UNIT 2

PRINCIPLES OF MANAGEMENT

Management principles are guidelines for the decisions and actions of managers.

The Principles of Management are the essential, underlying factors that form the foundations of successful management. According to Henry_Fayol in his book General and Industrial Management (1916), there are fourteen 'Principles of Management'.

1. **Division of Work** - According to this principle the whole work is divided into small tasks. The specialization of the workforce according to the skills of a person, creating specific personal and professional development within the labour force.
2. **Authority and Responsibility** - This is the issue of commands followed by responsibility for their consequences.
3. **Discipline** - It is obedience, proper conduct in relation to others, respect of authority, etc. It is essential for the smooth functioning of all organizations.
4. **Unity of Command** - This principle states that each subordinate should receive orders and be accountable to one and only one superior. If an employee receives orders from more than one superior, it is likely to create confusion and conflict.
5. **Unity of Direction** - All related activities should be put under one group, there should be one plan of action for them, and they should be under the control of one manager.
6. **Subordination of Individual Interest to Mutual Interest** - The management must put aside personal considerations and put company objectives firstly. Therefore the interests of goals of the organization must prevail over the personal interests of individuals.
7. **Remuneration** - Workers must be paid sufficiently as this is a chief motivation of employees and therefore greatly influences productivity.
8. **The Degree of Centralization** - The amount of power wielded with the central management depends on company size. Centralization implies the concentration of decision making authority at the top management.
9. **Line of Authority/Scalar Chain** - This refers to the chain of superiors ranging from top management to the lowest rank. The principle suggests that there should be a clear line of authority from top to bottom linking all managers at all levels.
10. **Order** - Order should be acceptable and under the rules of the company.
11. **Equity** - Employees must be treated kindly, and justice must be enacted to ensure a just workplace. Managers should be fair and impartial when dealing with employees, giving equal attention towards all employees.
12. **Stability of Tenure of Personnel** - Stability of tenure of personnel is a principle stating that in order for an organization to run smoothly, personnel (especially managerial personnel) must not frequently enter and exit the organization.
13. **Initiative** - Using the initiative of employees can add strength and new ideas to an organization.

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14. **Esprit de Corps** – "Unity Is Strength" This refers to the need of managers to ensure and develop morale in the workplace; individually and communally. Team spirit helps develop an atmosphere of mutual trust and understanding. Team spirit helps to finish the task on time.

Fayol classified all business activities into 6 categories: technical (Production or manufacturing), commercial (Buying, Selling and exchange), financial (search for optimum use of capital), security (protection of property and person), Accounting, Managerial

According to F.W. Taylor " Scientific management means knowing exactly what you want men to do and seeing that they do it in the best and cheapest way." Taylor's chief contribution was not in the field of higher management. He devoted mainly at the shop floor level. His philosophy of scientific management is based upon the following principles:

1. **Development of true science for each element of work:** Through scientific investigation, the best way of doing work can be developed. The decision should be made on the basis of facts rather than on opinions and beliefs.
2. **Scientific selection, training and development of workers:** this principle requires that workers should be selected and trained in accordance with the requirements of the jobs, to be entrusted to them.
3. **Close cooperation between workers and management:** the interests of employer and the employee should be equally harmonized.
4. **Equal division of work and responsibility.**
5. **Maximum prosperity for both employers and employees.**

Comparison between management of F.W. Taylor and Henry Fayol

F.W.Taylor	Henry Fayol
He looked at management from the supervisory point of view and tried to improve efficiency at the operating level.	He analysed management from the angle of top management downward with emphasis on co-ordination.
He focused his attention on factory management and his principles are directly applicable at the shop floor level.	He concentrated on the functions of managers and his principles of management are applicable to all spheres of human activity.
The main aim of Taylor is to improve productivity of labour to eliminate all types of waste through standardization of work and tools.	He attempted to develop a universal theory of management. He gives stress on teaching the theory and practice of management.
He called his Philosophy " Scientific Management"	**He described his approach as a " General theory of administration ."**

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COORDINATION

According to Mooney and Reelay, "Co-ordination is orderly arrangement of group efforts to provide unity of action in the pursuit of common goals". Management seeks to achieve co-ordination through its basic functions of planning, organizing, staffing, directing and controlling. That is why co-ordination is not a separate function of management because achieving of harmony between individuals efforts towards achievement of group goals is a key to success of management. Co-ordination is the essence of management and is implicit and inherent in all functions of management.

A manager can be compared to an orchestra conductor since both of them have to create rhythm and unity in the activities of group members. Co-ordination is an integral element or ingredient of all the managerial functions as discussed below: -

a. **Co-ordination through Planning -** Planning facilitates co-ordination by integrating the various plans through mutual discussion, exchange of ideas. e.g. - co-ordination between finance budget and purchases budget.
b. **Co-ordination through Organizing -** Mooney considers co-ordination as the very essence of organizing. In fact when a manager groups and assigns various activities to subordinates, and when he creates department's co-ordination uppermost in his mind.
c. **Co-ordination through Staffing -** A manager should bear in mind that the right no. of personnel in various positions with right type of education and skills are taken which will ensure right men on the right job.
d. **Co-ordination through Directing -** The purpose of giving orders, instructions & guidance to the subordinates is served only when there is a harmony between superiors & subordinates.
e. **Co-ordination through Controlling -** Manager ensures that there should be co-ordination between actual performance & standard performance to achieve organizational goals.

COMMUNICATION

Communication (from Latin commūnicāre, meaning "to share") is the act of conveying intended meaning to another entity through the use of mutually understood signs and semiotic rules. The basic steps of communication are the forming of communicative intent, message composition, message encoding, transmission of signal, reception of signal, message decoding and finally interpretation of the message by the recipient.

The study of communication can be divided into communication studies, which concerns only human communication, and biosemiotics, which examines the communication of organisms in general. Communication is usually visual, auditory, or biochemical, while human communication is unique for its extensive use of language.

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Nonverbal communication

Nonverbal communication describes the process of conveying meaning in the form of non-word messages. Examples of nonverbal communication include haptic communication, chronemic communication, gestures, body language, facial expression, eye contact, and how one dresses. Nonverbal communication also relates to intent of a message. Examples of intent are voluntary, intentional movements like shaking a hand or winking, as well as involuntary, such as sweating. Speech also contains nonverbal elements known as paralanguage, e.g. rhythm, intonation, tempo, and stress. There may even be a pheromone component. Research has shown that up to 55% of human communication may occur through non-verbal facial expressions, and a further 38% through para-language. It affects communication most at the subconscious level and establishes trust. Likewise, written texts include nonverbal elements such as handwriting style, spatial arrangement of words and the use of emoticons to convey emotion.

Nonverbal communication demonstrates one of Wazlawick's laws: you cannot not communicate. Once proximity has formed awareness, living creatures begin interpreting any signals received. Some of the functions of nonverbal communication in humans are to complement and illustrate, to reinforce and emphasize, to replace and substitute, to control and regulate, and to contradict the denotative message.

Verbal communication

Effective verbal or spoken communication is dependent on a number of factors and cannot be fully isolated from other important interpersonal skills such as non-verbal communication, listening skills and clarification. Human language can be defined as a system of symbols (sometimes known as lexemes) and the grammars (rules) by which the symbols are manipulated. The word "language" also refers to common properties of languages. Language learning normally occurs most intensively during human childhood. Most of the thousands of human languages use patterns of sound or gesture for symbols which enable communication with others around them. Languages tend to share certain properties, although there are exceptions. There is no defined line between a language and a dialect. Constructed languages such as Esperanto, programming languages, and various mathematical formalism is not necessarily restricted to the properties shared by human languages. Communication is two-way process not merely one-way.

An Effective Communication Process:

• Use standard terminology when communicating information. • Request and provide clarification when needed. • Ensure statements are direct and unambiguous. • Inform the appropriate individuals when the mission or plans change. • Communicate all information needed by those individuals or teams external to the team. • Use nonverbal communication appropriately. • Use proper order when communicating information.″* for formal English-speaking groups

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Written communication and its historical development

Over the continuing progression of technology advances include communications psychology and media psychology, an emerging field of study.

The progression of written communication can be divided into three "information communication revolutions":

1. Written communication first emerged through the use of pictographs. The pictograms were made in stone hence written communication was not yet mobile. Pictograms began to develop standardized and simplified forms.
2. The next step occurred when writing began to appear on paper, papyrus, clay, wax, and other media with common shared writing systems, leading to adaptable alphabets. Communication became mobile.
3. The final stage is characterized by the transfer of information through controlled waves of electromagnetic radiation (i.e., radio, microwave, infrared) and other electronic signals.

Communication is thus a process by which meaning is assigned and conveyed in an attempt to create shared understanding. Gregory Bateson called it "the replication of tautologies in the universe. This process, which requires a vast repertoire of skills in interpersonal processing, listening, observing, speaking, questioning, analyzing, gestures, and evaluating enables collaboration and cooperation.

Misunderstandings can be anticipated and solved through formulations, questions and answers, paraphrasing, examples, and stories of strategic talk. Written communication can be clarified by planning follow-up talks on critical written as part of the everyday way of doing business. A few minutes spent talking in the present will save valuable time later by avoiding misunderstandings in advance. A frequent method for this purpose is reiterating what one heard in one's own words and asking the other person if that really was what was meant (paraphrasing).

MOTIVATION

The term motivation has been derived from the word “Motive” which means the urge to do or not do something. Motive is that force within an individual which compels him to act or not to act in a certain way. Motivation is defined as the process of stimulating or inducing people to take the desired course of action. It is the act of inspiring employees to work hard to achieve the goals of the organization. Motivation involves arousing desire among people to perform to the best of their abilities so as to fulfill the desired goals.

Salient Features of Motivation:

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1. Motivation is a psychological phenomenon. It is an internal feeling which arises from the needs and wants of a person.
2. Motivation is a continuous process because human needs are unlimited.
3. Motivation causes goal-oriented behavior.
4. Motivation may be positive or negative. Positive motivation means inspiring people to work better and offering or rewards or promotions.
5. It is the responsibility of every manager to motivate his subordinates.

Importance of Motivation:

The success of an organization to a great extent depends upon the motivation of its employees. Motivation is the core of management due to the following reasons:

1. Motivation helps in increasing productivity and reducing the cost of operations.
2. Motivation creates the willingness to work among the employees. It helps the management to achieve the best possible utilization of all resources.
3. Motivation induces employees to contribute their best efforts towards the achievement of goals.
4. Motivation increases the loyalty and commitment of employees towards the organization. As a result the problems of absenteeism and labour problems are reduced.
5. It improves the relationship between employer and employees because employees are awarded promotion and other rewards in recognition of their efficiency.

DECISION MAKING

The task of management involves making of countless decision for the smooth functioning of the enterprise. Administration is a decision making process and authority is responsible for making decisions and for ascertaining that the decisions made are carried out.

It is as important in planning as in organization, coordination and control, for in each of these functions the management has to choose from among a number of alternative courses of action. There are two types of acts – those which are as a result of deliberation, calculation and thought and those which are unconscious, automatic and responsive. There are many subsidiary acts in decision making and it is unknown to the persons which are acting on it.

A decision may relate to the end or means or both. In some cases an end may be given and the manager is to decide upon the best means of attaining it. In others, the end may also have to be decided- through the logic process of reasoning and analysis.

Characteristic of a decision:

1. It is the end process and proceeds by deliberation and reasoning.
2. It is the choice of the best course among alternatives.

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3. It may be negative and may just be a decision not to decide.
4. It relates the means to end.

Types of decisions:

There are four basic criteria which determine the nature of a decision and the level of authority that should make it. These are:

1. The degree of futurity.
2. The impact on other functions, area or the decision as a whole.
3. The number of qualitative factors that enter into it.
4. Whether it is periodically recurrent or rare, if not unique.

If a decision does not commit the company for long or is immediately reversible, it can be taken at a lower level. Similarly if it affects only one function, it is of the lowest value. The moment basic principles of conduct, ethical values, social and political beliefs, etc... have to be taken into account, the decision moves into a higher order and requires after determination or review at a higher level.

Decisions may be broadly classified as major or minor, routine or strategic policy or operating, depending upon the issues involved. Decision may also be classified as programmed or unprogrammed on the basis of the procedure adopted.

Steps in Decision Making:

1. **Perception:** A state of awareness, out of which consciousness of being arises.
2. **Conception:** That power of the mind which develops ideas out of perception. Conception might be termed as scheme or design for action.
3. **Investigation:** The search for, and the acquisition of information pertinent to specific concepts, so that the relative advantages and limitations of alternative courses of action can be compared.
4. **Deliberation:** A mental weighing of relative merits and consequences attached to alternative schemes of action.
5. **Selection:** A discrimination among the available alternatives so that the most desirable course of action is designated as the decision
6. **Promulgation:** A declaration or public pronouncement of the decision so that all persons concerned are adequately notified.

Decision Making has five phases:

1. Defining and analyzing the problem
2. Finding relevant facts.
3. Developing alternate solutions.
4. Selecting the best solution.
5. Converting the decision into effective action.

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LEADERSHIP

Leadership is both a research area and a practical skill, regarding the ability of an individual or organization to "lead" or guide other individuals, teams, or entire organizations.

"Leadership is a holistic spectrum that can arise from: (1) higher levels of physical power, need to display power and control others, force superiority, ability to generate fear, or group-member's need for a powerful group protector (Primal Leadership), (2) superior mental energies, superior motivational forces, perceivable in communication and behaviors, lack of fear, courage, determination (Psychoenergetic Leadership), (3) higher abilities in managing the overall picture (Macro-Leadership), (4) higher abilities in specialized tasks (Micro-Leadership), (5) higher ability in managing the execution of a task (Project Leadership), and (6) higher level of values, wisdom, and spirituality (Spiritual Leadership), where any Leader derives its Leadership from a unique mix of one or more of the former factors".

Studies of leadership have produced theories involving traits, situational interaction, function, behavior, power, vision and values, charisma, and intelligence, among others.

INNOVATION

Innovation implies doing things in new way or doing new things. It may involve introduction of new techniques, introduction of new goods and services; developing a new market, etc… An entrepreneur is basically an innovator who tries to develop new technology, products and markets. The entrepreneur uses his creative faculties to do new things and exploit opportunities in the market. Entrepreneurship is another name of innovation.

PRODUCTION MANAGEMENT

Production is the foundation on which every organization is built. Production is an intentional act of producing something in an unorganized manner. It is a fabrication of a physical object through the use of men, material and equipment. The main objectives of production are:

1. Optimum use of resources at optimum cost.
2. Manufacture of desired quality and quantity of goods and services.

Production management is the process of effective planning and regulating the operations of that section of an enterprise which is responsible for the actual transformation of materials into finished products.

Production management deals with the decision making related to production process so that the resulting goods and services are produced in accordance with the quantitative specifications and demand schedule with minimum cost.

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From the above definitions, it is clear that the production planning and its control are the main characteristics of production management. In the case of poor planning and control of production activities, the organization may not be able to attain its objectives and may result in loss of customer's confidence and retardation in the progress of the establishment.

FUNCTIONS OF PRODUCTION MANAGEMENT

1. Design and development of production process.
2. Production planning and control
3. Implementation of the plan and related activities to produce the desired output.
4. Administration and coordination of the activities of the various components and departments responsible for producing the necessary goods and services.

Production management's responsibilities are summarized by the "five M's": men, machines, methods, materials, and money. "Men" refers to the human element in operating systems. Since the vast majority of manufacturing personnel work in the physical production of goods, "people management" is one of the production manager's most important responsibilities.

The production manager must also choose the machines and methods of the company, first selecting the equipment and technology to be used in the manufacture of the product or service and then planning and controlling the methods and procedures for their use. The flexibility of the production process and the ability of workers to adapt to equipment and schedules are important issues in this phase of production management.

The production manager's responsibility for materials includes the management of flow processes—both physical (raw materials) and information (paperwork). The smoothness of resource movement and data flow is determined largely by the fundamental choices made in the design of the product and in the process to be used.

The manager's concern for money is explained by the importance of financing and asset utilization to most manufacturing organizations. A manager who allows excessive inventories to build up or who achieves level production and steady operation by sacrificing good customer service and timely delivery runs the risk that overinvestment or high current costs will wipe out any temporary competitive advantage that might have been obtained.

METHODOLOGY OF ACTIVITIES

The methodologies of activities which are done in production management are discussed in the following heads.

(a) Product designing : The selection of the right product and then selecting the attributes of the product such that it is best suited for the market and provides end user satisfaction.

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(b) Production system designing: The activity is related to the engineering of the production system and includes design of tools and jigs design, development and installation of equipment and the selection of optimum size of the prim. These activities require technical expertise on the part of the production manager and his staff.

(c) Facilities location: The location of the facility is decided taking into consideration factors such as the raw material and finished product transportation cost. Availability of raw material and other requirements. Govt. policies and taxes being levied etc are also considered.

(d) Methodology: The work methodology also extremely important. It includes the style of working and evaluation of the working. Design of standard operating procedures for the tasks to be performed is also covered under this head.

(e) Plant layout & material handling: The plant layout includes the arrangement of the machines and facilities of the plant. These arrangements must be made in a manner to allow the smooth plant operation. The material handling operations must also be carried out designed to allow the smooth operationing of the processes. The material handling department must ensure that minimal wastage of materials occur, while also ensuring that there are no stock outs and neither are there any surplus overstocking.

(f) Capacity planning: This deals with the procurement of productive resources. Capacity refers a level of output of the conversion process over a period of time. The capacity is planned for a short term as well as for long term productivity. Tools for capacity planning include break even point analysis, learning curves, linear programming and decision trees.

(g) Production planning: The decision in production planning includes preparation of short term production schedule, plan for maintaining the record of raw material, finishes and semi finished stock, specifying how the production resources of the concern are to be employed over some future time in response to the predicted demand for products and services

(h) **Production control:** After the successful planning, the next managerial function is to control the production according to the production plans because production plans cannot be activated unless they are properly guided and controlled. Production control is the process of planning production in advance of operations, establishing the exact route of each individual item, a part or assembly; setting, starting and finishi9ng dates for each important item, assembly and the finished products and releasing the necessary orders as well as initiating the required follow up to effect the smooth functioning of the enterprise.

(i) **Inventory control:** Inventory control deals with the control over raw materials, work in progress, finished

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PERFORMANCE EVALUATION TECHNIQUES

Critical Path Management

The critical path method (CPM) is a project modeling technique developed in the late 1950s by Morgan R. Walker of DuPont and James E. Kelley, Jr. of Remington Rand. Kelley and Walker related their memories of the development of CPM in 1989. Kelley attributed the term "critical path" to the developers of the Program Evaluation and Review Technique which was developed at about the same time by Booz Allen Hamilton and the U.S. Navy. The precursors of what came to be known as Critical Path were developed and put into practice by DuPont between 1940 and 1943 and contributed to the success of the Manhattan Project.

The essential technique for using CPM is to construct a model of the project that includes the following:

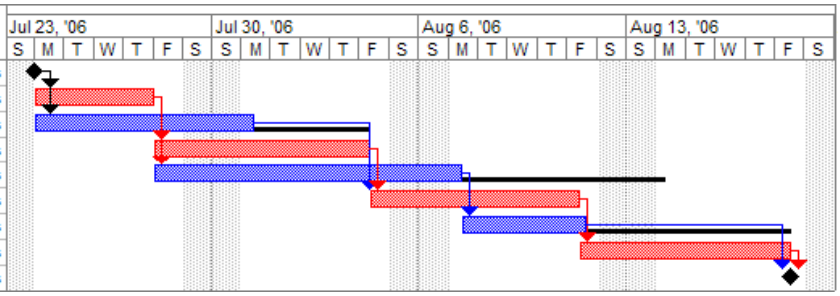
1. A list of all activities required to complete the project (typically categorized within a work breakdown structure),
2. The time (duration) that each activity will take to complete,
3. The dependencies between the activities and,
4. Logical end points such as milestones or deliverable items.

Using these values, CPM calculates the longest path of planned activities to logical end points or to the end of the project, and the earliest and latest that each activity can start and finish without making the project longer. This process determines which activities are "critical" (i.e., on the longest path) and which have "total float" (i.e., can be delayed without making the project longer). In project management, a critical path is the sequence of project network activities which add up to the longest overall duration, regardless if that longest duration has float or not. This determines the shortest time possible to complete the project. There can be 'total float' (unused time) within the critical path.

GANTT Chart

A Gantt chart is a type of bar chart, adapted by Karol Adamiecki in 1896 and independently by Henry Gantt in the 1910s, that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements comprise the work breakdown structure of the project.

ID	Task Name	Predecessors	Duration
1	Start		0 days
2	a	1	4 days
3	b	1	5.33 days
4	c	2	5.17 days
5	d	2	6.33 days
6	e	3,4	5.17 days
7	f	5	4.5 days
8	g	6	5.17 days
9	Finish	7,8	0 days



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Performance Evaluation Review Technique

The program (or project) evaluation and review technique, commonly abbreviated PERT, is a statistical tool, used in project management, which was designed to analyze and represent the tasks involved in completing a given project. First developed by the United States Navy in the 1950s, it is commonly used in conjunction with the critical path method (CPM).

PERT is a method to analyze the involved tasks in completing a given project, especially the time needed to complete each task, and to identify the minimum time needed to complete the total project.

PERT was developed primarily to simplify the planning and scheduling of large and complex projects. It was developed for the U.S. Navy Special Projects Office in 1957 to support the U.S. Navy's Polaris nuclear submarine project. It was able to incorporate uncertainty by making it possible to schedule a project while not knowing precisely the details and durations of all the activities. It is more of an event-oriented technique rather than start- and completion-oriented, and is used more in projects where time is the major factor rather than cost. It is applied to very large-scale, one-time, complex, non-routine infrastructure and Research and Development projects. An example of this was for the 1968 Winter Olympics in Grenoble which applied PERT from 1965 until the opening of the 1968 Games.

This project model was the first of its kind, a revival for scientific management, founded by Frederick Taylor (Taylorism) and later refined by Henry Ford (Fordism). DuPont's critical path method was invented at roughly the same time as ′PERT′.

PDCA (plan–do–check–act or plan–do–check–adjust)

It is an iterative four-step management method used in business for the control and continuous improvement of processes and products. It is also known as the Deming circle/cycle/wheel, Shewhart cycle, control circle/cycle, or plan–do–study–act (PDSA). Another version of this PDCA cycle is OPDCA. The added "O" stands for observation or as some versions say "Grasp the current condition." This emphasis on observation and current condition has currency with Lean manufacturing/Toyota Production System literature.

PLAN

> Establish the objectives and processes necessary to deliver results in accordance with the expected output (the target or goals). By establishing output expectations, the completeness and accuracy of the specification is also a part of the targeted improvement. When possible start on a small scale to test possible effects.

DO

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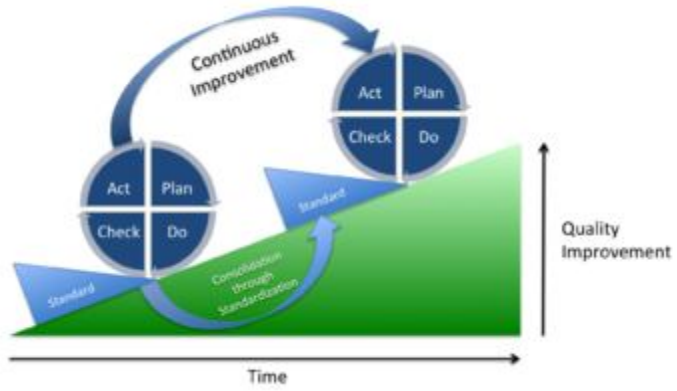
Implement the plan, execute the process, make the product. Collect data for charting and analysis in the following "CHECK" and "ACT" steps.

CHECK

Study the actual results (measured and collected in "DO" above) and compare against the expected results (targets or goals from the "PLAN") to ascertain any differences. Look for deviation in implementation from the plan and also look for the appropriateness and completeness of the plan to enable the execution, i.e., "Do". Charting data can make this much easier to see trends over several PDCA cycles and in order to convert the collected data into information. Information is what you need for the next step "ACT".

ACT

If the CHECK shows that the PLAN that was implemented in DO is an improvement to the prior standard (baseline), then that becomes the new standard (baseline) for how the organization should ACT going forward (new standards are enacted). If the CHECK shows that the PLAN that was implemented in DO is not an improvement, then the existing standard (baseline) will remain in place. In either case, if the CHECK showed something different than expected (whether better or worse), then there is some more learning to be done... and that will suggest potential future PDCA cycles. Note that some who teach PDCA assert that the ACT involves making adjustments or corrective actions... but generally it would be counter to PDCA thinking to propose and decide upon alternative changes without using a proper PLAN phase, or to make them the new standard (baseline) without going through DO and CHECK steps.



The PDCA Cycle

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MAINTENANCE MANAGEMENT

Maintenance management encompasses and supplies solutions for the planning and control of activities associated with maintenance activities of a plant or facility. Generally, it incorporates labor and materials and may include the management of maintenance stores.

Maintenance Management addresses several competencies and areas of expertise. These are vehicle maintenance, shop operations, environmental issues, inventory management section, and benchmarking section and finally, outsource maintenance activities.

The first competency concentrates on vehicle maintenance, including specific maintenance functions, preventive maintenance program implementation and effective administration of warranty programs. This potentially affects all aspects of fleet management including the financial and safe operation of a fleet and the end user's productivity.

The second competency is shop operations, which review shop practices related to efficiency, staffing levels, and the decision to outsource a shop operation. This process appraises operation to determine optimum staffing levels and advantageous outsourcing opportunities.

The third competency, environmental issues, provides greater comprehension and addresses environmental regulatory affairs and environmentally-responsible fleet/shop operations. Its requirements guarantee not only a clean and healthy environment, but also employee safety.

The inventory management section identifies the importance of effective materials management. It makes use of professionally managed parts to operate at peak efficiency. It is an important contributing element to the progress of maintenance facility.

After that, the benchmarking section offers valuable principles for an in-house fleet maintenance operation. It is a key function to retain productivity and effectively maintain operations. Benchmarking involves proper data collection, comparison, and analysis to determine performance status and standards.

And the last competency, which is outsourcing, reviews and understands factors and elements influencing settlements on outsource fleet maintenance activities. Its conclusion depends on a wide array of factors but its ultimate goal is efficiency.

Another element making up maintenance management is its processes. It is inclusive of Preventive Maintenance and Condition Monitoring; Maintenance Planning and Scheduling; Root Cause Analysis and Materials Management.

Preventive maintenance and condition monitoring starts out by creating the implementation plan—identifies measurable success indicators for the condition monitoring and preventive maintenance program. The goal is to achieve a condition monitoring and preventive maintenance program that is documented, executed and tracked. And this may be done through the process of setting up, executing and measuring an effective program.

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Maintenance Planning and scheduling is an important element in developing a well functioning maintenance organization. In order for it to work, the organization should do equipment inspections through preventive maintenance, technical database such as bill of materials, work order history, and standard job plans. Advanced methods are also a must in leading the company's focus on simplifying the planning and scheduling process to make it truly effective.

Root cause analysis, another process of maintenance management, if properly implemented results to the reduction of maintenance planner's work load; decrease in inventory-replenishment purchase orders; deduction of manually-prepared direct purchase requisitions; condensation of maintenance storeroom inventories, while increasing reliability; and generation of new measures for tracking plant reliability.

To complete the maintenance management processes is materials management. This comprises educational maintenance audit and benchmarking tools. Its purpose is, to train and educate the organization in best practices for reliability and maintenance; and to conduct a maintenance audit of the company's reliability and maintenance performance.

Efficiency and effectiveness of maintenance management relies heavily on total comprehension and the ability to address the competencies or areas of expertise involved; and the proper calculation, assembly and conduction of each of its processes.

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