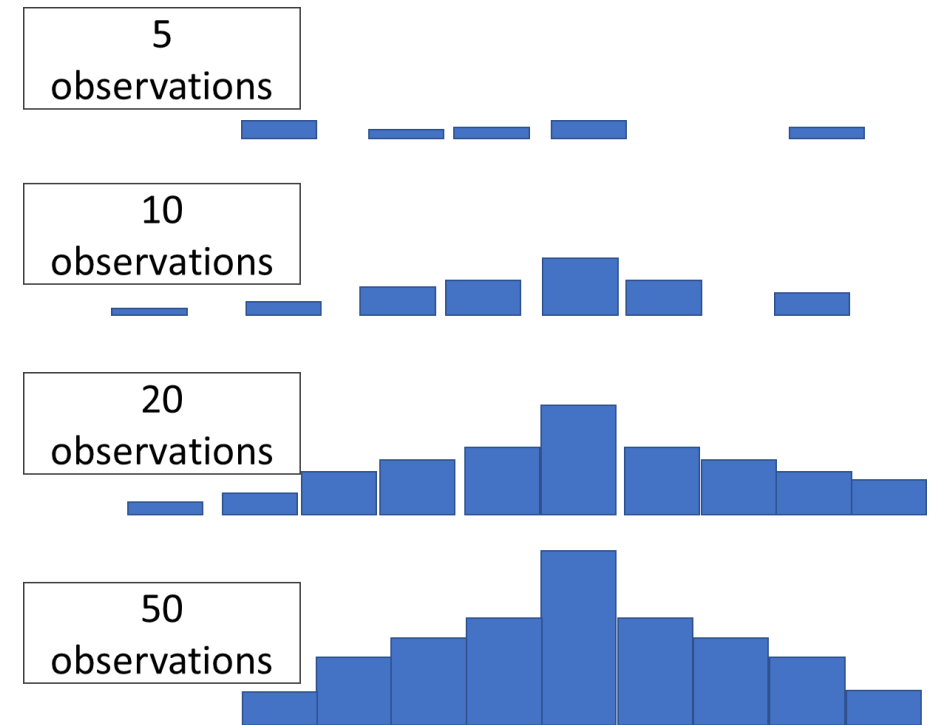
50 observations

Process Observation

Procedure:

Required number of cycles by timing and rating the operator.

Process Observation
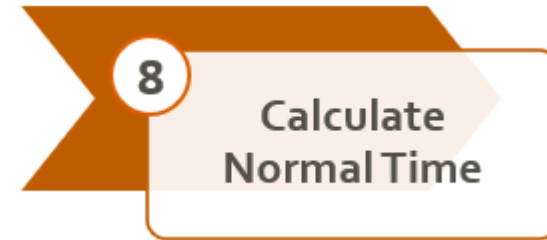
Procedure:

Multiply it by the rating factory to get normal time.

$$Normal\ Time\ (NT) = Observed\ time\ x\ Rating\ factor$$

Process Observation

8 Calculate Normal Time

Procedure:

Example:

An operator takes an average of 10 minutes to complete a particular task. Operator's performance rating (pace) is 110%. What is the normal time for completing this task?

$$NT = 10 \text{ minutes } (110\%/100\%)$$

$$NT = 11 \text{ minutes}$$

Add the normal time of various elements to obtain the normal time for the whole operation.

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Procedure:

The normal time arrived at, therefore does not include unavoidable delay and other lawful lost time.

It is necessary and important that the time study analyst applies some adjustment, or an allowance to pay off for such losses, so that time standard is established for the given job.
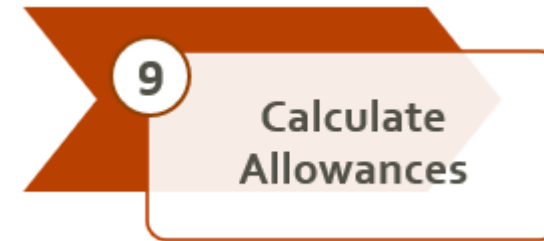
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Procedure:

Adding allowances to the normal time of operation.

$$Standard\ Time = NT\ (1 + AF)$$

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Process Observation

10 Determine Standard Time

Procedure:

Example:

An operator takes an average of 10 minutes to complete a particular task. Operator's performance rating (pace) is 110% and there is an allowance or 15%. What is the normal time and standard time (ST) for completing this task?

Given the NT = 11 minutes,

Therefore, the standard time is:

Standard Time = 11(1+0.10)

ST = 12.65 minutes
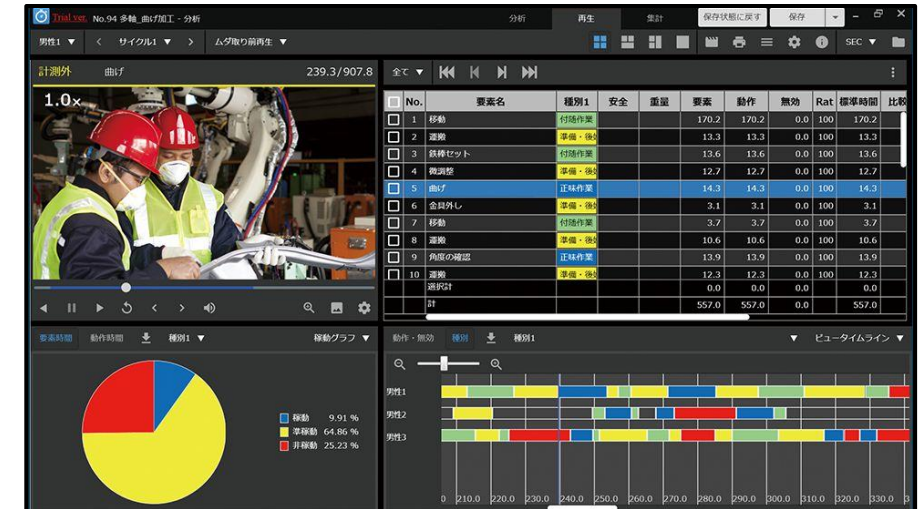
Process Observation

Limits and Disadvantages:

- Inaccuracy when capturing tasks

- Hawthorne Effect

- It tasks several observations to get the accuracy

- Task variations need to be measured separately

- Tasks need to be remeasured when process change

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Preroll Assembly

TOOLBOX

Process Observation Worksheet

	PathStone Group					**Time Motion Study Worksheet**							

										UOM	**Pouches**

Operator ID	Task / Operation	Type of Operation	Cycle Time (seconds)					Ave Obs Time (sec)	Ave Obs Time (min)	Normal Time (min)	Standard Time (min)	Target
			1	**2**	**3**	**4**	**5**					Pouches/hr
1	Open the box with tubes	Manual	2	3	5	5	2	3.40	0.06	0.06	0.003	169,412
2	Fit box inside dispenser	Manual	5	3	5	7	6	5.20	0.09	0.09	0.004	110,769
3	Fill kanban bin with tubes	Manual	3	4	3	4	4	3.60	0.06	0.06	0.003	160,000
4	Pick up empty kanban bins	Manual	2	4	3	5	3	3.40	0.06	0.06	0.003	169,412
5	Take one tube and label it	Process	3	4	4	3	6	4.00	0.07	0.06	0.005	105,882
6	Place tube on bin	Manual	4	3	5	4	2	3.60	0.06	0.06	0.003	160,000
7	Pass tube to check weigher machine	Machine	3	3	4	3	3	3.20	0.05	0.05	0.003	180,000
8	Place 12 tubes in a case	Manual	4	5	4	3	5	4.20	0.07	0.07	0.004	137,143

Sample Size	
Preliminary mean of observation time	34
Standard deviation of observed time	2
Confidence level required (z Value)	1.96
Maximum acceptable error	5%
	5

	Performance Rating Factor	Allowance Factor
Manual Operation	100%	5%
Machine Operation	100%	5%
Process (Manual+Machine)	85%	8%

Working Hours	8.00

Total Cycle Time	30.6	sec
	0.51	min
Total Normal Cylce Time	0.50	min
Total Standard Cylce Time	0.03	min
Expected Target	149,077	Pouches/hr

Takeaways

- Video Time and Motion study accurately document and time any task while simultaneously isolating the non-value-added work content.

- Combine the process observation with a Value-Added Analysis

- Build good a good relationship with the operators to make the process observation more accurate.

Thank You

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A PRACTICAL TOOL BOOK FOR BUSINESS COMPETITIVENESS AND LEAN TRANSFORMATION
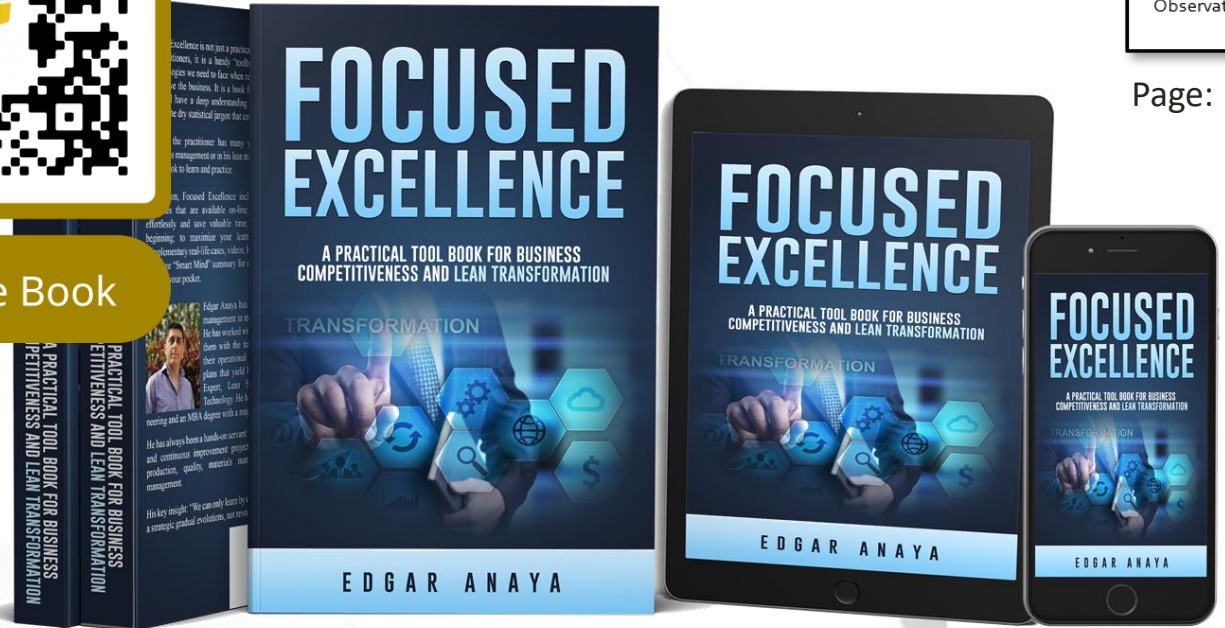
TRANSFORMATION

EDGAR ANAYA

edgar@pathstonegroup.com

Reference: Focused Excellence
by Edgar Anaya
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A Practical Tool Book for
Business Competitiveness and
Lean Transformation