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Quality and Productivity Improvement Through Defect Prevention and Worker Involvement

Ralph (Randy) R. English

QUALITY AND PRODUCTIVITY IMPROVEMENT THROUGH DEFECT PREVENTION AND WORKER INVOLVEMENT

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B.S. - Business

An Abstract Presented to the Faculty of the Graduate School of Lindenwood College in Partial Fulfillment of the Requirements for the Degree of Master of Business Administration

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ABSTRACT

The intent of this project is to suggest a more efficient way to increase productivity and reduce errors in customer shipments. This method will save our facility $1.7 million annually while costing nothing to implement. In the Service Parts Operation in St. Louis, we service some 1,200 dealers in 14 states. At G.M. Parts, our goal is to offer a better, more effective distribution network to service our dealers and satisfy their customers. To maintain this high level of service, we must constantly strive for new ways to reduce errors, cut cost and improve worker satisfaction. We must not only use the state of the art equipment to track our work, we must also strive to get worker involvement and participation. Once the workers buy into the program and take responsibility for servicing our customers, half the battle is won. On the other side of the coin, management must listen to the workers who handle the parts on a daily basis and take their suggestions seriously.

In this project we will demonstrate that getting workers involved and expecting them to do things right the first time will be cost effective, increase productivity, and lead to job enrichment. We will put checks in place to monitor our system on a random sampling basis. If these checks indicate a jump in errors of more than 2 percent, we will trace back to the source and cure the problem at this point rather than waiting four weeks for our current reports to come out. By this time, the cause may be untraceable and reoccur on a cyclical basis. This

trace back will also give us future references should a similar problem arise.

We will also monitor through receivable and shipment reports our fast and slow moving parts so they may be located in the warehouse accordingly. The faster moving parts will be centrally located rather than scattered throughout the warehouse. This will reduce walk time and cut down on fatigue.

Once this system is in place, overtime should be drastically reduced. Employee complaints should be greatly reduced and customer satisfaction should increase.

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AN OVERVIEW OF GENERAL MOTORS WAREHOUSING AND DISTRIBUTION DIVISION

HISTORY

The General Motors Warehousing and Distribution Division as it is known today was formed in 1981 when the General Motors Parts Division and the AC-Delco Division were reorganized into one operating division. At that time, the new division acquired all of the functions of both former divisions, except sales and marketing.

AC-Delco and GM Parts sales activities have remained separate organizations, along with GMWDD, under the umbrella of GM's Service Parts Operations.

GMWDD is the product of two corporate streams which date back to the earliest days of the auto industry. One of them, which was most recently known as GM Parts Division, had its history in the parts operations of GM's car and truck divisions. The other stream grew from a family of parts suppliers including Hyatt Roller Bearing, Delco and Champion Ignition Company, whose parts operations eventually became known as AC-Delco Division.

GM Parts Division was first formed--under Chevrolet management--in 1935, when it took over the warehousing and distribution of service parts for Pontiac, Chevrolet, Oldsmobile and Buick. Cadillac joined the system in 1963. In 1969, GM Parts Division became a separate operating division of General Motors. It was created in order to provide one centralized service parts organization devoted entirely to the nationwide distribution of replacement parts to GM dealers. In 1974, the parts sales and marketing activities, previously performed separately by the car divisions, were assigned to GM Parts Division. In 1977, GMC Truck and Coach Division joined its parts operations with GM Parts Division in order to provide a full service concept to all GM dealers for both passenger car and truck service parts. Then, in 1978, GM Parts Division became directly responsible for the distribution of General Motors' U.S. automotive parts worldwide. The division's scope of responsibility remained the same until its consolidation with AC-Delco Division in 1981.

AC-Delco's history dates back to the days of United Motors Corporation (UMC) which was composed of several parts and accessory manufacturers purchased by GM's founder, W. C. Durant, in 1916. Some of the companies which made up the UMC were Hyatt Roller Bearing, Dayton Engineering Laboratories Company (DELCO) and Remy Electric Company. United Motors Service (UMS) was later formed to sell and service the parts manufactured by the various United Motors companies. In 1971, UMS became United Delco Division.

The AC-Spark Plug Division, which started as Champion Ignition Company in 1908, joined its parts sales and distribution functions with United Delco Division in 1974 to form AC-Delco Division. The scope of responsibility of AC-Delco Division remained the same until it merged with GM Parts Division in 1981.

Today, GM Warehousing and Distribution Division consists of seven parts plants and 35 parts distribution centers (PDCs) located throughout the United States. The division ships parts to GM dealers, independent warehouse distributors and mass merchandisers in the United States, Canada and overseas.

ENGINEERING

GM dealers and customers around the world rely daily on GMWDD to provide the parts they need to service and maintain the variety of vehicles that comprise the world's transportation network. It is the job of WDD's Engineering department to determine which parts will be offered as replacement parts and assure the quality of those parts, make current and accurate part identification information available to dealers and customers, and design and test product packaging.

The division's service parts engineers are located at various General Motors divisions and are responsible for authorizing those parts that will be offered as new and remanufactured parts on GM's new model cars and trucks.

During the course of a year, the Engineering department will translate manufacturers' specifications on more than three million part usage statements into information which will appear in parts catalogs provided to GM franchised dealers and AC-Delco customers. Utilizing highly advanced computer systems, this information is transmitted to staff areas within the division to aid the stocking and distribution of the more than 340,000 service and replacement parts currently available.

Each year, over 1.5 million computer-generated parts catalogs are produced and distributed to GM car and truck dealers worldwide.

Recently, advances in technology have extended the capacity of our computer systems to include computer graphics. Through the use of computer graphics, illustrators construct, revise and generate line drawings for use by dealers.

To protect parts against damage, prevent corrosion and provide merchandising appeal for all service parts and accessories, Packaging Engineering develops packaging specifications and guidelines.

The availability of technical data is vital to the performance and reliability of each service part. More than one million parts drawings are readily available to our engineering technicians to assure that each part will do exactly what it is designed to do.

Warehousing and Distribution Division, like General Motors, is committed to providing products of unquestionable quality to customers. Inspection and verification of products by our engineering laboratory technicians are vital in helping achieve this goal.

MATERIALS MANAGEMENT

Materials management is much more than a synonym of the words "inventory control." The Materials Management staff at GMWDD encompases Purchasing, Material Control, Traffic and Order Processing. These four departments accomplish their tasks through the effective use of their human resources.

Purchasing assures that sources are available to supply the division with cost-competitive, high quality parts to help support the stringent standards of service we have pledged to our customers.

Getting the right part in the right place at the right time is what Material Control is all about. Through the use of highly sophisticated computer systems and a complex series of formulas, the activity forecasts demand and determines optimum order quantities and delivery dates from more than 2,000 suppliers to WDD. This material is moved through a refined distribution network to strategically located PDCs across the United States. Critical to assuring parts availability is filling the pipeline to our customers with the 340,000 different parts needed to service and maintain much of the world's vehicle population.

The Traffic department strives to provide the best transportation service for customer orders while at the same time keeping an eye on cost. In addition to providing transportation requirements for a steady outflow of material to customers, the department provides a smooth flow of incoming material from suppliers for redistribution to the vast network of PDCs.

The Order department is people helping people. This philosophy is perhaps best stated by the motto, "a customer on the road today, not tomorrow." Geared to handling the exceptions, the department deals directly with GMWDD's customers and vehicle owners and their needs.

PARTS PLANT OPERATIONS

Parts Plant Operations is an integral part of the division's team effort to serve General Motors customers. There are six parts plants in Michigan: Flint, Burton, Lansing, Drayton Plains, Pontiac and Willow Run. A seventh facility is located in Martinsburg, West Virginia.

Combined, parts plant facilities occupy over 11 million square feet of floor space and provide roughly 193 million cubic feet of warehouse space. In total, the seven parts plants employ more than 4,100 people.

Basic plant functions are to receive parts from suppliers; unitize, paint and package where required; and store material. Upon release of replenishment orders, plant employes pick, pack and ship parts to 35 PDCs located throughout the United States. Some parts shipments are made directly to domestic and overseas dealers, allied and overseas plants, and independent warehouse distributors.

Parts generally ordered in low volume are stocked at Lansing to allow consolidated shipment directly to dealers. Another direct shipping service to dealers is the Target Marketing program which is handled by the Pontiac facility. Other higher volume items, processed at Flint, Martinsburg, Drayton Plains and Pontiac, are shipped to PDCs. Exclusive heavy-duty truck parts are processed and stocked at Willow Run. AC products and related parts are packaged and stocked at Burton for distribution to independent warehouse distributors and mass merchandisers.

PARTS DISTRIBUTION CENTERS

GMWDD Operations include 35 PDCs, shipping service and replacement parts to GM dealers, independent warehouse distributors and mass merchandisers throughout the world. In total, there are more than 25,000 customer shipping destinations.

The PDCs are geographically positioned in each major area and market of the United States and are grouped into five categories according to either the number of parts they stock or the type of parts they stock. All of the PDCs are classified as zone, master, master/factory, truck or AC-Delco.

In total, PDC operations comprise more than 8.5 million square feet of warehousing space stocking nearly 140,000 different parts numbers. Approximately 5,400 hourly and salaried employes are responsible for the shipment of 250,000 line orders each day from these facilities.

GMWDD employes are committed to providing accurate and expeditious shipments at all times. To accomplish this task, the division has implemented some of the latest material handling techniques and systems. But this is only a part of the story. The success of the General Motors Warehousing and Distribution Division depends upon the dedication, motivation and interest of employes in satisfying General Motors customers.

INFORMATION SYSTEMS

Keeping track of more than 25,000 customers and 340,000 part numbers stored throughout the world is no small task. It requires a sophisticated network of computers utilizing the latest in computer technology.

GMWDD maintains one of the largest data processing systems in the industry. Four of the largest "mainframe" computer systems are interconnected to form the backbone of the division's worldwide communications network. Sixty-five smaller computer systems comprise a network of more than 30,000 miles of telephone circuits which handle nearly 350,000 line orders per day from GM dealers, independent warehouse distributors and mass merchandisers. The on-line disk storage maintains billions of pieces of information concerning every aspect of the business.

Together these systems are responsible for collecting and processing parts orders, maintaining comprehensive inventory and sales history records, purchasing from suppliers, keeping track of financial and engineering data, and providing up-to-the-minute management information internationally.

Utilizing "RAPID" terminals located onsite, 9,000 GM dealers around the world can enter orders directly into the computer system. This system provides the dealer with a printed "answer-back" message on his terminal, advising him within minutes of the disposition of his order.

Data in this complex computer network is continuously updated and funneled to the division's Central Office Data Center located in Flint. A second Field Processing Center is located in Pontiac. A third center, which handles AC-Delco customer orders from across the country, is located in the Renaissance Center in Detroit. More than 1,700 computer terminals located in all departments throughout the organization provide instantaneous access to information and form a direct link between the division and its customers worldwide.

FORWARD PLANNING AND FACILITIES

The engineering of productivity and facilities, not products, is the job of Forward Planning and Facilities. Running the gamut from the efficiency of buildings and machinery to the efficiency of people and systems, quality, cost savings and return on investment are the watchwords.

There are four major departments within the staff: Facilities and Planning; Industrial Engineering, including Methods and Standards; and Forward Planning.

Facilities and Planning is responsible for divisional electrical, mechanical and architectural engineering, including project control, managing and reporting energy usage, and the coordination of office designs and layouts.

The emphasis of Methods is on plant layout, material handling equipment, storage media, selecting and refining processing equipment and techniques, and analyzing value based on cost. Techniques such as modeling, simulation, and computer-aided design are utilizied to pretest systems and concepts.

The focus in Standards is on labor efficiency. This is achieved through analysis of labor content and methods, establishment of labor routings, time studies, efficiency reports and special cost studies.

Forward Planning forecasts facilities rquirements utilizing information in investment, sales, inventory and space. In addition, the department utilizies specialized computer analysis for problem solving.

Designing, implementing and controlling material storage media helps maximize return on investment and productivity.

Those in Facilities and Forward Planning may be best viewed as "agents of change" and must be accomplished not only in technical skills, but in their people and communications skills. Selling projects on paper and in person is a part of each employe's job.

FINANCIAL, PERSONNEL AND PUBLIC RELATIONS

The Financial department, as the name implies, is responsible for managing GMWDD's financial resources. Reporting financial results to the corporation, developing annual budgets and monthly financial forecasts are the responsibility of this department. Auditing, paying suppliers, invoicing customers, collecting accounts receivables, paying the more than 12,000 Warehousing and Distribution Division employes and maintaining the records on our taxes, insurance, retirements and benefit programs are also handled by this broad-based activity. The department also develops and publishes prices for the various product lines.

A significant responsibility of the Financial Department is to develop analytical data on operating costs for use as a management tool.

In Personnel, the business is people. Industrial and employe relations, safety and security fall into this category, along with negotiating and administering local collective bargaining contracts with labor unions.

Salaried Personnel Administration coordinates personnel policy and procedures for the division's nearly 5,000 salaried employes; coordinates human resources planning, recruitment, management development, education and training; and administers salaried compensation.

Employe Services administers employe benefits and employe service programs. The Organizational Development activity coordinates the division's Quality of Worklife process.

Public Relations communicates information about GMWDD to employes, elected and appointed national, state and local government officials, community leaders, and print and broadcast media throughout the world. Another responsibility of Public

Relations is to monitor public issues of concern to the division and develop and recommend GM's position on such issues.

Video and print media are used to communicate with the division's 12,000 employes, including the division's newspaper, Pipeline, The Weekly Digest and the daily Noon News Summary.

SALES AC-DELCO AND GM PARTS

AC-Delco and GM Parts are separate organizations which, together with GM Warehousing and Distribution Division, comprise GM's Service Parts Operations. Serving distinct market segments, AC-Delco and GM Parts have service parts sales and marketing responsibilities that span the globe. More than 6,500 independent warehouse distributors and mass merchandisers are served by AC-Delco, while the service parts sales of nearly 12,500 GM dealers are the responsibility of GM Parts.

Developing a market identity is a primary function of these two sales activities. Merchandising programs such as GM Parts' "Mr. Goodwrench" and brand names like AC and Delco enjoy widespread recognition and consumer appeal.

Dedicated to serving the ever changing aftermarket, these two organizations are heavily involved in market research, advertising and sales promotion and training.

SUMMARY

GM Warehousing and Distribution Division is responsible for providing quality service and replacement parts to GM customers throughout the world.

The strength of the organization is the 12,000 dedicated people who provide the highest standards of service in the industry. This division was formed by the consolidation of various service parts operations within General Motors, each with a long and distinguished history, and are well equipped with talented and experienced people who bring special knowledge and ability to their jobs.

They take pride in their role in the ever-changing automobile business and are committed to continue providing the best possible service in the years to come.

INTRODUCTION

CHAPTER 1 - THE CONCEPTS OF QUALITY AND PRODUCTIVITY

A. WHY QUALITY IMPROVEMENT IS NECESSARY IN TODAY'S BUSINESS ENVIRONMENT.

Most people feel that all problems are caused by other people; some people feel that error is inevitable, that mistakes will be made and that employees just don't give a damn about doing a good job. These are the kinds of myths that result in American companies spending 15 to 20 percent of every sales dollar on reworking, scrapping, repeated service, inspections, tests, warranties, and other quality-related costs.

A method to overcome the traditional idea that errors and mistakes will occur and that they are part of business will be examined here. It will show that quality is free. It is not a gift and does not happen by chance, but it is free. What really costs money are the non-quality things--all the actions that involve not doing the job right the first time. Quality is not only free, it is an excellent profit-maker. Every penny a company does not spend on doing things wrong, or doing them over, becomes half a penny right on the bottom line. If concentration is put on making quality certain, it can probably increase profit by an amount equal to 5 to 10 percent of sales. That is more or less free money. Making quality certain simply means getting people to do things right the first time--something they should be doing anyway. "People" includes top management as well as the lower levels of the organization.

This concept must become a way of life at work, one that everyone buys into, and one that accepts no less than zero defects. Steps will be outlined that lead up to making employees more productive and profitable simply by doing the things they get paid to do and doing them right the first time. Simply put, quality improvement through defect prevention.

B. WHAT IS QUALITY?

What is quality? Almost everyone has an opinion. Most people have experienced bad products and bad services, such as defective automobiles, poor haircuts, and household goods that have been damaged or lost in moves. From these experiences, each individual has formed a definition of quality.

Some say quality means "goodness." Others say, "customer satisfaction." There are a variety of other commonly used definitions. So, because quality means different things to different people, the subject has become confusing. In business, these multiple definitions have made quality appear to be a difficult thing to achieve.

It isn't. The answer to the question, "What is quality?" is, simply, quality means conformance to requirements. When people are asked to "do it right the first time"--the "it" is the requirement. If management cannot tell employees what "it" is--in a way that can be understood--then consistently conforming to requirements will be impossible.

A Cadillac that looks like all its requirements is a quality product. A Lynx that looks like all its requirements is a quality product. There is no variation--no "good," "bad," "high," or "low" quality. There are only two possibilitiesusing this definition. "It" either conforms to the requirements and is quality, or "it" fails to conform and is nonquality.

Defining quality as conformance to requirements makes quality a very specific element. This definition can be applied to any job, since all jobs must have requirements.

The second question is, "What system will cause it?". When individuals are asked what systems are involved in quality, they immediately think of the familiar ones, such as: inspections, tests, audits, etc. These systems all have a common failing--they are aimed at finding errors or defects and fixing them. Such systems are based on a philosophy of appraisal.

The only system that really causes quality is prevention. Prevention means eliminating the potential for error. It involves identifying opportunities for error, and taking actions to eliminate those opportunities before a problem occurs.

Prevention is different from appraisal. Appraisal requires that errors be found, evaluated, dispositioned, and corrected. None of these activities are necessary with an effective prevention system in place. Implementation of such a system is, however, a continuous, long-term process.

Perhaps that is why true prevention systems are rare in business today. Often the closest many operations come to prevention is reviewing input before it is used, so more errors aren't created through defective inputs. But this is still just "testing and inspection"--not prevention.

In our personal lives, however, we are more oriented toward prevention. In our family cars we take care to change the oil on schedule, because failure to do so can mean high repair bills. In our homes, logical and systematic steps are taken to assure that food does not spoil, because the result can be food poisoning.

Yet, at the office, prevention is rarely a planned activity. It is often not considered logical to spend time and resources on things that have not yet occurred. Instead, problems are found and fixed after-the fact.

Prevention involves thinking, planning, and analyzing processes to determine where the opportunities for error are, and then taking action to assure that errors do not happen.

Appraisal is easy. It involves hiring a few more inspectors, editors, proofreaders, etc. If a few mistakes happen, or if a customer is dissatisfied, there is always someone to blame. It is often convenient to point to the Quality Control Department and complain that, "If only they had done their jobs, these problems wouldn't exist."

A prevention system involves getting it all straight up front. It doesn't mean talking about a vague concept of "customer satisfaction," which may be obtained through exchange of defective products, complimentary hotel rooms, or bottles of champagne. It means finding out exactly what the customer needs, establishing formal requirements, and then conforming to these requirements all the time.

In this way, time and energy can be spent assuring that requirements are correct and are being met. It is not necessary to expend resources placating angry customers.

The third Absolute refers to the performance standard that management expresses. The performance standard means, "How often do you want me to do things right?" The answer is often not as obvious as might be expected. The common standard used in business is "acceptable quality level" or, "that's close enough." These are performance standards that can be misunderstood, because they lead people to believe that nonconformance is expected and allowed.

The answer to "how often do you want me to do things right?" should be "all the time." Therefore, the standard that should be communicated is Zero Defects--the symbolic expression of "right the first time."

In personal business most people demand Zero Defects. They expect to receive accurate bills. They expect the brake repairs on their vehicles to be correct. They expect clothes to fit properly. They expect moving companies to deliver furniture undamaged.

At work, however, a different standard often prevails. When individuals believe they have the option of not doing things right the first time, they don't take the necessary actions to improve. Over the years, the conventional approach has "institutionalized" the acceptability of error.

If Zero Defects seems like a difficult standard, imagine what happens if everyone agrees to do their jobs with 1 percent error. Multiply 99 percent correct by itself once for every person in a given system. That will reveal the probability of ever getting something done correctly.

The attitude of Zero Defects must be reflected in a company's quality policy: "We will deliver defect-free products to customers, on time."

The last question is, "What measurement of quality is meaningful?" In most companies quality is measured using indices, or process averages. If people are asked how the quality of their job is, they will normally respond with such words as, "Some things are better, some are worse." Overall there is no clear understanding of whether quality is improving or not.

Such measures of quality produce a confusing situation. The fact that "some things are getting better and some are worse" does not provide a clear understanding of the signficance of errors occurring in the workplace. How significant is 1 percent error? There needs to be a more explicit measurement of quality that can be understood by everyone.

The best way to measure quality is to calculate what it costs to do things wrong. This becomes a clearly understood measure--the money wasted due to rework, repair, reprocessing, reconciliation, etc.

The total measure recommended is the "Cost of Quality," which is made up of two parts: the price of nonconformance, which is the price paid for not doing the job right; plus the price of conformance, which is the price paid for making certain that requirements are met the first time.

Most service organizations spend 25 to 40 percent of their operating costs on doing things over. A number of manufacturing companies spend over 20 percent of their sales dollars on waste.An effective prevention system, with training, systems, and measurement, would cost about 5 percent. There is clearly a big opportunity for profit enhancement through quality improvement.

Some examples of the price of nonconformance are:

- Change orders
- Testing returns
- Redoing expense accounts
- Spoilage
- Rework
- Excess inventory carrying charges
- Redesign
- Interest on overdue accounts receivable
- Downtime
- Revisions

The price of nonconformance gives a specific value to quality improvement--the value of changing from conventional wisdom to reality in the management of quality.

Changing from the conventional wisdom of quality to the reality of quality management requires understanding, and accepting the four Absolutes as a unit.

A convenient way to remember these four principles is to analyze the phrase, "Do it right the first time."

When this phrase is examined, it states the reality of quality management.

- "Do it" means conform to the requirements (the first Absolute).
- "Right" means prevent errors (the second Absolute).
- "The first time" means Zero Defects--no rework needed (the third Absolute).

The price of nonconformance (the fourth Absolute) measures how much it costs when there is failure to do it right the first time.

C. THE PROFILE OF A PROBLEM ORGANIZATION

When a physician sees a patient with red spots, a fever, and a brother who has the measles, it is not necessary to be Louis Pasteur to make a diagnosis. Identifying companies with big quality troubles has somewhat the same degree of difficulty.

Dissatisfaction with the final product or service of an organization is called trouble with quality. However, it is only a symptom of what is happening inside the firm.

There are several characteristics that troubled organizations have in common. Before launching into a discussion of the causes and cures of nonquality, we should examine some of the symptoms of the patient.

<u>1. The outgoing product or service normally contains deviations from the published, announced, or agreed-upon requirements.</u>

Product companies have waivers, "off-specs," material review decisions, and so forth incorporated in outgoing material. This means that every unit is different. The "patients" see nothing wrong in this because they have carefully documented each nonconformance and ensured that it does not interfere with the form, fit, or function of the product.They fail to recognize that not only do they lose control of the outgoing product, but all that fooling around costs much more than it would to make everything as agreed.

Service companies, such as Service Parts Operation, do not usually document their nonconformances as formally as product companies. The ease of living in a situation where nonconformance is the norm produces a consistent flow of problems. This consistency alone convinces everyone that "this is the way life is." Thus the situation feeds on itself. At present this attitude of "things are always going to be that way, that that's good enough for here," is an attitude we must change quickly at Service Parts Operation. Our customers are being bombarded with foreign products that look like ours and we must step up and take care of these customers or lose them to this new breed of competitors. Because if things are always going to be that way, then it is necessary to take some other steps to ensure customer satisfaction. This leads us to the next symptom.

<u>2. The company has an extensive field service or dealer network skilled in rework and resourceful corrective action to keep the customers satisfied.</u>

Product companies have "customer engineers" (CEs) who repair the copiers, computers, furniture, and other products that come to the customer directly. Many times the CE does the installation, which provides an opportunity to finish the product assembly in the customer's office without the customer's knowing what is going on. Little plastic bags with wires and notes in them are a tip-off. Customers love the CE, hate the company.

Companies with extensive dealer networks, such as automotive organizations, conduct "get ready" routinely. This means that the dealer finishes the product. The factory does not deliver a car (or similar product) that can be driven away from the end of the line and used. If you want to pick up a car at the plant, it must go through a different operation after it is built. Product recalls occur now and then to let the company finish something else. Most of these defects were known about beforehand--there have been very few surprises in product recalls.

Field service and dealer organizations consider themselves the vital connection between the company and the customer. When you realize that the customer could not use the product without their services, it is not hard to understand why they feel so important. In many companies the field service operation represents a large part of revenues because of its service contracts. Work done under the warranty is not profitable, however.

Service companies have their own way of providing field service. Credit card operations give a name and telephone number so that we will have someone to talk to when things go wrong; banks provide a "personal banker" who runs interference and translates for you; insurance sales people spend most of their time trying to make the "home office" get the customer's data right.

Hotels install "hot lines" so that when the staff fails, a guest can call an assistant manager who overrides the system and produces extra towels or whatever. Airlines dress employees in different colors so that the flyer can deal with the representative who handles specific problems.

All these actions represent a custom of patching that began a long time ago and is now deeply entrenched in the self-fulfilling prophecy that "this is the way life is." Individuals spend a lifetime with a company and retire content, never having done anything but rework.

When the service is expected to be incomplete and the product is assumed to always require some adjustment, a situation emerges in which the employees create their own performance standards. That leads us to the next symptom.

<u>3. Management does not provide a clear performance standard or definition of quality, so the employees each develop their own.</u>

In product companies "quality standards" tend to be based on what the process itself actually produces. When the field finds 4 percent bad, the standard becomes "outgoing quality level of 4 percent defective." That sounds very precise and scientific. However, all it means is that the operation has settled on a level of incompetence.

"Schedule first, cost second, quality third" becomes the tradition, once employees see what happens to those who miss schedule or cost.

"Yield" is another expression used in processes. When the basic assumption is made that the process can never be operatedwithout error, then the next step is a matter of putting an agreed-upon number on that error. If the yield is planned at 85 percent, that means a commitment to 15 percent error. People who are into "yield management" will tell you that isn't true, but it is.

When administrative companies establish off-line systems so customers or senior executives can bypass the bottlenecks, they make a clear statement. That statement is: "We don't really expect to meet our requirements, so just cope the best you can."

Thus employees are rewarded for resourcefulness. House newspapers proudly note cases in which employees knocked themselves out to get something done for a customer "in the best tradition of service." What is overlooked is that the knocking out would not have been necessary if the job had been done right the first time.

The amazing part of all this fixing and reacting is that management doesn't realize what it has cost in terms of expense. That brings up symptom number four.

THE PROFILE OF A QUALITY-TROUBLED COMPANY

Characteristic	That's us all the way	Some is true	We're not like that
1. Our services and/or products normally contain waivers, deviations, and other indications of their not conforming to requirements.	____	____	____
2. We have a "fix it"-oriented field service and/or dealer organization.	____	____	____
3. Our employees do not know what management wants from them concerning quality.	____	____	____
4. Management does not know what the price of nonconformance really is.	____	____	____
5. Management believes that quality is a problem caused by something other than management action.	____	____	____
	5 Points	3 Points	1 Point

Point count condition:

21 - 25	Critical:	Needs intensive care immediately.
16 - 20	Guarded:	Needs life support system hookup.
11 - 15	Resting:	Needs medication and attention.
6 - 10	Healing:	Needs regular checkup.
5	Whole:	Needs counseling.

4. Management does not know the price of nonconformance.

Product companies, as we will see further along, spend 20 percent or more of their sales dollars doing things wrong and doing them over. Service companies spend 35 percent or more of their operating costs doing things wrong and doing them over.

These expenses are very real and very high. A prevention-oriented quality management system can replace all that cost with the modest expense of an education and monitoring process.

If it is all so clear and obvious, how come management puts up with it? That brings up the fifth symptom, which is really the most important.

5. Management denies that it is the cause of the problem.

The denial, for all types of businesses, is based on the random improvements that occur when any specific problem is attached. Push in the balloon in one place, however, and the air goes to another area.

Most managers send everyone else to school, set up "programs" for the lowest levels of the organization, and make speeches with impressive-sounding words. It is not until all the problems are pulled together, particularly the financial ones, that the seriousness of the situation is exposed.

There is a parallel here with drug abuse, where the primary symptom also is denial. "I can handle it," is what victims all say. Usually they discover they can't handle it only when their life falls apart. With companies it occurs when the market share shrinks and the profits disappear. The main obstacle to improvement is the stubbornness of management. using this definition. "It" either conforms to the requirements and is quality, or "it" fails to conform and is nonquality.

CHAPTER 2 - THE IDENTIFICATION OF REQUIREMENTS FOR QUALITY AND PRODUCTIVITY IMPROVEMENT

A. THE PROCESS TO ATTAIN DEFECT PREVENTION

All jobs are made up of one or more processes. So, to show how quality improvement relates to a specific job, it is helpful to examine that job or task from a process standpoint. The examination begins by identifying both a job's various component parts, and the requirements that define each component.

The tool used to gather this information is the Process Model. It provides a means of breaking down a job into smaller activities. These smaller activities are then analyzed to determine who is involved, and what the requirements are.

A process is simply a series of actions or operations conducted to produce a desired result. A job is a process, and the individual components that make up a job are also processes.

All processes have two factors in common. They are made up of:

- Outputs--things or services provided to others.
- Inputs--things or services others provide.

The output--a product or a service--is provided <u>to</u> someone. This "someone" can be referred to as the customer.

To produce an output that satisfies the customer, it is crucial to first understand what the customer expects. These expectations are expressed as requirements. Mutually agreed upon requirements define the output, and enable the supplier to plan a process that will produce a conforming product or service.

The other common element to all processes is input. An input to a process comes from someone, and this "someone" can be referred to as the supplier. Again, it is crucial that suppliers and customers alike share clear and agreed upon requirements.

The Process Model shows that the nature of inputs and outputs can vary with each process being considered.

If the process to be analyzed relates to product development in a large manufacturing company, then the inputs and outputs will be relatively large in scope. Inputs will be from suppliers, company departments, and general management. Outputs will go to the ultimate customer, the marketing department, and other areas within the company.

On the other hand, if the process to be analyzed is smaller in scope, then the scope of the inputs and outputs will also be smaller.

B. HOW WILL WE ANALYZE OUR PRESENT SYSTEM?

To begin analyzing a process, the process must first be clearly identified and defined. For example, if the process is making an apple pie, it is important to know if the scope of the process includes buying the ingredients as well as cooking. This kind of definition is important because as the scope of the process changes, so do the inputs and outputs.

After the process has been defined, the outputs for the process--and the customers for those outputs--must be identified. It is then necessary to determine the requirements that define each output.

The final step in analyzing a process involves examining the five elements required by a process to produce outputs.

In order to use the Process Model, it is first necessary to define each of its parts.

Outputs

An output is a product or service provided to another person or organization. An output could be a product such as: a videotape, a computer, an insurance policy, a credit card statement, or an automobile. An output can also be a service, such as : delivery of a package, maintenance of a lawn, or answering of a telephone.

When outputs are being defined, it is important not to overlook "secondary" outputs, such as: informal information, budgets, and status reports related to a process.

Types of Input

The Process Model also contains the five elements required by a process to produce outputs. They include:

- Inputs
- Equipment/Facilities
- Training/Knowledge
- Procedures
- Performance Standards

Inputs - An input is the information or material used or operated upon to create an output. For example, if the output of a process was building a computer, the inputs would be parts and supplies. If the output was a report, the input would include paper and information.

The next four elements are also types of inputs. However, they are the kinds of inputs that control the process, and are not generally consumed to create an output.

Equipment/Facilities - This category includes any equipment and facilities needed to perform a process, such as: computers, pencils, typewriters, tools, or capital equipment.

Training/Knowledge - This input covers the skills and understanding needed to perform a process. If someone is to operate a word processor, build a kite, or assemble a bicycle, knowledge is required to perform the process.

Procedures - This type of input includes the instructions or the description of an internal process. There are steps in every process--and every process requires procedures, such as: policies, work instructions, plans of process instructions, etc.

Performance standard - A performance standard helps to determine how well--or how poorly--a process is performing through use of targets, goals, and other traditional measures.

Everyone is a customer, and everyone is a supplier. Suppliers exist for each input into the processes we perform.

That is why it is important that the requirements for each exchange of products or services between two people or organizations be clearly understood--by both parties. Without clear requirements, no one can perform a task error-free.

Definition--Conformance to Requirements

Understanding requirements is the basis for quality improvement. If the requirement of a product or service (the "it" in "Do it right the first time") is not clearly understood by the supplier and the customer, then the supplier cannot consistently produce a satisfactory product.

Sometimes, if a requirement is not made clear--or does not exist as a formal part of doing business--an "assumed" requirement takes over. As long as the customer does not complain, it is assumed there is no problem. However, assumed requirements lead to confusion, lost time, and sometimes lost customers. Even an "in-house" customer can find a new supplier when communication breaks down.

System--Prevention

Prevention of nonconformance is a primary reason to formally document and define a process.

When the requirements of a process have been identified and agreed upon, the measurement of nonconformance can take place. From this data, action can be taken to alter the process so nonconformances are prevented.

C. PERSONAL PERFORMANCE STANDARD--ZERO DEFECTS

The attitude of Zero Defects is a major element in causing quality improvement. In order to implement Zero Defects in any operation, requirements must be clearly understood. When Zero Defects has been adopted as a personal performance standard, when processes are understood, and when this commitment is communicated throughout a company, then that company is well on the way to achieving quality improvement.

Measurement--The Price of Nonconformance

The most effective tool used to quantify nonconformance is money--the price of nonconformance. This technique is valuable in measuring a process, and quickly identifies targets for corrective action. However, this is only possible if requirements are defined.

The necessity for understanding requirements is obvious. Through use of the Process Model, requirements in any process can be easily identified and understood.

Example

1. Identification of task to be analyzed.

   The task is cleaning windows on an 82-story office building.

2. Output

   The output of the process will be clean windows.

Things needed to perform the task:

3. Inputs

   The inputs include dirty windows, cleaning fluids, etc.

4. Equipment/Facilities

   Equipment such as a scaffold, and devices to apply the cleaner and remove the dirt are needed. A container for the cleaning fluid is also required.

5. Training/Knowledge

   The person cleaning the windows should know how to operate the scaffolding. Training might also be needed on the most efficient way to clean a window.

6. Procedure/Process Definition

   A procedure must define such items as how to clean a window. Must it be rinsed? At what times of the day will the windows be cleaned?, etc.

7. Performance Standards

   The performance standard could be how many windows should be cleaned each day.

Every task can be viewed as a process. The Process Model is a tool that can be used to help understand work processes and make certain clear requirements have been defined. It is important that these requirements are understood by both the supplier and the customer.

CHAPTER 3 - THE MEASUREMENT, PREVENTION, AND PRICE OF CONFORMANCE AND NONCONFORMANCE

A. THE MEASUREMENT OF CONFORMANCE

The science of physical measurement is called Metrology. Measurement is often defined as the assignment of numbers to objects or events according to a rule. Some of these rules are:

- Binary--reducing everything to a condition of positive or negative, yes or no, on or off, etc.
- Cardinal--counting (1, 2, 3, 4).
- Nominal--using numbers as names or labels.
- Interval--the determining of equal distances along a scale.
- Ratio--comparing relationships to an equal base such as length, weight, volume time intervals.

Measurements are so much a part of everyday life that much of our vocabulary is made up of measurement terms: length, width, height, voltage, current, time weight, temperature, speed, volume, direction, etc.

In most instances, then measurements are needed to convey information. In fact, measurement can asnwer three of the five most basic questions: What is it?, Where is it?, and When did it occur?

The Steps to Measuring Nonconformance

The steps to measurement are simple. They are:

- Identifying
- Counting
- Charting

Identifying

Identifying means determining the activity targeted to be measured. The more precise the identification, the better the measure--and the quicker the improvement. There are three reasons for this:

First, zeroing in on an activity explicitly defines that activity, so everyone can understand and relate to the target. Improvement activities will be supported because everyone is focused in the same direction.

Second, if too large an activity is targeted for improvement, it becomes more difficult to measure.

Third, it should be pointed out that in identifying tasks to be measured, a small percentage of the targeted jobs will provide the bulk of the improvement. This is a reflection of the "Rule of 80-20," which states that 80 percent of our problems are caused by 20 percent of our activities. To identify that troublesome 20 percent, the next step in the measurement process is very useful.

Counting

Counting is always a means to an end. That "end," in this case, is the segregation of problems. Accomplishment of this requires three steps:

- Observation or enumeration
- Addition
- Stacking

Observation or enumeration - The first step is to make the nonconformance simple and easily observable--therefore countable (Binary). It works or it doesn't, meets requirements or it doesn't, and is either right or wrong. If the requirement is not clear or not communicated. the validity of the data will be attacked, ridiculed and finally ignored.

Addition - In the Quality Improvement Process, the individual is concerned with the number of nonconformances related to a certain process (Cardinal). The subsequent analysis will quantify (Nominal) how large the problem is and help determine the extent of resources needed to cause improvement. It will also provide the ability to stack problems (Ordinal) which will identify the major offenders.

Stacking - This is another name for Pareto Analysis--a concept which was first applied in the field of economics. Long before Pareto, however, people were always "scratching the most active itch" first. Products manufactured were listed in the order of importance, or the amount of defects recorded. Next, the major offending products were stacked by area.

After arriving at an area to focus on, the subassembly causing the most problems is determined. Then, a defective component list from the product/area/subassembly is stacked to find the major failing component in that product. This process could continue to also include all the vendors supplying that component.

At any time, the analysis could be stopped or taken directly to the component level, depending on the information desired.

The purpose of stacking is to narrow the scope of targets for improvement.

This type of analysis can be used universally--whether it is the marketing organization stacking customers by dollars expended, accounting stacking receivable dollars owed by a customer, or making a personal decision listing pros and cons by importance.

Charting

The final step is to track improvements over time, and assess the impact of day-to-day decisions. This step is called "charting"--a pictorial form of nonconformance measurement. This form is effective in giving instant comparisons of measures. There are many different ways to present the measures pictorially.

For the purpose of quality improvement, all are acceptable. But the ordinary line chart will be sufficient because it accomplishes three things: it compares an activity with time, makes the comparison easy to see, and is easy to plot at the viewing site. This is important, because above all else, the chart must be easily identifiable. There are six distinct items on quality improvement charts that need to be addressed.

- Title

  This is a description of the activity identified for improvement. It must be bold, distinct, and easy to read at a glance.

- Vertical axis

  This axis (normally a vertical line on the left side of a chart) is used as a scale to express the activity being measured. This scale may be dollars, defects, defect ratio, etc.

- Horizontal axis

  The time interval is placed along this axis. The interval is dependent upon the purpose of the chart. If it is process control, then the time interval may be hourly. If it is merely group or management information, then the interval would be longer.

- Baseline

  This is the data accumulated before the improvement process or measurement is implemented. It is historical data that will set the basis for determining if improvement is occurring, and how rapidly.

- Performance standard

Improvement will probably be gradual and based on a set of improvement activities mapped out to achieve Zero Defects. The expected improvements brought about by implementing the plan should be shown on the chart.

- Activity rate

This is an area used on activities that tend to fluctuate from period to period. A 50 percent rejection rate may mean very little if only two items were tested. Showing the activity rate gives the viewer added information when looking at ratio information.

Measurement is only effective when it is done in a way that produces information people can understand and use. Therefore, operating and reporting methods should be straightforward and expressed in simple terms, such as "defects per unit," "percent defective," etc.

Implementation

Implementation of the measuring process is best handled by a question and answer session. There are four questions that should be asked when implementing measures. They are:

- What is the process needing defect prevention?
- How should the measure be presented?
- How will the measure be obtained?
- Who is going to make measurements?

Problems are everywhere. For problem solvers, there are abundant opportunities to show expertise. However, there might not be as many problems as previously thought--just a variety of symptoms.

That is why it is always good to look at a situation from the reverse angle. What is trying to be accomplished? What are the opportunities for error? Are continuous measures in these areas reasonable?

If activities have already begun, it would be wise to go through the stacking process previously mentioned and determine whether the measures should be implemented in a continuous manner. Also, measuring should be implemented only if actions are going to follow. If action will not follow, then don't waste your time. It is important to note that if too many measures are initiated at one time, they lose impact.

After determining what should be measured, the presentation of that measurement must be decided. The presentation of the measure depends largely upon the customer. If upper management wants to know how quality is, it would probably be better to use a chart showing dollars expended on a problem rather than a bunch of charts showing rejection rate information.

If engineering is interested in the quality of a product, they might respond to hours. Service areas will respond to call rates, manufacturing to defects per machine--or defects per employe--and quality to rejection rates. Although this is by no means definitive, it does show the need to consider what measurement base will move the customer to action.

The next question to consider when implementing is: How will the measures be obtained? If the activity being measured needs to be stringently controlled, then recording and charting the actual observation at the time the activity is being performed is best. However, if observation is not necessary, then secondary data can be used. This is the recording of measures on activities that occurred previously. Noncomplex forms should be supplied to the measurers so they can record the results. The basic information required is:

- Activity name and/or number; date; name of measurers and operator
- Amount checked
- Amount found defective
- Specific description of each defect
- Operation and area where detected.

The last major way of obtaining measures to be used in the Quality Improvement Process is through the use of questionnaires.

This data-gathering mechanism is most valuable in white collar areas. Questionnaires can be used to determine the quality of products or services that have direct contact with the customer. Such measures could cover insurance agents, restaurant, hotel, or service personnel, customer delivered products, etc.

In developing questionnaires, questions that lead, mislead, are not clear in meaning, have two questions in one, or obtain useless information should be avoided. The questionnaires may be administered by actual customer contact, telephone inquiry, or mail. In all cases, the questionnaire should be brief, to the point, and as easy as possible to answer.

The last question for consideration in implementing measures is: Who will do the measuring?

This question can best be answered by asking who is most interested in the outcome. Hopefully, it is the department performing the activity--not some central reporting function or the department receiving the product.

Nonconformances can only be solved in the areas where they occur. So the rule to use in determining measures is: make them as close to self measures as possible. This does not mean stop inspecting the supplied product, whether it is a component in receiving inspection, or a subassembly in the process of being assembled or tested. It does mean that the goal should be to limit inspection to a minimum. The objective should always be to force problem identification (therefore, measures) as close to the source as possible.

There is a psychology of measurement. Research has proven that the mere knowledge that the measurement process is occurring improves performance. Findings show that verbal commitments to setting goals usually means that those goals will be met.

Also, as might be expected, controlled evidence shows that feedback of knowledge of results can improve performance, and that public presentation of performance will also act to further improvement. Dramatic performance improvements can also be achieved by graphing individual versus group performance.

Obviously, these techniques are not new. However, they have had a resurgence in management application recently. Vast improvements have been seen in companies using these techniques, but all too often the improvements are short-lived. Why? Because there is something common to most consequences of measuring in our management society: negative rewards.

If measurements are going to be accepted and used as a tool for improvement, they must first be supported by the people being measured. This means group participation in determining what should be measured--no "surprise charts" going up without discussion and agreement. When possible, have those being measured plot their own graphs.

Above all, the job environment must be positive. Therefore, avoid negative rewards or mentioning how poorly someone performed. The chart will provide the only negative information a person needs. Dwell on how people can be helped to do their jobs right the first time--and then work to remove any obstacles that prevent them from doing so.

Removing obstacles that prevent people from doing their jobs right the first time is what quality improvement is all about.

The purpose of measuring is to provide a display of current and potential nonconformance problems in a way that permits objective evaluation and corrective action.

Measurement is only one part of the Quality Improvement Process--but it is the backbone of the control system. It is the vehicle used to evaluate and plan management actions.

B. THE PREVENTION OF NONCONFORMANCE

Prevention is nothing more than causing defects not to happen. So it is important that a prevention system be put in place before a process becomes operational. To establish such a system, five things are required:

- Clear requirements
- Well-defined processes
- Proof of process capability
- Process control

- Systems and policies for defect prevention.

We have previously covered clear requirements and defining the process; we will now look at the process capability.

Establishing a prevention system requires consideration of the third factor--proof of process capability. Proving is simply making certain that a process is capable of meeting requirements.

Different industries use a variety of techniques for process proving. Specific techniques applicable to the processes of the paper industry, for instance, might not apply in the case of automobiles. Specific techniques which work in electronics might not work in petrochemical industries.

Process capability studies are sometimes called "procedure proofing," "pilot lots," "trial runs," etc. But while specific techniques may vary, such studies all have several things in common. They use:

- The same equipment and facilities that will be used by the process in actual running.
- The same skills and knowledge that will be used in performing the process on a day-to-day basis.
- The identical, formally documented procedures to be used for carrying out the process on a day-to-day basis. (These must be followed step by step.)
- The same suppliers that will be used by the process on a day-to-day basis.
- Objective tests to determine if the output conforms to requirements.
- Statistical analysis of data from the output, which is used to assess the process on a consistent basis.

Finally, in any prevention system, the process is corrected as necessary to provide defect-free output.

In short, simply establishing requirements in a process is not enough. In addition, a process must be proven capable of producing conforming output on a continuous basis. Management cannot very well ask people to perform error-free work if the process itself is not error-free.

Once it has been established that a process is capable of producing conforming output, it is then necessary to find methods of controlling that process. This leads into the next step in establishing a prevention system.

Process control can be illustrated by use of the following example: Driving is a process--and one element of this process is controlling the speed of the vehicle. This control can be accomplished in any of three ways:

- Observing the speed of other cars, watching telephone poles going by, and guessing how fast other cars are going.
- Watching the speedometer, and accelerating or decelerating as necessary to stay within the speed limit.
- Operating with a cruise control--using a built-in device to automatically regulate speed.

All these methods of control have four things in common. They operate with:

- A requirement--the speed limit that should not be exceeded;
- A method of measurement;
- A standard to which the measurement is compared;
- A method of regulation.

However, there is an important difference that makes one method of control preferable over the others--the time required from measurement to process regulation.

In the first example of controlling speed, measurement is accomplished through after-the-fact comparison. A car operated in such a way will probably vary between going seriously over and very much under the speed limit--unless the driver is an experienced and highly-skilled telephone pole watcher.

A driver checking the speedometer periodically will do better, because a measurement of the output--the speed of the car--is available. By manually accelerating or decelerating as required, the driver can regulate speed fairly well--providing he or she remains alert.

However, probably the best method of regulating speed is automatic control--using a cruise control device or its equivalent. Here, the driver has an instrument that continually senses the speed of the car, comparies it to the pre-set standard, and takes appropriate action to conform. Using automatic control has the following results:

- The car operates continuously at very close to the pre-set speed, which means no loss of time and no traffic tickets.

- Because the car is not randomly accelerated or decelerated, it will use less fuel and operate more efficiently. The result is a lower price of conformance.

The advantage of cruise control is obvious. Like the other methods, it contains the elements needed for process control. But it also provides for continual monitoring and automatic, immediate process regulation.

Yet, such control often doesn't exist in offices and factories. Many processes in business have outputs that are measured, not continually, but once an hour, once a day, or once a week. Some processes are not measured at all--until a customer complains.

In business, there are three philosophies of dealing with process control which correspond to the three methods of speed control for a car. They are:

- Fixing--operating a process, using the output as produced without question, then setting up very efficient methods of handling complaints from the ultimate user.
- Maintaining--thoroughly checking outputs and having errors corrected by the departments generating them.
- Preventing--establishing systems that assure nonconformances will not be generated in the first place.

Systems and policies are discussed together because they are so interrelated.

A policy is a statement of what is to be accomplished. Typical policies are high level and very inclusive. Some examples of policies might be:

- Prevent flooding of cities along the Mississippi River basin.
- Provide adequate health care systems for school-aged children.
- Provide a secure national defense.
- Deliver defect-free, competitively priced goods and services, on time.

All of these are policies--high level statements of goals.

But before they can be implemented, policies require systems through which action is taken. Such systems might include:

- Establish a series of dams on the tributary rivers to contain spring flooding.
- Require annual physicals, and immunication for diphtheria, polio, tetanus, typhus, and smallpox.

- Allocate funds for development of new weapons systems.

- Establish process qualification procedures for all new products.

While few would argue with the overall policies stated, some might disagree strongly with the specific systems.

Is immunization for smallpox necessary? Some people would say no. Are dams upstream necessary? Some people say no--"We haven't had a flood in 20 years--why should we refurbish that dam?" Certainly, much discussion could be generated on each individual system.

Consequently, systems for defect prevention need to be carefully examined and agreed upon before they are announced. Also, it is important to make certain that systems designed to prevent defects are related to the basic policies.

Prevention of defects requires taking each of the five elements seriously:

- Clear requirements
- Well-defined processes
- Proof of process capability
- Process control
- Systems and policies for defect prevention.

Once accomplished, these steps cause quality improvement. However, to accomplish true defect prevention, all of the above must be managed to a personal performance standard of Zero Defects.

C. THE NEED FOR A PERFORMANCE STANDARD

The typical method for evaluating performance involves three basic elements:

- Requirements
- Measurements
- Performance standards.

In a conventional situation, problems exist because of the way performance standards are used and understood. Some performance standards mislead people into believing that "just a few" nonconformances are acceptable. This attitude illustrates the need for a performance standard that cannot be misunderstood--a standard that says errors are not acceptable, and must be eliminated forever.

Requirements are the definition of a task to be performed--the "it" in "Do it right the first time." So, for processes to be controlled, the requirements must be clearly understood.

The second of the three elements in evaluating performance is measurement. After the requirements for a task have been set, there must be a means of evaluating whether or not the requirements are being met. This determination can only be made through measurement.

A performance standard is a means of analyzing now well--or how poorly--a process is performing. Measurements in a process are compared to the standard, and if the comparison is unfavorable, efforts are made to improve. If, on the other hand, the standard is met or bettered, it is assumed that the process is working well and no corrective action is taken.

The nature of the performance standard for a process is usually expressed as the number of nonconformances divided by the number of tasks performed. The standard is normally stated in the same terms as the individual measurements taken, such as: "percent defective," "defects per unit," "errors per hour," etc.

Once the nature of the performance standard has been selected, the next task is to decide specifically how many nonconformances should be used--how many defects per day, or errors per hour should be allowed in a "good" performance.

For example, in a stockroom operation, the number of units removed from a certain stock bin must be recorded on a stock removal form. This form is later entered into a computer where the inventory for that bin in maintained. A performance standard might be selected which states that the number entered on the form must be correct 99 percent of the time. This standard says that one discrepancy out of 100 transactions could be considered good.

Specific numbers of nonconformance for a process are usually selected as a standard based on: historical data, analyzing the process, industry averages, or several other methods. Once defined, these standards are used to determine the level of performance that is considered "acceptable"--or as a target for desired performance.

After the specific performance standard has been defined, the process is then measured in those terms, and the measurements are compared to the standard. If the measurement shows higher nonconformance than the standard allows, then management and the employees know that action should be taken to improve the process.

If, on the other hand, the operation produces fewer nonconformances, no action is taken--the operation is considered to be running adequately and nothing more is done.

It is this practice that produces the need for another type of performance standard. The standard just described--1 percent errors in stocking transactions--can easily be misunderstood because it sounds as though 1 percent error is acceptable. If this understanding is conveyed to the people doing the work, then the process will never exceed the performance standard. Improvement will be at a standstill.

Therefore, there is a need for a performance standard that cannot be misunderstood--a standard that does not lead people to believe errors or nonconformances are acceptable. This performance standard is Zero Defects. It is simply the attitude that nonconformances are not acceptable--and must be eliminated forever.

People have their own performance standards. These personal standards are really attitudes concerning how well an individual wants to do his or her job.

The performance standard of 1 percent error in the stocking transaction process could be misunderstood to mean that 1 percent error was acceptable. Therefore, everyone who accepted 1 percent as a personal standard relaxed a little in their job.

If, on the other hand, an individual had a personal performance standard that errors were not acceptable--Zero Defects--then attempts would be made to identify the cause of errors and resolve them forever. It is easy to see that such an attitude, and the resulting actions, produce quality improvement.

There are two types of performance standards: performance standards that can be misunderstood, and a performance standard that cannot be misunderstood.

The first type relates to numbers of nonconformances that may be allowed. The second makes it clear that zero nonconformances are acceptable. This attitude plays a key role in quality improvement. Traditional performance standards that allow people to accept error are contrary to the attitude of defect prevention.

In business today, easily misunderstood performance standards are frequently used. These performance standards indicate that certain nonconformances are acceptable, and that processes with these levels of nonconformance are performing well enough.

The attitude of accepting nonconformance can also be bolstered through interpersonal communication. Some examples are:

- "This is a very complex process. It's state of the art. You must expect some errors."
- "There are only a very few nonconformances in this process. It used to be much worse.
- "You can't expect the design to be totally right when it's issued to manufacturing. There must be some engineering changes. It would take forever to make it perfect."
- "With this many transactions in an hour, you can't expect every digit to be exactly right."
- "It's not quite right, but it's close enough."

In these examples, a performance standard has been advocated which shows that errors are acceptable in certain situations.

The practice of deciding that some errors are acceptable, and therefore tolerable, is termed an attitude of "that's close enough" (T.C.E.). It's an attitude that says, even though the requirement hasn't been met, the performance is "close enough" under certain situations.

T.C.E. does much to confuse a work process and make it uncontrollable, because to control a process, tasks must be performed in accordance with requirements. This is true whether the task is forecasting, making calculations, or manufacturing a product.

Once a task has been defined and nonconformances are allowed, regardless of the reason, a varying process will result. Products and services will be produced that do not meet the requirements of previous tasks, and these nonconforming products will build on each other. They are sent to the next operation just a little bit outside the requirement.

In an operation managed this way, it is never really known what the previous process has produced. Technical calculations and judgments that had been made relative to the process definition are lost, eliminating its planned, consistent nature. The impact of these "little" variations along the line is a final product or service that contains seemingly random nonconformances.

It is clear that in order to make a process predictable, a performance standard that is easily understood is needed--a standard that communicates to everyone that requirements are to be taken seriously. The attitude of Zero Defects insures that nonconformances will be reviewed, and action taken to correct them. This attitude provides the basis for quality improvement.

> "The first step is to examine and adopt the attitude of defect prevention. This attitude is called, symbolically: Zero Defects. Zero Defects is a standard for management, a standard that management can convey to the employees to help them decide to 'do the job right the first time.'

> People are conditioned to believe that error is inevitable. We not only accept error, we anticipate it. Whether we are designing circuits, programming a computer, planning a project, selling the product, typing letters, completing an account ledger, or assembling components, it does not bother us to make a few errors, and management plans for these errors to occur. We feel that human beings have a 'built-in' error factor.
>
> However, we do not maintain the same standard when it comes to our personal life. If we did, we would resign ourselves to being shortchanged now and then as we cash our pay checks. We would expect hospital nurses to drop a certain percentage of all newborn babies. We would expect to go home to the wrong house by mistake periodically. As individuals we do not tolerate these things. Thus we have a double standard--one for ourselves, one for the company."

The Zero Defects concept is based on the fact that mistakes are caused by one of two things: lack of knowledge and lack of attention. Lack of knowledge can be measured and attacked by tried and true means. But lack of attention is a state of mind. It is an attitude problem that must be changed by the individual.

When presented with the challenge to do this, and the encouragement to attempt it, the individual will respond enthusiastically. Remember that Zero Defects is not a motivation method. It is a performance standard. It is for everyone. The biggest gains occur in the paperwork and administrative areas.

The Zero Defects standard must be personally started by management. People receive their standards from their leaders. They perform to the requirements given to them. They must be told that your personal standard is: Zero Defects.

To gain the benefits of Zero Defects, you must decide to make a personal commitment to have improvement in your operation. You must want it. The first step is: make the attitude of Zero Defects your personal standard.

D. THE PRICE OF NONCONFORMANCE

The price of nonconformance (PONC) is every cost incurred because things were not done right the first time--including direct costs, overhead, and benefits.

There is also a price of conformance (POC)--the costs involved in making certain that things are, or were, done right the first time.

Taken together, the price of nonconformance and the price of conformance make up the "Cost of Quality." However, it is best to refer to the individual elements as separate entities, because "Cost of Quality" seems to imply that cost is unavoidable, and is somehow associated with the achievement of quality improvement. This is a mistaken assumption.

Price of nonconformance more correctly conveys the message. This is the price that companies choose to pay by not preventing defects, and by not doing it right the first time. In fact, none of this money need be spent. The price of nonconformance can be eliminated through systematic quality improvement. But is it worth the effort? Let's look at the numbers to find out.

It is not unusual for a service company to spend 40 percent of its operating budget on doing things over again. In a manufacturing company, the figure is generally around 20 percent of sales. Clearly, this can amount to a substantial sum in lost profits.

In reality, there is no need for any business to spend more than 5 percent on the total price of nonconformance and the price of conformance. This is the payoff for causing quality improvement through defect prevention.

The price of nonconformance has three purposes:

- To get management's attention, and show them the need for quality improvement.
- To provide an objective measurement of quality improvement.
- To pinpoint areas where corrective action will be most profitable.

Assigning a specific value to quality improvement is critical, because management pays attention to things expressed in an easily understood language--money. The price of nonconformance puts the need for quality improvement into terms that management will understand and react to.

Once the scope of the problem is revealed, and the potential for improvement is shown, most management teams will leap at the opportunity to add a substantial sum to corporate net profit figures.

Without an effective yardstick, it is impossible to determine how well the Quality Improvement Process is being implemented. The price of nonconformance provides that yardstick. It demonstrates, in terms that can be easily understood, the effects of quality improvement and the advantages of doing it right the first time.

The price of nonconformance also provides persuasive evidence against the argument that quality improvement is "too expensive" to be worthwhile. A consistently reported system, including both the price of conformance, will show that failure to improve is far more costly.

Perhaps the most significant use for the price of nonconformance is assigning priorities for corrective action. It provides a logical basis for channeling effort to specific problem areas.

Most companies don't have the resources to attack all of their problems at once. It is necessary to be more selective, and strive to eliminate the most serious problems first. But how is this determination made? There are always several highly-visible difficulties that seem to beg for attention. But the most apparent problems aren't always the ones costing the most money.

Through use of the price of nonconformance, the importance of corrective action in a given area can be logically evaluated, using cost as the basis.

The price of nonconformance can only be calculated in the area where the cost is incurred. But, while the cost may be incurred in a specific department, the real cause of the problem may exist elsewhere. This is the essence of managing the price of nonconformance: find out where the problem lies, and assign responsibility for corrective action to the people most affected. Then, require the problem to be eliminated forever.

In calculating the price of nonconformance, there are several useful techniques. These are:

- Collection of cost by account
- Collection of cost by whole person
- Labor claiming
- Defect dollarization

- Surveys

Collection of Cost by Accounts

This simply means collecting costs that are designated by complete accounts in the books. Some examples are: scrap, liability payments, premium freight, expediting charges, and warranty.

Collection of Cost by Whole Person

These costs are almost as easy to obtain as cost by account. This method of calculation is based on counting the number of persons involved in a given activity. The activity could be related to waste due to nonconformance (PONC), or to assuring that requirements are met (POC). Some examples are: expeditors, customer relations, audit departments, and individuals dedicated to reprocessing.

Labor Claiming

Labor claiming describes careful calculation of the amount of labor expended on a particular project. This can be done through use of time cards, time sheets, or other methods of reading the amount of time involved. Some typical examples would include:

- The amount of time spent by an accountant tracking errors in a reporting system.
- Time spent by an engineer to find a "bug" in a missile system.
- Time spent by a salesman calling on accounts to explain a problem with material that had been shipped.
- Time spend preparing litigation in a product liability suit.

Labor claiming is particularly useful in dealing with large, complex problems.

Defect Dollarization

Defect dollarization is perhaps the simplest and the most useful technique in calculating the price of nonconformance. And yet, it is also the most overlooked.

It involves first determining the number of nonconformances. Next, it is necessary to find the average cost of correcting each nonconformance by taking a small sample and calculating the amount of work required to rectify each one. Finally, this average cost is multiplied by the number of nonconformances occurring in the reporting period.

This technique is particularly useful in areas where the nonconformance involves a number of different people. Such items might include:

- An engineering design change which might impact 20 or 30 departments.
- Processing of the paperwork on returns.
- Processing customer complaints.
- Software debugging.

Surveys

Surveys are the least accurate, but often the best available method of calculating the price of nonconformance in some areas.

Certain functions have an extremely high price of nonconformance. But it is difficult to judge exactly how high because the amount of time involved in doing things over is not always readily apparent.

This problem is most often encountered in professional areas, such as: sales, engineering, administration, legal, underwriting, development, etc. In these areas, the individuals involved tend to go from one project to another--from development to review to repair--almost continuously.

A salesman, for example, may simultaneously be introducing a new product, taking orders, and repairing damage done by incorrectly sent material.

Studies have shows that people are notoriously bad judges of how their time is actually spent. Time management experts recommend that busy individuals keep a "periodic log," where they record what they are doing every 15 minutes throughout the day. This does not have to be done over a long period of time--one or two days for most professionals would provide an adequate sample.

This technique works well in determining how much time an individual is spending doing things over. After a lapse of six months or so, a professional might resume keeping the periodic log to determine if utilization of his or her time has been improved.

One of the greatest potential gains any company can make is releasing its professionals to work on new projects. It is a waste to keep such people involved in solving the same old problems over and over again.

The price of nonconformance is every cost incurred because things were not done right the first time--including direct costs, overhead, and benefits.

E. THE ELIMINATION OF NONCONFORMANCE

Now we will explore a system to permanently eliminate nonconformance using five steps:

- Define the situation
- Fix the nonconformance
- Identify root cause
- Implement corrective action
- Evaluate and follow up.

Define the Situation

Defining a situation of nonconformance requires a two-part analysis. The first part is to define precisely what the nonconformance is. The second part is to determine the gross constraints involved in producing a solution.

Careful definition of these two parts is essential before proceeding. Without proper definition, the focus and direction used to determine the solution may be wrong. This can result in solutions to the wrong problems, hours of investigation into the wrong causes, etc.

Fix the Nonconformance

Resources must be allocated to make the output of a process conform to requirements. If the output cannot be reworked, then replacement activities must be undertaken.

This step is a "necessary evil." Although it is not prevention oriented, it frequently must be done to keep the user in business. Care must be taken to assure these activities do not become the focus of corrective action. This can stall the process of identifying the root cause of the nonconformance.

Identify the Root Cause of the Nonconformance

Problems generally have a way of growing and producing more problems. If the root cause is not eliminated, the problems occur again, or reappear in a different form.

This is comparable to changing the battery in a car, only to find that when the new battery also dies, the root cause was a faulty alternator.

Implement Corrective Action

This step involves identifying which parts of a process must be changed to permanently correct the situation and remove the root cause.

This change must be formally implemented, because formal implementation assures that all parties involved are notified and improves the chance for permanent resolution.

Evaluate and Follow Up

This step assures that the corrective actions implemented have been effective in eliminating the problem and that the changes are kept in place.

The problem elimination process requires a structured framework. A Problem Elimination Reporting System (PERS) satisfies this purpose. The advantages of this system are that it provides visible commitment, schedule status on activities, and routine status reporting.

The purpose of a PERS is to assure that all activities related to problem elimination occur and are being communicated. A typical flow of problem resolution will follow a pattern like this:

Define the Situation

- More data gathered to better define the problems to be resolved.
- Nonconformances determined, categorized, and stacked.
- Definition of the nonconforming situation and criteria for a solution determined.
- Precise definition of the nonconformance to be resolved entered into the Problem Elimination Reporting System.

Fix the Nonconformance

- Determine an appropriate immediate fix for the nonconformance (disposition).

Identify Root Cause

- Review and list all possible reasons for nonconformance (opportunities for error). This activity starts the investigation into root cause.
- Assign responsibility to investigate the nonconformance.
- Agree on the reporting mechanics for the investigator--such as frequency, method, etc.
- Agree on completion date for each of the steps leading to determination of root cause.
- Determine root cause.

Implement Correction Action

- Agree on corrective action activities and completion dates.

Evaluate and Follow Up

- An independent party verifies the specified corrective action has been taken.

- Problem removal from the Problem Elimination Reporting System.

The major steps in this process will be discussed in more detail later.

PERS is used to close the loop of corrective action activities. It is a method of planning and accounting for corrective action from definition to follow up, and usually requires a central keeper. The system can be anything from a single log to a computer programmed system.

A proper definition of the nonconformance to be resolved is always the starting point. Carefully and precisely stating the problem--the nature of the nonconformance--is critical.

First, the problem as stated should be objective and nonjudgmental. It is not effective to define a situation using probable causes or impacts.

An important point to remember when defining nonconformances is "remove the person from the problem." The process is what failed--not the individual. Saying, "Three of five tee shots landed out of bounds," instead of "He's a lousy golfer," addresses the problem in an objective and nonjudgmental way.

In the case of excess inventory, everyone can again agree that three months inventory is three months inventory. This does not say that the sales force is ineffective, that manufacturing is producing the wrong product, or that marketing has made bad forecasts.

It should be clear that unless a problem is accurately defined as a measure of nonconformance, there will be continuing argument about cause without real agreement on what the problem is. However, once a problem is adequately defined, work can begin on the second half of the definition of the situation--defining the criteria for a solution.

Obviously, the ultimate objective is permanent elimination of nonconformance. It is generally agreed that given enough time, money, and manpower, most problems can be eliminated.

However, constraints in these areas and other areas are often imposed upon problem solvers. These constraints are requirements that must be met before the solution can go forward. Once formed, these requirements are called "criteria for solution."

In beginning an analysis of the criteria for solution, answering the following questions will be helpful:

How Big is the Problem?

A quick price of nonconformance (PONC) on a particular problem will be helpful in determining its size.

It must be realized that the initial price of nonconformance may not tell the whole story. What is the cost of customer goodwill? What is the cost of employe goodwill? What is the cost of aggravation and stress? Are other costs of nonconformance associated with this one being considered?

What Human Resources are Required?

What type of nonconformance does the problem appear to be? Is it complex, technical, human relations, or procedural? What departments are involved or affected by the problem?

What is the Measure of Completion?

Is the problem eliminated if it doesn't reappear in the next three weeks? Is it eliminated only when the customer agrees it has been eliminated? Is it eliminated only when a mistake-proof process has been installed?

By determining ahead of time the measure of completion, commitment to eliminating the problem is more likely to remain strong.

When Must the Nonconformance be Resolved?

Since the nonconformance should not have occurred in the first place, management usually wants the problem eliminated immediately.

This may not be realistic. Very little may be known about the complexity of a problem, even after the definition phase is complete. Only by knowing the amount of resources that can be applied, and by understanding the problem elimination steps to be taken, is a reasonable estimate of corrective action time possible.

However, an estimated completion date should be developed to allow for planning and implementation scheduling.

Fixing is making the nonconforming output conform, or disposing of and replacing it. This is an activity that can normally be performed concurrent with defining the situation.

Fixing is absolutely necessary, but it must be looked upon as a "necessary evil" because it costs profits. It can also be misinterpreted as problem resolution and, therefore, prematurely end the process of problem elimination. Some examples of fixing are:

- If a word is found misspelled during proof-reading, it is corrected.
- If a component is found defective in a printed circuit board, it is replaced.

- If a computer program has mistakes in it, it is corrected and retested.

- If a forecast is found to be 30 percent too high, it is corrected.

- If a dimension is found out of tolerance on a piece of machined steel, it is remachined or scrapped.

These are all dispositions of nonconforming output. The costs incurred are part of the price of nonconformance.

How this activity is conducted tells much about management's understanding of an commitment to quality. Is fixing taken for granted by planning it into the process? Do the people who find the errors fix the output? If this is the case, aren't the originators of the nonconformances being freed up to continue producing nonconforming output? This must change.

A key step in this change will be the manner in which management approaches this fixing of nonconformances. If fixing is expected, it will surely be a self-fulfilling prophecy.

The first two steps in the system, define the solution and fix the nonconformance, are normally done simultaneously. These two steps define the scope of the problem, the requirements for a solution, and take the necessary actions to keep users in business. The next step in nonconformance elimination is identifying the root cause.

The "root cause" is the original reason for a nonconformance within a process. Root cause can be defined as the factor which, when changed or eliminated, will eliminate the nonconformance.

A good example is pulling weeds. A weed is a nonconformance in a beautifully landscaped yard. Too often, the nonconformance is fixed by simply pulling weeds along with some shallow roots.

This will result in a conforming lawn, but only temporarily. Within a few weeks, the weeds will grow back.

Elimination requires that the tap root be found and destroyed, either by carefully digging it up or applying weed killer. This process takes more time initially, but pays off handsomely over the course of a summer.

In a lawn, the "root cause" of weeds is fairly easy to identify and understand; though not always easy to do something about. In business processes, the root cause of a nonconformance may not be as obvious. To assist in identification of root cause, use of formal techniques is recommended. The technique which is normally most effective is termed, "threads of similarity."

"Threads of similarity" uses information obtained by analyzing a process through the Process Model. The technique is based on answering a series of questions. These questions seek to uncover similarities in process conditions that exist when nonconforming output is produced.

The results are then compared and contrasted, to highlight dissimilarities between conforming and nonconforming conditions. Such an analysis can provide clues as to root cause.

Taking the questions in order, they are:

1. Where was nonconforming output found?

1a. Where was conforming output found?

2. When was nonconforming output found?

2a. When was conforming output found?

3. Who was involved in creating nonconforming output?

3a. Who was involved in creating conforming output?

4. What equipment and facilities were involved in creating nonconforming output?

4a. What equipment and facilities were involved in creating conforming output?

5. What performance standards were utilized by processes creating nonconforming output?

5a. What performance standards were utilized by processes creating conforming output?

6. What written procedures were being used by processes creating nonconforming output?

6a. What written procedures were being used by processes creating conforming output?

7. What inputs were used in creating nonconforming output?

7a. What inputs were used in creating conforming output?

This analysis assumes that all inputs are being managed according to their requirements. If, however, inputs are being managed using a performance standard of "that's close enough," the process may appear to vary randomly. This possibility should be investigated carefully if threads of similarity fail to uncover a possible root cause. If "T.C.E." is found to be present, it should be replaced by Zero Defects as a performance standard.

The plotting of data is also a useful technique in finding cause and effect relationships. Charts may show a relationship that would not be visible otherwise, even to an experienced investigator.

Finally, any trouble-shooting or investigation should include the expert on the process--the person doing the job. Usually, the people directly involved can more readily identify opportunities for error in a given process.

Threads of similarity, charting, and identifying opportunities for error in the process will reveal causes of the vast majority of nonconformances. If a nonconformance cannot be traced through these techniques, however, there are three possible reasons:

- A requirement is missing that should be present on one of the inputs.

- The requirements on the inputs are inadequately stated.

- The process is incapable of meeting the requirements on a consistent basis.

Most managers do not have to face problems as complex as these. Indeed, many managers can go through an entire career without needing the advanced statistical techniques necessary to handle such problems. When they are encountered, however, use of powerful statistical techniques, such as analysis of variance, is required.

Identifying the root cause has one purpose: to direct corrective action and eliminate the nonconformance forever.

Corrective action can be defined as "a formally implemented change to a process, designed to eliminate a specific root cause of an identified nonconformance."

This definition is carefully worded to emphasize that corrective action cannot be a "hit or miss" effort. It must be:

- Formally planned

- Directed toward an analyzed (modeled) process

- Directed toward a specific root cause

- Directed toward eliminating an identified and quantified nonconformance.

A great deal of what passes as corrective action fails because it has not taken these factors into consideration.

Ineffective corrective action is often incomplete, informally documented, or otherwise poorly implemented.

Closing the loop on corrective action requires formal documentation within a corrective action system. The Problem Elimination Reporting System discussed earlier is typical of a mechanism which can be used for such documentation. Planned corrective action should answer the following questions:

- Which process will be changed?
- What is the specific nonconformance being corrected?
- Has the criteria for solution been defined?
- Has the root cause of the nonconformance been identified?
- What input to the process will be changed? (equipment and facilities, procedures, performance standards, training, consumable inputs)
- Who will specify the change to the process?
- When will the change be implemented?
- How will the change be documented?
- Who must be informed and concur with the change before it is implemented?

There is also the matter of permanence--how to make certain the corrective action put in place is both effective and maintained. The two questions regarding permanence are:

- How is the effectiveness of corrective action evaluated?
- What should be done to make certain the corrective action stays in place?

The last steps in the elimination of nonconformance are evaluation and follow-up, two frequently overlooked factors.

Evaluation is done by following up on a question asked during definition of the nonconformance: "What is the measure of completion?" If this phase of the nonconformance elimination process was correctly followed, then there should be a clearly defined criteria for evaluation--a measurement. If the measurement shows the problem has recurred, then the root cause has not been found and it is necessary to go back and re-examine the process.

The time between implementing corrective action and seeing the desired result can often be lengthy. Consequently, many problems are prematurely assumed to be corrected. Because of this, management attention and resources may be moved to other areas, allowing the problem to reappear. This is why problems should be reported upon until all measures necessary indicate permanent elimination.

Follow up refers to a group of techniques designed to make certain that the corrections within a process remain in place. It takes two primary forms:

- Mistake proofing
- Auditing.

<u>Mistake Proofing</u>

A process is mistake-proofed against a particular nonconformance if it has procedures in place which make it impossible for that nonconformance to be unknowingly provided to the customer. Mistake-proofing normally takes four basic forms:

<u>Contact</u> - Variation is shape or dimension of inputs is checked by a "contact/no contact" detection method. For example, guages or gateways can be installed on a machine to detect items which fall outside tolerance limits. When nonconformance is

detected, the process is stopped. Guide holes which orient products before processing are another frequently used mistake-proofing method.

<u>Constant number</u> - Constant number involves using a mechanism which conforms whether or not a specific number of components are present in a finished good, or a specific number of actions are taken to create a finished service. An indication of more or less than the specified number of actions can indicate nonconformance. For example, a mechanism can be placed in a bin that signals when a unit has been removed. Before a package can be released for shipment, all bin indicators must be positive.

<u>Action step</u> - Similar to the constant number method, this technique conforms whether or not a series of action steps have been followed in a specified order. What differentiates action step from constant number is its focus on the specific sequence of actions to be carried out.

<u>Artificial intelligence</u> - Computers have provided new methods of assuring conformance to requirements by rapidly, accurately, and continuously scanning operations. For most operations, computer based feedback can be "instantaneous."

Virtually any input to a process can also be used to mistake-proof the process. It is important when implementing mistake-proofing to avoid the term "fool-proofing." Fool-proofing means, quite literally, protecting the process from fools. Clearly, this term can have negative connotations to employes.

Some operations cannot be mistake-proofed. If this is the case, an audit is appropriate.

Auditing

An audit is simply a periodic inspection, made to assure that a process is conforming to its requirements. It is an inspection of the process--not an inspection of output.

In this sense, audits have become one of the most misused and mistermed functions in business today. Frequently, the term "audit" is used to describe reinspecting work done by others. If reinspection is necessary, it should be termed reinspection, not an audit.

Audits should be used strictly to assure than processes are being carried out in accordance with their specified procedures in areas where mistake proofing is impractical. Under these circumstances, audits are a valuable prevention tool.

The five-step technique to problem elimination is an effective method of dealing with nonconformance. When followed, this method causes significant improvement in all operations.

F. THE TEAM APPROACH TO PROBLEM ELIMINATION

Doing business in today's world is tougher than ever. There are more demands and more problems--problems that are often very complex and cost businesses millions of dollars in wasted time and effort.

The complexity of these problems put them beyond the power of any individual to adequately solve. One way to solve such problems is through the use of teams. A team is a group of experienced individuals banded together to solve a particular problem. Their skills and knowledge make them the most likely source of an acceptable solution.

Some business professionals balk at the use of teams. They don't like "work by committee." Instead, they may rely on outdated methods to solve a problem.

But as Henry Kissinger once said, "We can now no longer overwhelm our problems: we must master them with imagination, understanding, and patience."

Using teams for problem elimination has some definite advantages.

- Teams can bring more talent, experience, knowledge and skill to the problem situation.
- Teamwork can be more satisfying and morale boosting for people than working alone.
- Team recommendations are more likely to be carried out than recommendations made by an individual. People are more willing to support an effort that they helped develop.
- Teams can react to a variety of problems that are beyond the technical competence of any one individual.
- Teams can deal with problems which cross department and division lines.

Teams can considerably improve the process of problem elimination. When properly managed, they can produce results quickly and economically.

The team leader is responsible for attending to these details:

<u>Participant Selection</u>

When selecting individuals for the meeting, the leader should select only those persons with knowledge and experience relevant to solving the problem. The team should be limited to between five and nine members. This will keep the team small enough to be manageable, but large enough for a good interplay of ideas.

Agenda Preparation

An agenda should be prepared and distributed to team members before the meeting. The agenda should include information about the meeting time and place, preparatory assignments (specific tasks to be completed by specific team members), and a roster of the individuals that will be involved. Supporting material should also be gathered and distributed.

Statement of Objectives

At the start of the meeting, the team leader should state the meeting objective as explicitly as possible. This will help the team members to focus their efforts on the solution and elimination of the problem. The leader will re-state the objective whenever the team appears to be sidetracked.

Review Procedures

Early in the meeting, the leader may review the problem elimination approach. This will help orient the team members to the procedures they will be following. A review of the team's role in the Quality Improvement Process and its operating authority is also recommended. A recording secretary should be selected to take the meeting minutes and distribute them to the team members.

Action Assignments

Team meetings don't solve problems. Meetings do produce strategies for solving problems. It is sometimes necessary to assign responsibility to team members for the implementation of certain aspects of the strategy. It must be clear who has responsibility to do what, and the time frame for implementation. This should be decided while the entire team is gathered together.

In addition, the team leader will be responsible for conducting the problem solving portion of the meeting. To do this, the team leader will try to tap the team's creative powers for a possible solution.

Tapping creativity is not an easy matter. But the team leader's management style will have a great deal to do with how creative the members can become. The best management style for helping teams solve problems requires that the team leader allow the members to participate as freely as possible. The leader should function as a facilitator--encouraging team members to exchange ideas and test understanding. The leader must always be ready to energize the team if it appears that they are floundering.

In addition to providing extra energy to the team, the leader can increase creativity by:

Encouraging Spontaneity

Ideas and possible solutions should not be censured or criticized at the early stages of a meeting. The leader should help the free exchange of ideas. Sorting out ideas based on criteria testing will occur later.

The best way to encourage spontaneity is to record ideas as they are generated by the team members. A flipchart is useful for this. All members can see their ideas go up for consideration.

And, as ideas are generated and recorded, new ideas can "leapfrog" from what has already been generated.

Overcoming Perceptual Blocks

A perceptual block is a preconceived notion that prevents people from finding opportunities or solving problems. Failure to break out of this mental rut can hamper innovative solutions to problems.

For example, for a long time people who waited at banks picked a line at a window and waited until their turn for service came. The trouble was, some lines always moved slower than others. It wasn't until years later than some principles of Queuing Theory were applied to this situation. Now, bank customers stand in one line, and step up to tellers' windows as they become free. The result is, customers are served much faster than in the past. But before this happened, bank officials had to change some perceptual blocks about how to run their business. Likewise, the team leader must help the participants to recognize and overcome their perceptual blocks.

De-emphasizing Status and Rank Differences

In a problem solving meeting, everyone is expected to contribute--not just the highest ranking members of the team. The team leader must not allow the higher ranking participants to squash the ideas of the lower ranking participants. The leader must let all participants know that their input will be appreciated.

Allowing Quiet Time

In the heat of a crisis, many people don't think clearly. By allowing participants to have a quiet minute to think, the leader can help them to perform at their peak mental capacity.

In conclusion, creativity is important to the problem elimination process. The team leader's management style will greatly affect the team's creativity.

Despite the advantages of the team approach, some business professionals are reluctant to use it. They have seen too many well-intentioned efforts go wrong. A team can fail due to:

The Problem of Hidden Agendas

In this situation, the team leader or other members of the team are more concerned about their personal objectives than the team's objectives. They have an agenda that is hidden from the rest of the team, and they try to manipulate the process to achieve their goals. The result is that the team may be split apart by self-serving interests.

To prevent this situation, the team leader should foster an atmosphere of honesty and trust within the group. The team leader must lead by example and show the team members that their input into the process will be acted on.

The Tendency of Some People to Shirk Responsibility in the Team Situation

It is easy to hide in a group. Some team members may fail to hold up their share of responsibility--if the leader lets them. Their attitude is that "someone else will do it." Other team members must work that much harder to get things done.

The best way to prevent this is to make certain that all members have specific, assigned duties. People are less likely to shirk their duties if they feel certain that they will be held responsible for their actions.

The Problem of the Activity Trap

Sometimes, a team will be so anxious to deal with a problem that it may fail to adequately analyze the problem first. This "quick fix" approach can cause more problems than it solves.

The best way to avoid the activity trap is to thoroughly analyze each problem before trying to resolve it.

The Lack of Team Leadership

A team leader must concentrate on two aspects of the team approach. On one hand, the leader must make certain that the group works through the problem. On the other hand, the leader must also take care of the emotional needs of the team members. A good team leader will make certain that all team members have a chance to participate and are fairly treated by other members of the group. If the leader is weak in either of these areas--task concern or people concern--the problem solving effectiveness of the team will be impaired. (It is possible that a team could have two leaders. One would express task concern; the other would show people concern. But notice that both types of concern must be present for effective team leadership.)

Regular feedback to the team leader will help make certain that one type of concern is not emphasized at the expense of the other. In some cases, leadership effectiveness training may be needed to correct deficiencies.

In the final analysis, there are some factors that can cause a team to fail. But if these factors are controlled, then the team approach is the single best method for eliminating complex problems.

The team approach to problem solving frequently provides the best means to solve problems and eliminate them. The strength of this approach is that it capitalizes on the skills and experience of people who work most closely at a particular job. They are the experts--and with some guidance, they can solve the problems.

G. THE COMPANY'S ROLE IN CAUSING IMPROVEMENT

It is important to create a company culture that allows all employees an opportunity to do their jobs right the first time. This is important, because quality improvement is a "people business"--it can only be achieved by the people of a company.

A company's culture is created by both management and the employes. Management brings people into a company, and provides training, systems, procedures, materials, job descriptions, etc. These actions, to a large degree, form the environment in which employes operate. Employes bring their skills, attitudes, and energies into this environment. All these factors combine to form the culture of a company.

Like the human body, a company is a body made up of many members, and each member serves an important function. Therefore, each employe has a vital role to play in creating, or changing, a company's culture.

A cultural change regarding quality must be carefully planned to assure that everyone in the company understands and has an opportunity to participate in this "new way of doing business." The plan must also provide for actions that move the whole company from the "conventional" culture to a culture in which quality is first among equals with cost and schedule. This overall plan, or strategy, is vital to quality improvement.

It takes constant attention to make quality first among equals because of the pressures under which companies operate. For instance, companies are pressured to deliver products and services on time. They are also pressured to make a profit. At the same time, most companies would like to be known as quality leaders in their field.

It is easy to measure whether or not products and services are being delivered on time. Systems are in place to report performance against delivery schedules. It is equally easy to measure how a company is doing financially. Systems to monitor revenues and expenditures are an established part of doing business.

But where does this leave quality? Often, in the effort to produce short-term profits and to make timely deliveries, quality is left behind.

In the conventional culture, companies frequently require compromise between cost, schedule, and quality. Compared to the concrete nature of shipment and financial measurements, quality seems subjective indeed--a desirable but elusive goal.

Consequently, a company culture grows up around the way in which quality is viewed by management. Employes are quick to recognize what it takes to succeed, or to "get by" in a company, and are quick to notice the kind of actions that are rewarded by management. Because these rewards are often bestowed upon people who "make it happen," a culture builds around the "make it happen" philosophy.

The focus of this philosophy remains on easily measurable company objectives. This is because employes are doing what management wants. Management is trying to achieve short-term targets they have set, or targets that have been set for them.

Everyone wants to be associated with a company known as a quality leader. Company management wants to take long-term actions which achieve this reputation. But everyone becomes so involved in simply surviving quarter-to-quarter that long-term planning never takes place. In such an environment, the individual's perception of what quality is determines the actions taken to achieve it.

There are a variety of frequently used but erroneous definitions of quality. One misleading definition holds that a "quality" product or service should simply be "functional."

But what does "functional" mean? A nebulous definition allows individuals to make subjective judgments about the requirements for a product or service. When this is allowed, some requirements are deemed less important that others. This leads to establishing "levels," or categories of requirements.

One such scheme is known as "classification of defects or characteristics." Under this concept, defects are classified according to their impact on the end use of the product or service.

Such a plan might define "Category A" as a requirement that must be met all the time. "Category B" might be classified as a requirement that should be met, although minor deviations could be allowed if properly reviewed prior to use. "Category C" might be a "minor" requirement that does not greatly impact the functionality of the product or service.

There might even be a fourth category for requirements that are incidental to the end use. Conformance, therefore, would not be necessary.

In such a scenario there are many "grey areas"--many requirements that do not fall neatly into only one of these categories. When this occurs, a decision must be made concerning which category the requirement will be placed in.

Consider a situation in which a "grey area" requirement had ended up in Category A, although originally there had been discussion about placing it in Category B. Then suppose a "minor" nonconformance occurred in this requirement. Correcting the nonconformance would delay shipments needed to meet the quarterly forecast.

Normally, in this situation, a team is assembled to deal with the problem. Team members recall that the requirement in question <u>could</u> have been placed in Category B, where minor nonconformances are allowed. A decision is made to allow the nonconformance rather than impair shipment.

Management applauds this action as "making it happen." Employes notice the recognition given to those who participated in the decision. Consequently, the tradeoff of schedule and quality is seen as an acceptable, even desirable, way of doing business.

A second erroneous definition of quality states that quality is nothing more than economics. It is a desirable characteristic that can exist in varying degrees, depending on the price a company is willing to pay.

People accepting this definition frequently use phrases like: "We can't afford to make it right all the time," or, "This is commercial quality--not the aerospace business."

This definition also makes quality a negotiable item. Everyone is required to use discretion and subjective judgments to determine the "right amount" of quality that can or should be obtained. Management recognizes and rewards short-term cost saving decisions made relative to quality. Again, the company culture is shaped according to the accepted definition of quality.

If a company is to cause quality improvement, all the individuals in that company must have the same <u>comprehension</u> of what quality is. To help accomplish cultural change--and to achieve comprehension--an educational system regarding quality must be planned and implemented.

While an intellectual understanding of quality provides a basis for quality improvement, it is still only a beginning. Understanding must be translated into action for quality improvement to happen. This action results from employe <u>commitment</u> to the basic concepts of quality improvement.

To get the right kind of action, commitment to the four Absolutes of quality management is necessary. If such commitment exists, then action will be taken to prevent nonconformance. Quality will not be subject to negotiation or to changing priorities. The company culture will not reward people for using nonconforming material; it will reward people who prevent defects from happening.

Commitment to the Absolutes is most apparent in situations where conflicts arise between cost, schedule, and quality. However, making tough decisions in favor of quality is not the only way commitment manifests itself. A company also demonstrates commitment by expending resources to change the company culture. This involves any move made to change the decisions, judgments, recognitions, and rewards that form a company's culture relative to quality.

Making this change work requires <u>competence</u> in the mechanics of change. Without a strategy to implement a systematic, proven plan for quality improvement, the effort can become very frustrating.

Individuals working on their own, without a plan, produce less than optimum results. Certainly, individual effort is important in achieving quality improvement. But this effort must be coordinated, organized, and carefully thought out.

Any plan dealing with a change in company culture must involve at least three basic activities:

- Putting management systems in place
- Allowing individual commitment
- Sharing the management of quality.

<u>Management Systems</u>

The first activity involves putting systems in place that are needed to manage quality improvement. Such systems should be clearly defined in the same manner as schedule and cost. These systems should involve not only measuring quality, but administering quality improvement throughout the company, providing for awareness and understanding of quality by all employees, and making certain that problems are resolved forever. This is achieved through an organized, high-priority corrective action system.

Individual Commitment

This involves making certain that each individual in the company has an opportunity to make visible their commitment to quality improvement.

Sharing Quality Management

The third type of activity involves the sharing of quality improvement management between company management and individuals within the company. This sharing activity should include goal setting, frequent recognition, and routine communication dealing with quality. These activities should be aimed at allowing individuals an opportunity to do their jobs right the first time.

Only after such a plan has been defined and put into place can a comprehensive Quality Improvement Process, aimed at changing the company culture, be effectively implemented.

After the comprehension of quality is accomplished, commitment has been made, and a plan has been put in place to implement quality improvement, the need arises for continued communication.

Too often companies have tried to change their culture, or to implement major processes or programs, without frequently communicating their intent to the employees. A way to assure that all employees are involved in this change is through honest, two-way communication.

If there is not a comprehensive, frequent, and thorough communication system in place, then areas, groups, and remote sites cannot understand and participate. As a result, these employees become frustrated and skeptical. That is why two-way communication must be a top priority for the various teams involved in quality improvement. Communication is the key to cultural change--the key to employe involvement.

After the plan for cultural change has been put in place, and communication begins, problems will begin to surface. Problems require actions, so companies frequently establish corrective action or problem resolution systems.

These systems involve identification of problems, assignment of responsibility, and tracking the problems to some resolution. However, the point is frequently missed that systems do not solve problems--people solve problems. Systems generally do not receive the management attention required to make corrective action happen.

Therefore, commitment to corrective action by all employees is crucial. It is equally important to have a plan or system to help in the permanent resolution of problems. Without such resolution, long-term improvement cannot occur.

It is also necessary that the commitment to change be continual and never ending. Continuance is achieved through the vigilance and attention of all employes in a company. It is crucial that quality improvement remain a high priority to assure that the process will remain viable.

The phases that occur in the Quality Improvement Process can be referred to as the six C's of quality:

- Comprehension
- Commitment
- Competence
- Communication
- Correction
- Continuance.

Comprehension

This deals with understanding the basics of quality improvement. Comprehension normally starts with management, but involves all employes as the Quality Improvement Process is implemented. Comprehension provides a basis for quality improvement, and requires continual activity throughout the Quality Improvement Process. Without comprehension, quality improvement cannot occur.

Competence

Competence deals with the method, or plan, that a company has defined to assure that everyone understands and has an opportunity to participate in quality improvement. The basic steps of this plan were detailed in the previous reading assignments. Some of the elements involve: measuring, awareness, Cost of Quality, etc. These considerations are interpreted into an action plan by the Quality Improvement Team.

Communication

This is the most frequently neglected part of quality improvement. Two-way communication is vital, and should include such things as details of the Quality Improvement Process, success stories, etc.

Correction

This involves getting the proper people and resources together to solve problems forever. Correction begins with clear requirements, followed by measurements. Problems are then identified and causes determined. These causes are eliminated through permanent corrective action.

Correction activities involve all departments and all levels of employes, and are dependent upon the free exchange of information regarding problems and their solutions. The ability of each employee to participate in solving problems is another key to improvement. If problems can't be eliminated, improvement cannot occur.

Continuance

This is the last of the C's involved in achieving quality improvement. This phase contains activities which assure that quality improvement will continue forever, and that quality will be first among equals with cost and schedule. These factors become a part of the basic fabric of the company.

Continuance, in short, is based on the understanding that it is never cheaper or quicker to do it right the second time.

As a company progresses through the six C's, quality improvement will gain momentum. But quality improvement requires constant attention, just as cost and schedule control do. If attention is shifted to other areas for a period of time, the gains that have occurred through quality improvement may go away.

Therefore, everyone must help create an environment where all employes can do the job right the first time.

METHODS

The purpose of the process is threefold. First, to positively affect accuracy and conformance to requirements. Secondly, to get everyone actively involved in the process. Finally, to demonstrate our commitment to quality.

The attached format and sample forms detail by department assigned audits and frequency and reporting procedures.

Where more than one individual is assigned to a department, all supervisors in the department will perform audits as scheduled. All audits are to be signed legibly.

This packet may be retained and used as a "PERMANENT" management tool. When maintained, its use will assist in measuring the quality of your department's output.

Of the ten (10) operations objectives we are measured on, the objectives related to cost and quality have not been attained. This process should have a very positive impact on our quality objective.

Before this system is implemented, these audits will be discussed with the Local Shop Committee. Several audits can be performed without hourly employees. However, some audits will require hourly employees working with us on audits.

AUDIT SCHEDULE I

AUDIT TYPE	DEPT.	SUPVR. QTY	SUPVR. FREQ.	GEN.SUPVR. QTY	GEN.SUPVR. FREQ	MGR/SU QUALIT QTY	
VIP/CIO/SSO	SHIP/PCP	30 LNS	DAILY	30 LNS	WEEKLY	30 LNS	M
BULK	SHIP/PCP	10 TAGS	DAILY	10 TAGS	WEEKLY	10 TAGS	M
TRAILER	SHIP DOCK	12 (2 TRLS) DEALERS	DAILY	5 (1 TRL) DEALERS	WEEKLY	1 (TRL) 5 DLRS	M
LOADING	SHIP DOCK	1 ROUTE MANIFEST	DAILY	1 ROUTE MANIFEST	WEEKLY	1 ROUTE MANIFEST	M
BULK	REC. RAIL	10 LNS	DAILY	5 LNS	WEEKLY	5 LNS	M
LOAD BACK	REC. RAIL	1 CAR	DAILY	1 CAR	WEEKLY	1 CAR	M
STOCK TAGS	REC. WHSE	10 TAGS	DAILY	5 TAGS	WEEKLY	5 TAGS	M
END OF CONVEYER LINE	MR	5 TAGS	DAILY	5 TAGS	WEEKLY	5 TAGS	M
BULK CHECK IN	MR	2 TAGS	DAILY	2 TAGS	WEEKLY	2 TAGS	M
FACTORY	MR	2 TAGS	DAILY	2 TAGS	WEEKLY	2 TAGS	M
RECEIPT	MR	1 DEALER	DAILY	1 DEALER	WEEKLY	1 DLR	M

SHIPPING SUPERVISOR'S AUDITS

1. Small orders with <u>no</u> separate pick - bulk:

   A. All orders should be selected from Tandem Audit Inquiry. Check minimum of 4 dealer orders daily.

   B. 30 lines total.

   C. No pads - VIP, CIO, SSO only.

   D. One order must be UPS or Air and at least 3 must be dedicated.

   E. When errors are found, employees responsible are to correct when possible.

   F. Compare order or MCD with tag(s) and tags with material for:

      Correct part number

      Correct quantity

      Packaging condition, i.e., damage, rust, etc.

   G. Record audit to Log Sheet.

   H. Record errors on Log Sheet sample page 2B.

2. Bulk Parts:

   A. Check 10 tags daily.

   B. Compare tag and parts with MCD. Use same criteria as in (F) above and record to Log Sheet.

3. RPD Dock Audit

   A. Check 12 dealer orders daily as they are loaded on at 2 different trailers.

   B. Look for correct labels, package condition, piece counts, loading procedure and manifest verification.

   C. Check one manifested route order vs. LDC (see sample on page 2C). Record to Audit Log Sheet.

NOTE: Where a complete shipment is audited, stamp PC 82 100% Audit and insure a record is entered into Tandem. All audits are to be legibly signed by all auditors.

INSTRUCTIONS:
1. 4-DEALERS DAILY - 30 LINES MINIMUM
2. HAVE EMPLOYE CORRECT OWN ERROR WHERE POSSIBLE
3. SIGN NAME.

DAILY DEALER ORDER AU

MONTH:

DEALER		SHIP.#	LINES AUDITED	EMP. ID #	INCORRECT QTY	WRONG PART	DAMAGE	IMPROP. PACK	SU NAM
MONDAY									
1.									
2.									
3.									
4.									
TUESDAY									
1.									
2.									
3.									
4.									
WEDNESDAY									
1.									
2.									
3.									
4.									
THURSDAY									
1.									
2.									
3.									
4.									
FRIDAY									

RPD DOCK TRAILER AUDIT

DEALER NAME	ROUTE	CODE	SHIP #	DATE		#PC'S ON ORDER		# ON MANIFEST	ERRO[illegible] FO[illegible]
1. PCS MISSING									
2. MANIFEST WRONG									
3. PCS. DAMAGED									
4. WRONG PART									
5. WRONG QTY									
6. LOAD CORRECTION MADE									

RAIL SUPERVISOR'S AUDITS

1. Audit one load back car daily.

   A. Insure gates are secured on wire bound and screen equipped dunnage.

   B. Are rack feet nested when stacked in cars?

   C. Like type containers should be stacked together.

   D. DF bars to be properly positioned to secure load.

   E. Debris and trash removed from car floor and containers.

   F. Extra DF bars to be stacked and banded to a skid.

NOTE: SEE SAMPLE AUDIT PAGE.

2. Audit inbound bulk lines.

   A. Check tag for correct plant location.

   B. Check part number, quantity and condition of parts.

   C. Check loading of material to rack.

RAIL LOAD RACK AUDIT

CAR#	DATE	DEST.	GATES SECURED		RACKS LEGS NESTED		LIKE CONTAINER GROUPED		OF BARS IN PROPER POSITION		DEBRIS REMOVED		AUDITOR
			YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	

WAREHOUSING SUPERVISORS AUDITS

1. PC 17 location set ups - PD 153.

   A. Three (3) daily - from prior days.

   B. At least one must be a move PC 17's.

   C. For all moves, check for move sticker.

   D. Insure correct stock is in location indicated.

   E. Condition of material, stacking, etc.

   F. Adequate size for material (see PD 153 page).

   G. Enter defect - codes in comments column.

2. Tag Audit

   A. 10 tags daily using PD 153.

   B. Check for all items indicated.

   C. If stock is not stacked properly, or other out of line condition exists not indicated by a code listed on PC 153, write code in comments column.

Warehousing & Distribution
Division of General Motors Corporation

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Location Audit

Date ____________

SHIFT ____________

Main Location ____________ Supplemental Location ____________ SUPERVISOR ____________

Part Number	Location	File Location	Defect Number	Comment or M.I.T. Number
C 17				
C 17				
C 17				
AG				
AG				
AG				
AG				
AG				
AG				
AG				
AG				
AG				
AG				

Total Samples ____________ Total Defects ____________

1. - Unauthorized package
2. - Damaged part - Any type damaged part found in location
3. - Incorrect location - Location appears on file - Not in physical location
4. - Invalid record - Good physical location - Doesn't appear on file
5. - Mixed stock - Stock correctly marked intermixed in incorrect location
6. - Incorrect M.I.T. Number - Wrong M.I.T. Number entered into computer
7. Wrong size location for parts.
8. Part # doesn't match Rec. tag.
9. Wrong quantity received tag not corrected.
10. Shipped to St. Louis in er
11. Other (Specify)

PD 153 Rev 9-5

MATERIAL RETURN AUDITS

All of the MR audits will use the MR Return Inspection Audit Sheet. Errors are to be covered where possible with employees concerned.

1. End of Conveyor Line Audit.
   A. Audit 5 tags daily.
   B. Check tag for stocking location.
   C. Check part(s) with tag for condition, quantity and package condition.
   D. List part number and location on Audit Sheet.
   E. Place entries in C1 through C5 on Daily Audit Sheet.
2. Bulk Check Audit
   A. Audit 2 tags daily.
   B. Check for damage, general salability, quantity and applicable codes.
   C. List part number and location on audit sheet.
   D. Place entries along side B1 and B2 on the Audit Sheet.
3. Factory Audit
   A. Audit 2 tags daily.
   B. Utilize codes on Audit Sheet to indicate out of line conditions found.
   C. List part numbers, stocking parts plant, MR Code and any defects found.
   D. Place entries beside F1 and F2 on Audit Sheet.

4. MR Dock Receipt Audit

   A. Audit one dealer receipt daily.

   B. Compare PC 302 or freight receipt and check sheet for consignee, piece count and condition of freight.

   C. Audit for correct placement of material in cages by dealer and/or racks by GM personnel.

   D. Audit for notation on truck detention sheets, checkers signature and dates. Also MR Dock Receipt Audit. Audit 3 x 5 card for correct dealer name, application number and date.

   E. Write application number and dealer name on Audit Sheet in applicable blocks.

   F. Place entry(s) beside and below (if necessary) "R-1" on the Audit Sheet.

PLANT

MATERIAL RETURN AUDIT

DATE

SUPERVISOR 105

PART NUMBER	MR CODE	STOCKING PARTS PLANT	FILE LOCATION	DEFECT TYPE	OTHER
C1					
C2					
C3					
C4					
C5					
B1					
B2					
F1					
F2					
R1					

DEFECT CODES:

1. Wrong or Omitted Part Number
2. Load Arrangement
3. Unauthorized Package
4. Damaged part
5. Inadequate Packing Protection
6. Date Code on labels don't match
7. Wrong quantity for tag
8. Not GM Part
9. Incomplete or Wrong Destination
10. Certification Requirement
11. Code "S" under $500.00
12. PC 302 & check sheet disagree
13. Checker did not sign
14. No entry on detention sheet
15. 3 X 5 card missing or incomplete
16. Other (specify)

PROCEDURES

TIME STUDY OVERVIEW

In order to correctly identify specific time lost on handling and shipping parts, a time study was performed on each operation. This time would give us the capability of the operation when performed at 100 percent efficiency. Also, when the studies were performed, all material and equipment to perform these operations were made readily available. (This is an important note to remember--due to routes and orders running out of sequence and because all material and equipment are not always available.) These times would help us determine if we needed to reorganize our routes, unloading times, shipping times, breakdown sequence of new material putaway, locations of new material, set up of the interior warehouse, order and delivery time of supplies, and relocation of departments. Time studies were performed by the Corporate Time and Motion Study Engineers. These studies were conducted over a three-week period and the operations were reviewed on both shifts.

All employees being timed were notified in advance and informed that the studies were not being used to eliminate jobs but to make our total operation more effective. The studies would also be used to revamp the warehouse and make any changes necessary in adding or deleting equipment and supplies.

Equipment was also analyzed to make sure it was in proper working order and did not cause unnecessary fatigue on the operators; e.g., flat trucks were checked to make sure they were oiled and greased so wheels did not hang up and cause unnecessary fatigue on employees picking the parts.

Once these studies were completed they, could be used to compare actual times to 100 percent efficient times. These time differences could then be analyzed to see which factors caused the most timely delays or setbacks. Once this information was complied, we could then begin to look at possible solutions to improve the overall efficiency of the plant.

These studies were broken down into five areas. The areas were as follows:

1. Breakdown
2. Putaway
3. Picking
4. Packing
5. Shipping

Also attached is a memo from the Standards Team's findings and areas checked. Included in these findings are the number of lines checked along with areas and a map of area locations.

BREAKDOWN

ROUTING:

X RECEIVING　　EQUIPMENT:　　PDC & PDC#: ST. LOUIS #03

SHIPPING　　TYPE OF PART: EXCESS CUBE　　OPERATION: BREAKDOWN

OTHER　　TIME PER: LINE　　EFFECTIVE DATE: 8/5/88

PROJECT #　　EMPLOYE:　　SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.1933	11.4	10.34
1 GET,PREP CONTAINER		0.00921			
2 CHECK,REMOVE TAGS		0.01383			
3 TRAVEL TO,FROM		0.00345			
4 CLERICAL		0.03099			
5 DUNNAGE		0.01429			
6 REARRANGE		0.00468			
7 ALLOWED DELAY		0.00046			
8 MISC.		0.02036			
9 LOST TIME DUE TO:		0			
10		0			
11		0			
12		0			
13		0			
TOTAL ADDED TIME		0.09727			
SHIFT ALLOWANCE		0.00982	0.10709		
14 GET STK,SORT,DISPOSE		0.00565			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00565			
SHIFT ALLOWANCE		0.00057	0.00622		
				PCS/LINE=	13.86

COMBINED COMPUTED DN & UP TIMES: 0.00622　　OPER. APP.　　PREP. BY:

CONVERTED COMPUTED UP & DN TIMES: ERR　　CK. BY:

ROUTING:

X RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: EXCESS CUBE	OPERATION: BREAKDOWN
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/5/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.0418	26.39	23.92

1 GET,PREP CONTAINER		0.00393		
2 CHECK,REMOVE TAGS		0.00357		
3 TRAVEL TO,FROM		0.00203		
4 CLERICAL		0.00185		
5 DUNNAGE		0.00236		
6 REARRANGE		0.00173		
7 ALLOWED DELAY		0.00014		
8 MISC.		0.00223		
9 LOST TIME DUE TO:		0		
10		0		
11		0		
12		0		
13		0		
	TOTAL ADDED TIME	0.01784		
	SHIFT ALLOWANCE	0.00180	0.01964	
14 GET STK,SORT,DISPOSE		0.00038		
15		0		
16		0		
17		0		
18		0		
19		0		SHIFT ALLOWANCE: 0.10092
20		0		
	TOTAL COMPUTED TIME	0.00038		
	SHIFT ALLOWANCE	0.00004	0.00042	
				PCS/LINE= 52.77

COMBINED COMPUTED DN & UP TIMES: 0.00042 OPER. APP. PREP. BY:

CONVERTED COMPUTED UP & DN TIMES: CK. BY:

PUTAWAY

ROUTING:

X RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: ALL	OPERATION: C/L PUTAWAY
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

COMPLETE OPERATION	OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
				.10187		9.82

ADDED

AREA 1	43.3% x .04624 = .01988	
AREA 2	15.8% x .07603 = .01216	
AREA 3	6.4% x .14438 = .00866	
AREA 4	29.1% x .09697 = .02812	
AREA 5	5.2% x .09750 = .00585	
TOTAL ADDED TIME		.07467

COMPUTED

PCS/LINE			PCS/LINE	
35.80	AREA 1	43.3% x .00066 = .00028	15.39	
20.13	AREA 2	15.8% x .00126 = .00020	3.22	
10.39	AREA 3	6.4% x .00270 = .00017	.62	
29.86	AREA 4	29.1% x .00068 = .00020	8.66	
27.84	AREA 5	5.2% x .00119 = .00007	1.67	
	TOTAL COMPUTED TIME	.00092 x	29.56 =	.02720

TOTAL
PCS/LINE= 29.56

OPER. APP.

ROUTING:

X RECEIVING	EQUIPMENT: HAND CART	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: BINNABLE	OPERATION: C/L P/A AREA 1
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION	NO.	STANDARD	HOURS	PROD	
COMPLETE OPERATION	EMP.	DETAIL	TOTAL	GROSS/HR	NET/HR
	1		0.03987	15.75	14.31
1 GET STOCK		0.00298			
2 PUSH CART		0.01557			
3 TRAVEL		0.006			
4 CHECK (SORT)		0.00442			
5 REARRANGE		0.00108			
6 DISPOSE EMPTY EQUIP		0.00033			
7 RETURN TO LINE		0.00526			
8 CLERICAL		0.00117			
9 DUNNAGE		0.00061			
10 MISC.		0.0022			
11 ALLOWED DELAY		0.00238			
12 LOST TIME DUE TO:		0			
13		0			
TOTAL ADDED TIME		0.04200			
SHIFT ALLOWANCE		0.00424	0.04624		
14 PUTAWAY DOWN		0.0006			
15		0			
16		0			
17 GET & PLACE LADDER		0			
18 PUTAWAY UP		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00060			
SHIFT ALLOWANCE		0.00006	0.00066		
				PCS/LINE= 35.80	

COMBINED COMPUTED DN & UP TIMES: 0.00066 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

X RECEIVING — EQUIPMENT: HAND CART — PDC & PDC#: ST. LOUIS #03
SHIPPING — TYPE OF PART: BINNABLE — OPERATION: C/L P/A AREA 2
OTHER — TIME PER: LINE — EFFECTIVE DATE: 7/20/88
PROJECT # — EMPLOYE: — SHEET #:

OPERATION DESCRIPTION / COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.10139	10.87	9.86
1 GET STOCK		0.00303			
2 PUSH CART		0.03016			
3 TRAVEL		0			
4 CHECK (SORT)		0.00712			
5 REARRANGE		0.00212			
6 DISPOSE EMPTY EQUIP		0			
7 RETURN TO LINE		0.00265			
8 CLERICAL		0.00046			
9 DUNNAGE		0.00155			
10 MISC.		0.01819			
11 ALLOWED DELAY		0.00358			
12 LOST TIME DUE TO:		0			
13		0			
TOTAL ADDED TIME		0.06906			
SHIFT ALLOWANCE		0.00697	0.07603		
14 PUTAWAY DOWN		0.00114			
15		0			
16		0			
17 GET & PLACE LADDER		0			
18 PUTAWAY UP		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00114			
SHIFT ALLOWANCE		0.00012	0.00126		
				PCS/LINE= 20.13	

COMBINED COMPUTED DN & UP TIMES: 0.00126 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

X RECEIVING	EQUIPMENT: TUGGER	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: BULK	OPERATION: C/L P/A AREA 3
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION		NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		1		0.13621	8.08	7.34
1 GET STOCK			0.00614			
2 PUSH CART			0			
3 TRAVEL			0.02926			
4 CKECK (SORT)			0.01417			
5 REARRANGE			0.0034			
6 DISPOSE EMPTY EQUIP			0.00774			
7 RETURN TO LINE			0.00872			
8 CLERICAL			0.00041			
9 DUNNAGE			0.00106			
10 MISC.			0.00794			
11 ALLOWED DELAY			0.00826			
12 LOST TIME DUE TO:			0			
13			0			
	TOTAL ADDED TIME		0.06710			
	SHIFT ALLOWANCE		0.00879	0.09589		
14 PUTAWAY DOWN			0.00423			
	TOTAL DN COMPUTED TIME		0.00423			
	SHIFT ALLOWANCE		0.00043	0.00466		
15 GET & PLACE LADDER			0			
16 PUTAWAY UP			0.00426			
	TOTAL UP COMPUTED TIME		0.00426		SHIFT ALLOWANCE:	0.10092
	SHIFT ALLOWANCE		0.00043	0.00469		

PCS/LINE= 8.63

COMBINED COMPUTED DN & UP TIMES: 0.00467 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.04032

ROUTING:

X RECEIVING	EQUIPMENT: SWING REACH	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: BULK	OPERATION: P/A MSTR. AREA
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.14132	7.79	7.08
1 RIP AND CHECK TAG		0.0058			
2 GET CONTAINER		0.0144			
3 CHECK MASTER		0.00978			
4 PULL MASTER		0.00827			
5 PUTAWAY MASTER		0.0159			
6 RETURN TO LINE		0.00793			
7 TRAVEL TO SUPP.		0.01139			
8 PUTAWAY SUPP.		0			
9 CLERICAL		0.00106			
10 BREAKDOWN		0			
11 ALLOWED DELAY		0.00262			
12 MISC.		0.04317			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.12032			
SHIFT ALLOWANCE		0.01214	0.13246		
14 CONSOLIDATE		0.00066			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00066			
SHIFT ALLOWANCE		0.00007	0.00073		
				PCS/LINE= 12.14	

COMBINED COMPUTED DN & UP TIMES: 0.00073 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

X RECEIVING
SHIPPING
OTHER
PROJECT #

EQUIPMENT: SWING REACH
TYPE OF PART: BULK
TIME PER: LINE
EMPLOYE:

PDC & PDC#: ST. LOUIS #03
OPERATION: P/A SURP.AREA3
EFFECTIVE DATE: 7/20/88
SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.07103	15.5	14.08

1 RIP AND CHECK TAG		0.00445	
2 GET CONTAINER		0.0049	
3 CHECK MASTER		0	
4 PULL MASTER		0	
5 PUTAWAY MASTER		0	
6 RETURN TO LINE		0.0104	
7 TRAVEL TO SUPP.		0.01282	
8 PUTAWAY SUPP.		0.01622	
9 CLERICAL		0.00759	
10 BREAKDOWN		0	
11 ALLOWED DELAY		0.00497	
12 MISC.		0.00317	
13 LOST TIME DUE TO:		0	
	TOTAL ADDED TIME	0.06452	
	SHIFT ALLOWANCE	0.00651	0.07103
14 CONSOLIDATE		0	
15		0	
16		0	
17		0	
18		0	
19		0	
20		0	
	TOTAL COMPUTED TIME	0.00000	
	SHIFT ALLOWANCE	0.00000	0.00000

SHIFT ALLOWANCE: 0.10092

PCS/LINE= 16.23

COMBINED COMPUTED DN & UP TIMES: 0 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING: COMPOSITE

X RECEIVING	EQUIPMENT: SWING REACH	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: BULK	OPERATION: P/A AREA 3
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		.20171		4.96

ADDED

MASTER	15% x .13246 = .01987	
SURPLUS	85% x .07103 = .06038	
SURPLUS TO MASTER	85% x .03246 = .11260	
TOTAL ADDED		.19285

COMPUTED

PCS/LINE			PCS/LINE	
12.14	MASTER	15% x .00073 = .00011	1.82	
16.23	SURPLUS	85% x .00000 = .00000	0.00	
12.14	SURPLUS TO MASTER	85% x .00073 = .00062	10.32	
	TOTAL COMPUTED	.00073 x 12.14		= .00886

TOTAL
PCS/LINE= 12.14

OPER. APP.

ROUTING: COMPOSITE

X RECEIVING	EQUIPMENT: S/R & TUGGER	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: BULK	OPERATION: P/A AREA 3
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

COMPLETE OPERATION / OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
			.17243		5.80

ADDED

SWING REACH	50% x .19265 = .09643		
TUGGER	50% x .09589 = .04795		
TOTAL ADDED			.14438

COMPUTED

PCS/LINE			PCS/LINE	
12.14	SWING REACH	50% x .00073 = .00037	6.07	
9.63	TUGGER	50% x .00467 = .00233	4.32	
TOTAL COMPUTED		.00270 x 10.39		= .02805

TOTAL
PCS/LINE= 10.39

OPER. APP.

ROUTING:

X RECEIVING	EQUIPMENT: TUGGER	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: SEMI-BULK	OPERATION: C/L P/A AREA 4
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.09417	11.69	10.62
1 GET STOCK		0.00774			
2 PUSH CART		0			
3 TRAVEL		0.01906			
4 CHECK (SORT)		0.01036			
5 REARRANGE		0.00161			
6 DISPOSE EMPTY EQUIP		0.00251			
7 RETURN TO LINE		0.00836			
8 CLERICAL		0.00029			
9 DUNNAGE		0.00145			
10 MISC.		0.0023			
11 ALLOWED DELAY		0.00728			
12 LOST TIME DUE TO:		0			
13		0			
TOTAL ADDED TIME		0.06098			
SHIFT ALLOWANCE		0.00615	0.06713		
14 PUTAWAY DOWN		0.00092			
TOTAL DN COMPUTED TIME		0.00092			
SHIFT ALLOWANCE		0.00009	0.00101		
15 GET & PLACE LADDER		0			
16 PUTAWAY UP		0.00108			
TOTAL UP COMPUTED TIME		0.00108		SHIFT ALLOWANCE:	0.10092
SHIFT ALLOWANCE		0.00011	0.00119		

PCS/LINE= 24.3

COMBINED COMPUTED DN & UP TIMES: 0.00111 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.02704

ROUTING:

X RECEIVING	EQUIPMENT: SCISSOR TRUCK	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: SEMI-BULK	OPERATION: P/A MSTR. AREA
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.09576	11.49	10.44
1 RIP AND CHECK TAG		0.00379			
2 GET CONTAINER		0.00665			
3 CHECK MASTER		0			
4 PULL MASTER		0.02023			
5 PUTAWAY MASTER		0.00729			
6 RETURN TO LINE		0.00905			
7 TRAVEL TO SUPP.		0.01161			
8 PUTAWAY SUPP.		0			
9 CLERICAL		0			
10 BREAKDOWN		0			
11 ALLOWED DELAY		0.00279			
12 MISC.		0.01785			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.07926			
SHIFT ALLOWANCE		0.00800	0.08726		
14 CONSOLIDATE		0.00022			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00022			
SHIFT ALLOWANCE		0.00002	0.00024		
				PCS/LINE= 35.42	

COMBINED COMPUTED DN & UP TIMES: 0.00024 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

X RECEIVING
SHIPPING
OTHER
PROJECT #

EQUIPMENT: SCISSOR TRUCK
TYPE OF PART: SEMI-BULK
TIME PER: LINE
EMPLOYE:

PDC & PDC#: ST. LOUIS #03
OPERATION: P/A SURP. AREA
EFFECTIVE DATE: 7/20/88
SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.04651	23.67	21.50
1 RIP AND CHECK TAG		0.004			
2 GET CONTAINER		0.00541			
3 CHECK MASTER		0			
4 PULL MASTER		0			
5 PUTAWAY MASTER		0			
6 RETURN TO LINE		0.00584			
7 TRAVEL TO SUPP.		0.00478			
8 PUTAWAY SUPP.		0.00829			
9 CLERICAL		0.00926			
10 BREAKDOWN		0			
11 ALLOWED DELAY		0.00224			
12 MISC.		0.00243			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.04225			
SHIFT ALLOWANCE		0.00426	0.04651		
14 CONSOLIDATE		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00000			
SHIFT ALLOWANCE		0.00000	0.00000		
				PCS/LINE= 46.26	

COMBINED COMPUTED DN & UP TIMES: 0 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING: COMPOSITE

X RECEIVING	EQUIPMENT: SCISSOR TRUCK	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: SEMI-BULK	OPERATION: P/A AREA 4
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	1		.13529		7.39

ADDED

MASTER	15% x .08726 = .01309	
SURPLUS	85% x .04651 = .03953	
SURPLUS TO MASTER	85% x .08726 = .07417	
TOTAL ADDED		.12679

COMPUTED

PCS/LINE			PCS/LINE	
35.42	MASTER	15% x .00024 = .00004	5.31	
46.26	SURPLUS	85% x .00000 = .00000	0.00	
35.42	SURPLUS TO MASTER	85% x .00024 = .00020	30.11	
	TOTAL COMPUTED		.00024 x 35.42	= .00850

TOTAL
PCS/LINE= 35.42

OPER. APP.

ROUTING:

X RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: SEMI-BULK	OPERATION: P/A AREA 4
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		.11727		8.53

ADDED

SCISSOR TRUCK 50% x .12679 = .06340

TUGGER 50% x .06713 = .03357

TOTAL ADDED .09697

COMPUTED

PCS/LINE			PCS/LINE
35.42	SCISSOR TRUCK	50% x .00024 = .00012	17.71
24.30	TUGGER	50% x .00111 = .00056	12.15

TOTAL COMPUTED .00068 x 29.86 = .02030

TOTAL
PCS/LINE= 29.86

OPER. APP.

ROUTING:

X RECEIVING	EQUIPMENT: HAND CART	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: MLDG.	OPERATION: C/L P/A AREA 5
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/20/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.13063	8.43	7.66

1 GET STOCK	0.00682			
2 PUSH CART	0.02597			
3 TRAVEL	0.00101			
4 CHECK (SORT)	0.01101			
5 REARRANGE	0.00116			
6 DISPOSE EMPTY EQUIP	0.00124			
7 RETURN TO LINE	0.01329			
8 CLERICAL	0.00037			
9 DUNNAGE	0.00767			
10 MISC.	0.00132			
11 ALLOWED DELAY	0.0187			
12 LOST TIME DUE TO:	0			
13	0			
TOTAL ADDED TIME	0.08856			
SHIFT ALLOWANCE	0.00894	0.0975		
14 PUTAWAY DOWN	0.00108			
15	0			
16	0			
17 GET & PLACE LADDER	0			
18 PUTAWAY UP	0			
19	0		SHIFT ALLOWANCE:	0.10092
20	0			
TOTAL COMPUTED TIME	0.00108			
SHIFT ALLOWANCE	0.00011	0.00119		
			PCS/LINE= 27.84	

COMBINED COMPUTED DN & UP TIMES: 0.00119 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

PICKING

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PICK PREP-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.00163	675.68	613.50
1 GET ORDERS		0.00022			
2 GO TO BENCH		0.00014			
3 REVIEW TAGS		0.00017			
4 CLERICAL		0.00031			
5 GET FLAT		0.00009			
6 GET & FORM CARTONS		0			
7 GET TOTES		0.00025			
8 TRAVEL TO 1ST LOC.		0.00026			
9 MISC.		0.00004			
10 ALLOWED DELAY		0			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
14		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.00148			
SHIFT ALLOWANCE		0.00015	0.00163	TOTAL PCS/LINE= 2.69	

COMBINED COMPUTED DN & UP TIMES: 0 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION:	PICK PREP-SHT.
OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/3/88
PROJECT #	EMPLOYE:	SHEET #:	1

COMPLET OPERATION	OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		1		0.00312	353.36	320.51
1 GET ORDERS			0.00032			
2 GO TO BENCH			0.00015			
3 REVIEW TAGS			0.0006			
4 CLERICAL			0.0009			
5 GET FLAT			0.0002			
6 GET & FORM CARTONS			0.00003			
7 GET TOTES			0.00021			
8 TRAVEL TO 1ST LOC.			0.0003			
9 MISC.			0.00012			
10 ALLOWED DELAY			0			
11 LOST TIME DUE TO:			0			
12			0			
13			0			
14			0			
15			0			
16			0			
17			0			
18			0			
19			0		SHIFT ALLOWANCE:	0.10092
20			0			
	TOTAL ELEMENT TIME		0.00283			
	SHIFT ALLOWANCE		0.00029	0.00312	TOTAL	
					PCS/LINE= 2.09	

COMBINED COMPUTED DN & UP TIMES: 0 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: BINABLE	OPERATION: PICK AREA1-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #S-15-85	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01067	103.2	93.72
1 PUSH CART		0.00241			
2 RIP TAG		0.00089			
3 TRAVEL CART TO BIN		0.00108			
4 TRAVEL BIN TO BIN		0.0006			
5 TRAVEL BIN TO CART		0.00058			
6 REARRANGE		0.00034			
7 LOOK FOR STOCK		0.0002			
8 CLERICAL		0.0002			
9 MISC.		0.00027			
10 ALLOWED DELAY		0.00005			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
TOTAL ADDED TIME		0.00662			
SHIFT ALLOWANCE		0.00067	0.00729		
14 PICK & TAG DOWN		0.0012			
15		0			
16		0			
17 GET & PLACE LADDER		0			
18 PICK & TAG UP		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00120			
SHIFT ALLOWANCE		0.00012	0.00132		
				PCS/LINE= 2.56	

COMBINED COMPUTED DN & UP TIMES: 0.00132 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: BINABLE	OPERATION: PICK AREA1-SHT.
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

COMPLETE OPERATION	OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		1		0.01664	66.18	60.10
1 PUSH CART			0.00476			
2 RIP TAG			0.00226			
3 TRAVEL CART TO BIN			0.00218			
4 TRAVEL BIN TO BIN			0.0002			
5 TRAVEL BIN TO CART			0.00164			
6 REARRANGE			0.00032			
7 LOOK FOR STOCK			0.00017			
8 CLERICAL			0.0001			
9 MISC.			0.00014			
10 ALLOWED DELAY			0.00077			
11 LOST TIME DUE TO:			0			
12			0			
13			0			
	TOTAL ADDED TIME		0.01254			
	SHIFT ALLOWANCE		0.00127	0.01381		
14 PICK & TAG DOWN			0.00107			
15			0			
16			0			
17 GET & PLACE LADDER			0			
18 PICK & TAG UP			0			
19			0		SHIFT ALLOWANCE:	0.10092
20			0			
	TOTAL COMPUTED TIME		0.00107			
	SHIFT ALLOWANCE		0.00011	0.00118	TOTAL	
					PCS/LINE= 2.40	

COMBINED COMPUTED DN & UP TIMES: 0.00118 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT: ELEVATOR	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: BINABLE(MEZZ)	OPERATION:	PICK AREA2-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88	
PROJECT #S-15-85	EMPLOYE:	SHEET #:	1

COMPLETE OPERATION	OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		1		0.01523	72.31	65.66
1 PUSH CART			0.00281			
2 RIP TAG			0.00091			
3 TRAVEL CART TO BIN			0.00148			
4 TRAVEL BIN TO BIN			0.00078			
5 TRAVEL BIN TO CART			0.00101			
6 REARRANGE			0.00014			
7 LOOK FOR STOCK			0.00012			
8 CLERICAL			0.00013			
9 MISC.			0.00045			
10 ALLOWED DELAY			0.00204			
11 LOST TIME DUE TO:			0			
12			0			
13			0			
	TOTAL ADDED TIME		0.00987			
	SHIFT ALLOWANCE		0.00100	0.01087		
14 PICK & TAG DOWN			0.0022			
15			0			
16			0			
17 GET & PLACE LADDER			0			
18 PICK & TAG UP			0			
19			0		SHIFT ALLOWANCE:	0.10092
20			0			
	TOTAL COMPUTED TIME		0.00220			
	SHIFT ALLOWANCE		0.00022	0.00242		
					PCS/LINE= 1.80	

COMBINED COMPUTED DN & UP TIMES: 0.00242 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT: ELEVATOR	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: BINABLE(MEZZ)	OPERATION: PICK AREA2-SHT.
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	1		0.02487	44.27	40.21
1 PUSH CART		0.00587			
2 RIP TAG		0.00107			
3 TRAVEL CART TO BIN		0.0028			
4 TRAVEL BIN TO BIN		0.00067			
5 TRAVEL BIN TO CART		0.00249			
6 REARRANGE		0			
7 LOOK FOR STOCK		0.00007			
8 CLERICAL		0			
9 MISC.		0.00029			
10 ALLOWED DELAY		0.00092			
11 USE ELEVATOR		0.00418			
12		0			
13		0			
TOTAL ADDED TIME		0.01836			
SHIFT ALLOWANCE		0.00185	0.02021		
14 PICK & TAG DOWN		0.00168			
15		0			
16		0			
17 GET & PLACE LADDER		0			
18 PICK & TAG UP		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00168			
SHIFT ALLOWANCE		0.00017	0.00185	TOTAL PCS/LINE= 2.52	

COMBINED COMPUTED DN & UP TIMES: 0.00185 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: SHEET METAL	OPERATION: PICK AREA3-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #S-15-85	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION		NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR		
		1		0.04079	26.99	24.52		
1 PUSH CART			0.02293					
2 RIP TAG			0.00112					
3 TRAVEL CART TO BIN			0.0025					
4 TRAVEL BIN TO BIN			0.00006					
5 TRAVEL BIN TO CART			0.0022					
6 REARRANGE			0.00175					
7 LOOK FOR STOCK			0.00017					
8 CLERICAL			0					
9 MISC.			0.00095					
10 ALLOWED DELAY			0.00047					
11 LOST TIME DUE TO:			0					
12			0					
13			0					
	TOTAL ADDED TIME		0.03215					
	SHIFT ALLOWANCE		0.00324	0.03539				
14 PICK & TAG DOWN			0.00372					
	TOTAL DN COMPUTED TIME		0.00372					
	SHIFT ALLOWANCE		0.00038	0.0041				
15 GET & PLACE LADDER			0					
16 PICK & TAG UP			0.00611					
	TOTAL UP COMPUTED TIME		0.00611				SHIFT ALLOWANCE:	0.10092
	SHIFT ALLOWANCE		0.00062	0.00673				

PCS/LINE= 1.11

COMBINED COMPUTED DN & UP TIMES: 0.00488 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: 0.0054

ROUTING:

	RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X	SHIPPING	TYPE OF PART: SHEET METAL	OPERATION:	PICK AREA3-SHT.
	OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/3/88
	PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	1		0.04729	23.28	21.15
1 PUSH CART		0.02823			
2 RIP TAG		0.00241			
3 TRAVEL CART TO BIN		0.00082			
4 TRAVEL BIN TO BIN		0			
5 TRAVEL BIN TO CART		0.00057			
6 REARRANGE		0.00127			
7 LOOK FOR STOCK		0.00038			
8 CLERICAL		0.00009			
9 MISC.		0.00147			
10 ALLOWED DELAY		0.00251			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
TOTAL ADDED TIME		0.03775			
SHIFT ALLOWANCE		0.00381	0.04156		
14 PICK & TAG DOWN		0.00473			
TOTAL DN COMPUTED TIME		0.00473			
SHIFT ALLOWANCE		0.00048	0.00521		
15 GET & PLACE LADDER		0			
16 PICK & TAG UP		0.00566			
TOTAL UP COMPUTED TIME		0.00566		SHIFT ALLOWANCE:	0.10092
SHIFT ALLOWANCE		0.00057	0.00623		
				TOTAL PCS/LINE= 1.02	

COMBINED COMPUTED DN & UP TIMES: 0.0056 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.00573

ROUTING:

RECEIVING	EQUIPMENT: TUGGER (PAD)	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: BULK	OPERATION: PICK TUG. AREA3
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.07569	14.55	13.21
1 DRIVE		0.02964			
2 WALK		0.00546			
3 DISPOSE		0.00087			
4 LABEL		0.0045			
5 LOOK		0.00083			
6 WIRE TAG		0			
7 CLERICAL		0.00456			
8 REVIEW TAGS		0.0039			
9 REARRANGE		0.00145			
10 MISCELLANEOUS		0.00513			
11 ALLOWED DELAY		0.00412			
12 LOST TIME DUE TO:		0			
13		0			
TOTAL ADDED TIME		0.06046			
SHIFT ALLOWANCE		0.00610	0.06656		
14 PICK & TAG DOWN		0.00521			
TOTAL DN COMPUTED TIME		0.00521			
SHIFT ALLOWANCE		0.00053	0.00574		
15 GET & PLACE LADDER		0			
16 PICK & TAG UP		0.00512			
TOTAL UP COMPUTED TIME		0.00512		SHIFT ALLOWANCE:	0.10092
SHIFT ALLOWANCE		0.00052	0.00564		

PCS/LINE= 1.6

COMBINED COMPUTED DN & UP TIMES: 0.00571 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: 0.00913

ROUTING: PIKPD3

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: SHEET METAL	OPERATION: PICK PAD AREA3
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.05383		18.50

ADDED

MANUAL 62% x .03539 = .02194
TUGGER 38% x .06656 = .02529
TOTAL ADDED TIME .04723

COMPUTED

PCS/LINE			PCS/LINE
.11 MANUAL	62% x (.00288 + .00200) =	.00303	.74
1.60 TUGGER	38% x (.00409 + .00162) =	.00217	.53
TOTAL COMPUTED TIME		.00520	x 1.27 =
			.00660

TOTAL
PCS/LINE= 1.27

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: SEMI BULK	OPERATION: PICK AREA4-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #S-15-85	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01571	70.08	63.65
1 PUSH CART		0.00524			
2 RIP TAG		0.00114			
3 TRAVEL CART TO BIN		0.00149			
4 TRAVEL BIN TO BIN		0.00013			
5 TRAVEL BIN TO CART		0.00153			
6 REARRANGE		0.00145			
7 LOOK FOR STOCK		0.0001			
8 CLERICAL		0.00004			
9 MISC.		0.00075			
10 ALLOWED DELAY		0.00022			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
TOTAL ADDED TIME		0.01209			
SHIFT ALLOWANCE		0.00122	0.01331		
14 PICK & TAG DOWN		0.00135			
TOTAL DN COMPUTED TIME		0.00135			
SHIFT ALLOWANCE		0.00014	0.00149		
15 GET & PLACE LADDER		0			
16 PICK & TAG UP		0.00133			
TOTAL UP COMPUTED TIME		0.00133		SHIFT ALLOWANCE:	0.10092
SHIFT ALLOWANCE		0.00013	0.00146		

PCS/LINE= 1.63

COMBINED COMPUTED DN & UP TIMES: 0.00147 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.0024

ROUTING:

RECEIVING	EQUIPMENT: FLAT TRUCK	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: SEMI BULK	OPERATION: PICK AREA4-SHT.
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION / COMPLETE OPERATION		NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		1		0.02863	38.45	34.93
1 PUSH CART			0.01629			
2 RIP TAG			0.00073			
3 TRAVEL CART TO BIN			0.00231			
4 TRAVEL BIN TO BIN			0.00029			
5 TRAVEL BIN TO CART			0.0028			
6 REARRANGE			0.0013			
7 LOOK FOR STOCK			0.00003			
8 CLERICAL			0			
9 MISC.			0.00035			
10 ALLOWED DELAY			0.00012			
11 LOST TIME DUE TO:			0			
12			0			
13			0			
	TOTAL ADDED TIME		0.02422			
	SHIFT ALLOWANCE		0.00244	0.02666		
14 PICK & TAG DOWN			0.00117			
	TOTAL DN COMPUTED TIME		0.00117			
	SHIFT ALLOWANCE		0.00012	0.00129		
15 GET & PLACE LADDER			0			
16 PICK & TAG UP			0.00142			
	TOTAL UP COMPUTED TIME		0.00142		SHIFT ALLOWANCE:	0.10092
	SHIFT ALLOWANCE		0.00014	0.00156		
					TOTAL PCS/LINE= 1.35	

COMBINED COMPUTED DN & UP TIMES: 0.0014 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.00197

ROUTING:

RECEIVING	EQUIPMENT: TUGGER/CAGE	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: 54'S	OPERATION:	PICK TUG/CAGE
OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/3/88
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	1		0.01446	76.16	69.16
1 GET TUGGER		0.00007			
2 GET TRAILER		0.00009			
3 LOAD/PREP CAGE		0.00047			
4 GET ORDER		0.00006			
5 DRIVE		0.00476			
6 REARRANGE		0.00182			
7 CLOSE/LABEL CAGE		0.00037			
8 CLERICAL		0.00078			
9 UNLOAD CAGE		0.00014			
10 WALK		0.00117			
11 MISC.		0.0005			
12 ALLWD. DELAY		0.00011			
13		0			
TOTAL ADDED TIME		0.01034			
SHIFT ALLOWANCE		0.00104	0.01138		
14 PICK DOWN		0.00174			
TOTAL DN COMPUTED TIME		0.00174			
SHIFT ALLOWANCE		0.00018	0.00192		
15 PICK UP		0.00189			
16		0			
TOTAL UP COMPUTED TIME		0.00189		SHIFT ALLOWANCE:	0.10092
SHIFT ALLOWANCE		0.00019	0.00208		

PCS/LINE= 1.53

COMBINED COMPUTED DN & UP TIMES: 0.00201 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.00308

ROUTING: PIKPAD4

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: SEMI BULK	OPERATION:	PICK PAD AREA4
OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/3/88
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
COMPLETE OPERATION					
	1		0.01561		64.06

ADDED

MANUAL 92% x .01331 = .01225
TUGGER 8% x .01138 = .00091
TOTAL ADDED TIME .01316

COMPUTED

PCS/LINE			PCS/LINE
.63 MANUAL	92% x (.00067 + .00080) =	.00135	1.46
1.53 TUGGER	8% x (.00085 + .00115) =	.00016	.16
TOTAL COMPUTED TIME		.00151	x 1.62 =
			.00245

TOTAL ADDED TIME
SHIFT ALLOWANCE

TOTAL
PCS/LINE= 1.62

ROUTING:

RECEIVING	EQUIPMENT: 54" BASKET	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: MOLDINGS	OPERATION: PICK MLD-PD/54
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.016	68.82	62.50
1 PUSH CART		0.00513			
2 RIP TAG		0.00081			
3 TRAVEL CART TO BIN		0.00139			
4 TRAVEL BIN TO BIN		0.00051			
5 TRAVEL BIN TO CART		0.00137			
6 REARRANGE		0.00053			
7 LOOK FOR STOCK		0.00018			
8 CLERICAL		0.00002			
9 MISC.		0.00018			
10 ALLOWED DELAY		0.00074			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
TOTAL ADDED TIME		0.01086			
SHIFT ALLOWANCE		0.00110	0.01196		
14 PICK & TAG DOWN		0.0017			
TOTAL DN COMPUTED TIME		0.0017			
SHIFT ALLOWANCE		0.00017	0.00187		
15 GET & PLACE LADDER		0			
16 PICK & TAG UP		0.00156			
TOTAL UP COMPUTED TIME		0.00156		SHIFT ALLOWANCE:	0.10092
SHIFT ALLOWANCE		0.00016	0.00172		

PCS/LINE= 2.24

COMBINED COMPUTED DN & UP TIMES: 0.00181 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.00404

ROUTING:

RECEIVING	EQUIPMENT: ADJ. RACKS	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: MOLDINGS	OPERATION: PICK MLD-PD/ADJ
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01534	71.79	65.19
1 PUSH CART		0.00233			
2 RIP TAG		0.00072			
3 TRAVEL CART TO BIN		0.00244			
4 TRAVEL BIN TO BIN		0.00183			
5 TRAVEL BIN TO CART		0.00207			
6 REARRANGE		0.00042			
7 LOOK FOR STOCK		0.00063			
8 CLERICAL		0			
9 MISC.		0.00011			
10 ALLOWED DELAY		0.00001			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
TOTAL ADDED TIME		0.01056			
SHIFT ALLOWANCE		0.00107	0.01163		
14 PICK & TAG DOWN		0.00202			
15		0			
16		0			
17 GET & PLACE LADDER		0			
18 PICK & TAG UP		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00202			
SHIFT ALLOWANCE		0.00020	0.00222		
				PCS/LINE= 1.67	

COMBINED COMPUTED DN & UP TIMES: 0.00222 OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT: 54" BASKET	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: MOLDINGS	OPERATION:	PICK MLD-ST/54
OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/3/88
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION		NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
COMPLETE OPERATION		1		0.01651	66.67	60.57
1 PUSH CART			0.00678			
2 RIP TAG			0.00064			
3 TRAVEL CART TO BIN			0.00204			
4 TRAVEL BIN TO BIN			0.00034			
5 TRAVEL BIN TO CART			0.0018			
6 REARRANGE			0.0003			
7 LOOK FOR STOCK			0.00037			
8 CLERICAL			0			
9 MISC.			0.00013			
10 ALLOWED DELAY			0.00011			
11 LOST TIME DUE TO:			0			
12			0			
13			0			
	TOTAL ADDED TIME		0.01251			
	SHIFT ALLOWANCE		0.00126	0.01377		
14 PICK & TAG DOWN			0.0025			
	TOTAL DN COMPUTED TIME		0.0025			
	SHIFT ALLOWANCE		0.00025	0.00275		
15 GET & PLACE LADDER			0			
16 PICK & TAG UP			0.00123			
	TOTAL UP COMPUTED TIME		0.00123		SHIFT ALLOWANCE:	0.10092
	SHIFT ALLOWANCE		0.00012	0.00135		

PCS/LINE= 1.37

COMBINED COMPUTED DN & UP TIMES: 0.00201 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: 0.00274

ROUTING:

RECEIVING	EQUIPMENT: ADJ. RACKS	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: MOLDINGS	OPERATION: PICK MLD-ST/ADJ
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01333	82.51	75.02
1 PUSH CART		0.00232			
2 RIP TAG		0.00036			
3 TRAVEL CART TO BIN		0.00309			
4 TRAVEL BIN TO BIN		0.00112			
5 TRAVEL BIN TO CART		0.00246			
6 REARRANGE		0.00013			
7 LOOK FOR STOCK		0.00022			
8 CLERICAL		0			
9 MISC.		0.0001			
10 ALLOWED DELAY		0.00005			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
TOTAL ADDED TIME		0.00985			
SHIFT ALLOWANCE		0.00099	0.01084		
14 PICK & TAG DOWN		0.00713			
15		0			
16		0			
17 GET & PLACE LADDER		0			
18 PICK & TAG UP		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00173			
SHIFT ALLOWANCE		0.00017	0.00190		
				PCS/LINE= 1.31	

COMBINED COMPUTED DN & UP TIMES: 0.0019 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING: PIKSHT5

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: MOLDING	OPERATION:	PICK SHT AREAS
OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/3/88
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01453		68.82

ADDED

54" BASKET 38% x .01377 = .00523
ADJ. RACKS 62% X .00672 = .02529
TOTAL ADDED TIME .01195

COMPUTED

PCS/LINE				PCS/LINE
1.87	54" BASKET	38% x (.00130 + .00071) =	.00076	.52
.31	ADJ. RACKS	62% x .00190 =	.00118	.81
TOTAL COMPUTED TIME			.00194	x 1.33 = 0.00258

TOTAL
PCS/LINE= 1.33

OPER. APP.

ROUTING: PIKPADS

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: MOLDING	OPERATION: PICK PAD AREAS
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01566		63.86

ADDED

54' BASKET 38% x .01196 = .00454
ADJ. RACKS 62% X .01163 = .00721
TOTAL ADDED TIME .01175

COMPUTED

PCS/LINE				PCS/LINE
.24	54' BASKET	38% x (.00100 + .00071) =	.00069	.85
1.67	ADJ. RACKS	62% x .00222 =	.00138	1.04
	TOTAL COMPUTED TIME		.00207	x 1.89 = 0.00391

TOTAL
PCS/LINE= 1.89

OPER. APP.

ROUTING:

RECEIVING	EQUIPMENT: FORK TRUCK	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ENG./TRANS.	OPERATION: PICK AREA 6
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.05577	19.74	17.93
1 LOOK/VERIFY LOC.		0.00382			
2 REARRANGE		0.00197			
3 TRAVEL TIME		0.02029			
4 DISPOSE OF BULK MOD.		0			
5 CLERICAL		0.00008			
6 MISC.-WAIT		0.00021			
7 MISC.		0.00229			
8 ALLOWED DELAY		0.00244			
9 LOST TIME DUE TO:		0			
10		0			
11		0			
12		0			
13		0			
TOTAL ADDED TIME		0.03110			
SHIFT ALLOWANCE		0.00314	0.03424		
14 PICK & DISPOSE		0.00928			
15 LABEL		0.01028			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.01956			
SHIFT ALLOWANCE		0.00197	0.02153	TOTAL PCS/LINE= 1.00	

COMBINED COMPUTED DN & UP TIMES: 0.01022 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING: PIKPADCP

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PICK PAD CMPST
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.0177		56.50

ADDED

AREA 1	43.3% x .00729 = .00316		
AREA 2	15.8% x .01087 = .00172		
AREA 3	6.4% x .04723 = .00302		
AREA 4	29.1% x .01316 = .00383		
AREA 5	5.2% x .01175 = .00061		
PICK PREP	.00163		
	TOTAL ADDED TIME	.01397	0.01397

COMPUTED

PCS/LINE			PCS/LINE	
2.56	AREA 1	43.3% x .00132 = .00057	1.11	
1.80	AREA 2	15.8% x .00242 = .00038	0.28	
1.27	AREA 3	6.4% x .00520 = .00033	0.08	
1.62	AREA 4	29.1% x .00151 = .00044	0.47	
1.89	AREA 5	5.2% x .00207 = .00011	0.10	
	TOTAL COMPUTED TIME	.00183	2.04 =	0.00373

TOTAL
PCS/LINE= 2.04

OPER. APP.

ROUTING: PIKSHALL

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: SHORT ORDER	OPERATION: PICK SHORT ALL
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.02675		37.38

ADDED

AREA 1	43.3% x .01381 =	.00598
AREA 2	15.8% x .02021 =	.00319
AREA 3	6.4% x .04156 =	.00266
AREA 4	29.1% x .02666 =	.00776
AREA 5	5.2% x .01195 =	.00062
AREA 6	.2% x .03424 =	.00007
PICK PREP		.00312
	TOTAL ADDED TIME	.02340

COMPUTED

PCS/LINE				PCS/LINE
2.40	AREA 1	43.3% x .00118 = .00051		1.04
2.52	AREA 2	15.8% x .00185 = .00029		0.40
1.02	AREA 3	6.4% x (.00324 + .00235) =	.00036	0.07
1.35	AREA 4	29.1% x (.00078 + .00061) =	.00040	0.39
1.33	AREA 5	5.2% x .00194 = .00010		0.07
1.00	AREA 6	.2% x .02153 = .00004		0.00
	TOTAL COMPUTED TIME		.00170	x 1.97 = 0.00335

TOTAL
PCS/LINE= 1.97

OPER. APP.

ROUTING: PIKALLCP

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PICK COMPOSIT
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/3/88
PROJECT #	EMPLOYE:	SHEET #: 1

COMPLETE OPERATION / OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.02098		47.66

ADDED

PICK PAD 63.8% x .01397 = .00891
PICK SHORT 36.2% x .02340 = .00847
TOTAL ADDED TIME 0.01738

COMPUTED

PCS/LINE			PCS/LINE	
2.04	PICK PAD	63.8% x .00183 = .00117	1.30	
1.97	PICK SHORT	36.2% x .00170 = .00062	.71	
TOTAL COMPUTED TIME		.00179 x	2.01 =	0.0036

TOTAL
PCS/LINE= 2.01

PACKING

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PACK RPD-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/28/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01028	107.07	97.28
1 GET STOCK		0.0001			
2 GET/FORM CARTON		0.00075			
3 CHECK		0.00017			
4 DUNNAGE		0.00003			
5 CLERICAL		0.00173			
6 CLOSE CARTON		0.0007			
7 LABEL		0.00054			
8 DISPOSE OF STOCK		0.00011			
9 TRAVEL/DOCK		0.00029			
10 B.O./NES.		0.00044			
11 MISC.		0.00172			
12 ALLOWED DELAY		0.00204			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.00862			
SHIFT ALLOWANCE		0.00087	0.00949		
14 PACK/CONSOLIDATE		0.00038			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00038			
SHIFT ALLOWANCE		0.00004	0.00042		
				PCS/LINE= 1.89	

COMBINED COMPUTED DN & UP TIMES: 0.00042 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PACK RPD-SHORT
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/28/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01566	70.27	63.86
1 GET STOCK		0.00009			
2 GET/FORM CARTON		0.00257			
3 CHECK		0.00045			
4 DUNNAGE		0.00002			
5 CLERICAL		0.00336			
6 CLOSE CARTON		0.00128			
7 LABEL		0.00104			
8 DISPOSE OF STOCK		0.0002			
9 TRAVEL/DOCK		0.00042			
10 B.O./NES.		0.002			
11 MISC.		0.0011			
12 ALLOWED DELAY		0.00114			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.01367			
SHIFT ALLOWANCE		0.00138	0.01505		
14 PACK/CONSOLIDATE		0.00022			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00022			
SHIFT ALLOWANCE		0.00002	0.00024		
				PCS/LINE= 2.53	

COMBINED COMPUTED DN & UP TIMES: 0.00024 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT: CAGES	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION:	PACK RPD-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE:	7/28/88
PROJECT #	EMPLOYE:	SHEET #:	1

COMPLETE OPERATION	OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		1		0.00496	222.22	201.61
1 GET STOCK			0.0006			
2 GET/FORM CARTON			0.00024			
3 CHECK			0.00013			
4 DUNNAGE			0.00001			
5 CLERICAL			0.00086			
6 CLOSE CARTON			0.00021			
7 LABEL			0.00009			
8 DISPOSE OF STOCK			0.00002			
9 TRAVEL/DOCK			0.00011			
10 B.O./NES.			0.00013			
11 MISC.			0.00087			
12 ALLOWED DELAY			0.00064			
13 LOST TIME DUE TO:			0			
	TOTAL ADDED TIME		0.00391			
	SHIFT ALLOWANCE		0.00039	0.0043		
14 PACK/CONSOLIDATE			0.00029			
15			0			
16			0			
17			0			
18			0			
19			0		SHIFT ALLOWANCE:	0.10092
20			0			
	TOTAL COMPUTED TIME		0.00029			
	SHIFT ALLOWANCE		0.00003	0.00032		
					PCS/LINE= 2.05	

COMBINED COMPUTED DN & UP TIMES: 0.00032 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PACK COMM.-PAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/28/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
COMPLETE OPERATION					
	1		0.00895	123	111.73
1 GET STOCK		0.00038			
2 GET/FORM CARTON		0.00122			
3 CHECK		0.00027			
4 DUNNAGE		0.00004			
5 CLERICAL		0.00211			
6 CLOSE CARTON		0.00086			
7 LABEL		0.00064			
8 DISPOSE OF STOCK		0.00039			
9 TRAVEL/DOCK		0.00016			
10 B.O./NES.		0.00001			
11 MISC.		0.00112			
12 ALLOWED DELAY		0.00027			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.00747			
SHIFT ALLOWANCE		0.00075	0.00822		
14 PACK/CONSOLIDATE		0.00047			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00047			
SHIFT ALLOWANCE		0.00005	0.00052		
				PCS/LINE= 1.40	

COMBINED COMPUTED DN & UP TIMES: 0.00052 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: PACK COMM-SHORT
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/26/88
PROJECT #	EMPLOYE:	SHEET #: 1

COMPLETE OPERATION / OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.02209	49.8	45.27
1 GET STOCK		0.00059			
2 GET/FORM CARTON		0.00149			
3 CHECK		0.0011			
4 DUNNAGE		0.00008			
5 CLERICAL		0.0086			
6 CLOSE CARTON		0.00113			
7 LABEL		0.00137			
8 DISPOSE OF STOCK		0.00034			
9 TRAVEL/DOCK		0.00051			
10 B.O./NES.		0			
11 MISC.		0.00234			
12 ALLOWED DELAY		0.00091			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.01846			
SHIFT ALLOWANCE		0.00166	0.02032		
14 PACK/CONSOLIDATE		0.00093			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00093			
SHIFT ALLOWANCE		0.00009	0.00102		
				PCS/LINE= 1.74	

COMBINED COMPUTED DN & UP TIMES: 0.00102 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION:	PACK CHICAGO
OTHER	TIME PER: LINE	EFFECTIVE DATE:	7/28/88
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.04225	26.06	23.67
1 GET STOCK		0.00223			
2 GET/FORM CARTON		0.00685			
3 CHECK		0.00247			
4 DUNNAGE		0.00013			
5 CLERICAL		0.01188			
6 CLOSE CARTON		0.00274			
7 LABEL		0.00215			
8 DISPOSE OF STOCK		0.00168			
9 TRAVEL/DOCK		0.0005			
10 B.O./NES.		0.00055			
11 MISC.		0.00411			
12 ALLOWED DELAY		0.00131			
13 LOST TIME DUE TO:		0			
TOTAL ADDED TIME		0.03660			
SHIFT ALLOWANCE		0.00369	0.04029		
14 PACK/CONSOLIDATE		0.00123			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL COMPUTED TIME		0.00123			
SHIFT ALLOWANCE		0.00012	0.00135		
				PCS/LINE= 1.45	

COMBINED COMPUTED DN & UP TIMES: 0.00135 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING: PAKCOMCP

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: COMMON	OPERATION: PACK COMPOSIT
OTHER	TIME PER: LINE	EFFECTIVE DATE: 7/28/88
PROJECT #	EMPLOYE:	SHEET #: 1

COMPLETE OPERATION / OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01366		73.21

ADDED

PACK PAD 63.8% x .00822 = .00524
PACK SHORT 36.2% x .02032 = .00736
TOTAL ADDED TIME .01260 0.0126

COMPUTED

PCS/LINE		PCS/LINE	
1.40 PACK PAD	63.8% x .00052 = .00033	.89	
1.74 PACK SHORT	36.2% x .00102 = .00037	.63	
TOTAL COMPUTED TIME	.00070 x	1.52	= 0.00106

TOTAL
PCS/LINE= 1.52

OPER. APP.

SHIPPING

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: DEDICATED	OPERATION: RPD LOADING
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION		NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		2		0.00663	332.22	301.66
1 GET STOCK			0.0006			
2 LOAD TRAILER			0.00078			
3 REARRANGE			0.00011			
4 DISPOSE EQUIP.			0.00016			
5 DUNNAGE			0.00014			
6 CLERICAL			0.00064			
7 CHECK			0.00035			
8 GET PAPERWORK			0			
9 GO TO OFFICE			0.00001			
10 TRAILER PREP.			0.00054			
11 LOOK FOR STOCK			0.00036			
12 LOST TIME DUE TO:	WAIT FOR T.D.,CKR,LDR		0.00194			
13 WAIT NO STOCK			0.00007			
14 MISC.			0.00014			
15 ALLOWED DELAY			0.00018			
16			0			
17			0			
18			0			
19			0		SHIFT ALLOWANCE:	0.10092
20			0			
	TOTAL ELEMENT TIME		0.00602			
	SHIFT ALLOWANCE		0.00061	0.00663		
					PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: DEDICATED	OPERATION: RPD LOADING
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION		NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
		2		0.0035	65.72	59.70
1 GET STOCK			0.00302			
2 LOAD TRAILER			0.00396			
3 REARRANGE			0.00056			
4 DISPOSE EQUIP.			0.00083			
5 DUNNAGE			0.00071			
6 CLERICAL			0.00325			
7 CHECK			0.00179			
8 GET PAPERWORK			0			
9 GO TO OFFICE			0.00006			
10 TRAILER PREP.			0.00271			
11 LOOK FOR STOCK			0.0018			
12 LOST TIME DUE TO:	WAIT FOR T.D.,CKR,LDR		0.0098			
13 WAIT NO STOCK			0.00034			
14 MISC.			0.00069			
15 ALLOWED DELAY			0.00091			
16			0			
17			0			
18			0			
19			0		SHIFT ALLOWANCE:	0.10092
20			0			
	TOTAL ELEMENT TIME		0.03043			
	SHIFT ALLOWANCE		0.00307	0.03350		
					PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: DEDICATED	OPERATION: RPD LOADING
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	2		0.0047	468.38	425.54
1 GET STOCK		0.0006			
2 LOAD TRAILER		0.00078			
3 REARRANGE		0.00011			
4 DISPOSE EQUIP.		0.00016			
5 DUNNAGE		0.00014			
6 CLERICAL		0.00064			
7 CHECK		0.00035			
8 GET PAPERWORK		0			
9 GO TO OFFICE		0.00001			
10 TRAILER PREP.		0.00054			
11 LOOK FOR STOCK		0.00036			
12 LOST TIME DUE TO:		0			
13 WAIT NO STOCK		0.00026			
14 MISC.		0.00014			
15 ALLOWED DELAY		0.00018			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.00427			
SHIFT ALLOWANCE		0.00043	0.00470		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: DEDICATED	OPERATION: RPD LOADING
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION / COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.02379	92.54	84.06
1 GET STOCK		0.00302			
2 LOAD TRAILER		0.00396			
3 REARRANGE		0.00056			
4 DISPOSE EQUIP.		0.00083			
5 DUNNAGE		0.00071			
6 CLERICAL		0.00325			
7 CHECK		0.00179			
8 GET PAPERWORK		0			
9 GO TO OFFICE		0.00006			
10 TRAILER PREP.		0.00271			
11 LOOK FOR STOCK		0.0018			
12 LOST TIME DUE TO:		0			
13 WAIT NO STOCK		0.00132			
14 MISC.		0.00069			
15 ALLOWED DELAY		0.00091			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE: 0.10092	
20		0			
TOTAL ELEMENT TIME		0.02161			
SHIFT ALLOWANCE		0.00218	0.02379		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

X RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: ALL	OPERATION: COMMON LOAD
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.01426	155.44	140.26
1 GET MATERIAL		0.00231			
2 CHECK STOCK		0.0012			
3 PUSH FLAT TO DOCK PL		0			
4 REARRANGE		0.00007			
5 DISP OF EMT FLT		0.00075			
6 CLERICAL		0.00222			
7 LOAD		0.00122			
8 GO TO B/L DESK		0.00012			
9 MISC.		0.00506			
10 ALLOWED DELAY		0			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
14		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.01295			
SHIFT ALLOWANCE		0.00131	0.01426		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

X RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
SHIPPING	TYPE OF PART: ALL	OPERATION: COMMON LOAD
OTHER	TIME PER: FREIGHT PCS.	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.02762	79.72	72.42
1 GET MATERIAL		0.00448			
2 CHECK STOCK		0.00233			
3 PUSH FLAT TO DOCK PL		0			
4 REARRANGE		0.00013			
5 DISP OF EMT FLT		0.00145			
6 CLERICAL		0.00429			
7 LOAD		0.00237			
8 GO TO B/L DESK		0.00023			
9 MISC.		0.00981			
10 ALLOWED DELAY		0			
11 LOST TIME DUE TO:		0			
12		0			
13		0			
14		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.02509			
SHIFT ALLOWANCE		0.00253	0.02762		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION:	LOAD CHICAGO
OTHER	TIME PER: LINE	EFFECTIVE DATE:	8/9/86
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	2		0.00763	228.6	262.12
1 GET STOCK		0.00064			
2 LOAD TRAILER		0.00403			
3 REARRANGE		0			
4 DISPOSE EQUIP.		0.00012			
5 DUNNAGE		0.0001			
6 CLERICAL		0.00036			
7 CHECK		0.00031			
8 GET PAPERWORK		0.00006			
9 GO TO OFFICE		0			
10 TRAILER PREP.		0.00002			
11 LOOK FOR STOCK		0.00026			
12 WAIT ON CLERICAL		0			
13 WAIT ON TRUCKDRIVER		0.00071			
14 WAIT ON LOADER		0			
15 WAIT NO STOCK		0			
16 MISC.		0.00018			
17 ALLOWED DELAY		0.00014			
18 LOST TIME DUE TO:		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.00693			
SHIFT ALLOWANCE		0.00070	0.00763		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: LOAD CHICAGO
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.01076	204.7	185.88
1 GET STOCK		0.0009			
2 LOAD TRAILER		0.00569			
3 REARRANGE		0			
4 DISPOSE EQUIP.		0.00018			
5 DUNNAGE		0.00014			
6 CLERICAL		0.00051			
7 CHECK		0.00044			
8 GET PAPERWORK		0.00008			
9 GO TO OFFICE		0			
10 TRAILER PREP.		0.00002			
11 LOOK FOR STOCK		0.00036			
12 WAIT ON CLERICAL		0.00001			
13 WAIT ON TRUCKDRIVER		0.001			
14 WAIT ON LOADER		0			
15 WAIT NO STOCK		0			
16 MISC.		0.00025			
17 ALLOWED DELAY		0.00019			
18 LOST TIME DUE TO:		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.00977			
SHIFT ALLOWANCE		0.00099	0.01076		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: LOAD L'VILLE
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.00554	397.62	361.02
1 GET STOCK		0.00051			
2 LOAD TRAILER		0.00071			
3 REARRANGE		0.00003			
4 DISPOSE EQUIP.		0.00019			
5 DUNNAGE		0.00009			
6 CLERICAL		0.00031			
7 CHECK		0.00025			
8 GET PAPERWORK		0			
9 GO TO OFFICE		0			
10 TRAILER PREP.		0.00012			
11 LOOK FOR STOCK		0.00045			
12 LOST TIME DUE TO: WAIT FOR T.D.,CKR.,LDR.		0.00193			
13 WAIT NO STOCK		0.00007			
14 MISC.		0.00019			
15 ALLOWED DELAY		0.00018			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.00503			
SHIFT ALLOWANCE		0.00051	0.00554		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: LOAD L'VILLE
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	2		0.02541	86.66	78.70
1 GET STOCK		0.00232			
2 LOAD TRAILER		0.00326			
3 REARRANGE		0.00013			
4 DISPOSE EQUIP.		0.00089			
5 DUNNAGE		0.00041			
6 CLERICAL		0.0014			
7 CHECK		0.00113			
8 GET PAPERWORK		0.00002			
9 GO TO OFFICE		0.00002			
10 TRAILER PREP.		0.00054			
11 LOOK FOR STOCK		0.00207			
12 LOST TIME DUE TO: WAIT FOR T.D.,CKR.,LDR.		0.00885			
13 WAIT NO STOCK		0.00034			
14 MISC.		0.00086			
15 ALLOWED DELAY		0.00084			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.02308			
SHIFT ALLOWANCE		0.00233	0.02541		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.
CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: LOAD L'VILLE
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.00363	606.06	550.96
1 GET STOCK		0.00051			
2 LOAD TRAILER		0.00071			
3 REARRANGE		0.00003			
4 DISPOSE EQUIP.		0.00019			
5 DUNNAGE		0.00009			
6 CLERICAL		0.00031			
7 CHECK		0.00025			
8 GET PAPERWORK		0			
9 GO TO OFFICE		0			
10 TRAILER PREP.		0.00012			
11 LOOK FOR STOCK		0.00045			
12 LOST TIME DUE TO:		0			
13 WAIT NO STOCK		0.00027			
14 MISC.		0.00019			
15 ALLOWED DELAY		0.00018			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE: 0.10092	
20		0			
TOTAL ELEMENT TIME		0.00330			
SHIFT ALLOWANCE		0.00033	0.00363		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION:	LOAD L'VILLE
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE:	8/9/88
PROJECT #	EMPLOYE:	SHEET #:	1

OPERATION DESCRIPTION	NO.	STANDARD	HOURS	PROD	
COMPLETE OPERATION	EMP.	DETAIL	TOTAL	GROSS/HR	NET/HR
	2		0.01665	132.28	120.12
1 GET STOCK		0.00232			
2 LOAD TRAILER		0.00326			
3 REARRANGE		0.00013			
4 DISPOSE EQUIP.		0.00089			
5 DUNNAGE		0.00041			
6 CLERICAL		0.0014			
7 CHECK		0.00113			
8 GET PAPERWORK		0.00002			
9 GO TO OFFICE		0.00002			
10 TRAILER PREP.		0.00054			
11 LOOK FOR STOCK		0.00207			
12 LOST TIME DUE TO:		0			
13 WAIT NO STOCK		0.00123			
14 MISC.		0.00086			
15 ALLOWED DELAY		0.00084			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.01512			
SHIFT ALLOWANCE		0.00153	0.01665		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT: POSTAL MACHINE	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: UPS	OPERATION: UPS METERING
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION / COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01777	61.96	56.27
1 GET,PLACE,WEIGHT STK		0.00295			
2 MAKE & PLACE STAMP		0.00337			
3 DISPOSE OF STOCK		0.00081			
4 CLERICAL		0.00315			
5 REARRANGE		0.00018			
6 DISPOSE OF FLAT		0.00027			
7 GET FLAT		0.00052			
8 MISC.		0.0017			
9 ALLOWED DELAY		0.00319			
10 LOST TIME DUE TO:		0			
11		0			
12		0			
13		0			
14		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.01614			
SHIFT ALLOWANCE		0.00163	0.01777		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT: POSTAL MACHINE	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: UPS	OPERATION: UPS METERING
OTHER	TIME PER: CONTAINER	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	 NET/HR
	1		0.01077	102.25	92.85
1 GET,PLACE,WEIGHT STK		0.00179			
2 MAKE & PLACE STAMP		0.00204			
3 DISPOSE OF STOCK		0.00049			
4 CLERICAL		0.0019			
5 REARRANGE		0.00011			
6 DISPOSE OF FLAT		0.00017			
7 GET FLAT		0.00032			
8 MISC.		0.00103			
9 ALLOWED DELAY		0.00193			
10 LOST TIME DUE TO:		0			
11		0			
12		0			
13		0			
14		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.00978			
SHIFT ALLOWANCE		0.00099	0.01077		
				PCS/LINE= 0.00	

COMBINED COMPUTED DN & UP TIMES: ERR OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: WILL CALL	OPERATION: LOAD WILL CALL
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.01971	55.87	50.74
1 GET/STAGE STOCK		0.00157			
2 GIVE PARTS TO DRIVER		0.00078			
3 CHECK STOCK		0.00431			
4 CLERICAL		0.00408			
5 DISPOSE EMPTY FLAT		0.00042			
6 REARRANGE		0.00003			
7 LOOK FOR STOCK		0.00075			
8 MISC.		0.00289			
9 ALLOWED DELAY		0.00307			
10 LOST TIME DUE TO:		0			
11		0			
12		0			
13		0			
14		0			
15		0			
16		0			
17		0			
18		0			
19		0		SHIFT ALLOWANCE:	0.10092
20		0			
TOTAL ELEMENT TIME		0.01790			
SHIFT ALLOWANCE		0.00181	0.01971		
				PCS/LINE= 1.29	

COMBINED COMPUTED DN & UP TIMES: 0 OPER. APP.

CONVERTED COMPUTED UP & DN TIMES: ERR

ROUTING: COMLOADI

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: LOADING
OTHER	TIME PER: LINE	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #: 1

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	1		0.00799		250.31

ADDED

LOAD COMMON	8.3% X .01426 = .00118
LOAD DEDICATED	82.6% X .00663 = .00548
LOAD CHICAGO	1.3% X .00763 = .00010
LOAD LOUISVILLE	3.6% X .00554 = .00020
LOAD UPS	3.2% X .01077 = .00034
LOAD WILLCALL	1.0% X .06899 = .00069

TOTAL ADDED TIME .00799 0.00799

TOTAL
PCS/LINE= 0.00

OPER. APP.

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#: ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION: LOAD COMPOSITE
OTHER	TIME PER: FBT PC	EFFECTIVE DATE: 8/9/88
PROJECT #	EMPLOYE:	SHEET #:

OPERATION DESCRIPTION COMPLETE OPERATION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
	2		0.03238		61.80

COMMON	8.7% X .02762 = .00240
DEDICATED	86.2% X .03350 = .02888
CHICAGO	1.3% X .01076 = .00014
LOUISVILLE	3.8% X .02541 = .00096

0.03238

TOTAL
PCS/LINE=

OPER. APP.

ROUTING:

RECEIVING	EQUIPMENT:	PDC & PDC#:	ST. LOUIS #03
X SHIPPING	TYPE OF PART: ALL	OPERATION:	LOAD COMPOSITE
OTHER	TIME PER: FRT PC	EFFECTIVE DATE: 8/9/88	
PROJECT #	EMPLOYE:	SHEET #:	

OPERATION DESCRIPTION	NO. EMP.	STANDARD DETAIL	HOURS TOTAL	PROD GROSS/HR	NET/HR
COMPLETE OPERATION					
	2		0.02368		84.40

COMMON	8.7% X .02762 = .00240
DEDICATED	86.2% X .02379 = .02051
CHICAGO	1.3% X .01076 = .00014
LOUISVILLE	3.8% X .01665 = .00063

0.02368

TOTAL
PCS/LINE=

OPER. APP.

MEMO TO FILE

Subject: Meeting in St. Louis #03 - Standards Team Conclusion

Attendees:

G. Graves (St. Louis)	W. Bell (I.E.)
J. McCollum (St. Louis)	J. Schneider (I.E.)
R. Sobanski (St. Louis)	H. Walton (I.E.)
	M. Wendell (I.E.)

I. Work Sampling Results (see attached).

II. Areas, lines, and pieces that have been studied (see attached).

Bell reviewed these with Graves, McCollum and Sobanski. Graves inquired about the impact of these studies on St. Louis as a whole. Bell responded that (at least) St. Louis will be better off than Atlanta.
Bell stated that he, B. Wilson, and M. Grimes will be in St. Louis to present standards on 8/31/88.
Sobanski requested that an agenda be mailed to him beforehand. Bell agreed.

III. General

Graves commented that picking with a tugger is not working out. Bell and Walton agreed. Lines per man-hour for both pads and shorts were compared with respect to tugger pick vs. manual pick. Graves asked about the possibility of hauling more than one rack at a time. Bell stated the option of using a 7 ft. cart as vs. the 6 ft. carts currently in operation.

Graves questioned lines per man-hour figures vs. the work sampling percentages in Area #5 (Bulk). Wendell stated a good portion of that included waiting for material and the fact that the vending machines were near that area.

Graves asked that the work sampling figures be explained, relative to the MR department. Wendell stated that employes are bogged down with paperwork, thereby losing actual work time. Salaried clerks to process the paperwork would significantly raise the lines/hour output.

Bell stated that St. Louis will never meet its shipping standards until the dispatch method is re-evaluated. Actual loading does not start until approximately 9:00 a.m. Up until then, there is nothing to load. Also, the 2nd shift supervisors are far more active in patrolling the aisles.

Memo to File
Page 2

Sobanski asked about crossdocking. Walton stated that loading will fall under a standard. Some time was collected. Time will be given, regardless, for target, crossdock, etc.

Bell stated that time will be taken to go over the standards in detail with the supervisors, GF's and the manager.

Sobanski asked if only one person does all the work sampling. Schneider stated no, that all members of the standards team participate.

Schneider asked why rail cars are switched in the morning and not the night before. Graves stated that GM is locked in with the railroad and that we are a lower priority with them.

J. H. Schneider

JHS/sf
Attach.

cc: Attendees
M. L. Grimes
B. L. Wilson

WORK SAMPLING OF 2ND SHIFT

AREA	W	I	TOTAL	%
1. Bins & Truck Rec'v	110	56	166	70%
2. Pack Benches & Shipping	213	75	288	74%
3. 54's, 400 area + Mldg.	87	31	118	74%
4. Bkdn & Rail Rec'g	59	51	110	54%
5. Bulk	70	20	90	78%
6. MR	41	31	72	57%
7. Mezz.	37	5	42	88%
Total	617	269	886	70%
Total of Previous Trips	1828	1044	2872	64%
Grand Total - Observations	2445	1313	3758	65%

WORK SAMPLING OF 1ST SHIFT

AREA	W	I	TOTAL	%
1. Bins & Truck Rec'g	353	238	591	60%
2. Pack Benches & Shipping	480	301	781	62%
3. 54's, 400 area & Mldg	267	141	408	65%
4. Bkdn & Rail Rec'g	187	125	312	60%
5. Bulk	165	64	229	72%
6. MR	238	161	399	60%
7. Mezz.	138	14	152	91%
Total Observations 1st Shift	1828	1044	2872	64%

AREA	LINES STUDIED	PIECES STUDIED	# OF STUDIES
MR			
UNLOADING-RPD	4269	10464	6
UNLOADING-COMMON	30	30	4
CHECKING-COMPOSITE			
EXCHANGE	116	116	7
BULK	116	144	10
CONVEYOR(BIN)	715	1038	11
RTD	58	79	7
TOTAL	5304	11871	45
MR			
PUTAWAY-COMPOSITE			
AREA 1-BINS FLR	263	568	4
AREA 2-MEZZ	158	216	5
AREA 3-S.M.	82	86	3
AREA 4-54'S	152	215	5
AREA 5-MLDG	66	71	2
TOTAL MR	721	1156	19
RECEIVING			
UNLOADING			
TRUCK-EX CUBE			STD. DATA
LINE			STD. DATA
CONTAINER			STD. DATA
TRUCK-NEX CUBE			STD. DATA
LINE			STD. DATA
CONTAINER			STD. DATA
CARTIME- CARS			STD. DATA
RAIL-EX CUBE			STD. DATA
LINE			STD. DATA
CONTAINER			STD. DATA
RAIL-NEX CUBE			STD. DATA
LINE			STD. DATA
CONTAINER			STD. DATA
RELOAD RACKS			STD. DATA
TRUCK CONTAINER			STD. DATA
RAIL CONTAINER			STD. DATA

AREA	LINES STUDIED	PIECES STUDIED	# OF STUDIES
HAUL			
EX CUBE			
LINE			STD. DATA
CONTAINER			STD. DATA
NEX CUBE			
LINE			
CONTAINER			
BREAKDOWN			
EX CUBE			
LINE	54	616	9
CONTAINER			
NEX CUBE	109	5187	7
TOTAL	163	5803	
PUTAWAY			
AREA 1	159	5692	22
AREA 2	64	1288	12
AREA 3-S.M. COMP			
AREA 3-S.M.S/R/MAS	21	255	6
AREA 3-S.M.S/R SUR	61	990	8
AREA 3-S.M.C/L	81	699	8
AREA 4-COMPOSITE			
AREA 4-MASTER	27	1028	8
AREA 4-SURPLUS	115	5320	8
AREA 4-54'S	73	1764	7
AREA 5-ADJ.RACK	29	863	3
AREA 5-COMPOSITE			
AREA 6-ENG&TRAN			
TOTAL	630	17899	82

AREA	LINES STUDIED	PIECES STUDIED	# OF STUDIES
SHIPPING-PICK			
PICK PREP-PAD	506	1363	10
PICK PREP-SHORT	307	643	10
AREA 1-PADS	292	748	7
AREA 1-SHORT	292	700	10
AREA 2-PADS	230	413	8
AREA 2-SHORTS	46	116	6
COMPOSITE-BINS			
AREA 3-PADS	67	74	9
AREA 3-SHORT	44	45	7
AREA 3-PADS/TUG	98	163	8
AREA 3-COMPOSITE			
AREA 4-PADS/WALK	227	369	7
AREA 4-SHORT/WALK	49	66	9
AREA 4-PADS/TUG	281	431	2
AREA 4-COMPOSITE			
AREA 5-PADS-54'S	61	156	7
AREA 5-PADS-ADJ	58	97	9
AREA 5-SHORT-54'S	25	40	10
AREA 5-SHORT-ADJ	24	32	7
AREA 6-ENG/TRANS	36	36	5
COMPOSITE-PADS			
COMPOSITE-SHORT			
COMPOSITE-OVERALL			
TOTAL	2643	5492	131
PACK			
RPD-PAD-BENCH	306	578	9
RPD-SHORT-BENCH	167	423	8
RPD-CAGE	742	1521	5
COMMON-PAD	251	352	5
COMMON-SHORT	104	181	6
CHICAGO	172	250	5
PICK/PACK COMPOSITE			
TOTAL	1742	3305	38

AREA	LINES STUDIED	PIECES STUDIED	# OF STUDIES
LOADING			
DEDICATED LINE	3179	630 F/P	6
DEDICATED FRT PC			
COMMON LINE	219	113 F/P	4
COMMON FRT PC			
WILL CALL LINE	112	138	6
WILL CALL FRT PC			
CHICAGO LINE	501	355 F/P	2
CHICAGO FRT PC			
LOUIV LINE	2181	477 F/P	3
LOUIV FRT PC			
UPS METER/LOAD/PKS	257	155 F/P	3
TOTAL	6449	138	24
GRAND TOTAL	17652	45664 1730 F/P	355

SUMMARY OF STANDARDS DEVELOPMENT

PDC: ST. LOUIS

LINES PER MANHOUR OR CONTAINERS PER HOUR

AREA	LPMH NET	AVERAGE PCS/LINE	LINES STUDIED	PIECES STUDIED	# OF STUDIES
MR					
UNLOADING-RPD	207	1.79	840	1500	5
UNLOADING-COMMON	80.9	1.27	114	145	7
UNLOADING-UPS	169.8		68		1
UNLOADING-COMPOSITE	147.1				
CHECK-EXCHANGE	34.2	1	116	116	7
CHECK-BULK	25	1.24	116	144	10
CHECK-CONVEYOR(BIN)	47.6	1.52	729	1107	10
CHECK-RTD	32	1.33	40	53	5
CHECK TRANSM.	10.3	1	12	12	1
CHECK-PC31	13.5	1.8	20	36	1
CHECK-TRANS. (OUT)	115.6	3.24	329	1066	1
CHECK-COMPOSITE	39.8	1.48			
TOTAL			2384	4179	48
MR-PUTAWAY					
AREA 1-BINS FLR	46.9	2.16	263	568	4
AREA 2-MEZZ	34.6	1.37	158	216	5
AREA 3-S.M.	20.2	1.07	82	86	3
AREA 4-54'S	31.7	1.42	152	215	5
AREA 5-MLDG	48.8	1.08	66	71	2
PUTAWAY-COMPOSITE	36.4	1.68			
TOTAL MR-PUTAWAY			721	1156	19
TOTAL MR			3105	5335	67
RECEIVING					
UNLOADING					
TRUCK-EX CUBE					STD. DATA
**LINE	51				STD. DATA
**CONTAINER	36				STD. DATA
TRUCK-NEX CUBE					STD. DATA
**LINE	243.3				STD. DATA
**CONTAINER	50.7				STD. DATA
CARTIME- CARS	8.3				STD. DATA
RAIL-EX CUBE					STD. DATA
LINE	56.8				STD. DATA
CONTAINER	37.9				STD. DATA
RAIL-NEX CUBE					STD. DATA
LINE	221.5				STD. DATA
CONTAINER	56.8				STD. DATA
RELOAD RACKS					STD. DATA
RAIL CONTAINER	36.3				STD. DATA
TOTAL			3105	5335	67

SUMMARY OF STANDARDS DEVELOPMENT

PDC: ST. LOUIS

LINES PER MANHOUR OR CONTAINERS PER HOUR

AREA	LPMH NET	AVERAGE PCS/LINE	LINES STUDIED	PIECES STUDIED	# OF STUDIES
HAUL					
EX CUBE-T/D-B/D					
LINE	49.2				STD. DATA
CONTAINER	35.1				STD. DATA
EX CUBE-RAIL-A3					
LINE	22.6				STD. DATA
CONTAINER	15				STD. DATA
EX CUBE-RAIL-BO					
LINE	20.4				STD. DATA
CONTAINER	13.6				STD. DATA
EX CUBE-COMPOSITE					
LINE	26.6				STD. DATA
CONTAINER	18				STD. DATA
NEX CUBE-T/D-B/D					
LINE	315				STD. DATA
CONTAINER	66				STD. DATA
NEX CUBE-RAIL A4					
LINE	83.8				STD. DATA
CONTAINER	21.5				STD. DATA
NEX CUBE-RAIL-B/D					
LINE	103.4				STD. DATA
CONTAINER	26.5				STD. DATA
NEX CUBE-COMPOSITE					
LINE	129.3				STD. DATA
CONTAINER	32.2				STD. DATA
BREAKDOWN					
EX CUBE	10.3	13.25	51	676	7
NEX CUBE	23.9	47.59	109	5187	8
TOTAL			160	5863	15
PUTAWAY					
AREA 1	14.3	35.8	159	5692	22
AREA 2	9.9	20.13	64	1288	12
AREA 1&2 COMP	12.9	32.67			
AREA 3-S.M. TUG	7.3	8.63	81	699	8
AREA 3-S.M.S/R/MAS	7.1	12.14	21	255	7
AREA 3-S.M.S/R SUR	14.1	16.23	61	990	8
AREA 3-SR COMP M&SUR	5	12.14			
AREA 3-S/M COMP-ALL	5.8	10.4			
AREA 4-TUG	10.6	24.3	73	1764	7
AREA 4-MASTER-REACH	10.4	35.42	26	921	8
AREA 4-SUR-REACH	21.5	46.26	115	5320	9
AREA 4-MASTER&SUR S/R	7.4	35.42			
AREA 4-COMPOSITE-ALL	8.5	29.86			
AREA 5-MOULDING	7.7	27.84	31	863	3
*PUTAWAY (ALL)	9.8	29.56			
TOTAL			631	17792	84

SUMMARY OF STANDARDS DEVELOPMENT

PDC: ST. LOUIS

LINES PER MANHOUR OR CONTAINERS PER HOUR

AREA	LPMH NET	AVERAGE PCS/LINE	LINES STUDIED	PIECES STUDIED	# OF STUDIES
SHIPPING-PICK					
PICK PREP-PAD	613.5	2.69	506	1363	10
PICK PREP-SHORT	320.5	2.09	307	643	10
AREA 1-PADS	93.6	2.56	292	748	7
AREA 1-SHORT	60.1	2.4	292	700	10
AREA 2-PADS	65.7	1.8	230	413	8
AREA 2-SHORTS	40.2	2.52	46	116	6
AREA 1&2 P&S COMP	61.5				
AREA 3-PADS-WALK	24.5	1.11	67	74	9
AREA 3-SHORT	21.2	1.02	44	45	7
AREA 3-PADS/TUG/CA	13.2	1.6	102	163	8
AREA 3-COMPOSITE	18.5	1.27			
AREA 4-PADS/WALK	63.7	1.63	227	369	7
AREA 4-SHORT/WALK	34.9	1.35	49	66	9
AREA 4-PADS/TUG	69.2	1.53	281	431	2
AREA 4-COMPOSITE	64.1	1.62			
AREA 5-PADS-54'S	62.5	2.24	98	219	9
AREA 5-PADS-ADJ	65.2	1.67	63	105	8
AREA 5-SHORT-54'S	60.6	1.37	43	59	10
AREA 5-SHORT-ADJ	75	1.31	26	34	9
AREA 5-SHORT-COMP	68.8	1.33			
AREA 5-PAD-COMP	63.9	1.89			
AREA 6-ENG/TRANS	17.9	1	36	36	5
COMPOSITE-PADS	56.5	2.04			
COMPOSITE-SHORT	37.8	1.97			
COMPOSITE-OVERALL	47.8	2.01			
TOTAL			2709	5584	134

SUMMARY OF STANDARDS DEVELOPMENT

PDC: ST. LOUIS

LINES PER MANHOUR OR CONTAINERS PER HOUR

AREA	LPMH NET	AVERAGE PCS/LINE	LINES STUDIED	PIECES STUDIED	# OF STUDIES
PACK					
RPD-PAD-BENCH	97.3	1.89	306	578	9
RPD-SHORT-BENCH	63.9	2.53	167	423	8
RPD-CAGE	201.6	2.05	742	1521	5
COMMON-PAD	111.7	1.40	251	352	5
COMMON-SHORT	45.3	1.74	104	181	6
CHICAGO	23.7	1.45	172	250	5
PACK COMPOSITE	73.2	1.52			
TOTAL			1742	3305	38
LOADING				F/P=FRT.PCS.	
# DEDICATED LINE	301.7		3179	630 F/P	6
# DEDICATED FRT PC	59.7				
! DEDICATED LINE	425.5				
! DEDICATED FRT PC	84.1				
COMMON LINE	140.3		219	113 F/P	4
COMMON FRT PC	72.4				
* WILL CALL LINE	50.7	1.29	112	145	6
CHICAGO LINE	262.1		501	355 F/P	4
CHICAGO FRT PC	185.9				
# LOUIV LINE	361.0		2181	477 F/P	3
# LOUIV FRT PC	78.7				
! LOUIV LINE	551.0				
! LOUIV FRT PC	120.0				
UPS METER/LOAD/PKS	56.3		257	155 F/P	3
LOADING-ALL	250.6				
# WITH LOST TIME					
! W/O LOST TIME					
* LOADING ALL-FRT PC					
# WITH LOST TIME	61.8				
! W/O LOST TIME	84.4				
TOTAL			6449	145	26
GRAND TOTAL			14796	38017 1730 F/P	364

WORK SAMPLING SUMMARY

	1ST	2ND	TOTAL
TOTAL OBSERVATIONS	2872	887	3759
WORK	1828	607	2435
IDLE	1044	280	1324
% WORK	64	68	65

INDIRECT LABOR ANALYSIS

PDC: ST. LOUIS #03

Classification Name	Occ. Code	Area Code	Man Power	On Std.	Off Std.	Description for Off Std.
REC. UNLOADING						
21501(0,1,3,9)						
DRIVER	6290	0	1	1	0	
CHECKER	6100	1	4	4	0	
DRIVER	6290	1	5	5	0	
MATL. HANDLER	6580	1	5	5	0	
DRIVER	6290	3	1	0	1	OUTSIDE AREA DRIVER
			0		0	
TOTAL UNLOAD			16	15	1	
REC. BREAKDOWN						
21501(4,8)						
			0			
			0			
			0			
			0			
			0			
			0			
			0			
			0			
TOTAL BRKDN			0	0	0	
REC. PUTAWAY						
21501(2,7)						
CHECKER	6100	2	2	2	0	
DRIVER	6290	1	21	19	2	PLACE STOCK ON BREAK-LINE
MATL. HANDLER	6580	2	33	32	1	MATERIAL HANDLER WITH DRIVER IN THE YARD
STOCKROOM ATTN.	6835	2	2	0	2	STOCKROOM ATTN.
CHECKER	6100	7	4	3	1	REWRAP NEW STOCK, WORKS MIXED WITH SELL AS
CLERK	6215	7	1	0	1	RECEIVING CLERK (TRUCK)
DRIVER	6290	7	1	1	0	
LEADER	6510	7	2	0	2	LEADER (RAIL REC.)
STOCKROOM ATTN.	6835	7	6	0	6	STOCKROOM ATTN.
TOTAL REC. PUTAWAY			72	57	15	

INDIRECT LABOR ANALYSIS

PDC: ST. LOUIS #03

Classification Name	Occ. Code	Area Code	Man Power	On Std.	Off Std.	Description for Off Std.
MR UNLOADING						
21506(0,1,3,9)						
CHECKER	6100	0	3	3	0	
			0			
			0			
			0			
			0			
			0			
			0			
TOTAL MR UNLOADING			3	3	0	
MR BREAKDOWN						
21506(4,8)						
			0			
			0			
			0			
			0			
			0			
			0			
TOTAL MR BREAKDOWN			0	0	0	
MR PUTAWAY						
21406(2,7)						
CHECKER	6100	2	17	17	0	
DRIVER	6290	2	3	3	0	
MATL. HANDLER	6580	2	8	6	2	STAGES CAGES-SORTS MATL. AT END OF CONVEYOR
BOX MAKER	6065	7	3	1	2	BOX MAKERS FOR REWRAP
CHECKER	6100	7	1	1	0	
CLERK	6215	7	5	4	1	REGISTERS MRS
INSPECTOR	6415	7	3	1	2	CHECK EXCEPTIONS, INSPECT DAMAGED
LEADER	6510	7	1	0	1	LEADERS
UNITIZER	6910	7	3	0	3	REWRAP MATERIAL RETURNS
DRIVER	6290	7	1	0	1	STAGE RACKS FOR PROCESSING
TOTAL MR PUTAWAY			45	33	12	
TOTAL RECEIVING			136	108	28	
% INDIRECT					0.21	

INDIRECT LABOR ANALYSIS

PDC: ST. LOUIS #03

Classification Name	Occ. Code	Area Code	Man Power	On Std.	Off Std.	Description for Off Std.
PICKING						
21507(1,2)						
CHECKER	6100	2	2	1	1	STAGE FREIGHT
CHECKER PICKER	6117	2	86	83.5	2.5	LOAD TRAILERS, RESTOCK BENCHES WITH CARTONS
CHECKER	6145	2	2	2	0	
DRIVER	6290	2	7	6	1	LOAD TRAILERS
STOCKROOM ATTN.	6835	2	1	0	1	STOCKROOM ATTEND.
TOTAL PICK(1,2)			98	92.5	5.5	
PICKING						
21507(3,4)						
			0			
			0			
			0			
			0			
TOTAL PICK(3,4)			0	0	0	
PICKING						
21507(5,6)						
			0			
			0			
			0			
TOTAL PICK(5,6)			0	0	0	
PICKING						
21507(7,8)						
LEADER	6510	7	3	0	3	LEADER
			0			
			0			
TOTAL PICK(7,8)			3	0	3	

INDIRECT LABAOR ANALYSIS

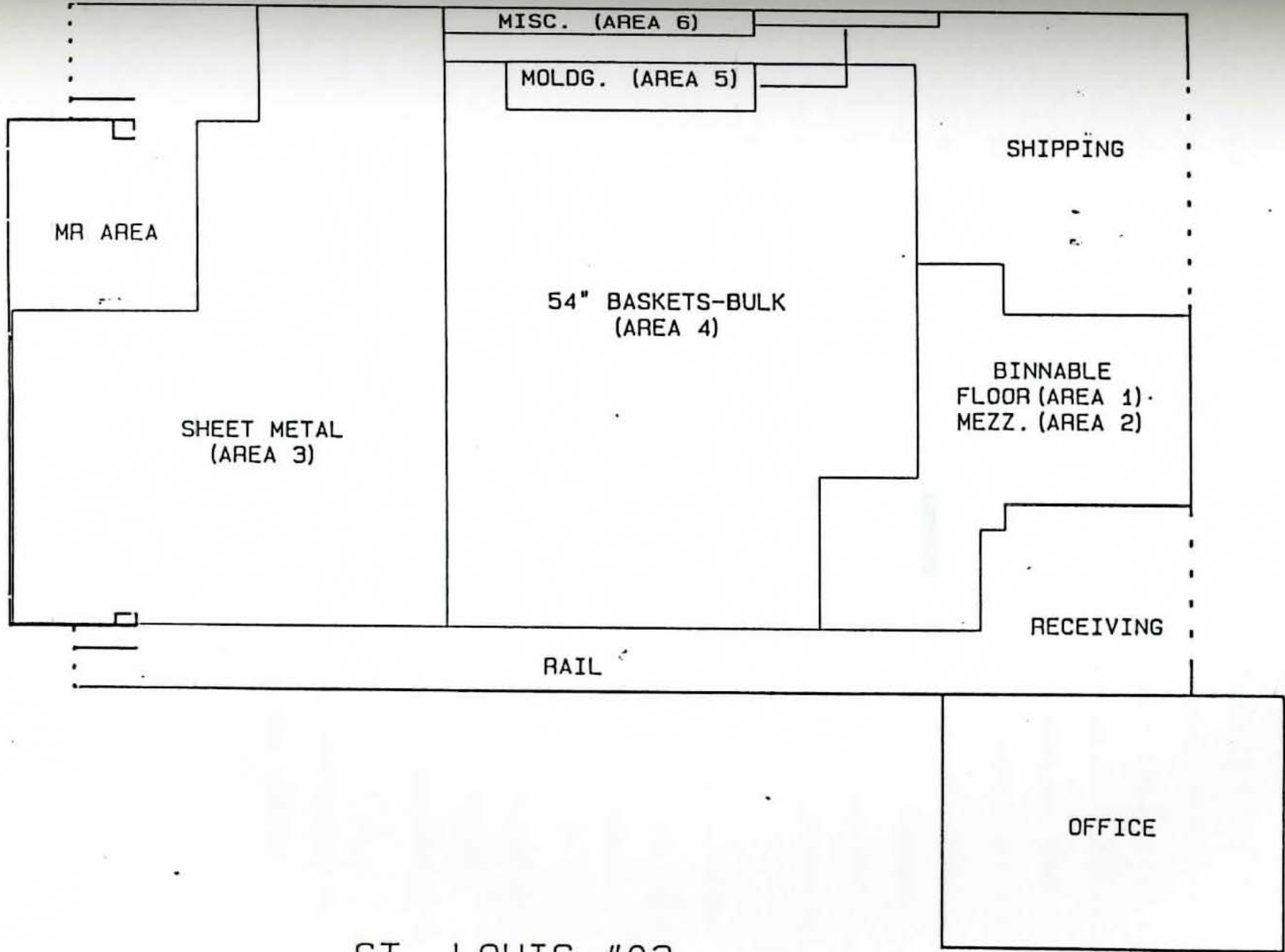
PDC: ST. LOUIS #03

Classification Name	Occ. Code	Area Code	Man Power	On Std.	Off Std.	Description for Off Std.
PACKING						
21502(2,7)						
CHECKER	6100	2	5	4	1	STAGES FREIGHT FOR LOADING
CHECKER PICKER	6117	2	63	63	0	
DRIVER	6290	2	11	10	1	LOAD TRAILERS
CHIEF CLERK	6160	7	3	0	3	CLERK B/L
CLERK	6215	7	9	4	5	MISC. CLERK-B.O. RUNNER
COUNT. SALES ATT	6260	7	1	1	0	
DRIVER	6290	7	1	1	0	
LEADER	6510	7	6	0	6	LEADER
			0			
			0			
TOTAL PACK(2,7)			99	83	16	
PACKING						
21502(4,8)						
			0			
			0			
			0			
			0			
TOTAL PACK(4,8)			0	0	0	
LOADING						
21502(0,1,3,9)						
CHECKER	6100	0	3	0	3	STAGES FREIGHT FOR LOADING
CHECKER(SHPG.)	6145	0	30	30	0	
DRIVER	6290	0	4	2	2	LOAD TRAILERS
TOTAL LOADING			37	32	5	
QUALITY CONTROL						
21508(ALL)						
LEADER	6510	7	1	0	1	LEADER QUALITY CONTROL
			0			
			0			
TOTAL Q.C.			1	0	1	

INDIRECT LABOR ANALYSIS

PDC: ST. LOUIS #03

Classification Name	Occ. Code	Area Code	Man Power	On Std.	Off Std.	Description for Off Std.
TOTAL PICKING			101	92.5	8.5	
TOTAL PACKING			99	83	16	
TOTAL LOADING			37	32	5	
TOTAL SHIPPING			238	207.5	30.5	
% INDIRECT SHIP.					0.13	
GRAND TOTAL			374	315.5	58.5	
% INDIRECT ALL					0.16	
COMMITTEEMEN						
CHECKER PICKER	6117	2	3	0	3	
DRIVER	6290	2	1	0	1	
INSPECTOR	6415	7	1	0	1	
MAINTENANCE						
MILLWRIGHT	100	2	2	0	2	
PAINTER	110	2	1	0	1	
PIPEFITTER	120	0	1	0	1	
TRUCK REPAIR	190	0	2	0	2	
ELECTRICIAN	50	2	2	0	2	
MAINT. LABORER	6485	2	1	0	1	
SANITATION						
OFFICE PORTER	6460	4	1	0	1	
PORTER	6855	2	10	0	10	
POWER SWEEPER	6865	2	2	0	2	
OTHER						
MAINT. HELPER	6330	7	1	0	1	
OUTSIDE DRIVER	6290	3	1	0	1	
M.H. (OUTSIDE)	6580	3	1	0	1	
CLERK	6215	7	1	0	1	
STOCKROOM ATTN.	6835	2	1	0	1	SUBSTANCE ABUSE REP.
TOTAL BURDEN				0	32	
TOTAL PLANT			406	315.5	90.5	


MISC. (AREA 6)
MOLDG. (AREA 5)
SHIPPING
MR AREA
54" BASKETS-BULK
(AREA 4)
BINNABLE
FLOOR (AREA 1)
MEZZ. (AREA 2)
SHEET METAL
(AREA 3)
RECEIVING
RAIL
OFFICE

ST. LOUIS #03

RESULTS

PICK - CHECK - PACK AUDITS

In the pickers and checkers audits we checked 67,293 lines over a five-month period. This represented 3 percent of our total lines picked and packed. Audits were taken at random on a daily basis on both first and second shift. Orders that were selected were audited 100 percent. The picker or packer who had completed the order was present, along with a supervisor, while the order was being audited. Any mistakes that were found were corrected on the spot by the person who has actually done the order. All orders audited were placed in a log for future reference. Any mistakes that were found were tracked backwards to try to determine what caused the error, and we tried when possible to put a safeguard in place to prevent future errors.

Monday through Thursday errors ran consistently in the .0234 percent to .0292 percent range. However, Friday errors were higher at .0515 percent. This was enough of a difference to warrant further investigating.

Also, "Incorrect Quantities" was the single highest mistake found on each of the days surveyed, with "Wrong Part" the next highest followed by a "Damaged Part" being picked, then "Part in an Improper Package."

Both small and larger dealers were audited and all types of orders were audited. This then gave us a realistic sampling of our entire scope of orders.

INSTRUCTIONS:
1. 4-DEALERS DAILY - 30 LINES MINIMUM
2. HAVE EMPLOYE CORRECT OWN ERROR WHERE POSSIBLE
3. SIGN NAME.

DAILY DEALER ORDER A

MONTH: July-Nov.

DEALER	% of Defects	SHIP.#	LINES AUDITED	EMP. ID #	INCORRECT QTY	WRONG PART	DAMAGE	IMPROP. PACK	S NA
MONDAY									
1. 452	.0234		10,396	Various	104	78	38	24	
2.									
3.									
4.									
TUESDAY									
1. 521	.0239		14,588	Various	167	98	63	21	
2.									
3.									
4.									
WEDNESDAY									
1. 387	.0292		12,384	Various	227	83	25	27	
2.									
3.									
4.									
THURSDAY									
1. 495	.0260		17,325		321	71	43	17	
2.									
3.									
4.									
FRIDAY									
1. 504	.0515		12,600		471	121	29	29	
2.									
3.									

RPD (SHIPPING) DOCK TRAILER AUDIT

We audited 525 trailers over a five-month period. This represented 19 percent of the total RPD routes or regularly scheduled routes shipped during this time. Our error rate was .1352 percent. The largest group of errors was in the area of parts left off the trailer and left sitting on the dock. The next group was bulk items picked wrong, then allowed to get by the dock checker and loaded. Followed by manifest printed wrong, then blowing the trailer or overscheduling it, which forced us to leave all dealers on the tail end of the route off until the following day.

Routes audited were broken down into two groups: local dealers and out-of-state dealers. Local dealer routes averaged a 10 percent error rate, while out-of-state dealers averaged a 17 percent error rate. All local dealer routes are picked on second shift, it was noted.

We did not include routes started and finished on time in our audits.

RPD DOCK TRAILER AUDIT

DEALER NAME	ROUTE	CODE	SHIP #	DATE		#PC'S ON ORDER		# ON MANIFEST	ERR
		% Error							
525	Various	.1352	Various	July-November		27		20	7
239	(Local Dealers)			10% Errors					2
286	(Out-of-State Dealers)			17% Errors					4
1. PCS MISSING				7					
2. MANIFEST WRONG				3					
3. PCS. DAMAGED				4					
4. WRONG PART				23					
5. WRONG QTY				34					
6. LOAD CORRECTION MADE				71					

RAIL LOAD BACK AUDIT

We audited 315 railcars over the five-month period. This accounted for 20 percent of the total cars received during this period. Our two biggest defects were reloading unlike container groups back into the railcar and leaving debris on racks that were loaded back. Our next area of significance was gates not secured, followed by rack legs not nested and then safety bars not in the proper position. Our total nonconformances averaged .0914 percent. Total errors found were 144 for the five-month period.

We are currently in the process of creating an inbound audit for the same items we are checking on the cars we send out. This will allow us to give some feedback to the main stocking warehouses and should also allow us to find any incoming stock which is damaged. At present we bear the cost of damaged stock because we do not audit as we unload. If we claim damage as the stock is unloaded, the charge goes back to the shipping warehouse. This auditing of inbound came about due to employes noticing that the items they were checked on when they loaded railcars back were not checked by the shipping warehouses. As we looked into this further, we began to find a significant amount of damage that we were being charged for.

AR#	DATE	DEST.	GATES SECURED		RACKS LEGS NESTED		LIKE CONTAINER GROUPED		OF BARS IN PROPER POSITION		DEBRIS REMOVED		AUDITOR
			YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	
315	July-November		284	31	298	17	271	44	304	11	274	41	
			315										
			x 5										
	Total Cars Checked		1,575										

144 - Total Errors = .0914% Total Errors

MATERIAL RETURN AUDIT

We audited 19,240 lines of material return parts during a five-month period. This represented 5 percent of the total material received for this time period. Direct codes were broken down into 16 categories with category 07, Wrong Quantity for Tag, being the biggest defect sent in by the dealers, followed by 04, Damaged Parts, on both small binnable parts and the larger bulk or sheet metal parts. We had over a 12 percent reject rate on sheet metal which has forced us to put in place a 100 percent audit for all sheet metal retrurned from dealers. Our overall rate for nonconformances was 8 percent.

Our trailers coming in also had a high defect rate for code 02, Load Arrangement. The average rate was nearly 18 percent. This defect comes not from the customer but from our RPD or trucking shippers. A great deal of these trailers had poor load arrangements because they were not strapped down properly. This also led to many parts being damaged in return shipments.

Also a category of growing concern was category 08, Not a GM Part. Many dealers have begun buying cheaper, off-brand parts due to pressure from insurance companies. But when they return parts for credit, they will put them in a GM box with labels they make and try and get full credit as if it were a genuine GM part. This has become a problem within the last 12 to 15 months and one that may cost GM millions of dollars if it is not addressed now in the early stages.

This wrapped up our audits, and all areas were found to have a need to put a system in place to prevent defects. All employes were encouraged to get involved and the final results were revealed to everyone.

PLANT

MATERIAL RETURN AUDIT

DATE July-Nov.

SUPERVISOR

PART NUMBER	MR CODE	STOCKING PARTS PLANT	FILE LOCATION	DEFECT TYPE	OTHER % Defects From Dealer
Binnable Items					
C1 327/14	01				.0428
C2 429/73	04				.1701
C3 379/91	07				.2401
C4 427/20	08				.0468
C5 395/7	13				.0177
Bulk Items					
B1 625/79	04				.1264
B2 634/41	06				.0646
Off Trailer					
F1 354/63	02				.1779
F2 278/11	09				.0395
R1					
3,848/317		.08% Nonconformance Rate			
x 5					
19,240/1,585					

DEFECT CODES:

1. Wrong or Omitted Part Number
2. Load Arrangement
3. Unauthorized Package
4. Damaged part
5. Inadequate Packing Protection
6. Date Code on labels don't match
7. Wrong quantity for tag
8. Not GM Part
9. Incomplete or Wrong Destination
10. Certification Requirement
11. Code "S" under $500.00
12. PC 302 & check sheet disagree
13. Checker did not sign
14. No entry on detention sheet
15. 3 X 5 card missing or incomplete
16. Other (specify)

DISCUSSION

As a result of time study comparisons, numerous audits, route checking, customer feedback, employee input and cost comparisons, the following recommendations have been put in place.

I. GRID MANAGEMENT SUBSYSTEM

A. General Information

1. The concept of Grid Management in new.

   a. It may be used for specific warehouse areas or for the entire warehouse.

   b. It will identify open locations for part putaway.

   c. It will assist in location selection for new parts (N/L parts).

   d. Grid Management will assist in balancing the warehouse, allowing for more efficient picking.

2. In order to effectively utilize Grid Management, an understanding of the following concepts is required.

   a. Opening Type - A five character alpha/numeric code used to represent valid opening types. A size description may be stated in inches or feet or an arbitrary unit and will represent the horizontal length of the opening. Each grid location is assigned one unique opening type. Each opening may have a unique size associated with it.

   b. Priority Zones - an area within an aisle which is mapped by a beginning and ending tier and level. Each aisle may consist of up to four priority zones, three of the zones will be available for picking and the fourth will be a surplus location. Priority zones are established based on the number of bin trips with zone one being the highest priority (Exhibit A and B).

   c. Priority Zone Breakpoint - the minimum number of bintrips required for a part to be located in a given priority zone.

   d. Compatibility Code - a two position code used to group similar parts (of size and/or weight) into specific categories for storage location management. Each part number will have a unique code associated with it. Each compatibility code may have one or more valid aisle ranges associated with it, within a selected aisle a beginning and ending tier and level range may be selected. (Exhibit C)

GRID MANAGEMENT SUBSYSTEM

A-2

e. Stocking Module - a five position code used to represent a type of storage container. A stocking module may be associated with up to six valid opening types, see section K of this subsystem.

f. Stocking Unit - a size factor (a three dimensional value) given to stocking modules and opening types. By comparing the physical dimensions (units) of an opening type and the stocking module, the system will identify available space at a particular location (Exhibit D).

g. Alternate Main Bin - a non-surplus location used when a part is being moved from one location to another within the warehouse., The alternate main bin is the location the part will be moved to. The alternate main bin will become the main bin when the original main bin reached stock exhaust. If this concept is to be used in Grid Management it must be used in the Location Subsystem and be selected in the Options Subsystem. For additional information on the alternate main bin concept, see the Locations Subsystem.

h. Double Main Bin - is used when it is advantageous to set up two main bins. The bins must be adjacent to each other. If this concept is to be used in Grid Management, it must be used in the Location Subsystem and be selected in the Options Subsystem.

i. Warehouse Areas - an area of the warehouse mapped by a beginning and ending aisle, tier, and level. An area may have up to 12 valid opening types. There is no limit to the number of Warehouse Areas which may be created.

B. Subsystem Main Menu

1. The subsystem Main Menu allows direct access to the Location Menu and Maintenance Menu.

```
WIC000               TAN GRID MAIN MENU          (DATE             )
-----------------------------------------------------------------------

                 F1   GRID MAINTENANCE MENU
                 F12  GRID MANAGEMENT INQUIRY/UPDATE MENU
                 SF1  RETURN

-----------------------------------------------------------------------
```

GRID MANAGEMENT SUBSYSTEM

B.

2. The items listed within the GRID MAINTENANCE MENU and the GRID MANAGEMENT INQUIRY/UPDATE MENU and will be available at any hardwired terminals in the office or warehouse.

3. Items on the INQUIRY/UPDATE MENU will be available on FM terminals at the Ft. Worth site only.

C. Grid Management Inquiry/Update Menu (F12)

1. The GRID MANAGEMENT INQUIRY/UPDATE menu is brought up by selecting the F12 key from main menu.

```
GRD091          GRID MANAGEMENT INQ/UPDATE          (DATE    )
-------------------------------------------------------------------

                F1 - NEW PART LOCATION

                F2 - RESIZE MAIN BIN

                F3 - REBALANCE MAIN BIN

                F4 - SUPLEMENTAL LOCATION

                F5 - GRID LOCATION INQUIRY

-------------------------------------------------------------------
```

2. Options selected from the menu are processed on a real-time basis to the local file.

3. When items from this menu are displayed on FM terminals the character size is expanded.

4. All of the screen display examples within this sub-menu will be shown as both hardwired and FM terminals.

D. New Part Location (F1)

1. The F1 key from the sub-menu will bring up the NEW PART LOC transaction. On the FM terminal the display will look like this:

GRID MANAGEMENT SUBSYSTEM

D. 1.

```
--------------------------------------------------------------------
             GRD001 00 NEW PART LOC         (DATE)
             PART NUM:________ STOCK MOD:________
             COMPATIBILITY CD:__ DOUBLE M B IND:__
             PRTY:___ LOCATION:0-___-___-___
                DOUBLE M B LOC:0-___-___-___
             F1 - RESERVE LOC        F3 - UNRESERVE LOC
             F4 - DISPLAY LOC
--------------------------------------------------------------------
```

2. The F1 key from the sub-menu will bring up the NEW PART LOC transaction. On the HARDWIRED terminal the display will look like this:

```
GRD001              NEW PART LOCATION         (DATE            )
--------------------------------------------------------------------

                         PART NUMBER:
                     STOCKING MODULE:
                  COMPATIBILITY CODE:
            DOUBLE MAINBIN INDICATOR:
                       PRIORITY ZONE:
                            LOCATION: 0-   -   -
            DOUBLE MAINBIN LOCATION: 0-   -   -

--------------------------------------------------------------------
F1 - RESERVE LOCATION                     F3 - UNRESERVE LOCATION
F4 - DISPLAY LOCATION
```

3. The purpose of this transasction is to request and reserve a mainbin or double mainbin location for putaway of a new part.

4. A location can be requested by input of the part number, stocking module and compatibility code. If desired, the double main bin indicator may be input. This will direct the system to search for a mainbin which has an associated double mainbin with the same stocking module and compatibility code.

5. The priority zone may be input if desired or the priority zone will be determined from the first position of the valid priority zones in the compatibility code record.

6. When reserved, a 291 transaction is created and sent to the FPC, thus setting up a mainbin location on the Parts Mainbin File.

GRID MANAGEMENT SUBSYSTEM

D.

7. Upon the display of the system selected location warehouse personnel will have the ability to reserve or release the location.

E. Resize Main Bin (F2)

1. This transaction allows warehouse personnel to request and reserve a location for resize of a mainbin location during the putaway process or analysis of the warehouse.

2. The F2 key from the sub-menu will bring up the RESIZE MAIN BIN transaction. On the FM terminal the display will look like this:

```
GRD002 00 RESIZE MAIN BIN      (DATE)
STOCK MOD:_____ PART NUM: _:________
DOUBLE M B IND: _:_  PRIORITY ZONE: D
LOCATION:           :0-___-___-___
DOUBLE M B LOC:     :0-___-___-___
F1 - RESERVE        F3 - UNRESERVE LOC
F4 - DISPLAY LOC
```

---

3. The F2 key from the sub-menu will bring up the RESIZE MAIN BIN transaction. On the HARDWIRED terminal the display will look like this:

```
GRD002              RESIZE MAIN BIN           (DATE          )
-------------------------------------------------------------------

          STOCKING MODULE:
          PART NUMBER:
          DOUBLE MAIN BIN INDICATOR:
            LOCATION:  0-   -   -
            DOUBLE MAINBIN LOCATION:  0-   -   -
            PRIORITY ZONE:

-------------------------------------------------------------------
F1 - RESERVE LOCATION                 F3 - UNRESERVE LOCATION
F4 - DISPLAY LOCATION
```

4. When a location has been reserved, the resize activity will take place in the Location Subsystem. An alternate main bin would be established, and when the original main bin reaches stock exhaust, the alternate would become the new (resized) main bin.

GRID MANAGEMENT SUBSYSTEM

E.

5. A location can be requested by input of the stocking module and part number and pressing the F4 key. If a double main bin location is requested, the double main bin indicator is required input. This will direct the system to search for a main bin which has an associated double main bin with the same stocking module.
6. Warehouse personnel will have the ability to reserve or release the system generated selection.

F. Rebalance Main Bin (F3)

1. The F3 key from the sub-menu will bring up the REBALANCE MAIN BIN transaction. On the FM terminal the display will look like this:

```
GRD003 00 REBAL MAIN BIN        (DATE)
REQUEST AISLE:____ PART NUM: _:______
DBL M B IND:__ LOC: 0-___-___-___
         DBL M B IND: 0-___-___-___
         PRIORITY ZONE:____
F1 - RESERVE LOC     F3 - UNRESERVE LOC
F4 - DISPLAY LOC
```

2. The F3 key from the sub-menu will bring up the REBALANCE MAIN BIN transaction. On the HARDWIRED terminal the display will look like this:

```
GRD003              REBALANCE MAIN BIN          (DATE         )
---------------------------------------------------------------
                     REQUESTED AISLE:
                         PART NUMBER:
         DOUBLE MAIN BIN INDICATOR:
                            LOCATION:  0-   -   -
          DOUBLE MAIN BIN LOCATION:   0-   -   -
                       PRIORITY ZONE:
---------------------------------------------------------------
F1 - RESERVE LOCATION                F3 - UNRESERVE LOCATION
F4 - DISPLAY LOCATION
```

GRID MANAGEMENT SUBSYSTEM

F.

3. A location may be displayed by input of an aisle and part number. The double main bin indicator may be entered for additional refinement of request. This will direct the system to search for a main bin which has an associated double main bin.

4. This transaction provides warehouse personnel with the ability to request and reserve a location for rebalancing.

5. The rebalancing statistics are available through the analysis of the Warehouse Breakpoint Calculation Report, see section R of this Subsystem.

6. The Breakpoint Calculation Report statistics are updated through the monthly parts refresh.

G. Supplemental Location (F4)

1. The F4 key from the sub-menu will bring up the SUPPLEMENTAL LOCATION transaction. On the FM terminal the display will look like this:

```
------------------------------------------------------------------

                GRD004 00 SUPPL LOC           (DATE)
                STOCKING MODULE:_______
                PART NUMBER:___________
                LOCATION:           :0-___-___-___

                F1 - RESERVE LOC       F3 - UNRESERVE LOC
                F4 - DISPLAY LOC
------------------------------------------------------------------
```

2. The F4 key from the sub-menu will bring up the SUPPLEMENTAL LOCATION transaction. On the HARDWIRED terminal the display will look like this:

```
GRD004                 SUPPLEMENTAL LOCATION      (DATE          )
------------------------------------------------------------------

                STOCKING MODULE:
                PART NUMBER:
                       LOCATION: 0-   -   -

------------------------------------------------------------------
F1 - RESERVE LOCATION                    F3 - UNRESERVE LOCATION
F4 - DISPLAY LOCATION
```

G.

3. This transaction will allow warehouse personnel the ability to request and reserve a location for surplus material during the putaway process.

4. A location can be requested by the input of the stocking module and the part number.

H. Grid Location Inquiry (F5)

1. The F5 key from the sub-menu will bring up the GRID LOCATION INQUIRY. On the FM terminal the display will look like this:

```
-------------------------------------------------------------------

                GRD005 00 GRID LOC INQ          (DATE)
                LOCATION: 0-___-___-___         :
                OPENING TYPE:____ PRIORITY ZONE:____
                LOCATION UNITS: 000  AVAIL UNITS: 000
                NUMBER OF PART NUMBERS: 00

                F4 - DISPLAY LOCATION    F5 - LIST NEXT

-------------------------------------------------------------------
```

2. The F5 key from the sub-menu will bring up the GRID LOCATION INQUIRY transaction. On the HARDWIRED terminal the display will look like this:

```
GRD005               GRID LOCATION INQUIRY             (DATE       )
-------------------------------------------------------------------

         LOCATION: 0-    -    -                  :
                              OPENING TYPE:
                             PRIORITY ZONE:
                            LOCATION UNITS: 000
                           AVAILABLE UNITS: 000
                    NUMBER OF PART NUMBERS: 00

-------------------------------------------------------------------
F4 - LIST                                  F5 - LIST NEXT
```

3. When a complete location aisle, tier and level are input, the system will respond the associated location detail.

4. When an aisle is input and the F4 key pressed, the system will bring up the first tier and level in the requested aisle.

GRID MANAGEMENT SUBSYSTEM

H.

5. To get the first record in the GRID file, press the F4 key with the aisle, tier and level blank.

6. Locations that are displayed in this inquiry are only those that are being utilized, whether partial or complete.

I. Grid Management Maintenance (F1)

1. The maintenance menu is accessed from the subsystem main menu when the F1 key is pressed.

```
GRD090              GRID MANAGEMENT MAINTENANCE          (DATE        )
--------------------------------------------------------------------------

                    F1 - GRID AREA FILE UPDATE

                    F2 - STOCKING MODULE FILE UPDATE

                    F3 - AISLE/PRIORITY FILE UPDATE

                    F4 - OPENING TYPE FILE UPDATE

                    F5 - GRID LOCATION FILE UPDATE

                    F6 - COMPATIBILITY FILE UPDATE

                    F7 - PRINT GRID LOCATION REPORTS

                    F8 - GRID TO PART EXCEPTION REPORT

                    F9 - START BATCH PROCESSES

--------------------------------------------------------------------------
```

2. The contents of this menu will allow for maintenance and report writing of the Grid Management Subsystem. The contents of this menu will not be available to the FM terminals.

J. Grid Area File Update (F1)

1. Maintenance to the area file can be accomplished when F1 is selected from the maintenance menu.

GRID MANAGEMENT SUBSYSTEM

J.1.

```
GRD006              GRID AREA FILE UPDATE              (DATE        )
-----------------------------------------------------------------------

                                AREA: ___
                    AREA DESCRIPTION: ____________

                     BEGINNING AISLE: ___
                        ENDING AISLE: ___

                              PRIORITY ZONE     1      2      3
              MAINBIN AISLE SURPLUS MAX:       _0     _0     _0
              CORRESP AISLE SURPLUS MAX:       _0     _0     _0

          BREAKPOINT PRIORITY  1-2:  00.00
          BREAKPOINT PRIORITY  2-3:  00.00
          NUMBER OF PRIORITY ZONES:   _0
     NEXT SUPPLEMENTAL SEARCH AREA:  ___

-----------------------------------------------------------------------
F4 - LIST            F5 - LIST NEXT             F6 - ADD
F7 - UPDATE         SF8 - DELETE
```

2. Input of the AREA and pressing the F4 - List key will produce a record of what is currently on file for a particular area.

3. If the AREA is left blank and the F4 - List key is pressed, the first record on the file will be displayed.

4. By selecting either add, change or delete the appropriate change will be made to the area file.

5. F4 - List must be used prior to any change of delete.

K. Stocking Module File Update (F2)

1. Stocking module maintenance can be performed when F2 is selected from the maintenance menu.

GRID MANAGEMENT SUBSYSTEM

K.1.

```
GRD007             STOCKING MODULE FILE UPDATE            (DATE      )
-----------------------------------------------------------------------

                STOCKING MODULE CODE:  ____

                STOCKING MODULE UNITS:  ____

                STOCKING MODULE DESCRIPTION:  ______________

                PRIMARY OPENING TYPE:  ____

                SECONDARY OPENING TYPES:  ___ ___ ___ ___ ___

-----------------------------------------------------------------------
F4 - LIST                     F5 - LIST NEXT                  F6 - ADD
F7 - UPDATE                  SF8 - DELETE
```

2. The stocking module code is required input.

3. If the stocking module is left blank and the F4 - List key is pressed, the first record on the fill will be displayed.

4. Changes may be made to the balance of the fields and with selection of the desired function code.

5. F4 - List must be used prior to any change or delete.

L. Aisle/Priority File Update (F3)

1. This file may be maintenanced when the F3 option is selected from the maintenance menu.

GRID MANAGEMENT SUBSYSTEM

L.1.

```
GRD008                AISLE/PRIORITY FILE UPDATE    (DATE      )
-----------------------------------------------------------------

BEGINNING AISLE NUMBER: ___               ENDING AISLE: ___
       BEG AISLE TIER: ___
       END AISLE TIER: ___
      BEG AISLE LEVEL: ___
      END AISLE LEVEL: ___
CORRESPONDING SURPLUS AISLE: ___          ENDING SURPLUS AISLE: ___
TOTE CONTRAINT IND: ___

          BEGINNING   ENDING                BEGINNING   ENDING
          TIER  LVL   TIER  LVL             TIER  LVL   TIER  LVL

ZONE 1:   ___   ___   ___   ___  EXCLUSION: ___   ___   ___   ___

ZONE 2:   ___   ___   ___   ___  EXCLUSION: ___   ___   ___   ___

ZONE 3:   ___   ___   ___   ___  EXCLUSION: ___   ___   ___   ___

SURPUS:   ___   ___   ___   ___  EXCLUSION: ___   ___   ___   ___
-----------------------------------------------------------------
F4 - LIST               F5 - LIST NEXT                F6 - ADD
F7 - UPDATE            SF8 - DELETE
```

2. Required input for this screen is either beginning aisle number or beginning and ending aisle number. This is valid for the add, change or delete updates.

3. F4 - List is required for either a change or delete update.

4. Up to four priority zones may be established for <u>each aisle</u> or <u>range of aisles</u> if beginning/ending aisles are different.

5. The existing detail for a given aisle or aisle range may be examined when the list option is selected.

6. The priority zone concept is explained further in Exhibits A and B of this subsystem.

M. <u>Opening Type File Update (F4)</u>

1. Opening type maintenance may be accomplished when F4 is selected from the maintenance menu.

GRID MANAGEMENT SUBSYSTEM

M.1.

```
GRD009          OPENING TYPE FILE UPDATE          (DATE     )
------------------------------------------------------------------
          OPENING TYPE: ____
         OPENING UNITS: 000
           DESCRIPTION: ___________________________________
                 AREAS: __ __ __ __ __ __ __ __ __ __ __ __ __

        __ BEG AISLE: ___    BEG TIER: ___    BEG LEVEL: ___
           END AISLE: ___    END TIER: ___    END LEVEL: ___

        __ BEG AISLE: ___    BEG TIER: ___    BEG LEVEL: ___
           END AISLE: ___    END TIER: ___    END LEVEL: ___

        __ BEG AISLE: ___    BEG TIER: ___    BEG LEVEL: ___
           END AISLE: ___    END TIER: ___    END LEVEL: ___

        __ BEG AISLE: ___    BEG TIER: ___    BEG LEVEL: ___
           END AISLE: ___    END TIER: ___    END LEVEL: ___
------------------------------------------------------------------
F4 - LIST                 F5 - LIST NEXT     F6 - ADD
F7 - UPDATE              SF8 - DELETE       SF9 - DELETE RANGES
F10 - LIST NEXT RANGES
```

2. The OPENING TYPE is a five position alpha/numeric code which will assign a unique identification to an opening.

3. The DESCRIPTION area is freeform, it should contain identifying or functional remarks about the opening type. It should contain the height of the opening. This would be used when valid opening types are assigned to a stocking module in Stocking Module Update, section K of the subsystem.

4. If it is desirable to add an opening type, total units and at least one area are required input, the description is valuable and should be included.

5. When the file is to be updated by a change or delete, only the opening type is required input. The F4 - List is required prior to the update.

6. There is no limit to the number of opening ranges that can be created.

GRID MANAGEMENT SUBSYSTEM

N. Grid Location File Update (F5)

1. The grid location file can be maintenanced when the F5 key is chosen from the maintenance menu.

```
GRD010               GRID LOCATION FILE UPDATE      (DATE      )
--------------------------------------------------------------------

                      LOCATION: 0-   -   -
                  END LOCATION: 0-   -   -  (FOR BATCH REQUEST ONLY)

                  OPENING TYPE: _____
                    UNITS USED:    0
                UNITS RESERVED:    0
                 DATE RESERVED:    0
               NUMBER OF PARTS:  0
            COMPATIBILITY CODE: __
                   STATUS CODE: _
      DOUBLE MAIN BIN LOCATION:   -   -

--------------------------------------------------------------------
F4 - LIST                F5 - LIST NEXT                  F6 - ADD
F7 - UPDATE             SF8 - DELETE
```

2. When a record is added to the file, the beginning or beginning and ending location is required input, as well as the opening type. Additional fields should be input as required.

3. A change or delete to the location record may be accomplished with required input of the beginning or beginning and ending location range. F4 - List is required prior to a change or delete update.

4. When a specific location is updated the system will respond on a real-time basis.

5. When more than one location is updated through one transaction update (mass changes) the transactions will be batched for later processing.

6. The batched transactions will be processed and update the file through, START BATCH PROCESSES, section R of this subsystem.

GRID MANAGEMENT SUBSYSTEM

O. Compatibility File Update (F6)

1. Access to the compatibility code maintenance screen is available through the F6 key from the maintenance menu.

```
GRD011              COMPATIBILITY FILE UPDATE    (DATE     )
-------------------------------------------------------------

     COMPATIBILITY CODE: ___
     COMPATIBILITY DESCRIPTION: ______________________________
     PRIORITY ZONES _ _ _ _

     __ BEG AISLE: ___   BEG TIER: ___    BEG LEVEL: ___
        END AISLE: ___   END TIER: ___    END LEVEL: ___

     __ BEG AISLE: ___   BEG TIER: ___    BEG LEVEL: ___
        END AISLE: ___   END TIER: ___    END LEVEL: ___

     __ BEG AISLE: ___   BEG TIER: ___    BEG LEVEL: ___
        END AISLE: ___   END TIER: ___    END LEVEL: ___

     __ BEG AISLE: ___   BEG TIER: ___    BEG LEVEL: ___
        END AISLE: ___   END TIER: ___    END LEVEL: ___

-------------------------------------------------------------
F4 - LIST              F5 - LIST NEXT          F6 - ADD
F7 - UPDATE           SF8 - DELETE            SF9 - DELETE RANGES
F10 - LIST NEXT RANGES
```

2. Required input for either update or delete is the compatibility code and the F4 - LIST key.

3. Additional fields may be input as desired if an update is desired.

4. A record may be added to the compatibility base with required input of the compatibility code and at least one location range.

5. Up to four different location ranges may be created for each individual compatibility code. There is no limit to the number of location ranges available for one compatibility code.

6. Updates to the compatibility data base is real-time. A screen response will confirm a successful update.

7. An example of compatibility code range is provided in EXHIBIT C.

GRID MANAGEMENT SUBSYSTEM

P. Print Grid Location Reports (F7)

1. The F7 key from the Grid Management Maintenance screen will allow access to this screen.

```
GRD012        PRINT GRID LOCATION REPORTS        (DATE          )
------------------------------------------------------------------
              REPORT OPTIONS:
                 LOCATION
                    BEGINNING AISLE: ___
                       ENDING AISLE: ___
                       OPENING TYPE: _____
                      PRIORITY ZONE: _
                 COMPATIBILITY CODE: _ _

------------------------------------------------------------------
F1 - PRINT ALL LOCATIONS            F2 - PRINT AVAILABLE LOCATIONS
F3 - PRINT ALL FILLED LOCATIONS     F4 - PRINT SUMMARY UTILIZATION
```

2. Two different report formats are available from this screen, Grid Locations Report By Location (Exhibit E) and Aisle Summary Utilization (Exhibit F).

3. The AISLE SUMMARY UTILIZIATION report will be generated when any of the other three reports are called for, or it may be generated by itself when the F4 key is selected. It is not necessary to enter an aisle range, opening type, priority zone or compatibility code to access this report.

4. The selections that can be specified for the GRID LOCATIONS REPORT By Location are:

   a. An aisle range can be specified; if left blank, the entire warehouse will be selected and reported on.

   b. A location size (opening type) can be specified; if left blank, all opening types will be included.

   c. The priority zone (1 thru 4) can be specified; if blank, all priorities will be included.

   d. The compatibility code may be specified; if left blank, all codes will be reported on.

5. After the inputs to the grid Locations Report are specified the report may be further defined by selecting either all locations, available locations or those locations which are currently being used (filled).

6. The reports are batch processed off line. The system will respond to the screen with the process status.

GRID MANAGEMENT SUBSYSTEM

Q. Grid to Part Exception Report (F8)

```
GRD013            GRID TO PART EXCEPTION REPORT       (DATE        )
--------------------------------------------------------------------

            REPORT OPTIONS:

                  BEGINNING AISLE: ____

                     ENDING AISLE: ____

                    HIGH PRIORITY: __

                     LOW PRIORITY: __

--------------------------------------------------------------------
F1 - VALIDATE ALL                       F2 - VALIDATE PRIORITY ZONES
F3 - VALIDATE COMPATIBILITY CODES       F4 - VALIDATE STOCKING MODULE
```

1. The F8 option from the maintenance menu will allow access to this report request screen.

2. The purpose of the Exception Report (Exhibit G) is to compare the compatibility code, priority level and stocking module for grid locations from the grid location file to locations in the part main bin file. Only differences between the two bases are printed on the report.

3. When the F2 key is selected for VALIDATE PRIORITY ZONES a report is generated which will show which parts should be moved to a higher or lower priority based on their bin trips and the calculated breakpoint values.

4. A message will appear next to each line detailing the exception condition and an asterisk will appear beside the field in error.

5. A beginning and ending aisle may be specified.

6. By selecting a desired high and low priority level, the report can be further refined to meet specific needs.

7. If the location and/or priority level are left blank, all locations and/or priorities will be reported on.

8. When the location and priority options are set the PDC has the option to select either compatibility code, priority zone, stocking module or all three for validation.

9. Validation will be accomplished with the selection of the appropriate function key.

GRID MANAGEMENT SUBSYSTEM

R. Start Batch Processes (F9)

GRD014 START BATCH PROCESSES (DATE)

BREAKPOINT CALCULATION: ____

DATA FILE LISTING: ____

F1 - START SELECTED PROCESS

1. To access this start process maintenance screen the F9 key is selected from the Grid Management Maintenance menu.

2. Valid input for options selection is an X in the appropriate space. Both options may be selected if so desired.

   a. Breakpoint calculation (Exhibit I) - will start an off-line process to calculate breakpoint values between priority zones and compare that value with the actual priority zone in each location. Warehouse locations are subdivided by area on this report.

   b. The bintrips which are used to calculate the breakpoint report are updated through the monthly parts refresh.

   c. Data File Listing - will start an off-line activity to list the opening type table, stocking module table and the compatibility code and description (Exhibit J). This report is used as reference when opening types, stocking modules or compatibility codes are reviewed.

3. In addition to the above-mentioned reports, three Grid reports will be run nightly. The reports are operator activated.

   a. Update Reserved Units - will update the Grid Location Data Base with the detail that is provided from a reserve location decision in the new part, resize, rebalance and surplus transactions. The detail which will be updated from these transactions is covered in sections D, E, F and G of this subsystem.

GRID MANAGEMENT SUBSYSTEM

R.3.

b. Batch File Maintenance will start on off-line activity which will process all batch transactions from Grid Location File Update (section N of this subsystem).

   This process will generate the File Maintenance Report (Exhibit H). Mass add, change and delete transactions will be identified on this report. Individual (one at a time) transactions done in Grid Location Maintenance will not appear on this report, they are processed real-time.

c. Availability File Build will update the Grid file with all available locations processed during the day, whether the availability is caused by adds or deletes to the file.

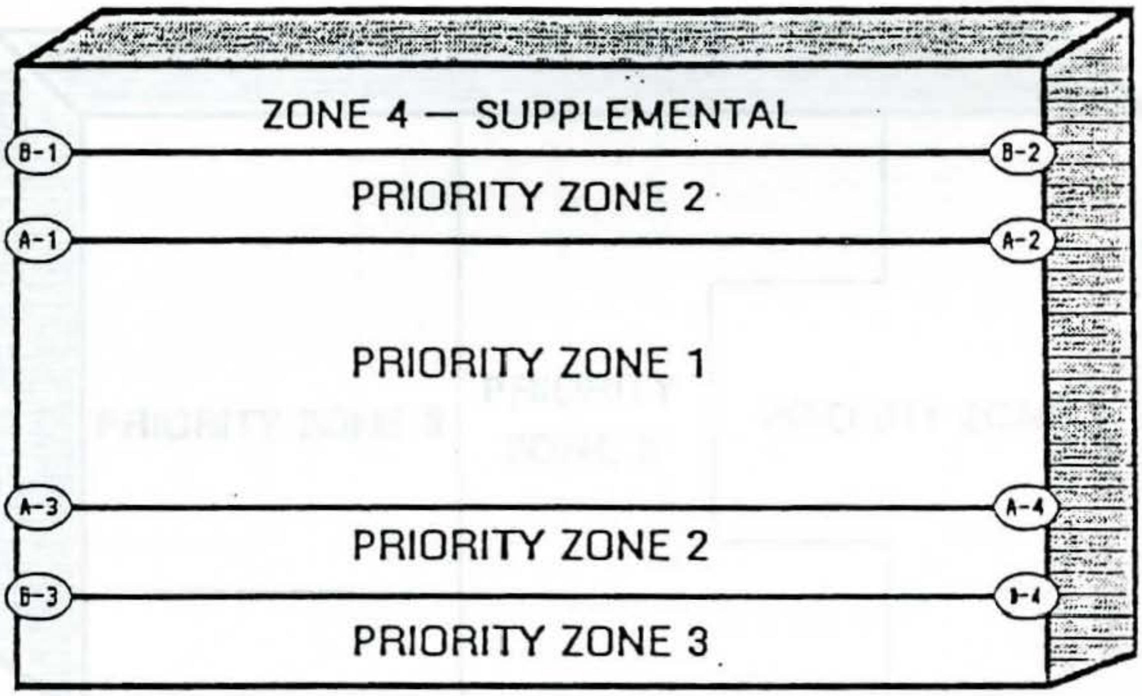
This Grid Management Subsystem has allowed us to more effectively unload rail cars and truckloads of material and expedite them to an open bin. This eliminates double bin master part locations and also allows stock to flow to these locations and has nearly eliminated back order stock. By allowing stock to flow to the main locations quicker, we have eliminated the need for excess space used to store material until it could be taken to the master location. This, in turn, has given us seven percent more floor space to set up new master locations and has improved quality by enabling us to redo cluttered masters that had two or three parts located in them. This also makes picking the parts easier since part numbers are not jammed and mixed together. The Grid Management System has also allowed us to do a much more effective job of scheduling freight into our warehouse. We now have a better feel for current inventory on hand, number of bin trips per day, days supply on hand, and future requirements. This has saved us nearly $100,000 over the past seven-week period in penalty charges to the railroad and trucking companies for rail cars and trailers we could not unload on time and had to delay. We can now schedule these switches in and out on a timely basis. We have also become more effective by unloading freight on two shifts rather than one. Stock does not jam up this way, and the freight floor can now be left clear and ready for the next shift to start on cars and trailers for their shift. By each shift working their own stock, we have reduced lost stock or misplaced stock by 17 percent. Errors on paperwork, due to two or three people from different shifts handling the same order, have decreased by 14 percent.

We have also recently begun establishing priority zones which allow us to locate like items and faster-moving items in a more central location. Once completely in place, this will greatly reduce picker walking time as compared to our current time study for nearly 37 percent of our binnable items. The basis of the priority zone system is as follows:

GRID MANAGEMENT SUBSYSTEM

PRIORITY ZONE BINNABLE AISLE EXHIBIT A

A SIDE VIEW OF A BINNABLE AISLE



1. Priority Zones are established in AISLE/PRIORITY FILE MAINTENANCE, section L of this subsystem.

2. A typical aisle may be prioritized as shown above. The area mapped by A-1, A-2, A-3 and A-4 represents Priority Zone 1, this is the highest Priority Zone based on bintrips.

3. The area mapped by B-1, B-2, B-3 and B-4 represents Priority Zone 2.

4. When the coordinates are set for Zone 2 in Aisle/Priority File Maintenance, the coordinates for Zone 1 must be entered as the area of EXCLUSION.

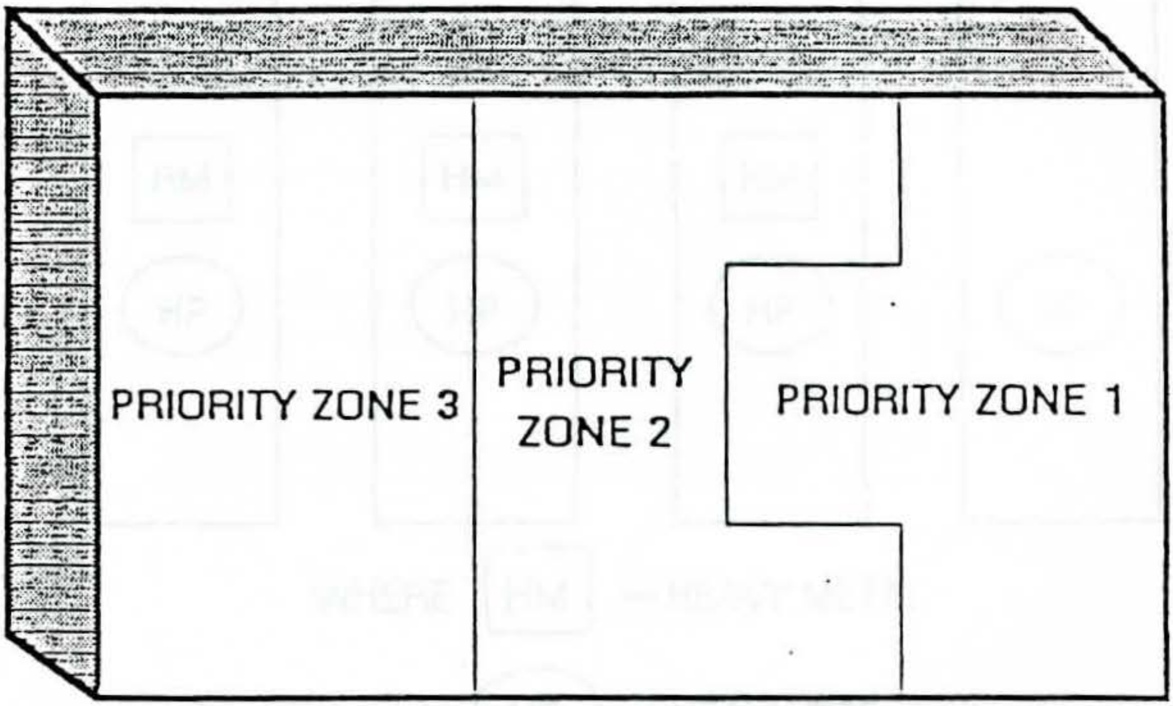
5. Priority Zones 3 and 4 do not overlap other Zones, therefore it is not necessary to exclude zone coordinates when establishing Zones 3 and 4.

6. Zone 4 is a supplemental Zone only, order processing will not direct picking to this location.

GRID MANAGEMENT SUBSYSTEM

PRIORITY ZONE ABRS AISLE EXHIBIT B

A SIDE VIEW OF AN ABRS AISLE



1. Priority Zones are established in AISLE/PRIORITY FILE MAINTENANCE, section L of this subsystem.

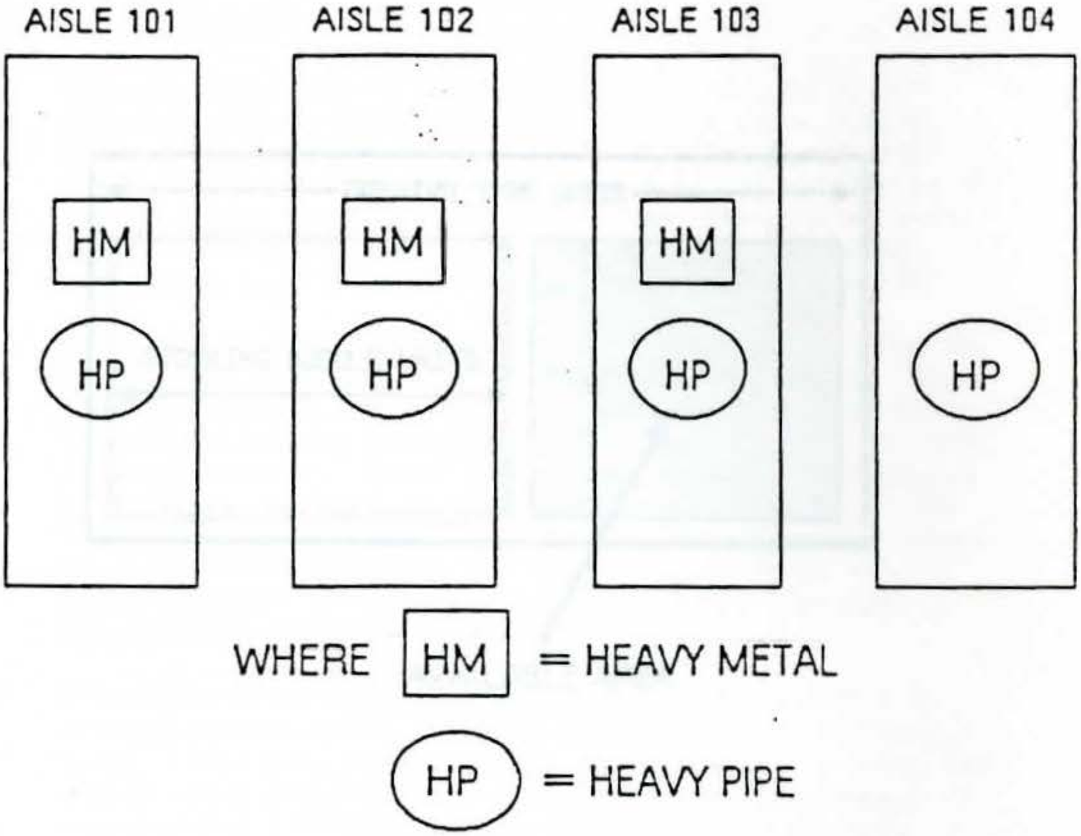
2. The same decision logic that applies to a binnable aisle (see EXHIBIT A) will apply to a typical ABRS aisle.

3. An ABRS aisle would not utilize the Zone 4 supplemental concept, surplus is not located in ABRS.

GRID MANAGEMENT SUBSYSTEM

COMPATIBILITY CODE EXAMPLE EXHIBIT C

AN OVERHEAD VIEW



1. The 2 position COMPATIBILITY CODE is established in Compatibility Code File Maintenance, section O of this subsystem.

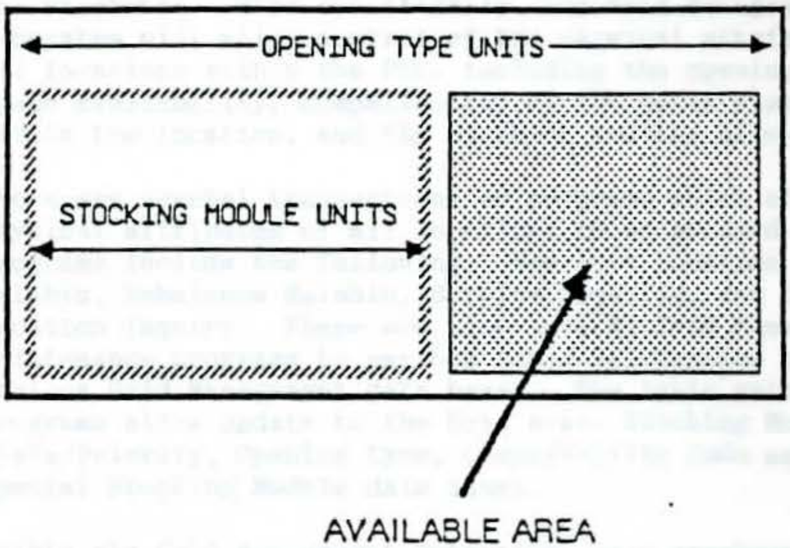
2. In this example, the Code HM has an aisle range of 101 through 103. The tier and level were not selected, thus parts with the Code HM may be located anywhere in aisles 101, 102 or 103.

3. The Code HP has an aisle range of 101 through 104. The tier and level were not selected, therefore parts with a Code of HP may be located throughout the aisles.

GRID MANAGEMENT SUBSYSTEM

STOCKING UNIT EXAMPLE EXHIBIT D

A FRONT VIEW OF AN OPENING



1. The Stocking Units for an opening type and a Stocking Module are input in OPENING TYPE MAINT. (section M) and STOCKING MODULE MAINT. (section K) respectively.

2. The comparison of Stocking Module Units to Opening Types Units is handled by the system.

FIELD OPERATING MANUAL
GROUP 1348

Subject: Tandem - Grid Management Subsystem

A. General Information

1. The purpose of the Grid Management Subsystem is to provide the ability to manage the storage of parts within the warehouse. More specifically, the Grid Management Subsystem will allow control of the physical attributes of all locations within the PDC, including the opening size, space availability, compatibility of the parts stored within the location, and the stocking modules allowed.

2. There are several transactions or programs which allow the physical attributes of all locations to be managed. These programs include the following: New Part Location, Resize Mainbin, Rebalance Mainbin, Surplus Location, and the Grid Location Inquiry. There are also several Grid Management maintenance programs to perform table maintenance of the various Grid Management data bases. The table maintenance programs allow update to the Grid Area, Stocking Module, Aisle/Priority, Opening Type, Compatibility Code and Special Stocking Module data bases.

3. Within the Grid Management Subsystem, each warehouse is divided into a series of areas designed to fit individual needs. Each area is defined in a table with beginning and ending aisle numbers. The areas have a maximum number of supplemental locations per part and the priority zone breakpoints are calculated for parts within that area. In addition, the priority zone is mapped by beginning and ending tier and level as well as each exclusion area within each priority zone.

4. All opening types used in the warehouse are defined in a table with the ranges of aisle, tier and level. A size description may be stated in inches or feet or an arbitrary unit and will represent the horizontal length of the opening.

5. Stocking modules are defined by each PDC and maintained in a table with the number of stocking units required for the module. Each module is assigned a primary opening type and can be asigned up to five (5) secondary opening types.

6. Compatibility codes are also defined in a table by aisle, tier and level, and maintained by each PDC. The codes are associated with valid stocking modules and priority zones to insure that parts of similar weight and size are stored together in a specific area.

GROUP OPERATING MANUAL
GROUP 1348

A.

7. The Grid Management concept applies to either a specific warehouse area or to an entire warehouse. The Grid Management Subsystem will identify open locations for part putaway and will assist in location selection for new parts. Overall, Grid Management will assist in balancing like parts stocked in the warehouse, allowing for more efficient picking.

8. When building initial grid files, they <u>must</u> be loaded in this sequence:

   a. GRD006 - Grid Area
   b. GRD008 - Aisle Priority
   c. GRD009 - Opening Type
   d. GRD007 - Stocking Module
   e. GRD011 - Compatibility Code

   The initial Grid Location build, GRD308, can now be run.

NOTE: Refer to Groups 1349 through 1364 in this manual for detailed information regarding the Grid Management Subsystem.

B. <u>Grid Management - Logon/Logoff/HELP</u>

1. A system logon is required to access the Tandem System and its subsystems. Refer to Group 1300, Section B-1 of this manual for information regarding the logon procedure.

2. To logoff the Tandem System, press the SF2 key from any screen and the system will return to the logon display.

3. For detailed information on the Tandem System HELP function, refer to Group 1300, Sections B-5 through B-10 of this manual.

C. <u>WIC Subsystem Main Menu - WIC000</u>

1. After successful logon, by pressing the F1 key on the Menu of Tan Subsystems (refer to Group 1300, Section B-2 of this manual), the system will return the Tan WIC Menu, Screen Display #1.

FIELD OPERATING MANUAL
GROUP 1348

C.1.

Screen Display #1

WIC000 TAN WIC MENU DATE: XX/XX/XX XX:XX:XX

F1 - GENERAL INQ
F2 - GRID MANAGEMENT
F3 - RECEIVING
F4 - PUTAWAY
F5 - MATERIAL RETURN
F6 - PICKING
F7 - SHIPPING
F8 - CONVEYOR
F9 - SUPERVISOR
F10 - LOST AND FOUND
F11 - RECEIVING
F13 - PACKING
F14 - CFIA
F15 - WIC PURGE
SF1 - RETURN

TO GET HELP FOR AN ITEM, POSITION THE CURSOR AT THE ITEM AND PRESS SF3

2. F2 - Grid Management Menu

a. The grid Management Menu, Screen Display #2, is accessed from Screen Display #1 when the F2 is selected.

b. Refer to Groups 1349 through 1353 for a more detailed description of the respective function keys on this menu.

Screen Display #2

GRD000 GRID MANAGEMENT MENU DATE: XX/XX/XX XX:XX:XX

F1 - NEW PART LOCATION
F2 - RESIZE MAIN BIN
F3 - REBALANCE MAIN BIN
F4 - SUPPLEMENTAL LOCATION
F5 - GRID LOCATION INQUIRY
SF1 - RETURN

TO GET HELP FOR AN ITEM, POSITION THE CURSOR AT THE ITEM AND PRESS SF3

READY

FIELD OPERATING MANUAL
GROUP 1349

Subject: Tandem - Grid Management Subsystem
New Part Locatin - GRD001

A. General Information

1. The purpose of the New Part location program is to provide the ability to request and reserve a location for putaway of a new part.

2. A location can be requested by entering a part number, stocking module, compatibility code and double main bin indicator, if necessary. Once this information has been entered, press the F4 key. The priority zone can be input, if desired, or the system will default to a priority zone. The default priority zone is determined from the first position of the valid priority zones in the compatibility code record. A location which meets all the attributes entered on the screen and a double main bin location will be displayed, if one was requested.

3. To assign a double main bin location, enter the part number, stocking module, compatibility code, priority zone number and a "Y" in the Double Main Bin Indicator field. After entering the information, press the F4 key. The second field displayed after the Location field is the double main bin location. Press F1 to add the displayed locations, if they are desirable.

4. When all variables to request a location for a part number remain the same, the search for the location begins in the next aisle meeting those characteristics from the last aisle/location that was assigned.

B. New Part Location - Screen Display and Definition of Data Fields

1. When F1, New Part Location, is selected on the Grid Management Menu (Group 1348, Screen Display #2), the following screen display will appear with the cursor in the Part Number field.

2. To access HELP information on the screen operation, position the cursor in any input field on the display and press the SF3 key to display HELP for that field. Press the SF7 key to position yourself at the first page of the HELP description for this page. You may now "page" through the file sequentially by pressing the SF8 key.

FIELD OPERATING MANUAL
GROUP 1349

B.2.

NOTE: The following F keys are provided on this screen display to perform additional functions:

F1 - ADD LOCATION - The Add Location key will set up the part entered on the screen in the location that has been selected and displayed on the screen. This adds a part record to the parts main bin file.

F4 - DISPLAY LOCATION - To display a location, enter the part number, stocking module and compatibility code. The priority zone and double main bin indicator may be entered, if necessary. The F4 key is then pressed to display a location.

Screen Display

```
GRD001  001       NEW PART LOCATION          XX/XX/XX  XX:XX:XX
-----------------------------------------------------------------

                PART NUMBER:  IIIIIIIII

            STOCKING MODULE:  IIIII

         COMPATIBILITY CODE:  II

  DOUBLE MAINBIN INDICATOR:  I

              PRIORITY ZONE:  I

                   LOCATION:  X - XXX- XXX- XX

   DOUBLE MAINBIN LOCATION:  X - XXX- XXX- XX

-----------------------------------------------------------------
F1 - ADD LOCATION                    F4 - DISPLAY LOCATION

XXXXXXX:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

NOTE: I = INPUT FIELD(S)
X = SYSTEM GENERATED FIELD(S)

3. Listed below are the data fields and definitions of the information that will appear in each field.

Data Fields	Definitions and Data Entry Requirements
PART NUMBER: (9 Positions-A/N)	Enter the GM service part number.

FIELD OPERATING MANUAL
GROUP 1349

B.3.

Data Fields	Definitions and Data Entry Requirements
STOCKING MODULE: (5 Positions-A/N)	Enter the code used to represent a type of storage container. Each stocking module can have up to six different opening types into which it can be placed.
COMPATIBILITY CODE: (2 Positions-A/N)	Enter the PDC established code used to insure parts similar in weight and size are stored together in an area. Each part number has a unique compatibility code associated with it (1 primary and 5 secondary).
DOUBLE MAINBIN INDICATOR: (1 Position-N)	Enter an indicator which will determine if a double main bin will be displayed. A double main bin is a secondary location within a PDC that allows storage of identical parts in bins that are side by side or stacked on top of one another in two levels. The double main bin location is actually a surplus location to be filled with the same part. Valid indicators are: Y - To create a double main bin location. N or Spaces - Do not create a double main bin location.
PRIORITY ZONE: (1 Position-N)	Enter the priority zone number which identifies an area within an aisle. This will allow the higher moving parts to be stored in priority zone 1 which is generally in the middle of the aisle and easily accessible to the picker. Priority zone 2 is generally defined around the outside perimeter of priority zone 1. Priority zone 2 will contain those parts that are a little slower moving than priority zone 1 but not as slow as priority zone 3 parts. Priority zone 4 is the surplus locations that are located in the aisle. Priority zones are used in relocating parts based on the number of bin trips for the previous month.

FIELD OPERATING MANUAL
GROUP 1349

B.3.

Data Fields	Definitions and Data Entry Requirements
LOCATION:	A location in the warehouse which consists of plant indicator, aisle, tier, and level. Each grid location record represents a unique physical location in the warehouse. The screen displays the recommended location in the plant which is available and where all of the priority zone, compatibility code, and stocking module requirements are allowed.
DOUBLE MAINBIN LOCATION:	A secondary location within a PDC that allows storage of identical parts in bins that are side by side or stacked on top of one another in two levels. The double main bin location is actually a surplus location to be filled with the same part.

FIELD OPERATING MANUAL
GROUP 1350

Subject: Tandem - Grid Management Subsystem
Resize Mainbin - GRD002

A. General Information

1. The purpose of the Resize Main Bin program is to provide the ability to request and reserve a location for resize of a main bin location during the putaway process or analysis of the warehouse. Resize may be used to locate parts to a larger or smaller main bin, based on its new attributes.

2. A location can be requested by entering a part number and stocking module. Entry of a compatibiity code is necessary only if it is different from the current one. If the compatibility code is not entered, the system will use the compatibility code from the parts main bin record. The double main bin indicator may be entered, if necessary. Once this information has been entered, press the F4 key. The priority zone is not to be entered. The system will calculate the priority zone based on the bin trips of the previous month stored on the parts main bin file for the part number entered. When the F4 key is pressed and a double main bin is requested, the second Location field displayed is the double main bin location.

3. The search for a location of subsequent parts begins at the next aisle from last assigned.

4. To assign a double main bin location, enter a "Y" in the Double Main Bin Indicator field, after entering the part number, stocking module and the double main bin indicator. The compatibility code may be entered, if desired, and the priority zone will be calculated based on the bin trips for the previous month. Press the F4 key. The second Location field displayed is the double main bin location. Press F1 to add the displayed locations, if desired.

B. Resize Mainbin - Screen Display and Definition of Data Fields

1. When F2, Resize Main Bin, is selected on the Grid Management Menu (Group 1348, Screen Display #2), the following screen display will appear with the cursor in the Part Number field.

2. To access HELP information on the screen operation, position the cursor in any input field on the display and press the SF3 key to display HELP for that field. Press the SF7 key to position yourself at the first page of the HELP description for this screen. You may now "page" through the file sequentially by pressing the SF8 key.

FIELD OPERATING MANUAL
GROUP 1350

B.2.

NOTE: The following F keys are provided on this screen display to perform additional functions:

F1 - ADD LOCATION - The Add Location key will set up a part record on the alternate main bin file if alternate main bins are allowed on the location options record. If alternate main bins are not allowed, the system will actually change the parts main bin record location to the displayed location.

F4 - DISPLAY LOCATION - Once the part number, stocking module, and if necessary, the compatibility code and double main bin indicator have been entered, press the F4 key. The system will display the location that matches the entered attributes.

Screen Display

```
GRD002  001        RESIZE MAINBIN              XX/XX/XX  XX:XX:XX
--------------------------------------------------------------------

                         PART NUMBER:  IIIIIIIII

                     STOCKING MODULE:  IIIII

                  COMPATIBILITY CODE:  II

            DOUBLE MAINBIN INDICATOR:  I

                       PRIORITY ZONE:  X

                            LOCATION:  X - XXX- XXX- XX

             DOUBLE MAINBIN LOCATION:  X - XXX- XXX- XX

--------------------------------------------------------------------
F1 - ADD LOCATION              F4 - DISPLAY LOCATION

XXXXXXX:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

NOTE: I = INPUT FIELD(S)
X = SYSTEM GENERATED FIELD(S)

3. Listed below are the data fields and definitions of the information that will appear in each field.

Data Fields	Definitions and Data Entry Requirements
PART NUMBER: (9 Positions-A/N)	Enter the GM service part number.

FIELD OPERATING MANUAL
GROUP 1350

B.3.

Data Fields	Definitions and Data Entry Requirements
STOCKING MODULE: (5 Positions-A/N)	Enter the stocking module used to represent a type of storage container. Each stocking module can have up to six different opening types into which it can be used (1 primary and 5 secondary).
COMPATIBILITY CODE: (2 Positions-A/N)	Enter the PDC established code used to insure parts similar in weight and size are stored together in an area. Each part number has a unique compatibility code associated with it.
DOUBLE MAINBIN INDICATOR: (1 Position-A)	Enter an indicator which will determine if a double main bin will be displayed. A double main bin is a secondary location within a PDC that allows storage of identical parts in bins that are side by side or stacked on top of one another in two levels. The double main bin location is actually a surplus location to be filled with the same part. Valid indicators: Y - To create a double main bin location. N or Spaces - Do not create a double main bin location.
PRIORITY ZONE:	The priority zone number identifies an area within an aisle. This will allow the higher moving parts to be stored in priority zone 1 which is generally in the middle of the aisle and easily accessible to the picker. Priority zone 2 is generally defined around the outside perimeter of priority zone 1. Priority zone 2 will contain those parts that are a little slower moving than priority zone 1 but not as slow as priority zone 3 parts. Priority zone 4 is the surplus location that is located in the aisle. Priority zones are used in relocating parts based on the number of bin trips for the previous month.

FIELD OPERATING MANUAL
GROUP 1350

B.3.

Data Fields	Definitions and Data Entry Requirements
LOCATION:	A location in the warehouse which consists of plant indicator, aisle, tier and level. Each grid location record represents a unique physical location in the warehouse.
DOUBLE MAINBIN LOCATION:	A double main bin location represents a secondary location within a PDC that allows storage of identical parts in bins that are side-by-side or stacked on top of one another in two levels. The double main bin location is actually a surplus location to be filled with the same part.

FIELD OPERATING MANUAL
GROUP 1351

Subject: Tandem - Grid Management Subsystem
Rebalance Mainbin - GRD003

A. General Information

1. The purpose of the Rebalance Main Bin program is to provide the ability to request and reserve a location for rebalancing and moving a main bin location discovered through analysis of the warehouse breakdown calculation report. Either low volume parts can be moved to a high volume aisle, or high volume parts to a low volume aisle.

2. A location can be requested by input of the requested aisle, part number and double main bin indicator, if necessary. Compatibility code and stocking module are determined from the main bin part location. The priority zone is determined by the number of bin trips for the part location and the calculated breakpoints in that area. Press the F4 key to display the new "rebalanced" location. If the F4 key is pressed, and a double main bin is requested, the second Location field displayed is the double main bin location.

3. To assign a double main bin location, enter a "Y" in the Double Main Bin Indicator field. After entering the part number, aisle number and the double main bin indicator, press the F4 key. The second Location field displayed is the double main bin location. Press F1 to add the displayed locations, if they are desirable.

B. Rebalance Mainbin - Screen Display and Definition of Data Fields

1. When F3, Rebalance Main Bin, is selected on the Grid Management Menu (Group 1348, Screen Display #2), the following screen display will appear with the cursor in the Requested Aisle field. This screen allows maintenance to the location file.

2. To access HELP information on the screen operation, position the cursor in any input field on the display and press the SF3 key to display HELP for that field. Press the SF7 key to position yourself at the first page of the HELP description for this screen. You may now "page" through the file sequentially by pressing the SF8 key.

FIELD OPERATING MANUAL
GROUP 1351

B.2.

NOTE: The following F keys are provided on this screen display to perform additional functions:

F1 - ADD LOCATION - The Add Location key will set up a part record on the alternate main bin file, if alternate main bins are allowed on the location options record. If alternate main bins are not allowed, the system will actually change the parts main bin record location to the displayed location.

F2 - DISPLAY LOCATION - Once the requested aisle, part number, and if necessary, double main bin indicator have been entered, press the F4 key. The system will display the location that matches the entered attributes.

Screen Display

```
GRD003  001          REBALANCE MAINBIN          XX/XX/XX  XX:XX:XX
-------------------------------------------------------------------

                       REQUESTED AISLE:  III

                           PART NUMBER:  IIIIIIIII

             DOUBLE MAINBIN INDICATOR:  I

                              LOCATION:  X - XXX - XXX - XX

              DOUBLE MAINBIN LOCATION:  X - XXX - XXX - XX

                         PRIORITY ZONE:  X

-------------------------------------------------------------------
F1 - ADD LOCATION                    F4 - DISPLAY LOCATION

XXXXXXX:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

NOTE:  I = INPUT FIELD(S)
       X = SYSTEM GENERATED FIELD(S)
```

3. Listed below are the data fields and definitions of the information that will appear in each field.

Data Fields	Definitions and Data Entry Requirements
REQUESTED AISLE: (3 Positions-N)	Enter the requested aisle that the entered part is to be relocated into.
PART NUMBER: (9 Positions-A/N)	Enter the GM service part number.

FIELD OPERATING MANUAL
GROUP 1351

B.3.

Data Fields	Definitions and Data Entry Requirements
DOUBLE MAINBIN INDICATOR: (1 Position-A)	Enter an indicator which will determine if a double main bin will be displayed. A double main bin is a secondary location within a PDC that allows storage of identical parts in bins that are side by side or stacked on top of one another in two levels. The double main bin location is actually a surplus location to be filled with the same part. Valid indicators are: Y - To create a double main bin location N or Spaces - Do not create a double main bin location.
LOCATION:	A location in the warehouse which consists of plant indicator, aisle, tier, and level. Each grid location record represents a unique physical location in the warehouse.
DOUBLE MAINBIN LOCATION:	A double main bin location represents a secondary location within a PDC that allows storage of identical parts in bins that are side-by-side or stacked on top of one another in two levels. The double main bin location is actually a surplus location to be filled with the same part.
PRIORITY ZONE:	The priority zone number identifies an area within an aisle. This will allow the higher moving parts to be stored in priority zone 1 which is generally in the middle of the aisle and easily accessible to the picker. Priority zone 2 is generally defined around the outside perimeter of priority zone 1. Priority zone 2 will contain those parts that are a little slower moving that priority zone 1 but not as slow as priority zone 3 parts. Priority zone 4 is the surplus location that is located in the aisle. Priority zones are used in relocating parts based on the number of bin trips for the previous month.

FIELD OPERATING MANUAL
GROUP 1352

Subject: Tandem - Grid Management Subsystem
Supplemental Location - GRD004

A. General Information

1. The purpose of the Supplemental Location program is to provide the ability to select a surplus location.

2. Required input is part number. Entry of the stocking module is required only if the stocking module going into a supplemental location is different from that of the main bin. The MIT number and quantity are used to set the part up on the surplus file when the F1 key is pressed. Surplus locations do not have compatibility codes and are always in priority zone 4.

3. To request a location, enter the stocking module, MIT number, quantity and part number. Once this information is entered, press the F4 key. The system will respond by displaying a surplus location in the location data field.

4. The maximum number of surplus locations allowed in the main bin aisle and corresponding surplus aisles are determined by the Grid Area Table. The main bin part location record is accessed to find the correct aisle to start the search for a surplus location. The Surplus field is accessed to count the number of surpluses in the main bin and corresponding surplus aisles and determine where to place the new surplus location.

B. Supplemental Location - Screen Display and Definition of Data Fields

1. When F4, Supplemental Location, is selected on the Grid Management Menu (Group 1348, Screen Display #2), the following screen display will appear with the cursor in the Stocking Module field.

2. To access HELP information on the screen operation, position the cursor in any input field on the display and press the SF3 key to display HELP for that field. Press the SF7 key to position yourself at the first page of the HELP description for this screen. You may now "page" through the file sequentially by pressing the SF8 key.

NOTE: The following F keys are provided on this screen display to perform additional functions:

F1 - ADD LOCATION - This key will set up an MIT on the surplus file in the location that has been selected and displayed on the screen.

FIELD OPERATING MANUAL
GROUP 1352

B.2.

F4 - DISPLAY LOCATION - Once the part number and if necessary, MIT number, stocking module and quantity have been entered, press the F4 key. The system will display a surplus location meeting the entered attributes.

Screen Display

```
GRD004  001          SUPPLEMENTAL LOCATION       XX/XX/XX  XX:XX:XX
-----------------------------------------------------------------------

            STOCKING MODULE:  IIIII

            PART NUMBER:  IIIIIIIII

            MIT NUMBER:  IIIIIII

            QUANTITY:  IIIII

                               LOCATION:  X - XXX - XXX - XX

-----------------------------------------------------------------------
F1 - ADD LOCATION                       F4 - DISPLAY LOCATION

XXXXXXX:  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

NOTE: I = INPUT FIELD(S)
X = SYSTEM GENERATED FIELD(S)

3. Listed below are the data fields and definitions of the information that will appear in each field.

Data Fields	Definitions and Data Entry Requirements
STOCKING MODULE: (5 Positions -A/N)	Enter the stocking module used to represent a type of storage container. Each stocking module can have up to six different opening types into which it can be placed (1 primary and 5 secondary).
PART NUMBER: (9 Positions -A/N)	Enter the GM service part number.
MIT NUMBER: (7 Positions-A/N)	Enter the MIT Number which uniquely identifies a surplus location for a part. This is the key to records on the surplus file and identifies supplemental material by part number.

FIELD OPERATING MANUAL
GROUP 1352

B.3.

Data Fields	Definitions and Data Entry Requirements
QUANTITY: (6 Positions-N)	Enter the actual quantity of the part to be set up on the surplus file for the entered MIT number and part.
LOCATION:	A location in the warehouse which consists of plant indicator, aisle, tier, and level. Each grid location record represents a unique physical location in the warehouse.

II. CONSOLIDATION OF RPD ROUTES

All of our dedicated delivery routes were reviewed for total lines shipped, trailer utilization, number of dealers delivered to, and total miles traveled. We started with 32 routes and we were able to reduce that to 28 routes with one of those being delivered every other day instead of daily. Our previous average trailer cube utilization was 62.83 percent. By restructuring the routes, we were able to increase our cube utilization to 79.35 percent, a significant increase.

We then restructured our thinking on when to cancel a route or work overtime to complete the load. A route sheet was created with a target start time, completion time, disperse pull time, and a cancel time. These times are all predetermined and have the advantage of saving overtime on drivers or calling a driver in and having to cancel a route. If the route is canceled, drivers are still paid for the run. In many cases drivers need to be notified four to six hours in advance if their route will be run. This is due to federal regulations on the number of hours a driver is allowed to drive in a 24-hour period.

This load sheet also gives us a permanent record of routes started and completed on time and total cube utilization. We can then monitor this closely and make any necessary adjustments in the future.

PDC# 03 DAY: 1 2 (CIRCLE ONE) CURRENT DATE:______________

ROUTE	TRL#	DIVERSION	CUBE%	RTE START	TRL COMPL	DS/ST	RB W/U	TRL COMPL	DISP PULL	CANC TIME	LOADERS
1-2 AA						1800	2230	0900	1100	2400Y	
1-2 BB						1800	2230	0900	1100	0700	
1-2 CC						1800	2230	1000	1200	0700	
1-2 DD						1900	0300	1000	1200	0700	
1-2 EE						2030	0800	1100	1300	0700	
1-2 FF						2030	0800	1200	1400	0700	
5 GG						2200	0900	1300	1500	1100	
1-2 HH						2200	0900	1400	1600	1100	
1-2 II						2300	1000	1400	1600	1100	
1-2 JJ						2300	1000	1500	1700	1100	
1-2 KK						2400	1230	1530	1730	2400Y	
2 KP						2400	1230	1530	1730	2400Y	
1-2 LL						0700	1300	1700	1900	0900	
1-2 MM						0700	1300	1700	1900	0900	
1-2 MC						0830	1400	1800	2000	0900	
1-2 NN						0830	1400	1800	2000	1200	
1-2 OP						0900	1500	1900	2100	1400	
1-2 PP						0900	1530	1900	2100	1400	
1-2 QQ						1000	1530	2000	2200	1600	
1-2 RR						1130	1530	2000	2200	1800	
1-2 SS						1130	1800	2100	2300	1800	
1-2 TT						1300	1800	2100	2300	1800	
1-2 UU						1300	1900	2200	2400	1900	
1-2 VV						1400	2000	2200	2400	1600	
5 WW						1600	2000	2300	0100	2100	
5 XX						1600	2100	2300	0100	2100	
5 YY						1600	2130	2330	0130	2100	
5 ZZ						1600	2130	2330	0130	2100	
CHICAGO						0700	2000	2000	2200		
EXTRA											
EXTRA											
EXTRA											

FIRST SHIFT SUPERVISOR'S SIG.______________________________

SECOND SHIFT SUPERVISOR'S SIG.______________________________

CC: J. RAYMOND (1), D. POOLE (1), GFS (2), ORDER DEPT. (4), CLAIMS DEPT. (2) REVISED 06/20/88

SHIPPING SCHEDULE

GM SERVICE PARTS OPERATIONS

ROUTE	DS/ST	RB W/U	TRAILER COMPLETION
VIPS	7:00 A M	2:30 P M	
LL	7:00 A M	1:00 P M	5:00 P M
LT	7:00 A M	1:00 P M	5:00 P M
MM	7:00 A M	1:00 P M	5:00 P M
MC	8:30 A M	2:00 P M	6:00 P M
CHI	7:00 A M	8:00 P M	8:00 P M
NN	8:30 A M	2:00 P M	6:00 P M
OP	9:00 A M	3:00 P M	7:00 P M
PP	9:00 A M	3:30 P M	7:00 P M
YEL	10:00 A M	2:30 P M	
UPS	7:00 A M	2:30 P M	
QQ	10:00 A M	3:30 P M	8:00 P M
RR	11:30 A M	3:30 P M	8:00 P M
SS	11:30 A M	6:00 P M	9:00 P M
TRANS	1:00 P M	6:00 P M	
UU	1:00 P M	7:00 P M	10:00 P M
VV	2:00 P M	8:00 P M	10:00 P M
VIPS	4:00 P M	11:30 P M	
WW	4:00 P M	8:00 P M	11:00 P M
XX	4:00 P M	9:00 P M	11:00 P M
YY	4:00 P M	9:30 P M	11:30 P M
ZZ	4:00 P M	9:30 P M	11:30 P M
AA	6:00 P M	10:30 P M	9:00 A M
BB	6:00 P M	10:30 P M	9:00 A M
CC	6:00 P M	11:30 P M	10:00 A M
DD	7:00 P M	12:30 A M	10:00 A M
EE	8:30 P M	8:00 A M	11:00 A M
FF	8:30 P M	8:00 A M	12:00 P M
ANR	8:30 P M	8:00 A M	
JONES	8:30 P M	8:00 A M	
UPS	4:00 P M	11:30 P M	
W/C	10:00 P M	8:00 A M	
GG	10:00 P M	9:00 A M	1:00 P M
HH	10:00 P M	9:00 A M	2:00 P M
II	11:00 P M	10:00 A M	2:00 P M
JJ	11:00 P M	10:00 A M	3:00 P M
KK	12:00 A M	12:30 P M	3:30 P M
KP	12:00 A M	12:30 P M	3:30 P M

DS/ST = DISPATCH START TIME

RB W/U = RELEASE BENCHES WRAP-UP

TRAILER COMPLETION LOAD

DRAW SCHEDULE
FROM EDS MACHINE ROOM
(REVISION - 7-1-88)

DAY #1

0830 HOURS DRAW #68	VIPS (RPD) 1-Q 1-R 1-S VIPS (COMMON) MISC - EXCHANGE DELCO COD
1000 HOURS DRAW #70	VIPS (RPD) 1-T 1-U 1-V SHIP NO CHARGE PADS 5-W 5-X 5-Y 5-Z 2-A 2-B 2-C (LINE COUNT 301 TO 1000)
1215 HOURS DRAW #60	VIPS (RPD) (RECLASS TO COMMON CARRIER) 1-A THRU 1-V CHICAGO VIPS (RECLASS) VIPS (COMMON CARRIER) RPD (ROUTES) 5-W 5-X 5-Y 5-Z 2-A 2-B 2-C
1415 HOURS DRAW #62	VIPS (RPD) 5-W 5-X 5-Y 5-Z WILL CALLS RPD (ROUTES) 2-D 2-E 2-F 2-G 2-H 2-I 2-J 2-K 2-KP PADS 2-D 2-E 2-F 2-G 2-H 2-I 2-J 2-K 2-KP (LINE COUNT 301 TO 1000) COMMON CARRIER PADS (LINE COUNT 301 TO 1000)
1600 HOURS DRAW #64	VIPS (RPD) 2-A 2-B 2-C 2-D 2-E 2-F RPD (ROUTES) 2-H 2-M 2-MC 2-N 2-OP 2-P 2-Q 2-R 2-S 2-T 2-U 2-V
1800 HOURS DRAW #67	CHICAGO (REGULAR) #2 DAY
1900 HOURS DRAW #72	VIPS (RPD) 2-G 2-H 2-I 2-J 2-K 2-KP 2-L 2-M 2-MC 2-N 2-OP 2-P VIPS (RPD) (RECLASS RPD TO COMMON CARRIER) 1-A THRU 1-V 2-A THRU 2-F VIPS CHICAGO (RECLASS) VIPS (COMMON) SHIP VIA SHIP NO CHARGE TRANSFERS PADS (#2 LINE COUNT 301 TO 5000)

DRAW SCHEDULE
FROM EDS MACHINE ROOM
(REVISION 11-14-88)

DAY #1

0830 HOURS DRAW #68	VIPS (RPD) 1-Q 1-R 1-S VIPS (COMMON) MISC. - EXCHANGE DELCO COD
1000 HOURS DRAW #70	VIPS (RPD) 1-U 1-V SHIP NO CHARGE PDS 5-W 5-X 5-Y 5-Z 2-A 2-B 2-C (LINE COUNT 301 TO 1000)
1215 HOURS DRAW #60	VIPS (RPD) (RECLAS TO COMMON CARRIER) 1-A THRU 1-V CHICAGO VIPS (RECLASS) VIPS (COMMON CARRIER) RPD (ROUTES) 5-W 5-X 5-Y 5-Z 2-A 2-B 2-C
1415 HOURS DRAW #62	VIPS (RPD) 5-W 5-X 5-Y 5-Z WILL CALLS RPD (ROUTES) 2-D 2-E 2-F 2-G 2-H 2-I 2-J 2-K 2-KP PADS 2-D 2-E 2-F 2-G 2-H 2-I 2-J 2-K 2-KP (LINE COUNT 301 TO 1000) COMMON CARRIER PADS (LINE COUNT 301 TO 1000)
1600 HOURS DRAW #64	VIPS (RPD) 2-A 2-B 2-C 2-D 2-E 2-F RPD (ROUTES) 2-L 2-LT 2-M 2-M 2-N 2-OP 2-Q 2-R 2-S 2-U 2-V
1800 HOURS DRAW #67	CHICAGO (REGULAR) #2 DAY
1900 HOURS DRAW #72	VIPS (RPD) 2-G 2-H 2-I 2-J 2-K 2-KP 2-L 2-LT 2-M 2-MC 2-N 2-OP 2-P VIPS (RPD) (RECLAS RPD TO COMMON CARRIER) 1-A THRU 1-V 2-A THRU 2-F VIPS CHICAGO (RECLASS) VIPS (COMMON) SHIP VIA SHIP NO CHARGE TRANSFERS PADS (#2 LINE COUNT 301 TO 5000)

DRAW SCHEDULE
FROM EDS MACHINE ROOM
(REVISION - 7-1-88)

DAY #2

0830 HOURS DRAW #69	VIPS (RPD) 2-Q 2-R 2-S VIPS (COMMON) MISC - EXCHANGE DELCO COD
1000 HOURS DRAW #71	VIPS (RPD) 2-T 2-U 2-V SHIP NO CHARGE PADS 5-W 5-X T-Y 5-Z 1-A 1-B 1-C (LINE COUNT 301 TO 1000)
1215 HOURS DRAW #61	VIPS (RPD) (RECLASS RPD TO COMMON CARRIER) 2-A THRU 2-V CHICAGO VIPS (RECLASS) VIPS (COMMON CARRIER) RPD (ROUTES) 5-W 5-X 5-Y 5-Z 1-A 1-B 1-C
1415 HOURS DRAW #63	VIPS (RPD) 5-W 5-X 5-Y 5-Z WILL CALLS RPD (ROUTES) 1-D 1-E 1-F 1-G 1-H 1-I 1-J 1-K 1-KP PADS 1-D 1-E 1-F 1-G 1-H 1-I 1-J 1-K 1-KP (LINE COUNT 301 TO 1000) COMMON CARRIER PADS (LINE COUNT 301 TO 1000)
1600 HOURS DRAW #65	VIPS (RPD) 1-A 1-B 1-C 1-D 1-E 1-F RPD (ROUTES) 1-L 1-M 1-MC 1-N 1-OP 1-P 1-Q 1-R 1-S 1-T 1-U 1-V
1800 HOURS DRAW #68	CHICAGO (REGULAR) #1 DAY
1900 HOURS DRAW #73	VIPS (RPD) 1-G 1-H 1-I 1-J 1-K 1-KP 1-L 1-M 1-MC 1-N 1-OP 1-P VIPS (RPD) (RECLASS RPD TO COMMON CARRIER) 2-A THRU 2-V 1-A THRU 1-F VIPS CHICAGO (RECLASS) VIPS (COMMON) SHIP VIA SHIP NO CHARGE TRANSFERS PADS (#1 LINE COUNT 301 TO 5000)

DRAW SCHEDULE
FROM EDS MACHINE ROOM
(REVISION 11-14-88)

DAY #2

0830 HOURS DRAW #69	VIPS (RPD) 2-Q 2-R 2-S VIPS (COMMON) MISC. - EXCHANGE DELCO COD
1000 HOURS DRAW #72	VIPS (RPD) 2-U 2-V SHIP NO CHARGE PADS 5-W 5-X 5-Y 5-Z 1-A 1-B 1-C (LINE COUNT 301 TO 1000)
1215 HOURS DRAW #61	VIPS (RPD) (RECLASS RPD TO COMMON CARRIER) 2-A THRU 2-V CHICAGO VIPS (RECLASS) VIPS (COMMON CARRIER) RPD (ROUTES) 5-W 5-X 5-Y 5-Z 1-A 1-B 1-C
1415 HOURS DRAW #63	VIPS (RPD) 5-W 5-X 5-Y 5-Z WILL CALLS RPD (ROUTES) 1-D 1-E 1-F 1-G 1-H 1-I 1-J 1-K 1-KP PADS 1-D 1-E 1-F 1-G 1-H 1-I 1-J 1-K 1-KP (LINE COUNT 301 TO 1000) COMMON CARRIER PADS (LINE COUNT 301 TO 1000)
1600 HOURS DRAW #65	VIPS (RPD) 1-A 1-B 1-C 1-D 1-E 1-F RPD (ROUTES) 1-L 1-LT 1-M 1-MC 1-N 1-OP 1-P 1-Q 1-R 1-S 1-U 1-V
1800 HOURS DRAW #68	CHICAGO (REGULAR) #1 DAY
1900 HOURS DRAW #73	VIPS (RPD) 1-G 1-H 1-I 1-J 1-K 1-KP 1-L 1-LT 1-M 1-MC 1-N 1-OP 1-P VIPS (RPD) (RECLASS RPD TO COMMON CARRIER) 2-A THRU 2-V 1-A THRU 1-F VIPS CHICAGO (RECLASS) VIPS (COMMON) SHIP VIA SHIP NO CHARGE TRANSFERS PADS (31 LINE COUNT 301 TO 5000)

DDS COST COMPARISON MODEL YEAR THROUGH SEPTEMBER, 1988

PDC	COST/LINE PDC	CARRIER	EQPT.	TOTAL	% OF SALES
STL	$0.37	$1.06	$0.45	$1.87	5.19%
ATL	$0.32	$0.62	$0.36	$1.30	2.99%
CIN	$0.23	$0.68	$0.32	$1.23	3.29%
CHI	$0.03 $0.09 *	$0.51	$0.24	$0.86	2.14%
PIT	$0.02	$0.66	$0.27	$0.96	2.57%
BAL	$0.30	$0.14	$0.23	$0.68	1.81%
L A	$0.32	$0.42	$0.19	$0.92	2.14%
JAX	$0.33	$0.65	$0.29	$1.28	3.06%
BOS	$0.26	$0.57	$0.34	$1.16	2.93%
PHI	$0.23 $0.27 **	$0.49	$0.20	$0.93	1.95%
REN	$0.31	$0.72	$0.35	$1.39	3.65%
LIV	$0.50	$0.66	$0.30	$1.46	3.49%
FT W	$0.12	$1.17	$0.00	$1.29	3.22%
OVERALL	$0.27	$0.67	$0.27	$1.21	2.96%

* CARRIER COST TO LOAD ALL LINES
** CARRIER COST TO LOAD TARGET AND PARTS PLANTS X-DOCK LINES AND CONSOLIDATE MR TRAILERS

NOTE:

1. PDC COST PER LINE DOES NOT INCLUDE MR CREDIT
2. AT CHICAGO AND PHILADELPHIA, CARRIER LOADING COST IS SHOWN SEPARATELY

JANUARY 31, 1989

TO: ALL SUPERVISION

SUBJECT: DEDICATED DELIVERY CHANGES

EFFECTIVE JANUARY 30, 1989, RYDER DISTRIBUTION RESOURCES HAS RESTRUCTURED A SEGMENT OF OUR TRANSPORTATION SYSTEM. ONLY OPERATIONS PRESENTLY DOMICILED IN KANSAS CITY HAVE BEEN AFFECTED. DEDICATED DELIVERY ROUTES A, M, V AND L ARE BEING RELOCATED TO ST. LOUIS. FROM ST. LOUIS, THESE ROUTES WILL BE OPERATED WITH DRIVER TEAMS.

ATTACHED PLEASE FIND A SUMMARY OF ALL CHANGES WHICH INCLUDE OLD LOAD CODES AND NEW LOAD CODES. PONTIAC AND CHICAGO HAVE BEEN ADVISED AND HAVE BEEN ASKED TO UPDATE THEIR RECORDS ASAP.

AS YOU WILL SEE, THE RESTRUCTURE HAS ELIMINATED THE 2-V AND 5-V ROUTES. THE 2-V HAS BEEN RESTRUCTURED TO THE 2-M AND 1-M ROUTES. THE 5-V ROUTE HAS BEEN RESTRUCTURED TO THE 5-L ROUTE.

IF YOU HAVE ANY QUESTIONS, PLEASE DO NOT HESITATE TO CALL ON ME.

THANK YOU,
JUDY BLOMEYER

RYDER DISTRIBUTION RESOURCES

301 N. LINDBERGH BLVD. • HAZELWOOD, MISSOURI 63042

January 27, 1989

FIVE DAY DEALER DELIVERY CAPABILITY
ALTERNATE ROUTE LOADING

SPRINGFIELD, MO (5RR) - PRIMARY 1BB, 2BB; SECONDARY 1CC, 2CC, 5DD

TULSA, OK (5CC) - PRIMARY 1BB, 2BB; SECONDARY 5DD

OKLAHOMA CITY, OK (5DD) - PRIMARY 1BB, 2BB; PLEASE CHECK BEFORE LOADING A 5DD EXTRA

KANSAS CITY METRO AREA (5LL, 5MC) - PRIMARY 1VV
SECONDARY 1LL, 2LL, 1MM, 2MM, 1MC, 2MC

OMAHA, NE (5EE) - 1FF, 2FF

MEMPHIS, TN (5GG) - PRIMARY 1II, 2II, 1JJ, 2JJ; PLEASE CHECK BEFORE LOADING A 5GG EXTRA/SECONDARY 1HH, 2HH

LITTLE ROCK, AR (5KK) - PRIMARY 2KP; SECONDARY 1JJ, 2JJ

ST. LOUIS METRO AREA (5WW, 5XX, 5YY, 5ZZ) - 5WW, 5XX, 5YY, 5ZZ

PLEASE REFER TO THE INDIVIDUAL ROUTE SUMMARY SHEET FOR THE ALTERNATE ROUTE THAT YOU WANT TO LOAD ON; ADDITIONAL INFORMATION CONCERNING SEQUENCING ON AN ALTERNATE ROUTE LOADING SITUATION WILL BE ON THAT SHEET.

27/89 Ryder Distribution Resources ROUTESCD
Route Schedule Summary Page Nr 1
Dealer Information

LOCATION: 8302 ROUTE: 1A TRAILER: 1A
DISPATCH DEADLINE: 11:00 AM SERVICE FREQUENCY ODD

LER #	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY		ZIP COD & OLD LOAD CODE
52 *	1AA01	01	BUXMAN MOTORS	1200 WASHINGTON	NEWTON	KS	316 283-0533	2PM-3PM		1VV37 *
97 *	1AA03	03	HOLSTINE MOTORS INC	200 W 5TH	NEWTON	KS	316 283-1220	2PM-3PM		1VV33 *
02 *	1AA07	07	SHEP CHEV.	106 E. SECOND	HAVEN	KS	316 465-2275	NOON-1PM		1AA17 *
22 *	1AA09	09	LESH MOTORS	1501 E. FIRST	PRATT	KS	316 672-5633	11AM-NOON		1AA13 *
25	1AA11	11	LODGE CHEV.	115 S. MAIN	MEDICINE LODGE	KS	316 886-5622	10AM-11AM		67104
36 *	1AA13	13	BOGNER, INC.	501 MAIN ST.	KIOWA	KS	316 825-4004	9AM-10AM		1AA09 *
43 *	1AA17	17	HOFMEIER CHEV/OLDS/PONT	W. HWY. 160 RFD 1	HARPER	KS	316 896-7344	8AM-9AM		1AA07 *
74	5AA20	20	PRESTIGE PONT/CAD	5800 W. KELLOGG	WICHITA	KS	316 942-1271	6AM-7AM		67209
12	5AA25	25	SAUDER-LYGRISSE GMC	4150 W. KELLOGG	WICHITA	KS	316 943-4271	6AM-7AM		67209
85	5AA30	30	QUALITY CHEVROLET	1520 E. DOUGLAS	WICHITA	KS	316 263-2111	5AM-6AM	LEG 1	67214
99	5AA35	35	BULGAR CAD/OLDS	1900 E. DOUGLAS	WICHITA	KS	316 265-8565	5AM-6AM		67214
15	5AA40	40	ROBINSON LESLINE BUICK	125 N. MATHEWSON	WICHITA	KS	316 262-4281	4AM-5AM	STL	67214
96	5AA45	45	DAVIS MOORE	6215 E. KELLOGG	WICHITA	KS	316 685-0211	4AM-5AM	TEAM	67218
10	5AA50	50	SCHOLFIELD BROS.	7633 E. KELLOGG	WICHITA	KS	316 684-2841	3AM-4AM		67207
96	5AA55	55	JOE SELF CHEV.	8801 E. KELLOGG	WICHITA	KS	316 684-6521	3AM-4AM		67278
94	5AA60	60	DON HATTAN CHEV.	6024 N. BROADWAY	WICHITA	KS	316 744-1275	2AM-3AM		67219
97	1AA63	63	PARKS MOTOR	615 STATE ST	AUGUSTA	KS	316 775-6365	1AM-2AM		67010
55	1AA67	67	DICK HATFIELD CHEV.	603 W. SEVENTH	AUGUSTA	KS	316 775-5445	1AM-2AM		67010
71	1AA69	69	LOSH MOTORS	114 W. MECHANIC	LEON	KS	316 745-3231	MID-1AM		67074
93	1AA71	71	DOWNINGS INC.	1225 E. RIVER	EUREKA	KS	316 583-5539	11PM-MID		67045
03 *	1AA72	72	ZSCHEILE MOTORS	S. HWY 75	BURLINGTON	KS	316 364-2127	10PM-11PM		1AA73 *
25 *	1AA73	73	BECKMAN MOTORS	701 N MAPLE	GARNETT	KS	913 448-5441	9PM-10PM		2MM06 *
26 *	1AA74	74	RON OLSON CHEV-BUI-OLDS-PONT	ROUTE 5 OLD/NEW 169 JC	PAOLA	KS	913 294-5375	8PM-9PM		2MM04 *
98	5AA75	75	DENNIS CHEVROLET	675 N RAWHIDE	OLATHE	KS	913 782-5600	7PM-8PM		66061
83	5AA80	80	SONNY HILL PONT-BUICK-GMC	1500 E SANTA FE	OLATHE	KS	913 782-1500	6PM-7PM		66061

* 1/30/89 - LOAD CODE CHANGE, SEE LAST COLUMN; NO LOAD CODE CHANGE IF IT SHOWS A ZIP CODE #

/26/89 Ryder Distribution Resources ROUTESCD
Route Schedule Summary Page Nr 1
Dealer Information

LOCATION: 8302 ROUTE: 2A TRAILER: 2A
DISPATCH DEADLINE: 11:00 AM SERVICE FREQUENCY EVEN

LER E	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY		ZIP CODE & OLD LOAD CODE
837	2AA04	04	MERLE SNIDER CHEV OLDS	RR #2 HWY 160	WINFIELD	KS	316 221-1030	2PM-3PM		67156
869	2AA08	08	TUBBS MOTOR INC	500 S SUMMIT	ARKANSAS CITY	KS	316 442-9200	2PM-3PM		67005
466	2AA12	12	KLOEFKORN CHEV	21 N MAIN	CALDWELL	KS	316 845-2708	1PM-2PM		67022
431	2AA14	14	LES JACOBS MOTORS	701 E 16TH	WELLINGTON	KS	316 326-7433	NOON-1PM		67152
092	2AA16	16	WELLINGTON IMPLEMENT CO	1417 N "A"	WELLINGTON	KS	316 326-3347	11AM-NOON		67152
479	2AA18	18	BRAMINE CHEV	1014 N 2ND	MULVANE	KS	316 777-1191	11AM-NOON		67110
374	5AA20	20	PRESTIGE PONT CAD	5800 W KELLOGG	WICHITA	KS	316 942-1271	10AM-11AM		67209
112	5AA25	25	SAUDER-LYGRISSE GMC	4150 W KELLOGG	WICHITA	KS	316 943-4271	9AM-10AM		67209
685	5AA30	30	QUALITY CHEV	1520 E DOUGLAS	WICHITA	KS	316 263-2111	9AM-10AM		67214
099	5AA35	35	BULGAR CAD/OLDS	1900 E DOUGLAS	WICHITA	KS	316 265-8565	8AM-9AM		67214
215	5AA40	40	ROBINSON LESLIE BUICK	125 N MATHEWSON	WICHITA	KS	316 262-4281	8AM-9AM		67214
206	5AA45	45	DAVIS MOORE OLDS	6215 E KELLOGG	WICHITA	KS	316 685-0211	7AM-8AM	LEG 1	67218
610	5AA50	50	SCHOLFIELD BROS	7633 E KELLOGG	WICHITA	KS	316 684-2841	7AM-8AM		67207
766	5AA55	55	JOE SELF CHEV	8801 E KELLOGG	WICHITA	KS	316 684-6521	6AM-7AM		67278
384	5AA60	60	DON HATTAN CHEV	6024 N BROADWAY	WICHITA	KS	316 744-1275	6AM-7AM	STL	67219
555	2AA64	64	MARSHALL BLAIN CHEVROLET	2502 W CENTRAL	ELDORADO	KS	316 321-4000	4AM-5AM	TEAM	67042
292	* 2AA65	65	JOHN K FISHER	2670 W CENTRAL	ELDORADO	KS	316 321-2820	3AM-4AM		2AA66*
350	* 2AA66	66	RICH LONGBINE CHEV-OLDS	3012 W HWY 50	EMPORIA	KS	316 342-2744	2AM-3AM		2MM18*
620	* 2AA67	67	WESTERN MOTOR OF EMPORIA	2910 W HWY 50	EMPORIA	KS	316 343-1155	1AM-2AM		2MM16*
726	2AA68	68	WILSON SALES	1144 N. UNION	COUNCIL GROVE	KS	316 767-5147	MID-1AM		66846
405	* 2AA69	69	NORDLING MOTORS	428 MARKET	OSAGE CITY	KS	913 528-3234	11PM-MID		2MM22*
610	* 2AA70	70	HOLTHAUS MOTORS INC	425 MARKET	OSAGE CITY	KS	913 528-3101	10PM-11PM		2MM24*
188	* 2AA71	71	MASTERS MOTOR / OIL CO	SANTA FE & TOPEKA	BURLINGAME	KS	913 654-3613	10PM-11PM		2MM26*
35	* 2AA72	72	CREASON TAWNEY CHEV-OLDS	K-68 & I-35	OTTAWA	KS	913 242-5050	9PM-10PM		2MM14*
49	* 2AA73	73	UNDERWOOD EQUIPMENT	JCT K68 & I-35	OTTAWA	KS	913 242-4400	8PM-9PM		2MM12*
02	* 2AA74	74	MINNICK MOTORS	261 S HICKORY ST	OTTAWA	KS	913 242-5600	8PM-9PM		2MM0E*
98	5AA75	75	DENNIS CHEVROLET	675 N RAWHIDE	OLATHE	KS	913 782-5600	7PM-8PM		66061
83	5AA80	80	SONNY HILL PONT-BUICK-GMC	1500 E SANTA FE	OLATHE	KS	913 782-1500	6PM-7PM		66061

1/20/89 - LOAD CODE CHANGE, SEE LAST COLUMN; NO LOAD CODE CHANGE IF IT SHOWS A ZIP CODE #

LOCATION: 8302 ROUTE: 2F TRAILER: 2F
ISPATCH DEADLINE: 2:00 PM SERVICE FREQUENCY EVEN

LER E	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY		ZIP CODE & OLD LOAD CODE
663	5FF05	05	CLASSIC CADILLAC	2525 DODGE ROAD	OMAHA	NE	402 346-1666	2PM-3PM		68131
630	5FF10	10	TIM O'NEILL CHEV	1010 34TH AVENUE	COUNCIL BLUFFS	IA	712 366-2541	2PM-3PM		51501
606	5FF15	15	MCINTYRE OLDS/CADILLAC	1029 32ND AVE.	COUNCIL BLUFFS	IA	712 366-9411	1PM-2PM		51501
402	5FF20	20	RHODEN AUTO CENTER	3400 S. FOURTH	COUNCIL BLUFFS	IA	712 366-9403	1PM-2PM		51501
451	5FF25	25	BEARDMORE CHEVROLET	418 FORT CROOK RD.	BELLEVUE	NE	402 734-1100	NOON-1PM		68005
211	2FF28	28	ELLIOTT-ROBERTS MOTORS	607 FIRST AVE.	PLATTSMOUTH	NE	402 296-3210	11AM-NOON		68048
60	2FF30	30	LARSON MOTORS	1801 FRONTAGE ROAD	NEBRASKA CITY	NE	402 873-5507	10AM-11AM		68410
32	2FF32	32	JOHNSON MOTOR	902 CENTRAL AVE,	AUBURN	NE	402 274-3160	9AM-10AM		68305
18	2FF34	34	ARMBRUSTER MOTORS	307 W. 17TH ST.	FALLS CITY	NE	402 245-2471	8AM-9AM	LEG 3	68355
54	2FF36	36	EDDE MOTORS	1805 STONE ST.	FALLS CITY	NE	402 245-4124	8AM-9AM	OMAHA	68355
29*	2FF37	37	CROUSE MOTORS	THIRD & NEBRASKA	MOUND CITY	MO	816 442-3121	8AM-9AM		2FF38*
25*	2FF38	38	GREG CHEV	707 S. 71 HWY.	SAVANNAH	MO	816 324-3161	7AM-8AM		2FF40*
56*	2FF39	39	GREG BUICK PONT-CAD	2008 N BELT	ST JOSEPH	MO	816 232-4413	6AM-7AM		1LL03*
94*	2FF40	40	DAVID FERRAEZ CHEVROLET	3921 FREDERICK	ST. JOSEPH	MO	816 232-7704	6AM-7AM		1LL09*
30*	2FF41	41	VIC OLDS GMC	1617 CROSS ST.	ST JOSEPH	MO	816 279-2711	5AM-6AM		1LL11*
59*	2FF42	42	TAYLOR CHEV	200 E. JACKSON	MAYSVILLE	MO	816 449-2176	5AM-6AM		2FF41*
91*	2FF43	43	RED I MOTORS	509 NORTHLAND DR.	CAMERON	MO	816 632-2162	4AM-5AM		2FF42*
77	2FF44	44	SCOTT MOTOR	1001 S. ARDINGER	HAMILTON	MO	816 583-2111	3AM-4AM		64644
22	2FF46	46	BARNES-BAKER MOTORS	HWY. 65 NORTH	CHILLICOTHE	MO	816 646-3156	2AM-3AM		64601
50	2FF48	48	WOLFE AUTO SALES	321 W. HELM STREET	BROOKFIELD	MO	816 258-3361	1AM-2AM		64628
71	2FF52	52	BRIGGS CUPP CHEV	301 N. KANSAS	MARCELINE	MO	816 376-3441	MID-1AM		64658
78	2FF54	54	SYDENSTRICKER MOTORS	HWY 36 EAST	SHELBINA	MO	314 588-2117	11PM-MID	LEG 2	63468
22	2FF55	55	PETE PARIS CHEV	HWY 24 & 36 E.	MONROE CITY	MO	314 735-4561	10PM-11PM		63456
65	2FF56	56	HADLER GMC	601 NORTH FOURTH	QUINCY	IL	217 222-1518	9PM-10PM	QUINCY	62301
8	2FF58	58	GEISE BUICK-PONT	930 MAINE ST.	QUINCY	IL	217 222-0745	9PM-10PM		62301
0	2FF62	62	BUFORD WARD CHEV.	1537 N. 24TH	QUINCY	IL	217 228-6500	9PM-10PM		62301
8	2FF64	64	JAPPY DICKSON CAD/OLDS	4200 BROADWAY	QUNICY	IL	217 222-8600	8PM-9PM		62301
3	2FF66	66	SCHWARTZ IMPLEMENT	HWY 168 W RTE 2	PALMYRA	MO	314 769-2302	7PM-8PM		63461
8	2FF68	68	FRED BATES CHEV/OLDS	900 CLINIC ROAD	HANNIBAL	MO	314 221-7438	6PM-7PM	LEG 1	63401
3	2FF70	70	DEAN POAGE MOTORS	HWY 61 AND PARIS GR. R	HANNIBAL	MO	314 221-0044	6PM-7PM		63401
5	2FF72	72	JENNINGS CHEV-OLDS	JCT. 154 & 54	CURRYVILLE	MO	314 594-6493	6PM-7PM	QUINCY	63339
8	2FF84	84	MARQUITZ PONT/CAD/OLDS	HWY 61 NORTH	TROY	MO	314 528-8561	4PM-5PM		63379
7	2FF86	86	PHIL BECK MOTORS	600 S. MAIN	TROY	MO	314 441-0825	4PM-5PM		63379
1	2FF88	88	SYDENSTRICKER-MOORE, INC.	108 N. LINCOLN	TROY	MO	314 528-5256	4PM-5PM		63379

E DAY DEALER DELIVERY CAPABILITY - OMAHA, NE (5EE) - UP TO TWO PADS INTO THE NOSE OF THE TRAILER

* 1/30/89 - LOAD CODE CHANGE, SEE LAST COLUMN; NO LOAD CODE CHANGE IF IT SHOWS A ZIP CODE #

CATION: 8302 ROUTE: 1L TRAILER: 1L
SPATCH DEADLINE: 7:00 PM SERVICE FREQUENCY ODD

R	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY		ZIP CODE & OLD LOAD CODE
7*	5LL05	05	WESTFALL-O'DELL MOTORS	JCT HWYS 10 & 69	EXCELSIOR SPRINGS	MO	816 234-0257	11AM-NOON		2LL08*
4*	5LL10	10	CERZA CHEV/BUICK	1905 W JESSE JAMES	EXCELSIOR SPRINGS	MO	816 637-1515	11AM-NOON		2LL12*
4	5LL20	20	PHILLIPS CHEV	HWYS M-291 & I-35	LIBERTY	MO	816 781-1628	10AM-11AM		64068
2	5LL25	25	PERKINS PONT-BUICK	5606 N OAK TRAFFICWAY	N KANSAS CITY	MO	816 454-0500	9AM-10AM		64118
1	5LL30	30	COURTESY CHEV-CAD	100 NW VIVION RD	KANSAS CITY	MO	816 454-6666	9AM-10AM		64118
0	5LL35	35	BOB STONE OLDSMOBILE	2015 N BURLINGTON	N KANSAS CITY	MO	816 221-3122	8AM-9AM		64116
0*	5LL37	37	WESTFALL GMC	9TH & BURLINGTON	N KANSAS CITY	MO	816 421-7262	8AM-9AM		5VV70*
1	5LL40	40	RIZZO CHEVROLET	1615 INDEPENDENCE	KANSAS CITY	MO	816 474-7910	8AM-9AM		64106
5	5LL45	45	NEW PLAZA PONTIAC	4200 MAIN STREET	KANSAS CITY	MO	816 531-4200	7AM-8AM	LEG 2	64111
6	5LL50	50	WALLACE OLDS	3440 MAIN	KANSAS CITY	MO	816 531-9600	7AM-8AM	COL	64111
5	5LL55	55	CHARLIE FISHER BUICK	3300 MAIN	KANSAS CITY	MO	816 561-7902	7AM-8AM		64111
5	5LL60	60	MAJOR CADILLAC	3200 MAIN	KANSAS CITY	MO	816 756-3344	6AM-7AM		64141
2	5LL65	65	O'CONNER & MICHAELS CADILLAC	1212 N MINNESOTA	KANSAS CITY	KS	913 342-3434	5AM-6AM		66102
6	5LL70	70	TOWN & COUNTRY OLDS-GMC	6736 STATE AVENUE	KANSAS CITY	KS	913 334-0100	5AM-6AM		66102
5	5LL75	75	GEORGE BALLAS BUICK/PONT	6800 STATE AVENUE	KANSAS CITY	KS	914 334-1166	4AM-5AM		66112
8	5LL80	80	JAY WOLFE CHEVROLET	7707 STATE AVENUE	KANSAS CITY	KS	913 334-3306	4AM-5AM		66112
3	5LL90	90	CABLE-DAHMER CHEVROLET	1834 S NOLAND	INDEPENDENCE	MO	816 254-3860	2AM-3AM		64055
1	5LL92	92	GALEN BOYER MOTORS	3107 S NOLAND	INDEPENDENCE	MO	816 252-9800	1AM-2AM		64050
6	5LL95	95	HAL QUINN BUICK-GMC	NOLAND ROAD & 32ND	INDEPENDENCE	MO	816 836-0404	1AM-2AM		64055

ST. LOUIS TURN FROM COLUMBIA, MO

LEG 1
COL

E DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5MC)-SECONDARY-
UP TO TWO PADS, SEQUENCING ON A CASE-BY-
CASE BASIS BY RDR.
PRIMARY ROUTE IS 1VV

* 1/30/89 - LOAD CODE CHANGE, SEE LAST COLUMN; NO LOAD CODE CHANGE IF IT
SHOWS A ZIP CODE #
ALSO, 5LL05 (WESTFALL-O'DELL) AND 5LL10 (CERZA) CHANGED TO FIVE
DAY DELIVERY

262

LOCATION: 8302 ROUTE: 2L TRAILER: 2L
DISPATCH DEADLINE: 7:00 PM SERVICE FREQUENCY EVEN

LER E	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY	ZIP CODE & OLD LOAD CODE
519*	5LL05	05	WESTFALL-O'DELL MOTORS	JCT HWYS 10 & 69	EXCELSIOR SPRINGS	MO	816 234-0257	NOON-1PM	2LL08*
354*	5LL10	10	CERZA CHEV/BUICK	1905 W JESSE JAMES	EXCELSIOR SPRINGS	MO	816 637-1515	NOON-1PM	2LL12*
428	2LL14	14	DAGLEY CHEVROLET	1ST & JEFFERSON	KEARNEY	MO	816 635-6622	11AM-NOON	64060
444	5LL20	20	PHILLIPS CHEV	HWYS M-291 I-35	LIBERTY	MO	816 781-1628	10AM-11AM	64068
072	5LL25	25	PERKINS PONT-BUICK	5606 N OAK TRAFFICWAY	N KANSAS CITY	MO	816 454-0500	9AM-10AM	64118
011	5LL30	30	COURTESY CHEV-CAD	100 NW VIVION	KANSAS CITY	MO	816 454-6666	9AM-10AM	64118
060	5LL35	35	BOB STONE OLDSMOBILE	2015 N BURLINGTON	N KANSAS CITY	MO	816 221-3122	8AM-9AM	64116
200*	5LL37	37	WESTFALL GMC	9TH & BURLINGTON	N KANSAS CITY	MO	816 421-7262	8AM-9AM	5VV70*
111	5LL40	40	RIZZO CHEVROLET	1615 INDEPENDENCE	KANSAS CITY	MO	816 474-7910	8AM-9AM	64106
345	5LL45	45	NEW PLAZA PONTIAC	4200 MAIN	KANSAS CITY	MO	816 531-4200	7AM-8AM	64111
906	5LL50	50	WALLACE OLDS	3440 MAIN	KANSAS CITY	MO	816 531-9600	7AM-8AM	64111
115	5LL55	55	CHARLIE FISHER BUICK	3300 MAIN	KANSAS CITY	MO	816 561-7902	7AM-8AM	64111
045	5LL60	60	MAJOR CADILLAC	3200 MAIN	KANSAS CITY	MO	816 756-3344	6AM-7AM	64141
012	5LL65	65	O'CONNER & MICHAELS CADILLAC	1212 N MINNESOTA	KANSAS CITY	KS	913 342-3434	5AM-6AM	66102
766	5LL70	70	TOWN & COUNTRY OLDS-GMC	6736 STATE AVENUE	KANSAS CITY	KS	913 334-0100	5AM-6AM	66102
145	5LL75	75	GEORGE BALLAS BUICK/PONT	6800 STATE AVENUE	KANSAS CITY	KS	913 334-1166	4AM-5AM	66112
948	5LL80	80	JAY WOLFE CHEVROLET	7707 STATE AVENUE	KANSAS CITY	KS	913 334-3306	4AM-5AM	66112
513	5LL90	90	CABLE-DAHMER CHEVROLET	1834 S NOLAND	INDEPENDENCE	MO	816 254-3860	2AM-3AM	64055
051	5LL92	92	GALEN BOYER MOTORS	3107 S NOLAND	INDEPENDENCE	MO	816 252-9800	1AM-2AM	64050
126	5LL95	95	HAL QUINN BUICK-GMC	NOLAND ROAD & 32ND	INDEPENDENCE	MO	816 836-0404	1AM-2AM	64055

LEG 2
COL

ST. LOUIS TURN FROM COLUMBIA, MO

LEG 1
COL

E DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5MC) - SECONDARY-
UP TO TWO PADS, SEQUENCING ON A CASE-BY-
CASE BASIS BY RDRT
PRIMARY ROUTE IS THE 1VV

* 1/30/89 - LOAD CODE CHANGE, SEE LAST COLUMN; NO LOAD CODE CHANGE IF IT SHOWS A ZIP CODE #
ALSO, 5LL05 (WESTFALL-O'DELLO AND 5LL10 (CERZA) CHANGED TO FIVE DAY DELIVERY.

1/26/89 Ryder Distribution Resources ROUTESCD
Route Scheoule Summary Page Nr 1 **263**
Dealer Information

LOCATION: 8302 ROUTE: 1M TRAILER: 1M
DISPATCH DEADLINE: 7:00 PM SERVICE FREQUENCY ODD

DEALER #	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY	ZIP CODE & OLD LOAD CODE
776*	1MM13	13	IRV SCHROEDER CITY MOTORS	416 S DATE	HILLSBORO	KS	316 947-3117	10PM-11PM	1VV38 *
496	*1MM17	17	WALLACE CHEVROLET OLDS	610 W KANSAS	MCPHERSON	KS	316 241-2540	9PM-10PM	1VV43 *
332	*1MM19	19	KEN GOERING MOTORS	113 S ASH	MCPHERSON	KS	316 241-0234	9PM-10PM	1VV41 *
540	*1MM21	21	MIDWAY CHEVROLET	HWY 260 & I-35	MOUNDRIDGE	KS	316 345-6311	8PM-9PM	1VV39 *
365	*1MM23	23	BARRY ERICKSON MOTORS	1100 E 30TH	HUTCHINSON	KS	316 662-4421	7PM-8PM	1VV31 *
490	*1MM27	27	CONKLIN CARS & TRUCKS	1400 EAST 11TH	HUTCHINSON	KS	316 662-4467	7PM-9PM	1VV29 *
114	*1MM29	29	BARRY ERICKSON MOTORS	30TH AT GM PLAZA	HUTCHINSON	KS	316 669-8141	7PM-8PM	1VV27 *
490	*1MM31	31	CONKLIN CARS & TRUCKS	815 WEST 4TH STREET	HUTCHINSON	KS	316 662-0553	6PM-7PM	1VV23 *
175	*1MM33	33	YOUNG MOTORS	220 S. GRAND	LYONS	KS	316 257-2328	5PM-6PM	1VV21 *
198	*1MM37	37	RICKABAUGH MOTORS	1009 W MAIN	LYONS	KS	316 257-2381	5PM-6PM	1VV19 *
26	*1MM39	39	BOB REITER CHEVROLET	4507 W 10TH STREET	GREAT BEND	KS	316 793-3511	4PM-5PM	1VV17 *
44	*1MM41	41	DOVE BUICK-OLDS-CAD	4217 W 10TH STREET	GREAT BEND	KS	316 792-8266	3PM-4PM	1VV13 *
45	*1MM43	43	DOONAN TRUCK & EQUIPMENT	JCT HWY. 56 & 156	GREAT BEND	KS	316 792-2491	3PM-4PM	1VV10 *
02	*1MM47	47	ELLIOT PONTIAC	2501 10TH STREET	GREAT BEND	KS	316 793-5463	2PM-3PM	1VV09 *
32	*1MM49	49	MANWEILER CHEVROLET	271 S MAIN	HOISINGTON	KS	316 653-2121	2PM-3PM	1VV07 *
86	*1MM51	51	RUSS HARVEY AUTO PLAZA	S HWY 281	RUSSELL	KS	913 483-5395	1PM-2PM	2VV08 *
79	*1MM53	53	HOLM MOTOR CO	1ST & LINCOLN	ELLSWORTH	KS	913 472-3101	NOON-1PM	1VV03 *
33	*1MM57	57	BENNETT AUTOPLEX	651 S OHIO	SALINA	KS	913 823-6373	11AM-NOON	2VV34 *
42	*1MM59	59	WARTA BUICK	2222 S 9TH	SALINA	KS	913 827-4451	10AM-11AM	2VV36 *
28	*1MM61	61	J-J CHEVROLET	2700 S 9TH	SALINA	KS	913 825-8271	10AM-11AM	2VV42 *
77	*1MM63	63	WADDELL CAD/OLDS	901 E CRAWFORD	SALINA	KS	913 825-9515	9AM-10AM	2VV44 *
80	*1MM67	67	HOLM AUTOMOTIVE CENTER	418 N W 2ND STREET	ABILENE	KS	913 263-4000	8AM-9AM	2VV46 *
08	*1MM69	69	WILLOHITE'S INC.	236-40 E 8TH ST	JUNCTION CITY	KS	913 238-4103	8AM-9AM	2VV48 *
69	*1MM71	71	MCKENNA PONTIAC BUICK	1219 N WASHINGTON	JUNCTION CITY	KS	913 238-3124	7AM-8AM	2VV52 *
4	*1MM73	73	JIM CLARK AUTO CENTER	834 GRANT AVENUE	JUNCTION CITY	KS	913 238-3141	7AM-8AM	2VV54 *
5	*5MM75	75	DALE SHARP, INC.	1900 TOPEKA AVENUE	TOPEKA	KS	913 233-8914	5AM-6AM	5MM35 *
3	*5MM80	80	BILL KOBACH BUICK/GMC	1980 TOPEKA AVENUE	TOPEKA	KS	913 235-5355	5AM-6AM	5MM40 *
2	*5MM85	85	VIC YARRINGTON OLDS	3001 S KANSAS AVENUE	TOPEKA	KS	913 266-4585	4AM-5AM	5MM45 *
9	*5MM90	90	ED BOZARTH CHEV	3731 TOPEKA BLVD	TOPEKA	KS	913 266-5151	4AM-5AM	5MM50 *
4	*5MM95	95	ED ROBERTS CHEVROLET	313 E. FRONT STREET	BONNER SPRINGS	KS	913 422-1000	2AM-3AM	5MM55 *

LEG 1 STL TEAM

…E DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5LL, 5MC) - SECONDARY- UP TO TWO PADS, SEQUENCING ON A CASE-BY-CASE BASIS BY RDR. PRIMARY ROUTE IS THE 1VV

* 1/30/89 - LOAD CODE CHANGE (ALL DEALERS CHANGED LOAD CODES)

NOTE - ON FRIDAY'S LOAD THE LEG 1 COLUMBIA DRIVER COMES TO ST. LOUIS AND CONTINUES ON THE ROUTE UNTIL ALL DEALERS ARE DELIVERED (LAYOVER). THEREFORE THER IS NO LEG 2 DISPATCH ON FRIDAY'S LOAD.

27/89 Ryder Distribution Resources ROUTESCD
Route Schedule Summary Page Nr 1
Dealer Information

LOCATION: 8302 ROUTE: 2M TRAILER: 2M
DISPATCH DEADLINE: 7:00 PM SERVICE FREQUENCY EVEN

LER E	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY		ZIP CODE & OLD LOAD CODE	
411	*2MM42	42	BABE HOUSER MOTOR	1201 E 6TH	CONCORDIA	KS	913 243-4380	8PM-9PM		2VV26	*
432	*2MM44	44	BELOIT MOTOR CO	221 E MAIN	BELOIT	KS	913 738-3511	7PM-8PM		2VV24	*
280	*2MM46	46	FULLER CHEVROLET	109 E 2ND	BELOIT	KS	913 738-2281	6PM-8PM		2VV22	*
437	*2MM48	48	HEARTLAND MOTORS	220 S MAIN	SMITH CENTER	KS	913 282-6161	5PM-6PM		2VV16	*
260	*2MM52	52	DUNTZ OLDS-PONTIAC-GMC	116 N MAIN	SMITH CENTER	KS	913 282-6628	4PM-5PM		2VV14	*
425	*2MM54	54	SWANK-STANDLEY MOTORS	120 S 2ND	OSBORNE	KS	913 346-5417	3PM-4PM		2VV12	*
126	*2MM56	56	CHARD MOTOR COMPANY	201 E LINCOLN	LINCOLN	KS	913 524-4188	2PM-3PM		2VV04	*
468	*2MM58	58	TOWN & COUNTRY CHEV OLDS BUICK	101-3 S CONCORD	MINNEAPOLIS	KS	913 392-2118	1PM-2PM		2VV32	*
250	*2MM62	62	KREIGH PONTIAC	107 N SHERIDAN	MINNEAPOLIS	KS	913 392-2109	NOON-1PM		2VV28	*
624	*2MM64	64	SKINNER MOTOR	625-39 LINCOLN AVE	CLAY CENTER	KS	913 632-2101	11AM-NOON		1VV51	*
108	*2MM66	66	ELKINS MOTORS CO	2312 STAG HILL	MANHATTAN	KS	913 537-8330	9AM-10AM	LEG 1	1VV57	*
568	*2MM68	68	MURDOCK CHEV CAD OLDS	600 MCCALL ROAD	MANHATTAN	KS	913 776-1950	9AM-10AM	STL	1VV59	*
198	*2MM72	72	MEINHARDT FARM EQUIPMENT	ROUTE 2 E HWY 24	WAMEGO	KS	913 456-2041	8AM-9AM	TEAM	1VV61	*
503	*2MM74	74	MORTON MOTOR COMPANY	907 W 4TH	WAMEGO	KS	913 456-9550	8AM-9AM		1VV63	*
135	*5MM75	75	DALE SHARP, INC	1900 TOPEKA AVENUE	TOPEKA	KS	913 233-8914	6AM-7AM		5MM35	*
533	*5MM80	80	BILL KOBACH BUICK-GMC	1980 TOPEKA	TOPEKA	KS	913 235-5355	6AM-7AM		5MM40	*
162	*5MM85	85	VIC YARRINGTON OLDS	3001 S KANSAS AVENUE	TOPEKA	KS	913 266-4585	5AM-6AM		5MM45	*
169	*5MM90	90	ED BOZARTH CHEVROLET	3231 TOPEKA AVENUE	TOPEKA	KS	913 266-5151	5AM-6AM		5MM50	*
536	*2MM92	92	DALE WILLEY PONT/CAD	2840 IOWA STREET	LAWRENCE	KS	913 843-5200	4AM-5AM		2VV56	*
140	*2MM93	93	ELLENA BUICK/OLDS/GMC	2112 W 29TH ST	LAWRENCE	KS	913 843-3522	4AM-5AM		2VV58	*
214	*2MM94	94	DINWIDDIE CHEVROLET	3400 S IOWA	LAWRENCE	KS	913 843-7700	3AM-4AM		2VV62	*
704	*5MM95	95	ED ROBERTS CHEVROLET	313 E. FRONT STREET	BONNER SPRINGS	KS	913 422-1000	2AM-3AM		5MM55	*

E DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5LL, 5MC)-
SECONDARY- UP TO TWO PADS, SEQUENCING
ON A CASE-BY-CASE BASIS BY RDR.
PRIMARY ROUTE IS THE 1VV

* 1/30/89 - LOAD CODE CHANGE (ALL DEALERS CHANGED LOAD CODES)

NOTE - ON FRIDAY'S LOAD THE LEG 1 COLUMBIA DRIVER COMES TO ST. LOUIS AND CONTINUE ON THE ROUTE UNTIL ALL DEALERS ARE DELIVERED (LAYOVER). THEREFORE THERE IS NO LEG 2 DISPATCH ON FRIDAY'S LOAD.

/89 Ryder Distribution Resources
Route Schedule Summary
Dealer Information

ROUTESCD
Page Nr 1

CATION: 8302 ROUTE: 2MC TRAILER: MC
PATCH DEADLINE: 8:00 PM SERVICE FREQUENCY EVEN

LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY	OLD LOAD CODE
5MC10	10	NEW UNION CHEV	9617 E. HWY. 350	RAYTOWN	MO	816 356-6610	NOON-1PM	64133
5MC15	15	DON KAHAN CHEV	505 N. HWY. 50	LEE'S SUMMIT	MO	816 524-6900	11AM-NOON	64063
5MC20	20	DAVE CROSS MOTOR	1120 N. 50	LEE'S SUMMIT	MO	816 524-3636	11AM-NOON	64063
* 2MC26	26	R Z MOTORS	HWY. 291 NORTH	HARRISONVILLE	MO	816 884-3269	10AM-11AM	1MC23*
* 2MC28	28	ROYAL CHEVROLET-OLDS	HWY. 291 NORTH	HARRISONVILLE	MO	816 884-3275	10AM-11AM	1MC27*
* 2MC32	32	HARRISONVILLE GMC	2606 ROCK HAVEN ROAD	HARRISONVILLE	MO	816 884-5021	10AM-11AM	1MC31*
5MC35	35	FLEETWOOD CHEVROLET	HWY 71 SOUTH/M58	BELTON	MO	816 331-4300	9AM-10AM	64012
5MC40	40	ALBRIGHT CHEVROLET	HWYS 117 & 71	KANSAS CITY	MO	816 763-4000	8AM-9AM	64134
5MC45	45	SARANN CHEVROLET	9400 TROOST	KANSAS CITY	MO	816 333-0900	7AM-8AM	64131
5MC50	50	CHRISTOPHER PONTIAC	9425 HOLMES	KANSAS CITY	MO	816 361-8520	7AM-8AM	64131
5MC55	55	CUNNINGHAM OLDS-GMC	555 W 103RD	KANSAS CITY	MO	816 941-0555	6AM-7AM	64114
5MC60	60	SUPERIOR BUICK	815 W 103RD	KANSAS CITY	MO	816 942-7100	6AM-7AM	64114
5MC65	65	PREMIER CADILLAC	8011 STATE LINE ROAD	KANSAS CITY	MO	816 361-2222	5AM-6AM	64114
5MC75	75	MORSE CHEVROLET	9201 METCALF	OVERLAND PARK	KS	913 649-6000	5AM-6AM	66212
5MC80	80	O'NEILL OLDS	80TH & METCALF	OVRLAND PARK	KS	913 648-5400	4AM-5AM	66204
5MC85	85	ANDY KLEIN PONTIAC-GMC	7801 METCALF	OVERLAND PARK	KS	913 642-5050	3AM-4AM	66204
5MC90	90	DON STEIN BUICK	7733 METCALF	OVERLAND PARK	KS	913 648-4000	3AM-4AM	66204
5MC95	95	VAN CHEVROLET	8300 W 63RD	MERRIAM	KS	913 384-1550	3AM-4AM	66201
5MC97	97	LLOYD KETCHUM OLDS	11911 E. HWY. 40	INDEPENDENCE	MO	816 358-2500	2AM-3AM	64050
* 5MC99	99	MOLLE CHEVROLET	411 MOCK	BLUE SPRINGS	MO	816 229-8800	2AM-3AM	5MM65*

LEG 2
COL

ST. LOUIS TURN FROM COLUMBIA, MO

LEG 1
COL

DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5LL) - SECONDARY-
UP TO TWO PADS, SEQUENCING ON A CASE-
BY-CASE BASIS BY RDR.
PRIMARY IS THE 1VV ROUTE

* 1/30/89 - LOAD CODE CHANGE, SEE LAST COLUM; NO LOAD CODE CHANGE IF IT SHOWS A ZIP CODE #

NOTE- ON FRIDAY'S LOAD THE LEG 1 COLUMBIA DRIVER COMES TO ST. LOUIS AND CONTUNUES ON THE ROUTE UNTIL ALL DEALERS ARE DELIVERED (LAYOVER) THEREFORE THERE IS NO LEG 2 DISPATCH ON FRIDAY'S LOAD.

/89 Ryder Distribution Resources
Route Schedule Summary
Dealer Information

ROUTESCD
Page Nr 1

CATION: 8302 ROUTE: 1MC TRAILER: MC
SPATCH DEADLINE: 8:00 PM SERVICE FREQUENCY ODD

LER E	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY	ZIP CODE & OLD LOAD CODE
69	5MC10	10	NEW UNION CHEV	9617 E. HWY. 350	RAYTOWN	MO	816 356-6610	NOON-1PM	64133
33	5MC15	15	DON KAHAN CHEV	505 N. HWY. 50	LEE'S SUMMIT	MO	816 524-6900	11AM-NOON	64063
09	5MC20	20	DAVE CROSS MOTOR	1120 N. 50 HWY.	LEE'S SUMMIT	MO	816 524-3636	11AM-NOON	64063
18	5MC35	35	FLEETWOOD CHEVROLET	HWY. 71 SOUTH/MSE	BELTON	MO	816 331-4300	9AM-10AM	64012
08	5MC40	40	ALBRIGHT CHEVROLET	117 & 71 HWYS	KANSAS CITY	MO	816 763-4000	8AM-9AM	64134
78	5MC45	45	SARANN CHEVROLET	9400 TROOST	KANSAS CITY	MO	816 333-0900	7AM-8AM	64131
69	5MC50	50	CHRISTOPHER PONTIAC	9425 HOLMES	KANSAS CITY	MO	816 361-8520	7AM-8AM	64131
96	5MC55	55	CUNNINGHAM OLDS-GMC	555 W 103RD	KANSAS CITY	MO	816 941-0555	6AM-7AM	64114
05	5MC60	60	SUPERIOR BUICK	815 W 103RD	KANSAS CITY	MO	816 942-7100	6AM-7AM	64114
09	5MC65	65	PREMIER CADILLAC	8011 STATE LINE ROAD	KANSAS CITY	MO	816 361-2222	5AM-6AM	64114
90	5MC75	75	MORSE CHEVROLET	9201 METCALF	OVERLAND PARK	KS	913 649-6000	4AM-5AM	66212
86	5MC80	80	O'NEILL OLDS	80TH & METCALF	OVERLAND PARK	KS	913 648-5400	4AM-5AM	66204
61	5MC85	85	ANDY KLEIN PONTIAC-GMC	7801 METCALF	OVERLAND PARK	KS	913 642-5050	3AM-4AM	66204
61	5MC90	90	DON STEIN BUICK	7733 METCALF	OVERLAND PARK	KS	913 648-4000	3AM-4AM	66204
5	5MC95	95	VAN CHEVROLET	8300 W 63RD	MERRIAM	KS	913 384-1550	3AM-4AM	66201
6	5MC97	97	LLOYD KETCHUM OLDS	11911 E. HWY. 40	INDEPENDENCE	MO	816 358-2500	2AM-3AM	64050
9*	*5MC99	99	MOLLE CHEVROLET	411 MOCK	BLUE SPRINGS	MO	816 229-8800	2AM-3AM	5MM65*

LEG 2
COL

ST. LOUIS TURN FROM COLUMBIA, MO

LEG 1
COL

DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5LL) - SECONDARY- UP TO TWO PADS, SEQUENCING ON A CASE-BY-CASE BASIS BY RDR.
PRIMARY IS THE 1VV ROUTE

* 1/30/89 - LOAD CODE CHANGE, SEE LAST COLUMN; NO LOAD CODE CHANGE IF IT SHOWS A ZIP CODE #

NOTE - ON FRIDAY'S LOAD THE LEG 1 COLUMBIA DRIVER COMES TO ST. LOUIS AND CONTINUES ON THE ROUTE UNTIL ALL DEALERS ARE DELIVERED (LAYOVER). THEREFORE THERE IS NO LEG 2 DISPATCH ON FRIDAY'S LOAD.

/89 Ryder Distribution Resources
Route Schedule Summary
Dealer Information

ROUTESCD
Page Nr 1

CATION: 8302 ROUTE: 1V TRAILER: 1V
SPATCH DEADLINE: MIDNIGHT SERVICE FREQUENCY ODD

R	LOAD CODE	SEQ NO	DEALER NAME	STREET	CITY	ST	PHONE	TIME OF DELIVERY	OLD LOAD CODE
5	* 1VV01	01	KINDRED CHEV-OLDS	HWYS 169 & 92	SMITHVILLE	MO	816 532-0900	6PM-7PM	2LL16 *
3	* 1VV02	02	SONNY HILL MOTORS	1600 E PRAIRIE ROAD	PLATTE CITY	MO	816 431-2144	5PM-6PM	1LL13 *
6	* 1VV03	03	COLLARD CHEVROLET	601 CHEROKEE	LEAVENWORTH	KS	913 682-4600	4PM-5PM	1MM03 *
8	* 1VV07	07	FRANK ROHRBACH MOTORS	5239 S 4TH STREET	LEAVENWORTH	KS	913 422-7900	4PM-5PM	1MM07 *
5	* 1VV09	09	PHALEN MOTORS	314 WOODLAWN	ACHISON	KS	913 367-3000	3PM-4PM	1MM09 *
1	* 1VV11	11	HIAWATHA MOTOR	714 UTAH	HIAWATHA	KS	913 742-7111	2PM-3PM	1MM11 *
3	* 1VV13	13	LEMAN MOTORS	811 GRANT	SABETHA	KS	913 284-2169	1PM-2PM	1MM13 *
7	* 1VV17	17	NEMAHA VALLEY MOTORS	703 NORTH ST	SENECA	KS	913 336-3481	1PM-2PM	1MM17 *
7	* 1VV19	19	H & H MOTOR CO	315 MAIN	SENECA	KS	913 336-2254	NOON-1PM	1MM19 *
0	* 1VV21	21	GLEASON CHEVROLET	26-28-30 N 4TH	SENECA	KS	913 336-2242	NOON-1PM	1MM21 *
1	* 1VV23	23	NORDHUS MOTOR	1301 BROADWAY	MARYSVILLE	KS	913 562-2596	11AM-NOON	1MM23 *
9	* 1VV27	27	BERGREN MOTORS CO	1406 S CENTER	MARYSVILLE	KS	913 562-2383	10AM-11AM	1MM27 *
3	* 1VV29	29	WHITEWAY CHEVROLET	210 N LOCUST	FRANKFORT	KS	913 292-4802	10AM-11AM	1MM29 *
1	* 1VV31	31	CLARK CHEV OLDS PONT BUICK	306 NEW YORK	HOLTON	KS	913 364-3156	8AM-9AM	1MM31 *

LEG 1

STL LAY-OVER

DAY DEALER DELIVERY CAPABILITY - KANSAS CITY METRO AREA (5LL, 5MC) - PRIMARY-
UP TO TWO PADS IN THE NOSE OF THE TRAILER.

* 1/30/89 - LOAD CODE CHANGES

NOTE - THIS TRAILER IS A TEMPORARY ROUTE, BUT IS LOADED EVERY OTHER DAY
UNTIL FURTHER NOTICE.

III. DAILY OBJECTIVE SHEETS

An area where we were extremely weak was where we stood on obtaining our ten budget objectives. The only feedback we received was a quarterly update report given by the Plant Manager. This information was basically useless. Three months after the fact it was hard, if not impossible, to determine what events may have kept us from meeting our objective. The report every quarter was also of no use in allowing response time to make a change in order to meet the objective. The objective had already been lost in the shuffle of papers and meetings.

This new report covers eight of our ten objectives that we have direct control over. The report was devised so it would come out daily. The information also gave a running month-to-date average and stated the monthly objective next to the current average. The report also breaks down the areas that kept us from obtaining the objective that day.

Each supervisory group now has ample information and time to react to trouble spots or capitalize on strong areas in a given month. We are also able to determine if it would be more cost effective to work overtime to meet an objective or whether we have enough time to make the objective on straight time. This also allows us a better gauge on moving manpower to see how it may affect another area.

The major accomplishment here is that all employees now know we have a goal or objective and that we are serious about obtaining it. This number is not something we bring out of the store room four times a year just to tell everyone how bad a job they are doing. This is a real, everyday number that may determine our future against the profitability of other warehouses.

We have established daily objective reports so each supervisory area knows their results daily as well as where they stand for the month. This gives us greater flexibility to correct and adjust problem areas versus our previous quarterly update reports. Copies of these reports follow.

Model year to date, we are making five of ten objectives and we are close in two other areas. Our last three deal with direct labor cost which should be reduced drastically as the new systems are put in place. This contrasts with the 1988 model year where we only made two objectives and we were not close in any of the other eight areas.

These reports have been a significant help in reaching these goals and making each supervisor and his employes aware of their objectives and responsibilities.

OBJECTIVES DATE 05-DEC-88

LINES PER HOUR

REC LINES	MR LINES	SHIP LINES	TOTAL LINES	DAILY HOURS	DAILY LINES HOUR	MTD LINES HOUR	OBJ.
1502	110	29884	31496	3397	9.27	7.73	9.12

MATERIAL HANDLING RATE

SHIPPING VOLUME	MR VOLUME	TOTAL VOLUME	TOTAL PROD. HOURS	ADJ VOLUME	DAILY MHR	MTD MHR	OBJ.
1037409	19230	1050712	2992	5927	3.97	4.48	3.34

SHIPPING STANDARD OF SERVICE - ORDERS

# VIPS LATE	OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
4	27	31	98.49	95.53	98.00

SHIPPING STANDARD OF SERVICE - LINES

# VIPS LATE	# OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
6	43	49	99.84	88.06	98.00

TWO-DAY PUTAWAY

DAY ONE	DAY TWO	DAY THREE	DAY FOUR	DAY FIVE	MTD ON TIME	OBJ.
24.70	95.60	100.00	100.00	100.00	95.60	96.00

QUALITY

WRONG QUANTITY	WRONG PART	DAMAGE	TOTAL LINES	DAILY INDEX	MTD INDEX	OBJ.
53	66	0	119	0.398	0.388	0.423

INVENTORY ADJUSTMENTS

B/ORDERED LINES	CANC LINES	REWRITE LINES	TOTAL LINES	DAILY B/O RATE	MTD B/O RATE	OBJ.
146	13	28	187	0.626	0.577	0.531

OVERTIME

DAILY HOURS	MONTHLY HOURS	DAILY %	MTD %	OBJ.
	0	10.2	14.3	8.50

OBJECTIVES DATE 22-DEC-88

LINES PER HOUR

REC LINES	MR LINES	SHIP LINES	TOTAL LINES	DAILY HOURS	DAILY LINES HOUR	MTD LINES HOUR	OBJ.
971	1690	29005	31666	3742	8.46	8.65	9.12

MATERIAL HANDLING RATE

SHIPPING VOLUME	MR VOLUME	TOTAL VOLUME	TOTAL PROD. HOURS	ADJ VOLUME	DAILY MHR	MTD MHR	OBJ.
1134959	102091	1227027	3319	10023	3.77	3.73	3.34

SHIPPING STANDARD OF SERVICE - ORDERS

# VIPS LATE	OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
77	15	92	96.32	96.43	98.00

SHIPPING STANDARD OF SERVICE - LINES

# VIPS LATE	# OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
149	27	176	99.39	95.93	98.00

TWO-DAY PUTAWAY

DAY ONE	DAY TWO	DAY THREE	DAY FOUR	DAY FIVE	MTD ON TIME	OBJ.
24.70	95.60	100.00	100.00	100.00	95.60	96.00

QUALITY

WRONG QUANTITY	WRONG PART	DAMAGE	TOTAL LINES	DAILY INDEX	MTD INDEX	OBJ.
76	69	0	145	0.499	0.515	0.465

INVENTORY ADJUSTMENTS

B/ORDERED LINES	CANC LINES	REWRITE LINES	TOTAL LINES	DAILY B/O RATE	MTD B/O RATE	OBJ.
114	12	0	126	0.434	0.532	0.531

OVERTIME

DAILY HOURS	MONTHLY HOURS	DAILY %	MTD %	OBJ.
	0	ERR	ERR	8.50

OBJECTIVES DATE 23-DEC-88

LINES PER HOUR

REC LINES	MR LINES	SHIP LINES	TOTAL LINES	DAILY HOURS	DAILY LINES HOUR	MTD LINES HOUR	OBJ.
565	1410	36439	38414	3010	12.76	8.83	9.12

MATERIAL HANDLING RATE

SHIPPING VOLUME	MR VOLUME	TOTAL VOLUME	TOTAL PROD. HOURS	ADJ VOLUME	DAILY MHR	MTD MHR	OBJ.
1403637	80977	1475682	2634	8932	2.49	3.65	3.34

SHIPPING STANDARD OF SERVICE - ORDERS

# VIPS LATE	OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
48	10	58	98.19	96.54	98.00

SHIPPING STANDARD OF SERVICE - LINES

# VIPS LATE	# OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
145	107	252	99.31	96.17	98.00

TWO-DAY PUTAWAY

DAY ONE	DAY TWO	DAY THREE	DAY FOUR	DAY FIVE	MTD ON TIME	OBJ.
24.70	95.60	100.00	100.00	100.00	95.60	96.00

QUALITY

WRONG QUANTITY	WRONG PART	DAMAGE	TOTAL LINES	DAILY INDEX	MTD INDEX	OBJ.
25	18	49	92	0.252	0.497	0.465

INVENTORY ADJUSTMENTS

B/ORDERED LINES	CANC LINES	REWRITE LINES	TOTAL LINES	DAILY B/O RATE	MTD B/O RATE	OBJ.
133	15	3	151	0.414	0.523	0.531

OVERTIME

DAILY HOURS	MONTHLY HOURS	DAILY %	MTD %	OBJ.
	0	ERR	ERR	8.50

OBJECTIVES DATE: HOLIDAY, DEC. 27,28,29,30

LINES PER HOUR

REC LINES	MR LINES	SHIP LINES	TOTAL LINES	DAILY HOURS	DAILY LINES HOUR	MTD LINES HOUR	OBJ.
812	4	103882	104698	11244	9.31	8.90	9.12

MATERIAL HANDLING RATE

SHIPPING VOLUME	MR VOLUME	TOTAL VOLUME	TOTAL PROD. HOURS	ADJ VOLUME	DAILY MHR	MTD MHR	OBJ.
3835382	174	3796506	9740	39050	3.57	3.64	3.34

SHIPPING STANDARD OF SERVICE - ORDERS

# VIPS LATE	OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
7	6	13	99.85	97.04	98.00

SHIPPING STANDARD OF SERVICE - LINES

# VIPS LATE	# OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
11	503	514	99.51	96.72	98.00

TWO-DAY PUTAWAY

DAY ONE	DAY TWO	DAY THREE	DAY FOUR	DAY FIVE	MTD ON TIME	OBJ.
24.70	95.60	100.00	100.00	100.00	95.60	96.00

QUALITY

WRONG QUANTITY	WRONG PART	DAMAGE	TOTAL LINES	DAILY INDEX	MTD INDEX	OBJ.
262	197	88	547	0.526	0.502	0.465

INVENTORY ADJUSTMENTS

B/ORDERED LINES	CANC LINES	REWRITE LINES	TOTAL LINES	DAILY B/O RATE	MTD B/O RATE	OBJ.
412	39	1	452	0.435	0.509	0.531

OVERTIME

DAILY HOURS	MONTHLY HOURS	DAILY %	MTD %	OBJ.
	0	ERR	ERR	8.50

OBJECTIVES DATE 03-JAN-89

LINES PER HOUR

REC LINES	MR LINES	SHIP LINES	TOTAL LINES	DAILY HOURS	DAILY LINES HOUR	MTD LINES HOUR	OBJ.
973	406	20942	22321	3736	5.97	5.97	9.12

MATERIAL HANDLING RATE

SHIPPING VOLUME	MR VOLUME	TOTAL VOLUME	TOTAL PROD. HOURS	ADJ VOLUME	DAILY MHR	MTD MHR	OBJ.
706440	61096	760124	3295	7412	6.04	6.04	3.34

SHIPPING STANDARD OF SERVICE - ORDERS

# VIPS LATE	OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
0	0	0	100.00	100.00	98.00

SHIPPING STANDARD OF SERVICE - LINES

# VIPS LATE	# OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
0	0	0	100.00	100.00	98.00

TWO-DAY PUTAWAY

LINES PUTAWAY	LATE LINES	DAILY ON TIME	MTD ON TIME	OBJ.
973	0	100.00	100.00	96.00

QUALITY

WRONG QUANTITY	WRONG PART	DAMAGE	TOTAL LINES	DAILY INDEX	MTD INDEX	OBJ.
105	88	21	214	1.022	1.022	0.465

INVENTORY ADJUSTMENTS

B/ORDERED LINES	CANC LINES	REWRITE LINES	TOTAL LINES	DAILY B/O RATE	MTD B/O RATE	OBJ.
102	9	0	111	0.530	0.530	0.531

OVERTIME

DAILY HOURS	MONTHLY HOURS	DAILY %	MTD %	OBJ.
	0	ERR	ERR	8.50

OBJECTIVES DATE 20-JAN-89

LINES PER HOUR

REC LINES	MR LINES	SHIP LINES	TOTAL LINES	DAILY HOURS	DAILY LINES HOUR	MTD LINES HOUR	OBJ.
1192	9118	18502	28812	5600	5.15	8.08	9.12

MATERIAL HANDLING RATE

SHIPPING VOLUME	MR VOLUME	TOTAL VOLUME	TOTAL PROD. HOURS	ADJ VOLUME	DAILY MHR	MTD MHR	OBJ.
621171	357970	967509	4942	11632	7.11	3.89	3.34

SHIPPING STANDARD OF SERVICE - ORDERS

# VIPS LATE	OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
11	2	13	99.23	96.89	98.00

SHIPPING STANDARD OF SERVICE - LINES

# VIPS LATE	# OTHER LATE	TOTAL LATE	DAILY ON TIME	MTD ON TIME	OBJ.
28	7	35	99.81	97.96	98.00

TWO-DAY PUTAWAY

LINES PUTAWAY	LATE LINES	DAILY ON TIME	MTD ON TIME	OBJ.
1192	0	100.00	99.94	96.00

QUALITY

WRONG QUANTITY	WRONG PART	DAMAGE	TOTAL LINES	DAILY INDEX	MTD INDEX	OBJ.
68	74	19	161	0.870	0.590	0.465

INVENTORY ADJUSTMENTS

B/ORDERED LINES	CANC LINES	REWRITE LINES	TOTAL LINES	DAILY B/O RATE	MTD B/O RATE	OBJ.
121	5	0	126	0.681	0.554	0.531

OVERTIME

DAILY HOURS	MONTHLY HOURS	DAILY %	MTD %	OBJ.
3835	10261	16.67	15.65	8.50

IV. 90% UTILIZATION VS. 95%

Our present floor space utilization is 95 percent, which leaves us little space when stock inbound escalates. The result is stock backed up in rail cars or trailers in the yard or, even worse, stock that is stuck in the racks out of sequence to get it out of the way. As a result, we have taken a look at the number of items we carry and bin trips to each item. This revealed some startling numbers on parts that should be deleted and moved back into the main parts depot.

As was discussed previously in this section under Grid Management Systems, a new way of receiving and putting up stock will soon be implemented. This added dimension will allow us much more flexibility and control over scheduling and receiving new material. It will also allow us to group like parts and faster-moving parts together. The extra 5 percent staging area will allow us to unload and release railcars and trailers in a more timely manner. This will greatly reduce the penalties now imposed by the railroads and trucking companies for detaining their equipment past the scheduled unload dates.

With this added space we will also be able to install temporary racking to stock campaign or recall items as necessary. This will eliminate double handling and allow all parts to be located in a central area which will expedite picking them. Another immediate advantage is the ability to unload and group like parts as they are unloaded. This will greatly reduce breakdown and material handling time. This then will make more time available to unload an extra railcar or two per day.

V. BULK TO BE BROKEN OUT OF REGULAR ORDERS

A very time-consuming item which was discovered in the time studies was the excess time required by our foot pickers to pick their bulk items. A picker will first go out and pick the smaller binnable items. Then on most orders they will need to bring their flat truck in, get a bulk truck, go back out into the far end of the warehouse and pick their bulk. In some cases it required them to make two or three trips back out for bulk items. We then discovered how much time was lost in loading these routes while waiting on a picker to bring in a large amount of bulk. After totaling the time in both areas that was lost and the number of occurrences we had, we decided it warranted further investigation.

After sorting through the time studies, we decided to try an experiment of sorting the bulk from the binnable items in seven of our routes. We tried this for approximately three months. The results were very convincing that a considerable amount of time could be saved by pulling the bulk and adding one to three bulk drivers to pick up the excess work. This would allow the foot pickers to turn their orders over more quickly and allow the routes to be completed sooner. The time that was saved picking the routes allowed them to be loaded sooner. Another benefit that came from pulling the bulk from binnable items was that most pickers would pick two to three more rounds than they had previously. This allowed us to pick more routes and complete them in a more timely manner.

The remainder of the routes are presently under consideration to see if we should break their bulk out from their binnable items.

On first shift, this will probably require more equipment since most of theirs is tied up at the present time. We feel most people will be in favor of pulling the bulk and freeing them up to pick the binnable items.

VI. REDESIGN MAINTENANCE AREA

Our maintenance area presently sits in the middle of our warehouse taking up valuable space that could be populated with faster-moving parts. This area would cut down picking time since parts could be moved from the back of the building forward. Plans are under way to make this move and add rack and storage space into the maintenance area.

Another area that will be added in maintenance is a quick change battery area. At present all equipment is brought in one-half hour before lunch and one-half hour before the end of the shift. This cuts all drivers' days from an eight-hour workday to a seven-hour workday. This translates to about 25 hours per month for each of 57 drivers totaling 1,425 manhours per month lost. These 1,425 manhours equate to about $28,500 per month. This does not include the costs for the people that they drive for who cannot check or unload stock while they take their equipment in early to charge the batteries. We then have another group of employees that sit idle. This quick change battery area will allow the driver to come in and have maintenance take out the drained battery and drop a new one in. This will eliminate almost 70 percent of the current lost time.

Another area in maintenance that has been improved is accountability of work requested and completed. Previously, if a maintenance item was needed in an area, word of mouth or a scrap piece of paper was the work order. Now a form is required and must be signed and dated by the requesting supervisor. The maintenance department then meets once a week to rank the items by importance as related to productivity and quality. Emergency items which would affect productivity output are handled immediately. Once a week a maintenance completion list is prepared and distributed. This allows the requesting supervisor to check on items turned in, their completion time, and question, if necessary, why items were not completed.

Overall productivity should improve, and they now have time to perform preventive maintenance instead of only " putting out fires." A sample Maintenance Items Completed list for the week of January 20, 1989 follows.

MAINTENANCE ITEMS COMPLETED
WEEK OF JANUARY 20, 1989

DESCRIPTION OF WORK REQUESTED	SUPERVISOR
Move heater #27 to heater #32 location	S. Thurston
Purchase/install water filters in cafe	S. Thurston
Repair A/C unit in timekeepers office	S. Thurston
Paint stripe along edge of rail well "CAUTION"	S. Thurston
Water supply pipe leaking men's toilet (office)	R. Kuether
Drill out and replace desk locks	R. Sharp
Place metal shelving in cafe office for can goods	T. Brady
Cover hole under pizza machine	T. Brady
Install TV monitors and brackets in conference room "B"	T. Brady
Install a wall switch to operate both monitors	T. Brady
Install trays in dispatch	D. Rigman
Wire both monitors to VCR	T. Brady
506 Aisle is being changed from 108" to 80" (CANCELLED)	K. Kirchner
Install mldg. around A/C unit in Rigman's office	D. Rigman
Faucet in sink in medical dept. very loose	B. Lehmann
Air hose leaking on staple gun in MR bulk re-wrap	J. McCarthy
Replace (2) lights in Dave Rigman's office	D. Rigman
Repair front panel on power dist. panel	E. Hadley
Rack guard column L-10 broken loose from floor (OSHA)	E. Hadley
Adjust eye wash water pressure in maintenance (OSHA)	E. Hadley
Replace light bulb in personnel office	G. Spalding
Replace exhaust fan switch (Rigman's office)	D. Rigman
Reinforce rubber bumper on door #4	B. Little
Verticle support at 751-28 is bent (safety)	K. Kirchner
Walk out door #9 Emergency Exit Bar Sticks	L. Sisk
Desert Cooler not working cafe	S. Bricky
Install damper in overhead duct cafe office	S. Bricky
Purchase and install ceiling fan cafe office	S. Bricky
Repair leak in sink in kitchen	S. Bricky
Plackards missing on (2) jack stands	B. Little
Replace lights in Aisles 9 & 5	A. Harber
Replace lock on cabinet in Quality office	R. Sharp
Remove lock from HDS TRAILER 914245	T. Brady
Adjust PC table in J. Blomeyer's office	J. Blomeyer
Milk container will not keep milk cold	S. Bricky
ADD electrical outlet to J. Blomeyer's office	J. Blomeyer
Set clocks in order dept.	J. Blomeyer
Jackie Wood's desk lock does not work	J. Jones
Toilet stopped up - ladies front office	K. Kirchner
Sink stopped up driver's toilet rec. dock.	K. Kirchner
Need guard rail at Bay Post K-4	E. Hadley

cc: All Salaried Personnel
Shop Committee

T. Brady
Gen. Office Supvr.

VII. ROUTE ASSIGNMENTS BY SHIFT

To further add accountability to supervisors and employees, we analyzed our routes by dispatch time, numbers of lines and parts in a route, and load time and assigned specific routes to each shift. This would allow us to guage how far ahead or behind we were for that day of business. This also allowed us to move employees in and out of the area as needed to keep all areas up. We could also address trouble spots and find out what caused us to get behind or helped us get ahead. This knowledge could then be compiled and used for future reference.

These seven areas were looked at in great length and detail before any changes were made. Also, anyone affected by the change was consulted and their input was solicited before the changes were made. Many ideas were modified, changed, and reshaped before they were agreeable and workable for everyone. This attitude of allowing everyone to participate in the decision made it easier for most people to buy in to the final decision. Most areas are still being changed and modified but, for the most part, in the right direction now. Goals have been established and a semi-formal road map has been charted. We now have a more meaningful and productive direction to travel in. This new direction has helped build pride back into the worker's job and also given them some new and meaningful responsibility. The challenge is now up to all of us.

SUMMARY

As a final step to improve customer satisfaction, improve quality, and reduce overall cost, on March 13, 1989 we will go from a two-shift operation to a three-shift operation. At present we offer overnight service to only 78 of our 1,200 dealers. Under this new three-shift concept, we will be able to offer 600 dealers overnight service. We will also give another 470 one-day service and the remaining 130 will have two-day service, which is a significant improvement over the two- to four-day service previously offered.

We are able to do this by matching our order draw time to the time employees are picking, packing, and shipping parts. We will stagger starting times for each area, and shift times will not overlap in areas where production is in process. This will allow us to be more efficient and use our current resources more productively. We will also be able to reduce overtime by having work readily available for each department as they come in rather than holding up work in several areas as they wait for other areas to generate a sufficient amount of work to make their area efficient. For example, the shipping group now comes in with the picking group. If no orders are ready to pack and load, this group of 30 to 50 employes may sit 1 to 4 hours with no work to perform. Then to complete their work, they either draw employes from other productive areas to complete their work on time or stay two to three hours overtime to finish. Under the three-shift concept, the shipping group will come in three hours behind the picking group so their work will be available to them immediately and should eliminate much wasted idle time and overtime.

Projected extra cost in shift premiums and utilities is $625,000 annually. Projected savings in overtime, idle work time, and the consolidation of routes that can be consolidated is $2,300,000 annually. This would translate into an overall cost savings of $1,675,000 annually. Another added cost that will be incurred but has not yet been completed is a quick change battery rack in the maintenance area. This will have a one-time cost of $100,000 but is expected to save us $45,000 per year in battery cost. This savings will come from the reduced need to recharge the batteries which will increase the overall life cycle. This will give us a payback in a little over two years with a savings from that point on.

Our initial theory was a projected annual savings of $1,700,000 with a no-cost investment; however, we have incurred some cost. The cost to totally revamp the layout of the plant, add in our Grid Management Program, adjust our route delivery system, and now our newest dimension, the three-shift concept, will give us a start-up cost of about $225,000. We will also have an annual cost of $625,000 in shift premiums. We fully expect an annual cost savings of $2,625,000. This takes into account the $2,300,000 labor savings with third shift and the elimination of several jobs which will not need to be duplicated with three shifts.

While we missed our no-cost start-up expenses, we have greatly surpassed our expected annual savings. We should have an added $925,000 savings which will drop to the bottom line and hopefully save jobs for the future. Our loss for 1988 was $1,930,000, so this $2,625,000 savings should turn us into a profit center to budget, instead of a drain on the corporation.

This extensive project has also taught us how to work more closely together and we have, hopefully, built a great deal of trust between the hourly workers and management. In the least, we have learned how to manage our business more effectively, efficiently, and profitably. We have also put in place a three-year plan which will help us be even more competitive in the years to come. This plan will also allow us to keep pace with industry standards and track our business better than every before.

The plan calls for more modernization and, due to this advanced planning, the corporation has recently budgeted $5 million in improvements to us over the next three years. These improvements are in our hands, we control our own destiny on how well we operate in saving the monies previously mentioned and taking ourselves from red ink to black ink.

APPENDIX

TEAM EFFECTIVENESS PROFILE

The Team Effectiveness Profile was used to determine how effective our management group was functioning as a team. We tried to determine if we were all working in the same direction and toward the same goals. We also needed to determine how well all levels of management interacted, what conflicts existed, how confident members were in decisions that were made, whether these decisions were made at appropriate levels, and whether our priorities were clear.

This Profile was taken by all levels of management from the Floor Supervisors all the way up to the Plant Manager. We are currently thinking of having the hourly work force take this Profile to find out their confidence level in management. This may offer an eye-opening overview of our operation from the opposite side of the fence.

TEAM EFFECTIVENESS PROFILE

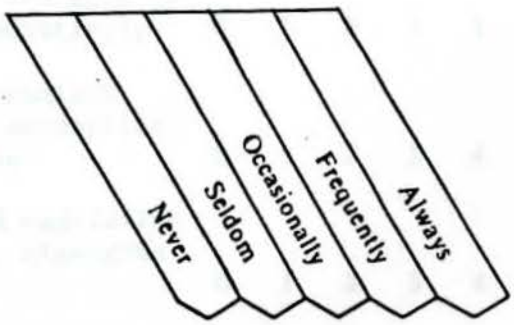
Second Edition

Developed by Rollin Glaser and Christine Glaser

Group dymanics research has verified the existence of a number of factors that affect group productivity and member satisfaction. To enable you and your group to assess the effectiveness of its work, sixty statements are presented for consideration in the Team Effectiveness Profile (TEP). Please evaluate your group against each of these statements, using the five-point scales shown below (0-4). The scale values are intended to reflect the following approximate judgments.

0 = We never do this. This is not the way this group operates.
1 = We seldom do this. This is rarely done.
2 = We occasionally do this. We do this sometimes.
3 = We frequently do this. This is often the way this group operates.
4 = We always do this. This is a norm operating in this group.

DIRECTIONS: Circle the value that reflects, in your judgment, how this group operates. Other members of your group may agree or disagree with your judgment. Later, you will have a chance to compare and discuss your perceptions.



Example:

1. Members of this group trust each other. 0 1 2 3 4

Please be candid in your ratings. Your perceptions will be anonymously reported to the group. The focus of the later discussion will be the group's general impressions of its own operations. Your individual perceptions will not be revealed unless you choose to do so. You can be of greatest help to your group by indicating your honest evaluation now and by later entering into a discussion of how best to remove some of the blockages to this group's success.

Directions:

For each statement, circle the value that reflects, in your judgment, how this group operates.

		Never	Seldom	Occasionally	Frequently	Always
		0	1	2	3	4
1.	Our group problem solving activities result in creative solutions to organizational issues.	0	1	2	3	4
2.	Our group members clearly understand their individual roles.	0	1	2	3	4
3.	We periodically review our progress toward our goals and objectives.	0	1	2	3	4
4.	Group members help each other find professional satisfaction from the group's work; opportunities for self-actualization and growth are deliberately cultivated for each group member.	0	1	2	3	4
5.	When we are in conflict or disagreement with another work group, we are able to resolve that conflict collaboratively.	0	1	2	3	4
6.	Appropriate coordinating mechanisms exist to help group members accomplish their shared responsibilities.	0	1	2	3	4
7.	Group members appreciate and capitalize on each other's differences, strengths and unique capabilities.	0	1	2	3	4
8.	We are able to arrange our priorities to meet the needs of other work groups.	0	1	2	3	4
9.	Group meetings are held regularly.	0	1	2	3	4
10.	Our group planning is regular and systematic.	0	1	2	3	4
11.	When new positions are created or old positions modified, an intentional effort is made to clarify these changes for everyone in the work group.	0	1	2	3	4

		Never	Seldom	Occasionally	Frequently	Always
		0	1	2	3	4
12.	Our group has a high level of commitment to its mission, goals and strategies.	0	1	2	3	4
13.	Our work group has open and full communication with other work groups.	0	1	2	3	4
14.	When we choose to use consensus decision-making, we have the skill to do it effectively.	0	1	2	3	4
15.	Group members are effective listeners.	0	1	2	3	4
16.	Our group is appropriately positioned within the total organization structure so that it can be effective in carrying out its mission.	0	1	2	3	4
17.	Communication within the group is open.	0	1	2	3	4
18.	Organizational problems are acknowledged and discussed; a sincere attempt is made to solve them.	0	1	2	3	4
19.	When we change our priorities, group members understand and accept the need for the changes, even though they might occur with little advance notice.	0	1	2	3	4
20.	Our reward system is fair.	0	1	2	3	4
21.	Our work group is able to capitalize on the differences, strengths and unique capacities of other work groups.	0	1	2	3	4
22.	Group leadership is democratic in style; the responsibility for direction is appropriately shared with all members of the group.	0	1	2	3	4

		Never	Seldom	Occasionally	Frequently	Always
		0	1	2	3	4
23.	Realistic "stretch" and challenge are built into the group's plans and goals.	0	1	2	3	4
24.	Position descriptions have been prepared and discussed and are kept up-to-date for each job in this work group.	0	1	2	3	4
25.	The style of group leadership is related to the task at hand; the degree of direction is proportional to the group's ability to plan and implement each assignment.	0	1	2	3	4
26.	Our work group is trusted by other work groups.	0	1	2	3	4
27.	Our goals and objectives are measurable; i.e., others outside of our work group could readily quantify and evaluate our progress.	0	1	2	3	4
28.	Group meetings are well managed and productive.	0	1	2	3	4
29.	Group members understand clearly each other's roles.	0	1	2	3	4
30.	Our group problem solving efforts are rational and systematic.	0	1	2	3	4
31.	Our group mission and plans are in writing with specific strategies for achieving our goals.	0	1	2	3	4
32.	Members of this group trust each other.	0	1	2	3	4
33.	We work toward integrating our plans with those of other work groups.	0	1	2	3	4
34.	Group decisions are of high quality.	0	1	2	3	4

		Never	Seldom	Occasionally	Frequently	Always
		0	1	2	3	4
35.	Our group is organized (structured) appropriately for its tasks; overlaps and gaps are minimal.	0	1	2	3	4
36.	Group performance is periodically evaluated and discussed.	0	1	2	3	4
37.	Participative methods have been used to establish the group's goals and objectives.	0	1	2	3	4
38.	Group members value and seek constructive feedback from each other; giving and receiving feedback is a group norm.	0	1	2	3	4
39.	We are able to resolve our <u>intragroup</u> conflicts and disagreements collaboratively.	0	1	2	3	4
40.	Group members enjoy each other's presence and look forward to interactional opportunities.	0	1	2	3	4
41.	Group activity is informal and appropriately flexible; business is conducted with minimal "red tape"; rapid response to a crisis can be expected.	0	1	2	3	4
42.	Our group is effective in coordinating its efforts with other work groups.	0	1	2	3	4
43.	Decisions are made at the appropriate level in our group, i.e., where the most complete and accurate information is available.	0	1	2	3	4
44.	Our meetings with other work groups are productive.	0	1	2	3	4
45.	Group members defend each other from outside attack.	0	1	2	3	4

		Never	Seldom	Occasionally	Frequently	Always
		0	1	2	3	4
46.	Our roles, relationships and group structure are clear and helpful to other work groups.	0	1	2	3	4
47.	Policies and procedures used in group operation are appropriate; neither too rigid and cumbersome nor too loose or nonexistent.	0	1	2	3	4
48.	The group works enthusiastically and energetically on any problem it tackles.	0	1	2	3	4
49.	Our group has appropriate controls over its performance; monitoring systems are adequate; checks and balances achieve desired outcomes.	0	1	2	3	4
50.	The goals of our work group mesh well with other groups' goals.	0	1	2	3	4
51.	Effective group performance is valued and rewarded.	0	1	2	3	4
52.	Our group members are qualified technically for their responsibilities; in cases where they are not, specific plans exist to prepare them for their responsibilities.	0	1	2	3	4
53.	Our reward system is timely.	0	1	2	3	4
54.	The climate is supportive when the group works together.	0	1	2	3	4
55.	Our reward system is varied; i.e., it includes pay, various incentives, recognition, perquisites, etc.	0	1	2	3	4
56.	Organization charts for the group are in writing and available for everyone to study.	0	1	2	3	4

	Never	Seldom	Occasionally	Frequently	Always
	0	1	2	3	4
57. The reporting relationships in our group are logical.	0	1	2	3	4
58. Implementation of group plans is steady and determined; deadlines are met or appropriately revised to meet changed circumstances.	0	1	2	3	4
59. We have a rational system for arranging our work priorities.	0	1	2	3	4
60. Our goals and objectives are clear, well formulated and unified.	0	1	2	3	4

AUDIT PROCESS
TABLE OF CONTENTS

The following practices should be followed when performing and documenting audits.

1. All forms should be filled out and turned in by management personnel.

2. Physically moving parts or equipment for audit purposes should be accomplished with the help of an hourly employee.

3. Errors found must be corrected by an hourly employee.

4. Supervisors should turn in their audits weekly.

AUDIT SCHEDULE I

AUDIT TYPE	DEPT.	SUPVR. QTY	SUPVR. FREQ.	GEN.SUPVR. QTY	GEN.SUPVR. FREQ	MGR/SUP QUALITY QTY	MGR/SUP QUALITY F
VIP/CIO/SSO	SHIP/PCP	30 LNS	DAILY	30 LNS	WEEKLY	30 LNS	MO
BULK	SHIP/PCP	10 TAGS	DAILY	10 TAGS	WEEKLY	10 TAGS	MO
TRAILER	SHIP DOCK	12 (2 TRLS) DEALERS	DAILY	5 (1 TRL) DEALERS	WEEKLY	1 (TRL) 5 DLRS	MO
LOADING	SHIP DOCK	1 ROUTE MANIFEST	DAILY	1 ROUTE MANIFEST	WEEKLY	1 ROUTE MANIFEST	MO
BULK	REC.RAIL	10 LNS	DAILY	5 LNS	WEEKLY	5 LNS	MO
LOAD BACK	REC.RAIL	1 CAR	DAILY	1 CAR	WEEKLY	1 CAR	MO
STOCK TAGS	REC. WHSE	10 TAGS	DAILY	5 TAGS	WEEKLY	5 TAGS	MO
END OF CONVEYER LINE	MR	5 TAGS	DAILY	5 TAGS	WEEKLY	5 TAGS	MO
BULK CHECK IN	MR	2 TAGS	DAILY	2 TAGS	WEEKLY	2 TAGS	MC
FACTORY	MR	2 TAGS	DAILY	2 TAGS	WEEKLY	2 TAGS	MC
RECEIPT	MR	1 DEALER	DAILY	1 DEALER	WEEKLY	1 DLR	MC

1. 4-DEALERS DAILY - 30 LINES MINIMUM
2. HAVE EMPLOYE CORRECT OWN ERROR WHERE POSSIBLE
3. SIGN NAME.

DAILY DEALER ORDER

MONTH: 298

DEALER		SHIP.#	LINES AUDITED	EMP. ID #	INCORRECT QTY	WRONG PART	DAMAGE	IMPROP. PACK	N
MONDAY									
1.									
2.									
3.									
4.									
TUESDAY									
1.									
2.									
3.									
4.									
WEDNESDAY									
1.									
2.									
3.									
4.									
THURSDAY									
1.									
2.									
3.									
4.									
FRIDAY									
1.									
2.									
3.									
4.									

RPD DOCK TRAILER AUDIT

DEALER NAME	ROUTE	CODE	SHIP #	DATE		#PC'S ON ORDER		# ON MANIFEST	ER
1. PCS MISSING									
2. MANIFEST WRONG									
3. PCS. DAMAGED									
4. WRONG PART									
5. WRONG QTY									
6. LOAD CORRECTION MADE									

AR#	DATE	DEST.	GATES SECURED		RACKS LEGS NESTED		LIKE CONTAINER GROUPED		OF BARS IN PROPER POSITION		DEBRIS REMOVED		AUDITO
			YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	

Warehousing & Distribution
Division of General Motors Corporation

Location Aud

Date

301

SHIFT

Main Location | Supplemental Location | SUPERVISOR

Part Number	Location	File Location	Defect Number	Comment or M.I.T. Number
17				
17				
17				
G				
G				
G				
G				
G				
G				
G				
G				
G				
G				

Total Samples | Total Defects

1. - Unauthorized package
2. - Damaged part - Any type damaged part found in location
3. - Incorrect location - Location appears on file - Not in physical location
4. - Invalid record - Good physical location - Doesn't appear on file
5. - Mixed stock - Stock correctly marked intermixed in incorrect location
6. - Incorrect M.I.T. Number - Wrong M.I.T. Number entered into computer
7. Wrong size location for parts.
8. Part # doesn't match Rec. tag.
9. Wrong quantity received tag not corrected.
10. Shipped to St. Louis in
11. Other (Specify)

PD 153 Rev

PLANT

MATERIAL RETURN AUDIT

DATE

SUPERVISOR 302

PART NUMBER	MR CODE	STOCKING PARTS PLANT	FILE LOCATION	DEFECT TYPE	OTHER
C1					
C2					
C3					
C4					
C5					
B1					
B2					
F1					
F2					
R1					

DEFECT CODES:

- Wrong or Omitted Part Number
- Load Arrangement
- Unauthorized Package
- Damaged part
- Inadequate Packing Protection
- Date Code on labels don't match
- Wrong quantity for tag
- Not GM Part

9. Incomplete or Wrong Destination
10. Certification Requirement
11. Code "S" under $500.00
12. PC 302 & check sheet disagree
13. Checker did not sign
14. No entry on detention sheet
15. 3 X 5 card missing or incomplete
16. Other (specify)

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