

# TQM in Indian Pulp and Paper Industries: Initiation, Implementation, Improvement, Excellence and Accreditation

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**ABSTRACT:** *The basic concepts in Quality, Quality control, Total Quality Management and ISO accreditation are brought out citing some sensational examples of achievement abroad through TQM. The major products relevant to pulp and paper organization in which ISO-9000 series of accreditation have been received abroad are mentioned. Experiences gained in initiation, implementation, appreciation (auditing) and accreditation, with applicability to pulp and paper industries as well as suppliers, customers, testing and R & D organizations, are described. Advantages and disadvantages on attempting for TQM with recourse to accreditation of certificates for ISO-9000 series or ISO/IEC Guide 25 (followed by NABL) are Highlightened.*

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## INTRODUCTION:

Concept of TQM (Total Quality Management) has evolved basically to involve the customers and all miscellaneous non-technical services also which were practically excluded in the conventional system of quality improvement through 'Quality Control' (QC) or 'Quality Assurance' (QA).

## MODERN CONCEPT OF QUALITY

Quality is defined<sup>1</sup> in the present context as "Totality of features and characteristics of a product or service that bears on its ability to satisfy a given need". It implies "Doing the right thing, Doing in right the first time, Doing it in time and Meeting customer's expectations and needs".

The present conception is that quality is not to be controlled, it is to be built in.

## TQM

Quality control or Quality assurance was confined to products or processes or customers but TQM encompasses the whole gamut of organizational activities having aims for long term continuous improvement. TQM is a dynamic process involving all levels of employees in an organization to promote never ending improvement in effectiveness and efficiency of all elements of a business.

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**Total Quality Culture or Total Quality Commitment (TQC) Provides true quality assurance. TQC allows companies to discover failure because everyone speaks frankly and in a helpful manner. It helps companies to avoid relying on false figs. and false production schedules and figures.**

**"Everyone in every division of the company must study, practice and participate in quality control. Total Quality Control is a thought revolution in management".**

**Though TQM was initiated in 1950-60's, it gained momentum with the introduction of Accreditation system of International Standard Organization (ISO) by European Community (EC) in 1987 - the ISO-9000 series. A new organization, formed in 1992, in the name of International Laboratory Organization (ILO) at Geneva has evoked for a separate Accreditation to Testing and Calibration Laboratories with guidelines provided in ISO/IEC Guide 25 (1990) as technical competence and strict adherence to test performance systems lack in ISO-9000 series of accreditation.**

**TQM gained further momentum, with the introduction of Malcolm Baldrige National Award in USA. The sensational performance and targets of Xerox Corporation and Federal Express Corporation of USA receiving this award so far, are worth knowing to visualize the level of competence, a company can achieve through TQM. Targets of both the companies are to achieve "Zero defect" with 100% service level. Federal Express Co. claims to have achieved 99% service level and to fulfil the remaining 1%, the strategies include:**

- \* aircraft's ability to land in bad weather**
- \* dual operating systems**
- \* batteries for computers.**

**TQM in any organization will results only to development in business and product quality with increase in profit. TQM is considered as a pre-requisite for ISO-9000 accreditation. Plenty of books, articles, consultants and Quality 'gurus' are available. It is told that in England, the number of Quality consultants is more than the medical practitioners. One company having six employees in Germany has received ISO-9000 accreditation.**

## **ISO-9000**

**Certification is confirmation of the Quality system claimed by an organization. ISO-9000 is a system for Quality assurance, the assessor of which is an impartial third party, recognized by ISO-10011, normally appointed by the Ministry of Industry in each country. ISO-9001 is for design, development, production, installation and servicing; 9002 for production and installation; 9003 for inspection and test while 9004 describes the philosophy behind the standards. Following TQM according to Crosby or Duran is considered not enough for quantification of the quality system. ISO-9000 was adopted in 1987 on the basis of BS-5750, leaving aside AQAPS (Quality Assurance and Quality Control Standards) initiated by NATD. It is thus in less than 10 years that Indian industries are capable to demonstrate their Quality systems equivalent to International Standard. However, when we are initiating the system, in Europe, USA and in Japan, industries are taking of "Zero defect" system.**

## **ISO/IEC Guide 25**

**This deals with the general requirements for competence of calibration and testing laboratories. Govt. of India has instituted "National Accreditation Board for Laboratories (NABL) for Testing and Calibration in accordance with ISO/IEC Guide 25 (1990). Previously the accreditation given in National level was "National Co-ordination for Testing and Calibration Facilities" (NCTCF).**

## **Quality Manual**

**The core of TQM is the 'Quality Manual' where all the systems followed by the organization are described. In the loose term, it is said for Quality Manual and ISO-9000.**

**"Do what you say and record what you do" - whatever is said in the Quality Manual, it should be done. Each organization has its own way of preparing the manual. About 15 chapters or subdocuments are the practice for many companies abroad. The tentative subject of subdocuments can be as shown in Table-1.**

**Table-1**

Typical subdocuments in Quality Manual	
Subdocument No.	Title
1.	Introduction and Description of the Company
2.	Quality policy
3.	Quality objectives
4.	Organizational structure
5.	Quality system
6.	Operations
7.	Inspection and Testing
8.	Nonconforming product
9.	Quality records
10.	Training
11.	Safety and Hygiene
12.	Procedure for revision
13.	Statistical methods
14.	Meetings related to Quality
15.	Amendments

**Initiation of TQM**

TQM can be initiated in any organization at any moment and without involving any outside parties or following to any legal procedures. However, for success of TQM with the objective of accreditation of ISO, long range planning with due investment is required. Consultants, Quality gurus or appointing experts with knowledge of TQM is the next step to initiate TQM after the top Management decides to adopt TQM. In fact, the first training to be taken in this subject is by the topmost person of the organization. He should not only be trained, he is to practice, preach and adopt quality as a way of life.

“Quality is a habit, not an act”.

Some of the problems for failure of TQM are:

1. Lack of commitment and encouragement from top

**Management**

2. Lack of training
3. Poor perception of Quality Improvement Programme (QIP)
4. Interest for short term gain
5. Customer criteria-internal as well as external
6. Continuous reading
7. Lack of analytical and statistical tools and poor data generation
8. Lack of calibration and standardization systems
9. Vertical communication
10. Lack of continuous improvement policy
11. Error fixation
12. Lack of quantity bias
13. Disorted perception of cost.

ISO-9000 series consist of ISO-9001, 9002, 9003 and 9004. The first ISO-9000 is a guideline for selection and use of other series, explains concepts, defines terms and summarizes how to select and use (S)-9001, 9002 and 9003.

ISO-9001 deals with “Quality Assurance in Design/ Development, Production, Installation and Servicing”.

ISO-9002 is the “Model for Quality Assurance in Production and Installation”. It is relevant to manufacturing firms where specific product requirements are based on specifications of established designs.

ISO-9003 is the “Model for Quality Assurance in Final Inspection and Test”. It concentrates more on end product testing and measurement.

ISO-9004 provides “Quality Management and Quality System Element Guidelines”.

Presently 56 countries have adopted ISO as National Quality Management Standards. European countries are mostly registered to ISO-9000 while in

USA so far, 250 companies have got registration which was started in 1989 by U.S. State Defence Department.

ISO-9002 Certification requires establishment, documentation and maintainance of 16 Quality Management Systems as shown in Table-2.

**Table-2.**

<b>Quality Management Systems</b>	
1.	Management responsibility
2.	Quality system
3.	Contract review
4.	Document control
5.	Purchasing
6.	Product identification and traceability
7.	Process control
8.	Inspection and Testing
9.	Inspection and Test status
10.	Control of nonconformity products
11.	Corrective action
12.	Handling, storage, packaging and delivery
13.	Quality records
14.	Internal quality audits
15.	Training
16.	Statistical techniques.

**The various steps before auditing are:**

- \* Education
- \* Formation of work team
- \* Self-help audit and corrective action
- \* Preliminary third party audit
- \* Post certification communications.

ISO-9000 certification however does not guarantee that a customer accepts the end product or it does not prove that the employees are quality conscious. It is only by doing so that the company procedures the best out of its employees. The overall objective is to improve quality awareness.

Expenditure for obtaining ISO-9000 in USA is calculated as 1500 dollar per employee. The management has to:

- produce a quality policy, objectives and commitments
- everyone is made known of this role
- supervise and review the progress.

What is important is that the product quality is tested following to the fixed standards. In a country like ours, the lack of calibration and standardization.

When one acquires his own Quality Manual, wonders how one can manage without it. It becomes the vital document dealing with all the characteristic features of the organizations. The Quality Manual becomes thus the stepping stone for TQM. The Manual becomes the mirror of the organization. Whatever is documented in the Manual, it should be preached and practiced or else it is abuse to Quality Manual. Therefore, while preparing the Quality Manual, it should be kept in mind the human resource aspect.

The American Society for Quality Control (ASQC) defines Quality as "A systematic approach to the search for Excellence". According to the changing perspective, Quality is customer oriented and market driven rather than based on design or production. A good Quality Manual thus should be written to cover the traditional testing, inspection, limit, statistical sampling for analysis, process control to Employees' involvement systems for Quality Improvement Programme (QIP) including Quality circles, zero defect programmes and Total Quality Control (TQC). Recently one company in USA considers health, hygiene and environment to be the most motivating factors for workers to be motivated.

**Customers and Suppliers**

One of the basic objectives of TQM is to satisfy the customers. The customer in TQM consists of colleagues in the same organization, for example the pulp mill personnel, the bleaching section people are the customer; the paper machine people are the customers of bleaching area and finally the finishing department is the customer of all previous sections. Thus in stead of finding the error at the end, each section has to be

satisfied by the previous section. However, most important customer is the outside market; the product has to be as per specifications and apart from that cost, delivery etc. are also to meet the requirements of the customer.

Some of the companies include the customers as part of TQM. Recently one company in USA has included suppliers also in TQM. The suppliers can be asked to follow TQM and make the raw material receipt programme competitive.

#### **R & D for customer's satisfaction**

Companies having good R & D facilities can easily produce or diversify to meet the customer's satisfaction according to the experience of one industry in USA.

The benefits from TQM are:

- Customer satisfaction
- Revenue
- Operating profit
- Market share
- Employee morale.

All these factors have been found to go on increasing with years.

TQM calls for 3 essential changes:

- Organizational strategic change
- Systematic change
- Personal change

Total Quality Improvement (TQI) was launched by an USA company with following aims:

- to satisfy existing customers and retain market share
- to attract new customers and increase market share
- to reduce waste
- to increase profitability
- to improve job security.

Achieving ISO-9001 or 9002 should be considered as

the beginning of a "solid and well-working quality system". After that it follows a period of

- system refinements
- adaptations and
- additions
- maintenance of systems with internal audits, correcting actions to nonconformance of products.

In Britain a recent survey showed that only 55% of companies registered for BS 5750 (Equivalent to ISO - 9000) registration, felt they had achieved any benefit at all. However, in paper industries, the situation is different. Companies who have opted it for their own satisfaction rather than customer demand, are fully satisfied with ISO-9000 Certification.

One of the severe criticisms is inconsistency in assessment. In some cases the assessors being from other fields, their demands are variable than when they are from the same line.

The Quality results of a company in USA in 4-5 years are:

1. productivity increase by 30%
2. decrease in rejected product
3. customer credits improved (8 to 2.7% rejection)
4. last time accident rate declined from 19 to 0
5. average sick leave dropped from 25 to 11
6. occupation safety and health ranging went from No. 13 to 1.

#### **New developments in ISO Certification**

In March 1993, a revision of ISO-9000 has been proposed by the Committee ISO TC 176. Some of the changes in ISO-9002 (for which most of the pulp and paper producers apply) are proposed to introduce/ drop new clauses are:

- (a) Servicing (In 4.19 of ISO-9001)
- (b) Scope - drop "contract review" - introduce "evaluation".
- (c) Preventing action.

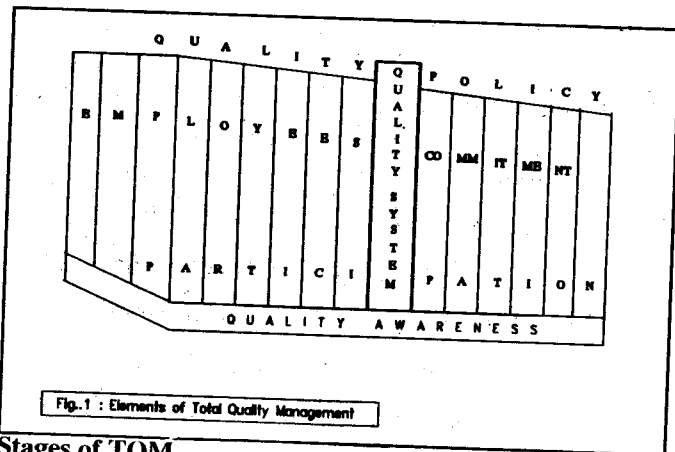
Tappi Test Methods Management Committee (TMMC) is going to put pressure on reproducibility

and repeatability statements of tests. ISO TC 6 Committee held in Munich in September, 1993 has decided changes in some of the terms used in Tappi user methods.

The future quality management would by no means be to guarantee business success; factors such as quality, cost and time management will dominate.

### Five elements of TQM

The basic elements for TQM are schematised in Fig. 1 with the Quality awareness being the foundation of the building. The building structure can be strengthened initially by participation of all and then commitment of all the employees. The Quality policy of the Management has to remain as protection at the roof. The Quality systems followed by the organization should be visible right on entering the organization.



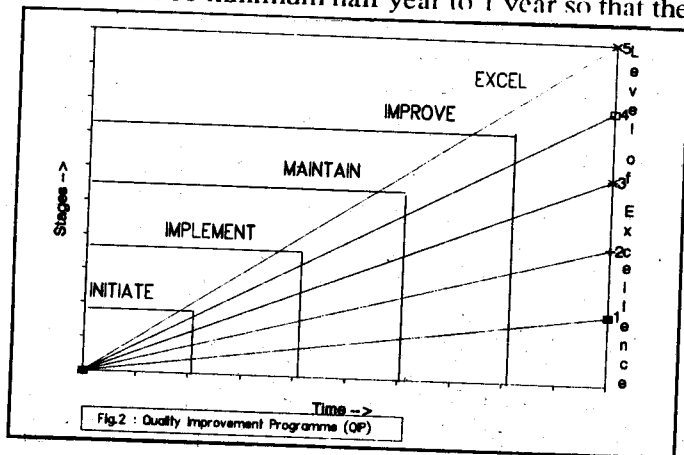
peak of TQM can be reached within 3 to 5 years depending upon the strength of 5 elements shown in fig. 1. The lines drawn from the zero stage indicate the levels of TQM achievable by organizations depending upon the 5 elements.

What is sometime not considered important is the stage to "Maintain". A time gap has to be given after implementation so that the employees also "appreciate". The progress should be audited at this stage and the strategies for further improvement can be planned. Slow and consistent progress is a better way for achieving the lasting TQM. The numbers marked on the right side can be the level of TQM achievable by the type of industry. Highest score of TQM should not be the dream of small organizations. R & D, testing, small mills, mills producing low grade products or having raw material crisis, mills using less efficient equipments, small suppliers, small customers should not desire for TQM level of 2-3 while big mills who can afford to spend sizable amount of resources for TQM and have little raw material problems, produce already quality products and have modern equipments can aspire for level of 4-5. The schema shown here indicate the universal applicability of TQM philosophy, each organization, small or big can benefit though the level of benefit may vary.

For rising in the ladder of excellence to the next level, it is imperative to reinitiate supplementary strategies, reframe the policies and follow the next path of excellence; it is not easy to jump to the next level at the stage of "Excel". In fact, this graph implies that 100% excellence or zero-defect (No. 5) can be achieved rarely by few organizations. For all others, it will be an unending process to attain 100% excellence and thus QIP can be a permanent feature of TQM for average organizations.

### Stages of TQM

The various stages for achieving TQM are shown in fig. 2. The time period for each stage in Indian context can be minimum half year to 1 year so that the



### TQM in Indian pulp and paper industries

Many mills may opine that TQM is being followed in indirect ways since quite sometime through Quality circles, Quality assurance or Quality control. As it can be seen, these are part of TQM as it may not reflect totality of the features. However as receipt of ISO-9000 accreditation certificates becoming imperative in corporate policies, specially with a view to export possibility, TQM conception is entering deeper and deeper everywhere. It is barely 10 years before that the meaning of "percentage defects" were not understood in advanced countries also. Therefore, if at

this stage if it is told that, most of the mills have not started TQM, there is nothing surprising. However, this is high time to initiate immediately TQM philosophy in all the mills.

Some of the problems in implementing TQM can be correlated to the previous stage of Quality Assurance where Testing is one of the most important criteria, which are explained below:

1. Testing with accuracy requires motivated staff
2. Well planned and well managed infrastructure facilities
3. Calibration of equipments
4. Standardization of test methods
5. Interproficiency testing
6. Computerized documentation/ Data collection system
7. Library with latest test methods
8. Modern analytical equipments.

However, TQM philosophy permits it to be initiated at any stage but not achievement of ISO-9000 certificates. ISO-IEC Guide-25 which are already described by the author previously should be obtained by more number of laboratories so that the pulp and paper mills can find it easy to achieve ISO-9000 certificates.

## CONCLUSIONS

It is imperative for all pulp and paper organizations in the country to initiate TQM. The attainment level of excellence for TQM may vary according to Quality elements and status of an organization; for small organizations, the excellence level aimed, should be 2-3, while for bigger organizations, the level can be 4-5. One of the major bottlenecks in opting for ISO-9000 certificate in the country, is the lack of accredited testing and calibration laboratories in pulp and paper. ISO-IEC Guide 25 applies to Testing and Calibration Laboratories for which attempts should be made to achieve accreditation through adaptation of TQM. Some of the clauses of ISO-9000 series are likely to be

revised.

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