

UNIT-2

ORGANIZING AND STAFFING THE PROJECT TEAM: Skills / abilities required for project manager, Authorities and responsibilities of project manager, Project organization and types accountability in project execution, controls, tendering and selection of contractors..

Skills and abilities required for project manager:

A project manager is a professional in the field of project management. Project managers have the responsibility of the planning, procurement and execution of a project, in any undertaking that has a defined scope, defined start and a defined finish; regardless of industry.

Skills every project manager should have are listed below.

1. Communication
2. Leadership
3. Organization
4. Negotiation
5. Team management
6. Time management
7. Risk management
8. Problem-solving
9. Budget management
10. Motivation
11. Technical writing
12. Adaptability
13. Technologically savvy
14. Reporting skills
15. Active listening
16. Research skills
17. Interpersonal skills
18. Project management methodologies
19. Policy knowledge
20. Conflict management

1. Communication

Project managers must have strong communication skills to be able to convey messages to clients and team members. They need this skill to effectively share their vision, goals, ideas and issues. They also need communication skills to produce presentations and reports.

2. Leadership

Strong leadership skills are critical for project managers. They allow leaders to oversee and coordinate tasks as well as motivate and encourage the team and define the road map to successfully complete the project.

3. Organization

To ensure processes are running smoothly and in line with common goals, project managers must have strong organizational skills. While this includes the ability to multitask, it also includes prioritizing tasks, compartmentalizing projects and documenting everything for easy access and future reference.

4. Negotiation

A project manager must be effective at negotiating terms with suppliers, clients and other stakeholders. You must also employ negotiation skills when working with your team as well to bring everyone in line with strategic goals or manage interpersonal conflicts within the team.

5. Team management

A project manager must be able to bring a team together and move them in one direction, aligning their personal goals with those of the organization. Team management skills include the ability to effectively delegate responsibilities, handle conflicts, evaluate performances and coach team members to help them improve their skills.

6. Time management

Every project is subject to deadlines, which means there are numerous tasks that need to be accomplished in a short amount of time. Project managers must be able to create a project timeline and maintain those deadlines throughout the project lifecycle.

7. Risk management

While they are not generally apparent, risks are inevitable during a project, which is why a project manager must have the experience and ability to pinpoint what could go wrong and implement a risk mitigation strategy. They must be able to ask their team hard questions and continually confirm timelines, decisions and dependencies. They should also know how to use professional risk management tools that allow them to analyze potential risks to develop risk mitigation strategies.

8. Problem-solving

A project manager must be able to gather information, weigh the associated pros and cons and then formulate the best solution. Strong problem-solving skills will allow project managers to have a structured approach to solving problems to achieve a positive result.

9. Budget management

One of the most important responsibilities for the project manager is to create a viable budget and control it throughout the lifecycle. Project managers usually need experience to be able to effectively identify where costs are being overrun and what changes they need to make to control the costs. They need the ability to track costs, put together spreadsheets and decide what the budget should or should not be spent on.

10. Motivation

To keep their team happy and motivated when deadlines are rapidly approaching, a project manager must have motivational skills. Tactics include using positive reinforcement, praise and team-building activities. They must be able to cultivate a positive, fun and collaborative working environment.

11. Technical writing

Technical writing is a form of writing that project managers use in drafting potential deliverables, circulating memos, targeting product releases or sending news updates.

12. Adaptability

Project managers must be able to adapt to upcoming product trends, new technology, user demographics and more. This is a particularly important skill at the material level, as they must lead entire teams in the right direction.

13. Technologically savvy

Being tech-savvy and having hands-on experience with the latest technology can allow you to increase the speed of your team's productivity. By knowing how to adapt to current technology trends, you may be able to increase output and your team's ability to get things done effectively.

14. Reporting skills

A project manager must be able to gather information throughout the lifespan of a project and report them for future evaluation. This is particularly important if a project begins to experience problems. Project managers need reporting skills to coordinate with managers, clients and team members to set expectations, objectives and convey information regarding deliverables.

15. Active listening

Active listening is an important part of effective communication that allows project managers to connect with team members, develop better relationships with clients and manage the

expectations of key stakeholders. Active listening allows them to fully understand the perspective of the person they are speaking to and empathize with them.

16. Research skills

Research skills allow the project manager to fill any gaps in knowledge that may allow them to complete the project more efficiently or more successfully.

17. Interpersonal skills

Interpersonal skills include self-confidence, relationship management and collaboration skills. The ability to collaborate well as part of a team allows the team to work together more productively and complete the project more efficiently. Relationship management skills are also essential, as they enable the project manager to develop and nurture relationships with clients, vendors and team members. The right level of self-confidence can also improve the confidence of the team as a whole, increasing morale and allowing for improved performance.

18. Project management methodologies

A good project manager must have the ability to apply frameworks and methodologies, such as agile and SCRUM, throughout the lifecycle of a project.

19. Policy knowledge

To keep a project running smoothly, project managers must have an adequate grasp of policy knowledge, including health, safety, environmental and business best practices.

20. Conflict management

Strong conflict management skills are essential for project managers, who must keep their teams operating efficiently and working well together. Conflict management and resolution skills are also important for fixing stalled workflows, project discrepancies or addressing other internal or external setbacks.

Figure 2.1 shows the different soft skills of a project manager.



Figure 2.1 Different soft skills of a project manager.

Authorities and responsibilities of project manager:

The following are the different responsibilities of a project manager.

Promotes the development and diffusion of project management culture throughout the enterprise.

- Maintains effective communication with senior management, making them aware of critical issues confronting corporate programs/ projects and of the action plans for addressing those issues.
- In conjunction with corporate leadership, develops and manages the enterprise project portfolio management process, integrates the corporate project decision-making with corporate strategy, and facilitates on-going enterprise program/project portfolio decision making.
- Identifies needed corporate process improvements and works with business partners to effectively drive change throughout the organization.
- Facilitates program/project reviews of critical/key enterprise programs and projects.
- Direction and oversight of all corporate systems for project planning, implementation and monitoring, insuring that all projects have clear goals, objectives and timelines with measurable milestones consistent with corporate strategy and goals.
- With the director of divisional project offices, organizes the project office structure to effectively achieve divisional and departmental project objectives.

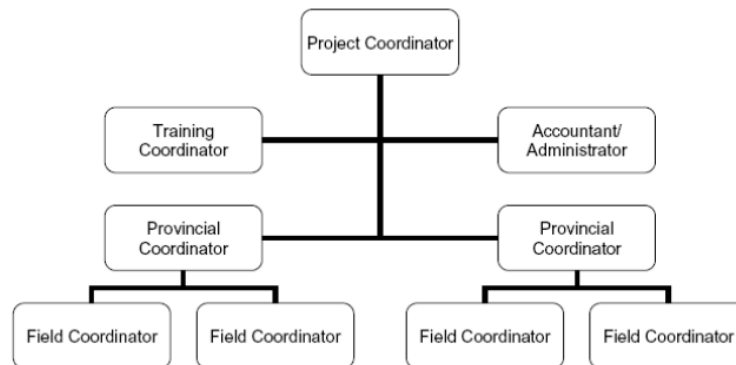
- With the director of the divisional project offices, oversees major periodic divisional portfolio meetings, driving results and resolving key project and program issues.
- With the divisional Project Office Director, oversees preparation of key management communications such as project steering committee presentations, status reports, budget reports, etc.
- With the divisional Project Office Director, oversees relationships between project personnel and functional managers.
- With the Enterprise Project Office Director, oversees education and mentoring for staff and management regarding project management.
- Oversees and participates in the project portfolio management process, ensuring that the technical objectives of projects are integrated with commercial requirements.
- Oversees the integration of project processes with other functional areas such as manufacturing, marketing, and finance in order to ensure the success of corporate strategies, products and initiatives.
- Maintains an understanding of contemporary project management techniques and industry practices, as they impact corporate objectives.
- Ultimate responsibility for enterprise project problem/issue identification and resolution.

Project organization:

A project organization is a structure that facilitates the coordination and implementation of project activities. Its main reason is to create an environment that fosters interactions among the team members with a minimum amount of disruptions, overlaps and conflict. One of the important decisions of project management is the form of organizational structure that will be used for the project. Each project has its unique characteristics and the design of an organizational structure should consider the organizational environment, the project characteristics in which it will operate, and the level of authority the project manager is given. A project structure can take on various forms with each form having its own advantages and disadvantages. One of the main objectives of the structure is to reduce uncertainty and confusion that typically occurs at the project initiation phase. The structure defines the relationships among members of the project management and the relationships with the external environment. The structure defines the authority by means of a graphical illustration called an organization chart.

A properly designed project organization chart is essential to project success. An organization chart shows where each person is placed in the project structure. An organization chart is drawn in pyramid form where individuals located closer to the top of the pyramid have more authority

and responsibility than members located toward the bottom. It is the relative locations of the individuals on the organization chart that specifies the working relationships, and the lines connecting the boxes designate formal supervision and lines of communication between the individuals.



Creating the project structure is only a part of organizing the project; it is the actual implementation and application that takes the most effort. The project organization chart establishes the formal relationships among project manager, the project team members, the development organization, the project, beneficiaries and other project stakeholders. This organization must facilitate an effective interaction and integration among all the major project participants and achieve open and effective communication among them. The project manager must create a project structure that will meet the various project needs at different phases of the project. The structure cannot be designed too rigid or too loose, since the project organization's purpose is to facilitate the interaction of people to achieve the project ultimate goals within the specified constraints of scope, schedule, budget and quality. The objective in designing a project structure is to provide a formal environment that the project manager can use to influence team members to do their best in completing their assignment and duties. The structure needs to be designed to help develop collaboration among individual team members; all in a cost effective way with a minimum of duplication of effort and overlaps.

The organization chart has a limited functionality; it only shows the hierarchical relationship among the team members but does not show how the project organization will work, it is for that reason that the design should consider factors that will facilitate the operation of the structure; these include communications, information flows, coordination and collaboration among its members.

Programmatic Based: The programmatic focus refers to a traditional structure in which program sector managers have formal authority over most resources. It is only suitable for projects within one program sector. However, it is not suitable for projects that require a diverse

mix of people with different expertise from various program sectors. In a programmatic based organization, a project team is staffed with people from the same area. All the resources needed for the project team come from the same unit. For instance, if the project is related to the health area, the project resources come from the health unit. The figure 2.2 shows programmatic based project organization

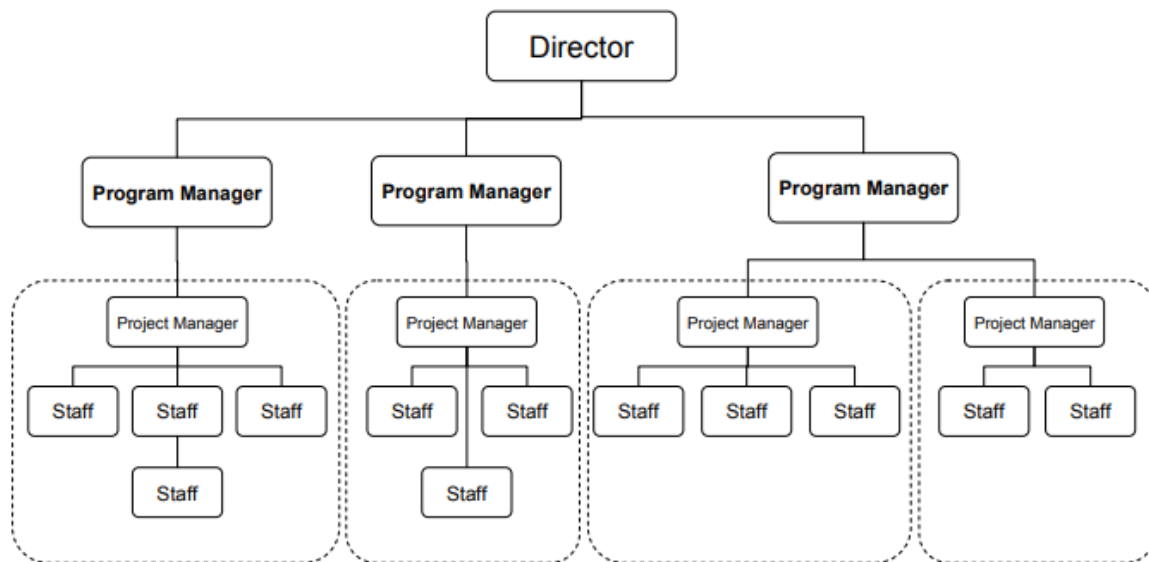


Figure 2.2 programmatic based project organization

The most obvious advantage of programmatic based projects is that there are clear lines of authority, in large projects the project managers tend to also be the program unit manager. There is not need to negotiate with other program units for resources, since all of the staff needed for the project will come from the same program area. Another advantage of this type of organization is that the team members are usually familiar with each other, since they all work in the same area.

The team members also tend to bring applicable knowledge of the project. A major disadvantage of the programmatic based organization is that the program area may not have all of the specialists needed to work on a project. A nutrition project with a water component, for instance, may have difficulty acquiring specialty resources such as civil engineers, since the only people available will work in their own program unit. Another disadvantage is that project team members may have other responsibilities in the program unit since they may not be needed fulltime on a project. They may be assigned to other projects, but it is more typical that they would have support responsibilities that could impact their ability to meet project deadlines.

Matrix Based: Matrix based project organizations allow program units to focus on their specific technical competencies and allow projects to be staffed with specialists from

throughout the organization. For instance, nutrition specialists may report to one program unit, but would be allocated out to work on various projects. A health specialist might report to the health unit, but be temporarily assigned to a project in another project that needs health expertise. It is common for people to report to one person in the programmatic unit, while working for one or two project managers from other projects in different programmatic units. Figure 2.3 shows matrix based project organization structure.

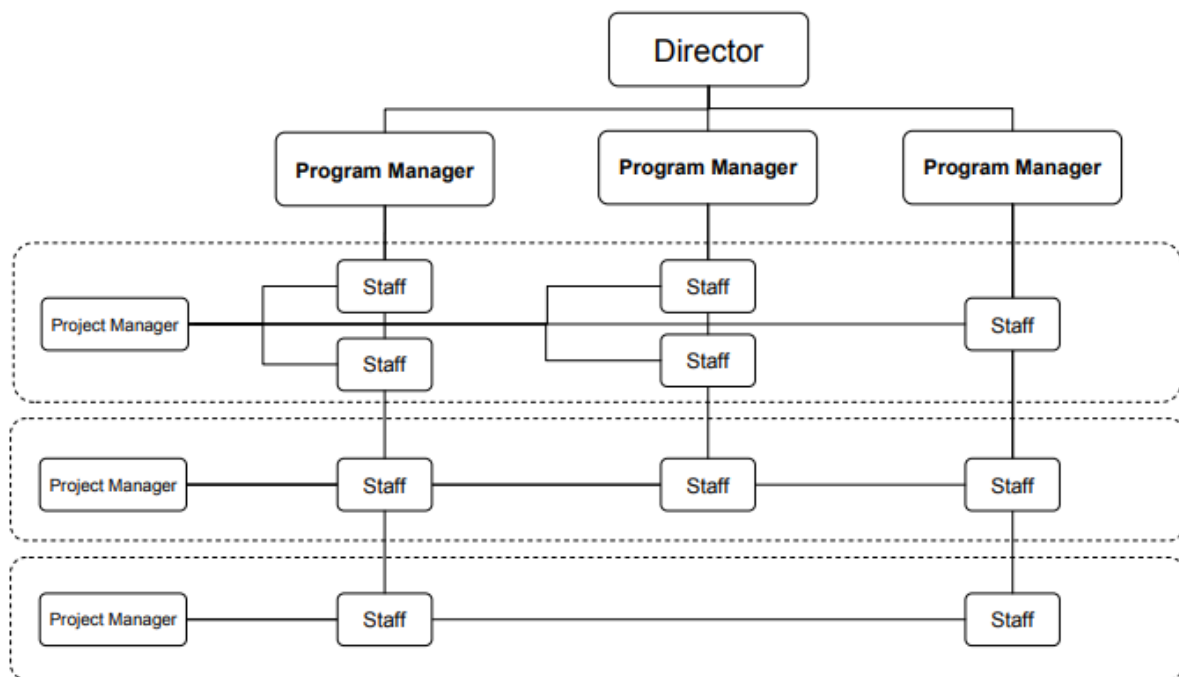


Figure 2.3 Matrix based project organization

The main advantage of the matrix based organization is the efficient allocation of all resources, especially scarce specialty skills that cannot be fully utilized by only one project. For instance, monitoring and evaluation specialists may not be utilized full-time on a project, but can be fully leveraged by working on multiple projects. The matrix based organization is also the most flexible when dealing with changing programmatic needs and priorities. Additional advantages to matrix management are: it allows team members to share information more readily across the unit boundaries, allows for specialization that can increase depth of knowledge and allow professional development and career progression to be managed. It is easier for a program unit manager to loan an employee to another manager without making the change permanent. It is therefore easier to accomplish work objectives in an environment when task loads are shifting rapidly between programmatic units.

The main disadvantage is that the reporting relationships are complex. Some people might report to programmatic unit managers for whom little work is done, while actually working for

one or more project managers. It becomes more important for staff members to develop strong time management skills to ensure that they fulfill the work expectations of multiple managers. This organization also requires communication and cooperation between multiple programmatic unit managers and project managers since that all be competing for time from the same resources. Matrix management can put some difficulty on project managers because they must work closely with other managers and workers in order to complete the project. The programmatic managers may have different goals, objectives, and priorities than the project managers, and these would have to be addressed in order to get the job done. An approach to help solve this situation is a variation of the Matrix organization which includes a coordinating role that either supervises or provides support to the project managers. In some organizations this is known as the Project Management Office (PMO), dedicated to provide expertise, best practices, training, methodologies and guidance to project managers.

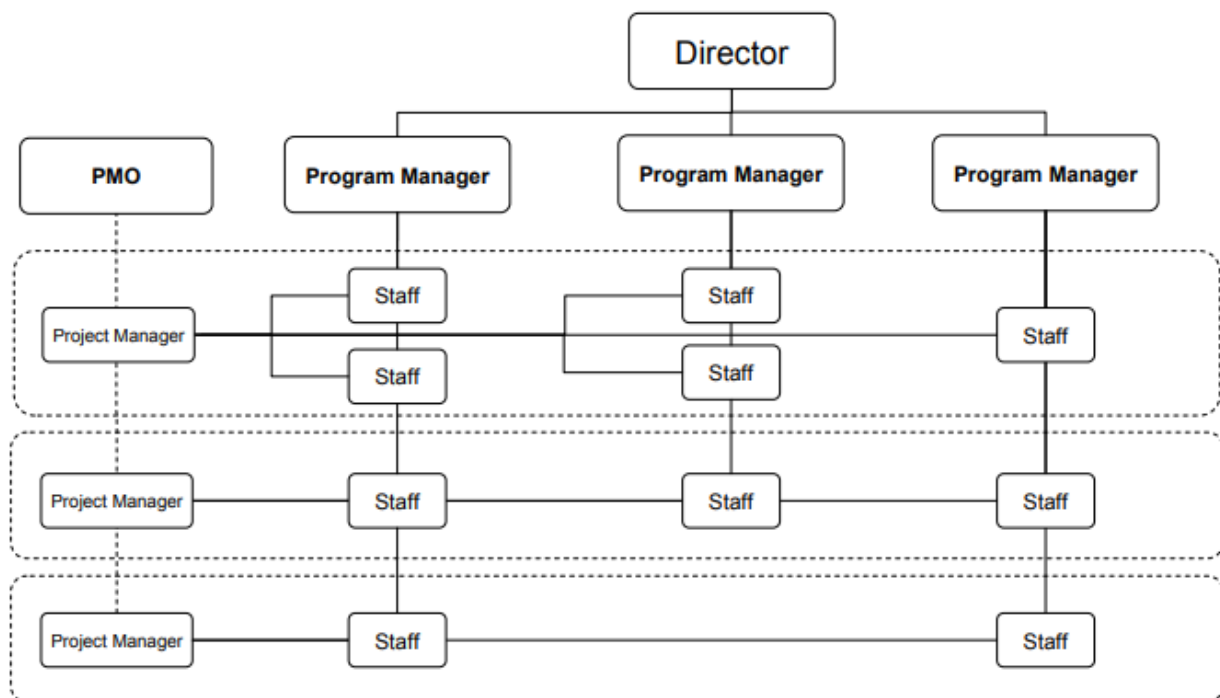


Figure 2.4

The PMO unit also defines and maintains the standards of project management processes within the organization. The PMO strives to standardize and introduce economies of scale in the implementation of projects. The PMO is the source of documentation, guidance and metrics on the practice of project management and implementation. The PMO can also help in the prioritization of human resources assigned to projects.

Project Based In this type of organization project managers have a high level of authority to manage and control the project resources. The project manager in this structure has total authority over the project and can acquire resources needed to accomplish project objectives from within or outside the parent organization, subject only to the scope, quality, and budget constraints identified in the project.

project based organizations: In the project based structure, personnel are specifically assigned to the project and report directly to the project manager. The project manager is responsible for the performance appraisal and career progression of all project team members while on the project. This leads to increased project loyalty. Complete line authority over project efforts affords the project manager strong project controls and centralized lines of communication. This leads to rapid reaction time and improved responsiveness. Moreover, project personnel are retained on an exclusive rather than shared or part-time basis. Project teams develop a strong sense of project identification and ownership, with deep loyalty efforts to the project and a good understanding of the nature of project's activities, mission, or goals. Figure 2.5 shows pure project based organizations structure.

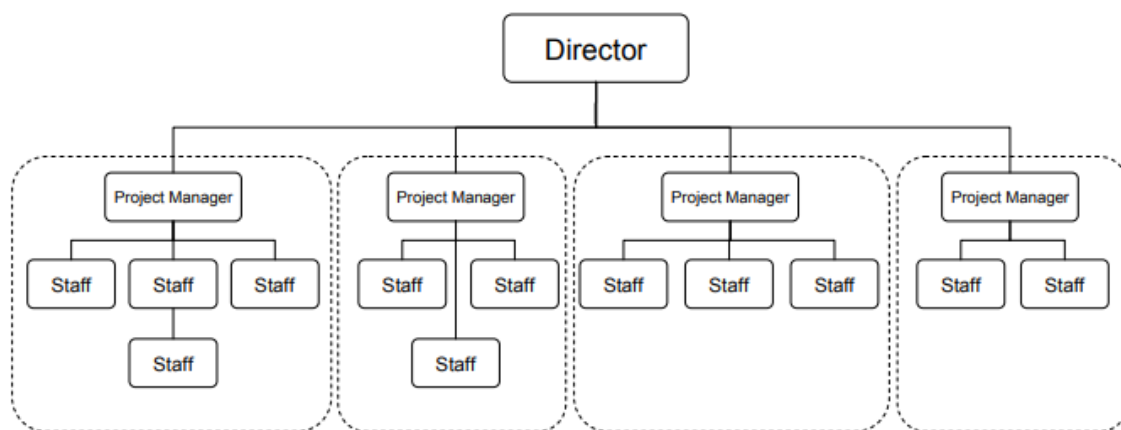


Figure 2.5 Matrix based project organization

Pure project based organizations are more common among large and complicated projects. These large projects can absorb the cost of maintaining an organization whose structure has some duplication of effort and the less than cost-efficient use of resources. In fact, one major disadvantage of the project based organization is the costly and inefficient use of personnel. Project team members are generally dedicated to one project at a time, even though they may rarely be needed on a full-time basis over the life cycle of the project. Project managers may tend to retain their key personnel long after the work is completed, preventing their contribution to other projects and their professional development. In this type of organization, limited

opportunities exist for knowledge sharing between projects, and that is a frequent complaint among team members concerning the lack of career continuity and opportunities for professional growth. In some cases, project personnel may experience a great deal of uncertainty, as organization's or donor's priorities shift or the close of the project seems imminent.

One disadvantage is duplication of resources, since scarce resources must be duplicated on different projects. There can also be concerns about how to reallocate people and resources when projects are completed. In a programmatic focus organization, the people still have jobs within the program unit. In a project-based organization it is not always clear where everyone is reassigned when the project is completed. Another disadvantage is that resources may not be needed as a full time for the entire length of the project, increasing the need to manage short term contracts with consultants and other subject matter experts. A variety of this pure project approach is temporarily project-based organizations. This organization consists of a project team pulled together temporarily from their program unit and led by a project manager that does not report to a programmatic unit. The project manager has the full authority and supervision of the project team.

Another design is based on a mixed structure that includes a matrix, programmatic focus and project based; this mix reflects the need for more flexibility in a development organization to accommodate different requirements. For example a health program may have a couple of projects short term and long term all reporting to the program manager. An education project may be organized on a matrix using resources part-time from other units, and a large water project organized as a fully project-based where all staff report to the project manager. It is not unusual to find this type of mixed designs on development organizations.

Accountability in project execution:

As in any branch or division of a business unit one needs to have a clear notion on the accountability and responsibility within the project management domain too. The project managers must be well aware of their responsibilities and the accountability towards the project whether it is a success or a failure. However, in the current times most often this accountability is being replaced by a phenomenon which is making the project managers play safe by avoiding risk. This is not a healthy thought given that most of mankind's success have come by taking risks, albeit careful risks!

Using the right tools too is important in project management, but at the same time one can easily be encompassed in the transparency and communication while not paying much attention to accountability, deadlines, etc. The project management tools should be viewed as data

sources and used accordingly to make informed decisions tied to accountability and responsibility. The client might want to know the project status or how the project money has been spent or any other information pertaining to the project. It is important that these details should be captured and shared with the client as and when required so as to build the relationship on trust and efficiency. In cases like this the project management tools are helpful in giving us the actual figures. Giving the reasons why the figures are the way they are is the responsibility of the project manager who is accountable for the project.

It should also be remembered that the project manager alone per se cannot be held accountable about the project, though he has a fair share of responsibility. This is because the project manager is very much dependent on the project team. Hence it is important to choose the right team carefully and groom them on the job and project. At the same time it is highly important that the project manager is accountable to the teams' efforts and the team management.

This is one of the reasons why companies across the globe are spending thousands of dollars in training their employees on the various technological and soft skills on a regular basis. Teamwork, trust and motivation are the three forces which can bring together a team to perform better and thus produce better results too. Taking care of these aspects and grooming the right team would help any organization in having valuable people assets who will be able to act as the company's ambassadors immaterial to the role that they are in.

Rendering and selection of contracts:

There might be many kinds of contracts made with or within a large project organization. For example, every employee should have a contract of employment. There will be a contract between a main contractor and the project owner, and more contracts between the main contractor and subcontractors. Every purchase involves a buyer-seller contract, usually embodied in a purchase order. For internal, or management change projects, a contract often exists between the company and the manager or other staff member who is assigned to manage the project.

Essential elements of a contract:

Although a legally binding contract can exist between two parties on the basis of a verbal agreement, for project management purposes it is assumed that the contract between the customer and the main contractor will be in writing. This applies also to all contracts made between the project contractor and the subcontractors and other suppliers of goods and services. Properly drafted written documents are likely to ensure that all aspects of each agreement are available for subsequent reference, both for routine administration of the contract and as

evidence should any dispute require resolution. The contract documentation might be a purchase order, an exchange of letters, a specially drafted contract or a standard form. It is assumed that any subsequent amendments to the contract will also be written on suitable documents.

Intention The parties must intend that the contract shall be legally binding. In project contracts this intention will be assumed unless the parties have specifically declared otherwise, in which case the contract becomes only a formal version of a 'gentleman's agreement'. Project managers are not likely to be concerned with this question of intention, except perhaps when problems arise with collective agreements between management and trade unions.

Offer and acceptance The contractor (seller) must make a definite offer stating willingness to contract on specified terms, and the contract becomes legally binding on both parties when the customer (buyer) informs the contractor that the offer is accepted without qualification. The customer must communicate acceptance before the expiry of any offer time limit set by the contractor.

It may happen that the picture becomes blurred as to what has been offered and what actually has been accepted. Therefore the offer must be defined by a specification that is as complete and up to date as possible, amended as necessary to take account of all changes agreed during negotiations.

Consideration A contract must result in each party promising the other a valuable benefit. In projects, this usually means that one party promises to deliver certain goods, property or services by a specified date and the other promises to accept the goods, property or services and pay for them. Failure of one party to keep its promise can lead to action by the other for breach of contract.

Capacity In general, if the offer made by a company falls outside the scope of its powers as set out in the objects clause of its memorandum of association, then the company has no power to make the offer and the contract is void.

BUSINESS CONTRACTS

A contract as such is an agreement between two or more parties in writing to do or not to do certain things. Business contracts are those agreements which are enforceable at law. They are entered between two or more competent parties for a legal consideration which is usually payment in the form of money. For an internal contract the consideration is normally absent. Legally, of course, a contract can be valid even though there may not be any consideration, but then it is not a business contract.

In order to enter into a contract, there must first be an offer or proposal signifying the willingness of one party to do or abstain from doing something at the desire of the other party. The desire of the other party is expressed in the enquiry often known as Notice Inviting Tender (NIT) and the offer to carry out the services is known as tender.

The sequence of events resulting in a business contract are as shown below:

- Enquiry – Issue of NIT to selected parties or to the newspapers by the project authority and sale of tender document.
- Offer – Submission of the tender document by the bidder.
- Acceptance – Considerations as accepted given a legal form and content duly signed by competent authorities of both parties.
- Contract – The contract consists of an agreement on stamped paper, a detailed letter of intent with agreed variations and the original tender document.

R'S OF CONTRACTING

Contracting, whether it is for a consideration or otherwise, is an essential arrangement for getting work done in an environment where authority relationships and responsibility delineations are unclear or non-existent. It is said that contracting is practiced even in a domestic environment where parents obtain desired behaviours from a child for a certain consideration. The same continues without our being aware of it in all our social relationships. Knowledge of contracting is, therefore, as much a basic requirement for day-to-day living as that of the three R's. If one chooses not to over-play the legal aspects, contracting itself can be found to constitute the 3 'R's in the case of contracting are:

- Responsibility,
- Reimbursement and
- Risk.

1. Responsibility

The first 'R' in a typical contract covers issues such as:

1. What to parcel out to the contractors and what to retain
2. How to define the work parcels so that the contractors know their scope precisely and there is not overlapping, undefined, unallocated or ambiguous work areas.
3. What are the relevant performance parameters for fulfillment of which contractors must assume responsibility?

Collectively, the above are often referred to as scope of work. Schedule of work, technical specifications, scope drawings, special conditions of contract, responsibility of matrix and special write-ups in appropriate combinations are used to ensure clarity.

Contact planning

The factors listed below may be considered while taking a decision on the number of contracts.

1. Specialty of the works
2. Location of the work sites
3. Value of the contract
4. Availability of contractors
5. Need to accommodate local contractors
6. Need to obtain performance guarantee for a system from a single party
7. Concern for early completion
8. Concern for completion at minimum cost
9. Concern for top quality
10. Current work load of the contractor and capability of the contractors
11. Time schedule of the work
12. Political pressure.

Reimbursement

The second 'R' of a contract refers to the type of reimbursement and it is as important as the first 'R'. Perhaps this 'R' is more important for the contractor than the owner. While the owner may refer to his responsibility to describe the contract arrangement, the contractor may choose to refer to it by the types of reimbursement such as lumpsum contract, item rate contract, etc. We shall, however, prefer to use, responsibility as the basis for assigning any name to a contractual arrangement.

Risk Factor

The last 'R' of a contract refers to the risk factors. Both the owner and the contractors are so much concerned about this 'R', that most of the pages of a contract deal with only this matter. In fact, a contract is considered to be an instrument for transfer of risk from the owner to the contractor, and necessarily this should evoke some resistance from the contractors. The least that a contractor would do is to seek protection in one form or other. But while the contractor would do is to seek protection in one form or other. But while the contractor risks only his fee, the owner runs the risk of not having his plant at all. Naturally, the owner would seek more protection and would not like to take any risk against which he does not have adequate insurance. The insurance, however, cannot be always in the form of a financial insurance policy. Only small risks can be covered by insurance and a little more protection may be provided in the contracts are awarded through a proven contracting process.

METHODS OF CONTRACTING

Execution of projects is being made mainly through contracting. The different methods of contracting and its relative merits and demerits are given below:

(A) TURNKEY PROJECTS

Engineers & Contractors take a single commitment for the design, engineering, procurement, delivery, construction, erection and commissioning of the project and training of operating and maintenance of personnel.

Two types of turnkeys are

1. Lumpsum
2. Fee plus reimbursement

Turnkey contracts are used for complete plants. Usual turnkey contracts have some sort of advanced technical know-how, which limits the number of competitors that can bid-know-how for construction and operation of the plant. In turnkey projects, the owner is not involved until the project/plant is ready for operation/commission. But, companies require some involvement during the execution. As a result, the turnkey contract now carefully details the company's rights and responsibility.

Turnkey Contracting

A turnkey contract may be defined as: "a single contractor acquires and sets all necessary premises, equipment, and supplies operating personnel to bring project to state of operational readiness. All that the customer needs to do is to turn the key to begin full effective usage of the new facility. Some time the contractor continues to assume operational control. Turnkey facilities are appropriate for customers who are unable to perform or wish to avoid their own subcontracting for ordering and testing components acquired from several vendors. Recruiting, screening and training is a highly specialized task. A turnkey contractor is compensated either through surcharges on each item or through services procured for the facility or by a commitment in advance to a fixed price". Therefore, turnkey contract may help in cutting down the number of responsibility centres to the extent of one. In a turnkey project a single contractor has complete responsibility to supply the owner a plant which is complete and ready for the owner to operate by simply turning the key. Turnkey thus is an expression for the extent of responsibility that a contractor undertakes; it is not to be mixed up with the commercial and payments terms. Turn-key would not necessarily mean a fixed price contract; it is quite possible for engineering consultancy organizations to undertake turnkey responsibilities for projects even without having capabilities of supplying and financing. On the other hand, in a lumpsum turnkey contract a contractor offers the owner a complete plant

for a single price. Even when a turnkey contract is entered into the process of dividing the work does not totally stop with the decision to go turnkey. It only reduces the number of agencies the owner is required to coordinate. The turnkey contractor in turn will be required to subdivide the work further as it is not possible to have all the capabilities required for a complex project under one single roof.

Advantages of Turnkey Contract

In projects that are undertaken by government or state-owned enterprises. Ownership and control after the completion of contract is retained with the owner. This is especially true in the case of traditional turnkey contracts, when the involvement of the turnkey contractor could be eliminated once the contract is completed, as he has no share in capital ownership, and hence there would be no conflict as regards policies and management of the operations of the enterprise.

In the turnkey contract a major advantages to the promoter stems from the fact that the responsibility for the contract lies with a single source and the promoter is relived from responsibilities for the equipment or plant and performance.

In the turnkey contract a major advantage to the promoter stems from the fact that the responsibility for the contract lies with a single source, and the promoter is relieved from responsibilities for the equipment or plant and performance.

The turnkey contract generally ensures that the projects is put into operation more rapidly than other contracts since both design and construction are the responsibility of one entity.

When a turnkey contract extends beyond the commissioning stage the teething problems of a multidisciplinary project can be resolved by the contractor's in-house trained personnel.

Disadvantages of Turnkey Contract

The cost of a turnkey contract may be significantly higher than that of a traditional form of contract because cost estimates are often expressed in overall terms without a detailed breakdown of costs.

The turnkey contract do not allow the promoter to participate or become familiarize with the facility that the promoter will operate after the handling over of project contract to engineering company.

The turnkey contract do not permit the normal checking procedure by the sponsor, as is sought to be developed by the promoter as it leads to internal conflicts.

Tendering and Selection of Contractor

A contract presumes that the parties entering into a contract are competent and normal. But if, for instance, the contractor selected for a specific work is not competent technically, financially or managerially, then the risks will multiply several times. This uncertainty must, therefore, be resolved at the first instance. A well laid out procedure for prequalification of contractors and tendering can resolve this uncertainty. Such a procedure is known as tendering procedure. A tender may be defined as an offer to carry out certain work or supply certain material or services in accordance with clearly detailed description and conditions. The tendering procedure deals with prequalification of contractors, preparation of tender documents, mode of floatation of enquiry, receipt of tender guidelines for evaluation of tenders and selection of contractor.

The need for contractors originally arose because plant sizes grew to such an extent that it became almost impossible for the traditional equipment suppliers to perform their own function efficiently as well as to deal with the organization, administration and overall design problems connected with complete plant projects. Bearing in mind that a contracting firm will usually tender only for plants worth several million dollars, it will be appreciated that the preparation of a tender is a major operation in itself and may cost (in the case of a substantial

Prequalification of contractors

For prequalification of tenders, notifications are issued in the press, at embassies etc. as appropriate giving details such as name of the purchaser/engineer, outline of the project, enquiry issue and tender submission dates, instructions for applying for prequalification and submission date for the contractor's prequalification data. Normally, a prequalification document, issued on request to a contractor seeks information on the organization, experience in the intended type of work, availability of resources like managerial, technical labour and plant, and also asks for financial statements. The contractors desirous of prequalification responds to the questionnaire and such details as may enable his qualification.

1. He has had similar experience earlier and is performance reports for previous contracts are satisfactory.
2. His past turnover and present financial commitments indicate no constraints on fund availability for execution of the proposed contract.

3. He has the necessary infrastructure, adequate technical manpower, construction equipment and his present commitments would not prevent him from executing the proposed assignment satisfactorily.

4. His credibility in terms of his associates and associations with other agencies including foreign agencies, job performance and relationship with customers are sound. After evaluation, the short-listed contractors are informed about their selection and their confirmation obtained as to whether they will submit the tender.

Preparation of tender documents

A tender document is prepared by the purchaser/engineer in as detailed and clear manner as possible to define the technical requirements of the work involved as also the responsibilities which the purchaser and contractor will have to share between themselves. A good tender document will include the following:

1. Letter of invitation to tender
2. Instruction to tenders
3. General condition of contract
4. Technical specifications
5. Special conditions of contract
6. Scope drawings
7. Bill of quantities
8. General information about site
9. Form of tender

Professional institutions like Institute of Mechanical Engineers have also standardized the tender form. A tender form for supply and erection of plant and machinery may cover the following items in the order listed below:

1. Prices
2. Programme
3. Terms of payment
4. Conditions of contract
5. Contract prices adjustment
6. Validity

The document is then issued to the short-listed contractors for submission of their tender.

Receipt of tenders

The tenderers may make a request to visit the site. Normally, the purchaser/engineer accompanies the tenderers to the site and provides further information. There may be a pre-

bid conference to clarify the various issues to the tenderers. Supplementary queries can be clarified through correspondence till the due date for the bidding. On the due date bids may be opened in front of the tenderers present. The purchaser/engineer will announce and record the names of tenderers and prices including prices of alternative tenders. They would also announce and record the names to tenderers, if any, who are disqualified due to late submission.

Evaluation of tenders

The tenders are evaluated from technical, commercial, contractual and managerial angles. Contractor's confirmation or classifications are sought on various matters which either do not conform the tender requirements or those that have been offered by the contractor. The correspondence may reduce the points of disagreement but a post-bid meeting often cannot be avoided. Normally, separate meetings are held with each contractor to obtain clarification and also to bring all the offers in line with the tender requirement.

The actual evaluation process includes checking the acceptability of the offer against technical specifications, management specification and various commercial and contractual terms and conditions. An adjusted contract price will be arrived at in each case. Normally, the lowest bidder who is also technically and managerially acceptable is awarded the contract.

Agreement

An agreement is now to be signed on a stamped paper. The form of agreement is probably the most standardized document. The form of agreement refers to the various documents which will together form the contract. The accompanying documents normally are:

1. Original tender papers comprising the conditions of contract, specifications, dates, drawings and other relevant information.
2. Schedule of rates/prices including those for engaging workmen, equipment, etc., for contingent works required during execution not envisaged at the tendering stage.
3. A list of deviations from original tender stipulations as mutually agreed upon between the purchaser and the contractor after discussions.
4. Other relevant attachments

Form of guarantee

Finally, whenever required, a guarantee from sureties in the following standard form of IMechE may be asked from the contractor as an insurance against uncertainties in dealings with the contractor.

Types of Tendering Process

Unfortunately for the contractor, a high proportion of inquiries are, for one reason or another, not very serious. This tends to occur mainly in countries where the infrastructure may not yet

be ready for a particular type of plant. It is upto the contractor to assess the seriousness of each inquiry. The tendering policy of most contractors can be categorized into one of the following three types.

Highly selective tendering

This is often historical in origin and is followed by contractors with long experience with certain industry, product or process. This type of tendering has the advantage of low costs and a high proportion of successful contracts achieved by negotiation rather than competition. The danger is that the announce and record the names to tenderers, if any, who are disqualified due to late submission.

Moderately selective tendering

This is the most common type, particularly among European contractors whose favoured field of operation is discernible. The danger is that firms can become too complacent or, on the contrary, that they are unable to restrict their activities.

Indiscriminate tendering

This is tendering for all projects without regard to the type and/or value. While a broad front is offered, a large number of small contracts must often be undertaken with a disproportionate amount of supervision and design cost, giving rise to high tendering costs. The acceptance rate is generally lower than for more selective tendering. Moderately selective tendering is thus to be preferred by the majority of contractors, although all may well claim to follow this type of procedure.

The tendering period also varies considerably. If this is too short, an inaccurate tender with a large number of qualifications and exclusion clauses can result. On the other hand, a tendering period is rarely considered by the contractor to be too long. A point worth noting is that many contractors are reluctant to request an extension of tendering time for fear that this gives the potential client an impression of inefficiency. Yet it is usually better to seek such an extension rather than to submit an inaccurate tender.

Prior to a client asking for bids for a plant, a feasibility study is necessary. This may be conducted by the client itself, by an independent consultancy organization or in some cases by the contractor. Such a feasibility study may be preceded by an advisability study that initially defines the project and assesses its possible attractiveness; this is usually carried out by the client. The feasibility study itself examines the markets for the products to be manufactured (with due regard for supplies, technological restraints, plant location, financial constraints and time schedule) in order to determine the overall economic feasibility. Based on the results of the feasibility study, a summary initial schedule is devised, usually comprising

three parts namely; advantages and disadvantages of various solutions and reasons for choice of the recommended solution; full information on the recommended proposition; a summary estimate of costs.

This schedule can be enlarged and refined to form the basis for decisions concerning the technical, financial and managerial aspects of the project. Additional inputs might include; descriptive and memoranda indicating construction and operating methods, breakdown of supplies and equipment leading to particular specifications, time schedules, the margins of risk; technical files comprising overall plants and drawings of the main components of the plant; an evaluation (to within + 10 percent) of the costs and expenses entailed.

Content of a Tender

1. Technical proposal

Project schedule	Schedule of professional staff
Process description	Resume of key personnel
Operating requirements	Project management policy
Plot-plans and elevations	Engineering department descriptions
Process flow diagrams	Construction department descriptions
Engineering flow diagrams	Procurement department descriptions
Utilities flow diagrams	Financial control descriptions
Heat balance	Lists of reference plants
Materials balance	
Equipment list and data sheets	Cost proposal
Facilities	Total price for services offered
-piping	Total breakdown by materials
-instrumentation	Price breakdown by materials
-electrical	Lobour and overheads
-civil engineering	Amount of subcontract work
-construction	Amount for offsite facilities
	Tax provisions Specification
-clients	Royalty provisions
-contractors	Alternative systems
Services provided	Optional equipment
-by clients	Prices adjustments
-by contractors	Escalation and penalty clauses
Model of proposed plant	Schedule of payments

GLOBAL TENDERING AND BID EVALUATION

These are very significant to the project managers engaged in design, construction, execution, installation, operation and maintenance of large-scale assets in order to derive

optimum benefits from the capital intensive projects. Global tenders are issued for high tech requirements particularly associated with international credits like World Bank loans. Since the source of supply may be outside the country, a detailed plan must be done and global tender must involve simplicity in language and clarity, specifying tendering and accepting authority. It is necessary to ensure that the accepting and tendering parties must be specific to commit. Tendering is nothing but visualization of various events that have to take place in the execution of contract spread over two to three years, and legislating for the buyer's stand a respect of all these, which should be practical, consistent with canons of financial propriety and allow for proper legal actions.

The chief merit of global tendering is that it gives equal opportunity to every supplier/contractor to make an offer within the terms and conditions of tender and thus it promotes competition. Global tendering is particularly recommended to ensure safeguard against public procurement.

Bids must be procured from really interested parties by proper prequalification and applying the bid bond clause. The tender is awarded to the responsible bidder whose price is the lowest, provided it is deemed reasonable and most advantageous. The bidder has to satisfy himself that full information has been furnished as required in the specifications, as lack of information will be at the risk of rejection of bid. The bids received will be scrutinized by the project team according to the bid evaluation criteria to ascertain the most suitable evaluation of bid for the total project.

Formal advertising of tender is resorted to in the bidder's interest; there must be time for formal solicitation and for the delays that may frequently develop. While submitting application for pre-qualification, the bidders must furnish package number, description of work intended for pre-qualification and name and address of the bidder, address of registered office of the firm. The bidder must also furnish the lists of technical personnel with their experience, names of sub contractors and the nature of job handled by them. The details of similar works executed in last ten years indication name, address of clients, nature of job, contract value, completion times, etc., need to be furnished by the bidder. Information on current orders in hand, expected time of completion have also to be furnished by the bidder.

The bid application, completed in all respect in seven copies must be submitted to the project authorities so as to reach them within a specified date. One set of sealed copy of application

must be sent under registered post to the Directorate General of Technical Development, Coordination Section, New Delhi. The following should be subscribed on the envelop; Package number Description ... Application for pre-bid qualification for plant modernization phase. The project authorities have the right to verify the credentials of the applicants and their facilities, etc., and call for additional information, if required, to ascertain the bidders' capabilities. The project authorities also reserve the absolute right to reject, at their discretion, the application of any or all bidders without assigning any reason.

Initial evaluation

Once the bids are received, the project authorities evaluate them on a preliminary basis, with a checklist, as to whether all key points, including commercial terms, costs, delivery schedules and other contractual aspects, have been fully covered. In order to shortlist the vendors, the acceptable bidders are arranged in ascending price order, after eliminating bidders with unacceptable quotations, or with incomplete bids. The preliminary evaluation enable to focus greater attention on a few vendors with competitive bidding, the need (if any) solicit additional information.

Technical evaluation

After initial scrutiny of the promising bidders' information a complete technical evaluation of the bids of the potential suppliers is performed by tabulating the data in a suitable way. It is desirable to specify for the shortlisted vendors the following checklists in program. Vendors, quotation reference, quotation date, validity expire date, vendors complete address, local representative, complete delivery material delivery point, basic price of material escalation terms, payment details, recommended spares, mandatory spares, shop assembly, shop painting, shop testing, packing, graphs, catalysts, lubricants, drawings, engineer services, warrantees, import duties, agents' fees, currency exchange etc., inspection fees, adjusted base cost, freight cost, operating cost, feed stockiest, utility cost, field service estimate, allowance for estimated extras, total estimated present cost also form a part of the checklist. It is necessary to scrutinize additional costs/savings and availability of vendor support at this phase.

Commercial evaluation

The detailed commercial scrutiny is usually conducted after evaluating the bid technically. The commercial scrutiny consists of checking whether everything is covered in the price. These aspects include the following :

drawings, documents, maintenance, operating manuals, test facilities, test certificates, painting and insulation, shop assembly, packing, creating, field service, freight to deliver payment, warranties, guarantees delivery crating, field services, freight to delivery payment, warranties, guarantees delivery date, unit rates, bases of escalation, discounted value of money, currency exchanges, imports costs and costs of values applies to down payment, progress payment, final payment, operating costs, variable annual costs, escalation costs, field service costs and other cost components.

Pre-award meetings

It helps the project authorities to meet the short listed vendors in apreaward conference prior to selection for reviewing any questions which have arisen during the technical and commercial evaluations and to confirm all aspects of the bid. It is desirable that a team of senior officers connected with the project meets, the shortlisted vendors so that negotiations, if necessary, can take smoothly and also to have discussions on ethical consideration.

Bid conditioning

The conditioning process helps the project authorities, to consider intangible and other factors which might influence vendor selection. A low bid may not necessarily be the cheapest bid when the following aspects are considered: additional expediting, follow-up, additional engineering review, delayed receipt of drawings, interchangeability of spares with existing equipments, local vendors, local pressures/support, future service availability, initial maintenance, compatibility with existing infrastructure, additional support facilities application of learning-curve for cost-reduction, transporting over dimensional consignments, etc.

Vendor selection

The vendor selection process is accomplished by the project committee. The technical aspects are reviewed by technical personnel, while the commercial aspects are evaluated by finance/commercial officers. A detailed presentation of the pros and cons of all aspects of the individual vendor a made, and a vendor is finally chosen.

Pre-commitment meeting

The pre-commitment meeting with the vendor enables the suppliers to know that he is likely to get the contract. A formal agenda is made to cover a comprehensive review of specification,

contracts, and commercial terms in order to reduce misunderstanding between the two parties. A broad identity of views on all aspect is reached between the two parties. If the vendor has some lingering doubts, these are recorded in written statements.

Formal award

The last step in the whole exercise is to formally award the contract to the vendor. A telex or telephone order is initially placed. A formal written purchased order, together with necessary documents, data sheets, specifications, contractual terms, etc., is handed over to the vendor. After choosing the vendor, the next stage of follow up of the contract's implementation on manufacture, transport, installation is planned, so that efforts are made to commission the project in time.

Steps required for bid preparation are given below:

A. Pre-bid invitation stage

1. Define as precisely as possible the need that is to be met.
2. Identify the product that will meet this need.
3. Specify operating and other relevant parameters.
4. Lay down specifications, as required, by reference to:
 - a. Standards:
 - i) national
 - ii) international
 - iii) other country's;
 - iv) industrial associations
 - b) Brand names
 - c) Catalogues of sellers
 - d) Drawings, engineering designs
 - e) Samples
5. Specify test methods and procedures
6. Research supply market to know the structural characteristics of the international market for the project.
7. Decide on procurement method and strategy.
8. Identify potential suppliers, through desk research.
9. Shortlist the more reliable ones through a pre-qualification systems
10. Prepare bid documentation and the invitation to tender. Define contract terms and conditions and scope and nature of guarantees required. Check for precision and completeness.
11. Establish evaluation criteria.

B. On receipt or opening of bids

1. Design a suitable format for bid tabulation.
2. Reduce all variables in different bids to a comparable basis, e.g. either all FOB or CER terms
3. Express all prices/costs in a single currency and use an appropriate exchange rate for the purpose.
4. As the ultimate cost to the buyer is more important than the price, compare the relative cost of supplies from different bidders and not only their price quotations.
5. For equipment, be assured by the supplies of the later availability of spares/replacements and their supply price.
6. As operating costs are as important an element of evaluation as the initial cost of the equipment, adopt a total-costing/life-cycle costing technique when evaluating bids for equipment.
7. As the time profiles of the costs and possible output (and hence, revenues) of different bids for equipment are likely to differ, use the net present value technique and take into account the serviceable life, salvage value at the end, and operating costs.
8. Follow these two objectives for the technical evaluation:
 - a) Assess deviations from prescribed specifications and, if these are acceptable, make appropriate adjustments to the price for positive and negative deviations to compare offers.
 - b) For commercial evaluation, reduce the payment terms of different offers for productivity differentials (use of material and/or human inputs per unit of output).
9. For commercial evaluation, reduce the payment terms of different offers to a comparable basis. In the case of deferred payments, make use of the net present value analysis technique.

DELIVERY TERMS OF CONTRACTS

There are five main types of contracts that are currently used by process plant contractors. In order of decreasing degrees of the fixed price element, these are as follows:

- Lump sum (fixed price) contracts
- Guaranteed maximum contracts
- Target price contracts
- Cost-plus-fixed fee contracts
- Cost-plus-percentage fee contracts