Chapter 6

6.0 Conclusion And Recommendations

6.1 Conclusions

Following conclusions can be derived from this research study.

(1) Quality is defined in relation to its application. Quality in manufacturing concentrates on product quality while quality in construction projects is defined meeting client's requirements within the cost, schedule and intended technical performance. A Quality Management System (QMS) which is implemented considering the all areas that will have an impact on the quality of product or service will pay off with many advantages such as improved performance, coordination, and productivity.

(2) ISO 9000 series is the most widely adopted Quality Assurance Scheme in the world. It is now being implemented in many sectors such as manufacturing, service, project management and software industry etc. Following are some of the main reasons for Companies to implement QMS.

   (a) Customers have demanded for a QMS such as ISO 9000.

   (b) To survive and compete in the changing business climate.

   (c) ISO 9000 certification has become pre-requisite for participation for tenders and obtaining contracts.

(3) Implementation of ISO 9001 standard in Lanka Transformers Factory has been very effective and resulted following major advantages to the organization.

   (a) Greater customer focus has been maintained and much attention has been given to quality.

   (b) A large number of employees have been trained in their discipline of work and on quality issues.

   (c) Low failure rates – The monthly failure rate of transformers has been reduced to less than 2% from the 12% before implementation of ISO 9000.

   (d) Reduced leaks- Process improvement has reduced the leaks in transformer tanks from 7% to 1%. The saving was Rs.600,000 annually on manpower.

   (e) The delivery time has been reduced. Delivery made on time.

   (f) Increased sales and inquiries - Numbers of customer inquires for special transformers increased from local and international markets from 7 to 67 and sale have increased from Rs. 1.7 Mn to Rs. 20 Mn.

(4) Implementation of ISO 9001 standard in Lanka Transformers Factory also revealed the following results on the motivation of employees.

(a) Ninety five percent (95%) of the work force were satisfied in their respective job positions and the systems in place.

(b) Seventy Nine percent (79%) of the employees suggested that the team activities would be the strategy for continuous improvement.

(c) 50% of the work force in the factory still believes that there exists room for further development of the product.

(5) The study at LTL Projects (Pvt.) Ltd. (LTLP) has revealed that achieving high levels of quality in project management could not be fully accomplished only by using traditional approaches of ISO 9000 quality management standards. However in literature review it was observed that the issues and opportunities pertaining to project scenario are not fully addressed by ISO 9000 alone.

(6) LTLP failed in implementing ISO 9000 in it's first attempt due to the following reasons of the developed QMS.

(a)The system did not cover the broader domain of project areas successfully.

(b) The system was not explicit enough to cover and control the sub contacted activities sufficiently and effectively.

(c) The system was not flexible enough to exist and operate within the wide spectrum of QMS of various clients.

Such deficiencies in the newly developed QMS induced following conditions within the organization creating alien atmosphere for the system.

(a) Lack of commitment by the management team

(b) Failure of integrating resources towards the implementation effort.

(7) ISO 9000-quality management system standard provides adequate guidance to avoid the following problems related to LTLP.

(a) Poor management of documents and drawings

(b) Insufficient system for gathering information and data

(c) Insufficient level of competence of personnel

(d) Insufficient depth of management review

(e) Poor policies and objectives

Whereas ISO 9000 fails to address the following issues related to LTLP in particular.

(a) Insufficient systems for costing

(b) Lack of system for risk evaluation

(8) ISO 10006 (guidelines for quality in project management) covers a wide range of project management aspects including guidelines for cost estimation, budgeting and cost control and guidelines for risk management. However ISO 10006 guidelines could not find any strong guidelines to overcome the following issues of LTLP.

(a) Poor management of documents and drawings

(b) Insufficient system for collecting information and data

(9) During the Gap Analysis, it was found that the broad and robust TQM concepts and tools could be constructively and effectively used in developing a quality system for project management. The study further revealed that the practical difficulties faced by LTLP in putting forward a QMS could have been avoided if TQM concepts were adopted. Project organizations may implement TQM concepts so that every body becomes customer oriented and quality conscious.

(10) ISO 9000 could be maintained in the manufacturing industry easily as ISO 9000 has essence of operational management and process management concepts, which are the features of manufacturing industry. Moreover it provides an internationally recognized certification. The concepts of ISO 10006 and TQM have more relevance to the activities in a Project management organization.

6.2 Recommendations

Based on the results of this study the following recommendations could be made.

(1) LTL transformer factory has maintained ISO 9000 based QMS for a long period with continual improvement. Employees are motivated to further improvements. The study recommends that it is the high time for LTL to introduce the TQM concepts.

(2) LTL Projects (Pvt.) Ltd. needs a properly defined QMS to address the areas significant to LTLP. This QMS should be a blend of ISO 9000, ISO 10006 and TQM. QMS to be developed by considering necessary elements of ISO 9000, by obtaining guidelines stipulated in ISO 10006 and by setting up management practices in line with TQM philosophy. All these aspects should be incorporated suitably to create a flexible management system.

(3) Prior to the any attempt for implementation of QMS for a Project management based organization, it is essential to provide attention to following areas

(a) Conduct an extensive awareness program to the senior management. This is different in the case of manufacturing organizations where such awareness program is also an integrated part of the implementation process.

(b) Any QMS recommended for project situations should be very flexible in order to accommodate multidiscipline activities.

(c) For the success of the implementation it is recommended to appoint a senior manager having qualities of good personnel relationship.

(4) LTLP should make more commitment to introduce ISO 9000 systems without further delay. The study further revealed that the management commitment was not at the same level as it was in the factories of LTL. It is recommended that LTLP should work to obtain the ISO 9000 certification for the following reasons:

(a) LTLP is facing a threat from the market. LTLP businesses are more connected with CEB projects. If tender specifications request for ISO 9000 certification, LTLP will be disqualified from securing jobs from CEB.

(b) Present management style of LTLP for projects should change towards more client-oriented management and client satisfaction.

(c) ISO 9000 can be the first step in bringing TQM concepts in to the organization.

(5) From the findings of the study, it can be suggested that a project management organization should not confine its quality aspects only to ISO 9000. ISO 9000 has its own advantages and also provides an internationally recognized certification. The concepts of ISO 10006 and TQM have more relevance to the activities in a Project management organization. Therefore project management organization should develop a Quality management System which is blended with the concepts of the above management approaches and targeting the ultimate satisfaction of the customer/ client. However, the new Standard of ISO 9001:2000 is designed to address above issues and it is recommended to follow the new standards for project situations.

(6) It is recommended that further studies to be carried out within the various groups of project organizations to identify the common issues that are to be addressed through a QMS designed for Project Based Organization.

(7) Further it is recommended that Quality Management to be included in curriculum in all levels of technical education within the Construction industry to create an environment among supervisory and management staff.

References

Albert P.C.Chan and C.M. Tam. (2000). Factors Affecting The Quality Of Building Projects In Hong Kong. *International Journal of Quality and Reliability Management,* **17** (1), 422-441.

Avery S. (1995). ISO 9000: the auto impact. *Purchasing Journal* , **118**(4), 270-280

Barkley Bruce T. and Saylor James H. (1994). *Customer Driven Project Management,* McGraw-Hill, New York

Chase G.W. (1995). Quality Management for Construction. *Dept. Of Civil and Construction Engineering, IOWA State University*, IOWA.

David A Garvin. (1988). *Managing Quality*, The Free Press, New York

Dickenson R.P., Campbell D.R and Azarov V.N. (2000). Quality management implementation in Russia Strategies for change. *International Journal of Quality and Reliability Management*, **17**(1), 66-81

European Union (1997). The added value and credibility of third party certification of Quality Systems in European Union. EU,DG III, Unit III/B/4, Quality Policy, certification and Conformity Marketing,

FIDIC. (1997). *A Guide to the interoperation and Application of the ISO 9001; 1994 for Engineering Consulting Sector*. FIDIC Publications.

FIDIC. (1997). *Guide to Quality Management in the Consulting Engineering*. FIDIC Publications.

Glen D. Hoffner, John W.Moran and Gerald Nadler. (1994). *Breakthrough Thinking in Total Quality Management*. P.T.R.Prentice Hall, New Jersey.

Harold P Roth and Wayne J Morse, (1983). *Management Accounting*, National Association of Accountant,

Hides M.T, Irani.Z, I.Polychronakis and J.M. Sharp. (2000). Facilitating Total Quality Through Effective Project Management. *International Journal of Quality and Reliability Management.* **17**(4/5) 407-422

Hitoshi Kume. (1996). *TQM Promotion GuideBook*, Japanese Standard Association, Tokyo.

Ho S.K. (1997). Are ISO 9000 and TQM routes for logistic excellence. *Journal of Logistics Information Management*. **10**(6) 56-79.

Hongyo Sun (2000). Total qulaity management, ISO 9000 certification and performance improvement. *International Journal of Quality and Reliability Management,* **17** (2), 168-179.

International Standards. ISO 10006 (1997). *Guidelines for Quality in Project Management.* International Standard Organization.

International Standards. ISO 9000 (1994). *Quality Systems – Models for quality assurance in design, development, production, installation and servicing.* .International Standard Organization.

International Standards. ISO 9001 (2000). *Quality Management Systems- Requirements.* International Standard Organization.

ISO Central Secretariat. (1996). *ISO 9000 for small business*. International Standard Organization.

Joel E. Ross. (1995). *Total Quality Management.* S.S.M.B, Singapore.

John Bank (1995). *The Essence of Total Quality Management*, Prentice Hall, New Jersey.

John Dingle. (1997). *Project Management- Orientation for Decision-Makers*. Arnold /Holder Headline Group, London.

John Seddon. (1996). ISO 9000 Implementation and value –added: three case studies, MCB University press. www.mcb.co.uk/services

Jonathan J. Golovin and Angus J. MacDonald (1999). Utilizing Manufacturing Execution Systems to Ensure ISO 9000 Conformance. www.consilium.com/publicators/iso.html

Joseph and Susan Berk. (1995). *Total Quality Management, Implementing Continuos Improvement*, Excel Books. New Delhi.

Love P.E.D and Gunesekaran A. (2000). The Management of Quality in Project Environments. *International Journal of Quality and Reliability Management*, 17 (4/5), 344-350.

Mark Brown. (1998). *Successful Project Management*, Holder & Stonghton , UK

Masao Umeda. (1993). *Seven key Factors for Success on TOM*, Japanese Standard Association, Japan.

Michael Beasley (1991). *Reliability for Engineers*, Macmillan Ltd., London.

Mohan .M. Kumaraswamy. (1996). Quality Management systems in Construction Organization- *Journal of Institute of Engineers Sri Lanka.*

Ngowi.A.B. (2000). Impact Of Culture On The Application Of TQM In The Construction Industry In Botswana. *International Journal of Quality and Reliability Management,* **17**(1), 442-452.

Nwankwo S. (2000). Quality Assurance in small business organizations: myths and realities. *International Journal of Quality and Reliability Management*, **17**(1), 82-99

Oakland J.S. (1993). *Total Quality Management*. Butterworth- Heinmann, London.

Paul O.Olomolaiye, Anada K.W.Jayawardana and Frank C. Harris. (1998). *Construction Productivity Management.* Longman London.

Peter Barrett. (2000). Systems And Relationships For Construction Quality. *International Journal of Quality and Reliability Management,* **17** (4/5), 377-392.

Peter W.G.Morris. (1994). *The Management of Projects*. Thomas Telford Services Ltd., London.

Philip.B.Crosby. (1979). *Quality is Free*, McGraw-Hill, New York.

Public Construction Commission of Taiwan. (1999). Enhance the Quality Standard of Public Construction Through Enforcing ISO 9000 Series. www.plc.gov.tw/erg/iso.html

Reedy R.F (1994). ISO 9000-Guidelines To Increased Product Quality and Reduced Costs. *Journal of Cost Engineering.* **36**(6) 127-142

Rene T.Domingo. (1997). *Quality means Survival*, Prentice hall, Singapore.

Richard Barret. (1991). *Statistical Methods in Manufacturing*. Pretice Hall, New Jersey.

Rob Kantner. (1997). ISO 9000-Ten common pitfalls, Myriad Views www.infograph.com/mview/mvwtr97.htm

Robert A. Orwing and Linda L. Brenan (2000). An Integrated View Of Project And Quality Management In To The Project Based Organizations. *International Journal of Quality and Reliability Management.* **17**(4/5), 351-363.

Samuel K.M. Ho. (1995). Is the ISO 9000 for TQM, *De Montfort University, UK* www.mcb.co.uk/services/confern/oct95/Slo tqm/backgmd.htm

TATA Business Excellence Model. (1999). TATA Quality Management Services, Tata Ltd., India.

Taylor A and Meegan S. (1997). Factors influencing a successful transition from ISO 9000 to TQM. The Influence of Understanding and Motivation. *International Journal of Quality and Reliability Management,* 14 (2), 100-117.

Taylor W.A.(1995). Senior Executives And ISO 9000: Attitudes, Behaviors And Commitments. *International Journal of Quality and Reliability Management.* **12**(4)

Tim Kotnour. (2000). Organizational Learning Practices In The Project Management Environment. *International Journal of Quality and Reliability Management.* **17**(4/5), 393-406.

Webster G. (1994). Whole Brain Project Management for all. Industrial and Commercial Training. **26**(11) 22-31.

Woon Kin Chung. (1996) *Primer on Cost of Quality*, National Productivity Board, Singapore.

Appendix 1

ISO 9000 in Construction industry of Taiwan, Thailand and Hong Kong.

Taiwan expects to open the domestic construction to member countries of World Trade Organization. It is necessary to take international standards as prerequisites for all contenders of public constructions to ensure the quality. In addition, applying an international standard as a requirement will ensure a non- discrimination principle by the government agencies (www.plc.gov.tw/erg/iso.html)

Status quo of ISO 9000 series regarding Construction related industry in Taiwan is given below.

There are 155 contractors and 74 construction related companies with ISO 9002 certification. That is approximately 50 % of the construction companies have obtained this certification.

In addition, the survey indicates that in 1997, 81% of the projects with budgets over 2 billion NTS were awarded to ISO 9002 certified contractors. These figures clearly indicate that ISO 9000 certified companies have better chances in winning contract awards.

Public Construction Commission (PCC) intends to use ISO 9000 series certification as a prerequisite in the tendering process of public construction to improve the quality of public works and enhance competitiveness in domestic construction industry.

According to the newspaper (11.12.1999) " THE NATION" of Thailand, ISO certification is a hot commodity in Thailand. One of the main reasons is that Thailand companies want to expand their businesses abroad, as the domestic market was very uncertain during crisis period. The requirement to have ISO certification has increased by many folds. In 1993, only 40 companies had ISO certification. But in 1999, over 1500 companies have obtained ISO 9000 certification and another 1500 have registered with ISO certifications.

In Sri Lanka, by 1999, 140 companies have obtained their ISO 9000 certification in manufacturing and service industry. However there were only 03 companies, which are directly involved in construction, have managed to get the certification. One of the reasons for such is that ISO 9000 series more relevant to the manufacturing related industry than to the construction or project management industry.

Hong Kong government gave concerned to the quality in construction due to the scarcity of land. According to Chan and Tam (2000), that Housing Authority of HK introduced the Performance Assessment Scoring System (PASS) and ISO 9000 certification as requirements in order to overcome poor quality in construction. The Housing authority required all construction contractors to be ISO 9000 certified to participate in tenders.

Appendix 2

Total Quality Management – TQM Definitions and Principals.

There are many definitions and principles on TQM. Following are some of them which explain the concepts and principles.

1. TQM is defined as the totally integrated effort for gaining competitive advantage by continuously improving every facet of organizational culture. (Tobin, 1999)

2. Witcher (1990) , defines TQM as.
   Total : Every person in the firm is involved (and where possible its customers and suppliers).
   Quality : Customer requirements are met exactly.
   Management : Senior executives are fully committed.

3. Feigenbaum)1991) defines TQM as the total quality control's organization.
   Another definition, from the USA's Department of Defense in Saylor (1992), is that TQM is both a philosophy and a set of guiding principles that are the foundation of a continuously improving organization. TQM is the application of quantitative methods and human resources to improve the material services supplied to an organization, all the processes within the organization, and the degree to which the needs of its customers are met, now and in the future. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach focused on continuous improvement.

The Basic Principles of TQM

TQM principles are the main factors which guarantee the successful implementation of TQM. Broadly speaking, they can be classified into ten major headings.

. (1) Leadership
. (2) Commitment.
. (3) Total customer satisfaction
. (4) Continuous improvement.
. (5) Total involvement
. (6) Training and education
. (7) Ownership
. (8) Reward and recognition
. (9) Error prevention
. (10) Co-operation and teamwork.

Robert T.Rigby , commenting on TQM states,

"Total quality management (TQM) is a relatively new approach to the art of management. It seeks to improve product quality and increase customer satisfaction by restructuring traditional management practices. The application of TQM is unique to each organization that adopts such an approach." (http/www.wmisoyem9020.com/TQM/htm).

He further suggests following evaluation criteria for quality assessment frame work

1. LEADERSHIP - The driver.
2. INFORMATION & ANALYSIS - Systems
3. STRATEGIC QUALITY PLANNING -Systems
4. HUMAN RESOURCE DEVELOPMENT & MANAGEMENT - Systems
5. MANAGEMENT OF PROCESS QUALITY – Systems.
6. QUALITY & OPERATIONAL RESULTS - Systems.
7. CUSTOMER FOCUS & SATISFACTION – The goal.

In another explanation TQM is explained as follows.

"TQM is a management philosophy that supports the process of continuous improvement within an organization and where total emphasis is placed on the customer. TQM includes such characteristics as decentralized management, which allows stakeholders their autonomy to solve problems and contribute to the decision making process. It also provides for a more meaningful methodology applied to measuring current indexes of quality on all factors concerning a business. These characteristics correlate well with the recommendations made in our Common future for managing industry towards sustainable development".

The focus of TQM is on the customer. In the socioeconomic view point, TQM defines the customer as all members of society and facets of environment that interact with the activities of the company. Stephan Robbins has pointed out that TQM is becoming a competitive factor that is used by companies to differentiate themselves from their competitors. A company that integrates sustainable development within its' TQM management processes could set itself apart from the competition, and perhaps force its' competitors to include sustainable development within their own operational considerations as well, thereby benefiting society as a whole. This trend should also reduce the demand from society to governments for mandates controlling business practices. John Elkington, supports this trend in his article, "Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development".

V. Daniej Hunt, in his very thorough investigation of quality management entitled, Quality Management for Government, has proposed that TQM will become a way of life for proper organizational management.

If this is true, then sustainable development policy should begin to augment within business organizations. The very nature of TQM, and how it is implemented, requires sustainable development policy consideration. If it is not considered, then quality management for that firm will likely to fail, and it will probably lose its' competitive advantage.

Another expalnation is that " It is nothing new. TQM is to do in a more reasonable and efficient way what you have done so far, and to achieve customer satisfaction".

JEOL E. ROSS (1995) Explains the concept of TQM.

Total quality management (TQM) is the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services. The goal is customer satisfaction.

TQM is based on a number of ideas. It means thinking about quality in terms of all functions of the enterprise and is a start-to-finish process that integrates interrelated functions at all levels. It is a systems approach that considers every interaction between the various elements of the organization. Thus, the overall effectiveness of the system is higher than the sum of the individual outputs from the subsystems. The subsystems include all the organizational functions in the life cycle of a product, such as (1) design, (2) planning, (3) production, (4) distribution, and (5) field service. The management subsystems also require integration, including (1) strategy with a customer focus, (2) the tools of quality, and (3) employee involvement (the linking process that integrates the whole). A corollary is that any product, process, or service can be improved, and a successful organization is one that consciously seeks and exploits opportunities for improvement at all levels. The load bearing structure is customer satisfaction.

In eloborating the concepts of TQM; Bruce T. Barkley (1994), states,

"Total quality management is a recent management concept evolving from a wide range of earlier management practices, productivity enhancements, and improvement efforts. There are almost as many definitions of TQM as there are organizations using it. That is so because each organization's transformation must be personalized to establish ownership for creating the commitment needed for success.

Although there are many applied definitions of total quality management, the basic essence of TQM involves the elements of continuous improvement, a people orientation, quantitative methods, and a focus on customer satisfaction. TQM is a management philosophy and set of guiding principles that stress continuous improvement through people involvement and measurements focusing on total customer satisfaction.

TQM is both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. TQM is the application of quantitative methods and human resources to improve the material services supplied to an organization, all the processes within the organization, and the degree to which the needs of the customer are met-now and in the future. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach focused on continuous improvement. This definition is offered in the draft Department of Defense Total Quality Management Guide. The Federal Quality Institute's definition is as follows: "TQM is a strategic, integrated management system for achieving customer satisfaction which involves all managers and employees and uses quantitative methods to continuously improve an organization's processes." These are only a few of the many applied definitions of TQM. These examples show that the definitions of total quality management include all the essential elements of TQM.

The definition of total quality management we like is: TQM is a leadership philosophy and set of guiding principles that stress continuous improvement through people involvement, and a disciplined structured methodology, emphasizing process measurement, and focusing everything on total customer satisfaction."

A further understanding of TQM comes from the words Total Quality Management.

Total in this context means the involvement of everyone and everything in the organization in a continuous improvement effort. Everyone is committed to "one" common organizational purpose, as expressed in the vision and mission. They are also empowered to act to make that

vision a reality. Besides people, everything in the organization, including systems, processes, activities, tasks, equipment, and information, must be aligned towards the same purpose.

Quality is total customer satisfaction. Total customer satisfaction is the center or focus of TQM. The customer is everyone affected by the product and/or service and is defined in two ways. The customer can be the ultimate user of the product and / or services; this is known as an external customer. The customer also can be the next process in the organization; this is known as an internal customer. TQM focuses on satisfying all customer's expectations, both internal and external.

Management means creating and maintaining the TQM environment. This involves the leadership of an organization. In fact, many organizations use the term total quality leadership to emphasize the need for leadership throughout the whole organization to guide the transformation. Further, management manages quality through the invention and improvement of processes.

References:

Bruce T. Barkley, James H. Saylor, (1994) *Customer Driven Project Management*, McGraw-Hill, New York.

Feigenbaum, A.V., (1991) *Total Quality Control*, 3rd ed. McGraw-Hill, New York.

Joel E. Ross, (1995) *Total Quality Management*, S.S.M.B, Singapore.

Masao Umeda, (1993) *Seven key Factors for Success on TOM*, Japanese Standard Association,

Robert T. Rigby., *Total Quality Management statement.*, http;//www.wmisystem9020.com/TQM/htm

Saylor, J.H., (1992) *TQM: Field Manual*, McGraw-Hill, New York.

Tobin L.M. (1999)"The New quality Landscape", Total Quality Management" *Journal of System Management* Vol 41, No11 pp 10-14.

Witcher, B.J.,(1990) *"Total Marketing; Total Quality and Marketing Concept"*, The Quarterly Review of marketing.

Questionnaire of a Recent Survey on Employee Motivation

(Q1) Present Job Satisfaction?

(A1) Satisfied & very happy.

(A1) Unsatisfied.

(A3) Hate the job.

(Q2) Do you have any skills or talents in any other area except the task & duties you are already involved with?

(A1) Yes.

(A2) No.

(A3) Nothing Special.

(A4) Have talents to do the work.

(Q3) Are you satisfied with your skills & talents required to do the work?

(A1) Yes.

(A2) No.

(A3) Average.

(A4) No Idea.

(Q4) What is the main part, which helps you to do your work extremely well?

(A1) You will be blamed if you did not do the work.

(A2) It will help us and the organization to achieve the goal.

(A3) Otherwise you will be charged.

(A4) No effort at all.

(Q5) Your attitude towards work?

(A1) To do in easiest way.

(A2) Exactly work to the given instructions.

(A3) Just fulfill the requirements to pass the inspection.

(A4) Just to work as others.

(Q6) What do you think is the reason, which disturbs you to do the work extremely?

(A1) Supervisors do not make any effort to do work.

(A2) Management does not make any effort to do work.

(A3) Misleading ideas among workers.

(A4) Salaries and wages do not compare with the duties and tasks.

(Q7) Do you try to improve your work?

(A1) No considered about improvements.

(A2) No use of tries hard for process.

(A3) Always try to improve the work method.

(A4) No room for improvements.

(Q8) What are existing barriers you think is affectivity the development of your activities & Organization as whole?

(A1) No barriers at all.

(A2) There is no particular scheme for much as endeavor.

(A3) There is no positive response for your suggestion & ideas.

(A4) Due to lack of communicating between management & subordinates.

(A5) Due to insufficient performance of management.

(A6) Insufficient knowledge of supervisors.

(A7) No appraisal or acceptance regarding the performances.

(A8) No extra payment for extra work.

(Q9) What is your opinion for continuos improvements?

(A1) It is only responsibility of managers & Supt.'s.

(A2) Should work as team.

(A3) Employee should be paided and an extra payment for improvements.

(A4) No room to do improvements.

(A5) No any useful results if we do improvements.

(Q10) What do you think about present quality of finished products you produce?

(A1) In very high quality.

(A2) No Improvements.

(A3) Improving gradually.

(A4) Can be improved further.

(Q11) What do you think about quality of components produce you?

(A1) In very high quality.

(A2) No Improvements.

(A3) Improving gradually.

(A4) Can be improved further.

Appendix 4

List of Steering Committee for implementation of ISO 9000 for LTL Projects (Pvt.) Ltd.

1. M.J.M.N.Marrikkar – Deputy General Manager
2. Ravindra Pitigala -Financial Controller
3. Manjula Perera - Contract Manager
4. Lasith Wimalasena - Quality Assurance Manager
5. Rohitha Ganepola - Senior Design Engineer
6. Narendra de Silva - Project Engineer (Substation/ Transmission Lines)
7. Dilan Perera - Project Engineer (Mini Hydro Power)
8. Udaya Gunarathne - Construction Engineer
9. Madhuka Ganegoda - Costing Engineer
10. Vijitha Padukka - Design Engineer
11. Ruwan Dissanayaka - Construction Superindents
12. Sampath Madawala - Construction Superindents

Appendix 5

List of Issues, Problems and Opportunities of Existing Quality system

Issue	Category
1. A standard drawing & document numbering system should be developed	2
2. I have observed that some documents have been numbered without consulting. Such documents have created many problems. This should not happen again. All documents of design should be numbered and gone through by me.	2
3. The drawing distribution is not good. At site I have observed instances where the site manager is working to an obsolete drawing while a new drawing has been issued.	2
4. There had been a very big loss of time and resources because that some design information was not reached me timely. For an example in the latest design at least we had to discuss 30 drawings because several data were not sent to me in time. This resolved in a loss of 2 weeks.	1
5. Now a new network system implemented and every body is saving data every where. This is now disturbing even our design data files. There must be control over this.	1
6. We have to purchase some revised standards. Some are obsolete.	2
7. We need a better design software for steel structures.	8
8. I prefer more reserved and more systematic organization of the design department.	8
9. Site manager should not expect that everything will be given by the design department.	7
10. It is necessary to have updated software.	8
11. It is better to hold frequent meetings with the client. There are some information always coming up to be clarified by the client.	7
12. A chance to participate at the tendering stage and specially to visit site would have been very valuable.	7
13. A user-friendly computer management system would be very valuable.	1
14. For a tender if the management can take an early decision on the party with whom we participate, it would be very easy.	6
15. When we work with several parties for a single project, it becomes a cumbersome work. If we can reduce the number of parties that we are dealing with, then we would be able to give more competitive tender.	6
16. The site cost data that I receive from sites are either inaccurate or not well recorded. There should be a method to extract correct costing from sites.	3
17. We must get more information from sites to evaluate sub contractor's costing and performances.	3
18. We have to develop a project specific costing system. I do not believe in a standard costing system.	3
19. It is worth to develop a costing software as what I have done for transmission lines. If we can develop such a system for works also it would be very valuable.	3
20. Drawings are not coming to the site at right time.	2
21. Site costing must be done as per standard quantity surveying methods.	3
22. There must be a more developed and flexible system than now.	
23.Better to hold short site meetings with relevant parties. Reports sent from the site should be made short and informative.	5

24. Skill development program should be available for skilled workers at site.	4
25. We have to exercise more care on safety and that must be addressed from the head office.	6
26. When a dispute occurs at site level, there must be fast response from the head office.	7
27. Quality of incoming material should be controlled to minimize rejects. There must be a good store control method to ensure availability of material despite any rejections.	8
28. For the discharge of plant/machinery and bulk supply of material, there must be a more reliable system.	8
29. It will be very valuable if we can designate some activities within one BOQ item and cost those. At BOQ level then the information we get will be more accurate. Even I would be able to schedule and monitor program more effectively.	3
30. I do not believe a quality supervisor at site will solve all there problems.	8
31. Marking, designation and demarcation of areas at site will be very valuable. Presently, these are exercised in my own way. This should be brought to a formal system.	8
32. Presently, available testing and inspection system should be agreed with client at the level of project development. This will make easy to implement that at site.	6
33. There must be a system by which I can find any document in any other department with no problem with minimum disturbance.	2
34. In costing I have seen that there exist duplication of software and database between my and other department. There must be a common software and database to avoid such duplication.	3
35. More time has to be devoted to the aspect of project development	6
36. Most of the work which come to my department are urgent. We must not wait till the customer comes to us at the last moment. We must go to them and explore the market before hand.	6
37. For my nature of work, the employment of small-scale contractor's won't be always effective.	4
38. We have to develop frequent meetings with client and even site visits and other involvement, as much as possible.	5
39. We have to develop a project specific document control system.	2
40. Site program reports and costing reports should be developed based on standard protocol, which facilitate the extraction of useful information easily.	1
41. It is observed that during the phase of developing the master program, the time allocations are unrealistic. For an example during the past couple of projects, the time allocation for design was far less than the actual requirement. This results in major deviation from the master program and unexpected costs.	1
42. I have noticed in many occasions that all the parties involved in the project have not understood the project objective and the delivery requirement exactly. This results in diversified goals and management incoherence.	6
43. Databases should be developed for costing, subcontractor recording and standards. Such should be concise and user friendly.	1
44. Data from the site should be formalized to a standard information system. Standard protocols should be developed and standard program monitoring tools such as earned value theorem should be implemented.	1
45. The purchasing should be discharged to site rather than handling from head office. But the system enforced should be stringent enough to exercise strict control over cost and quality.	6

46. At site level some re-working is taking place. In order to avoid this, there must be robust quality control and verification systems operating at site.	8
47. In certain tender offers, we have not appreciated certain risks sufficiently.	8
48. Certain delays at the initial stages of the project could have been avoided if the management intervened and addressed the problem.	5
49. The unreliability caused by the absence of a robust costing database at the level of tendering has to be reduced.	3
50. Short and concise meeting system has to be implemented.	5
51. Information flow between departments is not taking place properly.	7
52. Changes and deviations from the specifications have not been documented properly, resulting in extra cost at site.	2
53. In venturing into new industries, the vacuum of exploiting market has not been addressed timely and adequately. Most of such markets which were well within our scope have been lost by us due to this lapse.	6
54. Risk allocation, risk management and risk identification within both tendering and construction has to develop extensively.	8
55. Site cost controlling and reporting system has to be developed. There the financial management should be emphasized.	3
56. Storage procedure should be robust enough to control the stock level at site in a minimum level.	8
57. Site auditing system is needed.	8
58. Project manager should inform me the present status and the probable requirement of each flow in reasonable timeframe with a higher certainty.	7
59. During tendering when indirect costs are calculated my participation should be considered. Especially in cases like risk evaluation and capital costing my presence is essential.	8
60. Certified amount of work related to invoicing has to be channeled in a controlled manner and when due.	7
61. At the initial phases of tendering when the tender documents are received the co-tenderers, required qualification, etc, have to be reviewed in detail against the standard protocol.	7
62. A single person with high control should handle purchase of tender documents.	2
63. The standard commercial conditions required in most of the tender should be pre-organized.	6
64. Site quality control should be strong enough to reject sub-standard material and sub-standard works. Supervision should be robust enough to avoid work rejects and reworking.	5
65. There must be a concise method for preventive maintenance of site plant & equipment.	6

Appendix 6

Name:---------- **Position:**---------- **Division:** ----------

1. Is the existing system of Management is adequate for Quality Management Yes ☐ No ☐
2. Does your staff that believe it is necessary to have ISO 9000 based system in your division? ☐ Yes ☐ No
3. Has all of your staff actively participated in getting ISO 9000 registration? ☐ Yes ☐ No
4. Is the time frame for preparation enough? ☐ Yes ☐ No
5. Are the procedures too much for implement? ☐ Yes ☐ No
   If yes, Please indicate the procedures to be corrected.

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5. The difficulties found in implementing ISO 9000 system in the division

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6. Suggestions to overcome the above difficulties

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7. Your thoughts, why LTL had failed to implement ISO 9000?

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8. Your suggestions to address the above issues in our next attempt

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