

FND QUALITY MANAGEMENT POLICY & STANDARDS

1. PERCEPTIONS OF QUALITY

Quality Management in FND preemptively mitigates the factors that potentially detract the design from its intended performance during construction and operation. Quality Management is strategic in that it explicitly identifies detracting factors and systematically minimizes their impact in terms of standard processes and distinct criteria.

The perception of quality has changed dramatically during the past hundred years. Towards the end of the twentieth century, quality control evolved into *quality assurance* with the emphasis on problem avoidance rather than detection. Quality assurance principles emerged such as the cost of quality, zero defect programs, reliability engineering and total quality control.

Today Quality Assurance is everyone's responsibility throughout the organization. Following principles shall be followed:

- Defects in quality are to be brought to the surface for corrective action.
- Quality problems should not lead to blame and excuses but form the basis for cooperative solutions.
- Problems will be documented as lessons learnt and used to ensure that mistakes are not repeated.
- Quality control does not increase costs, but in fact quality control reduces costs and improves business.
- Quality Control should not require close supervision, and all personnel should produce quality work of their own accord.
- Quality is not something to be done during project execution but must start with project initiation and must be continued at all stages of the project design and construction.

2. DRIVERS OF QUALITY

Quality is driven by customers and markets requiring:

- Better designs,
- faster completion of designs,
- higher technological sophistication,
- acceptable costs,
- matching of quality and cost,
- fewer defects and/or rejects,
- high degree of safety and operability,
- high design reliability and assured performance under prescribed maintenance.

3. PURPOSE OF QUALITY MANAGEMENT

This document presents guidelines for the *implementation* of good Quality Management in engineering practice at FND.

4. REFERENCE OF THESE GUIDELINES

This Guideline is generally based on and laid out along the lines of the FIDIC Guide to Quality Management in The Consulting Engineering Industry, 2001.

5. HOW TO ENSURE QUALITY MANAGEMENT

Quality Management at FND will be achieved by ensuring that the actions implied in this Guideline are proactively pursued and formally documented. FND Project Managers will be required to confirm that they have implemented Quality Management at the appropriate level in their departments by inclusion of the compliance checklist for every project. The degree of compliance will be monitored by scrutiny of quality documentation and records during random audits.

6. EIGHT PRINCIPLES OF QUALITY MANAGEMENT

The eight principles of Quality Management extracted from Section 2.3 in the FIDIC Guide to Quality Management in The Consulting Engineering Industry, 2001, are:

a) *Customer-Focused Organization*

i) *Customer Satisfaction*

Quality Management adds value for the client. A proactive pursuit of customer satisfaction is therefore a critical element. Internal customers are the next person in line in generating the final product for the external customer and their wants and needs should also be observed in delivering the required quality.

ii) *Client Relationship*

Understanding client needs, what the real project objectives are, who the “real clients” are, and what all the expectations are, is an essential step in achieving quality objectives related to the client. The activities before project inception are crucial to a close working relationship with the client and the development of mutual trust and confidence.

b) *Leadership*

i) *Top Management Commitment*

Top FND management must demonstrate clearly and visibly, in words, actions and initiatives, their full commitment to Quality Management. The CEO must demand that the Quality Management System is adhered to and must remove all barriers and obstacles to achieving this requirement.

ii) *Proactive Leadership*

Proactive leadership is a style of management that empowers staff and delegates responsibility and authority to the staff to act on a clear vision and on the principle-based values of the organization.

iii) *Plan to Achieve Purpose*

Leadership must plan to establish a quality policy, acquire knowledge of quality, effectively involve staff, improve communication and information systems, develop a service-oriented plan and arrange a client-driven delivery system.

c) *Involvement of People*

i) *Employee Involvement*

Every member of staff is involved every day in the delivery of the professional services of the business and unless they are fully committed to quality, the benefits of Quality Management will not be realized.

ii) *Synergized System Implementation*

Synergy generates success of the whole that is greater than the sum of the individual staff contributions. Synergy can be developed by creating trust as underlying foundation to staff empowerment.

iii) *Communication*

Effective ongoing verbal and written communication on all aspects of a project is essential to the successful implementation of Quality Management in the organization.

iv) *Teamwork*

Mutually supportive, synergistic teamwork ensures project quality in all respects.

v) *Working Environment*

Working environment includes both the global environment of the organization and the environment in which the specific project work is performed. Adequate resources, adequate lighting, absence of noise, air, olfactory, sound and visual pollution and suitable ergonomics contribute to a quality working environment and associated quality performance.

vi) *Recognition*

What gets rewarded gets repeated. As an alternative to demanding quality work, management should strongly support staff training on the quality of their responsibilities in addition to their technical skills.

d) *Process Approach*

i) *Processes*

All processes must be identified and controlled for correctness and correct execution to ensure quality services and products. The requirements of employees on which the processes depend must be duly considered in this respect.

ii) *Planning*

To ensure that the desired quality is achieved requires that adequate time is spent

on planning the work.

iii) *Document and Information Management*

The collection, storage, retrieval, sharing, processing, updating and ultimate presentation of data and information are at the core of delivering quality products and services. The systems to effectively facilitate all of these actions are an essential part of Quality Management.

e) **System Approach to Management**

Identifying, understanding and managing inter-related processes as a system contributes to the effectiveness and efficiency of the organization in achieving its objective.

f) **Continuous Improvement**

In the absence of continuous improvement, quality withers in time. Every process must be continuously reviewed for effectiveness and efficiency in a **Plan-Do-Check- Act** cycle (**P** – identify relevant factors and plan improvement process; **D** – implement and test process; **C** – analyze results; **A** – install process as standard)

g) **Factual Approach to Decision Making**

i) *Measurements*

The expected results of Quality Management must be identified and the quality achieved measured for improvement. Appropriate methods are required to monitor the Quality Management System.

ii) *Auditing*

The defined conditions in existing protocols for randomly selected aspects of project work in the Quality Management System must be examined in detail. The number of material departures from the norms must be recorded, described, counted and reported to management for remedial action.

iii) *Management Review*

The Quality Management System must be analyzed and reviewed for suitability, effectiveness and relevance. The review must focus on measurable aspects of services and products as direct indicators of poor adherence to procedures. The oversights analyzed should include changes in regulatory standards, increments in scope of services, achievement of quality objectives, audit results, non-conformance, customer complaints and corrective and preventive actions.

iv) *Client and or Other External Feedback*

External feedback is crucial for a Quality Management System and may include client evaluations (by direct inquiry, questionnaire or repeat appointment), benchmarking criteria of competitors, follow-up debriefings on proposals, independent external audit and peer review.

v) *Prevention Focus*

The **process** should be checked rather than the **product**. Quality cannot be inspected into a product or service. It must be built or designed in at every step of every project phase as preventive intervention aimed at getting it right, first time, every time. **Product checking** cannot preempt lapses in quality that are much

more costly to correct than to prevent. **Process checking** which is focused on error prevention at the very early stages leads to reduced project costs and avoids wasted resources.

h) *Mutually Beneficial Supplier Relationships*

Mutually beneficial relationships with sub-consultants, contracted organizations and long-term suppliers require trust, knowledge of personnel capabilities and understanding of each other's quality cultures that are developed over time. Such relationships are crucial to the quality of projects that almost always rely to some extent on external inputs.

7. ISO 9001:2000 REQUIREMENTS FOR QUALITY MANAGEMENT

FND is planning to achieve ISO 9001 certification. In the interim ISO 9001:2000 requirements for Quality Management have been summarized below to enable FND personnel to understand the underlying structure and concepts of the standard. This summary should not be used in lieu of the standard.

a) *Quality Management System*

i) *General Requirements*

The organization shall establish, document, implement and maintain a Quality Management system and continually improve its effectiveness in terms of appropriate processes. The organization shall exercise control over any outsourced process that affects product conformity.

ii) *Documentation Requirement*

(1) *General*

The documentation for the Quality Management system shall include statements on the quality policy and quality objectives, a quality manual, specified procedures, planning operation and control processes, and specified records.

(2) *Quality manual*

The organization shall establish and maintain a quality manual that includes the scope and procedures of the Quality Management system and a description of the interaction between the processes of the system.

(3) *Control of documents*

Documents required by the Quality Management systems shall be controlled in terms of a documented procedure covering all relevant aspects.

(4) *Control of records*

Records shall be established and maintained to provide evidence of conformity to requirements and of the effective operation of the Quality Management system. A documented procedure shall be established to define the controls needed for all aspects of the use of the records.

b) *Management Responsibility*

i) *Management Commitment*

Top management shall provide evidence of its commitment to the development and implementation of the Quality Management system and continually improving its effectiveness.

ii) *Customer Focus*

Top management shall ensure that customer requirements are determined and that the organization aims to enhance customer satisfaction.

iii) *Quality Policy*

Top management shall ensure that the quality policy suits the organization, includes commitment to comply with requirements and to continual improvement, provides for review of the policy, is communicated and understood in the organization and is reviewed for continued suitability.

iv) *Planning*

Top management shall ensure that quality objectives are established at relevant functions and levels in the organization and are measurable and consistent with the quality policy. Top management shall ensure that the Quality Management system is planned and that its integrity is maintained when changes are contemplated.

v) *Responsibility, Authority and Communication*

Top management shall ensure that responsibilities and authorities are defined and communicated in the organization. Top management shall appoint a member of management who shall have responsibility and authority to ensure that Quality Management processes are in place, report on the performance of the Quality Management system and ensure that the awareness of customer requirements are promoted in the organization. Top management shall ensure that appropriate communication processes are in place and that communication on the effectiveness of the Quality Management system takes place.

vi) *Management Review*

Top management shall review the Quality Management system for continuing suitability, adequacy, effectiveness, opportunity for improvement and the need for changes. The relevant input and output requirements shall be duly regarded in the review.

c) Resource Management

i) *Provision of Resources*

The organization shall determine and provide the resources needed to implement and maintain the Quality Management system, continually improve its effectiveness and to enhance customer satisfaction.

ii) *Human Resources*

The competence of personnel performing work affecting product quality shall be assured by appropriate education, training, skill and experience. The organization shall evaluate personnel competence, provide the necessary remedial action, evaluate the effectiveness of the remedial action, ensure that personnel are aware of the importance of their contribution to quality, and maintain records of the remedial actions taken.

iii) *Infrastructure*

The organization shall determine, provide and maintain the infrastructure needed to achieve conformity to product requirements.

iv) *Work Environment*

The organization shall determine and manage the work environment needed to achieve conformity to product requirements.

d) *Product Realization*

i) *Planning of Product Realization*

The organization shall plan and develop the processes needed for product realization consistent with the requirements of other processes of the Quality Management system.

ii) *Customer Related Processes*

The organization shall determine customer requirements, requirements necessary for intended use, and statutory and regulatory requirements. The organization shall review the requirements prior to commitment to supply a product and shall record the results of the review. The organization shall put in place effective arrangements for customer communication.

iii) *Design and Development*

The organization shall plan and control the design and development of products and shall review and update the planning output as the process progresses. Product input requirements shall be determined and recorded. The form of design and development outputs shall enable verification against inputs. Records of the results of verification shall be maintained. Validation of design and development shall be performed to ensure that the resulting product is capable of meeting requirements. Records of the results of validation shall be maintained. Design and development changes shall be identified and records maintained.

iv) *Purchasing*

The organization shall ensure that purchased product conforms to specified purchase requirements. Purchasing information shall describe the product to be purchased. The organization shall ensure that purchased product meets specified purchase requirements.

v) *Production and Service Provision*

The organization shall plan and carry out production and service provision under controlled conditions. The organization shall validate any process for production and service provision where the output cannot be verified by monitoring and measurement. The organization shall identify the product throughout product realization and shall exercise care with customer property under its control. The organization shall preserve the conformity of product during internal processing and handling.

vi) *Control of Monitoring and Measuring Devices*

The organization shall determine the required monitoring and measurement and the devices needed to provide evidence of conformity of product to requirements. The organization shall put in place processes to ensure that monitoring and

measurement can be and are being carried out consistent with requirements.

e) Measurement, Analysis and Improvement

i) General

The organization shall plan and implement the monitoring, measurement, analysis and improvement processes needed to demonstrate conformity of the product, ensure conformity of the Quality Management system and continually improve its effectiveness.

ii) Monitoring and Measurement

The organization shall monitor information relating to customer perception on meeting its requirements. The organization shall conduct internal audits to determine whether the Quality Management system conforms to planned arrangements and requirements and is effectively implemented and maintained. The organization shall apply suitable methods for monitoring and measurement of the processes of the Quality Management system against planned results. The organization shall monitor and measure the characteristics of the product to verify that requirements have been met in accordance with planned arrangements.

iii) Control of Nonconforming Product

The organization shall ensure that product that does not conform to requirements is identified and prevented from unintended use or delivery. The organization shall deal with nonconformity in an appropriate way. Records of nonconformities and subsequent actions taken shall be maintained.

iv) Analysis of Data

The organization shall determine, collect and analyze relevant data to demonstrate the suitability and effectiveness of the Quality Management system and to evaluate where continual improvement of the system can be made.

v) Improvement

The organization shall continually improve the effectiveness of the Quality Management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review. The organization shall take action to eliminate the cause, occurrence and recurrence of nonconformities

8. PROCESS FLOW CHART FOR DESIGN APPROVAL

- a) FND DESIGN TEAM to prepare outline sketches, plans specifications, the Engineering Services design method statement and outline FND Project Review Team to review "Schematic Package" and submit and discuss with CLIENT. NOT ACCEPTABLE TO CLIENT: FND Project Review Team to brief Design Team of changes, amendments etc. On being briefed by FND Project Review Team under 8c, Design Team to revise and resubmit the package to FND Project Review Team. ACCEPTABLE TO CLIENT: the following shall be prepared: Formal Outline Drawing Package Submission Cost Plan Project Working Programme and submit to FND Project Review Team as the "Outline Design Package" FND Project Review Team to review 'Outline Design Package' and submit to CLIENT. NOT APPROVED by CLIENT: FND Project Review

Team to brief Design Team on deletions, changes, amendments etc. On being briefed by FND Project Review Team under Design Team to revise and execute deletions, changes, amendments etc. and repeat cycle 8e onwards. APPROVAL by CLIENT to be in writing to FND Project Review Team. FND Project Review Team to confirm to Design Team in writing that the: Outline Brief including drawings

- Project Budget is approved
- k) FND Project Review Team to agree separately with the CLIENT the Project Master Programme.

9. PROCESS FLOW CHART FOR TENDERING

- a) FND Project Review Team to identify Trade Contractors for Pre-Qualification in consultation with the Architect or Design Consultant. FND Project Review Team to receive Pre-Qualification Documents, evaluate and recommend Contractors for Pre-Qualification to the CLIENT. NOT ACCEPTABLE to CLIENT: FND Project Review Team to incorporate changes and re-submit to the CLIENT. ACCEPTABLE TO CLIENT: Issue Tenders to Pre-Qualified Contractors. Submission of Tenders by the Contractors to the CLIENT. CLIENT forwards all Tenders to FND Project Review Team for appraisal. Evaluation of Tenders and recommendation by FND Project Review Team to the CLIENT. FND Project Review Team to discuss, review and receive approval from the CLIENT. FND Project Review Team to issue Letter of Award to the Contractor. CLIENT to sign Contract Agreement with the Consultant. FND Project Review Team to maintain Quality, Budget, Schedule/Progress and supervise all construction/supply and installation process of all Contractors, vendors etc.