



COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Construction and Building Engineering

Course: Construction Project Management II **Course No:** CB 519

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Productivity Assignment

Question 1: Define the following terms:

- a) Effectiveness.
- b) Efficiency.
- c) Production.
- d) Production rate.
- e) Total productivity
- f) Labor productivity

Question 2:

Discuss how the following factors affect the construction labor productivity:

- a) Materials and tools availability.
- b) Design outputs.
- c) Project organization.
- d) Location of the project.
- e) Site layout.
- f) Overtime.

Question 3:

Determine the effect (Increasing or Decreasing) of each of the following factors on the construction labor productivity:

- a) A lot of change orders required by the owner
- b) Lack of management control effort on the site
- c) Employing a crew of skilled laborers.
- d) Using overtime system in a late schedule project.
- e) Construction site on rainy areas.
- f) Very large project of repetitive units.
- g) Very restricted building code.

- h) Awarding a cost plus fixed fee contract.
- i) A construction site with good organization and facilities.
- j) Employing a weak worker with no motive.

Question 4: The following data are given for a construction operation:

Quantity of work = 4680 units

Number of laborers = 4 laborers

Normal conditions: 42 hour / workweek

Day = 7 hours,

Week = 6 days

Production rate = 3 units / man-hour

Labor cost = 3 L.E. / hour / labor

Scheduled Overtime: 60 hour / workweek

Day = 10 hours

Week = 6 days

Average cumulative production rates: as given in table (1)

Labor cost = 3.0 L.E. / hour / labor (for 7 hours / day)

= 4.5 L.E. / hour / labor (for hours over 7 hours / day)

Required:

- a) Calculate the duration and labor cost for this operation in the following cases :
 - i) Normal conditions = 42 hr / workweek
 - ii) Scheduled overtime = 60 hr / workweek.
- b) Compare between the results of the two cases in a table form.
- c) Discuss and comment on the results.
- d) State your recommendations on when to use overtime.

Table (1) Cumulative Effect of Overtime on Labor Productivity

(60 hour Workweeks)

Week Number	Av. Cum. Production Rate (% of Normal Production Rate)
1	83
2	88
3	88
4	83
5	79
6	74
7	70
8	67
9	66
10	65
11	64
12	63

Question 5:

A bill of quantity of a project includes 300 m² of masonry works. The unit price of one cubic meter of masonry equals 30 L.E. According to the method statement; the work will be done by one crew that consists of the following:

Masonry crew	All-in rate (L.E./day)
2 brick layers	50
1 assistant	25
2 laborers	15

The production rate of the crew is 50m²/day. The vendor price of 1000 cement bricks equals L.E. 160. Building 1 m² of masonry requires 55 cement bricks. One cubic meter of mortar, which is used to join the bricks in an area of 50 m², consists of:

Material	Vendor price
1 m ³ sand	12 L.E./m ³
6 sacks (50 kg each) cement	160 L.E./ton

Calculate the followings:

- a) Labor productivity
- b) Material productivity
- c) Labor and material productivity