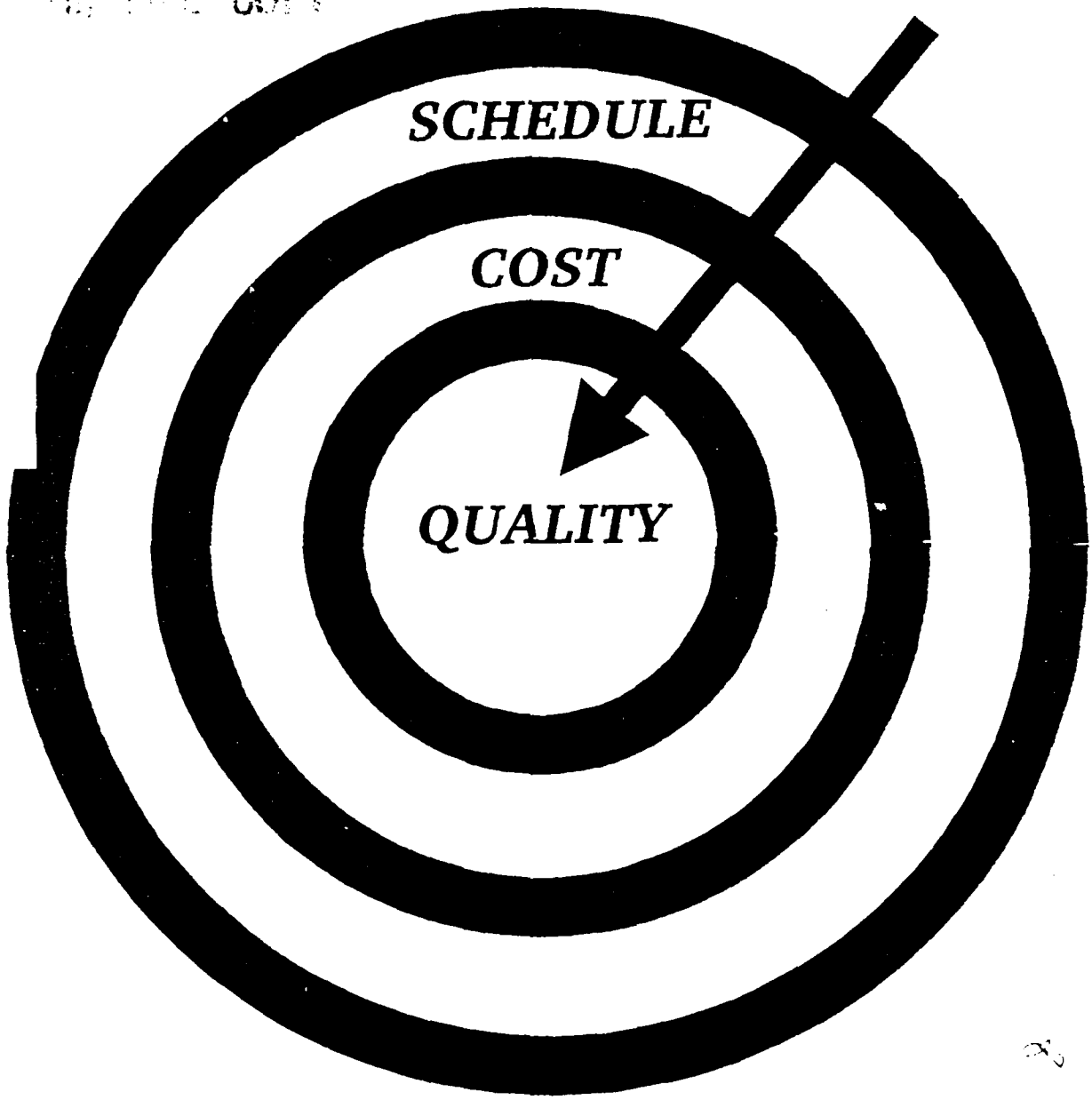
DEFENSE LOGISTICS AGENCY

TOTAL QUALITY MANAGEMENT

DCASR BOSTON

is

THE *CUSTOMER'S* VOICE



TOTAL QUALITY MANAGEMENT

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This document contains information concerning actions taken in FY 89 to implement Total Quality Management at DCASR Boston. Results of Quality Improvement efforts are discussed in detail. Management by planning vision elements which drive the DCASR Boston approach to management are customer focus, process focus and measures of vision attainment. Each of the elements is discussed in depth.

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INTRODUCTION

"DO NOT HURRY; DO NOT REST"

This quote from Goethe has set the pace for DCASR Boston's paradigm shift from the traditional management focus on short term results and defect identification, to the customer focus on process and Total Quality Management (TQM).

Our research into the histories of various companies such as Ford Motor Company, NEC-IC Micon System Co., Hewlett Packard and Harris Corporation, convinced us that attempts at mass implementation would lead to employee frustration and to ultimate failure. We actively resisted the temptation to simultaneously train our entire work force in statistical process control, or to send hordes of senior managers to experience Dr. Deming. Instead, we built on our senior management's commitment to develop a Vision and a plan incorporating the qualities that must characterize DCASR Boston. This Vision had to provide a practical structure which would give form to our goals and priorities, and have the utility of a TQM compass and sextant.

A team of eleven, including deputy directors of the Region, a DCASMA and a DCASPRO Commander, and several mid-level employees was selected to develop this plan.

To assure a common understanding and to provide ourselves with the necessary tools, we sought philosophical underpinnings from a Deming seminar, and practical tools from GOAL/QPC, an internationally known consulting and training firm.

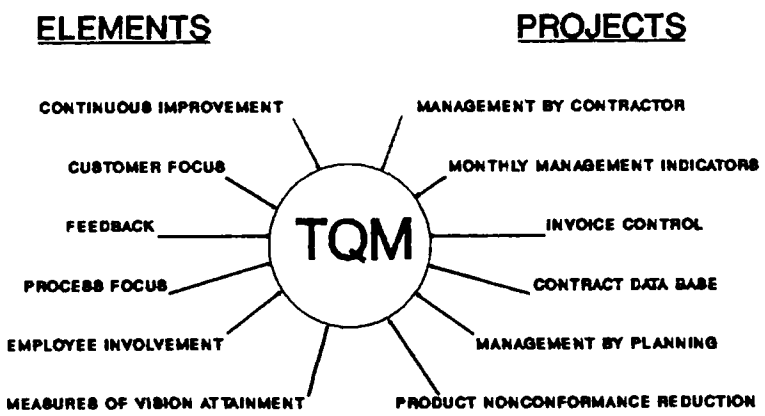
The DCASR Boston plan had to be **process oriented** rather than results oriented, involving **all the employees** who worked in these processes, rather than individuals who were held accountable for only a piece of the process. The plan had to motivate the work force through **quality**, rather than by traditional time or cost motivators. It had to embrace **customer satisfaction** as an essential element, and it had to recognize the internal customer -- the next person in the process. It had to assure that we could accurately measure customer satisfaction through valid, reliable data.

Thus, MBP provided the tools to develop our 5 year-vision which is to:

CREATE AN ENVIRONMENT THAT PROMOTES CUSTOMER SATISFACTION

THROUGH TEAMWORK AND CONTINUOUS PROCESS IMPROVEMENT.

It also provides the structure to articulate the elements of that vision and the projects to translate the vision into action.



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The six elements of the Vision are embodied in all of the Process Action Team projects, and they form the structure through which the eight criteria of the Quality Improvement Prototype (QIP) application are addressed. Throughout this application, the Vision will be used to express our concept of Quality. The projects will be used to demonstrate how we are incorporating the Vision into our daily work.

We are excited that our six TQM demonstration projects are driven by the same criteria that are addressed in this application. This is a new experience, and very different from the traditional approach of trying to force-fit old activity into new criteria.

The mission of DCASR Boston is to administer delegated contracts and provide quality products and services timely and economically; to be responsive to our customers' needs by being proactive and seeking continuously to improve the acquisition process.

The product of this mission is information derived from surveillance of contractor performance in meeting the expectations of our customers.

The service we provide is communication. We report the results of our assessment of contractor performance to the contracting activities, who are our customers.

In January of 1988, we began to recognize that our traditional way of measuring how well we performed our mission did not tell us whether this information was satisfying our customers. What we were measuring was the frequency that various mission tasks were accomplished. These workload performance measures reflected such activities as the number of contracts, the number of specialized functional reviews, or the number of payments issued. We knew we needed a system that measured how well, not how much, we accomplished.

We also began to notice a significant difference between world-class manufacturers and many of our defense contractors. We knew that to get industry to respond to the challenge of international competition they had to learn and practice TQM. In order for us to lead them to that understanding, we had to practice it ourselves. We acknowledged our own need to adapt to the TQM culture.

We took the first step with the recognition that continuously improving contractor performance is essential to satisfying our customers. In stating our mission in customer-oriented terms we committed ourselves to measure how well those contractors perform, and to improve how well we measure. At that point in time, we created constancy of purpose. Once we had purpose, we realized the need for a plan. Since traditional planning had failed us in the past, we looked for a plan that would give proof to our Vision. We adopted the new philosophy.

QUALITY ENVIRONMENT

DCASR Boston's Strategic/Total Quality Management Master Plan sets forth the Vision, and provides a...

> living, breathing document to ensure that the directions, targets, and objectives of our organization are well developed and defined, clearly communicated, monitored, implemented, and responsive (based on system feedback).

Each director has submitted a one-year plan to assure that the Vision elements become reality. They have spent a significant amount of training dollars to provide systematic TQM exposure. A matrix has been integrated into the plan describing what type of exposure (orientation, education, training) will be provided to which level of employee (senior management, middle management, work force). This assures that we do not do mass indoctrination, simply throwing dollars at ambiguous TQM targets. Instead, senior management, through the TQM steering committee, plans training to provide the tools to the work force as they are needed.

For example, the Deputy Comptroller shows a clear, visible commitment by personally leading the Process Action Team on improving the contract data base. Before beginning work, this team was sent off-site for an orientation on the seven tools of quality control. They were given exposure to flow charting, cause-and-effect diagrams, Pareto charts, and other tools, but were not taught how to use them until their work progressed to the stage where these tools were needed. At that point, the team was provided reading material, formal training, and an advisor to facilitate the tools' use. When the team needed Statistical Process Control (SPC), they were given 8 hours of orientation on statistical thinking, variation, and control charting. Then they were given 40 hours of off-site classroom instruction, SPC software, and statistical calculators.

The key executives of DCASR Boston were appointed to a TQM Steering Committee by General Order 2-89, formalizing a special order given to each director in January 1988. The Committee is chaired by the Region Commander, and meets weekly. General responsibilities include:

> ...providing oversight and direction for implementation of TQM throughout the Region. This responsibility

includes defining training requirements for all levels of management and staff; establishing a budget for the necessary training; approving specific applications witnin the various Directorates; and charting the general direction that TQM will take within the Region.

There are also specific responsibilities calling for executive commitment and personal involvement, structured by the nature of the priorities (projects) of the plan. For example, the Director of Quality Assurance personally manages the process of exporting TQM to our contractors. The tool he uses is a program to reduce manufacturing variation. This is one of six TQM demonstration projects the Steering Committee directs.

An inherent phase of Management by Planning is the deployment phase which provides for a "bottom-up" input to senior management. This cannot happen until all levels of the organization speak the same language. In the interim, the Commander has made presentations to the men and women of DCASR Boston, describing his commitment to quality. He has made a video of portions of these presentations, for those he could not reach personally.

The costs associated with this commitment are considerable, but inconsequential compared to the costs of quality incurred by our organization. Formal training, education and orientation account for $198,000. We have spent another $55,000 on the tangible tools of process improvement such as video tapes, books, calculators, and statistical slide-rules. This investment has been focused on 10 percent of our work force, with an initial concentration on senior management and those workers directly involved in one of the six demonstration projects. Our aim is to achieve the "critical mass" necessary to lead the process of continuous improvement. This approach to the critical mass grows closer every day, as more and more of our people come alive to TQM, adopt the new philosophy, and apply the methods to their daily activities.

However, the real commitment is demonstrated in the thousands of manhours devoted to identifying and eliminating the variation in our processes which hinder us from delivering quality services to our customers. Our directors themselves have contributed more than 2,000 manhours to the quality improvement process during the past year. The most significant investment, however, was the dedication of five people (a lieutenant colonel, three GS-12s and a GS-6) to an

office (DQ) with the full-time goal of integrating TQM into the Region.

With the support of this office, we have been able to spread the word beyond the bounds of DCASR Boston to our contractors, our customers, and the professional community. DCASR Boston executives are frequent speakers on the topics of quality and productivity, routinely addressing major industry association meetings, and presenting training seminars for both Government and industry. They have also made presentations to the Assistant Secretary of Defense (Acquisition) on managing variation.

QUALITY MEASUREMENT

In May of 1989, the Commander of DCASR Boston sent a letter to the Deputy Director (Acquisition Management), Defense Logistics Agency. The subject of the letter was **"Customer Focus of DCASR Mission."** Its purpose was to identify traditional measures of so-called mission success which were misleading, measuring the wrong thing, or were simply wrong-minded.

> Our traditional indicators attempt to measure the efficacy of functions, i.e., Quality Assurance, Contract Management, Comptroller, etc. Unfortunately, these measures fail to Chart the success of our processes in satisfying the needs of our internal customers. We are now applying TQM in measuring the ongoing process of the Contract data base. These measures are not reported in terms of the function (Comptroller) where we would traditionally report "backlog data" (those contracts awaiting input). Our TQM initiative focuses on cross-functional measures, i.e., measuring the Comptroller (contract data input) in terms of the nonvalue-added work (rework) a faulty database causes for its internal customers, i.e., ACOs, CMAs, the contractor, and the next person in the process. Unless our internal customers are satisfied, we cannot hope to satisfy our external customer - buying and using commands.

Three Management by Planning (MBP) vision elements address quality measurement directly:

-- CUSTOMER FOCUS
-- PROCESS FOCUS
-- MEASURES OF VISION ATTAINMENT

These elements drive our approach to defining the data to manage the Region.

We are able to measure the part of the contract database containing schedules. Schedules are input by the Comptroller (supplier), but are used by Industrial Specialists (ISs) and Contract Management Assistants (CMAs) of the Contract Management Directorate (customer). We charted the process of entering schedules into the data base, sampled it to separate the vital few from the trivial many errors, and statistically measured the distribution of those errors. We now were able to define the process (flow chart), identify where we should concentrate our effort, (Pareto chart) and determine if our system was in control (Shewhart control chart).

We found the system was stable and in control, but was not capable of delivering a quality product to its customer; fully 30 percent of the schedules were erroneous. In extending the process we found a **"hidden factory of rework"** that diverted our work force from their real responsibilities to the task of correcting schedule errors. The degree to which this nonvalue-added work contributes to the 30 percent delinquency rate of our contractors is not yet measured, but it's a priority. What we are measuring is the lost opportunity time spent in correcting the schedule data file. The customers, who over time have come to expect at least one out of three schedules to be inaccurate, have had to check them all. By applying time measurement accounting principles, we have measured a $75,000/yr loss on this one small part of the process involving only a minute portion of the total work involved. Accurate measurement is the first step. Adopting this measurement technique to identify the **"cost of quality"** associated with this nonvalue-added work will become an integral measure of the efficiency of all our processes.

When the Commander of the DCASMA involved in this project was approached, he initially balked at its focus, saying **"don't waste your time looking at my Production folks (CMAs & ISs), they are the most productive workers I have."** When asked how he knew this he responded **"according to the SPDs** (special purpose data - a measure of productivity based on work standards) **they are 120 percent efficient!"** The answer

to the question of how they could be more than 100 percent efficient while being involved in so much rework gave rise to another project questioning traditional measures of productivity - A study of SPDs themselves. An in-depth study is in process, but initial findings indicate that SPDs reward activity whether it adds value or not. The so-called 120 percent productivity of the production branch was achieved by changing defective schedules, not satisfying customers.

We learned a valuable lesson in the case of invoice processing. Formerly the DCASRs were resourced based on the number of invoices processed (SPD activity count). We earned workyears by processing the same invoice more than once. A study of invoice processing disclosed that about 40 percent of our invoices are recycled or reworked more than once. We are now committed to measuring the process, not the work involved in the process.

This awareness, that data are a means and not an end in themselves, has helped move the entire Region forward. Until recently, we based management actions on budgeted expectations of costs based on history. Today, through the **Resource Utilization Committee**, we base our management on unit cost earnings. Previously, if Commanders were over budget, they would focus on cost-cutting measures such as hiring temporary employees, cutting back training or by increasing the level of nonvalue-added activities. Today, they focus on identifying nonvalue-added work and redirecting earned resources in efforts that contribute to customer satisfaction. The old way focused on false productivity improvement. Today's Commander focuses on quality improvement as the vehicle to meet budget.

QUALITY IMPROVEMENT PLANNING

The single factor that has been most instrumental in keeping our TQM effort on track has been **Hoshin Kanri**, the Japanese term for Management by Planning, which loosely translates as "compass" and "sextant".

When we initially began the planning effort, we searched for a model that would facilitate TQM implementation. Management by Planning helped us understand that TQM was not the goal, it was the way.

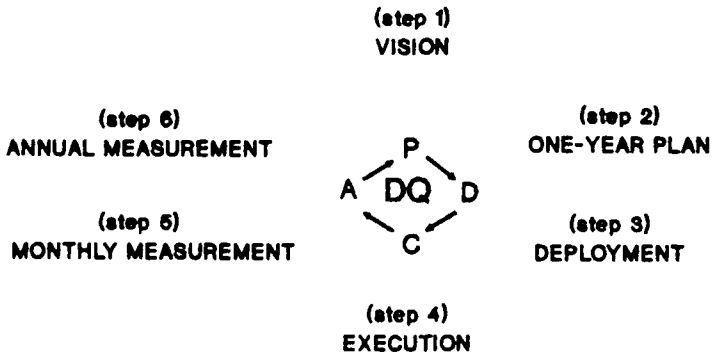
The first step in our planning process was the Commander's commitment to break with the concept of traditional

strategic planning. We all had experience with the annual drill of spending weeks and weeks writing a plan which few would read and even fewer would use. The Commander's commitment empowered us to develop a plan which would clearly point the direction (Hoshin), as well as provide the structure for getting there (Kanri).

The next step was to obtain professional counsel in this new planning approach. We were fortunate to get GOAL/QPC, who had helped Ford and Hewlett Packard develop their MBP effort. They taught us the **Seven New Tools for Management and Planning** for executives in the planning phase of the Shewhart Improvement "PLAN-DO-CHECK-ACT" cycle. These tools are quite different from the Seven Quality Control Tools assembled by Kaoru Ishikawa, which are particularly helpful to process workers and managers involved in the DO-CHECK-ACT phases. The Seven New Tools for Management and Planning were used by our executives to:

-- Create a Vision
-- Anticipate Obstacles
-- Establish Means to Achieve Targets
-- Assign Responsibility for Implementation
-- Report Progress
-- Establish Appropriate Progress Measures
-- Plan Implementation Timetable

One of the functions of the TQM Integration Office (DQ) was to assist the directors in integrating the plan into daily activities. The office was staffed with representatives of the three mission directorates: Quality Assurance, Contract Administration, and Comptroller (Contractor Payment). However, it was not organized along functional lines, but rather according to the process, **PLAN-DO-CHECK-ACT**. It is this cycle which drives the MBP process.



The Vision describes our long-term priorities. Our actions in the short term are planned to accomplish the Vision.

We focused on bringing the entire Region to a common understanding of TQM through training, education and orientation. We operationally defined the Vision through the application of TQM's tools on six demonstration projects. All of these projects are structured around the elements of the Vision. These projects serve to bridge the short-and long-term priorities, and keep the efforts focused on well-defined objectives. As they progress, the projects expand to include more and more of the process, and the people involved in it. We have been very mindful of the dangers inherent in having too many unrelated projects going on in too many different areas. We have two major focuses:

-- **Internal** (MBP, Invoice, Data base, Monthly Management Indicators and Management by Contractor)

-- **External** (Manufacturing Nonconformance Reduction)

EMPLOYEE INVOLVEMENT

Employee involvement is one of the six elements of the DCASR Boston Strategic/TQM Master Plan. In developing this plan, all participants recognized that without active employee involvement, our Vision would not be achieved. It would take much longer for us to realize our goals of knowing our customers, providing the services they needed, and continuously improving our services.

We have a number of means for employees to contribute to quality and productivity improvement. Chief among these are:

-- The IDEAS Network
-- Process Action Teams
-- Team Briefings
-- TQM Briefings for the Region TQM Steering Committee
-- Employee Articles in our Local News Paper (The Patriot)

The IDEAS Network is a combination of the Beneficial Suggestion Program and the Model Installation Program (MIP). In Fiscal Year 1989, we have paid out close to $13,000 to

our employees for their suggestions. These efforts let our employees know that we do pay attention to their ideas, and that we are actively seeking their help in achieving the Vision.

Process Action Teams (PATs) are becoming an increasingly important means of employee involvement in DCASR Boston. Presently, there are about 15 PATs in place.

Team briefings involve our work force in what is happening to the organization as a whole. At regularly scheduled Commanders' Conferences, various staff and field personnel address a variety of issues. We also have briefings conducted by employees trained in TQM concepts at our Steering Committee meetings.

A survey of our employees showed us a number of changes in the format and content of the paper were necessary. The title "The Patriot" was chosen from close to 70 submissions. The paper has become a principal method of providing information and feedback to our employees.

Thus far in Fiscal Year 1989, we have approved 94 employee ideas, and another 134 are pending review and evaluation. Team activity involves approximately 10 percent of our work force in various areas such as the DLA Finance Center (DFC) team, the Payroll Work Group, development of the Materiel Resource Planning (MRP) Manual, mechanization of Overhead and Maintenance vouchers, and the 6 TQM projects mentioned above.

TRAINING FOR QUALITY IMPROVEMENT

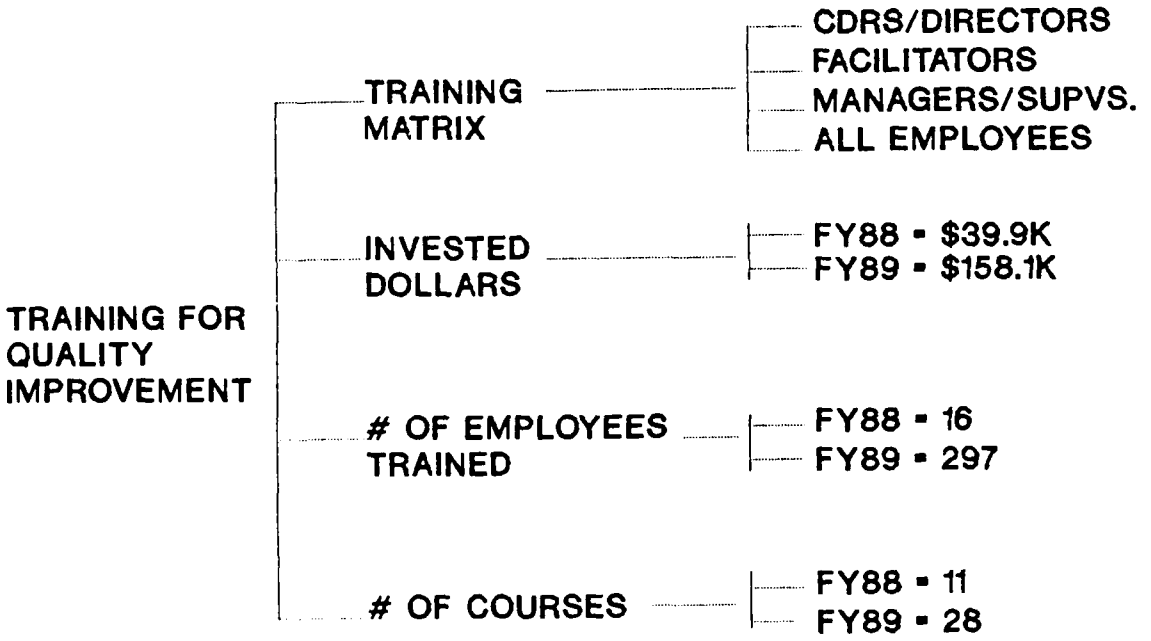
Education and training are an integral part of each element of our strategic/TQM Plan. We recognized early on, that management commitment must be expressed in terms of growth opportunities for both individuals and the organization. We also realized that employees must be involved in the decision-making process, motivated to contribute their ideas and thoughts on what is valuable and on ways to effect improvements. Management is ultimately responsible for making the decisions, but by involving employees and properly managing the employee involvement process, they can make more informed decisions. In order for this to happen, managers must be educated; therefore, we initially concentrated the training on our TQM Executive Steering Committee, Commanders, Deputies, Managers and Supervisors. This training is in the form of philosophy and education,

the WHYS. Our projects are the means we use to convert our Vision to practice, so as specific requirements occur, we selectively train working level facilitators with the tools they need to perform their job, the HOWS. However, without a basic understanding of the philosophy, the tools are useless; therefore, everyone receives an orientation to establish a common understanding.

About 300 of our people have received a total of 28 courses in the tools of TQM. Ninety-three of the 300 are managers and supervisors: 13 Commanders, 4 Deputy Commanders, 9 Directors, 4 Deputy Directors, 35 Division Chiefs and 28 Branch Chiefs.

We have built a cadre of workers experienced in process action, led by managers who have learned that their responsibility is to work "on" the system. Our people are becoming the force which modifies our priorities, identifies new customers, and assures that the gains are held.

The following matrices and diagrams show our training plans.



TQM TRAINING - FY89

WHO	WHAT	WHEN
COMMANDERS/DIRECTORS TQM STEERING COMMITTEE	DEMING SEMINAR or EQUIVALENT (G.W. UNIVERSITY)	AS AVAILABLE
	TQM IMPLEMENTORS SEMINAR (NAVY)	AS AVAILABLE
	CONWAY PROGRAM (NASHUA N.H.)	AS AVAILABLE
	QFD EXECUTIVE OVERVIEW	JULY 1989
	MANAGEMENT BY PLANNING EXECUTIVE OVERVIEW	SEPTEMBER 1989
	IMPROVING QUALITY AND PRODUCTIVITY DURING SERVICES	SEPTEMBER 1989
FACILITATORS:	QFD PRACTITIONER/FACILITATOR	JULY 1989
MBP WORKING GROUP & REGION FACILITATORS	DEVELOPING A COMPANY-WIDE CONTINUOUS IMPROVEMENT MASTER PLAN	AUGUST 1989
	MANAGEMENT BY PLANNING	SEPTEMBER 1989
	SEVEN TOOLS FOR MANAGEMENT	SEPTEMBER 1989
	UNIVERSITY OF TENNESSEE QUALITY & PRODUCTIVITY PROGRAM	SEPTEMBER 1989
MANAGERS/SUPERVISORS	DCASR BOSTON TQM ORIENTATION (1 DAY)	AUGUST/SEPTEMBER 1989
	DCASR BOSTON TQM COURSE (5 DAY)	IN DEVELOPMENT
ALL EMPLOYEES	DCASR BOSTON TQM ORIENTATION (1 DAY)	COMMENCING SEPTEMBER 1989

EMPLOYEE RECOGNITION

We have come to recognize that the traditional methods of rewarding our employees are flawed. However, we will continue to reward our employees, even if the system is imperfect, until new methods are developed. Employee recognition is a major responsibility of management.

In Fiscal Year 1988, approximately 27 percent of the work force received recognition through Quality Step Increases, Sustained Superior Performance Awards, Special Act Awards, Meritorious Civilian Service Awards, or Certificates of Achievement. In this current Fiscal Year, to date, that figure has increased to 30 percent.

Four of our employees were recipients of the DoD Productivity Award for their significant contributions to Quality and Productivity. We have also submitted Region employees for awards sponsored by the local Federal Executive Boards, and the DLA Outstanding Employees of the Year Awards.

Teamwork plays an important role in recognition of our employees. In Fiscal Year 1988, we recognized 77 employees with 21 group awards. To date this year, 14 group awards have gone to 64 employees. One of these went to 18 people for joint efforts.

We are excited about the promise of such projects as PACER SHARE, an OPM demonstration project, and DLA FUTURES II Initiatives, incorporating Productivity Gainsharing for teams of workers involved in the process. The Office of Civilian Personnel has instituted an organizational change that encompasses the use of the team concept to improve the quality of service provided to its customers. They have also defined and published goals and objectives which are a measure of customer satisfaction. Within the Comptroller organization, we have removed arbitrary numeric quotas and standards from employee performance appraisals. Process Action Teams have been chartered to develop meaningful measures that include job satisfaction. Additionally within the Comptroller organization, we are implementing real-time sampling techniques with which we can build statistically sound distributions for individuals doing the same work. These distributions will show us those working outside the system. Those on the high end will be rewarded as "shining stars". Those on the low end will be retrained.

CUSTOMER FOCUS

During our education over the past several years, we have begun to realize that customers are both internal and external, including contractors, Headquarters, local governments, the Defense Contract Audit Agency (DCAA) as well as the next person in the process. These are all in addition to the buying activities on which we have traditionally focused. The primary means of determining the needs of these customers is to maintain a dialogue. It often begins with the recognition of a mutual interest.

For example, contract administering offices (CAOs) possess a wealth of information which is useful to buying activities in making decisions on awarding contracts. Except when a preaward survey was requested, this information was seldom available to the buyers. Customer focus helped us recognize this need and drove us to develop a listing of contractors of concern to the CAOs. The DLA Contractor Alert List (DCAL) was developed to communicate this concern to our customers. The buying activities actively participated in its development, and their satisfaction can be measured in the expansion of distribution from 35 to over 200 activities. DCASR Boston now consolidates input from all nine DCAS regions and provides it to our customers in a usable consolidation.

These dialogues provide the forum for customer interface and allow clear communication of customer desires. The air of mutual interest encourages input which allows us to establish a new service, such as the DCAL, or to improve a method or level of service. Comments from the buyers, solicited during follow-up visits to using commands, have led to refinements of the DCAL in presentation, means of transmission, and medium. Periodic meetings at a high level between DCASR Boston and the Northeast Region of DCAA provide information for both agencies to coordinate efforts to improve effectiveness of the available resources in monitoring contractors and safeguarding Government interests.

Our contractors are also seen as our customers. Sensitivity to customer desires throughout the organization has increased to the point where a "simple" comment from a contractor resulted in exploring a better means of sharing information that they needed. Contractors' invoices are submitted to the Region for processing and payment. Our data base tracks the invoice from receipt to payment with

codes reflecting its status or denoting problèms. To check status, Contractors once called the field office, the people processing the invoices, or a special section set up to handle contractor inquiries. This reduced the time available to do value-added work. Contractor access to the automated invoice information provides faster responses while eliminating this interruption of primary duties. This access was developed with contractor participation and its success can be measured by the queue of contractors who desire to connect to it at their own expense.

While a formal means of communication with buying activities and contractors has existed for some time, it was viewed as a separate activity. Management by Planning has reoriented us to incorporate this into the process, to view each contact, at whatever level of the organization, as an opportunity to elicit and receive feedback. In carrying out our desire to be the "Customer's Voice," we negotiate Memoranda of Agreement with major defense suppliers to hold them accountable for the continuous improvement of their goods and services.

We are continuously refining our feedback measures from our customers, whether internal or external. In November the program manager for the Multiple Subscriber Element (MSE), the largest off-the-shelf procurement in DoD history, along with the Department of the Army's principal for TQM, will visit DCASR Boston for an overview of how our Management by Planning includes them as customers, and how we specifically address their needs through Memoranda of Agreement. We are applying SQC techniques to the US Army Missile Command's (MICOM) database to help them understand the source of the approximately 450 Military Standards Requisitioning and Issue Procedures (MILSTRIP) changes they make each month. We have developed workload forecasts for each buying command to strategically allocate resources to better serve them. We have invited our customers and suppliers to determine, in face-to-face meetings, how we can better serve each other. We are bringing the Mechanization of Contract Administration Services (MOCAS) operators from the field into the contract data input section, so that they can better understand the entire data base process. Before they begin working on the process, however, they will receive the same structured orientation, education, and training that their counterparts from the Comptroller's organization received.

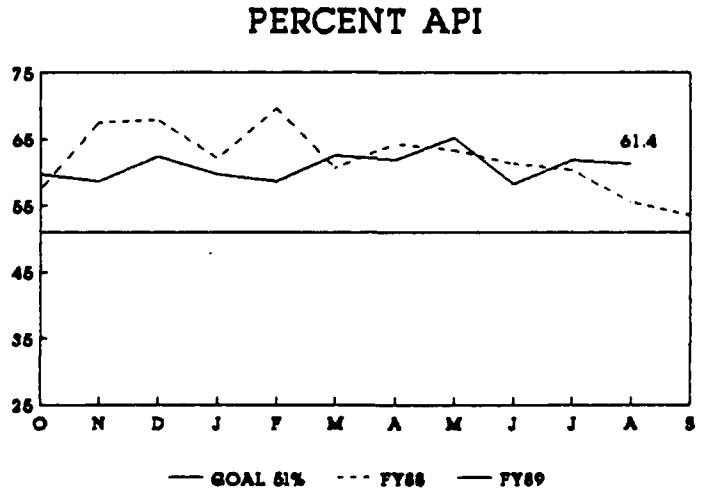
RESULTS OF QUALITY IMPROVEMENT EFFORTS

The effectiveness of DCASR Boston's focus on its various customers can be measured in many ways. Some of these are quantitative. Already discussed were the number of activities subscribing to distribution of the DCAL and the number of contractors interested in spending their own money to access invoice information. Rework by internal customers caused by data base errors decreased by 23 percent. Invoice processing time is well within the requirements of OMB Circular 125. Others touch on the "unknown and unknowable" that Dr. Deming refers to in his discussion of customer focus. A senior Navy official publicly stated that DCASR Boston provided the best service of the many payment offices he dealt with. Contractors moved their accounts receivable to our Region to "take advantage" of our better performance in paying invoices. Buying activities dealing with a contractor participating in our effort to reduce product nonconformances express incredulity at the improvement in delinquency rate and quality of products. These are operational definitions of customer satisfaction.

We are working towards making "Quality" the primary driver in all that we do. Our first step has been to refine our measures to reflect customer satisfaction. The following charts reflect our success.

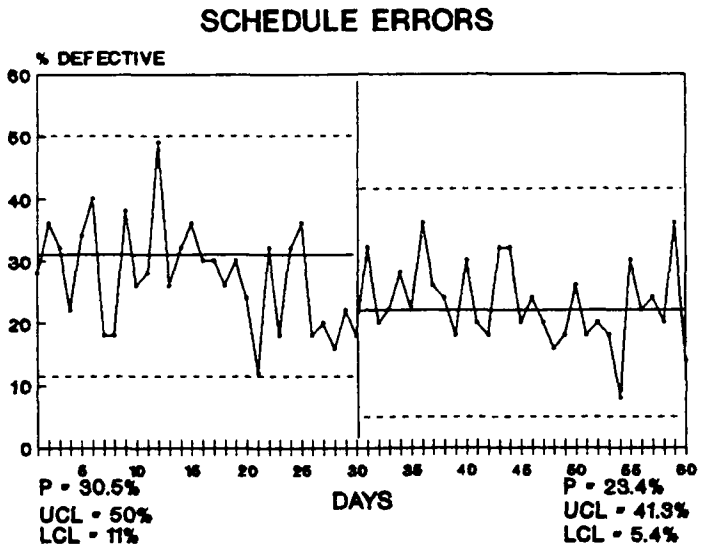
Automatic Payment Of Invoices

The DLA goal is 51 percent. The Region has consistently surpassed its goal by 18 percent. Our external customers benefit directly in that the Military Services' financial appropriation records are accurately updated and defense contractors receive timely payments.



Schedule Errors

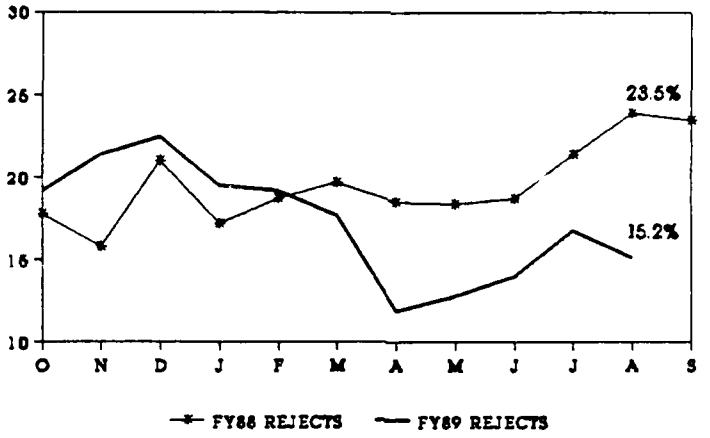
This chart reflects our efforts resulting from our major project in contract data base purification. Specifically, the highest number of customer complaints (confirmed by Pareto analysis) dealt with the input of contract schedule data. The initial sampling of data showed an average error rate of 30.5 percent, our initial efforts have reduced the average to 23.4 percent or a 23 percent improvement in the process.



Rejected Invoice Rate

The Rejected Invoice Rate indicates the number of times an invoice must be reworked and returned to our external customer (defense contractors) prior to payment. Through training and working the process closely, we have been able to achieve a significant breakthrough in FY 1989 as compared to FY 1988. The results have been dramatic since the inception of this TQM effort. The next step is to develop a control chart.

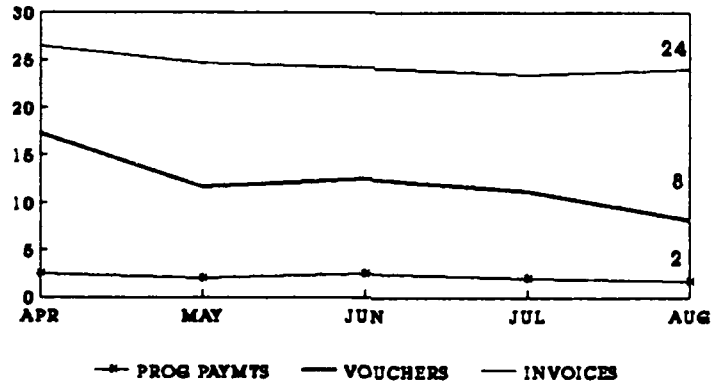
REJECTED INVOICE RATE



Average Processing Time

The standard for processing cost vouchers and progress payments is five to ten days and net invoice thirty days. We are consistently exceeding the standards. Exceeding these standards results in cost avoidance of interest penalties to our external customers.

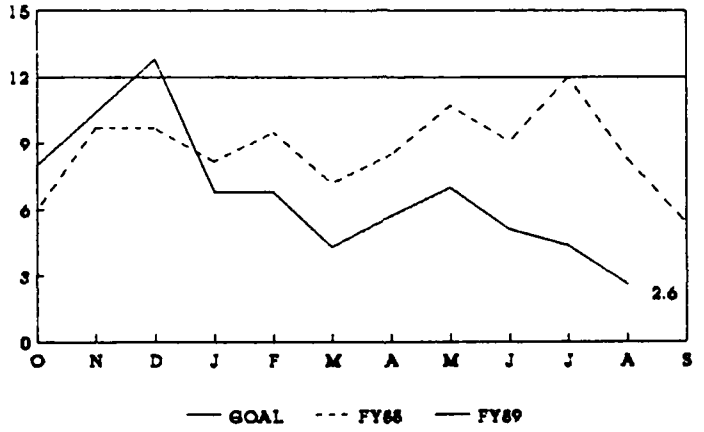
AVERAGE PROCESSING TIME



Invoices Over 29 Days

The standard for invoices over 29 days is 12 percent. In August 1989, the Region achieved 2.6 percent. This chart demonstrates sustained improvement over the last two years. The improvement translates into a direct savings through reduced interest payments to contractors.

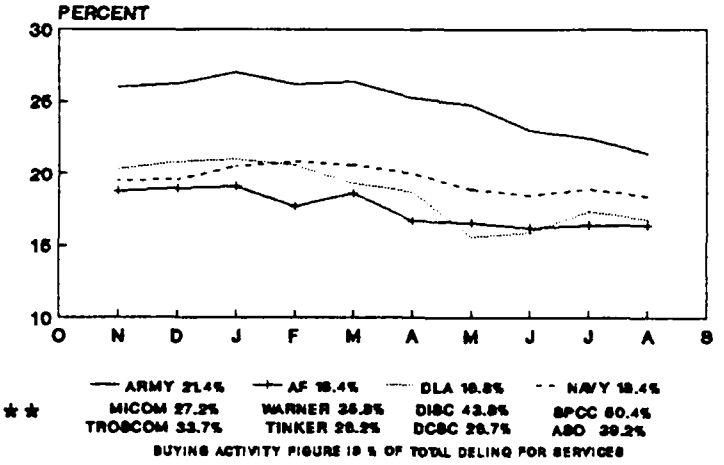
PERCENT INVOICES OVER 29 DAYS



Delinquency Trend By Military Services

Delinquencies are a critical factor the buying activities use to measure our effectiveness in administering their contracts. When arrayed by military service, the downward trend is evident.

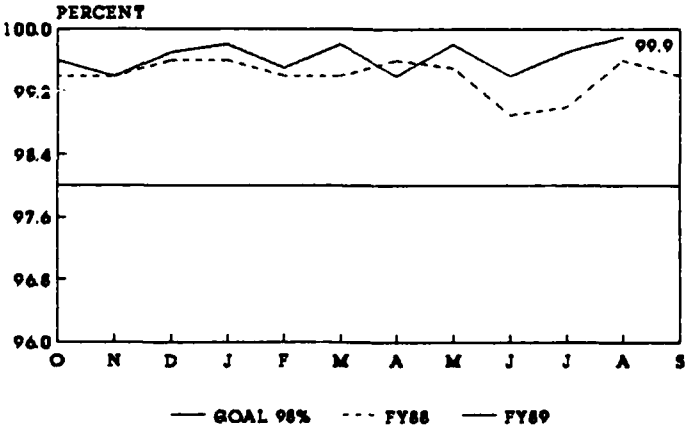
DELINQUENCY TREND BY MILITARY SERVICES



Discounts Earned

The DLA goal for discounts earned is 98.0 percent. DCASR Boston's record for FY 1989 is 99.6 percent. During August 1989, we reached a high point of 99.9 percent. The cumulative savings for FY 1989 amounts to $3.6 million for the government and accelerated cash flow from our external customers.

% DISCOUNTS EARNED



Workyear Savings

DCASR Boston has consistently exceeded efficiency standards and goals. During FY 1989, the Region was assessed a five percent productivity improvement. We not only met that assessment, but saved 68 workyears of labor worth $2.3 million. Additionally, under the unit cost concept of resourcing, the Region returned $2 million of earnings to our parent organization - DLA. By improving quality we have been successful in reducing costs and improving schedules.

WORKYEAR SAVINGS

DLA FUNDED WORKYEARS	2,465
WORKYEAR USAGE FYTD AUG.	2,397
WORKYEAR SAVINGS	68
COST SAVINGS	$2,333,760

(68 X $34,320 AAR FYTD AUG.)

As demonstrated by the above charts, DCASR Boston's quality and productivity efforts are driven by a master plan. This plan provides the necessary tools to make it possible and structures our efforts around the five initial TQM demonstration projects, culminating in management by contractor. The five demonstration projects are summarized below:

Management By Planning

Perhaps the most meaningful result of any of our projects has been the master plan. Developed through the MBP process, this plan codifies the Region's Quality System, describes the Vision and provides the means to structure the involvement of management and the work force. The master plan is supplemented by a specific deployment plan for each mission directorate and subordinate command. It makes use of the seven management tools to assure constancy of purpose is maintained. It employs feedback measures to give us confidence that our customers are satisfied.

Contract Data Base

The contract data base process is the beginning and the end of virtually all of the data driven activity throughout a DCAS Region. The data base crosses functions and is used by internal and external customers, but is marred by inaccurate data, rework, and nonvalue-added activity. The data base project forms the heart of our internal TQM efforts. Its initial focus is on preventing problems at the input (process) level and thereby preventing the rework that permeates the process. The project is conducted by employees who are advised by experts and coached by management. Successes are measured by process assessments and expressed in terms of rework which the customer is spared. Arbitrary goals have been eliminated, but results are measured in terms of reducing common causes of variation.

Invoice Control

A measure of data base accuracy, within the Comptroller function is the Automatic Payment of Invoices (API). This project uses statistical problem-solving techniques to allow our work force to practice the tools of TQM in satisfying an external customer (the contractor) by improving the process through preventing errors and eliminating nonvalue-added work. Increased job satisfaction is the ultimate result and this is reinforced by positive customer feedback.

Monthly Management Indicators

Traditional management indicators do not allow us to differentiate between stable systems, which will be made worse by tampering and those that need intervention to find special causes of variation. This project is designed to supplant numbers reflecting activity with data that measure the control and capability of processes. One aspect of this project deals with replacing trend charts based on averages of contractor delinquencies with control charts depicting the distribution of a contractor's performance by contract or commodity.

In another example, contractor nonconformance data is measured at the process level rather than at final acceptance when nonvalue-added activity is the only recourse.

Product Nonconformance Reduction

This project is external in focus and employs TQM methods in working with nine contractors to reduce variation in key manufacturing processes. It structures the plan with a negotiated Memorandum of Agreement which serves as the voice of the customer (buying/using commands). Goals are a part of the agreement, but are designed around prevention measures at the process level. Statistical Quality Control techniques are integral to the effort. Success is measured in "Cost of Quality" (scrap, rework, and repair) with quantifiable results.

Our understanding of process measures is changing the way we evaluate results. For example, we used to "measure" the productivity of our contract data input clerks by the size of their backlog (contracts awaiting input into the data base). Through exhorting the clerks to work harder, management drove the backlog down from 5 days to an average of 2.5 days; a whopping 50 percent reduction. Management was able to hold this gain and plotted the savings on a chart depicting the dollars saved by reducing the number of input clerks. Everything seemed fine, until measuring the process led to our understanding systems interactions -- how actions in one part of a process affect everybody and everything that is part of the process.

By using Percent Defective (P Charts) Control Charts to measure two parts of the data base, schedules and contract line items, we learned that one out of three schedules was

inaccurate, and one out of four contract line items was wrong. The managers of the Comptroller organization who took pride in the manhour savings had no idea of the rework costs incurred by their customers in Contract Administration. By admonishing the input clerks to work harder, they emphasized time at the expense of quality. The contracts were input faster, but the mistakes increased to the point where the product of their effort was of dubious value to the customer.

Two process-focused actions attacking common causes of variation produced positive and quantifiable results. The first step management took was the elimination of numeric quotas from the performance standards of the data input clerks. Management's attention was now on quality of input, not quantity. The second was flowcharting the input process, where they noted variation in the process between different input teams.

Next, PATs developed statistically valid samples and plotted their values on control charts. These control charts allowed us to identify the special causes and eliminate them.

Once that was accomplished we focused on the different work methods between input teams (Cells), found through flowcharting, separated those errors which contributed significantly from those that had less of an influence through Pareto analysis, then took action to reduce common causes. Finally, we standardized the steps of the process through work instructions and training. These efforts resulted in a 23 percent decrease in schedule errors. We also looked at the rework performed by the customer of the schedule, DCASMA Boston. We discovered that almost four manyears of effort was wasted on correcting schedules. The 23 percent reduction in errors saves a 2,000 hour manyear. A good start.

There is a paradox associated with results that are not process measures; the longer we wait to measure the effect of the defect, the larger the dollar savings will be associated with finding it and fixing it. Our Product Nonconformance Reduction Program is a good example of this. By finding defects and refusing to accept the nonconforming items we could report saving hundreds of thousands, or millions of dollars. Unfortunately, finding defects does not improve the process. If we find a defect at the process where it is made the cost may be $0.10. If the inspector finds that same defective part in final assembly

the cost may be $100,000. In the past, we congratulated ourselves when we found it at the end, because our measures led us to believe that we saved more ($100,000 vs. $0.10).

Our results are not nearly so "big" anymore, but they are far more significant. These are some examples from our Product Nonconformance Reduction Program:

> Contractor "A" reported over $5 million saved in terms of scrap, rework, and repair rate reductions over the previous year. they also reduced the number of nonconforming items produced by 21 percent.
>
> Contractor "B" reported a process improvement of more than 60 percent reducing the number of nonconforming items produced from 80.65 to 30.72 per 1,000 direct labor hours over a 12 month period.
>
> Contractor "C" reduced scrap by 18 percent over an eight-month period, which translated into a $400,000 savings.

These results are all reported in savings to the contractor for preventing problems, versus dollars paid to the Treasury as consideration for producing bad product. The contractors' profits increase (as costs go down) and the customers are happier with lower delinquencies and better performance.

The Product Non Conformance Reduction Program has also facilitated the transition of our Quality Assurance workforce from defect oriented procedures to the process oriented methodology of the New In-Plant Quality Assurance Evaluation procedures. The goals of each effort are mutually supportive as has been the TQM training.

The contract data base is at the heart of our internal improvement efforts, and we have several Process Action Teams (PATs) involved in various aspects of the data base. One team, focusing on the final shipment portion of the Invoice Control Demonstration Project, used the Seven QC Tools to find and eliminate nonvalue-added work. Twenty-two steps were eliminated from the process, saving about $10,000. The API rate was also improved by the efforts of another PAT focused on mechanizing DD250s, invoices, and progress payments to reduce handling errors, mailing costs, and time (both in-process and awaiting payment). By simply putting the data on magnetic tape, our automatic processing

rate has reduced handling of over 100,000 pieces of paper per year.

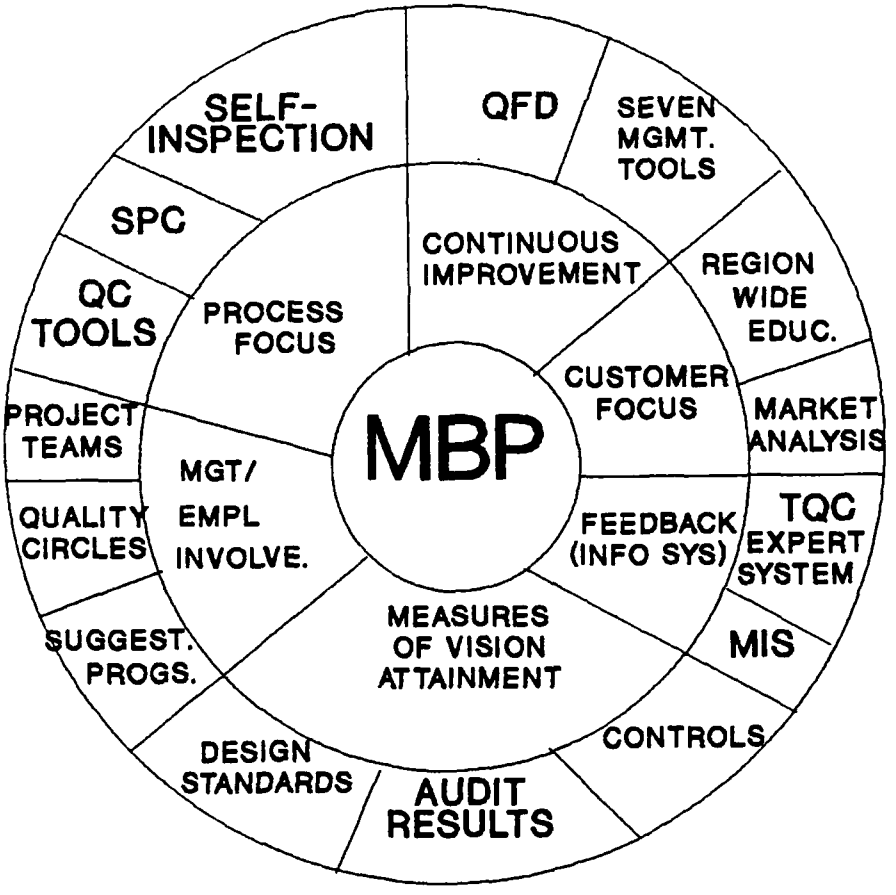
Another PAT has brought automation to the contract reconciliation process. Based on an annual average of 144 reconciliations, we have saved about $100,000 locally. DLA has adopted this program agency-wide with a projected savings of $1 million. The cumulative effect of these efficiencies at the process level has yielded a 30 percent reduction in overtime.

Since the Defense Contractor Alert List (DCAL) was originally issued in April 1985, the report has been refined through customer input to the point where demand is the operational measure of customer satisfaction. Distribution has increased by 674 percent. We now distribute a report listing 1,084 contractors to over 270 Government activities.

Savings through productivity have not only funded our TQM training, they have also contributed significantly to the quality of work life for our employees through renovation of office space and installation of systems furniture throughout the Region Headquarters. Success in this endeavor resulted in our winning the "Commander-in-Chief's Annual Award for Installation Excellence."

As demonstrated throughout this application, DCASR Boston's quality and productivity efforts are driven by a master plan that expresses our Vision, and provides the necessary tools to make it possible. Our TQM demonstration projects are focused on the mission requirement to accurately measure contractor performance and communicate this to our customers.

DCASR Boston consistently meets or exceeds nearly all the key measures used by DLA, our parent organization, in assessing the quality, timeliness, and cost-effectiveness of the services that we provide our customers.


MBP
PROCESS FOCUS
CONTINUOUS IMPROVEMENT
CUSTOMER FOCUS
MGT/ EMPL INVOLVE.
FEEDBACK (INFO SYS)
MEASURES OF VISION ATTAINMENT
SELF-INSPECTION
QFD
SEVEN MGMT. TOOLS
SPC
QC TOOLS
REGION WIDE EDUC.
MARKET ANALYSIS
PROJECT TEAMS
QUALITY CIRCLES
TQC EXPERT SYSTEM
MIS
SUGGEST. PROGS.
CONTROLS
DESIGN STANDARDS
AUDIT RESULTS