

## Lecture 1:

### INTRODUCTION TO ENGINEERING MANAGEMENT

Modern Definition of Engineering By ABET (Accrediting Board for Engineering and Technology);

**Engineering:** The profession in which a knowledge of the technical, mathematical, and natural sciences gained by study, experience, and practice is applied with judgment to develop ways economically to utilize the materials and forces of nature for the benefit of mankind.

**Engineer:** A person who properly applies his mathematical and scientific knowledge to mankind.

#### **What is Management?**

- 1) Directing the actions of a group to achieve a goal most efficiently.
- 2) Getting things done through other people.
- 3) Process of achieving organizational goals by working with and through people and organizational resources.

#### **What is Engineering Management?**

1. Directing supervision of engineers and/or engineering functions.
2. An engineer possessing both abilities to apply engineering principles and skills in organizing and directing people and projects.

### **Why Engineering Managers?**

Competition is global and companies need these people to compete successfully. The advantages of having an engineer as a manager;

1. Has the ability of thinking systematically,
2. Has technical, mathematical & natural sciences talents,
3. Seizes the research & development as an opportunity, not a cost.

### **Advantages of Understanding Technology in Top Management**

1. Understanding the business thoroughly,
2. Understanding technology driving the business today and technology that will change the business in future,
3. Treating Research and Development as an investment not an expense to be minimized,
4. Spending more time on strategic thinking,
5. Dedicating a customer's problem (true marketing via customer relations),
6. Place a premium on innovation.

### **Management and its Functions:**

Management is a process concerned with the achievement of goals or objectives. It includes:

1. Planning: Selecting missions and objectives. Requires decision-making.
2. Organizing: Establishing the structure for the objective. And making arrangements.

3. Staffing: Keeping filled the organization structure and selecting the right people for the job.
4. Leading: Influencing people to achieve the objective by giving instructions.
5. Controlling: Measuring and checking progress against plans and correcting the activities.

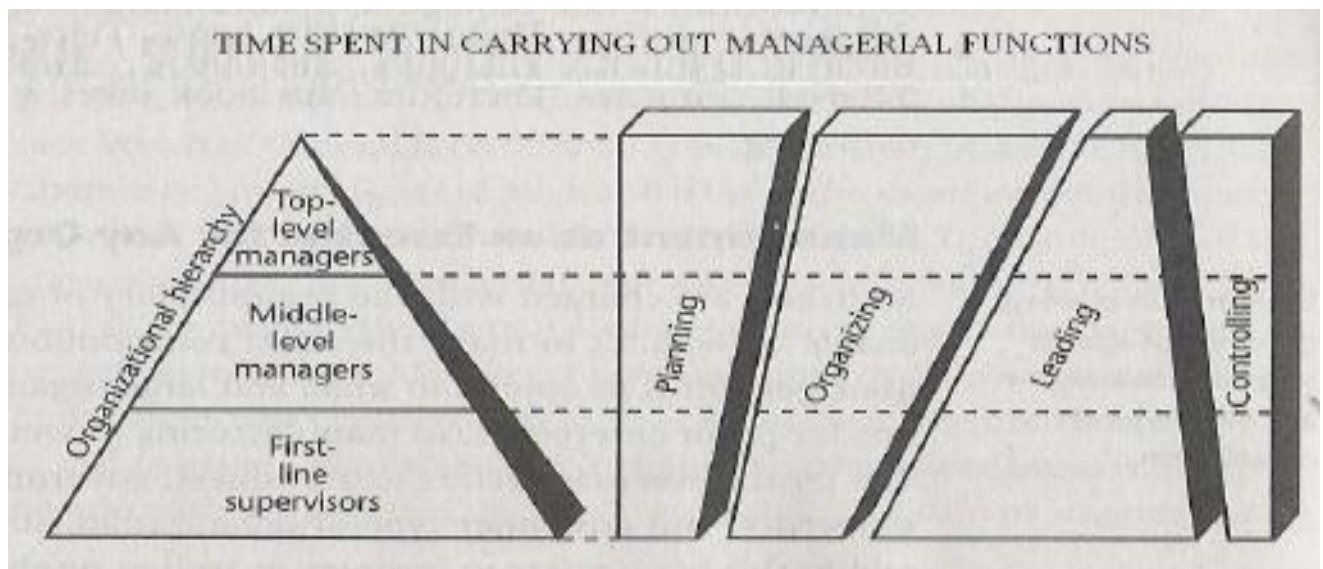


**Management can be classified into one of four categories:**

- 1- An organizational or administrative process,
- 2- A science, discipline, or art,
- 3- The group of people running an organization,
- 4- An occupational career.

**The Main Levels of Management are:**

1. Top level, (president, executive vice president)
2. Middle level, (chief engineer, division head etc.)
3. Lower/Supervisory level, (foreman, supervisor, section chief)



**A. Top Level Management**

1. The managers working at this level have maximum authority.
2. It includes group of crucial persons essential for leading and directing the efforts of other people. For example, Managing Director, General Manager, President, Vice President, Chief Executive Officer (C.E.O.) etc.

**B. Middle Level Management**

1. This level of management consists of departmental heads such as purchase department head, sales department head, marketing manager etc.
2. People of this group are responsible for executing the plans and policies made by top level.

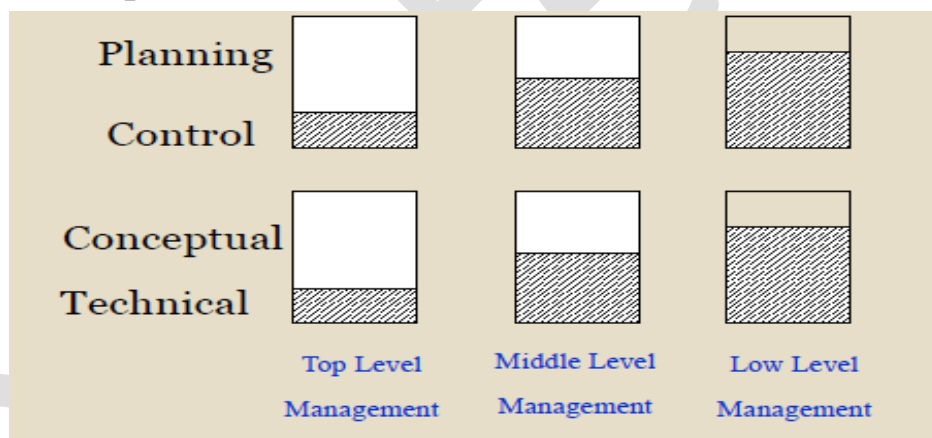
### C. Low Level Management (First-line management)

1. Their authority is limited. The quality and quantity of output depends upon the efficiency of this level of managers.
2. Managers of this group actually carry on the work or perform the activities according to the plans of top and middle level management. Supervisors, clerks etc. come under this group.
3. They pass on the instruction to workers and report to the middle level management.

#### Involvement % of the different levels of management

Figure below shows the involvement % of the different levels of management for:

- (Planning vs. controlling)
- (conceptual vs. technical)



#### Some Recommended References

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- 4- النعيمي, "بحوث العمليات", الطبعة الأولى, 2016
- 5- Modeling and Linear Programming in Engineering Management
- 6- Performing time study in workplace
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