

MODULE 3

Construction disputes and settlement:

- Types of disputes
- Modes of settlement of disputes
Arbitration
- Arbitrator
- Advantages and disadvantages of arbitration
- Arbitration Award

Construction cost and budget:

- Construction cost
- Classification of construction cost
- Unit rate costing of resources
- Budget
- Types of budget
- Project Master budget

CONSTRUCTION DISPUTES AND SETTLEMENTS

- Dispute implies assertion of a claim by one party and repudiation thereof by another. Thus, neither a mere claim without repudiation nor a pair of claim and counterclaim can be called a dispute.

CAUSES OF DISPUTES

- The genesis of many disputes often lie in the contract document itself.
- It is often observed that tenders are hastily made and sufficient attention is not paid to ensure that
- a) All the required information and details are appropriately incorporated in the tender document.
 - b) the documents are internally consistent, i.e., there is no contradiction in the provision of general conditions, special conditions and drawings
 - c) Specifications where required
- Incompleteness, inaccuracy and inconsistency of information are only part of the reasons for disputes in construction project.

CAUSES :1. Incorrect ground data

- Such data includes information about ground conditions, depth of ground water table, rainfall and temperature data, availability of power and water etc.
- Any difference between the ground reality during execution and the conditions provided in the contract could easily be the reason for disputes.

2. Use of faulty and ambiguous provisions or language in contracts.

- The language of the contract should be clear and such that it is not open to different interpretations.

3 Deviations

- The contract should be so designed that there are as few extra items or deviations as possible.
- In other words, the scope of work in any contract should be unambiguously defined, and this obviously calls for thorough preparation on the part of the client or owner before actually floating an enquiry.

4 Unreasonable attitudes.

- It should be borne in mind that in order to complete the work professionally, it is important that the parties involved resort to unilateral action to preserve an environment of mutual trust.
- Thus both the client and contractor need to have professional approach to the project, including areas where there could be disagreement on interpretation.

5 Contractor being of poor means

- It is important that the contractor identified to do a job possesses the required human, financial and technical resources.
- In the absence of any of these, it is very likely that the contractor will look for an escape route for leaving the project, and may try to force a termination of the contract.

6. Unfair distribution of risk

- This could be a major reason for not only avoidable litigation but also increase in the cost of the project.

MECHANISM OF DISPUTE RESOLUTION

Apart from the normal legal process, emphasis here is on the alternative dispute resolution mechanisms generally available in construction contracts.

Such mechanisms could include negotiation, mediation, conciliation and arbitration.

1 NEGOTIATION

- This could refer to a focused discussion on the dispute among the engineers from all interested parties, with the intention of resolving differences without the involvement of third parties.
- Indeed, this is an informal process in the legal sense.
- The negotiation process is fast and does not involve additional expenses.
- The discussions are held between the parties across the table in a cordial and peaceful atmosphere.

2. MEDIATION AND CONCILIATION

- Mediation and conciliation are essentially an informal process in which the parties are assisted by one or more neutral third parties in their efforts towards settlement.
- These mediators do not sit in judgement but try to advise and consult impartially with the parties.
- Mediation and conciliation are voluntary in the sense that the parties participate of their own free will and a neutral third party simply assist them in reaching a settlement.
- The process is private, confidential and conducted without prejudice to any legal proceedings.

Stages in mediation process :

- In the pre-mediation stage, there has to be a basic agreement among the parties to the mediation process, including the identification of a mediator.

- Mediation could be direct or indirect, and could involve meeting with parties, presentations being made by them, putting together of facts, negotiations and settlement.
- Finally, a mediator may also like to be involved in the process of compliance with the settlement reached.

Advantages :-

- (i) Less time consuming
- (ii) Involve lesser cost
- (iii) Outcome could be more satisfying to the parties.
- (iv) Minimizing further disputes
- (v) It opens channels of communication and could contribute greatly to preserving or enhancing a professional relationship
- (vi) Empower the parties and give them greater confidence in their ability to handle disputes.

3. ARBITRATION

- Arbitration perhaps the most commonly used mechanism for settlement of technical disputes in a construction project.
- It is a quasi judicial process to extent that legal protocol is largely observed and it is important that the arbitrator who basically acts as judge, understands legal procedures.
- In India, the Arbitration and Conciliation Act 1996 provides legal "frame work" for arbitration process
- In principle, collection and interpretation of evidence, examination and cross-examination of witness etc are some examples of essentially legal matters, which an arbitrator needs to have a sound understanding of.

- Arbitrator should be able to guide and provide a direction to the proceedings, which could be quite tough especially when the parties to the disputes are represented by professional lawyers.
- As far as the number of arbitrators is concerned, much like the judicial system, technical disputes can also be resolved by single arbitrators, or panel of several arbitrators and though the parties are free to determine the number of arbitrators, it should be ensured that the number is odd, so that a situation of a tie in an award is preempted.
- One arbitrator each is nominated by the contractor and the owner and these individuals together choose a third colleague arbitrator to complete the constitution of a bench of arbitrators.

Causes leading to arbitration :

- (i) Incorrect ground data
- (ii) Contracts containing faulty and ambiguous provisions

Advantages of arbitration :-

1. Faster than litigation in court
2. Cheaper and more flexible
3. Arbitral proceedings and arbitral awards are generally non public and can be made confidential.
4. In arbitral proceedings the language of arbitration may be chosen, whereas in judicial proceedings the official language of the country of the competent court will be automatically applied.
5. Arbitration awards are generally easier to enforce in other nations than court verdicts.
6. In most legal systems there are very limited avenues for appeal of an arbitral award, which is sometimes an advantage because it limits the duration of the dispute and any associated liability.

Disadvantages of arbitration :-

1. Arbitration agreements are sometimes contained in ancillary agreements and consumers and employees often do not know in advance that they have agreed to mandatory binding pre-dispute arbitration by purchasing a product or taking a job.
2. The parties waive their rights to access the court and to have a judge or jury decide the case.
3. If the arbitrator or arbitration forum depends on the corporation for repeat business, there may be an inherent incentive to rule against the consumer.

4. There are very limited avenues for appeal, which means that an erroneous decision cannot be easily overturned.
5. Although usually thought to be speedier, when there are multiple arbitrators on the panel, juggling their schedules for hearing dates in long cases can lead to delays.
6. In some legal systems, arbitration awards have fewer enforcement options than judgements, although in the United States arbitration awards are enforced in the same manner as court judgements and have the same effect.
7. Arbitrators are generally unable to enforce interlocutory measures against a party, making it easier for a party to take steps to avoid enforcement of member or a small group of members in arbitration due to increasing legal fees, without explaining to the members the adverse consequences of an unfavourable ruling.
8. Discovery may be more limited in arbitration or entirely nonexistent.
9. The potential to generate billings by attorneys may be less than pursuing the dispute through trial.
10. Unlike court judgements, arbitration awards themselves are not directly enforceable. A party seeking to enforce an arbitration award must resort to judicial remedies, called an action to confirm an award.

ARBITRAL AWARDS

Arbitration awards are characteristically an award of damages against a party in many jurisdictions tribunals have a range of remedies that can form a part of the award. These may include

→ Payment of a sum of money (conventional damages)

- The making of a declaration as to any matter to be determined in the proceedings.
- In most jurisdictions, the tribunal has the same power as court to
 - * Order a party to do or refrain from doing something (injunctive relief)
 - * to order specific performance of a contract
 - * to order the rectification, setting aside or cancellation of a deed or other document.

CONSTRUCTION COST

Whether you are a property owner or a contractor, you want to have a clear and accurate forecast of how much a building project will cost and how long will it take before you begin.

Planning construction cost :-

- It encompasses planning judgement, costing techniques, cost control measures etc.
- It use standard cost concepts for costing work packages

CLASSIFICATION OF CONSTRUCTION COST



1. DIRECT COSTS

The cost of materials, labour and other expenses which can be identified with the execution of an item of work.

It can be divided in to

- a) Direct material cost
- b) Direct labour cost
- c) other direct expenses.

a) Direct material cost

→ These covers all the cost related to materials

→ It includes the following

- * Purchase costs
- * Transportation costs (includes means of transportation, custom clearance, insurance, handling charges)
- * Site manufacturing and fabrication costs (window or door fabrications, reinforcement fabrications etc).

b) Direct labour cost

→ It covers net expense of procurement, maintenance and wages of foremen and all category of workers employed at work sure for the execution of project.

→ It includes

- * Basic wages
- * Overtime and allowances.
- * Procurement expenses includes recruitments and conveyance at site.
- * Benefits and statutory regulations (Earned leave, provident fund, gratuity, bonus, insurance etc.)

c) Other direct expenses

→ It includes all other expenses on account of service rendered, which can directly attributed to, and clearly identified with the execution of an activity or work item.

→ It includes

- * Special purpose plant and machinery cost (ready mix concrete production)
- * subcontracted items
- * hired resource cost
- * temporary activity (special work required for erecting a scaffolding)

- * special technical consultant
- * Investigation or trial.

2. INDIRECT COSTS

- It includes all costs which are attributable to a given project but cannot identified with the performance of a specific activity or work packages.
 - It constitute a significant amount compared to the direct cost.
 - All the costs other than direct cost are covered in indirect cost.
 - Range of indirect cost depend upon the nature of work.
 - It varies from 7.5% to 35% of the total cost.
- ⇒ Classification based on nature of cost

a) Indirect material cost

- Trades man's tool
- Minor equipments
- Consumable materials

b) Indirect labour cost

- Salary and wages of supervisors
- Salary and wages of other indirect workers.

c) Other indirect expenses

- Plant hiring cost

⇒ Classification based on performance consideration

a) Production overheads

These includes indirect man power, indirect materials and other indirect expenses incurred by each production responsibility center.

b) External support service costs

→ These includes indirect manpower, indirect materials and other indirect expenses of the functional set ups concerned with providing technical and logistic support to the production centre.

→ It includes

- * Technical design and quality control services
- * Material at site manufacturing services
- * Equipment supply services
- * Personal and security services.
- * General services including temporary works and camp utility services.

c) Administration overheads

→ These includes indirect manpower, indirect materials and other indirect expenses incurred by the project management for the direction, control and administration of the project.

→ It includes

- * Office management costs
- * Planning and co-ordination management costs.
- * Technical management costs
- * marketing, costing and contract management costs
- * resource management costs.
- * finance and risk management costs.

d) Home office overheads

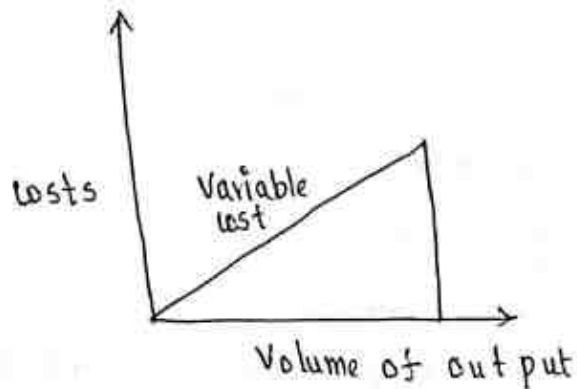
→ It represent the expenses relating to the operations and services rendered by the home-office.

→ This cost includes consultants fee, legal expenses, licensing charges, visits, entertainment taxes, insurances etc.

⇒ Classification based on behaviour

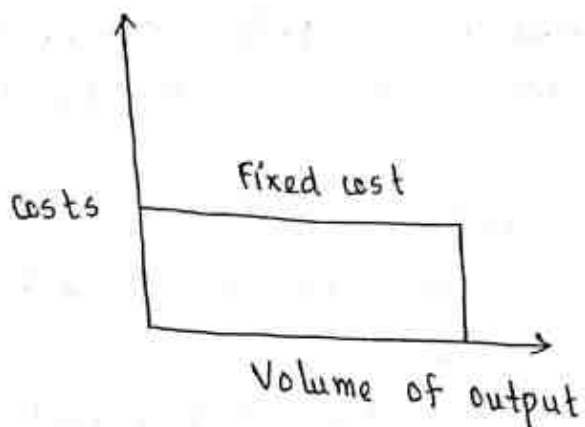
a) Variable indirect cost

Nature of variable indirect costs :



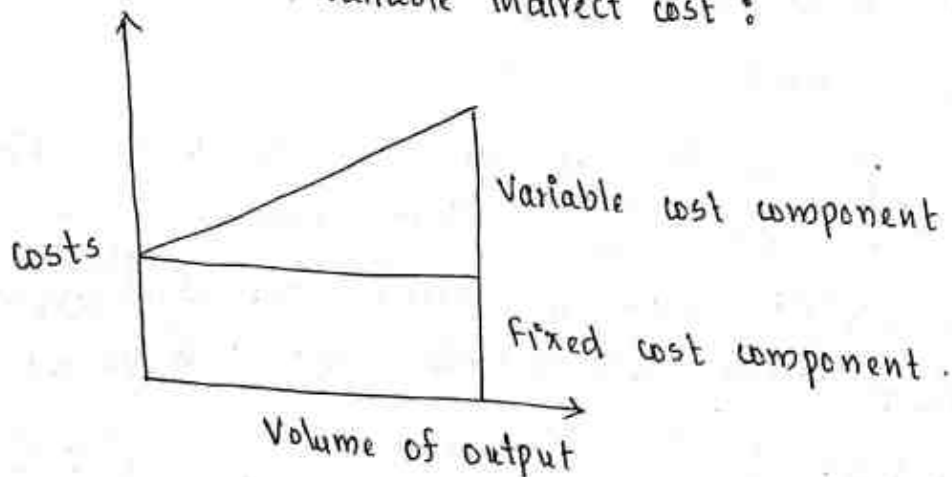
b) Fixed indirect cost

Nature of fixed indirect costs :



c) Semi variable indirect cost

Nature of semi variable indirect cost :



UNIT-RATE COSTING STANDARDS OF RESOURCES

- The term costing stands for the method of estimation of production costs.
- For estimating direct and indirect costs of a work package or work item, the resources of men, equipment and materials are computed under

$$\text{Labour cost} = \text{Labour effort in man-hors} \times \text{Standard labour hourly rate.}$$

$$\text{Equipment utilization cost} = \text{Equipment utilization hour} \times \text{Standard equipment hourly rate}$$

$$\text{Materials cost} = \text{Materials consumption quantity} \times \text{Standard material unit price}$$

• STANDARD LABOUR HOURLY RATE

- Direct labour, employed on monthly or daily wages, is costed on an hourly rate basis.
- Complete labour hourly standard rate includes net expenses incurred on procurement, wages, benefits and statutory costs.
- The labour hourly standard rate is determined for each category of direct labour employed at the site of production work.
- For costing purposes, direct labour is categorized into foremen/supervisors, highly skilled, skilled, semi skilled and unskilled.
- The method of calculation of labour hourly standard rate involves the determination of annual labour estimated cost and the number of productive hours worked in the year.

$$\text{Labour hourly standard cost} = \frac{\text{Annual estimated labour cost}}{\text{Annual productive hours.}}$$

The labour rates can be expressed in different forms as

Average hourly labour rate per worker of a crew (B)

$$B = \frac{A}{N}$$

where,

A = Hourly labour rate of the crew

N = Number of workers of the crew.

Crew cost per unit of work (C)

$$C = \frac{A}{Q}$$

where,

A = hourly labour rate of the crew

Q = Quantity of work done in one hour.

• STANDARD EQUIPMENT HOURLY RATE

$$\text{Equipment rate per hour} = \begin{array}{c} \text{Owning cost per hour} \\ + \\ \text{Operating cost per hour.} \end{array}$$

Owning cost = Depreciation

Operating cost = Fuel cost + maintenance cost + major repair cost + operator's cost + tyre replacement cost for rubber tyred equipment

→ Factors affecting the equipment owning and operating costs

- * State of equipment (old or new)

- * corporate capitalization policy

- * sources of funding for new purchase

- * site delivered price

- * purchase implication on corporate taxes

- * economical plant life in years
- * resale value
- * annual operational hours contemplated
- * past performance record in the case of old equipment
- * job conditions
- * skill of the operator
- * repair and maintenance facilities available.

- Equipment utilization rate also depends upon its ownership. The rate will be different if it is taken from client's own plant than if it is hired from the market.
- While establishing hourly standards for an item of equipment, the mathematically estimated equipment utilization rate is suitably modified by the experienced estimator according to the situation.

• MATERIALS STANDARD PRICE

- It is defined as the estimated all-in price of the unit quantity of an item, delivered at the project site.
- This all in price includes price at source, wastage costs, transportation costs up to site and taxes involved.
- Site storage and handling costs from site warehouse to construction sites are covered under indirect costs.
- The purchase price of each item can be ascertained by inviting quotations and then concluding a supply sub-contract with the selected supplier.
- Some items can be priced from standard price catalogues commercial cost guides and past experience.
- Enquiries regarding the purchase price are made by the estimator at the tender stage, the prices vary from time to time.

→ The purchase price depends on

- * quantity required
- * lot-size of each delivery
- * delivery dates
- * specifications
- * shelf life
- * payment terms.

→ Direct material standard price can best be estimated by the project materials manager, who is in due course is required to control these prices.

BUDGET

- A budget is a financial plan for a defined period, often 1 year.
- It may also include planned sales volume and revenues, resource quantities, costs and expenses, assets, liabilities and cash flows.
- Companies, governments, families and other organisations use it to express strategic plans of activities or events in measurable terms.
- A project budget reflects the financial plan of the operations.
- Some types of budgets are
 - i) Sales budget
 - ii) Production budget
 - iii) Financial budget
 - iv) Overheads budget
 - vi) Personnel budget
 - vii) Master budget.

1. SALES BUDGET

- A sales budget is an estimate of expected total sales revenue and selling expenses of the firm
- It is known as a nerve center or backbone of the enterprise.
- It is the starting point on which other budgets are also based.
- It is a forecasting of sales for the period both in quantity and value.
- It shows what product will be sold, in what quantities and at what prices

- The forecast not only relates to the total volume of sales but also its break-up product wise and area wise.
- The responsibility for preparing sales budget lies with the sales manager who takes in to account several factors for making the sales budget.
- Some of these factors are :
 - (i) Past sales figures and trend
 - (ii) Estimates and reports by salesmen
 - (iii) General economic conditions
 - (iv) Orders in hand
 - (v) Seasonal fluctuations
 - (vi) Competition
 - (vii) Government's control

2. PRODUCTION BUDGET

- Production budget is prepared on the basis of the sales budget.
- But it also takes in to account the stock levels required to be maintained.
- It contains the manufacturing programs of the enterprise
- It is helpful in anticipating the cost of production.
- The nature of production budget will differ from enterprise to enterprise.
- For practical purposes, the overall budget should be divided in to production per article per month, looking in to the estimate of the likely quantity of demand.

→ It is the responsibility of production department to adjust its production according to sales forecast.

- The production budget often divided into several budgets

(i) Material budget

Which fixes the quantity, quality and cost of raw materials needed for uninterrupted production.

(ii) Labour budget

Which specifies the requirement of labour in terms of the number and type of workers for various jobs.

(iii) Plant and equipment budget

Which lays down the needs of machines, equipment and tools including their repairs and maintenance.

(iv) Research and development budget

which specifies the estimated cost on research and development for developing new products and for improving existing ones.

3. FINANCIAL BUDGET

→ This budget shows the requirement of capital for both long term and short term needs of the enterprise at various points of time in future.

→ Its objective is to ensure regular supply of adequate funds at the right time. An important part of financial budget is cash budget.

→ Cash budget contains estimated receipts and payments of cash over the specified future period.

→ It serves as an effective device for control and co-ordination of activities that involves receipt and payment of cash.

- It helps to detect possible shortage or excess of cash in business.
- The financial budget also contains estimates of the firm's profits and expenditure i.e., the operating budget.

4. OVERHEADS BUDGET

- It includes the estimated cost of indirect materials, indirect labour and indirect factory expenses needed during the budget period for the attainment of budgeted production targets.
- In other words an estimate of factory overheads, distribution overheads and administrative overheads is known as overheads budget.
- The capital expenditure budget contains a forecast of the capital investment.
- This budget is prepared on departmental basis for effective control over costs.
- The factory or manufacturing overheads can be divided into three categories : (i) Fixed (ii) Variable (iii) Semi variable.
- This classification helps in the formulation of overhead budget for each department.

5. PERSONNEL BUDGET

- It lays down manpower requirements of all departments for the budget period.
- It shows labour requirements in terms of labour hours cost and grade of workers.

→ It facilitates the personnel managers in providing required number of workers to the departments either by transfer or by new appointments.

6. MASTER BUDGET

→ The institute of cost and management accountants, England defines master budget as the summary budget incorporating all the functional budgets, which is finally approved, adopted and applied.

→ Thus master budget is prepared by consolidating departmental or functional budgets.

→ It is a summarised budget incorporating all functional budgets.

→ It projects a comprehensive picture of the proposed activities and anticipated results during the budget period.

→ It must be approved by the top management of the enterprise.

→ Though practices differ, a master budget generally includes sales, production, costs-materials, labour, factory overhead, profit, appropriation of profit and major financial ratios.

Module - III

Construction disputes and settlement : Types of disputes - Modes of settlement of disputes - Arbitration - Arbitration award. Advantages and disadvantages of arbitration - Arbitration accord. Construction cost and budget : Construction cost Classification of construction cost - Unit rate costing of resources - Budget - Types of budget - Project Master Budget.

Disputes arise in all sorts of group activities when two individuals or parties come together and work for a common goal. It could be between family members, between neighbours, between employer and employees, professor and students, between the colleagues. In construction industry, disputes occur mainly between the contractor and the client. Even though the parties assigned to construction contracts are not competitors among themselves, but associates who have different functions to perform to achieve the common goal for accomplishing the prescribed end product, due to difference of opinion, conflicts do arise. Development of disputes leads to creation of claims and then to seeking of settlement.

At some time or other, every project manager will be exposed to a legal problem. The problem might arise at any point during the construction process - before the process starts, while it

is in progress, or after it has been completed. Although it might be the general contractor's intent to avoid it at all costs, litigation may be forced on him. If the project manager has been doing a proper job of documentation and is somewhat familiar with legal terminology, court rulings and past practices, he will be better prepared to deal with the inevitable disputes.

Development of disputes:

Most of the happenings that could occur during the actual execution of a project cannot be foreseen. Consequently no universal formula can be postulated to forecast their effects in advance. However their effects can be minimise by some ethical practices and by managing in an unemotional and above board manner. Interpretations of contract clauses, differences of opinions regarding their application, effect of unforeseen sub soils and natural calamities, riots and strikes etc can create contractual problems. These need to be solved judicious and expeditiously as and when they occur.

The client may rightfully demand completion of work by the contractor, despite the latter's protestations and petitions. The client may threaten to stop the work, take over the contractor's plant and equipment and also the materials and stores and have the remaining work carried out either

departmentally or by another contractor

Categories of disputes:

There are 2 general categories of disputes, namely, contractor's claims against the client and client's claims against the contractor. They are now discussed below.

* Contractor's claims against the client:

1. Claims for extras.
2. Claims for refund of amount wrongly recovered or deducted by the employer.
3. Claims for compensation for extra expenditure incurred or losses suffered by the contractor due to delays and hindrances caused by the employer and on account of consequent prolongation of the contract period and on account of breaches of contract committed by the employer.
4. Claims on various other accounts under the contract such as balance payment due, extra payment due, on various grounds etc.
5. Interest on delayed payments.
6. Interest on various claim amounts.

* Client's claim against the contractor:

1. Claims for liquidated damages for delay caused by the contractor in completing the work.

2. Claim for any over payments made to contractor
3. Claim for defective work done by the contractor
4. In case of incomplete work or abandoned contracts, claims for expenditure incurred by the client for getting balance work completed through other agencies.
5. Other compensation claims for delays caused by the contractor, when there is no provision in the contract for agreed liquidated damages.
6. Interest on the amounts claimed by the client

Modes of settlement of disputes:

The mode of settlement of disputes in construction contracts mainly depends upon the provisions in the Contract. It is the normal practice is that to provide for decisions by the architect or engineer or by third parties other than the client and the contractor. Normally in Construction Contracts provisions are included for settlement of disputes by arbitration. When such provisions are not there in the contract, disputes arising in the Contract are generally settled by direct negotiations between the client and the contractor and if that is not materialising, the parties have to resort to civil suit in competent Civil courts. Thus the major modes of settlement of disputes in Construction

Contracts can be briefly categorised as follows:

1. Settlement by direct negotiation between the client and the Contractor:

The easiest and most advisable method of settlement is by direct negotiations. The majority of construction disputes are finalised and settled by such direct negotiations. Only few contracts require settlement of dispute by arbitration or civil suits etc. This is the best and most recommended mode of settlement of disputes and it is also in the interest of both the parties.

2. Settlement through arbitration:

Arbitration is the settlement of a dispute by the decision, not for a regular and ordinary court of law, but of one or more persons chosen by the parties themselves who are called arbitrators. Thus the arbitration is a domestic court where the arbitrator acts as a judge.

Arbitrator:- Arbitrator is a person chosen by the parties themselves to whom the disputes and differences are referred to, to act as a judge and give his judgement judicially. He finds out whether either of the parties has incurred any financial loss on which the disputes stands, for no fault on his part.

3 Settlement through Court Action: Computerised evidence

The use of CPM as a method of pinpointing delays is made use in providing computerised evidence for settling disputes in many developed countries. The reliability and accuracy of the computerised results has given a faster method of settling the disputes.

(4) Settlement through Court Action:-

Settlement through a court of law is obviously the last resort and this usually takes number of years can be frustrating. Courts usually would like the party concerned to exhaust all other administrative channels for seeking redress (eg. direct negotiation and arbitration) before hearing the case. Only if the contractor is extremely confident of his case and honestly believes that he has been wronged at the negotiation and at the arbitration levels, must embark for court action. Court action will require engaging, top legal minds (attorneys) who have some experience in construction industry feuds and ensuing long legal battle - which will also require prolonged attention and physical presence of contractor's top personnel, whose services will be thus be diverted away from their usual business. This can be extremely costly and demoralizing.

Arbitration

Arbitration is a form of alternative dispute resolution (ADR) is a technique of settlement of dispute by the decision not of a court of law but of one or more persons chosen by the parties themselves involved in the dispute. The persons so chosen and given the right to give decisions are called arbitrators. Thus arbitration may be said to be a domestic court where the arbitrators act as judges.

Other forms of ADR include mediation (a form of settlement negotiation facilitated by a neutral third party) and non-binding resolution of experts. Arbitration is often used for the resolution of commercial disputes, particularly in the context of international commercial transactions. The use of arbitration is also frequently employed in consumer and employment matters, where arbitration may be mandated by the terms of employment or commercial contracts.

Arbitration is a proceeding in which a dispute is resolved by an impartial adjudicator whose decision the parties to the dispute have agreed, or legislation has decreed, will be final and binding. There are limited rights of review and appeal of arbitration awards.

Need for arbitration:

In view of the all round development activities new construction projects are being taken up in the country every day. Since most of the works are got done through contractors by inviting tenders, interpretation of project document clauses that are bound to crop up is course of execution of the project. There may be so many other reasons also because of which disputes are likely to come up every now and then between contracting party and contractors. The only way of solving such disputes is through law courts or arbitration. The solution of such disputes is very time consuming which may extend through years. It is seen that some disputes took more than 20 years in getting decision. In the interest of development of the nation departmental officers should make every effort to appoint an arbitrator with mutual consent so that quicker disposal of such disputes is attained. Whenever case has been referred to law courts the judges at various levels should on merit refer suitable cases for settlement through arbitration. The sole purpose of arbitration is to get the cases disposed of at the earliest so that progress of important and national development projects is not jeopardized.

Advantages of arbitration:-

- (1) When the subject matter of dispute is highly technical arbitrators with an appropriate degree of expertise can be appointed.
- (2) Arbitration is often faster than litigation in court.
- (3) Arbitration can be cheaper and more flexible for businesses.
- (4) Arbitral proceedings and an arbitral award are generally non-public and can be made confidential.
- (5) In arbitral proceedings the language of arbitration may be chosen, whereas in judicial proceedings the official language of country of the court will be automatically applied.
- (6) Arbitration awards are generally easier to enforce in other nations than court judgements.
- (7) In most legal systems there are very limited avenues for appeal of an arbitral award, which is sometimes an advantage because it limits the duration of the dispute and any associated liability.

Disadvantages of arbitration:-

- (1) Arbitration may be subject to pressures from powerful law firms representing the stronger and wealthier party.

- (2) In some arbitration agreements, the parties are required to pay for the arbitrators, which adds an additional layer of legal cost.
- (3) Although usually thought to be speedier, when there are multiple arbitrators on the panel, juggling their schedules for hearing dates in long cases can lead to delays.
- (4) Unlike court judgements, arbitration awards themselves are not directly enforceable. A party seeking to enforce an arbitration award must resort to judicial remedies, called an action to confirm an award.
- (5) Huge legal expenses to arbitrate dispute in the first place.

Arbitrator

The process by which the parties under a contract get their disputes and differences settled through the ~~intervention~~ intervention of an impartial person or a committee of experts in a judicial manner is known as arbitration. The impartial person or persons are known as the arbitrators. An arbitrator is more or less like a private judge chosen by the parties and endowed by them with power and privilege to decide the matter of dispute between them.

MODULE IV

Concept of ethics – Professional ethics – ethical problems – provisions of a professional code – Role of professional bodies, Project management information system- Concept – Information system computerization – Acquiring a system – Problems in information system management - Benefits of computerized information system.

INTRODUCTION

In day to day life, an engineer faces a number of situations in which he has to choose between the well-being of the project he is working on and the well-being of the society in large. An action taken by him may be beneficial for the project but it may be endanger to the ecosystem. In such delicate or confusing situations, the concerned engineer may have the option to consult some experts and act on their recommendation, or he may act according to the wishes of superior ignoring the ethical part of the problem, or he may himself weigh different arguments for and against and take decision.

The decisions taken by engineer have far reaching consequences and therefore he should be even handed in taking different points of view into consideration. Many temptations come in the way of discharging duties in course of one's career. The engineer should be able to resist these temptations by controlling his desires in view of large public interest and welfare of mankind. An engineer should not only be having expertise in his/her professional field, but also be familiar with ethical rules and codes of conduct of his/her profession.

ETHICS

- Study of characteristics of morals
- Value driven
- Tells us what to do
- Fundamentally founded on the concern for other people

ENGINEERING ETHICS

- Rules and standards governing conduct of engineers.
- A body of philosophy indicating ways that engineers should conduct themselves in their professional capacity.
- Engineering ethics is the study of moral values, issues and decisions involved in engineering practice

- Engineers solve problems – Since there is no perfect solution, solved problems may create new ones
- Each engineer must follow 3 responsibilities: concern for public safety, technical competence, timely communication of positive and negative results

ENGINEERING ETHICS - ISSUES

- Handling, storing and disposing of hazardous materials
- Conflict of interest – claim turning into the type of dispute
- Social obligations
- Miscommunication
- Safety negligence of subordinates
- Plagiarism
- Accountability to clients and customers

ETHICAL PROBLEMS

- A problem or situation that requires a person or organization to choose between alternatives that must be evaluated as right (ethical) or wrong (unethical).
- Unethical practices can take place at every phase of a construction project – during planning and design, pre-qualification and tender, project execution and operation and maintenance.

Ethical Problems in Construction Industry are:

- Cover pricing
- Bid cutting
- Bid shopping
- Poor documentation
- Late and short payments
- Subcontractors' lack of safety ethics
- Unfair treatment of contractors in tender/final account negotiations
- Competitor's overstatement of capacity and qualifications to secure work
- Competitor's falsification of experience and qualifications

- Miscommunication
- Plagiarism
- Conflict of interest

ETHICAL THEORIES

- Utilitarianism
- Rights Ethics
- Duty Ethics
- Virtue Ethics

Utilitarianism

- Suggests that plans and actions evaluated by their consequences
- Morality of an action assessed through its consequences
- Based on the philosophy of maximum good for the greatest number of people
- Positive and negative results are weighed
- Utilitarianism has offered :
 - Risk – Benefit Analysis
 - Cost – Benefit Analysis
- Limitations :
 - Difficult to weigh matters on this basis
 - Unable to justify between morally justified and morally unjustified emotions

Right ethics

- Individual's rights and dignity must be respected
- Due respect, safe working conditions, reasonable pay system, unbiased performance evaluation
- Individual's privacy and integrity must be respected

Virtue ethics

- “What kind of people we should be?”

- Virtue ethics is person rather than action based
- Deals with the virtue or moral character of the person rather than the episodes or actions
- Actions are right if they support good character qualities – virtues: responsibility, honesty, competence, loyalty.
- Actions are wrong if they support bad character qualities: dishonesty, disloyalty, irresponsibility.
- Virtue ethics fails to tell how to act since it concentrates on character

Duty ethics

- Proposed by Immanuel Kant
- Explains that an action is moral if it is conducted for the sake of duty
- By acting out of duty, a person acts out of a concern for what is morally right

PROFESSION AND PROFESSIONAL ETHICS

- A profession as a vocation requiring advanced education and training.
- A profession is a job that requires specific training and is regulated by certain standards.
- Professional ethics encompass the personal and corporate standards of behaviour expected of professionals.
- Professional Ethics is concerned with one's behaviour and conduct when carrying out professional work.
- It is codified and varies across different cultures.
- Professional ethics includes the ethical norms, values, and principles that guide a profession and the ethics of decisions made within the profession.

COMPONENTS OF PROFESSIONAL ETHICS

- Honesty
- Integrity
- Transparency
- Accountability
- Confidentiality
- Objectivity
- Respectfulness
- Obedience to the Law

Honesty

Honesty is a facet of moral character that connotes positive and virtuous attributes such as integrity, truthfulness, straightforwardness, including straightforwardness of conduct, along with the absence of lying, cheating, theft, etc. Honesty also involves being trustworthy, loyal, fair, and sincere.

Integrity

Integrity is the practice of being honest and showing a consistent and uncompromising adherence to strong moral and ethical principles and values. In ethics, integrity is regarded as the honesty and truthfulness or accuracy of one's actions.

Transparency

Transparency, as used in science, engineering, business, the humanities and in other social contexts, is operating in such a way that it is easy for others to see what actions are performed. Transparency implies openness, communication, and accountability.

Accountability

In ethics and governance, accountability is answerability, blameworthiness, liability, and the expectation of account-giving. As an aspect of governance, it has been central to discussions related to problems in the public sector, nonprofit and private and individual contexts.

Confidentiality

Confidentiality involves a set of rules or a promise usually executed through confidentiality agreements that limits access or places restrictions on certain types of information.

Objectivity

Objectivity is a philosophical concept of being true independently from

individual subjectivity caused by perception, emotions, or imagination. A proposition is considered to have objective truth when its truth conditions are met without bias caused by a sentient subject.

Respectfulness

Respect, also called esteem, is a positive feeling or action shown towards someone or something considered important, or held in high esteem or regard. It conveys a sense of admiration for good or valuable qualities. And it is also the process of honoring someone by exhibiting care, concern, or consideration for their needs or feelings.

Obedience to the Law

Law is a set of enforced rules under which a society is governed. Law is one of the most basic social institutions and one of the most necessary. The law thus establishes the rules that define a person's rights and obligations. The law also sets penalties for people who violate these rules.

PROFESSIONAL CODE OF ETHICS

- A code of ethics prescribes how professionals are to pursue their common ideal so that each may do the best they can at a minimal cost to themselves and to those they cares about (including the public...).
- The code is to protect each professional from certain pressures (for example, the pressure to cut corners to save money) by making it reasonably likely (and more likely than otherwise) that most other members of the profession will not take advantage of her good conduct.
- Helps to perform their roles, to know how to conduct and to know how to resolve certain ethical issues
- Offers guidance in applying moral and ethical principles to the situation encountered
- Provides a framework for ethical judgment.
- Expresses commitment to ethical conduct.
- Defines the roles and responsibilities of professionals
- Helps professionals to evaluate the ethical aspect of their decisions
- Compliance based code of ethics - not only set guidelines for conduct, but also determine penalties for violations.
- Value based code of ethics - require a greater degree of self-regulation than compliance-based codes.

CODE OF ETHICS - NSPE

Preamble

- Engineering is an important and learned profession
- Expected to exhibit the highest standards of honesty and integrity.
- Direct and vital impact on the quality of life for all people.
- Services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behaviour that requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfilment of their professional duties, shall:

1. Hold paramount the safety, health and welfare of the public.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts.
6. Conduct themselves honourably, responsibly, ethically, and lawfully so as to enhance the honour, reputation, and usefulness of the profession.

II. Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.

- a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
- b. Engineers shall approve only those engineering documents that are in conformity with applicable standards.
- c. Engineers shall not reveal facts, data or information without the prior consent of the client or employer except as authorized or required by law or this Code.
- d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe are engaged in fraudulent or dishonest enterprise.
- e. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such

information or assistance as may be required.

2. Engineers shall perform services only in the areas of their competence.

- a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
- b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
- c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.

3. Engineers shall issue public statements only in an objective and truthful manner.

- a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
- b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
- c. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.

4. Engineers shall act for each employer or client as faithful agents or trustees.

- a. Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.
- b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
- c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.

- d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.
- e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.

5. Engineers shall avoid deceptive acts.

- a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or past accomplishments.
- b. Engineers shall not offer, give, solicit or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect of intent to influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

III. Professional Obligations

1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.

- a. Engineers shall acknowledge their errors and shall not distort or alter the facts.
- b. Engineers shall advise their clients or employers when they believe a project will not be successful.
- c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment they will notify their employers.
- d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretences.
- e. Engineers shall not actively participate in strikes, picket lines, or other collective

coercive action.

- f. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.

2. Engineers shall at all times strive to serve the public interest.

- a. Engineers shall seek opportunities to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health and well-being of their community.
- b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
- c. Engineers shall endeavour to extend public knowledge and appreciation of engineering and its achievements.

3. Engineers shall avoid all conduct or practice that deceives the public.

- a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.
- b. Consistent with the foregoing, Engineers may advertise for recruitment of personnel.
- c. Consistent with the foregoing, Engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.

4. Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve.

- a. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the Engineer has gained particular and specialized knowledge.
- b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the Engineer has gained particular specialized knowledge on behalf of a former client or employer.

5. Engineers shall not be influenced in their professional duties by conflicting interests.

- a. Engineers shall not accept financial or other considerations, including free

engineering designs, from material or equipment suppliers for specifying their product.

- b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the Engineer in connection with work for which the Engineer is responsible.

6. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.

- a. Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised.
- b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.
- c. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice.

7. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.

- a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.
- b. Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
- c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.

8. Engineers shall accept personal responsibility for their professional activities, provided, however, that Engineers may seek indemnification for services arising out of their practice for other than gross negligence, where the Engineer's interests cannot otherwise be protected.

- a. Engineers shall conform with state registration laws in the practice of engineering.
- b. Engineers shall not use association with a non engineer, a corporation, or

partnership as a "cloak" for unethical acts.

9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.

- a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
- b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the Engineer for others without express permission.
- c. Engineers, before undertaking work for others in connection with which the Engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents, should enter into a positive agreement regarding ownership.
- d. Engineers' designs, data, records, and notes referring exclusively to an employer's work are the employer's property. Employer should indemnify the Engineer for use of the information for any purpose other than the original purpose.

NOTE:

PROFESSIONAL CONDUCT

1. Be inclusive: We welcome and support people of all backgrounds and identities. This includes, but is not limited to members of any sexual orientation, gender identity and expression, race, ethnicity, culture, national origin, social and economic class, educational level, color, immigration status, sex, age, size, family status, political belief, religion, and mental and physical ability.

2. Be considerate: We all depend on each other to produce the best work we can as a company. Your decisions will affect clients and colleagues, and you should take those consequences into account when making decisions.

3. Be respectful: We won't all agree all the time, but disagreement is no excuse for disrespectful behavior. We will all experience frustration from time to time, but we cannot allow that frustration become personal attacks. An environment where people feel uncomfortable or threatened is not a productive or creative one.

4. Choose your words carefully: Always conduct yourself professionally. Be kind to others. Do not insult or put down others. Harassment and exclusionary behavior aren't acceptable. This includes, but is not limited to:

- Threats of violence.
- Insubordination.
- Discriminatory jokes and language.
- Sharing sexually explicit or violent material via electronic devices or other means.
- Personal insults, especially those using racist or sexist terms.
- Unwelcome sexual attention.
- Advocating for, or encouraging, any of the above behavior.

5. Don't harass: In general, if someone asks you to stop something, then stop. When we disagree, try to understand why. Differences of opinion and disagreements are mostly unavoidable. What is important is that we resolve disagreements and differing views constructively.

6. Make differences into strengths: We can find strength in diversity. Different people have different perspectives on issues, and that can be valuable for solving problems or generating new ideas. Being unable to understand why someone holds a viewpoint doesn't mean that they're wrong. Don't forget that we all make mistakes and blaming each other doesn't get us anywhere. Instead, focus on resolving issues and learning from mistakes.

Below are some common provisions found in organizational codes:

➤ **Compliance, Integrity and Anticorruption**

- Accuracy of corporate finances and financial reporting
- Employee records and expense reports
- Bribes
- Political contributions

➤ **Conflicts of Interest**

- Gifts and gratuities
- Political activity
- Outside employment
- Family members
- Disclosure of financial interests

➤ **Employee, Client and Vendor Information**

- Maintaining records and information

- Privacy and confidentiality
- Disclosure of information
- **Employment Practice**
 - Workplace harassment
 - Equal opportunity
 - Diversity
 - Fair treatment of staff
 - Work-family balance
 - Discrimination
 - Fair labor practices
 - Illegal drugs and alcohol
 - Use of organization property and resources
 - Proper exercise of authority
 - Employee volunteer activities
 - Romantic relationships with coworkers
 - Incentives and recognition systems
- **Environmental Issues**
 - Commitment to the sustainability
 - Employee health and safety
- **Ethics and Compliance Resources**
 - Ethics advice helpline
 - Reporting procedures
 - Anonymous/confidential reporting hotline
 - Summary of investigations process
 - Anti-retaliation policy and protections for reporters
 - Accountability and discipline for violators
- **Internet, social networking and social media**
 - Internet and social network use at work
 - Prohibited sites and content
 - Policies regarding posts about company, work products or coworkers
 - Online relationships between managers and their reports
- **Relationships with third parties**

- Procurement
- Negotiating contracts

ROLE OF PROFESSIONAL BODIES

- Professional bodies are organizations whose members are individual professionals.
- This is related to how the profession is regulated i.e. who is responsible for making sure that professionals are doing their jobs properly.
- In some professions it is compulsory to be a member of the professional body, in others it is not.
- This usually depends on whether or not the profession requires the professional to have a 'license to practice', or to be on a professional register, in order to do their job.
- This is related to how the profession is regulated i.e. who is responsible for making sure that professionals are doing their jobs properly.

The professional body may have a number of functions. They may:

- Set and assess professional examinations
- Provide support for Continuing Professional Development through learning opportunities and tools for recording and planning
- Publish professional journals or magazines
- Provide networks for professionals to meet and discuss their field of expertise
- Issue a Code of Conduct to guide professional behavior
- Deal with complaints against professionals and implement disciplinary procedures
- Be enabling fairer access to the professions, so that people from all backgrounds can become professionals.
- Provide careers support and opportunities for students, graduates and people already working.

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

- Construction projects need an information system for making decisions speedily
- PMIS helps at collecting economically the right data, in the right form, through right means, at the right time, in the right place and communicating the extracted information to the right person
- PMIS is an integrated user-machine system that provides information to support operations, management and decision making functions to planning and control of project objectives

FUNCTIONS OF PMIS

- To develop PMIS strategy in consultation with the project team and stakeholders and communicate this to all concerned authorities after getting approval by the project manager.
- To establish an initial database with data structures codes and baselines.
- To set standards and baseline against which the progress and costs can be measured and compared. These standard baselines include the project time schedules, the project control budgets, material schedules, labour schedules productivity standards, quality assurance and control methodology.
- To organize efficient means of measuring, collecting, verifying, and quantifying the data that reflect performance with respect to time, cost, resources and quality.
- To manage the means of converting data from operations into informations.
- To report the correct and necessary information in a form, which can be best interpreted by management and should be at a level that is most appropriate for the individual managers or supervisors who will eventually use it.
- To provide management exception reports that highlights critical factors.
- To communicate the information on time for consideration and decision making for remedial corrective action to the concerned authorities, and to protect it from unauthorized access.
- To identify and acquire data from both internal as well as external services.
- To create and store digitize documents, drawings, baseline and database.

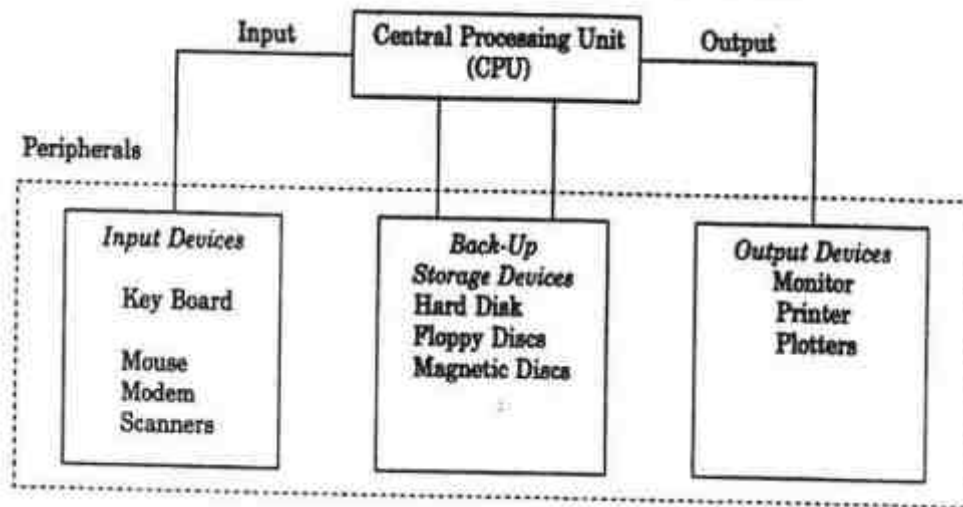
COMPONENTS OF PMIS

1. Hardware

- All electronics and electro-mechanical equipment's used in computerized data

processing systems

- Consists of Central Processing Unit and its peripherals



2. Software

- Computer hardware needs instructions to perform operations – communicated by user by programme – programmes by computer language – translated by computer's in built system to a set of instructions – CPU understands and acts accordingly
- All these operating instructions and procedures in a computerized system – SOFTWARE
- Software covers whatever is necessary to generate instructions with a view to operate the system's hardware as per the programmer's requirements

3. Database

- Contains all data utilized by models and application softwares
- Individual set of stored data – file

4. Procedure

- Formal operating procedures like manual or instruction booklet

5. Operators

- Computer operators, system analysts, programmers, data administrators etc.

6. Documents

- Master files, reports, process enquiries, outputs etc.

STRUCTURE OF PMIS

- According to needs of managerial planning and control activities divided into 3 categories :

- (a) Strategic planning
- (b) Management control
- (c) Operational control
- Strategic planning – long term plans for achieving project objectives
- Management control – ensure the assigned resources are used effectively and efficiently to accomplish assigned targets
- Operational control – minimize wastage of resources / resources productivity control



FRAMEWORK OF PMIS

(a) Data processing system for operational and managerial levels

- Performs 3 functions
- *Book keeping* – gathering and recording data
- *Issuance* – routine documents like invoices, pay cheques and reminders
- *Control reports* – by product of routine transactions (provide pre-formatted type of information for structured type of decisions)

(b) Decision Support Systems

- Managers take decisions with the aid of Information system in structured situations
- With advancements in technology, Information Technology provide complete solutions to the managerial decision making process in semi- structures situations
- DSS considers all the important aspects of a system systematically – records and presents information to decision maker
- Executive Support System – strategic planning process for top executives



(c) Office Information Systems

- To facilitate speedy communication within project and between project office and corporate office
- *Document management system* : Word processing, desktop publishing, projectors, photo copier etc
- *Message transmission system* : Electronic mail, telephones
- *Teleconferencing system* : Audio and video conferencing
- *Office support system* : Desktop organizer, computer aided design

(d) Artificial Intelligence System

- Capability of a computerised system to provide information that reflects human like intelligence
- Robotics, natural language systems, vision systems, neural networks

(e) Information Communication

- Telecommunication and Information Technology –
- fast reducing communication barrier
- Data may be maintained on a central computer (server) and accessed, updated by any user (clients)
- Local Area Network
- Wide Area Network

NOTE:

E.g. for computer based PMIS

Microsoft Project (MS Project)

- Microsoft Project (MS Project) dominates project management software systems.
- This software system carries its own database and is compatible with SQL Server or Oracle databases.
- Although it requires installation on every user's computer, it is fully compatible with Microsoft Office so team members can easily save to the database documents created in any Office application.
- In addition, because it has the same toolbars as MS Office applications, most users become quickly familiarized with it.

- MS Project provides the ability to publish to the
- Internet or the company intranet.
- There are no limits to the number of tasks or projects the software can handle.

ACQUIRING A SYSTEM

Involves choosing a software, matching the hardware, analysing the training needs, evaluating system costs and finalizing the supplier

(1) Choosing Software

Either procured or developed as per the specific requirements

a. Package Preview

- Shortlist two or three out of available by going through the specifications

b. Operations Evaluation

- Shortlisted ones evaluated for their operational features to find the best one

c. Demonstrations

- Demonstration of software with the proposed hardware as a system to identify its performance

(2) Matching Hardware and Software

Software dictates the type of hardware required

a. Scrutinizing Processor Capacity

- Various chips – control chips, memory chips, processor chips
- Chips define the processor capacity
- Memory chips provide RAM and ROM
- In-built RAM of 16 MB is sufficient for project management packages

b. Video Display Units

- *Size* – Screen size of 12 inches for desktops and 5 inches for portable computers
- *Colour* – Multi-coloured facilities
- *Character design for normal viewing distance* –
- Characters at least 3mm space
- *Clarity* – Depends on density of tiny dots called pixels or picture elements. Usually 500 x 500 and graphics need 2000 x 2000

c. Keyboards

- Similar to type writer keyboards but contains special functions shift, etc..

d. Input / Output ports

- Number of ports must be at least one more than the total number of peripherals
 - Additional ports may be considered
- e. Options
- Provision for drives of hard and floppy disks
 - Provision for expansion slots
 - Provision for extra memory etc.
- f. Power Requirement
- Local power supply is 110/120 V or 220/240 V
 - Must be compactable with local power supply
- g. Back-up storage capacity
- Depends on the quantity to be stored and the type of software
- h. Choosing Printers
- *Quality of print* – Laser and ink-jet printers
 - *Quantity of daily printed output*
 - *Speed of printing* – Printers work for 20-40% of the daily working hours
 - *Nature of Printing* – Graphic work, Typescript
- 3. Training**
- User and computer staff must be trained depending on their degree of work involved
 - Aid of instructions manuals
- 4. Systems Costs**
- a. Equipment costs
- Onetime costs
 - Purchase of hardware, software and media
 - Second hand equipments must be avoided
- b. Installation costs
- Onetime costs of setting up the equipment at the site – may include training also
- c. Operating costs
- Recurring costs
 - Equipment maintenance and repair costs, software updations, operator's costs, insurance costs etc.
 - 10-15% of the equipment purchase cost – rule of thumb
- d. Computer Room costs
- Accommodations with renovations to meet system requirements

- Laying cables and connections for power supply
- Air conditioning

5. Selecting the Supplier

- Track record of the supplier
- Analysing his / her reputation

PROBLEMS IN INFORMATION SYSTEM MANAGEMENT

1. Managers do not know what they need

- Exists a gap between the quantum of information the manager requires and the quantum of information made available to him
- Storage requirements

2. Information not easily retrievable

- Uneconomical to retrieve
- Usage of wide range of softwares makes it difficult

3. Information misinterpreted

- Misunderstood information gives negative effect

4. Information accumulation is common

- Duplication due to the fear of misplacement
- Adds up the costs

5. Some people hide information

- Reluctance to share

6. Resistance to change

- Not ready to shift from old methods

7. Information delays

- Time lag between the occurrence of an event and the information reaching the concerned person

8. Information systems are of little use to construction men

- Sticks onto the traditional used way
- Site managers prefer on-site resolutions rather than desktop resolutions

9. Information systems cost money

- Installed equipment not fully utilised
- Money spent becomes obsolete

BENEFITS OF COMPUTERIZED INFORMATION SYSTEM

Computerized system helps the project manager to fulfil various roles

- Interpersonal role of Figurehead, Leader, Liaison
- Informational role of Monitor, Disseminator and Spokesperson
- Decisional role of Entrepreneur, Disturbance handler, Resource allocator, Negotiator
- Computer system enhances productivity & efficiency
- Sometimes manual methods may be better than Computerized system in critical cases
- Indicates plan-making sequence
- Removes data voids
- Speedily work out answers – computer analyses large networks of complex projects with ease
- Offers answer to ‘what if’ in the form of alternate projects
- Clearly defines the tasks involved
- Computer printers etc. can produce reports, graphs quickly
- Storage capacity of past works
- Error occurrence is nil or minimize

Information System Computerization

The main purposes of information systems are provide the right information to the right people at the right time. It is used to track, store, manipulate and distribute the information from gathered data to appropriate persons when necessary. It is an organised integration of hardware and software technologies and human elements designed to produce timely, integrated, accurate and useful information for decision making purposes.

Computer (Based) Information System is essentially an IS using computer technology to carry out some or all of its planned tasks. The basic components of computer based information system are:

- *Hardware*– these are the devices like the monitor, processor, printer and keyboard, all of which work together to accept, process, show data and information.
- *Software*– are the programs that allow the hardware to process the data.
- *Databases*– are the gathering of associated files or tables containing related data.
- *Networks*– are a connecting system that allows diverse computers to distribute resources.
- *Procedures*– are the commands for combining the components above to process information and produce the preferred output.

The first four components (hardware, software, database and network) make up what is known as the information technology platform. Information technology workers could then use these components to create information systems that watch over safety measures, risk and the management of data. These actions are known as information technology services.

EXAMPLES OF COMPUTER BASED PMIS:

EXAMPLES OF COMPUTER-BASED PMIS

- **Project Scheduler**
- Project Scheduler works with an SQL database and is MS Office compatible.
- Information from multiple projects or subprojects can be merged or consolidated to reveal company wide resource utilization.
- The report writer enables a wide range of standard and customized reports, which can be output in HTML format.
- Data can be located on shared disk drives and accessed only by users with the appropriate password.

EXAMPLES OF COMPUTER-BASED PMIS

- **Primavera**
- Primavera offers four software products.
 - **Sure Trak Project Manager.**
 - This software enables modeling and scheduling of simultaneous projects of up to 10,000 activities per project.
 - Activities can be inserted or rearranged on Gantt charts and PERT charts with a mouse click.
 - Actual completion dates and costs can be compared with targets, progress estimated for each activity or for the entire project, and forecasts produced of resources necessary to get a project back on track.
 - If resources exceed supply, Sure Trak can reassign them from low-priority activities. Assignments, deadlines, and status can be shared with project participants at all levels and locations using the Web publisher

EXAMPLES OF COMPUTER-BASED PMIS

- **Microsoft Project (MS Project)**
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 - Although it requires installation on every user's computer, it is fully compatible with Microsoft Office so team members can easily save to the database documents created in any Office application.
 - In addition, because it has the same toolbars as MS Office applications, most users become quickly familiarized with it.
 - MS Project provides the ability to publish to the Internet or the company intranet.
 - There are no limits to the number of tasks or projects the software can handle.

Benefits of computerized information system

Communication – with help of information technologies the instant messaging, emails, voice and video calls becomes quicker, cheaper and much efficient.

Globalization and cultural gap – by implementing information systems we can bring down the linguistic, geographical and some cultural boundaries. Sharing the information, knowledge, communication and relationships between different countries, languages and cultures becomes much easier.

Availability – information systems has made it possible for businesses to be open 24×7 all over the globe. This means that a business can be open anytime anywhere, making purchases from different countries easier and more convenient. It also means that you can have your goods delivered right to your doorstep with having to move a single muscle.

Creation of new types of jobs – one of the best advantages of information systems is the creation of new and interesting jobs. Computer programmers, Systems analyzers, Hardware and Software developers and Web designers are just some of the many new employment opportunities created with the help of IT.

Cost effectiveness and productivity – the IS application promotes more efficient operation of the company and also improves the supply of information to decision-makers; applying such systems can also play an important role in helping companies to put greater emphasis on information technology in order to gain a competitive advantage. IS has a positive impact on productivity, however there are some frustrations can be faced by systems users which are directly linked to lack of training and poor systems performance because of system spread.

Disadvantages

Unemployment and lack of job security – implementing the information systems can save a great deal of time during the completion of tasks and some labour mechanic works. Most paperwork's can be processed immediately; financial transactions are automatically calculated, etc. As technology improves, tasks that were formerly performed by human employees are now carried out by computer systems. For example, automated telephone answering systems have replaced live receptionists in many organizations or online and

personal assistants can be good example also. Industry experts believe that the internet has made job security a big issue as since technology keeps on changing with each day. This means that one has to be in a constant learning mode, if he or she wishes for their job to be secure.

Dominant culture – while information technology may have made the world a global village, it has also contributed to one culture dominating another weaker one. For example it is now argued that US influences how most young teenagers all over the world now act, dress and behave. Languages too have become overshadowed, with English becoming the primary mode of communication for business and everything else.

Security issues – thieves and hackers get access to identities and corporate saboteurs target sensitive company data. Such data can include vendor information, bank records, intellectual property and personal data on company management. The hackers distribute the information over the Internet, sell it to rival companies or use it to damage the company's image. For example, several retail chains were targeted recently by hackers who stole customer information from their information systems and distributed Social Security numbers and credit card data over the Internet.

Implementation expenses – to integrate the information system it require pretty good amount of cost in a case of software, hardware and people. Software, hardware and some other services should be rented, bought and supported. Employees need to be trained with unfamiliar information technology and software. Information systems contribute to the efficient running of organizations. Information systems are showing the exponential growth in each decades. Today's information technology has tremendously improved quality of life. Modern medicine has benefited the most with better information system using the latest information technology. By understanding and learning what advantages and disadvantages it can bring, we have to try, believe and put an effort with our best to make that existing advantage much better and navigate the disadvantages to have a less impact on organizations and society.

Problems in information system management

The problems are:

1. Alignment of MIS Plan

2. Design of Information System Architecture

3. Allocation of Development Resources

4. Completion of Projects in Schedule

5. Selection of Methodologies.

1. Alignment of MIS Plan: It is often difficult to ascertain the strategies and goals to which the information system plan is to be aligned, but without this alignment the information system plan will not obtain long term organizational support.

2. Design of information System Architecture: The system architecture also includes databases, model bases and supporting software along with management activities. It should not only guide long-range development but also allow response to diversify short-term information system needs. When the information requirements are well defined there still exist a number of alternatives for system architecture.

3. Allocation of Development Resources: The allocation of development resources among competing units is difficult. The functional organization unit requirement should conform to an orderly framework to establish competencies and when this conformity is achieved, the problem of rational allocation arises.

4. Completion of Projects in Schedule: Project plans are seldom accurate as time and resource requirements are generally underestimated. MIS management thus gets discredited.

5. Selection of Methodologies: There are number of methods for developing application portfolios and allocating the resources. Each method has a set of circumstances under which it has an advantage. There is no overall framework for classifying methodologies.