

Service Quality

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Quality Management Initiatives in PDIL

R.G. Rajan, D. Jha

ABOUT PDIL

Projects & Development India LTD., (PDIL) is a premier design engineering and consultancy organization, committed to technological excellence and self-reliance in the growth of fertilizer and allied chemical industries. It has played a pivotal role in the growth of the Indian Fertilizer Industry. For over four decades, it has been providing design, engineering and project execution services from the concept to the commissioning of fertilizer and chemical projects. Down the years the company has diversified its technological base in other industrial sectors and it now provides services for projects in fertilizer, chemicals, oil and gas, refinery, power, petrochemical and infrastructure.

It involves engineers specialized in the various disciplines of engineering and computer aided design facilities at its offices at Noida (near New Delhi) and Baroda (Gujarat). It also has a catalyst manufacturing unit at Sindri (Jharkhand) producing a range of catalysts used in fertiliser and oil industries. Its inspection offices are spread over Noida, Baroda, Mumbai, Chennai, Kolkata and Hyderabad and provide third party inspection and non-destructive testing services to the engineering industry.

It provides detailed engineering and site services for one of the world's largest single stream ammonia plant at Karratha in Australia, which is based on KBR's (USA) technology. Our clientele includes Essar Projects, Reliance, GAIL, IGL, IOC,

BPCL, HPCL, ONGC, GNFC, GSFC, besides all the nitrogenous fertiliser companies like Tata Chemicals, Chambal Fertiliser, Deepak Fertiliser, Nagarjuna Fertiliser, NFL, RCF, IFFCO, Kribcho, KSFL etc. In addition to this, it also provides services to companies abroad, while actively looking for overseas markets.

It has the unique distinction of working with different process licensors of ammonia & urea technology like Halder Topsoe of Denmark; Kellogg Brown Root (KBR) of U.S.A.; SNAM Progetti of Italy and Toyo Engineering of Japan

It is an ISO 9001:2000 certified company, that has been performing consistently with robust growth in profitability and volume of business undertaken.

APPROACH TO QUALITY

Quality improvement and resource optimisation has always been a matter of concern in PDIL ever since its inception in 1962, then as P & D Division of the erstwhile Fertilizer Corporation of India. It was, however, rechristened as an independent PSU under Ministry of Fertilizer and Chemicals in the year 1978. From that time on, it has been taking up the job of standardization and is a permanent institutional member of Bureau of Indian Standards. Having developed a large number of its own standards, it has led on to quality control of identified modules by “develop once and use repetitively” approach. It has followed three level controls over all deliverables relating to project execution, namely prepared, checked and approved approach. Work study and methods improvement were constantly followed in engineering as well as manufacturing activities. The working teams were encouraged to identify objects for standardization

But these processes were not identified formally as there were no performance evaluation systems. Also several factors like excessive manpower in non-technical disciplines; receding growth in fertilizer sector; longer life of catalysts and the resultant reduction in catalyst sales were some of the factors which contributed towards recurring losses in PDIL.

Despite these adverse conditions, the top management of PDIL took several initiatives which included measures like setting goals in different areas to achieve net profits while exceeding customers' expectations. While the company was re-structured in 2003, the initiative for formal quality management system began in April 1997 with the formation of a core team to identify and execute all activities leading to implementation of quality management system conforming to ISO 9001:1994 the first step on its journey in achieving TQM. Plans were put in place to develop and implement quality system with focus on customer satisfaction and continual improvement. These milestones were:

- i) **Identification of team members** with concern for quality, having good communication skills (both written and oral), willing to contribute to the cause of quality and acceptable to mass by virtue of their position and past relationships.
- ii) **Identification of external agency** to guide PDIL in understanding requirements of ISO 9001:1994. Provide guidelines and training for development and implementation of quality systems. FICCI and external consultants from its panel were selected as agencies to provide help.
- iii) **Creating Mass awareness** among a 1500 strong work force about quality management and the requirements of ISO 9001:1994. This was achieved with the help of FICCI and the appointed consultants. Three levels of awareness were identified: mass awareness, audit team and lead audit team.
- iv) **Creating internal quality audit team and appointment of Management Representative.** After imparting intensive audit training to over 60 executives, a team of 18 executives was identified to act as internal auditors. The role of these auditors was not just limited to carrying out internal audit, but also to interact with other personnel and spread quality culture to make people aware of the quality requirements. They would provide feed back to management representative regarding issues requiring special attention. The MR looks after the overall quality requirement of PDIL.

- v) **Reorganizing existing procedures** and work practices. The training that was imparted to core team of lead auditors, auditors and other executives along with active participation of all personnel, provided quick identification of working practices to be put under quality control. External consultants were very helpful in identification of work practices to become a part of quality control as required by ISO 9001:1994.
- vi) **Identifying processes** whereby tacit knowledge had to be converted to explicit knowledge. This meant written procedure and planning along with monitoring development of these processes.
- vii) **Identification of agency for certification.** This was done by identifying proper agencies for the job by tendering. In December 1997 the Indian register of shipping was finally selected as the certifying agency.
- viii) **Phasing implementation:** PDIL had two main activities: providing engineering services and catalyst manufacturing. In the first phase, the engineering services were selected for quality system for implementation.

IMPLEMENTATION PHASE

All the above were successfully managed by the dedication and team work. All the quality control measures were designed to achieve customer satisfaction. In order to convert tacit knowledge into explicit knowledge, individuals were identified to develop procedures/work instructions for each identified activity. Mass awareness consumed around 2000 mandays through talks by guest faculty and in-house and external training. In all, over 2000 man days were spent in training and talks. PDIL was ready with the quality control procedures by December 1997 and these were implemented. Internal audit was carried out in February while pre-certification audit in April 1998. The certification audit of quality

system was done in July 1998 and PDIL was issued certification in September 1998. The journey from a state of no formal quality control measures to a regime of formal, measurable and certified quality system was difficult but achieved within a short interval of around 15 months by continuous involvement of personnel.

The journey did not stop at certification of implemented quality system. Training sessions to manage transition of implemented quality system for meeting requirement of ISO 9001:2000 were organised in November 2002. All further work relating to revision of work practices and certification of quality system was carried out and quality system was certified against ISO 9001:2000 in July 2003. Quality system was implemented in catalyst manufacturing in 2004. Transition of quality system and implementation in catalyst manufacturing was carried out through in-house resources without help from consultants.

PRESENT STATUS

PDIL has not halted its journey to quality after certification of its units and activities. It provided consultancy services and thereby helped NATCO, Nigeria in implementing quality management system meeting requirements of ISO 9001:2000 in the year 2003 by posting one personnel to their office. In the year 2007, it deputed two of its engineers to OMIFCO, Oman to help assist them in bringing improvement in their materials management system so that they could go for ISO certification. In the same year, it made a strategic alliance with BSI Management Systems India, a part of British Standard Institution, and is offering quality related training and certification to corporate clients.

PDIL is now contemplating having a quality circle in all its units and major functions. It strives to exceed customers' satisfaction in all the areas of its working. Today, it is getting repeat orders from most of its clients even in private sectors on nomination basis which is a testimony to its quest of having a long list of satisfied clients.

PDIL has signed a MOU with Govt. of India in which continual measurement of customers' satisfaction and achieving a targeted score carries high weightage. Today, it has an "Excellent" rating.

PDIL has also identified its thrust area and has decided to automate its activities by using world class software. This will enable it to build a highly competent pool of world class core professionals.

Employees are encouraged to give constructive suggestions in open forum to improve products, processes and organizational image. The chief executive also addresses employees on all formal occasions and employees' concerns are promptly addressed.

GAINS FROM QUALITY APPROACH

The table below provides a view of performance of PDIL over last 6 years. While it can not be stated that the improvement in its performance is only due to quality initiatives, quality has certainly played an important role in creating confidence among the clients. The experience and benefits may be summarized as:

- identification of measurable processes and monitoring of performance of identified processes. Activities for continual improvement in performance are based on the data generated.
- development of procedure/work instructions to act as knowledge base and help new recruits to assimilate from past experience quickly.
- providing a platform for identification of tacit knowledge for documentation and conversion into explicit knowledge.
- implementing system driven approach to replace man driven organisation.
- it is qualified to participate in business opportunities where ISO certified quality system is an essential qualifying requirement.
- lean management approach has helped in reducing the workforce from over 1600 to below 500 which in turn controls expenditure.

Table -Performance of PDIL at a glance

(Rs. in Lakh)

Year ended 31st March	2003	2004	2005	2006	2007	2008*
Total Income	3086	4912	4552	4224	4626	5458
Total expenses	5330	3973	3411	3006	3506	4201
Profit before tax	-3718	813	1001	1084	1120	1257
Man power in Nos (average)	1716	502	464	477	440	451

Note: * - the figures for year ending on 31.03.2008 are provisional.

OTHER QUALITY INITIATIVES AND FUTURE PLAN

PDIL is focusing its attention on quality improvement to meet the challenges created by globalization. All management trainees are exposed to implemented quality systems. As a strategy, quality issues are discussed monthly by top officials under chairmanship of the CMD. Stress remains on achieving customer satisfaction and reducing customer complaints. Lean management has become the norm and PDIL is regularly devising means to handle work without long term commitment to resources. As a result, current manpower strength is 451 against 1628 in July 2003. IT is being used extensively. It has a strong urge to implement TQM. The real essence of TQM implementation lies in continuous organizational improvement, effective communication at all levels and delivering products and services which far exceed customers' satisfaction. Accordingly, it has initiated multi pronged actions which include adopting best practices, benchmarking and employees' care while meeting customers' requirements. Implementation of knowledge management, ERP and carrying out performance and process benchmarking are some of the future plans set out by PDIL.

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NxPaint, Use of PC Software to Create and Deliver Broadcast Graphics in Real Time

Atima Mankotia

THE CONTEXT

NDTV's tryst with television began way back in 1988, when it produced a news and current affairs show 'The World this Week' for the government-owned broadcaster doordarshan. The show proved to be immensely popular, and NDTV established its image as a credible private news producer. It moved on to become the sole news content provider and producer for India's first 24-hour news channel, Star News. The company's biggest milestone was established in 2003, when it launched two 24-hour news channels NDTV 24x7 in english and NDTV India in hindi followed by a 24-hour business news channel NDTV Profit in 2005, which became a leading business news channel in the short period of time.

In 2006, the company broke new ground, formulating a strategy to build a global business. NDTV Networks Plc, a 100% subsidiary of NDTV was incorporated in UK to seize opportunities in areas 'beyond news'- entertainment, lifestyle, media technology and outsourcing. It also set up four stepdown subsidiaries NDTV Lifestyle (for lifestyle content), NDTV Imagine (for general entertainment content), NDTV Convergence (triple play; to exploit the synergies between television, Internet and mobile), NDTV Labs (to develop media software and technology for captive use) and a 50:50 joint venture with Genpact, NGEN Media Services (outsourcing of post-production services and digital asset management).

Subsequently, in 2007, the company launched several television channels in India NDTV Good Times (an up-market lifestyle channel for the global urban Indian), NDTV Metro Nation (a New Delhi-centric channel in English) and NDTV Imagine (general entertainment channel). The company also launched a global portfolio of channels Astro Awani, a channel each in Indonesia and Malaysia, and NDTV Arabia in the Middle East, catering to the Indian diaspora there.

Recently, the US media giant NBC Universal acquired a 26% equity stake in NDTV networks in a deal valued at USD 150 million. Earlier this year, a group of private equity investors and hedge funds invested USD 120 million in NDTV networks, valuing the company at over USD 550 million.

From a pure-news focused player, NDTV is metamorphosing into a diversified global media player and intends to consistently break new ground!

PROBLEM AND OPPORTUNITY

For any broadcast company, graphics delivery is a basic requirement. Companies spend thousands of dollars on purchase and support of expensive broadcast graphics creation and delivery systems, which provide their designers the tools to generate and deliver broadcast graphics.

NDTV runs three 24x7 national TV channels, which have a constant need for broadcast graphics like stills and animations delivered rapidly in everyday and breaking news scenarios.

As the channel size/viewership has increased, there is a growing requirement of new graphics delivery systems to cater to its audiences.

In addition, two new 24-hour channels were pending launch in 2007 and needed their own graphics creation and delivery systems. This meant more investment for NDTV towards new hardware and software and maintaining licenses for each deployment.

In addition, with each deployment, dedicated skilled professionals need to be hired to maintain the continued working of these systems.

AIMS, GOALS AND OBJECTIVES

NDTV was looking at a solution where an alternative graphics solution can produce the same results at a lower cost.

SETTING THE SCENE

NDTV decided to write its own software using Visual Basic.Net and Blackmagic SDI card SDK to deliver real time graphics. The graphics were created using high-end PC software like Adobe Photoshop and Adobe After Effects.

These softwares are capable of generating high quality off-line graphics and are being used in the film and print media for a long time. (Recent example of a movie using After Effects and Photoshop is the effects laden Hollywood movie "300")

You can read about the case study on the following URL: http://www.adobe.com/cfusion/showcase/index.cfm?event=cases_tudydetail&casestudyid=301411&loc=en_us)

Traditionally, the problem with using Adobe Photoshop/After Effects in broadcast has been that even though they could generate high quality graphics, delivering it on-air was a long drawn procedure, which required multiple steps and could never be used in real-time.

To overcome this bottleneck, NDTV has developed a complete architecture built on top of Photoshop and After Effects, which enable efficient delivery (1 click delivery) and provisions for stacking multiple stills or animations. For the designers they do not need to learn complex new machines and work on familiar territory of Photoshop and After Effects. They get all the benefits of using a PC software (like easy access to thousands of filters and plugins, built in spell checker, source material, actions etc.)

The solution is based on a Windows XP based personal computer and uses an inexpensive video card with SDI-out capability to deliver graphics directly on-air.

This architecture is capable of delivering any kind of media generated on PCs or Macs like Quicktime video, DivX video, audio clips and combinations of it.

EXPERIENCE

All still-graphics are designed on Adobe Photoshop. Animations are created on Adobe After Effects. NDTV wrote the plug-in and software tools to store, organise, maintain and deliver the graphics. This was done using Visual Basic.NET and SQL Server Database.

The designer has the option to show the designed graphic directly on-air from inside Photoshop itself or save a complete "stack" of multiple graphics to take them back-to-back on-air.

The stack(s) can be saved with tags for later retrieval or searching through previously stored stacks. The original/source files are stored with the stack for later editing if required.

To generate an external key for the graphic, all the designer needs to do is define the transparent (or alpha) areas of the graphic and it is rendered with it on air.

Similarly, animations can be designed in Adobe After Effects, saved, managed, searched, retrieved and delivered when required. Animations can be paused/resumed for synchronization with talent voice-overs.

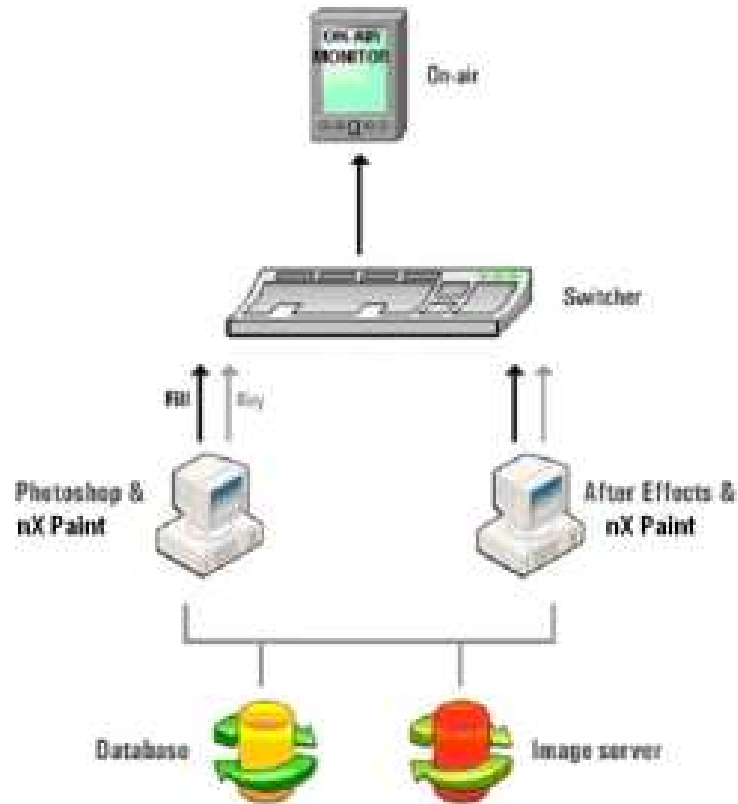
The hardware requirement for this solution is minimal and works perfectly with an Intel Pentium 4, 3.2Ghz PC with Blackmagic's DeckLink SDI out card.

A high capacity SATA disk is installed on a network share to store all graphics (and source files) so that multiple setups can access each other's stored stacks and source files.

In case the broadcaster requires high definition video output, it can be achieved by a simple change of the SDI card (additional cost of \$300) and software configuration changes.

We are also working to make this solution MOS compliant.

Diagram:



OUTCOME AND IMPACT

With successful implementation of NDTV's custom solution as an alternative to proprietary broadcast graphics systems, NDTV has saved over US \$250,000 in a year by installing 2 of these setups in its News center.

Cost comparison (per setup)

Using custom NDTV solution for graphics delivery	Price
Personal computer for running NDTV's solution (configuration used: Intel Pentium4, 3.2GHZ, 1 GB RAM, WinXP OS)	\$1000
SDI card to connect to switcher (Black magic's Decklink card with SDI i/o and genlock capability)	\$800
Software license cost for Adobe Photoshop CS2	\$649
Software license cost for Adobe After Effects 7.0	\$999
Wacom Intuous Tablet	\$750
SATA drive	\$350
Development cost	\$18000
Total cost	\$22550

Using Quantel Paintbox System	Price
Unit with software	\$160,000
Total cost	\$160,000

NDTV has also sold one Unit of this system to Malaysia based Astro Group and is looking to effect more sales in the coming years.

ADDITIONAL BENEFITS

- Adobe Photoshop and After Effects are very powerful graphics and animation suite which have been used in the broadcast and film industry for years.
- Photoshop and After Effects artists are much easier to find than artists familiar with broadcast graphics systems. Cost of broadcast-specific graphics artists has, traditionally, been much higher than PC graphics artists.

- The solution is scalable; needs a personal computer with an SDI out card and the software to go into production.
- Maintenance cost of this system is much lower than that of proprietary solutions.
- Support for internalization is built-in through Microsoft Windows.
- Since the solution is based on Windows PCs, designers have access to the Internet for source material and can even copy paste graphic and text content from newsroom systems and emails. This reduces chances of human errors while duplicating data in the graphics.
- Support for using local languages is easy and there is no need to install additional software to make them work. All that is needed is the appropriate font installed on the delivery machine.
- Upgrading to high definition output requires a simple change of the SDI card (additional cost of \$300) and software configuration changes.

AWARDS

NxPaint has already won two prestigious awards of CBA/IBC (Commonwealth Broadcasting Association/) and NAB (National Association of Broadcasters) International Broadcasting Excellence Award 2008 for most innovative product of the year.

The product is now ready to be used by broadcasters around the globe and is expected to be a huge revenue earner for the Group.

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Provision of Computer Equipment to Members of Rajya Sabha : - A Study in Systems Improvement¹

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THE CONTEXT

Parliament of India consists of the president and the two houses, known respectively as the council of states (Rajya Sabha) and the house of the people (Lok Sabha). Rajya Sabha consists of not more than two hundred and fifty members, out of which two hundred and thirty-eight members represent the states and union territories and twelve members are nominated by the president. The representatives of the states are elected by the elected members of state assemblies in accordance with the system of proportional representation by means of the single transferable vote. The representatives of the union territories in Rajya Sabha are chosen in accordance with laws enacted by parliament. Twelve members nominated by the president are from amongst persons having special knowledge or practical experience in respect of literature, science, art and social service. The Rajya Sabha is a permanent body and is not subject to dissolution. However, one-third of its members retire biennially. The last biennial elections were held in March 2008. A member who is elected for a full term retains his membership for six years.

With the spread of information technology, a need was felt, in the early nineties, for the application of this technology to the functioning of Rajya Sabha and its secretariat. As a result, a beginning was made in computerizing the activities of Rajya

¹A paper on this topic was presented at the general meeting of the society of clerks-at-the-table of Commonwealth Parliaments in Kuala Lumpur, Malaysia on 08 August 2008.

Sabha. Simultaneously, it was thought that computers should be supplied to members of Rajya Sabha free of cost, as a facility, so that they could access parliamentary information electronically.

The issue of providing computers to the members of Rajya Sabha, to facilitate their parliamentary work, was first considered by the general purposes committee of Rajya Sabha (GPC) at its meeting held on 14 February, 1995. Thereafter, notebook/laptop computers were procured in that very year for supply to members on a returnable basis. For this purpose, provision of computers to members of parliament-rules and procedures, 1995 (hereinafter called "the 1995 Rules") were framed.

With the supply of notebook computers, requests from members for other equipment and services started pouring in. In order to have an institutional arrangement for proper consideration of such matters, the GPC at its meeting held on 20 February, 1997 recommended that a committee consisting of seven members be constituted to go into all aspects relating to supply, etc. of computers to members of Rajya Sabha and authorized the chairman, Rajya Sabha to nominate such a committee under the chairmanship of deputy chairman, Rajya Sabha. Accordingly, the committee on provision of computer equipment to members of Rajya Sabha (hereinafter referred to as "the computer committee") was constituted by the Chairman, Rajya Sabha on 18 March, 1997. This committee has held fifty eight meetings since its inception, in which it has considered issues ranging from norms for provision of computer hardware and software, to be made available to members from time to time, to application of information technology in the functioning of Rajya Sabha and taking steps to increase the use of electronic mode for information dissemination to members.

OLD SCHEME OF PROVISIONING COMPUTER EQUIPMENT TO MEMBERS OF RAJYA SABHA

Before 01 April, 2008, computer equipment was procured and supplied to members under the 1995 Rules. As per these rules, computer equipment, including desktop or laptop computer, printer, scanner and UPS were supplied to members of Rajya Sabha by making the procurement through a government agency, namely

National Informatics Centre Services Incorporated (NICSI). The handheld computer was added to this list in the year 2005. The specifications etc. of the equipment were finalized by the computer committee on the recommendations of the Standing Technical Advisory Committee (STAC), which comprised representatives from the National Informatics Centre (NIC) and the Rajya Sabha Secretariat. The period for which the equipment was made available to a member was restricted to his/her term in Rajya Sabha (i.e. six years), after which he was required to either return the equipment or retain it by paying the depreciated cost to be calculated @ 60% depreciation per annum on the written down value.

In the year 2005, the members were given an option to get their computers upgraded, after three years from the date of supply and, in case it was not technically feasible to upgrade the computer, it could be replaced with a new computer, provided the old computer was purchased by the member by paying depreciated cost to be calculated @ 30% depreciation per annum on the written down value. This was done keeping in view the fast obsolescence rate of the computer equipment.

Besides the computer equipment, internet and e-mail facilities were also provided to the members by the National Informatics Centre (NIC). Responsibility for maintenance of the equipment, which was supplied to members, was that of the secretariat. Similarly, the insurance for the computer equipment was provided for the first three years by the secretariat.

PROBLEMS ENCOUNTERED WITH THE OLD SCHEME

With passage of time, as the members became familiar and comfortable with the use of information technology, their need and requirement of hardware and services became more personalized, and the secretariat started receiving a number of demands/suggestions from members wherein they listed their specific hardware requirements, personal choice of models, specifications, softwares, etc. The computer committee felt that despite best efforts, the requirements and expectations of members with regard to computer equipment were not being optimally met for the following reasons:

- it was difficult to select a single model which would be acceptable to all members.
- there was a time lag of 3 to 4 months between the time of finalization of the model by the committee and its actual delivery to the member. This led to complaints regarding delay in the supply of computer equipment.
- the market gets inundated with new models/products within a very short span and, given the fast rate of obsolescence in computer equipment, the members would get a feeling that they are being given an outdated model.
- despite best efforts, members would often complain about the quality of maintenance support provided by the Annual Maintenance Contract (AMC) vendor.
- with members becoming more techno-savvy, they are in a better position today to assess their hardware and software requirements than they were in the past years.
- there was additional problem of storage of computer equipment after its acquisition and before it was sent out to the members. There was also the problem of storage and disposal of equipment returned by the members upon completion of their term.

ALTERNATIVES CONSIDERED

Information Technology (IT) Section of the Rajya Sabha Secretariat, which services the computer committee, was asked to develop a new scheme whereby the problems being faced in the old scheme could be resolved.

Initially, it was considered whether the members should be given a lump-sum allowance for computer equipment. The proposal was objected to on the ground that all members may not utilize the allowance, or the full amount, for procuring computer equipment.

Thereupon, the IT Section came up with the idea of a “financial entitlement” for members, for the purpose of computer equipment, which would be released/reimbursed only on production of the proof of purchase. The computer committee found this idea

acceptable and gave its “go ahead” to develop a new scheme based thereon.

The new scheme was accordingly developed by the IT section and the computer committee, after due consideration, approved it in its meeting held on 14 January, 2008. After obtaining the approval of the chairman, Rajya Sabha, the new scheme came into force on 01 April, 2008.

NEW SCHEME OF PROVISIONING COMPUTER EQUIPMENT TO MEMBERS OF RAJYA SABHA

In order to keep pace with the fast changing technology and to facilitate members to procure computer equipment as per their personal needs and choices, the computer committee introduced a scheme of financial entitlement of members of Rajya Sabha for computer equipment. The scheme provides sufficient freedom to members to purchase laptop and handheld computers of their choice (any brand and any model) within a financial limit. A restriction has, however, been imposed with regard to purchase of desktop computers and computer peripherals, with a view to guarding the members from purchasing sub-standard equipment since the market is flooded with a large number of “assembled” desktop computers with spurious parts. This scheme forms part of the revised Rules, namely, “The provision of computer equipment (members of Rajya Sabha and officers) Rules, 2008,” which came into force on 01 April, 2008 (hereinafter referred to as “the 2008 Rules”).

The salient features of the new scheme are as follows:

- i. The financial entitlement of a member for purchasing computer equipment and software under the scheme is :
 - Rs.1,50,000/- (US\$ 3500 approximately) if he is elected / nominated to Rajya Sabha on or after 01 April, 2008.
 - Rs.1,50,000/- (US\$3500 approximately) if he was elected/nominated to Rajya Sabha before 01 April, 2008 but has not been supplied any computer equipment by the Secretariat.

- Rs.1,00,000/- (US\$ 2400 approximately) if he is elected/nominated to Rajya Sabha on or after 01 April, 2008 on a casual vacancy for a term of three years or less.
 - Rs.75,000/- (US\$ 1750 approximately) if he was elected/nominated to Rajya Sabha before 01 April, 2008 and has already been supplied computer equipment by the Secretariat.
- ii. The adequacy of the amounts of financial entitlements shall be reviewed by the computer committee annually and revision, if any, shall take effect prospectively.
- iii. Under the scheme, members are entitled to purchase any or all of the following items of computer equipment:
- Desktop computer
 - Laptop computer
 - Handheld communicator/computer
 - Printer (DeskJet/ LaserJet/Multi-function/portable)
 - Scanner
 - UPS (with desktop only)
 - Pen drive
 - Data internet cards
 - MS Office suite
- iv. The members are free to purchase any model of the computer equipment and software, specified above, at any time during their term. The members are also free to purchase any mix of computer equipment that has been specified, subject to the condition that the amount of reimbursement/payment shall not exceed the “entitlement” as fixed by the committee. In case the cost of equipment purchased by the member exceeds his financial entitlement, the difference between the actual cost and the entitlement is to be borne by the member himself.
- v. The computer committee shall review every year, at the time of reviewing financial entitlement, whether any items should be added to or deleted from the specified list.
- vi. The computer committee may notify, from time to time, a list of authorized vendors of various manufactures of computer

- equipment from whom it is mandatory to purchase the desktop computers. This list shall be prepared in consultation with the NIC. Primary criteria for short-listing of vendors are availability of a country-wide network and dedicated customer service personnel. At present, the following manufacturers have been approved for desktop computers and members can purchase these equipments from an authorized vendor of any of these manufacturers:
- M/s Acer India Ltd.
 - M/s HP India Ltd.
 - M/s Lenovo India Ltd.
 - M/s Dell Ltd.
 - M/s Wipro Ltd.
 - M/s PCS Ltd.
- vii. The financial entitlement of a member shall be the amount last fixed by the committee before his election/nomination to the Rajya Sabha and his entitlement shall not get affected by modifications made by the committee in the amount, subsequent to his election/nomination.
- viii. The computer equipment purchased by a member under the scheme shall remain with him even after he ceases to be a member. Also, computer equipment supplied to a member before 01 April, 2008 shall remain with him without payment of any depreciation cost.
- ix. The system of reimbursement/payment towards the purchase of computer equipment by a member shall be as follows:
- In case a member purchases the computer equipment from an authorized vendor and makes the payment, then he has to produce the proof of payment to the secretariat for reimbursement.
 - Alternatively, a member can bring a performa invoice from an authorized vendor for the computer equipment to be procured, which is processed by the secretariat and payment is made directly to the vendor.
 - In any case, the amount of reimbursement/payment is restricted to a member's entitlement.

- In cases where a member submits an invoice and purchases the equipment, he has to furnish the proof of purchase to the secretariat, within 30 days from the date of release of payment, for the purpose of record and audit.
- x. The member shall be himself responsible for the insurance of computer equipment purchased under the scheme. Similarly, the arrangement for the maintenance of the computer equipment shall be made by the member himself.

OUTCOME AND IMPACT

The new scheme has been in force for a period of around four months now and it has been noticed that the response of members to the scheme is extremely positive. Members have wholeheartedly welcomed the freedom given to them in the purchase of computer equipment that they would like to use. However, some procedural problems did arise which have been resolved by seeking directions of the computer committee. The important among these problems are listed below :

- members were initially not given complete freedom to purchase the brand of computer equipment of their choice (except in the case of handheld communicator) and were required to purchase one of the brands specified by the committee. On representations received from members to remove this restriction, the computer committee removed the brand restriction on laptop computer on the ground that, unlike desktops, laptops were not prone to tampering or being assembled locally with non-genuine parts. It, however, did not remove the brand restriction imposed in respect of desktop computers. Members now have complete freedom of choice as regards the laptop computer and handheld communicator/computer and can purchase any model/brand thereof from anywhere.
- under the scheme, members are required to purchase desktop computers and accessories from the authorized vendors of the manufacturers empanelled by the computer committee. Some members had purchased accessories/peripheral equipment from vendors, who were authorized to sell the computer of a particular

brand but were not authorized vendors of other peripherals like printer, etc. (This happened where the brands of computer and those of accessories/peripherals were different). The committee has now allowed the purchase of such peripherals from a common vendor, provided he is the authorized supplier of the main computer equipment (i.e. computer).

- Data Internet Card can be purchased by the members under the scheme. However, the cost of some cards also includes user charges for a certain period, which are not allowed under the scheme. The committee, after due consideration, allowed the purchase of Data Internet Cards which had in-built cost of user charges for a certain initial period.

On the whole, the new scheme is an improvement over the old scheme, mainly in the following respects:

- it allows the members freedom of choice in selecting his computer equipment based entirely on his personal requirement and preference.
- the member is able to decide the time and place of purchase of computer equipment and can also replace it, within the limits of his financial entitlement.
- the member can select an after-sales support arrangement that suits him the best.
- earlier, the computer committee was devoting considerable time in taking purchase decisions. The new scheme allows the computer committee to devote quality time on finding ways and means of improving use of IT tools in the functioning of Rajya Sabha.
- the need for bulk purchase, storage and distribution of computer equipment to the members as well as disposal of computer equipment returned by the members upon ceasing to be a member by the Rajya Sabha Secretariat has also ceased.

LESSONS LEARNT

The Rajya Sabha Secretariat (IT Section) was initially diffident about overhauling the existing scheme since it was not sure of the response of members, particularly because the members would have to themselves make the procurement and would also be

responsible for the maintenance, insurance, etc. of the equipment. However, the response of the members to the new scheme has been overwhelming. This goes to show that an organization should not hesitate in making systemic changes if these are well-conceived, tested and are for the over-all good of the stakeholders. The secretariat has felt encouraged by the response to the new scheme and, henceforth, would be proactive in conceptualizing and implementing constructive changes.

FUTURE PLANS : TOWARDS E-PARLIAMENT

The computer committee having come of age with this experimentation, in a manner of speaking, its rules have been formulated and they are proposed to be added to the statute book (Rules of Procedure and Conduct of Business in the Council of States).

In due course, more manufacturers / vendors of desktop computers and peripherals are likely to be added and the list of permissible computer equipment and peripherals is also likely to undergo a change.

On the IT front, two plans are already on the anvil. The first pertains to the digitization of Rajya Sabha debates since 1952 with a versatile search facility. The computer application is ready and is being tested. Once implemented, CDs/DVDs of the debates would also be made available to members of parliament, libraries, research scholars, etc.

Another proposal to provide touch screen monitors in the chamber of Rajya Sabha, for each member, is at design stage, in consultation with the National Informatics Centre and the National Institute of Design (Ahmedabad).

R.K. Chopra
Joint Secretary and Financial Advisor
Rajya Sabha, Secretariat, New Delhi.

V.K. Agnihotri
Secretary General
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Quality Obsession

Ashok Kumar Jain

'Quality' is built in the product, system or service by the task-performer. 'Quality' is an attitude, a mindset the reflection of which can be seen in the workplace as well as in all walks of life. Employees, when they put their hearts, heads and hands onto the work, produce the best quality. This is how great monuments like the Taj Mahal and the Konark Sun Temple were beautifully carved out of stones. This focused approach is an amalgamation of procedures, people and passion to produce superior products is termed "**Quality Obsession**".

Quality obsession, in turn, can only be achieved through worker's participation, involvement appreciation and commitment in improving the key processes. At the Bharat Heavy Electricals Limited (BHEL), some innovative and novel approaches were evolved. Through **Quality through Measurement (QTM) & Root Cause Analysis (RCA)** attitudinal changes were introduced thereby achieving 'quality obsession'. The value & importance of each one's job was articulated as per customer's perception. This brought a remarkable change in the quality of the work performed and the resultant output of the task performers. So, higher the participation, involvement, dedication and commitment, better the quality of output. Thus resulting in 'quality obsession'.

CHANGING BUSINESS SCENARIO

In today's changing business scenario, the world is gradually becoming a single market. Trade restrictions, barriers and boundaries are things of the past. In the present scenario, teamwork

scores over individualism, global market over domestic ones, and long term customers, not short profits. Quality, rather than a single-minded focus on costs, gives as a competitive edge. It recognizes the value of multicultural work force in an increasingly diverse labour pool and customer base. The new form of organisation is based on a network of alliances and partnerships, rather than self-sufficient hierarchy. It is governed by a broad view of the company's constituents, who include customers, employees, suppliers, shareholders and society at large.

In a global economy quality, cost, delivery and service have become the essential requirements for each industry to survive in the market. Quality obsession has to permeate down to every task performer. A knowledge of customer perception develops quality attitude and a mindset that encourages task performers to become actively involved in the workplace. This results in quality enhancement.

The process of quality obsession has the following steps:

- development of attitude & mindset amongst task-performers
- measurement , analysis and improvement of all business processes
- love for quality

Above steps of quality obsession are illustrated in Figure 1.



Figure 1. Steps of Quality Obsession

PROCESS OWNERSHIP

Task performers acquire instincts of commitment, dedication and achievement. This helps them to become process owners of the processes that are being performed by them. To prevent defects and to enrich quality, they look forward to their all customers, understanding their requirements, needs and expectations. They implement the necessary controls resulting in highest degree of quality, making their customer, delighted ones. At the same time, these employees communicate their requirements and needs to their internal suppliers to achieve desired quality of supplies. They provided adequate feedback to their supplier colleagues to constantly improve upon. This makes a chain of satisfied supplier and delighted customers. This model of process ownership is illustrated in Figure 4.

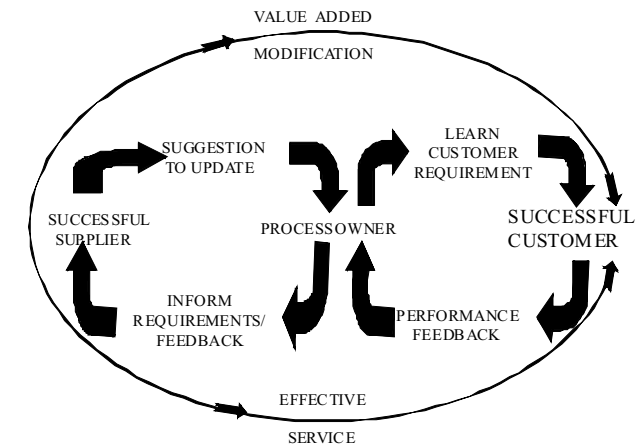


Figure 4. Process Ownership

At BHEL, love for quality has been achieved through some of the innovative initiatives. These are: 'Quality through Measurement' and 'Root Cause Analysis'. These initiatives have been in place for the last 5 years and are now a stage of quality obsession in the mind of each employee. These are presented in this paper.

QUALITY THROUGH MEASUREMENT (QTM)

Quality Through Measurement (QTM) is based on the philosophy of “what gets measured, gets done.” Hence appropriate measurement system is a must in the areas which need improvement. QTM has been developed as a tool for identification and measurement of the characteristics requiring improvement to achieve overall objective of enhancing quality of products and services.

So, characteristics are identified, measured and results of measurement are defined in form of a numerical value termed as Quality Index (QI). The numerical value thus achieved is used to understand the quality level and to take improvement measures. The quality index value varies from zero to one, zero being the 100% conformance and one being the 100% non-conformance of characteristic measured. Poor indices, having value away from zero, are analysed for its basic cause and actions taken to move towards zero value of QI for those characteristics. Measurement is done for all business processes like production, engineering, finance, marketing, material management, maintenance & personnel and administrative. Flow diagram in illustrated at Figure-5 .

QTM – Approach adopted for manufacturing functions

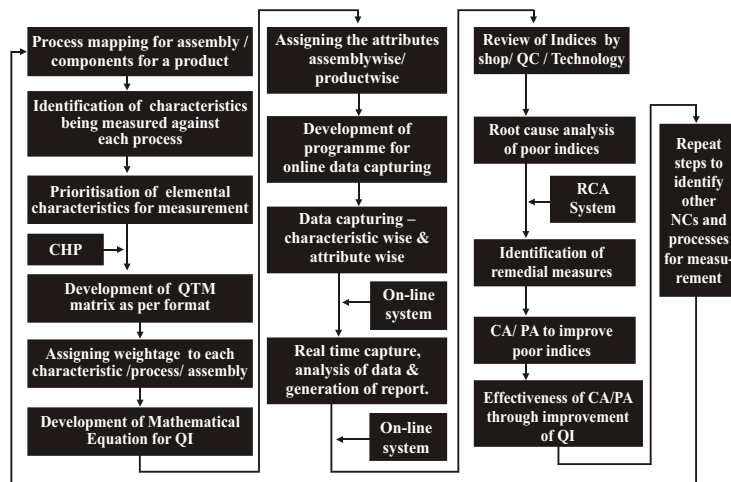


Figure 5. Flow Diagram for QTM

WEIGHTAGE CONCEPT

As all processes and characteristics do not have equal criticality from the customer and product performance point of view, these are given different weightages. A weightage, varying from 0 to 1, is assigned to each product/assembly/component/process/characteristic in manufacturing area and to each function/section/area/process/ characteristic in non-manufacturing areas. The aspects/characteristics having higher effect on product performance or impacting customer are assigned a higher weightage. This system for BHEL, Haridwar is illustrated at Figure-7.

This dynamic process and weightage system of focusing the improvements gives this system an edge over six sigma practices which take care of all activities of a process, simultaneously.

SYSTEM FOR DATA ENTRY

To make the system user friendly, an online data entry system has been developed. This provides users with all relevant information needed during the data entry for an individual characteristic. Only authorised persons can enter the data in the system.

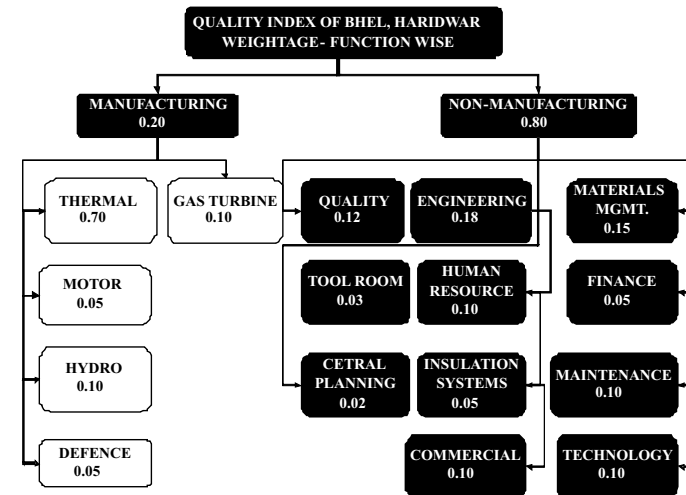


Figure7. Weightage system for a typical organisation

METHODOLOGY FOR MEASUREMENT

A five column QTM matrix is developed for each product/function. Measurements are done at the elemental level of characteristics and a quality index is generated. Quality indices for process/ component/ assembly/ product or process/ area/ section/ function are calculated with the help of a mathematical equation developed for each sub-assy, assembly, product, shop and at plant level using respective weightages assigned at each stage. An online system is put in place across the organisation to capture and process this large data at the basic level.

CALCULATION OF QUALITY INDEX (QI) FOR A COMPONENT IN FABRICATION

As the measurement are taken at characteristics level, first of all quality index is calculated at sub-process i.e. for root gap & bevel angel.

Calculation of QI at Characteristics level

$$\text{Quality Index } Q_{Ir} = \frac{\text{No. of non-conformities}}{\text{No. of measurements for gap}}$$

$$\text{Quality Index of } Q_{Ib} = \frac{\text{No. of non-conformities}}{\text{No. of measurements for angle}}$$

To calculate QI of fit-up process, characteristics of process i.e. root gap and bevel angle and their respective weightage are considered.

Calculation of QI for sub-process

$$Q_{Ip1} = Q_{Ir} \times 0.6 + Q_{Ib} \times 0.4$$

To calculate QI at component level, its processes and their respective weightage are considered.

$$Q_{Ist \text{ fab}} = \square \text{ Quality Index of module } \times \text{ respective wtg.}$$

Calculation of QI for thermal set, Q_{It}

$$Q_{It} = \square \text{ Quality Indices of assemblies of thermal sets } \times \text{ respective product wtg.}$$

Calculation of QI for manufacturing function, Q_{Im}

$$= \square \text{ QI products } \times \text{ respective wtg.}$$

Calculation of QI for plant, Q_{Iu}

$$\square \text{ QI manufacturing } \times \text{ wtg.} + \text{ non-manufacturing } \times \text{ wtg.}$$

ANALYSIS AND REPORTING

Once the measurement of a characteristic is entered, the system calculates the quality index and updates the indices of all related higher level of aspects like sub-process/ component/ assembly/ product or process/ area/ section/ function in the QTM matrix on a real time basis.

A web based reporting system is used which provides various types of reports, including trend analysis of the product/ function. The various reporting systems, envisaged under QTM concept, provides triggers to the RCA committees constituted across the organization for systematically analyzing the root cause, undertaking corrective/preventive actions, eventually leading to improvement in Quality Index (QI).

SCOPE

QTM system has been deployed throughout the organization, which includes:

- all manufacturing shops like Electrical Machine Shops, Turbine Shops, Fabrication Shops.
- all non-manufacturing departments like;

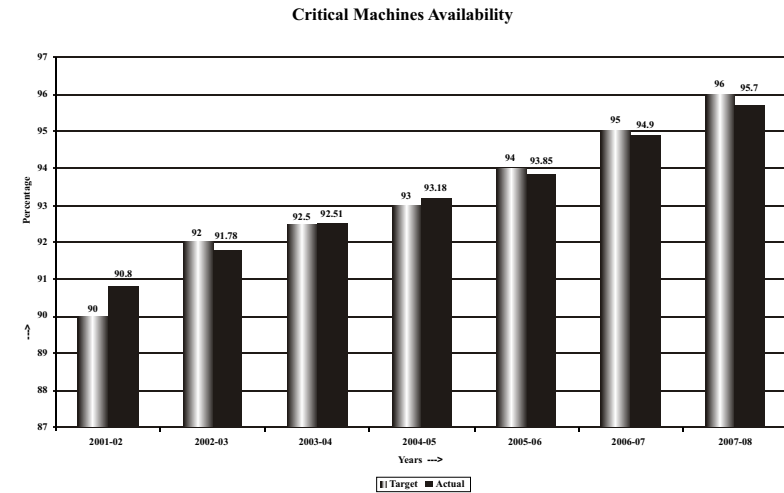
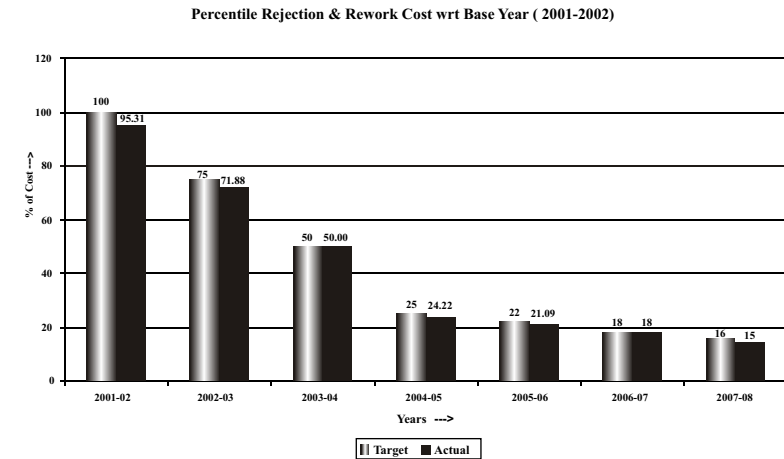
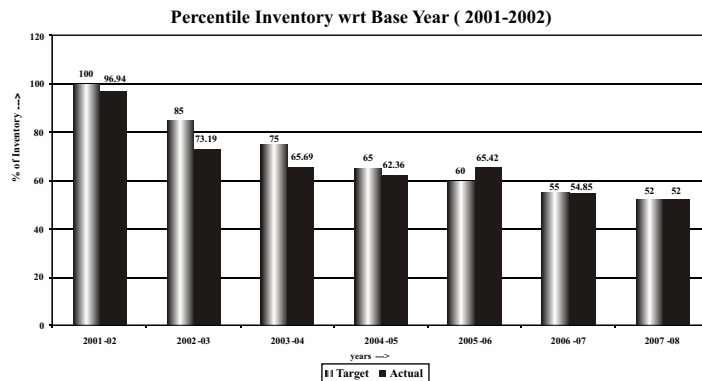
Commercial, Engineering, Finance,
 Material Management, Human Resource, Quality,
 Maintenance and After sale service.

ROOT CAUSE ANALYSIS (RCA)

Root cause analysis (RCA) is a structured investigation that aims to identify the true cause of problem, and the action necessary to eliminate and prevent the same. There are 22 RCA cross-functional committees having representation from Senior Production, Engineering, Technology, Quality and maintenance functions. These committees meet regularly on weekly basis and discuss all customers, site, shop problems and poor Quality Indices (QI) reported through QTM. This has developed a deep commitment of all the personnel in the organisation towards quality. It is now, almost an obsession.

GAINS

All around gains through reduction in rejection/rework and inventory, enhancement of machine utilization , productivity and customer satisfaction have been recorded. Some of these gains are depicted here.



Quality obsession is a boon both for employees and organizations. A dedicated, committed and empowered employee can make a difference in putting his organisation at the very acme of quality world. Process ownership, QTM, RCA are some of the seeds

planted to reap quality obsession. It is imperative to further and continuously enrich employees to enhance quality obsession. It has been said:

"Don't judge each day by the harvest you reap, but by the seeds you plant."

Robert Louis Stevenson

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Building Healthier Communities - the *Ekjut* Initiative

**Snehil Kumar, Suchitra Rath, Shibanand Rath, Rajendra Mahapatra,
Dipnath Mahto, Rajkumar Gope, Nirmala Nair, Prasanta Tripathy**

BRIEF DETAILS OF THE INSTITUTION AND ITS ACTIVITIES

Ekjut is a development organization with a strong field presence in the bordering districts of Jharkhand and Orissa. The partnering communities of *ekjut* are Ho, Santhal, Oraon, Bhuiyan and Juango Adivasis and others that live alongside them.

THE CONTEXT

TQM (Total Quality Management) is an essential component for improvements in any service delivery system. The supply side can be addressed through this approach and can lead to increased uptake and demand for services.

Ekjut believes that there have to be parallel activities to empower these communities to enable them to decide when and what services to access so as to be aware of their entitlements.

For improvement of access and quality of service delivery, disproportionately higher investment should be made where it is needed the most. Thus, if investments on capacity building of "duty-bearers" are essential, so is the need for building the capacity of the "claim holders".

This paper describes the *Ekjut* initiative to "improve maternal and newborn health among the indigenous communities through their empowerment"

Pre-initiative status of the area/ domain in which quality initiative was undertaken;

Some of the largest concentrations of tribal people in India reside in the states of Jharkhand (28%) and Orissa (24%). Three contiguous districts were selected for this study where approximately half of the population is tribal. A baseline study was conducted at the start of this initiative and 12 clusters of villages were selected from each of the three contiguous districts in West-Singhbhum, Saraikela Kharswan in Jharkhand and Keonjhar district in Orissa. A Maternal Mortality Ratio (MMR) of 722 per 100_000 live births was observed in the study area¹ (36 clusters) as compared to 450 in India². Neonatal Mortality Rate (NMR) was 58.4 and Prenatal Mortality Rate (PMR) 77.2 compared to NMR of 40 and PMR of 48.5 for India³.

REASON(S) FOR TAKING UP EKJUT INITIATIVE

Established in 2002, *Ekjut* was planted in the bordering districts of Jharkhand and Orissa in 2003. The organization was looking for collaborators for an action cum research project that could provide clue to address maternal and child health problems.

Institute of Child Health, London (ICH) too was interested in replicating the just concluded Makwanpur (Nepal) trial* in different locations to see if the approach worked in different settings and chose to collaborate with *Ekjut*.

*The Makwanpur trial (A collaborative project between MIRA (Nepal) and ICH, London) result showing a 30% reduction in newborn mortality. This impressive and statistically significant decline in maternal mortality ratio was published in 2004 (Manandhar *et al*). This was attributed to ***participatory intervention using a community action cycle whereby women's groups discussed their problems, developed strategies to solve them, and after engaging with local villagers, implemented and evaluated solutions.*** This Cluster Randomized Controlled Trial

covered a population of 170, 000 over 2000 square kms. of the remote hills in Makwanpur, Nepal.

AIM

The *Ekjut* study is designed to test the effectiveness of a community approach* to improve maternal and newborn health.

This study aimed to judge two hypotheses depending on the fact that community mobilization would contribute towards -

- reduction of neonatal mortality rate by at least 35%, from 58 to 38
- reduction of maternal mortality ratio by at least 55% from 700 to 351 in two years.

*It is hoped that this approach may function in two ways. Firstly, it may prevent problems by improving community care and secondly, timely access to health care.

METHODS

The study was conducted spread over 36 clusters in three contiguous districts (with clusters of 12 villages in each district). 18 of these clusters were randomly chosen for working with women's groups. *Ekjut* trained local women facilitators who conducted monthly meetings with these groups, supported them in identifying and prioritizing maternal and newborn problems while encouraged them to identify and implement possible solutions.

A strong system was set up to ensure that all expectant mothers are identified. Consent obtained, for them being interviewed during 42 days of post partum period. Analysis of this information would highlight if there has been any reduction in newborn death. There is reduction of maternal deaths for every 100,000 live births (maternal mortality ratio) in the 18 cluster of villages where *Ekjut* facilitators played role.

An independent committee of experts constituting the Data Safety and Monitoring Board has looked at the data for the initial two years. It recommended for the study till 30th July 2008. They

would be analysing the data to assess if the community intervention has acted. The findings are shared thereafter.

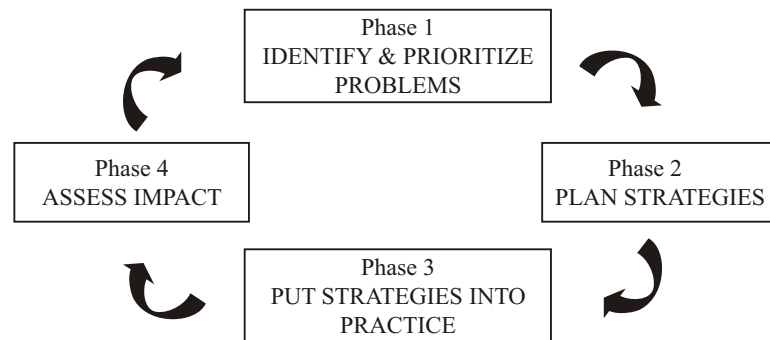
KEY ASPECTS OF IMPLEMENTATION

Scope of the study covers 36 non contiguous clusters of villages from three contiguous districts of Jharkhand and Orissa states. A monitoring system records all births and their outcomes within the 36 control and intervention clusters. Primary indicators like neonatal mortality rate, prenatal mortality rate, maternal mortality ratio and secondary outcomes related to home care practices and utilization of health services etc. can be measured for the study period.

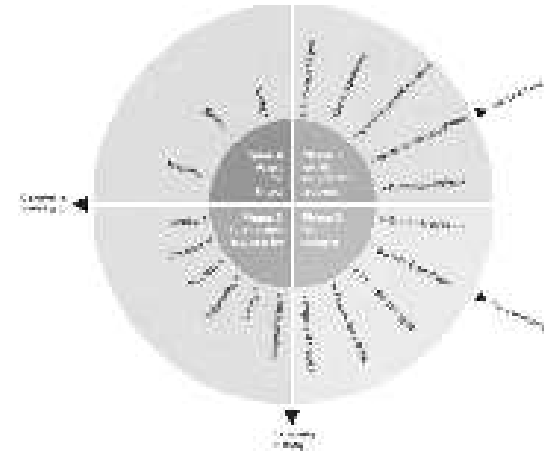
After 36 weeks of prospective baseline (21st November 2004 to 30th July 2005) data collection, 18 clusters were randomly allocated for intervention (from the 31st July 2005 onwards).

The intervention involved 18 facilitators (one for each cluster) facilitating the activities of women's groups in their clusters, *supporting them in identifying and prioritizing maternal and newborn problems and helping them to identify and implement solutions.* This process involves identification of problems, prioritizing them, selecting strategies for implementation and consensus building.

The 4 Phases of the cycle



Women's Group Participatory and Action Cycle



WHAT DID IT SET OUT TO ACHIEVE?

- to improve maternal and newborn health through empowerment of marginalized communities.
- to strengthen links between the community and primary health care providers by improving health service delivery..

PRE-INITIATIVE ACTIVITIES

Before the start of the project a piloting of the women's group cycle was carried out in three villages that had differential characteristics and were located in a non-study area. Feedback from every meeting was incorporated into the development of a manual to guide the work of women's group facilitators.

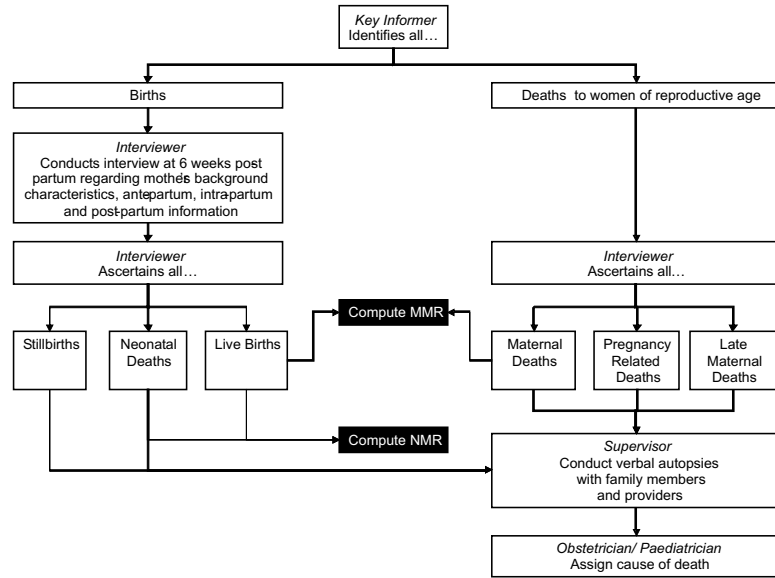
COLLABORATION

The Ekjut Initiative is a collaborative project between Ekjut and Centre for Health and Development. Besides the multidisciplinary senior management team of Ekjut, CIHD- University College of London, UK provided inputs through a senior research fellow, a health economist and a professor who helped develop a trial protocol to guide the work.

The roles and responsibilities were worked out and a standardized protocol was followed to carry out the initiative.

SUCCESS MEASURES AND INSTRUMENTS

A robust low cost surveillance system involving key informants was set up to identify all births and deaths of women of reproductive age. The system does not leave a scope for a single birth to be missed⁵.



DATA MANAGEMENT AND ANALYSES

The checking process is done in two-stages:

The first stage of data checking is done in the field by the monitoring supervisors while the second at the point of data entry by the data in-putters at the head office. Data is then fed into a relational database management system in Microsoft Access. Each section of the questionnaire is entered into a separate table in the database. Each mother and child are given a unique ID number

enabling them to be linked to each other.

The quantitative data, following data cleaning, will be explored through descriptive analyses, looking at distributions of exposure and outcome variables. The hypotheses will be tested comparing rates of maternal and neonatal mortality and maternal depression in intervention and control clusters.

DATA SAFETY AND MONITORING BOARD

An independent data safety and monitoring board chaired by a noted paediatrician and having members from diverse backgrounds in economics, paediatrics, and monitoring and evaluation reviewed the analyzed data in December 2007.

The meeting focused at :

- assess data quality, including completeness.
- monitor recruitment figures and losses to follow-up.
- monitor compliance with the protocol by participants and investigators.
- monitor trial conduct - organization and implementation of trial protocol.
- suggest additional data analyses.
- advise on protocol modifications suggested by investigators (e.g. inclusion criteria, trial endpoints, or sample size).
- monitor planned sample size assumptions and review the analysis of primary and secondary outcomes.
- consider the ethical implications of any recommendations made.
- assess the impact and relevance of external evidence.

The DSMB had recommended that the trial should be extended for one more year i.e. till 30th July 2008 after which the Board will meet once again to assess the impact.

DSMB observed that there has been excellent compliance of the protocol by the participants and the investigators, and that the implementation of the trial protocol under extremely difficult circumstances is commendable.

PROCESS EVALUATION

This is ongoing and the findings would help us interpret the trial data and to document the impact a standardized process evaluation protocol was developed.

Outcome and Impact: What was the result? How did it affect/ How did it affect improve the area of activity chosen for improvement?

MAIN FINDINGS/LEARNING

- The project set up a low cost key informant surveillance system in a remote population in India. The prospective baseline data collected over a period of 36 weeks at the start of the project also established that our initial assumption - the study area is underserved with high maternal and newborn mortality and morbidity - was indeed correct. Newborn mortality rate was high at 58 and the maternal mortality ratio measured over first 110 weeks of the study was found to be 720 (C.I. 591-882).
- At the end of July 2008, 21,374 births have been recorded and the system also enabled us to conduct verbal autopsies for 1,095 newborn deaths and 133 maternal deaths.
- This method could be used to monitor trends in maternal and newborn health and to test the impact of interventions in large populations with poor vital registration and thus assist policy makers in making evidence-based decisions. An article titled "A prospective key informant surveillance system to measure maternal mortality - findings from indigenous populations in Jharkhand and Orissa, India" was published in *Bio Med Central Pregnancy and Childbirth* 2008; 8: 6. It is available at <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2268911>
- Women's group meetings facilitated by the trained facilitators of *Ekjut* were well received. In all 244 women's groups held a total of 5833 monthly group meetings, the monthly average attendance being 4399 for women and 400 for men.

Gleaning through the process evaluation (on-going) data one gets the impression that participatory health promotion approach to promote empowerment seems to be in place. It has an important role to play in preventing delays by building the capacities of individuals and communities to take control of their health. These capacities can put individual women in a position to take control of decisions about issues that affect them; can improve the organization of communities to provide transport in times of need and; enable both individuals and communities to take social and political actions to improve the services they receive from health facilities.

ECONOMIC EVALUATION

An economic evaluation was carried out alongside the trial, using the standard methods outlined by Drummond (1997). Using standard costing templates developed during the economic evaluation of a similar project in Nepal (Borghi *et al.* 2005), all resources used (both financial and economic) to set up and run the facilitation programme and the health service strengthening were quantified and valued. Cost-effectiveness was defined in terms of cost per averted neonatal death and Disability Adjusted Life Year (DALY) (Fox-Rushby and Hanson, 2001). Finally, the cost implications of programme expansion to a larger population were also explored."

Dr Josephine Borghi has been providing this support also for the *Ekjut* project and calculated the cost of operating the surveillance system at US\$386 a month, or US\$0.02 per capita per year. At the end of the trial she will also evaluate the programme against cost effectiveness.

KEY OUTCOMES

The trial ended on the 29th July 2008 after three years of intervention and as per the advice of an independent data safety and

monitoring board (DSMB) who had earlier perused the data. They will again review the data in December 2008 to know if the intervention was effective before recommending wider dissemination.

IMPACTS AND OUTCOMES

By the end of 2008 we will have the necessary data to test our initial hypothesis-which community mobilization will contribute towards

- reduction of neonatal mortality rate and
- reduction of maternal mortality ratio in two years.

What we can say now is that the project was successful in implementing a research (a cluster randomized controlled trial.) cum development project in three underserved remote districts of Jharkhand and Orissa.

The project was also successful in highlighting the health status of mothers and newborn babies in these populations and brought it to the notice of government.

The capacities of *Ekjut* staff have considerably enhanced during the process of implementation and they will now be confident of taking up similar activities in future also.

One of the development objectives of the project was to influence improvement of health service delivery at all levels. Senior staffs of *Ekjut* are now regularly invited by other organizations to impart training to government doctors. We have developed training materials using our own data and therefore the training inputs are contextually relevant and evidence based.

During the second year of implementation the project included additional questions to measure the prevalence of post natal depression among mothers.

After the completion of the trial period we have plans to include fresh topics to include women's health issues and care of children under five. This decision was made after extensive discussions with the women's group members and also noticing

that their attendance in the monthly meetings, even after 30 months, continued to be good and the current approach of participatory learning and action seems to be effective.

COST-EFFECTIVENESS

Lessons Learnt: Do's and don'ts. Conceptualization of good practices and pitfalls to be avoided

SHARED LEARNING

Baseline findings - The baseline findings related to maternal and newborn health status of the partnering communities were shared with senior government officials of the health department of Jharkhand during a dissemination workshop at Ranchi during October 2006. Representatives of voluntary organizations involved in community based work and media were invited. The baseline data was also disseminated in the three districts where the projects are located.

Ekjut baseline data as well as the trial design was shared with more than 100 civil society organization being supported by DFID funded PACS (Poor Areas Civil Society Strengthening) programme in Jharkhand.

Ekjut is now regularly invited to conduct the 'Maternal Health' module for the fast track training programme for the doctors of the state of Jharkhand. These training programmes are organized by Public Health Resource Network (PHRN). *Ekjut's* training module draws from the findings of the current study and therefore relevant to doctors from Jharkhand and Orissa. We have now been invited by Orissa to conduct such modules.

Ekjut has disseminated its baseline findings to Civil Society Organizations of Orissa during our first Data Safety and Monitoring Board meeting at the state capital during December 2007.

We shall disseminate the findings and learning from the study

after the trial results is confirmed by the next data safety and monitoring board. Since the ongoing process evaluation is looking at the context in which the trial is being conducted, the methods being employed and the possible mechanism of behaviour change. This will lead to the interpretation of trial results.

We have filmed the work of our women's groups and the final cut is available by September. This will be used in-house when the scaling up of the work is taken up in the other 8 districts next year. We will also widely disseminate the film among organizations working to empower communities.

Trial results will be disseminated through peer reviewed journals, CIHD and *Ekjut* websites and popular media. The trial protocol, Process evaluation protocol, Baseline findings and the women's group manuals will be available for downloading.

KEY DRIVERS FOR SUCCESS

Irrespective of what the final trial result would be, the project so far has been a success as the three arms of the project namely: monitoring and evaluation, working through the women's groups and health services strengthening have gone on smoothly.

Some of the key drivers for success are :

- design of the study has clear focus. This is backed by a study protocol to guide the work, to define clear roles and responsibilities to the project staff.
- regularity of fund disbursement at all levels (ICH to *Ekjut*, *Ekjut* to districts and from districts to the project staff
- support received from ICH (regular visits, inputs on key aspects of the work, and timely feed back) has been appreciated by the project staff.
- all the frontline staff and their supervisors were selected from the partnering community. The community was consulted for defining the criteria for the selections as well as in the recruitment process. This gained the confidence of local people for the project which became a key to the successful implementation of a community based project.

- a lot of effort has been put towards staff capacity building at all levels.
- constant availability of senior project personnel at the project districts.
- though the project design is hierarchical the management style is participatory.
- constant focus on keeping the cost to a minimum.
- project senior functionaries built an excellent rapport with all stakeholders (government, media, civil society organizations etc.). Project baseline data was disseminated to them and the proposed plan was shared.
- experiences from the other sites where similar trials are being undertaken also enrich the *Ekjut* project. We adapted some of the approaches to suit the local context.

OBSTACLES TO SUCCESS

- The study is designed to test the effectiveness of a community approach to improve maternal and newborn health. We expect that whilst many health problems can be tackled at the community level, it also needs to be matched with improved timely access to health care. For this to happen, the quality of services provided on the supply side need to be of a minimum standard. The study team considers it unethical to only strengthen the health system in intervention areas so approaches to improve the health system are also being implemented across the study area. However, due to budget restrictions there was a limited amount this project could do regarding strengthening the system and in this context a lot more is needed to bring the system to a minimum standard. This could affect the ability of intervention to improve timely access to quality care. In order to address this issue *Ekjut* has started networking with other institutions mandated to build capacity of government health functionaries and provides strategic inputs to them as well as conducts regular training sessions.
We have also been invited to join hospital improvement committees. But we feel that major investment is necessary for systematically augmenting the quality of services.

- frequent power cuts in the districts led to major disruptions of work in the office. This problem was solved to some extent by arranging power back up systems with partial success.
- poor infrastructure facilities in the district like absence of places for accommodating visiting experts to the project, absence of internet facilities for the major part of the project and related difficulties had to be managed.
- though we anticipated the need for extending the project beyond the stipulated period we didn't apply to multiple sources for future funding. Our constraint was that there were no results to show for asking for such grants. However, we have succeeded in securing a grant that will help us to take the trial to its logical end.

Future Plans : How are the lessons learnt going to be taken care of in the future

- publications, media coverage, scaling up of women's group activities to new districts in Jharkhand and Orissa and to 5 other states.
- including child under-5 to broaden the purview from new born health.
- super-imposition of the health inputs in the established women self help groups which were earlier engaged with savings and credit related activities. It is seen that most of their savings are used for meeting unforeseen health needs which can be reduced by awareness and empowerment.
- the problem of 3 delays of deciding to seek care, reaching the care and receiving care can be tackled because most deliveries take place at home. We believe that many lives can be saved if people know about safe home based delivery.

SUSTAINABILITY

The project has two arms:

- **monitoring system** - We have demonstrated that the monitoring system that was set robust and cost effective. As mentioned earlier we have already published an article in Bio Med about this system. We would continue to share this with

others. Our data will help the government to look at the data collected through the government system and will contribute towards improvements.

- **community empowerment** is being done through our work with the women's groups. We expect lasting behavior changes to happen. Sustainability of impact of the programme is probably more important than sustainability of the programme. If lasting changes happen (we have plans to see if the impact of our work through the women' groups continues to benefit the community one year after our work with the women's group comes to an end).

Our experience from similar work in Nepal shows that 95% of women's groups continued to meet even after the project funding. While this is a distinct possibility (more so because these groups were in existence before our intervention), we will also look at the possibility of providing some critical support and inputs to hold the gains.

We believe that dependence can be minimized if there is unambiguous and continuous communication both with the facilitators and with the community opinion makers. Fortunately, this is the reality.

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Ekjut, Bani Park, Jaipur

L & T ECC Division - A brief on QMS Implementation

G. Shettar

BACK GROUND/BRIEF HISTORY OF ORGANISATION

Larsen & Toubro Limited (L & T) is the legacy of two Danish Engineers, who built a professionally managed world class engineering organisation. Together Mr.Holck-Larsen and Mr.Toubro founded the partnership firm of L & T in 1938 which was converted into a Public Limited Company in 1950. Today this has metamorphosed into one of India's biggest success stories. The organisation has grown from its humble origins to a large conglomerate spanning engineering and construction.

Larsen & Toubro Limited is a technology driven engineering and construction organisation and one of the largest companies in India's Private Sector.

A strong, customer focussed approach and the constant quest for top class quality have enabled the organisation to attain and sustain leadership in it's major lines of business spanning seven decades.

With factories and offices located around the country, further supplemented by a comprehensive marketing and distribution network, L&T enjoys an image and equity across India.

ECC the engineering and construction and contracts division is India's largest construction organisation. Many of the country's prized landmarks - it's exquisite buildings, tallest structures, largest industrial projects, longest flyovers, highest viaducts, longest pipelines and several bench mark projects- have been built by ECC. ECC's leading edge capabilities cover every discipline of

construction; civil, mechanical, electrical and instrumentation. Engineering Design and Research Centre (EDRC) provides a broad spectrum of engineering, design, research and consultancy services ranging from concept to commissioning of all types of projects in the above business segments.

Domestic operations are carried out through seven regions, Ahmadabad , Bangalore, Chennai, Delhi Hyderabad , Mumbai and Kolkata.

TURNKEY CAPABILITIES

L & T is equipped with the requisite expertise and wide ranging experience to under take Lump Sum Turnkey Contracts (LSTK) with single source responsibility. LSTK assignments are executed using state of the art design tools and project management techniques.

INDIAN MULTINATIONAL

As the country moves towards enhancing the image of brand of India around the world, L & T proudly leads the way as an Indian multi national, sporting its tricolor national flag on work sites around the globe. Over the years L & T has outgrown its national barriers and extended activities into more than 20 countries encompassing South Asia, South East Asia, the Middle East, Russia, CIS Countries including African Countries. As an Indian Multi National, L & T brings the best of Indian thought and practice to these countries.

The organisation has an international presence with a global spread of offices and joint ventures with world leaders. L & T 's large technology base and pool of experienced personnel enable it to offer integrated services in world markets.

L & T ECC division operates in following divisions,

- building and factory sectors
- transportation infrastructure
- hydel and nuclear power and foundation engineering
- hydro carbon and power sector

- industrial projects and utility sector
- power transmission and distribution sector
- L & T concrete
- L & T formwork
- developmental projects.

QUALITY MANAGEMENT SYSTEM & IMPLEMENTATION

Good Quality Products & Customer Satisfaction are two basic requirements of business. Well-structured quality management systems ensure good quality, safety, reliability & controlled cost at every stage of construction with a view to enhance customer satisfaction and continual improvement, adding to stake holder value.

L & T- ECC's Quality Management Programme initiated in its early days, was given a further thrust when it was brought under ISO certification during early '90s. Now ECC's all business units are certified for ISO -9001 : 2000 quality standards.

Quality Management System is being implemented to ensure that all the business units would function systematically in accordance with **L & T Vision** and **Quality Policy**. The QMS manual is designed in such a way that all employees can follow the manual easily in their day to day work.

A comprehensive quality policy has been set by the top management keeping in view of following objectives.

- customer value
- process
- improvement
- leadership
- motivation
- partnership

Relevant procedures are established which clearly specifies the criteria and methods for effective operation, monitoring and control. Necessary resources and information to support the operation and monitoring of these processes are established. Also we have established procedures for monitoring, measuring and

analysing these processes and to take necessary actions to achieve planned results and continual improvement of these processes.

Typical organisation structure at site level is detailed in annexure - 1. The responsibilities and authorities of each function are defined.

These include, a) planning b) operations c) control d) review and monitoring e) corrective action and preventive action as appropriate for respective functions.

Effectiveness of Quality Management System is measured through at various levels and course correction made accordingly. The monthly review meetings have predefined agenda. The information flow is effected through the minutes of meetings to ensure that both operation and control of these processes are effective and transparent.

For each of the projects and QMS requirements are detailed in project quality plan, which include the following :

- quality manual including quality policy and quality objectives.
- documented work procedures
- work instructions
- inspection and test plan with formats.

Management Information System (MIS) is the tool used for systematic data collection and reporting. This data is used to analyse, review and monitor project at different levels and reviewed by management committee. Action plans are developed and communicated to concerned for implementation and improvement.

Customer Focus : Processes are established for customer communication on suggestions for improvements, information on status and meetings. The regional manager / or his authorised representative obtain the customer feedback on satisfaction level.

Key parameters for obtaining customer feed back are,

- time schedule
- product quality
- house keeping
- safety standards

- response to client requirements
- work methods
- communication
- work delegation among staff
- resource mobilisation
- courteousness

Areas of dissatisfaction, improvements are discussed at various levels. These are implemented at the project site and corrective actions taken based on the above inputs.

This is one of the great monitoring tools, based on the feed back, corrective actions are taken immediately, there by ensuring customer satisfaction at the highest level.

During process the customer interaction is on a continuous basis and the requirements are met instantly. The customer complaints received at projects are addressed through an established procedure.

SETTING THE SCENE/ THE EXPERIENCE

The corporate vision and quality policy are guiding forces for all the process applicable across the organisation including the project. Top management articulated quality policy consistent with L & T vision. Quality objectives are derived from quality policy for operations applicable at project sites. Various units / departments and individuals at functional level would derive list of objectives. For the project sites the objectives are set at the time of project commencement. Management representative (MR) appointed for each of the projects/ area offices, who will have authority to effectively implement and maintain Quality Management System. Management representative conducts management review meetings periodically to review QMS, to ensure its suitability, adequacy and effectiveness including quality policy and objectives. Customer complaints, product related issues are discussed in detail.

Resource Management : L & T has established and maintaining the procedures for identifying and providing resource required in time to implement and improve the processes of Quality

Management System. Competence, awareness and training is one of the focussed area. This process is followed for the staff as well for workmen . Each employee is made competent in the field before being put on to the job. Training is imparted during orientation as well as on a regular basis. Training needs for each is identified and monitored. Effectiveness of training is reviewed and proven through process control records and internal audit. Further action is decided depending upon the input and training records maintained.

Infrastructure and work environment : Infrastructure like necessary buildings, work places, software utilities including water, electricity etc. provided for effective and efficient performance. Also welfare of staff, workmen is well addressed and the best work environment ensured.

Product realisation : Model PQP has been designed as per the requirements of the International standards and requirements of Quality Management System. Each project management team incorporates project specific requirements in the model and develops project quality plan for the project.

Project Quality Plan consists of the following:

- all process for realisation of the product as contracted with particular customer.
- organisation and clearly defined roles.
- work methods for construction
- verification, validation, monitoring, inspection and test activities for conformance to product requirements.
- records for meeting customer requirements
- pre delivery and delivery activities to the satisfaction of customer.

Customer related process : In the QMS customer requirements are determined in pre-contracting stage including statutory and regulatory requirements. These are finalised by contracting stage. Deviations in mutual understanding are recorded in the contract and organisation's internal capabilities are assessed prior to acceptance of the order. Deviations from contract during execution stage and implications arising thereof are mutually discussed and agreed upon. All variations are recorded as amendment to original contract.

Purchasing : The materials and services are procured from suppliers and subcontractors respectively. L&T ECCD,s procurement at three levels: head quarters, regional / area office and sites.

Various steps involved are:

- evaluation of suppliers / subcontractors : each supplier / sub contractors is evaluated and registered based on their ability to supply product / service in accordance with organisation requirements;
- criteria for selection, evaluation and re-evaluation are established;
- the materials / services are availed only from registered suppliers/subcontractors;
- material requisition raised by users for procurement contains all the information on the product, delivery and inspection and is incorporated in the purchase order; and
- a procedure been established to verify the material at supplier premises before delivering to site.

Control of production and service provision: At L & T - ECCD, the production at its site, is based on a project-specific quality plan. The quality of a product is controlled by the control of the processes by which it is developed. This is controlled and monitored through inputs like resources, environment, information and control of the output through measurement and review. All these controls are defined in work methodologies of each project specific activity. In Project Quality Plan (PQP) processes involved are:

- validation of process for production and service
- identification and traceability
- necessary care to protect customer property
- preservation of product by proper handling, packaging and storage

Control of monitoring devices : A documented procedure has been set at all ongoing sites / processes to ensure that all monitoring and measuring devices used during the process are controlled and kept in good working condition.

OUTCOME AND IMPACT / LESSONS LEARNT

Implementation of Quality Management System has proved systematic functioning, enhanced customer satisfaction, increase in productivity and reduction in repair / reworks. At each stage of the process a performer can realise level of customer satisfaction, quality of product. These are closely monitored by defining, **measurement, analysis and improvement processes.**

L & T - ECCD has established management guidelines for monitoring, measurement, analysis and improvements of all the processes (as listed below) at various levels through management committee meetings at various levels.

1) **Monitoring and measurement of processes -**

- needed to demonstrate conformity of the product through inspection and testing process.
- to continually improve the effectiveness of the quality management system.
- use of statistical techniques for analysis.

2) **Monitoring and measurement of Customer Satisfaction -** as one of the measurements a procedure is maintained for obtaining **Direct Customer Feedback** to understand their perception. (As per annexure - II)

3) **Internal audit** : A documented procedure is established to conduct internal audits at planned intervals to determine whether the Quality Management System:

- conforms to the planned arrangements to the requirements of International standard and to the Quality Management System requirements established by the organisation
- is effectively implemented and maintained.

4) **Monitoring and measurement of product:** Product release and delivery is not done until the planned arrangements have been satisfactorily completed, unless otherwise approved by a relevant authority and where applicable by the customer. Monitoring, measurement acceptance and record are done in the following stages:

- quality objectives
- work plan

- inspection and test plan
 - product quality rating - product quality rating done on random sampling method. Rating of the product is done thoroughly by a team of experts and detailed report indicating areas of improvements is being prepared and discussed in management review meetings .
 - every year quality competitions are held for different categories of sites and winners are awarded.
- 5) **Control of nonconforming product** : We ensure that a product which does not conform to requirements, is identified and controlled to prevent its unintended use or delivery. When non-conforming product is corrected it is subjected to re-verification to demonstrate conformity to the requirements.
- 6) **Analysis of Data** : L & T - ECCD determines ,collects and analyse appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the system can be made. This includes data generated as a result of monitoring and measurement and from other relevant sources. The analysis of data provides information relating to ,
- customer satisfaction
 - quality objectives
 - quality management system
 - conformity to product requirements
 - characteristics and trends of processes and products including opportunities for preventive action
- 7) **Improvement** : We continually improve effectiveness of quality management system through:
- continual improvement through quality objectives derived from quality policy
 - analysis of data
 - knowledge upgradation of staff and workmen by training

LESSONS LEARNT

Quality management system is a tool to control processes. Direct

Customer feed back is one aspect in the system where in a customer responds to the process and product which will set the guide line to improve.

Training is one key factor of the QMS where in need for training is identified, training imparted and monitored. This in turn will reduce the repair cost with enhanced productivity.

FUTURE PLANS

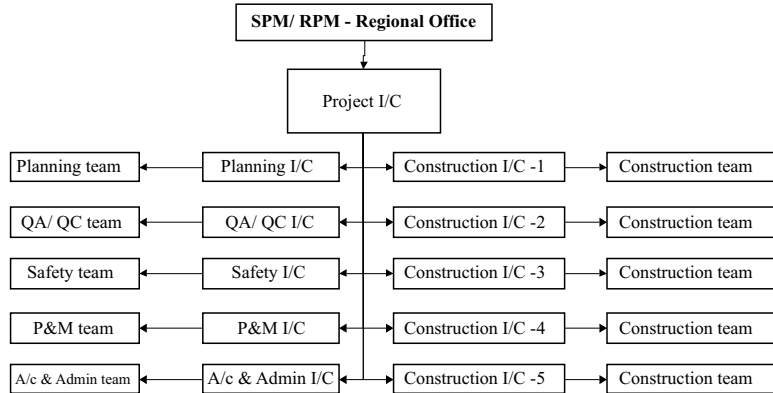
Aligning business to customer needs and prevailing market conditions has always given L & T -ECC an edge over its competitors. Market survey, analysis of customer needs, competitor strategies and own competencies, finding the gaps and bridging them have all strengthened the organisation stronger. Strategic plans have been developed to provide direction to business while the accompanying strategic initiatives help in focused action to achieve targets. The strategies and future plans are also aimed at improving the levels of satisfaction of customers and stakeholders through improvement of organisational effectiveness. Comprehensive road maps are prepared for implementation of strategies and action plans. The strategic plans are reviewed and updated annually.

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ANNEXURE - 1

ANEEXURE - II

Fig C.4: PROJECT SITE ORGANIZATION



CUSTOMER SATISFACTION REPORT / FEEDBACK FORM

PROJECT NAME :

Period: From To

Attributes	Customer perception -Tick as applicable (scale: 1-poor, 5 excellent)				
	Excellent 5	V. Good 4	Good 3	Fair 2	Poor 1
Time Schedule					
Product Quality					
House Keeping					
Safety standards					
Response to Client's requirements					
Work methods					
Communication					
Work delegations among staff					
Resource mobilization					
Courteousness					
Over all assessment					
Would you refer us to other clients? YES			NO		

What were you most satisfied with, in regard to this project so for? (Your comment could be with respect to processes, practices, work methods, materials used, workmanship. productivity etc.)

What were you least satisfied with, in regard to this project so for?

Please specify possible areas / scope of improvement in our system:

Customer representative signature:

Name:

Date:

Note: the above feedfack strictly confidential and is ment for the purpose of quality management system procedures of larsen & toubro limited, ecc division.

Making Quality Happen in BPCL Mumbai Refinery

K.A. Kunjumon

ABOUT BPCL:

Erstwhile Burmah Shell Company, Bharat Petroleum Corporation Limited (BPCL) came into the national mainstream in January 1976 following a take over of Refining and Marketing operations by the Government of India. Today, it is an integrated petroleum refining and marketing company owning and operating two refineries at Mahul,(Mumbai) and Kochi. There is also one subsidiary company: Numaligarh Refinery Ltd. with a Refinery in Assam. The corporation, one of the 'NAVRATNA', has an all India presence through its extensive marketing network, employing some 13000 people. It produces and markets a diverse range of petroleum, petrochemicals products and speciality lubricants. It is listed in Platt's Top 250 and Fortune Global 500.

BPCL Mumbai refinery commissioned in 1955 by Burmah Shell Refineries Ltd., was originally designed with a capacity to process 2.2 million metric tonnes per annum of crude oil. The capacity has been consistently enhanced to 12.0 MMTPA by de-bottlenecking / expanding the existing facilities.

CURRENT BUSINESS ENVIRONMENT

With increasing globalization of the Indian economy, the winds of quality excellence are blowing across all business organizations. With every passing year, there is greater impetus on specific competencies for businesses to compete and survive competition. The story for petroleum sector has been no different. The petroleum

product market scenario in India has changed during the IXth Five Year Plan period a deficit situation to a surplus situation, with slow down in consumption and excess refining capacity installation within the country. Private refiners entry and lessening of government controls has also opened new vistas in quality and timely delivery of products / services to customers. Thus the business environment became challenging for BPCL.

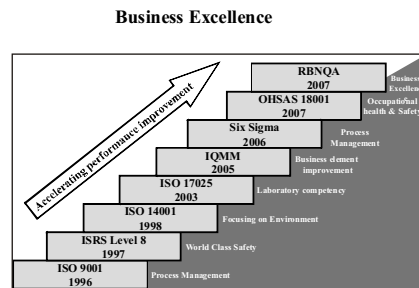
JOURNEY FROM QUALITY TO EXCELLENCE

The core strength of BPCL has always been the ardent pursuit of qualitative excellence for maximization of customer satisfaction. BPCL realizes that, in the long run, success can only come with a total re-orientation and change in approach with the customer as the focal point. Continuous innovation, adoption of new technologies, excellent strategy for implementation and operating excellence under strong leadership have been the main focus parameters for uninterrupted growth.

The approach to quality movement in BPCL's Mumbai Refinery has been structured and integrated. But it does not remain limited to quality models propagated by various quality gurus like Walter Shewhart, Edward Deming, Taguchi, Ishikawa, Joseph Juran, Philip Crosby etc. Thus, the refinery has adopted a blend of several models: focusing on people, processes, technology, customer and society.

ROADMAP

Accelerating performance improvements aiming at business excellence in Mumbai Refinery has been through effective and efficient integration of various quality philosophies and tools as illustrated below. The implementation has been progressive and spread over a decade.



ISO 9001: Even though the refinery had its own time-tested system of quality controls and MIS, it went ahead with the implementation of Quality Management System under ISO 9001 in the year 1996. The standard was preferred considering its capability as a management tool for the innovative development of any organization towards business excellence through performance oriented continuous improvement approach. It gave an excellent opportunity to the management to imbibe a new culture in the organization and created a platform for the development of a decision making process which is based on data and brought objectivity in the overall approach of the organization.

Efforts towards certification started in the year 1994 with the formation of a steering committee under the chairmanship of executive director and appointing a management representative. The refinery was certified under ISO 9001 in 1996 and continues with its certification with detailed documentation and periodic system evaluation through internationally accredited certification agency M/s. DNV.

ISRS: It believes that safety is an integral part of the organization's business and has defined salient features/role of management as well as of employees in its safety management system. As a conscious and structured effort to obtain results in safety and loss control, in the year 1997, Mumbai refinery went ahead with building a safety management system, under ISRS (International Safety Rating System) as part of an improvement process leading to reduction of accidents and other mishaps and to obtain better control over activities.

M/s. DNV, UK, conducted various audits under the ISRS and in June 1999, BPCL refinery was placed at ISRS Level 7, the first industrial site then in India to have achieved this safety standard level. The journey for improvement was further taken up with greater thrust. The augmented Safety Management System was subjected again to audit in 2001 by M/s. DNV and refinery achieved ISRS Level - 8 which was again the highest level achieved by any industry in India. BPCL refinery could achieve a place in the top 8% of 220 refineries worldwide practicing ISRS.

ISO 14001: Environmental protection is an integral part of the vision of the refinery. Over the last four decades, along with modernization at refinery, significant progress has also been made in the field of environmental protection. The priority accorded by refinery towards this can be gauged from the fact that cumulative capital investments of more than Rs. 2100 crores have been spent for environmental improvement projects in last fifteen years.

Identifying ISO 14001 as a strong mechanism for achieving improvements in environmental performance, it has got itself certified under ISO 14001 since 1998. The Environment Management System (EMS) here is applicable to all facilities within the refinery premises viz. process units, product storage facility, dispatch facilities as well as other utilities and infrastructure located in the refinery.

In addition, a number of initiatives in the area of air pollution management, waste water management and solid waste management were taken up by the refinery in line with the charter on "corporate responsibility for environmental protection for oil refineries" drawn by the Ministry of Environment and Forests.

During the year 2005, Quality Management System under ISO 9001 & Environmental Management System under ISO 14001 in Mumbai refinery were merged as an integrated EQMS in order to streamline the entire process management system certification, reduce system administration and paper work.

ISO 17025: Finding value in the role of laboratory accreditation in building technical competence and promoting global trade, Mumbai refinery laboratory started NABL (National

Accreditation board for testing and calibration laboratories) activities in the year 2000. Accredited on 25.01.2003, the process of re-assessments and re-certification, continues.

Laboratory accreditation under NABL provided a means of evaluating the competence of refinery laboratory to perform specific types of tests and measurements by third party assessment and following international guidelines / criteria. It has also helped to enhance the accuracy, precision and reliability of the tests and measurement data.

IQMM: During 2005, it got assessed under IQMM (International Quality Maturity Model) through M/s. Qimpro who has pioneered quality movement in India through transformation management and has developed the model, which is in line with internationally acclaimed EFQM (European Foundation for Quality Management). The model presents a comprehensive range of business elements essential for efficient and effective performance of an organization. An assessment under this model measures the excellence in business performance and mine best practices in an organization.

The key elements of IQMM are:

<p>A. Leadership</p> <ul style="list-style-type: none"> □ Organisational vision, mission and values are defined □ Leadership is inculcated at all levels □ Leaders reinforce a culture of excellence within the organisation □ Leaders review organisational performance □ Leaders evaluate leadership effectiveness □ Leaders support and strengthen key communities 	<p>B. Customer and Market Focus</p> <ul style="list-style-type: none"> □ Built customer and market knowledge □ Design products and services based on customer need □ Evaluate methodologies for customer research □ Building relationship with customer □ Manage customer complaints □ Measure customer satisfaction □ Evaluate approaches for customer satisfaction measurement
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<p>C. Strategic Planning</p> <ul style="list-style-type: none"> □ Systematic planning process integrating multiple factors □ Set strategic goals □ Deploy action plans □ Develop long term goals □ Derive human resource plan 	<p>D. Measurement, Analysis and Knowledge Management</p> <ul style="list-style-type: none"> □ Track operational and organisational performance □ Compare / benchmark performance with best □ Ensure hardware and software support □ Manage organisational knowledge
<p>E. Cost of Poor Quality (COPQ)</p> <ul style="list-style-type: none"> □ Manage organisational knowledge □ Assess COPQ □ Develop quality indicators □ Analyse internal, external, hidden and prevention cost 	<p>F. Value Creation Processes</p> <ul style="list-style-type: none"> □ Determine key value creation processes and requirements □ Design, control and audit value creation processes □ Improve value creation processes
<p>G. Human Resource Focus</p> <ul style="list-style-type: none"> □ Plan and manage people resources □ Facilitate organisational culture □ Achieve effective communication □ Implement performance management system □ Provide training □ Co-relate employee satisfaction and business results 	<p>H. Support Processes</p> <ul style="list-style-type: none"> □ Determine key support processes and requirements □ Design, control and audit support processes □ Storage, handling and transport □ Service plans and standards
<p>I. Supplier and Partner Focus</p> <ul style="list-style-type: none"> □ Establish standards and measure performance □ Enable improvement in supplier partner performance / relationship 	<p>J. Improvement and Innovation</p> <ul style="list-style-type: none"> □ Define scope of quality and improvement □ Performance and rewards □ Training and motivation for quality □ Monitor performance

K. Internal Quality Audits	L. Business Results
□ Develop Quality Management System (QMS)	□ Customer focused results
□ Develop quality audit resources	□ Product and service results
□ Manage QMS non-conformance	□ Financial and market results
□ Analysis of data and management review	□ Organisational effectiveness results
	□ Governance and social responsibility results

Six Sigma : Six Sigma is a long-term, forward-thinking initiative designed to fundamentally change the way corporations do business. It is first and foremost a business process that enables companies to increase profits dramatically by streamlining operations, improving quality, and eliminating defects or mistakes in everything a company does. While traditional quality programs have focused on detecting and correcting defects, Six Sigma encompasses something broader: it provides specific methods to re-create the process itself so that defects are never produced in the first place.

Refinery wanted to take advantage of the capability of Six Sigma as a quality tool to improve the manufacturing processes there by increasing the bottom line and decided to go ahead with its implementation.

The objectives identified were in line with the business plan and are:

- cost reduction
- profit enhancement
- productivity improvement
- business process improvement and
- new learning

Accordingly, familiarization programmes for steering committee members and champion's training for HODs were held. Training programme for Green Belt along with project execution during training was undertaken for the nominated team members from various departments with the support of a Six Sigma

consultant. Through brain storming sessions of champions and project teams, a number of Green Belt and Black Belt projects were identified and short listed for implementation.

34 nominees drawn from various departments underwent rigorous training under Six Sigma processes and have successfully completed 13 Green Belt projects so far. Currently, a batch of 13 Green Belts are undergoing Black Belt training / project implementation. The projects implemented so far have come out with a number of process improvements in day-to-day operations, defect reductions and in turn, huge financial gains.

OHSAS 18001: The OHSAS 18001 standard prescribes requirements for an Occupational Health and Safety (OH&S) management system to enable an organization to formulate a policy and objectives, taking into account legislative requirements and information about significant hazards and risks, which the organization can control.

There has been an increased realisation in the corporate sectors that OHSMS objectives carry positive values in the economic equation in addition to create a positive perception of prevention of work place hazards. In view of this, the Mumbai refinery went ahead with the implementation of this voluntary system in 2007.

RBNQA (Ramkrishna Bajaj National Quality Award) Model: This model has criteria in line with world famous Malcolm Baldrige National Quality Awards and is used for conducting organisational self-assessment leading to improving organisational performance practices, capabilities and results. The model also serves as a working tool for understanding and managing performance and for guiding organisational planning and opportunities for learning. Criteria for performance excellence framework under this model covers:

- leadership
- strategic planning
- customer and market focus
- measurement, analysis and knowledge management
- workforce focus

- process management
- results

Mumbai Refinery has undertaken these stringent business excellence assessments during the years 2002, 2006 and 2007. These have helped it bring in a renewed emphasis on quality system for managing the products, services, human resources, and customer relationships.

OUTCOME

Year after year, the values, culture, skill and commitment of the people has enabled the Mumbai refinery to successfully implement and sustain quality philosophies and tools to achieve new standards. The initiatives have helped us in our efforts towards continuous innovation, adoption of new technology, developing excellent strategy for implementation and operating excellence aiming at uninterrupted growth.

Improvements in production and productivity in Mumbai refinery have led to it winning a number of accolades, which are a testimony to the success of these unrelenting efforts.

ACCOLADES

- RBNQA Special Award 2007 for performance excellence.
- Greentech Environmental Excellence Gold Award 2007 for Mumbai Refinery.
- best improvement in Specific Energy Consumption Award instituted by MOP&NG for 2006 & 2007 for Mumbai refinery.
- RBNQA Merit Certificate in 2006 under Manufacturing Category for Mumbai refinery.
- uptime Champion 2005 Award in Technology Senate 2005.
- Golden Peacock National Quality Award 2005 from IOD for Mumbai refinery.
- Golden Peacock Environmental Management Award 2004 (Second time) from World Environmental Foundation, UK.

LESSONS LEARNT

The growth of quality culture awareness at all levels is the essence of successful implementation of quality drive in any organisation. In order to achieve this, effective communication has to be established through a number of communication channels.

Implementation of any quality drive needs strong support and commitment from the top management. ISO systems and business excellence assessments etc. have been of great help in process improvements, helping in institutionalising quality improvement programmes that are auditable.

Finally, empowering people in any organisation involves getting their wholehearted involvement and it is a vital factor in sustenance of quality enhancement efforts.

FUTURE PLANS

Our endeavour in the future would be continuous refinement of the existing quality systems to get the best out of them. The refinery is in the process of integrating the EQMS system with OHSAS 18001 so as to have an Integrated Management System. Considering the success of Six Sigma endeavour, more emphasis is being placed on this quality philosophy. Aiming at development of grass root level employees, refinery is in the process of implementing Quality Circles.

Quality in the context of global markets requires deeper understanding and appreciation by all in the organisation. We believe that the continual efforts towards quality will ensure that the quality culture goes much deeper down and spreads across the entire organisation, achieving and sustaining business excellence.