

Homework #5: Time Study

1. The observed average time in a direct time study was 2.40 min for a repetitive work cycle. The worker's performance was rated at 110% in all cycles. The personal time, fatigue, and delay allowance for this work is 12%. Determine:
 - a. The normal time for the cycle.
 - b. The standard time for the cycle.
2. The observed elements' times and performance ratings collected in a direct time study are indicated in the table below using snapback timing method.

Work element	a	b	c	d
Observed time (min)	0.22	0.41	0.30	0.37
Performance rating	90%	120%	100%	90%

The personal time, fatigue, and delay allowance in the plant is 14%. All elements are regular elements in the work cycle. Determine:

- a. The normal time for the cycle.
 - b. The standard time for the cycle.
3. The standard time is to be established for a manual work cycle by direct time study. The observed time for the cycle averages 4.80 min. The worker's performance was rated at 90% in all cycles observed. Every eight cycles, the worker has to exchange parts' container, which takes 1.60 min, rated at 120%. The PFD allowance for this class of work is 15%. Determine:
 - a. The normal time for the cycle.
 - b. The standard time for the cycle.
 - c. If a worker produced 123 work units during an 8-hour shift, what was her/his efficiency?
 4. The snapback timing method was used to obtain the average times for work elements in a manual repetitive task, see table below.

Work element	a	b	c	d	e
Observed time (min)	0.32	0.85	0.48	0.55	1.50

All elements are worker controlled and were performance rated at 80%. Element **e** is an irregular element performed every five cycles. A 15% allowance for personal time, fatigue, and delays is applied to the cycle. Determine:

- a. The normal time for the cycle.
 - b. The standard time for the cycle.
- If a worker's performance during actual production was 120% in all manual elements for seven actual hours worked during an eight-hour shift:
- c. How many units would have been produced?
 - d. What was her/his efficiency?

5. The continuous timing method was used to direct time study a manual task cycle consisting of four elements: **a**, **b**, **c**, and **d**, see table below.

Element	a	b	c	d
Observed time (min)	0.35	0.60	0.86	1.46

Two parts were produced each cycle. Element **d** is an irregular element performed once every six cycles. All elements were performance rated at 90%. The PFD allowance is 11%. Determine:

- The normal time for the cycle.
 - The standard time per part.
 - If a worker completed 844 parts in an 8-hour shift during which she worked 7 hours and 10 min, what was her efficiency?
6. The readings in the table below were taken by the snapback timing method of direct time study to produce a certain subassembly that is stored on a rack.

Element and description	Observed time (min)
1. Pick up mechanism plate from rack and place in fixture.	0.42
2. Assemble motor and fasteners to front side of plate.	0.28
3. Move to other side of plate.	0.11
4. Assemble two brackets to plate.	0.56
5. Assemble hub mechanism to brackets.	0.33
6. Remove plate from fixture and place in rack.	0.40

The regular production elements were performance rated at 85%. Each rack holds 20 mechanism plates and has universal wheels for easy movement. After completing 20 subassemblies, the operator has to move the rack (which now holds the subassemblies) to the aisle and then move a new empty rack into position at the workstation. This irregular element was timed at 2.90 min and the operator was performance rated at 80%. The PFD allowance is 15%. Determine:

- The normal time for the cycle.
 - The standard time for the cycle.
 - The number of parts produced by an operator, if he/she worked at standard performance for a total of 6 hours and 57 min during the shift.
7. The time values in the table below were obtained using the snapback timing method for work elements in a certain manual repetitive task.

Work element	a	b	c	d	e
Observed time (min)	0.61	0.42	0.76	0.55	1.10

All elements were worker controlled and were performance rated at 85%. Element **e** is an irregular element performed every five cycles. A 15% PFD allowance is applied to the cycle. Determine:

- The normal time for the cycle.
 - The standard time for the cycle.
- If a worker's performance during actual production was 125% for seven actual hours worked during an eight-hour shift:
- How many units would have been produced?
 - What was the worker's efficiency?