No.

Bangladesh Power Development Board (BPDB)
Power Grid Company of Bangladesh (PGCB)
West Zone Power Distribution Company Limited (WZPDCL)

The Project on Strengthening Management and Performance Standards in Power Sector of Bangladesh through Promotion of TQM

Project Completion Report

October 2009

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Appendix

List of Abbreviations Used

A, kA	ampere, kilo-ampere
ADB	Asian Development Bank
BPDB	Bangladesh Power Development Board
CB	Circuit Breaker
C/B	Collection/Billing
CF	Cash Flow
CI	Combustion Inspection
CLDC	Central Load Dispatching Center
CT	Current Transformer
DC	Direct Current
DESCO	Dhaka Electric Supply Company
DTC	Distribution Training Center
EAL	Engineer Associates Limited
EGCB	Electricity Generation Company of Bangladesh
ESU	Electricity Supply Unit
FY	Fiscal Year
GMD	Grid Maintenance Division
GT	Grid Transformer
GW, GWh	giga-watt, giga-watt hour
HGPI	Hot Gas Pass Inspection
HQ	Headquarters
IRR	Internal Rate of Return
JCC	Joint Coordination Committee
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
KPI	Key Performance Index
kV	kilo-volt
kVA, MVA	kilo-volt ampere, mega-volt ampere
kW, kWh	kilo-watt, kilo-watt hour
M/C	Machine
MBO	Management by Objectives
MD	Managing Director
MOH	Major Overhaul
MoPEMR	Ministry of Power, Energy, and Mineral Resources
MW, MWh	mega-watt, mega-watt hour
NPV	Net Present Value
NWPGCL	North-West Power Generation Company, Limited
O&M	Operation and Maintenance
Off-JT	Off the Job Training
OJT	On the Job Training
P/S	Power Station
PBS	Palli Bidyut Samities

PC	Personal Computer
PDCA	Plan-Do-Check-Action
PDM	Project Design Matrix
PGCB	Power Grid Company of Bangladesh
PI	Priority Issue
QC	Quality Control
ROA	Return of Asset
ROE	Return of Equity
ROI	Return on Investment
S&D	Sales and Distribution
S/S	Substation
SAE	Sub Assistance Engineer
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SD	Self Development
SE	Superintending Engineer
SL	Situational Leadership
SPP	Simple Payback Period
ToT	Training of Trainers
TPP	Thermal Power Plant
TQM	Total Quality Management
UF	Unbalance Factor
USAID	United States Agency for International Development
VT	Voltage Transformer
WAPDA	Water and Power Development Authority
WZPDCL	West Zone Power Distribution Company, Limited
XEN	Executive Engineer
X-former	Transformer

Section 1 Project Outline

1.1 Project Name

The Project on Strengthening Management and Performance Standards in Power Sector of Bangladesh through Promotion of TQM

1.1.1 Project Period

December 2006 – November 2009

1.1.2 Counterpart Organizations

Bangladesh Power Development Board (BPDB)

Power Grid Company of Bangladesh (PGCB)

West Zone Power Distribution Company Limited (WZPDCL)

1.1.3 Project Objectives and Targets

This project was designed to promote and progress the development and institutionalization of TQM (Total Quality Management) activity in Bangladesh, through the provision of the know-how needed to improve the operation, maintenance and management capabilities of all local electricity businesses and the implementation of technical support. Its main objectives were measurable improvement in the operational, maintenance and management capabilities in electrical generation, transmission and distribution.

1.1.4 Target Businesses

Baghabari Power Station (Part of BPDB)

Grid Maintenance Division (GMD) Dhaka-east (Part of PGCB)

Mymensingh Distribution Station (Part of BPDB)

Khulna Distribution Station (Part of WZPDCL)

1.1.5 Dispatch of Expert Project Leaders

Throughout the project, the system of expert leader dispatch was reviewed, and the expert members were changed annually. Changes in the project implementation system will be discussed in Chapter 4. The project team members (hereinafter, "team") at project completion were as follows:

a)	General/TQM	: Noboru Seki
b)	TQM	: Akiko Tobita
c)	Generation (O&M)	: Kiyoshi Kataoka
d)	Generation (O&M)	: Toshiyuki Kobayashi
e)	Transmission (O&M)	: Kenichi Kitamura
f)	Transmission (O&M)	: Hideki Kibata
g)	Distribution (O&M)	: Keisuke Yanauchi
h)	Distribution (O&M)	: Toshifumi Karasawa
i)	Distribution (O&M)	: Keiichi Fujitani

1.2 Project Design Matrix (PDM)

The objectives, expected results and activities based on those results, as set out in the Project Design Matrix (PDM), are as follows:

(1) Principle Objective

To improve the operational, maintenance and management capabilities of all electricity providers by popularizing the findings and results of the project.

(2) Project Objectives and Indices

To improve the operational, maintenance and management capabilities of model electricity businesses and departments in electrical generation, transmission and distribution units through the implementation of TQM.

(3) Project Objective Indices

(Electricity Generation: Baghabari Power Station)

Reliability = (operational hours + standby hours + periodical inspection hours) / 8760 (hours = 24 hours x 365 days) x 100 = should reach 98% (currently 95%: Previous evaluation).

Periodical inspections will be implemented according to schedule (currently not implemented according to schedule: Previous evaluation).

(Transmission: GMD Dhaka East Transmission Station)

To reduce accidental interruption hours to 80 hours or less annually (currently 130 hours: Previous evaluation)

To reduce instances of accidental interruption to 28 times or less annually (currently 46 times: Previous evaluation)

To reduce level of energy not supplied to 467MWh or less annually (currently 760MWh: Previous evaluation)

(Distribution: BPDB Mymensingh Distribution Station)

To reduce total accidental interruption hours to 100 hours or less annually (currently 423 hours: Previous evaluation. This index is the objective for the Sales & Distribution Division-1 within Mymensingh Distribution Station, and indices for the entire Mymensingh Distribution Station will be set once the project has begun).

To reduce instances of accidental interruption to 100 times or less annually (currently 478 times: Previous evaluation)
To reduce system loss to 15% or less (currently 21%: Previous evaluation)
To achieve payment collection ratio of 100% or more, including collection of accounts receivable (currently 96%: Previous evaluation)
(Distribution: WZPDCL Khulna Distribution Station)
To reduce total accidental interruption hours to 1,478 hours or less annually (currently 3,695 hours: Previous evaluation)
To reduce instances of accidental interruption to 2,315 or less annually (currently 5,787: Previous evaluation)
To reduce system loss to 11% or less (currently 17%: Previous evaluation)
To achieve payment collection ratio of 100% or more, including collection of accounts receivable (currently 92%: Previous evaluation)

(4) Project Achievements and Indices

<Achievement 1>

Model businesses will become fully acquainted with and capable of continuing quality management activities, including policy management, daily management, QC activities, improvement planning, and inspection & testing functions.

<Achievement 2>

A system and framework will be put in place to allow the quality management practices resulting from the TQM system introduced and institutionalized at each model business to be communicated to and adopted by all businesses.

(5) Project Achievement Indices

<Index 1>

(a) By FY2009, policy management will be clearly established and implemented.
- By 2009, mid-tem management plans for electrical distribution management and sales will have been established, according to current national government policy
- Policy and management indices are clearly established and achieved by each model business in each budgetary year
- Each manager at each model business clarifies the objectives and management indices for his or her department/QC cycle.

(b) By FY2009, daily management will be clearly established and implemented
- An O&M manual, including labor division charts, work flows, check lists and standards, will be created; content will be designed to support the achievement of policy and management target indices for each model business
- Based on the O&M manual, each employee will be provided with specific work guidelines

(c) After the introduction of quality control practices, each model business will produce new targets for content (quality) and figures, including good case studies of QC cycle

practices targeted at achieving objectives and management indices.

<Index 2>

(a) By FY2009, establish a TQM promotion system that will support the popularization of good quality management practice to all electricity-related businesses, via good case studies

- Draw up TQM practice promotion plan and supporting documentation for each model business
- Create monitoring and evaluation groups, and establish monitoring and evaluation systems
- OJT Supervisors, appointed to oversee the promotion of TQM, will ensure that both quality and quantity are maintained

The indices and objectives of the PDM as established at the kick off the project are set out below.

Chart 1.2-1 Indices and Objectives in the Project Design Matrix (PDM)

Model business	Index	Definition	Score at previous evaluation (2006)	Target figure (2009)
Baghaberi Power Station	Reliability	Operational hours + standby hours + periodical inspection hours / 8760 hours	95%	98%
	Periodical Inspection	–	–	Running to plan
	Other	–	–	
GMD Dhaka East Transmission Station	Total annual accidental interruption hours	–	130 hrs (2006)	80 hrs
	Total annual accidental interruption instances	–	46 times (2006)	28 times
	Total energy not supplied	–	760MWh (2006)	467MWh
Mymensingh Distribution Station	Total annual accidental interruption hours	–	423 hrs (2005)	100 hrs
	Total annual accidental interruption instances	–	473 times (2005)	100 times
	System loss	(Total power sold – total power bought) / Total power bought	21%	>15%
	Payment recovery rate (C/B Ratio)	Payment recovered/	96% (2005)	<100%
Khulna Distribution Station	Total annual accidental interruption hours	–	3605 hrs (2005)	19. 1478 hrs
	Total annual accidental interruption instances	–	5787 times (2005)	2315 times
	System loss	(Total power sold – total power bought) / Total power bought	17%	>11%
	Payment recovery rate (C/B Ratio)	Payment recovered/	96% (2005)	<100%

Section 2 Background to Project Implementation

2.1 Background and Objective

2.1.1 Background

The electrification rate in the People's Republic of Bangladesh (hereinafter, Bangladesh) is low, at just 38%(2006). The Bangladeshi government, aware of this comparative lag, has pledged to improve the current situation, announcing plans that aim to ensure a reliable distribution of electricity to the entire Bangladeshi population by 2020. The current electricity distribution is unstable and inadequate; there are huge system loss ratios, and public companies related to electricity almost invariably suffer from poor management. Since 1994, motivated by the need to improve these various issues, the Bangladeshi government has pushed forward with a reorganization of the electrical power sector, including the clarification of responsibilities shared by public companies, and the proactive introduction of private funds into the sector. Previous efforts to improve the sector have seen the Power Grid Company of Bangladesh (hereinafter, PGCB) and the Dhaka Electric Distribution Company (DESCO) separated from public electricity companies, but have failed to achieve more that organizational reform. Results thus far fall short of that which could be called satisfactory.

The Bangladesh Power Development Board (hereinafter, BPDB) is responsible for all electricity generation in the public sector, and regional and metropolitan distribution of electricity; it is also the largest electricity company in Bangladesh. In January 2004, the Bangladeshi Cabinet decided that its generation and transmission departments were to be turned into stand-alone holding companies. However, the likelihood remains that the same problems that have plagued the splitting off companies such as PGCB and DESCO will affect the newly created holding companies.

Until now, Japan has provided support to the electricity sector in Bangladesh through the Japan Bank for International Cooperation (hereinafter, JBIC), mainly through the provision of machinery and infrastructure. Support of 'softer' elements, like skills and know how, has been provided since 1999 through a technology-focused cooperative program, carried out mainly with BPDB, which has focused on providing initial levels of support for the implementation of Total Quality Management (hereinafter, TQM) and the acquisition of the technical skills needed for maintenance management. This support has been provided through the short-term dispatch of Japanese specialist staff, and country-specific projects. As a result, BPDB has also been steadily implementing TQM since 1999, and in 2002 established a TQM Promotional Office; it is making dedicated efforts to realize the promotion and implementation of TQM throughout all of its companies. However, BPDB does not possess the necessary skills and strengths to push forward with a project designed to introduce TQM throughout all its companies alone; it must work at further improvements to capacity before this can be achieved. It was in this context, then, that the Bangladeshi government approached Japan with the idea of a technological collaborative project, aimed at the dissemination of TQM, and improvements in operational, maintenance and management capabilities through the introduction of TQM.

2.1.2 Objective

This project was designed to promote and progress the development and institutionalization of TQM (Total Quality Management) in Bangladesh, through the provision of the know-how needed to improve the operation, maintenance and management capabilities of local electricity business and the implementation of technical support. Its main objectives were measurable improvement in the operational, maintenance and management capabilities in electrical generation, transmission and distribution.

2.2 Target Businesses: Current Performance

2.2.1 Businesses for Project Implementation

The counterparts involved in this project are: the Ministry of Power, Energy and Mineral Resources (MoPEMR) in Bangladesh, the Bangladesh Power Development Board (BPDB), the Power Grid Company of Bangladesh Ltd.(PGCB) and the West Zone Power Distribution Company Ltd. (WZPDCL). Four model businesses, in generation, transmission and distribution, were then selected as targets for project implementation.

Generation:	Bhagabari (BPDB)
Transmission	GMD Dhaka East Transmission Station (PGCB)
Distribution:	Mymensingh Distribution Station (BPDB)
	Khulna Distribution Station (WZPDCL)

2.2.2 Related Organizations

The organizational chart below shows the structure of the electrical power sector in Bangladesh.

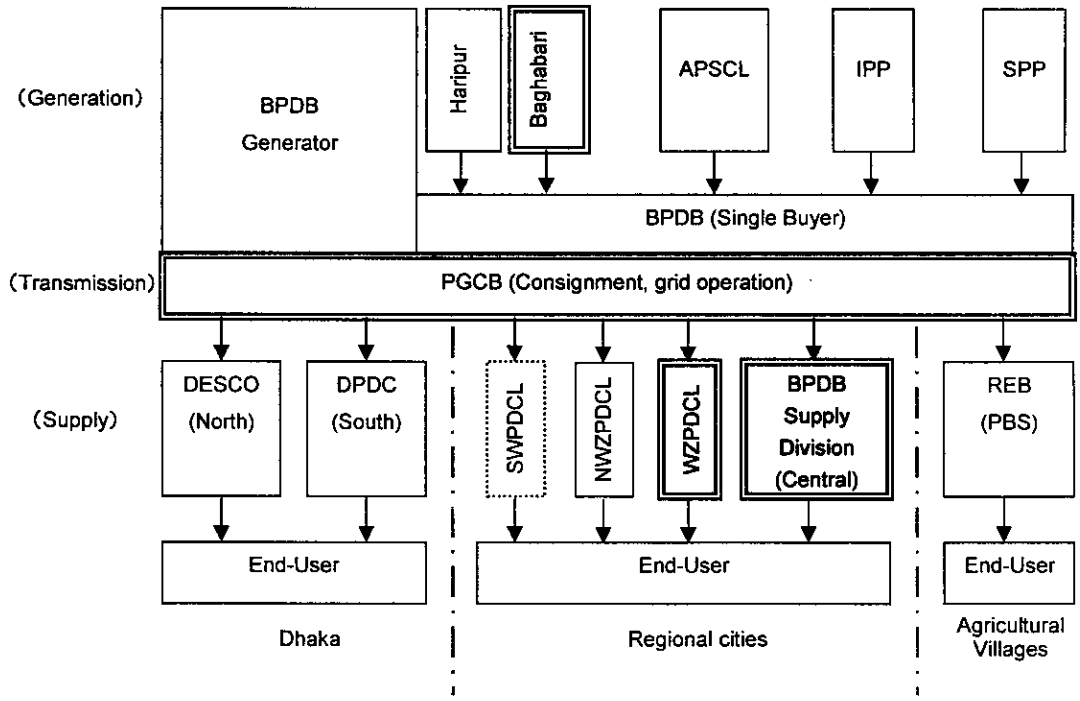


Fig. 2.2-1 Organizational Structure of Electrical Power Sector in Bangladesh

2.3 Current TQM Promotional Framework

2.3.1 BPDB

In August 2002, the BPDB established a TQM Promotion Office, and in November 2002 a TQM Steering Committee, which is a decision-making body run by executive management; these two organizations are now responsible for the promotion and development of TQM in Bangladesh. In July 2004, TQM Promotion Officers were appointed in each relevant department or business. Their role is to monitor and provide instruction for TQM practices.

The organizational structure for the promotion of TQM practices is shown in the figure below. The TQM Promotion Office, led by the Director, is under the direct jurisdiction of the TQM Steering Committee, which is led by the President and is a decision-making body. The TQM Steering Committee therefore oversees the activities of the TQM Promotion Office, and provides guidance where necessary. It is under the umbrella of these two organizations, then, that all activities related to the promotion and development of TQM practices are implemented. Moreover, monitoring and guidance is provided at each department or business, according to the level at which TQM has thus far been implemented, in order to ensure that TQM becomes an integral part of everyday managerial practice. The activities of the Task Team Committee and the TQM Promotion Officer Committee are designed to complement and support the monitoring and guidance provided by the TQM Promotion Office to businesses which have introduced TQM.

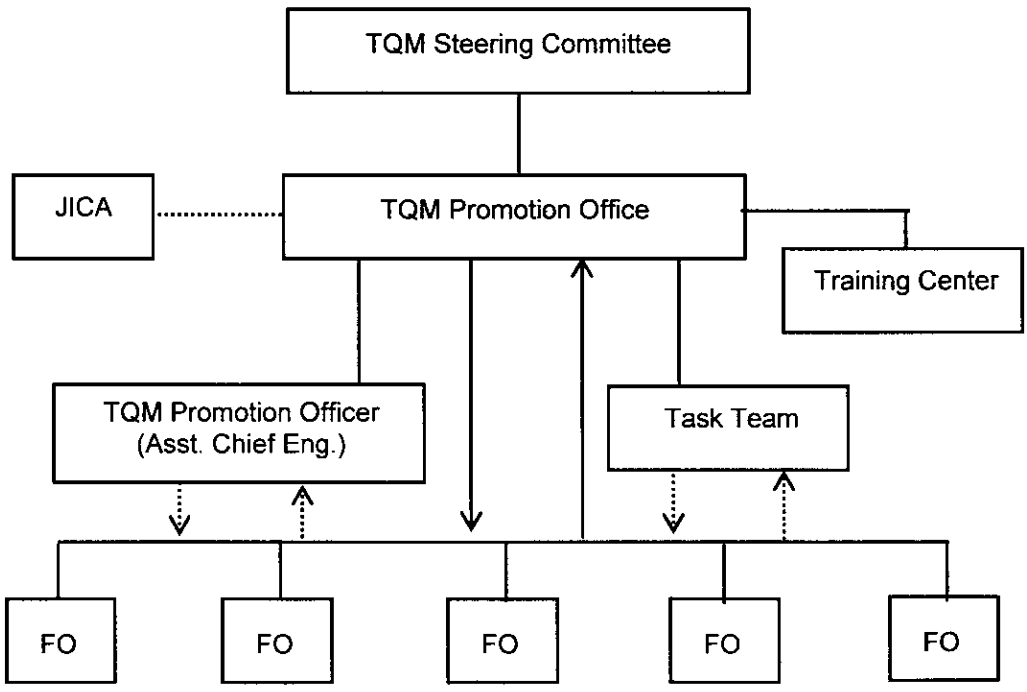


Fig. 2.3-1 The Organizational Structure of TQM Promotional Practice at BPDB

2.3.2 PGCB

The organizational structure for the promotion of TQM practices at PGCB is shown in the figure below. Activities related to the dissemination, promotion and monitoring of TQM practices are carried out by the TQM Steering Committee, which takes the Managing Director (MD) as its head, and by the TQM Promotion Office, which is also under the direct jurisdiction of the MD. The TQM Promotion Office is responsible for the design, planning and operation of TQM-related activities, for the planning and operation of training, for the TQM Steering Committee, for the operation and management of the Promotional Offices located in each transmission station, and for maintaining a clear overview of and evaluating the activities and practices of all businesses.

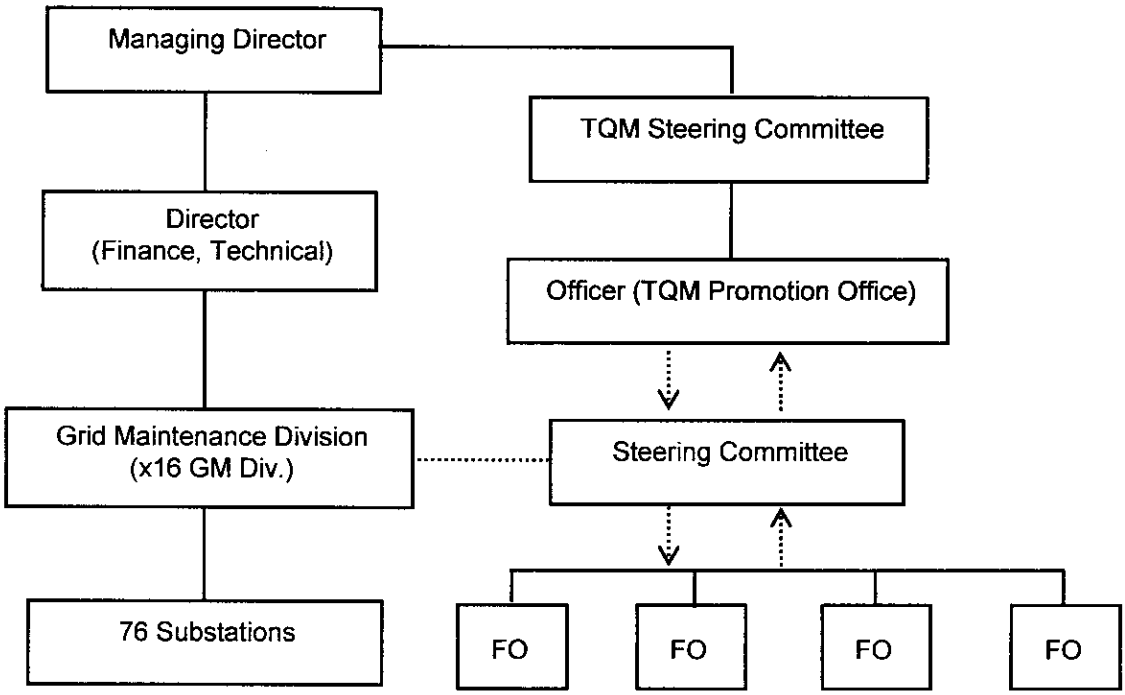


Fig. 2.3-2 The Organizational Structure of TQM Promotional Practice at PGCB

2.3.3 WZPDCL

The organizational structure for the promotion of TQM practices at WZPDCL is shown in the figure below. The TQM Promotion Office works with Steering Committees, set up in the businesses under the Office's jurisdiction, to provide monitoring and guidance on QC cycle practices at each business.

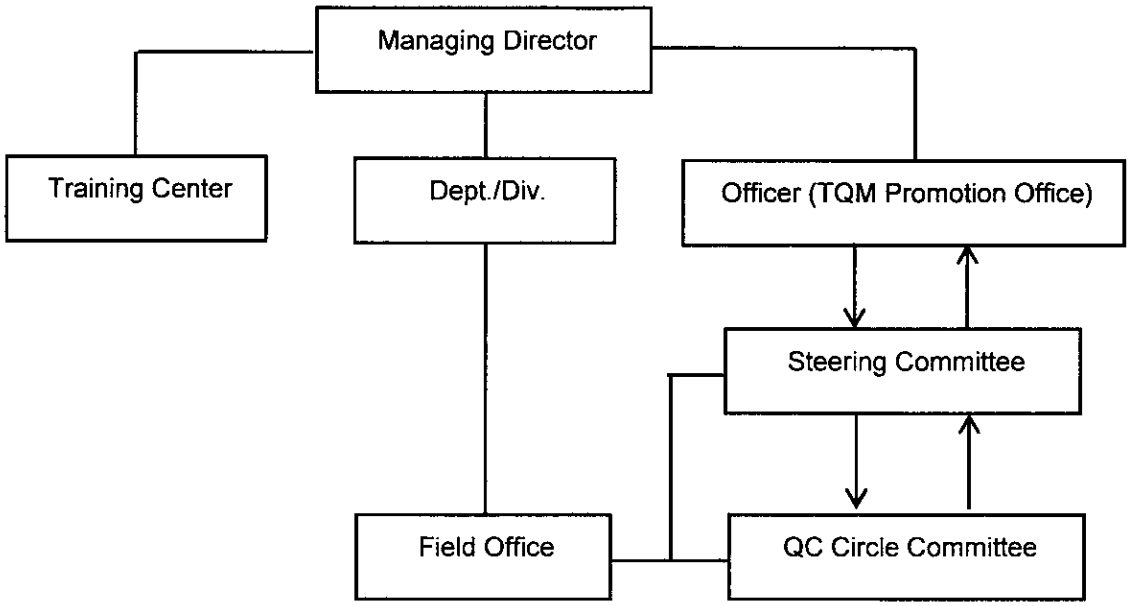


Fig. 2.3-3 The Organizational Structure of TQM Promotional Practice at WZPDCL

2.4 Trends in Other Donor Organizations

The trends in activities related to TQM undertaken by other donor organizations are as follows.

2.4.1 USAID

USAID carried out the following three projects.

- Training program on making improvements in managerial capability and on grid operational protocol for middle to senior management of BPDB (2000)
- Capacity building in the energy sector (electricity, oil, gas) related to effective project formation and sector reform (2001)
- Training program on TQM/QC circle for all PGCB staff (2004)

2.4.2 JETRO

In 2004, in collaboration with Bangladeshi corporations, JETRO established the Japan-Bangladesh Chamber of Commerce and Industry (JBCCI); activities related to the JBCCI have included the introduction of and guidance on 5S, TQM, and kaizen to Bangladeshi corporations. In January 2006, JETRO held a two-day seminar on TQM for Bangladeshi manufacturers and service providers, and it is likely that the organization will continue to provide TQM-related support in the future.

2.4.3 ADB

ADB has indicated that it intends to provide support in helping companies become sustainable after the separation of business into the three segments of generation, transmission and distribution, as a result of the government-led reorganization of the electrical power sector. It is likely that this will include TQM-related support, but at present no specific details have been released on the exact nature of services and support to be provided.

Section 3 Project Implementation Methodology

3.1 Basic Implementation Policy

TQM practices aimed at managerial improvements will be introduced into model businesses, with a view to becoming an integral part of management practice. The project was designed to make possible the continued implementation of TQM-related practices in businesses even after project completion, and facilitate the extension of TQM practices to all electricity-related businesses in Bangladesh; as such, the following operational approach was adopted.

Chart 3.1-1 Operational Approach

Preparation Phase

1－1. Construction of framework for the promotion of quality control & management practice
- (a) Survey of managerial framework (policy management, day-to-day management)
- (b) Survey of current TQM implementation (QC practices, activities geared towards performance improvements)
- (c) Establish managerial & testing functions, monitoring framework

1－2. Baseline survey (Survey of current performance)
- (a) Power system, operational & maintenance situation
- (b) Current state of regulations, standards etc (including O&M manual)

Operation Phase

2－1 Establishment of policy management practices
- (a) Generate management indices, evaluate appropriateness of target figures
- (b) Establish managerial & testing functions, monitoring framework
- (c) Create mid-term management plan

2－2 Support for TQM activities of mid-level managers, staff & workers
- (a) TQM guidance through OJT (instruction for trainers)
- (b) TQM support activities within businesses from trainers
- (c) Creation of TQM promotion plan
- (d) Operational support from all committees (Joint Survey Committee, Monitoring & Evaluation Committee)

2－3 Review of regulations & standard required to achieve management indicators
- (a) O&M manual
- (b) Incentive/Disciplinary systems (including systems for suggesting improvements)

The operational work outlined above was put into practice at Baghabari Power Station (BPDB); GMD Dhaka East Transmission Station (PGCB); and Mymensingh Distribution Station (BPDB) and Khulna Distribution Station (WZPDCL).

The annual development of the project is shown in Chart 3.1-2; the first year comprised preparation phase surveys, and surveys carried out in anticipation of the operational phase. The second year through to the fourth year comprised consecutive TQM-related support activities for executive staff, mid-level managers, and staff and workers. In the fourth and final year, various documentation was

drawn up, including a TQM Promotional Plan, an O&M Manual, a Mid-Term Management Plan and educational literature. A mid-term workshop was held in the third year, and a final workshop in the fourth. The figures below show the overall project structure and the project workflow.

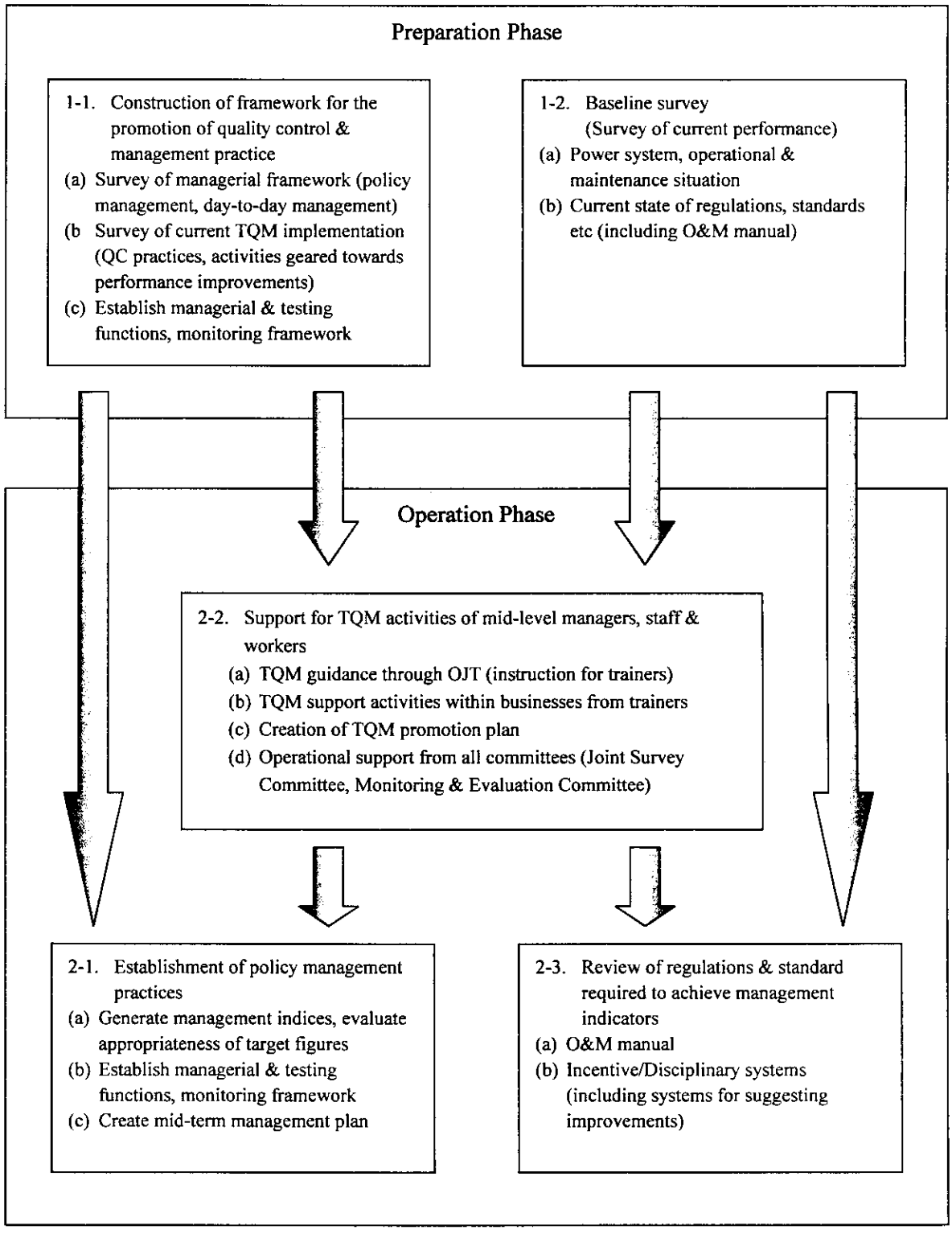
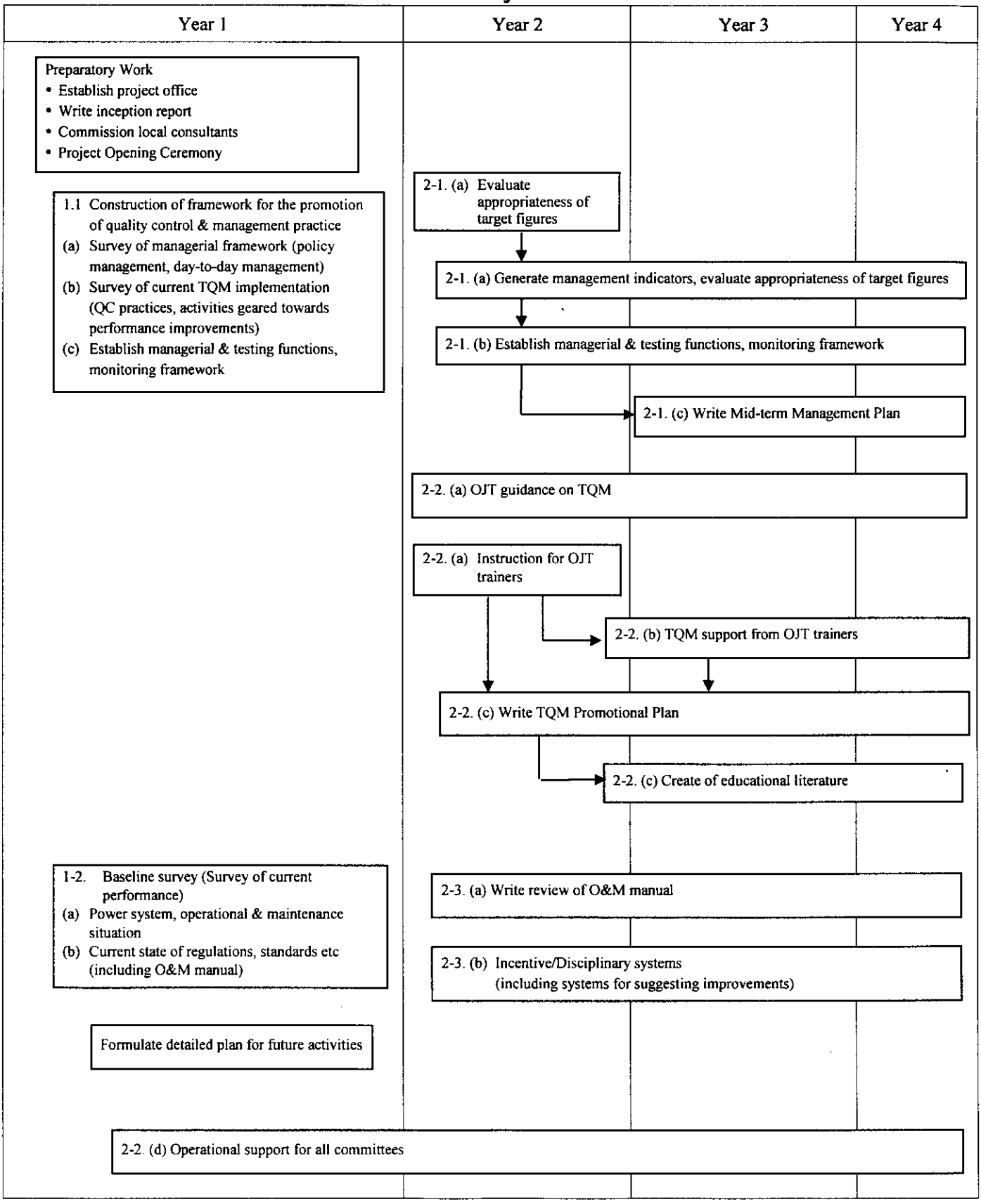


Fig.3.1-1 Overall Project Structure

Chart 3.1-2 Overall Project Workflow



3.2 Operational Content and Practical Implementation

3.2.1 Establishing Policy Management Practice

In order to achieve improvements on an organizational level, all of the six elements as shown below have to be maintained in a well-balanced manner, and improvements made to each element. The need for this overall balance was explained to model businesses as the project was implemented. Efforts were also made to help members understand that those elements which relate directly to organizational infrastructure must be strengthened on the basis of a long-term perspective.

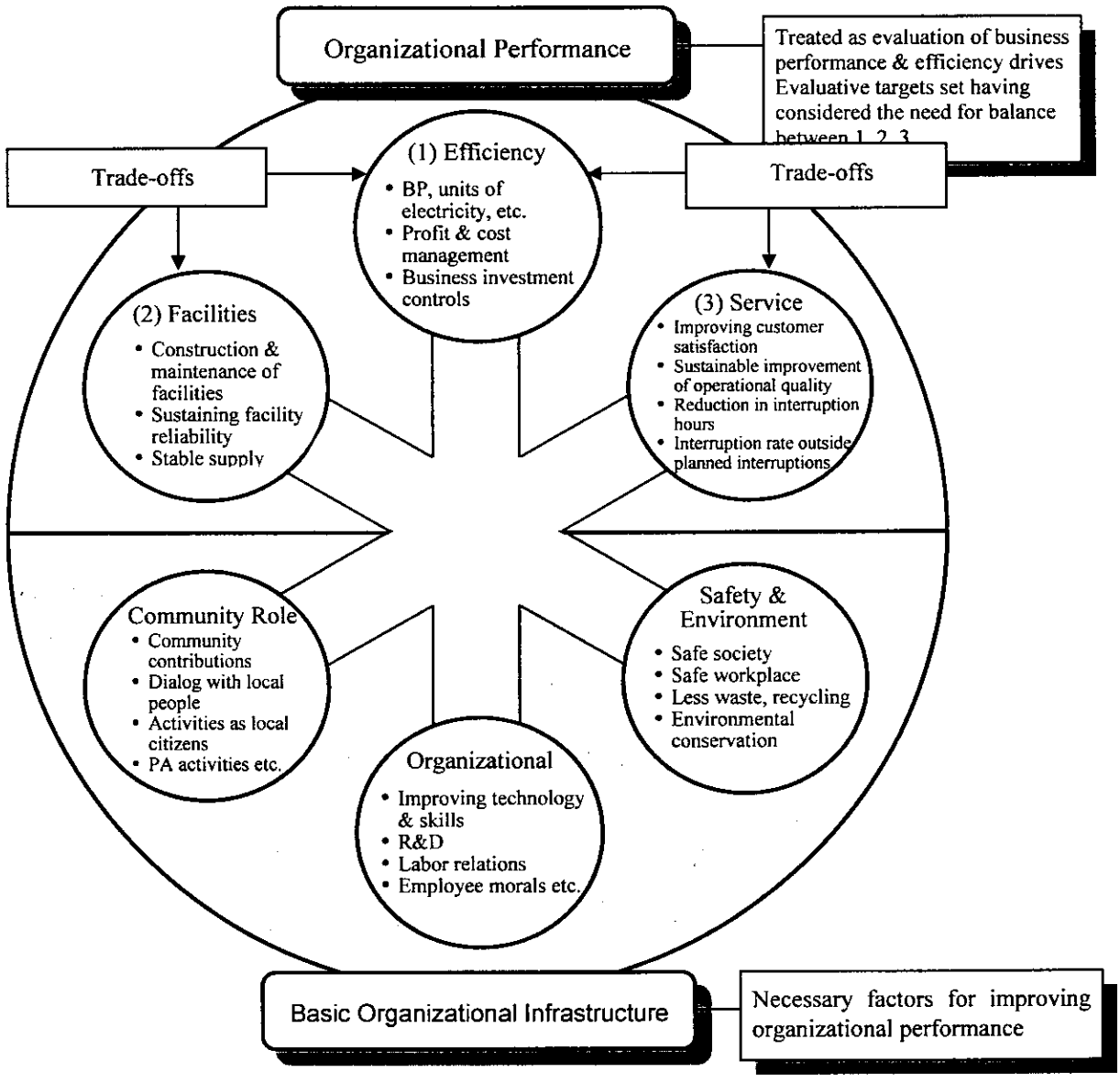


Fig. 3.2-1 Organizational Structure of the Electric Power Sector in Bangladesh

Based on this context, work was implemented with a focus on the appropriateness of those indicators considered crucial to the success of the Mid-Term Management Plan (mid- to long-term business plan).

3.2.2 TQM Practices Support for Mid-level Managers, Staff and Workers

Efforts were made to understand the specific circumstances and needs of mid-level managers, staff and workers at each model business in terms of carrying out TQM activities. Practical plans for TQM practices were then drawn up according to the level of need identified at each business.
Areas of specific importance included the introduction of "priority issues solving" to mid-level managerial staff and the expansion of the scope of QC cycle activities to new regions and fields.

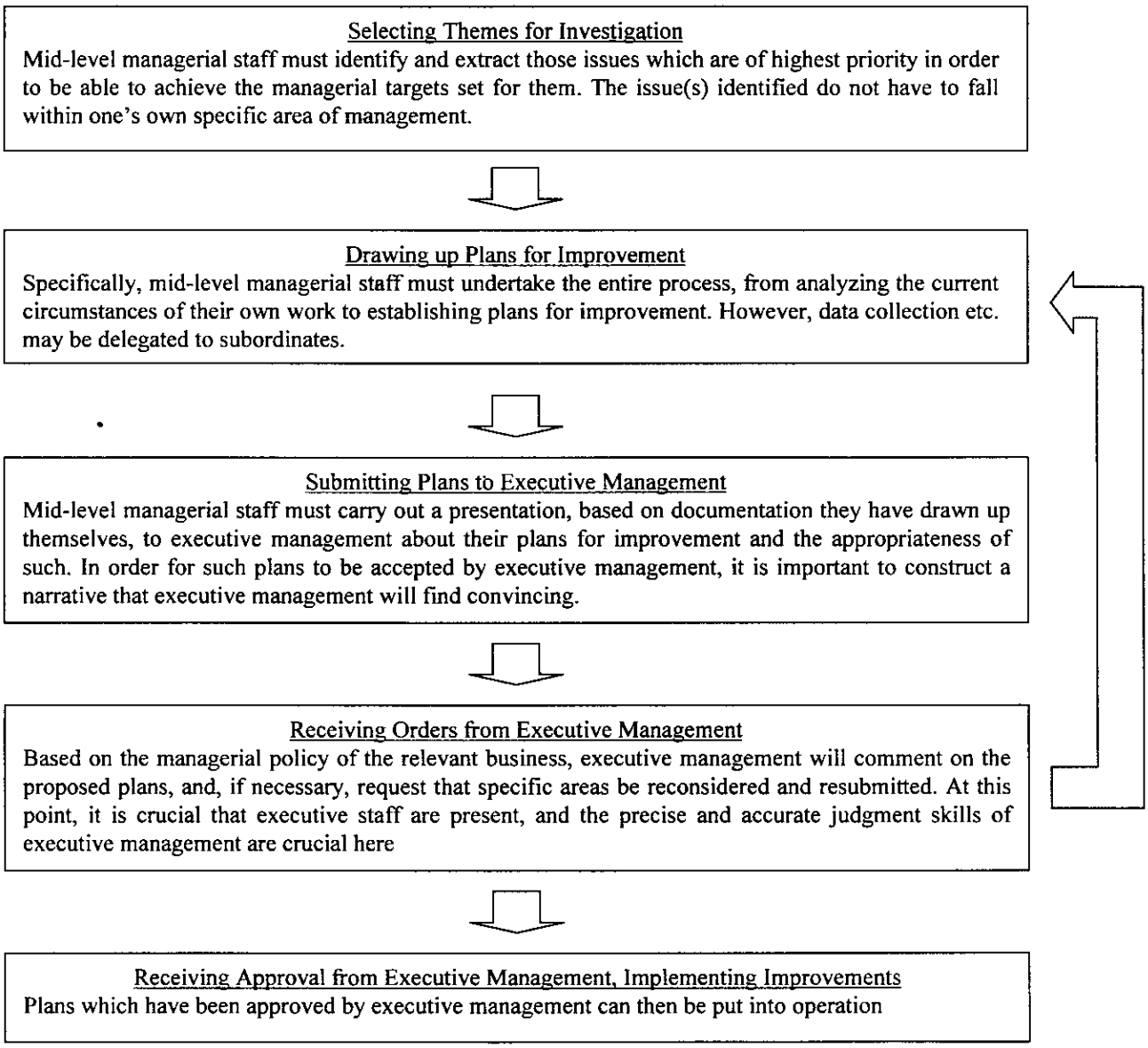


Fig. 3.2-2 Introducing "Priority Issues Solving" Practice to Mid-level Management

3.2.3 Operational Structures of Related Committees

Project quality management was established through the formation and running of the operational framework set out below, comprising all relevant committees.

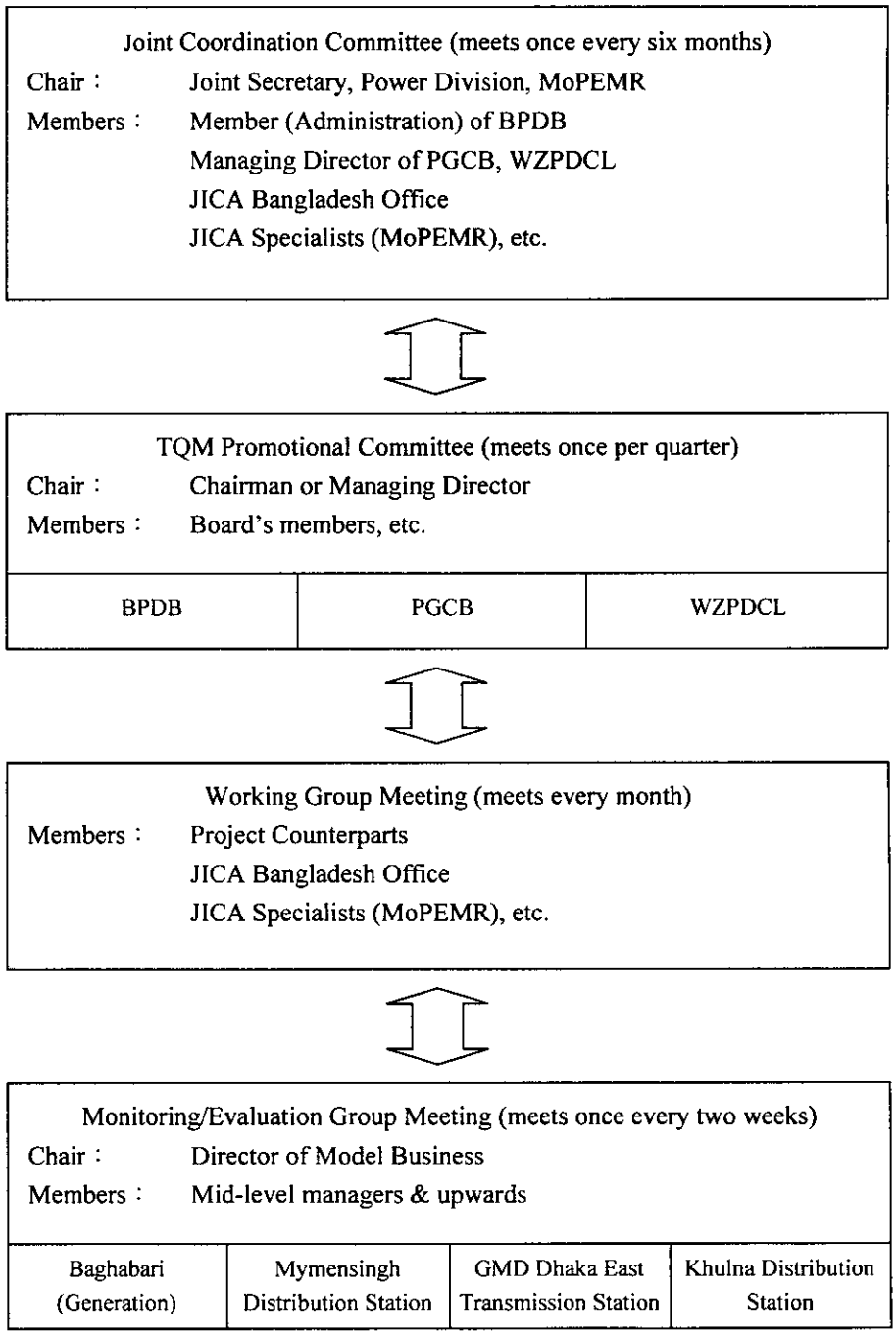


Fig. 3.2-3 Project Quality Control through Related Committees

3.2.4 Revision of Regulations and Standards Required to Achieve Management Indicators

Based on the results of surveys carried out during the preparation stage on regulations and standards, revisions were carried out where necessary of the relevant regulations and standards, with a particular focus on O&M manuals.

Section 4 Contributors' Performance

4.1 Japan

4.1.1 Expert Project Leaders

This project involved the dispatch of expert project teams and team leaders from Japan. The performance and achievement of the dispatch of these expert project leaders are outlined in Appendices 1 & 2. Chart. 4.1-1 shows total dispatch Records of the project.

Chart 4.1-1 Total dispatch Records of the project

Year	M/M (Site Survey)	M/M (Domestic Survey)	Total
2006	7.63	3.81	11.44
2007	9.92	4.12	14.04
2008	7.00	1.99	8.99
2009	4.00	1.46	5.46
Total	28.55	11.38	39.93

4.1.2 Trainee Program

Counterpart Training in Japan was held four times between FY2006 and FY2009. The Counterpart Training comprised of lectures and visits to relevant facilities; the first week concentrated on practical training and discussion focused on management, and was held at a residential training facilities. The second week comprised a series of on-the-job seminars, where lectures were combined with site visits, with a focus on technical management.

A list of trainees can be found in Appendix 6.

4.1.3 Equipment Provision

During the period of project implementation, digital clip meters, indicated as required at the very beginning of the project, and digital cameras and other equipments, shown to be necessary during the operation phase, were purchased. Appendix 3 lists all such equipments. These equipments will be required in future management activities at the relevant model businesses; as such, the equipment has been gifted to them.

4.2 Bangladesh

4.2.1 Counterparts

Counterpart organizations are as shown in 1.1.2.

4.2.2 Trainees

Trainees throughout the project comprised participants in the resident training courses, participants on the PI-Solving Activity courses, and participants in the Counterpart Training Program in Japan. Details are outlined in Appendices 4, 5 and 6. These trainees should now be able to take on leadership roles with regard to the promotion and implementation of TQM in the future.

Section 5 Project Performance

5.1 Overall Project Achievements Summary

This project included a large volume of technology transfer-focused activities, including residential training programs, on-site OJT, activity and achievement reporting seminars. Other achievements include the creation of manuals and promotional videos, resulting in concrete evidence of the project's success. Details of these technology transfer activities are listed in Appendices 4-6.

5.2 Residential Training

5.2.1 Objective and Background

This project included efforts to introduce Priority Issue (PI) Solving Activity, an important resource in identifying which issues are of primary concern in the context of achieving TQM-related management targets. Trainees took part in training programs (Basic Management training and Trainer's Training) lasting from 2-5 days, held at BPDB's training facility in Tongi. Trainees were equipped with the basic knowledge and training required to be able to identify and prioritize issues through PI Solving Activity. Chart. 5.2-1 shows total training programs of the project. Fig. 5-2-1 shows an example of a Basic Management training schedule for a program held in the second year of the project.

Chart 5.2-1 Total training programs of the project

	Duration	Basic management training	Trainer's training
2007	3rd/June-7th/June (5days)	24	
2008	25th/May-28th/May (4days)	22	13
2009	24th/May-26th/May (3days)	23	11
Total		69	24

Chart 5.2-2 Basic Management Training Schedule (example)

	Start		End	Contents	Instructor
03. Jun (Sun)	10:00	--	10:30	Orientation, Explanation on Training schedule	Kibata
	10:30	--	12:30	Self introduction (including explanation on issues)	All
	12:30	--	*13:30*	*Lunch*	
	13:30	--	14:20	Explanation on PI Solving activity	Seki
	14:20	--	16:00	TQM exercise (Fishbone Diagram)	All
04. Jun (Mon)	10:00	--	12:30	Introduction	Hida
	12:30	--	*13:30*	*Lunch*	
	13:30	--	16:00	Work Management	Hida
05. Jun (Tue)	10:00	--	12:30	People Management	Hida
	12:30	--	*13:30*	*Lunch*	
	13:30	--	16:00	People Management Action Plan	Hida
06. Jun (Wed)	10:00	--	11:00	How to use TQM Tool	Yanagiuchi
	11:00	--	12:30	Group Discussion	All
	12:30	--	*13:30*	*Lunch*	
	13:30	--	16:00	Selection of Theme (individually) Create presentation material	All
07. Jun (Thur)	10:00	--	12:30	Presentation (2 groups, 25 minutes/person)	All
	12:30	--	*13:30*	*Lunch*	
	13:30	--	15:30	Presentation (continue)	All
	15:30	--	15:45	Future Schedule	Seki

5.2.2 Training Overview

Participants in training programs are listed in Appendix 5. Participants who were invited onto training courses were in mid-level management positions at the model businesses that took part in the project. Moreover, one facilitator – responsible for organizing the other trainees and for communication with executive staff and consultants – took part from each model business. Finally, observers were also invited to take part, from BPDM and TQM Promotion Offices, in order to be able to organize effective future TQM training and activities.

In the project's third and fourth years, training was organized into two sections, as outlined below, with the intention of encouraging the wider dissemination and further understanding of TQM:

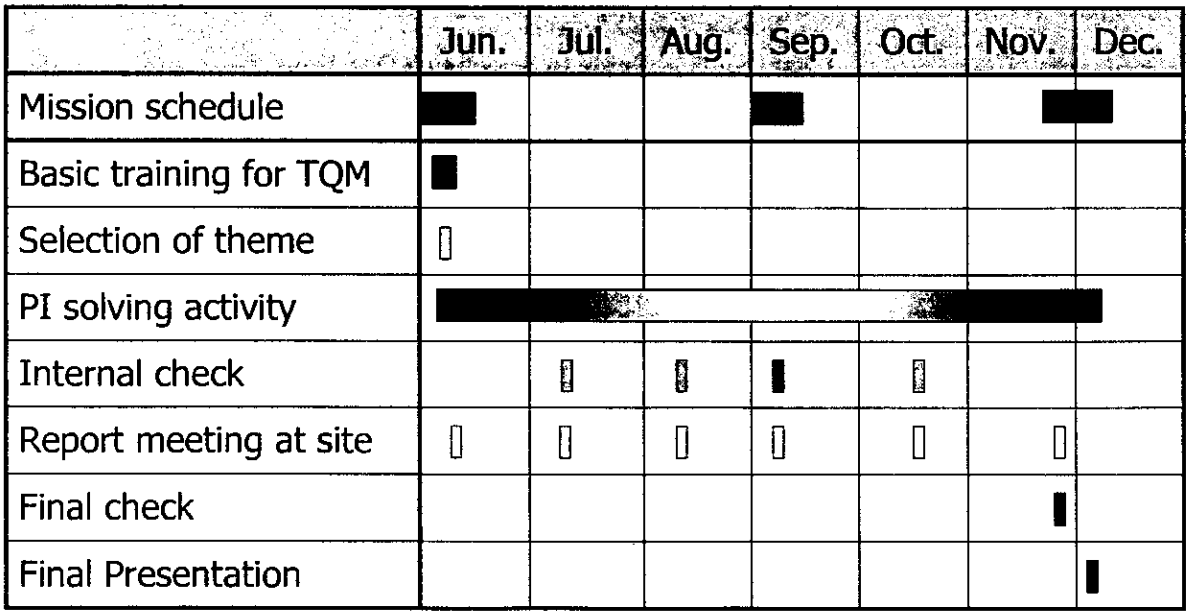
- New trainees equipped with basic knowledge on TQM, and participate in residential training programs focusing on PI Solving Activity (Basic TQM Training and Basic Management Training)
- Trainees who completed basic training in the previous year participate in instructor training (statistics and economic evaluation methods)

5.2.3 Training Content

(1) Introductory Training

Training opened with the concept of PI Solving Activity being explained to trainees. An outline of PI Solving Activities can be found below at Chart. 3.2-2. It was explained to trainees that the annual schedule for PI Solving Activities was as outlined in Chart 5.2-2, and that each trainee would take part in a six-month cycle in which he or she would have to identify and solve particular issues. Specifically, at the beginning of the year, introductory training was held, in which the issues to be tackled by each trainee were identified and selected. On-site surveys were then held half-way through the training period, where visits were made to trainees' place of work, allowing instructors to give guidance appropriate to individual circumstances and practical conditions. During the periods in between on-site surveys, local consultants were used to ensure that trainees received additional guidance and training where needed, based on the content of monthly progress reports submitted by trainees. Finally, JICA TV Conference System was used to hold monthly progress report meetings, at which additional guidance was given as appropriate.

Chart 5.2-3 PI Solving Activity Schedule



(2) TQM Basic Training

Instruction and guidance was provided on TQM-related analytical tools, such as the 7 QC Tools (7 tools which are useful in analyzing figures, such as statistical data, related to Quality Control), which are essential to effective problem solving activities. Instruction made use of simple case studies, introduce specific examples of utilization methods, and was strongly geared towards enhancing trainees' understanding of the tools. The main elements of instruction are listed below:

- TQM Tools overview
- Introduction of tools used to analyze issues
  - ➢ How to use the tools
  - ➢ Important points to remember when using the tools
  - ➢ How to use the tools
- Simple case studies

Chart 5.2-4 The 7 QC Tools

7 Tools

	Name	Purpose	Characteristics & Image
1	Pareto Diagrams	Select the Priority Issues. Grasp the importance of each item.	Bar charts of each item. Line plot of accumulated values
2	Cause and Effect Diagrams	Pursue the cause of the problem. Sort out the knowledge of causes and effects.	Final effect is linked by the associated causes.
3	Graphs	Facilitate to grasp the information of data through visualization.	Circular graph, Bar chart, Radar chart
4	Check Sheets	Facilitate the data collection and the data sorting.	Spreadsheet or records for easy data collecting and less-mistakable format.

7 Tools

	Name	Purpose	Characteristics & Image
5	Histograms	Grasp the data dispersion. Grasp the characteristics of distribution.	Bar charts of the frequency distribution table.
6	Scatter Diagrams	See the co-relation between two parameters. Study co-relation and recurrence.	Plot diagram of two parameters, each of which is allotted to X-axis and Y-axis.
7	Control charts	Facilitate to grasp the information of data through visualization. Manage the process. Analyze the problem in the process.	Line plot dependent on time, with regulated limits' lines.

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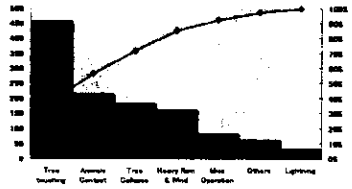
Chart 5.2-5 A Guide to Selecting TQM Tools

Tool Selection Guide for 7 Tools

No.	Sequence of procedure \ Tool							
1	Selection of theme	◎ Bar chart, line graph	○	●	○	◉		○
2	Understanding of the present status and goal setting	● Bar chart, line graph	○	◉	◉	○	○	●
3	Preparation of action plan	● Gantt Chart						
4	Analysis of element	● Bar chart, line graph	◉	○	●	●	●	●
5	Study on and implementation of the countermeasure	◉				●		
6	Confirmation of the effect	◉ Bar chart, line graph	●	◉	●		○	○
7	Standardization and establishment of control	○	●		○			●

Example of Analysis



Most Frequent Reason ?

Tree Touching

Potential Solution?

In order to reduce the failure, the distribution system should be prevent from tree touching

Fig. 5.2-1 Examples of Using TQM Tools

Classifying Reasons

Cause & Effect Charts

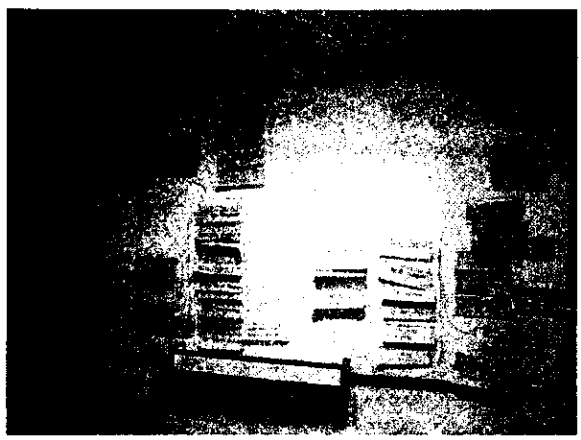


Fig. 5.2-2 Basic TQM Training

(3) Basic Management Training

The objectives of this training were as follows:

- Trainees to comprehend and retain knowledge on basic management
- Trainees to understand the role of a manager, and become motivated to carry out that role in the workplace
- Trainees to use the knowledge and approaches learned during training to improve results in the workplace

The curriculum comprised the following elements:

- Overview
  - ➢ Understanding the definition of "management"
  - ➢ Understanding the five functions of management (1. Setting targets, 2. Organization, 3. Giving direction, 4. Control, 5. Adjustment)

- Understanding the role fulfillment capacity required of all managerial staff

- Managing Work
  - The importance of setting targets, points to remember when setting appropriate targets
  - The importance of following the PDCA cycle
  - Points to remember when implementing improvements (clarification of issues, steps to improvement)
- Managing Staff
  - Motivation (understanding the mechanisms of desire and action; useful points in motivating staff)
  - Leadership (the definition of leadership, situation-specific leadership)
  - Educating & training for members (importance of OJT, Off-JT & educational activities)
- Formulating Action Plans
  - Presentations of action plans drawn up by trainees in order to implement the knowledge gained during the training in the workplace; group discussions amongst trainees

Lecture

Group Discussion

Fig. 5.2-3 Basic Management Training

(4) Instructor Training

Instructors need a higher-level knowledge in order to adequately educate trainees; this program comprised training on statistics and the use of economic evaluation methods. For reference, the training schedule used in a third year program is shown below in Chart 5.2-6.

Chart 5.2-6 Trainer's Training (Example)

	Start		End	Contents	Instructor
25-May (Sun)	10:00	--	10:30	Orientation, Explanation on Training schedule	Kibata
	10:30	--	12:30	Statistics	Kobayashi
	12:30	--	13:30	*Lunch*	
	13:30	--	16:00	Statistics	Kobayashi
26-May (Mon)	10:00	--	12:30	Economic evaluation method	Ueno
	12:30	--	13:30	*Lunch*	
	13:30	--	16:00	Discussion on some presentation	All

Statistics is a vital tool in the analysis of data required for the effective implementation of TQM. The main training contents were as follows:

- Absolute frequency
- Relative frequency
- Median, variance, standard deviation, variable coefficients
- Probability and probability distribution, binominal distribution, Poisson distribution
- Relationship between normal distribution and probability
- Statistical significance
- Correlation analysis
- Regression analysis

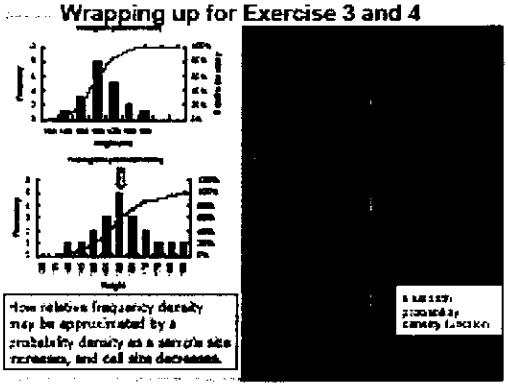
An example of the presentation materials used in lectures is shown below.

Introductory Statistics in Business and Economics for Middle Class Managements

For Power Sector
in Bangladesh

25th May, 2008
Tokyo Electric Power Co.

Wrapping up for Exercise 3 and 4



How relative frequency density may be approximated by a probability density as a sample size increases, and cell size decreases.

Exercise 5 Spread of Distribution Answers

- Central tendency
  - Mean
  - Mode: Most frequent value
  - Median: middle observation or 50th percentile
- Variance
  - Variance
  - Standard deviation
  - Coefficient of variation

Exercise 6-(2) Spread of Distribution Answers

To understand standard deviation, keep in mind that variance is the average of the squared differences between data points and the mean. Variance is labeled in units squared. Standard deviation, being the square root of that quantity, therefore measures the spread of data about the mean, measured in the same units as the data.

For the normal distribution, this accounts for 68.27 % of the set, while two standard deviations from the mean (medium and dark blue) account for 95.45 %, three standard deviations (light, medium, and dark blue) account for 99.73 %, and four standard deviations account for 99.994 %.

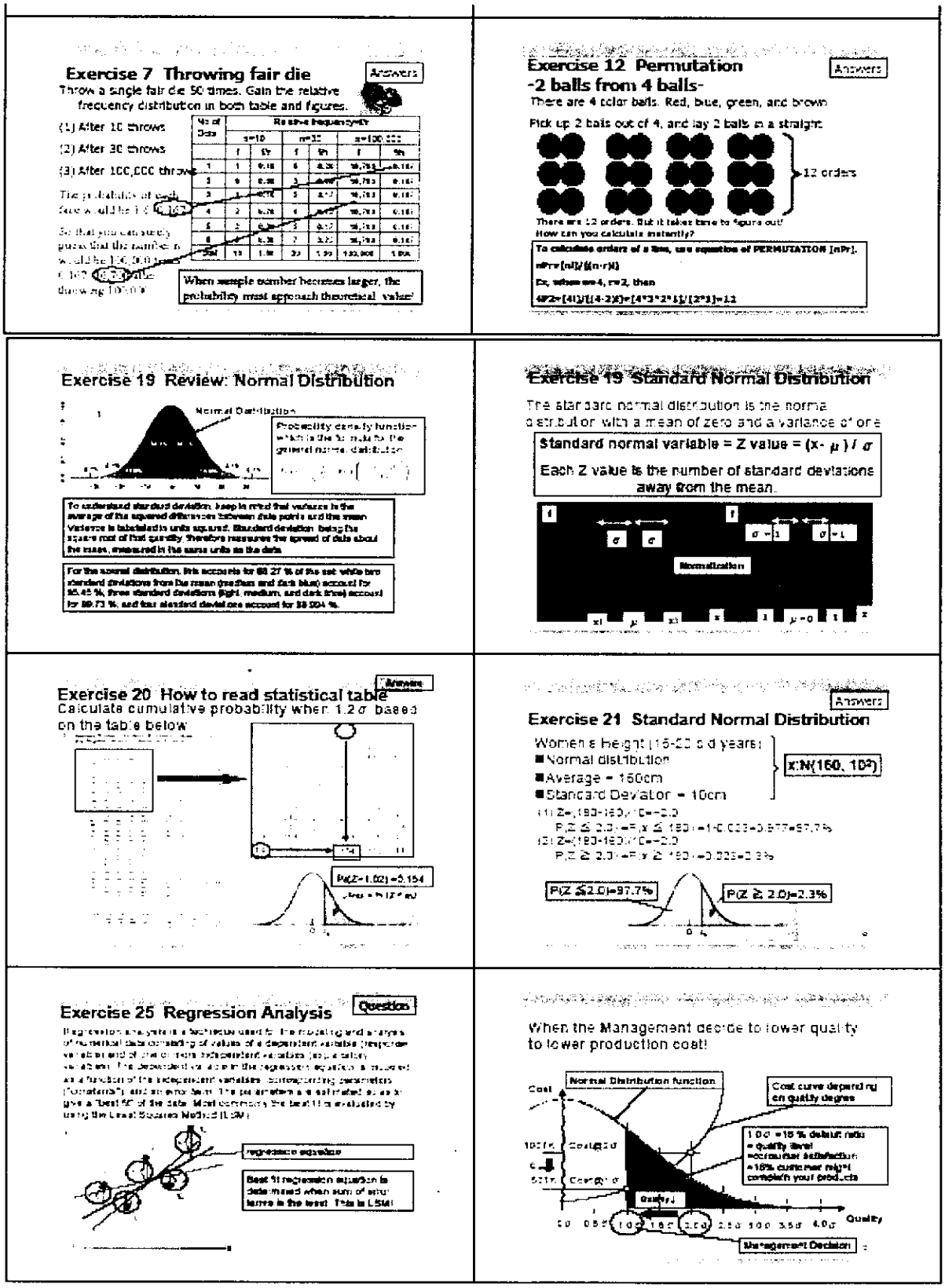


Fig. 5.2-4 Data Analysis Tools (Statistics)

Economic evaluation methods also represent a vital set of tools for the effective implementation of TQM practices; it is essential that mid-level managerial staff fully understand such methods and are able to use them. The training on these methods comprised the following elements:

- Formulating indicators required for investment-related decisions
- Return on Investment (ROI)
- Simple Payback Period (on Capital Invested) (SPP)
- Net Present Value (NPV)
- Internal Rate of Return (IRR)

Below is an example of the presentation documentation used in training lectures.

Investment Efficiency Evaluation
- Basic -

May 2008
Tokyo Electric Power Co.

1

Introduction of Evaluating Methods

Comparison of major methods

	Time value of money	Life-cycle cash flows	Risk considerations	Easy to understand
Return on Investment (ROI)	No	No	No	Yes
Simple Payback Period (SPP)	No	No	No	Yes
Net Present Value (NPV)	Yes	Yes	Yes	No
Internal Rate of Return (IRR)	Yes	Yes	Yes	No

Topic: Cash Flow (CF)

- Cash flow is a measure of cash inflow and outflow which generate from a income-generating project.
- Net cash flow refers to the excess of cash inflows over cash outflows (the amount of remaining money) in a given operation or a certain period of time.
- It is a measure of economic efficiency but does not coincide with the accounting term "profit".
- The table below is an example of cash flow statement:

Year	0	1	2	3	4	5	6
Investment	$200mil.						
O&M Cost		-$20mil.	-$20mil.	-$20mil.	-$20mil.	-$20mil.	-$20mil.
Expected Revenue		$80mil	$80mil	$80mil.	$80mil.	$80mil	$80mil
Net cash flow at each year	-$200mil.	$60mil.	$60mil.	$60mil.	$60mil.	$60mil.	$60mil.

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Exercise (ROI)

Net cash flow on $1,000 investment

Year	0	1	2	3	4	5
Net Cash flow	-$1,000	$100	$90	$80	$50	$40

Calculate the ROI of each year:

Year	0	1	2	3	4	5
ROI	-	10%	9%	8%	5%	4%

Exercise (SPP)

How long is the payback period?

Year	0	1	2	3
Net cash flow	- $3,000	+$1,500	+$1,000	+$1,000

3,000 = 1,500 + 1,000 + 500
➔ 2.5 years

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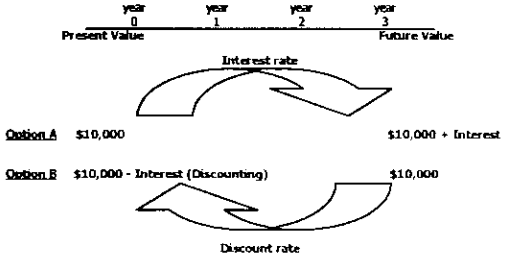
Time Value of Money

Image of Option A and B



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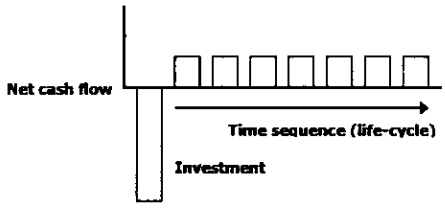
Life-Cycle Cash Flow (LCC)

Cash flow diagram of the said example



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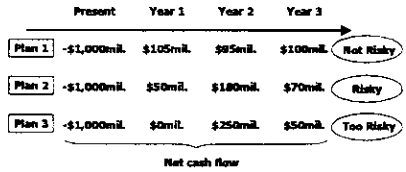
Risk Consideration

◆ Risk is inseparable from return. Every investment involves some degree of risk.



◆ Risk is the possibility of a return being more different than expected.

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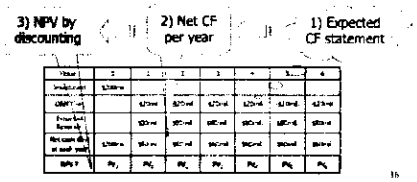
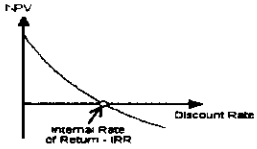
3. Steps in Calculating NPV

1) Calculation of expected cash inflows and out flows
2) Calculate the net cash flow per year
3) Convert each cash flow by using discount rate, then summate each of obtained present value



4. Internal Rate of Return (IRR)

◆ Internal rate of return (IRR) refers to the discount rate at which the NPV is zero.



◆ A hurdle rate, the minimum required IRR that must be met to undertake a particular project, is set as the benchmark rate.
◆ If IRR is higher than a hurdle rate, a sort of go/no-go threshold (often same as capital cost or market interest rate), the investment may be accepted.

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Topic: Microsoft Excel Functions – NPV

◆ Suppose that a $1,000 investment will generate $300 cash flows at the end of each of the next five years:

Discount Rate	12%					
Year (Period)	0	1	2	3	4	5
Net Cash Flow (thousand)	($1,000)	$300	$300	$300	$300	$300
Net Present Value	$81.4					

◆ First, select B6 and type: =NPV(12%,C4:G4) and we will see the answer is $1,081.4. Note that we did not include the year 0 cash flow in the function. The NPV function will automatically discount the cash flow of year 0, even if it shouldn't.
◆ Second, remember that the NPV, according to the actual definition, is calculated as the present value of the expected future cash flows, minus the cost of the investment.
◆ Then, we need to subtract the $1,000 of the investment. Therefore, the formula to calculate the net present value is: =NPV(B1,C4:G4)-B4 and the answer is $81.4

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Practice 1

Make a comparison of the following 2 plans listed below with the NPV method :

	Plan A	Plan B
Investment	$200mil.	$120mil.
Expected Life-cycle	6 years	4 years
O&M Cost	$20mil./year	$10mil./year
Expected Revenue	$80mil./year	$60mil./year
Discount Rate	10%	7%

Note: Initial investment is done at the year zero (n=0). Do not consider the effect of tax reduction

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Fig. 5.2-5 Data Analysis Tools (Economic Evaluation Methods)

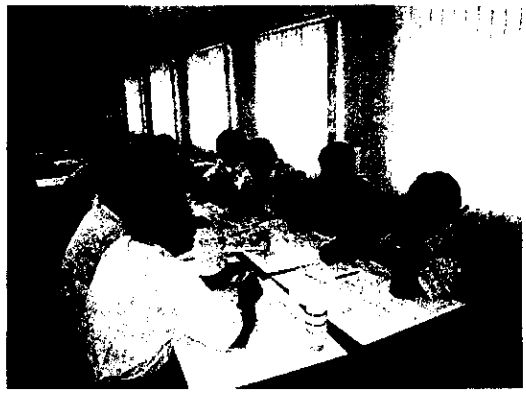
(5) Identifying Issues for PI Solving Activities

Before the beginning of training, trainees were required to draw up lists of potential issues; these were then used, alongside group discussion, to help trainees identify the priority issue(s) that they would investigate and attempt to solve throughout their training period. They also drew up presentation materials to be used in Progress Report Meetings. When selecting issues, trainees were asked to consider those issues that were directly related to the achievement of management targets. However, since the purpose of the training was to help trainees to understand and master the methods required for effective PI Solving Activities, it was determined that issues did not have to be directly related to the achievement of

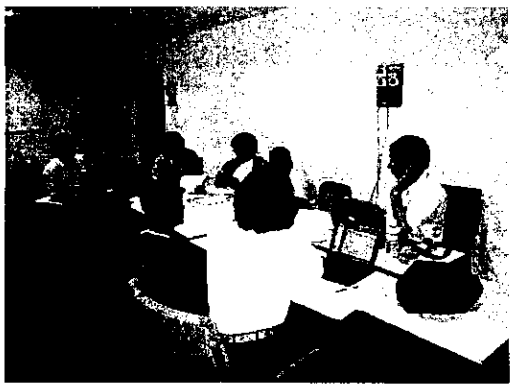
management targets, as long as they could be reasonably solved within six months, and were a priority in terms of fulfilling the daily tasks of the relevant trainee(s). The priority issues selected by trainees are listed in Appendix 5.

Baghabari

GMD Dhaka East Transmission Station



Mymensingh Distribution Station



Khulna Distribution Station

Fig.5.2-6 Identifying Priority Issues

(6) Priority Issue Presentations

Each trainee then made a presentation on the priority issue(s), as described in the previous paragraph, that he or she had identified and selected, and the issue(s) were discussed among all participants. Presentations contained the following information:

- Issues in the workplace
- The priority issue(s) selected
- Ideal working conditions and targets to achieve
- The causes of the issue(s)
- Methods for evaluating current performance
- Activity plan

(7) Completion Ceremony for Introductory Training

It was then confirmed with each trainee that he or she would continue to examine the priority issue(s) identified, as described above. Training was then deemed completed, and trainees were presented with certificates marking the successful completion of training.

Training Completion Certificates are handed out

Trainees

Fig.5.2-7 Training Completion

5.3 Top Management Training

5.3.1 Objectives and Background

In order to successfully reform and reorganize the electrical power sector, it is vital that mid-level staff improve their performance. Any such improvement, however, will be meaningless without the understanding importance and support of top level executives; the staff, in other words, with decision-making powers. In recognition of this, training was also carried out for top level management, with a focus on changing the opinion and approach of executive level staff. Executive staff from relevant organizations were invited to participate, in training that focused on the mindset of top level management (2008.5.24). Representatives from the apparel industry were also invited to share their experiences about quality control in that area, and concrete case studies of quality control operation in private companies were introduced and discussed.

5.3.2 Training Content

Points covered in Top Management Training were as follows:

- Mid-term Management Plan
- Introduction & discussion of quality control case studies from the apparel industry
- Management training for executive staff
- Comments from long-term JICA experts

Mid-term Management Plan

Case Study: QC in the Apparel Industry

Management Training for Executive Staff

Comments from long-term JICA experts

Fig.5.3-1 Top Management Training

5.4 Support for Issues Solving Activities in the Workplace

5.4.1 Objectives and Background

The objective of this support project was to participate in mid-term report meetings and check up on the progress of trainees' activities. Also significant was creating the opportunity to provide more specific guidance and advice on TQM-related methods such as the collection of data, the establishment of proposals and the formulation of action plans.

5.4.2 Instruction and Guidance at each Model Business

Instruction and guidance was provided at each model business, as follows:

- Mid-term activity progress checks at mid-term conference
- Appropriateness and focus of investigations
- Guidance on how to use analytical tools
- Suitability of data
- Consistency between workplace situation and theme

5.4.3 Progress Report Meetings

Trainees, having selected priority issues in their introductory training, reported on the progress of their activities at Progress Report Meetings which were also attended by high-level staff from trainees' organizations. The purpose of this was to gain the understanding and approval of executive staff, as well as gain relevant advice from both the Bangladeshi government and from consultants involved in the project.

Moreover, relevant executive staff in attendance were able to ensure that an appropriate working environment, in which trainees would be able to pursue their priority issue solving activities, would be created for all participants.

Baghabari

GMD Dhaka East Transmission Station

Mymensingh Distribution Station

Khulna Distribution Station

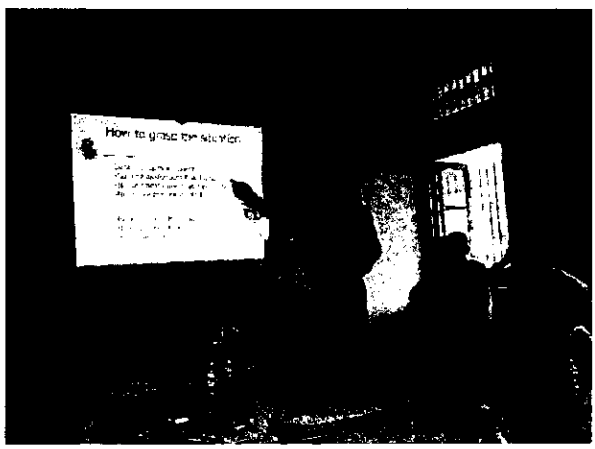


Fig. 5.4-1 Progress Report Meetings

5.5 Japanese Support for PI Solving Activities

As shown in Chart 5.2-3, trainees took part in monthly progress report meetings, held at their place of work, at which they reported on progress to executive staff, received relevant approvals and advice. In those cases when consultants were not present in Bangladesh, long-term JICA experts cooperated with progress report meetings, together with locally-based consultants, through e-mail correspondence offering advice based on progress reports drawn up by trainees and report meeting minutes. Moreover, direct guidance and advice was offered using the TV Conference System linking the JICA Bangladesh Office and JICA Tokyo Headquarters.

5.6 PI Solving Activity: Final Reporting Conference

The Final Reporting Conference saw trainees present the results of their year-long activities to top-level staff from their companies, and group discussions between executive staff and mid-level managerial trainees. These activities were designed to promote and publicize the activities geared towards improvement that had been carried out in each model business. In addition, the TQM Competition, described below, saw the best TQM case studies being presented by trainees to executive staff of their own business, the executive staff of all other model businesses, and the rest of the trainees; this was designed to facilitate the lateral spread of TQM within organizations, by introducing trainees to model examples to TQM in practice. Moreover, the competition was, of course, an excellent way to boost trainees' confidence.

The criteria for selection for the competition are shown below, in Fig. 5.6-2. These criteria were used by top-level civil servants from the Bangladeshi government, JICA experts and consultants to grade the presentations; from these, the winning presentation was selected.

In selecting the winning presentation, note was made of the significance of the theme(s) selected, and whether or not trainees had gathered enough logical data to convince executive staff of the validity of their proposals, and whether their proposals had been appropriately based on facts and not conjecture. Additionally, marks were awarded for good presentation technique (slide layout and comprehensibility, how well the trainees' spoke, etc.).

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Mymensingh Distribution Station

Khulna Distribution Station

Fig.5.6-1 Project Completion Meeting

Evaluation Sheet for PI Solving Presentation

at Conference Room, 26th(, 27th or 28th) November 2007

Scorer's Name:	

Evaluation Items

Item 1	Selection of Theme	Did he/she select a theme that must be a priority issue for his/her office?
Item 2	Analysis of Present Situation	Did he/she sufficiently describe present situation utilizing data & facts?
Item 3	Cause Analysis	Did he/she sufficiently analyze the problem and identify their causes?
Item 4	Selection of Measures	Did he/she effectively justify the most effective measures for improvement in comparison with other options?
Item 5	Implementation Plan	Did he/she formulate an appropriate implementation plan and a target?
Item 6	Presentation	Did his/her presentation illustrate the activities logically, attractively and understandably?

Evaluation Criteria

Score	5	4	3	2	1
Criteria	Excellent	Very good	Good	Mediocre	Poor

Name / Position Theme		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Total Score
1)								
2)								
3)								
4)								
5)								
6)								

Fig.5.6-2 Evaluation Criteria for PI Solving Activity

5.7 Final Presentation Conference (TQM Competition)

Chart. 5.7-1 shows Final Presentation Conference of the project. In the first year, the Final Presentation Conference was held at the Bangla-China Friendship Conference Centre. The Electric Power Secretary from MoPEMR attended on behalf of the Bangladeshi government, alongside all members of the JCC. From Japan, the Japanese Ambassador to Bangladesh attended, together with

the Director of the JICA Bangladesh Office. At this final conference, those trainees selected as outstanding gave presentations on the results of their PI activities, and a group discussion was held.

Chart 5.7-1 Final Presentation Conference of the project

	Date	
FY2007	4th/Dec., 5th/Dec.	Bangla-China Friendship Conference Center
FY2008	29th/May	Spectra Convention Center
FY2008	25th/Jan.	Spectra Convention Center
FY2009	27th/May	Spectra Convention Center

Opening Speech by Japanese Ambassador to Bangladesh

Opening Speech by MoPEMR Secretary

Presentations by Trainees

Guests

Prize Awarded for Best Presentation

Closing Comments from Chief Representative of JICA Bangladesh Office

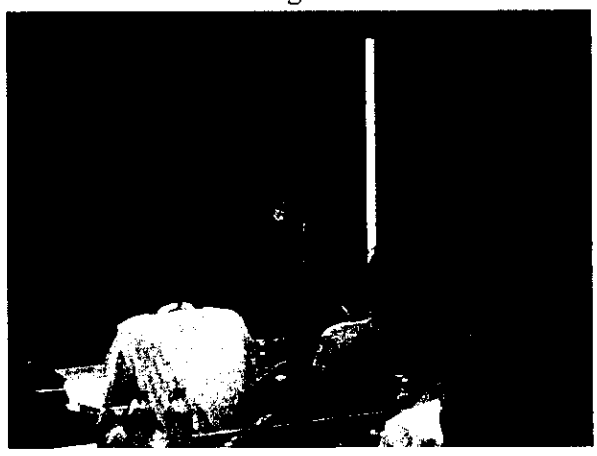


Fig.5.7-1 TQM Convention

5.8 Joint Coordination Committee (JCC)

The Joint Coordination Committee (JCC) was scheduled to meet at least once annually; in the project's first year, the JCC met once, then twice in the second year (May 31, 2007 and December 5, 2007), twice in the third year (June 1, 2008 and January 26, 2009), and twice in the final year (May 28, 2009 and September 16, 2009); a total of seven times. Most meetings were held in the BPDB headquarters (WAPDA Building), but the third meeting was held at the Bangla-China Friendship Conference Centre.

Discussions held by the JCC covered the following main topics. Once discussed, annual activity plans were approved and set in place.

- Explanation of activity performance
- Activity plans
  - Explanation, discussion & approval of mid-term management plan
  - Explanation, discussion & approval of TQM promotional plan
  - Discussion & approval of drawing up of O&M / Safety manuals
  - Planning & approval of Priority Issue Solving activities

Explanation of TQM promotional plan

Discussion on TQM promotional plan

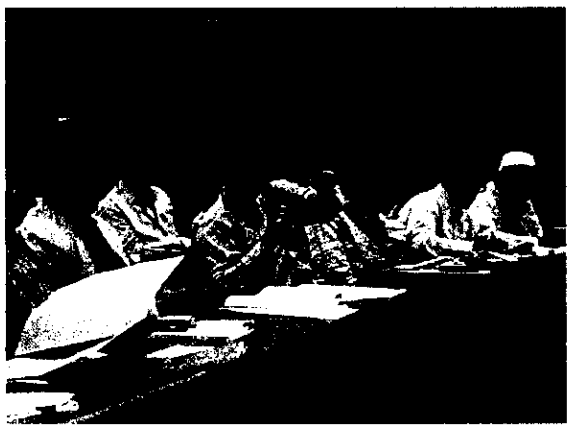


Fig.5.8-1 Joint Coordination Committee (JCC)

5.9 Training in Japan

Trainees selected as outstanding in the TQM Competition were invited to take part in TQM-based training in Japan. The objective of this training was for trainees to learn about Best Practice, by looking at the executive management methods employed by leading Japanese electrical power firms, O&M methods in the workplace, and safety management systems. In doing so, the goal was to contribute to the improvement of management practice in the Bangladeshi electrical power sector.

Training programs in Japan were carried out four times in total, between FY2006-2009, and a total of 26 trainees participated. The participants are listed in Appendix 6. Chart. 5.9-1 shows total Training Program in Japan of the project

For reference, a sample schedule of the training program held in Japan in FY2009 is shown below.

Chart 5.9-1 Total Training Program in Japan of the project

	Duration	Participants
FY2006	18th/Feb.-2nd/Mar. (13days)	4
FY2007	24th/Feb.-8th/Mar. (14days)	8
FY2008	22nd/Feb.-7th/Mar. (14days)	8
FY2009	23rd/Aug.-5th/Sep. (14days)	6
Total		26

Chart 5.9-2 Sample Schedule of Training Program in Japan

Date	Day	Time	Programme
1	**8/23 (Sun)**	**PM**	**Arrive at Tokyo**
2	8/24 (Mon)	AM	Orientation at JICA
		PM	Outline of Power sector of Japan, and TEPCO
3	8/25 (Tue)	AM	Central load dispatch center
		PM	Electrical Museum
4	8/26 (Wed)	AM/PM	Basic management (Case study)
5	8/27 (Thu)	AM/PM	Exercise for data management by using PC
6	8/28 (Fri)	AM/PM	Nissin Electric Co. (kyoto facotry)
7	**8/29 (Sat)**		**Holiday**
8	**8/30 (Sun)**		**Holiday**
9	8/31 (Mon)	AM/PM	Shin-Fuji Substation
10	9/1 (Tue)	AM	Sodegaura thermal power station
		PM	Chiba thermal power station
11	9/2 (Wed)	AM	Customer center
		PM	Centre for Power Distribution Equipment and Engineering
12	9/3 (Thu)	AM	TEPCO Training center
		PM	Preparation for Presentation (Action plan)
13	9/4 (Fri)	AM	Presentation by each Trainee (Action plan)
		PM	
14	**9/5 (Sat)**		**Depart from Tokyo**

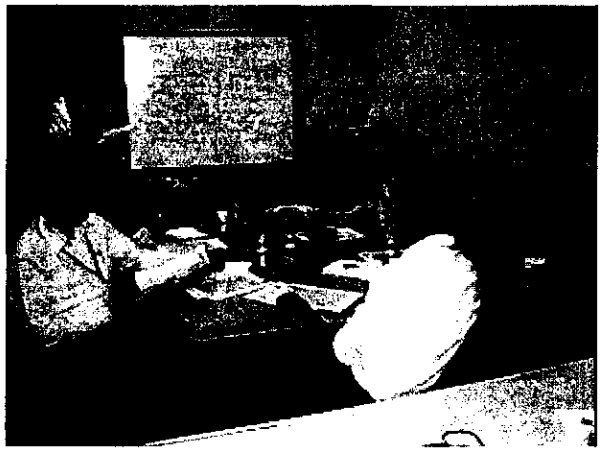
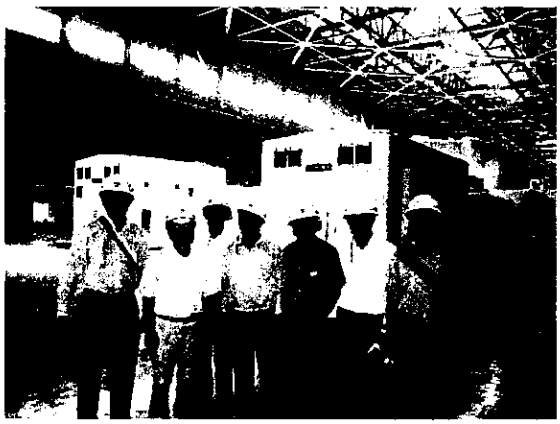
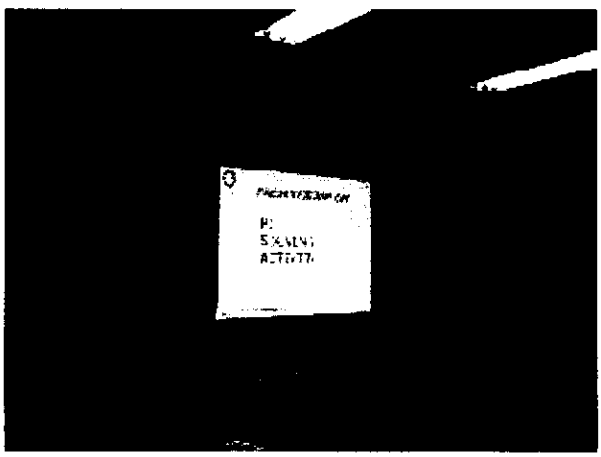
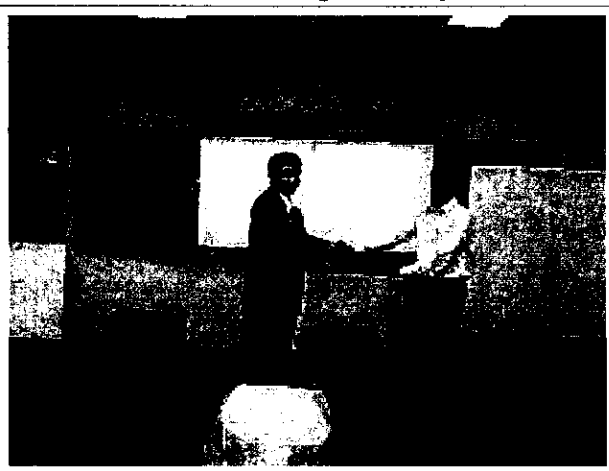
Consumer-focused PR activities (on-site seminar)	Management trainee case studies (lecture)
	
Thermal electrical power generation	Nissin Electric (on-site seminar)
	
9/4 Action Plan Presentations	9/4 Closing ceremony
	

Fig.5.9-1 Training Program in Japan

5.10 Project Literature

5.10.1 TQM Promotional Plan

An initial draft of the TQM Promotional Plan was drawn up after discussions at JCC meetings in the second year of the project. After further consideration of this draft, a second draft was submitted to the Bangladeshi government and JICA at the JCC meeting held on June 1, 2008. After further deliberation at the JCC meeting held on January 26, 2009, all comments relating to the draft were collated by the end of February 2009. The final version, in which comments were reflected, was re-submitted to the Bangladeshi government and JICA in June 2009.

5.10.2 O&M Manual

Similarly to the TQM Promotional Plan, an initial O&M manual draft was drawn up in the second year of the project. This was revised into a second draft in order to reflect the opinions of the Bangladeshi government; this second draft was submitted to the Bangladeshi government and JICA at the JCC meeting held on June 1, 2008. As with the TQM Promotional Plan above, after further deliberation at the JCC meeting held on January 26, 2009, all comments relating to the draft were collated by the end of February 2009. The final version, in which comments were reflected, was re-submitted to the Bangladeshi government and JICA in June 2009.
As shown below, the O&M Manual comprises three pamphlets, one for each of the generation, transmission and distribution segments, and has been drawn up in two languages, English and Bengali.

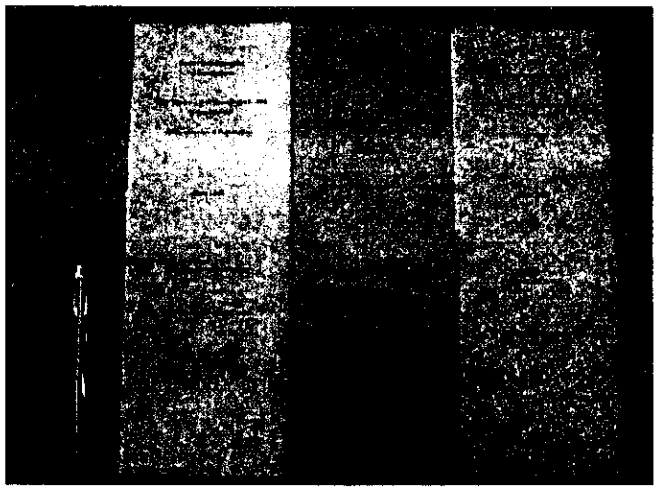


Fig. 5.10-1 O&M Manual

5.10.3 Mid-term Management Plans

In drawing up Mid-term Management Plans for each model business, executive staff at each model business engaged in discussions with JICA about the indicators shown in the relevant PDM and the associated target figures. Ultimately, these indicators and figures were then presented as part of the Mid-term Management Plans, the final versions of which were submitted to the

Bangladeshi government and JICA in June 2009.

However, it should be noted that the indices contained within the PDM bring with them certain issues, as outlined below. As such, the SAIFI and SAIDI systems are to be newly introduced to distribution companies, as appropriate indices to measure reliability in electricity distribution and customer satisfaction, rather than annual accidental interruption hours and instances. Indices have also been introduced for calculation methods. ≪

Chart 5.10-1 PDM Indices, Targets and Issues

		Current performance	Target figure (2009)	Comments
Baghabari	Reliability	95%	98%	- In terms of actual capacity, perhaps need to evaluate operational capacity rate without including periodical inspection hours - Only have two generators, so even some slight problems have a significant effect on figures
	Periodical Inspection		Running to plan	
	Other			From an efficiency perspective, perhaps a good idea to set as an index the amount of fuel consumption in relation to total power sold (in FY2005, 0.359m3/kWh for Generator 1, 0.346m3/kWh for Generator 2)
GMD Dhaka East	Total annual accidental interruption hours	130 hrs (2006)	80 hrs	- Definition and relevant facilities too vague - Target figures have been set at a decrease of 15% per year; whilst this is possible for a certain period, an annual 15% decrease cannot be maintained indefinitely, and at some point this figure will fall below
	Total annual accidental interruption instances	46 times (2006)	28 times	
	Total energy not supplied	760MWh (2006)	467MWh	
Mymensingh	Total annual accidental interruption hours	423 hrs (2005)	100 hrs	- SDD-1 (10 feeder) target figures - If possible, would prefer to use SAIFI, SAIDI indices which are clearly defined internationally and allow meaningful comparison with other suppliers (however, since no figures on current performance are available, we would
	Total annual accidental interruption instances	478 times (2005)	100 times	
	System loss	21%	15% or less	- Basis upon which target figures have been set is unclear (possibility of achieving target could be brought down to reasonable level by considering figures from Khulna)
	Payment recovery rate (C/B Ratio)	96% (2005)	100% or more	- It is possible to achieve >100% rate for a certain period, but it is unreasonable to set >100% as an ongoing target figure. - More meaningful to look at the ratio (months) for sales receivable (currently around 6 months)
Khulna	Total annual accidental interruption hours	3695 hrs (2005)	1478 hrs	- Target figures for entire Khulna operations (45 feeders) - If possible, would prefer to use SAIFI, SAIDI indices which are clearly defined internationally and allow meaningful comparison with other suppliers (however, since no figures on current performance
	Total annual accidental interruption instances	5787 times (2005)	2315 times	
	System loss	17%	11% or less	- Basis upon which target figures have been set is unclear (some doubt as to the likelihood of achievement)
	Payment recovery rate (C/B Ratio)	96% (2005)	100% or more	- It is possible to achieve >100% rate for a certain period, but it is unreasonable to set >100% as an ongoing target figure. - More meaningful to look at the ratio (months) for sales receivable (currently around 6 months)

System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) are internationally recognized indices which calculate average SAIFI and SAIDI per customer as follows:

$$SAIFI = \frac{\sum_i (Number\ of\ customers\ affected\ by\ each\ outage)_i}{(Total\ number\ of\ customers\ of\ the\ Distribution\ Office)}$$

$$SAIDI = \frac{\sum_i ((Duration\ of\ each\ outage)_i \times (Number\ of\ customers\ affected\ by\ each\ outage)_i)}{(Total\ number\ of\ customers\ of\ the\ Distribution\ Office)}$$

5.10.4 Project Promotional DVD

In order to publicize project results at businesses other than the original four model businesses, and in order for JICA to showcase the achievements of the project in terms of Good Practice, a promotional DVD (English language only) was produced.

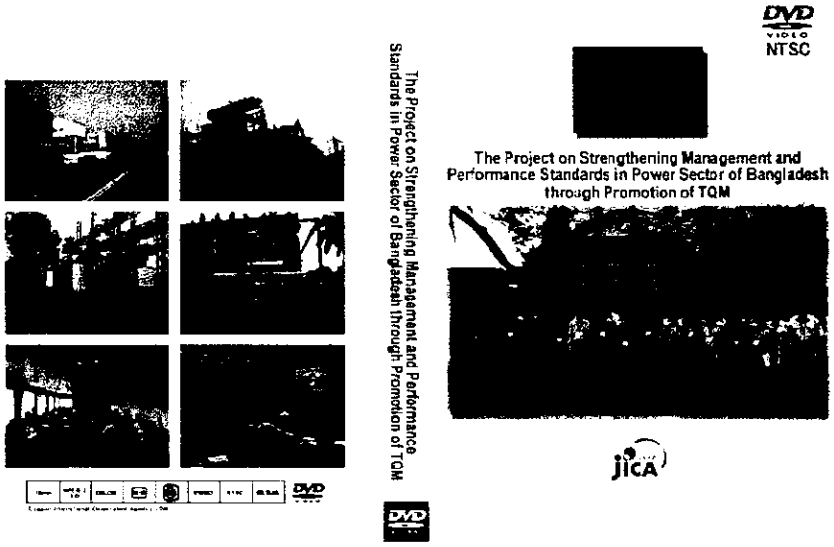


Fig.5.10-2 Project Promotional DVD

Section 6 Project Performance and Achievements

6.1 The Establishment of TQM in Model Businesses

6.1.1 Establishment and Current Implementation of Policy Management

The final JCC meeting confirmed that, based on the Mid-term Management Plan submitted as part of this project, the Mid-term Management Plan was in the process of being established and would continue to be promoted as such in the future. Moreover, at the meeting it was also confirmed that policy and management indicators were well on the way to being properly established. Additionally, there has been a shift towards the clarification of objectives and management indicators for each specific QC cycle, with the TQM Promotion Offices located in each model business taking principle responsibility for such activity.

In the distribution sector, this project has pushed hard for the introduction of the SAIFI and SAIDI indices, which measure distribution reliability and customer satisfactory. As a result, the distribution department at BPDB, and WZPDCL executive management have announced, at the final JCC meeting, their intention to calculate and manage SAIFI and SAIDI figures each year, in all of their businesses and departments, not just those which took part in the project as model businesses.

6.1.2 Establishment and Current Implementation of Day-to-day Management

Comments from the executive management of model businesses in the final JCC meeting of the project confirmed that the O&M Manuals produced and submitted as a result of this project are already proving useful in the achievement of policy and manual indicators in model businesses. Moreover, pocket-sized O&M manuals, written in the local language, have been distributed to all on-site staff; real improvements in work performance can be expected.

6.1.3 Content of Priority Issue Solving Activity

The content of priority issue solving activities undertaken throughout the entire project period is outlined in Appendix 5. In the fourth year of the project, many businesses aside from the model businesses were involved in problem solving activities, which suggests that TQM practices are becoming established throughout the entire electric power sector in Bangladesh. More details will be given in the next section. Moreover, BPDB, PGCB and WZPDCL will hold pan-company annual meetings designed to ensure the continuation of TQM activities, presenting awards to outstanding TQM practitioners.

6.2 Establishment of TQM in Other Businesses

6.2.1 Creating Systems and Frameworks to Popularize TQM to Other Businesses

It was confirmed in the presentation of the executives at the final JCC meeting that, with a focus on the activities of TQM Promotion Offices, plans were in place for the popularization of TQM practices to businesses other than the model businesses originally selected for the project.

At BPDB, several organizations are already implementing PI Solving activities, in addition to those selected as model businesses, such as the Chittagong and Ghorasal generators, and the Chittagong and Sylhet transmission facilities.

With regards to PGCB and WZPDCL, both companies are proactively developing the expansion of TQM training into departments and facilities outside of model businesses; it appears that a TQM-based approach is well on the way to becoming established practice. At PGCB, in particular, since the beginning of FY2006 TQM trainees have also been selected from the GMD Dhaka North and Dhaka South transmission facilities, in addition to those from the original model business of GMD Dhaka East Transmission Station; TQM-based practices have been introduced at these two facilities, too. Moreover, the scope of departments and facilities at which TQM-based activities are being introduced had been gradually widened, and by 2009, issue solving activities are being implemented in every single area of the company.

Of these two companies, the number of TQM trainees participating from departments outside the model businesses originally selected have been as follows:

PGCB: 2007, 3 out of 7 / 2008, 9 out of 10 / 2009, 4 out of 4

WZPDCL: 2007, 1 out of 5 / 2008, 1 out of 6 / 2009, 5 out of 5

BPDB, too, selected 3 trainees in 2008 that were not affiliated to model businesses, and 7 in 2009. From the power generation segment, EGCB sent one trainee in 2008 and one in 2009 to participate in training activities, and NWPGCL sent two trainees to take part in the 2009 program.

6.2.2 TQM Promotional Framework for Disseminating the PI Activity-based Model to Other Businesses

TQM Promotional Offices are aware of the importance of the lateral spread of PI Activities, such as have been introduced into model businesses. These offices are currently considering which methods could best be put in place to support and encourage proactive implementation of such practices in the future. Furthermore, the TQM Promotional Plan, the submission of which comprised part of this project, was confirmed at the JCC meeting of January 26, 2009 to have been approved for roll-out across all Bangladeshi electrical power companies. It is likely we will see the establishment of a top-down TQM promotional framework in the very near future.

6.2.3 Securing OJT Instructors for TQM Promotion

Persons who took part in Instructor Training (ToT) as part of this initial project are listed in Appendix 4; they are stationed in each of the model businesses that participated. Looking at specific figures, whilst there were no people eligible to take part in this training at the beginning of the project, by 2008, a total of 13 people underwent training, and 15 people in 2009. These new instructors have a vital role; not simply to provide instruction to new trainees, but also to take on operational roles in the Progress Report Meetings that take place at their respective businesses, and to provide useful and motivating advice to new trainees. Additionally, they will be involved in the arrangement of Progress Report Meetings, Final Reporting Conferences on PI Solving Activity, and TQM Competitions. Their future role is as trainer and instructor in their place of work, and as such we can confidently state that a framework in which new trainees can be fostered has been successfully established.

6.3 Index Trends

6.3.1 Baghabari Power Station (BPDB)

Trends in index-based performance at Baghabari Power Station are shown in Figs. 6.3-1 and 6.3-2; these clearly show that the interruption frequency per unit is steadily improving. However, there was no improvement in the level of fuel consumption per kWh. However, monitoring is taking place to ensure that improvement in this area will be seen in the near future, and to confirm that the desired effects of project participation are indeed being realized.

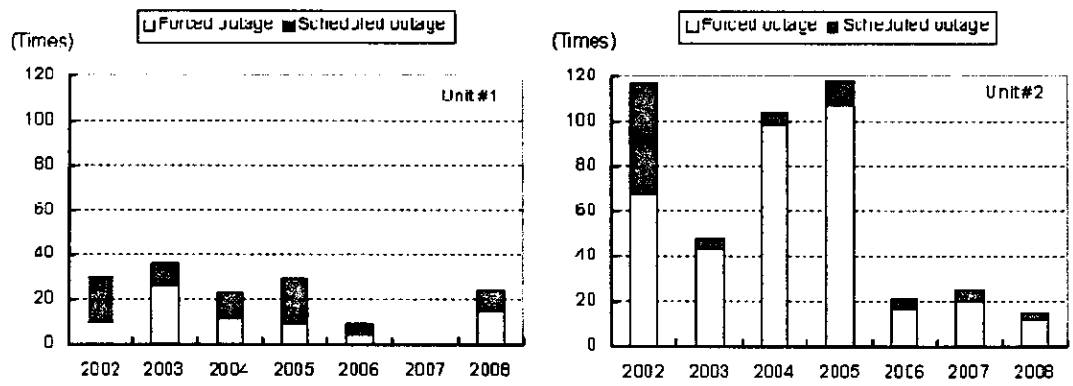


Fig. 6.3-1 Outage Frequency per Unit

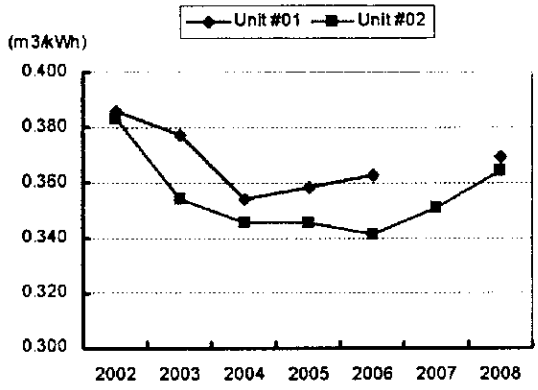


Fig. 6.3-2 Fuel Consumption per kWh

6.3.2 GMD Dhaka East Transmission Station (PGCB)

Trends in index-based performance at GMD Dhaka East Transmission Station are shown in Figs. 6.3-3 and 6.3-4; these clearly show that performance has improved across the board. However, improvements, by nature, show themselves incrementally; it is vital that index monitoring continues, to confirm that the desired effects of project participation are indeed being realized.

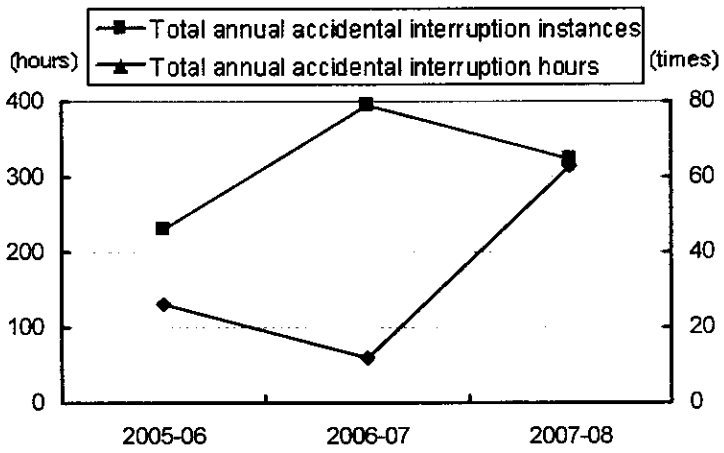


Fig. 6.3-3 Annual accidental Interruption Hours and Frequency

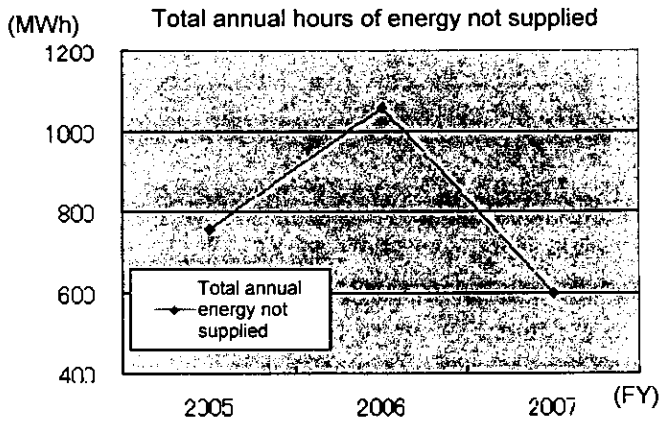


Fig. 6.3-4 Annual Energy Not Supplied

6.3.3 Mymensingh Distribution Station (BPDB)

Trends in index-based performance at Mymensingh Distribution Station are shown in Fig. 6.3-5; all indications are that performance is improving. However, improvements, by nature, show themselves incrementally; it is vital that index monitoring continues, to confirm that the desired effects of project participation are indeed being realized.

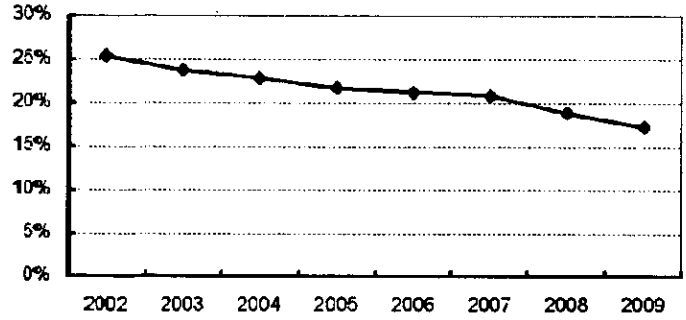


Fig. 6.3-5 System Loss

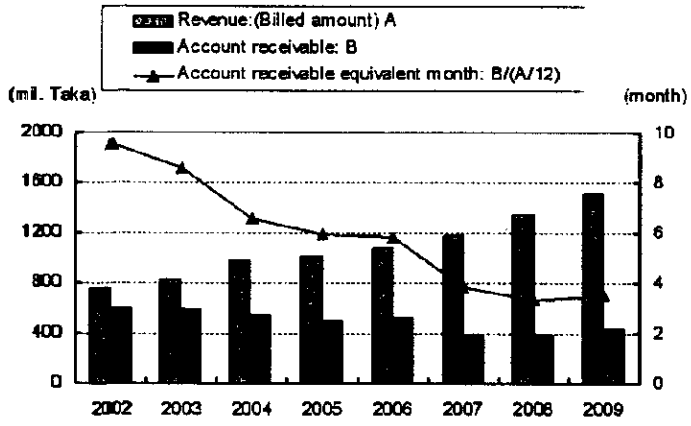


Fig. 6.3-6 Payment Recovery Period

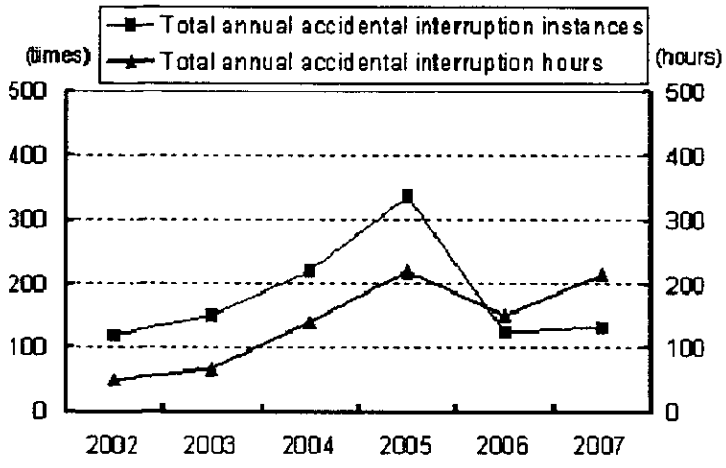


Fig. 6.3-7 Annual accidental Interruption Hours and Frequency

6.3.4 Khulna Distribution Station (WZPDCL)

Trends in index-based performance at Khulna Distribution Station are shown in Fig. 6.3-8; all indications are that performance is improving. However, improvements, by nature, show themselves incrementally; it is vital that index monitoring continues, to confirm that the desired effects of project participation are indeed being realized.

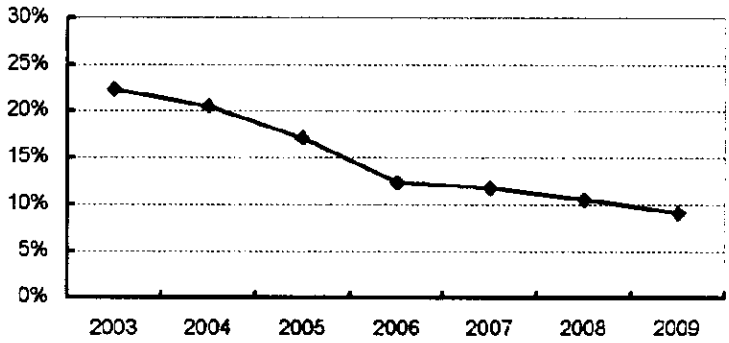


Fig. 6.3-8 System Loss

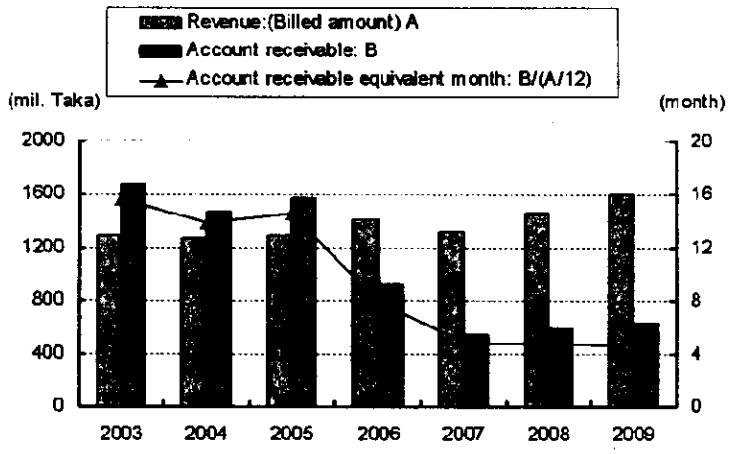


Fig. 6.3-9 Payment Recovery Period

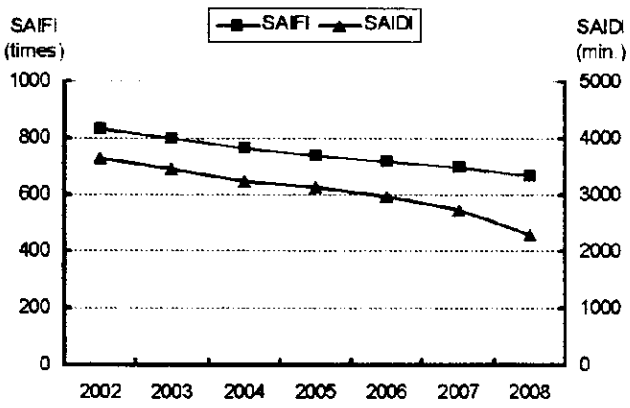


Fig. 6.3-10 SAIFI and SAIDI

6.4 Project achievements based on PDM Index Trends

Since a TQM project is not the activity that raises directly the numerical value shown with the PDM Index but a project that aims at an overall bottom rising, there is the feature that an effect appears gradually. For this reason, it is difficult to evaluate the result of the whole project only by change of the PDM Index value. The consideration of project achievements based on PDM Index Trends in this time is follows.

(1) Index Trends

The PDM index adopted this time is an index of only the model businesses. The performance of indices shown at the beginning of the project in the PDM is shown below.

Chart 6.4-1 PDM Index Performances

Model business	Index	Score at previous evaluation	Actual Performance	Target figure (2009)
Baghaberi Power Station	Reliability	95%	Unit #01: 99% (2009) Unit #02: 99% (2009)	98%
	Periodical Inspection	–	Running to plan	Running to plan
	Other	–	–	–
GMD Dhaka East Transmission Station	Total annual accidental interruption hours	130 hrs (2006)	315 hrs (2008)	80 hrs
	Total annual accidental interruption instances	46 times (2006)	65 times (2008)	28 times
	Total energy not supplied	760 MWh (2006)	599 MWh (2008)	467 MWh
Mymensingh Distribution Station	Total annual accidental interruption hours	423 hrs (2005)	–	100 hrs
	Total annual accidental interruption instances	478 times (2005)	–	100 times
	System loss	21%	17.4%	<15%
	Payment recovery rate	96% (2005)	96% (2009)	>100%
Khulna Distribution Station	Total annual accidental interruption hours	3695 hrs (2005)	–	1478 hrs
	Total annual accidental interruption instances	5787 times (2005)	–	2315 times
	System loss	17%	9.2%	<11%
	Payment recovery rate	96% (2005)	96% (2009)	>100%

TEPSCO
TEPCO

＜Baghaberi Power Station＞
Reliability and Periodical Inspection have attained the original desired value. This is the result of making the pocket edition local language manual, having carried out OJT training, and having raised the skill level of the operation stuffs in one's PI Solving activities. In addition, it is thought that effects, such as having listed the upper and the lower limit of each parameter in order to discover a foretaste of an facility accident in an early stage, and having aimed at common knowledge to the operation stuffs.

＜GMD Dhaka East Transmission Station＞
Before this project initiation, only what resulted in supply outage was totaled about total annual accidental interruption hours and total annual accidental interruption instances. However, from a viewpoint of preventing an equipment accident, since what results in supply outage, and the case of outage or not (for example, it is a case of single circuit accident at multi circuit power line) does not need to be divided, after agreeing with PGCB, we decided to total altogether. So, total annual accidental interruption hours and total annual accidental interruption instances increased compare with the value at the initial evaluation time, and it has deviated greatly with the desired value.
On the other hand, although a desired value is not reached about the total energy not supplied, which has big influence to a customer, it is decreasing rather than the value at the initial evaluation time.
In PI Solving Activity, there are many challenges to reduce facility accidents, and it has achieved results. It is teaching so that the above-mentioned contents of activity may be propagated within PGCB from the 2008 fiscal year, and it is assumed that supply outage continues to decrease steadily.

＜Mymensingh Distribution Station＞
Although the system loss is not given to a desired value, it is decreasing more sharply than the value at the initial evaluation time, and is considered to progress towards an improvement. This is the result of aiming at correspondence finely to one-house the customer of one house about the checking stealing power, incorrect inspection of a meter, inaccurate meter which is case of non technical loss, and is one of the achievements of this TQM project.
In addition, although it asked for offer of the data of actual performance from the Mymensingh Distribution Station about total annual accidental interruption hours and total annual accidental interruption instances, the definition and scope in the numerical value at the initial evaluation time were indefinite, verification of the numerical value in an initial evaluation time was not completed, and the trend of the numerical value by the same definition and scope was not able to be followed.
According to the data, which received offer from the Mymensingh Distribution Station, total annual accidental interruption hours of a 33-kV level are 220 hours (2005) and 215 hours (2007), total annual accidental interruption instances of a 33-kV level are 336 times (2005) and 131 times (2007). The newest performances are stabilizing or decreasing from the numerical value at the initial evaluation time in 2005. It is considered what has the accident comparatively large to total

annual accidental interruption hours of that in which total annual accidental interruption instances decreased sharply for which the cause by which an improvement was hardly mostly regarded as the numerical value at the initial evaluation time on the level requires time by restorations, such as a natural disaster like large cyclone, and damage by fire of a transformer.

＜Khulna Distribution Station＞

A system loss decreases more sharply than the value at the initial evaluation time, and below the desired value has become. This is the result of aiming at correspondence finely to the cause of generating of a non-technical loss like the Mymensingh Distribution Station, and is one of the achievements of this TQM project.

In addition, although it asked for offer of the data of actual performance from WZPDCL about total annual accidental interruption hours and total annual accidental interruption instances, the definition and scope in the numerical value at the initial evaluation time were indefinite, verification of the numerical value in an initial evaluation time was not completed, and the trend of the numerical value by the same definition and scope was not able to be followed.

According to the data, which received offer from WZPDCL, total annual accidental interruption hours in Khulna Distribution Station are 1687 hours (2005) and 1502 hours (2008), total annual accidental interruption instances in Khulna Distribution Station are 1414 times (2005) and 1205 times (2008). The newest performances are decreasing from the numerical value at the initial evaluation time in 2005.

(2) Project achievements based on the new index item proposed in the middle administrative plan

As indicated in Part 5.10.3 of Section 5, suggestions were made to introduce new indices for measuring performance, via the Mid-term Management Plan submitted to and discussed with both the Bangladeshi government and JICA. And it has agreed with them.

Especially to all the power distribution station of BPDB and WZPDCL, we decided to aim at introduction of SAIFI and SAIDI, which measures the level of electric supply reliability and customer satisfaction. Although these are indexes completely introduced newly in Bangladesh, they are desirable for release data regularly in official announcement data, such as Annual Report and Web Site.

The performance of these proposed newly is shown below.

Chart 6.4-2 New Index Performances proposed in the Mid-term Management Plans

Model business	Index	Score at previous evaluation	Actual Performance
Baghaberi Power Station	Fuel consumption per unit sales	#1 0.359m3/kWh (2005) #2 0.346m3/kWh (2005)	#1 0.369m3/kWh (2008) #2 0.364m3/kWh (2008)
	Number of Forced Outages	#1 9 times (2005) #2 107 times (2005)	#1 15 times (2008) #2 12 times (2008)
	Duration of outage (Forced + Planned)	#1 841 hrs (2005) #2 807 hrs (2005)	#1 618 hrs (2008) #2 227 hrs (2008)
GMD Dhaka East Transmission Station	Duration of outage (Forced + Planned)	773 hrs (2006)	1105 hrs (2008)
	Total annual outage	760MWh (2006)	599MWh(2008)
Mymensingh Distribution Station	System loss	21.7% (2005)	17.4% (2009)
	Account receivable against monthly sales	6.0month (2005)	3.5 month (2009)
	SAIFI	—	—
	SAIDI	—	—
Khulna Distribution Station	System loss	17.1% (2005)	9.2% (2009)
	Account receivable against monthly sales	14.6 month (2005)	4.7 month (2009)
	SAIFI	739 times (2005)	662 times (2008)
	SAIDI	52.1 hrs (2005)	38.4 hrs (2008)

< Baghaberi Power Station >

The Fuel consumption per unit sales is increasing a little, and efficiency is getting worse. Although it is also considered that only efficient employment has not been performed, since this is considered factors, such as an increase in the operation situation in middle load and a fall of a gas-pressure cable, after fully analyzing a cause, it is necessary to cope with it.

The number of Forced Outages and Duration of outage are stabilizing or decreasing. Especially in No. 2. it decreased sharply, and has fitted in the level low No. 1 or 2.

< GMD Dhaka East Transmission Station >

Although total annual outage is increasing, Duration of outage is decreasing rather than the value at the initial evaluation time, and it is thought that the stop (or there is very little outage) without outage is increasing.

＜Mymensingh Distribution Station＞
As compared with 2005 year, Account receivable against monthly sales and system loss has improved sharply.
Although introduction was started about SAIFI and SAIDI at some branches in a place of business, it has just still introduced newly and the track record value as a Mymensingh Distribution Station has not come out at present. (Although it is possible to trace back and calculate the past track record value, at present, it is not carrying out to there.)

＜Khulna Distribution Station＞
As compared with 2005 year, Account receivable against monthly sales and system loss has improved sharply.
About SAIFI and SAIDI, under a division general manager's powerful instruction, since the past track record value was traced back and calculated, the track record value from the past (2002) to the present has come out. According to it, SAIFI and SAIDI are decreasing gradually and are considered to progress towards an improvement.

(3) Project achievements which does not appear in a PDM index

The themes that were selected for examination by trainees as part of this project were done so on the basis of those same trainees considering them to be issues of utmost priority, that demanded resolution. As such, some of the themes selected did not have any direct relation to the indices stipulated in the PDM. However, finding solutions to these themes remains an exercise that may provide crucial in the resolution of the many problems that affect contemporary Bangladesh, and whilst some may not have contributed directly to any improvements in PDM-based indicators, nevertheless most represent a significant contribution to the overall improvement of managerial practice in the Bangladeshi electric power sector.
Some specific examples are outlined below:

Chart 6.4-3 Sample theme of good PISA

Place	Name	Theme	Activities implemented
Baghabari	Md. Alauddin	Improvement of generation capacity up to the design level in summer	During the summer months, output peaks at 80MW, falling well short of maximum design value (100MW). Viewing this as problematic, I worked to increase generation capacity a further 20MW by implementing appropriate measures.
Baghabari	S.M Farhad Hussain	Improvement of operator's technical	Taking note of the generally low level of technical knowledge seen amongst operators, I worked to improve the technical

		knowledge	capabilities of operators, whilst constructing a framework that would allow even those operators with poor technical knowledge to recognize abnormalities and respond appropriately.
Baghabari	Md. Mostafa Al-Mamun	Improvement of efficiency of self-cleaning inlet air filtration system for 100MW GT	The self-cleaning inlet air filtration system does not always function correctly; I looked to improve the system, whilst implementing a longer cycle for filter replacement, thus reducing O&M costs.
PGCB	Nityananda Banik	Low Voltage	Voltage often drops below standard values. I have put in place countermeasures from a facilities and operational perspective, and worked to resolve the low voltage problem without requiring large-scale investment.
PGCB	Md. Mustafa Musharraf Khlid	S/S energy consumption is high	Energy consumption within substations has been problematically high; I have analyzed the reasons behind this, and put in place measures to mitigate loss.
PGCB	Md. Monjur Morshed	Hot spot/red hot at different points of Modunaghat 132 k V ring bus	When a certain part of the Modunaghat substation outs, peripheral transmission equipment becomes partially unable to transmit. Having tested and compared several measures designed to improve this problem, I have put the most effective measure in place, and managed to avoid generation becoming limited.
WZPDCL	Md. Kamuruzzaman	Improvement low voltage	Noticing that voltage tends to be lower than standard levels, I have implemented facilities and operational-based countermeasures and improved the low voltage issue.
WZPDCL	Krisna Das Saha	Customer excess load regularization	Fees for excess load paid by customers according to the kW amounts used have not been revised since the very early contracts; considering this problematic, I designed a system that revises fees regularly, in an attempt to stabilize income.

Mymensingh Distribution Station	A.B.M. Faruk Hosain	Customer excess load regulation	As above

The ultimate objective of this project was to establish TQM practices in all distribution facilities throughout the Bangladeshi electric power sector. From this perspective, it can certainly be said that, from the second year of the project onwards, the scope of TQM-based activities has expanded steadily, spreading beyond the model businesses selected for the project. However, any results from these activities, whilst welcome, fall outside the of the project model businesses, and therefore do not contribute, nor are relevant, to the PDM target figures, and the improvements demanded of such, set at the beginning of the project. However it introduced positively through this kind of lateral spread, we have seen the gradual establishment of TQM-based practices in non-model businesses.

Section 7 Conclusions and Comments

7.1 A Summary of Project Achievements

For just under three years, between December 2006 and October 2009, and with no small amount of trial and error, various activities and projects were carried out as part of this project. What was consistent throughout the project, however, was the practical transfer of technology; that is, technology transfer based on OJT. Activities such as residential training, on-site OJT, and Activity Report Meetings served to provide project counterparts with a platform for practical training, and were carried out for a single purpose: to create an unrivalled opportunity for effective OJT. At residential training programs, for example, emphasis was placed on discussions and practice-based exercises; trainees were there to experience, not just to listen. Equally, with project counterparts now moving onto independently-driven activities, efforts were made to ensure that the project facilitated the creation of all the systems, frameworks and documentation necessary for the successful continuation of TQM practices.

It is possible to summarize the achievements of this project as follows:

- Successful technology transfer to counterparts and trainees
- Creation of manuals required for sustainable TQM promotional activities
- Construction of TQM promotional framework

Specifically, success in technology transfer to counterparts and trainees, which has already been discussed briefly in Section 6.2.3, has been particularly noteworthy for the following:

(1) trainees from previous years are cultivated into instructor roles, thus becoming able to teach new trainees;
(2) in addition to fulfilling significant roles in the operation of Progress Report Meetings in the workplace, these instructors are also able to comment on presentations made by new trainees and provide guidance proactively;
(3) instructors are also able to assist as facilitators at Progress Report Meetings, PI Solving Activity Final Reporting Conferences, and TQM Competitions.

Looking now at achievements in terms of the creation of manuals required for sustainable TQM promotional activities, and the construction of a TQM promotional framework, achievements of note include:

(1) the drawing up of the TQM Promotion Plan, O&M Manuals, and the Mid-term Management Plan;
(2) the confirmation, at the final project JCC meeting, that executive staff in model and other businesses were intending to actively continue to promotion good TQM practice in the future, and push forward with the Mid-term Management Plan.

Finally, Appendix 7 details the contribution that PI Solving Activity undertaken by project trainees has made to PDM indicators. It should be noted, however, that improvements, by nature, show themselves incrementally; they are related qualitatively, not quantitatively, to the degree of contribution made. As such, it is vital that index monitoring continues, to confirm that the desired effects of project participation are indeed being realized.

7.2 Comments

Various issues came to light in the process of operating this project. These included:

(1) technical knowledge and skills failing to take root in the workplace as a result of personnel transfer;
(2) difficulties in securing the funds required for TQM promotional activities;
(3) widespread failure to make use of manuals.

Improvements can be made in these areas by focusing on mid-level managerial staff, who are key to reform in the electrical power sector. The fact remains, however, that any such improvements are rendered meaningless without the support and understanding of top level executives; the staff, in other words, with decision-making powers. As such, Top Management Training was also carried out, with a focus on changing the opinion and approach of executive level staff.

7.2.1 On Sustainable TQM Promotional Activities

In terms of advice that can be given in order that the achievements of this project be utilized to maximum effect, and that TQM promotional activities are operated sustainably and effectively, we can offer the following:

(1) Ongoing Work Opportunities for Trained Personnel

Effective strategies need to be put in place to ensure that the technology that has been transferred is nurtured. Technical knowledge and skill is something that can be fostered within people – staff – and it is a resource that will ultimately be of benefit not simply to the electrical power sector but to the entire country. It is easily lost, however, unless adequate measures are implemented to ensure such knowledge and skill is shared and correctly applied.

Once lost, it is extremely difficult to reconstruct. Therefore, the project has advised the BPDB and the model businesses who participated to ensure that those staff members who have received training are supplied with appropriate and ongoing work opportunities or programs. In this way, trained personnel can, in turn, train a new generation of staff, creating a positive cycle. This cycle will firm into a strong foundation of technical knowledge within the Bangladeshi electrical power sector, improving the chances for smooth and efficient sectoral reform.

(2) Securing funds for TQM promotional activities

Executive management at BPDB, PGCB and WZPDCL need have a clear understanding of the cost-saving benefits that ultimately result from any capital investment in the practical operation of TQM promotional activities; moreover, they need to be able to secure the necessary funds in order to facilitate a robust and effective program of TQM activity.

(3) Utilizing tangible project results

The project has resulting in the production of manuals and other tangible items. From now on, if relevant parties operate and manage projects according to those manuals, then the

sustainability of facilities should be guaranteed. As such, it is necessary to ensure that an environment is created in which these tangible products can be utilized effectively.

(4) Monitoring of Mid-Term Management Plan Indices

TQM-based improvements, by nature, show themselves incrementally. As such, it is vital that index monitoring continues, of those figures outlined in the Mid-term Management Plan. Monitored figures and indices can then be used to considerable effect in future sales and planning.

(5) Further Support Potential

Those organizations which were not initially selected as model businesses for this project (e.g. NWPGCL) have not been shy to call out for support from a similar type of project. It is more than possible for a similar project to be carried out, one which, again, is geared towards the encouraging the adoption of TQM activities throughout the entire electrical power sector in Bangladesh. Such a project would be possible through the participation of former project trainees; the appropriate use, in other words, of peer-based instruction. At the same time, however, the electrical power sector in Bangladesh must aim to improve distribution reliability and customer satisfaction; there is scarce enough capital to go round. It must focus on providing support to companies and departments seeking to improvement their overall corporate management. In terms of specific measures of support, appropriate projects might include those focusing on advanced technology, such as that required for the assessment of remaining service life for equipment and facilities, exploratory skills for identifying accident sources in transmission lines, and methods for distribution lines without interruption.

7.2.2 On Launching Similar TQM Projects in Other Countries and Industries

(1) Project Objectives and Implementation Methods

The objective of the TQM project was to encourage an attitudinal change in project counterparts, and to create a foundation upon which future TQM and PI solving activities could be carried out, on an ongoing basis, even after project-related experts had withdrawn their day-to-day support. In order to do so, the project was not geared towards the identification or submission of solutions; rather, it focused on providing counterparts with the skills and knowledge required to find such solutions themselves. The adoption of such an approach, in other words, allowed counterparts to develop the capabilities required to identify and present solutions proactively.

Initially, some counterparts approached project experts with requests for help and advice on the formulation of issue resolutions. However, these same experts refused to provide direct or concrete responses, limiting themselves to useful hints and tips. It is easy to present a clear and direct solution to a problem based on case studies from Japan or elsewhere; but because it is easy it removes the need to think for oneself, and generate a situation-specific solution. As such, once the experts have left, counterparts would have found themselves in quite the same position as they had been previously.

(2) The importance of indices selected and the difficulties of index management

A particular distinction of this project was its expression of the PDM on a numerical level. The results of project activities were managed numerically, according to pre-determined indices; this was crucial to the project design. When attempting to evaluate the success of a project based on numerical indices, it is necessary to ensure that the indices selected meet the following conditions:

- Indices match the priority targets of the project
- All relevant parties are satisfied with the indices (e.g. JICA, counterparts, consultants)
- Definitions and facilities where index management is to be implemented are clear
- Previous trends in the relevant figures can be referred to (data is being collected)

The indices selected for this project caused certain issues, as shown in Chart 5.10-1. Furthermore, since a TQM project is not the activity that raises directly the numerical value shown with the PDM Index but a project that aims at an overall bottom rising, there is the feature that an effect appears gradually. For this reason, it is difficult to evaluate the result of the whole project only by change of the PDM Index value.

In addition, when it is considered as the index of only the model businesses, although the PDM Index of the model businesses is necessary, it is important to accomplish the project based on not only the PDM Index of the model businesses but also the high order target "All the power industry companies' operation, maintenance, and management ability turned for improving by spreading the result of a project".

(3) Input from Persons Other than Experts

Japan provided input into this project in a number of ways, aside from the dispatch of experts to model businesses taking part in the project. That input was as follows:

- Support from long-term experts
- Lending of equipment, e.g. PCs (PCs, projectors, digital cameras, printers, etc.)
- Appointment of local consultants
- Implementation of Training Programs in Japan
- Running of TQM Competitions (Venue costs)

This input combined to great effect, and it is likely that the subtraction of just one of these elements would have significantly and adversely affected the satisfactory results of the project. Looking at the lending of equipment, for example, one set of equipment was lent to each model business; this had not been included in the original budget, however, and during the project implementation period, these were purchased using budgetary surplus from a different project. In the future, when operating projects under similar conditions, it would be better practice to consider the level of IT equipment, such as PCs, present in the relevant counterpart, determine whether or not the level of IT equipment is acceptable and, if not, include funds for such equipment-based support in the budget from the beginning of the project.

Bangladeshi input comprised the provision of trainees to participate in training, amongst other elements. Trainees were not required to meet any criteria other than being mid-level managerial staff, and selection was left entirely to the Bangladeshi side. The ages of trainees were quite diverse, ranging from people in their twenties to those in their fifties; the younger people may have had relatively slim experience, but certainly made up for it with their enthusiastic approach to TQM training and PI activities. In the future, it would be preferable to see the age of eligible trainees capped at around 40, particularly when considering their potential role as future instructors for younger trainees.

Another significant element of the Bangladeshi contribution was the involvement of senior staff, the superiors of the participating trainees. In particular, there was strong involvement from the very top level of management, such as Managing Directors, and it would be no exaggeration to say that the enthusiastic participation of such executive staff has been a key to the success of this project.

7.3 Lessons Learnt

Over the course of its three years, this project has provided a number of useful lessons of which we should take note.

(1) The importance of providing opportunities to use technology and technical skill

Much of this project was spent working hard to facilitate effective technology transfer to counterparts and target groups. We learnt that it was most effective to then provide these people and groups with practical opportunities to try out and utilize the technological know-how transferred to them. Effective technology transfer requires a good balance between lectures and practical training; a balanced combination of the two will prove effective in establishing the technology being transferred.

(2) The importance of capacity building throughout mid-level management

Mid-level managers often find themselves without the time necessary to work hardly on organizational reform or provide guidance to their staff. In order to see the organization itself grow in efficiency, then, it is vital to encourage capacity building amongst mid-level management that will allow them to develop into central figures able to both operate the organization effectively and provide pertinent instruction and guidance to staff.

(3) The importance of using local consultants

This project only had a limited number of experts to dispatch for a limited number of days. In order to make the most of these limited resources, the emphasis was firmly placed on encouraging model businesses to generate solutions independently and proactively through project trainees. Project trainees were required to give regular updates on their activities to executive staff throughout the project, and in order to ensure that this was the case a system of monthly Progress Report Meetings was established. At the beginning of the project, however, this system failed to function effectively, with both sides unable to schedule meetings due to the required experts not knowing when they would be available to visit. To

combat this, therefore, local consultants were hired; these consultants represented the views of experts in meetings, arranged the schedule for the monthly Progress Report Meetings, encouraged executive staff to participate, and gave comments and advice. Their role in the success of the project has been significant.

(4) The importance of incentives

Training Programs in Japan were held four times throughout the project. For the first Program, the Bangladeshi government set the criteria by which trainees were selected. For the second, third and fourth Programs, however, consultants recommended those trainees who had performed outstandingly by winning TQM Competitions to participate on the Program. The Bangladeshi government, in turn, honored these recommendations and selected the competition winners as the Japan Training Program participants. All trainees were aware of this system, and it functioned as a strong incentive for the Bangladeshi students, motivating them to strive for excellence in their PI Activities.

Appendix 1

Appendix 1

Expert Dispatch Records (1/2)

Field	Expert	2007												2008		
		12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
TQM expert	Noboru SEKI																
	Akiko HIDA																
O&M Expert (Power Generation)	Kiyoshi KATAOKA																
	Syuichi HIRAYAMA																
	Toshiyuki KOBAYASHI																
O&M Expert (Transmission & Substation)	Hideki KIBATA																
	Kenichi KITAMURA																
O&M Expert (Distribution)	Takahisa MURATA																
	Masahiko TADA																
	Keiichi FUJITANI																
	Takeshi KAKEYA																
	Toru UENO																
	Toshifumi KARASAWA																
	Yasushi IIDA																
	Keisuke YANAGIUCHI																

Field	Expert	2008									2009								
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
TQM expert	Noboru SEKI																		
	Akiko HIDA																		
O&M Expert (Power Generation)	Kiyoshi KATAOKA																		
	Syuichi HIRAYAMA																		
	Toshiyuki KOBAYASHI																		
O&M Expert (Transmission & Substation)	Hideki KIBATA																		
	Kenichi KITAMURA																		
O&M Expert (Distribution)	Takahisa MURATA																		
	Masahiko TADA																		
	Keiichi FUJITANI																		
	Takeshi KAKEYA																		
	Toru UENO																		
	Toshifumi KARASAWA																		
	Yasushi IIDA																		
	Keisuke YANAGIUCHI																		

Appendix 2

Appendix 2

Expert Dispatch Records (1/2)

Field	Expert	Dispatched Period
TQM expert	Noboru SEKI	Feb. 2 - Feb. 16, 2007
		May 29 - Jun. 19, 2007
		Nov. 23 - Dec. 7, 2007
		May 13 - Jun. 3, 2008
		Jan. 16 - Jan. 28, 2009
		May 17 - May 29, 2009
		Sep. 3 - Sep. 18, 2009
	Akiko HIDA	Jun. 1 - Jun. 16, 2007
		May 17 - May 31, 2008
		May 21 - May 29, 2009
O&M Expert (Power Generation)	Kiyoshi KATAOKA	Feb. 2 - Mar. 9, 2007
		Jun. 1 - Jun. 16, 2007
		May 16 - May 24, 2008
		May 18 - May 24, 2009
	Syuichi HIRAYAMA	Feb. 2 - Feb. 16, 2007
		Feb. 23 - Mar. 9, 2007
	Toshiyuki KOBAYASHI	Jun. 4 - Jun. 19, 2007
		Sep. 1- Sep. 14, 2007
		Nov. 23 - Dec. 7, 2007
		May 16 - Jun. 3, 2008
		Jan. 16 - Jan. 28, 2009
		May 17 - May 29, 2009
		Sep. 3 - Sep. 18, 2009
O&M Expert (Transmission & Substation)	Hideki KIBATA	Dec. 5 - Dec. 8, 2006
		Feb. 2 - Feb. 9, 2007
		Feb. 20 - Mar. 9, 2007
		May 29 - Jun. 19, 2007
		Sep. 1- Sep. 14, 2007
		Nov. 23 - Dec. 7, 2007
		May 13 - Jun. 3, 2008
		Jan. 16 - Jan. 28, 2009
		May 17 - May 29, 2009
	Kenichi KITAMURA	Feb. 2 - Feb. 23, 2007
		Jun. 4 - Jun. 16, 2007
		May 17 - May. 24, 2008
		May 18 - May 22, 2009
	Takahisa MURATA	Feb. 2 - Mar. 9, 2007
		Jun. 1 - Jun. 16, 2007
	Masahiko TADA	Nov. 23 - Dec. 7, 2007
	Keiichi FUJITANI	May 17 - May. 24, 2008
		Jan. 16 - Jan. 28, 2009
		May 16 - May 29, 2009
	Takeshi KAKEYA	Feb. 2 - Feb. 16, 2007
		Feb. 23 - Mar. 9, 2007
		Jun. 4 - Jun. 16, 2007

O&M Expert (Distribution)	Toru UENO	Nov. 24 - Dec. 7, 2007
		May 16 - May 31, 2008
	Toshifumi KARASAWA	Jan. 16 - Jan. 28, 2009
		May 18 - May 24, 2009
	Yasushi IIDA	Jun. 5 - Jun. 19, 2007
		Sep. 6- Sep. 19, 2007
		Jun. 9- Jun. 21, 2008
	Keisuke YANAGIUCHI	Feb. 2 - Feb. 16, 2007
		Feb. 23 - Mar. 9, 2007
		May 29 - Jun. 16, 2007
		Sep. 6- Sep. 19, 2007
		Jun. 9- Jun. 21, 2008
		May 16 - May 22, 2009

Appendix 3

Appendix 3

Equipment Administration for the Survey

Date of Registration (Day-Month-Year)	Name of Equipment	Specification	QTY	Unit Price (US$, BDT)	User	Condition
18-Mar-07	Digital Clamp on Power Hitester	HIOKI 3286-20	10	US$663	BPDB, WZPDCL	Transfer
18-Mar-07	Digital Clamp on Hitester	HIOKI 3282	10	US$209	BPDB, WZPDCL	Transfer
18-Mar-07	Safety Belt	Local Made	20	US$6.00	BPDB, WZPDCL	Transfer
18-Mar-07	Hand Gloves	3300 Volt resistant	20	US$3.00	BPDB, WZPDCL	Transfer
09-Sep-07	Personal Computer	Toshiba Satellite A200-A411	4	BDT 73,395	BPDB, PGCB, WZPDCL	Transfer
09-Sep-07	Digital Camera	Sony DSC-S650 (incl. battery, 2GB	4	BDT 22,250	BPDB, PGCB, WZPDCL	Transfer
09-Sep-07	Projector	Hitachi CP-RS55	4	BDT 61,950	BPDB, PGCB, WZPDCL	Transfer
10-Sep-07	Printer	Canon iP1300 (incl. spare ink)	4	BDT 8,822	BPDB, PGCB, WZPDCL	Transfer
20-Sep-07	Software	Microsoft Office 2007 (Word, Excel, PowerPoint)	4	BDT 34,650	BPDB, PGCB, WZPDCL	Transfer

Appendix 4

Appendix 4

Training Record

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
		Jitendra Chandra Acharjya	Resident Engineer (XEN)	Netrokona Electric Supply, Netrokona.	BPDB	Facilitators
		Shaikh Abul Hossain	Deputy Director (XEN)	Distribution Training Centre , Khulna.	WZPDCL	Facilitators
		Ahsan Habib	Sub-Divisional Engineer	Baghabari Power Station, Sirajgonj.	BPDB	Facilitators
		Mothaher Hossain	Assistant Manager (Tech.)	GMD-Dhaka (East), Dhaka.	PGCB	Facilitators
		Md. Faruque Ahmed	Sub-Divisional Engineer	Sales and Distribution Division (South), Mymensingh	BPDB	Trainees
		Md. Safiqul Islam	Assistant Engineer	Distribution Division, Kishorganj.	BPDB	Trainees
		Shayamal Kumar Das	Assistant Engineer	Distribution Division, Serpur	BPDB	Trainees
		Md. Ruhul Amin	Assistant Engineer	Superintending Engr.Office's O &M Circle, Mymensingh	BPDB	Trainees
		Md. Shahdat Ali	Assistant Engineer	S & D, Tangail.	BPDB	Trainees
		Md. Shahidul Islam	Assistant Engineer	Baghabari Power Station, Sirajgonj.	BPDB	Trainees
		Md. Alauddin	Assistant Engineer	Baghabari Power Station, Sirajgonj.	BPDB	Trainees
		S.M. Farhad Hussain	Assistant Engineer (Operation Division)	Baghabari Power Station, Sirajgonj.	BPDB	Trainees
		Punab Chandra Kundu	Assistant Engineer (Operation Division)	Baghabari Power Station, Sirajgonj.	BPDB	Trainees

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
2007	03/June/2007 - 07/June/2007	Md. Emdadul Haque	Sub-Divisional Engineer	Baghabari Power Station, Sirajgonj.	BPDB	Trainees
		Md. Shafiqul Islam	Sub-Divisional Engineer	S & D-1, Khulna	WZPDCL	Trainees
		Md. Nurul Haque	Sub-Divisional Engineer	S & D-3, Khulna	WZPDCL	Trainees
		Syed Sahidul Alam	Sub-Divisional Engineer	S & D-4, Khulna	WZPDCL	Trainees
		Md. Mijanur Rahman	Assistant Engineer	S & D-2, Khulna	WZPDCL	Trainees
		Shahin Akter Pervin	Assistant Engineer	Distribution Training Centre, Khulna	WZPDCL	Trainees
		Tanveer Ahmed	Assistant Manager (Technical)	GMD-Dhaka (East), Dhaka	PGCB	Trainees
		Md. Sakhawat Hossain	Assistant Manager (Technical)	GMD-Dhaka (East), Dhaka	PGCB	Trainees
		Nityananda Banik	Assistant Manager (Technical)	GMD-Dhaka (South), Dhaka	PGCB	Trainees
		Md. Monowar Hosain	Assistant Manager (Technical)	GMD-Dhaka (South), Dhaka	PGCB	Trainees
		Abdur Rouf Siddiqui.	Assistant Manager (Technical)	GMD-Dhaka (North), Dhaka	PGCB	Trainees
		S.M. Haider Ali	General Manager	Training and Career Development, Dhaka	BPDB	Observer
		Md. Abdul Wahab Khan	Director	TQM Promotion Office, Dhaka	BPDB	Observer
		ABM Abdullah	Deputy Director (XEN)	TQM Promotion Office, Dhaka	BPDB	Observer

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
		ATM Mostafizur Rahman	Deputy Director (XEN)	TQM Promotion Office, Dhaka	BPDB	Observer
		Suresh Chandra Paul	Sub-Divisional Engineer	TQM Promotion Office, Dhaka	BPDB	Observer
		Md. Shafique Uddin	Deputy Director (XEN)	Regional training Centre, Tongi, Gazipur.	BPDB	Observer
		Biswanath Sarker	Sub-Assistant Engineer	Baghabari Power Station	BPDB	Trainees
		Md. Mohabbat Hossain	Sub-Assistant Engineer	Baghabari Power Station	BPDB	Trainees
		Md. Nazrul Islam	Sub-Assistant Engineer	Baghabari Power Station	BPDB	Trainees
		Md. Mostafa Al-Mamun	Assistant Engineer	Baghabari Power Station	BPDB	Trainees
		Md. Shahab Uddin	Assistant Engineer	Baghabari Power Station	BPDB	Trainees
		Md. Abdul Basid	Sub-Divisional Engineer,	DD Sherpur, Mymensingh O&M Circle	BPDB	Trainees
		Md. Abdus Sattar	Sub-Assistant Engineer	DD Sherpur, Mymensingh O&M Circle	BPDB	Trainees
		A.B.M. Faruk Hossain	Assistant Engineer	S&D(S) , Mymensingh, Mymensingh O&M Circle	BPDB	Trainees
		Md. Lukman Hossain	Sub-Assistant Engineer	S&D D-1, Mymensingh, Mymensingh O&M Circle	BPDB	Trainees
		Md. Jahirul Islam	Assistant Engineer	Netrokona ESU, Mymensingh O&M Circle	BPDB	Trainees
		Md. Mijanour Rahman	Assistant Manager,	GMD, Dhaka-North	PGCB	Trainees

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
2008	25/May/2008 - 29/May/2008	Md. Mamun Hasan	Assistant Manager,	GMD, Comilla	PGCB	Trainees
		Md. Alamgir Hossain	Deputy Manager,	GMD, Rangpur	PGCB	Trainees
		Masudul Haque	Assistant Manager,	GMD, Mymensingh	PGCB	Trainees
		Mostafa Mosharraf Khalid	Assistant Manager,	GMD Khulna	PGCB	Trainees
		S.M. Wazed Ali	Assistant Engineer,	S&D D-1, Khulna	WZPDCL	Trainees
		Md. Shahidul Alam	Sub-Divisional Engineer,	S&D D-1, Jessore	WZPDCL	Trainees
		Bhabesh Chandra Das	Assistant Engineer,	S&D D-2, Faridpur	WZPDCL	Trainees
		Bashiruzzaman Mia	Assistant Engineer,	S&D D-2, Barisal	WZPDCL	Trainees
		Mohammed Sherajul Islam	Assistant Engineer,	Siddhirganj Power Station	Siddhirganj, Narayanganj,	Trainees
		Ayesha Parvin	Sub-Assistant Engineer,	RTC Tongi	BPDB	Trainees
		Ratan Kumar Paul	Sub-Divisional Engineer,	Tongi Power Station	BPDB	Trainees
		Mohd. Alauddin	Assistant Engineer	Baghabari Power Station	BPDB	Trainer's Ttainees
		S.M. Farhad Hussain	Assistant Engineer	Operation Division, Baghabari Power Station	BPDB	Trainer's Ttainees
		Punab Chandra Kundu	Assistant Engineer	Operation Division, Baghabari Power Station	BPDB	Trainer's Ttainees

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
		Shayamal Kumar Das	Assistant Engineer	DD Sherpur, Mymensingh O&M Circle	BPDB	Trainer's Ttainees
		A.K.M. Mostafa Zaman	Assistant Engineer	EAUD, Mymensingh, Mymensingh O&M Circle	BPDB	Trainer's Ttainees
		Abdur Rouf Siddiqui	Assistant Manager (Technical)	GMD-Dhaka (North-West)	PGCB	Trainer's Ttainees
		Md. Sakhawat Hossain	Assistant Manager (Technical)	GMD-Dhaka (East)	PGCB	Trainer's Ttainees
		Md. Monowar Hosain	Assistant Manager (Technical)	GMD-Dhaka (South)	PGCB	Trainer's Ttainees
		Shafiqul Islam	Sub-Divisional Engineer,	S&D D-1, Khulna	WZPDCL	Trainer's Ttainees
		Mijanur Rahman	Assistant Engineer,	S&D D-2, Khulna	WZPDCL	Trainer's Ttainees
		Ashis Kumar Sordar	Assistant Engineer,	S&D D-1, Sylhet	BPDB	Trainer's Ttainees
		Md. Jasimuddin Bhuiyan	Sub-Divisional Engineer,	S&D Halishahar, Chittagong	BPDB	Trainer's Ttainees
		Indrajit Debnath	Assistant Engineer	DD Tangail, Mymensingh O&M Circle	BPDB	Trainer's Ttainees
		Mostofa Zaman	Sub-Divisional Engineer	Enery Auditiong Unit. Mymensingh	BPDB	Trainees
		Jahangir Alam Juwel	Assistant Engineer	S & D Division-1, Tangail	BPDB	Trainees
		Abdus Satter	Assistant Engineer	Dist. Division, Sherpur	BPDB	Trainees
		Ashis Kumar Sardar	Assistant Engineer	Dist. Division, Sylhet	BPDB	Trainees

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
		Md. Adu Sayeed	Assistant Engineer	Dist. Division, Fouzderhat, Chittagong	BPDB	Trainees
		Abdur Rashid	Assistant Engineer	S & D Division-4, Rajshahi	BPDB	Trainees
		Md. Mohanmmad Ali	Assistant Engineer	RTC, Tongi, Gazipur	BPDB	Trainees
		Akram Hossain	Sub-Assistant Engineer	CERS, Tongi, Gazipur	BPDB	Trainees
		Emdadul Haque	Sub-Divisional Engineer	Baghbari Power Station	BPDB	Trainees
		Shahidul Alam	Sub-Divisional Engineer	Chittagong Power Station, Rawzan	BPDB	Trainees
		Juwel Hossain Shiraji	Assistant Engineer	1-4 Unit, Ghorasal Power Station	BPDB	Trainees
		Fatama Nargis	Assistant Engineer	Siddhirganj Power Station	PGCB	Trainees
		Motiul Islam	Assistant Manager	North West Power Generation Company Ltd.	NWPGCL	Trainees
		Saifuddin Ahasa	Assistant Manager	North West Power Generation Company Ltd.	NWPGCL	Trainees
		Mohaiminul Islam	Assistant Manager	North West Power Generation Company Ltd.	NWPGCL	Trainees
		Md Abdul Majid	DM	Veramara E/S, Kustia	WZPDCL	Trainees
		Bhabesh Chandra Das	Assistant Manager	S & D-2, Faridpur	WZPDCL	Trainees
		Md. Khalilur Rahman	Assistant Manager	S & D-1, Jessore	WZPDCL	Trainees

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
2009	24/May/2009 - 27/May/2009	Md. Bashiruzzaman Mia	Assistant Manager	S & D-2, Barisal	WZPDCL	Trainees
		Md. Sahagir Hossain	Assistant Manager	S & D-2, Barisal	WZPDCL	Trainees
		Md. Nuruzzaman	Manager	computer section(ICT)	PGCB	Trainees
		Md. Ataul Karim	Assistant Manager	(HRM),	PGCB	Trainees
		Md. Noor Jamal	Assistant Manager	GMD Dhaka East	PGCB	Trainees
		Bijoy Kumar Das	Deputy Manager	GMD Dhaka North West	PGCB	Trainees
		Md. Shariful Islam	Assistant Manager	GMD Bogra	PGCB	Trainees
		Nizamul Haque Sarker	Sub-Divisional Engineer	S & D-1, Mymensingh	BPDB	Trainer's Ttainees
		Abdul Basit	Sub-Divisional Engineer	Dist. Division, Sherpur	BPDB	Trainer's Ttainees
		Zahirul Islam	Assistant Engineer	Netrokona Electric Supply	BPDB	Trainer's Ttainees
		Obaidul Islam	Sub-Divisional Engineer	Dist. Division, Maulobibazar	BPDB	Trainer's Ttainees
		Md. Bellal Hossain	Assistant Engineer	S & D Division, Shaloshor	BPDB	Trainer's Ttainees
		Aesha Parveen	Sub-Assistant Engineer	RTC, Tongi, Gazipur	BPDB	Trainer's Ttainees
		Punab Chandra Kundu	Assistant Engineer	Baghbari Power Station	BPDB	Trainer's Ttainees

Management Training

Place : Regional Training Centre, BPDB, Tongi

Year	Period	Name of Participants	Designation	Office address	Organization	Remarks
		Mostafa al Mamun	Assistant Engineer	Baghbari Power Station	BPDB	Trainer's Ttainees
		Ashin Kumar Benarjy	Assistant Engineer	Chittagong Power Station, Rawzan	BPDB	Trainer's Ttainees
		Shirajul Islam	Assistant Engineer	210, Siddhirganj Power Station	BPDB	Trainer's Ttainees
		Md. Shafiqul Islam	DM	S & D-1, Khulna	WZPDCL	Trainer's Ttainees
		Md. Mijanur Rahman	DM	S & D-2, Khulna	WZPDCL	Trainer's Ttainees
		Md. Motahar Hossain	Deputy Manager	GMD Comilla	PGCB	Trainer's Ttainees
		Md. Tanveer Ahmed	Assistant Manager	GMD Dhaka East	PGCB	Trainer's Ttainees
		Mostafa Mosharraf Khalid	Assistant Manager	GMD Khulna	PGCB	Trainer's Ttainees

Appendix 5

Training Record

PI Solving Activity

Year	Office	Name	Office address	Organization	PI Theme
2007	Baghabari PS	Farhad Hussain	Operation Division, Baghabari PS	BPDB	Improvement of technical knowledge management
		Md. Alauddin	MMD, Baghabari PS	BPDB	Improvement of generation capacity up to design level in summer season (Unit No.2)
		Punab Chandra Kundu	Operation Division, Baghabari PS	BPDB	Improvement of operational management
		Md. Emdadul Haque	EMD-100MW, Baghabari PS	BPDB	Improvement of safety management
		Md. Shahidul Islam	EMD-71MW, Baghabari PS	BPDB	A reduction of maintenance schedule
	GMD-Dhaka	Md. Sakhawat Hossain	GMD-Dhaka (East)	PGCB	Improper file management
		Nityananda Banik	GMD-Dhaka (South)	PGCB	Low voltage
		Abdur Rouf Siddiqui	GMD-Dhaka (North)	PGCB	Transformer oil leakage
		Tanveer Ahmed	GMD-Dhaka (East)	PGCB	So much interruption
		Md. Monowar Hosain	GMD-Dhaka (South)	PGCB	Isolator (TX-1, LV, Line) cannot operate from remote
		Md. Moazzemur Rahman	GMD-Dhaka (East)	PGCB	Isolator do not operate properly
		Md. Harunur Rashid	GMD-Dhaka (East)	PGCB	Cooling fan do not operate in auto GT-2
	Mymensingh O&M Circle	Md. Faruque Ahmed	S&D (South)	BPDB	Distribution system loss
		Md. Safiqul Islam	Distribution Division, Kishorganj	BPDB	Unbalanced distribution transformer
		Md. Shahdat Ali	S&D, Tangail	BPDB	Customer complaints
		A. K. M. Mostafa Zaman	Energy Auditing Unit Division,	BPDB	Un-collected revenue
		Shayamal Kumar Das	Distribution Division, Serpur	BPDB	Power interruption
	Khulna O&M Circle	Md. Shafiqul Islam	S & D-1	WZPDCL	Reduction on Non-technical System Loss
		Md. Mijanur Rahman	S & D-2	WZPDCL	Unbalance load of the 11/0.4kV transformer
		Mst. Shahin Akter Pervin	Distribution Training Centre	WZPDCL	Establishment of Training of Trainer (TOT) course for the officers of Distribution Training Center
		Md. Kamruzzaman	S & D-3	WZPDCL	Low voltage to be improved
		Syed Sahidul Alam	S & D-4	WZPDCL	Defective meter change
2008	Baghabari P/S	Farhad Hussain	Operation Division, Baghabari PS	BPDB	Improvement of Safety Awareness in Operation and Maintenance Division
		Md. Alauddin	MMD, Baghabari PS	BPDB	Improvement of maintenance management of 100MW unit
		BISWANATH SARKER	Baghabari PS	BPDB	Improvement of operational management of substation & auxiliary Power supply system from Emergency Diesel
		Md. Mohabbat Hossain	Baghabari PS	BPDB	Improvement of heat rate management for both #1,2 GTs
		Md. Nazrul Islam	Operation Division, Baghabari PS	BPDB	Ensuring operating air pressure of circuit breaker in 132 kv Circuit breaker
		MD. MOSTAFA AL-MAMUN	Operation Division, Baghabari PS	BPDB	Reactivation of Auto Pulsation of Self-Cleaning Inlet Air Filtration System of 100MW GT Unit
	GMD-Dhaka	Mostafa Mosharraf Khalid	GMD Khulna	PGCB	S/S Energy Consumption is High
				PGCB	Compressor running hour is high in CB-1252
		Md. Tajedul Islam	Grid Circle Dhaka	PGCB	Improper Transmission Loss
					Problematic MIS Reporting System
		Masadul Haque	GMD Mymensingh	PGCB	The location of Tower of Transmission line under GMD Mymensingh are not clearly defined
					Insufficient necessary data for GMD Mymensingh including fixed and movable Assets
		Md. Mijanour Rahman	GMD Dhaka(North)	PGCB	Duration of Schedule / Emergency Outage is High
					Transformer(GT2 & GT3) Auto Cooling System inoperative
		Md. Mamun Hasan	GMD Comilla	PGCB	Damage of DC auxiliary relay of CB
		Md. Alamgir Hossain	GMD Rangpur	PGCB	Frequent Unbalancing of Capacitor bank Unit
		Jana Alam	GMD Dhaka (South)	PGCB	Isolator Inter locking system inactive
		Tanveer Ahmed	GMD Dhaka (East)	PGCB	Contamination of Bushing/Insulator of switchyard equipment and Transmission Line
		Nityananda Banik	GMD Dhaka (South)	PGCB	Prevention of Accidents
		Md. Manzur Morshed	GMD Chittagong	PGCB	Hot spot/Red hot at different points of 132 kV ring bus
		Md. Jahirul Islam	Netrokona E/S	BPDB	Non-technical system loss reduction

PI Solving Activity

Year	Office	Name	Office address	Organization	PI Theme
2009	Mymensingh O&M Circle	Shah Mustafa Rafiqul Islam	S&D (N), Mymensingh	BPDB	Reliable power supply
		Abdus Sattar	DD, Sherpur	BPDB	Load balancing of unbalanced dist. X-former
		A.B.M. Faruk Hosain	S&D (S), Mymensingh	BPDB	Consumer excess load regulation
		Md. Lukman Hossain	D&D D-1, Mymensingh	BPDB	Reduction of non-technical loss
		Md. Abdul Basid	DD, Sherpur	BPDB	Reduction of non-technical loss
	Khulna O&M Circle	Krisna Das Saha	S&D-1 Khulna	WZPDCL	Customer excess load regularization
		SM Wazed Ali	S&D-1 Khulna	WZPDCL	Defective meters
		Atiqullah Khan	S&D-4 Khulna	WZPDCL	Improvement of customer service
		Bimol Kanti Das	S&D-2 Khulna	WZPDCL	Frequent power interruption of distribution system
		Md. Rawsan Ali Mia	S&D-3 Khulna	WZPDCL	Reduction of non technical loss
		Khan Mokter Ali	S&D-2 Jessore	WZPDCL	Unbalanced load of transformer
	Other	Md. Sherajul Islam	-	EGCB	Improvement of Maintenance Technician's Technical knowledge
		Indrajit Debnath	DD, Tangail	BPDB	Dist. X-former burning
		Jasim Uddin Bhuyan	S&D, Stadium, Chittagong	BPDB	Power Interruption
		Aeisha Parvin	RTC, Tongi, Gazipur	BPDB	Installation of HT meter for practical training at RTC laboratory
2009	Baghabari PS	Md. Mostafa Al-Mamun	Electrical MaintenanceDivision	BPDB	Improvement of efficiency of Self-Cleaning Inlet Air Filtration System for 100MW GT Unit.
		Punab Chandra Kundu	Operation Division, Baghabari PS	BPDB	Improvement of mist eliminator efficiency of 100 MW GT unit
		Md. Biswanath Sarker	Mechanical Maintenance	BPDB	Reactivate the fire fighting system in auto-mode at Baghabari power station
		Abdus Satter	Distribution Division, Sherpur	BPDB	Load Balancing of Unbalanced Distribution Transformer
		Jahangir Alam Jewel	Sales & Distribution Division, Tangail	BPDB	Power Interruption
	GMD-Dhaka	Jana Alam	GMD, Dhaka-South	PGCB	Isolator's Electrical Interlocking System Inactive
		Nasir Uddin Ahmed	Load Despatch Circle	PGCB	System Frequency is not Controlled within 49.5 Hz to 50.5 Hz
		Manzur Morshed	Grid Sub-station, GMD, Chittagong	PGCB	Hot Spot/Red Hot at different points of Madunaghat 132 Kv Ring Bus
		Masudul Haque	GMD Office, Mymensingh	PGCB	Insufficient necessary data for Grid maintenance division, Mymensingh including fixed and movable
	Mymensingh O&M Circle	Abdul Basid	Distribution Division, Sherpur	BPDB	Reduction of Non Technical System Loss
		Kamrul Hasan Siddique	Sales & Distribution Division – 1 (North),	BPDB	Reduction of Non Technical System Loss
		A. K. M. Mostafa Zaman	Energy Auditing Unit Division,	BPDB	Replacement of 2-element analog meter by 3-element digital meter for Reduction of technical loss
	Khulna O&M Circle	Md.Abdul Mazid	S&D Division-1Kushtia	WZPDCL	Protection of Distribution Transformer
		Bhabesh Chandra Das	S&D Division-2, Faridpur	WZPDCL	Burning of Distribution Transformer
		Sahagir Hossain	S&D Division-1, Barisal	WZPDCL	Consumers Excess Load Regularization
		Mr Khalilur Rahman	S&D Division-1, Jessore	WZPDCL	Unbalance Load of Distribution Transformer
		Bashiruzzaman Mia	S&D Division-2, Barisal	WZPDCL	Frequent Power Interruption
	Other	Ashim Kumar Benaiy	Chittagong PS	BPDB	Confinement of hydrogen leakage from generator
		Ashis Kuar Sordar	Sylhet	BPDB	Consumer complain
		Saifuddin Ahsan	-	NWPGCL	Not up to date accounting store& HR management
		Jewel Hossain Serazi	-	BPDB	Prevent frequent failure problems at regulating valves of steam turbine
		Md. Motiul Islam	-	NWPGCL	Lack of information and communication system
		Md. Raisul Akram	Tongi, Gazipur	BPDB	Damage transformer oil convert into usable
		Kshirod Mohan Bose	Ghorasal PS	BPDB	Proper maintenance of electrically actuated and manual valves of boiler side of 6 unit
		Jahangir Alam	Siddhirganj PS	EGCB	Ensuring generation reliability by improvement of technical knowledge of maintenance team
		Md. Obaidul Islam	Moulvibazar	BPDB	System loss reduction
		Abdur Rashid	Rajshahi	BPDB	Power interruption

Appendix 6

Training Record

Japan Training

Year	Name of Participants	Designation	Office address	Organization
2006	Md. Abdul Hakim Sarker	XEN,	EMD, Baghabari Power Station	BPDB
	Md. Habibur Rahman	SDE	S&D-1, O&M Circle, Mymensingh	BPDB
	Shariful Islam	XEN	S&D-1, O&M Circle, Khulna	WZPDCL
	Mir Motahar Hossain	Assistant Manager	Haripur S/S, Dhaka East GMD	PGCB
2007	Md. Alaudin	Assistant Engineer	Opration Division, Baghabari Power Station, Sirajgonj	BPDB
	Md Shahdat Ali	Assistant Engineer	Sales & Distribution Division, Tangail	BPDB
	Shayamal Kumar Das	Assistant Engineer	Distribution Division, Serpur	BPDB
	S.M. Farhad Hussain	Assistant Engineer	Opration Division, Baghabari Power Station, Sirajgonj	BPDB
	Nityananda Banik	Assistant Manager (Tech.)	GMD, Dhaka- South	PGCB
	Tanveer Ahmed	Assistant Manager (Tech.)	GMD Dhaka (East)	PGCB
	Md.Shafiqul Islam	Sub Divisional Engineer	S&D-, Khulna	WZPDCL
	Md. Mijanur Rahman	Assistant Engineer	S&DD-2, Khulna	WZPDCL
	BHUIYAN Jasim Uddin	Sub Divisional Engineer	S&D, Stadium, Chittagong	BPDB

Japan Training

Year	Name of Participants	Designation	Office address	Organization
2008	ISLAM Shah Mostafa Rafiqul	Sub Assistant Engineer	Sales & Distribution Division 1 (North), Mymensingh	BPDB
	KHALID Mostafa Mosharraf	Assistant Manager (Tech.)	Grid Maintenance Division, Khulna	PGCB
	KHAN Md. Atiqullah	Senior Assistant Engineer	Sales and Distribution Division 4, Khulna	WZPDCL
	Indrajit Debnath	Assistant Engineer	DD Tangail, Mymensingh O&M Circle	BPDB
	RAHMAN Mohammad Mijanour	Assistant Manager (Tech.)	Grid Maintenance Division, Dhaka-North	PGCB
	SARKER Biswanath	Sub-Assistant Engineer	Mechanical Maintenance Division, Baghabari Power Station, Serajgong	BPDB
	ALI S.M. Wazed	Senior Assistant Manager	Sales and Distribution Division 1, Khulna	WZPDCL
2009	KUNDU Punab Chandra	Assistant Engineer	Baghabari Power Station, Serajgong	BPDB
	AL-MAMUN Md. Mostafa	Assistant Engineer	Baghabari Power Station, Serajgong	BPDB
	AHSAN Muhammad Saifuddin	Assistant Manager	Khulna 150MW PPP Project	NWPGCL
	SORDAR Ashis Kumar	Sub- Divisional Engineer	Sales and Distribution Division 2, Sylhet	BPDB
	MIA Md. Bashiruzzaman	Senior Assistant Manager	S&D D-2, Barisal	WZPDCL
	MORSHED Md. Manzur	Assistant Manager	Madunaghat Grid Station, Chittagong	PGCB

Appendix 7

Baghabari P/S, BPDB

E: Efficiency, F: Facility, C: Customer satisfaction, Ot: Others, I: Indirect affect

FY	PISA Theme	Name	Outline	E	F	C	Ot
2007	Improvement of Operator's Technical Knowledge	S.M. Farhad Hussain	To improve operator's knowledge			I	O
	Improvement of Generation Capacity up to the Design Level in Summer Season	Md. Alauddin	To improve generation capacity during summer season (Plus 20MW)	O		I	
	Improvement of Operational Management	Punab Chandra Kundu	To improve operational management system		O	I	
	Improvement of Safety Management	Md. Emdadul Haque	To improve safety management				O
	A Reduction of Maintenance Schedule	Md. Shahidul Islam	To reduce maintenance schedule	I		O	
2008	Improvement of operational management during black out condition by using emergency D/G	Biswanath Sarkar SAE, Mac. & Civil Div.	To identify root cause of deficiency of Emergency diesel generator	O			
	Ensuring operating air pressure in 132kV circuit breaker	Md. Nazrul Islam SAE, Operation Div.	To identify defective air pressure and repair them	I	O		
	Improvement of efficiency of Self-Cleaning Inlet Air Filtration System for 100MW GT Unit	Md. Mostafa Al-Mamun AE	To reduce maintenance cost by repairing air filtration system	I	O		
	Improvement of heat rate management for both #1,2 GTs	Md. Mohabbat Hossain SAE	To propose calculation methodology for heat rate at each unit	O			
	Improvement of the Mist Eliminator efficiency of 100 MW GT unit	Md. Shahab Uddin AE	To repair mist eliminator for efficient operation	I	O		
Others	Improvement of Maintenance Technician's Technical knowledge	Md. Sherajul Islam, AE, EGCB	To improve operator's knowledge				O

PGCB

E: Efficiency, F: Facility, C: Customer satisfaction, Ot: Others, I: Indirect affect

Appendix 7

FY	PISA Theme	Name	Outline	E	F	C	Ot
2007	So much interruption	Tanveer Ahmed	To identify cause and reduce scheduled outage		O	O	
	Low Voltage	Nityananda Banik	To reduce voltage drop by reviewing operation method	I		O	
	Improper File management	Md. Sakhawat Hossain	To introduce file management system for efficient works				O
	Isolator (781S, 636S) cannot operate from remote	Md. Monowar Hosain	To identify defective isolator and replace them		O		
	Transformer Oil Leakage	Abdur Rouf Siddiqui	To repair oil leakage to reduce maintenance period and costs		O		
	Cooling Fan do not operate in auto system in GT-2 Transformer		To repair auto system of cooling fan		O	I	
	Isolator do not operate properly from local, remote and manual	Md. Moazzemur Rahman	To identify defective isolator and replace them		O		
2008	Isolator's electrical interlocking system inoperative	Md. Jana Alam AM, GMD, Dhaka-East	To identify defective isolator and replace them		O	I	
	132kV circuit breaker's compressor running hour is high	Md. Mustafa Musharraf khlid AM, GMD, Khulna	To repair circuit breaker's compressor	I	O		
	S/S Energy Consumption is High		To reduce S/S energy consumption	O		I	
	Problematic MIS reporting system	Md. Tajedul Islam AM, Grid Circle, Dhaka	To improve MIS reporting system	O			
	Improper Transmission Loss		To propose proper calculation methodology for transmission loss	O			
	Transformer (GT2 & GT3) auto cooling system inoperative	Md. Mijanur Rahman AM, GMD, Dhaka-North	To repair auto system of cooling fan		O	I	
2008	Duration of Schedule / Emergency Outage is High	Md. Mijanur Rahman AM, GMD, Dhaka-North	To identify cause and reduce scheduled and emergency outage	O		O	
	Hot spot/red hot at different points of Modunaghat 132kV ring bus	Md.Monjur Morshed AM, GMD, Chittagong-South	To reinforce existing facility to avoid red hot				
	Frequent Unbalancing of Capacitor bank Unit	Md. Alamgir Hossain	To recede unbalancing of capacitor bank unit	I	O	I	
	Insufficient necessary data for GMD Mymensingh including fixed and movable Assets	Masudul Haque, AM, GMD Mymensingh	To improve asset management system	O			
	The location of Tower of Transmission line, under GMD Mymensingh are not clearly defined		To introduce data management system for transmission facility	O		I	
	Damage of DC auxiliary relay of CB	Md. Mamun Hasan AM, GMD, Comilla	To identify defective CB to prevent accident		O	I	

WZPDCL

E: Efficiency, F: Facility, C: Customer satisfaction, Ot: Others, I: Indirect affect

FY	PISA Theme	Name	Outline	E	F	C	Ot
2007	Reduction of Non-technical System Loss	Md. Shafiqul Islam	To replace defective meter	O			
	Establishment of Training of Trainers (TOT) Course	Shahin Akter Pervin	To establish TOT course				O
	Defective Meter	Syed Shahidul Alam	To identify defective meter	O	O		
	Improvement of Low Voltage	Md. Kamuruzzaman	To reduce voltage drop by balancing load	I		O	
	Unbalanced Load of Distribution Transformer	Md. Mijanur Rahaman	To change connection phase	I	O	I	
2008	Customer excess load regularization	Krisna Das Saha DM, S&D-1, Khulna	To reduce customers who use excess load	O	O	I	
	Defective Meters	SM Wazed Ali AM, S&D-1, Khulna	To identify defective meter and replace them	O		I	
	Improvement of customer service	Atiqullah Khan AM, S&D-4, Khulna	To change customer connection method		O	O	
	Frequent power interruption of distribution system	Bimol Kanti Das AM, S&D-2, Khulna	To reduce outage duration and frequency by using MCCB	I		O	
	Reduction of Non-technical Loss	Md. Raswan Ali Mia AM, S&D-3, Khulna	To identify adapted meter & by-pass meter and to seal meter box	O			
	Unbalanced Load of Transformer	Khan Mokter Ali AM, S&D-2, Jessore	To reduce unbalance load		O	I	

Mymensingh O&M Circle, BPDB

Appendix 7

E: Efficiency, F: Facility, C: Customer satisfaction, Ot: Others, I: Indirect affect

FY	PISA Theme	Name	Outline	E	F	C	Ot
2007	Customer (Technical) Complains	Md. Shahdat Ali	To reduce loose connection to improve customer satisfaction		O	O	
	Power Interruption	Shyamal Kumar Das	To reduce outage duration and frequency by changing cutting tree works	O	I	O	
	Defective Meter	Md. Faruque Ahmed	To identify defective meter	O			
	Uncollected Revenue	A. K. M. Mostafa Zaman	To reduce uncollected revenue amount	O			
	Unbalanced Load of Distribution Transformer	Md. Shafiqul Islam	To reduce unbalance load	O	O	O	
2008	Non-technical system loss reduction	Md. Jahirul Islam AE, Netrokona E/S	To reduce non-technical loss	O			
	Reliable power supply	Shah Mustafa Rafiqul Islam SAE, S&D-1 (N)	To introduce operation/management index such as SAIFI・SAIDI	O	O	O	
	Load balancing of unbalanced dist. X-former	Abdus Sattar SAE, DD, Sherpur	To reduce unbalance load		O	O	
	Consumer excess load regulation	A.B.M. Faruk Hosain AE, S&D (S), Mymensingh	To reduce customers who use excess load	I	O	O	I
	Reduction of non-technical loss	Md. Lukman Hossain SAE, D&D D-1, Mymensingh	To reduce financial loss	O			
	Reduction of non-technical loss	Md. Abdul Basid SDE, DD, Sherpur	To reduce non-technical loss	O			
Others	Dist. X-former burning	Indrajit Debnath AE, DD, Tangail	To reduce unbalance load	I	O	I	
	Power Interruption	Jasim Uddin Bhuyan SDE, S&D, Stadium, Chittagong	To reduce unbalance load	I	O	I	
	Installation of HT meter for practical training at RTC laboratory	Aeisha Parvin SAE, RTC, Tongi, Gazipur	To introduce practical training program		I	I	