MODULE-III

Construction quality

Quality can be defined as meeting the legal, aesthetic and functional requirements of a project. Requirement may be simple or complex, or they may be stated in terms of the end results required or as a detailed description of what is to be done. But however expressed, quality is obtained if the stated requirement is adequate, and if the completed project conforms to the requirements.

Quality in construction is defined as meeting or exceeding the requirement of client/owners.

Advantages of Quality in construction

- Satisfying the specification mentioned in the contract.
- Completing the project time.
- Fulfilling the owner's requirement within budget.
- Avoiding disputes claims and
- Ensuring the faculties performs its intended purpose.

Quality Control

- Quality control is the periodic inspection to ensure that the constructed facilities meet the standard specified in the contract.
- It's an overall commitment to produce defect free products.

- Most often implemented in the manufacturing and monitoring the quality of finished products.
- Setting up specific standard for construction.
- Checking the deviation from the standard.
- Taking action to correct or minimize the variation.
- Improvement of the standard.

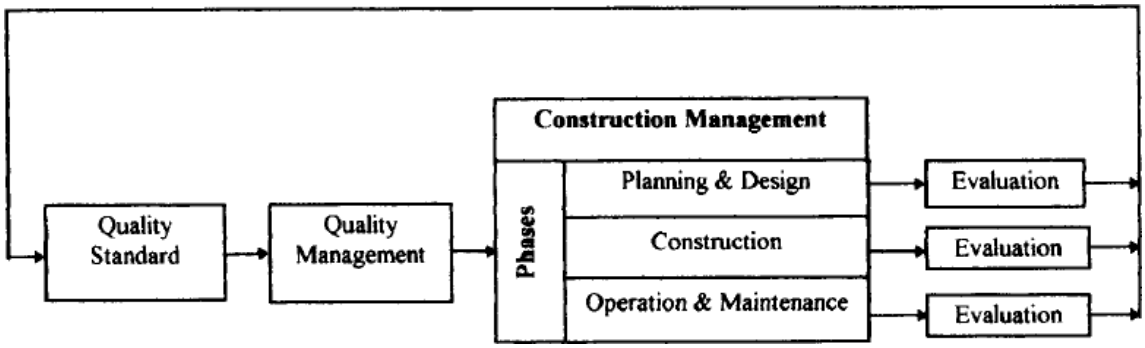
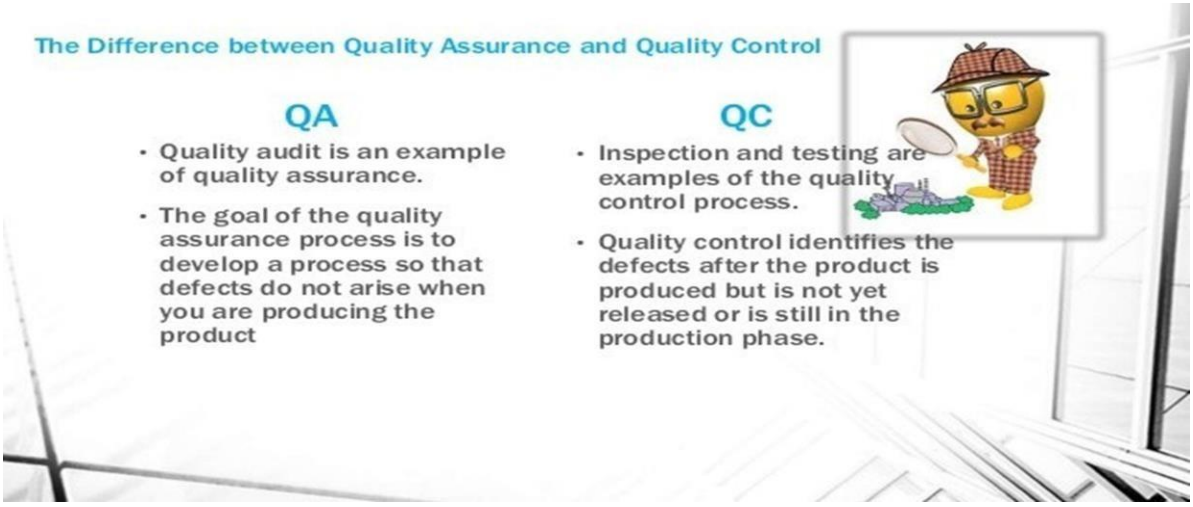


Fig: Total quality control flow chart

Quality Assurance

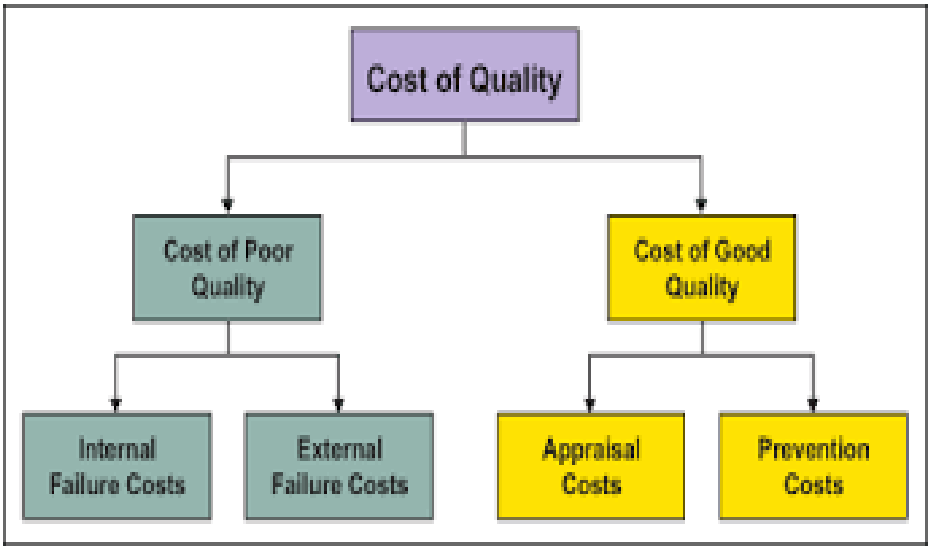
- Quality Assurance (or QA) covers all activities from design, development, production, installation, servicing and documentation.
- It's a scheme adopted by a construction company to maintain the standard or quality consistent.
- Arranging periodical training for its worker.
- A good safety Program.
- A sound procurement system to get best quality material and suppliers.
- A reward scheme for innovative work and competitive career progress scheme.



Cost of quality

Quality costs consist of the cost of prevention, the cost of appraisal and the cost of deviation. Prevention costs are those resulting from activities used to avoid deviations or error, while appraisal costs consists of costs incurred from activities used to determine whether a product,, process or service conforms to established requirements. The cost of design or constructability reviews, as well as the cost of modifying work procedures to adhere to quality standards might be considered prevention cost, while inspection is an example of an appraisal cost. A survey of US firms indicates that the major obstacle to using the ISO 9000 standards is the additional cost of modifying work procedures and the additional cost of revising standards. Deviation costs are those resulting from not meeting the requirements. Some deviation costs are incurred on the project site due to scrap, rework, failure analysis, re-inspection, supplier error, or price reduction due to nonconformity.

Other deviation costs are incurred once the owner takes possession of the constructed facility. These include costs for adjustment of complaints, repair costs, costs for handling and replacing rejected material, workmanship or equipment costs for correcting errors, and litigation costs.



ISO standards

The term ISO describes the series of international standards dealing with product design, production, delivery, service and testing. The ISO 9000 series comprises two basic types of standard: that addressing quality assurance and that addressing quality management. The

quality assurance standards are designed for contractual and assessments purposes and are ISO 9001, ISO 9002, and ISO 9003. The quality management standard is ISO 9004 and is designed to provide guidance for companies developing and implementing quality systems, t7 A company registered as complying with ISO standards has demonstrated to an accredited third party (an approved outside auditor) that its processes have been documented and that the company is systematically auditing and being audited that they are following the policies and procedures necessary to produce high quality products.

- ISO 9000 is a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements to be implemented to maintain an efficient quality system.
- The ISO 9000 series are based on seven quality management principles (QMP).

Seven quality management principles (QMP)

- QMP 1 – Customer focus
- QMP 2 – Leadership
- QMP 3 – Engagement of people
- QMP 4 – Process approach
- QMP 5 – Improvement
- QMP 6 – Evidence-based decision making.
- QMP 7 – Relationship management.

Total Quality Management in the Construction Process

Attainment of acceptable levels of quality in the construction industry has long been a problem. Great expenditures of time, money and resources, both human and material, are wasted each year because of inefficient or non-existent quality management procedures. The manufacturing industry has developed Total Quality Management (TQM) concepts.

TQM is an effort that involves every organization in the industry in the effort to improve performance. It permeates every aspect of a company and makes quality a strategic objective. TQM is achieved through an integrated effort among personnel at all levels to increase customer satisfaction by continuously improving performance. TQM focuses on process improvement, customer and supplier involvement, teamwork, and training and education in an effort to achieve customer satisfaction, cost effectiveness, and defect-free

work. TQM provides the culture and climate essential for innovation and for technology advancement.

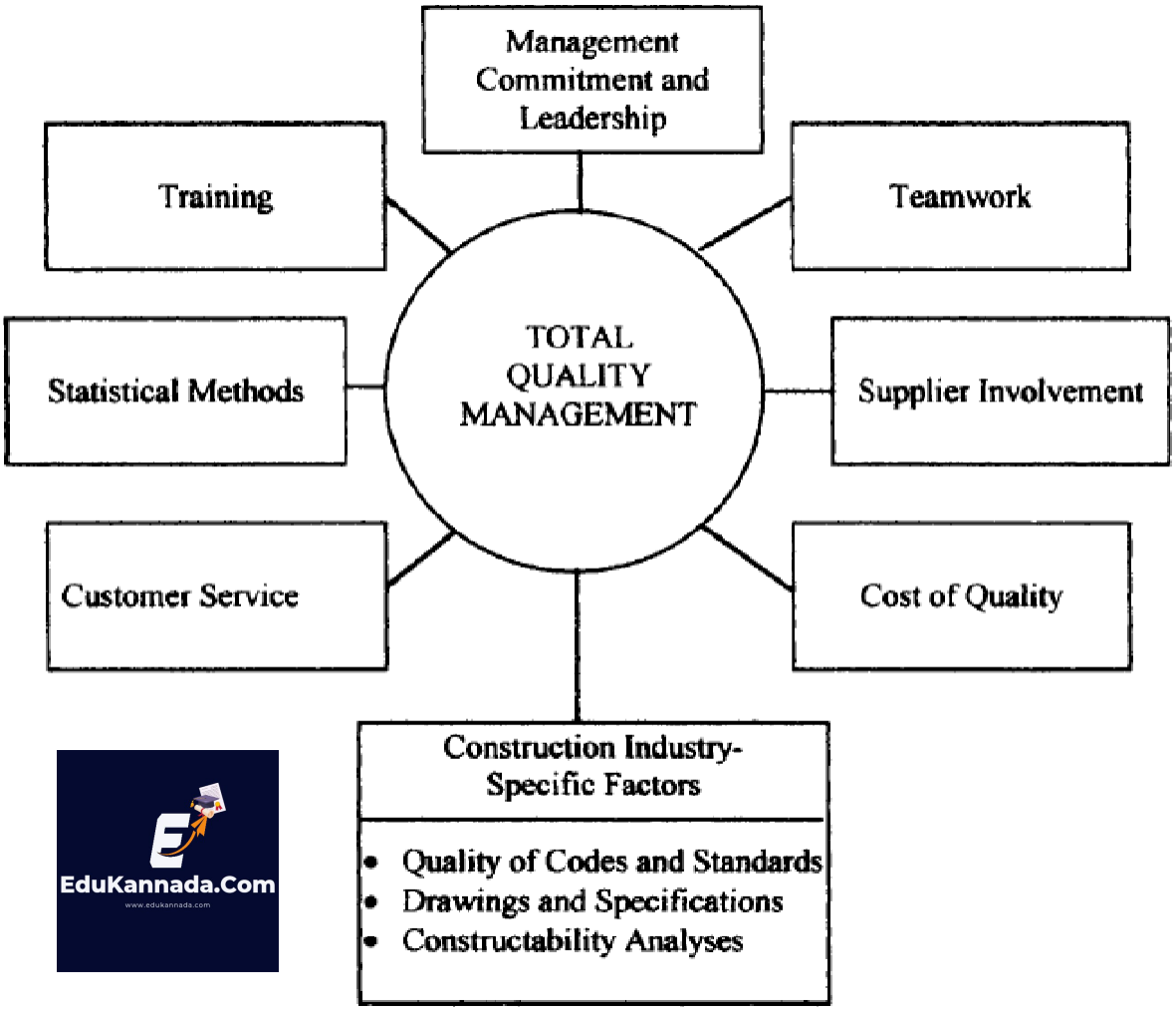


Fig: Elements of total quality management in the construction process

1. Management commitment and leadership

The primary causes for the decline of construction productivity directly or indirectly involved **poor management practices**. Since quality is part of productivity, the first step for management is to recognize that there is a problem. The **success of a TQM** program first of all depends on management practices.

2. Training

The importance is recognized by every quality expert. Under TQM, quality becomes everyone's responsibility and the training must be targeted for every level of the company. There should be customized training plans for management, engineers, technicians, home and field office staff, support personnel and field labour.

3. Teamwork

Quality teams provide companies with the structured environment necessary for successfully implementing and continuously applying the TQM process. Quality training is conducted and the continuous improvement process executed through a well-planned team structure. The ultimate goal of the team approach is to get everyone, including contractors, designers, vendors, subcontractors, and owners involved with the TQM process.

4. Statistical methods

Statistical methods provide problem-solving tools to the TQM process. They provide teams with the tools to identify the causes of quality problems, to communicate in a precise language that can be understood by all team members, to verify, repeat, and reproduce measurements based on data, to determine the past, present, and to a lesser degree, the future status of a work process.

5. Cost of quality

Quality costs consist of the cost of prevention, the cost of appraisal, and the cost of deviation.

6. Supplier involvement

Close and long-term relationships with these suppliers to the construction process are required if the constructor is to achieve the best economy and quality.

7. Customer service

Customers may be either internal or external. Satisfying the needs of these customers is an essential part of the process of supplying the final external customer with a quality product.

8. Construction industry-specific factors

Because of distinguishing characteristics, the construction industry has generally been considered to be quite different from manufacturing industries.

- Quality of Codes and Standard
- Drawings and Specifications
- Constructability Analyses

Construction process

Following schematic diagram shows the complete construction process

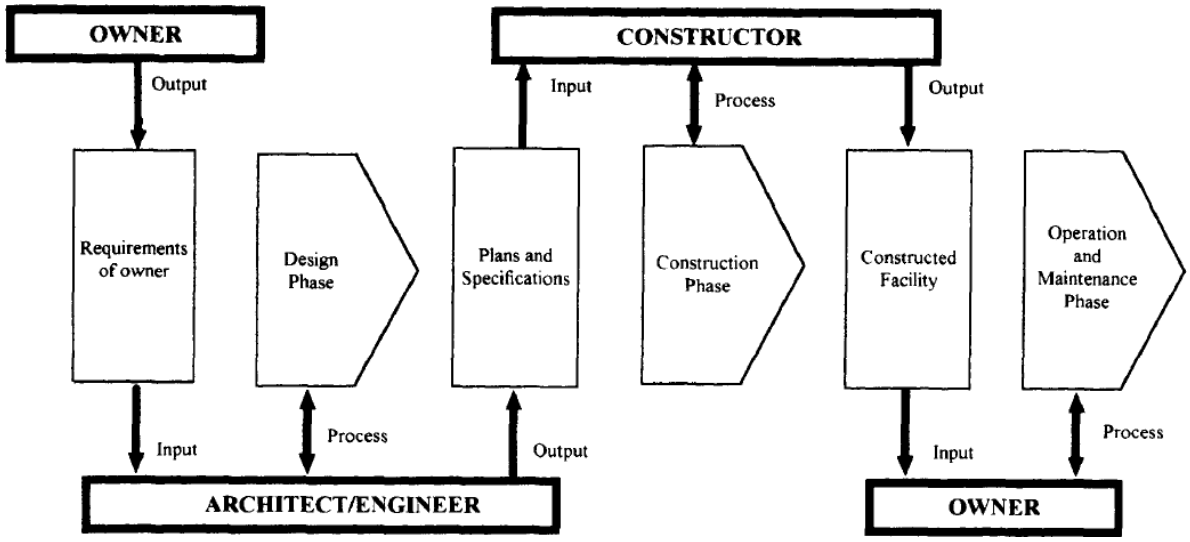


Fig: Construction process

Health, Safety and Environment at Construction Site (HSE)

Safety in Construction

There is a justifiable demand for construction safety throughout the world. Safety laws places the responsibilities on us all to act in a manner so as not to endanger the lives or property of others.

Effective safety implementation programs should focus on both the physical and the behavioural sides of safety and health. A balance between the different components of safety and health is therefore essential.

On the behaviour side. Recent research has produced practical and workable guidelines aimed at the attitudes and actions of top management, project managers and superintendents, foremen and workers.

The physical side of safety involves:

- Education and training.
- Proper utilization and maintenance of correct tools and equipment.
- Equipments for personal protection.
- Good housekeeping
- Frequent inspections by knowledge and objectives professionals.
- Integrating safety and health into thorough preplanning for field operations.

Importance of Safety in Construction

Safety in construction is a prime requisite but it often gets neglected on work sites. With the advancement in construction technology,

The need for proper attention to safety aspects has become essential for human, economic and other considerations. The wide range of construction and building activities involving complex techniques have led to many new problems of safety. However, economic cost is not only the reason a contractor should be concious of construction safety. The reasons for considering safety include:

- **Humanitarian concern:** – When the accident happens, the resulting suffering of the injured workers and their families is difficult to quantify in economic terms. The contractor should never ignore this even if he has insurance against accidents.
- **Economic reason: -** even if a contractor has insurance he will find out that the cost of accidents will come out of his own pocket through an increase in insurance premiums. In addition, there are other indirect costs that results from accidents. The direct and indirect costs of accident can be:

  Direct cost:

  - Medical care expenses for injured
  - Workmen's compensation costs.
  - Insurance premium increase.
  - Replacement cost of equipment and material damaged
  - Fees for legal counsel.

  Indirect cost:

  - Slowdown in operations
  - Decrease in morale which affects productivity.
  - Productive time lost by injures worker and fellow workers.
  - Administrative work associated with accident.
  - Loss of client confidence.
  - Overtime necessitated by work slowdown.

LAWS AND REGULATIONS:- The occupancy safety and health act of 1970 (OSHA) requires that each employer furnish to each of his employees a place of employment which is free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees.

''VOILATION OF THIS LAW WILL BE SUBJECT TO FEDERAL PENALTY.''

ORGANIZATIONAL IMAGE: - A good safety record can produce higher morale and productivity and stronger employee loyality. It will also improve the company's public image and therefore make it easier to acquire negotiated jobs.

CONSTRUCTION SAFETY PROBLEMS

There are numerous problems associated with construction site hazards which result in injury and even death. These problems can range from negligence to construction equipment accidents. A few are listed below:

- Pressure tends to increase the accident rate.
- Competition among workers tends to increase the accident rate.
- Workers who fears of their job security tend to have more accidents.
- Speedy job are more accident prone.
- Workers who are not taught safety rules and regulations pertaining to the job are accident prone.
- Long working hours – lack of rest can cause serious accidents.
- Unsafe working tools and equipments can cause serious accidents.
- Unsupervised jobs can result in accidents.
- Adequate construction safety apparel neglected.
- Smoking in the areas in which there are dangerous gases present.

SAFETY MEASURES

Prevention of accidents is a major aim of construction management, both for human and financial considerations. In order to prevent accidents at construction sites, certain safety measures need to be taken in the following major activities prone to risks of accidents:

Safety measures for excavation

- In all works, an experienced and competent foreman or supervisor should look after the excavation work. He should have authority to enforce safety rule and prevent the use of defective/unsafe appliances.
- Before doing the excavation, a complete knowledge of underground structures such as sewers, water pipe lines, gas mains etc. Is essential and proper precautions should be taken to prevent accidents to the workmen engaged in excavation
- Safety helmets should be worn by all persons entering a trench where hazards from falling stones, timber or other material exist.
- Whenever workmen have to excavate in trenches, in soil, soft, or fissured rock or hard soil exceeding 2m in depth, the trenches should be securely shored and timbered.
- Heavy equipment, such as excavating machinery, trucks. Dumpers etc. Should be kept away from excavated sides at a distance not less than the depth of trench or at least 6m for trenches deeper than 6m.
- At places where public is likely to trespass, fences or barricades should be erected to avoid accidents. At night, excavated areas should be adequately lighted.
- Sheathing should be placed against the side of the trench so that the length of each piece of sheathing is vertical. Where the trench is excavated in loose or soft soil, each piece of sheathing should be driven into the bottom of the trench so as to be firmly held in place.
- Excavated material should be kept away from the edge of the trench in order to provide a clear berm width of not less than one third the final depth of excavation. However, in special cases where disposal area is limited, the minimum berm width should not be less than 1 m.

SAFETY MEASURES FOR HOT BITUMINOUS WORKS.

- On all major works, an experienced foreman or supervisor should be placed in charge or the work that should guard against the use of defective/unsafe appliances, equipment and tools and should keep atock of fire extinguishing equipment and first aid kit etc.

- Workers engaged on jobs involving handling of hot bitumen should use protective wares such as boots, gloves, goggles and helmets.
- When heating and handling of hot bituminous materials is to be done in the open, sufficient stocks of clean dry sand or loose earth should be kept ready at the work site to cope with any resultant fire. When such materials are not available, arrangement must be made for adequate supply of water to extinguish the fire.
- Bitumen plants should be provided with safe means of access. Working platforms should be provided with hand rails, and pulleys, belts and drive mechanisms should all be protected by suitable guards.
- Compressors, electrical installations and other equipment such as elevators and conveyors should be adequately protected from weather, mechanical damage and dust particles.
- When bitumen plants are working on a public road, an adequate traffic control system must be established.

SAFETY MEASURES FOR DRILLING AND BLASTING

- To transport small quantity of explosives (approx. 5kg) specially designed insulated containers may be used which are made of finished wood not less than 5cm thick. Or plastic not less than 6mm thick. The container should be waterproof and free from any metal parts (such as nails, screws etc.)
- Vehicles to be used for transporting explosives should be in good working condition with tight wooden or non-sparkling metal floor and sides.
- Smoking is strictly prohibited at places where explosives are stored.
- Explosives should be stored only in a magazine which is clean, dry, well ventilated, reasonably cool, bullet and fire resistant.
- Explosives and fuse lighters should not be stored in a damp or wet place or near oil, gasoline or steam pipes, or other sources of heat.
- Leaves, grass or debris of any kind should not be allowed to accumulate within 8m of the magazine.
- Any package containing explosives should not be dragged, dropped or handled roughly and these packages should be opened only at a safe distance from the package of explosives in bulk storage.

- No person should attempt to uncoil the wires and open the bare leading wires of the electric blasting caps during dust storms.

SAFETY MEASURES FOR SCAFFOLDING, LADDERS, FORMWORK AND OTHER EQUIPMENT

- Every scaffold should be securely supported or suspended and properly strutted or braced to ensure stability.
- All scaffolds and working platforms should be securely fastened to the building or structure. If independent of a building, they should be braced properly.
- If scaffolds are to be used to a great extent for long periods of time, a regular plank stairway, wide enough to allow two people to pass, should be erected with handrails on both sides.
- When work is being performed above a scaffold platform, a protective overhead covering should be provided for the men working on the scaffolds. The protection should not be more than 3m above the scaffold platform and should be made of planks.
- For wooden ladders, no rugs should be fixed to the stringer with nails, spikes or other similar fixings. In case of bamboo ladders, rugs may be fixed to the rails with spikes of approx. Design and strength.
- Ladders employed in behaviour trades should not exceed 6m in length. For lighter trades, ladders should not exceed 8m in length.
- During dismantling of scaffolds, necessary precautions should be taken to prevent injury to person sure to fall of loose materials, bracings and other parts of scaffolds.
- Care should be taken to see that no uninsulated electric wires exist within 3m of the working platforms, gangway etc. Of a scaffold.
- The supporting bellies for framework should be checked for each individual member. The bellies should be properly braced. Many accidents occur due to negligence on this account.
- All operators and supervisors of machines should be thoroughly trained in operating the machines and equipment. All person handlings construction equipment should be completely acquainted with the safety aspects of machines and then operation.
- Safety in terms of both main and auxiliary equipment should be considered at all construction sites. Unauthorised persons should not be allowed to handle or operate any equipment. Ropes and connections should be thoroughly checked before use.

SAFETY IN FABRICATION AND ERECTION.

- All equipment such as gas cutting and welding sets, drills. Power hacksaws, grinders etc. Should be checked periodically to ensure their safe working.
- Moving parts of all equipment should be provided with safety guards.
- Rubber pipe-lines for oxygen and acetylene gas should regularly check for leakage or damage. Leakage of gas from regulators, pipe lines or connections with the gas torch should be rectified immediately.
- Workers engaged in gas cutting and welding operations should wear suitable gloves and aprons and use proper welding screens.
- Power cables for all equipment should be properly insulated and protected from damage and cuts.
- Danger signs should be prominently displayed on all poles top avoid accidents.
- All lifting tools and tackles such as wire ropes, u-clamps, shackles, and chain pulley blocks hook etc. Should be checked thoroughly before undertaking erection work.
- All erection equipment such as cranes, derricks, hoists etc. Should be thoroghly checked before use.
- Workers engaged in erection works should wear helmets and use safety belts to avoid accidents.

SAFETY IN STORAGE

- Timber including sleepers, runners, scantlings, bellies, plywood etc. Should be stored separately in neat stacks. Adequate space should be left in between the stacks to avoid fire hazard. Smoking and open fires should be prohibited in timber yards and stores.
- Petroleum products should be separately stored. Smoking and open fires should be strictly prohibited where these products are stored. Only essentially required quantities of such products should be stored at site.
- Adequate fire fighting arrangements should be provided at site particularly in areas where petroleum products and timber are stored.

- Explosives must be stored in proper magazines and the prescribed safety measures for handling and stores of explosives should be observed.

SAFETY MEASURES FOR DEMOLITION.

- On every demolition work, danger signs should be provided all around the structure and doors giving access to the structure. Barricades should be erected around the structure and at least two exists must be provides for the escape of workman during any emergency.
- During night time, red light should be placed around the barricades and entry of unauthorised persons restricted.
- At the time of demolition work, workers should use all safety appliances such as helmet, goggles, gloves etc.
- In case any danger is anticipated to the adjoining structure during the process of demolition, the same should be got vacated to avoid any danger to human life.
- The process of demolition may weaken the side walls of an adjoining structure and to prevent possible damage, these walls should be supported until permanent protection is provided.
- The power on all electric service lines must be shut off and all such lines disconnected before the demolition work is started.
- All gas, water, steam and other service lines must be shut off before the demolition work is started.
- If a structure to be demolished has been partially wrecked by fire, explosion or other catastrophe, the walls and damaged roofs should be braced suitably.
- No demolition work should be carried out at night especially when the structure to be demolished is in an inhabitated area.

For safety against fire hazards in buildings, early warning systems should be installed to detect fire and give fire alarm so as to protect the structure and its occupants. The early warning system commonly used consists of a smoke detector. All buildings should be designed to satisfy fire safety requirement as per codal provisions.

With the increase in the number of accidents in the construction industry, it is becoming essential to educate workers in regard to various safety measures. Towards this end, safety campaigns should be launched at work sites. A continuing safety education programme incorporating the use of print and non-print media will prove effective in reducing the accident rate. Safety measures must be considered an integral part of the construction activity itself. This will help in protecting life and property and in reducing the project cost.

Morals and Values

Morals:

Morals are principles and values based on what a person or society believes are the right, proper or acceptable ways of behaving.

Values:

Values of a person or group are the moral principles and beliefs that they think are important in life and that they tend to live their lives by such values as guiding principles.

Morals or Ethical Principles

Ethical values, translated into active language establishing standards or rules describing the kind of behavior an ethical person should and should not engage in, are ethical principles. The following lists of principles incorporate the characteristics and values that most people associate with ethical behavior.

1. HONESTY. Ethical executives are honest and truthful in all their dealings and they do not deliberately mislead or deceive others by misrepresentations, overstatements, partial truths, selective omissions, or any other means.

2. INTEGRITY. Ethical executives demonstrate personal integrity and the courage of their convictions by doing what they think is right even when there is great pressure to do otherwise; they are principled, honourable and upright; they will fight for their beliefs. They will not sacrifice principle for expediency, be hypocritical, or unscrupulous.

3. PROMISE-KEEPING & TRUSTWORTHINESS. Ethical executives are worthy of trust. They are candid and forthcoming in supplying relevant information and correcting misapprehensions of fact, and they make every reasonable effort to fulfill the letter and spirit of their promises and commitments. They do not interpret agreements in an unreasonably technical or legalistic manner in order to rationalize non-compliance or create justifications for escaping their commitments.

4. LOYALTY. Ethical executives are worthy of trust, demonstrate fidelity and loyalty to persons and institutions by friendship in adversity, support and devotion to duty; they do not use or disclose information learned in confidence for personal advantage. They safeguard the ability to make independent professional judgments by scrupulously avoiding undue influences and conflicts of interest. They are loyal to their companies and colleagues and if they decide to accept other employment, they provide reasonable notice, respect the proprietary information of their former employer, and refuse to engage in any activities that take undue advantage of their previous positions.

5. FAIRNESS. Ethical executives and fair and just in all dealings; they do not exercise power arbitrarily, and do not use overreaching nor indecent means to gain or maintain any advantage nor take undue advantage of another's mistakes or difficulties. Fair persons manifest a commitment to justice, the equal treatment of individuals, tolerance for and acceptance of diversity, the they are open-minded; they are willing to admit they are wrong and, where appropriate, change their positions and beliefs.

6. CONCERN FOR OTHERS. Ethical executives are caring, compassionate, benevolent and kind; they like the Golden Rule, help those in needs, and seek to accomplish their business objectives in a manner that causes the least harm and the greatest positive good.

7. RESPECT FOR OTHERS. Ethical executives demonstrate respect for the human dignity, autonomy, privacy, rights, and interests of all those who have a stake in their decisions; they are courteous and treat all people with equal respect and dignity regardless of sex, race or national origin.

8. LAW ABIDING. Ethical executives abide by laws, rules and regulations relating to their business activities.

9. COMMITMENT TO EXCELLENCE. Ethical executives pursue excellence in performing their duties, are well informed and prepared, and constantly endeavor to increase their proficiency in all areas of responsibility.

10. LEADERSHIP. Ethical executives are conscious of the responsibilities and opportunities of their position of leadership and seek to be positive ethical role models by their own conduct and by helping to create an environment in which principled reasoning and ethical decision making are highly prized.

11. REPUTATION AND MORALE. Ethical executives seek to protect and build the company's good reputation and the morale of its employees by engaging in no conduct that

might undermine respect and by taking whatever actions are necessary to correct or prevent inappropriate conduct of others.

12. ACCOUNTABILITY. Ethical executives acknowledge and accept personal accountability for the ethical quality of their decisions and omissions to themselves, their colleagues, their companies, and their communities.

Work Ethic

A strong work ethic is vital to a company achieving its goals. Every employee, from the CEO to entry-level workers, must have a good work ethic to keep the company functioning at its peak. A work ethic is a set of moral principals an employee uses in his job. Certain factors come together to create a strong work ethic.

1. Strong Work Ethic

Employers value employees who understand and possess a willingness to work hard. In addition to working hard it is also important to work smart. This means learning the most efficient way to complete tasks and finding ways to save time while completing daily assignments. It's also important to care about your job and complete all projects while maintaining a positive attitude. Doing more than is expected on the job is a good way to show management that you utilize good time management skills and don't waste valuable company time attending to personal issues not related to the job. Downsizing in today's job market is quite common so it's important to recognize the personal values and attributes employers want to improve your chances of job security should a layoff occur.

2. Dependability and Responsibility

Employer's value employees, who come to work on time, are there when they are supposed to be, and are responsible for their actions and behavior. It's important to keep supervisors abreast of changes in your schedule or if you are going to be late for any reason. This also means keeping your supervisor informed on where you are on all projects you have been assigned. Being dependable and responsible as an employee shows your employer that you value your job and that you are responsible in keeping up with projects and keeping them informed of the things that they should know about.

3. Possessing a Positive Attitude.

Employers seek employees who take the initiative and have the motivation to get the job done in a reasonable period of time. A positive attitude gets the work done and motivates others to do the same without dwelling on the challenges that inevitably come up in any job. It is the enthusiastic employee who creates an environment of good will and who provides a positive role model for others. A positive attitude is something that is most valued by supervisors and co-workers and that also makes the job more pleasant and fun to go to each day.

4. Adaptability

Employers seek employees who are adaptable and maintain flexibility in completing tasks in an ever changing workplace. Being open to change and improvements provides an opportunity to complete work assignments in a more efficient manner while offering additional benefits to the corporation, the customer, and even the employee. While oftentimes employees complain that changes in the workplace don't make sense or makes their work harder, oftentimes these complaints are due to a lack of flexibility.

Adaptability also means adapting to the personality and work habits of co-workers and supervisors. Each person possesses their own set or strengths and adapting personal behaviours to accommodate others is part of what it takes to work effectively as a team. By viewing change as an opportunity to complete work assignments in a more efficient manner, adapting to change can be a positive experience. New strategies, ideas, priorities, and work habits can foster a belief among workers that management and staff are both committed to making the workplace a better place to work.

5. Honesty and Integrity

Employers value employees who maintain a sense of honesty and integrity above all else. Good relationships are built on trust. When working for an employer they want to know that they can trust what you say and what you do. Successful businesses work to gain the trust of customers and maintain the attitude that "the customer is always right". It is the responsibility of each person to use their own individual sense of moral and ethical behavior when working with and serving others within the scope of their job.

6. Self – Motivated

Employers look for employees who require little supervision and direction to get the work done in a timely and professional manner. Supervisors who hire self-motivated employees do

themselves an immense favour. For self-motivated employees require very little direction from their supervisors. Once a self-motivated employee understands his/her responsibility on the job, they will do it without any prodding from others. Employers can do their part by offering a safe, supportive, work environment that offers employees an opportunity to learn and grow. Working in a supportive work environment and taking the initiative to be self-directive will provide employees with a better sense of accomplishment and increased self-esteem.

7. Motivated to Grow & Learn

In an ever-changing workplace, employers seek employees who are interested in keeping up with new developments and knowledge in the field. It has been noted that one of the top reasons employees leave their employers is the lack of opportunity for career development within the organization. Learning new skills, techniques, methods, and/or theories through professional development helps keep the organization at the top of its field and makes the employee's job more interesting and exciting. Keeping up with current changes in the field is vital for success and increased job security.

8. Strong Self – Confidence

Self-confidence has been recognized as the key ingredient between someone who is successful and someone who is not. A self – confident person is someone who inspires others. A self-confident person is not afraid to ask questions on topics where they feel they need more knowledge. They feel little need to have to impress others with what they know since they feel comfortable with themselves and don't feel they need to know everything.

The self-confident person does what he/she feels is right and is willing to take risks. Self-confident people can also admit their mistakes. They recognize their strengths as well as their weaknesses and are willing to work on the latter. Self-confident people have faith in themselves and their abilities which is manifested in their positive attitude and outlook on life.

9. Professionalism

Employers value employees who exhibit professional behavior at all times. Professional behavior includes learning every aspect of a job and doing it to the best of one's ability. Professionals look, speak, and dress accordingly to maintain an image of someone who takes pride in their behavior and appearance. Professionals complete projects as soon as possible and avoid letting uncompleted projects pile up. Professionals complete high quality work and

are detail oriented. Professional behavior includes all of the behavior above in addition to providing a positive role model for others. Professionals are enthusiastic about their work and optimistic about the organization and its future. To become a professional you must feel like a professional and following these tips is a great start to getting to where you want to go.

10. Loyalty

Employers value employees they can trust and who exhibit their loyalty to the company. Loyalty in the workforce has taken on a new meaning. Gone are the days when employees plan on starting out and retiring with the same company. It is said that most people will hold between 8 – 12 jobs throughout their career. What does this mean in terms of loyalty in today's workforce?

Companies offering employee growth and opportunity will ultimately gain a sense of loyalty from their employees. Employees today want to feel a sense of satisfaction in their jobs and will do a good job when they feel that the employer is fair and wants to see them succeed. Although this may mean only staying for five or ten years in a position, employees can offer loyalty and make an important contribution during their time with the company.

More companies today encourage employee feedback and offer employees an opportunity to lead in their area of expertise. This gives employees a greater sense of satisfaction and a sense of control over their job. Empowerment encourages employees to do their best work since companies are displaying a trust and expectation that they believe in their employees to do a good job.

Offering jobs that encourage learning and the development of new skills also gives employees a sense of empowerment in the workplace. Aligning an employee's values with the goals of the organization will foster loyalty and a bond between employer and employee. Fostering good relationships within an organization and offering constructive ways to handle conflict provides a win – win situation for both employer and employee. Creating an organization that values loyalty within the organization can also work to its benefit by using the same techniques and strategies to establish loyalty with customers; and loyalty from customers ultimately makes for a successful business.

The Importance of Ethics in the Engineering Sector

Engineers are the engines of the modern world. They are the people that keep theworld operative through various constructions, inventions, discoveries andmanufacturing. They are the creators of civilizations.

An engineer should have the ability and judgement to refine one's behaviours, decisions and actions in performing the duty to the family, organization and to thesociety. Thus, he has to often make difficult choices while performing his responsibilities. A set of beliefs, attitudes and has its is thus essential for an engineer so that he is a有le to make the correct decisions. Ethics are, therefore, the guiding principles to the decision making capability of an engineer.

1. Structural Failures

Engineering took on much more importance in everyday life after the Industrial Revolution. Large-scale engineering projects came to dominate the landscape of most major countries. Highlighting the importance of solid engineering were the structural failures of several notable landmarks, such as the Quebec Bridge in 1907, which cost many lives. Engineering ethics began to take on a supreme importance in this way, as people learned that lives depended on a well-crafted design.

2. Public Welfare

Similar to the Hippocratic Oath in medicine, the first duty of the engineer is to protect the welfare and safety of the public -- do no harm. This means being completely certain of the integrity of any structure and thoroughly testing the safety of any product, even if there is temptation to cut corners or overlook a concern that would be inconvenient. The purpose of establishing professional ethics is to enforce a minimal standard.

3. Whistle-Blowing

There is no excuse for an engineer if she says she allowed a faulty project to go through because she was obeying orders. All engineers have the duty to report any faulty engineering of which they are aware. If an organization refuses to take the necessary steps on its own to fix a problem, it is the duty of the engineer to be a whistle-blower and report the organization to the proper government authorities.

4. Professional Associations

As engineers became more prominent and important to society following the Industrial Revolution, many different engineering societies came about. These societies generally

follow a certain specialization of engineering, such as the Institute of Electrical and Electronics Engineers. Such organizations seek very prominently to promote ethical concerns within the field, and they typically have an explicit code of ethics they expect all members to follow. Members can be expelled if they are found in violation.

Professional Ethics in Engineering

1. Confidentiality

Confidentiality is the protection of personal information. Confidentiality means keeping a client's information between you and the client, and not telling others including co-workers, friends, family, etc.

Examples of maintaining confidentiality include:

- Individual files are locked and secured
- Support workers do not tell other people what is in a client's file unless they have permission from the client
- Information about clients is not told to people who do not need to know
- Clients' medical details are not discussed without their consent
- Adult clients have the right to keep any information about themselves confidential, which includes that information being kept from family and friends.

The types of information that is considered confidential can include:

- Name, date of birth, age, sex and address
- Current contact details of family, guardian etc
- Bank details
- Medical history or records
- Personal care issues
- Service records and file progress notes
- Individual personal plans
- Assessments or reports
- Guardianship orders
- Incoming or outgoing personal correspondence.

2. Conflicts of interest

A conflict of interest is a situation in which an individual has competing interests or loyalties. A conflict of interest can exist in many different situations. The easiest way to explain the concept of conflict of interest is by using some examples.

- With a public official whose personal interests conflict with his/her professional position.
- with a person who has a position of authority in one organization that conflicts with his or her interests in another organization
- With a person who has conflicting responsibilities.

Conflicts of Interest in the Workplace

An employee may work for one company but he or she may have a side business that competes with the employer. In this case, the employee would likely be asked to resign or be fired.

3. Gifts and bribes

- A bribe is a substantial amount of money or goods offered beyond a stated business contract with the aim of winning an advantage in gaining or keeping the contract.
- Gifts are not bribes as long as they are small gratuities offered in the normal conduct of the business.
- Prearranged payments made by contractors to companies in exchange for contracts actually granted are called "kickbacks".
- Bribes are illegal or immoral because they are substantial enough to threaten fairness in competitive situations, while gratuities are of smaller amounts.
- "Engineers shall not solicit nor accept gratuities directly or indirectly from contractors, their agents, or other parties dealing with their clients or employers in connection with work for which they are responsible".

Difference between Gifts and Bribes

Tests	Bribe	Gift
Timing	Given before	Given after
Cost of item	Large amount	Small amount, articles of daily use
Quality of Product	Poor	Good/High
Transparency	Made in secret	Made in open
Motive	Expect undue favor	Thanking for favor
Consequence on organizations' good will	Damaging the goodwill and reputation	No damage is involved.

4. Whistle-blowing

Whistle-blowing is the act of telling the authorities or the public that the organization you are working for is doing something immoral or illegal.

—**Features of whistle-blowing**

1. Act of disclosure: - Information is intentionally conveyed outside approved organizational channels.

2. Topic: - The information concern what the person believes is a significant problem for the organization.

3. Agent: - The person disclosing the information is an employee or former employee.

4. Recipient: -The information is conveyed to a person or organization in a position to act on problems.

Types of whistle-blowing

—Based on the destination, whistle blowing is classified into:

1. **Internal: -** The information is conveyed to a person within the organization, but beyond the approved channels.
2. **External: -** This happens when the information is transmitted outside the organization.

5. Employee rights

- Employee rights are any rights, moral or legal, that involve the status of being an employee.
- They include some professional rights that apply to the employer-employee relationship.
- Employee rights include fundamental human rights relevant to the employment situation. E.g.:- the right not to be discriminated against one's sex, age or national origin.

6. Right to privacy

- ✓ Is the right to control the access to and use of information about oneself.
- ✓ Is limited in certain situations by employers' rights.
- ✓ Only duly authorized persons can get the personal information.
- ✓ A supervisor might suspect a worker and conduct a search in his cupboard when the worker is absent. But the supervisor is to have another officer as witness in such cases.

7. Trademark

- Trademark is a wide identity of specific good and services, permitting differences to be made among different trades.
- It is a territorial right which needs registration.
- Registration is valid initially for 10 years and renewable.
- It may be registered in form of a heading, label, a ticket, a word, logos.

8. Trade secret

- Trade secret is the information which is kept confidential as a secret.
- This information is not accessed by other than the owner and this gives a commercial advantage over the competitors.
- Trade secrets are not registered but only kept confidential.
- Trade secrets may be formulae or methods or test results or data collected, analyzed and synthesized.
- This information should not be disclosed or used by any other person.

9. Discrimination

- Is morally unjustified treatment of people on arbitrary or irrelevant grounds.
- Because of caste, sex, religion and language are regressive actions.

- Reverse preferential treatment is giving an advantage to a member of a group that in the past was denied equal treatment, in particular, women and minorities.

Discrimination-examples

- ✓ A senior manager post is vacant. There is competent ad proven candidate from outside the state. A local engineer with lesser competence is proved.
- ✓ Prize amounts for the winners in the world sport are not the same for men and women.
