

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**



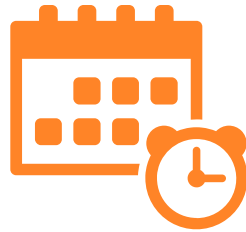
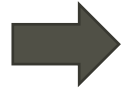
Process Observation

Phases:



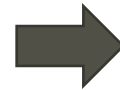
Analisisys

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.



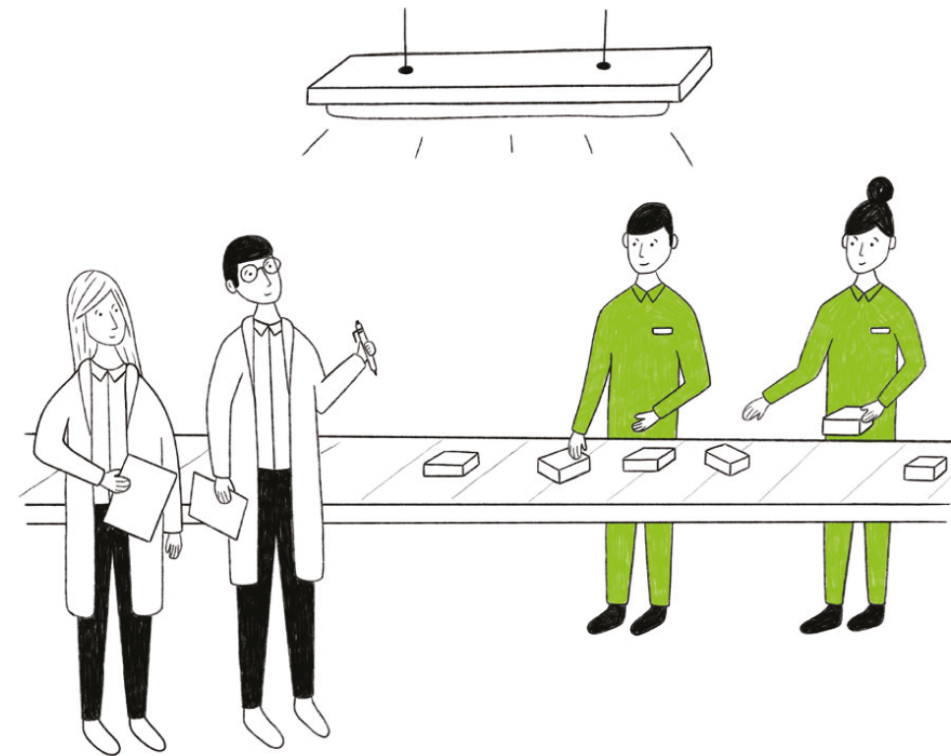
Synthesis

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

Process Observation

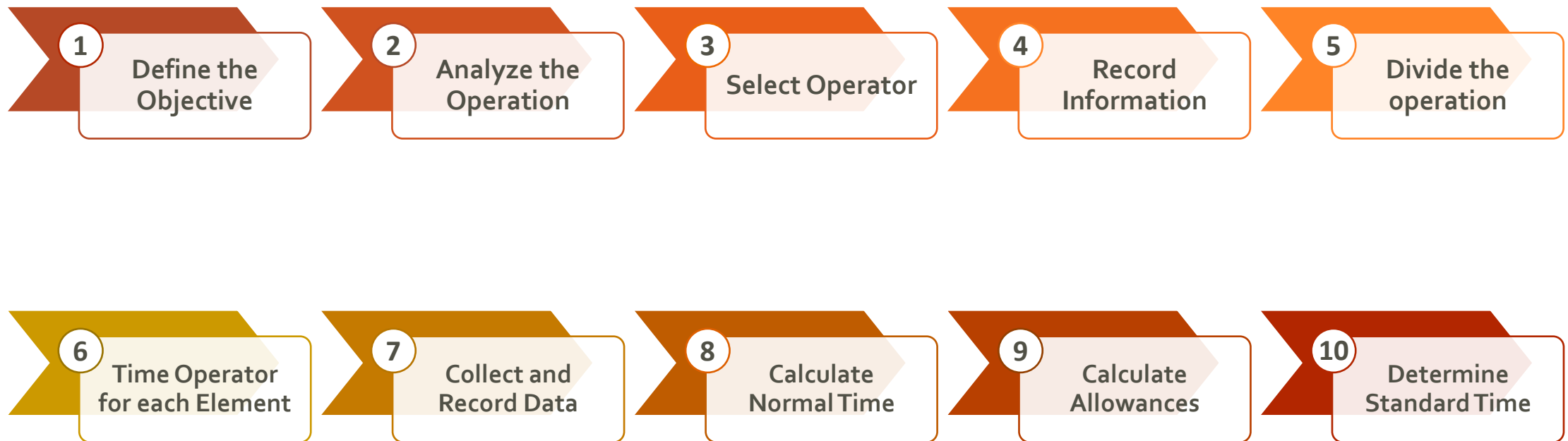
General Guidelines:

- 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:



Process Observation



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



Procedure:

Sample size:

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

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

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

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

Process Observation

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

Process Observation

2

Analyze the Operation

Procedure:

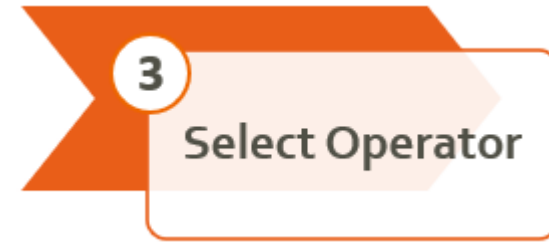
Determine whether standard method and conditions exist and whether the operator is properly trained.

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



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

Process Observation



Procedure:

Select the operator



Process Observation

4

Record Information

Procedure:

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

Use the worksheet.

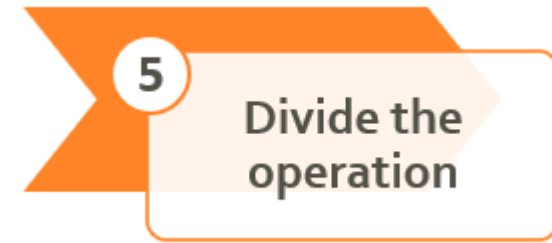


PathStone Group		Time Motion Study Worksheet															
WORK MEASUREMENT TIME STUDY WORKSHEET (EMPLOYEE)		ORGANIZATION		DATE		REFERENCE FILE STUDY NO.											
C. OPERATOR		A. ORIGINAL TOOL CENTER				B. TIME UNIT											
D. OPERATOR		A. NAME OF OPERATOR/OPERATOR NO.				B. MACHINE NO./TOOL NO.											
E. TOOL		C. MOUNT				D. QUANTITY											
E. STOP TIME		F. START TIME		G. STOPPED TIME (TIME STOP POINT)		H. TYPE OF JAMES STYLE											
I. ELEMENT DESCRIPTION		OBSERVATION RECORD (TIME/COMPLETION)															
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Process Observation

Procedure:

Divide the operation into reasonably small elements.



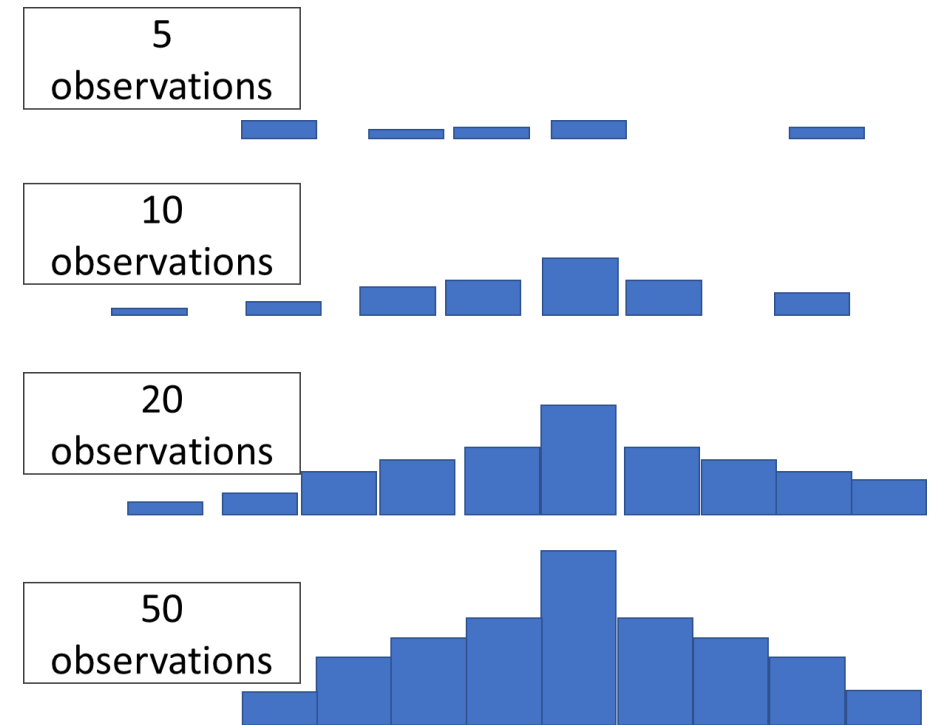
Process Observation

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



Process Observation

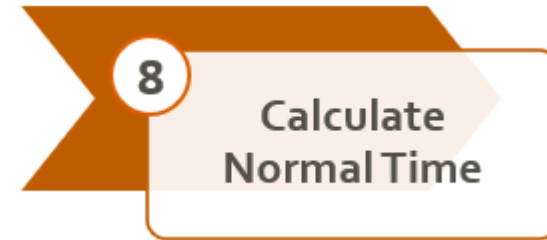


Procedure:

Required number of cycles by timing and rating the operator.



Process Observation



Procedure:

Multiply it by the rating factor to get normal time.

$$\textit{Normal Time (NT)} = \textit{Observed time} \times \textit{Rating factor}$$

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.

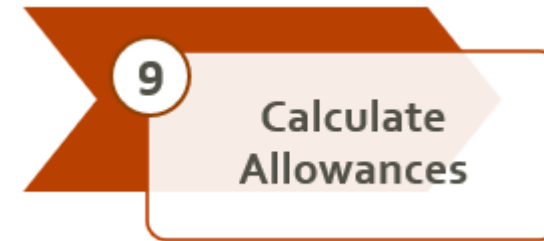


Process Observation

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.



Process Observation



Procedure:

Adding allowances to the normal time of operation.

$$\textit{Standard Time} = NT (1 + AF)$$

Process Observation



Procedure:

Example:

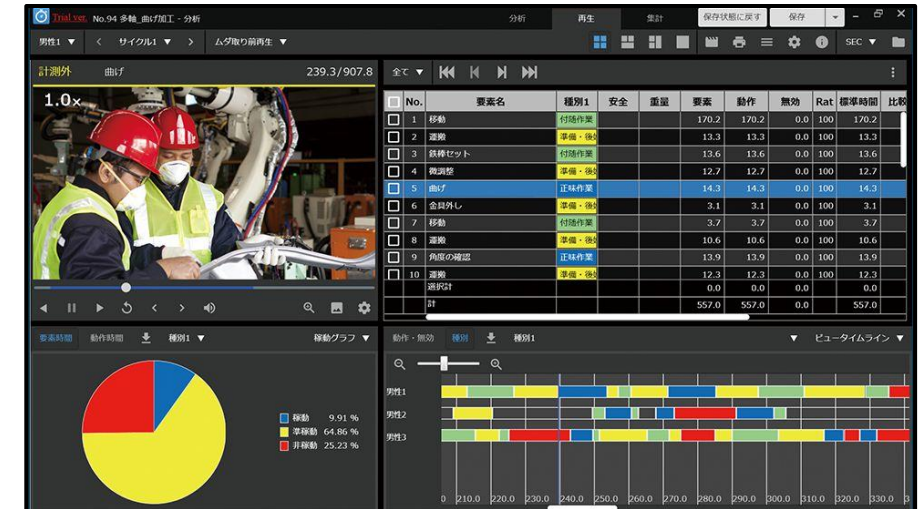
An operator takes an average of 10 minutes to complete a particular task. Operator's performance rating (pace) is 110% and there is an allowance or 15%. What is the normal time and standard time (ST) for completing this task?

Given the $NT = 11$ minutes,

Therefore, the standard time is:

$$\text{Standard Time} = 11(1+0.10)$$

$$\text{ST} = 12.65 \text{ minutes}$$




Process Observation

Limits and Disadvantages:

- Inaccuracy when capturing tasks
- Hawthorne Effect
- It takes several observations to get the accuracy
- Task variations need to be measured separately
- Tasks need to be remeasured when process change

Preroll Assembly

LEARNING HUB



Measuring the Process



TOOLBOX



Process Observation Worksheet



PathStone Group

Time Motion Study Worksheet

Operator ID	Task / Operation	Type of Operation	Cycle Time (seconds)					Ave Obs Time (sec)	Ave Obs Time (min)	Normal Time (min)	Standard Time (min)	UOM	Pouches
			1	2	3	4	5						Target 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 Cycle Time	0.50 min
Total Standard Cycle 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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Process Observation

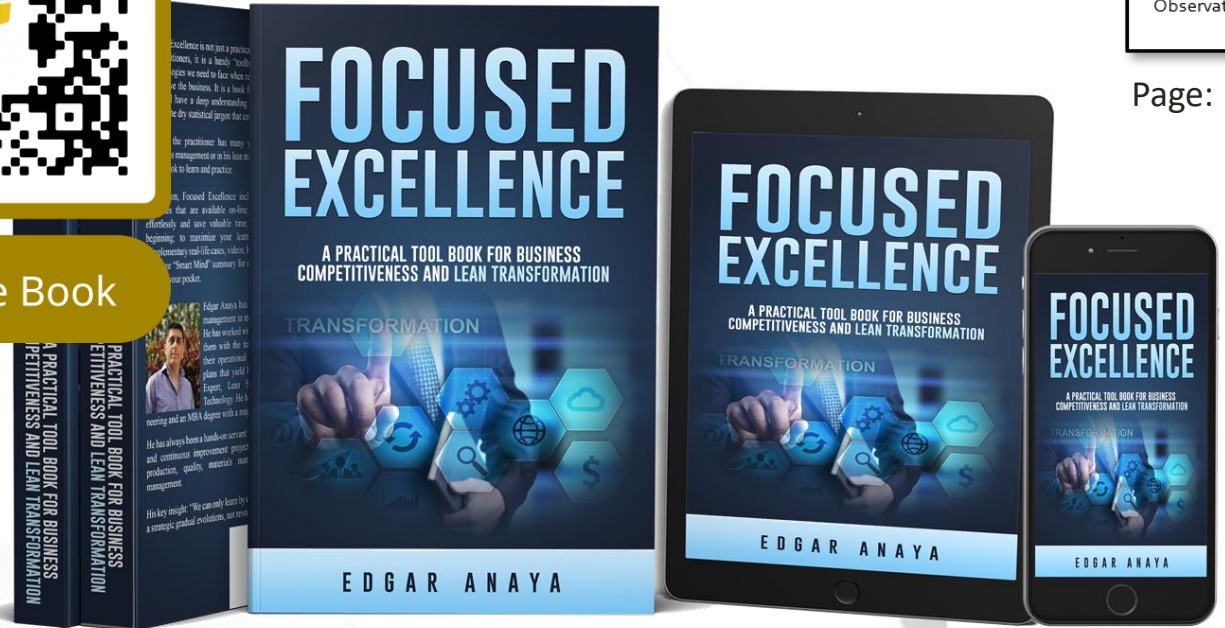
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TOPIC

Process Observation

Page: 172

Reference: Focused Excellence
by Edgar Anaya
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**Business Competitiveness and
Lean Transformation**