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The Effects of Quality of Work Life Processes on Job Satisfaction and Productivity

Greg Alan Dabicci
Western Michigan University

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THE EFFECTS OF QUALITY OF WORK LIFE PROCESSES
ON JOB SATISFACTION AND PRODUCTIVITY

by

Greg Alan Dabicci

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Arts
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
August 1981
This study was conducted to determine the effects of employee participation on job satisfaction and productivity. A small group of hourly employees (5-7) from a package sort and load operation worked with management to identify, analyze, and solve performance problems. Four employee participation interventions were examined: 1) group problem-solving of sorting performance, 2) individualized problem-solving of loading performance, 3) general participation on job satisfaction, and 4) general participation on overall productivity. The results indicated that the participation program was effective in improving job satisfaction, group performance, and individual performance. The program was not effective in improving overall productivity. The study indicated that the process of participation, in itself, is not the critical factor for successful participative management. The results demonstrated that the intervention was effective only when it followed a precise problem-solving/change strategy for specific behaviors and problems.
ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to Dr. Dale Brethower for the assistance he has provided me throughout my college career. I have always found him willing to help with any problem or project. His insight and influence have been, and will continue to be, of great value to me. I would also like to recognize General Motors Corporation for its cooperation and permission to use the Quality of Work Life Survey Questionnaire. Finally, I am indebted to United Parcel Service for allowing me to conduct this research and for providing me with invaluable experience with the human element of business organizations. The interventions and observations reflected in this study are those of the researcher and not necessarily those of United Parcel Service. I assume sole responsibility for the appropriateness and accuracy of this study.

Greg Alan Dabicci
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</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Much has been written in recent years concerning the growing disparity between employees and employers (Calhoun, 1980; Scobel, 1980; Guest, 1979; Yankelovich, 1978). There appears to be an ever-widening gap between the goals of the individual employee and the goals of the organization he belongs to. This worker alienation has been attributed to the changing needs and motivations of a younger work force. The goals and values of what has been labelled the "New Breed" worker are so different from those of earlier generations that traditional rewards are not as effective in motivating them. This "New Breed" worker is more resistant of authority, more critical of management prerogative, more concerned about his personal involvement in the organization, and more demanding of a greater say in matters that affect his organizational life. The consequences of this increasing separation between employee and employer have been numerous and quite negative to business. Increasing absenteeism and tardiness have made it difficult for companies to man their operations adequately. Sabotage and theft contribute to organizational losses. Most critically, poor product quality has put American businesses at a disadvantage in the world market due to increasing costs and low dependability.
Many companies are currently implementing management systems which are intended to improve the quality of life at work in order to combat the problems mentioned above. Improved Quality of Work Life (QWL) is seen as a goal and a process. As a goal, QWL represents the creation of more involving and satisfying jobs performed in cooperative work environments. As a process, QWL calls for a strategy of active participation of everyone in the organization in order to reach this goal. QWL goals and processes represent philosophical ideals in which people respect one another, treat each other fairly, and work to solve common problems in a collaborative manner. This collaborative approach balances the needs and development of the employee with the goals and development of the organization.

As can be seen, a QWL process is not a single notion or concept. Rather, it is a broad term used to describe a wide range of behavioral concepts and organizational climates. Ted Mills, director of the American Center for the Quality of Work Life, states that QWL encompasses many related concepts including human resource development, work restructure, job enrichment, organizational restructure, socio-technical systems, work humanization, group work concept, labor-management cooperation, worker involvement, worker participation, and cooperative work structures (Mills, 1978). A review of the research on work improvement strategies identified nine action levers manipulated in order to improve
productivity and the quality of work life (Cummings & Molloy, 1977, pp. 5-8). The nine most common categories of action levers in the literature included:

1) pay-reward systems
2) autonomy/discretion (participation)
3) support systems
4) training
5) organizational design
6) technical/physical changes (socio-technical)
7) task variety (job enrichment)
8) information/feedback
9) interpersonal/group processes (team building)

Cummings and Molloy (1977, p. 9) also identified the five most common outcome measures examined in quality of work life processes. These included cost, productivity, quality, withdrawal, and attitudes.

While QWL represents philosophical ideals and goals, these nine categories indicate strategies for achieving those ideals and goals. The researcher of the present study chose participation as the primary change strategy. He examined the effects of participation on productivity and job satisfaction.

One study of participative decision-making was carried out in the Advanced Circuitry division of Litton Industries. The company implemented participation groups in an attempt to improve quality initially, then to concentrate on productivity and employee morale. An effort was also made
to implement an ongoing program so structured that it would continue indefinitely (Curtis, 1977). In this participation model, group meetings followed a seven-step problem-solving format conducted by the supervisors. This was emphasized for the purpose of focusing on a single problem at a time. The researchers found that supervisors who did not closely follow the sequence tended to have longer meetings. Furthermore, these supervisors were not as effective in their meetings. They tried to solve too many problems at once which resulted in much discussion but little action so that fewer problems were solved. Follow-up training for supervisors stressed the importance of following the problem-solving sequence. The results have indicated a high correlation between employees' positive reactions to the program and how closely their supervisor follows the "steps."

The problem-solving sequence that Litton employed is similar to the change strategies advocated by Malott (1973), Gilbert (1978), and Luthans and Kreitner (1975). It appears that quality circles and the process of participation itself is successful when structured along behavioral dimensions. The Litton study was effective due to the ability to pinpoint, measure, and consequence specific behavioral events. Most successful quality circles are so because the group selects one problem or behavior, uses various tools to measure its frequency and identify its antecedent causes, implements solutions, and charts feedback information on the progress of the solution implementation.
Successful attempts at participative management include all components of Gilbert's (1978) behavior engineering model. They provide 1) training so that members and supervisors have the knowledge to participate, 2) select leaders that have the capacity to manage participatively, 3) provide groups with the tools and technical assistance they need, 4) provide inductive information about the program and the organization as well as feedback information, 5) offer incentives that will reward participation and involvement, and 6) structure voluntary participation to gain members with motives conducive to participation.

Luthans and Kreitner (1975) report on several successful behavior change studies. These studies included production, service, and government applications with individual, group, and total organization targets of intervention.

Some researchers argue that the process of participation itself leads to the success or failure of organizational endeavors. Lawler and Hackmann (1969) found that employee participation in the development of a pay incentive plan was effective in improving attendance. However, the same plan implemented in a non-participation group was not effective in increasing attendance. The researchers cited three possible reasons for the findings: 1) subjects who participated in the plan were more knowledgeable about it, 2) participation caused the subjects to be more committed to the plan, and 3) participation increased the employees trust of the good intentions of management with respect to the plan.
A behavioral analysis of the Lawler and Hackmann study revealed that 1) subjects in the participation group received more complete information about which behaviors would result in reinforcement, 2) the participation group was able to implement a plan which would include acceptable contingencies and provide desired rewards, and 3) the cooperative process allowed management to contract specific behaviors and contingencies and then to implement them according to the agreement.

A large aerospace company provided another setting for the study of participation (Chaney & Teel, 1972). The objective of this program was to build employee commitment to the goals of the organization—primarily high productivity and high quality. Also, the researchers believed that a participative management system would get employees involved in identifying and solving problems that they encountered everyday in the course of their work. This study also supported the contention that participatively derived plans are more effective than imposed plans. The researchers attempted to implement changes developed by one group into other groups in order to achieve the same positive results, without success. The researchers claimed that the degree of participation in making the decision seemed to be the key factor. Six departments were rated by two psychologists according to the degree of participation that was employed in each. Two groups were rated as low
participation, two rated as medium, and two as high. The study did not specify what criterion measures the researchers used to reach these ratings. The researchers found a significant positive relationship between the degree of participation and both the degree of favorable job attitudes and the degree of production improvements. From an assessment of the training program employed in this setting, it appears that here also success was due to such behavioral methods as goal setting, performance measurement, and feedback systems.

The researcher of the present study examined the effects of participative decision-making on job satisfaction and individual and operation productivity. Specifically, this intervention took the form of a quality circle. A quality circle is a specific tactic employed to follow the strategy of participation in order to achieve the ideals of improved quality of work life. Quality circles originated in Japan in 1962 (Gryna, 1981). A circle consists of a small group of employees, usually 8-10, from a common department who meet regularly to identify, analyze, and solve problems. The researcher of the present study believed that employee participation in a quality circle would lead to improved job satisfaction and productivity.
CHAPTER II

METHOD

Setting:
The setting for this study was the A.M. Sort and Load operation of United Parcel Service's Benton Harbor, MI center. Part-time hourly employees, two part-time supervisors, and one full-time supervisor made up this operation. The full-time supervisor was responsible for the effectiveness of the operation and was viewed as "the company" by employees. He participated in the program on an extremely limited basis. One part-time supervisor served as the researcher of the present study. The employees viewed him more as circle leader and fellow employee than as a supervisor. The other part-time supervisor was not involved in the program in any way. His only responsibility was the unloading of inbound packages. The sort operated from 5:00 a.m. to 9:00 a.m. when the delivery operation began. The function of this operation was to unload inbound packages from central relay centers in the Midwest, sort them according to local delivery addresses, and load them into the correct sections of the appropriate delivery vehicles.

Subjects:
Twenty hourly employees from a package sort and load operation were eligible to participate in the study. Three
basic job classifications made up the subject population. The sort consisted of unloaders, primary sorters, and preloaders. Actual subjects were composed of employees that had volunteered to take part in the QWL/Quality Circle program. Attendance at the meetings was usually open to all employees; however, only seven employees participated regularly. The total subject population consisted of both males and females ranging from 18 to 34 years of age. All employees had at least a high school education.

Procedure:

In order to facilitate the initiation of this project, the proposal was presented at a monthly organizational function called a Service Awareness meeting. The researcher explained the goal of a Service Awareness meeting to employees that had never been involved with one. He then presented the proposal for the QWL/Quality Circle program as an extension of this meeting concept. He also explained the basic purpose and processes of QWL to the employees present. After the researcher explained the program, he distributed a QWL Program Participation form to each employee (Appendix A). He then requested the employees to indicate their interest in participating in the quality circle and to sign the form.

The next step of the initial proposal meeting consisted of the administration of a QWL survey questionnaire. This survey measured sixteen dimensions of job satisfaction in terms of quality of work life (Appendix B). The QWL survey questionnaire was administered twice during the study, once
before the initiation of the quality circle and then after
the circle's discontinuation. The responses for the questions
were recorded in terms of a five-point Likert scale corre-
sponding to the following labels: (1) Strongly Disagree,
(2) Disagree, (3) Neither Agree nor Disagree, (4) Agree,
and (5) Strongly Agree. All members present agreed to
complete the survey even if they did not wish to participate
in the quality circle. The researcher explained that
individual responses to the questionnaire were confidential
and that no one, including himself, would be able to identify
any employee's survey.

The researcher conducted circle meetings once every
two weeks for a duration of one hour each. He conducted
the meetings in a large office at the center. The meetings
took place immediately following the operation. Materials
and facilities included a conference table, a flip chart,
and various printed study materials and visual aids. Employees
were not paid for this time spent in meetings but food and
refreshments were served.

Three component areas made up the QWL/Quality Circle
format (Appendices G, D, & E): 1) QWL Fundamentals Infor-
mation, in which employees learned the basic philosophy
and processes of QWL; 2) Organizational Design, Policy, and
Operations Information, in which employees learned more
about the structure and functioning of the organization
they are a part of; and 3) Group Problem-Solving and
Experience Based Learning, in which employees learned
problem-solving and decision-making skills in order to prepare them to help solve problems encountered on-the-job. Each meeting included topics pertaining to each of the three component areas or a special meeting was devoted to one area. This was often the case when employees learned about organizational matters.

In addition to the formal group meetings, individual employee problem-solving was instituted by the circle leader/supervisor with certain employees. This was an attempt to maintain job performance but also to support the QWL philosophy and worker involvement on-the-line. The individual employees worked with the circle leader/supervisor to eliminate their performance problems and increase their productivity. The supervisor requested employee participation and input in order to improve performance cooperatively. These working meetings took a form of sequential problem-solving similar to the group problem-solving model (Appendix F). The supervisor selected three employees for this intervention. All three employees were Preloaders responsible for loading packages into delivery vehicles. The researcher employed a multiple baseline across subjects design in this mode of the participation model. Employee A participated in the cooperative problem-solving strategy following baseline, while Employee B and C remained in the non-participative baseline condition. Then Employee B took part in the intervention while Employee C remained in baseline. Finally, Employee C
participated in the problem-solving sequence. Table I lists the research methodology for each mode of the complete QWL/Quality Circle intervention.
Table I: General research methodology for QWL/Quality Circle program
<table>
<thead>
<tr>
<th>TYPE OF INTERVENTION</th>
<th>INDEPENDENT VARIABLES</th>
<th>DEPENDENT VARIABLES</th>
<th>EXPERIMENTAL DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>QWL/Quality Circle meetings</td>
<td>Pre/Post QWL survey results; 89 items measuring 16 dimensions</td>
<td>A-B</td>
</tr>
<tr>
<td>Group</td>
<td>Problem-solving meetings</td>
<td># of Belt shutdowns</td>
<td>A-B-A</td>
</tr>
<tr>
<td></td>
<td>Identification of sorting problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary sort system reorganized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>Individual problem-solving model</td>
<td>Percent Effective performance</td>
<td>Multiple baseline across subjects</td>
</tr>
<tr>
<td></td>
<td>Identification of performance problems</td>
<td>% Standard performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Implementation of change strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consequation</td>
<td></td>
<td></td>
</tr>
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CHAPTER III

RESULTS

The following results correspond to the four target areas of the QWL/Quality Circle program: 1) the QWL survey questionnaire, 2) the circle problem-solving of the primary sort system problem, 3) the individual problem-solving with the three Preloaders, and 4) total system productivity.

Table II represents the pre and post survey results in terms of the sixteen categories of quality of work life. It presents the percentage distribution for each response on a representative question in each of the sixteen categories. Also reported are the mean scores for each category question and the ranking of the total categories overall. Twelve of the sixteen categories of work life quality improved in rank following intervention, two areas declined, and two remained the same. Five areas of quality of work life improved noticeably in rank. These five were "Absence of Developing Apathy," "On the Job Development and Utilization," "Employee Involvement and Influence," "Career Goal Progress," and "Confidence in Management's Understanding of My Concerns." The two dimensions that indicated a post-measure decrease were "Relations with Supervisor" and "Respect for the Individual."

The results of the group problem-solving of the primary sort system are presented in terms of belt shut-downs. Fig. 1
Table II: Pre and post QWL Survey results
# TABLE II
Pre and Post QWL Survey Results

<table>
<thead>
<tr>
<th>PERCENTAGE DISTRIBUTION DIMENSION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>MEAN</th>
<th>RANK</th>
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<tr>
<td>EMPLOYEE COMMITMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Feelings of loyalty to company, and commitment to and concern for the future of the organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2 Pre Post</td>
<td>0</td>
<td>9</td>
<td>9</td>
<td>64</td>
<td>18</td>
<td>3.91</td>
<td>2</td>
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<tr>
<td>ABSENCE OF DEVELOPING APATHY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative absence of deterioration in employees' concern and ambition regarding their work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#6 Pre Post</td>
<td>9</td>
<td>45</td>
<td>9</td>
<td>36</td>
<td>0</td>
<td>2.72</td>
<td>10</td>
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<tr>
<td>ON THE JOB DEVELOPMENT AND UTILIZATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>The opportunity to learn, and to apply one's skills and abilities in a meaningful and challenging way on the job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10 Pre Post</td>
<td>27</td>
<td>27</td>
<td>18</td>
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<td>0</td>
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<td>9</td>
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<td>EMPLOYEE INVOLVEMENT AND INFLUENCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The extent to which employees feel they are involved in and exert influence on decisions affecting the work and workplace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>#15 Pre Post</td>
<td>9</td>
<td>36</td>
<td>27</td>
<td>18</td>
<td>9</td>
<td>2.82</td>
<td>11</td>
</tr>
<tr>
<td>ADVANCEMENT BASED ON MERIT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The belief that management is interested in the progress of individuals, and that the rewards go to those who deserve them on the basis of their ability, performance or experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#19 Pre Post</td>
<td>0</td>
<td>30</td>
<td>40</td>
<td>30</td>
<td>0</td>
<td>3.00</td>
<td>13</td>
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### Pre and Post QWL Survey Results (cont'd)

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<thead>
<tr>
<th>DIMENSION</th>
<th>PERCENTAGE DISTRIBUTION</th>
<th>MEAN</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAREER GOAL PROGRESS</td>
<td>Satisfactory progress in the achievement of career objectives and the belief that there are opportunities for further progress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#27 Pre</td>
<td>18 18 36 27 0</td>
<td>2.73</td>
<td>14</td>
</tr>
<tr>
<td>Post</td>
<td>0 43 14 43 0</td>
<td>3.00</td>
<td>8</td>
</tr>
<tr>
<td>RELATIONS WITH SUPERVISOR</td>
<td>What it is like to work with the supervisor as reflected in the fairness, honesty, and mutual respect in the relationship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#31 Pre</td>
<td>0 27 064 9</td>
<td>3.55</td>
<td>4</td>
</tr>
<tr>
<td>Post</td>
<td>29 14 29 29 0</td>
<td>2.57</td>
<td>8</td>
</tr>
<tr>
<td>WORK GROUP RELATIONS</td>
<td>How employees under the same supervisor relate to each other and provide mutual support and encouragement in working together</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#36 Pre</td>
<td>0 27 27 45 0</td>
<td>3.18</td>
<td>6</td>
</tr>
<tr>
<td>Post</td>
<td>29 29 0 43 0</td>
<td>2.57</td>
<td>4</td>
</tr>
<tr>
<td>RESPECT FOR THE INDIVIDUAL</td>
<td>The feeling of being treated with respect and dignity as an adult human being</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#43 Pre</td>
<td>0 18 36 45 0</td>
<td>3.27</td>
<td>3</td>
</tr>
<tr>
<td>Post</td>
<td>14 14 43 14 14</td>
<td>3.00</td>
<td>7</td>
</tr>
<tr>
<td>CONFIDENCE IN MANAGEMENT'S UNDERSTANDING OF MY CONCERNS</td>
<td>The belief that management is aware of what employees think and what their problems are while also looking out for their individual interests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#45 Pre</td>
<td>9 45 27 18 0</td>
<td>2.55</td>
<td>15</td>
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<tr>
<td>Post</td>
<td>14 14 43 14 14</td>
<td>3.00</td>
<td>6</td>
</tr>
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<td>DIMENSION</td>
<td>PERCENTAGE DISTRIBUTION</td>
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</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>PHYSICAL WORK ENVIRONMENT</td>
<td>Conditions affecting employees' health, comfort, and convenience while performing their jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#47 Pre</td>
<td>18 27 0 55 0</td>
<td>2.91</td>
<td>8</td>
</tr>
<tr>
<td>Post</td>
<td>14 14 14 57 0</td>
<td>3.14</td>
<td>2</td>
</tr>
<tr>
<td>ECONOMIC WELL-BEING</td>
<td>Receiving adequate financial rewards and having income protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#80 Pre</td>
<td>0 0 0 50 50</td>
<td>4.09</td>
<td>1</td>
</tr>
<tr>
<td>Post</td>
<td>0 0 0 57 43</td>
<td>4.43</td>
<td>1</td>
</tr>
<tr>
<td>EMPLOYEE STATE OF MIND</td>
<td>Freedom from feelings of being upset or depressed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#70 Pre</td>
<td>0 40 20 40 0</td>
<td>3.00</td>
<td>16</td>
</tr>
<tr>
<td>Post</td>
<td>0 14 0 86 0</td>
<td>3.71</td>
<td>3</td>
</tr>
<tr>
<td>ABSENCE OF UNDUE JOB STRESS</td>
<td>The relative absence of excessive work demands and pressures which might interfere with doing the job well</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#75 Pre</td>
<td>0 20 30 50 0</td>
<td>3.30</td>
<td>7</td>
</tr>
<tr>
<td>Post</td>
<td>0 0 43 57 0</td>
<td>3.57</td>
<td>6</td>
</tr>
<tr>
<td>IMPACT ON PERSONAL LIFE</td>
<td>The spill-over effect of the job on employees' personal lives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#86 Pre</td>
<td>0 10 40 50 0</td>
<td>3.40</td>
<td>5</td>
</tr>
<tr>
<td>Post</td>
<td>0 14 14 71 0</td>
<td>3.57</td>
<td>3</td>
</tr>
<tr>
<td>UNION-MANAGEMENT RELATIONS</td>
<td>The extent to which the union and management recognize mutual goals and work together effectively in trying to achieve them</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#59 Pre</td>
<td>9 18 45 27 0</td>
<td>2.90</td>
<td>12</td>
</tr>
<tr>
<td>Post</td>
<td>29 29 14 29 0</td>
<td>2.43</td>
<td>9</td>
</tr>
</tbody>
</table>
indicates the number of belt shut-downs during each phase of this project. The belt was shut down an average of 19 times per work day during Baseline I. Following intervention, the mean daily belt shut-down rate dropped to 13. With the reinstitution of baseline conditions in Baseline II, belt shut-downs increased to the pre-intervention mean of 19 per work day.

The results of the individual problem-solving between employees and the circle leader/supervisor are presented according to Preloader percent effective. The percent effective index is based on industrial engineering time studies and is the most reliable measure of Preloader performance. This number reflects the comparison between the actual time taken to complete the loading and the planned time based on the standards. The planned hours take several variables into consideration including total volume, packages received per hour, average capability, and time required to make dispatch adjustments. The results are reported in terms of percent effective prior to the participative problem-solving and that after its implementation according to a multiple baseline across subjects design. Also presented is a measure of the percentage of work days the Preloader was at or above the standard percent effective. This measure is a more accurate description of experimental control because it is not subject to the variability of extremely high or low scores as percent effective means are. The minimum acceptable requirement (mar) for daily Preloader performance
Figure 1: Mean daily belt shut-down rate for each experimental phase
was 97 percent effective. The results for Employee A are presented in Fig. 2. This employee had a mean score of 98 percent effective during the baseline period. Although this mean of weekly percent effective scores is above the 97% standard, the daily scores fluctuated above and below mar greatly with no consistently high performance. Following the intervention of the problem-solving phase, percent effective rose to 101%. This represented a 3.06% improvement over baseline. Further, during baseline Employee A was meeting or exceeding mar 60% of the time. Following intervention he improved his daily performance by being 97 percent effective or above 85% of the time. This was a 42% improvement over baseline.

Employee B, also represented in Fig. 2, showed a 4.21% improvement on percent effective over baseline. During the base period this employee had a mean weekly score of 95 percent effective. During intervention this employee's percent effective improved to 99%. In addition, his daily performance was much more consistent. Employee B met or exceeded mar only 20% of the time during baseline. Following baseline, his performance rose to meet mar 80% of the time. The change in frequency of meeting mar represents a 300% improvement.

Employee C also demonstrated an improvement following his participation, although not as significantly as Employee A or B. Fig. 2 shows Employee C with a mean weekly percent effective of 95%. During this period he reached mar only
Figure 2: Mean daily percent effective for employees A, B, & C
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27% of the time he preloaded. At intervention his mean percent effective rose slightly to 96%. This represented preload performance that met or exceeded 53% of the time. His frequency of standard performance improved 96% following intervention.

The results of the QWL/Quality Circle program on total system productivity is presented in Fig. 3. Productivity in this sort and load operation was calculated by dividing the total volume of packages sorted by the total paid employee hours. This yielded a measure of packages sorted per man-hour. During the baseline period productivity was a mean of 99.75 packages per man-hour. During the intervention phase each month's productivity figures were examined as a result of the group meetings. This was done in a time series fashion. No significant differences between each month could be detected. Furthermore, the mean packages per man-hour during intervention was not significantly different from that of baseline. The intervention productivity measure reached a mean of 100.67 packages per man-hour. (December data thrown out due to non-representative man-hours)
Figure 3: Mean weekly productivity--packages sorted/man-hour
CHAPTER IV

DISCUSSION

The purpose of the present study was to determine if participative decision-making in the form of a quality circle is effective in increasing productivity and job satisfaction. The results indicated that the participation model employed was successful in improving job satisfaction along several dimensions, solving specific group performance problems, and solving individual performance problems. The participation model was not effective in improving overall productivity.

These results are consistent with the results obtained in the Litton Industries study (Curtis, 1977), in that a precise problem-solving model for participation proved most effective. The researchers found that supervisors who followed the problem-solving algorithm had more productive meetings and solved more problems. Employees participating in such structured groups were most satisfied also. The present study was similar to the Litton study in that a specific problem-solving model was used to guide the participation process for both the group and individual endeavors. It is clear from the present study that the only effective use of participation followed a definite problem-solving/change strategy. The process of participation itself
is not the critical component for success as certain researchers claim (Lawler & Hackmann, 1969). The circle members in the present study often engaged in much participation but too little action. This resulted in too little change and much discouragement. Apparently functional participation in which a specific problem or behavior is pinpointed, functionally analyzed, and systematically effected by some change variable is required. This approach is advocated by Luthans and Kreitner (1975). Under such an approach, one identifies, measures, analyzes, intervenes, and evaluates. Such a problem-solving/change strategy helps to shape participative behavior along lines of interaction that are most productive.

System support is another factor that appears critical to the effectiveness of participation. Participation and quality circles must be supported by a hierarchial system. A participative endeavor should be a total system approach developed preferably from the top-down. This total structure must span from policy levels to strategic levels to tactical levels. The Litton study was structured to support the participation process across all levels of the organization. Level I meetings consisted of employee problem-solving "step meetings." Level II meetings were made up of representatives of work groups closely associated in the production process in an attempt to foster interdependent cooperation. Finally, Level III meetings included departmental managers
and served to provide maintenance and support for the program. In this way, Litton provided structure (seven-step problem-solving) and support (Level I, II, & III) to its participation program.

An important finding in the present research was the fact that success or improvement was achieved only where support was available. The company was committed to the philosophy behind the QWL/Quality Circle program but was unable to commit to many of the action steps necessary to make this philosophy a reality. Consequently, management allowed the researcher to conduct the meetings but the rest of the operation was managed the same as it always had been. To complicate this problem further, the head supervisor for the operation studied was not totally committed to the program. While he acknowledged the validity of the approach and even agreed to participate, he could not actualize the philosophy on-the-line. As a result, there was a critical inconsistency between what was accomplished and discussed in the meetings and how the employees were managed on the job. Participative behavior was reinforced in the meetings but compliance behavior was required on-the-job and subject to strict contingencies. Most participative behavior and employee input was extinguished. Several decisions or issues of crucial importance to employees were decided arbitrarily by this supervisor and imposed upon the employees. This inconsistency of system support was a major factor in the decline in the "Relations with Supervisor" and "Respect for
the Individual" components of the QWL survey. It is also one of the reasons for the lack of effect on total system productivity.

The results of this study provided several conclusions and recommendations for supervisors. The researcher of the present study, as a supervisor himself, demonstrated that a front-line manager can carry out research of potential value to the organization and society in general. He also demonstrated that behavior modification procedures can be effective despite management dismissal due to supposed incongruities between practical problems and theoretical approaches. Furthermore, the researcher found that a participative approach to managing human resources could be effective in achieving results despite organizational barriers. The study also demonstrated that a supervisor attempting any innovative approach to management must have an organizational structure to support his efforts. At the very least he needs a superior who condones the approach. In addition, he requires control over all other management personnel at the tactical level in order to insure a consistent management philosophy. However, if total system support is not available, the supervisor should limit his efforts to interventions where he has enough control that support is not necessary. An important finding of the present study was that a supervisor could effect improvements in both individual and group performance by following a
specific problem-solving/change strategy. Likewise, a further finding was that supervisory intervention in areas of non-support were not likely to be successful. A recommendation to supervisors attempting such an approach would be to focus on small areas of improvement where control is available. A series of small successes could have the effect of gaining management support and commitment to an overall program. A potentially useful guideline for subsystem intervention is Gilbert's (1978) behavior engineering model. If the supervisor has control over the information, instrumentation, and motivations provided in the environment and to the employees, success is likely.

A factor contributing to the unchanged productivity was the lack of total involvement from the employees in this operation. Only a small percentage of employees desired to participate throughout the entire study. The majority either did not have the time, did not see any reward value in becoming involved, or did not see management providing the opportunity for new behaviors or following through on desired contingencies. Consequently, only those employees involved could have possibly contributed to improved productivity due to the intervention. Any improvement in these employees was most likely offset by the uninvolved employees. Also, the interdependence of the different groups of employees may have contributed to the lack of a total system improvement. It appears obvious that an approach
such as Brethower's (1972) total performance system is mandatory to achieve complete benefit from the participative process.

In assessing the costs and benefits of the present participation program, it can be concluded that the benefits did not exceed the costs. Without organization-wide commitment to improved quality of work life in this setting, much of the time and effort of such an approach was wasted. However, this is not to say that such an approach is not cost effective or of value to management. Management's major responsibilities are in the areas of planning, organizing, leading, and controlling. Employee participation systems can aid management greatly in these functions as well as provide training and development for its human resources. Participation systems can provide a wide range of rewards for everyone involved in addition to greater productivity and job satisfaction.

The results achieved in the primary sort system were desirable. However, true benefits in terms of cost savings and greater efficiency could not be assessed due to partial system control. Full realization of benefits would require changes or improvements in other parts of the total system the primary sort system belonged to. The improvements obtained in Preloader performance were translatable into cost/benefit terms. Because the percent effective index reflects a comparison of planned hours to actual paid hours,
performance improvement on this measure indicates cost savings. Although actual monetary figures are not available, it can be safely concluded that improvement due to the intervention was beneficial. Considerable wage savings could be realized providing improved performance was maintained following intervention.

Future research in the area of participative decision-making and quality circles should be conducted in settings where total management commitment is available. These attempts should include structured support systems in the form of steering committees and "linking pin" structures to insure an organization-wide effort. Additional research should assess the contribution of formal feedback systems on participation including self-recording procedures. Another interesting line of research would be a study of autonomous work groups as an on-the-job extension of the quality circle meetings.
The Quality of Work Life (QWL) Program at UPS will involve regular meetings of A.M. Sort employees in small groups. These meetings will continue with rotating membership as long as there is employee interest. Employees will have the opportunity to learn more about the company and its benefits, discuss problems that affect them, help find solutions, and generally improve the quality of their lives at work.

Please put an "X" in the appropriate box.

☐ I am interested in the idea of QWL and would like to be a member of the first group.

☐ I would like to participate in the QWL Program but I do not have the time right now.

☐ I am interested in the QWL concept but want to learn more about it before I decide.

__________________________  __________________________
Date                                 Signature
This survey is aimed at getting your ideas about what it is like to work here. We are trying to learn more about the quality of work life where you work. The purpose of this survey is to measure the attitudes, opinions, and work climate of UPS organizations from the employee's point of view.

You should answer each question as honestly as you can so your answers, along with those of other employees, will provide a good measure of the quality of work life at this location.

The best answer is always just what you think.

Your answers are completely confidential. To be sure that your answers will not be identified, please do not write your name on the form.
Please indicate how much you Agree or Disagree with each statement. Each statement should be completed by circling one of the answer spaces.

1. What happens to UPS is really important to me.  
2. I feel very little loyalty to this UPS organization.  
3. I could care less what happens to UPS as long as I get my paycheck.  
4. I often think of quitting.  
5. I really care about the future of this UPS organization.  
6. I used to care about my work more than I do now.  
7. I used to be more ambitious about my work than I am now.  
8. My job requires that I keep on learning new things.  
9. My job requires that I use a wide range of abilities.  
10. My job gives me the chance to learn new skills and techniques.  
11. My job makes good use of my skills and abilities.  
12. On my job I have a chance to do some things that really test my ability.  
13. I have a great deal of say over what changes are made in my work place.  
14. I can influence the decisions that affect my job.  
15. I have a great deal of freedom to run my own job.
16. I have enough opportunity to work with others in solving job-related problems.  
   | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
   | 1 | 2 | 3 | 4 | 5 |

17. Around here, I am asked for my ideas.  
   | 1 | 2 | 3 | 4 | 5 |

18. UPS rewards those who do their jobs well.  
   | 1 | 2 | 3 | 4 | 5 |

19. People who get ahead at UPS deserve it.  
   | 1 | 2 | 3 | 4 | 5 |

20. At UPS, getting ahead is based on ability.  
   | 1 | 2 | 3 | 4 | 5 |

21. Job experience is financially rewarded at UPS.  
   | 1 | 2 | 3 | 4 | 5 |

22. UPS management is really interested in my getting ahead.  
   | 1 | 2 | 3 | 4 | 5 |

23. I think more job opportunities/should be given to women and minorities around here.  
   | 1 | 2 | 3 | 4 | 5 |

24. I have the opportunity to get a better job in this part of UPS.  
   | 1 | 2 | 3 | 4 | 5 |

25. I really expected to make more job progress than I have up to now.  
   | 1 | 2 | 3 | 4 | 5 |

26. I feel that I deserve to have been promoted higher by now.  
   | 1 | 2 | 3 | 4 | 5 |

27. I am making satisfactory progress toward my career goals.  
   | 1 | 2 | 3 | 4 | 5 |

28. My current job is helping me reach my career goals.  
   | 1 | 2 | 3 | 4 | 5 |

29. My immediate supervisor treats everyone fairly.  
   | 1 | 2 | 3 | 4 | 5 |

30. In this part of UPS I can honestly disagree with my boss.  
   | 1 | 2 | 3 | 4 | 5 |

31. My immediate supervisor is interested in listening to what I have to say.  
   | 1 | 2 | 3 | 4 | 5 |

32. My immediate supervisor is one of the best people to work with.  
   | 1 | 2 | 3 | 4 | 5 |
33. I respect my immediate supervisor as a leader.  

34. Communications is good in my work group.  

35. People in my work group encourage each other to work together.  

36. Members of my work group trust each other.  

37. If I have problems with my job I can count on my co-workers for help.  

38. There is a great deal of teamwork in my work group.  

39. You can give your honest opinion around here without any worry.  

40. At work I am shown less respect than I enjoy in the community where I live.  

41. Around here, I am always treated as an adult.  

42. Around here, my private life is respected by management.  

43. In this organization, I am treated with dignity and respect.  

44. Sufficient effort is made to get the opinions and thinking of people who work here.  

45. I feel that management will always protect my interest if something comes up that would hurt my pay, working conditions, seniority rights, etc.  

46. People at the top of this UPS organization are aware of the problems at my level of the organization.
<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>47.</td>
<td>I am free of annoying distractions.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>There is good ventilation.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>The temperature is comfortable.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>The layout of my work space is convenient.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>There is good housekeeping.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>Changes in this UPS organization usually seem to create more problems than they solve.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>I think that changes around here tend to work well.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>When changes are made in this part of UPS, the employees lose out in the end.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>Knowing what I know now, if I had to decide all over again whether to take the job I now have, I would decide to take it.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>I feel I am being discriminated against when it comes to getting ahead around here.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.</td>
<td>If a good friend of mine were interested in getting a job like mine in UPS, I would recommend it.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>Our employee benefit programs cover all the areas they should.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IN THIS UPS ORGANIZATION:**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.</td>
<td>The union and management work well together.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60.</td>
<td>The union and management are opposed to each other.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61.</td>
<td>The way our union and management deal with each other needs to be greatly improved.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
62. The union and management try to reach the same goals.

1 2 3 4 5

63. Both the union and management people try to make this a better place to work.

1 2 3 4 5

64. I feel I am essential to the UPS organization.

1 2 3 4 5

65. In comparison with people in similar jobs in other companies, I feel my pay is:

Much lower .............................................. 1
Slightly lower ........................................... 2
About the same ........................................ 3
Slightly higher ......................................... 4
Much higher ............................................. 5

66. Compared to the amount of effort you know you could put into doing your job (if it really "turned you on"), how much effort do you find yourself putting into your job on a day-to-day basis?

Much less effort—less than half the effort I know I could put into my job if it really turned me on ........................................... 1
About half (50%) of the effort I know I could ...................... 2
A little more than half (60-70%) of the effort I know I could .... 3
About 75% as much effort into my job as I could ................. 4
A little more than three-quarters as much effort (80-85%) as I know I could ............................................. 5
Almost as much effort (90-95%) as I know I could ................ 6
Just as much effort as I could  this job really turns me on... 7

67. In your opinion, how much of the effort you put into doing your job is lost or not productive because of things on the job over which you have no control?

A great deal of my effort is lost (55% or more) .................. 1
About half my effort is lost (50%) ................................. 2
Somewhat less than half of my effort is lost (30-45%) ......... 3
About one-quarter of my effort is lost (25%) .................... 4
Less than one-quarter of my effort is lost (10-20%) ............ 5
Very little of my effort is lost (5%) ............................... 6
None of my effort is lost (0%) .................................... 7
As you read the items in this group, think about yourself and your job. Then indicate for each item below how much of the time you feel or think this way by choosing one of the responses.

WHILE AT WORK:

68. I worry. 1 2 3 4 5
69. I feel tense. 1 2 3 4 5
70. I feel short-tempered. 1 2 3 4 5
71. I feel irritated. 1 2 3 4 5
72. I feel downhearted and blue. 1 2 3 4 5
73. I feel the amount of work I have to do may interfere with how well it gets done. 1 2 3 4 5
74. I feel I have enough time to get everything done. 1 2 3 4 5
75. I feel too many demands are being made of me. 1 2 3 4 5
76. I feel like I am being "hassled". 1 2 3 4 5
77. I have trouble getting the information I need to do my job well. 1 2 3 4 5
78. I have difficulty getting tools and supplies when I need them on my job. 1 2 3 4 5
79. How do you rate the amount of pay you get on your job?

Very poor.......................................................... VP
Poor................................................................. P
Fair................................................................. F
Good................................................................. G
Very Good........................................................ VG
80. How do you rate your total UPS benefits program?

<table>
<thead>
<tr>
<th>Rating</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td>VP</td>
</tr>
<tr>
<td>Poor</td>
<td>P</td>
</tr>
<tr>
<td>Fair</td>
<td>F</td>
</tr>
<tr>
<td>Good</td>
<td>G</td>
</tr>
<tr>
<td>Very good</td>
<td>VG</td>
</tr>
</tbody>
</table>

81. How do you rate UPS in providing job security for people like yourself?

<table>
<thead>
<tr>
<th>Rating</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td>VP</td>
</tr>
<tr>
<td>Poor</td>
<td>P</td>
</tr>
<tr>
<td>Fair</td>
<td>F</td>
</tr>
<tr>
<td>Good</td>
<td>G</td>
</tr>
<tr>
<td>Very good</td>
<td>VG</td>
</tr>
</tbody>
</table>

82. All in all, what effect have the demands of your job in UPS had on your personal life away from work?

<table>
<thead>
<tr>
<th>Effect</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A very negative effect</td>
<td>1</td>
</tr>
<tr>
<td>A somewhat negative effect</td>
<td>2</td>
</tr>
<tr>
<td>No effect one way or the other</td>
<td>3</td>
</tr>
<tr>
<td>A somewhat positive effect</td>
<td>4</td>
</tr>
<tr>
<td>A very positive effect</td>
<td>5</td>
</tr>
</tbody>
</table>

83. Working for UPS brings me the respect of my friends and neighbors.

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Neither</td>
<td>3</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>5</td>
</tr>
</tbody>
</table>

84. I have learned many things on my job that have helped me in my personal life.

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Neither</td>
<td>3</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>5</td>
</tr>
</tbody>
</table>

85. The demands of my job keep me from doing things I would like to do in my personal life.

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Neither</td>
<td>3</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>5</td>
</tr>
</tbody>
</table>
66. The kind of work I do in UPS is seen as worthwhile by my friends and neighbors.

- Strongly disagree.................................................. 1
- Disagree........................................................................ 2
- Neither......................................................................... 3
- Agree............................................................................. 4
- Strongly agree.............................................................. 5

67. How satisfied are you with the community you now work in?

- Very dissatisfied...................................................... 1
- Dissatisfied................................................................. 2
- Neither......................................................................... 3
- Satisfied........................................................................ 4
- Very satisfied.............................................................. 5

68. Beyond providing jobs, to what extent has UPS helped to make your community a better place to live?

- Not at all........................................................................ 1
- To a little extent.......................................................... 2
- To some extent............................................................. 3
- To a great extent......................................................... 4
- To a very great extent.................................................. 5

69. Considering everything, how satisfied are you with your job at the present time?

- Very dissatisfied...................................................... 1
- Dissatisfied................................................................. 2
- Neither......................................................................... 3
- Satisfied........................................................................ 4
- Very satisfied.............................................................. 5
APPENDIX C

A. QWL FUNDAMENTALS INFORMATION

1. Read and discuss Quality of Work Life: What's in a Name?
2. Listen to and discuss "If Japan Can, Why Can't We?"
3. Review guidelines for QWL application at UPS
4. Learn Quality Circle tools and techniques
   a. problem-solving model
   b. cause and effect diagram
   c. pareto analysis
   d. problem action log
5. "Fishing Trip" exercise
6. "Group Name" exercise
7. "Red and Green" exercise
APPENDIX D

A. ORGANIZATIONAL DESIGN, POLICY, AND OPERATIONS INFORMATION

1. Present and explain organizational structure and departmentalization

2. Present and explain all center operating units, e.g., Sort and Load, Local Reload, On Road, etc.

3. Read and discuss policies regarding human relations

4. Presentations by circle leader or invited speakers on various policies, programs, benefits, changes, etc.
   a. TLA
   b. Thrift Plan
   c. Government regulations
   d. Costs
   e. Service commitments and procedures
   f. Pension plan
   g. Insurance benefits
   h. Safety programs
   i. Rules and regulations
   j. Operational methods and procedures
   k. Productivity
   l. Competition
APPENDIX E

Group Problem-Solving and Experienced Based Learning

A representative case study from the circle meetings will be examined in order to demonstrate the methods used in this component. This case study involved the identification and elimination of a sorting problem encountered by the Primary Sorters. The Primary Sorters are responsible for sorting packages to various positions on a top and bottom conveyor belt so that they are "primed" for employees down the belt. These employees were trained in brainstorming techniques both for the identification of problems and the identification of causes and solutions. The circle members used the following troubleshooting/problem-solving algorithm:

A. PROBLEM IDENTIFICATION By: Circle Members
   Management
B. PROBLEM SELECTION By: Circle Members
C. PROBLEM ANALYSIS By: Circle Members
   Technical Specialists
D. SOLUTION RECOMMENDATION By: Circle Members
E. SOLUTION REVIEW By: Management
F. SOLUTION IMPLEMENTATION By: Circle Members
G. FOLLOW-UP By: Circle Members
   Management

The problem identified and selected in this case involved unsafe and ineffective primary sorting systems. The Primary Sorters were responsible to 'prime" packages as the unloaders pushed the packages from the trailers onto the belt. They
also had to pull off packages destined to two high volume company receivers and load them into respective trailers. It was necessary for the Sorters to "prime" at a combined rate of 2800 packages/hour in order for the operation to go down on time for the next operation (delivery) to begin. Therefore, anything that interfered with them meeting this requirement threatened the mission of the operation. Under the existing sorting system, Sorters often stacked packages up in the work aisles instead of the trailers, shut the belt down causing time delays, did not meet the sorting rate, and worked in cramped and hazardous positions.

A technique common to quality circles and one employed by this group to aid in the Problem Analysis step is the Cause and Effect diagram. This is a graphic method of presenting the symptoms of a problem and then listing and partitioning the causes. Fig. 1 indicates the circle's use of a Cause and Effect diagram for the primary sort problem. Following the listing of causes, the group brainstormed solutions. They then reported the proposed solutions to upper management for review. Management examined the potential solutions in terms of cost and feasibility. The next phase following management's approval involved the actual implementation of the solutions by the employees and the circle leader/supervisor. Fig. 2 represents another tool used by the circle which documents the progress made by the circle, the Problem Action Log. The changes effected by the employees remained functional.
Figure 1: Cause and Effect diagram
Figure 2: Problem Action Log
CAUSE AND EFFECT DIAGRAM

MATERIALS
1. package too large to sort to top belt
2. too many small packages
3. build up of packages in trailers and work aisles

MANPOWER
1. incorrect unloading
   a. labels down
   b. packages stacked
2. poor utilization of primers
3. packages contacted great distance from source of input
4. primer interference with one another
5. double handling of packages

UNSAFE, INEFFECTIVE PRIMARY SORT SYSTEM

MACHINERY
1. belts too close to dock walls
2. sharp edges on belts and slides
3. no padding on hard surfaces

METHODS
1. primers positioned incorrectly along belt
2. appropriate belt speed not maintained
3. appropriate package flow rate not maintained

Figure 1

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**PROBLEM ACTION LOG**

**Center:** Benton Harbor

**Department:** Sort and Load QC

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>SOLUTION</th>
<th>WHO</th>
<th>HOW (specifications where applicable)</th>
<th>WHEN</th>
<th>FOLLOW-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe work methods in primary sort</td>
<td>Reorganize primary sorting system</td>
<td>Leader</td>
<td>Have trailer spotted at dock on other side of belt</td>
<td></td>
<td>Management review</td>
</tr>
<tr>
<td>Inefficient methods</td>
<td></td>
<td>Primers</td>
<td>Have PM Sort stack local retain packages in new area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belt shutdowns</td>
<td></td>
<td>Unload</td>
<td>Devise roller system to load trailer on other side of belt without rehandling</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Change primer positioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prime packages as they come off of rollers early</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unload small packages in tote boxes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unload packages one-high with labels up</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Primary Superv.</td>
<td>Set proper belt speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintain steady unload rate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 2*
until upper management required modification. The researcher used an ABA experimental design to examine the effects of this group project. Baseline I represented existing conditions with no employee involvement. The Intervention phase involved employee participation in identifying, analyzing, and solving the problem. Finally, Baseline II represented a return to baseline conditions where changes occurred with no employee involvement allowed.
APPENDIX F

INDIVIDUAL PROBLEM-SOLVING MODEL

A. DESCRIBE THE PROBLEM

1. explain importance of productivity and quality
2. explain productivity calculations
3. demonstrate percent effective calculations
4. explain excess cost
5. explain importance of top performance to both employee and employer

B. ASK FOR EMPLOYEE HELP IN SOLVING THE PROBLEM

1. listen to ideas
2. identify barriers to good performance
3. identify resources employee needs
4. listen for individual motivations and possible incentives

C. DISCUSS CAUSES OF PROBLEM

1. identify D_'s, D_'s, and D_'s
2. perform methods evaluation

D. IDENTIFY SOLUTIONS

E. DECIDE ON SPECIFIC ACTION

1. employee action
2. supervisor action

F. PROVIDE FEEDBACK ON PROGRESS

1. verbal feedback
2. graphic feedback
3. corrective feedback

G. PROVIDE REINFORCEMENT

1. verbal praise
2. tangible rewards
BIBLIOGRAPHY


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