

IMPLEMENTING A GRAND STRATEGY SYSTEM-- BY WHAT METHOD

A Case/Field Study of National Grocers' Peterborough Distribution
Warehouse's Grand Strategy System Effort

by:

Karen L. Matusz

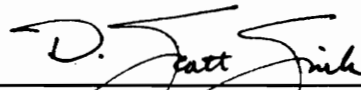
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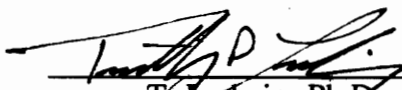
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by:

Karen L. Matusz

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Industrial and Systems Engineering

(ABSTRACT)

In the last decade, companies have been faced with a turbulent business environment. There have been dramatic technological shifts, deregulations, economic uncertainty, rapid growth, increased global competition, and major shifts in demography and values. Managing organizational performance and success is becoming increasingly challenging and difficult. Organizations are realizing that in order to succeed, or even to merely exist, they must change the way they do business on a grand scale. Large scale organizational change is risky, hard, complex, unpredictable, and emotionally intense. On the other side of the coin, not changing in this turbulent day and age can even be riskier.

National Grocers Company Limited is currently going through a large scale organizational change effort. Their effort started with a pilot test in their Peterborough, Canada food distribution warehouse. This thesis is a summative evaluation of the change effort within the Peterborough warehouse. This research:

- Documents the Peterborough GSS implementation
- Documents warehouse performance results
- Evaluates the effectiveness of the PDSOF project
- Evaluates the effectiveness of the GSS framework in the PDSOF project
- Documents expert advice on GSS implementation

By organizing and presenting a variety of data in a format that is easy to understand and learn from, I have created a reference document that organizations can use in their large scale organizational change efforts to take theory to practice. More specifically, I provided National Grocers with a document of the change effort at the Peterborough warehouse so that other National Grocers' warehouses can benefit from the wisdom gained and lessons learned at Peterborough. Therefore, my results and conclusions have "meaning" for real world managers.

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CHAPTER 1 - INTRODUCTION

This document describes a research project completed for partial fulfillment of a Master's degree in the Management Systems Engineering concentration within the Industrial and Systems Engineering Department. This document describes the project from conception to completion. Also included is a body of knowledge review on types of organizational change, large scale organization change, frameworks used to create change, and research.

1.1 Background of the Project

Managing organizational performance and success is becoming increasingly challenging and difficult. It is particularly difficult to implement continuous improvement in organizations that are growing rapidly and are attempting to manage large, complex projects/programs. Sink and Monetta (1992) describe an approach, termed the Grand Strategy System (GSS), to architect and engineer continuous improvement efforts that are strategically thought through, comprehensive, and well integrated. The major component of the GSS framework are the "fronts" or major sub-systems of activity within an organization that must be managed. There are nine fronts: Planning, Infrastructure, Culture, Education and Development, Measurement, Motivation, Communication, Technology and Political. Sink and Monetta propose that the GSS framework can assist an organization in developing world class quality and productivity management efforts and results.

The organization studied in this research, National Grocers Company Limited (NG), is the Wholesale Food Division of Loblaws Companies Limited. With annual sales in excess of \$5 Billion Canadian, NG employees over 30,000 people. NG supplies grocery, general merchandise, produce, dairy and meat products to a network of retail outlets in

five Canadian provinces. The Distribution System of National Grocers is made up of twelve warehouses that are geographically and strategically separate to support the various retail outlets. The Distribution System supplies over 200 corporate store locations, approximately 600 franchised outlets, and thousands of independent retail outlets throughout Eastern Canada. National Grocers Distribution System is the primary mover of product and information from the vendor(s) to the retail outlets for purchase by the consumer.

The Virginia Quality and Productivity Center (VQPC) is currently assisting National Grocers in their corporate wide change effort. The VQPC, modeled after a teaching hospital, operates within the Industrial and Systems Engineering Department located at the Virginia Polytechnic Institute and State University. The Center's mission is to perform research related to quality and productivity improvement, reduce that research to practice through their work with public and private sector organizations, and disseminate their lessons learned by teaching the students of Virginia Tech. The VQPC uses the Grand Strategy System framework for organizational change.

NG started the corporate change effort within their distribution warehouses. This part of the change effort is referred to as "The Distribution System of the Future" project (DSOTF). The DSOTF was created to re-think the way NG does business currently and secure its future as a leading edge preferred supplier of goods to its customers. The goal at the outset of the DSOTF project was to achieve significant improvement in one warehouse in an eighteen month period of time before expansion to the total distribution system. The change effort within the DSOTF project began with a pilot test at the Peterborough warehouse, termed the "Peterborough Distribution System of the Future" or PDSOF. The period of performance for the PDSOF project was from January 1, 1993 to

June 4, 1994. Actual discussion of the project and preliminary interventions happened between August 1992 and January 1, 1993. The Peterborough warehouse was chosen as the first implementation site for several reasons. First, it was large enough that performance improvements would be significant, yet small enough that if the change effort didn't go well there was limited downside risk for NG. Second, the warehouse had a full mix of customers and products and was stable financially (Peterborough handled six percent of National Grocers' total volume). Third, because of strong union/management relations, it was believed that the culture at Peterborough would allow for project buy-in from employees.

1.2 Research Purpose

The research purpose is a global, over-riding reason for conducting the research. The purpose of this research was:

To provide insight for organizations on how to reduce large scale organizational change theory to practice.

1.3 Conceptual Research Model

In undertaking a research project of this magnitude, it is important to have a framework that guides decisions and actions with respect to the research. This framework will delimit the domain and provide a picture of what it is I am attempting to study.

Figure 1-1 is a conceptual model representing my research topic's relevant constructs and interrelationships. Figure 1-1 starts with the most abstract construct in organizational change -- theory. Next, some change in the internal or external environment forces organizations to change or fall behind the competition. The organizations look for some sort of framework or method to tell them how to go about changing the way they do

business. In applying the model to their situation, the organizations make many different interventions aimed at improving performance. The changes they make may or may not lead to better performance results. My conceptual model portrays the general phenomenon of organizational change. The dotted area shows the area of this model my research focused on.

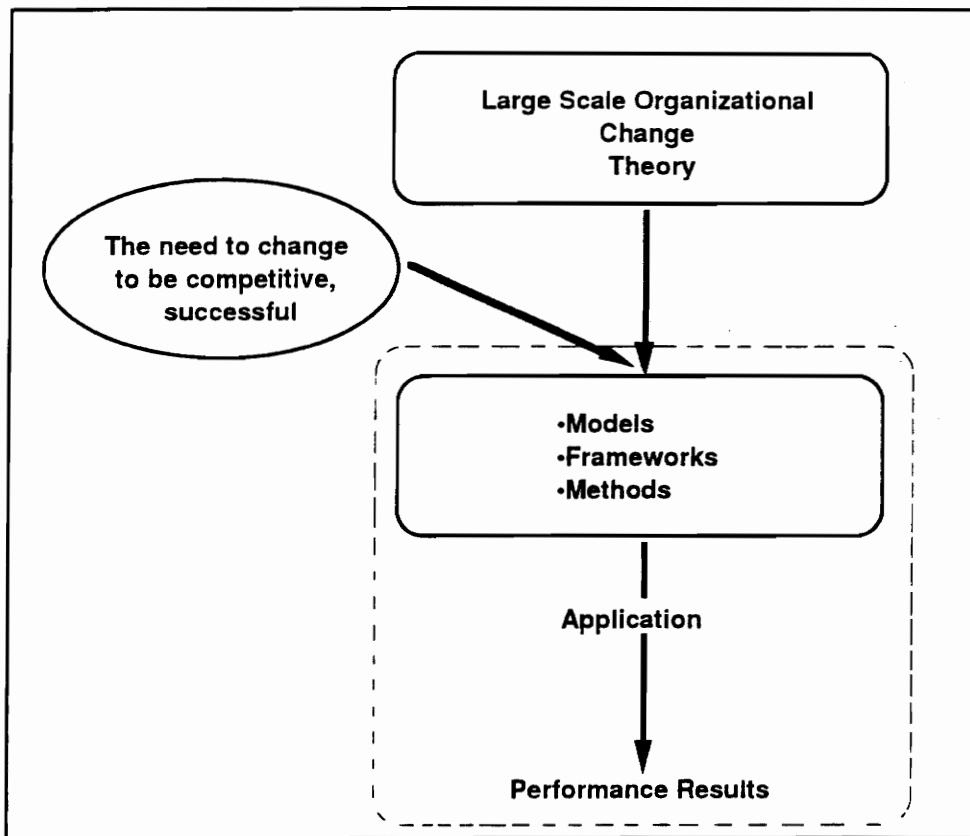


Figure 1-1: Conceptual Research Model

1.4 Research Scope

This research focus was on the case/field application of the GSS framework. I studied the change effort at Peterborough from the projects pre-conception (August 1992) through the period of performance (January 1, 1993 to June 4, 1994), to eight months after the

"official" project ending date (January 1995). This research was guided by the following problem statement, research questions, and research objectives.

1.4.1 Problem Statement

Organizations have recognized the need to change, but have a difficult time organizing and managing a change effort. The problem is taking change theory to application for improved organizational performance. Therefore, the problem statement for this research was

How did National Grocers' Peterborough warehouse orchestrate their change effort and what were the results?

1.4.2 Research Questions

The following is a list of research questions that were addressed within this research project.

- 1) How has NG applied the GSS framework to improve the performance of their Peterborough warehouse?
- 2a) Was the PDSOF project effective?
- 2b) Was the GSS framework effective in the PDSOF project?
- 3) What advice would the project participants give to others implementing a GSS, that they believe would lead to greater performance improvements?

1.4.3 Research Objectives

There are many theories on how to do large scale organizational change. There are not many documents describing "by what method" organizational change is brought about.

In order to answer the research questions, I accomplished the following objectives.

- 1) Document the Peterborough GSS implementation.
- 2) Document warehouse performance results.
- 3) Evaluate the effectiveness of the PDSOF project.
- 4) Evaluate the effectiveness of the GSS framework in the PDSOF project.
- 5) Document expert advice on GSS implementation.

What I termed "effectiveness" must be defined. The PDSOF project was effective if the set goals of the project were reached. The "experts" are defined as the PDSOF project participants. These include Peterborough Employees, NG Corporate Employees, VQPC Employees, Peterborough Customers, and Peterborough Suppliers. Throughout the PDSOF project, the experts have accumulated many "lessons learned." They have experienced what interventions have worked/not worked and have ideas on what they would have done differently. I was interested in the advice they would have for others implementing a GSS.

1.5 Desired Research Outputs

Specific desired outputs of this research study included the following:

- 1) Documentation of all GSS interventions pertaining to the Peterborough project.
- 2) Documentation and analysis of performance results at Peterborough.
- 3) Evaluation of whether the PDSOF project met its performance improvement goals.
- 4) Evaluation of the effectiveness of the GSS framework in the PDSOF project.
- 5) Expert advice for increased performance improvement using the GSS framework; to be used as guidance for others considering the GSS for their change effort.

1.6 Desired Research Outcomes

Through this research, I believe I have contributed to the Body of Knowledge on “by what method” does an organization go about making large scale change. By organizing and presenting the data in a format that is easy to understand and learn from, I have created a reference document that organizations can use in their large scale organizational change efforts to take theory to practice. More specifically, I provided National Grocers with a document of the change effort at the Peterborough warehouse so that other NG warehouses can benefit from the wisdom gained and lessons learned at Peterborough. Therefore, my results and conclusions have “meaning” for real world managers.

For myself, I have systematically acquired knowledge of implementing large scale organizational change by documenting NG's GSS efforts. I now understand other methods, besides the GSS, to create large scale organizational change. Overall, I have gained an understanding of how to reduce theory to practice.

Ideally, the following chain of events would come from this research:

- 1) Other NG warehouses or other organizations will review the documentation of the Peterborough project. They will have a clear picture of what was involved.
- 2) They then turn to see whether the project achieved its goals.
- 3) Seeing the evidence of project success, they are then sold on the idea of trying a GSS and are looking for where to start.
- 4) They review the lessons learned to start them out on the right track.
- 5) They then go back to the PDSOF project description and examine it more closely for guidance on orchestration of their particular effort.

1.7 Measures of Success

The success of my research can be discussed in terms of effectiveness, efficiency, quality, and innovation. I will have been effective if I successfully completed the stated research outputs. Success in efficiency can be achieved if I defend my proposal in the middle of Fall '94 and defend my thesis by Spring '95. If my research adds to the body of knowledge on how organizational change is brought about, I will have been successful at innovation. I can justify this statement by the fact that no one else has systematically documented a GSS implementation. An additional measure of success will be if NG distributes my thesis to Distribution Managers in their warehouses. One of the most important ways I can judge whether my research has been successful is the level of understanding people gain from reviewing my research. I have extensive qualitative and quantitative data. If I have done a good job of organizing and presenting the data in a meaningful and comprehensive way so that others understand the PDSOF project, my research will be successful. An evaluation of my performance against the above measures of success is documented in Chapter 7.

1.8 Assumptions/Delimitations of this Research

One delimitation of my research is the level of detail in event descriptions. In documenting what happened at Peterborough, I listed the intervention in one brief statement. I did not provide a detailed description nor document why the intervention happened. I did however, write a one to two page general description of what went on per front. I also listed who to contact and what to read for further information on interventions within a front.

There are many GSS implementations happening at National Grocers. I only studied the pilot program of GSS implementation; the Peterborough Distribution System of the Future project.

Most measures of Peterborough performance were not tracked until week 36 of 1993.

This happened for several reasons:

- 1) Key measures of performance were not formalized or operationalized until that time.
- 2) It took some time to figure out how to capture the data.
- 3) Measures typically tracked by period were changed to capture data by week.
- 4) Quality measures typically tracked by single occurrence were changed to capture defects per 1000 cases shipped.

Therefore, for this research I started my analysis of performance quantitative data from week 36 of 1993 and ended it at week 10 1995. I did not go back and try to recreate data before week 36 of 1993. However, I did seek out data previous to week 36 1993 for the cost/ton measure and the three common measures of performance between Chatham, Sudbury, and Peterborough.

I studied the Peterborough warehouse's attempt at GSS implementation, with the primary focus on project effectiveness and secondarily on GSS effectiveness. My second research question (p. 5) addressed these two different focuses. It is repeated below.

- 2a) Was the PDSOF project effective? (Did the project reach its performance goals?)
- 2b) Was the GSS framework effective in the PDSOF project? (Was it GSS implementation that produced the performance results?)

Question 2a & 2b are different. My main focus will be on answering question 2a.

Question 2b calls for proving a cause and effect relationship between the GSS strategy and the performance results achieved. Field research and reduction to practice work does not allow enough control to perform strict confirmatory analysis. I believe question 2b to

be important and worthy of study, but its study in this thesis will be secondary. A dissertation on systematic evaluation of the GSS framework applied to Peterborough is warranted.

In order to explore the possibility of a causal relationship between GSS implementation and changes in performance, I charted performance of two non GSS NG warehouses similar to Peterborough (Chatham and Sudbury) for four key performance measures over the same time period. These four key performance measures were common across all three warehouses (with some conversion of measurement units). Comparing shifts in performance level for a warehouse doing GSS implementation (my experimental group) against shifts in performance level of two who were not (my control group), gave me some useful information in support of a causal relationship. I did not compare *actual performance* results across the three warehouses. I did compare *occurrences of shifts* (jumps) in performance. If implementing the GSS framework in Peterborough was the cause of shifts in performance, then one would expect not to see a shift in performance, over the same time period, for the other two warehouses who did not implement GSS.

Another assumption is that the people involved in the PDSOF project are experts because they have profound knowledge of the system, and have learned many lessons on GSS implementation. I refer to the PDSOF participants throughout this research as "the experts." This group is made up of Peterborough Employees, NG Corporate Employees, VQPC Employees, Peterborough Customers, and Peterborough Suppliers.

Because you must describe before you can prescribe, most of this thesis is a descriptive study of Grand Strategy System implementation. Prescribing a method for large scale change consists of the lessons learned by the experts. This thesis shares the lessons

learned in an attempt to help those who might be inclined to apply the GSS approach or to help those who are already engaged in some form of large-scale organizational change effort. I use "advice" and "lessons learned" synonymously throughout my research.

1.9 Justification for this Research

In considering the justification for this research, I approached the response from two different perspectives: 1) Industrial Engineering 2) The Business World.

1.9.1 Industrial Engineering Component of the Research

The Institute of Industrial Engineers defines the field of Industrial Engineering as “concerned with the design, improvement and installation of integrated systems of people, materials, equipment and energy..... It draws upon specialized knowledge and skill.... to predict and evaluate the results to be obtained from such systems.” The Handbook of Industrial Engineers states that “Industrial Engineers accept as their primary mission that of productivity improvement, which, broadly defined, implies a more efficient use of resources, less waste per unit of input supplied, higher levels of output for fixed levels of input supplied, and so on. Therefore, the mission of Industrial Engineering is to study a process *with the intent of improvement..*” I am documenting the NG GSS effort with the intent *of GSS methodology improvement*. To change a perplexity or problem to a process, there must be a documented, consistent method. By striving for consistency of method, replication becomes possible. Therefore, I envision my thesis as the first of several studies on the NG GSS effort.

Sink (1993) states that performance improvement efforts will increasingly require large scale organizational change. IEs are one of the disciplines in organizations trained as performance experts to respond to complex improvement initiatives. A basic aspect of

the IE's professional role has always been helping individuals and organizations participate in the solution of their own problems. IEs use techniques to facilitate the processes by which organizations enhance their own effectiveness. Learning to be a change master, by managing change and leading others through change, is becoming the focal point of Industrial Engineering for many companies (Kanter 1984, Sink 1993).

1.9.2 Relevance to the Business World

Rigor and relevancy is important in research. My study is relevant to today's businesses as they try to continually improve in order to stay competitive. Deming, 1986 urges organizations to make "the transformation" but doesn't detail how. Businesses want to know how, and my study is rigorous through detailed descriptions. My thesis could be used as a reference document for organizations to use in their large scale organizational change efforts. In particular, my research is relevant to National Grocers as they apply the GSS to other areas of their business.

1.10 Researcher's Bias

In scoping my research, I identified biases that could cloud my results. It was important to understand the paradigms I operate under because they bias my research.

First, through my education and work experience at the Virginia Quality and Productivity Center, I have gained knowledge and experience in large scale organizational change. The theory I am most familiar with is the Grand Strategy System. I recognize that I have personal beliefs on how to use the GSS framework for large scale organization change which may not be in agreement with the experts involved in the NG project.

Next, I believe that this thesis will assist organizations in the necessary first step in doing large scale organizational change - have a systematic method. I am working under the assumption that others will continue my work. This way, I can stay in the boundaries of the scope of this thesis.

I also believe that a person external to an organization can recognize improvement opportunities that internal members of an organization may not be aware of. Not having profound knowledge of large scale organizational change, I must be able to substantiate my personal recommendations with fact and expert opinion.

One of the most important biases that I might bring to the research is that of being involved with the PDSOF project. I was a member of the VQPC project team. One of my roles in the project was to create a performance improvement handbook based on the experiences at Peterborough. I believe the GSS framework was effective within the PDSOF project, i.e. the performance improvement goals were met.

Other people's biases effect my research. Bias in documentation and perceptions of events will be present. I will talk about these more specifically in Chapter 3.

CHAPTER 2 - BODY OF KNOWLEDGE

2.1 Description of the Body of Knowledge Review

This chapter provides the reader with an understanding of the underlying concepts and theories that guided this research. The Body of Knowledge review includes a compilation of the knowledge I have gained through reading, writing, and practical experience in the areas of organizational change, large scale organizational change, methods for change, and research.

2.2 Types of Organizational Change

Organizations go through change all the time. However, the nature, scope, and intensity of the change varies.

2.2.1 Basic Typology of Different Changes

Nadler and Tushman (1989), describe four types of organizational change (see Figure 2-1).

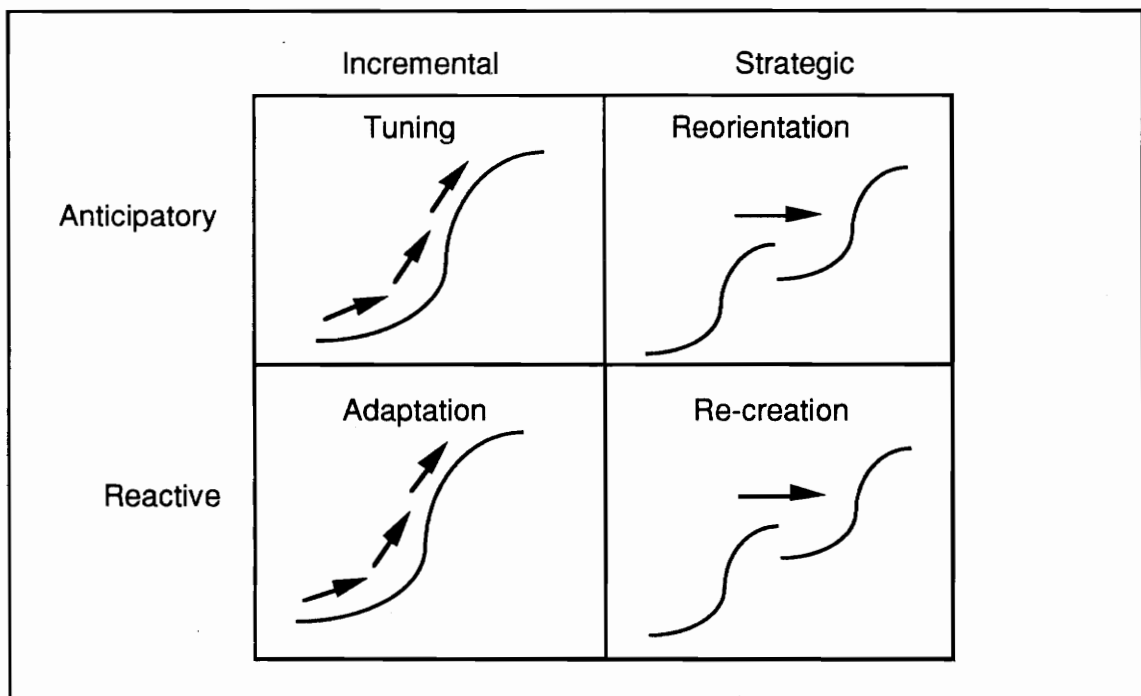


Figure 2-1: Types of Organizational Change (adapted from Nadler and Tushman, 1989)

The first dimension in change is the incremental vs. strategic change type. The focus of incremental change is on improving the efficiency or effectiveness of certain elements of the organization. Incremental change is also termed continuous improvement. When practicing continuous improvement, an organizational unit examines its current processes/methods/technologies and determines what incremental changes it could make for better performance. An S-shaped curve is a representation for how learning and performance can change over time. As organizations learn, use, and improve current processes, the rate of change of their performance is slow at first then becoming exponential. Continuous improvements of an organization over cumulative time and effort is depicted as traveling up an S-shaped curve (see Figure 2-2).

Strategic changes, on the other hand, have an impact on the whole organizational system. These changes "end up fundamentally redefining what the organization is or changing the basic framework of organizing, including strategy, structure, people, processes, and (in some cases) core values" (Nadler and Tushman, 1989). Re-engineering is a type of strategic change. In strategic change, the organization moves up to a new S-shaped curve. Any process/method/technology has limitations in how much improvement can be made. A point is reached where the rate of change in performance tapers off, stabilizes and becomes ingrained in the organization. The process is well understood and used. Once an organization reaches this level, it can no longer incrementally improve. The organization must look for a better process if it wants to improve performance. This letting go of the old, and finding and latching on to the new is termed "jumping to a new S-shaped curve." When the organization first makes the leap to the new process, there is a decrease in performance. But once the new process is stabilized, continuous incremental improvement can begin; traveling up the new S-shaped curve (see Figure 2-2).

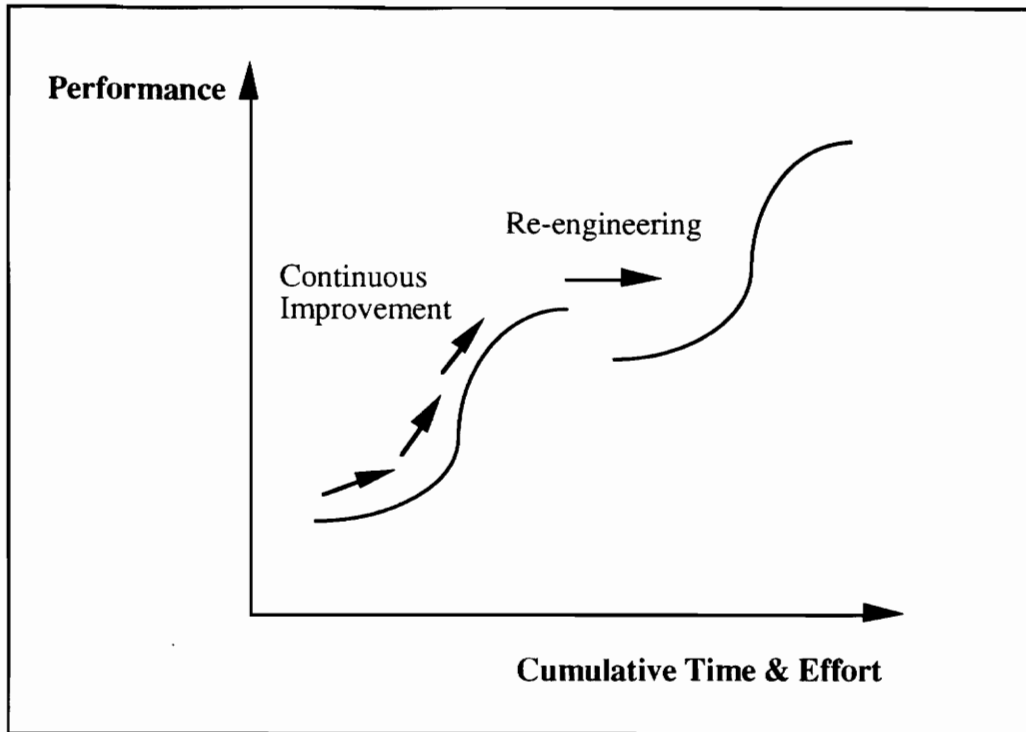


Figure 2-2: Incremental Change (Continuous Improvement) vs. Strategic Change (Re-engineering) (adapted from Foster, 1985)

The second dimension in change is the reactive vs. anticipatory change. Reactive organizational change is made in direct response to an external event. These changes are in some way forced upon the organization by technology, competition, environment, politics, or society. Anticipatory change, however, is initiated in advance of future events. The purpose of a proactive approach is to gain a competitive advantage, be ahead of surprises, and try to "control" the organization's destiny.

When these two dimensions of change are combined, a basic typology of different changes emerge (Nadler and Tushman, 1989). Change that is incremental and anticipatory is called tuning. Tuning is incremental changes made in anticipation of future events. These changes are made to increase organizational performance, but not to respond to any immediate need or problem. Incremental changes made in reaction to external events are

adaptation change. These external events could be actions of competitors, change in market needs, or a new technology.

Strategic change initiated in anticipation of future events is called reorientation. This "frame-bending" strategic change is made when the external events that necessitate change are anticipated. Re-engineering or new S-shaped curve improvements would fall under reorientation. These changes involve fundamental redirection of the organization but are continuous with the past. On the other hand, "frame-breaking" strategic changes, termed re-creations, are necessitated by immediate external events which are life threatening to the organization. These changes usually radically depart from the past.

2.2.2 Planned and Managed Change

Levy (1986) distinguishes between planned change and managed change.

The concepts 'planned' change and 'managed' change refer to changes that are deliberately shaped by organizational members... Planned change usually refers to the way internal and external changes can help the organization cope with difficulties and plan and implement changes. Managed change refers to the way managers plan and implement changes. (Levy, 1986, p. 6)

He goes on to recognize two types of planned change: first-order and second-order. First-order change consists of minor improvements and adjustments that occur as the system grows and develops. On the other hand, second-order change occurs in the organization's "core," and is irreversible. Figure 2-3 shows the characteristics of first- and second-order change in organizations.

First-Order Change	Second-Order Change
Change in one or a few dimensions, components, or aspects.	Multidimensional, multicomponent change and aspects.
Change in one or a few levels (individual and group level).	Multilevel change (individuals, groups, and the whole organization).
Change in one or two behavioral aspects (attitudes, values).	Changes in all the behavioral aspects (attitudes, norms, values, perceptions, beliefs, world view, and behaviors).
Quantitative change.	Qualitative change.
Change in content.	Change in context.
Continuity, improvements, and development in the same direction.	Discontinuity, taking a new direction.
Incremental changes.	Revolutionary jumps.
Reversible changes.	Irreversible change.
Logical and rational change.	Seemingly irrational change based on different logic.
Change that does not alter the world view, the paradigm.	Change that results in a new world view, new paradigm.
Change within the old state of being (thinking and acting).	Change that results in a new state of being (thinking and acting).

Figure 2-3: The Characteristics of First- and Second-Order Change in Organizations (Levy, 1986)

The major focus of my research is on large scale organizational change. Overall, large scale organizational change falls under the reorientation and re-creation type of change discussed previously. According to Levy, large scale organizational change would be termed planned second-order change. The GSS framework is for large scale organizational change, and the PDSOF project is part of NG's large scale organizational change effort. Therefore, I will now discuss in- depth this type of change.

2.3 Large Scale Organizational Change

As mentioned previously, large scale organizational change would probably fall under the category reorientation and re-creation, or planned second-order change. This special type of change needs closer examination.

2.3.1 What is Large Scale Organizational Change

Ledford, Mohrman, Mohrman, and Lawler (1989) define large scale organizational change as "a lasting change in the character of an organization that significantly alters its performance"(p. 2). There are two important points in this definition. "Change in character" includes changes in organizational design and processes. When an organization's character changes, so does "organizational performance." This change in performance must be significant and system wide. The authors go on to identify three dimensions of large scale change: the depth of the change, the size of the organization, and the degree to which the change pervades the organization. Depth of change is "the extent to which the change involves shifts in the beliefs and values of organizational members and shifts in the way the organization is understood and enacted" (Ledford et al., 1989, p. 12). "The second dimension along which large-scale organizational changes can vary is pervasiveness of change-- the proportion of the organization's elements and subsystems that are changed" (p. 15). Large scale organizational change must be pervasive, involving all or most organizational subunits, subsystems, and levels. The final dimension of large scale organizational change is organizational size. This dimension is important because the larger the organization, the greater the change required to modify its character and performance. Ledford et al. summarize their position on large scale organizational change by saying that these types of changes are risky, hard, complex, unpredictable, and emotionally intense. On the other side of the coin, not changing in this turbulent day and age can even be riskier.

Ledford et al. explanation of large scale organizational change flows well with Levy's explanation of second-order planned change. Levy would consider large scale organizational change synonymous to second-order planned change . He notes that this type of change happens along four depth dimensions: in core processes, in mission and purpose, in culture, and in organizational work view or paradigm. What is changed in large scale organizational change is shown in Figure 2-4.

Perspective	Changed Elements	Changed Dimension
Systems	Input, output, throughput processes	Functioning processes
Management	Goals, objectives, policies, strategies	Mission and purpose
Planned change	Norms, values, beliefs	Culture
Evolution	Context, template, metarules, world view	Paradigm

Figure 2-4: The Content of Second-Order Change (adapted from Levy, 1986)

A systems approach is required to succeed with large scale organizational change. A system is a set of interacting and interrelated parts including environmental factors. Key components of an organizational system are interdependent and the interdependencies must be managed. Figure 2-5 depicts five key quality checkpoints in an organizational system that must be managed. Taking a systems perspective would include managing the whole system from q1-q5.

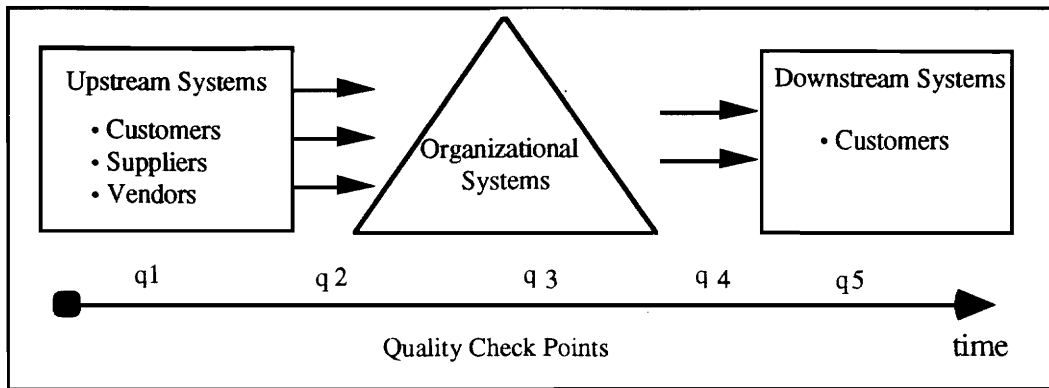


Figure 2-5: The Five Quality Check Points (adapted from Sink and Tuttle, 1989)

The key to the systems approach is to manage the dynamic, not the pieces (Duck, 1993). One of Dr. Deming's four elements of profound knowledge is appreciation for a system. Deming defined a system as "a network of interdependent components that work together to try to accomplish the aim of the system" (Deming, 1993, p. 50). He goes on to state that a system must have an aim and that "management of a system therefore requires knowledge of the interrelationships between all the components within the system and of the people that work in it." A systems view of change allows optimization of the whole by orchestrating the efforts of all components toward the achievement of the stated aim. (Sink and Morris, 1995). Dr. Deming also talks about organizations making a "transformation." This "transformation" is to a new style of management and an environment of optimization towards a common aim. I believe the transformation Dr. Deming is referring to falls under the category of large scale organizational change.

Barczek et al. (1985), suggest that large scale changes must first take place in the settings in which they are most likely to succeed. They see large scale organizational change as a modular concept, one that originates in sub-systems, that ultimately create a restructured organization through example.

Cumming, Mohrman, and Mitroff (1989) align with Schein's view (1985) that true organizational change must take place within the culture of the organization. "Deep change involves feelings and values; the unconscious, latent, and tacit ways of behaving; and the (mostly unarticulated) culture of the organization" (Cumming et al, 1989, p. 91). To achieve long term, sustained change, the culture held within the organization must also be changed.

Finally, Kilmann, Covin and associates description of large scale organizational change is summarized by the quote below:

Corporate transformation is the process by which organizations examine what they were, what they are, what they will need to be, and how to make the necessary changes...The term corporate is used to convey the comprehensive effort required, in contrast to a piecemeal or single-division effort. Transformation indicates the fundamental nature of the change, in contrast to a mere linear extrapolation from the past. Corporate transformation is serious, large scale change that demands new ways of perceiving, thinking, and behaving by all member of the organization (Kilmann, Covin and associates, 1988, p xiii-xiv).

In summary, large scale organizational change seems to go beyond the routine changes that occur continuously in organizations. In large scale change, the organization is "transformed." A paradigmatic shift occurs. "Large-scale organizational change involves learning and understanding --either as a necessary part of the change process or as the fundamental source of all change" (Mohrman et al, 1989, p. 294). Change must also address the underlying culture of the organization. Many authors listed leadership as a key element in large scale organizational change. This element will be addressed further in this chapter.

2.3.2 Why Change- Driving Forces

Analysis of why organizations change can lead to developing better methods and tools for change. In the last decade, companies have been faced with a turbulent business environment. There have been dramatic technological shifts, deregulations, economic uncertainty, rapid growth, increased global competition, and major shifts in demography and values.

In the past, organizational activities have mainly focused on getting the job at hand done. This mentality may work for awhile. Soon, however, other organizations will enter the market. The organization that will ultimately succeed is the one that also has focused on continually improving. These organizations will not only be able to satisfy current customer demands, but will also look ahead and design products and services their customers will need in the future.

Two driving forces behind change are pain and frustration. Change-related "pain" refers to the level of discomfort a person experiences when his or her goals are not being met (current pain) or are not expected to be met (anticipated pain) due to the status quo. Change occurs only when the pain of the status quo is perceived to be greater than the pain of the uncertainty of the unknown. Creating this situation is sometimes referred to as creating a "burning platform" - jump or perish! Schein cautions, "No matter how much pressure is put on a person or a social system to change through disconfirmation (of present practice/behavior) and the induction of guilt or anxiety, no change will occur unless members of the system feel it is safe to give up the old responses and learn something new" (Schein, 1985).

David Gleicher, of Arthur D. Little, developed a readiness for change model. It suggests that determining readiness and capability for change can be modeled conceptually with the following formula:

$$C = abd > R \text{ where,}$$

C= readiness to change

a= level of dissatisfaction with status quo

b= clear or understood desired state

d= practical first steps towards a desired state

R= cost or risk of changing or resistance to change by either individuals or organizations

This equation illustrates the point that people will be more ready to change if the risk of changing is less than the combination of their dissatisfaction with the status quo, having a clear desired state, and knowing the first steps towards that state. In addition, effective change occurs when the members of the organization have a role in the change process. If they feel ownership for the change effort, they are more likely to accept the changes.

2.3.3 How Change Occurs (Cycles and Stages)

Understanding the principles of organizational evolution allows the development of strategies and technologies for participating in this process. In this section, I will present three models of the organizational change cycle.

2.3.3.1 Phases of Client Change

Through their consulting experience, Sink and Morris (1995) recognize that individuals, groups, and organizations generally move through six phases as they change to improve. The phases happen in a cyclical order, but shifting back and forth among the phases also

takes place. Sink and Morris use the term "client" to represent both individual change, group change, and organizational change. Below are their explanations of the six phases.

- **Situation Appraisal (Scouting, Targeting, Diagnosis)**

The client's attention comes to focus on a limited, although perhaps vaguely understood, problem area or source of difficulty, dissonance, and dissatisfaction. The client begins to refine feelings about "what is wrong" or where change is likely to have the best benefits-to-burdens ratio.

- **Catharsis (Stress Relief)**

The client reduces the inhibiting effects of past frustrations, anxieties, and conflicts. Blame casting, fault finding, injustices, and so on are expressed, set aside, and the client's attention is to some degree freed for concentration on the change process.

- **Self-Awareness**

Data and fact gathering, modeling the present system (e.g., input/output analysis) and studies of "how we do it now" increase the client's self-perception and self-objectification.

- **Self-Evaluation**

The client comes to make his or her own evaluation of present behavior. The client becomes clearer about goals, standards, and objectives and their relation to existing behavior. There is a growing appreciation of the need for change, the material and psychological costs of change, and the development of realistic expectations about the change process.

- **Self-Designed Change Strategies**

The client or client organization plans or accepts plans for new behaviors, methods, and systems. The greater the degree to which the client participates in the planning of change, the greater is the probability that change will actually occur. The phase also includes the planning of tests, experiments, and trials of the new behavior.

- **Implementation and Deployment; Trying Out the New Behavior**

The client experiments with new methods and systems. Experiential learning leads to modifications and refinements.

- **Reinforcing the New Behavior**

To be replicated, to be made a part of the individual's or organization's repertory of behaviors, the new behavior must be rewarded and reinforced.

2.3.3.2 Cycle of Second-Order Change

Levy (1986) discusses the stages and process of second-order change. The four developmental stages are decline, transformation, transition, and stabilization and development. Figure 2-6 shows the cycle of second-order change and its stages.

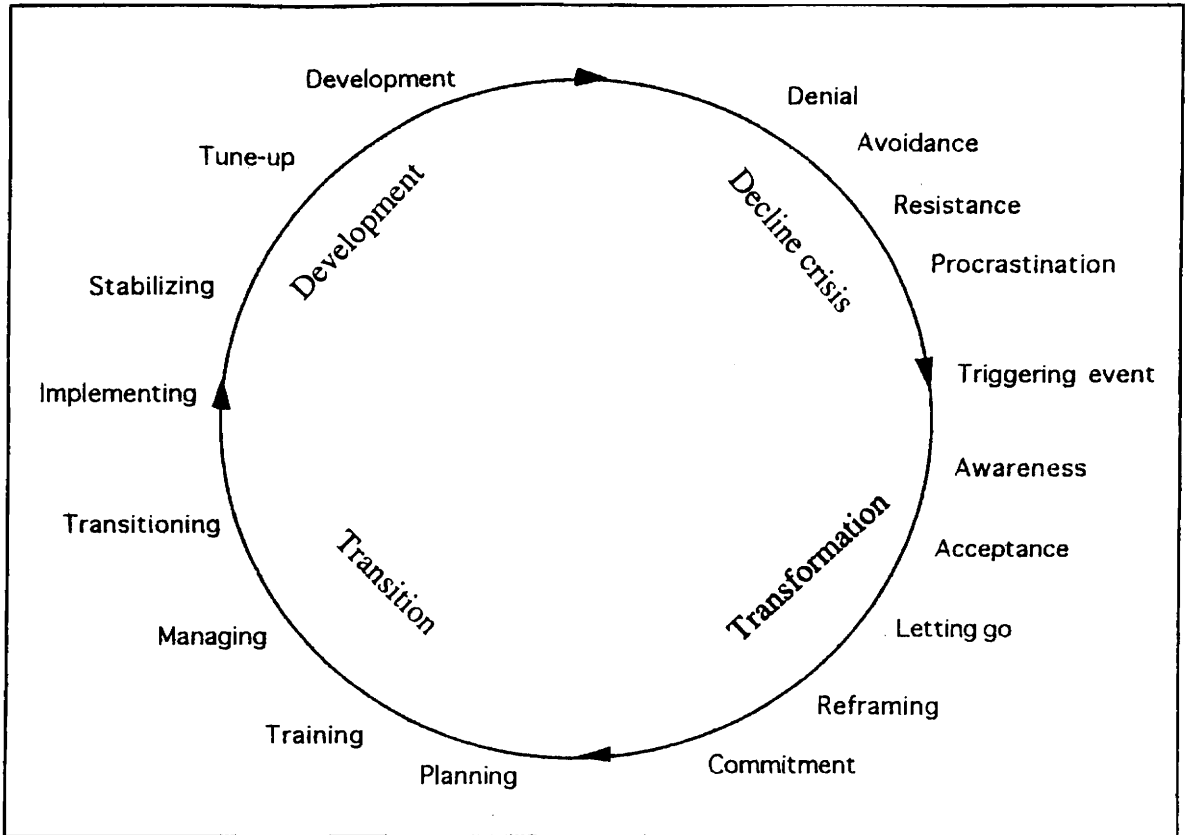


Figure 2-6: The Cycle of Second-Order Change (Levy, 1986)

Levy (p. 13-14) describes these four stages in the following manner:

Decline:

External and internal needs are not appropriately met. Warning signals about the need for radical reorganization are denied or avoided. Efforts to cope with problems by first-order change result in crisis, chaos, procrastination, efforts to go "back to basics," resistance to change, and anger. Through ever-increasing fluctuation, the system reaches a critical point beyond which the alternative is demise or revitalization.

Transformation:

This stage includes acceptance of the need for change, discontinuity from the past, commitment to change, reframing processes, creating or discovering new realities, a sudden shift in perception, a moment of illumination, insight, and the emergence of a new direction quantitatively and qualitatively different from the old one. This stage also involves a departure from the old beliefs and habits, the process of "letting go."

Transition:

This stage includes planned and managed efforts to translate ideas and vision into action steps, programs, structures, and procedures. The focus is on assessing solutions and their impact and managing the transition from an unstable state to a new stable state.

Stabilization and Development:

Occurs when the change program is institutionalized, tuned up, maintained, and developed by first-order changes.

2.3.3.3 Three Stage Change Process

To effectively manage organizational change, Lewin (1951) proposed a three stage model. The three stages are: unfreezing, change, and refreezing. The first stage, unfreezing, prepares the organization to change. People must become aware of the need to change and be dissatisfied with the status quo. The key factors in unfreezing are to create the motivation to change, recognize and agree upon the problem, confront the problem, and remove restraining forces.

The second stage involves making the actual change. It may mean developing new responses based on new information, confirming requirements for change, recognizing new approaches, and planning and carrying out actions.

The final stage, refreezing, involves making the changes permanent. The changes have to be reinforced so that they become standardized and integrated into people's daily routines. The purpose of this stage, is to solidify the new way of acting so that people do not slip back into the old way of doing things.

The three perspectives on the cycle of change (Sink and Morris, Levy, and Lewin) can be used as a guide when implementing a change effort. By identifying what point the organization is at, one can better manage the change effort.

2.3.4 Keys to Dealing Successfully with Large Scale Organizational Change

Authors on large scale organizational change state different keys to deal successfully with change. I will briefly present three such "keys for change".

Barczek et al. (1985) state that the key to dealing successfully with complex change is to remain in a constant state of readiness. The key to large scale change efforts is adaptability, responsiveness and flexibility. Four elements are necessary for successful large scale change. These elements include:

- 1) Pattern breaking: freeing the system from structures, processes, or functions that are no longer effective or useful.
- 2) Experimenting: generating new patterns better suited to the present environment.
- 3) Visioning: choosing a new perspective around which a system can reorganize.
- 4) Bonding and attunement: harmonizing members to move the system towards new ways of doing, thinking, and learning.

Another author, Duck (1993), believes the key to change is integration and balance of all the performance improvement efforts. Duck states:

An organization may simultaneously be working on TQM, process re-engineering, employee empowerment, and several other programs designed to improve performance. But the key to the change effort is not attending to each piece in isolation; it's connecting and balancing all the pieces. In managing change, the critical task is understanding how pieces balance off one another, how changing one element changes the rest, how sequencing and pace affect the whole structure (Duck, 1993, p. 110).

Finally, most authors believe a key element in successful large scale organizational change is leadership. There are many people involved in a change effort. The success of this effort depends upon strong leadership and key players. The Change Advocate, Change Sponsor, Change Target, and Change Masters are some defined positions on the road to orchestrating and managing change.

The Change Advocate(s) recognizes the need for change and supports it, but doesn't have the formal or informal power to cause change. They must find someone to champion their effort -- a Change Sponsor. The Change Sponsor is a person(s) in a pivotal position of power who can champion the effort and legitimize it. They provide the system of communication, promote the securing of essential efforts (resources, services) and define the purpose (Barnard, 1939). The Change Target is the individual or system that is being focused on in the change effort. These people will be affected by the improvement efforts and therefore should be participants. Kanter (1983) defines Change Masters as "those people and organizations adept at leading and managing positive change" (p. 13). Change Masters, also referred to as Change Agents, are individuals or groups that have been given the task of leading and managing the change/improvement efforts. They are the "architects and engineers" of large scale improvement efforts (Sink and Morris, 1995). A Change Master uses her/his skills in resource allocation, team management, and systems thinking in order to bring about change. In their position, Change Masters deal with the dynamics of change--the confluence and congruence of the forces that change unleashes.

2.4 What to Use to Change: Frameworks for Large Scale Organizational Change

Organizations have a tendency to search for "quick fixes" (Kilmann, 1984) to improve performance. In contrast, "grand strategies" (Morris, 1979) should be developed and followed to create effective change. "A grand strategy is simply a strategically thought through plan, encompassing two to five years, that is documented in a specific fashion and communicated effectively to all levels of employees" (Sink and Tuttle, 1989).

A number of different models, frameworks, and methodologies have been proposed to address the requirements of managing large scale change. I have spent considerable research time trying to distinguish between the terms "model", "framework", and "method". I have not been satisfied with any response I uncovered. I could find no trend between what different authors termed as models, frameworks, or methods. So, I distinguish between the three in the following manner. Models are more theoretical, whether they are trying to describe or prescribe an approach. Frameworks try to take theory to practice, outlining first level steps. Methods are the most concrete of the three constructs. Methods are a series of steps that go beyond what a framework provides.

Methods could be included in frameworks, frameworks in models, models in methods, models in frameworks etc. Semantics aside, in this section I present other professed "ways" to make the transformation. These different "ways" I will consistently term "frameworks". To me, a framework is something you can hang your hat on. It is something you can build the rest of your house upon. It is something you can build your change plans around and then use while change is occurring. This is what I tried to look for, no matter whether the author termed their work a model, framework, theory, or method. Every time I came across something, I asked myself "Can I build and manage an organizational change effort by using this construct?" The following are several frameworks that I believe answer yes to that question.

2.4.1 Kilmann's Five Tracks

Kilmann (1989) presents an approach for managing "beyond the quick fix." He calls his approach "a framework for understanding the essence of an organization and a completely integrated program for managing the essence for organizational success" (Kilmann, 1989, p. 202). Kilmann's Five Stages of Planned Change framework is depicted in Figure 2-7.

Briefly, in stage 1, the critical issue is determining whether the conditions exist for a successful improvement effort. In stage 2, the objective is to develop a deep understanding of the full range of problems (barriers) facing the organization and its opportunities (channels) for success. The next stage of planned change is scheduling the tracks. Kilmann identifies five tracks that must be managed over time in order to ensure that large scale (system wide) improvements are successful. The five tracks are culture, management skills, team-building, strategy-structure and reward system. Kilmann (1988, p.317) defines the tracks as follows:

The Culture Track: Establishing trust, information sharing and adaptiveness; being receptive to change and improvement.

The Management Skills Track: Augmenting skills to cope with complexity; exposing and updating assumptions.

The Team-Building Track: Infusing new cultural norms and assumptions into each work unit; fostering cooperative efforts.

The Strategy-Structure Track: Aligning all work units and resources with new strategic direction.

The Reward System Track: Establishing a performance-based reward system; sustaining the whole improvement effort.

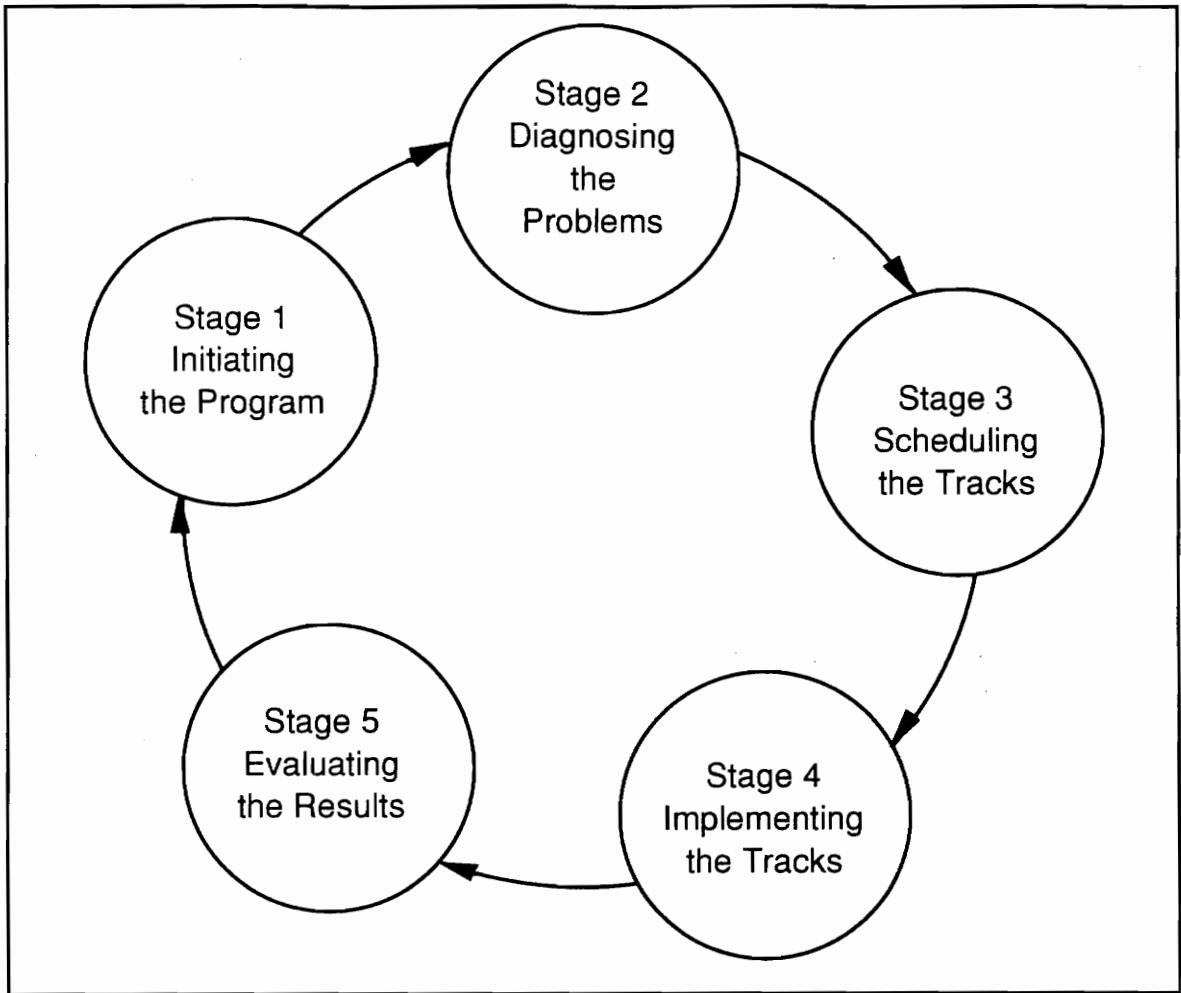


Figure 2-7: The Five Stages of Planned Change (Kilmann, 1989)

There is a sixth track, termed the "shadow" track, that runs parallel to the other five tracks. "This shadow track facilitates implementation by forming a steering committee representing all members in the organization and by making use of internal consultants throughout the implementation process" (Kilmann, 1989, p. 202).

For stage 3, scheduling the tracks involves:

- (1) Selecting the first unit to participate in the program and planning the spread of change to the remaining units.
- (2) Selecting the techniques (methods for bringing about change) that will make up each of the five tracks in each unit in order to address the problems identified during the diagnostic stage.
- (3) Scheduling the five tracks into a timed sequence of activity in order to promote effective learning and change in each organizational unit (Kilmann, 1989, p. 36).

In stage 4, implementing the tracks, flexibility is key. Changes will need to be made to the schedule/plan in order to adapt to events. The final stage in planned change is evaluating the results. Evaluation is done to improve the implementation process for future efforts, discover barriers that need attention, and determine whether the program has improved organizational performance.

2.4.2 Deming's 14 Points

The second framework for organizational change comes from Dr. W. Edwards Deming. Dr. Deming (1986) suggests applying fourteen points when trying to transform an organization. The fourteen points are:

- 1) Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
- 2) Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
- 3) Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
- 4) End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item on a long-term relationship of loyalty and trust.
- 5) Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

- 6) Institute training on the job.
- 7) Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.
- 8) Drive out fear, so that everyone may work effectively for the company.
- 9) Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
- 10) Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
- 11a) Eliminate work standards (quotas) on the factory floor. Substitute leadership.
- 11b) Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
- 12a) Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.
- 12b) Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means abolishment of the annual or merit rating and of management by objective.
- 13) Institute a vigorous program of education and self-improvement.
- 14) Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

Dr. W. Edwards Deming urged companies to make the "transformation" to a new style of management and an environment of optimization towards a common aim. His fourteen points are a guideline for this transformation.

2.4.3 The Management System Model (MSM)

Dr. Harold Kurstedt provides the next framework for organizational change. Kurstedt (1989) developed the Management System Model (MSM) to capture the structure and interrelationships existing in a management system a.k.a. systems view of an organization

(Figure 2-8). The Management System Model (MSM) provided a framework for describing a management system, its components, and their relationships¹.

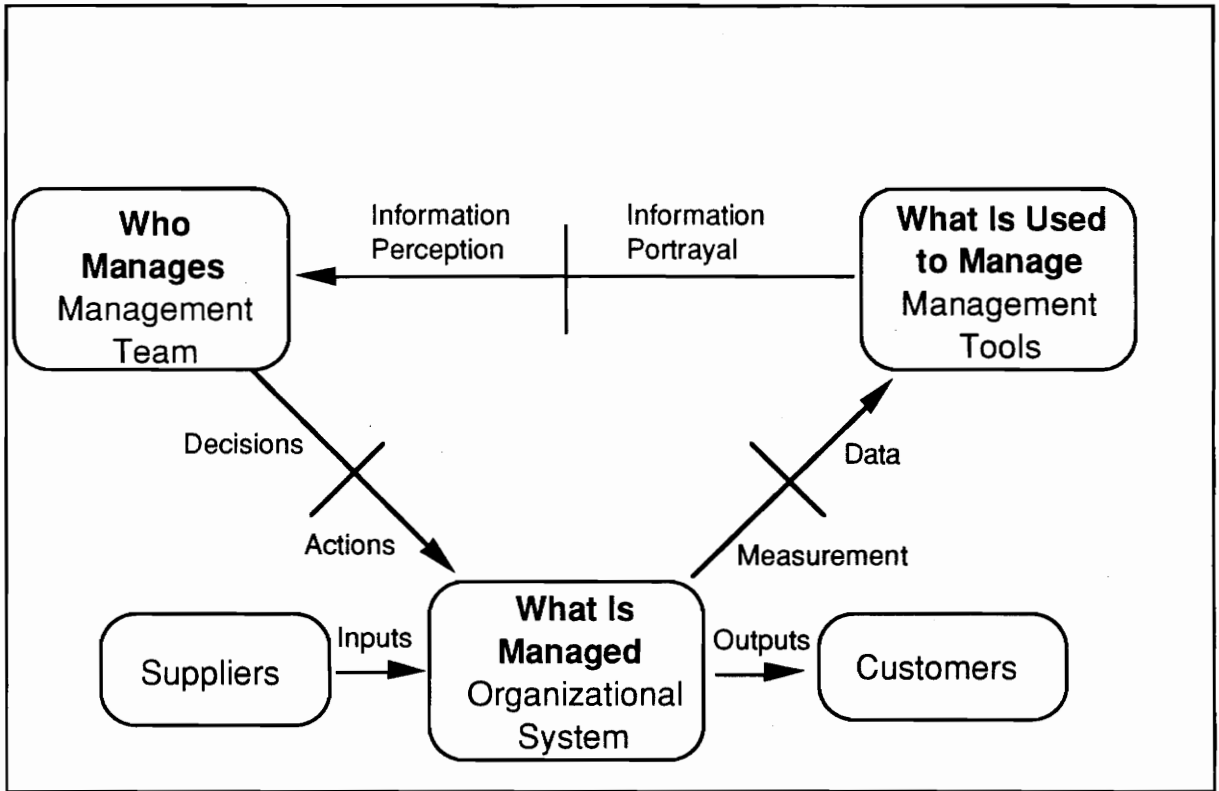


Figure 2-8: The Management System Model (adapted from Kurstedt, 1992)

There are three main components to this model. The “who manages” component is anyone who makes decisions that result in actions that affect “what is managed.” The “what is managed” component includes the things the manager is responsible for. The “what is used to manage” component is comprised of the tools managers use (Kurstedt, 1992).

This model also includes three interfaces between the main components: (1) decisions to actions; (2) measurement to data; and (3) information portrayal to information perception.

¹ This explanation of the MSM was adapted from previous work by Cheryl Simmers.

These interfaces help describe how the “who manages” progresses through the system and how the components are interrelated. The MSM can represent the management system as an open system, by considering external influences (i.e., environmental influences, suppliers, customers). An organizational system has upstream systems (suppliers), inputs (labor, capital, energy, material, information/data), outputs (goods and/or services), and downstream systems (customers).

2.4.4 Deming's Plan, Do, Study, Act Cycle

Dr. W. Edwards Deming (1993) adapted his Plan, Do, Study, Act (PDSA) improvement model from previous work done by Shewhart. The PDSA Cycle is a model for learning and for improving a product or process (see Figure 2-9). I believe this model can be used as a framework for large scale organizational change efforts.

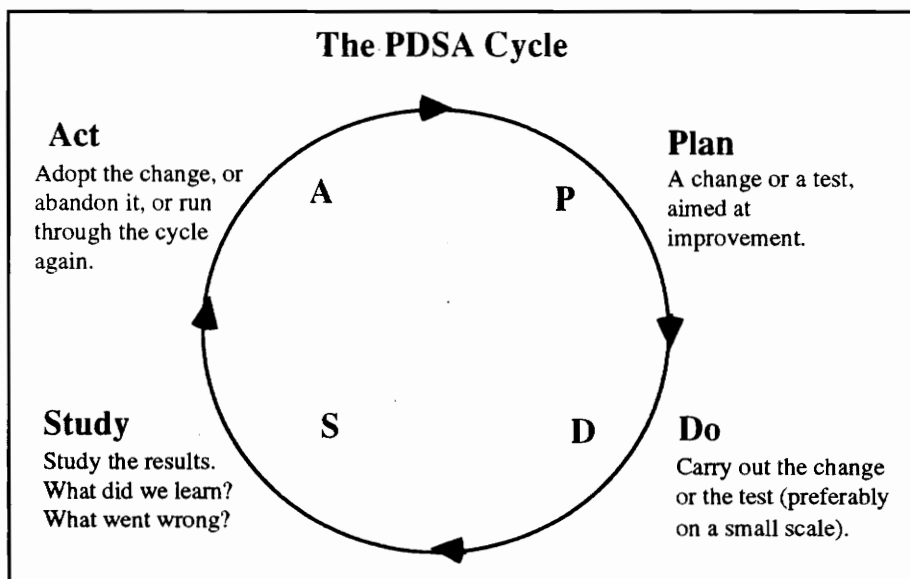


Figure 2-9: The Plan, Do, Study, Act Cycle (Deming, 1993)

The planning step is most important. Planning is time consuming and should be an ongoing process. The planning (or management) team should include a member from each

affected group. This team is cross-functional and includes workers from different organizational levels. It may also include members from the organization's suppliers and customers.

During the planning step, the Mission, Vision, and Objectives of the organization are documented. Past processes, current processes and roadblocks are explored. Key performance indicators are developed. Plans must take into consideration the whole system and be flexible enough to respond to changing situations. Competitive benchmarking should be used in planning. Benchmarking involves identifying top performers in a chosen field and adapting their processes to the organization's own operations. Ways to communicate information between all affected parties should be established. Tentative meeting dates and "achievement" dates are agreed upon.

The implementation of the plan follows next. This is the "Do" in PDSA. Commitment and communication are the keys to successful implementation. There is need not only to keep focused on the steps of the plan but to remember the goal being strived for. The implementation steps are not set in stone and should be constantly evaluated and changed accordingly. The goal of implementation is to make the new system become a routine part of operations.

Study or measurement is the third step. Measurement is a key factor in performance improvement, providing information on where the organization is and how it is doing with respect to set objectives. Figuring out how and what to measure is important. Data is collected for the purpose of evaluation, not control. Current measurement tools and technology need to be evaluated and new ones explored. Knowledge of statistics is needed to interpret the data.

Act/evaluate is performed next in the closed loop change process. The data collected by measurement is converted into information. Performance improvement can be evaluated by analyzing such things as effectiveness, quality, productivity, quality of work life, and profitability. The results of the obtained information are compared against the established key performance indicators. Based on the management team's perception of the findings, processes are altered or continued.

2.4.5 Transformation Model

The next framework for organizational change comes from Finney, Bowen, Pearson, and Siehl (1988). They present a model for enacting and managing organization wide transformation (see Figure 2-10). This transformation requires changing the systems of meaning within an organization and ongoing visioning, reframing, and adaptive experimentation. The transformation model presents "a view of organization wide transformation as a set of mission-driven strategies supported by enacting structures" (Finney et al., 1988, p. 284).

The mission of the transformation effort guides the work that is done. The strategies, designed to accomplish the mission, involve an organizational assessment process. This process identifies the present belief system of employees, along with the qualitative and quantitative impact over time of these systems on the way work is done. Along with the organizational assessment process, another strategic related exercise, a three-stage meaning change process, is used. In the initial stage, visioning, leaders identify the ideal characteristics and values the organization should espouse and use. In the second stage, reframing, leaders try "to identify the best means of changing meaning from that assessed as present to that identified as ideal" (Finney et al., 1988, p. 284).

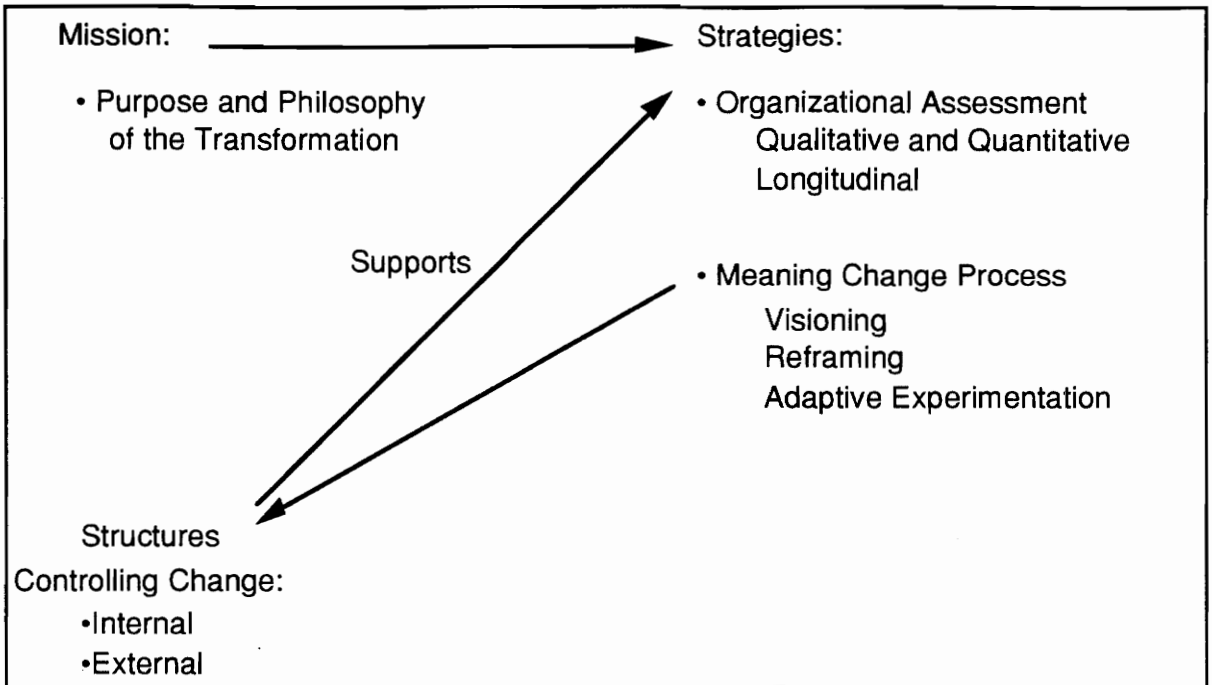


Figure 2-10: The Transformation Model (Finney et al., 1988)

Finally, in the last stage, adaptive experimentation, leaders are concerned with the implementation, monitoring, evaluation, and redesign of any reframing activity. The above strategies are controlled and directed by multiple structures. Ideally, these structures are both internal and external.

2.4.6 The Use of Frames

Bolman and Deal (1991) discuss the idea of viewing a change effort through different *frames* or schemata, maps, images etc. "Frames are both windows on the world and lenses that bring the world into focus. Frames filter out some things while allowing others to pass through easily. Frames help us to order experience and decide what action to take... They are tools for action" (p. 11). Reframing is the art of attacking old challenges with different and more powerful tools. It is a new way to look at old problems and dilemmas. "The ability to reframe experience enriches and broadens a leader's repertoire and serves as a

powerful antidote to self-entrapment. Expanded choice enables managers to generate creative responses to the broad range of problems that they encounter" (p. 4).

Bolman and Deal (1991) identify four frames, each having its own vision or image of reality: structural, human resource, political, and symbolic. Their definitions (p. 15) for each frame are as follows:

The Structural Frame: Emphasizes the importance of formal roles and relationships. Structure must fit the situation.

The Human Resource Frame: Starts with the fundamental premise that organizations are groups of individuals with different needs, feelings, skills and limitations. The key to effectiveness is to find an organizational form that enables people to get the job done while feeling good about what they are doing.

The Political Frame: Views organizations as arenas in which different interest groups compete for power and scarce resources. Conflict is everywhere because of the differences in needs, perspectives, and life-style among various individuals and groups. Problems arise because power is concentrated in the wrong places or because it is so broadly dispersed that nothing gets done.

The Symbolic Frame: Organizations are cultures that are propelled more by rituals, ceremonies, stories, heroes, and myths than by rules, policies, and managerial authority. Problems arise when actors play their parts badly, when symbols lose their meaning, when ceremonies and rituals lose their potency.

To be effective, manager and leader should match frame to situation along with blending the four frames if necessary. "Choosing a frame, and understanding the frames that others are using, involves a combination of analysis, intuition, and artistry" (Bolman and Deal, 1991, p. 325). The four frames can be used to think of change as a four-dimensional process, each frame suggesting a different view of the major issues. If a manager can look through all four frames, then they can appreciate the depth and complexity of organizations and what it takes to change them.

2.4.7 The Grand Strategy System

The last framework I will discuss is the Grand Strategy System. "Most organizations today are not improving the quality of their plans for improvement, specifically, their ability to ensure plans are implemented, deployed, and achieve the desired results. Grand Strategy System is one method for solving this problem" (Sink and Morris, 1995). The Grand Strategy System (GSS) provides a framework that can be used to plan and manage a comprehensive system change effort. The GSS is Sink and Monetta's (1992) approach to engineering management systems such that continuous improvement efforts are strategically thought through, comprehensive, and well integrated. GSS is designed to provide a comprehensive and integrated strategy which may be implemented to develop world class quality and state-of-the-art productivity management. In GSS, there is a strong interrelationship between what an organization has done in the past and its strategic performance plan for the future. Also, all aspects of the change effort are managed using a systems perspective; recognizing that changes in one operation will affect other processes in the system. The GSS seeks to optimize the entire organizational system, from supplier to organization to customer. A GSS effort is typically a 3-5 year process.

2.4.7.1 Definition

The Grand Strategy System (see Figure 2-11) consists of four basic components:

(1) past, (2) present, (3) future, and (4) fronts.

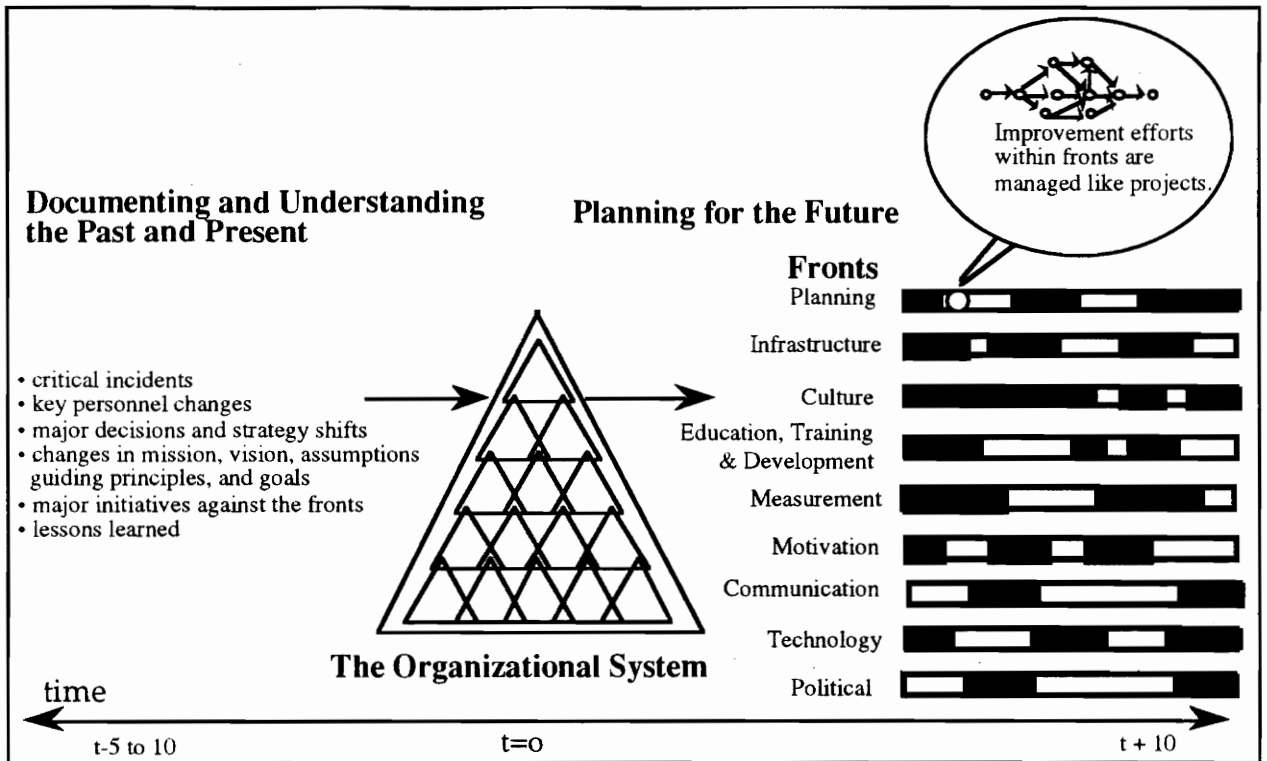


Figure 2-11: Grand Strategy System (Sink and Monetta, 1991)

An understanding, awareness, and analysis of the past and present is the foundation in the construction of a GSS. In addition, the future component of GSS addresses vision, plans, strategies, and tactics. Sink & Poirier (1994) present listings of questions and issues that must be addressed in assessing an organization's past, present and future. These are presented in Figure 2-12.

PAST

- What has worked and why?
- What hasn't worked and why?
- How have we performed over time? (statistical thinking, understanding variation, total performance assessment)
- Critical Incidence analysis for past.
- Major milestone review
- False starts and why
- Assess continuity of leadership, constancy of purpose, consistency of methods
- What methods, tools, techniques, programs have been adopted? Which have become a way of doing business? Why? Which have succumbed to entropy? Why?

PRESENT

- Mission/purpose of the target organizational system.
- Zero-base, blank sheet of paper analysis, if we could start over, what businesses/products/services would we engage in? What would our size be (people)? What would our mix be (people)? How would we be structured to succeed?
- Input/output analysis to provide appreciation for system.
- Assessment of organizational capabilities, core competencies, how fast we can support and cope with change/improvement?
- Guiding principles/shared values along with a culture gap analysis. are we walking the talk?
- Internal and external strategic analysis leading to the creation of assumptions.
- Current performance levels (introduce statistical thinking through the use of longitudinal or time series data).
- Assessment of the infrastructure supporting improvement.
- Evaluation of the skills of the organization in measuring, converting data to information, information to knowledge, and knowledge into decisions and actions; experience with the PDSA (plan, do, study, act improvement cycle).
- Key leadership should complete a Conceptual Image Document and Professional Plan of Development

FUTURE

- What is our vision in terms of mission, businesses we will be in, customers/markets served, technologies employed, levels of performance, values (e.g., business investments, operational procedures, organizational characteristics, service to clients, customers, employees)?
- What overall strategies do we have for achieving our vision, our great performances, our plans?
- What would a great performance be for us in 12-18 months?
- What will we start doing that we are not presently doing to continue to improve our performance on the basis of our improved understanding of the past and present?
- What will we stop doing that we are currently doing because it hasn't worked, it won't work, we can't make it work, it's not adding value?
- What will we continue to do because we need to stay the course, it will work, we haven't given it time enough to know whether it will or will not work, it's the right thing to do?

Figure 2-12: Questions to Assess Past, Present, Future

Sink and Monetta (1991) have defined nine major sub-systems of activity (referred to as fronts) that must be improved over time. The secret is alignment, coordination, synergy, progress and balance. In managing interventions within each front, one integrates re-engineering (step-function, or new S-shaped curve improvements) with continuous improvement ("baby steps," incremental improvements). The term "fronts" is used to identify with a battle analogy. In war, if one front gets too far ahead of the other fronts, it runs the risk of getting cut off; if it lags too far behind, it jeopardizes the other fronts or perhaps the entire war. Most organizations today can identify with the battle analogy; therefore, the concept of fronts communicates appropriately the character of the struggle to manage continuous improvement effectively. The following are the operational definitions of each front from Sink and Morris (1995):

- planning--the planning system, includes strategic, performance improvement, business, marketing, operations planning, daily planning--the whole spectrum of planning, and most importantly includes the entire planning cycle, in other words, includes implementation and evaluation (e.g. PDSA).
- infrastructure--how the organization is structured to do its business reflected in the organizational chart, position descriptions, functional and perhaps cross-functional responsibilities, but also, more importantly, how the organization is structured/organized to improve performance. Establishing "shadow organizations", collateral structure, alternate structures to improve performance and address cross-functional issues and problems.
- education, training and development--the system by which all individuals in the organization are improving personally and professionally. Extends far beyond the traditional domain of training departments, concentrates on an understanding of system-wide knowledge and skills for doing the job and for improving performance. The system of sharing knowledge and skills.
- culture--the culture management system, how leaders and managers consciously attempt to ensure that "the pattern of basic assumptions--invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration--that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" is supportive of continuous improvement. (Schein, 1985)

- motivation--the system of inducements, recognition, rewards that are created by the organization to ensure that willingness to cooperate is maintained and to ensure that everyone is doing their very best in a system that ensures that this will mean organizational success.
- communication--the system of sharing information such that coordination, understanding, cooperation exists. This system is often not managed in a systematic fashion in most organizations.
- measurement-- the system for sharing information regarding multiple levels of performance (individual, group, organizational).
- technology--the system for managing "how we accomplish things". Technology is broadly defined as a way of getting something done. So, this front includes methods, procedures, protocol, hardware and software, tools, etc. It includes understanding when to re-engineer versus when to continuously improve or tune.
- political--the informal and formal aspects of performance management. This front includes boundary spanning, internal communication, opportunity sensing and capturing, working with various bases of power, paying attention to stakeholders, working with pivotal people in positions of power to ensure they are on-board, etc.

The fronts must be managed together as a system. However, there are certain fronts that are termed "lead fronts." The lead fronts enable other fronts to be effective and are therefore foundational to the GSS effort. Lead fronts include: infrastructure, education, training and development, planning, measurement, and communication. If these fronts are managed carefully during the first year of start up, the change efforts will be on a solid foundation.

2.4.7.2 Applications of the Grand Strategy System

The VQPC has had three significant opportunities to test the GSS in the field in the past four years, first with the New Production Reactors program in the Department of Energy, next with National Grocers, and then Botswana Telecommunications Corporation. Other field work has been on a smaller scale than the three mentioned. Field research and reduction to practice work do not allow enough control to perform strict confirmatory analysis of whether the GSS leads to performance improvement. However, based on the

VQPC's experience, application of the GSS makes sense to use, is working for them, they believe in it, and they know the GSS is based on sound theory, research and substantial experience.

2.5 What is Research?

The following section examines the construct of research. I address what research is and its three dimensions. I relate these three dimensions to my specific research.

2.5.1 Defining Research

Research is "the manner in which we attempt to solve problems in a systematic effort to push back the frontiers of human ignorance or to confirm the validity of the solutions to problems others have presumably resolved" (Leedy, 1985). One can think of research in three dimensions: 1) overall purpose for the research, 2) the nature of the research, and 3) research strategy/method.

2.5.2 Three Dimensions of Research

The first dimension of research is the purpose. Patton (1990) presents a taxonomy of the various types of research and research purposes as shown in Table 2-1. The author also lists the focus of the research, desired results, desired level of generalization, and key assumptions for each research type.

Table 2-1: A Taxonomy of Research and Research Purposes (taken from Patton, 1990)

Types of Research	Purpose	Focus of Research	Desired Results	Desired Level of Generalization	Key Assumptions
Basic Research	Knowledge as an end in itself; discover truth.	Questions deemed important by one's discipline or personal intellectual interest.	Contribution to theory.	Across time and space (ideal).	The world is patterned; those patterns are knowable and explainable.
Applied Research	Understand the nature and sources of human and societal problems.	Questions deemed important by society.	Contributions to theories used to formulate problem-solving programs and interventions.	Within as general a time and space as possible, but clearly limited application context.	Human and societal problems can be understood and solved with knowledge.
Summative Evaluation	Determine effectiveness of human interventions and actions (programs, policies, personnel, products).	Goals of the intervention.	Judgments and generalizations about effective types of interventions and the conditions under which those efforts are effective.	All interventions with similar goals.	What works one place under specified conditions should work elsewhere.
Formative Evaluation	Improving an intervention: a program, policy, organization, or product.	Strengths and weaknesses of the specific program, policy, product, or personnel being studied.	Recommendations for improvements.	Limited to specific setting studied.	People can and will use information to improve what they're doing.
Action Research	Solve problems in a program, organization, or community.	Organization and community problems.	Immediate action; solving problems as quickly as possible.	Here and now.	People in a setting can solve problems by studying themselves.

The second dimension of research is the nature of the research. Yin (1989) describes the nature of research as being exploratory, descriptive, explanatory, and/or predictive. The researcher may explore the issues and constructs of a phenomenon or just describe them. In explanatory research, the researcher examines cause and effect relationships. Researchers carry out predictive research in order to predict outcomes of situations. Included in the nature dimension of research is whether the researcher is attempting to test theory or build theory. The Wallace Wheel Model of research depicts the nature of research (Figure 2-13).

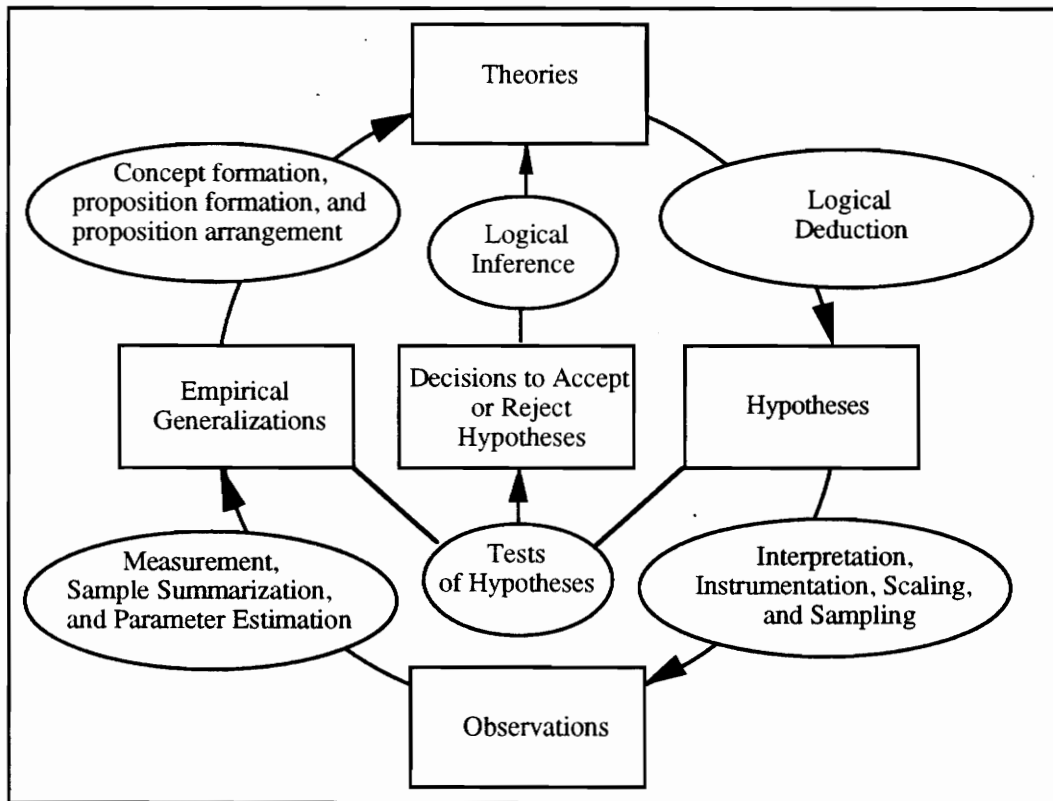


Figure 2-13: The Wallace Wheel (taken from Wallace 1971)

The following quote from the author helps to clarify the various components of the figure:

Individual observations are highly specific and essentially unique items of information whose synthesis into the more general form denoted by empirical generalizations is accomplished by measurement, sample summarization, and parameter estimation. Empirical generalizations, in turn, are items of information that can be synthesized into a theory via concept formation, proposition formation, and proposition arrangement. A theory, the most general type of information, is transformable into new hypotheses through the method of logical deduction. An empirical hypothesis is an information item that becomes transformed into new observations via interpretation of the hypothesis into observables, instrumentation, scaling, and sampling. These new observations are transformable into new empirical generalizations (again via measurement, sample summarization, and parameter estimation), and the hypothesis that occasioned their construction may then be tested for their conformity to them. Such tests may result in a new information outcome: namely, a decision to accept or reject the truth of the tested hypothesis. Finally, it is inferred that the latter gives confirmation, modification, or rejection of the theory (Wallace, 1971).

The left half of the wheel is inductive (moving from specific observations to a general theory). The right half is deductive (moving from general theories to specific observations). The top half pertains more to "theorizing" while the bottom half pertains to doing "empirical research."

In regards to the third dimension of research, there are several strategies/methods in carrying out research. Table 2-2 summarizes these methods.

2.5.3 My Type of Research Along the Three Dimensions

My research type is applied summative evaluation. "The purpose of applied research and evaluation is to inform action, enhance decision making, and apply knowledge to solve human and societal problems...Summative evaluations serve the purpose of rendering an overall judgment about the effectiveness of a program, policy, or product for the purpose of saying that the idea itself is or is not effective and, therefore, has the potential of being generalizable to other situations" (Patton, 1990).

Table 2-2: Research Methods (taken from Leedy, 1985)

Method	Characteristics of the Method and the Research Goals
Action Research	The approach in action research is to do something to see if it works. Will playing video games improve eye-hand coordination in typing? Method: Get a bank of computers, a group of typists; set up a training session. See if typing skills improve.
Case and Field Study Research	A type of descriptive research in which data is directly gathered from individuals (individual cases) or social or community groups in their natural environment for the purpose of studying interactions, attitudes, or characteristics of individuals or groups. A case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used” (Yin, 1989). A case study is a research strategy which focuses on understanding the dynamics present within single settings (Eisenhardt, 1989).
Descriptive (or Normative) Survey	The descriptive survey method, also called the normative survey method, is employed to process the data that come to the researcher through observation. This method looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees.
Developmental	This type of research is an observational-descriptive genre of investigation that usually stretches over a period of time and is frequently called “the longitudinal study.” Trend studies and projections of future trends are sometimes considered as developmental research projects.
Historical	The historical method attempts to solve certain problems arising out of a historical context through a gathering and examination of relevant data.
Experimental Method	The experimental method attempts to control the entire research situation, except for certain input variables which then become suspect as the cause of whatever change has taken place within the investigative design.

Although summative evaluation researchers seek generalizations concerning the effectiveness of specific interventions on specified populations under specifiable conditions, the researcher still seeks patterns that cut across programs or policies in a

number of different places and for a number of different groups. Table 2-3 gives a summary of Applied Summative Evaluation Research.

Table 2-3: Applied Summative Evaluation (taken from Patton, 1990)

Purpose	Determine effectiveness of human interventions and actions (programs, policies, personnel, products).
Focus of Research	Goals for the intervention.
Desired Results	Judgments and generalizations about effective types of interventions and the conditions under which those efforts are effective.
Desired Level of Generalization	All interventions with similar goals.
Key Assumptions	What works one place under specified conditions should work elsewhere.
Publication Mode	Evaluation reports for program funders and policy makers, specialized journals.
Standard for Judging	Generalizability to future efforts and to other programs and policy issues.

My thesis is based on summative evaluation. I attempted to determine the effectiveness of the GSS interventions in the Peterborough project. As stated previously, I envision my thesis as the initial groundwork (a summative evaluation) for improving an intervention (formative evaluation).

The nature of my research is exploratory and descriptive. I am building on large scale organizational change theory, not testing it. The same goes for the GSS framework. I operated mainly on the left side of the Wallace Wheel, going from the bottom to top. I made specific observations at Peterborough, measured results, and made generalizations on effectiveness and use of the GSS framework for large scale organizational change. My work will add to concept formation. Once repeated studies are done of GSS implementation, there is the possibility to add to theory.

Overall my research strategy/method is case-field study. According to Yin (1981), a case study is an empirical inquiry that:

- Investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

I have described the GSS application in the Peterborough warehouse and gathered data directly from the site. I studied interactions, attitudes, and characteristics of the warehouse. I combined descriptive and historical methods during my case study.

CHAPTER 3 - RESEARCH METHODOLOGY

A method is, very simply, a way of accomplishing an end result. The nature of the data and the problem for research dictate the research methodology (Leedy, 1989). This chapter begins with a discussion of my operational research model, leading to a discussion of required data, available sources, and collection methods. I end this chapter presenting how results were obtained, conclusions drawn, and recommendations made.

3.1 Operational Research Model

Whereas the conceptual model in Chapter 1 (p. 4) portrays the general phenomenon of organizational change, the operational research model depicts the variables I specifically studied. As stated before, my research focused on the application of models to produce results. This research reviewed a case application of the Grand Strategy System framework at the Peterborough warehouse and the performance results obtained. The three variables I studied were interventions, performance, and time.

Figure 3-1 depicts variables 1-3 above. I studied the improvement interventions within the Peterborough warehouse for each front from August 1992 to January 1995. I also documented the warehouse performance results. After completing those two tasks, I then evaluated the effectiveness of the PDSOF project.

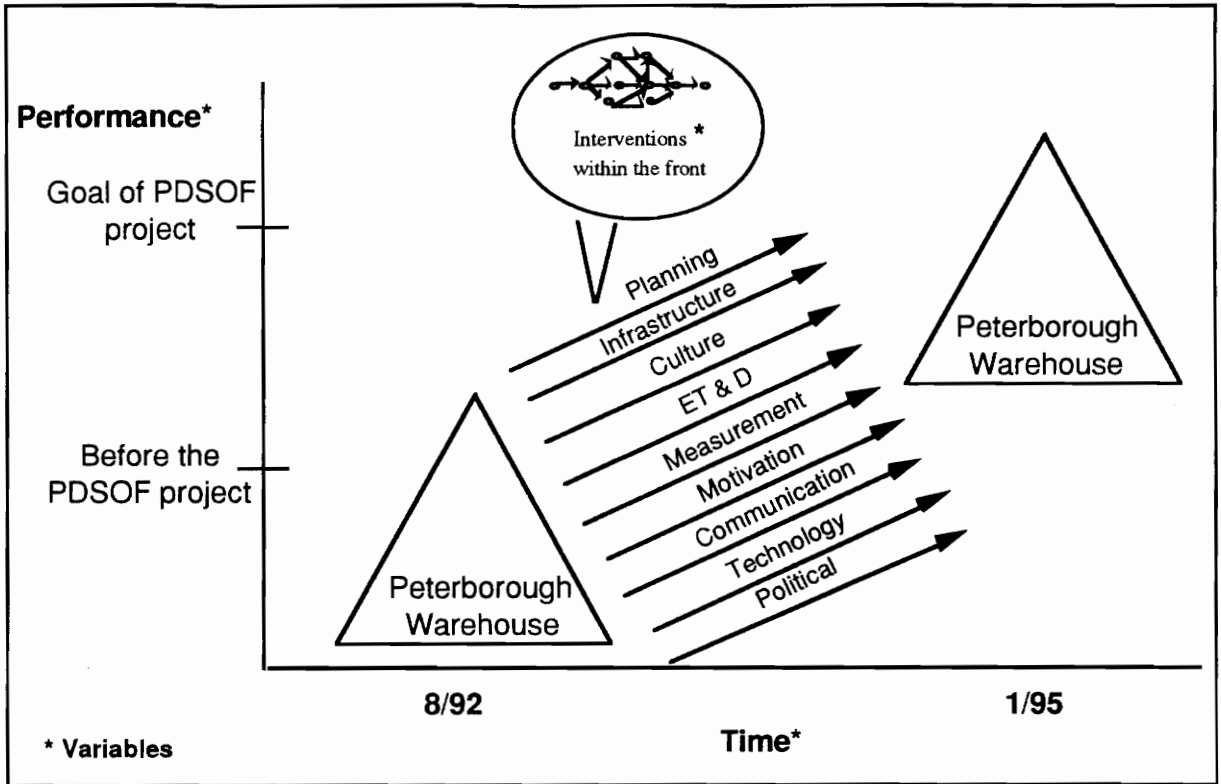


Figure 3-1: Operational Research Model Depicting Variables 1-3

Figure 3-2 depicts the fourth variable, lessons learned. The figure shows Deming's Plan, Do, Study, Act improvement cycle. The PDSOF project participants designed plans, carried out interventions, studied the changes in the warehouse and then acted accordingly. My research added another step to this cycle, recording lessons learned. Another warehouse or possibly another organization may want to use the GSS framework in their change effort. They could plan interventions based on (1) what worked and didn't work at Peterborough and (2) what the Peterborough participants would have done differently to gain better performance improvement results.

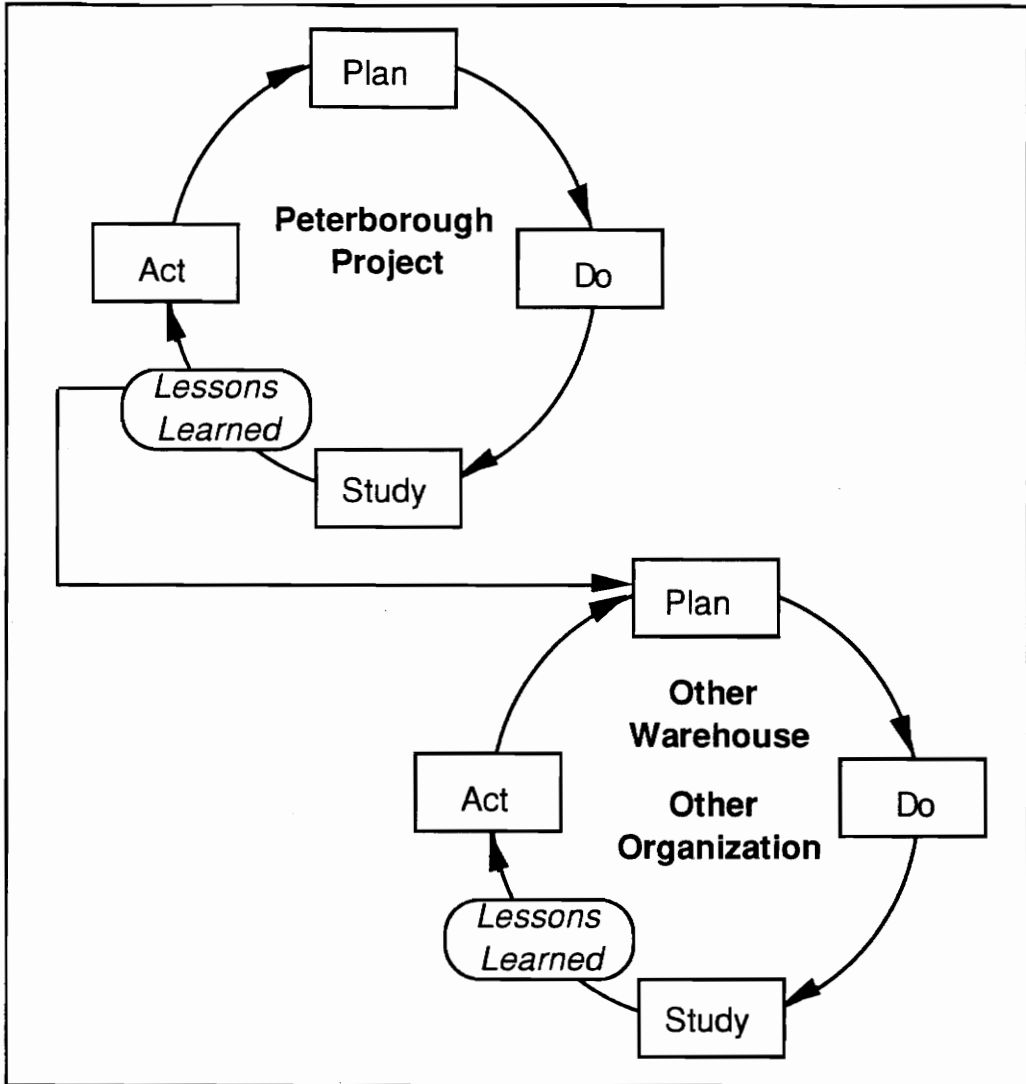


Figure 3-2: Operational Research Model Depicting Variable 4

3.2 Data Required

I needed the following data to meet the objectives listed in Section 1.4.3.

- 1) Interventions that took place with respect to the PDSOF project (Objective 1, Objective 3)
- 2) Goals of the PDSOF project (Objective 3)
- 3) Peterborough performance quantitative data (Objective 2, Objective 3, Objective 4)

- 4) Peterborough performance qualitative data (Objective 3)
- 5) Performance data on two non-GSS NG warehouses similar to Peterborough (Objective 4)
- 6) Expert advice on interventions to do the same or differently for increased performance improvements (Objective 5)

To clarify, I collected and analyzed both quantitative and qualitative Peterborough performance data. The quantitative data came from those performance indicators measured during the project. The qualitative data came from questionnaires completed by the experts. So, the qualitative data were really experts' perceptions of performance. Qualitative data gave me insight into warehouse performance indicators that weren't measured such as employee morale, satisfaction, relationships, knowledge, communication etc.

3.3 Data Sources

There were several sources of data available. The first category of data were archival data. Archival data are primarily historical documents generated throughout the project lifetime. The second category of data was survey data. Each individual involved in the PDSOF project had his or her own personal memories of what took place, the results obtained, and ideas on what they would do differently next time they are involved in a similar project. These data stored in the mind are referred to as survey data.

It is important to state the bias of my sources which in turn bias my data. Archival and survey data may be biased. People who write documents put their bias into the account. People's emotions and feelings can cloud accounts of events. I recognize this bias in my data and tried to reduce the effect by sampling many experts and checking archival data against survey data.

3.3.1 Archival Data

This data category consists of documents generated throughout the lifetime of the project. I needed archival data on all points mentioned in Section 3.2. They were:

- 1) Interventions that took place with respect to the PDSOF project
- 2) Goals of the PDSOF project
- 3) Peterborough performance quantitative data
- 4) Peterborough performance qualitative data
- 5) Performance data on two non-GSS NG warehouses similar to Peterborough
- 6) Expert advice on interventions to do the same or differently for increased performance improvements

Archival data sources are listed below, along with the data they provided as numbered above.

- Project Reports --- 1,2,3,4,6
 - VQPC internal & external project reports
 - National Grocers internal & external project reports
- Meeting Notes / Reports of Output -- 1,2,4,6
 - VQPC project team meetings
 - VQPC/Peterborough project team meetings
 - PDSOF "B" infrastructure team meetings
 - Bootcamp reports
- VQPC Trip Reports -- 1,3,4
- Peterborough Financial Performance Reports -- 3
- The Visual Management Boards -- 2,3,5
- Chartbooks -- 2,3,4,5,6
- PEP Reports -- 5

- The NG Performance Improvement Handbook -- 1,2,4,6
- Project Scoping Agreements / Contracts -- 1,2
- Memos, Letters, Emails -- 1,2,3,4,6
- VQPC Project Folder on Community Server -- 1,2,3,4,6
- Personal Computer Files -- 1,2,3,4,6
- Other VQPC Graduate Student Theses and Dissertations -- 1,2,3,4,6
- Articles Written on the National Grocers Change Effort -- 1,2,3,4,6
- NG Distribution Warehouse Survey -- 3,4,5

A special note on performance data of the two non-GSS NG warehouses similar to Peterborough (listed #5). In trying to identify two warehouses similar to Peterborough, I spoke to Dave Dexter, Mike Sullivan, Barry Doggart, Rene Couture, and Tom Gyles from National Grocers, along with Scott Sink, Altyn Clark, and Stephen Hacker from the VQPC. Items that I felt were important to try to match between the three warehouses were: volume of product, technology, number of employees, union presence, type of product, customers, and physical size. Chatham and Sudbury were identified as the two non-GSS NG warehouses closest to Peterborough along several operating aspects. Profile information on Sudbury, Chatham, and Peterborough were obtained from their respective Change Agent. A summary of the similarities and differences between all three warehouses can be found in Chapter 4. Full profiles of each warehouse can be found in Appendix G.

3.3.2 Survey Data

Data sometime lie buried deep within the minds or within the attitudes, feelings, perceptions and reactions of people. I recognized that survey data would be necessary on all the points mentioned in Section 3.2 except Peterborough performance quantitative data (listed #3). Survey data were used to fill in the blanks on what happened historically

through the life of the project. Questionnaires were used to tap into survey data on perceived warehouse performance. Survey data were also used to understand what interventions project participants would do the same or differently to get greater performance improvement results, based on the lessons they learned through project participation. I gathered survey data from the following experts/project participants:

- Peterborough Employees
- NG Corporate Employees
- VQPC Employees
- Peterborough Customers
- Sudbury and Chatham Employees

My personal experience with the PDSOF project was a source of survey data. Having been involved in the Peterborough project, I had first hand observations of project events while they happened. I was part of the VQPC team and used my observations while “in the field” as relevant data.

3.4 Data Collection Process

The next issue is the data collection process. Section 3.4 is a discussion of methods for collecting both archival and survey data. The tools needed to collect survey data are also included.

3.4.1 Archival Data

Most of the archival data were electronic or paper documents. The Visual Management Boards (VMB) were an exception. These are physical boards hanging in the Peterborough warehouse. However, the data on these boards were included in the chartbooks, which are reports of warehouse performance. Documents were secured in the following manner:

- Phoned appropriate person and asked that they send/fax me paper or electronic copies of documents; and
- Downloaded electronic files from VQPC project folder on community server.

Identifying the "appropriate person" who had the documents I needed was not difficult. Having been involved in the project, I knew who the key players were and their respective roles.

3.4.2 Survey Data

I needed survey data on interventions to check against what I was able to piece together from documentation. The experts helped me to add, subtract, or clarify interventions. I collected historical intervention survey data in the following manner:

- Determined the experts, per front, who were most knowledgeable about what went on;
- Sent those experts charts depicting all the interventions, per front, that I had been able to piece together; and
- Had the experts review the chart for their front, adding or subtracting interventions based on their experience.

I also needed survey data on the determined goals of the PDSOF project. Via phone and personal interview, I discussed the goal statement with Dr. Scott Sink and Altyn Clark of the VQPC, along with Mike Sullivan, Barry Doggart, and Dave Dexter of National Grocers. The goal at the outset of the project was to achieve significant improvement in a portion of the total distribution system (Peterborough) in an eighteen month period of time. Also through the PDSOF project, National Grocers and the VQPC were attempting to learn how to integrate re-engineering and continuous improvement; to re-engineer and at the same time build the capacity to continuously improve (Sink and Poirier, 1994).

The set goals of the project were:

- 1) Achieve a minimum 30% performance improvement, which translates into a \$2.56 million cost reduction, or an increase in throughput of approximately 29,000 tons with no change in operating costs, or a combination of both.
- 2) Experiment with continuous improvement and reengineering simultaneously.
- 3) Sustain improvements over time. Sustain a culture/environment of continuous improvement and reengineering over time.

Although Peterborough, Chatham and Sudbury's performance results were documented (archival data), I sought clarification of the results. I had frequent discussions with Mike Sullivan and Altyn Clark about the performance results.

I used two similar questionnaires to collect the fourth type of survey data, experts' perceptions of Peterborough performance. As indicated in Section 3.3.1, the chartbook was a source of performance data for Peterborough. Along with quantitative data, nine chartbooks also included results of a questionnaire on warehouse performance for that month. This questionnaire was administered to a stratified random sample of nine to thirteen Peterborough employees across different shifts every month. The chartbook questionnaire is represented in Figure 3-3.

**Qualitative Data Obtained for the (Month) Peterborough
Chartbook Based on Employee Responses**

1. Is the Peterborough Distribution System getting better?
2. How do you know?
3. On what basis do you make this decision?
4. Other Questions and concerns of the employees.

Figure 3-3: Peterborough Monthly Chartbook Questionnaire

I also wanted to collect perceptions of performance from members of the Design and Development Team (DDT) and Steering Committee (SC) infrastructure teams. The monthly chartbook questionnaire was not administered to them. So, I designed a similar questionnaire specifically for them. It is depicted in Figure 3-4. The method of administration and collection was as follows:

- Barry Doggart of NG sent the questionnaire to the DDT and SC team members working at his location in Toronto.
- Mike Sullivan of Peterborough distributed the questionnaire to DDT and SC members at Peterborough.
- I faxed the questionnaire to the remaining DDT and SC team members at other locations.
- All questionnaires were faxed back to me.

This questionnaire was administered to a total of twenty people, with a return of ten.

Dear Peterborough Distribution System of The Future Participant:

My name is Karen Matusz and I am a graduate student at Virginia Tech conducting a comprehensive study on the Peterborough Distribution System of the Future Project. The study will benefit National Grocers through the transfer of knowledge and experiences from the PDSOF project to other areas within NG.

I am collecting data on performance results you've noticed at Peterborough that occurred as a result of the changes in the warehouse from 1/93 to present.

Could you please take a few minutes and reply to the following question? Your responses will be kept confidential. Please return your responses to me by **2/27/95** via email (karen_matusz@perform.vt.edu) or fax (703-231-3538) . If you have any questions, please call Barry Doggart at (416) 235-2144 or myself at (703) 231-3525. Thank you for your time and input.

Please answer the following questions considering Peterborough operations from 1/93 to present. For questions 2 & 3, please provide as many answers as you can-- you are not limited to one response.

1) Is the Peterborough Distribution System getting better? (Yes/No/Don't Know)

-

2) How do you know? (comment on issues like relationships, communication, service, atmosphere, attitude, commitment etc.)

- *example: Communication between shifts has improved since 1/93.*

-

-

-

3) On what basis do you make this decision? (What changes or events in your dealings with the warehouse can you point to, in support of your answer to question 1?)

- *example: Shift meetings have been implemented.*

-

-

-

Figure 3-4: DDT & SC Questionnaire

To complement archival data, the fifth type of survey data I needed was with respect to the lessons the experts learned through the GSS implementation. I was interested in the experts' advice on what to do the same or differently when implementing a GSS. A way to find out what interventions the experts would recommend in GSS implementation was to ask the other NG Distribution Managers what GSS interventions they had started using in their warehouse. Word of mouth about Peterborough's success traveled quickly to other NG warehouses, who were eager to try out some of the GSS interventions in their warehouses. I designed and administered a questionnaire asking the other Distribution Managers what GSS interventions they had started to implement. This questionnaire also asked whether they were experiencing success or failure with the intervention at their Distribution Center. The actual questionnaire is depicted in Figure 3-6. The method of administration and collection was as follows:

- Stephen Hacker of the VQPC administered the questionnaire during his meeting with all the Distribution Managers of National Grocers in January 1995.
- He collected the completed questionnaires at the end of his meeting and returned them to me.

Figure 3-5 is the verbal instructions Stephen Hacker gave the Distribution Managers before administering the survey.

Verbal Instructions from Stephen Hacker

Karen Matusz, a graduate student at the Center, is doing her thesis on the Peterborough Distribution System of the Future Project. She is studying what was done, the results obtained, and the lessons learned.

From you, she is interested in discovering what tools, techniques, ideas or events from the Peterborough project you adopted and implemented at your Distribution Center (DC).

Please take 15 minutes to list interventions from Peterborough you adopted and answer why you chose to implement them in your Distribution Center. Also, please indicate whether or not they are successful or working for you.

Please be sure to indicate what DC you are from. If your DC has not implemented any Peterborough interventions, please indicate this also on the survey.

Your response is confidential. Only Karen will know what DC each response came from. I will be collecting the survey sometime during this session today, so that I may take them back with me to Karen.

Thank you for your help.

Figure 3-5: Verbal Instructions for NG Distribution Managers Questionnaire on GSS Interventions Currently Implementing

**Take-aways
from the
Peterborough Distribution System of the Future Project**

I am interested in discovering what tools, techniques, ideas or events from the Peterborough project you adopted and implemented at your Distribution Center. Please list them and answer why you chose to implement them in your Distribution Center. Also, please indicate whether or not they are successful/working for you. Your response will only be known to myself.

Below are some examples of tools techniques, events, and ideas used in the Peterborough Project. This list is not comprehensive, but instead is meant to show some examples.

- Visible Management Boards/ Visible Management System (VMS)
- Chartbooks
- All-hands meetings
- Daily Shift meetings
- Performance Action Teams
- The Grand Strategy System Approach
- The Plan, Do, Study Act Cycle
- Customer Focus Groups
- Employee Survey
- Weekly Shift Meetings
- Benchmarking
- Defining a Great Performance
- The Empowerment Process
- Supervisor Affinity Groups
- Education, Training and Development
- Forming Infrastructure Teams (DDTs, SCs, PATs, PLTs)
- Cards Exercises
- Planning Sessions
- Bootcamps
- Library established
- Red Teams
- Any technological improvements
- Identification of Key Performance Indicators (KPIs)

Thank you for your support.

Karen Matusz

**Figure 3-6: NG Distribution Managers Questionnaire on GSS
Interventions Currently Implementing**

Distribution Center: _____

DC hasn't tried to implement any Peterborough Interventions (check): _____
Why not?: _____

If DC has, please fill in the chart below.

Tool, Technique, Event Adopted from the Peterborough Project	Why Chosen	Successful in your Distribution Center? (yes/no) Why or Why not?

Figure 3-6 Continued: NG Distribution Managers Questionnaire on GSS Interventions Currently Implementing

3.4.3 Summary of Data Collection Process

Below is a summary of the data required, its type, the collection tool required (if survey data), and to whom the tool was administered. As stated previously, all archival data was collected by identifying and contacting the appropriate person, and then requesting the needed document.

Table 3-1: Summary of Data Collection

Data Required	Type	Survey Collection Tool Required	Experts the Tool was Administered to
Interventions that took place with respect to the PDSOF project	Archival & Survey	Mailing of intervention charts by front	<ul style="list-style-type: none"> • Experts most familiar with a front, per front
Goals of the PDSOF project	Archival & Survey	Phone or face-to-face interviews with appropriate project personnel	<ul style="list-style-type: none"> • Scott Sink - VQPC • Altyn Clark- VQPC • Barry Doggart - NG • Mike Sullivan- NG • Dave Dexter - NG
Peterborough performance quantitative data	Archival (Survey for clarification)	(Interviews by phone or in person)	<ul style="list-style-type: none"> (• Mike Sullivan- NG • Altyn Clark- VQPC)
Peterborough performance qualitative data	Archival & Survey	<ul style="list-style-type: none"> • Existing monthly chartbook questionnaire • DDT/SC questionnaire 	<ul style="list-style-type: none"> • Random sample of 9-13 Peterborough employees • 21 DDT/SC Members
Chatham & Sudbury performance data	Archival (Survey for clarification)	(Interviews in person)	<ul style="list-style-type: none"> (• Altyn Clark- VQPC)
Expert advice (lessons learned) on interventions to do the same or differently for increased performance improvements	Archival & Survey	NG Distribution Managers questionnaire on GSS interventions currently implementing	Distribution Managers from: St. John's, Halifax, Surveyor Road, Erin Mills, Kitchner, Ottawa, Cochrane, Sudbury, Moncton, Chatham

3.5 Results (Chapter 4)

Carrying out the data collection methodology generated a wealth of data for comprehensive analysis. Information was extracted from this archival and survey data through organization, portrayal and analysis. This information was then used to answer my research questions. The following describes the data organization, portrayal, and analysis process. In Chapter 4 of this thesis (and various Appendixes), I present data that were collected during the study in an organized format. Chapter 4 also contains portrayals of the data, along with findings (information) from my analysis.

3.5.1 Data Organization Process

In order to complete my objectives, the identified data was first organized. The task of a researcher is one of analysis and synthesis. History arrives localized, in bits and pieces -- isolated events, dates, individuals. Synthesis is fitting the pieces together to form a meaningful matrix (Leedy, 1989). Reducing, coding, arranging, separating, or summarizing the data is required to extract relevant, meaningful, or important facts and information. The primary organizational parameter for my research is by objective. As stated before, I needed the following data to meet my objectives.

- 1) Interventions that took place with respect to the PDSOF project
- 2) Goals of the PDSOF project
- 3) Peterborough performance quantitative data
- 4) Peterborough performance qualitative data
- 5) Performance data on Chatham and Sudbury
- 6) Expert advice on interventions to do the same or differently for increased performance improvements

For the first set of data, interventions of the PDSOF project, I organized my collected interventions by GSS front. To do this systematically, I had clear operational definitions for each front (p. 44-45). Every time I came across an intervention in my reading, I placed a copy of that document, with the intervention highlighted, in the appropriate front file folder. I also recorded the time span associated with the intervention. After I put together as complete a history as possible, I arranged the interventions, per front, in chronological order.

The third set of data, Peterborough performance quantitative figures, were organized according to prearranged categories (existing chartbook categories). These categories included:

- Total cost per shipped ton by period
- Shipped tons per direct labour hour by week
- Thruput (shipped+received) cases per direct labour hour by week
- Total percent attendance by week
- Grocery receiving cases per hour by week
- Grocery putaway pallets per hour by week
- Grocery replenishment pallets per hour by week
- Grocery assembly cases per hour by week
- Percent on-time departures from warehouse by week
- Percent on-time arrival at customer by week
- Grocery total quality: scratches, shorts, mispicks, and damages per 1000 cases shipped by week
- Grocery scratches per 1000 cases shipped by week
- Grocery shorts per 1000 cases shipped by week
- Grocery mispicks per 1000 cases shipped by week

- Grocery damages per 1000 cases shipped by week
- Produce shorts per 1000 cases shipped by week
- Produce mispicks per 1000 cases shipped by week
- Produce damages per 1000 cases shipped by week

For the fourth set of data, performance qualitative data, I took the two questionnaire types (nine monthly chartbooks and one DDT/SC) and organized the participants' responses into two categories: perceptions of performance and methods used to form perceptions of performance. As described previously, the questionnaire asked three different questions:

- 1) Is the Peterborough Distribution System getting better?(Yes, No, Don't Know)
- 2) How do you know?
- 3) On what basis do you make this decision?

From the response data received, there seemed to be some confusion about the difference between question two and question three. Some experts listed changes they observed in warehouse performance for question two, while others listed that same type of information as an answer to question three. Similarly, some experts listed specific tools or methods they used to form their judgment of improvement (like charts on the VMS) for question two while others listed those same tools/methods as answers to question three. Clearly, the chartbook questionnaire needs to be redesigned so that there will be less confusion for the participant and better data for the analyst. In regards to this qualitative data for my study, I was interested in two things:

- Perceptions of warehouse performance
- How they formed those perceptions (tools/methods they used)

I reorganized all the questionnaire data (no matter what question the response was to) into the above two categories. What category a response fell into was a subjective judgment on my part. When the category was unclear, I organized the response under the category that seemed to make the most sense. Data on what methods the experts used to form

perceptions of warehouse performance were organized according to similarity of response. The perceptions of performance data were organized according to Sink & Tuttle's seven performance criteria (1989). Sink and Tuttle (1989) propose that organizational performance is a complex function of seven interrelated criteria: effectiveness, efficiency, innovation, productivity, profitability, quality, and quality of work life. Figure 3-7 depicts the seven performance criteria mapped to the expanded bottom portion of the modified Management System Model (p. 35).

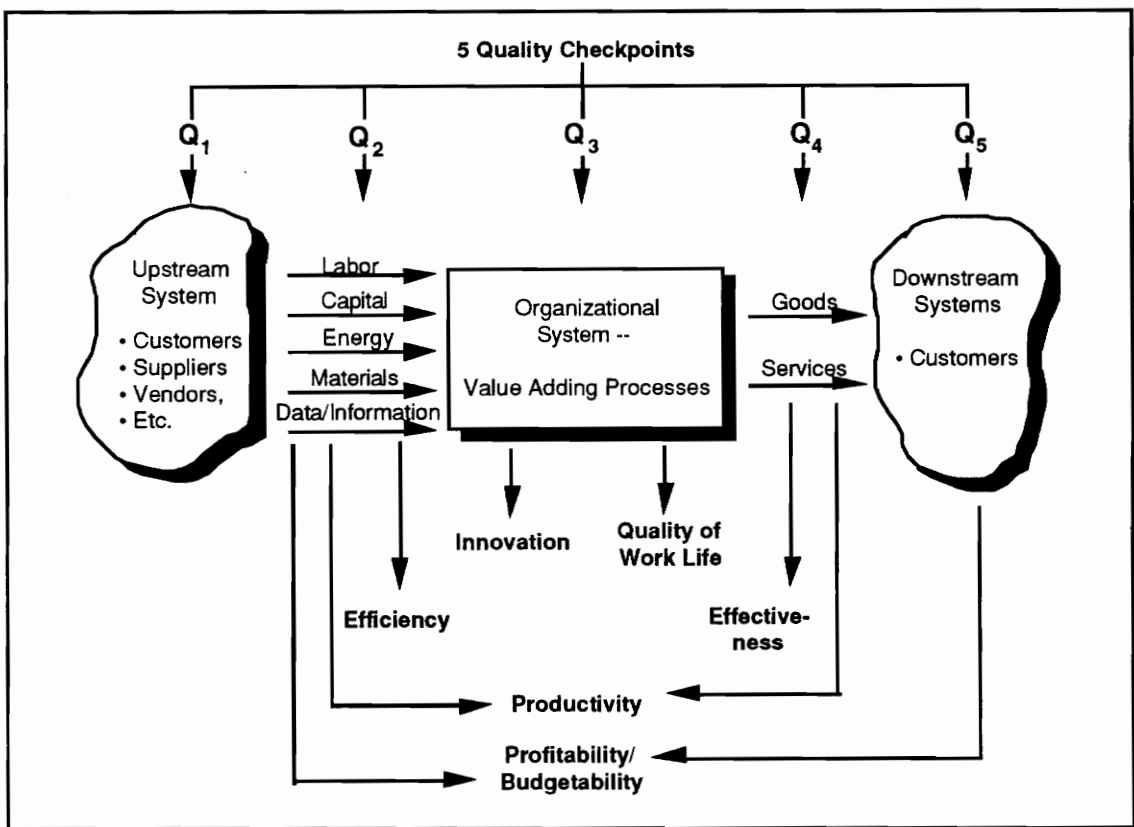


Figure 3-7: The Management System Model and 7 Performance Criteria (adapted from Kurstedt, 1992 and Sink and Tuttle, 1989)

To organize the performance perception data systematically, I had clear operational definitions for each performance criteria. What follows are the operational definitions I used for each criteria, based on Sink and Tuttle, 1989.

Effectiveness focuses on the output side of the organization. It considers whether the organization is completing the “right thing“ on time, within specifications/ expectations. This criterion also addresses the timeliness and quality of the output being delivered. Effectiveness is further defined by the ratio of actual output divided by expected output.

Efficiency relates to the input side of an organization. It considers whether the organization is completing the “right” thing “right”. This criterion is further defined by the ratio of resources expected to be consumed divided by the resources actually consumed.

Quality is delighting the end-user. Total quality is managed at five points:

Q1: the selection and management of upstream systems (i.e., suppliers, vendors)

Q2: incoming quality assurance

Q3: in-process quality management and assurance

Q4: outgoing quality assurance

Q5: proactive assurance that the organizational system is meeting or exceeding customers’ needs, specifications, requirements, wants, desires, and expectations

Innovation is continuously improving. It is the reactive, proactive, creative, and successful response to changes (perceived or otherwise) in the internal and external environments of an organizational system.

Productivity is doing more with less. It is the relationship between what comes out of the organizational system and what is consumed to create those outputs. It is a set of ratios and indexes comparing output to input.

Profitability/budgetability is generating surplus/using the right amount of resources. It is a set of measures of the relationship between revenues and costs.

Quality of Work Life (OWL) is creating a great place to work. It is “the affective response or reaction of the people in the organizational system to any number of factors, such as pay, working conditions, culture, leadership, coworker relations, feedback, autonomy, skill variety, task identity, task significance, the boss, amount of involvement in planning, problem solving, and decision” (Sink and Tuttle, 1989, p. 182).

In regards to the performance data for Chatham and Sudbury (data set #5), all NG warehouses are currently in various stages of implementing a Visual Management System (chartbooks and visible boards). Each warehouse's measurement master is in the process of taking existing data, some of which comes from PEP Reports, and organizing them into the measures the chartbook uses to track warehouse performance. The older measurement tool, PEP Reports, were organized according to five areas of responsibility. These areas include:

Productivity

- Direct Labor Dollars Per Ton

Service Level

- On-Time Arrivals
- Scratches & Shorts
- % of Fleet Operational
- % of Preventative Maintenances Performed

Quality of Work Life

- Safety
- Sanitation
- Environmental management

Cost Control

- Expenses (Other Wages & Fringe, Variable, and Fixed expenses)
- Expense Forecasting

- Damages

Development

- Training
- Innovations
- Communications/Tripmaster

In comparing shifts in performance among all three warehouses, four common key measures were available to me. "Common" measures means that data existed in the same unit of measurement and over the same time period for both Peterborough, Chatham, and Sudbury. Data for three of these common measures were organized according to chartbook categories. Performance quantitative data was available in version 1.0 of the chartbooks for Chatham and Sudbury. These three common measures were:

- Total warehouse cost per ton (profitability indicator)
- Percent on-time arrival at customer by period (effectiveness indicator)
- Grocery shorts per 1000 cases shipped by period (quality indicator)

The fourth common key measure available to me came from the NG Distribution Warehouse Survey. This survey was administered to all warehouses and asked questions on quality of work life issues. Although the NG Distribution Warehouse Survey had fifty two questions, 1991 to 1993 data was available for Chatham, Peterborough, and Sudbury for only fourteen of the questions. Five of the fourteen questions related to quality of work life (QWL) issues. Organized QWL responses to these five questions from Peterborough, Chatham, and Sudbury employees made up the fourth common key performance measure. It is important to point out that the 1991 and 1992 Survey were administered and collected in January of the following year. However, the 1993 Survey was not administered and collected until June 1994. So, the 1993 Survey is biased with 1994 experiences.

Finally, the sixth set of data concerns expert opinions on what interventions to do/not do if faced with another GSS application. First I organized the data by front. Then within each front, I created a listing of the lessons learned for each frontal intervention singled out by the experts.

3.5.2 Data Portrayal Process

The first step in taking data to information is comparison to a reference point (organization). The second step is portrayal. The following chart shows my collected, organized data and the way they were portrayed.

Table 3-2: Organized Data and Portrayal

ORGANIZED DATA	PORTRAYAL
<ul style="list-style-type: none"> • Historical interventions by front 	<ul style="list-style-type: none"> • Gantt charts for each front • One-two page summary of what happened per front • Contact & Source listing for more information per front
<ul style="list-style-type: none"> • Peterborough performance quantitative data by chartbook category 	<ul style="list-style-type: none"> • Control charts for each measure
<ul style="list-style-type: none"> • Peterborough performance qualitative data organized by performance criteria 	<ul style="list-style-type: none"> • Affinity Diagram for each month
<ul style="list-style-type: none"> • Chatham & Sudbury warehouses performance data by chartbook category and QWL criteria 	<ul style="list-style-type: none"> • 3 common key performance measure control charts • Bar graphs of QWL common key performance measure
<ul style="list-style-type: none"> • Expert advice (lessons learned) on interventions to do the same or differently for increased performance improvement by front 	<ul style="list-style-type: none"> • Listing of the lessons learned for each frontal intervention singled out by the experts

3.5.3 Data Analysis Process

Analysis of data does not necessarily come after organization and portrayal. Throughout my data collection, organization, and portrayal, I was analyzing data. I also analyzed the portrayed data to yield additional information in an effort to answer my research questions.

In this section I present my data analysis process. Chapter 4 contains the information from my analysis process.

In regards to what happened during GSS implementation, analysis of historical interventions was done during collection, organization, and portrayal. Summarizing what happened in each front was also part of analysis. I uncovered the following information: 1) what happened at Peterborough, 2) who to contact for details on what happened, and 3) where to look for additional information. Documenting what happened was necessary in order to answer my other two research questions (was the project effective, what advice do the experts have for other GSS applications). The documentation of interventions was important so that, in theory, other warehouses can implement a GSS by following what was done at Peterborough.

In regards to project effectiveness, analysis was done on several sets of data. The first set of performance data were the Peterborough control charts presented in the chartbook. I used control charts as my method for portrayal of quantitative data. On each control chart, I marked interventions that the PLT felt had an impact on that measure. Time Series analysis of control charts on Peterborough measures led to information about performance behavior between approximately week 32 1993 and January 1995. Wheeler (1993) points out that control chart analysis has advantages over simple comparisons of data to specifications, goals, or targets. These simple comparisons encourage a binary view of the world. They do not allow separation of potential signals (that something significant has happened to change the process) from probable noise (natural variation of the process). Comparisons of data to specifications, goals, and targets ignores natural variation and treats every fluctuation as a signal.

Control charts provide a better approach to the analysis of data. They overcome the shortcomings of the other approaches by explicitly considering the effects of variation upon the data (Wheeler, 1993). The control chart shifts the emphasis away from results and towards the behavior of the system which produced the results. The behavior of the system is referred to as the "voice of the process." Control charts are used to monitor a process to see whether it is in statistical control. The upper and lower control limits indicate how much variation is typical for the process. "Control charts help to distinguish between variation inherent in a process (variation from a "common cause") and variation arising from sources that come and go unpredictably ("special causes")" (Scholtes, 1988, p. 33). Data points that stay within the control limits indicate that most variation is coming from common causes (e.g., design, choice of machine, preventive maintenance). Points that fall outside the limits or into particular patterns (in either the X-Chart or Moving Range Chart) signal the presence of a special cause of variation (e.g., people errors, unplanned events, freak occurrences), that is not part of the way the process normally operates (Brassard, 1985). Signals indicate that the process is different, and the cause deserves investigation. "Detrimental assignable causes need to be eliminated. Beneficial ones need to be made part of the process" (Wheeler, 1993, p. 119).

Another piece of information I had with regards to project effectiveness was a precise statement of project goals to compare with the final project results. Comparison of the performance results to the goal statement yielded information on whether or not the goals were reached at the end of the eighteen months, i.e. whether the PDSOF project was effective.

The third set of data analyzed in regards to judging project effectiveness were the perceptions of performance - qualitative data from the chartbook and DDT/SC

questionnaires. Analysis of these data was done through creation and interpretation of Affinity diagrams. An Affinity diagram is a tool that "gathers large amounts of language data (ideas, opinions, issues, etc.), organizes it into groupings based on the natural relationship between each item, and defines groups of items" (Brassard, 1989, p. 17). Interpretation/analysis of Affinity diagrams included identification of trends in and across the diagrams. Comparison of this performance qualitative information to the goal statement yielded information on whether or not the project goals were reached.

In regards to whether GSS implementation *caused* the change in Peterborough performance, I analyzed occurrences of shifts in performance among the three warehouses for four key performance measures. Comparing occurrences of shifts in performance of a warehouse doing GSS implementation (my experimental group) against shifts in performance of two who were not (my control group), gave me some useful information in support of a causal relationship. I did not compare *actual performance* results across the three warehouses. I did compare *occurrences of shifts* (jumps) in performance. If implementing the GSS framework in Peterborough was the cause of shifts in performance, then one would expect not to see a shift in performance, at the same time period, for the other two warehouses who did not implement GSS.

To analyze shifts in performance among the three warehouses, I compared occurrences of shifts detected in their control charts for each of the three common chartbook performance measures. On the Peterborough control chart where the shifts occurred, I marked GSS interventions that either myself or the Peterborough Leadership Team (PLT) felt could have caused the shift in performance for that measure. Further analysis of this data set included conducting a t-test for significance. If Peterborough's difference in performance level (from beginning of the PDSOF project till the end) was statistically significant, while

Chatham and Sudbury's was not, I could support a cause and effect relationship between GSS implementation and Peterborough performance results achieved. To analyze shifts in performance for the quality of work life indicator (the fourth common key measure of performance), I compared the jumps in 1991 to 1993 ratings detected in the bar graphs for each warehouse.

The final set of data were the lessons learned through the PDSOF project. Analysis of this data was done throughout collection, organization and portrayal.

Table 3-3 summarizes the data collection, portrayal and analysis processes. The first and second columns are repeated from Table 3-2. The third column shows the analysis techniques I used, leading to information which is portrayed in the fourth column. With this data and information, I was able to answer my three research questions.

3.6 Conclusions (Chapter 5)

The purpose of the conclusions chapter (Chapter 5) is to convert information gained from the research into conclusions, i.e. answers to the research questions. I interpreted the information gained from my analysis and drew conclusions from:

- 1) the data and information from my study (Chapter 4)
- 2) the information from my body of knowledge review (Chapter 2)

After presenting conclusions made with facts, data, and information, I then presented conclusions based on my experience as a researcher.

Table 3-3: Summary of Organization, Portrayal, Analysis, Information, & Relevant Research Question

ORGANIZED DATA	PORTRAYAL	ANALYSIS	INFORMATION	TO ANSWER RESEARCH QUESTION
<ul style="list-style-type: none"> Historical interventions by front 	<ul style="list-style-type: none"> Gantt charts for each front One-two page summary of what happened per front Contact & Source listing for more information per front 	<ul style="list-style-type: none"> Done during collection, organization, and portrayal Summary of what happened per front 	<ul style="list-style-type: none"> What happened at Peterborough Who to contact for details on what happened Where to look for additional information on a front 	<p>1</p> <p>How has NG applied the GSS framework to improve the performance of their Peterborough warehouse?</p>
<ul style="list-style-type: none"> Peterborough performance quantitative data by chartbook category 	<ul style="list-style-type: none"> Control charts for each measure 	<ul style="list-style-type: none"> Time Series Analysis of control charts Comparison of performance results and project goals 	<ul style="list-style-type: none"> Peterborough warehouse performance Whether reached project goals or not 	<p>2a</p> <p>Was the PDSOF project effective?</p>
<ul style="list-style-type: none"> Peterborough performance qualitative data organized by performance criteria 	<ul style="list-style-type: none"> Affinity Diagram for each month 	<ul style="list-style-type: none"> Done during collection, organization, and portrayal Identification of trends in and between monthly Affinity diagrams Comparison of performance results and project goals 	<ul style="list-style-type: none"> Perceived warehouse performance Method/tools used to form perceptions Whether reached project goals or not 	<p>2a</p> <p>Was the PDSOF project effective?</p>
<ul style="list-style-type: none"> Chatham & Sudbury warehouse performance data by chartbook category and QWL criteria 	<ul style="list-style-type: none"> 3 common key performance measure control charts Bar graphs of QWL common key performance measure 	<ul style="list-style-type: none"> Time series analysis of 4 common key performance measures Comparing occurrences of shifts in performance among the 3 warehouses for the 4 common key performance measures T-test for significance (Peterborough, Chatham, & Sudbury) 	<ul style="list-style-type: none"> Chatham & Sudbury warehouse performance Differences/ Similarities between the 3 warehouses Support for/against a causal relationship between GSS implementation at Peterborough and the performance results obtained 	<p>2b</p> <p>Was the GSS framework effective in the PDSOF project?</p>
<ul style="list-style-type: none"> Expert advice (lessons learned) on interventions to do the same or differently for increased performance improvement by front 	<ul style="list-style-type: none"> Listing of the lessons learned for each frontal intervention singled out by the experts 	<ul style="list-style-type: none"> Done during collection, organization, and portrayal 	<ul style="list-style-type: none"> Suggestions on what to do/not do when implementing a GSS framework. 	<p>3</p> <p>What advice would the project participants give to others implementing a GSS, that they believe would lead to greater performance improvements?</p>

3.7 Quality of My Research Design

Yin (1989) states that four tests are relevant in evaluating the quality of any research study: construct validity, internal validity, external validity, and reliability. Various tactics are available to deal with these tests, and these tactics are used during different phases of the research process¹. Table 3-4 outlines these tests, the various tactics available to deal with these tests, and the phase of the research process in which these tactics are used.

In regards to construct validity, the first tactic is the use of triangulation-- cross-checking data derived from different sources. The sources I used, as mentioned previously, are archival (documents) and survey (interviews, questionnaires, and observations) data. I sampled more than one person while collecting survey data. The second tactic to address construct validity is to establish and maintain a chain of evidence - explicit links between the questions asked, the data collected, and the conclusions drawn. I have set up my methodology this way. The logical chain of evidence from questions to conclusions was depicted in Table 3-3. The third tactic for construct validity is to have key case informants review draft(s) of the case study report. My "case study report" is my thesis. I reviewed the essential facts and evidence presented in Chapter 4 with certain experts to enhance accuracy. For example, I had certain experts review my gantt charts of what interventions happened historically throughout the PDSOF project. I also reviewed warehouse performance results with measurement masters to make sure I correctly interpreted the data. The likelihood of falsely reporting an event has been reduced. These reviews enhanced the accuracy of the study and hence, increased its construct validity.

¹ The idea for this section came from Eileen Van Aken's dissertation (1991).

Table 3-4: Case Study Tactic for Four Design Tests (taken from Van Aken, 1990 adaptation of Yin, 1989)

Tests	Definitions	Case Study Tactic	Phase of Research in Which Tactic Occurs
Construct validity	establishing correct operational measures for the concepts being studied	use multiple sources of evidence establish chain of evidence have key informants review draft case study report	data collection data collection composition
Internal validity (for explanatory or causal studies, not for descriptive or exploratory studies)	establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships	do pattern matching do explanation-building do time-series analysis	data analysis data analysis data analysis
External validity	establishing the domain to which a study's findings can be generalized	use replication logic in multiple-case studies	research design
Reliability	demonstrating that the operations of a study -- such as the data collection procedures - can be repeated, with the same results	use case study protocol develop case study data base	data collection data collection

Internal validity is relevant for explanatory or causal studies, not for descriptive or exploratory studies. When I posed the question -- "Was the GSS framework effective in the PDSOF project?" -- I was looking for a cause and effect relationship between the GSS framework and the events and results at Peterborough. This however, was not the main focus of my research. To lend support for a causal relationship, I studied two NG warehouses similar to Peterborough over a similar period of time. The comparison

between a warehouse doing GSS implementation against two who were not, gave me some useful data in support of a causal relationship. By choosing two NG warehouses, as opposed to two warehouses of a competitor, I reduced the pool of factors that might be responsible for Peterborough's performance results other than GSS implementation. By choosing two NG warehouses similar to Peterborough in a number of aspects, I again reduced the pool of factors that might be responsible for Peterborough's performance results other than GSS implementation.

In regards to external validity, the desired results of doing applied summative evaluation research is producing judgments and generalizations about effective types of interventions and the conditions under which those efforts are effective. The desired level of generalization is to all interventions with similar goals. I first generalized (based on Peterborough's success with the GSS framework) that other NG warehouses with goals similar to Peterborough's can gain positive performance results by applying the GSS framework. I then generalized even further to any NG business unit, United States warehouse, or other organization. To assist in transferability of results, I documented similarities and differences in operating a food distribution warehouse in Canada versus the United States.

Yin (1989) states that emergent theory must be tested through replication of the findings in a second or third case study. Perhaps after several replications and studies of GSS implementation are made, the framework can be generalized as a method for large scale organizational change no matter what the business or situation.

As a case study or field study, my research occurred in the "real world" as opposed to a laboratory experiment. This also increased the external validity and generalizability of my results.

The goal of reliability is to minimize the errors and biases in a study. One way to do this is to make as many steps as possible operational. I operationalized my research process down to the last detail in Table 3-3. I also identified possible biases in order to make myself more conscious of them. If another researcher can repeat the procedures and arrive at the same results, then the research is reliable. I extensively documented my research process from data collection to conclusions. The more explicit, the more reliable my research.

3.8 Recommendations (Chapter 6)

The purpose of my recommendations chapter (Chapter 6) was to convert the information I've gained from my research into decisions and actions. I presented decisions and actions for several audiences: Peterborough, other NG warehouses, NG, and other organizations.

3.9 Review of Thesis (Chapter 7)

In Chapter 7, I presented my next steps as a researcher. I also evaluated my research by examining the degree to which I accomplished the measures of success outlined in Chapter 1. As mentioned previously, I see my thesis/research as the first of several studies on the NG GSS effort. I listed areas I believe further research should be conducted. Finally, I shared lessons that I had learned in working through the research process. This information would be valuable to future students undertaking a thesis or dissertation.

3.10 Thesis Project Plan

In order to complete my research by May '95, I needed a comprehensive plan/strategy. A gantt chart of my research methodology and key milestones (after my proposal defense) is depicted in Appendix B.

CHAPTER 4 - RESULTS

4.1 Description of the Results Section

Carrying out the data collection methodology generated a wealth of data for comprehensive analysis. Information was extracted from archival and survey data through organization, portrayal and analysis. This information was then used to answer my research questions. In Chapter 4 of this thesis, I present data that were collected during the study in an organized format (some of the actual data can be found in Appendixes). The chapter also contains portrayals of the data, along with findings (information) from my analysis.

Data and information in this chapter are presented according to the research question they help to answer. I needed the following data to meet my objectives and answer my research questions.

- 1) Interventions that took place with respect to the PDSOF project
- 2) Goals of the PDSOF project
- 3) Peterborough performance quantitative data
- 4) Peterborough performance qualitative data
- 5) Performance data on Chatham and Sudbury
- 6) Expert advice on interventions to do the same or differently for increased performance improvements

4.2 Data to Information on Front Interventions- Research Question 1

Research Question 1: How has NG applied the GSS framework to improve the performance of their Peterborough warehouse?

The GSS interventions were collected and organized by front. As stated in Chapter 3, I needed clear operational definitions for each GSS front so that I could organize the data accordingly. The operational definitions used were:

- planning--the planning system, includes strategic, performance improvement, business, marketing, operations planning, daily planning--the whole spectrum of planning, and most importantly includes the entire planning cycle, in other words, includes implementation and evaluation (e.g. PDSA).
- infrastructure--how the organization is structured to do its business reflected in the organizational chart, position descriptions, functional and perhaps cross-functional responsibilities, but also, more importantly, how the organization is structured/organized to improve performance. Establishing "shadow organizations", collateral structure, alternate structures to improve performance and address cross-functional issues and problems.
- education, training and development--the system by which all individuals in the organization are improving personally and professionally. Extends far beyond the traditional domain of training departments, concentrates on an understanding of system-wide knowledge and skills for doing the job and for improving performance. The system of sharing knowledge and skills.
- culture--the culture management system, how leaders and managers consciously attempt to ensure that "the pattern of basic assumptions-invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration-that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" is supportive of continuous improvement. (Schein, 1985)
- motivation--the system of inducements, recognition, rewards that are created by the organization to ensure that willingness to cooperate is maintained and to ensure that everyone is doing their very best in a system that ensures that this will mean organizational success.
- communication--the system of sharing information such that coordination, understanding, cooperation exists.
- measurement-- the system for sharing information regarding multiple levels of performance (individual, group, organizational).
- technology--the system for managing "how we accomplish things". Technology is broadly defined as a way of getting something done. So, this front includes methods, procedures, protocol, hardware and software, tools, etc. It includes understanding when to re-engineer versus when to continuously improve or tune.
- political--the informal and formal aspects of performance management. This front includes boundary spanning, internal communication, opportunity sensing and

capturing, working with various bases of power, paying attention to stakeholders, working with pivotal people in positions of power to ensure they are on-board, etc.

Many of the PDSOF interventions fall under more than one specific front. I used my judgment in deciding what front to record the intervention under. Sometimes the intervention is repeated under several fronts. The following are one to two page summaries of what happened in each PDSOF project front from August 1992 to January 1995. The summaries also include a listing of sources (documents and people) for additional information on the front. These summaries of front interventions were taken from comprehensive Gantt charts I created in order to show what interventions happened along a certain front, when they occurred, and how long they lasted. The actual Gantt charts are found in Appendix C. The gantt chart for a front is broken into three sections relating to the three phases of the PDSOF project. Phase I of the project was referred to as "Posturing for Action" and ran from August 1992 to January 1, 1993. Phase II, "Implementation & Deployment," was from January 1, 1993 to June 4, 1994. I termed the period of performance after the "official" ending date of the PDSOF project as Phase III "Beyond the 18 Months" (June 4, 1994 to January 1995).

4.2.1 The Planning Front

The planning front kicked off on August 25, 1992 with a situation appraisal and initial design session held in Blacksburg, VA with a team of NG and VQPC managers. The VQPC's proposal was submitted and approved by September 1992. In December, the DDT attended an intensive education and planning session, called a DDT bootcamp, where they produced version 2.0 of the project plan. Throughout the project, the Design and Development Team (DDT) focused on planning at a strategic level, coordinating

activities among all the fronts. The PDSOF project plan integrated the sub-plans for each of the fronts into one comprehensive plan.

Another DDT bootcamp was held in January 1993, focusing on more training and design of the project plan. Specific plans for the technology front were designed in February. Over the next three months, the DDT enhanced the project plan. Twice during that time period, a panel of internal and external distribution/organizational change experts critically evaluated the project plan created by the DDT. This panel was termed a "red team" and its purpose was to stimulate thinking and improve the project plan. In October 1993, the VQPC and NG team conducted a Mid-Term design session to reflect on what happened in the project so far and assess the project's current status. The Peterborough Leadership Team (PLT) held a planning design session focusing on specific major improvement interventions. These PLT tactical planning sessions were held every half year even after the project's official ending date.

In February 1994, a planning session was held discussing an expansion strategy of the DSOTF project into other warehouses. Based on the PLT's assessment of Peterborough's ability to handle 30% more volume, three new stores were added as customers in late March 1994. The PLT went through a planning recycle in May, where they focused on Peterborough in 1995. Several bootcamps were held from August through December 1994. These bootcamps focused mainly on rejuvenating the PLT and their plans.

The Change Agent Support Team (CAST) assessed the stagnation of the PDSOF effort and presented their findings to the PLT in January 1995. Stephen Hacker of the VQPC also addressed the PDSOF situation with the PLT in January.

More information on this front can be found in:

- VQPC monthly reports
- Bootcamp Reports of Output
- Planning Session Reports of Output
- The PDSOF project plan (and various updates)
- The National Grocers Performance Improvement Handbook
- DDT, PLT, SC meeting notes
- VQPC project team meeting notes
- Report of Output for Design Sessions
- VQPC Proposal for the DSOTF project
- Sink, D. S. and Poirier, D.F, (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement"

More information on this front can be given by:

- Dave Dexter (NG-Peterborough)
- Tim Ludwig (VQPC)
- Barry Doggart (NG-Monogram)
- Dave Poirier (NG-Monogram)
- D. Scott Sink (VQPC)
- Altyn Clark (VQPC)
- Kevin Whibbs (NG-Erin Mills)
- Stephen Hacker (VQPC)
- Tim Ludwig (VQPC)

4.2.2 The Infrastructure Front

Infrastructure interventions involved developing and adapting both individual and team roles in order to distribute decision making and project management responsibilities across the NG system. The first teams formed and chartered were the Design and Development Team (DDT) and the Steering Committee (SC). The DDT was a ten member, cross function team. Their role was to strategically design, plan, manage, and implement the overall GSS effort. They were the "chief architects and engineers" of the project plan. The SC was composed of twenty two NG leaders who had formal organizational power. This group was formed to establish policy, provide sponsorship, be active and visible, eliminate roadblocks, and lead the change effort. Toward the end of 1992, the Peterborough Leadership Team (PLT) and various Task Forces were chartered. The PLT was composed of approximately 15 managers and Peterborough employees. The team was responsible for tactical planning, implementation, Performance Action Team (PAT) leadership, and progress analysis of the improvement effort. Task Forces were teams of specialists working on a specific GSS front. These teams of specialists worked with the DDT to ensure that strategies for their front were well planned, systematic, and coordinated.

Performance Actions Teams (PATs) started to be formed January 1993 to work on performance improvement projects in specific areas. PATs were in charge of planning their intervention, carrying out the plan, studying the results, and reacting accordingly. Shift teams were formed, with representatives appointed. These representatives were a communication mechanism between the shifts, sharing shift information on warehouse performance and problems encountered. In November 1993, twenty part-timers were put on call. Supervisors were trained on how to make effective and efficient manpower decisions based on the Visible Management System (VMS).

In March of 1994, the Change Agent Support Team (CAST) was formed, having a representative member from each NG warehouse. This group helped manage the expansion of DSOTF into other warehouses. In January 1995, this group presented, to the PLT, their assessment of Peterborough's apparent stagnation of improvement and made suggestions to move the PDSOF effort forward.

More information on this front can be found in:

- The PDSOF project plan
- The National Grocers Performance Improvement Handbook
- VQPC monthly reports
- Infrastructure team meeting notes
- Sink, D. S. and Poirier, D. F, (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement"

More information on this front can be given by:

- D. Scott Sink (VQPC)
- Dave Dexter (NG-Peterborough)
- Tim Ludwig (VQPC)
- Barry Doggart (NG-Monogram)
- Mike Sullivan (NG-Peterborough)
- Kevin Rottenburg (NG-Peterborough)
- Blair Wraight (NG-Peterborough)
- Rod Black (NG-Peterborough)

4.2.3 The Measurement Front

The measurement front effort was aimed at gaining visibility of what was happening in the warehouse, stabilizing performance in key areas, then systematically improving against key performance indicators. The effort started with the 30% performance improvement target being set by management in September 1992. Key distribution processes were identified and mapped in the beginning of 1993. Version 1.0 of macro (the entire NG distribution system) and micro (Peterborough-specific) key performance indicators to measure were established in February 1993. The finalized and adopted key performance indicator (KPI) breakdown structure, which assesses performance over time at employee, team, warehouse, and distribution system level, was not finalized until September 1993. The KPI's are measures of effectiveness, efficiency, productivity, quality, quality of work life, and profitability.

The Visual Management System (VMS) was put in place in May 1993. The VMS consisted of three primary parts: a monthly chartbook, a weekly chartbook, and functional area Visible Management Boards throughout the warehouse. The purpose of the VMS was to show the linkages between day to day employee activities and system performance; to inform employees of warehouse performance so that they can make decisions and take actions. The Visible Management Boards, located in the visibility room within the warehouse, were used by employees throughout their shift to record performance data. A summary visibility board was posted by the warehouses' front offices. Each week, data and information from the daily visibility boards were converted into individual (X-Chart) and moving range control charts for posting in the warehouse and entry into a KPI chartbook (Clark, 1995). Each month, a monthly chartbook was created to share the status of improvement initiatives and their result on total Distribution Center performance (Clark, 1995). The monthly chartbook was a compilation of the key

performance indicator charts on the Visible Management Boards and other system level charts which depict the overall performance of the Peterborough branch. The chartbook is primarily a problem identification and problem solving tool for the PLT; secondarily it is an information sharing tool for audiences outside Peterborough.

The PLT started interpreting the quantitative charts in the monthly performance chartbooks in January 1994. Creation and interpretation of the chartbooks by the PLT led to decisions and actions to solve a problem or to improve performance. They continued to receive training on chartbook interpretation and statistical thinking. The PLT started to interpret the chartbook qualitative questionnaire data on employee perceptions of performance in August 1994.

Start up Measurement Task Forces from NG corporate functions visited Peterborough to learn about the VMS in June and July 1994. In December 1994, the performance targets for the Distribution System in 1995 were reviewed.

More information on this front can be found in:

- The PDSOF project plan
- Peterborough Monthly Chartbooks
- The National Grocers Performance Improvement Handbook
- Measurement task force meeting notes
- VQPC monthly reports
- Sink, D. S. and Poirier, D. F, (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement"
- Clark, A., (1995), "Visible Measurement Systems Improve Performance," ASQC 49th Annual Quality Congress Proceedings.

More information on this front can be given by:

- D. Scott Sink (VQPC)
- Altyn Clark (VQPC)
- Dave Dexter (NG-Peterborough)
- Tim Ludwig (VQPC)
- Barry Doggart (NG-Monogram)
- Mike Sullivan (NG-Peterborough)
- Kevin Whibbs (NG-Erin Mills)
- Rob Hilliard (NG-Peterborough)
- Michael Groves (VQPC)

4.2.4 The Communication Front

The PDSOF project had a systematic method of sharing information for coordination, understanding, and cooperation. Phase 1 of this front consisted of briefings and communications to upper management and union representatives about the upcoming PDSOF initiative. The first all-hands meeting was December 1992. In all-hands meetings, all members of the warehouse met to share information about warehouse performance and project status. These meetings were also used to energize and sustain the effort, achieve buy-in and create a common understanding of direction.

Shift meetings began at Peterborough in January 1993. In these meetings, the representative from the finished shift would share information on warehouse performance and problems encountered with the upcoming shift representative. Letters introducing the PDSOF project were sent to customers, vendors and NG Vice Presidents in January. In October 1993, the warehouse employees took control of running the all-hands meetings instead of the Distribution Manager. Weekly shift meetings were started in

November 1993, facilitated by the Distribution Manager. The weekly shift meetings helped employees to understand and have better knowledge of the key performance indicators and how individual performance affected these indicators. During weekly shift meetings, warehouse performance over the past week was reviewed, general business information was shared, and a project update was given.

In February 1994, the PLT hosted a PDSOF project update and Peterborough warehouse tour for the Distribution Managers and Supervisors from other NG warehouses. In May, an empowerment video was created showing clips of Peterborough employees discussing how empowerment was working in the warehouse. In October, the Peterborough Distribution Manager discussed Peterborough data in the 1993 NG Distribution Warehouse Survey. Top NG and George Weston Ltd. leaders visited Peterborough through the end of 1994.

More information on this front can be found in:

- The PDSOF project plan
- The National Grocers Performance Improvement Handbook
- VQPC monthly reports and "one pagers"
- Sink, D. S. and Poirier, D. F, (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement"

More information on this front can be given by:

- Dave Dexter (NG-Peterborough)
- Tim Ludwig (VQPC)
- Barry Doggart (NG-Monogram)
- Mike Sullivan (NG-Peterborough)

- Altyn Clark (VQPC)
- Steve Townes (NG-Peterborough)
- Blair Wraight (NG-Peterborough)

4.2.5 The Education, Training and Development Front

Education, Training and Development (ET&D) initiatives were done for multiple infrastructure teams and individuals. In Phase 1, the ET&D focus was on the DDT. They were trained in: systems thinking, continuous improvement, the role of change masters, measurement, decision making, personal & professional plans of study, business process reengineering, quality tools, and motivation theory. The SC and PLT also received some basic training during this phase. Bootcamp I, an intensive day of training, occurred in December 1992. A follow-up bootcamp occurred in January 1993.

The DDT and PLT received training on team building in January 1993. Also, a library was established in Peterborough for employees during this month. A benchmarking trip was taken by a group of Peterborough employees to Sears in February 1993. Another benchmarking trip was taken in April to Corning to learn about their self-managing teams. Also in April (both '93 and '94), Peterborough employees attended the Virginia Senate Productivity and Quality Award Conference to learn what organizations in Virginia were doing with respect to quality and continuous improvement. From July to October 1993, the PLT attended training offered by the NG School of Management on meeting management, quality tools, problem analysis, decision making, consensus building, and motivation. Toward the end of 1993, VQPC trained Peterborough employees in measurement theory and data interpretation.

In February 1994, the PLT received more training on measurement and chartbook/VMS improvement. In May, all the Distribution Managers attended an intensive training session referred to as NGU II. Stephen Hacker of the VQPC taught the PLT tools of root cause analysis in January 1995.

More information on this front can be found in:

- The PDSOF project plan
- The National Grocers Performance Improvement Handbook
- VQPC monthly reports
- Sink, D. S. and Poirier, D. F, (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement"
- Bootcamp Reports of Output
- VQPC Performance Improvement Engineer (PIE) training course notebook

More information on this front can be given by:

- Dave Dexter (NG-Peterborough)
- Tim Ludwig (VQPC)
- Barry Doggart (NG-Monogram)
- Mike Sullivan (NG-Peterborough)
- Altyn Clark (VQPC)
- Stephen Hacker (VQPC)
- Cathy Bolla (NG-Monogram)
- Kevin Rottenburg
- Blair Wraight (NG-Peterborough)
- Rod Black (NG-Peterborough)

4.2.6 The Technology Front

The focus of the technology front was to provide new systems for Peterborough that would support the 30% performance improvement goal. These technological systems included policies, procedures, equipment, and warehouse operating methods. In Phase I, the DDT and PLT conducted a nominal group technique (NGT) where they identified 118 improvement strategies for the PDSOF project. Examples of strategy statements are: Customer Driven Culture; Inventory Control System; Map, Measure, and Reengineering the Peterborough Distribution System; Distributed Decision Making. They then ranked the 118 improvement strategy statements and divided them into three categories: Technologies, Enablers, and Outcomes.

Strategy statements in the Technologies category describe issues that are candidates for continuous improvement or reengineering. The Technologies strategy statements are separated into three decision types: Type I, II and III. Depending on the technology type, each is handled differently. Both Type I and II are candidates for continuous improvement. Type I technologies were those strategy statements which described issues that could be addressed immediately by a PAT without the need to confer with any other group (i.e., "just do it!"). Type II technologies were those issues that could be addressed by the PLT immediately, but required information gathering prior to implementation. Type III technologies were those strategies that required significant research and data gathering to increase knowledge and understanding of the subject area. These technologies were candidates for reengineering, i.e., total redesign of a process. Most "hard core" technological interventions like the Dallas system, cross docking, and transshipment were Type III technologies.

Enablers Strategies supported the gathering and dissemination of information, the development of technological strategies, or supported the project infrastructure. These strategies were the highest priority in terms of execution as they "enabled" the implementation of other strategies. Task forces were created to address these areas by the DDT.

Outcome strategy statements described a desired end state as a result of reaching the projects goals. The outcome statements generated by the NGT were used to develop key performance indicators for the project.

In Phase II of the technology front, the PATs and task forces were formed. A technology task force was formed in December 1992 to strategically scope out warehouse methods for improvement. Warehouse technologies identified for study were transshipment, slow moving warehouse, Dallas, re-alignment (PACMAN), and store lanes. Once the technology was investigated by the task force, PATs were chartered to tackle specific technologies. These activities continued into Phase III of the front. Brief descriptions of warehouse technologies can be found in Appendix I.

More information on this front can be found in:

- VQPC monthly reports
- The PDSOF project plan
- The National Grocers Performance Improvement Handbook
- Technology Task Forces and PATs meeting notes
- Clark, A., (1995), "Visible Measurement Systems Improve Performance," ASQC 49th Annual Quality Congress Proceedings

More information on this front can be given by:

- Dave Dexter (NG-Peterborough)
- Barry Doggart (NG-Monogram)
- D. Scott Sink (VQPC)
- Tim Ludwig (VQPC)
- Altyn Clark (VQPC)
- Kevin Whibbs (NG-Erin Mills)
- Mike Sullivan (NG-Peterborough)
- Gale Blank (NG-Monogram)
- Janice Sedal (NG-Monogram)
- Nancy Cote (NG-Monogram)

4.2.7 The Motivation Front

The Motivation Task Force was formed and trained in motivation theory in December 1992. Also in December, an all-hands meeting took place. While all-hands meetings were an effective communication intervention, they were also used to energize employees, achieve buy-in to the project, and recognize individual and team efforts.

An employee suggestion system was started in January 1993. A Peterborough employee survey was developed in March 1993 and administered in April and in October. This survey assessed employee knowledge of the PDSOF project, feelings about the project, and their needs in relation to the project. Also in April, the supervisor performance appraisal system was redesigned. Supervisor performance was appraised in five categories: self development, development of others, dedication to the PDSOF project, PAT leadership and involvement, and job performance. From January to September 1993, all Distribution Managers and Peterborough Supervisors participated in a job

analysis and redistribution exercise (a "cards exercise"). A motivation bootcamp took place in October 1993. Toward the end of 1993, issues such as development and implementation of reward systems, motivation roadblocks, and an employee feedback system were addressed by the task force with the help of a motivation employee focus group.

Toward the end of March 1994, employees were rewarded for their hard work and success with new volume for the Peterborough warehouse. Throughout the PDSOF project, recognition of employee efforts was a key to the motivational effort. Several bootcamps were held from August through October 1994 for Peterborough employees. These bootcamps focused mainly on "re-motivating" the work force and specifically the PLT.

More information on this front can be found in:

- The PDSOF project plan
- The National Grocers Performance Improvement Handbook
- VQPC monthly reports
- Motivation Bootcamp Report of Output
- Motivation Employee Focus Group meeting notes
- Supervisor Performance Appraisal Specifications
- Motivation Task Force meeting notes

More information on this front can be given by:

- Tim Ludwig (VQPC)
- Dave Dexter (NG-Peterborough)
- Barry Doggart (NG-Monogram)

- Mike Sullivan (NG-Peterborough)
- D. Scott Sink (VQPC)
- Cathy Bolla (NG-Monogram)

4.2.8 The Culture Front

The culture at the Peterborough warehouse changed through the course of the PDSOF project. In the initial stages of the project, the culture was one of concern and reservation. Employees were concerned that the PDSOF project meant losing their jobs, and/or doing more work. The communication front was key to dispelling these rumors and gaining project buy-in.

The employee empowerment process started early on in the project. The goal was to make employees feel they owned the warehouse. To do this, day to day planning and warehouse operation decisions were made at the lowest level. The Distribution Manager gave some of his responsibilities to supervisors, and supervisors in turn gave warehouse employees power over work decisions and actions. Employees took control of their work environment, made decisions and solved roadblocks. An important part of the empowerment process was the sharing of information through the VMS. Another part was the team structure, which created responsibility and involvement.

The culture of continuous improvement was reinforced by management through role modeling, teaching, and coaching. Many training opportunities were available to employees, from measurement basics to high school equivalence courses. As employees participated in the change effort through PAT activities, their understanding and appreciation of the PDSOF project increased. In fact, employees frequently conducted tours of the warehouse and gave presentations on project progress to high level

stakeholders. Employees felt a sense of ownership and were able to answer questions that normally only management had information on. They also made a video showing various employees talking about the empowerment effort and warehouse culture.

There seemed to be a shift in the culture toward the end of 1994. A dip in warehouse performance levels seemed to parallel feelings of stagnation.

More information on this front can be found in:

- VQPC monthly reports
- The National Grocers Performance Improvement Handbook
- NG Distribution Warehouse Survey, Peterborough Employee Survey
- Peterborough Monthly Chartbooks
- Sink, D. S. and Poirier, D. F, (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement"

More information on this front can be given by:

- Dave Dexter (NG-Peterborough)
- Barry Doggart (NG-Monogram)
- Dave Poirier (NG-Monogram)
- D. Scott Sink (VQPC)
- Altyn Clark (VQPC)
- Rod Black (NG-Peterborough)
- Mike Sullivan (NG-Peterborough)

4.2.9 The Political Front

Many GSS interventions impacted the political front. The following is a summary of political interventions grouped according to whom they were meant to affect.

Peterborough Union:

NG management involved in the PDSOF project had to convince the Union representing the Peterborough branch that the project would not infringe in their role as a Union.

- Informed the Union Executive about the Peterborough DSOTF project. It was NG's intent to give this group an understanding of where the company was heading into the future.
- Dave Poirier and Andy Fass communicated the PDSOF project outline to the warehouse employees. This was done to gain acceptance from the union membership. Also present at this meeting were representatives from the Ontario Government who helped fund the initiative.
- Gained acceptance amongst the union about the role of the shift representative.

Peterborough Employees:

Peterborough employees had to buy into the PDSOF project in order for it to succeed.

- At the first all-hands meeting, employees were updated on the project and ensured that no full-time jobs would be eliminated.
- At the second all-hands meeting, Mike Scarfone gave the employees an update on where NG was going with their business and how the DSOTF project fit into the company's vision.

Infrastructure Teams:

Political ramifications were recognized and addressed during the formation and operation of the various infrastructure teams.

- For the PLT, one member from transportation, clerical, and each shift had to be selected for the team.

- For the DDT, all areas of the business needed to be represented within the group.
- At the same time the DDT and PLT were carrying out interventions, the VQPC principle investigator was teaching and selling them the project.
- The Steering Committee had to be managed throughout the eighteen month period. This was to enable their acceptance of the project.
- The red team was formed so that it had the right people from within NG and outside NG.
- For the first Steering Committee (SC) update, the group was given a tour of the warehouse to see the changes that occurred since January 1993. A question and answer session was also held with the SC and Union employees of the PLT team.
- The SC meetings were an important political event. The Distribution Managers, who were members, had to be managed such that when the DSOTF was rolled-out and deployed in their Distribution Center, there would be less resistance. The bootcamps also helped to persuade the Distribution Managers that the DSOTF initiative was the right thing to do.

NG Stakeholders:

Additional stakeholders were involved in the DSOTF project. This included NG employees from other Distribution Centers and the corporate offices. It also included Peterborough customers and management from Loblaws and George Weston Ltd.

- Distribution Managers were continuously reminded to not zero in on Peterborough results (distribution typical measurements) immediately. It was reinforced that the PDSOF project process was to change culture first before improvement could be made. Getting the VMS up and running to show actual PDSOF project results was important.
- Continuous education was needed for those in other areas of the business who questioned the investment in Peterborough; stating that this investment could be better allocated to other parts of the business with a better rate of return.
- David Williams, Andy Fass, Dave Poirier and selected customers attended a DSOTF project update presentation given by the PLT.
- Leaders in the Distribution network debated whether or not GSS was the right direction for National Grocers and Distribution in particular.

- Customer focus groups were a political event in regards to Peterborough customers. Retailers were invited to meetings at the warehouse so that they would be informed on what was happening.
- Peterborough warehouse visits were conducted for employees from other warehouses so that they could see the changes being made.
- Galen Weston, Dave Williams, Andy Faas, Mike Scarfone, Kevin Ryan and other VIP visitors were invited to the Peterborough warehouse to get an update from the PLT. Mr. Weston also went on a tour to visit with the day-shift employees.

More information on this front can be found in:

- VQPC monthly reports
- Bootcamps Reports of Output
- Personal Trip Notes from VQPC personnel

More information on this front can be given by:

- Dave Poirier (NG-Monogram)
- D. Scott Sink (VQPC)
- Mike Scarfone(NG-Monogram)
- Dave Dexter (NG-Peterborough)
- Tim Ludwig (VQPC)
- Barry Doggart (NG-Monogram)

4.3 Information on Project Goals - Research Question 2a

Research Question 2a: Was the PDSOF project effective?

For this research, the PDSOF project was effective if the set goals of the project were obtained. To repeat, the set goals of the project were:

- 1) Achieve a minimum 30% performance improvement, which translates into a \$2.56 million cost reduction, or an increase in throughput of approximately 29,000 tons with no change in operating costs, or a combination of both.
- 2) Experiment with continuous improvement and reengineering simultaneously.
- 3) Sustain improvements over time. Sustain a culture/environment of continuous improvement and reengineering over time.

Goals statements two and three are self explanatory. Goal statement one, however, needs to be broken down further in order to understand where the 30% goal came from and how it was operationally defined.

The first project goal, achieve a minimum 30% performance improvement, was set by NG management by benchmarking competitors' labor costs. Table 4-1 shows roughly how the 30% figure was calculated.

What this calculation shows is that National Grocers' operating costs for a warehouse were 30% higher than their competitors' costs. Eliminating this 30% difference became the target for the PDSOF project.

The main measure (key performance indicator) that was used in determining the 30% performance improvement was total warehouse cost/shipped ton. It was felt that the balance of the Distribution system would not consider the PDSOF project successful unless significant improvement was made on this traditional productivity measure that Distribution employees know and understand. Also, this measure encompasses all

Table 4-1: The 30% Improvement Goal

<u>The National Grocers Distribution Challenge</u>	
Net NG Expenses	\$183 million
Direct Labor Portion	\$107 million
Average Hourly Rate of Pay to Hourly Employees (including fringe benefits):	
• National Grocers	\$30/hour
• Potential Competitors	\$15/hour
Percentage Difference	50%
Dollar Difference	\$53.5 million
Dollar Difference as a % of Net NG Expenses	<u>29%</u>

distribution expenses, so that the performance improvements seen in the different Peterborough functional areas would be captured against the direct dollar expense line. The Peterborough warehouse operated at an average productivity level of \$124.44/ton in 1992 (\$8,547,872 total warehouse expenses divided by 68,689 tons shipped). Therefore, a 30% improvement yields \$87.11/ton. This improvement could be achieved by a reduction in cost, an increase in volume, or a combination of the two as follows:

- Costs held constant at \$8,547,872, total volume increased to 98,127 tons (this represents a 42.9% increase in tonnage- 29,438 tons).
- Volume held constant at 68,689 tons, total cost decreased to \$5,983,499 (this represents a 30% decrease in cost-\$2,564,373).
- Any combination of cost reduction and volume increase which results in a cost per ton of \$87.11.

It was also made clear that any one of the above improvements could not be obtained at the expense of quality measures such as mispicks, shorts, damages etc. In fact, the expectation was that Peterborough would achieve the performance improvement target while simultaneously improving performance on these and other quality indicators.

4.4 Chartbook Quantitative Data to Information on Peterborough Performance- Research Question 2a and 2b

Research Question 2a: Was the PDSOF project effective?

Research Question 2b: Was the GSS framework effective in the PDSOF project?

The data and information presented in this section help to answer whether the PDSOF project was effective and whether it was GSS implementation that caused the warehouse performance results. Peterborough identified numerous measurements to cover important aspects of warehouse performance. The measurement breakdown structure for the Peterborough warehouse is portrayed in Figure 4-1. The performance measures in heavy black lined boxes are those measures currently included in the chartbook. The unshaded boxes indicate relationships among data and one of the seven performance criteria (p. 72), or specific measures that either have been identified as being desirable but are not yet measured, or measured but not currently in the chartbook.

- Unshaded boxes indicate relationships among data & performance criteria, or specific measures not currently in the chartbook.
- Black shaded boxes are those measures found in the chartbook.

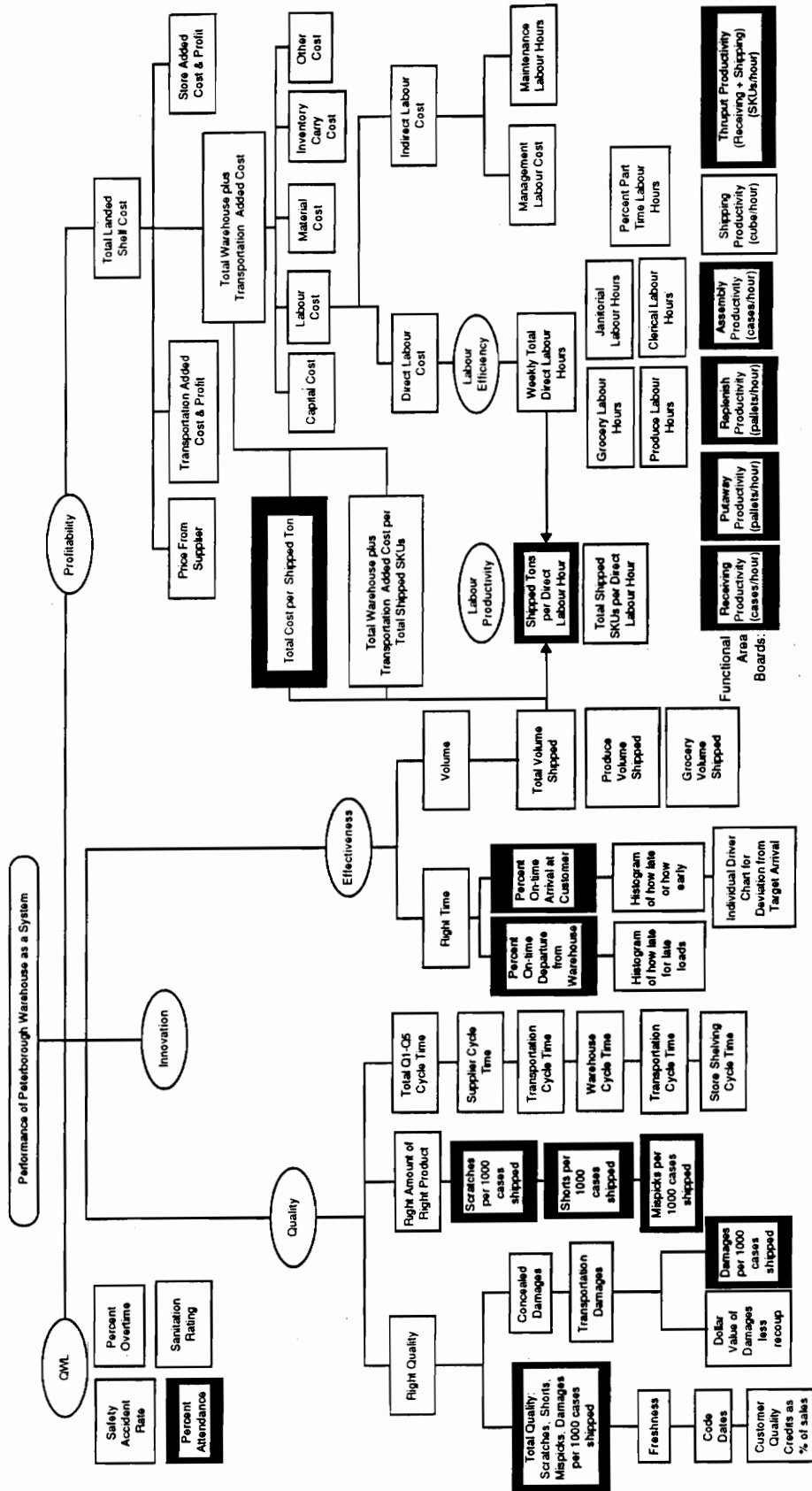


Figure 4-1: Peterborough Measurement Breakdown Structure

The operational definitions of each chartbook key performance indicator are found in Table 4-2. The charts are organized into five categories:

- Distribution System Level Charts
- Functional Area Charts
- Customer Service Charts
- Grocery Quality Charts
- Produce Quality Charts

Table 4-2: Operational Definitions of Chartbook Key Performance Indicators

Distribution System Level Charts	
Total cost per shipped ton by period *	Total Cost (Warehouse Cost + Transportation Cost) = Direct labour + Indirect labour + Fixed costs+ Variable costs **
Shipped tons per direct labour hour by week	Direct hours = receiving, putaway, assembly, replenishment, shipping, clerical, janitorial
Thruput (shipped+received) cases per direct labour hour by week	Total number of cases received + shipped/ total number direct hours for the week. Direct hours = receiving, putaway, assembly, replenishment, shipping, clerical, janitorial
Total Percent Attendance by week	Percent of employees who were scheduled and came to work

Functional Area Charts	
Grocery receiving cases per hour by week	Receiving = Physically accepting material, unloading that material from the inbound transportation mode, staging, verifying quantity and condition of the material, and documenting this information as required
Grocery putaway pallets per hour by week	Putaway = Removing the material from the receiving dock, transporting the material to a storage area, placing that material in a staging area, then to a specific location. Recording this movement, and identification of the location where the material has been placed
Grocery replenishment pallets per hour by week	Replenishment = Relocating material from a bulk storage area to an order pick storage area, and the documentation of this relocation
Grocery assembly cases per hour by week	Assembly = picking ordered items, gathering items together onto a pallet and delivering pallet to shipping lane

Customer Service Charts	
Percent on-time departures from warehouse by week	On-time departures = if order leaves warehouse 30 min. either side of the set departure schedule
Percent on-time arrival at customer by week	On-time arrival = if order arrives at the store 30 min. either side of the set delivery schedule

Grocery Quality Charts	
Grocery total quality: scratches, shorts, misspicks, and damages per 1000 cases shipped by week	All Grocery quality indicators (scratches, shorts, misspicks, and damages) combined per 1000 cases shipped by week
Grocery scratches per 1000 cases shipped by week	Store has ordered the product from the warehouse but the warehouse can't locate the item for shipping
Grocery shorts per 1000 cases shipped by week	Store doesn't receive items that the warehouse says it has shipped
Grocery misspicks per 1000 cases shipped by week	Customer orders an item, but the warehouse sends the wrong produce
Grocery damages per 1000 cases shipped by week	Occurrence of any kind of physical damage to the product

Produce Quality Charts	
Produce shorts per 1000 cases shipped by week	same as Grocery
Produce mispicks per 1000 cases shipped by week	same as Grocery
Produce damages per 1000 cases shipped by week	same as Grocery

* Period: A period is four calendar weeks, so there are 13 periods in a calendar year.

** Examples of:

Indirect labour- supervisor, maintenance

Fixed costs- depreciation, insurance, taxes, rent

Variable costs- operating supplies, phone, fuel

Time series analysis was conducted for performance data depicted in the control charts.

The following are interpretations of warehouse performance for all key performance indicators identified in the chartbook. Interpretations of warehouse performance are from the point in time data was available (usually week 36 1993), up to approximately week 10 in 1995. I also analyzed average performance level during June 4, 1994 - the PDSOF project ending data (approximately week 22 / period 5 1994). The actual Peterborough control charts can be found in Appendix D. On each control chart, I marked GSS interventions that either the PLT or myself felt had an impact on that measure. Also in Appendix D is a chart mapping PAT and other major interventions to key performance indicators (KPIs). The PLT felt that successful execution of these interventions would improve certain KPIs. The three Peterborough common key performance indicator control charts, to compare with Chatham and Sudbury's, can be found in Appendix H (using the similar measurement units and time period).

4.4.1 Distribution System Level Charts

Table 4-3 is a summary of the time series analysis of the Distribution System level control charts. Control charts allow interpretation of warehouse behavior (i.e., the voice of the process).

Table 4-3: Interpretation of Peterborough Distribution System Level Key Performance Indicators

Distribution System Level Key Performance Indicators	Warehouse Behavior (Voice of the Process)
<p>Total cost per shipped ton by period (prd)</p> <p><i>(Data available from prd1 '93 to prd2 '95)</i></p>	<ul style="list-style-type: none"> • For all of 1992, Peterborough's average productivity level was \$124.44/ton • From prd1 '93 to prd1 '94 the indicator was in statistical control averaging \$120.34/ton. • From prd1 '94 to prd4 '94 the indicator was going through a statistically significant downward trend. • From prd4 '94 through prd2 '95 the indicator was in statistical control averaging \$98.16/ton. <p>* During 6/4/94 cost/ton had decreased by 26.28 (avg during 6/4/94=\$98.16) over the initial average of \$124.44 /ton (1992). This was a 21.12% performance improvement.</p>
<p>Shipped tons per direct labour hour by week (wk)</p> <p><i>(Data available from wk1 '93 to wk42 '94)</i></p>	<ul style="list-style-type: none"> • From wk1 '93 to wk34 '93 the indicator was in statistical control averaging .52 tons/labor hour. • From wk35 '93 to wk5 '94 the indicator was going through a statistically significant upward trend. • From wk5 '94 through wk42 '94 the indicator was in statistical control averaging .71tons/labor hour. <p>* During 6/4/94 ton/direct labor hr had increased by .19 (avg during 6/4/94 = .71) over the initial average of .52 tons/labor hr (wk5 '94 to wk42). This was a 37% performance improvement.</p>
<p>Thruput (shipped+received) cases per direct labour hour by week</p> <p><i>(Data available from wk37 '93 to wk19 '95)</i></p>	<ul style="list-style-type: none"> • From wk37 '93 to wk44 '93 the indicator was in statistical control averaging 57 cases/hr. • From wk44 '93 through wk3 '94 the indicator climbed to a steady state of 69 cases/hr. • From wk4 '94 though wk12 '94 the indicator was in statistical control averaging 78 cases/hr. • From wk13 to wk20 the indicator was operating in control at 86 cases/hr. New business (increased tonnage) for Peterborough arrived during this time period. • After wk20 '94 the indicator dropped and levelled off to 82 cases/hr through wk52. • In '95 the indicator dropped again and levelled off to 86 cases/hr through wk10. <p>* During 6/4/94 cases/hr had increased by 24.46 (avg during 6/4/94 = 82.08) over the initial average of 57.63 cases/hr (wk37 '93 to wk44). This was a 42.4% performance improvement.</p>

<p>Total Percent Attendance by week</p> <p><i>(Data available from wk46 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk46 '93 to wk8 '94 the indicator was in statistical control averaging 97.22% attendance, but with great fluctuation in variation. • From wk8 '94 through wk13 '94 the indicator climbed to a steady state of 98.38%. • From wk14 '94 to the end of '94 the indicator was in statistical control averaging 97.47%, but with great fluctuation in variation until wk28. • Beyond wk52 '94 till wk 10 '95, the indicator was in statistical control averaging 96.33%. <p>* During 6/4/94 % attendance had increased by .25 percentage points (avg during 6/4/94= 97.47%) over the beginning average of 97.22% (wk46 '93 to wk8 '94). This was a .26% performance improvement.</p>
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4.4.2 Functional Area Charts

Table 4-4 is a summary of the time series analysis of the Functional Area control charts.

Table 4-4: Interpretation of Peterborough Functional Area Key Performance Indicators

Functional Area Key Performance Indicators	Warehouse Behavior (Voice of the Process)
<p>Grocery receiving cases per hour by week</p> <p><i>(Data available from wk31 '93 to wk52 '94)</i></p>	<ul style="list-style-type: none"> • From wk31 '93 through wk47 '93 the indicator was in statistical control averaging 636 cases/hour. • From wk48 '93 through wk19 '94 the indicator was in statistical control averaging 556.9 cases/hour. • From wk20 '94 through wk38 '94 the indicator was in statistical control averaging 688.9 cases/hour, but with great fluctuation in variation. • From wk38 '94 through wk52 '94 the indicator was in statistical control averaging 618.8 cases/hour. <p>* During 6/4/94 ton/direct labor hr had increased by 52.9 (avg during 6/4/94 = 688.9) over the initial average of 636 cases/hr (wk31 '93 to wk48). This was a 8.3% performance improvement.</p>

<p>Grocery putaway pallets per hour by week</p> <p><i>(Data available from wk31 '93 to wk11 '95)</i></p>	<ul style="list-style-type: none"> • From wk31 '93 to wk45 '93 the indicator was going through a statistically significant downward trend. • From wk45 '93 through wk2 '94 the indicator was in statistical control averaging 19.9plts/hr. • From wk3 '95 through wk11 '95 the indicator was in statistical control averaging 22.6 plts/hr. <p>* During 6/4/94 plts/hr had increased by 4.5 (avg during 6/4/94 = 22.6) over the initial average of 18.1 plts/hr (wk31 '93 to wk37). This was a 24.9% performance improvement.</p>
<p>Grocery replenishment pallets per hour by week</p> <p><i>(Data available from wk31 '93 to wk11 '95)</i></p>	<ul style="list-style-type: none"> • From wk31 '93 through wk44 '93 the indicator was going through a statistically significant downward trend. • From wk45 '93 through wk2 '94 the indicator was in statistical control averaging 15.5 plts/hr. • From wk3 '94 through wk46 '94 the indicator was in statistical control averaging 16 plts/hr. • From wk47 '94 through wk11 '95 the indicator was in statistical control averaging 14.79 plts/hr. <p>* During 6/4/94 plts/hr had increased by 4 (avg during 6/4/94 = 16) over the initial average of 12 plts/labor hr (wk31 '93 to wk37). This was a 33% performance improvement.</p>
<p>Grocery assembly cases per hour by week</p> <p><i>(Data available from wk31 '93 to wk11 '95)</i></p>	<ul style="list-style-type: none"> • From wk31 '93 through wk2 '94 the indicator was going through a statistically significant upward trend (avg 123-140). • From wk3 '94 through wk26 '94 the indicator went through 3 statistically significant upward shifts (avg 151-156-159). • From wk27 '94 through wk2 '95 the indicator was in statistical control averaging 171.8 cases/hr. • From wk3 '95 through wk11 '95 the indicator decreased to an average of 167.5 cases/hr. <p>* During 6/4/94 cases/hr had increased by 36 (avg during 6/4/94 = 159.4) over the initial average of 123.4 cases/hr (wk31 '93 to wk44). This was a 29.2% performance improvement.</p>

4.4.3 Customer Service Charts

Table 4-5 is a summary of the time series analysis of the Customer Service control charts.

Table 4-5: Interpretation of Peterborough Customer Service Key Performance Indicators

Customer Service Key Performance Indicators	Warehouse Behavior (Voice of the Process)
<p>Percent on-time departures from warehouse by week</p> <p><i>(Data available from wk42 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk42 '93 through wk52 the indicator was going through a statistically significant upward trend. • From wk1 '94 to wk10 the indicator was in statistical control averaging 97.92%. • From wk11 '94 through wk51 '94 the indicator was in statistical control averaging 93.51% on-time departures, but with great fluctuation in variation. • From wk52 '94 to wk10 '95 the indicator climbed to a steady state of 97.07%. <p>* During 6/4/94 % on-time departures had decreased by 1.36 percentage points (avg during 6/4/94= 93.51%) from the beginning average of 94.87% (wk42 '93 through wk43). This was a 1.4% decrease in performance.</p>
<p>Percent on-time arrival at customer by week</p> <p><i>(Data available from wk42 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk42 '93 through wk18 '94 the indicator was in statistical control averaging 97.52%. • From wk19 '94 through wk32 '94 the indicator was in statistical control averaging 91.39% on-time arrivals, but with great fluctuation in variation. • From wk33 '94 to wk10 '95 the indicator climbed to a steady state of 96.9%. <p>* During 6/4/94 % on-time arrivals had decreased by 6.13 percentage points (avg during 6/4/94= 91.39%) over the beginning average of 97.52% (wk42 '93 through wk18 '94). This was a 6.3% decrease in performance.</p>

4.4.4 Grocery Quality Charts

Table 4-6 is a summary of the time series analysis of the Grocery Quality control charts.

Table 4-6: Interpretation of Peterborough Grocery Quality Key Performance Indicators

Grocery Quality Key Performance Indicators	Warehouse Behavior (Voice of the Process)
<p>Grocery total quality: scratches, shorts, mispicks, and damages per 1000 cases shipped by week</p> <p><i>(Data available from wk36 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk36 '93 through wk42 the indicator was in statistical control averaging 10.96 cases/1000. • From wk43 '93 to wk5 '94 the indicator was going through a statistically significant downward trend. • From wk5 '94 through wk21 '94 the indicator levelled off at an average of 2.66 cases/1000. • From wk22 '94 to wk51 the indicator was in statistical control averaging 4.35 cases/1000. • From wk51 '94 to wk10 '95 the indicator was in statistical control averaging 3.45 cases/1000. <p>* During 6/4/94 total quality had decreased by 6.61 (avg during 6/4/94= 4.35) over the beginning average of 10.96 (wk36 '93 through wk42 '93). This was a 60% performance improvement.</p>
<p>Grocery scratches per 1000 cases shipped by week</p> <p><i>(Data available from wk36 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk36 '93 through wk38 the indicator was in statistical control averaging 6.386 cases/1000. • From wk39 '94 through wk48 the indicator decreased to an average of 4.08 cases/1000. • From wk49 '93 to wk12 '94 the indicator was going through a statistically significant downward trend, levelling off finally to an average of .494 cases/1000. • From wk12 '94 through wk20 '94 the indicator increased slightly to an average .642 cases/1000. • From wk21 '94 through wk4 '95 the indicator was in statistical control averaging 1.008 cases/1000 with little variation. • From wk5 '95 through the end of the data (wk10) the indicator was in statistical control averaging .56 cases/1000. <p>* During 6/4/94 scratches/1000 cases had decreased by 5.378 (avg during 6/4/94= 1.008) over the beginning average of 6.386 cases/1000 (wk36 '93 to wk38). This was a 84% improvement .</p>

<p>Grocery shorts per 1000 cases shipped by week</p> <p><i>(Data available from wk36 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk36 '93 through wk42 the indicator was in statistical control averaging 1.604 cases/1000. • From wk43 '93 through wk4 '94 the indicator decreased slightly averaging 1.497 cases/1000. • From wk5 '94 through wk28 the indicator was in statistical control averaging .909 cases/1000. • From wk29 '94 through wk41 the indicator increased again averaging 1.414 cases/1000. • From wk42 '93 through wk10 '95 the indicator was in statistical control averaging 1.070 cases/1000. • In wk 42 '93 a signal was detected by both the X Chart and the Range Chart. This signal reappeared in wk32 '94. It is probably that since nothing was done to investigate the signal and correct the problem, the problem will happen again. <p>* During 6/4/94 shorts/1000 cases had decreased by .695 (avg during 6/4/94= .909) over the beginning average of 1.604 cases/1000 (wk36 '93 to wk42). This was a 43% improvement.</p>
<p>Grocery mispicks per 1000 cases shipped by week</p> <p><i>(Data available from wk36 '93 to wk9 '95)</i></p>	<ul style="list-style-type: none"> • From wk36 '93 through wk42 the indicator was in statistical control averaging 3.57 cases/1000. • From wk42 '93 through wk50 the indicator decreased to an average of 1.7 cases/1000. • From wk51 '93 through wk21 '94 the indicator kept significantly decreasing, to level off at .543 cases/1000. • From wk22 '94 through wk9 '95 the indicator was in statistical control averaging .991 cases/1000. <p>* During 6/4/94 mispicks/1000 cases had decreased by 2.58 (avg during 6/4/94= .991) over the beginning average of 3.57 cases/1000 (wk36 '93 to wk42). This was a 72% improvement.</p>

<p>Grocery damages per 1000 cases shipped by week</p> <p><i>(Data available from wk36 '93 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk36 '93 through wk6 '94 the indicator was in statistical control averaging .982 damage/1000 cases • From wk7 '94 through wk25 '94 the indicator shifted to operate at an average of .63 damage/1000 cases. • From wk26 to wk29 the indicator increased to 1.212 due to a special cause in wk28. • From wk30 through wk38 the indicator shifted downward to an average of .825 damage/1000 cases. • From wk39 '94 through wk9 '95 the indicator shifted to operate at an average of 1.177 damage/1000 cases. • In wk 45 '93 a signal was detected by both the X Chart and the Range Chart. This signal reappeared in wk28 & 49 '94. Although each signal was investigated and its reason identified, it seems that nothing was done to correct the problem. Therefore the signals keep on reappearing. These "special causes" have now become common causes because they were not fixed. <p>* During 6/4/94 damages/1000 cases had decreased by .352 (avg during 6/4/94= .63) over the beginning average of .982 cases/1000 (wk36 '93 to wk42). This was a 36% improvement.</p>
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4.4.5 Produce Quality Charts

Table 4-7 is a summary of the time series analysis of the Produce Quality control charts.

Table 4-7: Interpretation of Peterborough Produce Quality Key Performance Indicators

Produce Quality Key Performance Indicators	Warehouse Behavior (Voice of the Process)
<p>Produce shorts per 1000 cases shipped by week</p> <p><i>(Data available from wk5 '94 to wk9 '95)</i></p>	<ul style="list-style-type: none"> • From wk5 '94 through wk10 '94 the indicator was in statistical control averaging 1.83 shorts/1000 cases. • From wk11 '94 through wk9 '95 the indicator was in statistical control averaging 1.09 shorts/1000 cases. <p>* During 6/4/94 shorts/1000 cases had decreased by .74 (avg during 6/4/94= 1.09) over the beginning average of 1.83 cases/1000 (wk5 '94 to wk10). This was a 40% improvement.</p>

<p>Produce mispicks per 1000 cases shipped by week</p> <p><i>(Data available from wk5 '94 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • From wk5 '94 through wk38 '94 the indicator was in statistical control averaging .518 mispicks/1000 cases. • From wk39 '94 through wk51 '94 the indicator shifted downwards to operate in statistical control averaging .351 mispicks/1000 cases. • From wk52 '94 through wk10 '95 the indicator was in statistical control averaging .9825 mispicks/1000 cases. • In wk 11 '94 a signal was detected by both the X Chart and the Range Chart. This signal reappeared in wk5 '95. It is probably that since nothing was done to investigate the signal and correct the problem, the problem will happen again. <p>* In 6/4/94, the process was operating in statistical control at the same average level as wk5 through wk38 '94 (.518). Therefore there was no indication of performance increase or decrease.</p>
<p>Produce damages per 1000 cases shipped by week</p> <p><i>(Data available from wk6 '94 to wk10 '95)</i></p>	<ul style="list-style-type: none"> • There were two periods in time this process was in statistical control: wk5 '94- wk25 averaging .38 damages/1000 cases and wk26 '94 -wk10 '95 averaging .11 damages/1000 cases. However, the variation throughout is significantly large. Both the X Chart and Range Chart show numerous signals. It doesn't appear that those signals were investigated or resolved. Hence, the process continues to behave erratically. <p>* In 6/4/94, the process was operating in statistical control at the same average level as wk6 through wk25 '94 (.38). Therefore there was no indication of performance increase or decrease.</p>

4.5 Qualitative Data to Information on Peterborough Performance- Research Question 2a and 2b

Research Question 2a: Was the PDSOF project effective?

Research Question 2b: Was the GSS framework effective in the PDSOF project?

4.5.1 Monthly Chartbook and DDT/SC Questionnaires

Qualitative data on Peterborough performance came from the Peterborough monthly chartbook questionnaire and the Design and Development Team/Steering Committee (DDT/SC) questionnaire. This qualitative data pertained to the experts' perceptions of performance. Qualitative data gave me insight into warehouse performance in areas not

specifically measured such as employee morale, commitment, communication, responsibility etc. The qualitative data also provided insight into what methods or tools the experts were using to form their perceptions of warehouse performance. There were nine monthly chartbook questionnaires available (12/93-6/94, 8/94, 11/94). I also collected perception of performance data from members of the Design and Development Team (DDT) and Steering Committee (SC) in February 1995 using a similar questionnaire. As mentioned in Chapter 3, I reorganized the qualitative data into two main categories:

- Perceptions of warehouse performance
- How they formed those perceptions (tools/methods they used)

Table 4-8 is a summary of my interpretations/inductive analysis of the experts' perceptions of warehouse performance based on Affinity diagrams I created for each month. The Affinity diagrams use Sink & Tuttle's seven performance criteria (1989) as major groupings. When interpreting the diagrams, I focused mainly on the quality of work life (QWL), innovation, quality, and efficiency performance indicators since the chartbook doesn't provide quantitative data on these indicators as much as it does on effectiveness, productivity, and profitability. It is important to remember that these were employee perceptions of how the warehouse was performing, not necessarily fact that could be backed by valid data. The individual Affinity diagrams for the nine monthly chartbook questionnaires and one DDT/SC questionnaire can be found in Appendix E. Shaded boxes on the Affinity diagram indicate a concern or perceived decrease in performance. The actual responses to the chartbook and DDT/SC questionnaires, that the Affinity diagrams were created from, can be found in Appendix F.

Table 4-8: Interpretation/Analysis of Experts' Perceptions of Peterborough Performance

<p align="center">When: Who</p> <p>Is the Peterborough Distribution System Getting Better?</p>	<p align="center">Perceptions of Performance (Identification of trends in and between Affinity diagrams)</p>
<p>December 17, 1993: Sample of Peterborough Employees (13)</p> <p>Peterborough getting better? yes=13 no=0 don't know=0</p>	<p>The warehouse appeared cleaner and more organized. The empowerment program was going well, but lack of quality communication was a concern. Morale in the warehouse was higher, except that of the part timers who were put on call. Individual effort/involvement improved. Dallas had a large impact on warehouse performance. Work was getting done and volume of product improving.</p>
<p>January 21, 1994: Sample of Peterborough Employees (12)</p> <p>Peterborough getting better? yes=11 no=1 don't know=0</p>	<p>Warehouse organization was making it easier to find product. Communication was not open and wasn't improved between mgmt and employees. Morale of part timers was still low. Perceived lack of employee involvement in decision making and lack of knowledge of what's going on. Management was not sharing information and was doing whatever it wanted to do. Awareness of goals through the VMS. Dallas still a big impact on performance. Lack of customer knowledge and service perceived. Volume was increasing which could have caused maintenance to be overworked.</p>
<p>February 18, 1994: Sample of Peterborough Employees (12)</p> <p>Peterborough getting better? yes=12 no=0 don't know=0</p>	<p>Warehouse improved appearance leading to less congestion and cleanliness. Employees attitude and commitment to the project had improved. Supervisors were more approachable. Along with Dallas and the VMS, labor scheduling was making a positive impact on whse performance. Employees worked smarter rather than harder. Able to do more with less.</p>
<p>March 23, 1994: Sample of Peterborough Employees (10)</p> <p>Peterborough getting better? yes=10 no=0 don't know=0</p>	<p>Perceptions similar to February's. New awarded business showed that the warehouse could do more with same amount of labor.</p>

<p>April 19, 1994: Sample of Peterborough Employees (10)</p> <p>Peterborough getting better? yes=10 no=0 don't know=0</p>	<p>Shift representatives were still taking on more responsibility. Employees were able to show what they could do through empowerment. Communication and teamwork between mgmt and union and between shifts seemed to have improved. The new business provided a sense of security. Quality of workmanship improved. Increased productivity kept customers happy and costs down. Perception that possibly too much emphasis was being put on the productivity numbers, causing retribution for natural variation.</p>
<p>May 24, 1994: Sample of Peterborough Employees (10)</p> <p>Peterborough getting better? yes=10 no=0 don't know=0</p>	<p>Employees worked as a team successfully. Employees knew goals for the day. Warehouse was able to handle more product with minimal problems. Removal and racking, bond, and slow mover made improvements on whse performance. Less pilferage from the warehouse.</p>
<p>June 23, 1994: Sample of Peterborough Employees (10)</p> <p>Peterborough getting better? yes=10 no=0 don't know=0</p> <p>* PDSOF pilot test officially ended June 4.</p>	<p>Warehouse appearance still satisfactory. Produce vendors were not on-time for Sundays.</p>
<p>August 22, 1994: Sample of Peterborough Employees (10)</p> <p>Peterborough getting better? yes=8 no=1 don't know=1</p>	<p>Mixed signals on employee attitude, morale, commitment. Work force was knowledgeable. Employees had a better understanding of what they had to do each day. Employees were always working. Moving of bulk product helped outbound product. There were employees who did not believe that the operation had changed. Whse ran smoother expect for problem areas like shipping.</p>

<p>November 9, 1994: Sample of Peterborough Employees (9)</p> <p>Peterborough getting better? yes=9 no=0 don't know=0</p>	<p>Relations between management and employees were very good. Mgmt was open to and respectful of ideas. Mgmt "allowing" employees to be self managing. However, sometimes mgmt overlooked employee experience when making decisions. NG as a company was performing well through support of assistance programs & community events. NG was looking after employees and perceived as being fair. Employees were educated. Employees had control of their future and enjoyed their jobs. Volunteered for jobs. Atmosphere more relaxed with an increased feeling of job security. Technology perceived as sometime being put in front of common sense.</p>
<p>February 27, 1995: DDT & SC Members (10)</p> <p>Peterborough getting better? yes=9 no=1 don't know=0</p> <p>* 9 months after PDSOF pilot test officially ended.</p>	<p>Attitude and commitment seemed to waiver. Employees' understanding of system had improved. Employees sought out info. Mixed signals on quality and amount of communication that took place. Improved customer service and relations. While productivity had increased significantly since project start-up, now seemed to be leveling off or regressing. Initiative followed through. PLT struggled somewhat. Employee awareness of the business had improved.</p>

From the Affinity diagrams and their summaries in Table 4-8, it seems that throughout the project (and after) experts perceived that Peterborough was improving ("getting better"). The experts' perceived that there were improvements in a number of factors such as pay, working conditions, communication, leadership, coworker relations, feedback, autonomy, teamwork, responsibility, task significance, management relations, and involvement in planning, problem solving, and decision making. However, the experts on the Design and Development Team (DDT) and Steering Committee (SC) perceive a stalling or regression of performance nine months after the PDSOF project end in June 1994. This perceived decrease in performance was not only for measurable

chartbook indicators, but also for issues such as attitude, commitment, and communication.

Figure 4-2 charts what methods/tools the experts used to form opinions of warehouse performance. I counted the number of times the method was specifically referred to in the questionnaire data. I did not infer the method from the data categorized under the perceptions of warehouse performance heading. For example, a comment such as "Productivity within the warehouse has improved" was not counted as a method comment because I did not know what method the expert was using to make that judgment. It is also important to note that the number of employees surveyed varied (9-13) and the variety and number of responses were different for each month. For example, in December 17, 1993 13 people were surveyed and 83 comments were given. However, in June 23, 1994 10 people were surveyed and 38 comments were given.

It seems that most experts used the Visible Management System to form their perceptions of warehouse performance. The next most used method was through personal experiences such as observations, discussions with employees and personal feelings. Investments were the third most used method to base perceptions of performance on. Occurrence and attendance at various infrastructure and project meetings ranking fourth. Various communications were also used (ranked fifth). These communications came from management, warehouse employees, external sources, and customers. Relations with stakeholders and training opportunities tied for sixth. Rounding out the list were visits to Peterborough, team activities, responses to various surveys and expansion of the best practice program.

General Method	12/17/93	1/21/94	2/18/94	3/23/94	4/19/94	5/24/94	6/23/94	8/22/94	11/9/94	2/27/95	Total
The Visible Management System	9	5	8	8	6	4	8	4		23	75
Meetings	3	1	3	3		1	3			3	17
Expansion	1										1
Personal Experiences	8	4				1		1	3	5	22
Relations with Stakeholders			1	1					1		3
Investments		4			4		4		7		19
Communications	2	3	1	1	3				1	5	16
Survey										2	2
Visits to Peterborough										2	2
Training									1	2	3
Team Activity										2	2

Examples of Typical Categorical Answers

The Visible Management System:

- Reference key performance indicators (KPIs)
- Reference KPI charts, graphs
- Statistics
- Chartbook
- Visibility boards

Training:

- PLT knowledge & abilities
- Bootcamp

Expansion:

- Expansion of best practice program in produce

Meetings:

- Weekly shift meetings
- End of shift meetings
- Meeting to explain to employees how to think about the customer
- Customer focus group meetings
- Attending meetings
- Lack of attendance at all-hands meeting

Survey:

- NGs' Distribution Warehouse Survey results
- Peterborough branch survey results

Team Activities:

- Produce PAT
- Focus groups

Communication:

- Communication from Management
- Constant feedback both good & bad
- More honest answers from warehouse employees
- Comments from external sources
- Feedback from those involved
- Positive feedback from customers
- Feedback about frustrations/lack of direction from outside sources

Investment:

- New scrubber just purchased indicates plans of maintaining whse for few more years
- New business that we have been awarded, shows we can do more work with the same amount of labor
- The salary and benefits we receive
- New technologies implemented
- Employee assistance program

Visits to Peterborough:

- Actual visits to the warehouse

Figure 4-2: Method/Tools Experts Specifically Referred to as a Basis for Their Perceptions of Warehouse Performance

4.5.2 NG Distribution Warehouse Survey: Peterborough Data

As mentioned previously, data for quality of work life (QWL) indicators to compare amongst the three warehouses came from the NG Distribution Warehouse Survey. Data were available from 1991 to 1993 for Chatham, Peterborough, and Sudbury for five QWL Survey questions. Table 4-9 contains Peterborough responses to the five QWL questions in the NG Distribution Warehouse Survey for 1991 to 1993. The percentages refer to the percent of total employees who gave that specific answer. These data are portrayed in bar graphs in Figure 4-3.

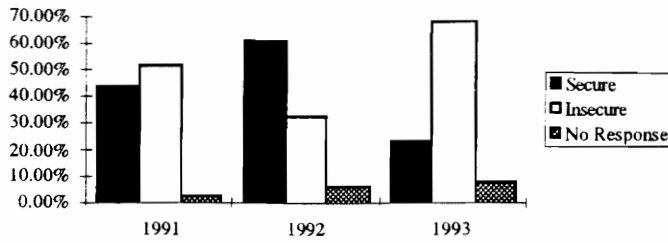
Analysis of the QWL data indicates that Peterborough employees felt less secure in their current position in 1993 than in 1991 or 1992. In the second QWL question, employees rate their supervisor on providing positive leadership. In relation to both 1991 and 1992, the excellent rating for supervisors in this capacity dropped in 1993. For supervisors showing employees how to do their work better, 1993 showed an increase in the excellent rating over 1991 and 1992. However, the poor and fair rating also increased in 1993. Employees felt that supervisors asked for their input more in 1993 than the other years. Perceptions on the spirit of cooperation within the branch did not change significantly over the three years.

It is interesting to compare the Affinity diagrams on perceptions of performance against the NG Distribution Warehouse Survey results. The Affinity diagrams (and their summaries in Table 4-8) indicate that people perceived quality of work life improving in the warehouse. However, the NG Distribution Warehouse Survey in 1993 showed a decrease in QWL indicators from the 1992 Survey. Of course, the QWL indicators are not exactly the same between the two.

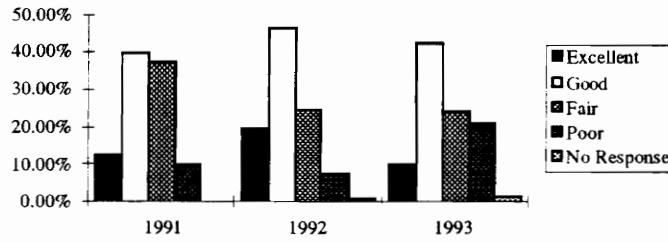
Table 4-9: Peterborough Responses To QWL Questions From NG Distribution Warehouse Survey 1991 to 1993

NG Distribution Warehouse Survey Question on Quality of Work Life	% of Total Peterborough Employees		
	1991	1992	1993
How secure do you feel in your current position with National Grocers? Very Secure: Secure: Somewhat Insecure: Insecure: No response:	44.4%	60.9%	23%
	52.8%	32.6%	68.9%
	2.8%	6.5%	8.2%
Rate immediate supervisor on: Providing positive leadership. Excellent: Good: Fair: Poor: No Response:	12.5%	19.6%	9.8%
	40.3%	46.7%	42.6%
	37.5%	25%	24.6%
	9.7%	7.6%	21.3%
	0%	1.1%	1.6%
Rate immediate supervisor on: Showing how to do your work better. Excellent: Good: Fair: Poor: No Response:	5.6%	6.5%	8.2%
	26.4%	44.6%	29.5%
	44.4%	35.9%	31.1%
	22.2%	10.9%	26.2%
	1.4%	2.2%	4.9%
Rate immediate supervisor on: Asking for your input. Excellent: Good: Fair: Poor: No Response:	8.3%	21.7%	26.2%
	30.6%	33.7%	29.5%
	29.2%	26.1%	23%
	29.2%	16.3%	18%
	2.8%	2.2%	3.3%
Do you feel there is a spirit of cooperation within your branch? Excellent Cooperation: Good Cooperation: Little Cooperation: No Cooperation: No Response:	2.8%	6.5%	4.9%
	48.6%	53.3%	49.2%
	37.5%	35.9%	34.4%
	11.1%	3.3%	4.9%
	0%	1.1%	6.6%

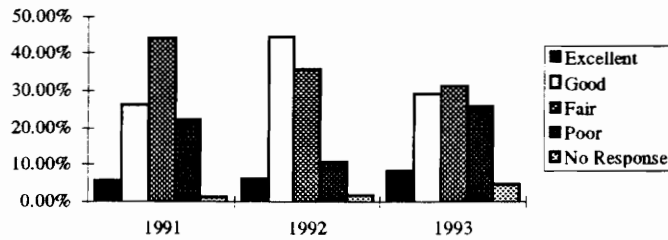
Peterborough: How secure do you feel in your current position with National Grocers?



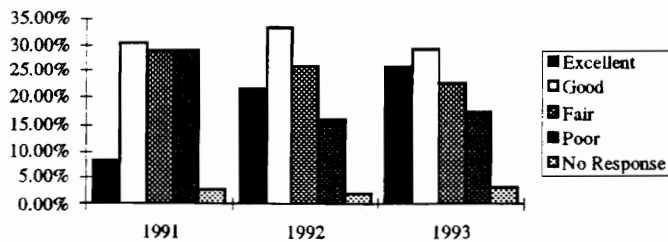
Peterborough: Rate immediate supervisor on providing positive leadership



Peterborough: Rate immediate supervisor on showing how to do your work better



Peterborough: Rate immediate supervisor on asking for your input



Peterborough: Do you feel there is a spirit of cooperation within your branch?

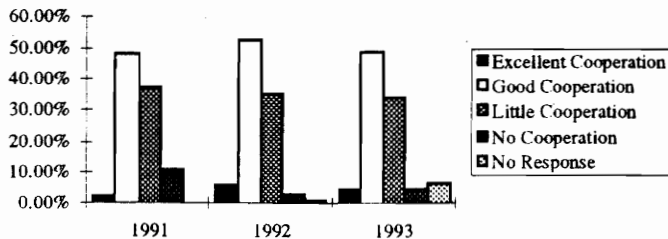


Figure 4-3: Peterborough Bar Graphs- QWL Responses From NG Distribution Warehouse Survey '91-'93

4.6 Data to Information on Grand Strategy System Implementation Effects on Performance- Research Question 2b

Research Question 2b: Was the GSS framework effective in the PDSOF project?

To answer Research Question 2b, data was collected from two NG warehouses similar to Peterborough, but who were not implementing a Grand Strategy System. The two chosen were Chatham and Sudbury. In the beginning of this section, data on similarities and differences between all three warehouses are presented. Then performance data for both Chatham and Sudbury are presented and analyzed. The section ends with a comparison of shifts in performance among the three warehouses.

4.6.1 Similarities/Differences Between Peterborough, Chatham, and Sudbury

Full profiles of each warehouse can be found in Appendix G. Table 4-10 is a summary of similarities and differences between all three warehouses .

Table 4-10: Major Similarities/Differences Between the Peterborough, Chatham and Sudbury Warehouses

Profile Of:	Peterborough	Chatham	Sudbury
Physical Size (sq. ft)	123,700	148,134	129,751
Current Shipping Rates (1994 cases/week)	131,383	227,085	1,243.94
Type of Product	Grocery, Produce, Dairy	Grocery, Produce	Grocery, Produce
Number of Receiving Doors	14	22	19
Number of Racking Set-Ups in Use	4	1	5
Technology Similarities	Dallas, Tripmaster, Optima	Dallas, Tripmaster, Optima	Dallas, Tripmaster, Optima
Technology Differences	Pacman, VMS	Engineered Standards and Minimums, TMT	Engineered Standards and Minimums, TMT
Number of Retail Formats Serviced	84	51	97

Union Presence	Steel Workers Union: fair & firm, cooperative relationship with mgmt.	Retail, Wholesale & Department Store Union: extremely strong presence in the warehouse.	Teamsters Union Local 330.
Number of Employees	127	117	97

4.6.2 Data to Information on Chatham Performance

Tables 4-11 is a summary of the time series analysis of Chatham's three common key measures. The control chart portrayals allowed interpretation of warehouse behavior (the voice of the process). Chatham's actual control charts can be found in Appendix H.

Table 4-11: Interpretation of Chatham Three Common Performance Indicators

Three Common Performance Indicators	Warehouse Behavior (Voice of the Process)
Total warehouse cost per ton <i>(Data available from prd1 '93 to prd1 '95)</i>	<ul style="list-style-type: none"> From prd1 '93 through pr1 '95 the indicator was in statistical control averaging \$68.47/ton.
Percent on-time arrival at customer by week <i>(Data available from prd1 '93 to prd2 '95)</i>	<ul style="list-style-type: none"> From prd1 '93 through pr2 '95 the indicator was in statistical control averaging 97.28% on-time arrivals.
Grocery shorts per 1000 cases shipped by week <i>(Data available from prd1 '93 to prd13 '94)</i>	<ul style="list-style-type: none"> From prd1 '94 through pr13 '94 the indicator was in statistical control averaging .34 shorts/1000 cases. However, the variation throughout is significantly large.

Table 4-12 contains Chatham responses to the five quality of work life questions (the fourth common key measure among the warehouses) in the NG Distribution Warehouse Survey for 1991 to 1993. These data are portrayed in bar graphs in Figure 4-4.

Table 4-12: Chatham Responses To QWL Questions From NG Distribution Warehouse Survey 1991 to 1993

NG Distribution Warehouse Survey Question on Quality of Work Life	% of Total Chatham Employees		
	1991	1992	1993
How secure do you feel in your current position with National Grocers? Very Secure: Secure: Somewhat Insecure: Insecure: No response:	82.3%	77.9%	51.3%
Rate immediate supervisor on: Providing positive leadership. Excellent: Good: Fair: Poor: No Response:	25% 57.3% 16.7% 1% 0%	34.7% 46.3% 16.8% 2.1% 0%	7.5% 46.3% 33.8% 12.5% 0%
Rate immediate supervisor on: Showing how to do your work better. Excellent: Good: Fair: Poor: No Response:	9.4% 51% 31.3% 6.3% 2.1%	25.3% 40% 33.7% 1.1% 0%	5% 25% 43.8% 25% 1.3%
Rate immediate supervisor on: Asking for your input. Excellent: Good: Fair: Poor: No Response:	26% 47.9% 18.8% 6.3% 1%	37.9% 45.3% 13.7% 2.1% 1.1%	13.8% 28.8% 30% 27.5% 0%
Do you feel there is a spirit of cooperation within your branch? Excellent Cooperation: Good Cooperation: Little Cooperation:: No Cooperation: No Response:	7.3% 59.4% 32.3% 1% 0%	9.5% 66.3% 23.2% 1.1% 0%	6.3% 42.5% 42.5% 6.3% 2.5%

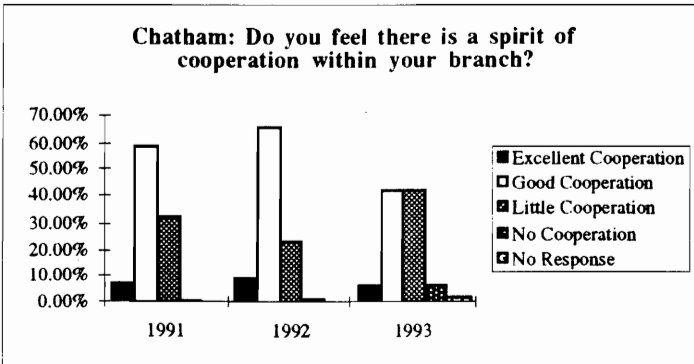
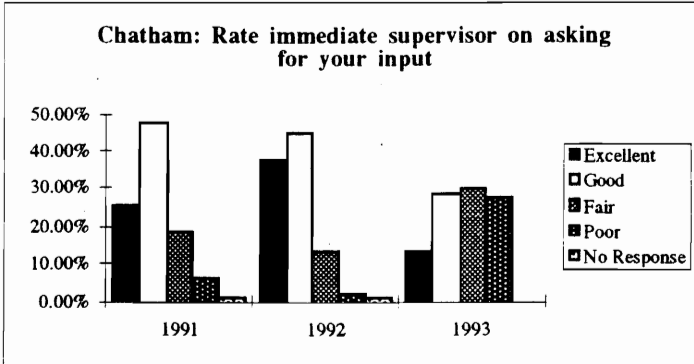
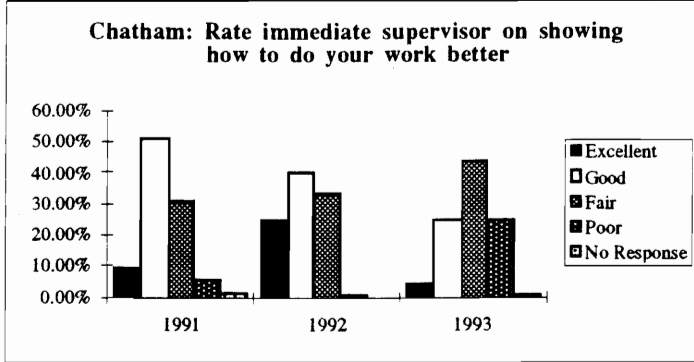
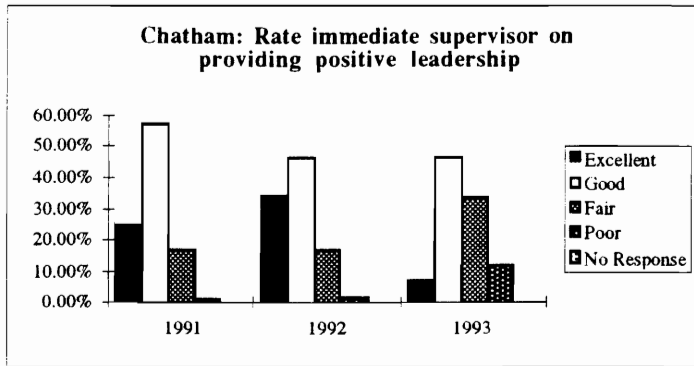
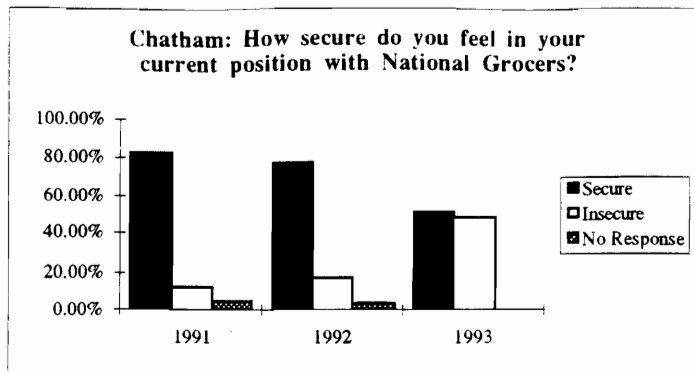


Figure 4-4: Chatham Bar Graphs- QWL Responses From NG Distribution Warehouse Survey '91-'93

Analysis of the QWL data indicates that Chatham employees felt very secure in their current positions in 1991 and 1992. In 1993 employees were almost evenly divided between feeling secure and insecure. In the second QWL question, employees rate their supervisor on providing positive leadership. The highest "good" rating was in 1991 whereas the highest excellent rating was in 1992. Supervisor ratings for this category in 1993 were mostly good to fair. For supervisors showing employees how to do their work better, 1991 had the highest good rating and 1992 the highest excellent rating. In 1993 most ratings were fair. Chatham employees felt that supervisors were asking for their opinions in 1991 and '92. However, supervisors were fair to poor mostly in this category for 1993. The spirit of cooperation within the branch increased from 1991 to '92 but then dropped significantly in '93.

4.6.3 Data to Information on Sudbury Performance

Tables 4-13 is a summary of the time series analysis of Sudbury's three chartbook common measure control charts. Sudbury's actual control charts can be found in Appendix H.

Table 4-13: Interpretation of Sudbury Three Common Performance Indicators

Four Common Performance Indicators	Warehouse Behavior (Voice of the Process)
Total warehouse cost per ton <i>(Data available from prd1 '93 to prd2 '95)</i>	<ul style="list-style-type: none"> • From prd1 '93 through prd2 '95 the indicator was in statistical control averaging \$145.95/ton..
Percent on-time arrival at customer by week <i>(Data available from prd1 '93 to prd2 '95)</i>	<ul style="list-style-type: none"> • From prd1 '93 through prd2 '95 the indicator was in statistical control averaging 97.72% on-time arrivals.
Grocery shorts per 1000 cases shipped by week <i>(Data available prd1 '93 to prd2 '95)</i>	<ul style="list-style-type: none"> • From prd1 '93 through prd10 '93 the indicator was in statistical control averaging 1.18 shorts/1000 cases • From prd11 '93 through prd5 '94 the indicator was in statistical control averaging 1.58 shorts/1000 cases • From prd6 '94 through prd2 '95 the indicator was in statistical control averaging 2.03 shorts/1000 cases

Table 4-14 contains data on Sudbury responses to the five quality of work life questions in the NG Distribution Warehouse Survey for 1991 to 1993. These data are portrayed in bar graphs in Figure 4-5.

Analysis of Sudbury's QWL data from 1992 to 1993 indicates that job security went down at a steady rate as insecurity climbed at a steady rate. In the second QWL question, employees rate their supervisor on providing positive leadership. The highest positive ratings were in 1991 but the 1992 and '93 ratings were not that much different. For supervisors showing employees how to do their work better, 1991 had the highest "good" and "excellent" ratings. 1992 ratings seemed to fit a normal distribution and in '93 "poor" ratings jumping significantly. For supervisors asking for employee input, 1991 had the highest "good" and "excellent" ratings. 1992 ratings seemed to fit a normal distribution and in '93 employees were split between "good" and "poor." The spirit of cooperation within the branch steadily decreased from 1991 to 1993.

Table 4-14: Sudbury Responses To QWL Questions From NG Distribution Warehouse Survey 1991 to 1993

NG Distribution Warehouse Survey Question on Quality of Work Life	% of Total Sudbury Employees		
	1991	1992	1993
How secure do you feel in your current position with National Grocers? Very Secure: Secure: Somewhat Insecure: Insecure: No response:	68.8%	39.3%	26.7%
Rate immediate supervisor on: Providing positive leadership. Excellent: Good: Fair: Poor: No Response:	17.2% 45.3% 32.8% 4.7% 0%	8.9% 35.7% 32.1% 16.1% 7.1%	6.7% 38.7% 28% 25.3% 1.3%
Rate immediate supervisor on: Showing how to do your work better. Excellent: Good: Fair: Poor: No Response:	7.8% 39.1% 40.6% 12.5% 0%	3.6% 25% 33.9% 26.8% 10.7%	4% 30.7% 22.7% 41.3% 1.3%
Rate immediate supervisor on: Asking for your input. Excellent: Good: Fair: Poor: No Response:	23.4% 40.6% 25% 10.9% 0%	14.3% 23.2% 26.8% 25% 10.7%	10.7% 32% 17.3% 36% 4%
Do you feel there is a spirit of cooperation within your branch? Excellent Cooperation: Good Cooperation: Little Cooperation:: No Cooperation: No Response:	6.3% 56.3% 32.8% 4.7% 0%	0% 48.2% 41.1% 7.1% 3.6%	2.7% 45.3% 36% 13.3% 2.7%

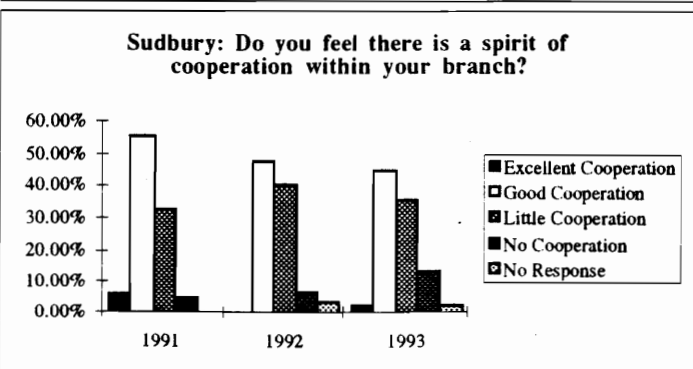
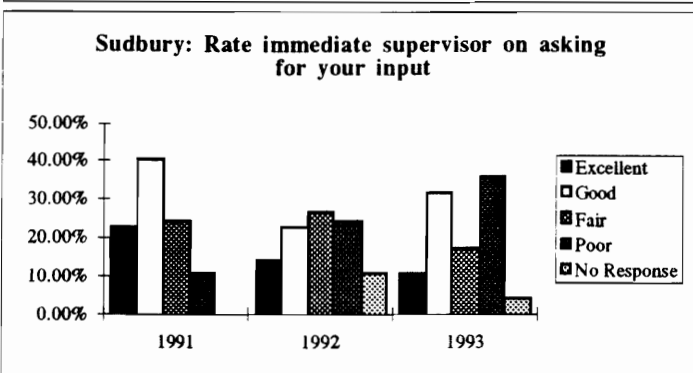
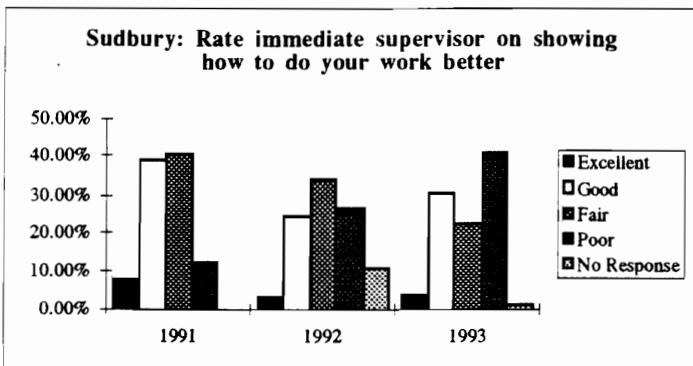
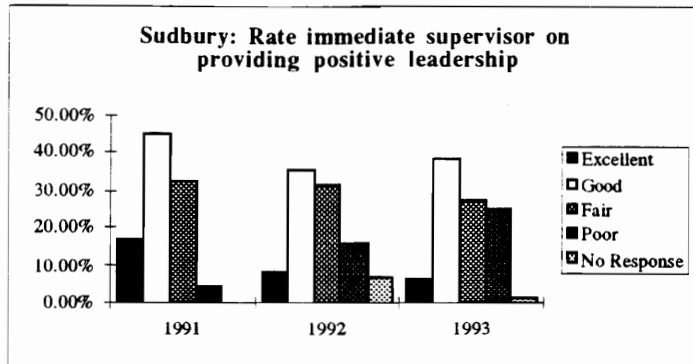
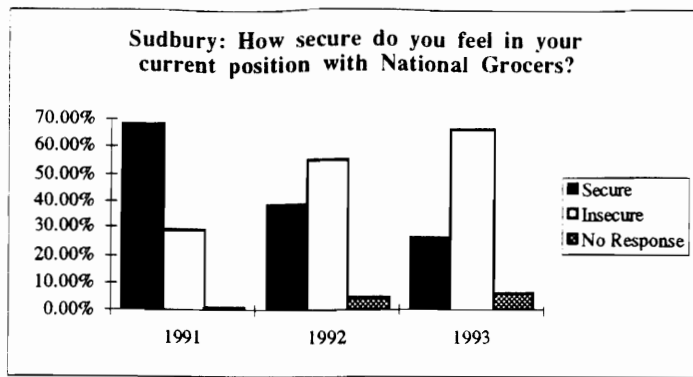


Figure 4-5: Sudbury Bar Graphs- QWL Responses From NG Distribution Warehouse Survey '91-'93

4.6.4 Comparing Occurrences of Shifts in Performance Among Peterborough, Chatham & Sudbury

In this section, occurrences of shifts in performance (detected by control charts in Appendix H and line graphs) among all three warehouses in four common key measures were analyzed. Three common measures were analyzed from 1993 to 1995. The fourth common measure was analyzed from 1991 to 1993. Further analysis for the first three common measures included conducting a t-test for significance. T-tests were used to determine if there was a statistically significant difference between Peterborough's performance prior to GSS implementation (or as far back as the data goes), and performance after the project ending date. A t-test was also done for the other two warehouses to explore whether or not there was a statistically significant difference between their operation before and after the PDSOF project. The null hypothesis states that the mean at the beginning of GSS implementation was the same as the mean after the project ended (i.e. there wasn't a statistically significant change in performance). The alternate hypothesis is that the mean in the beginning is not equal to the mean after the project ended.

Ho: $u_1 = u_2$ where: u_1 = performance close to beginning of project (approximately first 5 periods of available data)
H1: $u_1 \neq u_2$ u_2 = performance after project ending date (approximately last 7 periods of available data)

I presented the p-value for each t-test. A p-value is the lowest level of significance at which the observed value of the test statistic is significant. The smaller the p-value, the heavier the weight of the sample evidence against Ho (rejecting Ho). For my tests, I used an alpha value of .05. This means that I reject the null hypothesis with a 95% probability of being correct. If Ho was rejected by a 2-sided t-test, I examined whether u_1 was greater than or less than u_2 .

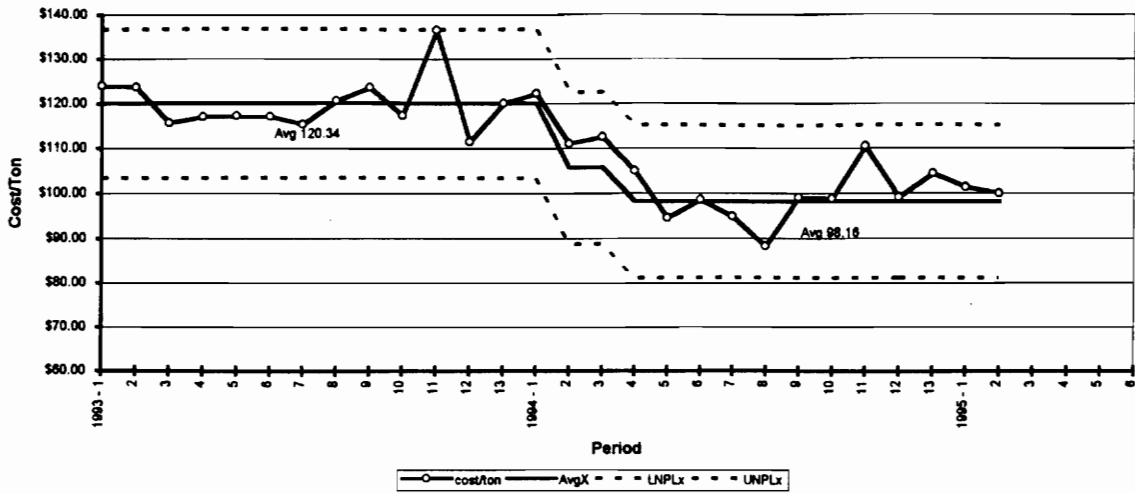
Since the earliest data I have for the three common chartbook measures is from 1993, I will refer to approximately the first five periods of 1993 as "before GSS implementation." I will refer to approximately the last 7 periods of available data as "after GSS implementation." It is important to note that the first analysis period occurred in approximately the January to May time frame whereas the final analysis period occurred from approximately September to February. This seasonal difference may have impacted the results.

4.6.4.1 Common Measure 1: Total Cost Per Shipped Ton by Period

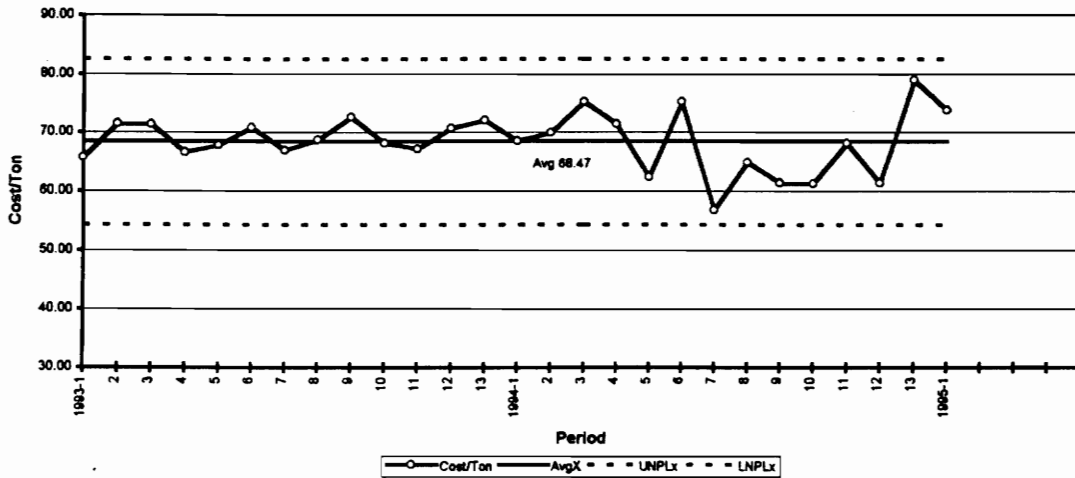
Figure 4-6 depicts the cost/ton indicator for all three warehouses (see Appendix H) from 1993 to the beginning of 1995. A shift downwards in performance occurred at Peterborough from period 1 1994 through period 4 1994. On the Peterborough control charts, in Appendix H, I identified interventions that could have caused this shift. This shift did not take place in either Chatham or Sudbury. In fact, Chatham and Sudbury's process was in statistical control throughout 1991 to period 1 1995.

The t-test results of cost/ton for each warehouse are shown in Table 4-15. Peterborough cost/ton before GSS implementation was significantly greater than cost/ton after, at the 0.0000 level. There was no statistically significant change in Chatham and Sudbury's cost/ton performance before GSS implementation at Peterborough and than after.

Peterborough Total Distribution Cost Per Shipped Ton By Period



Chatham Total Distribution Cost Per Shipped Ton By Period



Sudbury Total Cost Per Shipped Ton By Period

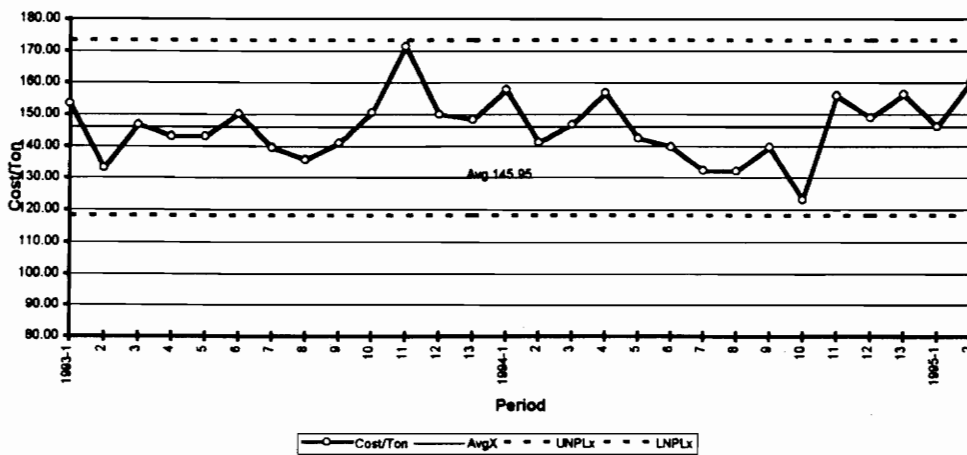


Figure 4-6: Cost/Ton Common Indicator for All Three Warehouses

Table 4-15: T-Test of Cost/Ton Indicator

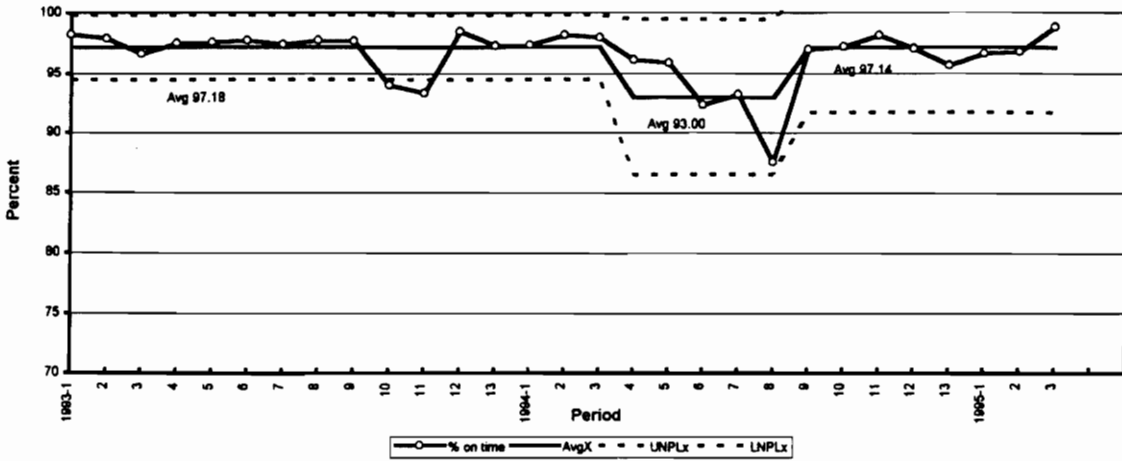
Warehouse (Cost/ton)	P-value for 2-sided test	Information
Peterborough	.0000	Cost/ton before GSS <u>greater</u> than cost/ton after
Chatham	.62	Cost/ton before GSS <u>same</u> as cost/ton after
Sudbury	.58	Cost/ton before GSS <u>same</u> as cost/ton after

Both Figure 4-6 and Table 4-15 show that Peterborough's process changed significantly whereas Chatham and Sudbury's stayed the same. Not only did Peterborough change, but the change in performance was positive for this indicator (cost/ton decreased).

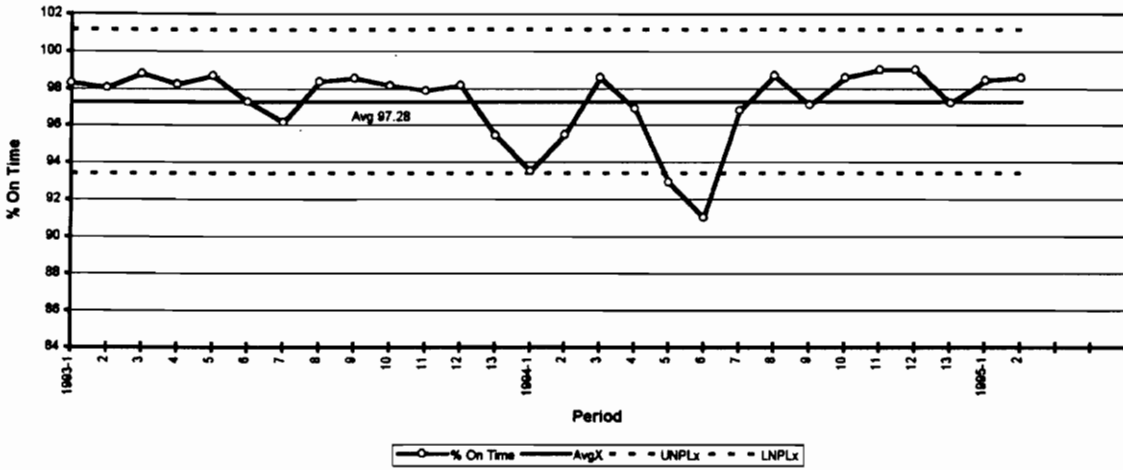
4.6.4.2 Common Measure 2: Percent On-Time Arrival At Customer by Period

Figure 4-7 depicts the percent on-time arrivals indicator for all three warehouses (see Appendix H) from 1993 to the beginning of 1995. A shift downwards in performance occurred at Peterborough at period 4 1994 through period 8 1994. However, Peterborough's performance after period 8 1994 shifted upwards, returning to a level similar to the 1993 level. This shift did not take place in Sudbury, who's process was in statistical control throughout 1991 to period 3 1995. Chatham's process shows two signals during period 4 and 8 1994.

Peterborough Percent On Time Arrivals At Customer By Period



Chatham Percent On Time Arrivals At Customer By Period



Sudbury Percent On Time Arrivals At Customer By Period

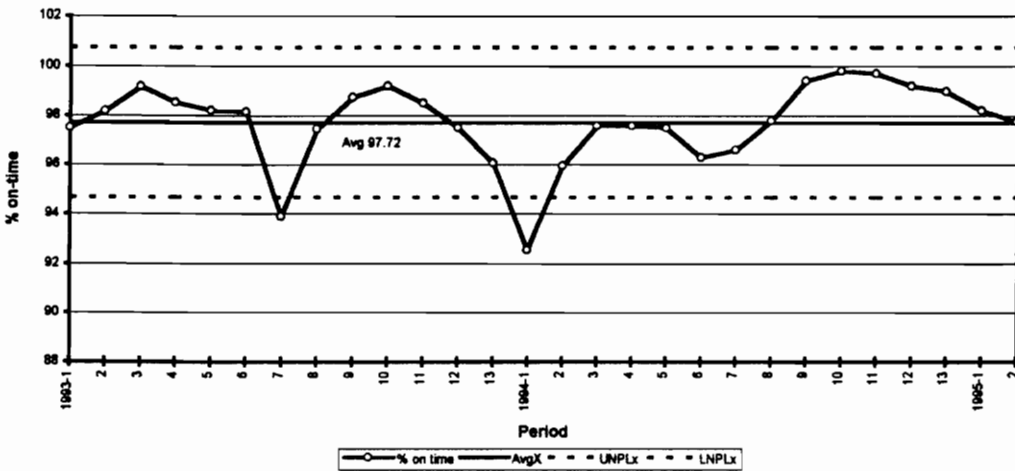


Figure 4-7: Percent On-Time Arrivals Common Indicator for All Three Warehouses

The t-test results of percent on-time arrivals for each warehouse are shown in Table 4-16. Peterborough's percent on-time arrivals before GSS implementation were not significantly different than on-time arrivals after, at the .41 level. Similarly, there was no statistically significant change in Chatham and Sudbury's percent on-time arrivals before GSS implementation at Peterborough and than after.

Table 4-16: T-Test of Percent On-Time Arrivals Indicator

Warehouse (On-time Arrivals)	P-value for 2-sided test	Information
Peterborough	.41	On-time arrivals before GSS <u>same</u> as on-time arrivals after
Chatham	.69	On-time arrivals before GSS <u>same</u> as on-time arrivals after
Sudbury	.12	On-time arrivals before GSS <u>same</u> as on-time arrivals after

Both Figure 4-7 and Table 4-16 show that there was no statistically significant difference in Peterborough, Chatham, or Sudbury's performance before and after GSS implementation.

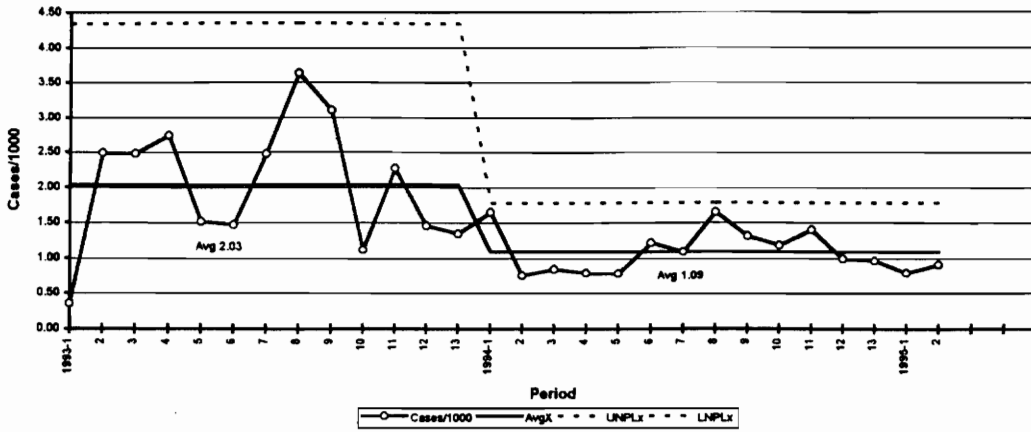
4.6.4.3 Common Measure 3: Grocery Shorts Per 1000 Cases Shipped by Period

Figure 4-8 depicts the shorts/1000 cases shipped indicator for all three warehouses (see Appendix H) from 1993 to the beginning of 1995. A shift downward in performance occurred at Peterborough in period 13 1993 through period 1 1994. On the Peterborough control chart, in Appendix H, I identified interventions that could have caused this shift. This shift did not take place in either Chatham or Sudbury. In fact, Chatham's process was in statistical control throughout 1991 to period 13 1994.

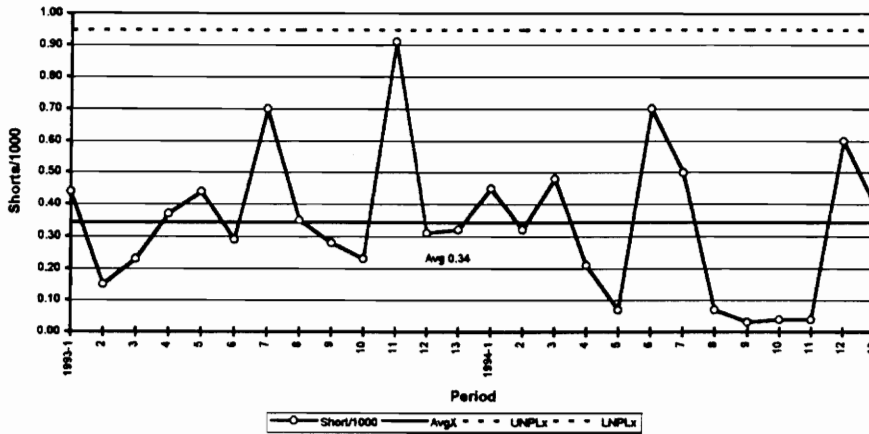
Sudbury's process, on the other hand, was increasing significantly from period 11 1993 through period 5, 1994 and then again from period 6 1994 to period 2 1995.

The t-test results of grocery shorts/1000 cases for each warehouse are shown in Table 4-17. Peterborough grocery shorts before GSS implementation were significantly greater than shorts after, at the .044 level. There was no statistically significant change in Chatham's grocery shorts before GSS implementation at Peterborough and than after. Sudbury's grocery shorts before GSS implementation were significantly less than shorts after, at the .0015 level.

Peterborough Grocery Shorts Per 1000 Cases Shipped By Period



Chatham Grocery Shorts per 1000 Cases Shipped By Period



Sudbury Grocery Shorts Per 1000 Cases Shipped By Period

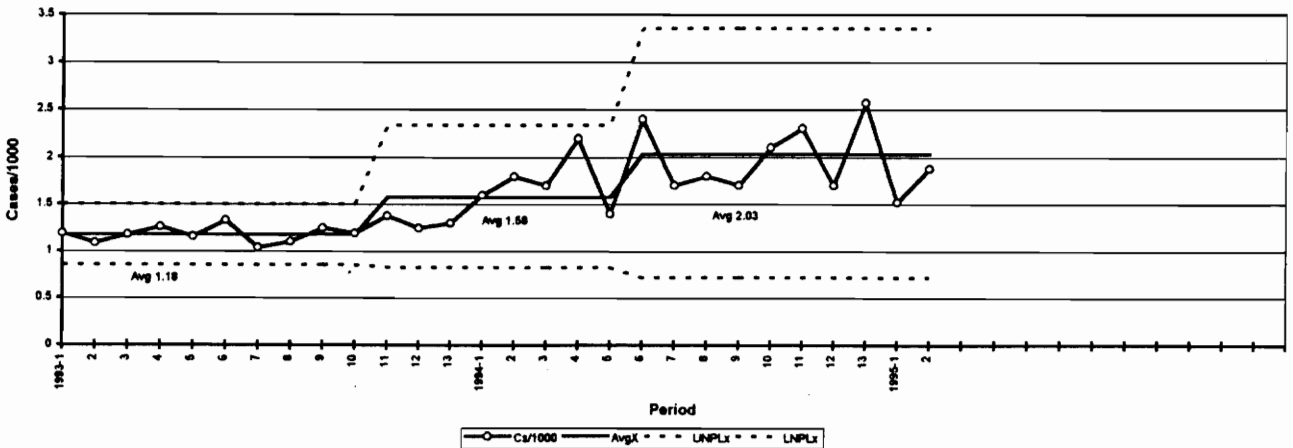


Figure 4-8: Grocery Shorts Per 1000 Cases Common Indicator for All Three Warehouses

Table 4-17: T-Test of Grocery Shorts/ 1000 Cases Indicator

Warehouse (Cost/ton)	P-value for 2-sided test	Information
Peterborough	.044	Grocery shorts before GSS <u>greater</u> than grocery shorts after
Chatham	.63	Grocery shorts before GSS <u>same</u> as grocery shorts after
Sudbury	.0015	Grocery shorts before GSS <u>less</u> than grocery shorts after

Both Figure 4-8 and Table 4-17 show that Peterborough and Sudbury's process changed significantly whereas Chatham's stayed the same. Not only did Peterborough change, but the change in performance was positive for this indicator (grocery shorts decreased). Sudbury's change, however was negative for this indicator (grocery shorts increased).

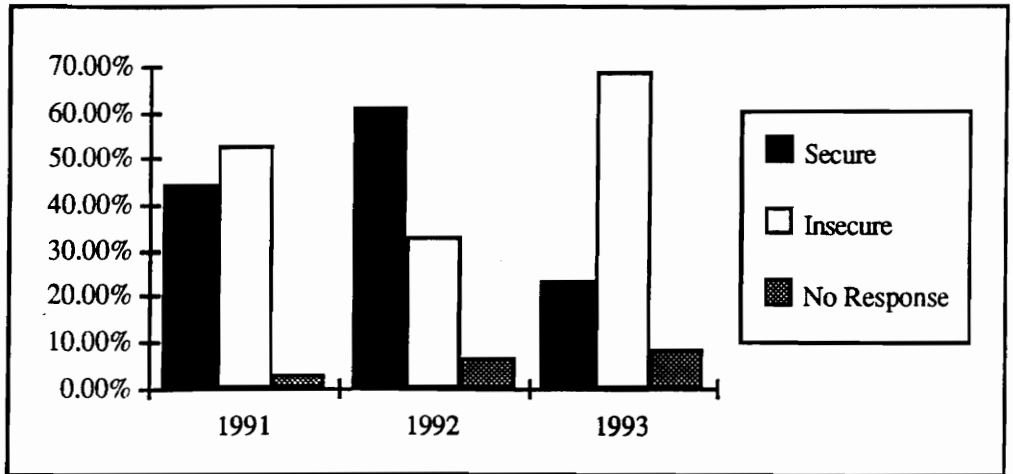
4.6.4.4 Common Measure 4: Quality of Work Life

The fourth comparison between the three warehouses focused on shifts in quality of work life (QWL). Figures 4-9,10,11 depict the changes for the QWL indicators (measured by the NG Distribution Warehouse Survey).

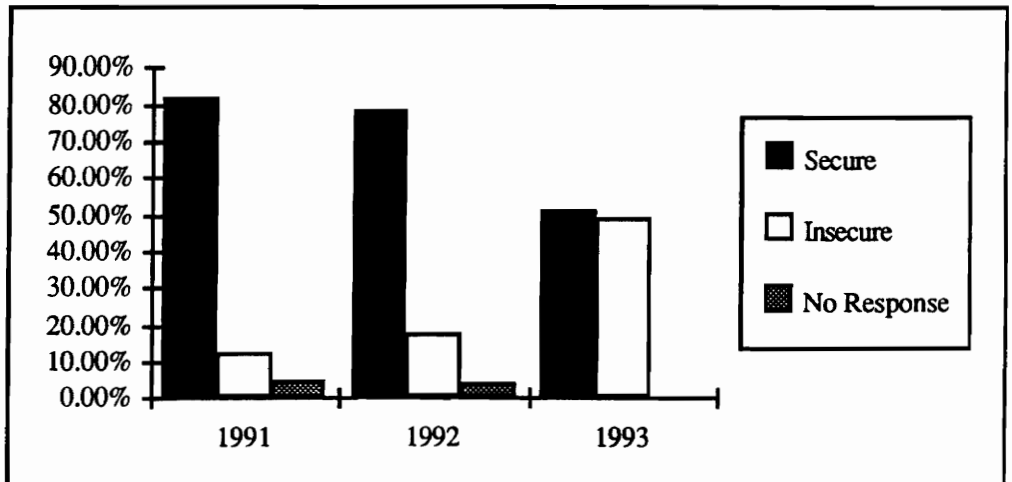
For the first question- how secure do you feel in your current position with National Grocers- all three warehouses experienced a negative shift in security from 1992 to 1993 (Figure 4-9). Between 1992 and 1993, Peterborough insecurity increased by 111%, Chatham by 173%, and Sudbury by 20%. Peterborough was the only warehouse where a positive shift in security ever took place (1991 to 1992).

1) How secure do you feel in your current position with National Grocers?

Peterborough



Chatham



Sudbury

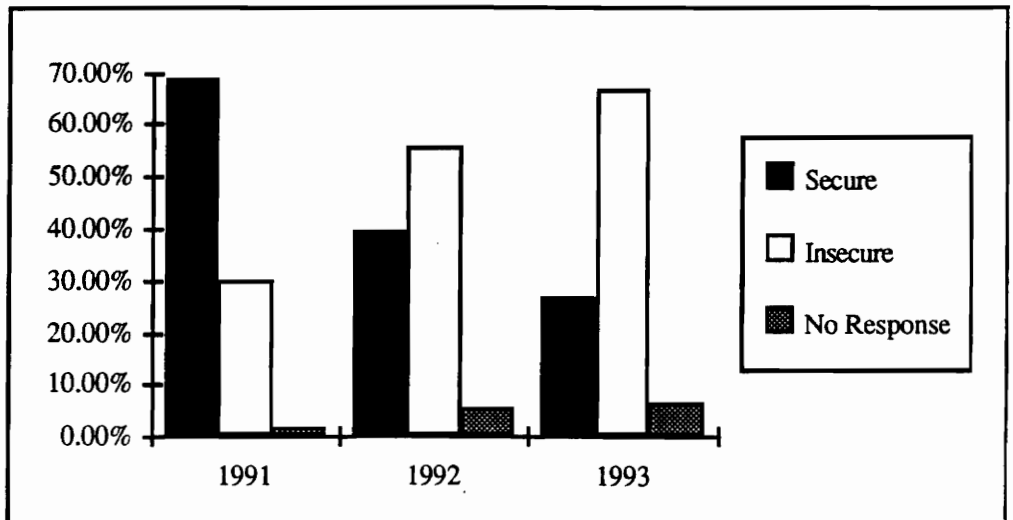


Figure 4-9: Question 1 QWL Indicator

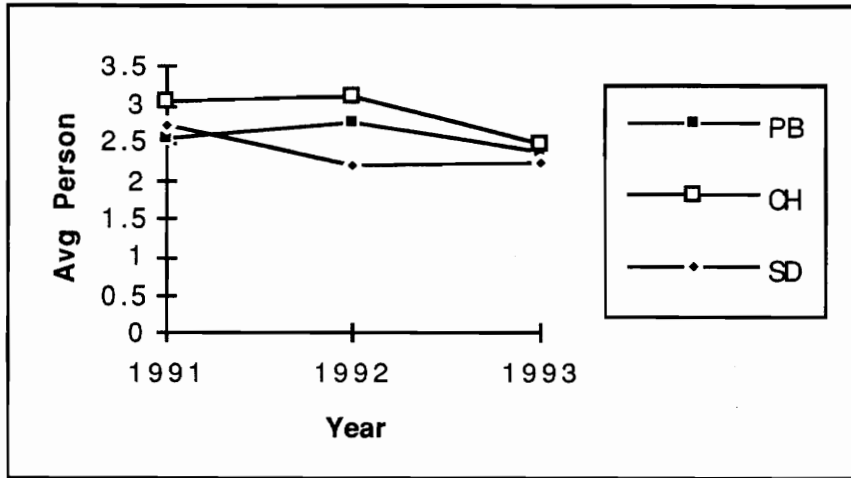
In order to compare the QWL indicators for questions 2,3, and 4 in the NG Distribution Warehouse Survey, I transformed the percentage data into an average numeric score. I assigned the "excellent" rating a value of 4, "good" as 3, "fair" as 2, "poor" as 1. I threw out the "no response" percentage. I then multiplied the percentage by it's corresponding rating number. The resulting numbers were then added. This final value was the "average person" response for that year. For example:

NG Distribution Warehouse Survey Question on Quality of Work Life	% of Total Sudbury Employees		
	1991	1992	1993
2) Rate immediate supervisor on: Providing positive leadership.			
<u>Rating #</u>			
4 Excellent:	17.2% -.688	8.9%- .356	6.7%- .268
3 Good:	45.3%-1.359	35.7%- 1.07	38.7%-1.161
2 Fair:	32.8%-.656	32.1%- .642	28%- .56
1 Poor:	4.7%- <u>.047</u>	16.1%- <u>.161</u>	25.3%- <u>.253</u>
"Avg. Person" Rating:	2.75	2.23	2.242

Both Figure 4-10 and Figure 4-11 show that, in general, Peterborough and Chatham's performance increased between 1991 to 1992 and then dropped from 1992 to 1993. Sudbury's general performance, however, dropped between 1991 to 1992 and then increased from 1992 to 1993.

2) Rate immediate supervisor on: Providing positive leadership.

	1991	1992	1993
Peterborough	2.557	2.761	2.375
Chatham	3.054	3.134	2.49
Sudbury	2.75	2.23	2.242



3) Rate immediate supervisor on: Showing how to do your work better.

	1991	1992	1993
Peterborough	2.126	2.425	2.101
Chatham	2.595	2.897	2.076
Sudbury	2.422	1.84	1.948

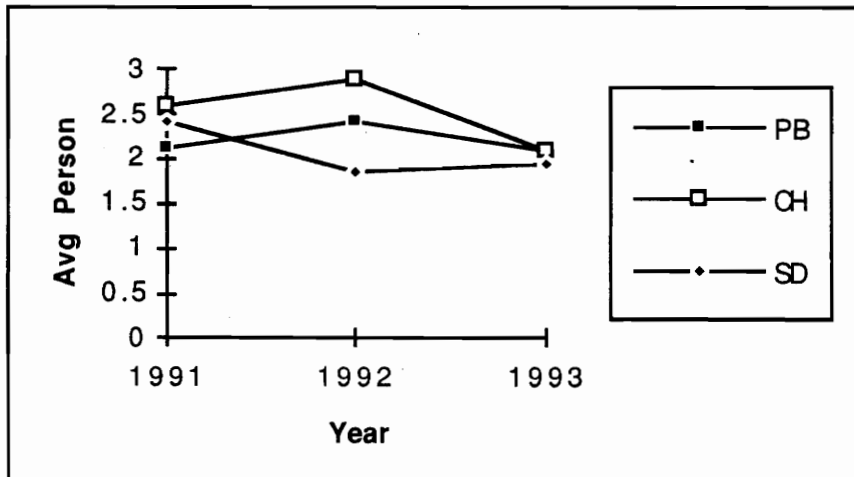
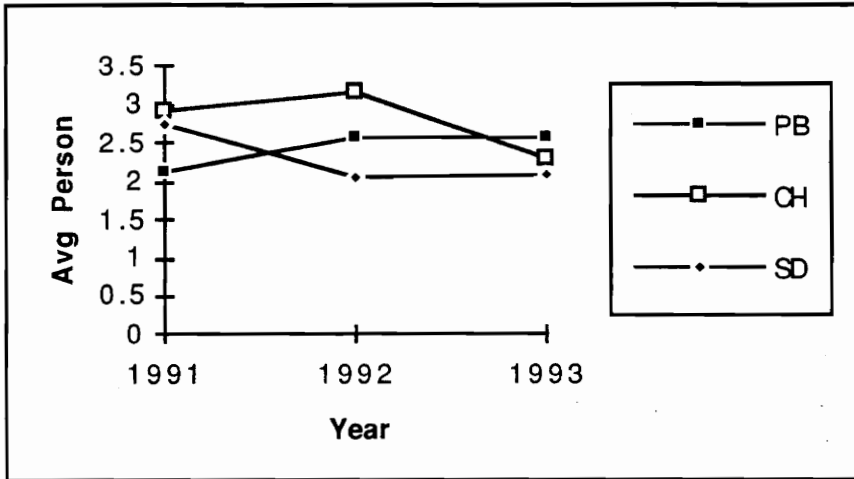


Figure 4-10: Question 2 & 3 QWL Indicator

4) Rate immediate supervisor on: Asking for your input.

	1991	1992	1993
Peterborough	2.126	2.564	2.573
Chatham	2.916	3.17	2.291
Sudbury	2.763	2.054	2.094



5) Do you feel there is a spirit of cooperation within your branch?

	1991	1992	1993
Peterborough	2.431	2.61	2.409
Chatham	2.73	2.844	2.44
Sudbury	2.644	2.339	2.32

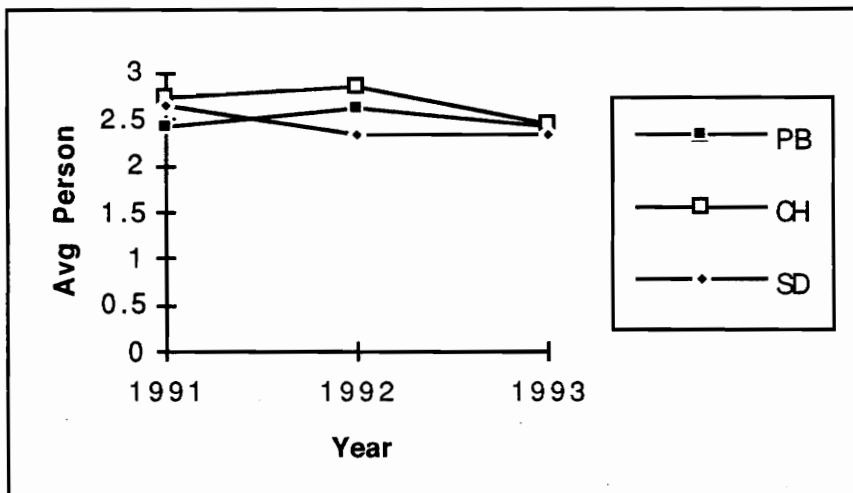


Figure 4-11: Question 4 & 5 QWL Indicator

4.7 Data to Information on Lessons Learned- Research Question 3

Research Question 3: What advice would the project participants give to others implementing a GSS, that they believe would lead to greater performance improvements?

Throughout the project, participants learned what interventions worked and didn't work. Based on their learning experience, each person had ideas on what to do differently if implementing another GSS framework. Section 4.7.1 includes listings of the lessons learned for interventions under certain fronts. Section 4.7.2 includes the results of the Distribution Manager questionnaire. The purpose of this questionnaire was to identify what Peterborough lessons learned were passed on to the other warehouses.

4.7.1 Lessons Learned By Front

In general, it seems that the experts learned the most in the areas of communication, infrastructure, and measurement. These three fronts were key in enabling the other fronts to move forward. While there is certainly a wealth of ideas on what to do differently or the same for increased performance, I have summarized the lessons learned for fourteen commonly referred to interventions. For each intervention, a brief explanation is given. Following the explanation, the comments by several experts pertaining to that intervention are listed.

4.7.1.1 Communication

Weekly Shift Meetings:

These meetings were weekly meetings for each shift, facilitated by the Distribution Manager (DM). The weekly shift meetings were established for employees to understand and have better knowledge of the key performance indicators and how their individual

performance affected these indicators. During the meetings, warehouse performance over the past week was reviewed, general business information shared, and a project update given. The group also identified roadblocks encountered. Identified lessons learned:

- By providing employees with feedback, quality was better in out-bound product.
- Employees had a much greater knowledge of the business and the Peterborough operation.
- Creates greater buy-in from employees.
- Start up could have occurred earlier for weekly shift meetings.
- DMs should note employee concerns and address them promptly at the next meeting.
- Let employees interpret the warehouse's performance for the DM.

Daily Shift Meetings:

End of shift meetings were used to ensure consistency, share ideas and information, solve problems, and work on process improvements.

- 1) Representatives were designated to communicate between shifts. At the beginning of each shift, a representative from the past shift gave the notes from his shift's meeting to a current shift's representative. In this way, information was shared between shifts.
- 2) At the beginning of the shift, the representatives of that shift meet to set the staffing for the day. Then, with the rest of the employees of the shift, objectives and goals of the shift were reviewed.
- 3) At the end of the shift, the shift employees met again. The representatives from each functional area gave updates. The productivity numbers for that shift were reviewed and compared against the goals. Roadblocks were identified and solutions discussed. The Visible Management Boards were updated for the shift. A representative from the shift took notes of the shift meeting and then passed them along to the next shift representative.

For the shift just ending, the meetings provided an opportunity for feedback on the day's performance as well as discussion of roadblocks. For the shift just beginning, the

meetings helped set expectations for the day. Identified lessons learned :

- Start the meetings early in the project.
- Because of the link between shifts, employees were using a systems approach, i.e. not sub-optimizing just their shift, but recognizing linkages with other shifts.
- Shift meetings created daily accountability.

All-Hands Meetings:

All members of the organization met to share information about warehouse performance and project status. By keeping everyone updated on progress and addressing concerns, an atmosphere of responsibility and belonging was created. These meetings also were used to energize and sustain the effort, achieve buy-in and create a common understanding.

Identified lessons learned:

- All-hands meetings made employees less anxious about the project, more willing to participate.
- The meetings gave employees an increased understanding of their role and responsibility for the project.
- Fewer rumors and false information circulated.
- One way to get employees to come to the meeting is to invite their spouses and other family members. This also sends the message that the changes will affect everyone in the Peterborough family and everyone's support is needed.
- Have employees eventually call and lead the meetings, so that they become the leaders of the change project.
- Visions of projects are difficult to communicate. The focus of a change effort is easily lost. Energizing employees is important. The all-hands meetings were a mechanism to accomplish this.
- Make sure that the information shared is "high quality" i.e. correct, right time and place, makes sense to the receiver.

Employee Surveys:

In order to better understand employee issues and concerns relative to the project and their job, two Peterborough employee surveys were conducted. They were used to assess employee knowledge of the project, feelings about the project, and needs in relation to the project. Identified lessons learned:

- Recommend that the survey be given to employees every three months in an effort to document the progress being made on the motivation, communication, and culture fronts.
- Make questionnaire anonymous to insure honesty.
- Complete on company time during shift meetings.
- Have an expert or someone experienced with survey design and interpretation.
- Share survey results.

4.7.1.2 Culture

Employee Empowerment :

Employee empowerment is making employees feel they own the warehouse. Day to day planning and warehouse operation decisions were made at the lowest level. The DM gave-up some responsibility, giving employees power over decisions and actions.

Employees took control of their work environment, made decisions and solved roadblocks. Identified lessons learned :

- Infrastructure helps support empowerment.
- Visible Management Boards support empowerment by giving employees information to make decisions.
- One shift initially “tried” the empowerment process. After seeing that the supervisors were serious about the empowerment process, the other shifts started making decisions on their own.
- Basic steps to empower someone or a group of people is to:
 - 1) Share information (a Visual Management System does this)
 - 2) Share knowledge (provide education and training on the business and performance levels)
 - 3) Share power (set up infrastructure groups, like a PLT and PATS, that have power over their domain)
- By giving floor employees the power to handle the administrative work and crises, the supervisor’s time is freed up to concentrate on activities to improve performance and build the business.
- A knowledgeable workforce that understands the decisions they make and the implications that surround them is important and necessary for empowerment.
- Empowered employees feel a sense of ownership and can answer questions that normally only management had information on.
- Supervisors must let go of some of the decisions they previously would have made, and allow the employees to make them. They must realize that bad as well as good decisions will be made by the employees, and help employees analyze how better decisions could be made. Foster a learning organization-- we learn from good or bad decisions.
- Constant reinforcement of the concept of empowerment must be given to the supervisors as well as the employees. Make sure the supervisors have

alternative attractive tasks to fill their time; they probably have ideas on what they would want to do if they only had the time. Push on the Supervisor Affinity Group and ET&D early.

- There is no line that can be drawn to define what decisions the supervisors should make and which ones the employees should make. This is a "touch-feel, trial by error" type of line.
- DMs need to accept the change of responsibility. They should have an open-door policy to show their accessibility. DMs must believe in empowerment and why the organization needs to change.
- The DM and supervisors must assume the role of a "preacher" and get out there and "reach, teach, empower and equip employees." Their job is to get "converts."
- Creating an Empowerment Video that shows employees taking charge of their jobs and making decisions is a good mechanism to support and add variety to the change of culture.

4.7.1.3 Infrastructure

Supervisor Affinity Group:

The purpose of this group was to have better cross-shift communication. This group, made up of supervisors from different shifts, was responsible for ensuring successful empowerment. In addition, the Supervisor Affinity Group (SAG) was responsible for ensuring that end of shift meetings were held and that action items from those meetings were completed in a timely and adequate manner. Identified lessons learned :

- Start the group early in the project.
- The Distribution Managers should be part of the SAG.
- The first issue the group will cover will be catharsis (i.e., griping at each other). An outside facilitator was used to get the group through this stage.
- When individuals take total responsibility for improvement/problems then they can start working together as one group.

Customer Focus Groups:

Group of employees who's task was to fulfill customer expectations. The group created a "profile" of the customer's preferences for better service. The customer focus group served as an opportunity to determine how satisfied the stores were with Peterborough's current business. They were also used to update the customers on activity in the

warehouse and to seek insight into what additional services Peterborough could provide.

Identified lessons learned:

- Increases communication between customer and supplier.
- Create customer profiles to explicitly state the desires of the customer.
- Set up customer-employee relationships so one employee is responsible for a certain customer's satisfaction.
- Start customer relationships with a few customers at first. Then roll out the process to the rest.
- Employee empowerment is an important factor for successful customer focus groups.
- Notice decrease in grocery and produce shorts. People are less likely to cheat a friend!

Performance Action Teams:

A PAT is a team of employees within the organization/warehouse/division, formed to work on specific performance improvement sub-projects identified by the planning team.

The team is in charge of planning the intervention, carrying out the plan, studying the results, and reacting according to the results. Identified lessons learned:

- Watch out for PAT breakdowns such as lack of perceived control over their assigned improvement project, poor timing of PAT formations, or lack of sufficient team training.

4.7.1.4 Measurement

Visible Management System:

The Peterborough Visible Management System (VMS) consisted of three primary parts: a monthly chartbook, a weekly chartbook, and functional area Visible Management Boards throughout the warehouse. The Visible Management Boards were used by employees throughout their shift to record performance data. Each week, data and information from the daily visibility boards were converted into individual and moving range control charts for posting in the warehouse and entry into a weekly key performance indicator (KPI) chartbook. Each month, a monthly chartbook was created to

share the status of improvement initiatives and their result on total Distribution Center performance. The chartbook was a compilation of the key performance indicator charts on the Visible Management Boards and some other system level charts which depicted the overall performance of the Peterborough branch. The purpose of the VMS was to show the linkages between day to day employee activities and system performance; to inform employees of warehouse performance so that they can make decisions and take actions. Identified lessons learned:

- Employees know how the warehouse is performing and how their contributions affect warehouse performance.
- Employees feel a sense of ownership for the boards.
- Knowledge of performance results can be a motivator.
- Push on measurement front early; start measuring performance at the beginning of your improvement process to determine progress in improvement.
- Need employee ET&D on interpreting and updating VMS and chartbook.
- Emphasize empowerment and that the VMS and chartbook are decision making tools.
- Establish a systematic process to collect data.

Benchmarking:

Benchmarking is the process of seeking out “best practices” in order to learn and apply the process to your organization's situation. It is the continuous process of measuring your products, services, and practices against the toughest competitors or companies recognized as industry leaders. A team of Peterborough employees visited outstanding organizations such as Canon of Virginia, the Corning Plant in Blacksburg, VA, Krogers, and Sears. Identified lessons learned:

- The makeup of the group sent to tour other companies is important. The Peterborough group consisted of the Project Leader, Distribution Manager, Supervisors, and floor employees.
- Benchmarking tours provide an opportunity to learn from the successes and failures of other organizations.
- The benchmarking tour group must establish a tour process:
 - 1) What are the expectations of the tour?
 - 2) Develop a list of questions.
 - 3) Present the findings and recommendations from the tour when you return.

Great Performance:

A Great Performance statement is used to define the goals of the project so that employees know what to aim for. To define a "Great Performance," employees of an organization ask themselves: "What would have to happen during this project and what results would need to be achieved to consider the project a success?" Answers are then combined into a Great Performance statement for the organization. Identified lessons learned:

- A performance improvement mentality causes a culture change.
- Know how to measure success of a project against the goals set.
- Need to define goals and objectives of the improvement effort so employees understand what they're striving for.
- Qualitative as well as quantitative goals must be defined.
- Important to use common terms when discussing goals.
- Benchmarking should be used to establish goals.
- Hold all-hands meetings to communicate goals.
- Group goals instead of individual standards encourage teamwork.

4.7.1.5 Education, Training, and Development

PLT Education, Training and Development:

Training courses were held to educate the PLT (which includes the Supervisors and PAT leaders) in meeting management, quality tools, problem analysis, decision making, consensus building, and motivation, so that they could lead others. The NG School of Management offered a training course for the PLT over the summer. The group being trained had a 50% management 50% employee mix. Additional training in statistical measurement and systems theory was identified and provided by the DDT for the PLT.

Identified lessons learned:

- Management and union employees have an understanding of tools to help them in their job and in their teams.
- More effective meetings were conducted, better decisions were made based on data, plans were implemented faster, and results were monitored.
- Training is best done on a "just in time" basis. Train the employee right before or during their need for that training.

- Train PAT leaders ASAP after team development. This way, PAT leaders can use the skills learned to train employees on the team.
- Insist on 100% attendance at training.
- Have training emphasize problem solving and decision making.
- Train on operational definitions of common terms and chartbook interpretation.
- Evaluate training to receive training improvement feedback along with feedback on what training employees are putting into practice.
- Training can be reinforced by using the skills and teaching others.
- Teach employees about the business; how it works and makes a profit.
- Never stop training. Continuously look for needs and opportunities to train.

4.7.1.6 Planning

Red Teams:

The Red Team is a panel of internal and external distribution/organizational change experts. The team's purpose is to critically evaluate the project plan created by the DDT in order to stimulate thinking and improve the project plan. The Red Team acts as a forcing function for the DDT and the PLT to form closure on specific initiatives. This team looks for gaps in the overall plan, and challenges assumptions made within the plan. They help to steer the Distribution Center towards those performance improvement activities which have the highest leverage. Identified lessons learned:

- The Red Team introduced new thinking/concepts.
- The Red Team acted as a catalyst for action by the DDT.
- Keep the Red Team members the same in subsequent sessions.
- Select the Red Team members on the basis of specific expertise. Have the experts critique only the area of the plan that they have expertise in.
- Prepare pre-work for the Red Team members prior to the red team meeting.
- Spend more time on explaining the role of the Red Team to those involved. Make sure the Red Team's role is constructive criticism. The people presenting the plan should not be made to feel defensive.
- The Red Team process is most effective during the plan's formative stages.
- Have the DDT send a report back to the Red Team to confirm understanding of key issues.
- The Red Team feedback is harsh and usually be felt by the DDT as a failure experience. But once the DDT knows what failure feels like, they know they don't want to continue failing throughout the project.
- The criticize in the review is direct and there is no place to hide. It is also done directly in front of bosses and peers. Therefore there was a lot of anxiety within the members of the DDT. This causes the DDT to become defense.
- The DDT must communicate the project plan clearly.
- It is not possible to be totally prepared for this type of intervention.

4.7.1.7 Technology

For warehouse technologies that had a communication plan, implementation typically went quicker than traditional implementations. They were also supported more by employees and generally required less "fire fighting" during early stages.

4.7.2 Transfer of Learning: Distribution Manager Questionnaire

Section 4.7.1 listed some of the lessons learned by the experts as they implemented a GSS. But what interventions would/did the experts recommend during start up of GSS implementation? A questionnaire was administered asking ten NG Distribution Managers what GSS interventions they had started to implement in their respective warehouse. The questionnaire also asked the Distribution Manager (DM) why he chose to implement those particular interventions. The questionnaire concluded by asking the DM if his Distribution Center was experiencing success or failure with that intervention.

DMs listed several main reasons why they chose to implement a certain intervention.

The reasons given were:

- Successful at Peterborough
- Suggested/recommended by PDSOF participants
- Always needed at my warehouse
- Required to implement
- Consistency with Peterborough

Data from the other two parts of the survey are displayed in Table 4-18.

Table 4-18: Data From the NG Distribution Managers Questionnaire on GSS Interventions Currently Implementing

Tool, Technique, Event Adopted from the Peterborough Project	Why Chosen	Successful in your Distribution Center? Why or Why not?
All-hands meetings	* See reasons listed previously in Section 4.7.2	Yes - right environment. Yes - employees were interested in their future. Yes - positive feedback from staff on info. sharing process. Yes - excellent feedback mechanism. Yes - communication mechanism. Fairly successful. Yes - well received. Yes - good method to provide information to membership. Yes - great kick-off, sparked interest. Yes - great way to share info, effective tool to kick off project.
GSS wall		Yes - initial start. In the works - visionary system.
Library		No - participation by employees not present. Too early to assess. Yes/No - need to improve employee awareness of the resources.
Identification of key performance indicators		Too early to assess. Yes - control panel for employees' performance. Yes - measurement review. Gives up-to-date information. Established and being input into system as a method for focusing on expectations. Yes - identifies those indicators that will show desired performance improvement.
Empowerment process		Yes- employees involved and taking initiative. Yes - gave employees the opportunity to do their own thing. Yes - employees made accountable. Yes - clerical and produce PATs successful.

Weekly shift meetings		<p>Yes - employees' comments positive.</p> <p>Yes - initially used as a venting process, currently for process improvement.</p> <p>Yes - open communication mechanism.</p> <p>Yes - innovation, committee process.</p> <p>Yes - information sharing mechanism.</p> <p>Yes - supports all-hands meetings, info tool, are now looked forward to.</p>
PATS		<p>Yes - creates ownership of the program.</p> <p>Yes - create ownership and enthusiasm.</p> <p>Yes - employees took ownership.</p> <p>Yes - continuous improvement mechanism.</p> <p>To be done.</p> <p>Yes - employee involvement, being used to facilitate reengineering initiatives.</p>
Benchmarking		<p>Yes - showed us how we're doing with outside carriers.</p> <p>Yes - proved conclusively we were ahead of curve.</p> <p>Yes - for consistency with Peterborough.</p>
ET&D		<p>Yes - created confidence, self esteem.</p> <p>Yes - made a better workplace.</p> <p>Yes - supervisors improving their communication skills; employees took stress seminar.</p>
PDSA Cycle		<p>Yes - gave employees a look at where the business is now and where we would like to be .</p>
Bootcamp		<p>Yes - revitalized the effort.</p> <p>Planned to undertake.</p> <p>Yes - excellent ET&D process.</p> <p>Planned - perfect start, fix mindset.</p>
Forming "B" Infrastructure		<p>Yes - provide consistent direction.</p> <p>Underway.</p>
Defining a Great Performance		<p>Yes - gives goals.</p> <p>Yes - goals and expectations set .</p> <p>Gives up-to-date information.</p> <p>Yes - consistency with Peterborough.</p>
The Grand Strategy System Approach		<p>Yes.</p> <p>Yes.</p>
Employee Survey		<p>Yes/No - performance slipped over previous survey.</p> <p>Planned.</p>

VMS		Not up as of yet. Not implemented at this time. Being designed - excellent method for reporting results. Not in yet - excellent tool. Yes - effective tool to share information and performance.
Supervisor Affinity Group		Just started. Yes - ease tension and anxiety. Yes - to engage supervision in DSOTF initiative.
Chartbooks		Yes - history is a great lesson.
Daily Shift Meetings		Yes - communication tool, good forum to share info & key performance indicators.

Section 4.7.1 presented lessons learned on GSS interventions by PDSOF experts involved in the project. So far, other Distribution Centers have started to implement all but two (customer focus groups and red teams) of those same interventions mentioned in 4.7.1. Many of the other interventions the DMs said they were currently implementing in their warehouses (but weren't listed in 4.7.1 as Peterborough lessons learned) were either started with the PDSOF project or used within the project. For example, Peterborough established a library, used the PDSA improvement cycle, formed a "B" infrastructure, attended bootcamps, and of course, used the Grand Strategy System Approach.

CHAPTER 5 - CONCLUSIONS

The purpose of the conclusions chapter (Chapter 5) is to convert information gained from the research into conclusions, i.e. answers to the research questions. I interpreted the information from my analysis, and drew conclusions from:

- 1) the data and information from my study (Chapter 4)
- 2) the information from my body of knowledge review (Chapter 2)

After presenting conclusions made with facts, data, and information, I then present conclusions based on my experience as a researcher. In the last section of this chapter, I address the issue of the GSS framework being generalizable to other situations or organizations.

5.1 Research Question 1- How has NG applied the GSS framework to improve the performance of their Peterborough warehouse?

The Gantt charts (Appendix C) and their summaries (Section 4.2) explicitly map how National Grocers applied the Grand Strategy System framework to improve the performance of the Peterborough warehouse. They followed the GSS theory, presented in Chapter 2, in regards to managing the change effort using a systems perspective. The effort sought to optimize Peterborough's entire distribution system from supplier (e.g. vendor alliances) to customer (e.g. customer focus groups, best practices). It is not clear whether the participants went through an analysis of the past, which is the first basic component of the GSS framework. The participants did, however, analyze the present situation of Peterborough and the NG Distribution System as a whole (GSS component 2) and defined the desired future state (GSS component 3). When the DSOTF project started to expand into other National Grocers' warehouses, the past was analyzed in regards to what worked/didn't work at Peterborough, critical incidences, and

methods/programs that have become a way of doing business. In regards to the fourth component of GSS, managing the nine fronts (subsystems), the PDSOF project was successful in integrating and managing the fronts in parallel throughout the effort. GSS theory identifies infrastructure, education, training and development, planning, measurement, and communication as being "lead" fronts that need to be focused on intensely within the first year of GSS implementation. From the gantt charts, it is obvious that each of these fronts was intensely focused on during the first year of GSS implementation, except perhaps the measurement front. The final key performance indicators were not finalized until September 1993. The slow process of getting the measurement front up and running is also supported by the lack of performance data before week 32 of 1993. Getting an early start on the measurement front was one of the lessons learned by the experts.

5.2 Research Question 2- Was the PDSOF project effective?

For this research, the PDSOF project was effective if the set goals of the project were obtained. To repeat, the set goals of the project were:

- 1) Achieve a minimum 30% performance improvement, which translates into a \$2.56 million cost reduction, or an increase in throughput of approximately 29,000 tons with no change in operating costs, or a combination of both.
- 2) Experiment with continuous improvement and reengineering simultaneously.
- 3) Sustain improvements over time. Sustain a culture/environment of continuous improvement and reengineering over time.

Below, I address each project goal separately and draw conclusions on effectiveness.

5.2.1 Project Goal 1: 30% Performance Improvement

As discussed in Section 4.3, 30% performance improvement was defined as achieving a total cost per ton of \$87.11 by project end. This improvement could be accomplished by

reducing costs and/or increasing output. As of June 4, 1994 the cost per ton average value was \$98.16. This value was a 21% improvement over the 1992 value of \$124.44, but did not match the goal of \$87.11/ton. Therefore, as the 30% is defined, the PDSOF project did not meet this goal.

Although the \$87.11/ton goal was not reached, Peterborough did notice some substantial gains in many performance indicators as of June 4, 1994. The percent improvements (and declines) are summarized in Table 5-1.

Table 5-1: % Change in Average Level of Peterborough Performance From Initial Data Period to June 4, 1994

Key Performance Indicators	Performance as of June 4, 1994
<i>Significant Improvement</i>	
Grocery total quality: scratches, shorts, mispicks, and damages per 1000 cases shipped by week	60% improvement
Grocery scratches per 1000 cases shipped by week	84% improvement
Grocery shorts per 1000 cases shipped by week	43% improvement
Grocery mispicks per 1000 cases shipped by week	72% improvement
Grocery damages per 1000 cases shipped by week	36% improvement
Produce shorts per 1000 cases shipped by week	40% improvement
Grocery replenishment pallets per hour by week	33% improvement
Total cost per shipped ton by period	21% improvement
Shipped tons per direct labour hour by week	37% improvement
Thruput (shipped+received) cases per direct labour hour by week	42.4% improvement
Grocery assembly cases per hour by week	29.2% improvement
Grocery putaway pallets per hour by week	24.9% improvement
<i>Minimal Improvement</i>	
Grocery receiving cases per hour by week	8.3% improvement
Total Percent Attendance by week	.26% improvement
<i>No Change</i>	
Produce mispicks per 1000 cases shipped by week	No change
Produce damages per 1000 cases shipped by week	No change
<i>Decline in Performance</i>	
Percent on-time arrival at customer by week	6.3% performance decline
Percent on-time departures from warehouse by week	1.4% performance decline

The goal statement was clear that improvements could not be obtained at the expense of quality measures such as mispicks, shorts, damages etc. In fact, the expectation was that Peterborough would achieve the performance improvement target while simultaneously improving performance on these and other quality indicators. Table 5-1 shows that as of June 4, 1994, grocery quality and produce shorts had improved but produce mispicks and damages had not changed.

It is my opinion, as a researcher, that the PDSOF project met its 30% performance improvement goal, if a broader view of what constitutes a 30% improvement is taken. I support this conclusion with the many gains in performance listed in Table 5-1. I also considered other improvements gained throughout the project, some of which were not measured or immeasurable. What Table 5-1 doesn't show are the inventory savings gained through the improvements in grocery quality indicators (i.e., scratches, shorts, mispicks and damages.) There is also no account for any performance improvement at the retail store generated by improved quality or enhanced customer relationships.

Also not reflected directly in the cost/ton indicator, or any other chartbook indicator, are improvements in issues such as quality of work life, communication, morale, and involvement. The performance qualitative data analyzed in Section 4.5.1 indicate that employees believed there were improvements in a number of factors such as working conditions, communication, leadership, coworker relations, feedback, autonomy, customer satisfaction, teamwork, responsibility, task significance, management relations, and involvement in planning, problem solving, and decision making (Table 4-8).

Many Peterborough interventions had/will have a positive cost and time savings impact on the total NG Distribution System. The DDT has identified three such interventions:

customer focus groups, the Warehouse Management System, and the slow moving warehouse prototype. Customer focus groups have increased communication with and satisfaction of Peterborough customers. The initiative clearly demonstrated that stacking product in a better manner can increase sales at the store level. The new warehouse management system (WMS) is expected to save the Peterborough branch \$250,000 once it is installed. The slow moving prototype was a first time initiative within NG. Due to the success at the Peterborough branch, the company has made the decision to build a designated slow moving product warehouse which will service all of Ontario. Total inventory savings for NG is expected to be twelve million dollars.

There are many GSS initiatives that started at Peterborough, from which all of NG will eventually benefit. Since Peterborough was a "test site" for GSS implementation, it allowed experimentation and provided the opportunities to work out the "bugs" in new methods, tools, and interventions. Interventions such as the Visible Management System (chartbooks and visibility boards), weekly and daily shift meetings, all-hand meetings, the empowerment process, and infrastructure teams are currently being implemented at the other NG warehouses. The implementation of these and other interventions in all NG warehouses will be easier because they can build on what Peterborough has already done.

There are also initiatives which helped improve performance at Peterborough but were not a new way of doing business within NG. The DDT calculated that the bond room initiative at Peterborough was a \$92,000/year savings to the distribution system. The shipped tons per direct labour hour control chart reflects the performance improvement impact after the bond was moved to Erin Mills. The DDT also felt that the Dallas inventory system improved the performance of the Peterborough warehouse. The thruput cases per direct labour hour control chart reflects the impact of Dallas.

5.2.2 Project Goal 2: Continuous Improvement & Reengineering Simultaneously

The second goal of the project was to experiment with continuous improvement and reengineering simultaneously. This goal was accomplished in the PDSOF project. As mentioned in the technology front summary (p. 100), Type I and II technologies were candidates for continuous improvement whereas Type III technologies were candidates for reengineering. Continuous improvement was used in PAT activities. Examples of PAT project include:

- Relocate product locations in the warehouse to promote easier, faster assembly
- Improve receiving function
- Fairly schedule labor in accordance with seasonal and weekly, daily demands
- Use of one standard pallet

Reengineering initiatives were fundamental changes in the way the warehouse did business. Examples of reengineering initiatives were the Dallas system, cross docking, and transshipment (see Appendix I). Continuous improvement and reengineering interventions can be found throughout the gantt charts in Appendix C.

5.2.3 Project Goal 3: Sustain Improvements & Culture Over Time

The first part of goal 3 was to sustain improvements over time. Tables 4-3,4,5,6,7 provided information on how the warehouse was performing, on average, during June 4, 1994 versus initial average performance. Table 5-2 compares the average performance level in June 4, 1994 to the average performance level after that date.

Table 5-2: Peterborough Average Performance Level After June 4, 1994

Key Performance Indicators	Performance after June 4, 1994
<i>Improvement</i>	
Produce damages per 1000 cases shipped by week	70.86% improvement
Grocery scratches per 1000 cases shipped by week	44.4% improvement
Grocery assembly cases per hour by week	5.06% improvement, but on the decline
Grocery total quality: scratches, shorts, mispicks, and damages per 1000 cases shipped by week	2.07% improvement
Percent on-time arrival at customer by week	6.1% improvement *
Percent on-time departures from warehouse by week	3.81% improvement *
<i>No Change</i>	
Grocery mispicks per 1000 cases shipped by week	
Total cost per shipped ton by period	
Shipped tons per direct labour hour by week	
Grocery putaway pallets per hour by week	
Produce shorts per 1000 cases shipped by week	
<i>Decline in Performance (% decline from June 4, 1994 performance average)</i>	
Produce mispicks per 1000 cases shipped by week	90% performance decline
Grocery damages per 1000 cases shipped by week	86.8 % performance decline
Grocery receiving cases per hour by week	10.2% performance decline
Grocery replenishment pallets per hour by week	7.56% performance decline
Thruput (shipped+received) cases per direct labour hour by week	4.78% performance decline
Total Percent Attendance by week	1.17% performance decline
Grocery shorts per 1000 cases shipped by week	1.77% performance decline

* As depicted in Table 5-1, the performance of these indicators from initial data period to June 4, 1994 had declined.

From Table 5-2, it is apparent that the PDSOF project failed on hold performance constant (or at an increasing performance level) for seven of the key performance indicators after June 4, 1994. Produce damages, grocery scratches, grocery assembly, and grocery total quality are the only indicators that showed improvements over the average June 4, 1994 performance level. Percent on-time arrivals and on-time departures

improved over the June 1994 average, but as Table 5-1 shows, the June 1994 average was less than the initial performance level.

After discussing part one of goal statement 3 with several project experts, I discovered that the goal was really to keep incrementally improving performance over time, not sustain the same performance level. Therefore, the PDSOF project did not fully achieve this goal.

As mentioned previously, the performance qualitative data analyzed in Section 4.5.1 indicate that the Peterborough experts (employees) believed that there were improvements in a number of factors from December 1993 to November 1994, such as working conditions, communication, leadership, coworker relations, feedback, autonomy, teamwork, responsibility, task significance, management relations, and involvement in planning, problem solving, and decision making. However, some experts on the Design and Development Team (DDT) and Steering Committee (SC) perceived a stalling or regression of performance nine months after the PDSOF project end. This perceived decrease in performance was not only for measurable chartbook indicators, but for issues such as attitude, commitment, and communication. The front gantt charts also show that steps were taken to try to deal with the perceived decreases in performance (bootcamps, CAST team interventions, education etc.). The Affinity diagram for February 27, 1995 shows a mix of perceptions on whether quality of work life (QWL) had improved or not. However, there was a definite increase in negative perceptions of QWL between the February 1995 questionnaire and the previous questionnaire in November 1994.

The 1994 NG Distribution Warehouse Survey has not been administered yet. However, the 1993 Survey was administered in June 1994. So actually, the 1993 Survey is biased with 1994 experiences. Analysis of the 1992 to 1993 NG Distribution Warehouse Survey indicates a decrease in QWL for Peterborough (Figure 4-9,10,11). With this information and the Affinity diagrams, I conclude that the PDSOF project was not successful in sustaining improvements over time for unmeasured performance indicators on QWL (DDT/SC questionnaire) and measured QWL indicators (NG Distribution Warehouse Survey 1993).

The second part of goal 3 was to sustain a culture/environment of continuous improvement and reengineering over time. As concluded in Section 5.2.2, continuous improvement and reengineering improvement methods were used throughout the project. But were those methods used after June 4, 1994?

All front gantt charts show improvement interventions taking place after June 4, 1994 that were mostly continuous improvement projects like continuation of PAT activities and formation of new PATs. Most of the reengineering efforts, focusing on implementing warehouse technologies, continued throughout 1994. However, no new reengineering initiatives seemed to start after June 4, 1994. The qualitative data from the DDT/SC questionnaire, as mentioned previously, seems to indicate that a culture of continuous improvement/reengineering was not in existence in February 1995. The DDT and SC members perceived that the project was not moving ahead, i.e. not continuously improving. So, overall I conclude that methods of continuous improvement were used past June 4, 1994, but that a culture/environment of continuous improvement and reengineering was not sustained over time.

5.2.4 Overall Conclusion On Project Effectiveness

My research type is summative evaluation, which was explained in Section 2.5 in the Body of Knowledge review. To reiterate, "...Summative evaluations serve the purpose of rendering an overall judgment about the effectiveness of a program, policy, or product....." (Patton, 1990). Based on Patton's description, I conclude that overall the PDSOF project was effective. Even though goal 1 was not met specifically the way it was defined, data show that significant improvements were made within the 18 month period of performance (Table 5-1). Goal 2 was met, supported by the front gantt charts. Goal 3 was not totally met. Continuous improvements in chartbook indicators was apparent for four out of eighteen indicators. Data indicate that continuous improvement in quality of work life issues over time, which feeds into sustaining a culture/environment of continuous improvement and reengineering over time, did not happen. As a researcher, I conclude that Peterborough gained considerable improvements during the PDSOF project, and it is my belief that the use of the GSS framework for organizational change has the potential of being effective and generalizable to other situations within National Grocers and other organizations.

Decrease or leveling off of some performance indicators took place after June 4, 1994 (Section 5.2.3). Analysis of the DDT/SC questionnaire indicates that there was also a decrease in performance for issues such as attitude, morale, involvement, and commitment. It is my conclusion that this phase of stagnation or regression is typical and predictable. It does not indicate that the project itself was not effective. I base this conclusion on theory presented in Chapter 2. Section 2.2.1 presented the concept of incremental change versus strategic change. In incremental change, an organization is proceeding up an S-shaped performance curve. In strategic change, an organization has improved up to a point where it can no longer improve unless a significant change is

made to the process. The organization adopts a radically new process, method, or technology in order to move to an increased level of performance, i.e. a new S-shaped curve. When the organization first makes the leap to the new process there is a decrease in performance. But once the new process is stabilized, continuous incremental improvement can begin again and the organization moves up the new S-shaped curve. I believe that the decrease in performance Peterborough is currently experiencing is explained by this theory of change. Figure 5-1 depicts the change process from incremental change to strategic change that possibly Peterborough went through. The warehouse moved up several S-shaped curves through continuous improvement. The warehouse also jumped to several new S-shaped curves through its reengineering efforts. I conclude that Peterborough is currently operating at one of three possible places, indicated in Figure 5-1 with stars (*).

Peterborough could be experiencing a decrease in performance because the warehouse has jumped to a new S-shaped curve (*). Or, Peterborough could be experiencing difficulty working its way up a S-shaped curve (**). Finally, I propose that Peterborough could be at the top of a S-shaped curve and having difficulty moving to a new one (***). Instead of moving to a new level of performance, the warehouse is regressing back down the curve.

Levy's (1986) explanation of the cycle of second-order change (Section 2.3.3.2) could also be used to explain/predict Peterborough's current stage of stagnation/regression. Peterborough could currently be in between the transition and development stage (Figure 2-6). At this point, the warehouse would be managing the transition from an unstable state to a new stable state. Or, Peterborough could currently be in between development and decline. At this point, the warehouse has stabilized their change program, but since

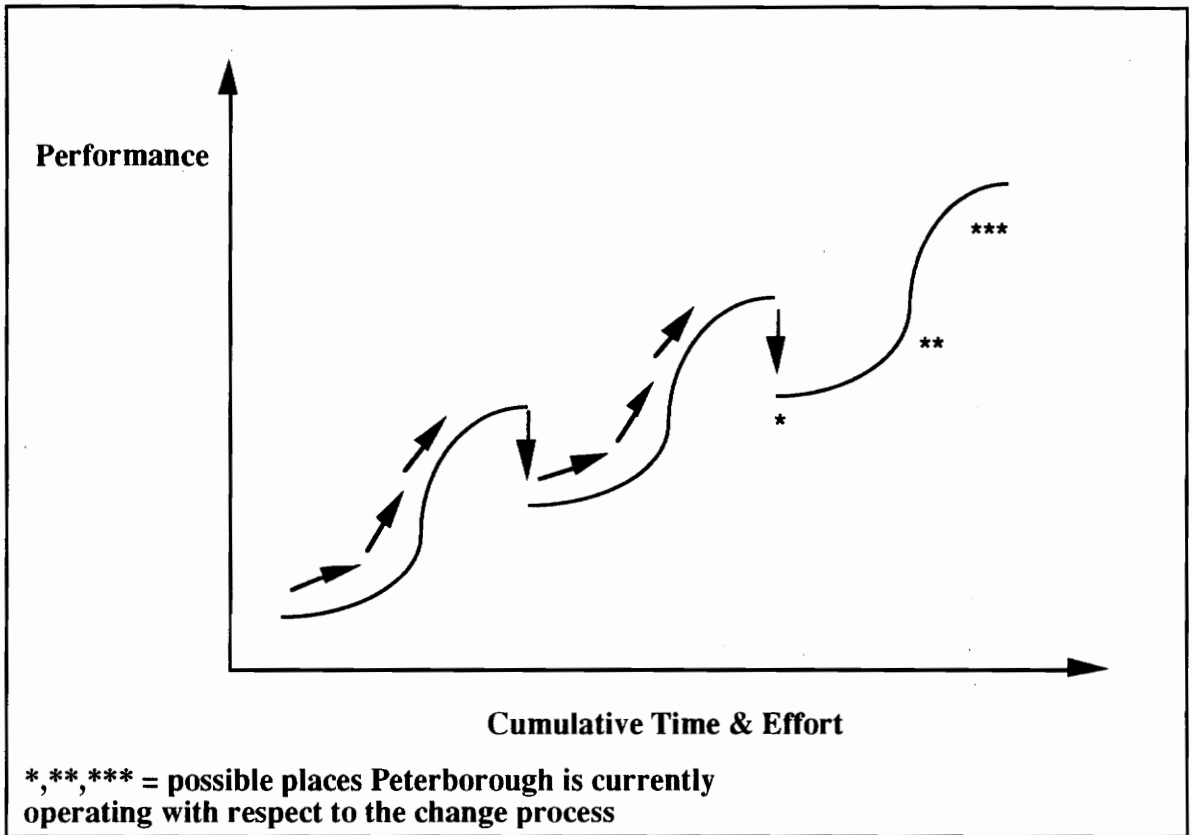


Figure 5-1: Possible Explanations for Peterborough's Decrease in Performance Level (adapted from Foster, 1985)

that time problems have arisen. Efforts to cope with the problems through continuous improvement are not working and "crises, chaos, procrastination, and efforts to go back to basics" (Levy, p. 13, 1986) are occurring.

GSS development is a 3-5 year project. "By year 4 or 5 the organization should have a stable program of performance improvement assuming sufficient resource allocation has been applied" (Sink and Poirier, 1994, p. 6). During the 3-5 years implementing a GSS, it is easy for "entropy" to increase (loss of momentum). Peterborough's GSS effort is in its third year. It is possible that entropy has increased in Peterborough's GSS effort. The

DDT 's job is to ensure this does not happen, but the DDT for National Grocers dissolved after the PDSOF project official ended. In Section 2.3.3.1, I presented the phases of client change from Sink and Morris (1995). The last phase of change was "reinforcing the new behavior" to be replicated. I do not believe that the PDSOF project was effective in the area of motivation. The lack of rewards and reinforcement could have caused Peterborough's stagnation/regression.

5.3 Research Question 2b- Was the GSS framework effective in the PDSOF project?

If implementing the GSS framework in Peterborough was the cause of shifts in performance, then one would expect not to see a shift in performance, over the same time period, for the two warehouses who did not implement GSS. Furthermore, if GSS implementation was the cause of performance results, a statistically significant difference in performance before GSS and after GSS should exist for Peterborough. I compared four common key performance measures between the experimental group (Peterborough) and the control group (Chatham and Sudbury).

Analysis of the cost/ton measure indicates that there is support for a cause and effect relationship between GSS implementation and cost/ton improvement at Peterborough. Both Figure 4-6 and Table 4-15 show that Peterborough's process changed significantly whereas Chatham and Sudbury's stayed the same. Not only did Peterborough change, but the change in performance was positive for this indicator (cost/ton decreased). The Peterborough control chart in Appendix H shows possible interventions that caused Peterborough's shift in performance.

Analysis of the percent on-time arrivals measure does not indicate a cause and effect relation between GSS implementation and Peterborough performance in this measure.

Both Figure 4-7 and Table 4-16 show that there was no statistically significant difference in Peterborough, Chatham, or Sudbury's performance before and after GSS implementation.

Analysis of the grocery shorts/1000 cases performance measure indicates that there is support for a cause and effect relationship between GSS implementation and grocery shorts improvement at Peterborough. Both Figure 4-8 and Table 4-17 show that Peterborough and Sudbury's process changed significantly whereas Chatham's stayed the same. Not only did Peterborough change, but the change in performance was positive for this indicator (grocery shorts decreased). Sudbury's change, however was negative for this indicator (grocery shorts increased). The Peterborough control chart in Appendix H shows possible interventions that caused Peterborough's shift in performance.

Analysis of the quality of work life measures in the NG Distribution Warehouse Survey is inconclusive with respect to whether GSS was the cause for shifts in this measure for Peterborough. Data are available for 1991, which was the period before the GSS interventions started, but data on QWL indicators are not available for the period after the project ended (1994 Survey). The closest data to the ending date are the 1993 responses.

A common shift in all warehouses occurred in Survey question one, asking how secure they felt in their current position. Clearly something happened between 1992 and 1993 that effected all three warehouses with respect to employee feelings of job security. Possibly the DSOTF project caused this insecurity. Peterborough was the only warehouse where security increased between 1991 and 1992. Possibly the employees felt that since their warehouse was picked to try this new change framework, and money

invested in the effort, that their jobs were secure. It is my opinion that the laying off of the part-time workers during 1993 caused Peterborough employee job insecurity to rise.

Chatham and Peterborough's results for Survey questions two to five, show that Peterborough and Chatham's performance increased between 1991 to 1992 and then dropped from 1992 to 1993. Sudbury's performance, however, dropped between 1991 to 1992 and then increased from 1992 to 1993 (Figure 4-10 and Figure 4-11). It is possible that GSS implementation caused a decrease in Peterborough performance for the quality of work life indicators, however Chatham also showed a decrease.

Based on the analysis of all four common key performance measures, I conclude that Peterborough warehouse performance significantly changed during GSS implementation. Since Peterborough's performance changed, and Chatham and Sudbury's didn't (or changed for the worse) I believe that it was GSS implementation that led to the performance improvement gains, and possibly caused the decrease in quality of work life detected in the NG Distribution Warehouse Survey.

5.4 Research Question 3- What advice would the project participants give to others implementing a GSS, that they believe would lead to greater performance improvements?

Section 4.7.1 documents the lessons the PDSOF project participants learned through the 18 month effort. Section 4.7.2 documents what advice PDSOF project participants actually gave to other NG warehouses implementing a GSS framework. So far, other Distribution Centers have started to implement all but two (customer focus groups and red teams) of the interventions mentioned in Section 4.7.1. This fact indicates that the experts involved with the PDSOF project did take what they learned and transfer it to the other distribution centers. This conclusion is backed by the Distribution Managers'

(DMs) responses to the question- "why did you implement that intervention?" DM responses that lend support to a transfer of learning were:

- Successful at Peterborough
- Suggested/recommended by PDSOF participants

5.5 GSS Effectiveness: Generalization to Other Situations

"..Summative evaluations serve the purpose of rendering an overall judgment about the effectiveness of a program, policy, or product for the purpose of saying that the idea itself is or is not effective and, therefore, has the potential of being generalizable to other situations" (Patton, 1990). In Section 5.2.4, I concluded that overall, the PDSOF project was effective. In Section 5.3, I concluded that there is a high probability that GSS implementation was the cause of the performance results at Peterborough. Based on these conclusions, and experience as a researcher and project participant, I conclude that use of the GSS framework for organizational change is effective and, therefore, has the potential of being generalizable to other situations. I explore these "other situations" below, establishing the domain to which the study's findings can be generalized and taking into consideration the external validity issue in regards to making those generalizations. Also, a key assumption in summative evaluation research is that what works one place under specified conditions should work elsewhere. The "specified conditions" that the PDSOF project operated under can be found in the extensive documentation of project, specifically:

- Section 1.1-Background of the Project,
- Section 4.2-Data to Information on Front Interventions
- Section 4.5.1-Monthly Chartbook and DDT/SC Questionnaires
- Section 4.7.1-Lessons Learned By Front
- Appendixes C, E, and G.

5.5.1 Generalization to Other National Grocers' Warehouses and Business Units

I conclude that other NG warehouses would be able to use the GSS framework for change and achieve similar performance results to those at Peterborough (perhaps better results by using the Peterborough lessons learned). This generalization is supported by the fact that the warehouses are all within one company and in the same country. They have similar technologies, operating procedures, infrastructure, product, and customers. All warehouses are starting to use the GSS framework, and if successful, the GSS framework's external validity would increase with multiple case studies.

I also conclude that GSS use is generalizable to areas within NG corporate operations, such as Finance, Information Systems, and Procurement. These employees are also operating within the same company. Some of them were involved in the PDSOF project, so they can help lead the effort within their business unit.

5.5.2 Generalization to United States Food Distribution Warehouses

The third generalization I make is to food distribution warehouses operating in the United States. The external validity of this generalization becomes a factor. I explored the differences between operating a food distribution warehouse in Canada vs. operating the same kind of warehouse in the United States. I spoke with several experts in the field of food distribution from Canada and the United States. They were:

- Chuck Handy: Food Manufacturing and Distribution, USDA
- Doug Richardson: VP National Grocers Association
- Rod Williams: Agriculture and Agra Food Canada, Food Services
- Rich Bacon: Secretary/Treasurer of The Food Distribution Research Society Inc.
- Paul Schulz: VP-Industrial Relations & Conventions at National American Wholesale Grocers Assoc. (NAWGA)

- Dennis Madsen: NAWGA
- Mary Davees: The Canadian Federation of Independent Grocers
- Walter Heller: Progressive Grocer

In Canada, food distribution is dominated by the few corporate grocery chains. These chains have their own distribution centers. There are eight major corporate distributors in Canada. They provide product not only to their respective chain stores, but also some independent retailers. Independent wholesalers (not affiliated with a chain) are smaller than the chain distribution centers, and are usually regionally based. To get discounts, independent retailers often partner with a few other independents and buy together from a distribution center. This is called a bind group. In some cases, a distribution center is supplying product to competing chain and independent stores for a certain region. This of course, leads to some problems. Whereas the chains and distribution centers are unionized, the majority of independent retailers are not. Recently, giant wholesalers such as Sam's Club and Wal-Mart are entering the Canadian market. These wholesalers threaten corporate distribution center business.

In the United States, food distribution is not dominated by corporate grocery chains to the same extent as in Canada. In fact, 56% of the food to a retail store comes from a wholesaler. The United States has more independent wholesalers than chain distribution centers. Also, the number of national chains in the United States is greater than in Canada.

Technology and operations would be similar between the two countries' warehouses. Differences would exist in expenses such as hourly wage rates and petroleum fuel costs. Union relations are different not only between countries, but between warehouses.

Geography and population density is a factor in delivery time. Other differences between the countries exist in safety requirements, health requirements, and labor laws.

From the information, I can identify several possible differences in implementing the GSS framework in the United States, as it was done in Peterborough, Canada.

Wholesalers in the United States are used primarily because they are cheaper and more cost effective. Because of this, results of implementing a GSS framework in a U.S. wholesaler may be less than the results realized at Peterborough. Perhaps U.S. wholesalers would not feel the pressure to change because they do not have a corporate body "requiring" it. Also, differences in management-union relations could be a possible roadblock to GSS implementation and success.

I believe that the GSS framework has the potential to be effective in distribution centers and wholesalers in the United States. However, the information on similarities and differences between operation in both counties presented in this section should be taken into account.

5.5.3 Generalization to Other Organizations

As mentioned in Chapter 2, the Virginia Quality and Productivity Center has had three significant opportunities to test the GSS in the field in the past four years, first with the New Production Reactors program in the Department of Energy, next with National Grocers, and then Botswana Telecommunications Corporation. Yin (1989) states that emergent theory must be tested through replication of the findings in a second or third case study. Perhaps after several additional replications and studies of GSS implementation are made, the framework can be proven as a method for effective large scale organizational change, no matter what the business or situation. Based on the data

and information I have, it is my conclusion that organizations needing a method for large scale organizational change would be successful with the GSS framework.

CHAPTER 6 - RECOMMENDATIONS

The purpose of my recommendations chapter (Chapter 6) is to convert the information I've gained from my research into decisions and actions. I will present decisions and actions for several audiences including Peterborough, other National Grocers' warehouses, National Grocers, and other organizations. In the case of Peterborough, other NG warehouses, and the company itself, some of the actions I recommend have already been implemented or are starting to be implemented. Most of the recommendations are for the Peterborough warehouse since it is the focus of this research.

6.1 The Peterborough Warehouse

Even though Peterborough's stagnation or regression can be predicted or explained by theory (p. 176-9), the situation needs to be addressed if Peterborough is going to be a continued success. I suggest the following actions:

- Hire someone for the vacant Change Agent position at Peterborough. Someone needs to re-energize and manage the continuous improvement effort.
- Have the Distribution Manager and Supervisors review their level of commitment and intention with respect to maintaining Peterborough's success.
- Do a root-cause analysis of Peterborough's failure to continuously improve.
- Begin to focus on measuring and improving quality of work life indicators such as trust, commitment, involvement, morale etc. Measure to be aware of performance and take action when problems are detected.
- Redesign the chartbook questionnaire. Portray, analyze and interpret the qualitative data collected. Take action when problems are detected.
- Make sure there is an understanding of and commitment to the 1995 performance goals.

- Continue holding all-hands meetings.
- Address possible underlying issues of PDSOF project "failure" because the cost/ton goal was not met.
- Learn new or improved techniques from the NG warehouses starting GSS implementation.
- Re-examine the Readiness for Change Equation with respect to Peterborough (p.24).
- Re-evaluate motivation front plans. Is there a system that rewards and reinforces new behavior?
- Determine if the fronts are in alignment. Is one too far out in front of the others?
- Address the performance problems outlined in Tables 5-1 and 5-2.
- Experiment with new interventions to keep people's interest.
- Have everyone track how much time they spend doing "A", "B", "C", and "D" activities: "A"=administrative tasks "B"=building the business tasks (continuous improvement oriented), "C"=handling crisis, "D" = doing the dumb. Employees need to spend a minimum of 15% of their efforts on "B" performance improvement activities in order for the warehouse to stay competitive.
- During daily shift meetings, have one person do a 5 minute presentation on a new tool/intervention, or something he/she has read that would help all employees with their work.
- Analyze the results of the 1994 NG Distribution Warehouse Survey. Compare them to the 1991-93 results.
- Continue with Customer Focus Groups/Best Practices and Vendor Alliances.

- The PLT should start using the chartbook more effectively. It is not apparent that decisions and actions are being made based on chartbook information.
- Re-administer the Peterborough Employee Survey. Do this every couple of months and address concerns or problems the survey uncovers.

6.2 Other National Grocers' Warehouses

Other National Grocers warehouses are beginning to implement GSS interventions. I would suggest the following actions:

- Read the Lessons Learned Section of this thesis (Section 4.7.1). Through analysis of the lessons learned other warehouses can have better plans, actions and possibly better results.
- Create a greater "pain" of staying with the status quo than the "pain" of going through change. Create a "burning platform" (p. 23).
- Have employees involved in the change effort so that they are more likely to accept the changes (ex. PATs, DDT, task forces).
- Start a list of lessons learned early on in the project, so that other warehouses may benefit from your experience.
- Be cautious of just implementing certain GSS interventions, like chartbooks or all-hands meetings. There needs to be an overarching strategy that ties interventions together.
- Involve your customers and suppliers early on in the change effort.
- Quickly begin measuring performance.

6.3 National Grocers

As more NG warehouses implement the GSS framework, along with corporate functions, the whole effort needs to be coordinated.

- Re-form the Design and Development Team for the DSOTF project.
- Let Peterborough know that they are not "done" with their GSS effort. As other warehouses start to implement GSS, Peterborough will be expected to be competitive.
- Continue to develop the Change Agent Support Team (CAST) and have them take on more responsibility.
- Administer the NG Distribution Warehouse Survey to all units of NG. Or, create a similar survey for the business units. What kinds of action can the company take based on this information?
- Make a video about the NG large scale change effort. Use it as a communication and education tool.

6.4 Other Organizations

In Section 5.5, I concluded that the use of the GSS framework for organizational change has the potential of being generalizable to other organizations orchestrating a large scale change effort. At a macro level, I suggest the following actions for other organizations:

- Research large scale organizational change and the GSS framework in particular.
- Review the documentation of the PDSOF project to get a clear picture of what was involved and the outcomes.

- Review the lessons learned to start out on the right track.
 - Communicate the change effort.
 - Create a version 1.0 of the overall project plan for at least 15 months.
Plan out each front month by month.
 - Form infrastructure teams.
 - Start a measurement system right away.
- Go back to the PDSOF project description (gant charts) and examine them more closely for guidance on orchestration of your particular effort.
- Benchmark National Grocers.
- Have a full time project manager to lead the effort. This person needs to be very disciplined with time management and lead and delegate effectively.
- Recognize that there is a price to pay, primarily in terms of time and effort, in doing large scale organizational change. Leaders and key participants in the effort must be willing and allowed to make this sacrifice.
- Work on the political front, particularly getting support of top management. Identify a Change Sponsor, Change Advocate, and Change Agents (p. 29).

CHAPTER 7 - REVIEW OF THESIS

In Chapter 7, I present my next steps as a researcher. I also evaluate my research by examining the degree to which I accomplished the measures of success outlined in Chapter 1.

As mentioned previously, I see my thesis/research as the first of several studies on the NG GSS effort. I list areas I believe further research should be conducted. Finally, I share lessons that I have learned in working through the research process. I believe this information can be valuable to future students undertaking a thesis or dissertation.

7.1 Next Steps as a Researcher

I see my main customers of this thesis to be the Distribution Managers of NG. I will submit a copy of my thesis to Dave Poirier, Senior Vice President of NG. Mr. Poirier will then distribute my thesis to the appropriate NG people, including the Distribution Managers (DMs). DMs could use my thesis as a "blueprint" for reference as they implement GSS in their warehouse. I will also submit a copy to the Distribution Manager of Peterborough, Dave Dexter. Peterborough can use my thesis as a review of their past, an evaluation of their present, and a tool to help them plan for the future.

7.2 Review of Measures of Success

In Chapter 1, I presented the measures I would consider to judge the success of my research. Table 7.1 lists these measures and the extent to which I have met them.

Table 7-1: Review of Measures of Success

Measure of Success	Completion?
Completed research outputs	Yes
Defend proposal in the middle of Fall '94 and defend thesis by Spring '95	Yes
Research adds to the body of knowledge on how organizational change is brought about	Yes
NG distributes thesis to Distribution Managers in their warehouses	In Process
Good job of organizing and presenting data in a meaningful and comprehensive way so that others understand the PDSOF project	I Believe So

7.3 Areas for Further Research

I see many areas that may be explored further as natural extensions of my research. One of the more important expansions of my research would be the study of GSS implementation in other NG areas and in other organizations. The more times GSS implementation is successful, the more valid the claim that the GSS framework is an effective method for organizational change. Yin (1989) states that emergent theory must be tested through replication of the findings in a second or third case study. Perhaps after several replications and studies of GSS implementation are made, the framework can be generalized as a method for large scale organizational change no matter what the business or situation.

7.3.1 Other National Grocers' Areas

Currently other NG warehouses are implementing the GSS framework. A documentation and evaluation of their efforts would be an area for further research. A comparison of results obtained and differences in implementation might lead to perfecting the GSS framework. Another interesting study would be comparing results gained in implementing the GSS framework in the warehouses versus results gained in the

corporate functions. Not only results could be compared, but also the method used to implement GSS. What does a "white collar" unit need to do differently than a "blue collar" unit?

7.3.2 Other Organizations

So far, the Virginia Quality and Productivity Center has had an opportunity to implement the GSS framework on a large scale in government, the food distribution industry, and the telecommunications industry. A comparison of ease of implementation, and/or results obtained would be interesting. Does GSS implementation work better in some industries than others?

7.3.3 Perceptions of Performance

In this thesis, I analyzed experts' perceptions of performance (Table 4-8). A further area of research could be comparing perceptions of performance against actual performance. Along those same lines, Figure 4-2 charted the methods/tools the experts used to form their perceptions. Another thesis could explore the topic of how perceptions are formed and design better tools to convey performance.

Through my analysis of the Peterborough performance qualitative data, it seemed that GSS implementation had a positive effect on quality of work life indicators during the PDSOF project. The NG Distribution Survey however, indicates that quality of work life decreased during GSS implementation. A further area of research could be focused on the effects GSS implementation has on less tangible aspects of performance such as job security, satisfaction, morale, and participation and how improvements in these areas can be sustained. When available, the 1994 NG Distribution Warehouse Survey results should be analyzed.

7.3.4 Transfer of Learning

In Section 4.7.2 and 5.4, I illustrated that the lessons Peterborough learned as they went through GSS implementation were transferred to the other NG warehouses as they began to implement GSS. An interesting research area would be to analyze how knowledge is passed on and if it has any effect on the receiver's performance.

7.3.5 Sustaining Results

Table 5-2 illustrated that many performance improvement gains were not sustained or enhanced once the PDSOF project ended. Theory states that loss of momentum and energy is predictable when taking on a change effort of great magnitude. How does an organization prevent stagnation or regression from occurring? How does it handle that situation if it has already occurred? Why does it occur in the first place? Is there another organizational change framework that needs to be implemented when entropy increases?

7.3.6 Time For Start-up, Implementation, and Results

GSS implementation is thought to be a 3-5 year initiative. Organizational change theory indicates that change of this magnitude takes a lot of work and time. How long does start-up of the GSS framework take? A study of the NG warehouses currently implementing the GSS framework might lead to useful information to answer this question. Since the other warehouses are building on what Peterborough has already done, is start-up faster in these warehouses? Is implementation? Are improvement results occurring sooner? How can the cycle time from initiation to results be shortened?

7.3.7 Cost/Benefit Analysis

A cost/benefit analysis of the PDSOF project would be another area for further research. What were the costs associated with doing this project (team participation, consulting

fees, resources, technologies, etc.) versus the benefits gained (performance increases, culture change, customer satisfaction, etc.)?

7.4 Lessons Learned

In this section of my thesis, I will share lessons that I have learned in working through the research process. This information can be valuable to future students undertaking a thesis or dissertation.

7.4.1 Preparing for Research

In the beginning, I did not have a good understanding of what research was or how to go about researching a particular topic and writing the research paper. Once I took a course in research methodologies, I had a better understanding of all aspects of research - doing a body of knowledge review, dimensions of research, types of research, types of methodologies, components of a proposal and final thesis, and the nature of research. A researcher should take a course in research as they are starting to write their thesis or dissertation. It is important not to take it before you start, because you can not ask questions relevant to your topic and you can not see how the concepts tie together unless you are actually doing it as you learn. The best time to take the course is while you are writing your pre-proposal (Chapter 1).

7.4.2 Writing the Pre-Proposal

The pre-proposal is Chapter 1 of your thesis. It includes key pieces of your research such as the research purpose, conceptual model, problem statement, research questions, and research objectives. I suggest having a pre-proposal meeting with your committee. This way, if there is a problem with one of these key pieces, you can make the changes before your proposal defense. Having a solid Chapter 1 will help you with your other chapters.

7.4.3 Buddy System

It is helpful to find a partner who is going through their research process at the same time as you. You can share ideas and give helpful feedback to each other. A buddy system also helps to push each person along in their research. I found it more effective to work with just one buddy as opposed to a group of graduate students. This way, the person you are specifically working with has a good understanding of your research problem and process.

7.4.4 Working With Your Committee

Each professor is different when it comes to keeping them abreast of your research progress. Find out what each of them prefers in terms of keeping in touch. Schedule your proposal and thesis defense as soon as possible because schedules fill up fast. Plus, it is a good forcing function to have a date you have to meet. Be aware that some committee members will give you detailed feedback on your document, while others will not.

7.4.5 Reviewing Your Work

It is helpful to have someone not involved with your research review your document. This fresh perspective will pick up on mistakes like grammatical and spelling errors, formatting errors, and sentences that do not make sense.

7.4.6 Proposal Defense

Depending on your committee and clarity of your proposal, your defense could be a formal presentation and then questions, or just questions. Be prepared for both. Have overheads available for a short summary of your proposal along with overheads of important tables or figures. Brainstorm possible questions and have prepared answers.

Have a friend at your defense to record changes the committee asks you to make, and the questions they ask you. All these points also apply to your thesis defense.

7.4.7 After Proposal Defense

After your proposal defense, it is easy to take a break from your research. It is important to not lose momentum. Write a memo to your committee on what changes you heard them tell you to make. Then rewrite your proposal to include those changes. Rewrite your proposal into the past tense.

7.4.8 Chapter Organization

I found it helpful to follow the Management Systems Model (Section 2.4.3) in organizing my chapters. Chapter 4 includes data, portrayals of the data, and information. Chapter 5 takes the information and turns it into conclusions. Chapter 6 uses the conclusions to recommend decisions and actions. Set up a table similar to my Table 3-3, to help guide you on taking data to information, using that information to answer the research questions, and recommending decisions and actions based on what you have learned.

Chapter 5 should include the answers to your research questions. In order to make this simple, organize Chapter 4 according to research question. This way, when you are drawing your conclusions, you know exactly where to look in Chapter 4 for the information.

7.4.9 Writing Down vs. Writing Up

I found it helpful to start with blank chapter files for each chapter. When I came across something that would fit into a certain chapter, I typed that thought into that chapter file. For example, while I was writing Chapter 4, I thought of a lesson learned to put in my

Chapter 7. Instead of trying to remember it until I starting writing Chapter 7, I entered it right away into my Chapter 7 file. When I entered it into Chapter 7 it was not a perfect paragraph, but rather notes to myself to help me remember my thought. This is what's called "writing down." When it was finally time to write Chapter 7, I took those notes and wrote a complete and grammatically correct paragraph. This is "writing up." Never say to yourself, "I'll be able to remember that" -- you won't.

7.4.10 Operational Research Model

The operational research model is a picture of the variables effecting the research (independent, dependent, moderating, and mediating). It is sometimes a flow diagram of the research methodology. A better operational research model for my research would begin with the 8/92 state of the Peterborough warehouse, then show the interventions and critical incidence during the project span, finally leading to the state of Peterborough performance in 6/94 with a check of performance against the project goals. This model would continue with the interventions and critical incidence after the project end date, leading to the state of Peterborough performance in 1/95 with another check of performance against the project goals.

7.4.11 Document Flow

My committee commented that my document flow was choppy in some places. Transitions between sections and sub-sections were not made smoothly. Perhaps this was caused by using a numbering system for structure. Other students should be aware of the flow of their document and possibly experiment with using a different structure.

APPENDIX A - BIBLIOGRAPHY/REFERENCES

- Adizes, I., (1988), *Corporate Lifecycles How and Why Corporations Grow and Die and What to Do About It*, Englewood Cliffs, NJ: Prentics Hall.
- Barczak, G., Smith, C. and Wilemon, D., (1985), "Managing Large-Scale Organizational Change," *Organizational Dynamics*, 23-35.
- Barnard, C.I., (1939), *The Functions of the Executive*, Cambridge, MA: Harvard University Press.
- Beaumariage, K., (1993), *Technical, Professional, and Administrative Cross-functional Employee Involvement: Case Studies on Affinity Groups*, diss.
- Bennis, W.G., Benne, K.D., and Chain, R., (1961), *The Planning of Change*, 4th Edition, New York: Holt, Rinehart, and Winston.
- Bolman L.G. and Deal, T.E., (1991), *Reframing Organizations*, San Francisco, CA: Jossey-Bass Inc.
- Brassard, M., (1988), *The Memory Jogger*, Methuen, MA: Goal/QPC.
- Brassard, M., (1989), *The Memory Jogger Plus+*, Methuen, MA: Goal/QPC.
- Clark, A., (1995), "Visible Measurement Systems Improve Performance," ASQC 49th Annual Quality Congress Proceedings.
- Cummings, T.G., Mohrman, A.M., and Mitroff, I.I., (1989), "The Actors in Large-Scale Organizational Change," *Large-Scale Organizational Change*, Allan Mohrman, et al., San Francisco, CA: Jossey-Bass Publishers, 91-99.
- Daft, R.L., (1982), "Antecedents of Significant and Not-So-Significant Organizational Research" in *What to Study: Generating and Developing Research Questions* (J.P. Campbell, R.L. Daft, and C.L. Hulin, eds.), Beverly Hills: Sage Publications.
- Deming, W.E., (1986), *Out of the Crisis*, Cambridge, MA: MIT Center for Advanced Engineering Study.
- Deming, W.E., (1993), *The New Economics*, Cambridge, MA: MIT Center for Advanced Engineering Study.
- Duck, J.D., (Nov.-Dec. 1993), "Managing Change: The Art of Balancing," *Harvard Business Review*, 109-118.
- Finney, M., Bowen, D.E., Pearson, C.M., and Siehl, Caren, (1988), "Designing Blueprints for Organizationwide Transformation," *Corporate Transformation: Revitalizing Organizations for a Competitive World*, Ralph Kilmann, et al., San Francisco, CA: Jossey-Bass Inc.

- Foster, R., (1986), *Innovation, The Attacker's Advantage*, New York: Summit Books.
- Kanter, R.M., (1984), *The Change Masters: Innovation & Entrepreneurship in the American Corporation*, New York, NY: Simon & Schuster, Inc.
- Katz, D. and Kahn, R.L., (1979), *The Social Psychology of Organizations*, 2nd Edition, New York: John Wiley and Sons.
- Kilman, R.K., (1989), "A Completely Integrated Program for Organizational Change," *Large-Scale Organizational Change*, Allan Mohrman, et al., San Francisco, CA: Jossey-Bass Publishers, 200-228.
- Kilman, R.K., (1989), *Managing Beyond the Quick Fix*, San Francisco, CA: Jossey-Bas Inc.
- Kilman, R.K., Covin, T.J. and Associates, (1988), *Corporate Transformation: Revitalizing Organizations for a Competitive World*, San Francisco, CA: Jossey-Bass Inc.
- Kurstedt, H.A., (1992), *Untitled Text*, Unpublished.
- Kurstedt, H.A., (1992), *A Project Management Approach to Theses and Dissertations*, Unpublished.
- Ledford, G.E., Mohrman, A.M., Mohrman, S.A., and Lawler, E.E., (1989), "The Phenomenon of Large-Scale Organizational Change," *Large-Scale Organizational Change*, Allan Mohrman, et al., San Francisco, CA: Jossey-Bass Publishers, 1-32.
- Leedy, P.D., (1989), *Practical Research: Planning and Design*, 4th Edition, New York, NY: Macmillan Publishing Company.
- Levy, A., (Summer 1986), "Second-Order Planned Change: Definition and Conceptualization," *Organizational Dynamics*, p15-20.
- Lewin, K., (1951), *Field Theory in Social Science*, New York: Marper & Row.
- Miles, M.B. and Huberman, A.M., (1984), *Qualitative Data Analysis: A Sourcebook of New Methods*, Newbury Park, CA: Sage Publications.
- Mohrman, A.M., Mohrman, S.A., Ledford, G.E., Cummings, T.G., Lawler, E.E., and Associations, (1989), *Large-Scale Organizational Change*, San Francisco, CA: Jossey-Bass Publishers.
- Morris, W.T., (1987), *Implementation Strategies for Industrial Engineers*, Columbus, OH: Grid Inc.
- Nadler, D.A., and Tushman, M.L., (1989), "Leadership for Organizational Change," *Large-Scale Organizational Change*, Allan Mohrman, et al., San Francisco, CA: Jossey-Bass Publishers, 100-199.
- Patton, M.Q., (1990), *Qualitative Evaluation and Research Methods*, 2nd Edition, Newbury Park, CA: Sage Publications, Inc.

- Salvendy, G., ed. (1992), *The Handbook of Industrial Engineers*, 2nd Edition, New York: Wiley and Sons.
- Schein, E.H., (1985), *Organizational Culture and Leadership*, San Francisco, CA: Jossey-Bass.
- Scholtes, P., (1988), *The Team Handbook*, Madison, WI: Joiner Associates Inc.
- Senge, P.M., (1990), *The Fifth Discipline*, New York: Doubleday/Currency.
- Simmers, C., (1994), *An Evaluative Study on Attempts to Improve the Quality of Processes for the U.S. Senate Productivity and Quality Award for Virginia*, thesis.
- Sink, D.S. and Monetta, D.J. (1991), "Continuous Improvement Engineering: Implementing a Grand Strategy System at the Office of New Production Reactors," *Quality and Productivity Management*, 9(4), 43-57.
- Sink, D.S. and Morris, W.T., (1995), *By What Method?* In press.
- Sink, D.S. and Poirier, D.F. (1994), "By What Method? A Case Study Update on the Application of Grand Strategy Systems Approach for Total Performance Improvement," 1994 Institute of Industrial Engineering Conference Proceedings.
- Sink, D.S. and Tuttle, T.C., (1989), *Planning and Measurement in Your Organization of the Future*, Norcross, GA: Industrial Engineering and Management Press.
- Van Aken, E., (1991), *A Multiple Case Study on the Information system to Support Self-Managing Teams*, thesis.
- Wallace, W., (1971), "Introduction: Science and Three Alternatives," *The Logic of Science in Sociology*, Chicago: IL, Aldine-Artherton, 11-29.
- Wheeler, D.J., (1993), *Understanding Variation: The Key to Managing Chaos*, Knoxville, TN: SPC Press, Inc.
- Yin, R.K., (1989), *Case Study Research: Design and Methods*, Newbury Park, CA: Sage Publications.
- Yin, R.K., (Sept., 1981), "The Case Study as a Serious Research Strategy," *Knowledge: Creation, Diffusion, Utilization*, p97-114.

APPENDIX B - THESIS PROJECT PLAN

Activity Name	Nov '94	Dec '94	Jan '95	Feb '95	Mar '95	Apr '95	May '95
	Write Chapter 4	██					
Collect and Organize (C/O) Data	██						
C/O Archival Data (Interventions, KPIs, performance qualitative data, lessons learned, goals)	██						
C/O Survey Data (Interventions, performance qualitative data, warehouse profiles)			████████████████				
Portrayal	██						
Warehouse performance quantitative data	██						
Interventions	██						
Qualitative Data: Affinity Diagrams, summaries, Warehouse Survey results			████████████████				
Other warehouse performance data			████████████████				
Lessons Learned listing				████████████████			
Analysis	██						
Interventions	██						
Qualitative Data: Affinity Diagrams, summaries, Warehouse Survey results				████████████████			
Other warehouse performance data				████████████████			
Lessons Learned listing				████████████████			
Conclusions: Write Chapter 5				████████████████████			
Recommendations: Write Chapter 6					████████████████		
Thesis Review: Write Chapter 7					████████████████		
Format Document						████████████████	
Thesis to committee							◆
Thesis defense							◆
Thesis turned in to Grad School							◆
Thesis rewrite due (if necessary)							◆

APPENDIX C - PETERBOROUGH INTERVENTION GANTT CHARTS

Planning Front 205

Infrastructure Front 208

Measurement Front 212

Communication Front..... 215

Education, Training and Development Front 219

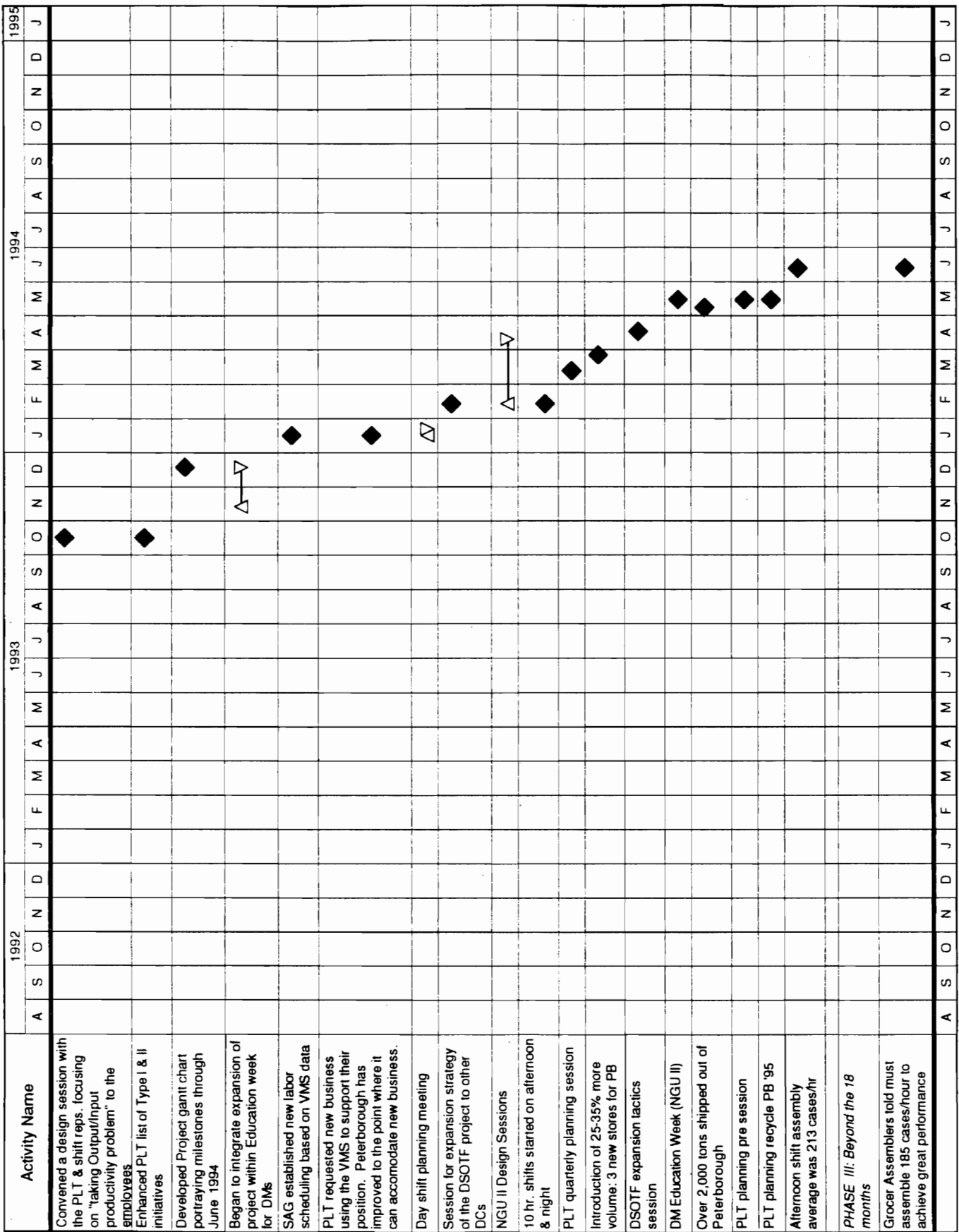
Technology Front 222

Motivation Front..... 224

Culture Front 226

Political Front (N/A)

Activity Name	1992					1993					1994					1995			
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	J
PLANNING																			
<i>PHASE I: Posturing for Action</i>																			
Initial Design Session	◆																		
Proposal Submission/ Proposed Review & Approval to proceed		◆																	
Project Mission & Vision			◆																
DDT 2 day working session (NGT exercise)				◆															
Version 1.0 of PDSof Plan					◆														
Bootcamp I: Strategy Session																			
Version 2.0 of PDSof Plan																			
PLT 2 day working session (NGT exercise)																			
<i>PHASE II: Implementation & Deployment</i>																			
Bootcamp II: Strategy Production Workshop																			
Version 3.0 of PDSof Plan																			
Version 4.0 of PDSof Plan																			
Version 1.0 of Technology Plans																			
Version 1.0 of Enabler Plans																			
Red Team I critique of plan																			
Next 6 month activity planning session by the DDT																			
Version 2.0 of Technology Plans																			
Version 2.0 of Enabler Plans																			
Version 5.0 of PDSof Plan																			
Red Team II critique of plan																			
Joint NGV/QPC Mid-Term Design Sessions																			
Drafted planning calendar integrating activities across all DSOTF from task forces																			



Activity Name	1992												1993												1994												1995													
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J		
PLT bootcamp I																																																		
Peterborough Cycle II Bootcamp																																																		
PLT bootcamp recycle (II)																																																		
CAST & TAG bootcamp I																																																		
CAST Bootcamp II Follow-up: Concern about Peterborough Performance																																																		
2 PLT members attend Ottawa bootcamp																																																		
CAST presents their assessment for a move forward for Peterborough to the PLT																																																		
Stephen Hacker visits Peterborough to address PLT issues & Peterborough performance																																																		

Activity Name	1992					1993					1994					1995														
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	J	A	S	O	N	D	J	J	A	S	O	N
Facilitated joint meetings between DDT, PLT, SC																														
Developed system of shift teams & employee reps. with 3rd shift at PB. Implementing shift teams with other shifts																														
TAG (The Affinity Group) formed & maintained																														
SC/DDT joint meeting																														
PLT/DDT joint meeting																														
First PATs formed																														
Red Team formed																														
SC/DDT joint meeting																														
Customer Focus group																														
PLT/DDT joint meeting																														
Red Team/DDT meeting																														
Implementing system of shift teams & employee reps with day & afternoon shifts																														
Joint DDT & SC mtgs																														
DDT membership changed																														
Convened joint DDT/PLT meeting for planning & info sharing																														
Trained supervisors how to make effective & efficient manpower decisions based on VMS																														
SAG (Supervisor Affinity Group) initiated																														
PLT meeting																														
Developed Supervisor Affinity Grp																														
Eliminated Friday afternoon shift, enhanced Sunday shift																														
Put approx 20 part-timers on call																														
Transportation Affinity group																														
Began transportation affinity grp																														
Increased night shift receiving																														
PLT meeting																														

Activity Name	1992				1993				1994				1995					
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Day shift expanded. Daily shift meeting to include shift planning																		
DDT meeting																		
SC meeting																		
Customer focus group meeting for new stores																		
PLT update																		
Customer focus group all Value-Mart/Freshmart stores																		
SC meeting & DMT formed																		
CAST formed																		
Posted 1 more receiver & forklift on the night shift																		
Developed DSTOF expansion infrastructure																		
PHASE III: Beyond the 18 months																		
PLT meeting																		
Supervisor/shift rep affinity group meetings																		
VQPC project manager changed																		
PLT meeting																		
PLT meeting																		
PLT meeting																		
New members are voted onto the PLT by their respective shifts																		
PLT Meeting																		
Customer Focus Group update																		
DM Team meeting																		
Emergency PLT Meeting in reaction to employee survey results. Decision made to make meetings open to all employees																		
PLT meeting																		
Produce PAT visits Erin Mills																		
Customer focus group meeting																		
CAST presents their assessment for a move forward for Peterborough to the PLT																		

Activity Name	1992					1993					1994					1995		
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Produce PAT visits produce vendor Gemini																		◆

Activity Name	1992			1993			1994			1995										
	A	S	O	N	D	J	J	M	A	M	A	M	J	J	A	S	O	N	D	J
MEASUREMENT																				
<i>PHASE I: Posturing for Action</i>																				
30% PI target established	◆																			
30% defined - Great Performance exercise with DDT		◆																		
Measurement Task Force Formed				◆																
<i>PHASE II: Implementation & Deployment</i>																				
Key distribution processes identified							◆													
Established & maintained Measurement Task Force to support needs of DDT/Task force & PL T/PAT research & decision making							△													
Developed, implemented, currently improving VMS							△													
Developed measurement breakdown structure to assess performance over time at employee, team, warehouse, & distribution system level							△													
Key distribution processes mapped with flow charts							◆													
Input/Output analysis completed							◆													
Macro & Micro Performance Indicators developed							◆													
Developed visibility room at PB									◆											
Baseline performance graphed (5yrs)									◆											
Initial Design of VMS									◆											
PB performance rpt #1 posted									◆											
VMS in place									◆											
Customer focus group session									◆											
Implement VMS version 2.0									◆											
Finalized & adopted Measurement Breakdown structure to assess performance over time at employee, team, warehouse, & distribution system level									◆											

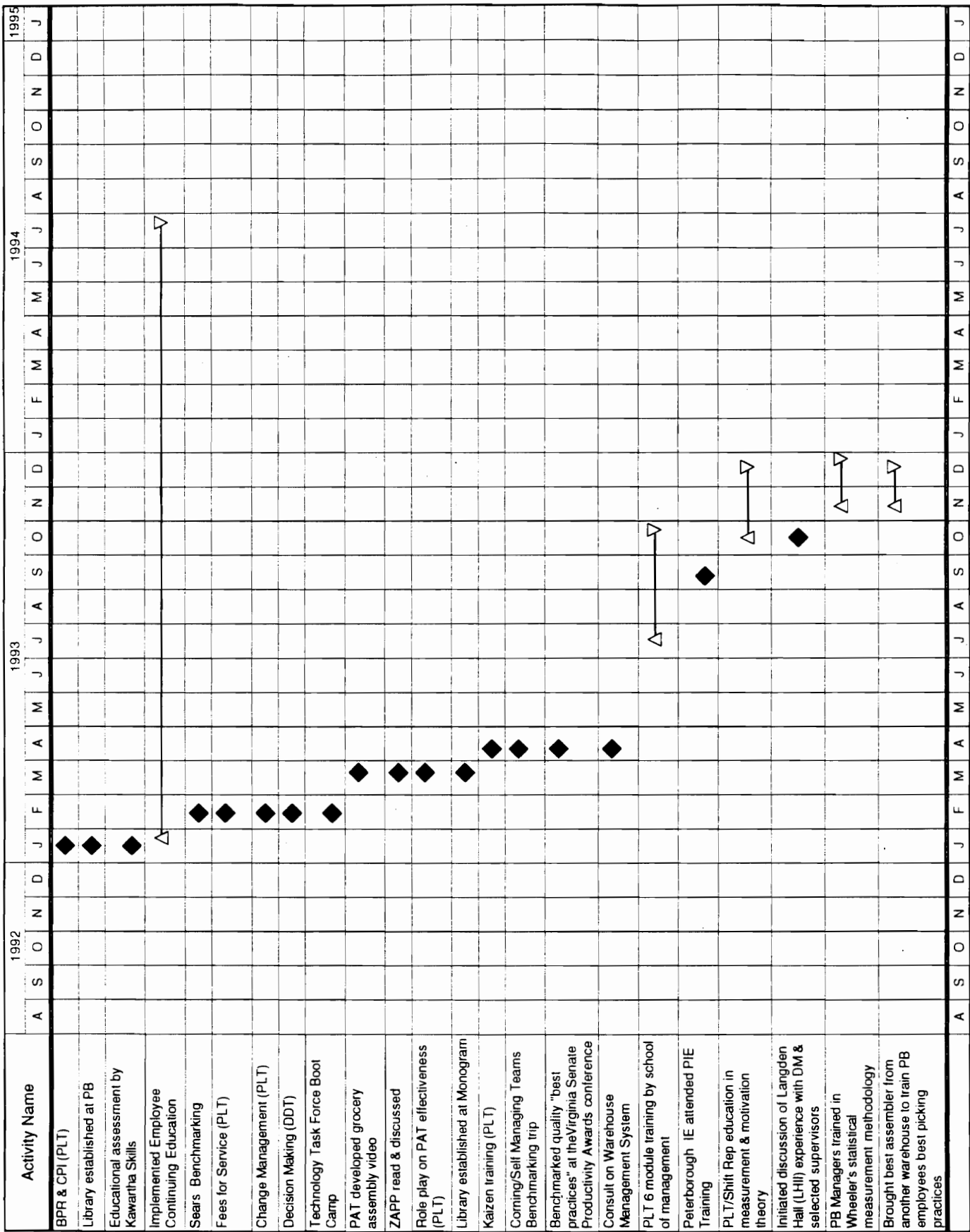
Activity Name	1992							1993							1994							1995											
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	D		
PLT continue interpretation of quantitative charts in monthly performance chartbook																																	
VMS expansion to Chatham begins																																	
Chartbook #4																																	
PLT chartbook interpretation meeting																																	
Chartbook #5																																	
PLT chartbook interpretation meeting																																	
PLT Chartbook Interpretation																																	
Valu-MART tour																																	
Chartbook #6																																	
Chartbook #7																																	
PHASE III: Beyond the 18 months																																	
Chartbook #8																																	
VMS PAT for Finance toured the warehouse																																	
Chartbook #9																																	
ISD measurement PAT visits Peterborough																																	
Chartbook #10: included PLT interpretation of qualitative chartbook data																																	
Chartbook #11																																	
Mike Sullivan reviewed great performance targets for 1995																																	

Activity Name	1992							1993							1994							1995															
	A	S	O	N	D	J	F	M	A	M	J	J	A	M	A	M	J	J	A	M	A	M	J	J	A	M	A	M	J	J	A	M	A	M	J	J	A
Top Management presentation																																					
PLT/PAT minutes posted																																					
PAT notebook developed																																					
Report to Affinity Group																																					
Red Team/DDT meeting																																					
Report made to Distribution Administration Grp																																					
Report made to CLT subgroup																																					
PLT put on E-mail																																					
Customer focus group																																					
All Hands meeting at PB																																					
Convened SC meeting & presented activities across all project fronts																																					
Employees took control of all hands meetings (designed for Nov 13)																																					
Re-established E-mail link between NG & VQPC																																					
Starting weekly shift mings at PB between employees & Dave D./Mgmt to share info on perf. & warehouse planning																																					
Distrib. & Procurement developed & implemented experimental reporting format to enhance prediction of the receiving function																																					
Employees ran November all-hands meeting at PB																																					
Customer store visits to improve slow mover service																																					
Letter to all customer regarding random quality checks																																					
All shifts presented new labor scheduling																																					
PLT presentation to Mike Scarfone - PB taking on new business																																					

Activity Name	1992												1993												1994												1995	
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	J	M	A	M	J	J	A	S	O	N	D	J								
The PLT hosted DMs and Supervisors from other warehouses and other functions in NG for project update and warehouse tour																																						
The DDT approved a plan and outline for the production of a Performance Improvement Handbook																																						
3 day shift assemblers visit Ottawa branch																																						
Employees run customer focus grps (cigs) for retail stores																																						
Making of empowerment video																																						
Union PLT members introduce the new store, grocery & produce managers to DSoF prj.																																						
Produce assemblers send intro letter to stores																																						
PB DM presentation to all shifts on how to achieve goal																																						
Top mgmnt spoke to PB employees about EM closure																																						
Performance Improvement Handbook presented to DMs																																						
Presentation to Dave Williams by PLT																																						
Performance Improvement Handbook to PLT																																						
Presentation to Finance DDT																																						
PHASE III: Beyond the 18 months																																						
Dave Dexter (DM) presentation to all shifts (subject: total expenses of warehouse)																																						
Mike Scarfone presentation to all shifts on the Erin Mills																																						
Update by Produce assembler on store issues with produce quality																																						
Letter sent to stores by produce assemblers																																						
All hands meeting: update on bootcamp and components of the wall																																						

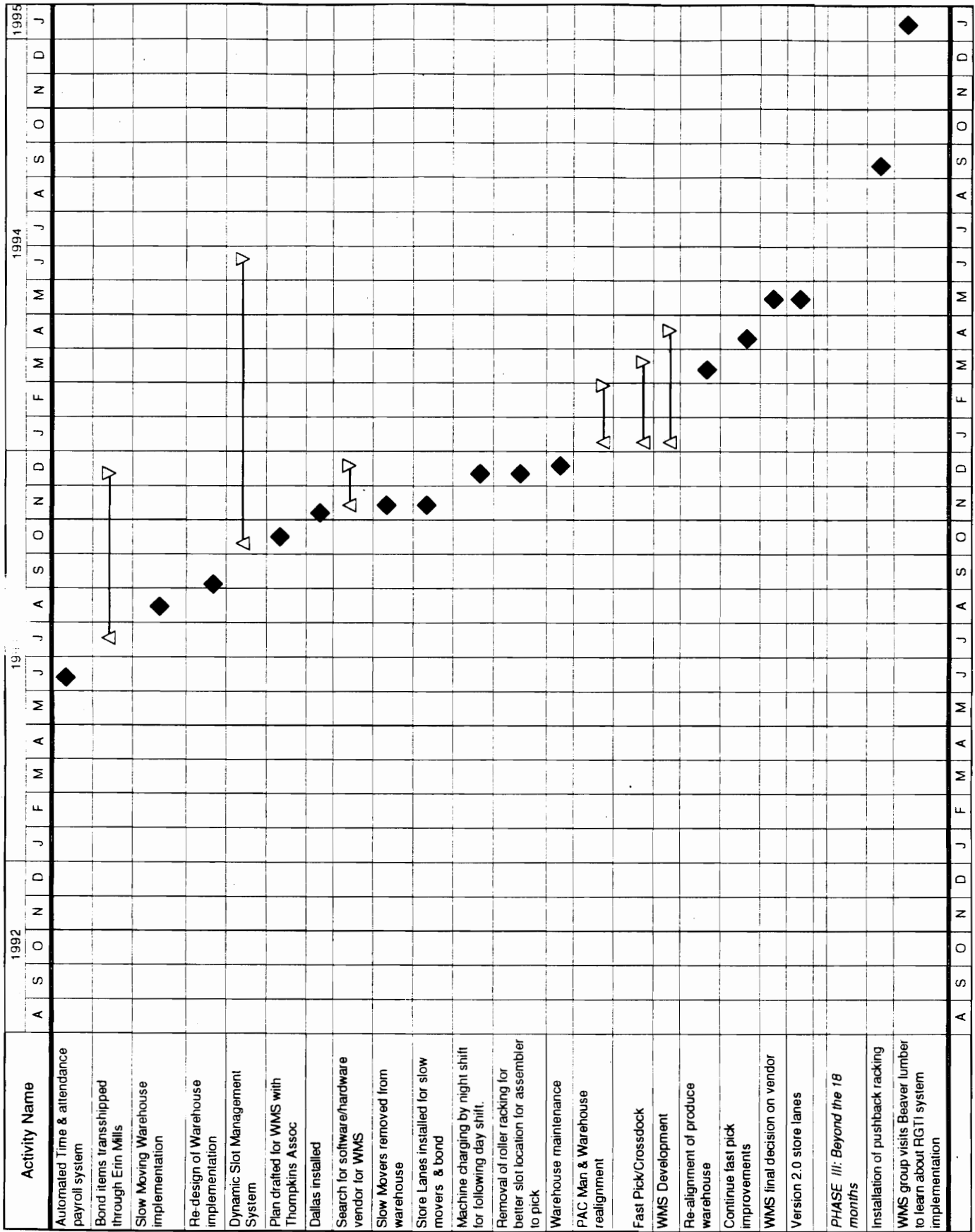
Activity Name	1992			1993					1994					1995				
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Ottawa supervisors visit Peterborough warehouse														◆				
Discussion of latest employee questionnaire with all shifts															◆			
All hands meeting																◆		
Andy Faas & Mike Scarfone visit Peterborough to see work of PLT and ensure team is progressing																◆		
All hands meeting																	◆	
Dave Dexter has meeting with all shifts																	◆	
Gayland Weston visited Peterborough to see progress of DSOTF initiative																		◆
3 PLT members visit Halifax warehouse to share Peterborough knowledge																		◆
Dave Dexter reviews 1995 budget with all shifts																		◆
Distribution budget posted in employee lunchroom																		◆
Email link NG & VQPC down																		◆

Activity Name	1992				1993				1994				1995												
	A	S	O	N	D	J	F	M	A	M	J	J	M	A	M	J	J	A	S	O	N	D	J		
ET&D																									
<i>PHASE 1: Posturing for Action</i>																									
DDT Baseline Body of Knowledge		Δ																							
Prework for DDT Foundational Training		Δ																							
GSS strategy training			◆																						
2 intensive days on levels of knowledge, systems thinking, Continuous Improvement, Change Masters, Meas & Great Perf, decision making			◆																						
DDT Foundational Training					◆																				
SC meeting and initial training					◆																				
DDT completes Personal & Professional Plans of Study					◆																				
Systems thinking					◆																				
Other VQPC educational modules					◆																				
Performance Improvement Engineer (PIE) training						◆																			
4-day Deming conference							◆																		
DDT viewed "visions" video							◆																		
Business Process Re-engineering							◆																		
Bootcamp I										◆															
Quality Tools (DDT)										◆															
Systems thinking (PLT)										◆															
Motivation theory										◆															
<i>PHASE 2: Implementation and Deployment</i>																									
Developed & delivered Leadership Training course for PLT																									
PLT Personal & Prof. Plan of Study																									
Bootcamp II																									
NG distribution pipeline (PLT)																									
Team Building (DDT/PLT)																									
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	J	A	S	O	N	D	J



Activity Name	1992												1993												1994												1995													
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J		
Employee education expanded to include intro to computers course																																																		
VQPC educational intervention of data interpretation																																																		
Designed and developed an evaluation instrument for PLT training																																																		
PLT training on measurement; charbook and VMS improvement																																																		
2nd course on intro to computers taught																																																		
LH II: Possibilities & Perf Improvement Planning, Implementation & Corporate Deployment Session with DMs																																																		
PLT customer focus group																																																		
NGU II DM GSS training																																																		
Largest vendor briefed on project																																																		
Final Report completed																																																		
PHASE III: Beyond the 18 months																																																		
PLT bootcamp I																																																		
Peterborough Cycle II Bootcamp																																																		
PLT bootcamp recycle (II)																																																		
CAST & TAG bootcamp I																																																		
Produce quality training seminar Ern Mills																																																		
CAST Bootcamp II Follow-up; Concern about Peterborough Performance																																																		
Stephen Hacker teaches PLT root cause analysis.																																																		

Activity Name	1992					1993					1994					1995														
	A	S	O	N	D	A	S	O	N	D	J	J	M	A	M	J	J	M	A	M	J	J	M	A	M	J	J			
TECHNOLOGY																														
<i>PHASE 1: Posturing for Action</i>																														
DDT & PLT completed NGT				◆																										
Ranked Strategy Statements				◆																										
Strategies divided into Technologies, Enablers, & Outcomes				◆																										
Technology strategy statements divided into Type I, II & III				◆																										
Technology Task Forces formed				◆																										
<i>PHASE 2: Implementation & Deployment</i>																														
Developed reporting process for technology development																														
Vendor Alliance																														
Dallas being implemented																														
Initial education on Just-in-time Warehouse Mgmt. System																														
Plan to transship slow-moving product out of Ottawa																														
Technologies Type I & IIs given to PLT for implementation																														
PATs #3, 15, 11, 36 formed																														
Technology Task Force Bootcamp																														
DDT narrows focus to 8 strategies																														
PATs #74, 78, 86, 79 formed																														
Red Team I: Technology Front Plan																														
Three Type III technologies given to PLT for implementation																														
PLT ranks current Type I & II for implementation priority																														
PATs #39, 28, 104, 106 formed																														
DDT narrows focus to 3 Type III technologies																														
Red Team III: Technology Front Plan																														



Activity Name	1992			1993												1994				1995	
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	J		
MOTIVATION																					
<i>PHASE 1: Posturing for Action</i>																					
Consequences exercise "what will happen if we do not get 30%?"		◆																			
Motivation Task Force formed				◆																	
Peterborough All-Hands meeting				◆																	
Motivation theory training				◆																	
<i>PHASE 2: Implementation & Deployment</i>																					
Job analysis (cards exercise) & redistribution with Supervisors						△															
Job analysis (cards exercise) & redistribution with DMs						△															
Completed job analysis (cards exercise) & redistribution with DM at PB						△															
P.E.P. redesigned to include supervisor perf appraisals						△															
Employee suggestion system developed & put in place						◆															
First employee survey written & given to union for review										◆											
Step 1 of P.E. P. redesign for supervisors appraisal system										◆											
Employee survey administered & results analyzed										◆											
Supervisor performance appraisal system designed										◆											
DDT & PLT QWL at ball game											◆										
Assembled ad hoc Motivation Task Force including members from PB, distribution, corp development, HR, retail, HF consulting, & strategic planning initiative																					
Convened Motivation Bootcamp																					
Administered second employee survey																					
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	J		

Activity Name	1992				1993				1994				1995					
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Developed list of 10 options for comprehensive motivation system in PB																		
Analyzed & distributed results of 2nd employee survey																		
Convened remaining Motivation Task Force meetings & arrived at consensus concerning development & implementation of reward system at PB																		
Convened 2 employee focus groups to ascertain the roadblocks employees felt were in the way of a motivated workforce																		
Developed & implemented system for employee feedback in form of grp & indiv. perf. reviews & weekly shift mings																		
Held a graduation night for the PLT in recognition of the successful completion of their training session																		
Empowerment program began																		
Employees rewarded with new volume																		
PHASE III: Beyond the 18 months																		
All employees go to Blue Jays game																		
PLT bootcamp I																		
Peterborough Cycle II Bootcamp																		
PLT bootcamp recycle (II)																		
CAST & TAG bootcamp																		
CAST bootcamp II Follow-up: Concern about Peterborough Performance																		
All shifts view "Team of Champions" video																		
Business of Paradigms was viewed by all shifts																		

Activity Name	1992							1993							1994							1995								
	A	S	O	N	D	J	F	A	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
CULTURE																														
<i>PHASE 2: Implementation and Deployment</i>																														
Established & monitored numerous PATs empowered to work on Type 1&2 projects																														
Notable improvement from PAT work in produce quality, maintenance tidiness, receiving efficiency, pallet re-work, damage reduction, & truck cleanliness																														
Shift teams responsible over some manpower allocation as well as into sharing between shifts																														
Developed and administered employee questionnaire to assess current attitudes & impression of the PDSofF project among PB employees																														
Identified & articulated key perf. problems which are integral to success of project.																														
Peterborough employee survey re-administered																														
Distribution & procurement working together more to solve receiving problems																														
Shifts working together to eliminate left over work across shifts																														
Continued PAT improvement efforts & began affinity group structure in some functional areas																														
Began inviting retail outlets who call the most shorts in to visit employees who assembled their load																														
Developed consensus among supervisory regarding empowerment program																														
Andy Faas visited PB & distributed certificate for PLT training																														
PLT bootcamp I																														

Activity Name	1992												1993												1994												1995					
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	J	A	S	O	N	D	J											
Peterborough Cycle II Bootcamp																																										
PLT bootcamp recycle (II)																																										
Feelings of stagnation and some regression																															<div style="display: flex; justify-content: space-around;"> ↙ ↔ ↘ </div>											

APPENDIX D - PETERBOROUGH CONTROL CHARTS

Chart of Major Improvement Interventions Mapped to Key Performance Indicators.....	229
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Distribution System Level Charts

• Total cost per shipped ton by period	230
• Shipped tons per direct labour hour by week	231
• Thruput (shipped+received) cases per direct labour hour by week.....	232
• Total Percent Attendance by week.....	233

Functional Area Charts

• Grocery receiving cases per hour by week	234
• Grocery putaway pallets per hour by week.....	235
• Grocery replenishment pallets per hour by week	236
• Grocery assembly cases per hour by week.....	237

Customer Service Charts

• Percent on-time departures from warehouse by week.....	238
• Percent on-time arrival at customer by week	239

Grocery Quality Charts

• Grocery total quality: scratches, shorts, mispicks, and damages per 1000 cases shipped by week	240
• Grocery scratches per 1000 cases shipped by week.....	241
• Grocery shorts per 1000 cases shipped by week.....	242
• Grocery mispicks per 1000 cases shipped by week.....	243
• Grocery damages per 1000 cases shipped by week.....	244

Produce Quality Charts

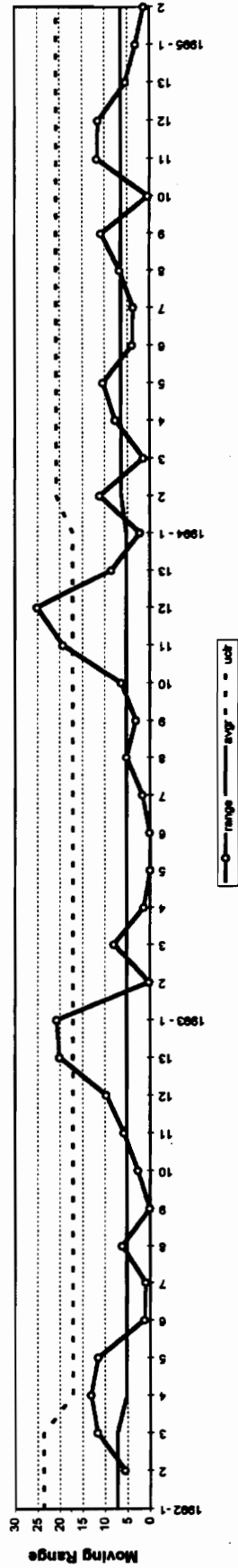
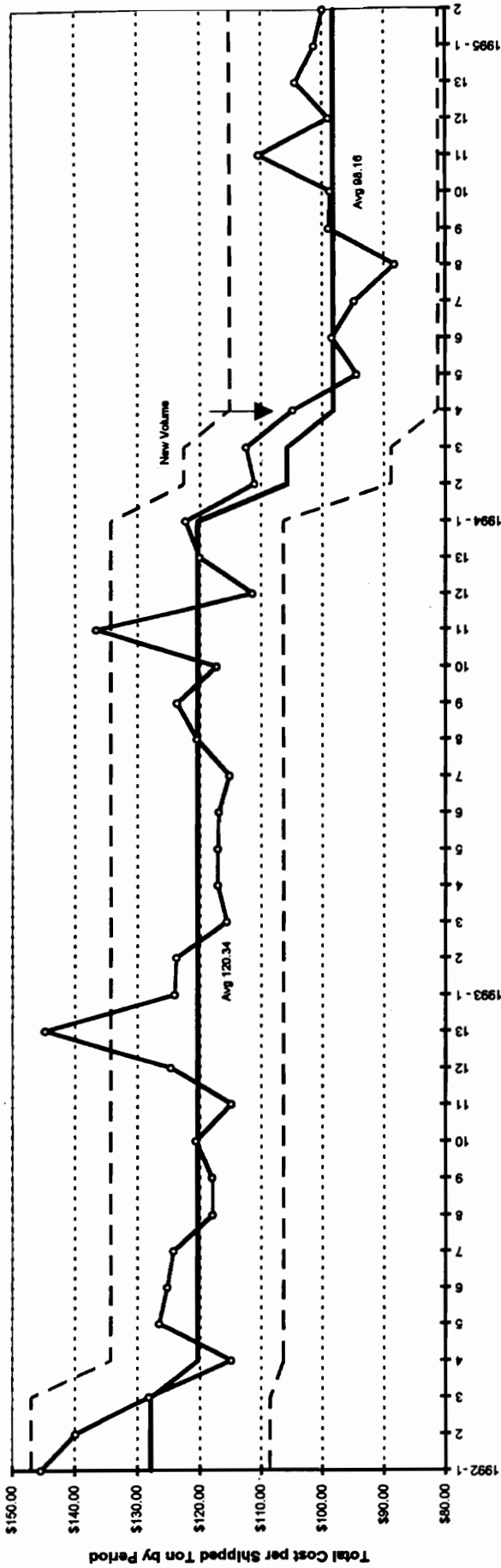
• Produce shorts per 1000 cases shipped by week	245
• Produce mispicks per 1000 cases shipped by week.....	246
• Produce damages per 1000 cases shipped by week	247

Major Improvement Interventions Mapped to Key Performance Indicators

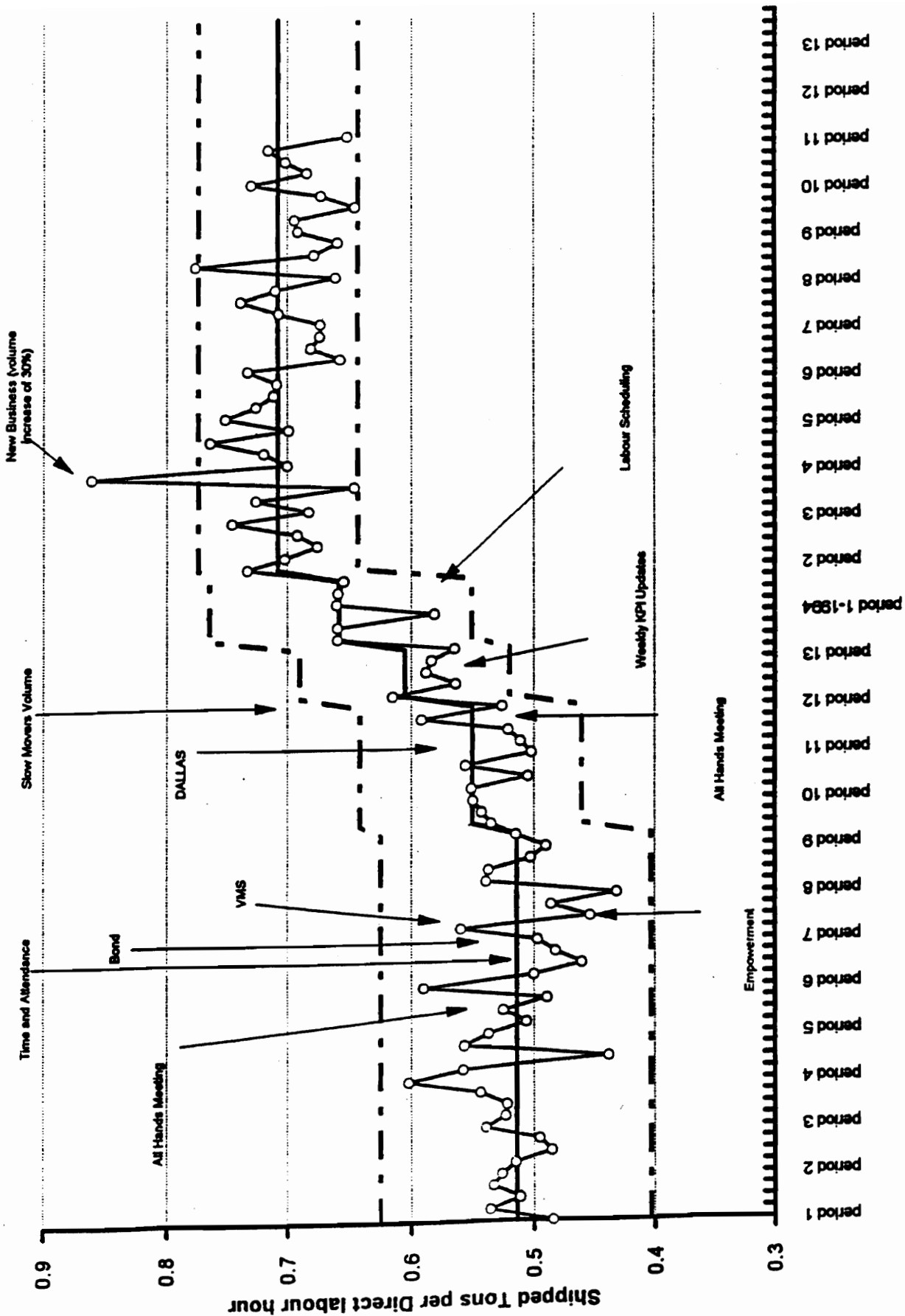
(An X in a cell means we believe successful execution of the intervention will improve the key performance indicator)

Intervention	Leader	PAI	Milestone	Key Performance Indicator	No specific KPI. It's just a good idea	Distribution System Level Charts	Total Cost Per Shipped Ton	Shipped Tons Per Direct Labour Hour	Thruput Cases Per Direct Labour Hour	Total Percent Absenteeism	Functional Area Charts	Grocery Receiving Cases Per Hour	Grocery Putaway Pallets Per Hour	Grocery Replenishment Pallets Per Hour	Grocery Assembly Cases Per Hour	Customer Service Charts	Percent On-Time Departures From Warehouse	Percent On-Time Arrival At Customer	Grocery Quality Charts	Grocery Scratches Per 1000 Cases Shipped	Grocery Shorts Per 1000 Cases Shipped	Grocery Misspicks Per 1000 Cases Shipped	Grocery Damages Per 1000 Cases Shipped	Dollar Value Of Grocery Damages Less Recoup	Produce Quality Charts	Produce Scratches Per 1000 Cases Shipped	Produce Shorts Per 1000 Cases Shipped	Produce Misspicks Per 1000 Cases Shipped	Produce Damages Per 1000 Cases Shipped	Dollar Value Of Produce Damages Less Recoup					
Current High Priority Interventions	Leader	PAI	Milestone																																
Warehouse Reassignment	Kevin R.	116																																	
Customer buying practices	Fae, Rob	86, 126																																	
Warehouse communication	Jimmy, Trent	126		X																															
Employees cross-training	Kevin R.	127		X																															
Functional area great performance	Jimmy, Trent	126																																	
Customer focus	Fae, Rob	86, 126																																	
Shift scheduling	Rob	none					X	X	X	X																									
Labour scheduling	Mike S.	none					X	X	X	X																									
Other Interventions	Leader	PAI	Milestone																																
Swap store lanes & bulk storage location			Jul-04																																
Aisle walks			Jun-04																																
Raymond Reach fork			May-04																																
New volume			Apr-04																																
Produce reassignment			Feb-04																																
Remove roller racks			Dec-03																																
Assembly goal setting			Dec-03				X																												
Random store order checks			Dec-03																																
Transportation PAI			Nov-03																																
Dollars			Nov-03																																
Store lanes			Nov-03																																
Slow Movers			Nov-03																																
Produce PAI			Aug-03																																
Empowerment			Aug-03																																
Bond			Jul-03																																
Time & attendance			May-03																																

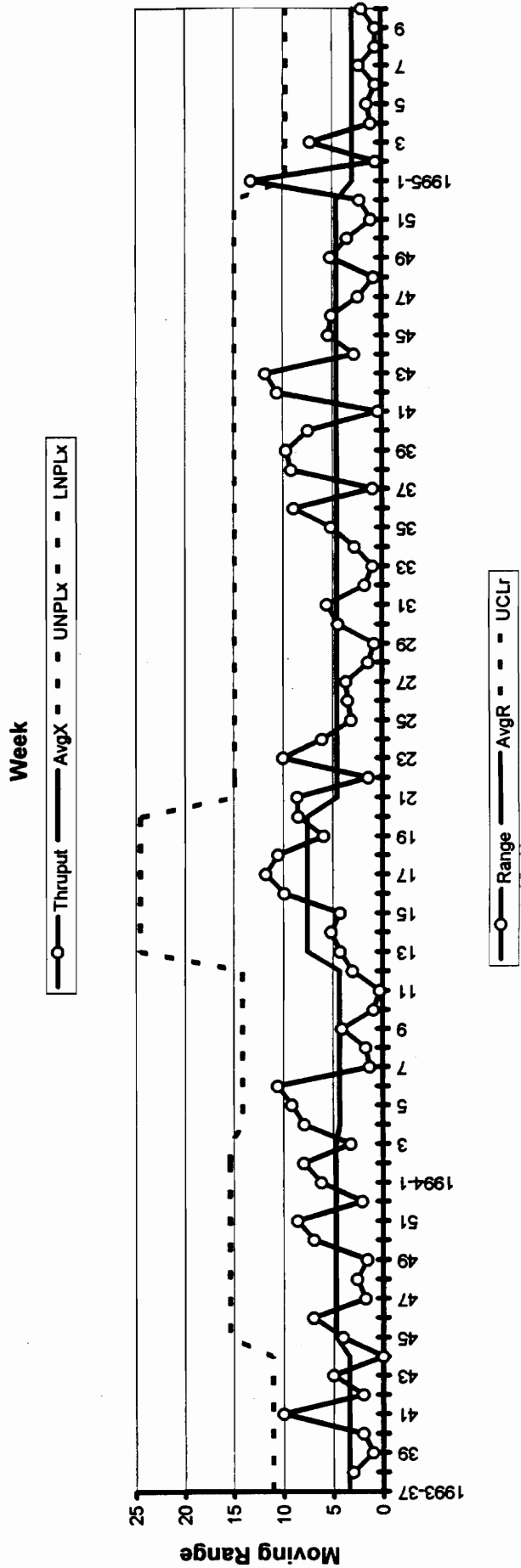
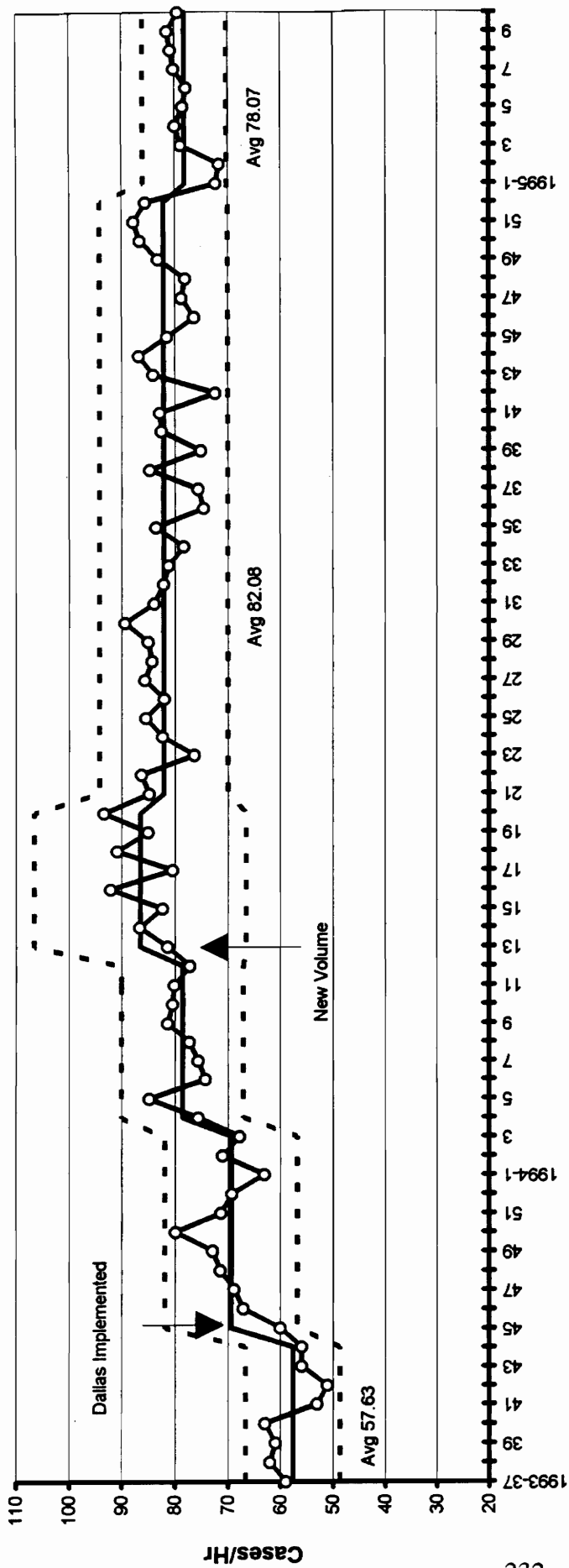
Peterborough Total Cost per Shipped Ton by Period



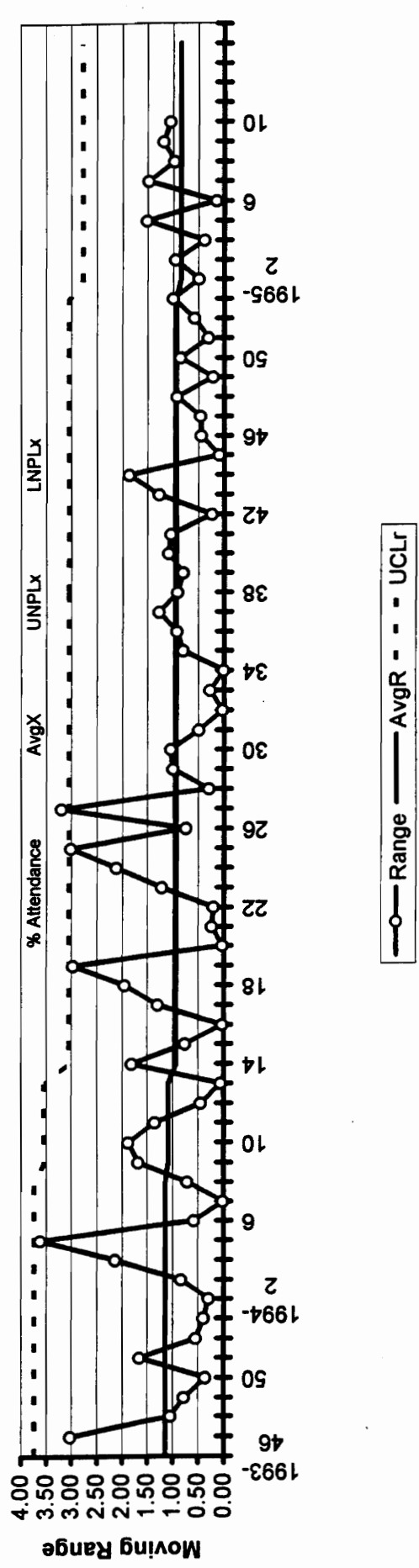
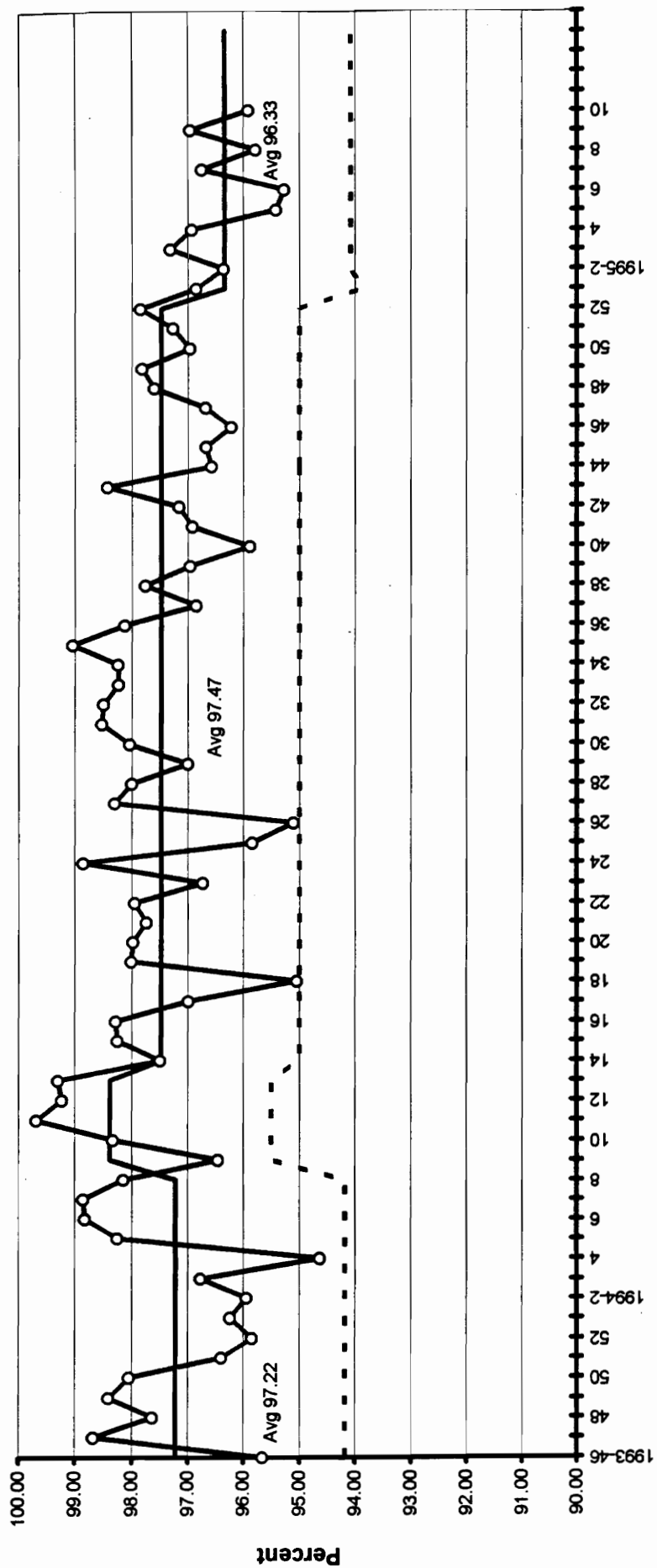
Shipped Tons per Direct Labour Hour by week



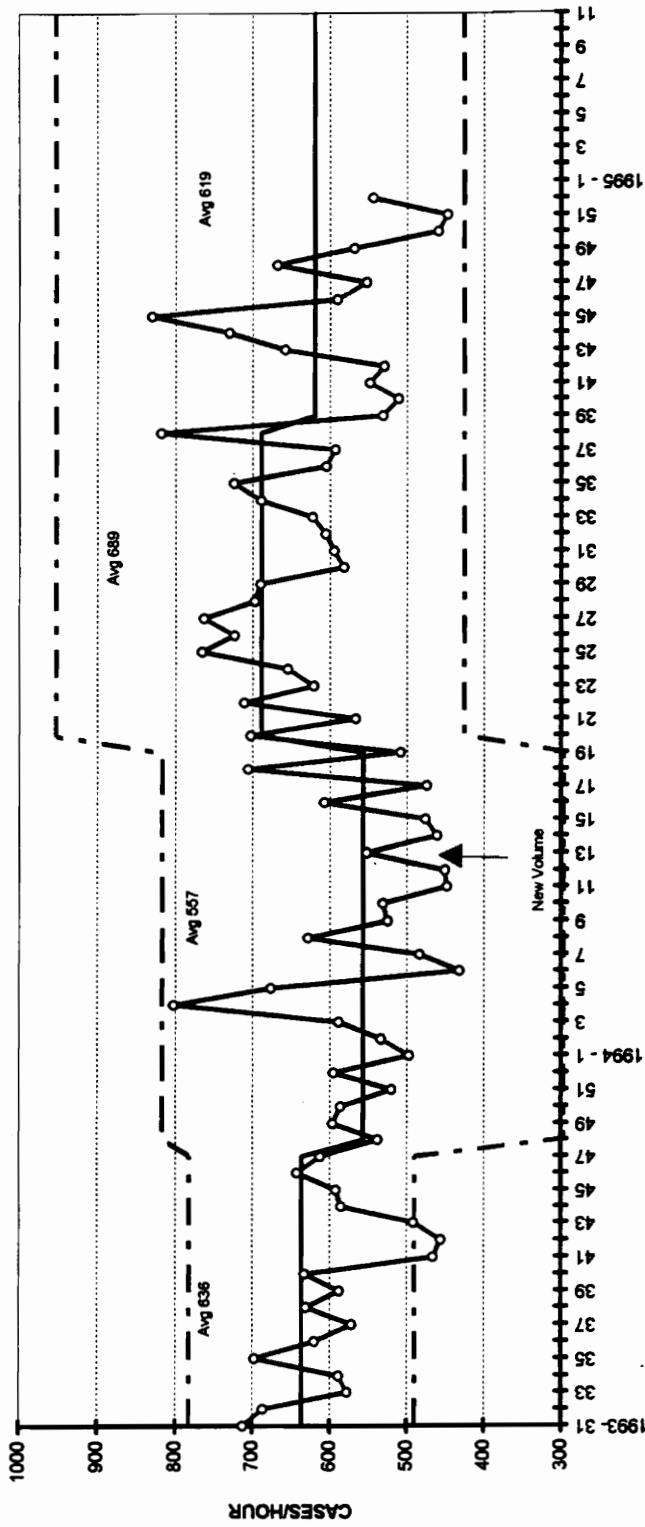
Peterborough Thruput Cases Per Hour By Week



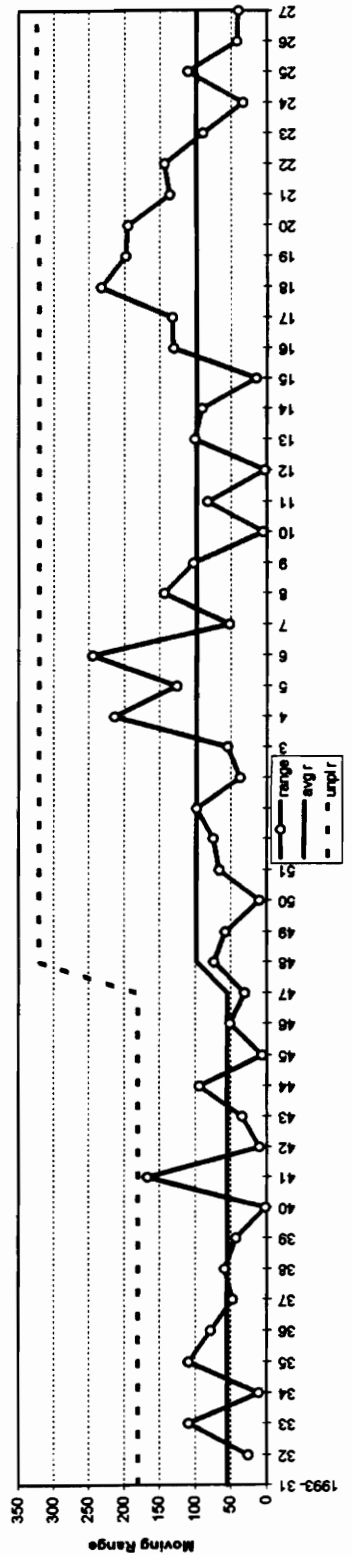
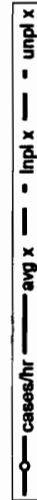
Peterborough Total Percent Attendance By Week



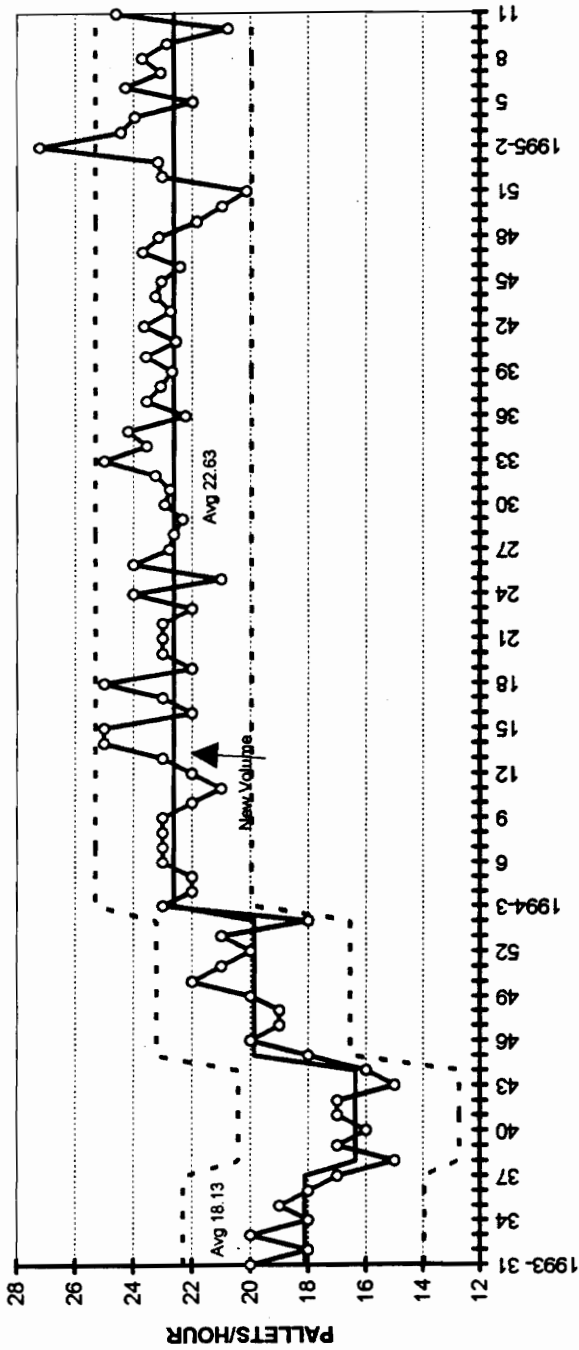
Peterborough Grocery Receiving Cases Per Hour By Week



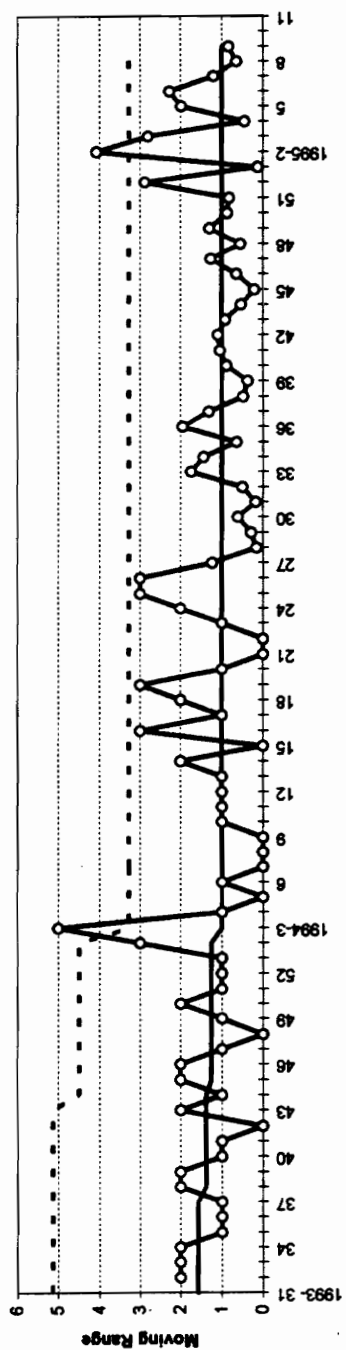
WEEKLY



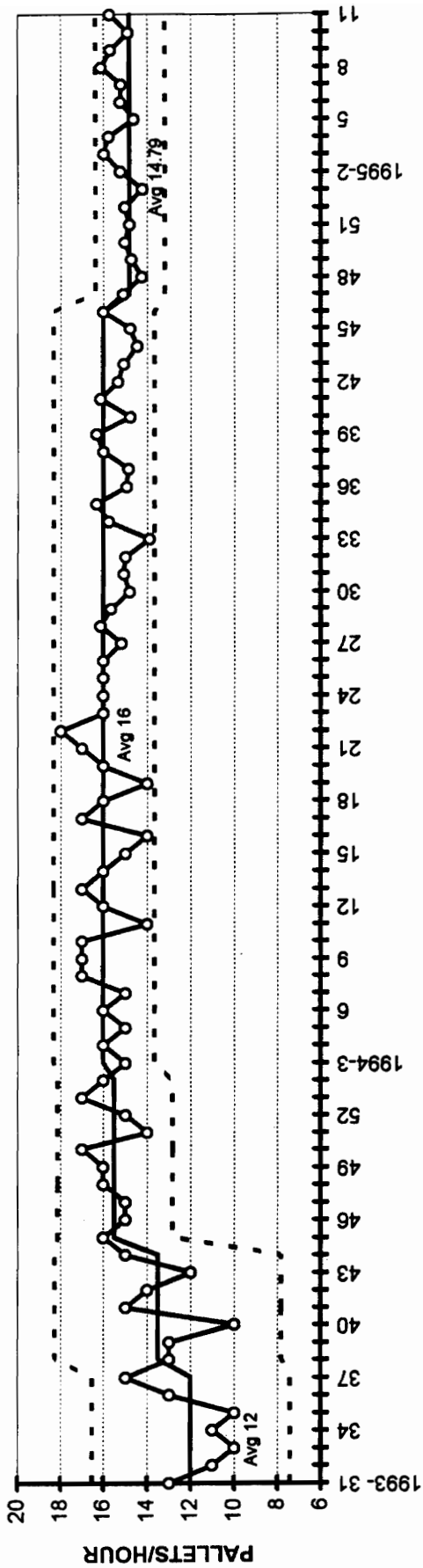
Grocery Putaway Pallets Per Hour By Week



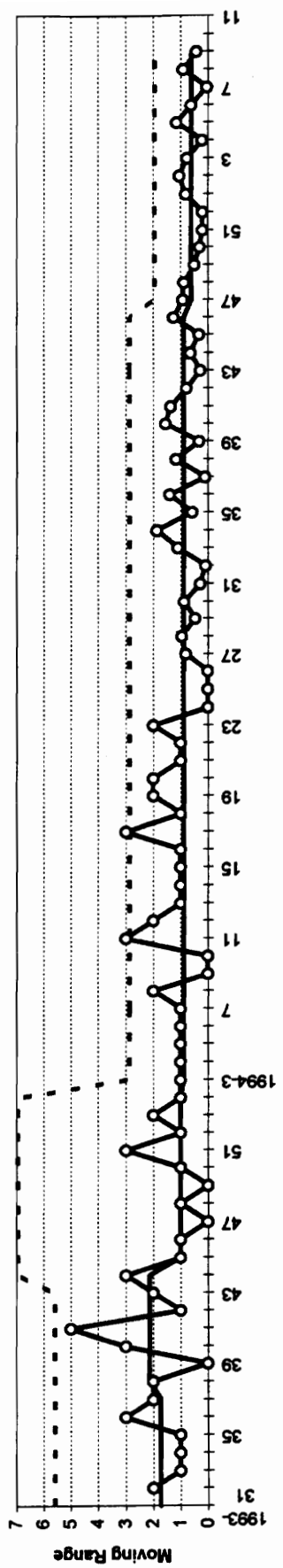
WEEKLY



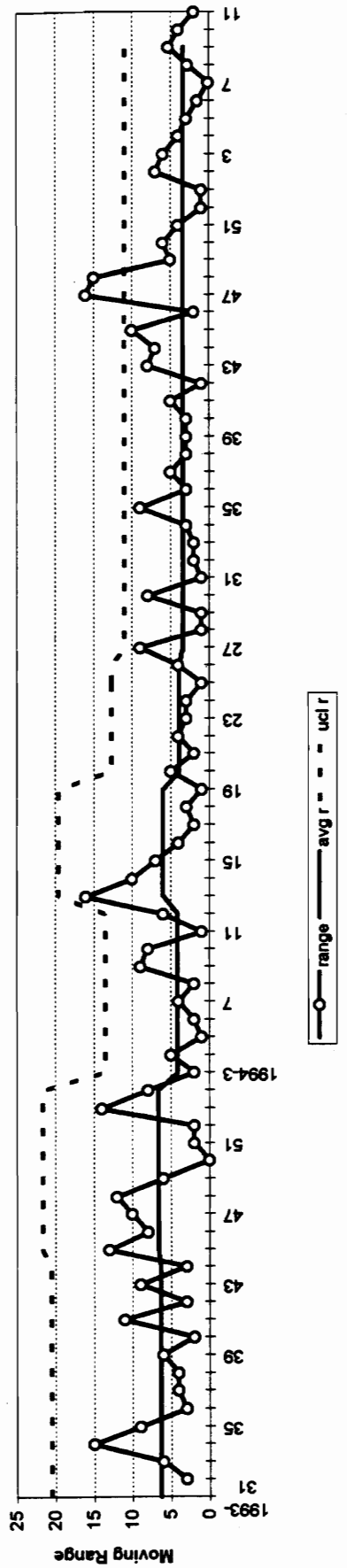
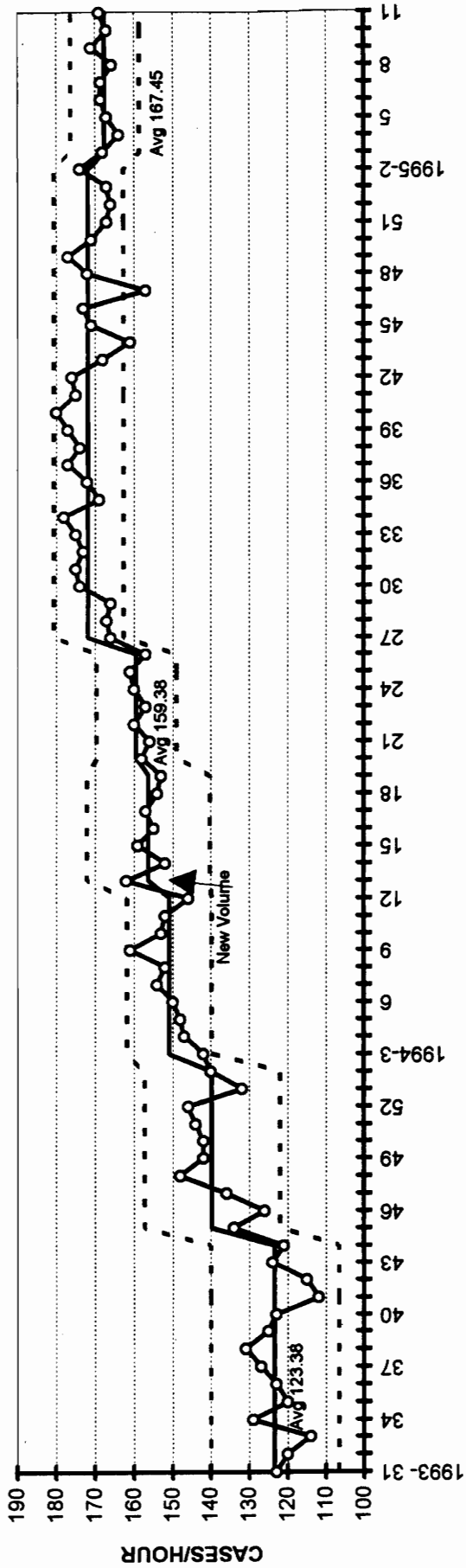
Peterborough Grocery Replenishments Pallets Per Hour By Week



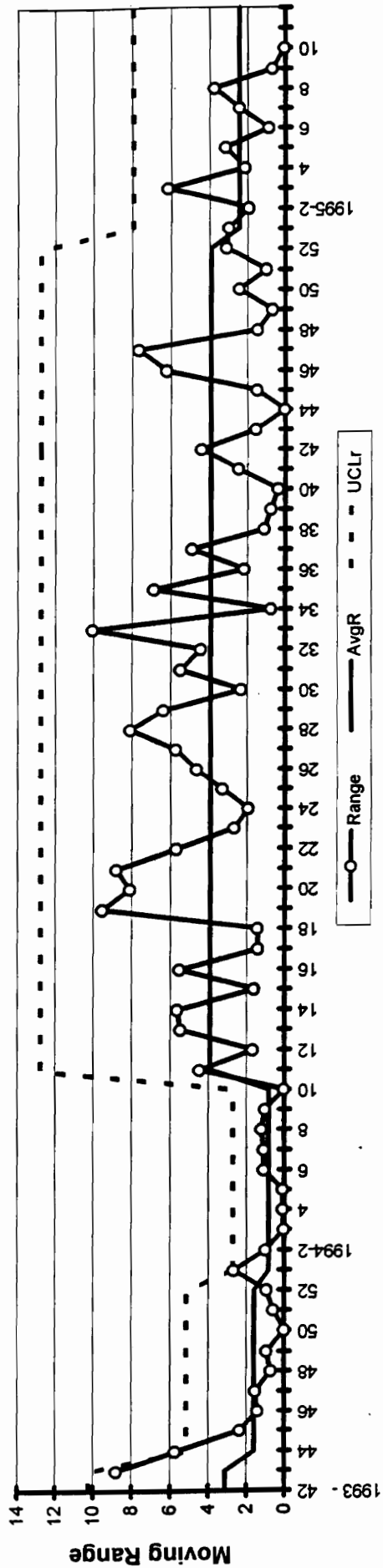
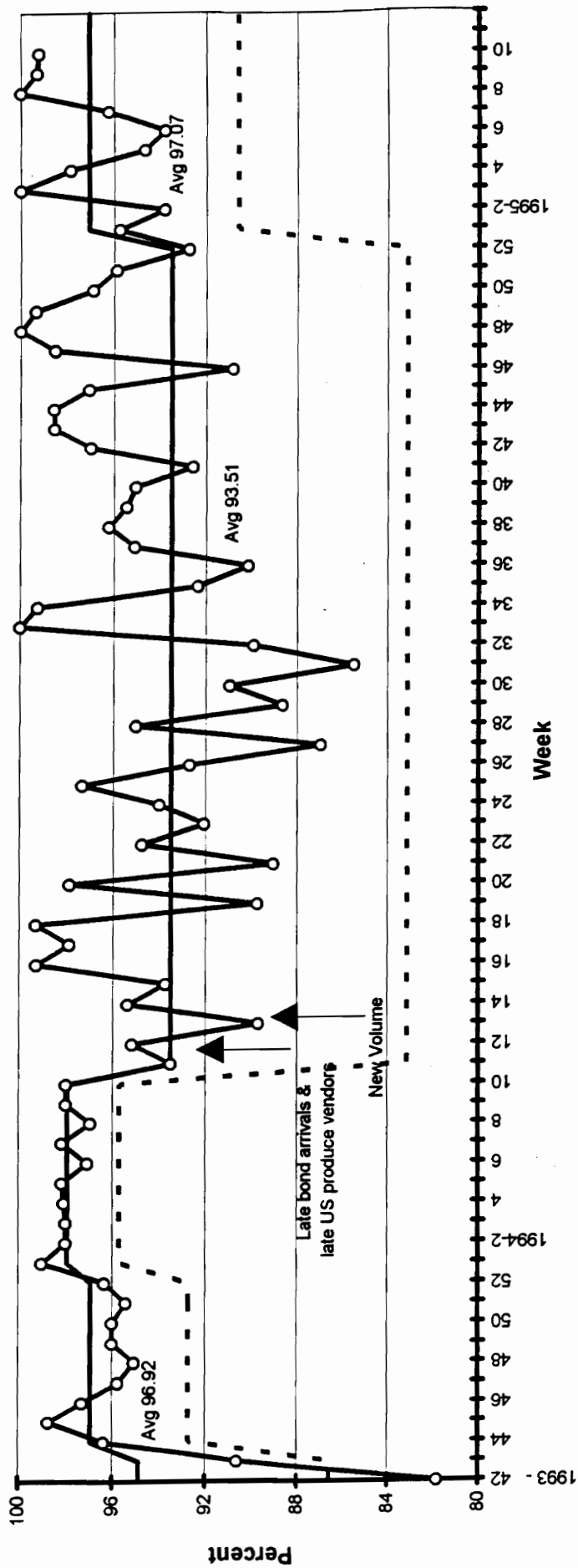
WEEKLY



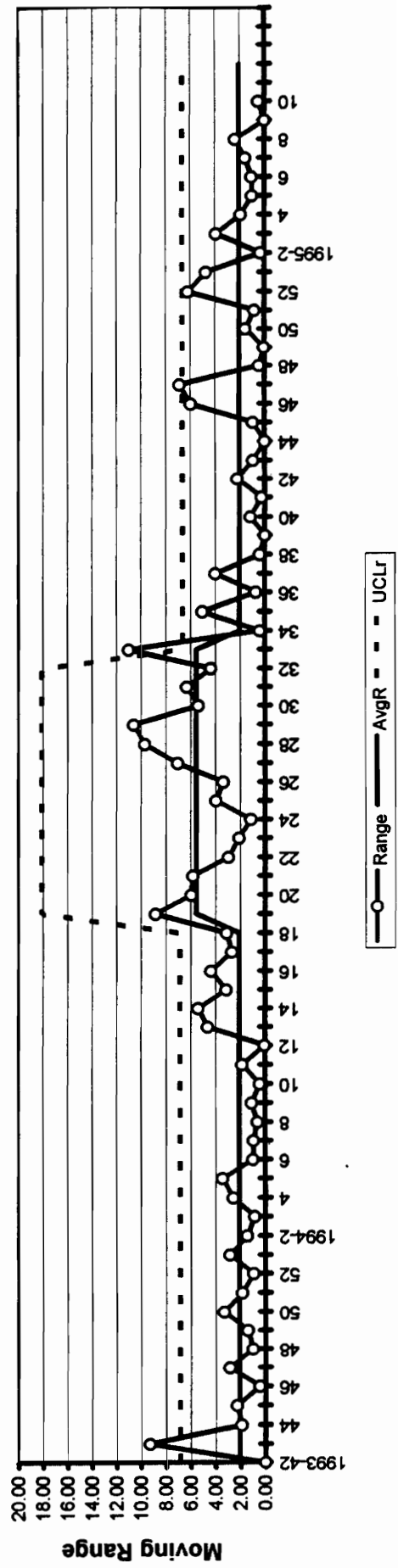
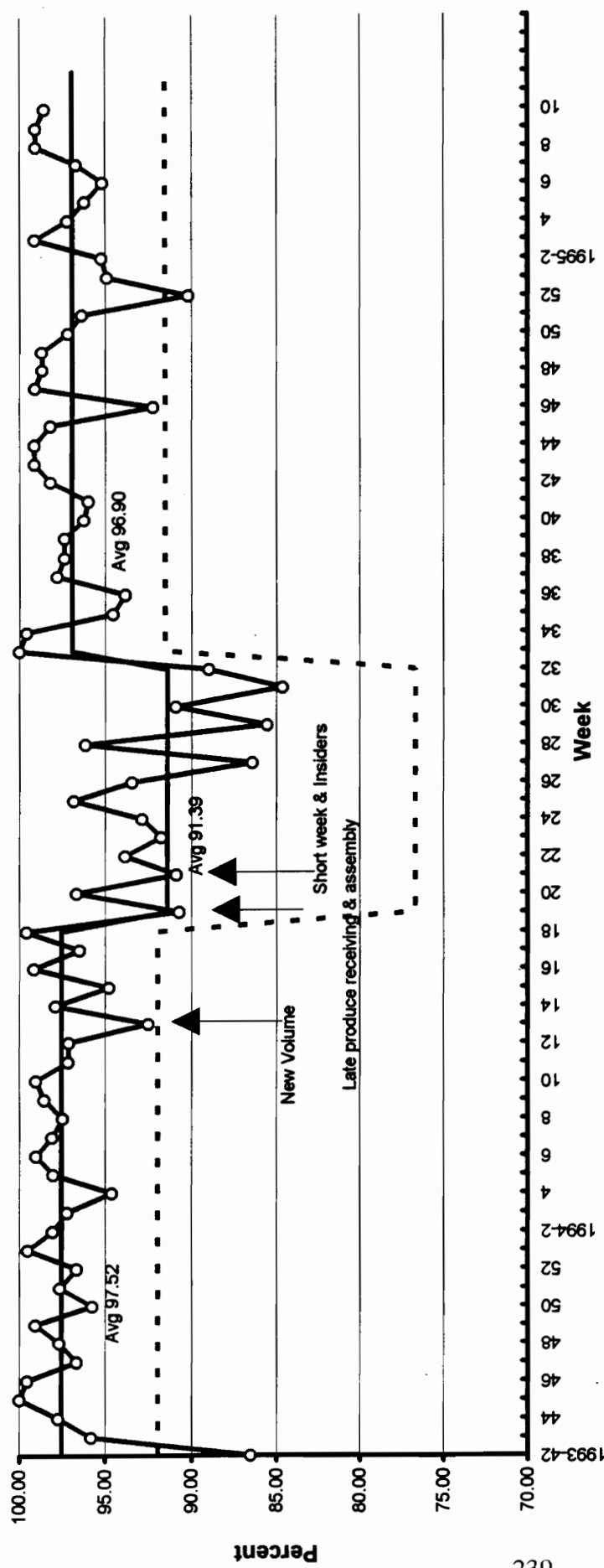
Peterborough Grocery Assembly Cases Per hour By Week



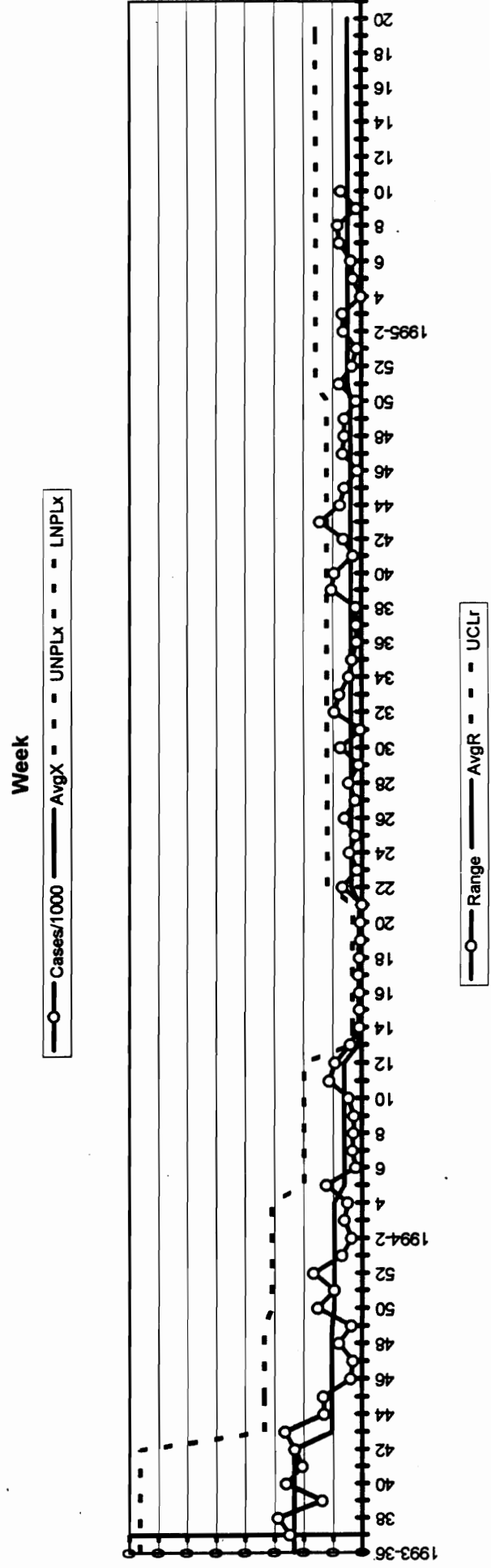
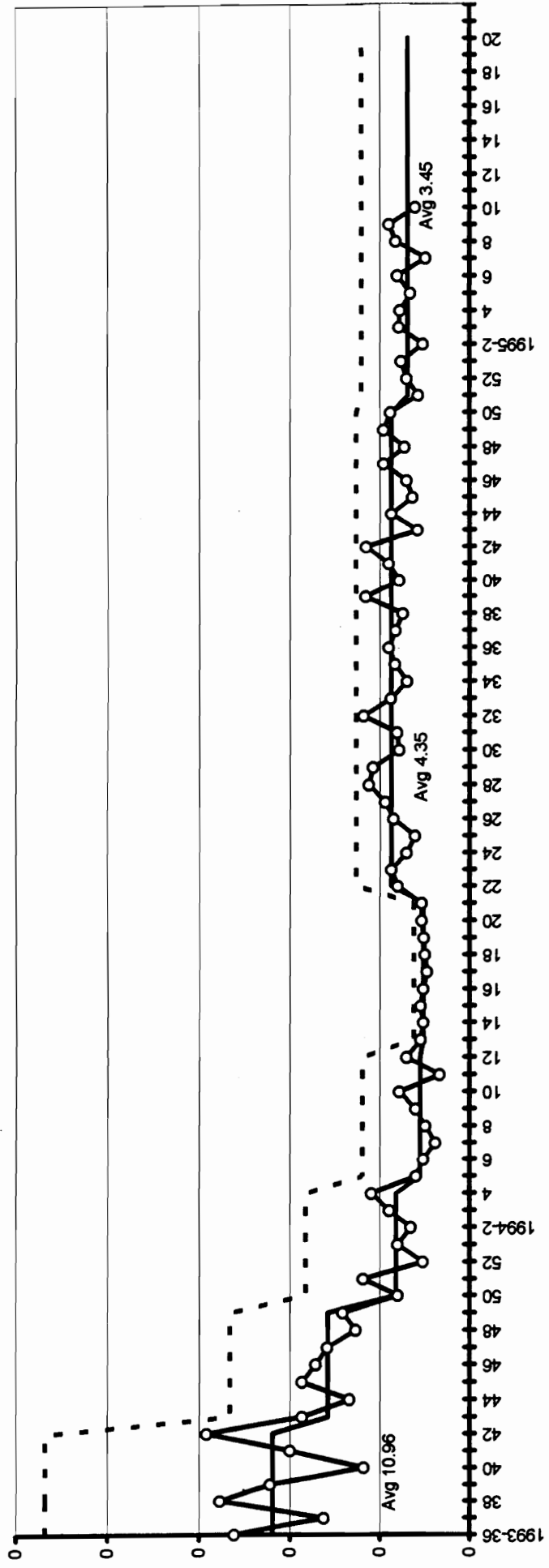
Peterborough Percent On Time Departures From Warehouse By Week



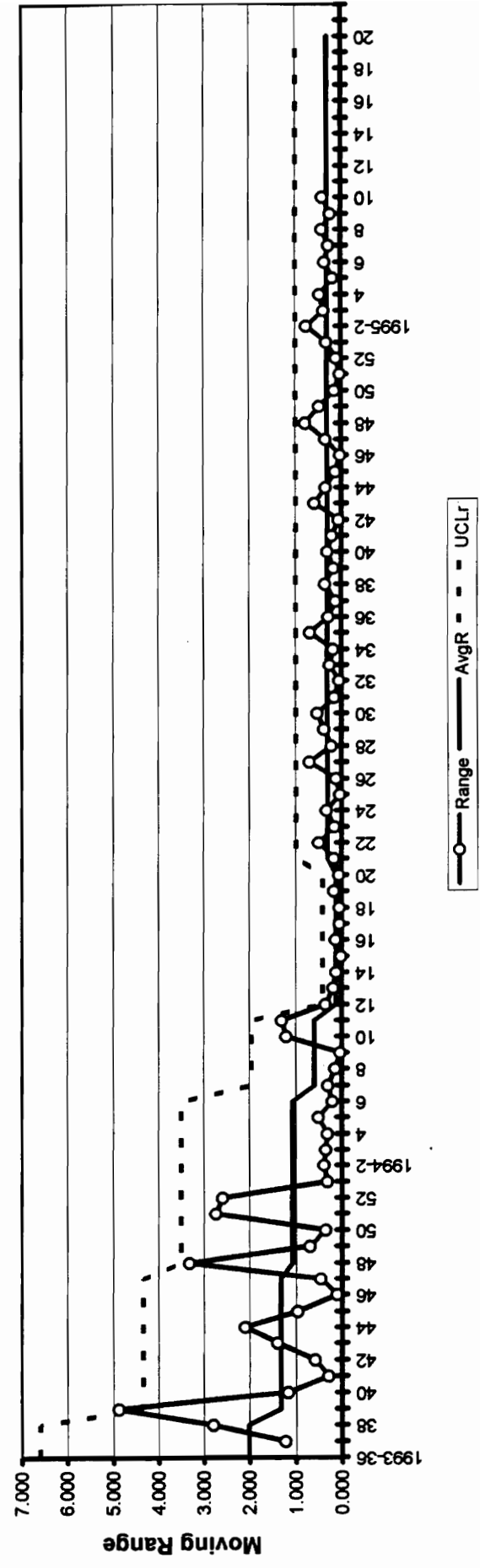
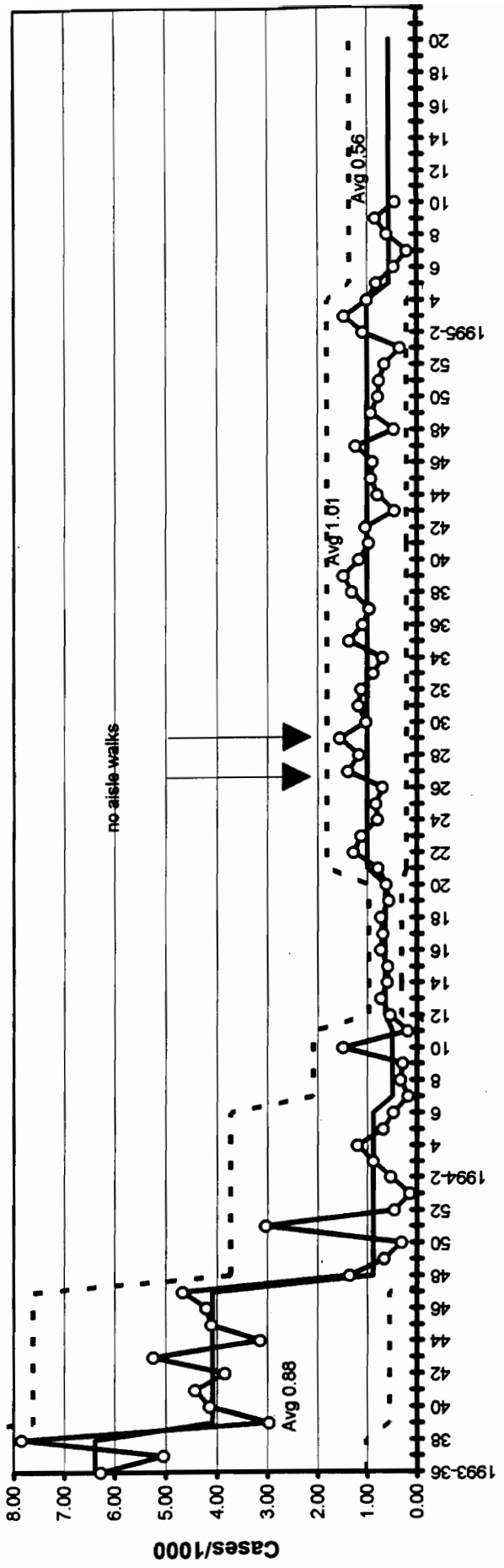
Peterborough Percent On Time Arrivals At Customer By Week



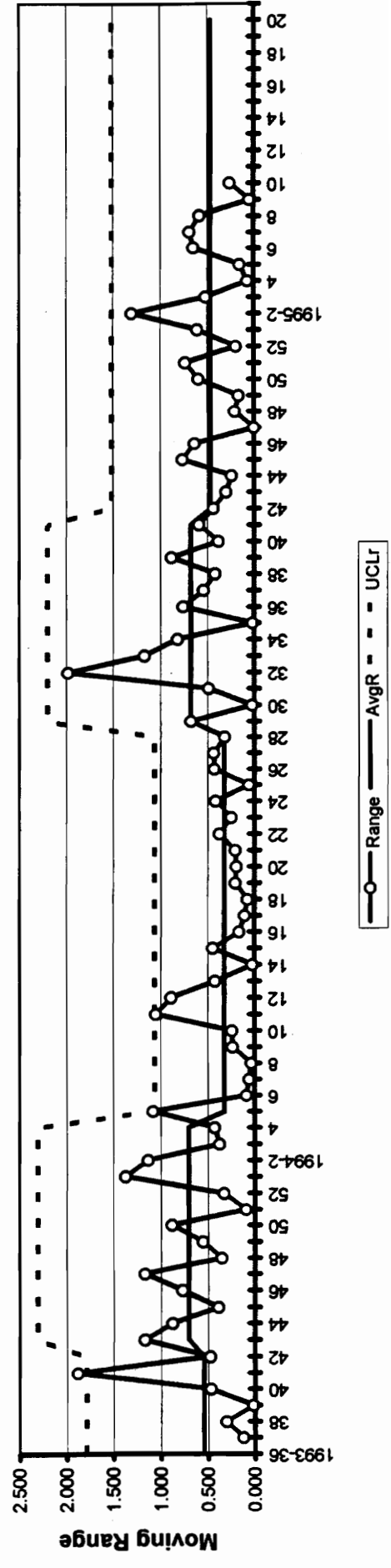
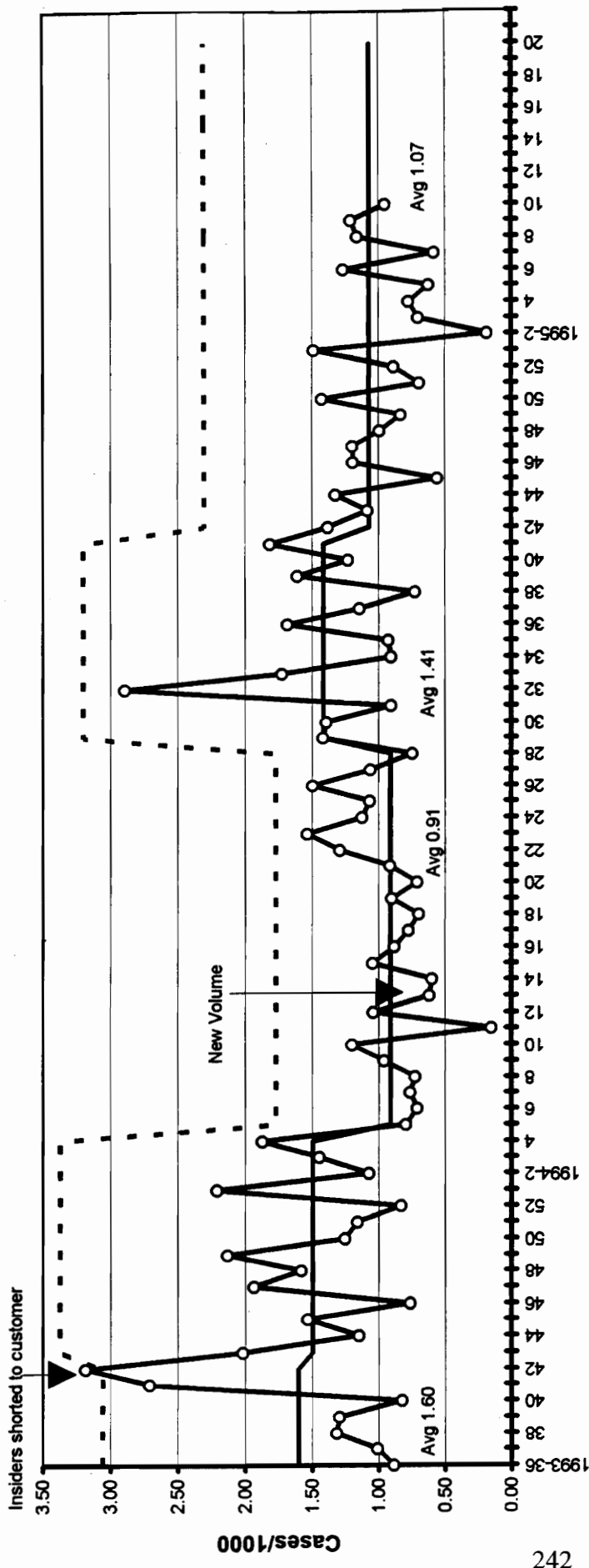
Peterborough Grocery Total Quality Per 1000 Cases Shipped By Week



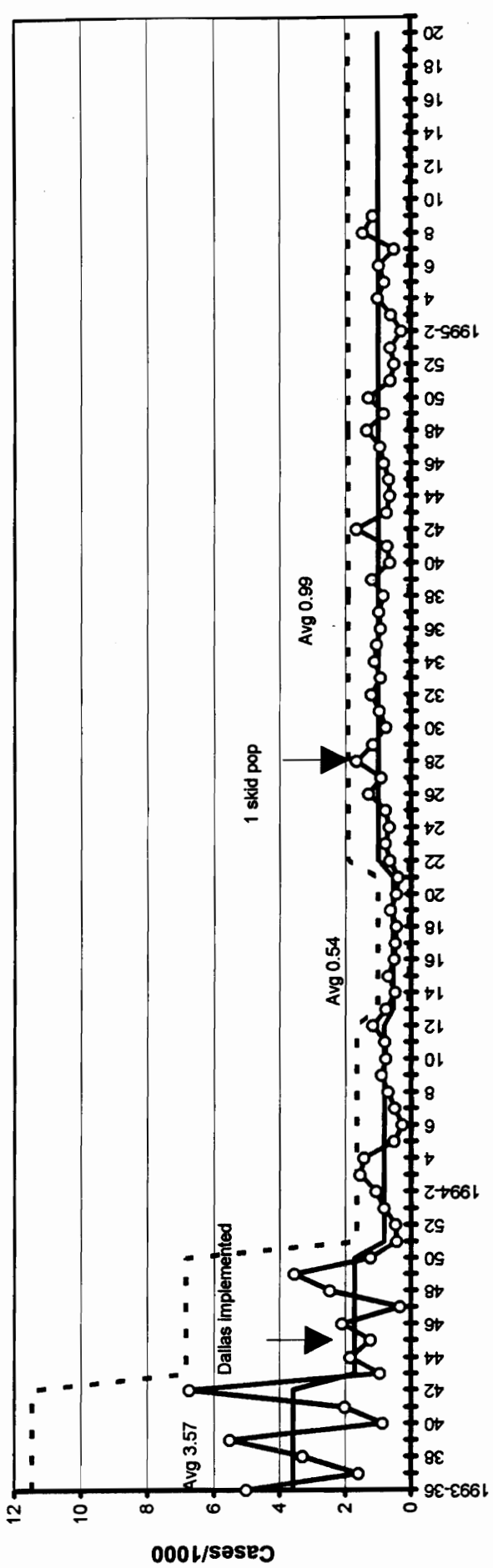
Peterborough Grocery Scratches Per 1000 Cases Shipped By Week



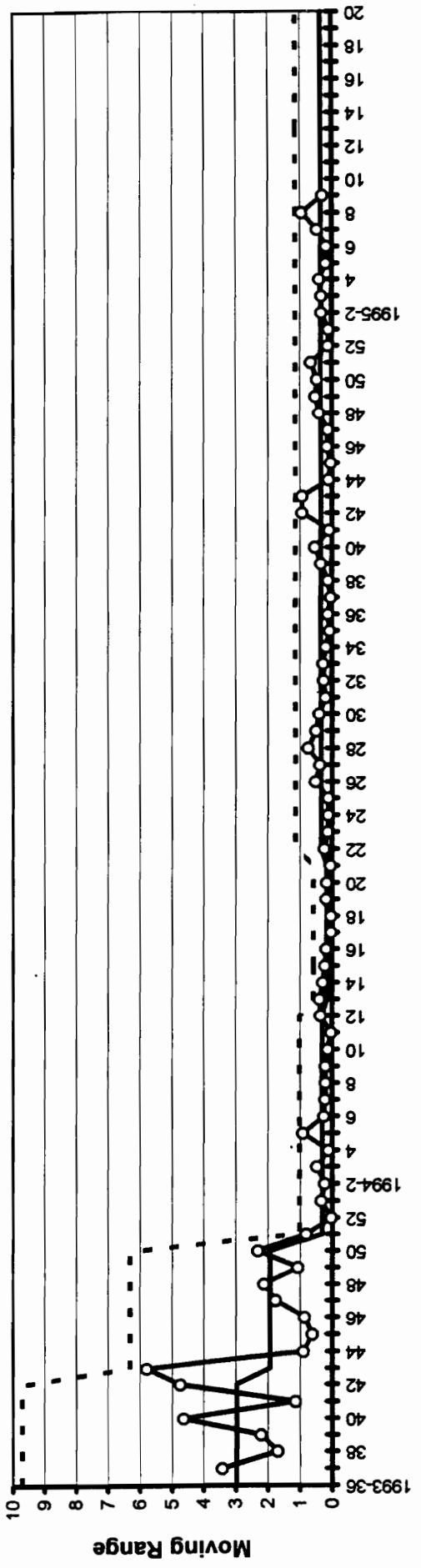
Peterborough Grocery Shorts Per 1000 Cases Shipped By Week



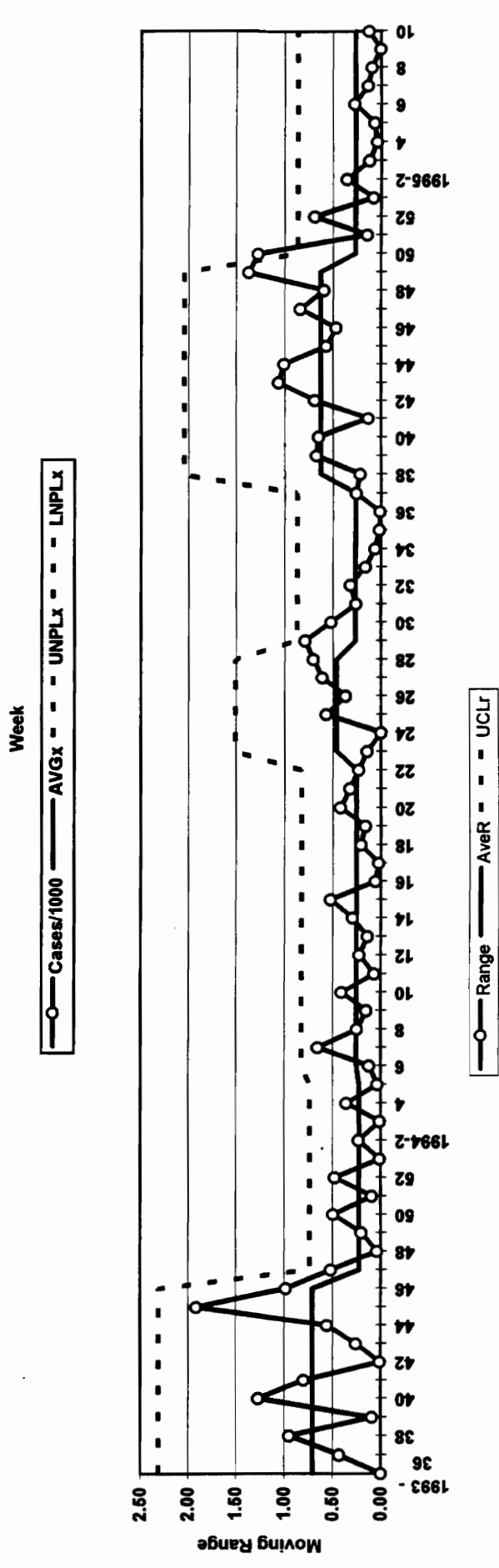
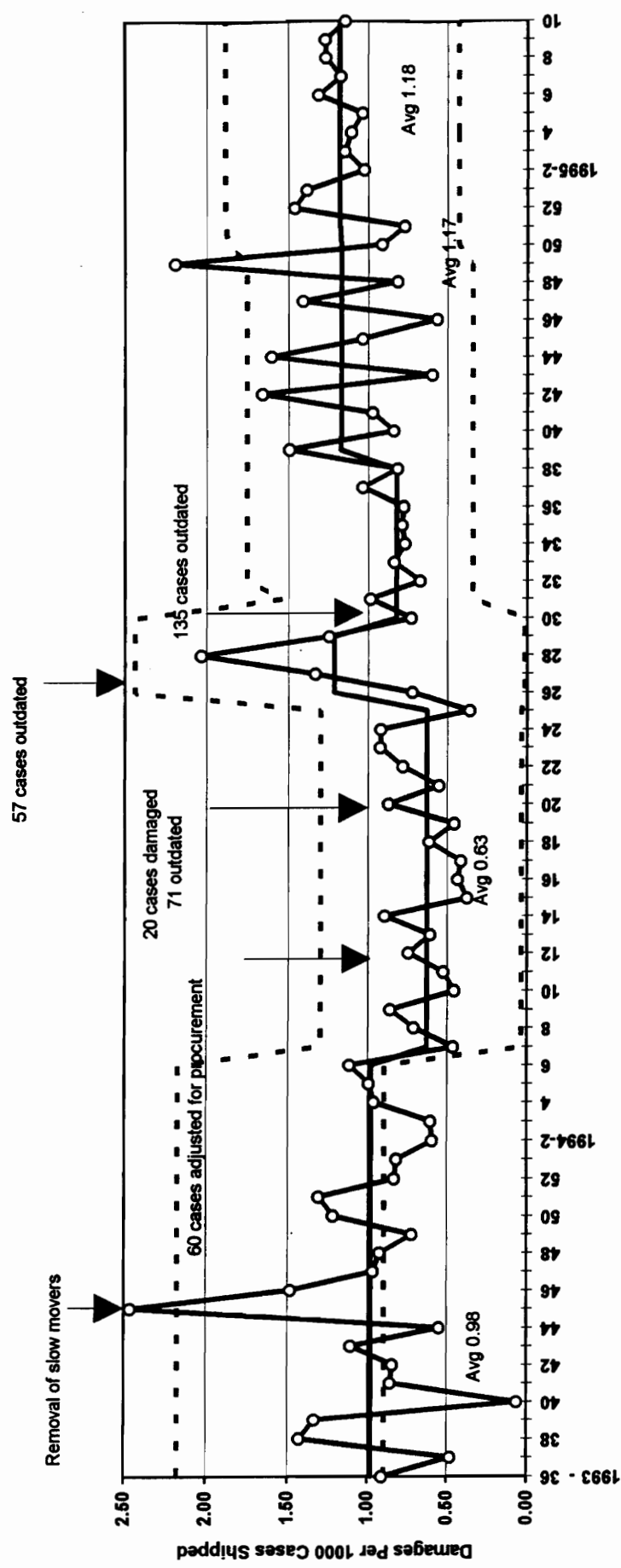
Peterborough Grocery Mispicks Per 1000 Cases Shipped By Week



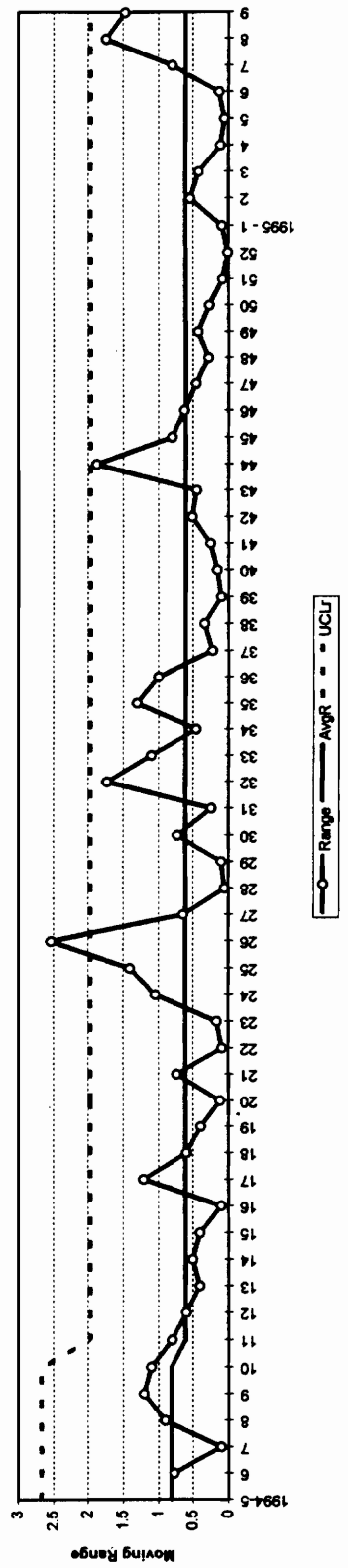
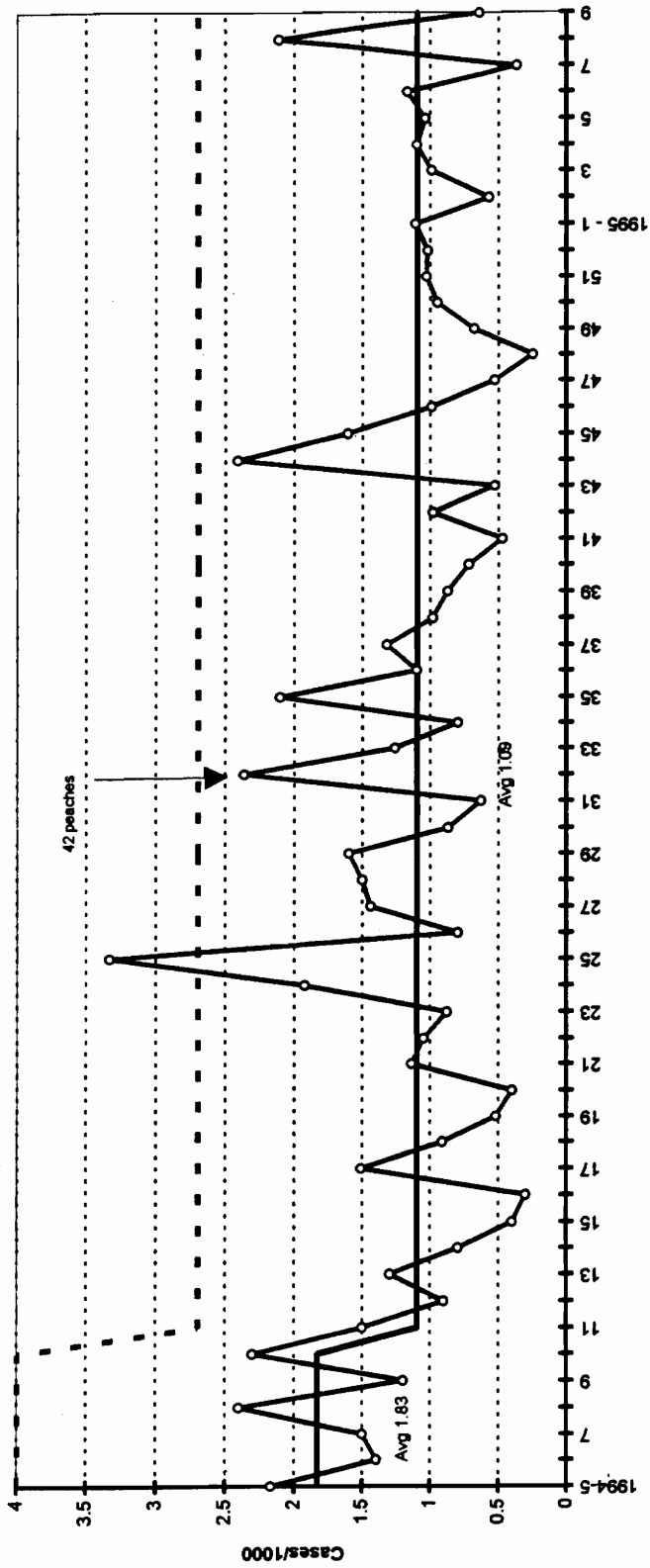
Week



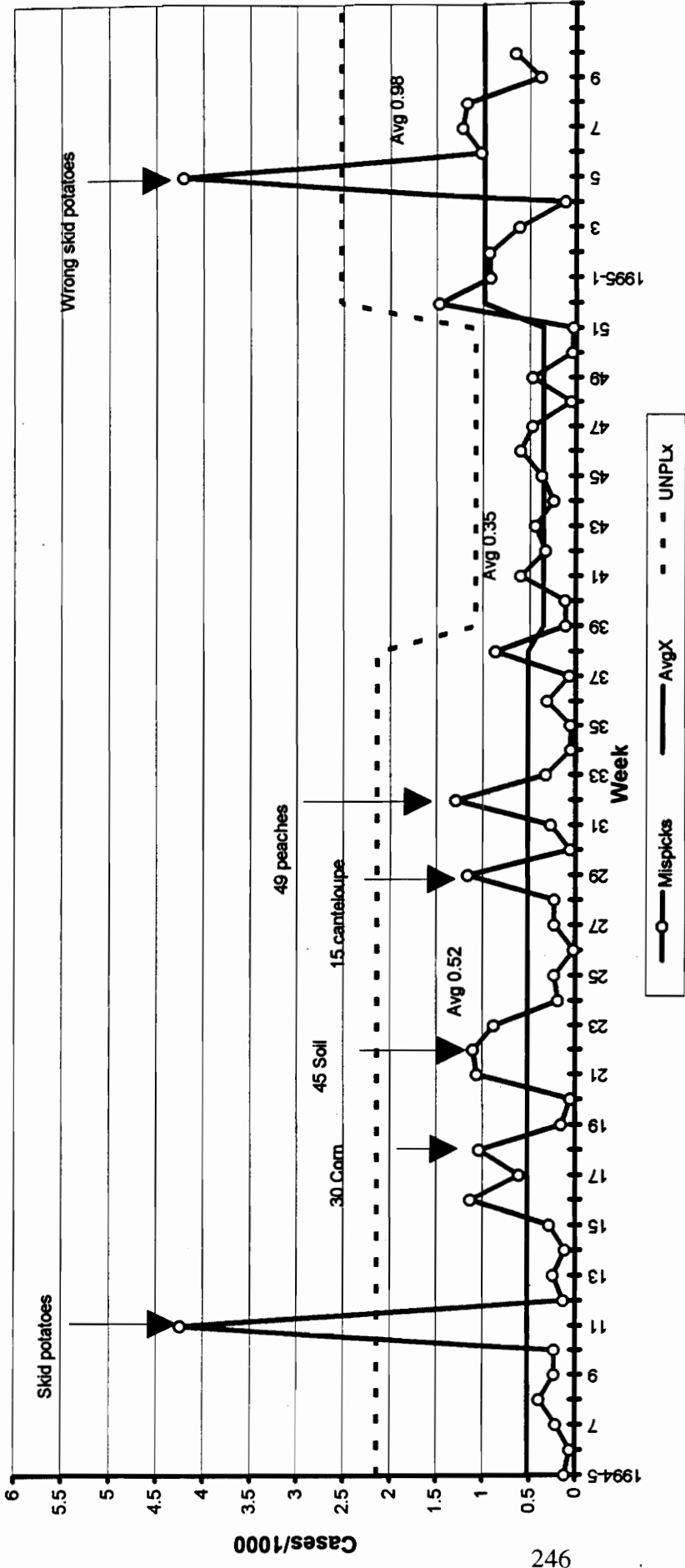
Grocery Damages Per 1000 Cases Shipped By Week



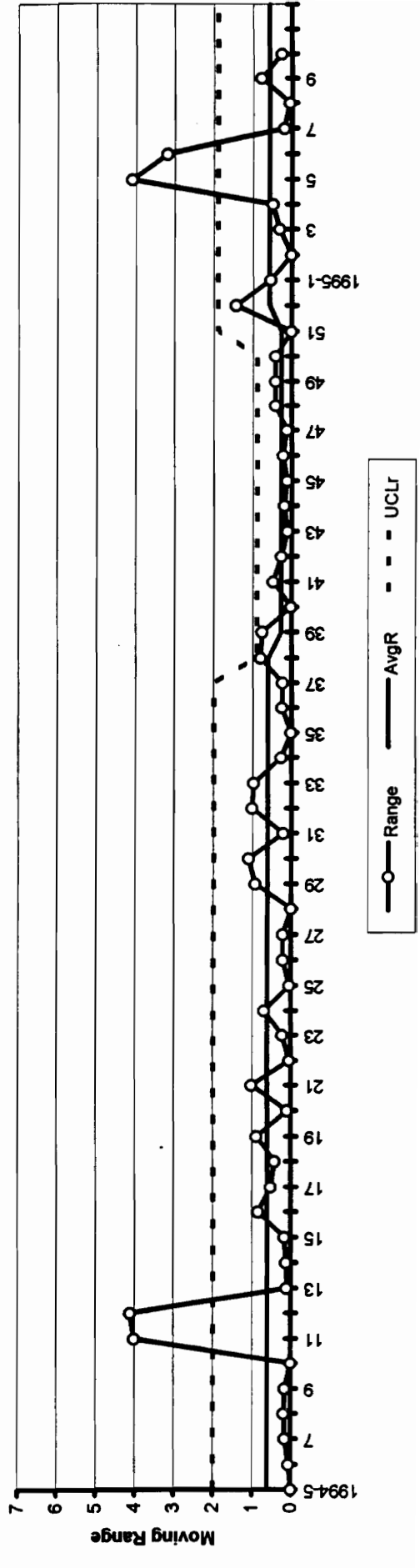
Peterborough Produce Shorts per 1000 Cases Shipped By Week



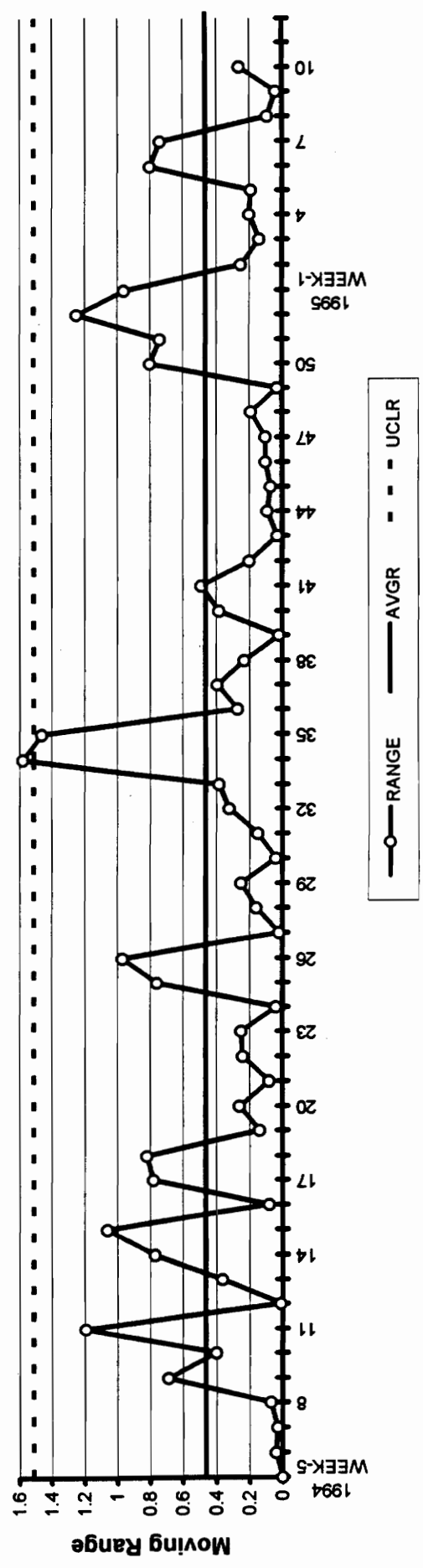
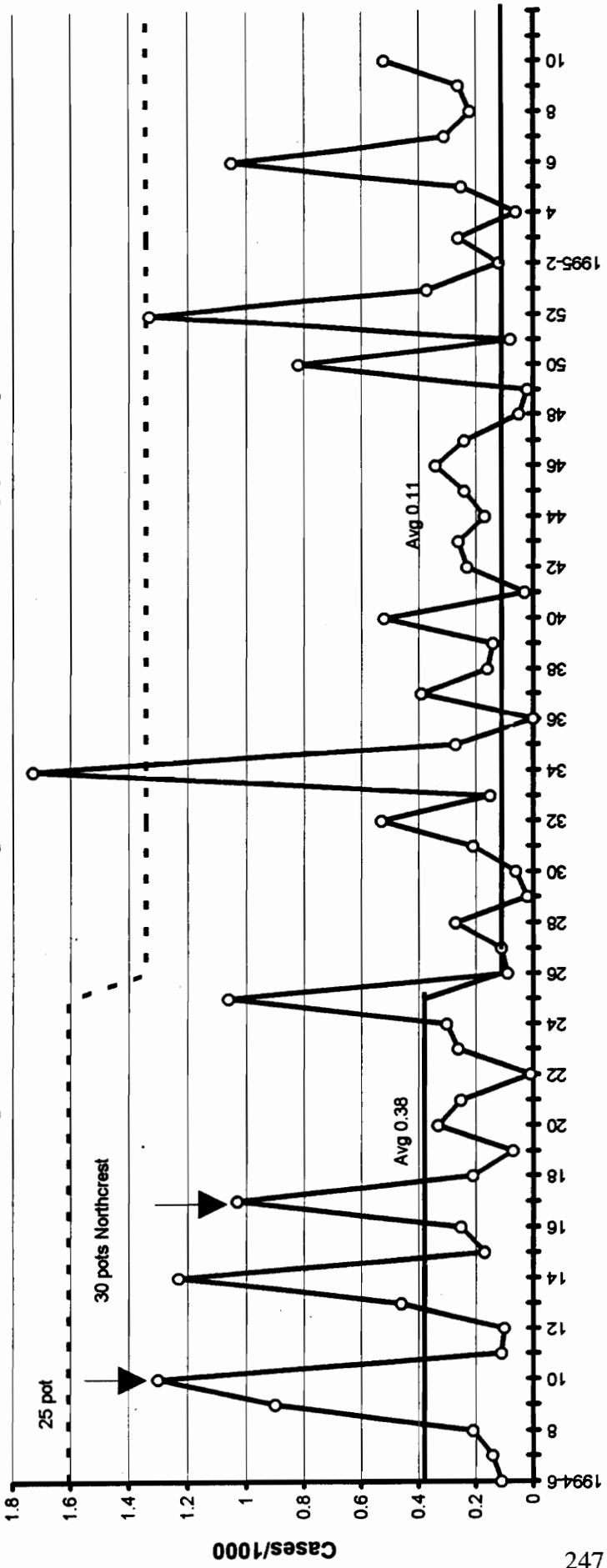
Peterborough Produce Mispicks Per 1000 Cases By Week



246



Peterborough Produce Damage Per 1000 Cases Shipped By Week



**APPENDIX E - PERCEPTIONS OF PETERBOROUGH PERFORMANCE
AFFINITY DIAGRAMS**

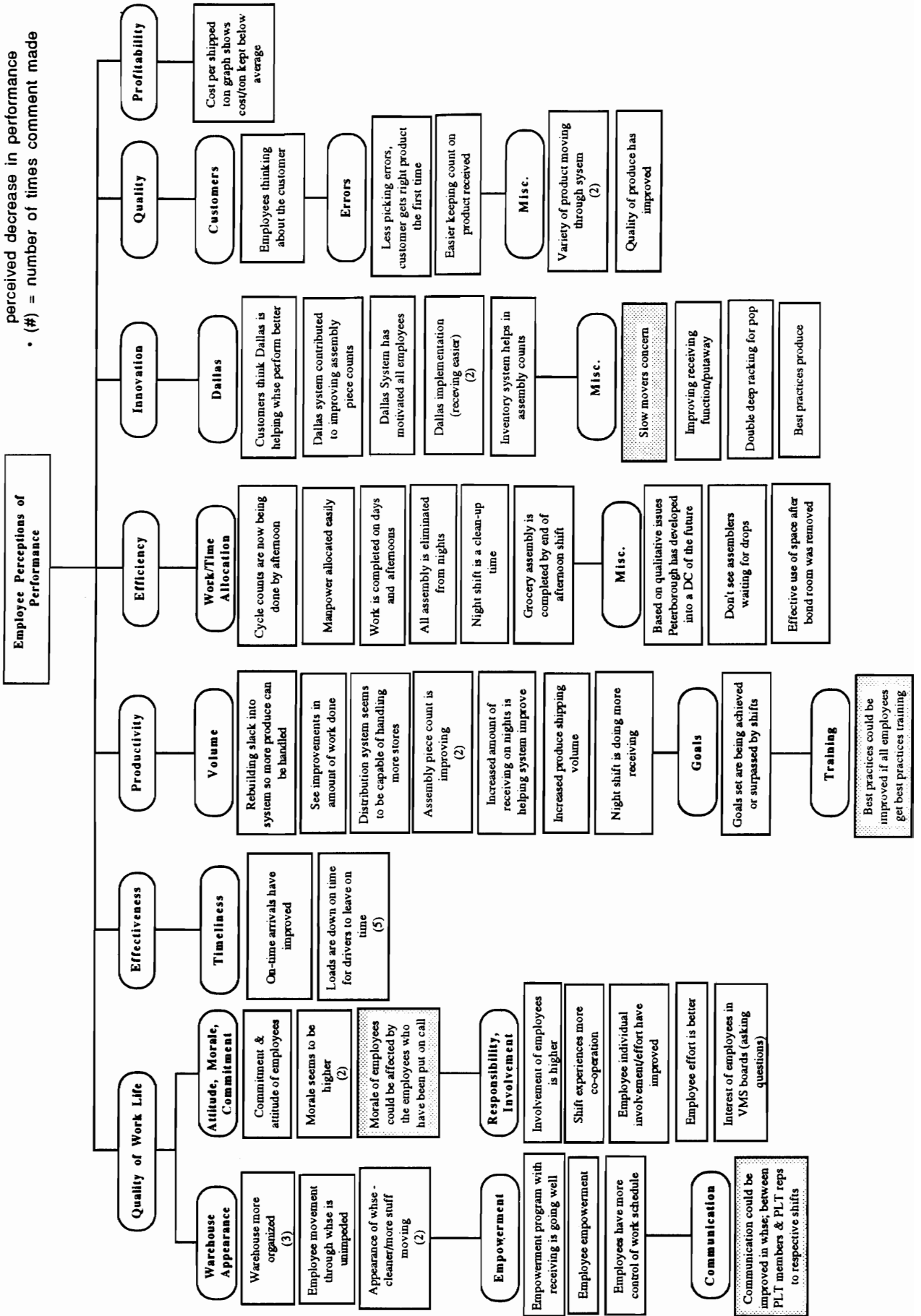
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**Design and Development Team and Steering Council (DDT/SC)
Questionnaire**

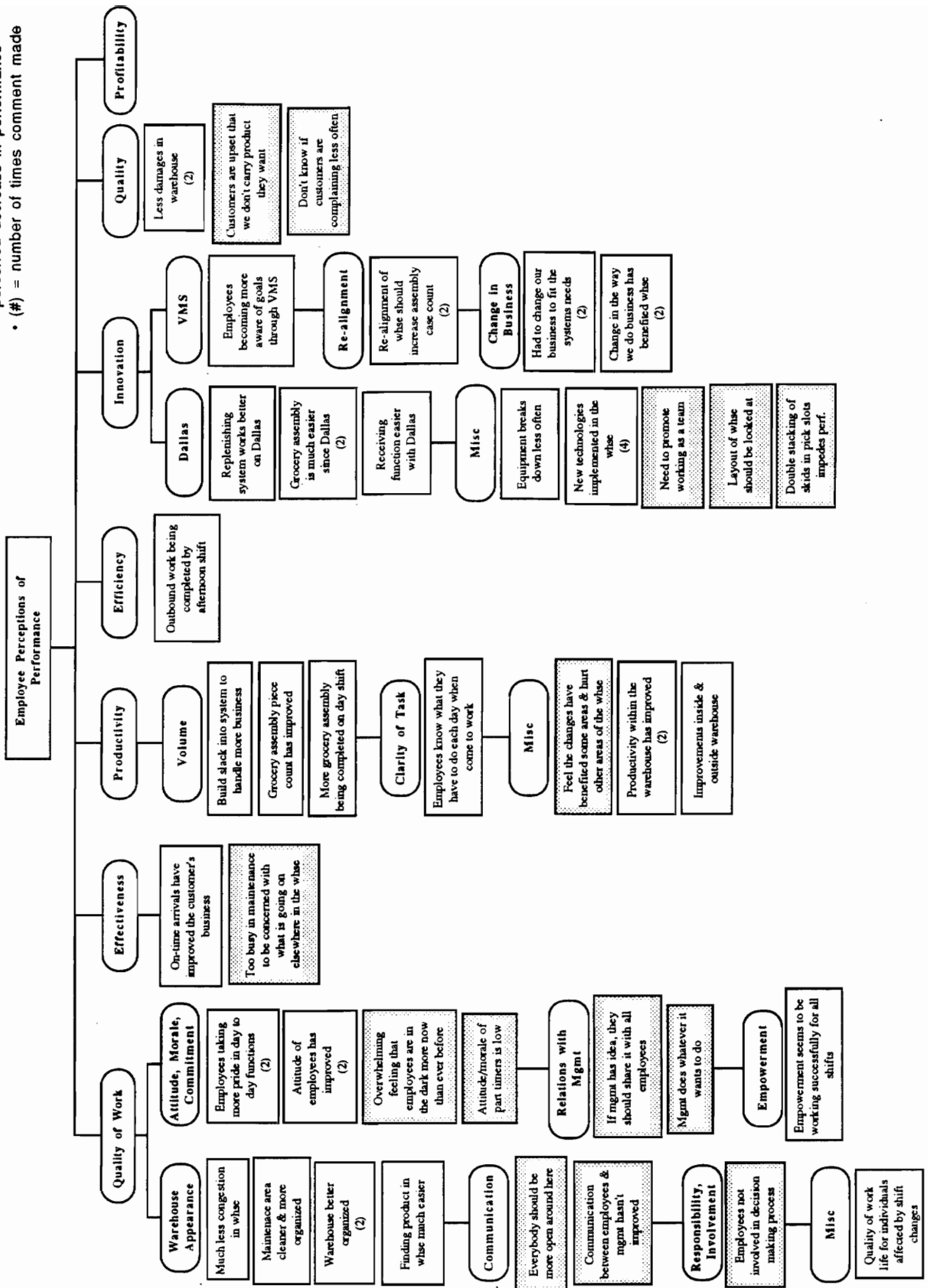
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- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



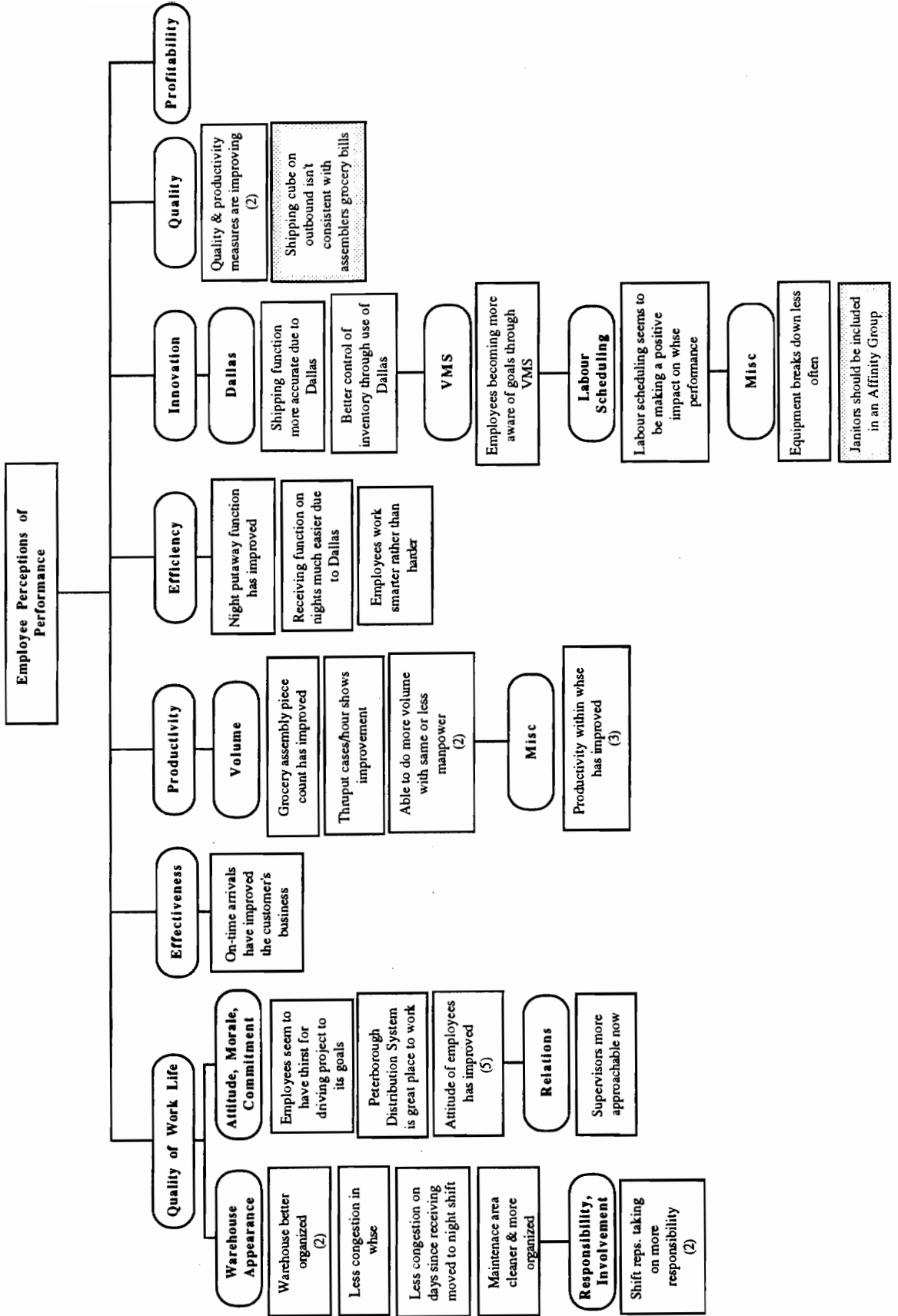
1/21/94

- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



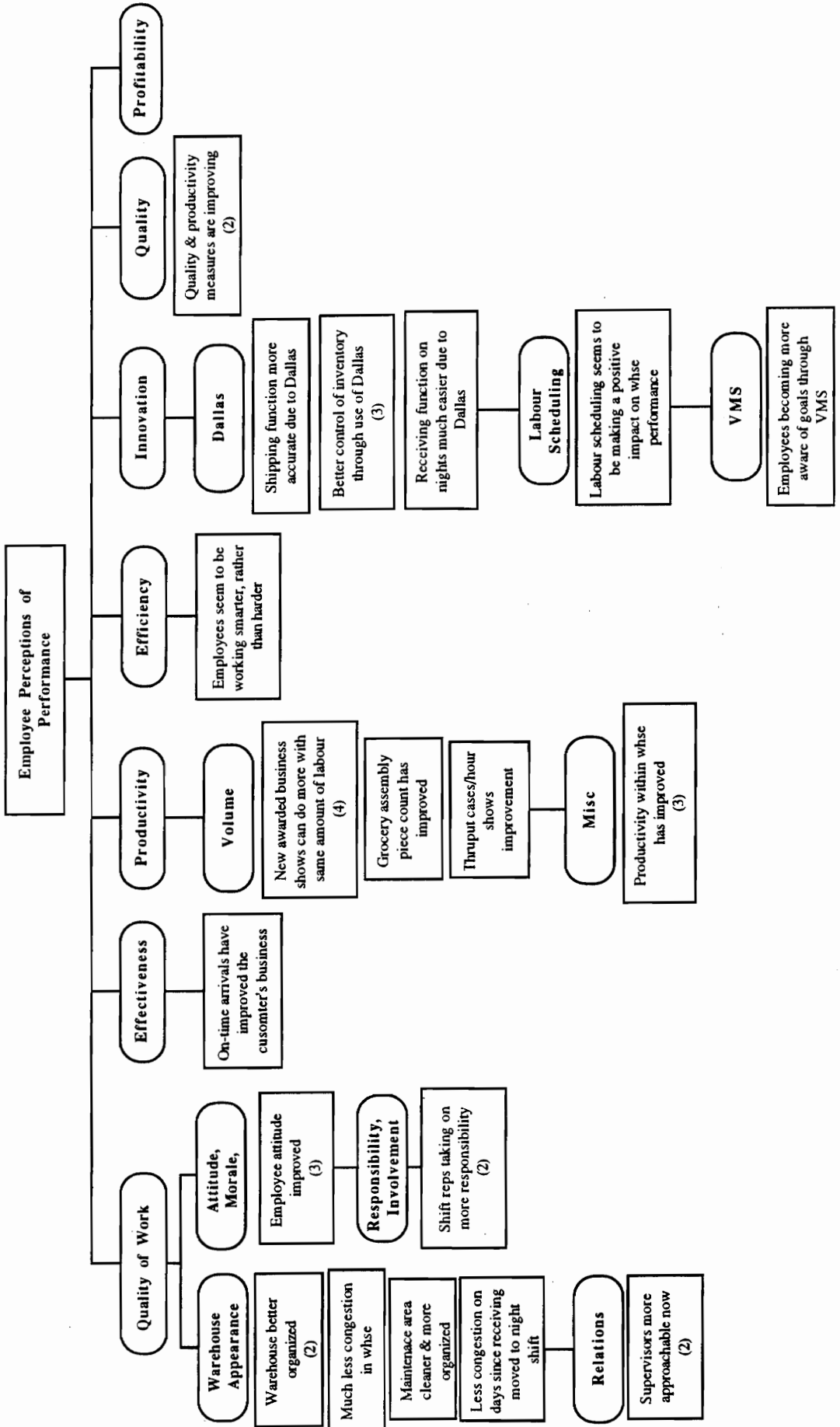
2/18/94

- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



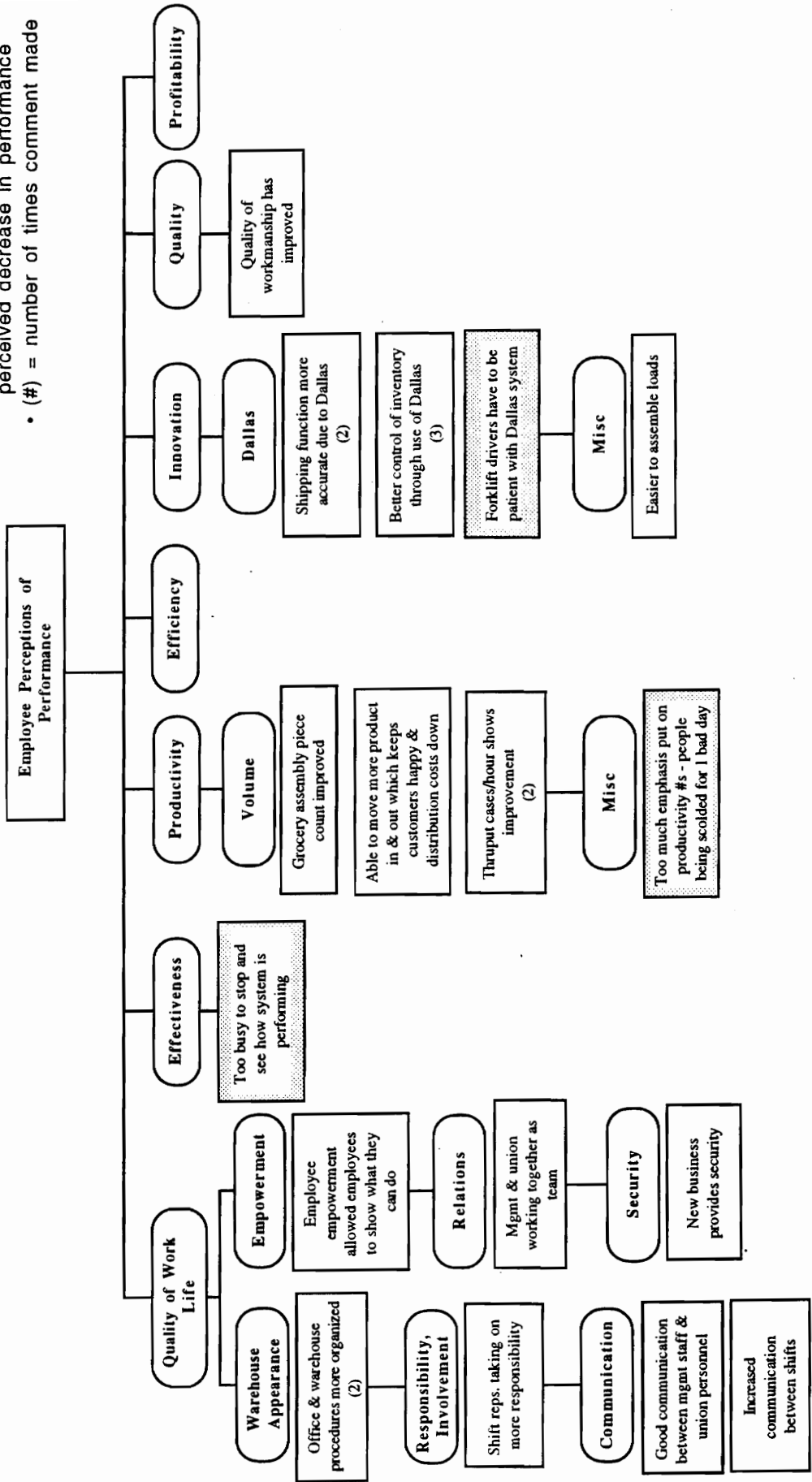
3/23/94

- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



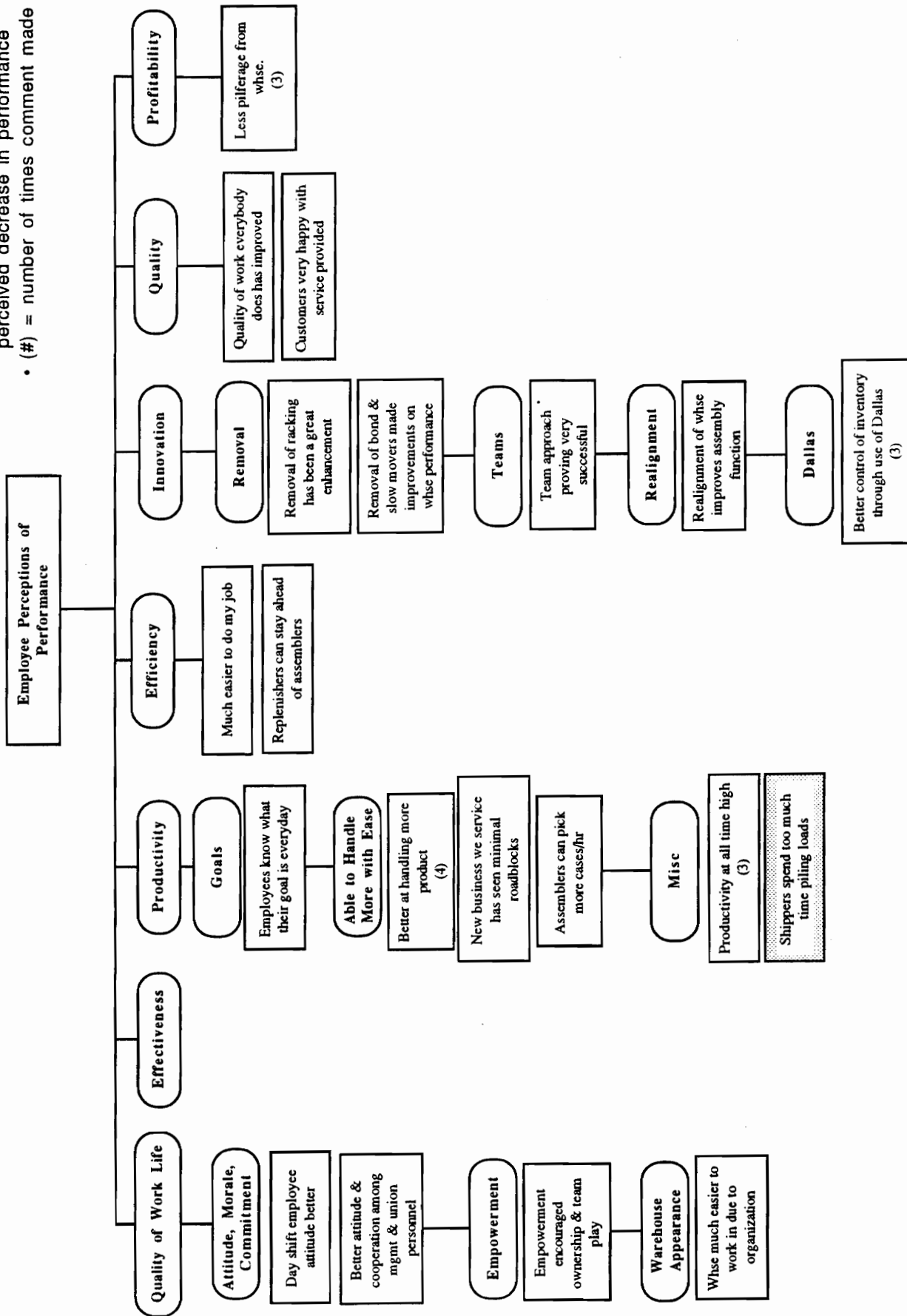
4/19/94

- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



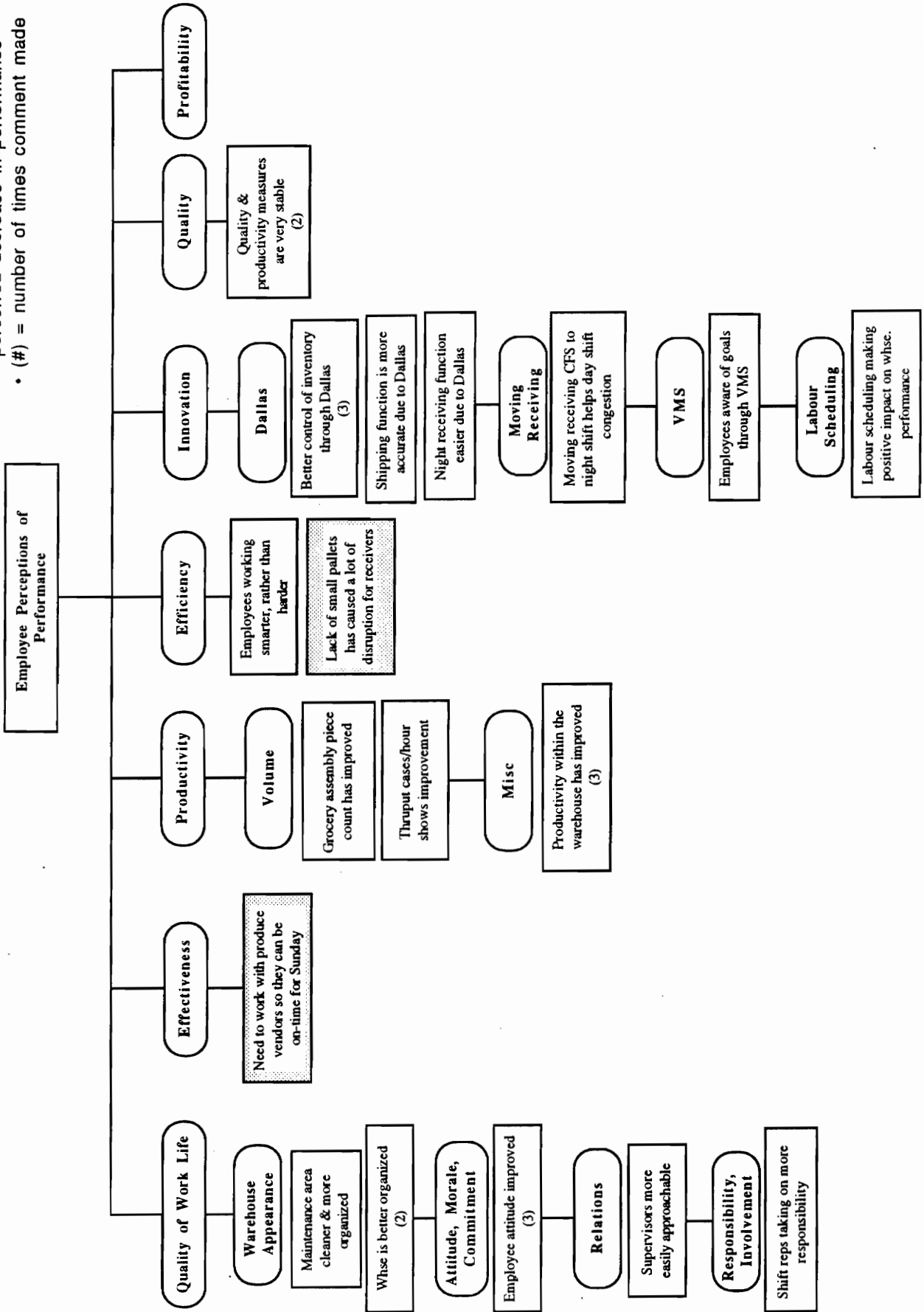
5/24/94

- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



6/23/94

- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made

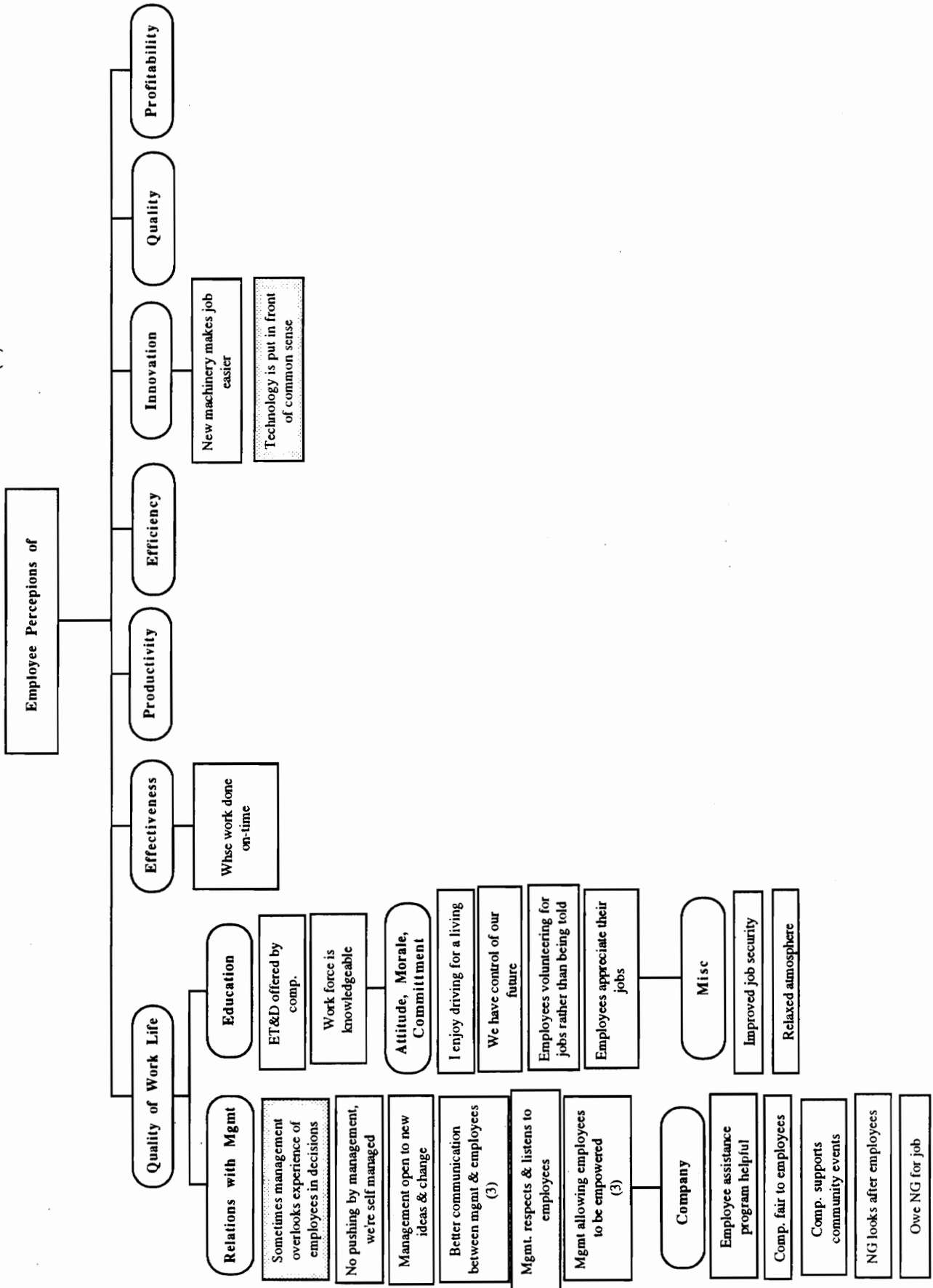


8/22/94

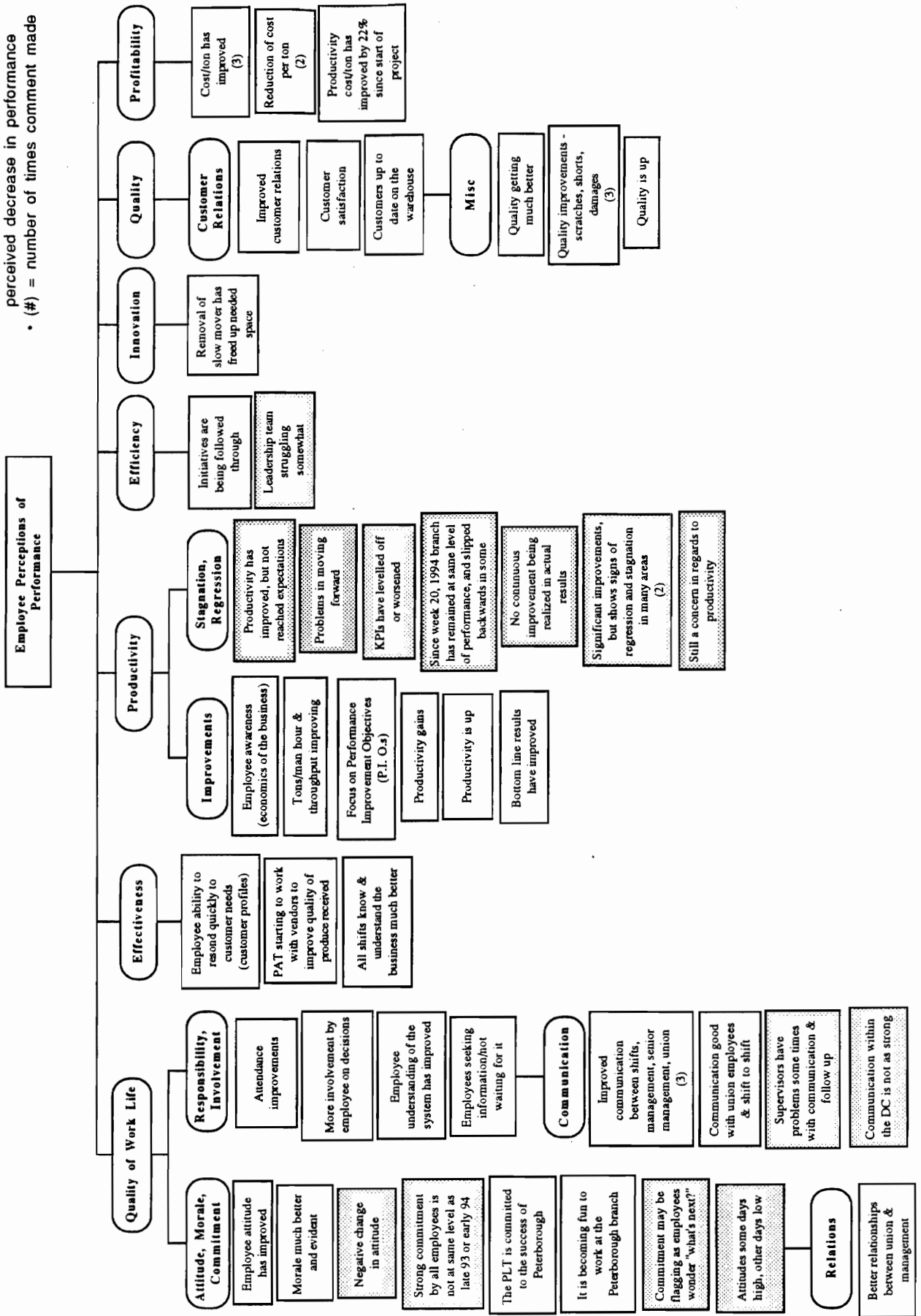
- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



- Shaded boxes indicate a concern or perceived decrease in performance
- (#) = number of times comment made



APPENDIX F - RESPONSES TO MONTHLY CHARTBOOK AND DDT/SC QUESTIONNAIRES

Chartbook Questionnaire December 17, 1993

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	13
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
X	Empowerment program with receiving is going well
X	Employees have more control of work schedule
XXX	Visually I see a more organized warehouse
X	See the numbers on the VMS boards improving
X	Don't see assemblers waiting for drops
X	Improving receiving function/putaway
XX	Appearance of warehouse - cleaner/more stuff moving
XX	Variety of product is moving through system
X	Employees movement through warehouse is unimpeded
XXXXX	Loads are down on time for drivers to leave on time (on time departures)
X	Customers think Dallas is helping warehouse perform better
X	Slow movers concern
X	Talking to employees
X	Feedback from the retailers (customers)
X	Interest of employees in VMS boards (employees are asking questions)
X	See improvements in the amount of work done
X	The shift experiences more cooperation
X	Employee empowerment
X	Employees thinking about the customer
X	Best practices produce
X	Work is completed on days and afternoons
X	Night shift is doing more receiving
X	All the assembly is eliminated from nights
X	Night shift is a clean-up time
XX	Morale seems to be higher
X	Manpower allocated easily
X	Goals set are being achieved or surpassed by shifts
X	Cost per shipped ton graph shows cost/ton kept below average
X	On time arrivals have improved
X	Based on graphs: productivity, quality, absenteeism improving
X	Based on qualitative issues Peterborough has developed into a DC of the future
X	Chart indicators

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XX	Assembly piece count is improving
XX	Dallas implementation (receiving easier)
X	Effective use of space after bond room was removed
X	Double deep racking for pop
X	Easier keeping count on product received
X	Rebuilding slack into system so more product can be handled (rec/ship)
X	Involvement of employees is higher
X	Employee effort is better
X	VMS board educate employees on warehouse operations
X	Dallas System has motivated all employees
X	Personal observation
X	Personal performance
X	Picked 200/hr one day last week
X	Inventory system helps in assembly counts
X	Less picking errors, customer gets right product the first time
X	Commitment and attitude of employees
X	Key indicators showing some improvement (i.e. absenteeism, quality issues, on-time departures, productivity numbers)
X	Expansion of the best practice program in produce
X	Dallas system has contributed to improving the assembly piece counts
X	Meeting to explain to employees how to think about the customer
X	Quality of produce has improved
X	Increased produce shipping volume
XX	Key performance indicators seem to be improving
X	Distribution system seems to be capable of handling more stores
X	Weekly shift meetings indicates improvement
X	End of shift meetings allow you to find out what you accomplished
X	Individual involvement/effort has improved amongst employees
X	Increased amount of receiving on nights is helping system improve
X	Grocery assembly is completed by the end of afternoon shift
X	Cycle counts are now being done by afternoons
X	Feedback from customers is positive
X	Employees beginning to interpret value of VMS boards
X	Refer to graph: increase of above average on time arrivals
X	Refer to graph: improvement of on time departures
X	Productivity chart showing steady improvement over time
X	Statistical

4) Concerns:

Communication could be improved in the warehouse, i.e. between PLT members and PLT reps. to respective shifts.

"Morale of employees" could be affected by the employees who have been put on call.

Best practices could be improved if all employees get the best practices training.

Chartbook Questionnaire January 21, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	11
No	1
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXX	Quality and productivity measure are improving
X	Less congestion in the warehouse
XX	Attitude of most employees has improved
X	More grocery assembly is being completed on the day shift
XX	Feedback from the customers is positive
XX	Productivity within the warehouse has improved
X	Equipment breaks down less often
X	Maintenance area is cleaner and more organized now
X	Weekly shift meetings are providing the employees with info on how warehouse is performing against the key performance indicators
XX	Employees are taking more pride in their day to day functions
XX	There are less damages in the warehouse now
XX	The warehouse is better organized
XX	Grocery assembly is much easier since Dallas was implemented
X	Finding product in the warehouse is much easier since we have minimized the amount of "zoo" lines
X	On-Time arrivals have improved the customer's business
X	You can see improvements inside & outside the warehouse
X	I have an overwhelming feeling that employees are in the dark more now than ever before
X	The employees are not involved in the decision making process
X	Empowerment seems to be working successfully on all shifts

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
X	Looking at the Key Performance Indicators there is some improvement over the last year
X	Personal observation at the branch level
XXXX	The new technologies that have been implemented in the warehouse
XX	Change in the way we do business has benefited the warehouse
X	The comments I hear from the employees each day
X	Quality of work life for those individuals affected by the shift changes
XXX	The productivity Key Indicator (thruput cases/hour) shows improvement
X	We have built slack into our system so we can handle more business
XX	We have had to change our business to fit the systems needs (ie- grocery assembly and shipping now on days)

X	The replenishing system works much better on Dallas than in the past
X	Grocery assembly piece count has improved
XX	The re-alignment of the warehouse should increase the assembly case count to above 185 cases/hour
X	The outbound work is being completed by the afternoon shift
X	The employees know what they have to do each day when they come to work
X	The employees are becoming more aware of our goals through the visual Management System
X	The receiving function is much easier since Dallas was implemented

4) Concerns:

I feel that the changes have benefited some areas and hurt other areas of the warehouse i.e. attitude/morale of part timers is low.

The communication between employees and management has not improved at all

Management does whatever it wants to do!

I am too busy in the maintenance to be concerned with what is going on elsewhere in the warehouse.

I do not know if the customers are complaining less often

The double stacking of skids in the pick slots impedes performance.

The layout of the warehouse should be looked at.

Customers are upset that we do not carry product that they want

We need to promote working as a team

Everybody should be more open around here

If management has an idea, they should share it with all the employees

Chartbook Questionnaire February 18, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	12
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXXXX	The attitude of most employees has improved
XXX	The productivity within the warehouse has improved
XXX	The weekly shift meetings are providing the employees with information on how the warehouse is performing against the Key Performance Indicators

XX	The warehouse is better organized
XX	The quality and productivity measures are improving
X	There is less congestion in the warehouse
X	The equipment breaks down less often
X	Maintenance area is cleaner and more organized now
X	On-time arrivals have improved the customer's business
X	Employees seems to be working smarter now, rather than working harder
X	There is less congestion on days since receiving was moved to the night shift
X	Customers are expressing their pleasure with the service we provide them
X	Employees seem to have a thirst for driving the project to its goal
X	The Peterborough Distribution System is a great place to work

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XXXX	Looking at the Key Performance Indicators there is vast improvement over the last year
XX	We are able to do more volume with the same of less manpower
X	Better control of inventory through the use of Dallas
X	The supervisors are more approachable now
X	The putaway function on nights has improved a lot
X	The shipping function is more accurate now that we are on the Dallas system
X	The productivity Key Indicator (thruput cases/hour) shows improvement
X	Grocery assembly piece count has improved
X	The employees are becoming more aware of our goals through the Visual Management System
X	Labour scheduling seems to be making a positive impact on warehouse performance
X	The way the employees presented themselves at the PLT update for the distribution managers
X	The shift representatives are taking on more responsibility
X	The receiving function on nights is much easier since Dallas was implemented

4) Concerns:

The shipping cube on outbound product is not consistent with the assemblers grocery bills

The janitors should be included in one of the affinity groups within the warehouse

Chartbook Questionnaire March 23, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	10
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXXX	The new business that we have been awarded, shows we can do more work with the same amount of labour
XXX	The attitude of most employees has improved
XXX	The productivity within the warehouse has improved
XX	The weekly shift meetings are providing the employees with information on how the warehouse is performing against the Key Performance Indicators
XX	The warehouse is better organized
XX	The quality and productivity measures are improving
X	There is less congestion in the warehouse
X	Maintenance area is cleaner and more organized now
X	On-time arrivals have improved the customer's business
X	Employees seems to be working smarter now, rather than working harder
X	There is less congestion on days since receiving was moved to the night shift
X	Customers are expressing their pleasure with the service we provide them

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XXXX	Looking at the Key Performance Indicators there is vast improvement over the last year
XXX	Better control of inventory through the use of Dallas
XX	The supervisors are more approachable now
X	The shipping function is more accurate now that we are on the Dallas system
X	The productivity Key Indicator (thruput cases/hour) shows improvement
X	Grocery assembly piece count has improved
X	The employees are becoming more aware of our goals through the Visual Management System
X	Labour scheduling seems to be making a positive impact on warehouse performance
X	The way the employees presented themselves at the PLT update for the distribution managers
X	The shift representatives are taking on more responsibility
X	The receiving function on nights is much easier since Dallas was implemented

4) Concerns:

Chartbook Questionnaire April 19, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	10
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXX	The new business that we have been awarded, shows we can do more work with the same amount of labour
XX	The office & warehouse procedures are more organized
X	There is good communication between management staff and the union personnel
X	Quality of workmanship has improved over the last year
X	The warehouse is beginning to receive a lot of positive comments from customers
X	The new business gives everybody a bit more security
X	From what is communicated to me by management, it seems we are getting better
X	The new scrubber that was bought this year indicates we have plans of maintaining the warehouse for a few more years
X	It is easier to assemble loads now, but there are still a number of system changes that need to be done (i.e. pacman, family grouping)

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XXXX	Looking at the Key Performance Indicators there is vast improvement over the last year
XXX	Better control of inventory through the use of Dallas
XX	The shipping function is more accurate now that we are on the Dallas system
XX	The productivity Key Indicator (thruput cases/hour) shows improvement
X	Grocery assembly piece count has improved
X	Employee empowerment has allowed the employees to show what they can really do
X	There is increased communication between shifts
X	Management and union are working together as a team
X	The shift representatives are taking on more responsibility
X	We are able to move more product in & out which keeps our customers happy and distribution costs down

4) Concerns:

Too much emphasis is put on the productivity numbers, people are being scolded for one bad day.

I am too busy to stop and see how the system is performing

Forklift drivers have to be patient with the Dallas system

Chartbook Questionnaire May 24, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	10
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXXX	We are better at handling more product now
XXX	There is less pilferage from the warehouse
XXX	Productivity is at an all time high
X	The warehouse is much easier to work in because it is more organized
X	The removal of the racking, because of the body removal, has been a great enhancement
X	It is much easier for me to do my job now
X	The attitude of the employees on the day shift is better now than it was a year ago
X	The team approach seems to be proving very successful
X	There is a better attitude & cooperation amongst management and union personnel
X	Employees in the warehouse know what their goal is everyday

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XXXX	Looking at the Key Performance Indicators there is vast improvement over the last year
XXX	Better control of inventory through the use of Dallas
X	Assemblers can pick more cases an hour now
X	Replenishers (forklifts), can stay ahead of the assemblers
X	Empowerment has encouraged ownership and team play
X	The new business that we service has seen minimal roadblocks
X	Removal of the bond & slow movers has made improvements on warehouse performance
X	The weekly shift meetings inform everybody on how we are performing
X	The quality of work everybody does has improved
X	Customers are very happy with the service that we provide them
X	Realignment of the warehouse will improve the assembly function

4) Concerns:

Assemblers need to remember to build all skids to 65 cubic feet. Shippers spend too much time piling loads.

Chartbook Questionnaire June 23, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	10
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXXX	The new business that we have been awarded, shows we can do more work with the same amount of labour
XXX	The attitude of most employees has improved
XXX	Productivity within the warehouse has improved
XXX	The weekly shift meetings are providing the employees with information on how the warehouse is performing against the Key Performance Indicators
XX	The warehouse is better organized
XX	The quality and productivity measures are very stable
X	Maintenance area is cleaner and more organized now
X	Employees seems to be working smarter now, rather than working harder
X	Moving more receiving CFS (head office) to night shift has helped ease the congestion on day shift

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XXXX	Looking at the Key Performance Indicators there is vast improvement over the last year
XXX	Better control of inventory through the use of Dallas
X	The supervisors are more easily approachable now
X	The shipping function is more accurate now that we are on the Dallas system
X	The productivity Key Indicator (thruput cases/hour) shows improvement
X	Grocery assembly piece count has improved
X	The employees are becoming more aware of our goals through the Visual Management System
X	Labour scheduling seems to be making a positive impact on warehouse performance
X	The shift representatives are taking on more responsibility
X	The receiving function on nights is much easier since Dallas was implemented
X	

4) Concerns:

We need to work with the produce vendors so they can be on-time for Sunday.

Lack of small pallets has caused a lot of disruption for the receivers.

Chartbook Questionnaire August 22, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	8
No	1
Don't Know	1

2) How do you know?

Number of Responses	Responses from the Employees
XX	Morale of all the employees is better
X	I do not see as many people standing around now
X	There is less downtime now, so employees are always working
X	The employees are more committed to doing the best job possible
X	The shift reps are a great asset to the warehouse operation.
X	Business is conducted same way as before the project began
X	The shipping function is still a lot of work
X	There are a lack of trained people to fill-in for vacation
X	We now have excellent communication between management and employees
X	The work force is very knowledgeable
X	The forklifts and receivers on day shift work together to get the work done
X	We are keeping the skids sorted
X	Increased number of forklifts on day shift helps to maintain the front dock
X	The attitudes of most employees has gotten worse
X	I am not involved with the day to day (inbound & outbound) operation of the warehouse.

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XX	Better control of inventory through the use of Dallas
XX	The number of damages in the warehouse is down
X	Moving of the bulk products from dock to the storelane has given us more staging area for outbound product.
X	The warehouse is a lot cleaner now, than it used to be
X	The Dallas inventory system has improved the assembly and forklift functions
X	There are more drops with using the Dallas system then before Dallas was implemented
X	We have better control of all KPI measurements since the implementation of the Visual Management system
X	We have had improvement across all the key Performance Indicators
X	The employees now have a better understanding of what it is they have to do each day.
X	More employees are late now and they don't seem to care if they are suspended
X	There is less for the mechanics to do because the machinery does not break down as often
X	The warehouse operation runs a lot smoother, since the Dallas system was implemented
X	There are less roadblocks for assemblers now than before
X	There has been continuous improvement of the assembly function over the last year

4) Concerns:

We have too many skids in the aisles.

Chartbook Questionnaire November 9, 1994

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	9
No	0
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXXXXX	The salary and benefits we receive
XXXX	The employees at the warehouse
XXX	Management allowing employees to be empowered
XXX	Better communication between management & employees
XX	Management respects and listens to employees
X	The new machinery makes it easier to do my job
X	There is no pushing down by management, we are self-managed
X	Employees are actually volunteering to do jobs now rather than being told
X	National Grocers looks after their employees
X	ET&D offered by the company. The work force is very knowledgeable
X	We have control of our future
X	The employee assistance program helps the employees
X	The company supports community events
X	Management is open to new ideas and change
X	The company is very fair to employees
X	I enjoy driving for a living
X	My coworkers create a relaxed atmosphere
X	I owe national grocers for the job I have, not vice-versa
X	The warehouse gets the work done on-time for the most part

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
X	Sometimes management overlooks the experience of employees in the decision
X	Technology is put in front of common sense
X	Improve job security for all employees
X	More honest answers from all employees within the warehouse
X	Constant feedback both good & bad
X	That all employees appreciate the job they have

4) Concerns:

DDT/SC Questionnaire February 27, 1995

1) Is the Peterborough Distribution System getting better?

Response	Number
Yes	9
No	1
Don't Know	0

2) How do you know?

Number of Responses	Responses from the Employees
XXXXX	Productivity measurement (reduced cost/ton)
XXX	Improved communication between shifts, management ,senior management, union
XXX	Quality improvements - scratches, shorts, damages
X	Improved customer relations
X	Employee awareness (economics of the business)
X	Employees ability to respond quickly to customer needs (customer profiles)
X	Employee seeking information/not waiting for information
X	Attendance improvements - measurement
X	Customer satisfaction - focus groups, etc.
X	Focus on P.I.O's
X	Actual visit of the Distribution Center
X	Attitude has improved
X	More involvement by the employee on decisions
X	Productivity has improved (but not reaches expectations)
X	Morale much better and evident
X	Sense of ownership by employees
X	Weekly summary of key indicators being measured
X	Appears that a major change in attitude has occurred in a more negative response
X	The strong commitment by all employees is not at the same level as late 93 or early 94.
X	Better relationships between union and management
X	Improved service to all our customers
X	The PLT is committed to the success of Peterborough
X	It is becoming fun to work at the Peterborough branch
XX	Peterborough has made significant improvement, but has shown signs of regression and stagnation in many area
X	Communication within the DC is not as strong
X	Commitment may be "flagging" as employees wonder "what's next?"
X	Bottom line results have improved
X	Chartbook KPI data indicates improvement and also shows the regression
X	I get a different "feel" (negative) from the warehouse now
X	Bootcamp experience
X	Facts and data from others
X	Experiencing predictable 1st cycle to 2nd cycle transition problems.

3) On what basis do you make this decision?

Number of Responses	Responses from the Employees
XX	Reduction 93 cost/ton to 94 cost/ton--measurement and results
X	Implementation of Dallas (easy implementation)
X	Feedback from customers (customer focus meeting)
X	Measurement (improving)
X	Leadership team knowledge and abilities
X	Quality - scratches, shorts, damages
X	Attendance improvements through measurement
X	Customer feedback
X	Productivity gains
X	Improvements made through reviewing chart books
X	Feedback from those involved
X	Reports on performance levels
X	Comments from external sources
X	Understanding of the system has improved
X	Initiatives are being followed through
X	Visits to branch, attending meetings
X	Individual discussions with employees
X	Review of chart books
X	NGs' distribution survey results (employees)
X	Peterborough's branch survey results (employees)
X	Lack of attendance to previous "All Hands meetings"
X	No continuous improvement being realized in actual results
X	The visual measurement system has given feedback to all employees on warehouse performance.
X	Removal of slow movers, has freed up needed space within the branch
X	The productivity cost/ton has improved by 22% since the start of the project
X	Customer focus group meetings bring the customer up to date on the warehouse
X	Produce PAT 86 has started to work with vendors to improve the quality of produce we receive (Jan '95)
X	KPI's in the Peterborough VMS have leveled off or worsened
X	The leadership team is struggling somewhat
X	Productivity is up
X	Quality is up.

APPENDIX G - Peterborough, Chatham and Sudbury Profile Information

- **Peterborough Profile**.....273
- **Chatham Profile**.....277
- **Sudbury Profile**.....281

Peterborough Warehouse

Operations Information

Facility Size:		123,700 sq. ft
Dept. Sizes:	Grocery	67,160 sq. ft
	Produce	11,726 sq. ft
	Dairy	6,772 sq. ft
	Bond	sq. ft
	Meat	---- sq. ft
	Frozen	---- sq. ft
	Office	11,964 sq. ft

Current Shipping Rates

	<u>1993 Avg.</u>	<u>1994 Avg.</u>
Skus/Week:		
	Grocery	71,362
	Produce	29,690
	Dairy	12,593
	Bond	
	Meat	
	Frozen	

Current Receiving Rates

	<u>1993 Avg.</u>	<u>1994 Avg.</u>
Skus/Week:		
	Grocery	865
	Produce	577
	Dairy	144
	Bond	
	Meat	
	Frozen	

Number of Receiving & Shipping Doors:

	<u>Receiving</u>	<u>Shipping</u>
Grocery	12	12
Produce	2	
Dairy	0	
Bond	0	
Meat	0	
Frozen	0	

Types and Number of Material Handling Equipment:

	<u>Number</u>	<u>Type(s)</u>
Double pallet transporter	24	Crowns
Single pallet transporter	15	Crowns
Counterbalance forklifts	5	3 Cats, 1 Baker for Receiving
Stand-up forklifts	1	Raymond
Sit-down forklifts	13	B.T's
Walking stackers	--	
Other Equipment:		
Personnel transporters	0	
Floor cleaning machinery	1	Tennat
Other equipment		

Manufacturers and Numbers of Tractors:

<u>Manufacturer</u>	<u>No. of Units</u>
Ford	20

Number and Length of Trailers:

<u>Length (ft.)</u>	<u>No. of Units</u>
53'	3
48'	8
47'	10
45'	6
'34	1

Type(s) of Racking Set-Up(s) Currently in Use:

	<u>Yes</u>	<u>No</u>	<u>Most Predominant</u>
Single Deep Selective	X		X
Double Deep Selective		X	
Two Deep Drive-In	X		
Three Deep Drive-In	X		(Push Back)
Shelf Rack	X		
Roll Rack		X	
Other		X	
Specialized		X	

System Use: (current use of the following Inventory, Warehouse, Performance Measurement, or Transportation Management systems)

	<u>Yes</u>	<u>No</u>
Dallas (DCMS)	X	
Engineered Standards (DCAMS)		X
Engineered Minimums		X
D-Cota		X
Roadshow		X
Yardmaster		X
Tripmaster	X	
Dynacon		X
Pacman	X	
TMT		X
OPTIMA	X	
OPTIMIZER		X
MAN INTERFACE		X

Service Area & Customer Profile:

Geographical Service area:
(farthest delivery point)

North: Huntsville C&C, Wilson's General Store
 South: Semple's Yig
 East: Kingston C&C
 West: Penetang Valu-Mart/Toronto

Type and Number of Retail Formats Serviced:

Loblaws	4
No-Frills	2
Valuemarts	12
Freshmarts	7
YIG	3
Cash & Carry	8
Mr. Grocers	14
Other Independents	35

Union Presence:

Employees represented by the Steel workers Union. It is a fair, yet firm union, having a cooperative relationship with the PDSOF project.

Employee Statistics:

127 Distribution Employees Total

82 Full Time Warehouse Employees + Drivers

6 Full Time Clerks

88 Union Full time

1 Distribution Manager

1 Change Agent

2 Senior Supervisor

4 Supervisors

1 Administrative Assistant

9 Salaried Distribution = 97 Full Time employees

29 Part Time Employees

1 Part Time Clerk

30 Union Part Time

The Chatham Warehouse

Operations Information

Facility Size:		148,134 sq. ft
Dept. Sizes:	Grocery	111,524 sq. ft
	Produce	21,386 sq. ft
	Dairy	4,612 sq. ft
	Bond	sq. ft
	Meat	sq. ft
	Frozen	sq. ft
	Office	10,617 sq. ft
	Trash Vestibule	sq. ft
	Cash & Carry	sq. ft
	Mechanics Room	sq. ft
	Charging Area:	sq. ft
	Rec./Ship Dock	sq. ft

Current Shipping Rates

	<u>1992 Avg.</u>	<u>1993 Avg.</u>	<u>1994 Avg.</u>	
Skus/Week:				
	Grocery	112,153	134,750	154,563 (includes dairy)
	Produce	57,812	61,653	72,522
	Dairy			
	Bond			
	Meat			
	Frozen			

Bond is assembled in Kitchener and transhipped through Chatham to our customers.
Frozen and meat is assembled by Conestoga and transhipped through Chatham to our customers.

Current Receiving Rates

	<u>1992 Avg.</u>	<u>1993 Avg.</u>	<u>1994 Avg.</u>	
Skus/Week:				
	Grocery	1306	1546	1762
	Produce	743	306	716
	Dairy			
	Bond			
	Meat			
	Frozen			

Number of Receiving & Shipping Doors:

	<u>Receiving</u>
Grocery	19
Produce	3
Dairy	0
Bond	0
Meat	0
Frozen	0

Types and Number of Material Handling Equipment:

	<u>Number</u>	<u>Type(s)</u>
Double pallet transporter		
Single pallet transporter		
Counterbalance forklifts		
Stand-up forklifts		
Sit-down forklifts		
Walking stackers		
Other Equipment:		
Personnel transporters		
Floor cleaning machinery		
Other equipment		

Manufacturers and Numbers of Tractors:

<u>Manufacturer</u>	<u>No. of Units</u>
----------------------------	----------------------------

Number and Length of Trailers:

<u>Length (ft.)</u>	<u>No. of Units</u>
----------------------------	----------------------------

Type(s) of Racking Set-Up(s) Currently in Use:

	<u>Yes</u>	<u>No</u>	<u>Most Predominant</u>
Single Deep Selective	X		80%
Double Deep Selective			
Two Deep Drive-In		X	
Three Deep Drive-In		X	
Shelf Rack		X	
Roll Rack		X	
Other			
Specialized			

System Use: (current use of the following Inventory, Warehouse, Performance Measurement, or Transportation Management systems)

	<u>Yes</u>	<u>No</u>
Dallas (DCMS)	X	
Engineered Standards (DCAMS)	X	
Engineered Minimums	X	
D-Cota		X
Roadshow		X
Yardmaster		X
Tripmaster	X	
Dynacon		X
Pacman		X
TMT	X	
OPTIMA	X	
OPTIMIZER		X
MAN INTERFACE		X

Service Area & Customer Profile:

Geographical Service area:
(farthest delivery point)

North: Port Elgin
South: Ridgetown
East: London
West: Winddor

Type and Number of Retail Formats Serviced:

Zehrs	21
No Frills	5
Valuemarts	12
YIG	1
Other Independents	12

We also assemble and tranship to Kitchener Branch, produce for a multitude of their NGR customers.

Union Presence:

Teamsters Union Local 330.

Employee Statistics:

117 Distribution Employees Total

95 Full Time Warehouse Employees

9 Full Time clerks

104 Union Full Time

61 Part Time Employees

6 Part Time Clerk

13 Union Part Time

The Sudbury Warehouse

Operations Information

Facility Size:		129,751	sq. ft
Dept. Sizes:	Grocery	63,836	sq. ft
	Produce	7,528	sq. ft
	Dairy	6,653	sq. ft
	Bond	5,688	sq. ft
	Meat	0	sq. ft
	Frozen	5,040	sq. ft
	Office	5,205	sq. ft
	Trash Vestibule	6,600	sq. ft
	Cash & Carry	11,705	sq. ft
	Mechanics Room	400	sq. ft
	Charging Area:	400	sq. ft
	Rec./Ship Dock	16,695	sq. ft

Current Shipping Rates

Skus/Week:	<u>1993 Avg.</u>	<u>1994 Avg.</u>
Grocery	505.84	535.83
Produce	243.77	279.33
Dairy	0	0
Bond	245.23	377.14
Meat	0	0
Frozen	48.86	51.64
	-----	-----
	1043.70	1243.94

Number of Receiving & Shipping Doors:

	<u>Receiving</u>
Grocery	18
Produce	1
Dairy	0
Bond	0
Meat	0
Frozen	0

Types and Number of Material Handling Equipment:

	<u>Number</u>	<u>Type(s)</u>
Double pallet transporter	12	Crowns
Single pallet transporter	5	Crowns
Counterbalance forklifts	4	3 Cats, 1 Baker for Receiving
Stand-up forklifts	10	Raymond
Sit-down forklifts	2	B.T's
Walking stackers	0	
Other Equipment:		
Personnel transporters	0	
Floor cleaning machinery	1	Scrubber
Other equipment	6	Walkie Pallet Movers For Trucks
	5	Hand Jacks For Trucks

Manufacturers and Numbers of Tractors:

<u>Manufacturer</u>	<u>No. of Units</u>
International	1
Ford	11

Number and Length of Trailers:

<u>Length (ft.)</u>	<u>No. of Units</u>
45'	14
26'	1

Type(s) of Racking Set-Up(s) Currently in Use:

	<u>Yes</u>	<u>No</u>	<u>Most Predominant</u>
Single Deep Selective	X		70%
Double Deep Selective			
Two Deep Drive-In	X		
Three Deep Drive-In	X		
Shelf Rack	X		
Roll Rack	X		
Other			
Specialized			

System Use: (current use of the following Inventory, Warehouse, Performance Measurement, or Transportation Management systems)

	<u>Yes</u>
Dallas (DCMS)	X
Engineered Standards (DCAMS)	X
Engineered Minimums	Scheduled for Installation 2/95 in Bond Room
D-Cota	X
Roadshow	
Yardmaster	
Tripmaster	X
Dynacon	
Pacman	
TMT	X
OPTIMA	X
OPTIMIZER	
MAN INTERFACE	

Service Area & Customer Profile:

Geographical Service area:
(farthest delivery point)

North: New Liskard
South: Burk's Falls / Parry Sound
East: Mattawa
West: Sault Ste. Marie

Type and Number of Retail Formats Serviced:

Valuemarts	9
Freshmarts	10
YIG	6 (plus 1 produce and bond)
Cash & Carry	3 (plus 1 bound transhipped via Cochrane)
Red and Whites	9
Other Independents	54 = 20 Independents 27 Quk Marts 4 Lucky Dollar 3 Jem Marts

Union Presence:

The Retail, Wholesale and Department Store union (RWDSU) has an extremely strong presence in the Sudbury distribution center.

Employee Statistics:

97 Distribution Employees Total

51 Full Time Warehouse Employees

15 Full Time Drivers

10 Full Time Clerks

76 Union Full Time

1 Distribution Manager

1 Senior Supervisor

6 Supervisors

8 Salaried Distribution = 84 Full Time Employees

12 Part Time Employees

1 Part Time Clerk

13 Union Part Time

**APPENDIX H - Control Charts of Chatham, Sudbury, and Peterborough
Common Key Performance Indicators**

Peterborough Common Key Performance Indicators

- Total cost per shipped ton 286
- Percent on-time arrival at customer by week 287
- Grocery shorts per 1000 cases shipped by week 288

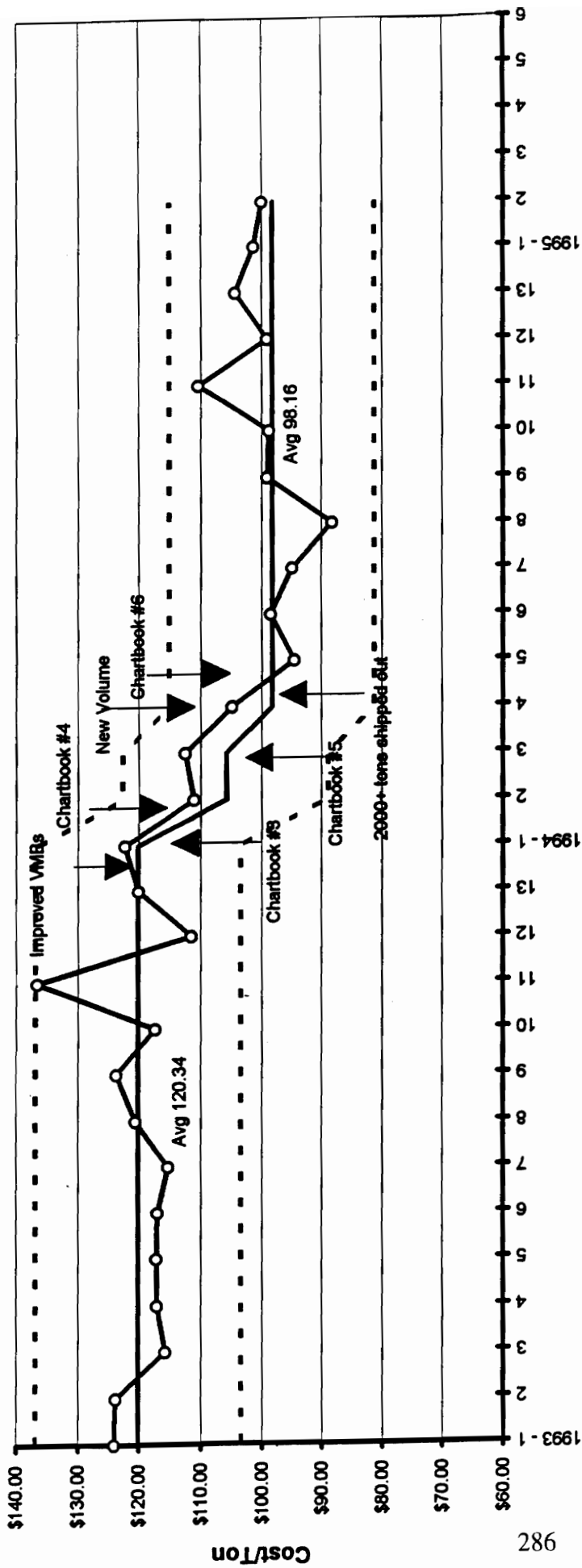
Chatham Common Key Performance Indicators

- Total cost per shipped ton 289
- Percent on-time arrival at customer by week 290
- Grocery shorts per 1000 cases shipped by week 291

Sudbury Common Key Performance Indicators

- Total cost per shipped ton 292
- Percent on-time arrival at customer by week 293
- Grocery shorts per 1000 cases shipped by week 294

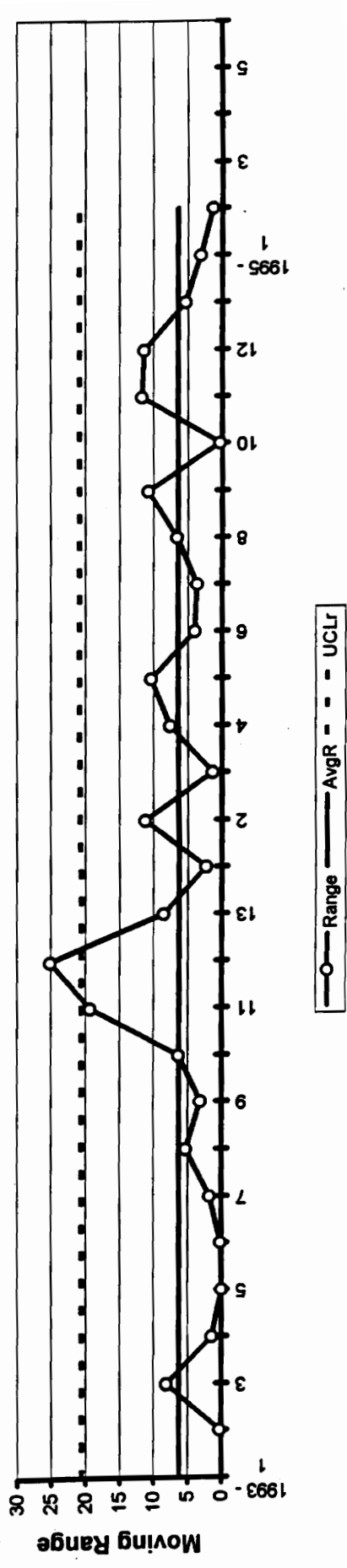
Peterborough Total Distribution Cost Per Shipped Ton By Period



982

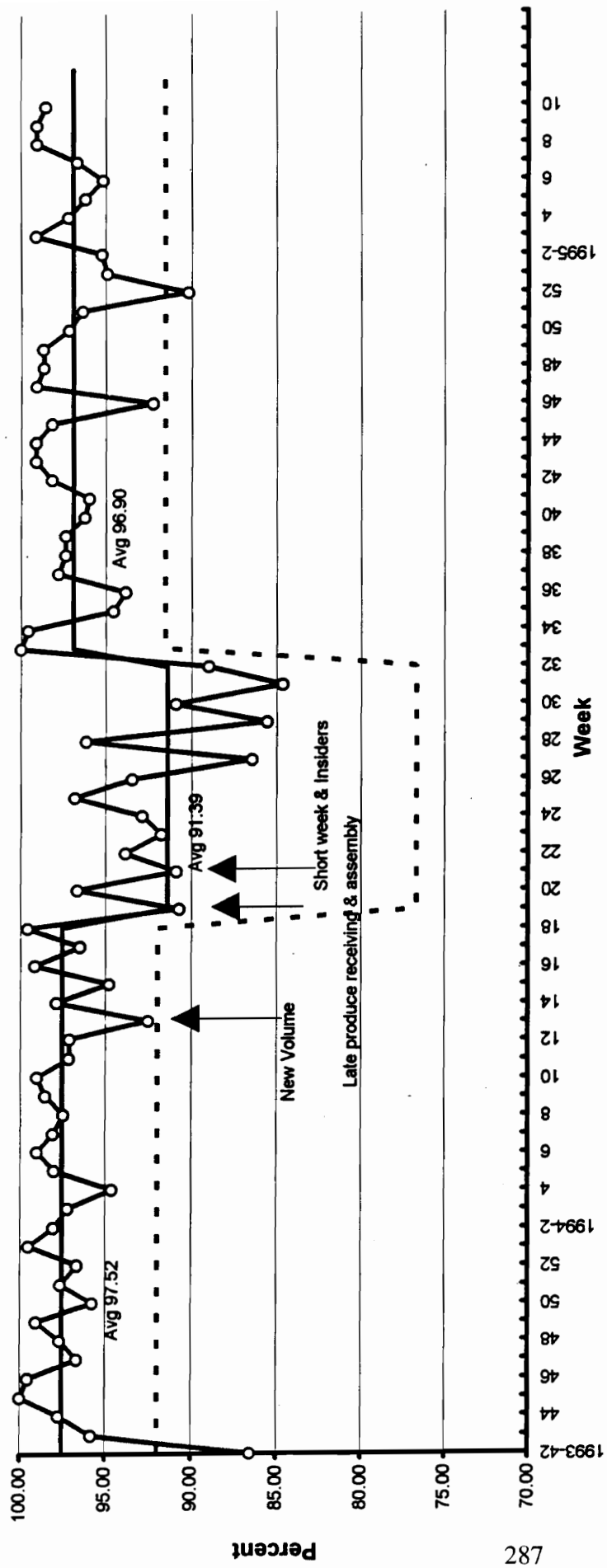
Period

○ cost/ton — AvgX — LNPLx — UNPLx

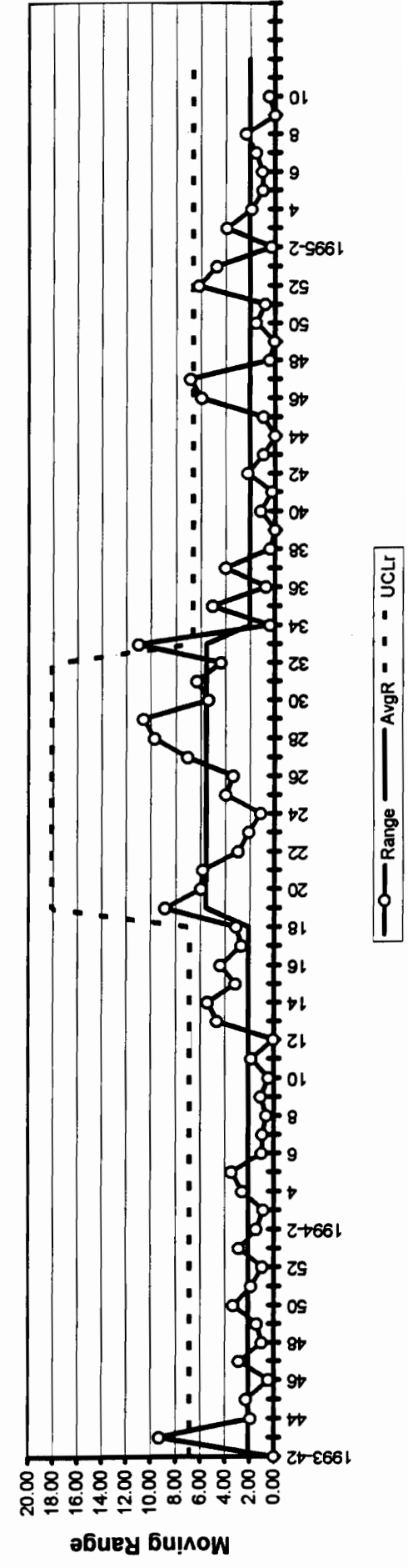


○ Range — AvgR — UCLr

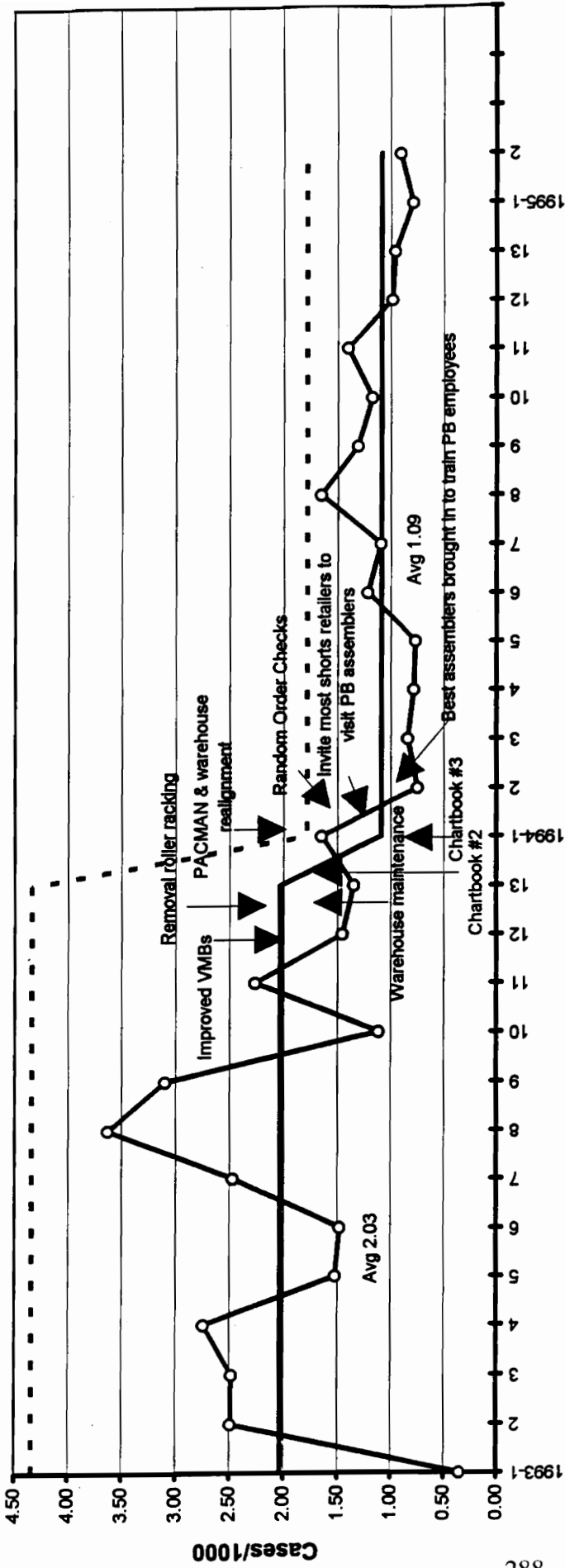
Peterborough Percent On Time Arrivals At Customer By Week



287



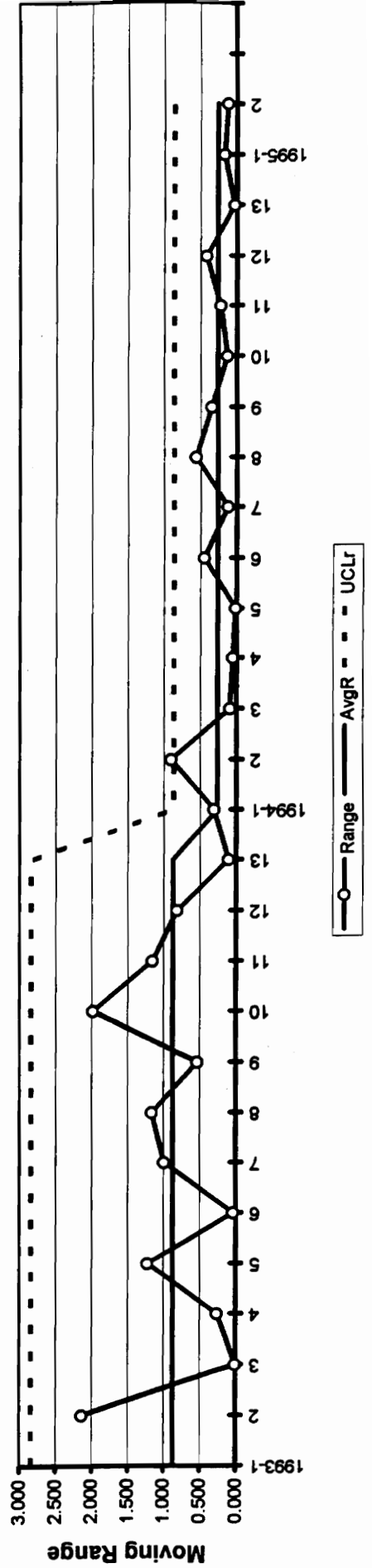
Peterborough Grocery Shorts Per 1000 Cases Shipped By Period



288

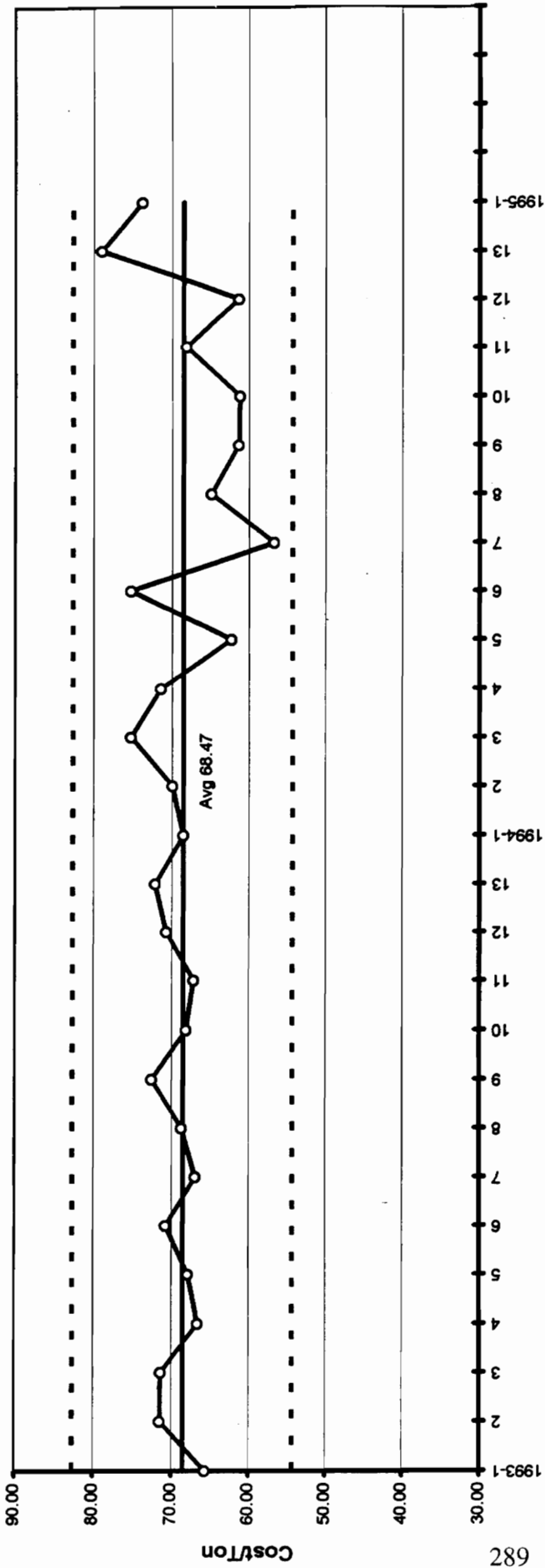
Period

○ Cases/1000 — AvgX — — LNPLx

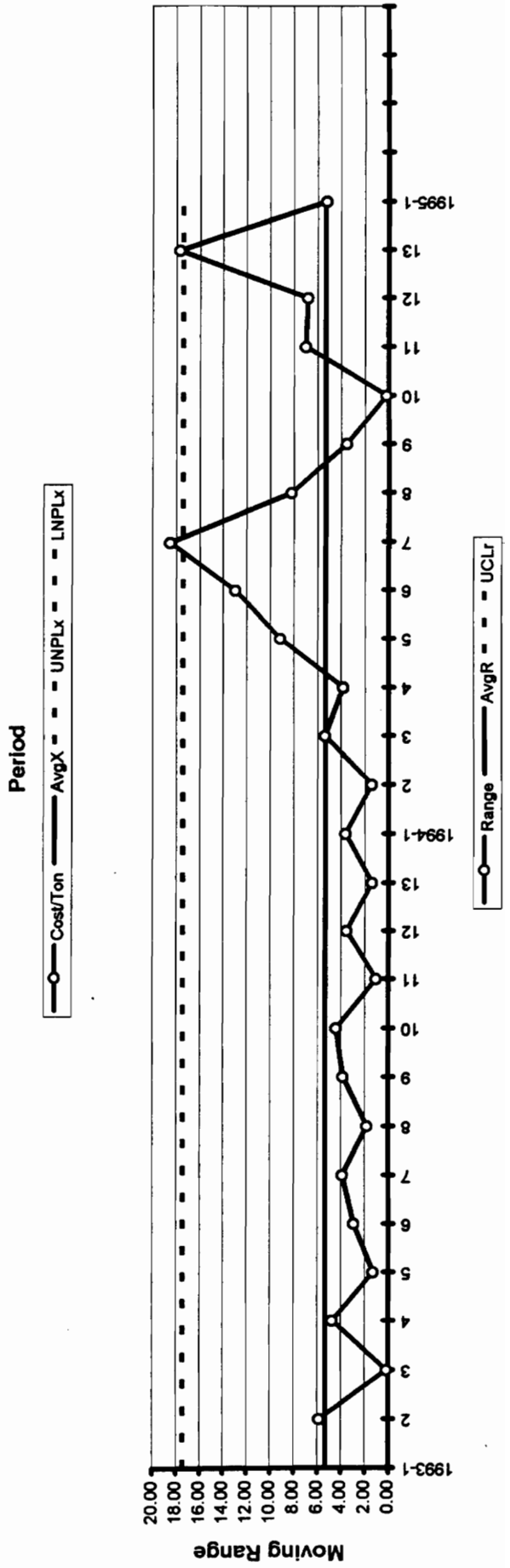


○ Range — AvgR — — UCLr

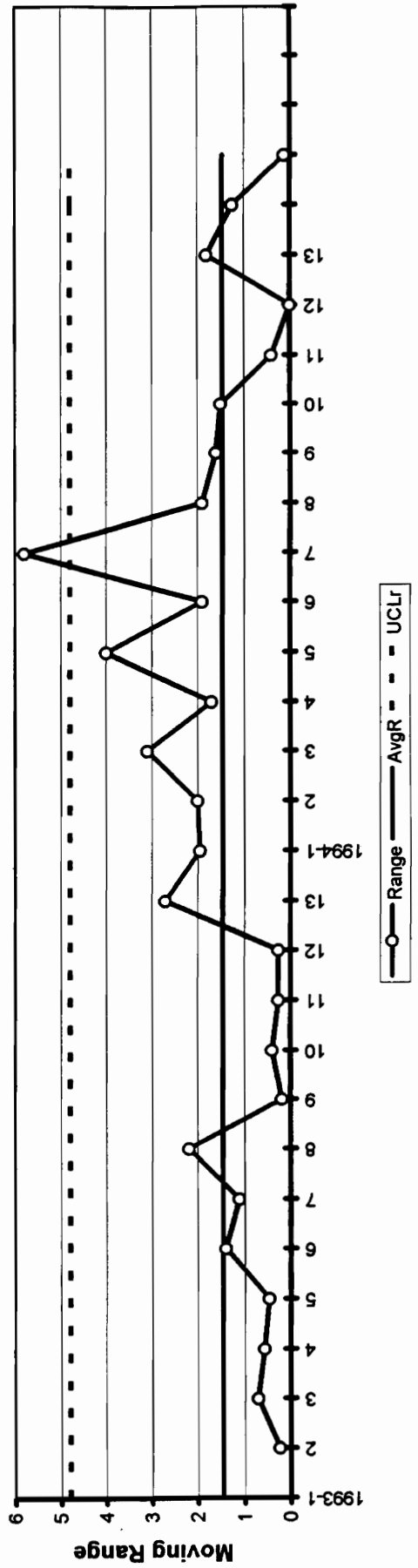
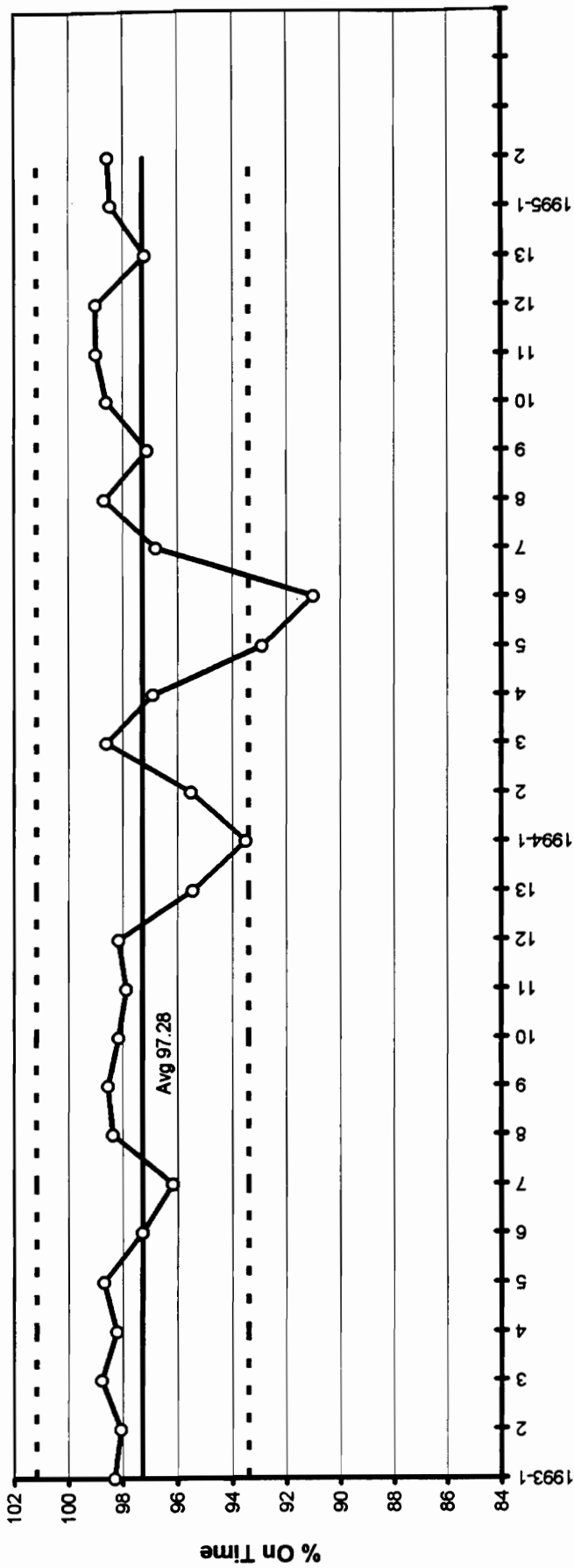
Chatham Total Distribution Cost Per Shipped Ton By Period



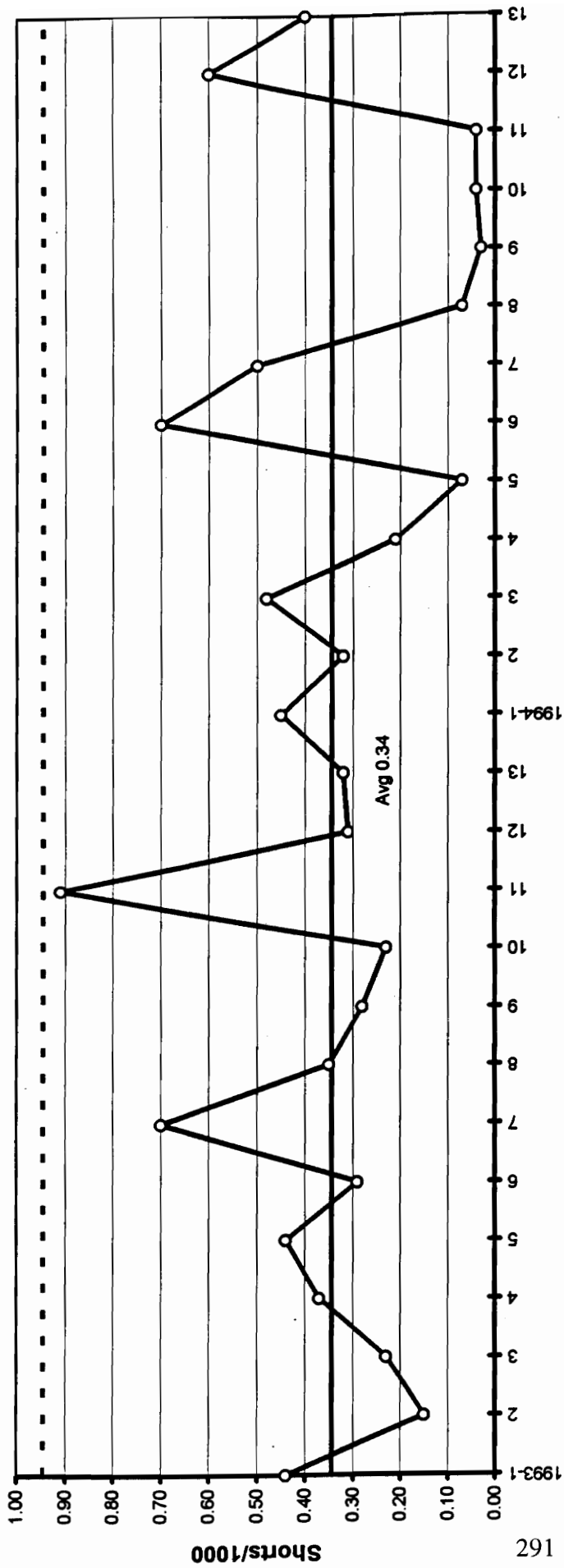
68



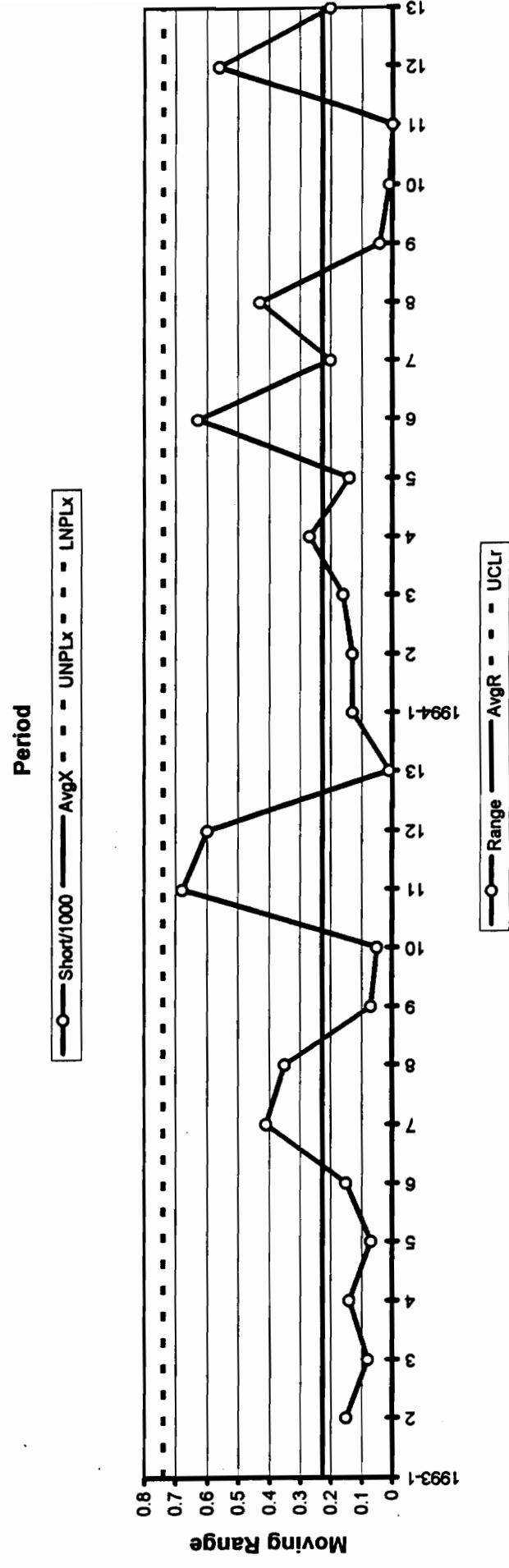
Chatham Percent On Time Arrivals At Customer By Period



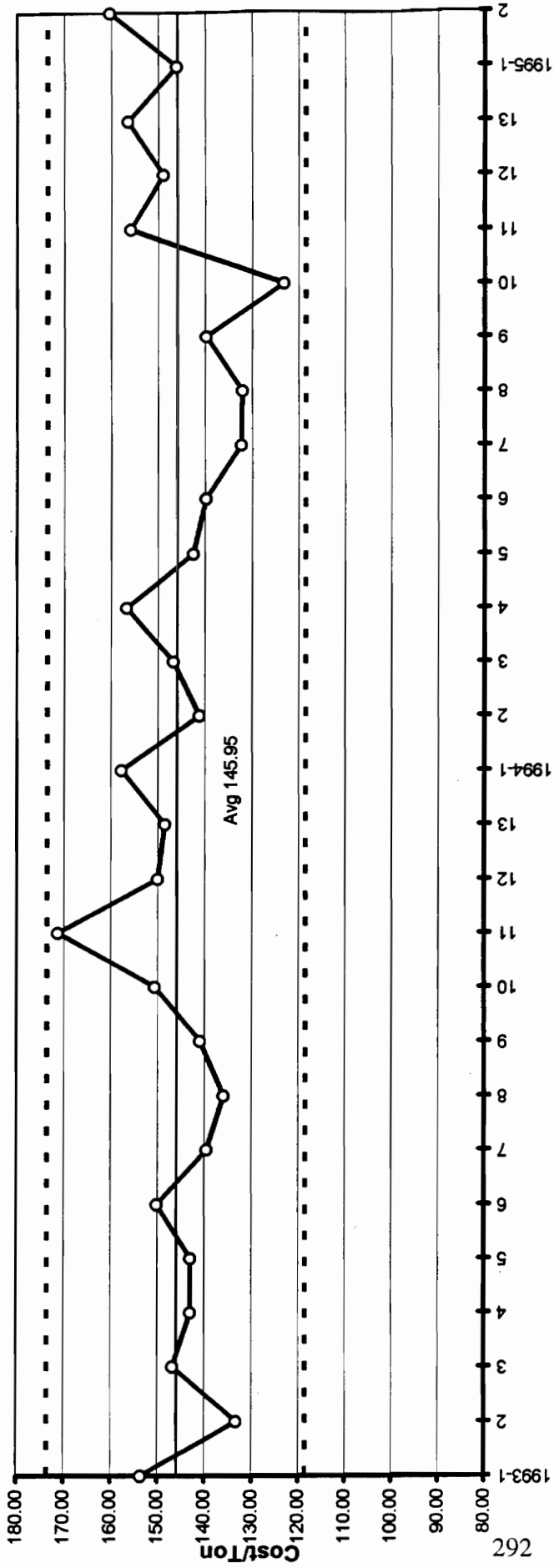
Chatham Grocery Shorts per 1000 Cases Shipped By Period



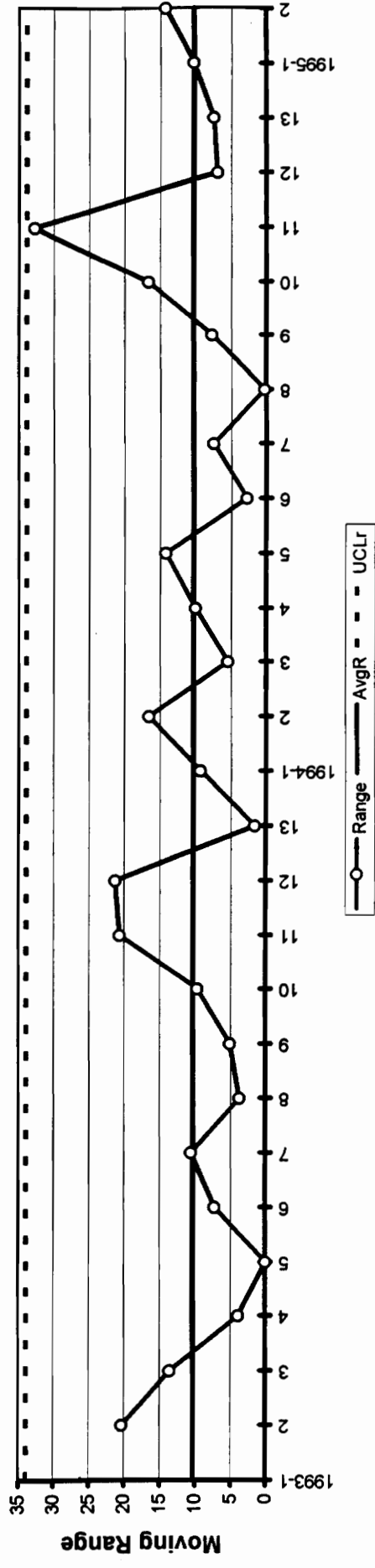
291



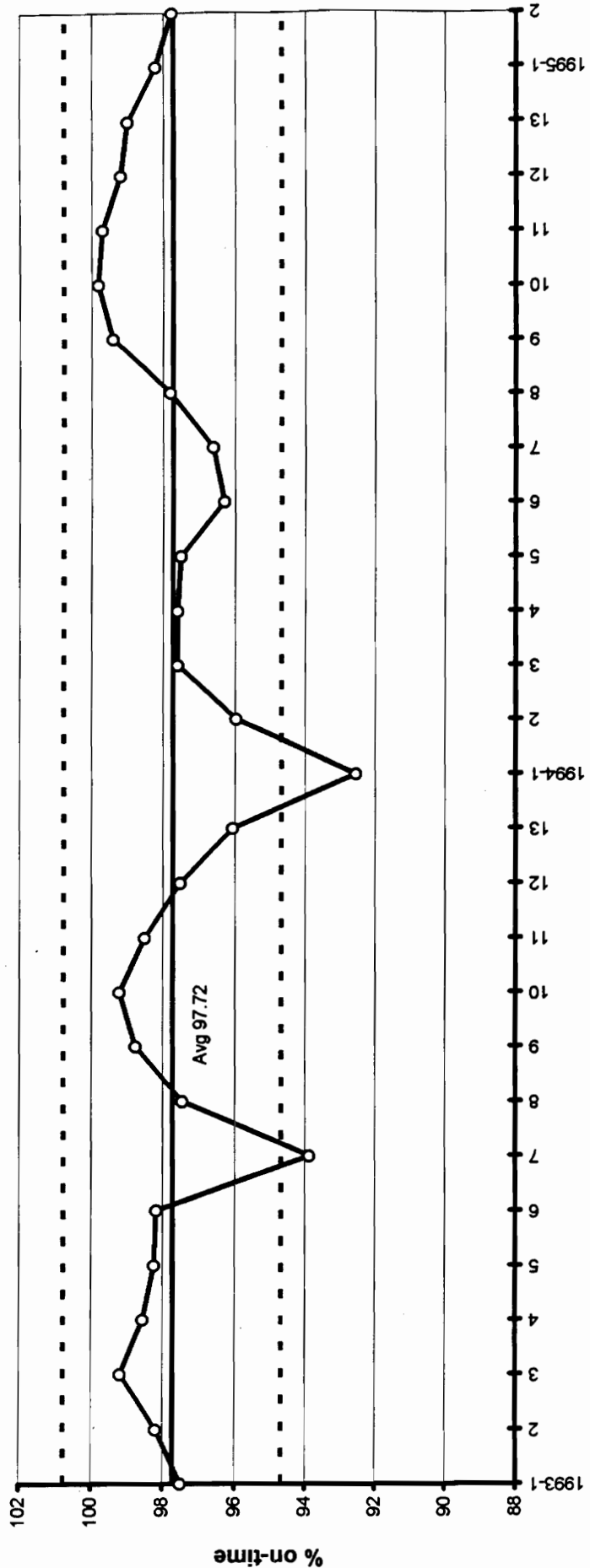
Sudbury Total Cost Per Shipped Ton By Period



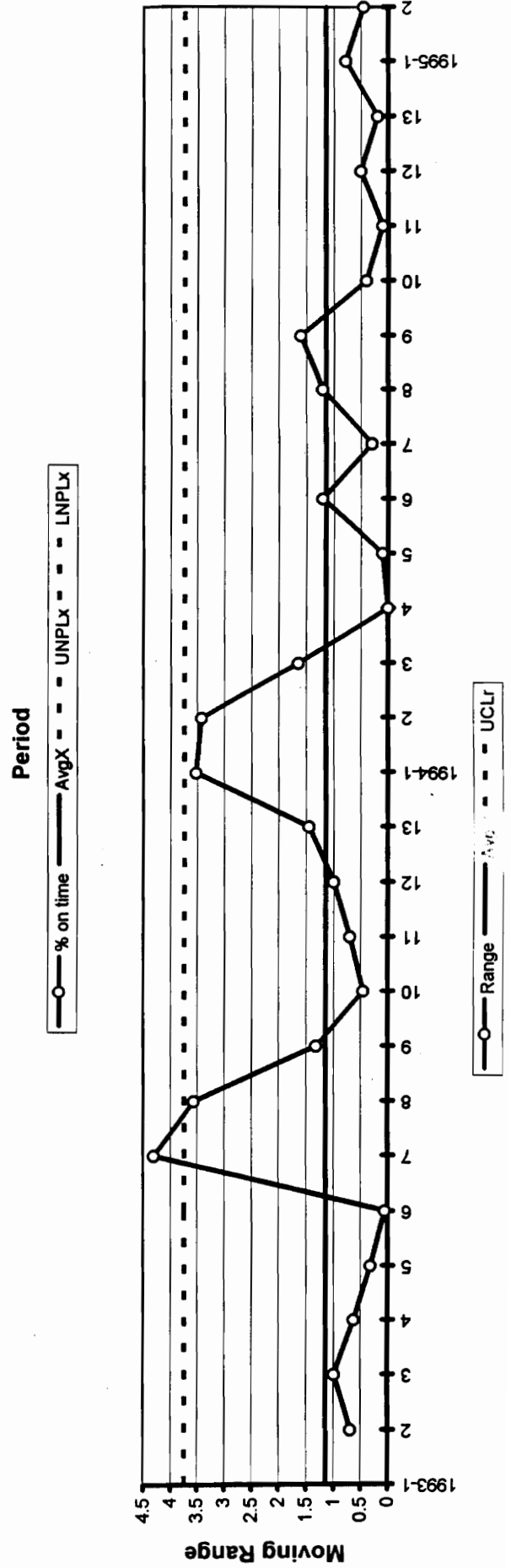
262



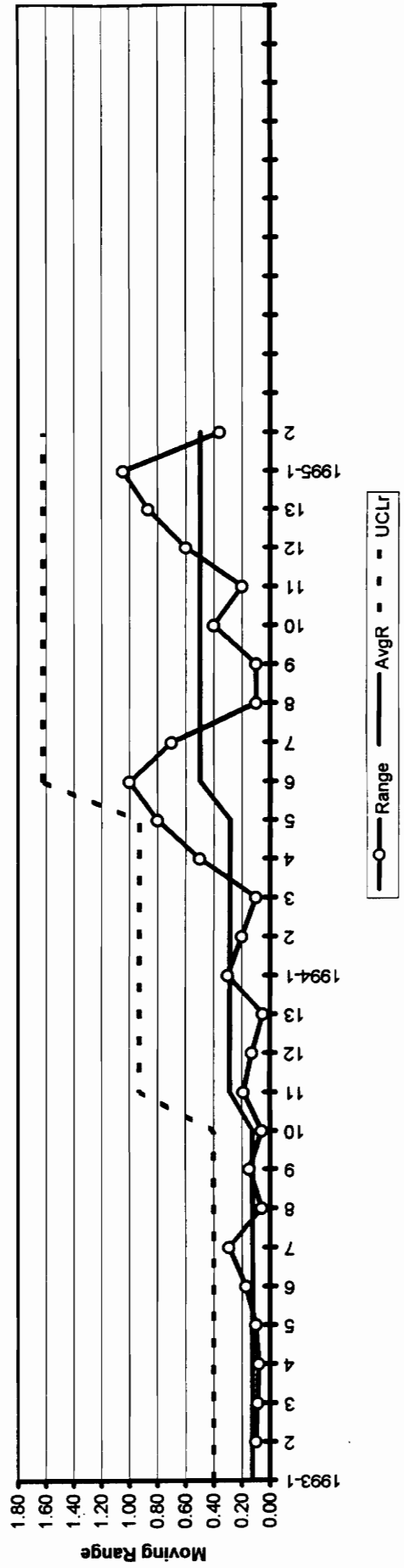
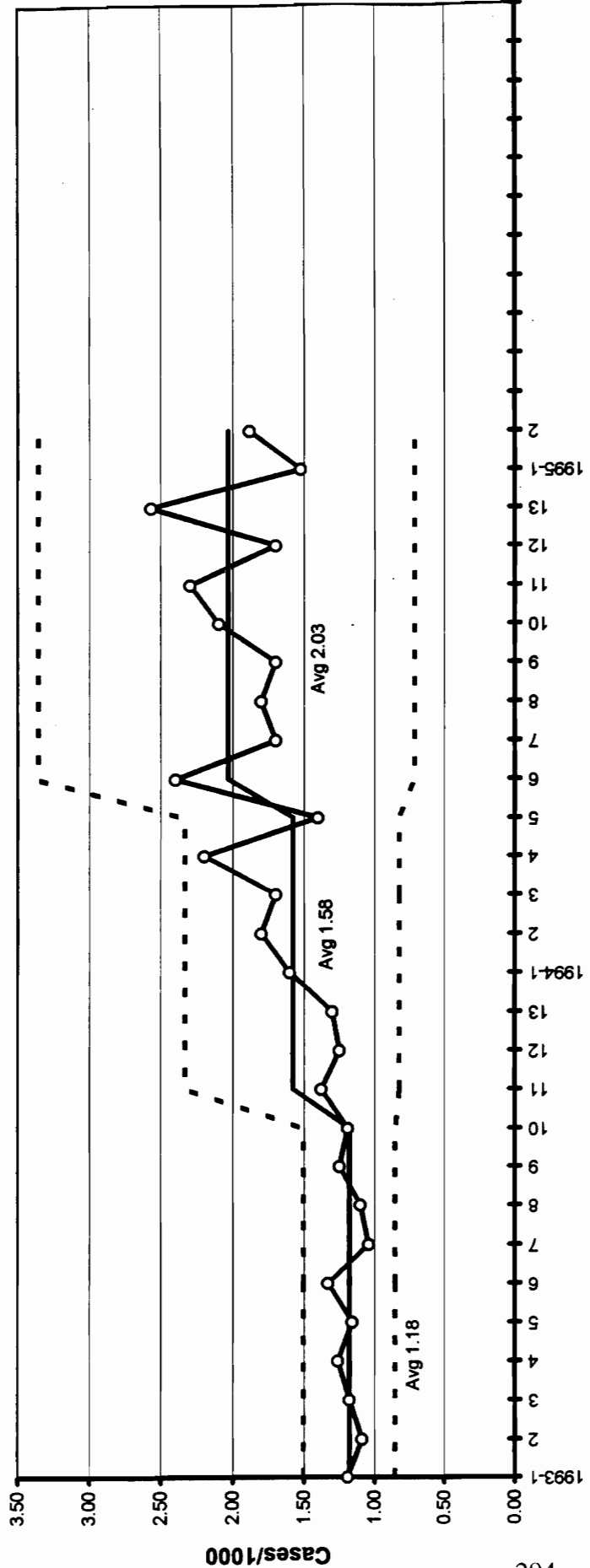
Sudbury Percent On Time Arrivals At Customer By Period



263



Sudbury Grocery Shorts Per 1000 Cases Shipped By Period



APPENDIX I - WAREHOUSE TECHNOLOGIES

Automate Time and Attendance

Implement an automatic means of recording employee attendance, hours worked, and functions performed.

Cross Docking

The cross docking system is set up so that as high volume product is received from another NG warehouse (transshipment) or a vendor, it is put directly into a store lane. This process eliminates the cost associated with the multiple handling of produce. Labor savings come from reduced need for put-away, replenishment, breakdown, and selection. Facility savings come from reduced inventory and associated carrying costs, less racking, less use of warehouse equipment and reduced maintenance of equipment. The cross docking technology is used to reduce the effort and cost involved in the distribution of items brought to Peterborough due to merchandising decisions that put the items on special or in advertisements.

Dallas

Computerized inventory control package.

Optima

Routing software package.

Re-alignment (PACMAN)

Grouping product into families. The PACMAN system assists employees in storing product in the correct slots.

Slow Moving Warehouse

Establish a single warehouse for all slow moving items (18 cases per week or less). Slow moving items would be stored here, picked, and then transhipped as needed to another NG warehouse for distribution to customers.

Store Lanes

Space designated for arriving transhipments which are going to a specific store/retailer.

Transshipment

This process involves having produce, bond, dairy, and slow moving product shipped from one NG warehouse to another.

Transshipment of Slow Moving Items

Removed items defined as "slow movers" from Peterborough facility to another party, internal or external to NG, to be transhipped as needed to Peterborough for distribution to customers.

Tranship Bond Items from Erin Mills

Relocate bond items (ex. health and beauty aides, cigarettes, gum) out of Peterborough to Erin Mills warehouse for transshipment as required. More cost effective storage and distribution of these goods. This relocation reduces duplication of high cost inventory at Erin Mills and Peterborough. It also takes advantage of Erin Mills Carousel technology investment for the benefit of Peterborough facility and its customers. The relocation makes

room at Peterborough for more value added processes such as cross docking. When Peterborough retailers need the bond items, they are transhipped from Erin Mills to Peterborough.

Vendor Alliances

Cooperative working arrangements with vendors and NG whereby both parties are committed to reducing cost of product distribution. The relationship is built on trust, and both parties are willing to experiment with new and innovative ways to handle product in order to reduce cost and improve quality for mutual benefit.

Warehouse Management System (WMS)

A microcomputer based system that manages the inventory and activities in the warehouse. The system allows the vendor to send NG their orders using Electronic Data Interchange (E.D.I.). The WMS has not been implemented as of yet. The following are all technological interventions that will go along with the WMS.

Centralized Ordering

Centralized ordering will provide NG with complete information on product flow to stores (both warehoused product and direct store deliveries). This information is fundamental in the ability to properly assess store requirements (demand forecasting) which will ultimately feed into a system which determines the least cost method of getting the product from the manufacturer to the store while fulfilling store requirements (right product, right time, right quality, in the right amount).

Computerized Dispatch System

The computer dispatch system will allow the dispatcher to assemble loads while still in the computer and print a load sheet (trip sheet) along with the orders that will be pre-marked.

Redesign Receiving

Redesign the entire process by which product is brought into the warehouse. Included in this is scheduled deliveries, working with vendors on load building, and implementing a tracking system for product.

Retail Demand Forecast

A model that will predict retail store needs based on the movement of produce through the cash register of the retail store. This forecasting will reduce inventory (store and warehouse), increase cash flow, and increase service level.

APPENDIX J - OPERATIONAL DEFINITIONS

ABCD Model

Dr. Harold Kurstedt, Professor at Virginia Tech, has developed a useful model of how managers and leaders spend their time. "A"= administering the business. "B"= building the business. "C"= handling crises. It is called the ABC model. Dr. Tompkins has added a fourth component to the model, "D"= doing the dumb.

Affinity Groups

An affinity group is a collegial association of peers which meets on a regular basis to share information, capture opportunities, and solve problems that affect the group and the overall organization.

All-Hands Meetings

All members of the warehouse met to share information about warehouse performance and project status.

Applied Summative Evaluation Research

"The purpose of applied research and evaluation is to inform action, enhance decision making, and apply knowledge to solve human and societal problems...Summative evaluations serve the purpose of rendering an overall judgment about the effectiveness of a program, policy, or product for the purpose of saying that the idea itself is or is not effective and, therefore, has the potential of being generalizable to other situations"(Patton, 1990).

Archival Data

Primarily historical documents generated throughout the project lifetime.

Bootcamps

Intense educational sessions held off-site from the company. The sessions are intended to "condition the mind" and prepare the participants to rethink/reconsider how they think and do when working within the organization, or "cook" the participants in the technology and methods of quality and productivity improvement.

Burning Platform

Creating a situation where the level of discomfort or "pain" a person experiences with the status quo is perceived to be greater than the pain of the uncertainty of change.

By What Method

How is large scale organizational change brought about? What is the method used?

Case/Field Study

A type of descriptive research in which data is directly gathered from individuals (individual cases) or social or community groups in their natural environment for the purpose of studying interactions, attitudes, or characteristics of individuals or groups. A case study is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used" (Yin, 1989). A case study is a research strategy which focuses on understanding the dynamics present within single settings (Eisenhardt, 1989).

Change Master

"Those people and organizations adept at leading and managing positive change" (Kanter). Also called Change Agents, these individuals or groups have been given the task of leading improvement efforts.

Change Target

The individuals, groups and organizations that are the focus of improvement efforts; the unit of analysis for improvement. Those who will be affected by improvement efforts. Those who must participate in, cooperate with, play a role in improvement efforts.

Change Sponsor

Individuals in pivotal positions of power who can ensure the cross-functional "battles" that must be fought, are fought and won; who can ensure that resource application requirements are met; who can help maintain a system of communication, maintain willingness to cooperate, and ensure the continuing integrity of purpose (Barnard, 1939).

Chartbook

Peterborough book of warehouse performance. Control Charts of key performance measures.

Continuous Improvement

"Baby steps", constantly looking for ways to improve a process.

Control Charts

Control charts are used to monitor a process to see whether it is in statistical control. The upper and lower control limits indicate how much variation is typical for the process. "Control charts help to distinguish between variation inherent in a process (variation from a "common cause") and variation arising from sources that come and go unpredictably ("special causes")" (Scholtes, 1988, p. 33).

DC

Distribution Center (warehouse).

DM

Distribution Manager.

DSOTF

Distribution System of the Future Project.

Empowerment

Making employees feel they own the warehouse. Day to day planning and warehouse operation decisions were made at the lowest level. The DM gave-up some responsibility, giving employees power over decisions and actions. Employees took control of their work environment, made decisions and solved roadblocks.

Framework

A method, model, theory, structure that you can create and manage a change effort with.

Fronts

Sub systems (9) in an organization that must be managed and coordinated.

- planning--the planning system, includes strategic, performance improvement, business, marketing, operations planning, daily planning--the whole spectrum of planning, and most importantly includes the entire planning cycle, in other words, includes implementation and evaluation (e.g. PDSA).
- infrastructure--how the organization is structured to do its business reflected in the organizational chart, position descriptions, functional and perhaps cross-functional responsibilities, but also, more importantly, how the organization is structured/organized to improve performance. Establishing "shadow organizations", collateral structure, alternate structures to improve performance and address cross-functional issues and problems.
- education, training and development--the system by which all individuals in the organization are improving personally and professionally. Extends far beyond the traditional domain of training departments, concentrates on an understanding of system-wide knowledge and skills for doing the job and for improving performance. The system of sharing knowledge and skills.
- culture--the culture management system, how leaders and managers consciously attempt to ensure that "the pattern of basic assumptions--invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration--that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" is supportive of continuous improvement" (Schein, 1985).
- motivation--the system of inducements, recognition, rewards that are created by the organization to ensure that willingness to cooperate is maintained and to ensure that everyone is doing their very best in a system that ensures that this will mean organizational success.
- communication--the system of sharing information such that coordination, understanding, cooperation exists.
- measurement-- the system for sharing information regarding multiple levels of performance (individual, group, organizational).
- technology--the system for managing "how we accomplish things". Technology is broadly defined as a way of getting something done. So, this front includes methods, procedures, protocol, hardware and software, tools, etc. It includes understanding when to re-engineer versus when to continuously improve or tune.
- political--the informal and formal aspects of performance management. This front includes boundary spanning, internal communication, opportunity sensing and capturing, working with various bases of power, paying attention to stakeholders, working with pivotal people in positions of power to ensure they are on-board, etc.

The Grand Strategy System (GSS)

A framework for change. The aim of the Grand Strategy System is to ensure that the organization's improvement efforts are strategically thought through, comprehensive, well integrated, and that they build on lessons learned from the past and present.

Implementation

The successful completion of a decision, solution, or project. A new plan, method, or system becomes a routine part of the life of an organization.

Improvement

Implementing change to cause improvement. There are at least two kinds of improvement discussed in the literature:

- (1) Step-function, break-through, re-engineering, re-creating;
- (2) Continuous, incremental, "baby step," tuning, re-orienting.

Infrastructure Teams

Change Agent Support Team (CAST)

Team of Change Masters, having a representative member from each NG warehouse. This group helped manage the expansion of DSOTF into other warehouses.

Design and Development Team (DDT)

A ten member, cross function team. Their role was to strategically design, plan, manage, and implement the overall GSS effort. They were the "chief architects and engineers" of the project plan.

Performance Actions Teams (PATs)

Teams of employees work on performance improvement projects in specific areas. PATs were in charge of planning their intervention, carrying out the plan, studying the results, and reacting accordingly.

Peterborough Leadership Team (PLT)

The PLT was composed of approximately 15 managers and Peterborough employees. The team was responsible for tactical planning, implementation, Performance Action Team (PAT) leadership, and progress analysis of the improvement effort.

Steering Council (SC)

The SC was composed of twenty two NG leaders who had formal organizational power. This group was formed to establish policy, provide sponsorship, be active and visible, eliminate roadblocks, and lead the change effort.

Task Forces

Task Forces were teams of specialists working on a specific GSS front. These teams of specialists worked with the DDT to ensure that strategies for their front were well planned, systematic, and coordinated.

Interventions

Improvement efforts within each front, tasks, projects, processes.

Key Performance Indicator (KPI)

A well defined, specific measure that is derived from quality and productivity improvement efforts. It is an indication of progress towards completing performance improvement

objectives. It is a means to demonstrate belief or knowledge in cause and effect relationships between strategy, actions and measures.

Large Scale Organizational Change

Ledford, Mohrman, Mohrman, and Lawler (1989) define large scale organizational change as "a lasting change in the character of an organization that significantly alters its performance"(p. 2).

Lesson Learned

What someone has learned to do, not to do through some experience. Can pass the lesson on to another in the form of constructive advice.

Management Systems Engineering

The harmonious, robust blend of the systems approach, the engineering process, and the management process. In MSE, we apply the engineering process to the management process under the purview of the systems approach. We engineer a management system, and see management as the object of engineering activities. MSEs also develop skills of analysis to build management tools and of synthesis to use management tools.

NG

National Grocers Company Ltd.

NG Distribution Warehouse Survey

A yearly survey administered to all warehouses, which asked questions about quality of work life issues.

Operational Definitions

An operational definition is having a definition you can do business with, internalize, or relate to. It's when you can understand, accept the theories, and put them into terms you understand.

Organizational System

All of the people, resources and facilities (including upstream and downstream) associated with an organization. Organizational system is a term used to mean a firm, corporation, school, university, department, branch, section, work-cell, team, city, community, division, function, plant, warehouse, cross-functional system, etc. Barnard (1939) defines an organization as two or more people who have come together to accomplish some common purpose.

PDSOF

Peterborough Distribution System of the Future Project.

PEP

Performance Evaluation Program. NG Distribution System Measurement Program before the Visual Management System (VMS).

Performance

The word performance (for an organizational system) means an integrated relationship among the seven performance criteria; effectiveness, efficiency, quality, quality of work life, productivity, innovation and profitability .

Performance Criteria

Performance criteria are the clusters of instruments/information that is needed for management teams to effectively manage. The seven performance criteria include effectiveness, efficiency, quality, productivity, quality of work life, innovation, and profitability.

Effectiveness focuses on the output side of the organization. It considers whether the organization is completing the “right thing“ on time, within specifications/ expectations. This criterion also addresses the timeliness and quality of the output being delivered. Effectiveness is further defined by the ratio of actual output divided by expected output.

Efficiency relates to the input side of an organization. It considers whether the organization is completing the “right” thing “right”. This criterion is further defined by the ratio of resources expected to be consumed divided by the resources actually consumed.

Quality is delighting the end-user. Total quality is managed at five points:

Q1: the selection and management of upstream systems (i.e., suppliers, vendors)

Q2: incoming quality assurance

Q3: in-process quality management and assurance

Q4: outgoing quality assurance

Q5: proactive assurance that the organizational system is meeting or exceeding customers’ needs, specifications, requirements, wants, desires, and expectations

Innovation is continuously improving. It is the reactive, proactive, creative, and successful response to changes (perceived or otherwise) in the internal and external environments of an organizational system.

Productivity is doing more with less. It is the relationship between what comes out of the organizational system and what is consumed to create those outputs. It is a set of ratios and indexes comparing output to input.

Profitability/budgetability is generating surplus/using the right amount of resources. It is a set of measures of the relationship between revenues and costs.

Quality of Work Life (OWL) is creating a great place to work. It is “the affective response or reaction of the people in the organizational system to any number of factors, such as pay, working conditions, culture, leadership, coworker relations, feedback, autonomy, skill variety, task identity, task significance, the boss, amount of involvement in planning, problem solving, and decision” (Sink and Tuttle, 1989, p. 182).

Project Effectiveness

In the context of my research, a project is effective if the set goals were reached.

Perceptions of Performance

Expert opinions on warehouse performance, not necessarily backed by factual data.

Performance Improvement

Performance is a measure of how well the organization is doing against the seven performance criteria. Improvement means advancement to a better state or quality. Performance Improvement is concentrating on how you do something, not just what you do.

Performance Qualitative Data

Data on constructs that are more difficult to measure in an organization such as improved morale, better intentions, atmosphere of caring.

Performance Quantitative Data

Measured data on warehouse performance.

Period

Four calendar weeks - 13 periods in a calendar year.

Phases of Client Change:

Scouting, Targeting, Diagnosis: Client focuses on a perhaps vaguely understood problem area or source of difficulty.

Stress Relief/Catharsis: Client surfaces frustrations, anxieties, expresses fault finding, blame casting and eventually sets them aside. The client's attention is then freed for concentration on the change process.

Self-Evaluation: Client makes his own evaluation of present behavior. Becomes more clear about goals and objectives. Develops appreciation of need for change.

Self Designed Change Strategies: Client plans or accepts plans for new behaviors, methods, systems.

Trying Out the New Behavior: Client experiments with new methods and systems.

Reinforcing the New Behavior: To make the new behavior a way of doing business, the behavior must be rewarded and reinforced.

Red Teams

A team of critics charged with finding the gaps/holes in the plan for quality and productivity improvement. Those designing the quality and productivity improvement plan (usually the DDT) must present and justify the plan to this panel of "experts" and use the feedback/comments from the panel to make the plan comprehensive and seamless.

Reengineering

Radical change of a process. Jumping to a new "S-shaped" curve.

Shifts in Performance

Changes in key performance indicators (positive or negative). Detected by control charts line graphs, or bar graphs.

SKU

Stock Keeping Unit (case of product).

S-Shaped Curve

A representations for how learning and performance can change over time. As we learn, use and improve current processes, methods, or technological advancements, the rate of change of our performance is slow or flat at first, then becomes exponential. Any method/process/technology has limitations in how much we can improve its performance, and we reach a point where the rate of change in our performance tapers off, stabilizes, and becomes ingrained in the organization and is well understood and used. See Figure 2-2 for a graphical representation.

Survey Data

Data "stored in the mind." Personal memories, perceptions collected through interviews and questionnaires/surveys.

System

A set of interacting and interrelated components, including environmental factors, that work together to accomplish a common aim.

Technology Types

Type I: continuous improvement projects that could be addressed immediately by a PAT without the need to confer with any other group (i.e., "just do it!").

Type II: continuous improvement projects that required information gathering by the PLT prior to implementation.

Type III: reengineering projects that required significant research and data gathering to increase knowledge and understanding of the subject area.

Visual Management System (VMS)

The chartbook and Visible Management Boards (VMB) showing performance of the organizational systems. The purpose of which is to enable the individual to link their performance with the performance of the overall system.

VQPC

The Virginia Quality and Productivity Center at Virginia Tech.