

Chapter 5 Tech. Note  
Job Design and Work Measurement

October 8, 2008

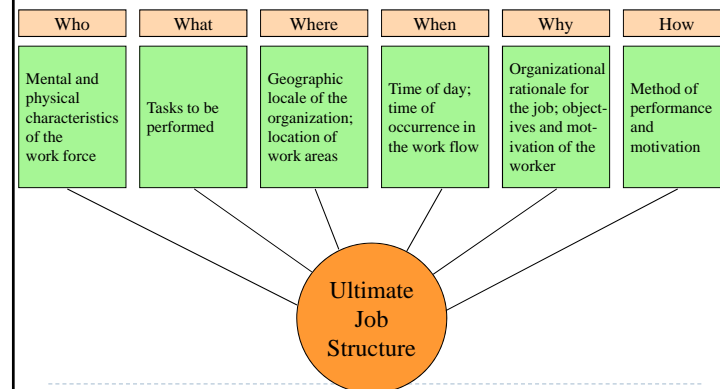
## OBJECTIVES

- ▶ Job Design Defined
- ▶ Job Design Decisions
- ▶ Trends in Job Design
- ▶ Work Measurement
- ▶ Basic Compensation Systems
- ▶ Financial Incentive Plans

## What is Job Design? *Defined*

- ▶ **Job design** is the function of specifying the work activities of an individual or group in an organizational setting
- ▶ The objective of job design is to develop jobs that meet the requirements of the organization and its technology and that satisfy the jobholder's personal and individual requirements

## Job Design Decisions



## Trends in Job Design

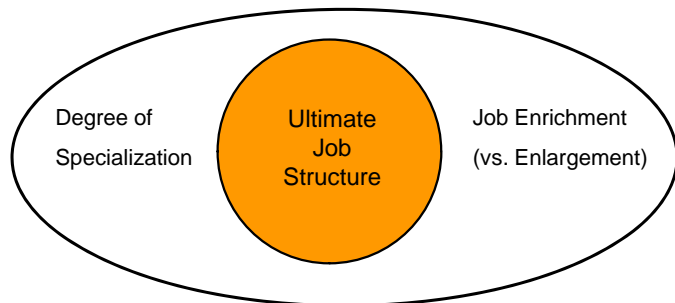
- Quality control as part of the worker's job
- Cross-training workers to perform multi-skilled jobs
- Employee involvement and team approaches to designing and organizing work
- "Informating" ordinary workers through e-mail and the Internet

## Trends in Job Design (Continued)

- Extensive use of temporary workers
- Automation of heavy manual work
- Creating alternative workplaces
- Organizational commitment to providing meaningful and rewarding jobs for all employee

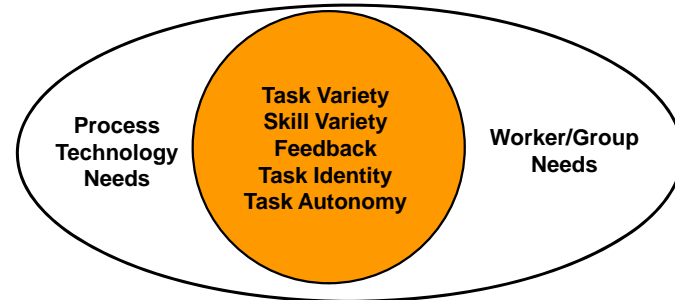
## Behavioral Considerations in Job Design

Balancing the specialization in a job and its content through enrichment can give us....



## Sociotechnical Systems

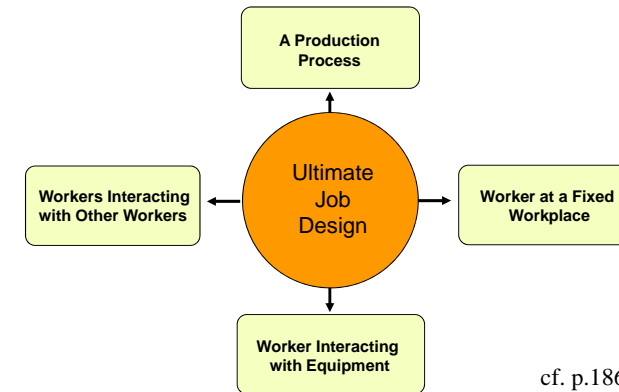
Focuses on the interaction between technology and the work group by looking at....



## Physical Considerations in Job Design

- ▶ **Work physiology** sets work-rest cycles according to the energy expended in various parts of the job. The harder the work, the more the need for rest periods.
- ▶ **Ergonomics** is a term used to describe the study of the physical arrangement of the work space together with tools used to perform a task. Fit the work to the body rather than forcing the body to conform to the work.

## Work Methods



cf. p.186

## Work Measurement *Defined*

- **Work measurement is a process of analyzing jobs for the purpose of setting time standards**
- **Why use it?**
  - Schedule work and allocate capacity
  - Motivate and measure work performance
  - Evaluate performance
  - Provide benchmarks

## Time Study Normal Time Formulas

- ▶ **Normal time(NT)=Observed performance time per unit x (Performance rating)\***

**\*The Performance Rating is usually expressed in decimal form in these formulas. So a person working 10% faster than normal would have a Performance Rating of 1.10 or 110% of normal time. Working 10% slower, 0.90 or 90% of normal.**

- ▶ **NT=  $\frac{\text{Time worked}}{\text{Number of units produced}} \times (\text{Performance rating})^*$**

## Time Study Standard Time Formulas

- ▶ **Standard time = Normal time + (Allowances x Normal times)**
- ▶ **Standard time = NT(I + Allowances)**
- ▶ **Standard time =  $\frac{NT}{I - Allowances}$ .**

## Time Study Example Problem

You want to determine the standard time for a job. The employee selected for the time study has produced 20 units of product in an 8 hour day. Your observations made the employee nervous and you estimate that the employee worked about 10 percent faster than what is a normal pace for the job. Allowances for the job represent 25 percent of the normal time.

**Question: What are the normal and standard times for this job?**

## Time Study Example Solution

$$\text{Normal time} = \frac{\text{Time worked}}{\text{Number of units produced}} \times (\text{Perf. rating})$$

$$= (480 \text{ minutes}/20) \times (1.10)$$

$$= 26.4 \text{ minutes}$$

$$\text{Standard time} = \frac{NT}{I - Allowances}$$

$$= (26.4)/(1-0.25)$$

$$= 35.2 \text{ minutes}$$

## Work Sampling

- ▶ **Use inference to make statements about work activity based on a sample of the activity**
- ▶ **Ratio Delay**
  - ▶ Activity time percentage for workers or equipment
- ▶ **Performance Measurement**
  - ▶ Relates work time to output (performance index)
- ▶ **Time Standards**
  - ▶ Standard task times

## Advantage of Work Sampling over Time Study<sup>17</sup>

- ▶ Several work sampling studies may be conducted simultaneously by one observer
- ▶ The observer need not be a trained analyst unless the purpose of the study is to determine a time standard
- ▶ No timing devices are required
- ▶ Work of a long cycle time may be studied with fewer observer hours

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## Advantage of Work Sampling over Time Study (Continued)<sup>18</sup>

- ▶ The duration of the study is longer, which minimizes effects of short-period variations
- ▶ The study may be temporarily delayed at any time with little effect
- ▶ Because work sampling needs only instantaneous observations (made over a longer period), the operator has less chance to influence the findings by changing work method

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## Basic Compensation Systems<sup>19</sup>

- ▶ Hourly Pay
- ▶ Straight Salary
- ▶ Piece Rate
- ▶ Commissions

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## Financial Incentive Plans<sup>20</sup>

- ▶ Individual and Small-Group Plans
  - ▶ Output measures
  - ▶ Quality measures
  - ▶ Pay for knowledge
- ▶ Organization-wide Plans
  - ▶ Profit-sharing
  - ▶ Gain-sharing
    - ▶ Bonus based on controllable costs or units of output
    - ▶ Involve participative management

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## Scanlon Plan Basic Elements

$$\text{Ratio} = \frac{\text{Total labor cost}}{\text{Sales value of production}}$$

- ▶ **The ratio**
  - ▶ Standard for judging business performance
- ▶ **The bonus**
  - ▶ Depends on reduction in costs below the preset ratio
- ▶ **The production committee**
  - ▶ Formed to encourage employee suggestions to increase productivity, improve quality, reduce waste, and so forth.
- ▶ **The screening committee**
  - ▶ Consists of top management and worker representatives who review monthly bonuses, discuss production problems, and consider improvement suggestions.

## Question Bowl

**A job is said to be enlarged vertically if the employee is involved with which of the following?**

- a. **The job's planning**
- b. **The job's organizing**
- c. **The job's inspecting**
- d. **All of the above**
- e. **None of the above**

**Answer: d. All of the above**

## Question Bowl

**Research on Sociotechnical Systems have found that individuals or work groups require an integrated pattern of work activities that incorporates which of the following job design principles?**

- a. **Decreased task variety**
  - b. **Decreased skill variety**
  - c. **Decreased task autonomy**
  - d. **All of the above**
  - e. **None of the above**
- Answer: e. None of the above (Increases in task variety, skill variety, and task autonomy have all been suggested in the research.)**

## Question Bowl

**Which of the following activities requires the most typical energy cost in calories per minute?**

- a. **Walking upstairs**
  - b. **Writing**
  - c. **Chopping wood**
  - d. **Typing on a computer**
  - e. **Digging**
- Answer: a. Walking upstairs (According to the Calorie Requirements for Various Activities exhibit walking upstairs requires the most calories at 12 per minute.)**

## Question Bowl

Which of the following is the Normal Time for a job whose observed performance time is 10 minutes and whose performance rating is only 90%?

- a. 90 minutes
- b. 9 minutes
- c. 1.10 minutes
- d. 11.111 minutes
- e. None of the above

Answer: b. 9 minutes ( $10 \times 0.90 = 9$  minutes)

## Question Bowl

Which of the following is the Normal Time for a job whose observed performance time is 35 minutes and whose performance rating is 30% above normal time?

- a. 40 minutes
- b. 50 minutes
- c. 60 minutes
- d. 116.666 minutes
- e. None of the above

Answer: e. None of the above  
( $NT = 35 \times (1.3) = 45.5$  minutes)

## Question Bowl

Which of the following is the Standard Time for a job whose Normal Time is 20 minutes and whose Allowances are 5% of Normal Time?

- a. 19.05 minutes
- b. 21 minutes
- c. 400 minutes
- d. 450 minutes
- e. None of the above

Answer: b. 21 minutes  
( $ST = NT(1 + \text{Allowances})$   
or  $20(1.05) = 21$  minutes)