

logical thinking. As a result these principles act as base of doing research and development in management studies. As these principles provide organized body of knowledge to perform research work and generate more and more knowledge, they have provided new ideas, imagination and base for research and development.

Principles of management are at the core of management theories. These act as base for management training and education.

Professional courses such as BBA, MBA also teach these principles as part of their curriculum. All the management institute take aptitude test and these tests are based on management principles only.

2.4 Fayol's Principles of Management

2.4.1 Background and History of Fayol

Henry Fayol was born in France in 1841. He got degree in Mining Engineering in 1860 and started working as engineer in a Coal Mining Company. In 1888 he was promoted as the managing director of the company. At that time the company was in the situation of insolvency. He accepted the challenge and applied his management techniques to bring out the company from this situation and he succeeded. When he retired after 30 years the company was a leading coal-steel company with strong financial background.

2.4.2 Major Contributions of Fayol

Henry Fayol became famous as "Father of Management Studies and Thought" because of the following contributions:

- (a) He made clear distinction between technical and managerial skill.
- (b) He identified the main steps in the process of management which are considered the major functions of management—planning, organising, staffing, directing and controlling.
- (c) He developed fourteen principles of management which act as guidelines for managers to perform managerial activities.

2.4.3 Principles of Management Developed by Fayol

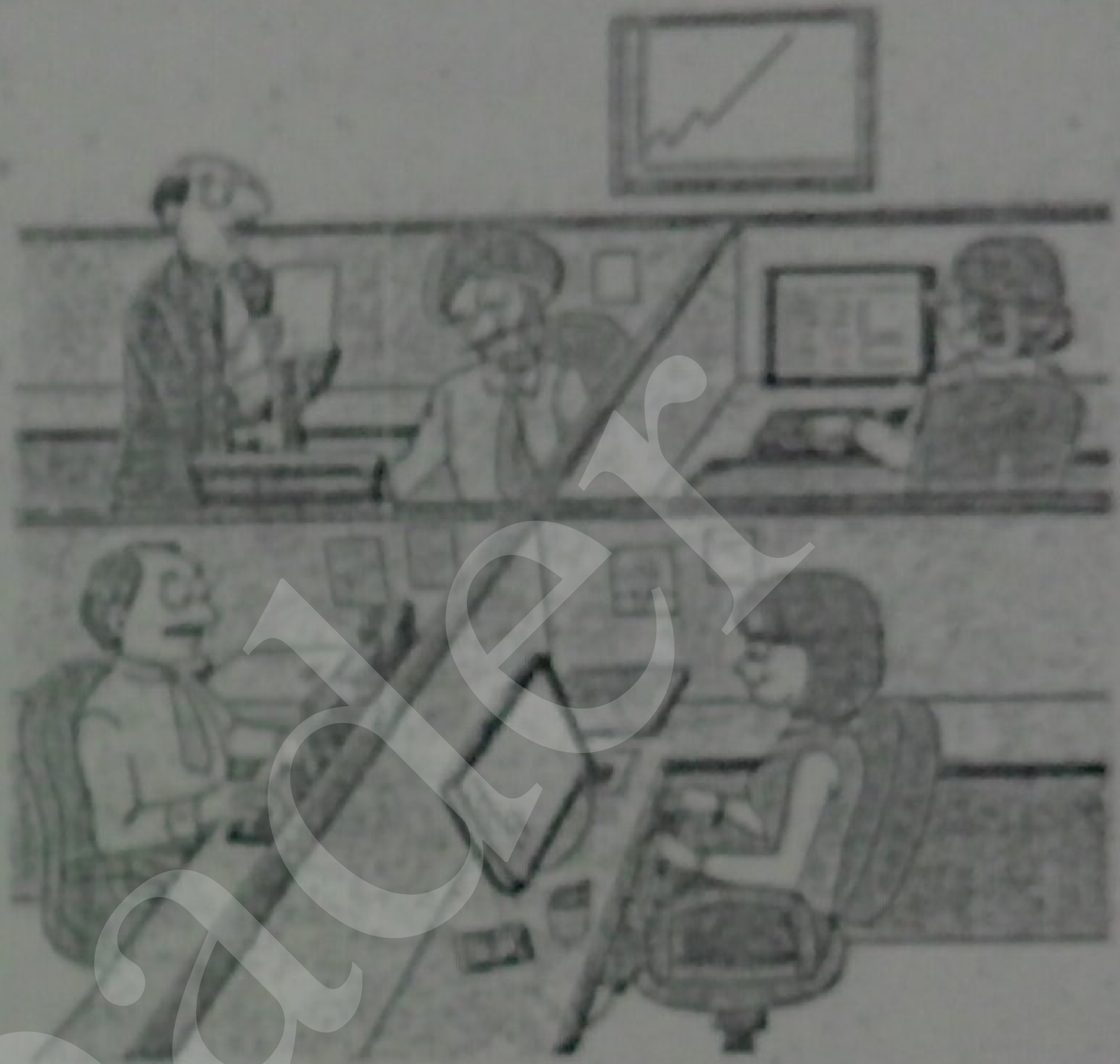
- (i) Principle of Division of Work. According to this principle the whole work should be divided into small tasks or units and instead of assigning the whole work to one person one task or unit of work should be assigned to one person according to the capability, qualification and experience of the person. When a person is performing a part of job again and again he will become perfect and specialist in doing that and the efficiency level will improve.

Fayol said not only the factory work but technical, managerial and skill jobs should also be divided into small segments for specialisation.

For example, in a furniture manufacturing company one person can be asked to cut the wood pieces, one to join them, one to polish, one to give finishing touch to furniture. With this division each person will become specialised in his part of job and his effectiveness and efficiency improves.

Positive effects of Principle of Division of Work:

1. Specialisation. Whenever work is divided according to qualifications then automatically it leads to specialisation.
2. Improves efficiency. When employee is performing only one part of job then he becomes expert in that and results in less wastage of resources.



Division of Work

Consequences of violation of this principles:

- (a) Lack of efficiency
- (b) There will be no specialisation
- (c) Chances of duplication of work
- (d) Principle of Authority and Responsibility.

Authority means power to take decision. Responsibility means obligation to complete the job assigned on time. According to this principle there must be balance or parity between the authority and responsibility. Excess of authority without matching responsibility may bring negative results and excess of responsibility without matching authority will not allow the worker to complete his job on time. There is need to bring parity between both for best results.

For example, if a person is given responsibility to produce 100 units in one week time but he is not given authority to purchase the raw materials. If there is no raw material available in the store-room as a result he could not complete the target of producing 100 units on time. The worker cannot be blamed for not completing on time because he was given only the responsibility and not the matching authority to carry on the work. Excess of responsibility with less authority results in non-completion of job.

Positive effects of this Principle:

1. No misuse of authority.
2. Helps in meeting responsibilities on time without any delay.

Consequences of violation of this principle:

- (a) Delay in work or in completion of work due to less authority.
- (b) Misuse of authority due to excess authority.
- (c) Overburden with work with excess responsibility.

- (iii) Principle of Discipline. Discipline refers to general rules, regulations for systematic working in an organisation. Discipline does not mean only rules and regulation but it also mean developing commitment in the employees towards organisation as well as towards each other. Fayol insists that discipline is required at superior as well as subordinate level. The disciplinary rules shall not be applicable only to subordinates but discipline requires good superiors at every level, clear and fair agreement between superior and subordinates.

According to Fayol discipline requires good superior at all levels, clear and fair agreements and judicious application of penalties.

For example, the employees must honour their commitments towards the organisation by working effectively and efficiently. On the other hand, superiors must also meet their commitments by meeting their promises of increments, promotions, wage revisions etc.

Positive effects of this Principle:

1. Systematic working in the organisation.
2. Improves efficiency.

Consequences of violation of this principle:

- (a) Disorder, confusion and chaos.
- (b) Wastage of resources in absence of discipline.
- (c) Delay in work due to absence of rules and regulations.

- (iv) Principle of Unity of Command. [According to this principle an employee should receive orders from one boss only because if he is receiving orders from more than one boss then he will get confused and will not be able to understand that whose orders must be executed first and on the other hand, if employee is receiving orders from more bosses he gets chance to give excuses by saying that he was busy in executing the orders of other boss.] To avoid confusion and to give no chance of excuse to employee, the orders must come from one boss only. If there are more bosses it can create problem of ego-clash among the superiors as every superior wants his order to be executed by the employee.

For example, if employee of production department is asked to go slow in production to maintain quality standard by the production incharge and sale incharge instructs the employee to fasten the production to meet the pending orders. In this situation employee will get confused as to whose instructions must be followed by him.

Positive effects of this Principle:

1. No confusion in the mind of subordinate.
2. No ego clashes.
3. Improves effectiveness in working.

Violation of this principle will lead to following consequences:

- (a) Confusion in the mind of employee.
- (b) Subordinate will get chance to escape from his responsibilities by giving excuses.
- (c) Ego clashes among the different superiors.
- (d) Difficulty in maintaining discipline in the organisation.
- (v) **Unity of Direction.** [According to this principle "one unit means one plan", that is the efforts of all the members and employees of organisation must be directed towards one direction that is the achievement of common goal. If this principle is applied it leads to coordination.] Each department and a group having common objective must have one head and one plan only.

For example, if an organisation is producing different lines of products — cosmetics, medicines and confectionery items each product has its own market and its own business environment. Each division must plan its target and every employee of that division must put his efforts towards the achievement of plan of their division under the direction of one head only.

Positive effects of this Principle:

1. Achievement of organisational goal.
2. Efforts of all the employees get unified towards one direction only.

Consequences of violation of this principle .

- (a) Lack of coordination.
- (b) Wastage of efforts and resources by working in different directions.
- (c) Difficulty in achieving organisational goal.

Difference between Unity of Command and Unity of Direction

Principle of Unity of Command	Principle of Unity of Direction
This principle insists on one boss on one subordinate.	This principle insists on one unit/division on one plan.
The main purpose of unity of command is to avoid confusion and fix up responsibility on the employee.	The purpose of unity of direction is to direct the efforts of employees of one department in achieving the main objective of that department.
This principle is related to functioning of employees with clarity in mind.	This principle is related to functioning of organisation as a whole or as one unit.

This principle results in systematic working and improves efficiency by removing confusion and chaotic conditions.

This principle results in co-ordination of activities of different personnels.

(vi) **Subordination of Individual Interest to General Interest.** [According to this principle the interest of organisation must supersede the interest of individuals or employees.] In the organisation all the employees are working with some objective and there is always an objective of organisation. If the objectives of individual are in the same direction of organisation then there is no problem but if the objectives of both the groups are in different directions then manager must try to reconcile individual interest with organisational goal and if it is not possible then individual goal must be sacrificed for achieving organisational goal. (vi)

The goal of organisation must not be sacrificed because individuals will be able to achieve their objectives only when organisation prospers.

For example, if individual's objective is to earn more remuneration and organisation is going through the situation of financial crisis and has the objective of cutting down the expenses. In this situation the individual must sacrifice his interest as when organisation will come out from financial crisis then he can achieve his objective.

Positive effects of this principle:

1. Achievement of organisational goal.
2. Coordination between individual and organisational goal.

Consequences of violation of this principle:

- (a) No achievement of organisational goal.
- (b) Even employees will also suffer in long run.

(vii) **Principle of remuneration of persons.** [According to this principle employees in the organisation must be paid fairly or adequately to give them maximum satisfaction. The remuneration must be just and fair because if employees are underpaid they will not be satisfied and an unsatisfied person can never contribute his maximum.] Dissatisfaction will lead to increase in employee's turn-over. So to have stability in organisation and to get maximum efforts from employees, the employees must be paid fairly. The fair wage is determined according to (ix)

- (a) financial capacity of the concern
- (b) by keeping in mind the Minimum Wage Act of Govt.
- (c) the wages and salaries paid by the competitors.

For example, if in a particular year the organisation has earned more profit than apart from giving extra profit to shareholders and owners, some part of profit must be given to employees also in the form of bonus. This will encourage and motivate to put more efforts and increase the profit of the company.

Positive effects of this principle:

1. Employees get motivated.
2. Devotion and commitment of employees improves.

Consequences of violation of this principle:

- (a) Increase in turnover of employees.
- (b) Dissatisfaction and demotivation of employees.

(viii) Principle of centralisation and decentralisation. [Centralisation refers to concentration of authority or power in few hands at the top level. Decentralisation means evenly distribution of power at every level of management.] According to Fayol a company must not be completely centralised or completely decentralised but there must be combination of both depending upon the nature and size of the organisation. A small organisation can be well organised and managed with centralised technique but in large organisation there is need for decentralisation. Secondly, if employees are efficient and competent then they can be trusted by having decentralisation but if employees are not fully developed and are less in number then there must be centralisation. Fayol advised not to have complete centralisation or complete decentralisation but a combination of both.

For example, the major decisions and activities of setting up organisational goals, plans, policies, strategies can be centralised but there can be policy of decentralisation for the activities of routine work such as purchase of raw materials, fixing targets of workers etc.

Positive effects of this principle:

1. Benefits of centralisation as well as decentralisation.
2. Fast decisions at operational level and strict control by top level.

Consequences of violation of this principle:

- (a) Complete centralisation will result in delay in decision.
- (b) Complete decentralisation will result in misuse of authority.

(ix) Principle of scalar chain. [Scalar chain means line of authority or chain of superiors from highest to lowest rank.] Fayol insists that this chain must be followed strictly in the organisation. Every information must pass through every key of this chain, no skipping of any one key should be allowed.

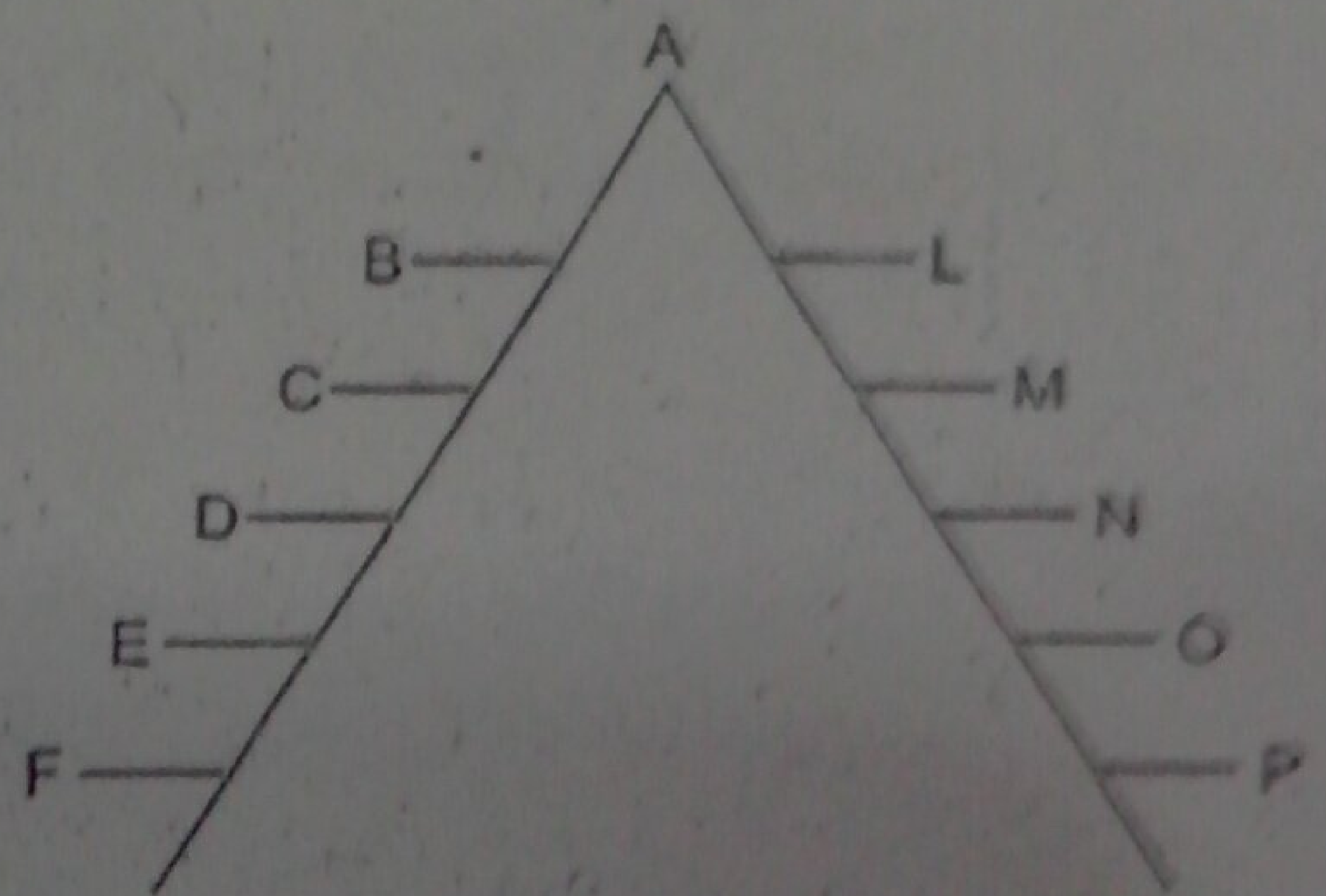


Fig. 2.3

Figure 2.3 explains the principle.

According to scalar chain principle if E wants to contact O he has to move through E — D — C — B — A — L — M — N and then O. If this chain is broken then there are chances of communication gap in the organisation but sometimes following scalar chain becomes a long process and if some important information has to be passed, it gets delayed so in case of emergency and urgent information, Fayol permitted a short cut in the chain which is called "Gang-Plank". Gang-plank permits direct communication between the employees working at the same level of authority without following the scalar chain.

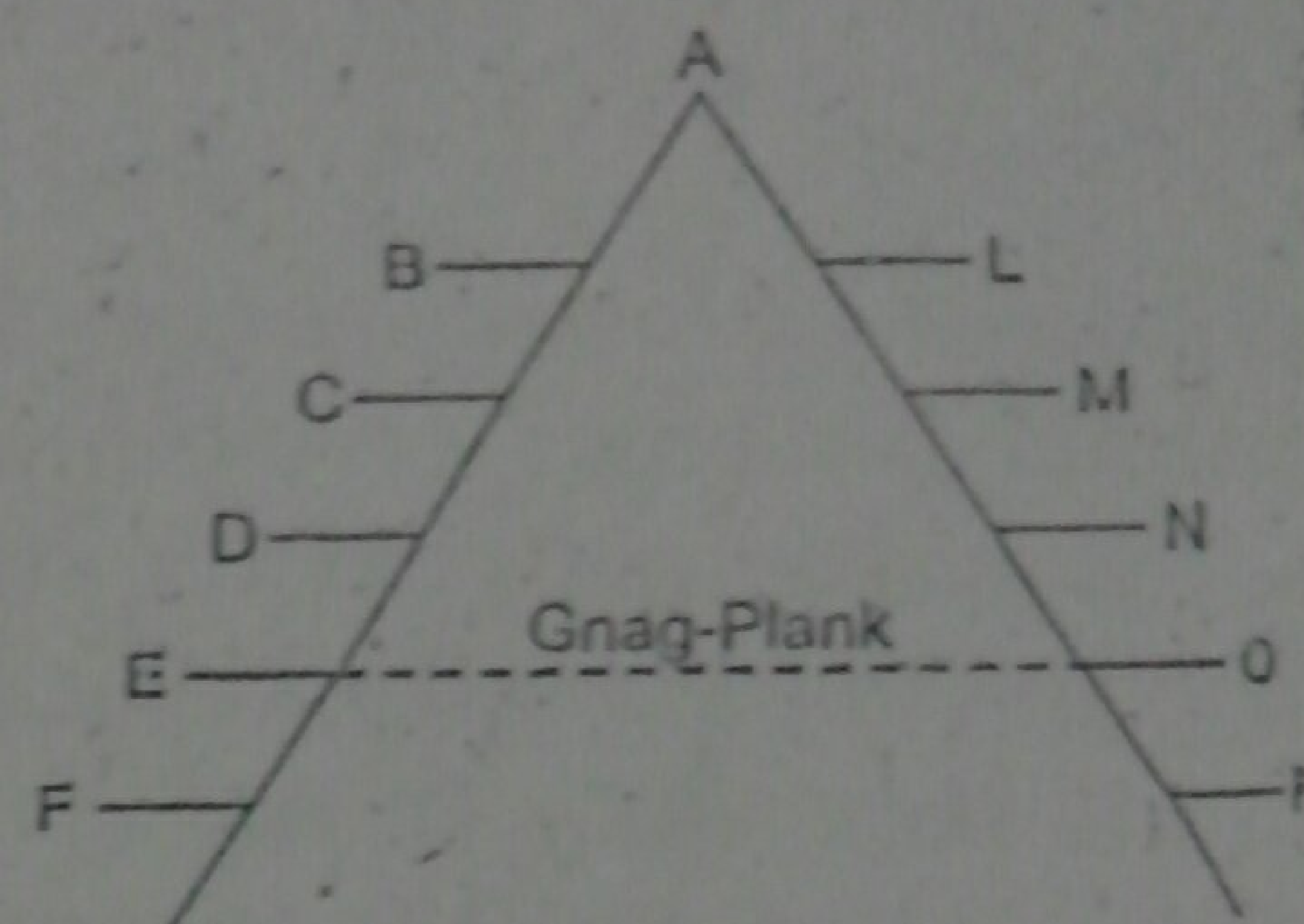


Fig. 2.4

For example, if E wants to pass some urgent information to O then instead of following the long route of scalar chain, he can directly communicate with O by constructing a gang-plank, but no gang-plank can be constructed between the people working at different levels, *i.e.*, no gang plank between D and L.

Positive effects of this principle:

1. Systematic flow of information.
2. No communication gap in the organisation.

Consequences of violation of this principles:

- (a) There may be communication gap.
- (b) No clarity in authority-responsibility relationship.

- (x) **Principle of order.** In this principle order does not mean command but it refers to orderly arrangement of men and material that is a fixed place for everything and every one in the organisation. Fayol insists that there must be a fixed place to keep every material and thing used in the organisation and fixed place or seat or cabin for every employee of the organisation so that no time and energy is wasted in search of any material or any person.

For example, if a worker is in need of a tool he must know in which box or tool room it will be found and if he needs guidance from supervisor he must know the fixed cabin of supervisor. If no fixed place is given then worker will waste his time and energy in search of tools or supervisor.

Positive effects of this principle:

1. No wastage of time in search of men or material.
2. Smooth and systematic working of organisation.

Consequences of violation of this principle:

- (a) Wastage of time and energy in search of men and material.
- (b) Not able to contact the people at the right time.

(xi) **Principle of equity.** [Equity refers to kind, fair and just treatment to employees. Employees will put their maximum efforts only when they are treated with kindness and justice. If a manager is biased in dealing with employees then employees will get dissatisfied and will not contribute to their maximum capacity. Equity does not mean equal salary to a peon and supervisor but equity means application of same disciplinary rules, leave rules in the same way irrespective of their grade, position and gender.

For example, the rules for granting medical leave to an employee should be same irrespective of their position, grade or gender.

Positive effects of this principle:

1. Employees get satisfied.
2. Motivate the employees and boost up the morale of the employees.

Consequences of violation of this principle:

- (a) Dissatisfaction in employees
- (b) Increase in turnover.
- (c) Unhealthy relation between superior and subordinates.

(xii) **Stability of tenure of personnel.** [It refers to no frequent termination and transfer. According to this principle the management must provide the feeling of job security among the employees because with the feeling of insecurity for the job, the employees cannot contribute their maximum.] Frequent turnover of employees is bad for organisation and such decision must be taken when they are almost unavoidable.

Not only turnover but frequent transfer or rotation should also be avoided because it takes some time to a person to learn and get settled on a job and by the time he gets settled and he receives transfer order then it will be wastage of resources and employee will not be able to contribute his best for organisation.

Positive effects of this principle:

1. Improves efficiency level of employees.
2. No wastage of time and resources.

Consequences of violation of this principle:

- (a) Wastage of resources in learning the new job.
- (b) Frustration and dissatisfaction among employees.

(xiii) Principle of Initiative. [Initiative refers to chalking out the plan and its implementing the same. ~~Fayol suggested that employees in the organisation must be given an opportunity to take some initiative in making and executing a plan.~~ It gives immense satisfaction to employees.] So managers must welcome the suggestions and ideas of employees before framing the plan. The initiative does not mean disobedience, i.e., once decisions are taken by management then every employee must follow it whether it is according to employee's suggestion or not.

For example, before setting up of plan the manager must welcome the suggestions and ideas of employees to allow their maximum participation. But once the plan is made every employee must follow it and implement it.

Positive effects of this principle:

1. Develops feeling of belongingness in employees.
2. Employees achieve the target on time if they are set up with their consultation.

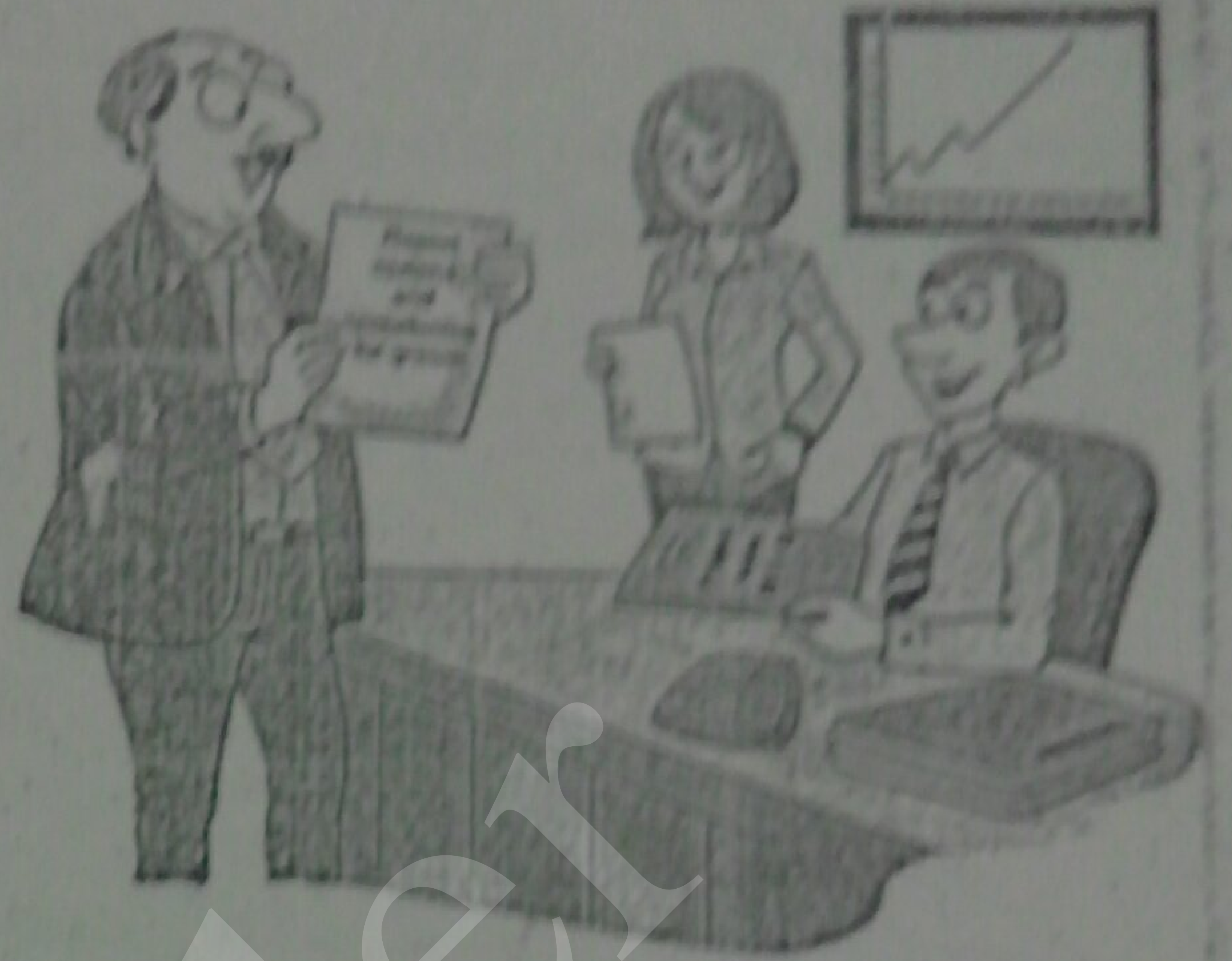
Consequences of violation of this principle:

- (a) Employees will not work to the best of their ability.
- (b) Demotivation among employees.

(xiv) Principle of Esprit De Corps.

[Esprit De Corps means union is strength. Fayol emphasised on the team work. He suggested that every employee in the organisation must consider him as a part or member of a team and try to achieve the team goal because team contribution is always better and more than individual contribution.]

Management must develop a feeling of belongingness among the employees as they must feel themselves as members of organisation team and contribute maximum to achieve team's goal.



Employee suggestion system.
Encourage initiative among trainee managers



Team Esprit

For example, if the production manager assigned a target of manufacturing 100 units to a group of 10 members, divided the target among themselves to produce 10 units each, principle of team spirit says that each member of the group should not concentrate only on achieving his individual target of 10 units but they must concentrate on achieving group target of 100 units so if two workers of that group fall sick, then the other eight members must divide their individual target among themselves and try to achieve the target of their group.

Positive effects of this principle:

1. Develops team spirit.
2. Achievement of group goal.

Consequences of violation of this principle:

- (a) Team goal may not be achieved.
- (b) No team spirit and more stress on individualism.

2.4.4 Fayol's 14 principles of management are very effective but the interpretations of these principles are changed.

Following table shows the traditional and present implications of management principles of Fayol.

S.No.	Name of Principle	Traditional impact	Modern impact
1.	Division of work	Specialisation in worker's job design.	Generalisation in worker's job design.
2.	Authority and Responsibility	Managers are empowered.	Employees are empowered.
3.	Discipline	Formalised rules and regulations.	Informal pressure control.
4.	Unity of command	Subordinates report to one boss only.	Subordinate report to multiple bosses.
5.	Unity of direction	Functions of one direction.	Functions have multiple directions.
6.	Subordination of individual interest to common goal	Employees are committed to the organisation.	Organisation is committed to the employees.
7.	Remuneration of Personnel	Reasonable pay reward.	Performance based reward.
8.	Centralisation	Power in hands of top level.	Powers distributed evenly at every level.
9.	Scalar chain	Smooth flow of information by passing through every level.	Flatter and short cut communication.
10.	Order	Orderly arrangement of men and material for control.	Orderly arrangement of men and material for coordination.

11.	Equity	Kindness and just treatment of employee.	Developing sense of ownership.
12.	Stability of tenure	Train employees to encourage them to remain.	On going employee training and development.
13.	Initiative	Managers are encouraged to give new ideas.	Workers are encouraged to give new ideas.
14.	Espirit de corps	Maintaining high morale of managers.	Maintaining high morale of employees.

2.5 Scientific Management Developed by F.W. Taylor

2.5.1 Background and History of F.W. Taylor

F.W. Taylor was born in 1856 in USA. In 1878 he joined Midval Steel Company as a Mechanical Engineer. Using his engineering background Taylor set out scientific studies and techniques. He was primarily concerned about the efficiency of workers and optimum utilization of resources. Taylor's principles and techniques were based on the observations he conducted in factories where methods of production lack planning and working methods were haphazard.

2.5.2 Contributions of Taylor

F.W. Taylor became famous as a father of scientific management. His major contributions which made him so popular were:

- (i) Taylor published books and research papers explaining his scientific view of industrial organisation and management.
- (ii) His major contribution was publishing of "Shop Management", "Piece Rate System" and "Principles of Scientific Management".
- (iii) He emphasised on adoption of scientific methods to the problems of management.

2.5.3 Meaning of Scientific Management

Scientific management can be defined as "Application of science for each and every element of management". In general language it means apply scientific tools, methods and trained personnel in order to increase the output. Scientific management insists on replacement of rule of thumb by science that means decisions in the organisation should not be taken on the basis of wills and wishes of manager but decisions must be based on scientific studies conducted by using scientific tools.

Definitions of Scientific Management

- ◆ "Scientific management means knowing exactly what you want men to do and seeing that they do it in the best and cheapest way".
Taylor
- ◆ "It is the art and science of preparing, organising and directing human effort applied to control the forces and utilise the materials of nature for the benefits of man".
Association of Mechanical Engineers, U.S.A.
- ◆ "It is the operational study of work, the analysis of work into its simplest element and the systematic improvement of the workers' performance of each element".
Peter F. Drucker

2.5.4 Scientific Principles of Management

Taylor formulated four principles of scientific management which are explained below:

- (i) **Science, not rule of thumb.** According to this principle Taylor insists that each job performed in the organisation should be based on scientific enquiry and not on intuition, experience and hit and miss methods. He says that there must be thinking before doing which is not in case of rule of thumb. Rule of thumb means dictatorship of manager whereas scientific decisions are based on cause and effect and scientific measurement of methods and ways of production.

Taylor insisted on introduction of scientific inquiry into the domain of management practice. Taylor believed that there is only one best method to maximise efficiency this method can be developed through work study and analysis. The method so developed should be substitute of Rule of Thumb.

For example, in rule of thumb the standard time required to do a particular job is decided by the managers on the basis of his past experience. Taylor insists that standard time for a job should be set up scientifically by performing time study in the organisation and then the day's target should be fixed.

- (ii) **Harmony, not discord.** According to this principle those who work together in an organisation must work in harmony that is with mutual give and take and proper understanding. Generally in every organisation there are two groups of people—workers group and management group and both the groups work as rivals of each other as workers always feel that they are underpaid and are overburdened with the work and management always feels that workers are good for



Sharing of gains between management and workers leading to complete harmony

nothing. In this principle Taylor insists that there is need for both the groups to change their attitudes for each other. He insists on mental revolution which means complete change of attitude and outlook for each other. They must develop positive thinking for each other and work with harmony and avoid discord as their objectives are in one direction only.

For example, the main objective of workers is to earn more and the objective of management is to maximise production; instead of discord for each other's objectives workers can earn more by producing more which will help in maximising the production also.

Management should share the gains of the company with workers at the same time workers must contribute to their best level. Taylor feels that prosperity of organisation depends upon prosperity of employer as well as employees.

- (iii) Co-operation, not individualism. This principle is the extension of the harmony not discord. According to this principle work must be carried on in co-operation with each other, with mutual confidence and understanding for each other. Workers and managers must work in co-operation. The management must take workers in confidence before setting up the standard task for them because when standards or targets are set up in consultation of workers, then they will try their best to achieve it.

To have cooperation management should welcome good suggestions of employees and they should be rewarded for their suggestion. At the same time workers should not go on strike and make unreasonable demands. There must be open communication system there must be Paternalistic style of management as in case of Japanese companies.

For example, while assigning job to workers if management asks them about their interest and then work is assigned according to their interest, definitely the workers will perform it more efficiently.

In Japanese companies this principle is practised as here managers treat workers as part of their family and workers also do not show their agitation by going on strike rather they tie a black ribbon to show their dissatisfaction and gain sympathy of managers.

Managers must work almost side by side with the workers, helping and encouraging them.

- (iv) Development of workers to their greatest efficiency and prosperity. Industrial efficiency depends upon the efficiency of workers. Worker's efficiency depends upon proper training and their selection. Taylor insisted due care should be taken while selecting the employees and after selecting they must be given job according to their qualification. Employees must be sent for training from time

to time to update their knowledge. This will ensure greatest efficiency and prosperity for both company and workers.

2.5.5 Scientific Techniques of Taylor

Along with scientific principles Taylor developed some scientific techniques by conducting various experiments at his work place.

The common techniques are:

- (i) **Functional foremanship.** [In this technique Taylor suggested the division of factory in two departments: planning department and production department as ~~Taylor felt that~~ workers must be free from the burden of planning and they must concentrate on work and production.] To develop specialisation in the productivity, Taylor suggested [under each department there must be some functional experts to supervise, guide and instruct the worker.] As one supervisor cannot be expert in every aspect of work so Taylor stressed on minimum eight specialists or functional experts to supervise and give orders to workers. Each boss will be specialised in one aspect of work and while observing and instructing the worker there will be definitely specialisation. So this technique is the extension of principle of division of labour. Taylor said foreman must be intelligent, educated, energetic, honest, specialised or profession expert. All these qualities cannot be found in one person so Taylor stressed on having minimum eight experts, four under each department to order and guide the workers [Fig. 2.5].

The eight functional experts suggested by Taylor are:

Under Planning Department:

- (a) Route Clerk. This foreman is responsible to fix up the sequence of steps for performing mechanical or manual job.
- (b) Instruction Card Clerk. This foreman is responsible for giving general instructions necessary to carry on the job in a specified manner.
- (c) Time and Cost Clerk. This foreman is responsible to fix up the time for starting and completion of job. He also prepares the cost sheet for every job.
- (d) Disciplinarian. This foreman is responsible for performance of job in orderly and systematic way.

Four Foremen under Operational Department:

- (a) Gang Boss. He arranges all the machines, tools and other resources required for performance of the job so that there is no delay.
- (b) Speed Boss. This foreman assures timely completion of job.
- (c) Rebair Boss. This boss ensures that machines and tools are kept in working conditions.

(d) *Inspector.* This boss keeps a check on quality control of the output. Taylor emphasised that when every foreman instructs and orders, the work efficiency will improve.

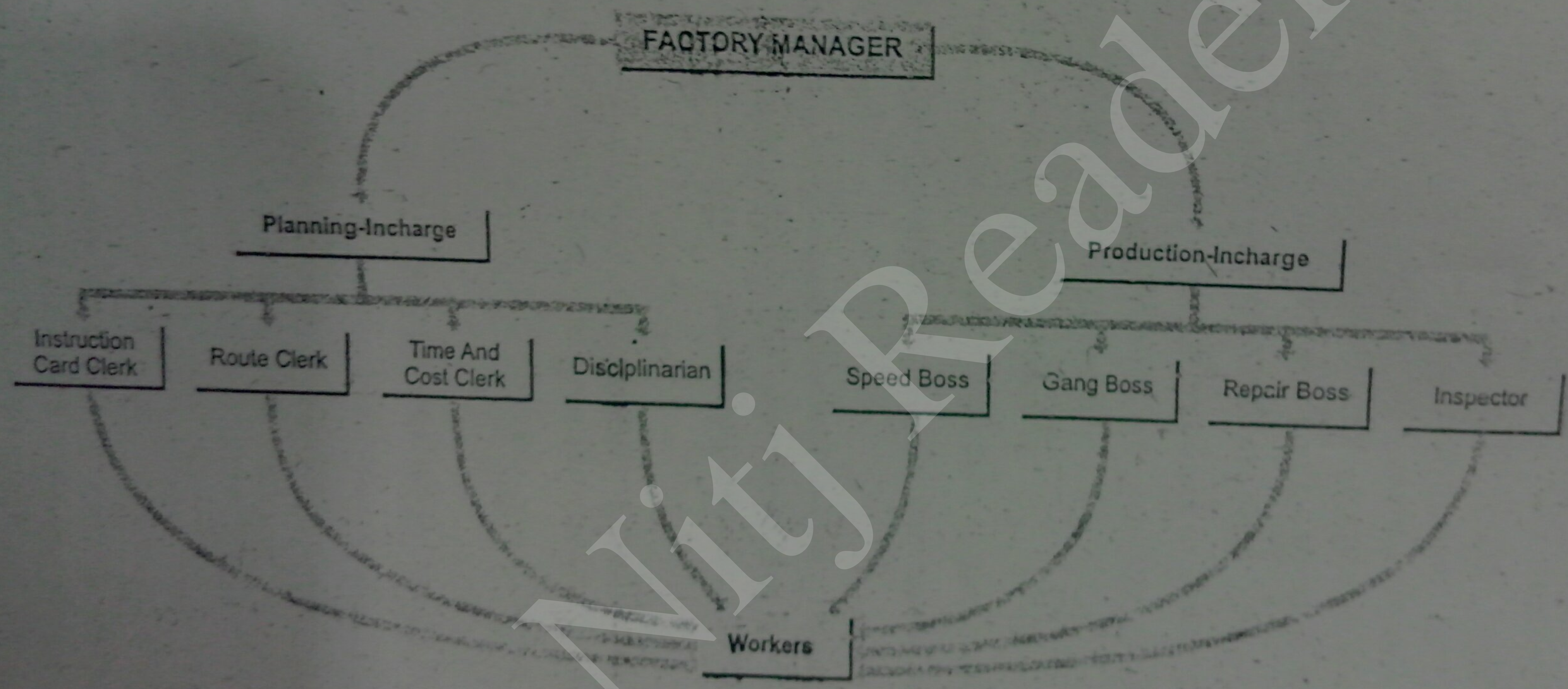


Fig. 2.5 Diagram of functional foremanship

(ii) Standardisation and simplification of work. [Scientific management emphasises on maintaining standards relating to every step of business operation. Standardisation of output is possible if standard is maintained right from selection of tools, equipment and machine to use, maximise the output by keeping in mind the quality standards. Standardisation does not mean only quality standard. It refers to setting up standards for size, type, weights, measures and quality of product. According to Taylor scientific methods of production must be selected to develop standard. To set up standard the managers must make use of work study technique which includes time study, motion study and fatigue study. Even modern techniques such as Kaizen, six sigma, etc. can be used to set up standards.

The objectives of standardisation are:

- To reduce a given line of product to fixed type, size and characteristics.
- To allow interchangeability of manufactured parts and output among different departments and branches.
- To maintain quality standards.
- To set up performance standards of men and machine.

Simplification emphasises on elimination of unnecessary diversity of product size and types:

As more varieties mean more inventory, more type of machinery, more labour cost etc.; by simplifying the task there can be economy in use of machine, less inventory maintenance etc. It will also help in improving the quality and reduction of cost.

For example, a paper manufacturing company in USA reduced its varieties from 2000 to 200 which brought positive results for the company.

A fruit can manufacturing co. reduced varieties from 200 to 32 and got efficient and effective results.

(iii) Fatigue Study. This technique of scientific management is conducted to find:

- The Frequency of Rest intervals.
- The Duration of Rest intervals.
- Number of Rest intervals.

A person is bound to get tired when he is performing a job for long period of time. There is always need for rest interval. Taylor suggested that the time and frequency of rest interval should not be decided by the wish and expectation of manager but to give a scientific approach, fatigue study must be conducted. To conduct fatigue study Taylor suggested to observe an average worker when performing a job and note down the time when that worker starts getting tired when his efficiency level starts decreasing, then give him break. This time is noted to decide frequency of rest interval and during break after how much

the worker became fresh to rejoin the work can be the time for rest interval. So frequency and time for rest interval is fixed by observing workers definitely it will be more scientific.

For example, if there are 3 shifts of work, if after one shift worker gets tired he can be assigned 1st and 3rd shift and given rest interval in 2nd shift. During one shift also small pauses of rest intervals can be given if it is observed that within a shift worker becomes more fresh with small breaks.

(iv) **Method Study.** The ^{this} method study technique of scientific management is conducted to find out the one best method or way of performing the job which keeps production cost minimum and makes maximum use of resources of the organisation.

Taylor suggested that method of production should not be decided by rule of thumb method but all the methods must be tried in the organisation and the one which brings maximum benefits with minimum cost must be selected.

To determine the best way there are certain parameters right from procurement of raw materials till the final product is delivered. Taylor developed the concept of assembly line by using method study. The objective of method study is to minimise the cost of production and maximise the quality and customer satisfaction. Ford Motors used this concept very successfully.

For example, for production of shoes there can be labour intensive method and machine intensive method. To find out which is best management must evaluate the cost of production with both the methods and compare both the methods with the available resources of the company. The method which involves minimum cost and exploits maximum resources must be selected as the best method of production.

(v) **Time Study.** The technique of time study is conducted to determine or to achieve the objectives of time study are:

- (a) The standard time required to perform a job.
- (b) Setting up the standard target for workers.
- (c) Determining the number of workers required to perform a job.
- (d) Categorising the workers in efficient and inefficient categories.

Taylor suggested that the time required to perform the job should not be decided by intuition, will and wish of manager, but Time Study must be conducted to determine the standard time scientifically. To conduct Time Study Taylor suggested to observe an average worker when he is performing the job with a stop watch in hand and note down the average time taken by the worker in completion of job. Taylor suggested to repeat the same observations for 100 times and then take the average time. This time should be considered the average time for performance of the job. Keeping this time in mind the targets for workers should be fixed and the workers who are able to achieve their targets in standard time are average

workers. If the worker is able to achieve target before standard time then he is an efficient worker and if the worker failed to achieve target in standard time then he is an inefficient worker.

(vi) Motion Study. The scientific technique of motion study is conducted or the objectives of motion study are:

- (a) To determine the movements of workers when they are performing the job.
- (b) To differentiate between productive and unproductive movements.
- (c) For cutting down unproductive and wasteful movements.
- (d) To design suitable equipment and tools to minimise the unproductive movements of workers.

To conduct motion study Taylor suggested to observe an average worker when he is performing the job and note down all the movements he is doing. How many times he is getting up from his place, how many times he is bending down etc. Repeat it for 100 times with different workers. After Writing all the movements classify them in productive and unproductive movements and make the strategy to cut down or minimise the unproductive movements.

Taylor and his associate Frank Galiberth were able to reduce motions in brick layering from 18 to just 5. Taylor demonstrated increase in productivity by four times by this process.

For example, while observing an average worker, if it is observed that worker has to bend frequently to pick up the tools from the tool box placed under his table, then a stool can be placed near his seat to keep the tool box so that worker does not waste his energy in bending again and again. Same energy he can use for improving his production capacity or efficiency level.

(vii) Differential Piece Wage system. The scientific technique of differential piece rate system emphasises on paying different rate of wage for efficient and inefficient employees. The technique of differential wage rate system insists on:

- (a) Paying different rate of wage to efficient and inefficient employees.
- (b) Extra wages paid to efficient employees will motivate them to remain efficient.
- (c) Extra wages paid to efficient employees will motivate inefficient employees to come in the category of efficient employees.
- (d) When payment is given according to number of units produced automatically the production will be maximised.

To conduct or adopt differential wage system Taylor suggested that the company must fix a standard rate of wage for workers producing standard output or their target. The workers who produce more than the standard-target must be paid with a higher rate of wage and those who are producing less than standard output must be paid with a rate less than standard rate.

The worker who is producing 10 units must be paid ₹ 500 (Standard Rate × Standard Output).
The worker, who is producing 12 units must be paid with a rate higher than standard rate say ₹ 60 per unit.
So he will receive $12 \times 60 = ₹ 720$ (Higher Output × Higher Rate).

The worker who is producing less than standard output must be taxed and penalised by paying less than standard rate say ₹ 40 per unit.
So he will receive $8 \times 40 = ₹ 320$ (Lower Output × Lower Rate).

This difference in wages will motivate the workers to become efficient and earn more.

(viii) **Mental Revolution.** The scientific technique of mental revolution is conducted to achieve the objectives of mental revolution are:

- Change in mental attitudes of workers and management towards each other.
- Co-operation between workers and management.
- Ruling out feeling of suspicion or prejudice from the minds of workers and management to adapt systematic thinking.

Taylor said that generally in every organisation workers feel that management exploits them, overburdens them with excess work and pays them less; on the other hand, management feels that workers always grumble, they follow go slow policy, damage the equipment and work carelessly. Both the groups suspect each other. In the technique of mental revolution Taylor stressed that there is need to change the attitude of both the groups drastically. He referred to change as a revolution in mind to develop positive thinking and feeling of co-operation for each other.

2.5.6 Modern Scientific Techniques

In present era many new scientific techniques are developed. The common new techniques are:

- Operations Research.** It was developed during 2nd world war to optimise the deployment of war.
- Lean Manufacturing.** This technique focuses on reducing seven wastes of overproduction, i.e., waiting time, transportation, processing, motion, inventory, scrap and any manufacturing process.
- Kaizen.** It is a Japanese word which means change for better. It is a daily activity which eliminates hard and difficult task by experimenting scientific methods.
- Six Sigma.** It refers to improving efficiency by reducing quality variations.

- (c) *Just in Time Manufacturing*. It is an inventory management strategy to improve return and reduce cost.

Difference between Time Study and Motion Study

S. No.	Basis	Time Study	Motion Study
1.	Meaning	Time study is conducted to find out the standard time for performing a task.	Motion study is conducted to find out total movements of workers while they are performing the task.
2.	Purpose	The purpose of time study is to find out standard time to fix a fair day's work for the workers.	The purpose of motion study is to eliminate wasteful and unproductive movements of workers to increase their efficiency level.
3.	Method of conducting	It is conducted with the help of a stop watch.	It is conducted with the help of a movie camera which keeps eye on worker's movements.

2.6 Comparison between Taylor and Fayol

The contributions of Taylor and Fayol can be differentiated on the following ground.

S. No.	Point of Difference	Taylor	Fayol
1.	Concern	Taylor's techniques and principles are concerned with worker's efficiency.	Fayol's principles are concerned with management efficiency.
2.	Level/Perspective	Taylor started his studies and approach from lowest level in the organisation.	Fayol started his studies and approach from the highest level in the organisation.
3.	Emphasis	Taylor laid great emphasis on standardisation of work.	Fayol laid great emphasis on functions of managers.
4.	Focus	Taylor laid focus on eliminating wasteful movements and saving energy of workers. It forces on increase in productivity.	Fayol's focus was on development of principles for better management. It focuses on improving overall achievement.
5.	Major contribution	Taylor's main contribution was development of scientific techniques and scientific principles.	Fayol's main contribution was development of fourteen principles of general management.
6.	Personality	Taylor developed a personality of scientist and became famous as father of scientific management.	Fayol developed the personality of a researcher and practitioner. He became famous as <i>father of general management</i> .

7.	Unity of Command	Did not follow this principle as Taylor insisted on minimum 8 bosses.	Strictly followed this principle i.e. only one boss for one employee.
8.	Expression	Taylor's techniques are expressed as scientific management.	Fayol's techniques are expressed as a general theory of administration.
9.	Applicability	Applicable to specialised situation.	Applicable universally.

Relevance of Taylor and Fayol's Principles (Similarities between Taylor and Fayol)

Taylor and Fayol's principles are complementary to each other because both have relevance in the business due to following reasons.

- (1) The main aim of Taylor's as well as Fayol's principles is maximising the efficiency.
- (2) Both insist on cooperation between employees and employers.
- (3) Both give more importance to organisational interest over the individual interest.
- (4) Both suggested division of work for specialisation.
- (5) The principles of both are used as basis for research in the field of management studies.

GLIMPSSES

- **Meaning.** Management principles are statement of fundamental truth which act as the guidelines for managerial activities.

Nature. Management principles are:

- (a) Universal application,
- (b) General guidelines
- (c) Formed by practice and experiments,
- (d) Flexible,
- (e) Behavioural in nature,
- (f) Based on cause and effect relationship,
- (g) Contingent.

Significance. Understanding of management principles helps the managers to:

- (a) provide insight to managers,
- (b) efficient utilisation of resources,
- (c) taking scientific decisions,
- (d) adopt the changes,
- (e) effective administration,
- (f) perform social responsibilities.
- (g) management training, education and research