



CHARLES BROOKS ASSOCIATES, INC.
Performance Improvement Technology
PO Box 3045, Cookeville, TN 38502-3045

800-868-3553
www.charlesbrooks.com

DESCRIPTION OF FIRM

CBA specializes in Manufacturing, Assembly, and Filling and Packaging **OPERATIONS PERFORMANCE IMPROVEMENT**, assisting clients to strengthen staff capability, to improve bottom-line results, and to optimize capital equipment and personnel utilization. CBA does not install “canned” programs, nor merely make recommendations. Rather, we assist clients to develop and implement programs suited to their needs and personnel following an initial period of investigation and analysis. Our work covers all aspects of the Operational Process Model from receipt of materials through manufacturing, assembly, and packaging to warehousing and distribution. CBA’s experienced specialists train client’s staff to achieve the expected results and to ensure program continuity after our involvement is complete. CBA’s techniques strengthen the usual improvement programs found in well-managed companies, and have been validated in over 20 manufacturing industries. Consultants News has named Charles Brooks Associates, Inc. one of the Top 100 Management Consulting Firms in North America.

AREAS OF PRACTICE

MAINTENANCE SERVICES

Controlled Maintenance (CM) A procedure to improve the quality of repairs and machine performance while **creating standard machine conditions**. The development of **Defined Equipment Standards (DES)** forms the basis for **training, preventive maintenance, and troubleshooting skills development**. Our **Controlled Maintenance** technique has proven to be a cornerstone of **Total Productive Maintenance (TPM)** and **Reliability Centered Maintenance (RCM)**.

Maintenance Benchmarking (MB) The Maintenance Benchmarking process is one, which reviews the entire maintenance operation of a plant, site or company. During a brief on-site survey, Charles Brooks Associates, Inc. interactively reviews the day-to-day operation of the maintenance department. Customer departments are surveyed to determine the level of satisfaction being generated by the maintenance operation. Primary areas to analyze include maintenance organization, maintenance procedures, planning and scheduling, planned maintenance and lubrication, equipment records, maintenance training, maintenance costs and maintenance performance measurement.

Computerized Maintenance Managements Systems CBA offers support in every facet of CMMS selection and implementation. Our experienced consultants have helped companies select the system best suited to their needs, establish MRO inventories, establish an effective work order system and generate reports that allow Maintenance Managers to effectively schedule, plan, and control maintenance activities.

TRAINING SERVICES

The Analytical Method of Training (AMT) Our firm has utilized the **Analytical Method of Training** system for more than 28 years over many industries to establish effective training capabilities. **AMT** enables clients to achieve a training system that is designed to fully train personnel from the outset to gain the skills and knowledge of skilled employees. Competency and performance are achieved following detailed analyses of job activities, associated skills, and principles of effective training. We have used the Analytical method of Training to develop training for machine operators, maintenance technicians, and supervisory personnel.

Supervisory Skill Development (SSD) is based on developing supervisory skills by providing shoulder-to-shoulder training in the work environment.

TEAM (Training, Engineering and Motivation) "TEAM" is a new approach to higher productivity, product quality, and lower labor turnover. It is a participatory activity involving employees and their supervisors as well as staff departments. TEAM is a structured approach enabling a company to harness its human resources in a way that line management usually does not have time to do. It develops a stronger "team spirit" as line and staff work closely together to solve problems and to make improvements.

The object is to make improvements in an operation with the involvement and understanding of all concerned. Where appropriate, participatory trials are first carried out to confirm the improvements. In this way, employees are able to participate in the process of establishing new procedures, methods, performance standards and goals.

New Plant/New Technology Start-Up is a combination of Training, Industrial Engineering and Personnel Management disciplines, supported by the solid manufacturing experience of our results-oriented specialists. All too often the physical resources may be in place well before the recruitment and training of the personnel needed to run the equipment. For any new start-up to be effective, the people side of the process must be as well planned and controlled as the equipment side.

High Performance Work Team Development Tapping the resources of the entire organization requires development of new cultures and use of revised approaches to management. Employee empowerment must be complemented with a system of team development that ensures achievement of organizational goals and objectives.

Employee teams may be highly directed by a coach or coordinator, receive limited direction, or be completely self-directed. No matter which form of team structure your organization chooses, High Performance Work Team development depends on designing and implementing policies and techniques that produce the desired cultural change.

PROCESS IMPROVEMENT SERVICES

Performance Excellence Process (PEP) CBA's Performance Excellence Process has been developed to provide a structured methodology that will promote the identification of innovative improvements, provide a better means to measure performance, and empower each operations and administrative area to design the most effective operational process. With the help of a trained facilitator, an operational team from each area will be guided through the redevelopment and implementation of its own formal Performance Excellence Process. Our approach fully supports and integrates with Value Management Engineering, Kaizen, Toyota Production Systems, and Six Sigma methodologies where applicable.

INTERIM MANAGEMENT SERVICES

CBA offers our experienced consultants to serve as temporary executive managers and project leaders for a variety of client projects. These additional resources help our clients focus on needed projects while allowing their staff to carry on the day-to-day activities. We can provide managers for maintenance, operations, and distribution when a full-time employee is not required or while recruiting key personnel.



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REPRESENTATIVE INDUSTRIAL CLIENTS

Automotive

Buick Division of GM
Collins & Aikman
CMI Schneible
Cummins Engine Company
Enkei America
GDX Automotive
Franklin Aluminum
GM, Central Foundry Division
GM, AC Rochester (Delphi)
GM Powertrain Division
GM Worldwide Facilities Group
Honeywell (Allied-Signal)
Lear Corporation
NTN Driveshaft, Inc.
Raybestos Corporation
Robert Bosch
Siemens Automotive
TRW
Volvo

Chemicals and Plastics

3M
BP Amoco
Akzo Nobel
Akzo CSI
Akzo Deutschland
Alcoa, HC Industries
Alcoa Industries de Mexico
BASF
Capsulas Metalicas (Spain)
Colbond
CosmoLab
Framatome Cogema
Great Lakes Chemical
Hoechst-Celanese
Exxon Chemicals
Hercules Fibers
Mobil Chemical
Moll Industries
National Starch and Chemical (ICI)
Owens-Illinois
Polygram
Tredegar Film Products
Uniqema

Consumer Products

American Tobacco
Benckiser
Brown & Williamson
Burlington House
Carolina Designs

Consumer Products (cont.)

Colgate Palmolive
Corning
Empire Berol USA
Frigidaire
General Electric
Liggett & Myers
Lorillard
Louisville Bedding
Owens-Corning Fiberglass
Philip Morris
Sanford Company
Sara Lee
Thompson & Formby
US Ceramics

Electrical/Electronics

International Jensen
Magnavox
Milltronics
Philips NA
Philips Mexico
Reliance Electric
Sprague Electric
Square D Company
Varta Industries

Food and Beverage Products

Alamance Foods
Alberta Distillers
Anheuser-Busch
Baptista's Bakery
Barton Brands
B & G Foods, Inc.
Brown-Forman
Coca-Cola Bottling
Coors Brewing
Diageo
Guinness UDV
Int'l Flavors & Fragrances, Inc.
Jim Beam Brands
Labatt Breweries
Lance, Inc.
L. A. Dreyfus
McCleary, Inc.
Mt. Olive Pickle
Midwest Biscuit
Miller Brewing
National Fruit
Ocean Spray Cranberries, Inc.
Pretzels, Inc.
Quaker Oats

Quaker de Mexico (Gatorade)
Ralcorp.
Unilever
Wm. R. Wrigley, Jr

Forest and Paper Products

Allegheny Particleboard
Federal Paperboard
Bowater Southern
Sonoco
US Gypsum
Westvaco
Weyerhaeuser

Medical Products

Abbott Labs
American Pharmaceutical Partners
BNS-JOBST
Bayer Corporation
C. R. Bard
Convatec
Genzyme
Hoffmann-LaRoche
Hudson RCI
Ken-Mex
Kendall
Mallinckrodt Medical
Smith Kline Beecham
Solvay Pharmaceuticals
Wyeth Consumer Healthcare

Metals and Machining

American National Can
Betz Industries
Boeing Corporation
Metal Leve
IMO Industries
Ingersoll-Rand
LTV Copperweld
Norris Industries
Nucor Fastener
Nucor Steel
SchuF
Trinity Industries

Printing and Publishing

Atlantic Envelope
Golden Belt Manufacturing
Graphic Packaging
Western Publishing

Transportation

Boeing Canada Technologies
Bollinger Shipyards, Inc.
Motor Coach Industries



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CONTROLLED **M**AINTENANCESM A well-proven approach toward **Total Productive Maintenance**

Controlled Maintenance is a process which ensures a continuous improvement in the **quality** of maintenance work carried out on production equipment which leads in turn to higher efficiencies and a reduction in the cost of non-conformance.

We have observed, over many years in diverse industries, that clear goals of achievement for mechanics are rarely established. It is equally rare that measurements are made of mechanics' performance. Furthermore, in most plants, there exists wider variations in mechanics' understanding, skill and motivation than is generally realized. This results in variations in accuracy, and consequent losses in equipment performance. The situation is aggravated any time there is a shortage of skilled mechanics.

This state of affairs can be remedied by the introduction of a Controlled Maintenance program which will lead to not only improvements in the quality of repairs and higher machine performance, but also higher morale and job satisfaction among mechanics. Furthermore, the creation of standard machine conditions facilitates the faster training of new mechanics and operators.

KEY FEATURES

Defined Equipment Standards

In our Controlled Maintenance program the emphasis is on a strong planned maintenance program in which the proper items are checked carefully and accurately at the proper intervals. Additionally, parts replacement and adjustments are made where necessary on a consistent and accurate basis. The definition and agreement of standard speeds, settings, tolerances, worn parts replacement criteria, etc. is developed with the full participation of the experienced mechanics and maintenance staff. These are referred to as Defined Equipment Standards.

Critical Component Analysis

Experience usually shows that the majority of maintenance required by any given piece of equipment is caused by a relatively few critical sub-assemblies or components. Similarly, there will be a relatively few sub-assemblies having a critical effect on productivity, product quality, waste or off-quality and machine efficiency. A careful analysis will usually identify these critical sub-assemblies or components. Early attention is concentrated on developing the Defined Equipment Standards for these critical components.

Proficiency Training

Where necessary, maintenance staff and mechanics are re-trained in the most effective and efficient methods of applying the Defined Equipment Standards. This raises the level of comprehension, commitment and skill, thereby reducing variations in performance.

Upgrading of Equipment (Restoration)

Equipment that is far below standards is upgraded to the Defined Equipment Standards and carefully checked with the involvement of client staff.

Operating Department Liaison

Production staff and operators are consulted in the analysis of critical components to ensure that operating practices are not counter-productive to the maintenance effort required to maintain Defined Equipment Standards. Production operators are retrained where necessary using client's instructors.

Autonomous Maintenance

Operators and/or production technicians are trained to perform basic maintenance on their assigned equipment, to maintain equipment in proper working order to Defined Equipment Standards, and to develop the ability to detect deterioration and problems before breakdowns occur.

Predictive Maintenance

Maintenance staff are trained to monitor the condition of equipment during operation and to diagnose evidence of probably imminent failure through the introduction and adoption of predictive maintenance techniques.

Maintenance Planning

A cooperative program involving both Production and Maintenance personnel is developed to ensure that full advantage can be taken of equipment outages to complete planned maintenance.

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Scheduling Analysis

The optimum maintenance intervals are determined taking into account all relevant production, quality and machine factors.

Development of a Performance-Related Evaluation System

An effective method is required of assuring that maintenance to Defined Equipment Standards has been done properly. This requires an accurate but rapid evaluation system. In this way, a portion of equipment can be graded regularly, giving a regular measure of the effectiveness of each mechanic's performance. This has a strong motivational effect and results in a higher standard of maintenance. A considerable reduction in the number of malfunctions enables mechanics to spend appropriate time on planned maintenance work. On multi-position equipment, a randomly selected number of positions can be checked to arrive at a grading for the overall machine.

Control

A rapid, documented feedback of both machine and mechanic performance is designed. This not only enables management to monitor and control conditions, but also serves to motivate mechanics and to build pride in the performance of their jobs.

Participatory Approach

Most plants have had experience with various preventive maintenance programs, and many of them have fallen by the wayside. Many mechanics - and, perhaps, not a few managers - feel that planned maintenance programs are fine in theory but do not stand the test of time in practice. To minimize any doubts about the practicality of the program and to assure success, a key factor in introducing Controlled Maintenance is the complete involvement of mechanics and their supervisors in the development of the process.

BENEFITS

Controlled Maintenance can contribute significantly to higher productivity, increased profits, improved maintenance management and other important benefits:

Improved Equipment Output: Typically as much as 15-25% through a reduction in controllable downtime, reduced set-up and start-up losses, and increased mean time between failures.

Improved Product Availability and Yield: Typically by 20-50%; sometimes more through a reduction in process defects, off-quality and scrap.

Increased Labor Productivity: By as much as 15-20% through reduced breakdowns and improved equipment availability and reliability.

Reduced Replacement Parts Cost: Typically by 15-20% through the improved definition of parts replacement criteria, and a clearer understanding by mechanics of such criteria.

Reduced Energy Costs: From more efficient machinery.

Faster Training of Mechanics: Through definition of required standards, measurement and control of mechanic performance and creation of standard conditions.

Simplified Operator Training: Machinery consistently set to Defined Equipment Standards is easier to operate.

Lower Labor Turnover and Improved Morale: Improved skill, confidence and success lead to improved morale and lower labor turnover.

OUR APPROACH

Following a discussion with one of our senior consultants, the first step is a short survey to determine the scope for our work, the benefits that may be expected, the costs involved and the resources the client should plan on making available to work with us.

When invited to work with a company, we do not install "package" programs; neither do we merely make recommendations. Following proven principles and techniques, we assist clients to develop a continuous improvement process suited to their needs and personnel, with full participation of the staff concerned. We then work with them to achieve the expected results. A major aspect of our approach is to give thorough training to members of the client's staff so that they may continue the process successfully after we leave.



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MAINTENANCE BENCHMARKING

The Maintenance Benchmarking process is one, which reviews the entire maintenance operation of a plant, site or company. During a brief on-site survey, members of Charles Brooks Associates, Inc. (CBA) interactively review the day-to-day operation of the maintenance department. Customer departments are surveyed to determine the level of satisfaction being generated by the maintenance operation.

While on-site, experienced CBA consultants will look at the maintenance department in the following areas:

MAINTENANCE ORGANIZATION

MAINTENANCE PROCEDURES

PLANNING AND SCHEDULING

PLANNED MAINTENANCE AND LUBRICATION

EQUIPMENT RECORDS

MAINTENANCE TRAINING

MAINTENANCE COSTS

MAINTENANCE PERFORMANCE MEASUREMENT

Following the on-site visit, CBA will provide a written report evaluating each area of maintenance. Opportunities for improvement will be identified and an initial game plan will be discussed. The results of the Benchmarking survey are often the foundation for the development of a Maintenance Mission and Vision.

Prior to the on-site portion of the Benchmarking process, a pre-survey checklist will be provided to allow local personnel to gather available data to facilitate the on-site analysis.



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THE ANALYTICAL METHOD OF TRAINING *for Lower Costs, Higher Productivity and Lower Labor Turnover*

THE ANALYTICAL METHOD OF TRAINING

The Analytical Method of Training (or A.M. Training as it is widely known) originated in England during World War II as an aid to faster operator training for war-time production. The early development work was carried out by a group of professionals whose backgrounds included Industrial Psychology, Industrial Engineering and Sociology.

The A.M. Training technique is distinguished by the following features:

- ! A more detailed skills analysis than is normally done.
- ! Initial development of critical skills using specially designed training exercises.
- ! Development of effective performance on individual job elements using experienced-operator method and quality before combining to practice the complete operation.
- ! Systematic stamina build-up by practicing for periods of increasing length, maintaining experienced-operator rhythm and quality.
- ! Progressive goals and measurements and motivational aids to stimulate sustained interest and effort and to develop positive attitudes.

OUR APPROACH

Our work is a combination of Training, Industrial Engineering and Personnel Management disciplines. Our training specialists are results-oriented professionals who have had several years industrial experience before joining our company. They have been carefully trained to assist our client companies to introduce changes and to obtain improvements with the cooperation and understanding of the client's staff.

The first step is a discussion with one of our senior specialists, followed by a short survey to determine the scope for our work, the benefits that may be expected, and the costs involved.

When invited to work with a company we do not install "package" programs - neither do we merely make recommendations. Following proven principles and techniques, we assist clients to develop programs suited to their needs and personnel - with full participation of the staff concerned - then work with them to achieve the expected results. A major aspect of our approach is to give thorough training to members of the client's staff so they may continue the work successfully after we leave.

In addition to our normal full-time assignments, our specialists are also available for occasional audits, advisory visits and in-house workshops and seminars. We also direct occasional Workshops on the Analytical Method of Training at different locations in the U.S.A. and Europe.

Charles Brooks Associates, Inc. has been associated with this method of training since 1949 and has concentrated activities in the United States since 1963. The company has refined and strengthened the A.M. Training technique and has applied it widely in the United States and Europe.

Originally designed for fast operator training only, the A.M. Training technique has been broadened in scope and is now being used for training and retraining of Supervisors, Mechanics, Operators, Inspectors and Clerical personnel as well as other employee categories. It has proven to be a very effective tool for achieving improvements in productive performance in a wide range of industries and commercial operations.

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BENEFITS

A.M. Training and Re-training can contribute very significantly to increased profits. Results vary according to the industry and type of operation, but typical results in diverse industries are:

Shorter Training Times

New employees are trained to skilled performance three times faster.

Higher Productivity

Department productivity is increased by 10-30% on employee controlled jobs.

Improved Quality

Controllable waste and off-quality are reduced by 20-30%.

Reduced Machine Down-Time

Controllable down-time due to repairs, set-ups, changeovers, etc. is reduced by 25%.

Reduced "Make-up"

"Make-up" pay on employee controlled jobs is reduced by 50%.

Improved Inspection

Inspection errors are reduced by 10-30%.

Lower Labor Turnover

Improved skill, confidence and success lead to improved morale and lower labor turnover and improved relations between employees and supervision.

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Management Consultants

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SUPERVISORY SKILL DEVELOPMENT for

HIGHER PRODUCTIVITY
IMPROVED RELATIONS

IMPROVED QUALITY
DEPARTMENT SPECIFIC SKILLS TRAINING

SUMMARY

During 30 years of management training experience which has included working with supervisors in many different industries, we have recognized clearly the limitations of the conventional types of supervisory development programs. The majority of such programs are conducted in the classroom and are mainly confined to knowledge training covering such subjects as human relations, management principles and company policies.

Important as knowledge training is, it alone is by no means sufficient to enable supervisors to perform their jobs effectively. Indeed many supervisors have difficulty relating some of the subject matter of conventional training courses to the daily routine of their jobs.

The particular job skills required by supervisors vary widely from one industry to another and from one department to another in the same company. Supervisors need both knowledge training and specific job skill training to be effective.

The thrust of our work, therefore, is to establish a strong results-oriented Supervisory Skill Development (SSD) program including both Knowledge training and Skill training. This is based on an analytical approach to determine the specific supervisory skills needed and includes "shoulder-to-shoulder" training for the supervisors in their own departments, according to their individual needs, to help them to use a positive approach with their subordinates and to obtain identifiable improvements in performance.

A KEY TO THE SUCCESS OF A SUPERVISORY SKILL DEVELOPMENT PROGRAM IS THE INVOLVEMENT OF THE SUPERVISORS CONCERNED IN THE PREPARATION OF THE PROGRAM, AND THE FOCUS ON HELPING THEM ACHIEVE RESULTS AS PART OF THE TRAINING PROCESS.

SSD FEATURES

Investigation

-Researching job descriptions, supervisors' backgrounds, specific department needs and goals, problems and employee work habits

Analysis

-Identifying key activities, skill requirements, training needs, etc. required to achieve departmental goals

Development of Training Plan

-Shoulder-to-shoulder training integrated with off-site training and knowledge training classes

"Live Action" Training

-Developing individual skills in resource utilization; setting short-term goals; reading key signals; utilizing control information; problem solving and decision making; performance measurement and feedback; employee counseling and motivating subordinates

Support Activity

-Succession and training plans for new supervisors; recommendations for organization and staffing changes

Documentation

-Guidelines for key skills, key procedures, job descriptions, control information and reports, performance analysis procedures, and supervisor selection and training procedures.

OUR APPROACH

Our work is a combination of Training, Personnel Management and Industrial Engineering disciplines supported by the solid manufacturing experience which most of our specialists have had before joining our company. Our staff has been carefully trained to assist client companies to introduce changes and to obtain improvements with the involvement and understanding of the client's personnel at all levels.

The first step is a discussion with one of our senior specialists, followed by a short survey to determine the scope for our work, the benefits that may be expected and the cost involved.

When invited to work with a company, we assist our clients to develop a program suited to their needs and personnel with the full participation of the staff concerned. We then work with them to achieve the expected results.

BENEFITS

Improved Productivity

At least 10% on employee-controlled jobs

Improved Product Quality

Improved Relations - Supervisors and Employees

Reduced Absenteeism and Labor Turnover

Improved Use of Staff Services by Supervisors

More Effective Training of New Supervisors

Problems Get Solved at Lower Levels

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Charles Brooks Associates, Inc.

Founded 1971

Member of AMCF, Inc.
The Association of Management Consulting Firms

**Client: Major Producer Fruit
Juices and Sauces**

Production Increased Over 60%

Improvements Achieved Using CBA's Mechanic Training And Defined Equipment Standards Techniques

BACKGROUND:

- The facility faced a shortage of skilled Mechanics.
- Poor equipment reliability resulted in the use of extra employees to manually place caps and over-caps on bottles.
- On-time shipments were missed due to low productivity.
- There was no effective maintenance system in place at the facility.
- Material costs were out of control.

SURVEY:

- An analysis of the facility revealed:
- Machine downtime averaged over 50%.
- Training was ineffective and there were no documented agendas or standard operating procedures in place.
- Line efficiencies averaged less than 50% due to unscheduled stops and poor Mechanic troubleshooting skills.
- Line set-ups and changeovers took far more time than necessary and results were variable.
- Simultaneous line stops caused excessive downtime due to the Mechanics' inability to correct machine problems in a timely manner.
- There were no documented procedures for changing lines from one product to another and changeover results were not measured.

ACTIONS:

- CBA took one line at-a-time using existing Mechanics to up-grade the equipment to standard conditions. The standards were developed using CBA's **Defined Equipment Standards** technique.
- During the up-grade period, Mechanics were trained to the new standards and necessary documentation was developed. Training consisted of machine functions, adjustment exercises, diagnostic exercises and job management exercises.
- A Product Changeover Training Matrix was developed to improve the quality and timeliness of product changeovers.
- CBA developed **Defined Equipment Standards** for the other pieces of equipment on the filling lines.
- CBA developed daily measurements and controls to enable the department to monitor and analyze daily performance.
- A fully documented training manual was developed for the on-going improvement process.

RESULTS:

- Line efficiencies improved over 60% measured against a true 100%.
- Labor costs were reduced through the elimination of "extra" labor to replace missing caps and over-caps.
- Changeover times were reduced 80%
- Improved equipment reliability reduced cap usage by 90%, Over-cap usage by 85%, bottle usage by 63%, and label usage by 88%.
- Preventive Maintenance routines were made possible due to improved machine availability time.
- On-time deliveries improved 70%.

For more information, contact:

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Client: Major Beverage Producer

Charles Brooks Associates, Inc.

Founded 1971

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Staff Reduced by 30% While Increasing Production Line Efficiencies

Total Controlled Maintenance Achieved by Implementing CBA's Complete Maintenance Management System

BACKGROUND:

- Top management mandated a corporate-wide reduction in maintenance work force.
- Management sought an independent appraisal of action to improve mechanic utilization and issues to be addressed in union contract negotiations.
- Division management was concerned that the current maintenance management system operated in a reactive mode and would be incapable of controlling necessary activities with a reduced staff.
- Production and maintenance had an adversarial relationship.
- Parts inventory was out of control: excessive inventory levels, duplicate items listed under different stock numbers, etc.

SURVEY:

- CBA's initial analysis of the production and maintenance operations revealed that:
 - There was little equipment history;
 - Preventive maintenance routines were not effective;
 - Maintenance operated in a breakdown mode with yearly overhauls;
 - Repair parts costs were excessive;
 - Maintenance planning and work order control were limited;
 - Computer support was ineffective.

Continued...

ACTIONS:

- CBA designed a Total Productive Maintenance program in the selected *pilot area* featuring:
 - Autonomous maintenance and co-ownership routines;
 - Planned maintenance skills training for PM mechanics;
 - A system for measuring and monitoring equipment condition and losses; including the quality of maintenance work performed;
 - PM training manuals for the pilot area equipment.
- CBA assisted internal staff in implementing the program.
- CBA strengthened production and maintenance supervisory capabilities through a six week supervisory technical job skills training program.
- CBA implemented development of a complete Computerized Maintenance Management System (CMMS) with parts and preventive maintenance interfaces.
- CBA developed a plan to totally revamp the parts system so that it was interactive among all the company's breweries and with the new CMMS.

RESULTS:

- Eleven months after the start of the project, the company had reduced maintenance staff by 30% while maintaining their high standard production levels.
- The Total Productive Maintenance concept became the corporate standard to be implemented at all breweries.
- In-house corporate staff was trained to expand the pilot project and to export the program to other plants.
- Losses to shorts and leakers were reduced from 227% to 130% while increasing line efficiency from 78% to 85% over an eight-month period.

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