

CONSULTING ENGINEERING INDUSTRIES FACING GATS CHALLENGES

HOW TO PREPARE CONSULTANTS TO FACE GLOBALIZATION ?

BY

GAMAL NASSAR

Egyptian Society Of CONSULTING Engineers (ESCON)
Executive Committee FIDIC

1. CONSULTING ENGINEERING INDUSTRY

Consulting engineer means any professionally qualified engineer or engineering firm who, either directly or indirectly, renders any advice, consultancy or technical assistance in any manner to a client in one or more disciplines of engineering.

1. The service rendered by a consulting engineer means any service provided to a client, by a consulting engineer in relation to advice, consultancy or technical assistance in any manner in one or more disciplines of engineering.
2. Consulting engineers shall include self-employed, professionally qualified engineer who may or may not have employed others to assist him or it could be an engineering firm - whether organised as a sole proprietorship, partnership, a private or a public Ltd. Company.
3. All these services which are rendered in the capacity of a professional person and specifically include the services pertaining to structural engineering works, civil / mechanical / electrical engineering works or relating to construction management. All services rendered within the above scope of the term engineering attract service tax provided they are rendered in the capacity of a consulting engineer. The scope of the services of a consultant may include any one or more of the following categories-
 - (i) Feasibility study;
 - (ii) Pre-design services/project report;
 - (iii) Basic design engineering;
 - (iv) Detailed design engineering;
 - (v) Procurement;
 - (vi) Construction supervision and project management;

- (vii) Supervision of commissioning and initial operation;
- (viii) Manpower planning and training;
- (ix) Post-operation and management;
- (ix) Trouble shooting and technical services, including establishing systems and procedures for an existing plant.

Though the above list is not exhaustive, it illustrates the wide scope and nature of the services rendered by a consulting engineer.

In their attempts to reach the international market-place, the adoption and implementation of a sound quality management system for engineering services will give consulting enterprises in developing countries a powerful tool for sharpening their ability to compete locally and internationally and to obtain client's satisfaction.

2. INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

The International Organization for Standardization (ISO) has issued models for such a system in its ISO 9000 series of standards. They cover the key areas of management quality policy and leadership, market research, product and process design and development, production methods, training, purchasing techniques, packaging, sales and distribution, storage, after-sales services, auditing and documentation, among others.

This compilation of the best quality practices of many countries is being increasingly accepted as a universal standard. If current trends continue, registration with competent bodies as proof of compliance with the standards will in the future be essential to entry into major world markets.

The International Trade Centre UNCTAD/GATT is convinced that implementation of the ISO standards will enable consulting as well as export enterprises in developing countries to offer services or products that meet well-defined needs, satisfy client's expectations, comply with applicable standards and specifications as well as conform to statutory or other requirements in regard to health and safety, protection of the environment, and conservation of energy and materials. All these at lower costs and higher levels of efficiency.

In short, the standards should help these enterprises to obtain a bigger share of their own as well as selected markets. It is also expected that application of the standards, because they are internationally in use, will reduce the technical barriers to trade of services.

The immediate aim of ITC and ISO is to help harmonize quality-assurance practices in developing countries with standards representing the consensus of

4. MARKETS IN DEVELOPING COUNTRIES

The economy of most developing countries is based on agriculture, which accounts for 60 to 80% of their gross national product (GNP), and their industries are in various stages of development. Manufacturing companies are generally family owned and professional management is confined to large companies or to production units working under licence from multinationals. Consequently, most producers are not aware of the benefits of quality systems and their effect on profitability and long-term growth.

The vast majority of people are poor and most of their purchasing decisions are based on considerations of price rather than of product quality. The behaviour of such governments when tendering for consulting works is not different. Usually its selection is based on price rather on quality. Exceptions are some times noticed.

Client's therefore lack the means to assess quality and to demand conformity to standards. They tend to put up with whatever is available in the market.

After decolonization in the years following the Second World War, most newly independent countries adopted self-reliance as a national policy and started to develop indigenous consulting industries. To accelerate the pace of industrialization, large State-owned industries were set up for industry as well as consultancy.

5. PERCEPTIONS AND MISCONCEPTIONS

Quality is regarded as a socially desirable objective, but its contribution to the profitability of business is considered marginal. This is the result of a number of misconceptions.

◆ Higher Quality Costs More.

This is the most widely held belief relating to quality. However, new insights into the mechanisms of quality building and manufacturing processes have shown that high quality does not always cost more. Computers, consumer electronics and household appliances are particularly good examples to show that this is not true. Throughout the last two decades the quality of these items has progressively improved and cost in real terms has dropped.

◆ Emphasis On Quality Leads To Reduced Productivity.

There is a widespread misconception among production managers that quality can be achieved only at the cost of quantity. This view is the legacy of the period when quality control consisted only of physical inspection of the end product.

For instance, one of the most important quality assurance (QA) activities is the review of a design before it is released for production. This review establishes

◆ **QUALITY POLICY:**

An organization's overall policy and directives on quality, as formally expressed by top management.

◆ **QUALITY MANAGEMENT:**

The overall management function that establishes and implements quality policy.

◆ **QUALITY SYSTEM:**

The organizational structure, responsibilities, procedures, processes and resources for the discharge of Quality management responsibilities.

**7. CHECK-LIST FOR MANAGEMENT RESPONSIBILITY
ISO 9001, CLAUSE 4.1**

1. Quality policy

- ◆ Is there a document stating the company's quality policy and objectives?
- ◆ Has the quality policy document been communicated to all personnel in the company?
- ◆ Do the personnel understand the quality policy?
- ◆ Are personnel committed to its implementation?
Organization
Do personnel responsible for functions affecting quality have defined
-responsibility and authority for:
-evaluation of quality problems,
-initiation, recommendation and provision of effective solutions,
- control of processes?
- ◆ Have adequate resources and personnel been assigned to verify activities and production?
- ◆ Is there a management representative appointed with definite authority and responsibility for matters related to quality and for ensuring that the requirements of this standard are implemented and maintained ?

2. Management review

- ◆ Does management carry out regular reviews of the quality system?
- ◆ Are adequate records of reviews kept?
- ◆ Are results of internal audits considered a part of the review procedure?

- ◆ Do you have procedures for obtaining the input required for design projects?
- ◆ Is there a system for reviewing the adequacy of the above Requirements? In case of deficiencies or inconsistencies, how are these resolved? Have you specified in what form the design output will be generated (e.g., drawings, specifications, process instructions)?
 1. Does the design output include acceptance criteria and acceptance tests?
 2. Does the design procedure specify that the design should meet
 - customers' requirements and design objectives,
 - safety requirements,
 - regulatory requirements?
 3. Does the design-control plan provide for design reviews and verification?
 4. Do you have procedures and check-lists to guide design-review teams?
 5. Does the design-review procedure cover the following aspect:
 - ease of production with existing equipment,
 - inspection requirements of the product and acceptance specifications,
 - rejection limits,
 - reliability and maintenance requirements,
 - packaging, labeling and user-friendly documentation for ease of operation and maintenance?
 6. Are there documented procedures for qualification testing?
 7. If the design is to be verified by alternative calculations or comparison with similar proven designs, how do you ensure that the personnel assigned have the requisite competence?
 8. Is there a procedure for formal approval of design changes?
 9. Does the procedure provide for consultation with all personnel or functional groups concerned before the design changes are approved?
 10. Is there a provision for obtaining the customer's approval where required?
 11. How do you ensure that a design change is reflected in all pertinent documents?
 12. How is information on design change transmitted to the persons concerned?

11 - CHECK-LIST FOR DOCUMENTS CONTROL ISO 9001, CLAUSE 4.5

What types of documents are to be covered by the documents control procedure?

1. Are documents identified by a unique numbering system?

11. Have you established criteria for removing vendors from the approved list of sub-contractors or vendors in case of unsatisfactory performance?
12. Do purchase requisitions and/or orders clearly define the requirements by reference to standards, specifications, drawings, etc?
13. Have you established a procedure for advising the vendor that he/she is required to provide evidence of quality control exercised in the plant - details on purchased material, test reports and other documents?
14. Does the purchase order include information on packaging, delivery schedule, mode of transportation, installation and after-sales service where applicable?
15. Does the purchase procedure provide for review or check of purchase order to ensure completeness of specification and other details to ensure that the vendor is fully aware of what is expected from him?
16. Does the purchase procedure cover the agreement with the vendor about quality verification of the purchased product including surveillance in the vendor's plant as well as plans for inspection/testing on receipt in the company?
17. Have you established procedures to ensure that methods of resolving quality problems and discrepancies in quantity are agreed upon before the order is placed?

13 - CHECK-LIST FOR QUALITY RECORDS ISO 9001, CLAUSE 4.16

1. Does the quality system indicate the records to be generated?
2. Have you identified the input documents required from customers and the type of quality records to be provided by suppliers?
3. Are records properly filed and easily retrievable?
4. Do records adequately demonstrate levels of quality achieved?
5. Are appropriate storage conditions maintained to prevent deterioration of, or damage to, records?
6. Is the retention period for various types of records specified?
7. Do you have procedures for the disposal of records at the end of their retention periods?

financial situation. The proposal manager should make a preliminary review of the Employer's bid specification and summarise what the Employer is looking for, and the type of information needed. An inquiry review meeting should, then be arranged by the person responsible for marketing and sales to review the scope of work and supply, order of magnitude, schedule requirements, financial aspects, contract variations, insurance requirements, commercial aspects, availability of qualified manpower and other resources, and quality assurance requirements.

As soon as a decision to bid is made, a proposal team should be set up to prepare a proposal in compliance with the Employer's requirements. The proposal should be prepared in accordance with the contracting firm's standards on the preparation of such proposals, and it should be prepared by a team consisting of members from the relevant disciplines. During this preparation, a review should be made of the conformity of the contract and the proposal. Any qualifications and/or exceptions relating to technical, commercial and legal aspects should be discussed with the Employer before acceptance.

After the contract has been awarded, a transfer meeting should be held to shift responsibility for the contract from the marketing and sales department to the projects department. Soon after the awarding of the contract, a review should be made of the contract itself. In fact, contract review is an ongoing process, which may result in contract variations. In particular, the contract should be reviewed for its technical, organizational, commercial, financial, and legal aspects.

14-2- REVIEW OF DESIGN BASIS

Before any engineering and design work can start, all those concerned with the project should be made aware of their tasks and responsibilities within the contract. They should know the design objectives and requirements, and they should have the right tools to perform their job. The design basis contained in the Employer's documents, e.g., project specifications, tender documents and other documents, should be thoroughly reviewed by the team comprising the project engineer, the job and lead engineers of each technical discipline and the quality assurance engineer. They should verify the completeness and clarity of all aspects of the work to be undertaken and should take care to detect any special or unusual requirements. In particular, they should review the scope of the work, the project organization, the design philosophy, applicable specifications and standards, design criteria, rules and regulations, and applicable procedures.

made known to the job engineer. This self-check is the first mandatory control.

b- DISCIPLINE CHECK

A discipline check is a technical control of the documents or drawings by a person qualified in the same discipline. The discipline check is carried out before documents or drawings are sent to other disciplines, the project management or the Employer. Discipline checks are carried out after preparation of the documents/drawings and the first self-check.

A second discipline check is also made after the comments made during the inter-discipline check have been incorporated into the drawings/ documents and a final discipline check is carried out after the comments of the Employer have been incorporated.

c- INTER-DISCIPLINE CHECK

The inter-discipline check constitutes a technical control of documents and drawings to ensure that the documents produced by one discipline are compatible with those produced by other disciplines and that any changes have been incorporated correctly. In some cases, information has to be added to the document, in which case those adding the comments are responsible for this information. Comments and additional information should be given in writing.

This final mandatory control is carried out by distributing the documents to the disciplines involved or by routing the documents from one discipline to another. In some cases, a screening meeting may be held to discuss the results of the inter-discipline check in order to eliminate incompatible comments and to achieve a consensus concerning the contents of a document before it is transmitted to the Employer and/or government authorities for approval.

d- SCREENING MEETING

If a screening meeting is necessary, the documents are reviewed page by page. Problems are discussed and the results are indicated on the blank copy of the document by the job engineer of the originating discipline. The drafter of the document/drawing incorporates the agreed comments on the document. The project engineers are responsible for ensuring that all problems and contradictions are resolved.

SHCEMATIC PROPOSED DESIGN CONTROL PROCEDURE
UPON RECEIPT OF INVITATION TO BID

A - RESPONSIBILITIES OF MARKETING AND SALES
DEPARTMENT :

1. TECHNICAL, COMMERCIAL & CONTRACTUAL REVIEW
OF INVITATION TO BID ON :

- ◆ Technical scope of work
- ◆ Availability of qualified manpower and other resources
- ◆ Approximate magnitude
- ◆ Quality assurance requirements
- ◆ Schedule requirements
- ◆ Financial and commercial aspects

2. UPON MANAGEMENT'S DECISION TO BID

- ◆ A proposal manager shall be assigned by the director of marketing & sales to co-ordinate activities and provide for internal information
- ◆ A proposal team should be set up to prepare proposal in compliance with the Employers requirements

3. PROPOSAL PREPARATION

- ◆ Review of conformity of contract and proposal
- ◆ Discuss with Employer any qualifications, exceptions before acceptance

4. AWARD OF CONTRACT

- ◆ A transfer meeting should be held
- ◆ Responsibility is shifted