AN ANALYSIS OF THE ORGANIZATIONAL STRUCTURE OF THE PACKAGING DEPARTMENTS OF TEN DOMESTIC PLANT LOCATIONS OF INTERNATIONAL BUSINESS MACHINES CORPORATION

THESIS FOR THE DEGREE OF M. S.

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ABSTRACT

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Body of Abstract

It was necessary to relate the perspectives of the organization of the packaging activities at ten plant locations of International Business Machines Corporation to their objectives. Within the past several years, the packaging activity has been placing a greater degree of emphasis on the shipping characteristics of their products; thus changing some of the long-range objectives of packaging. In view of these changing objectives, this study was undertaken to analyze the organizational structure of the packaging departments of each individual plant.

The research study included collecting data from the various plants' packaging managers through personal interviews and a written, structured questionnaire asking questions on the interaction patterns of the packaging departments and, also, the opinions of the packaging personnel in relation to their organization.

The major findings of the study were: first, the packaging activity in most plant locations is oriented toward the activities of materials handling, plant layout and internal warehousing. Second, the objectives, however, of both the Corporate Packaging Program and in individual plants pointed to a closer alignment with such functions as Product and Development Engineering, Customer Engineering and Quality Control.

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A THESIS

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PREFACE

The purpose of this study is to both synthesize and analyze IBM's packaging activities from an organizational viewpoint. It was felt there was a definite need to stand back and view the overall operations of the packaging activities to see just where we are today and to point up some real or potential organizational problems that may exist for further examination by the discrete management of the various IBM plants.

The scope of this study encompasses more than can be learned from a formal organization chart. I hope that this research will be of assistance to the students of packaging by giving them a greater insight into the organization of packaging departments and the relationship of packaging to other functions within a business enterprise.

In studying and gathering data concerning the packaging activities in IBM, I had to call on all the packaging department managers and their personnel for assistance. Their cooperation was excellent and I am indebted to them. I would like to thank many individuals within IBM, both at Rochester and Corporate Headquarters, who spent a great deal of time answering

questions and giving valuable advice in their areas of specialty.

I would also like to express special thanks to Thomas Murray of IBM, Rochester; and to acknowledge the assistance of two professors at Michigan State University's School of Packaging, Dr. H. J. Raphael, my academic advisor, and Dr. J. W. Goff.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

INTRODUCTION

Before describing the methodology and organization of this paper, I felt it would be helpful to briefly summarize a few facts about IBM so that the reader will have a better perspective of the size and complexity of this world-wide organization. With this background information in mind, he can then begin to realize the varied and highly technical problems that face one small part of the corporation - packaging.

International Business Machines Corporation had its beginning in 1911 when three companies: The International Time Recording Company, The Tabulating Machine Company and The Computing Scale Company, merged to form the Computing-Tabulating-Recording Company. Three years later, in 1914, the late Thomas J. Watson, Sr. took over its presidency. In 1924 the name International Business Machines Corporation was adopted.

The company's early product line consisted of commercial scales, tabulating machines and time recording equipment. Until the start of World War II, IBM was primarily developing office machines which performed inventory control, billing, sales analysis,

cost accounting and other administrative functions.

In 1944, IBM built its first large-scale computer and presented it to Harvard University. This electro-mechanical machine performed three calculations a second by utilizing relays and tape-controlled programming devices.

The company's first production computer, the IBM 701, was introduced in 1952 and did 21,00 calculations a second. Today an IBM 7074 can perform 350,000 additions or subtractions a second.

The advent of electronics brought substantial changes in data processing machines and methods. Equally important, however, has been the change in the concept of data processing, its advancement from a bookkeeping tool to a technique for advanced management and operational control of an organization.

As a manufacturer, IBM produces several hundred separate products, including:

Electronic data processing machines.

Punched card accounting and statistical machines.

Typewriters, electronic typing calculators and dictation equipment.

Advanced systems for military and space applications.

Special purpose and advanced electronic information processing systems for business and government use.

Supplies, including magnetic tapes, tabulating cards, typewriter ribbons and carbon paper.

In keeping with the decentralized program initiated in 1955 within the company and including the most recent organizational change of January, 1965, there are now ten divisions:

The Advanced Systems Development Division explores new markets and new technologies for system development, innovates and proves the feasibility of new types of information-handling systems and turns over the results to other divisions of the company for final development, manufacturing and marketing.

The Data Processing Division sells, leases and services the complete line of IBM electronic data processing equipment and punched card accounting machines for the domestic market through its 190 sales offices.

The Systems Development Division is a recently organized division comprised of the development laboratories of the former Data Systems, General Products and Components Divisions. In addition, the functional direction of the European Development Laboratories of IBM World Trade Corporation will be the responsibility of this Division.

The Systems Manufacturing Division is another recently organized division consisting of the manufacturing facilities of the former Data Systems, General Products and Components Divisions.

The Office Products Division manufactures and markets electronic typing calculators and office dictation equipment in addition to its major line of typewriters. The SELECTRIC* typewriter is among significant developments from the division's laboratory.

The Federal Systems Division provides a range of special information handling systems and technology for the military,

*IBM Trademark

scientific and civil agencies of the Federal Government.

The Industrial Products Division is responsible for the selection and marketing of industrial products outside the company's regular product line.

The Real Estate and Construction Division is responsible for all IBM real estate acquisition and sale, site consideration and construction.

The Research Division undertakes theoretical and basic research in all areas of computer science and provides new ideas and fundamental support to the divisional product development laboratories.

The Supplies Division designs and produces punched cards and other supplies used in data processing systems.

The organizational change of January, 1965 involved creating the Systems Manufacturing Division and the Systems Development Division. The reason for this change as stated by T. J. Watson, Jr. was:

> "Our DP Product Divisions were established when our product line was made up of systems of a variety of types. This was in accord with available technology and successfully met the requirements of the market. The introduction of the System/360 and the compatible single-system concept, however, marked a major change in our approach; and we are reorienting our DP Product Divisions to this change. The grouping of the company's full data processing development and manufacturing resources in separate divisions should help assure that we will continue to bring our customers the best possible line of equipment with the shortest possible time between concept and delivery."

The company also has two wholly owned subsidiaries: the IBM World Trade Corporation and The Service Bureau Corporation. IBM World Trade manufactures, markets and services IBM products abroad; the Service Bureau Corporation provides a contract data processing service whereby the customer provides the raw data which is processed by SBC into detailed reports, analyses and studies.

IBM employed 1,200 people in 1914, 39,000 in 1955 and now there are more than 140,000 employees worldwide. The gross income from sales, service and rentals totaled 3.2 billion dollars in 1964, as compared to 564 million dollars ten years ago.

Methodology

The very first phase of the research study might best be described as the "Help! Help!" stage. In this phase I was only concerned with getting some factual information about the packaging departments or groups of IBM's ten domestic plants and obtaining a few opinions pertinent to their organization structure. The method used was a personal telephone interview with the packaging managers of each of the ten plants. The basic questions asked were the same in all interviews; but since they were of the open-end type, they often led to additional questions for expansion or clarification purposes.

The conversations were recorded using an IBM Executary*. The recorded questions and answers were then typed and copies sent to the packaging managers for verification. This first phase was exploratory and was used in part in formulating the next phase of the study.

Phase two was a descriptive study; i.e., it described the characteristics of a given situation. It included a written structured questionnaire that was answered by thirty-six individuals involved in packaging at the ten plant locations. The questionnaires were administered by the packaging manager of each plant.

Since the number of packaging personnel in most plant locations was four or less (the range was from one to twelve), the data in the opinion section of the survey was not broken down to show the results of each plant location. If the opinion results were categorized by plant, it was quite likely that individuals could have been singled out (which I had stated I would not do), thus their anonymity would not have been kept. It is also possible that they may not have given their true opinions. (See Appendix A for Questionnaire)

The questions asked in the survey had two purposes: First, there were several classification and interaction pattern questions asked that were used in conjunction with the personal interview phase. These presented a

*IBM Trademark

complete factual picture of the various plants' packaging activities. Second, the opinion questions were asked in order to give management an idea of how the packaging personnel felt about the organization structure of the packaging activity.

Organization of the Research Study

Since organization in the formal sense means order, it would be paradoxical if I didn't explain the order of this research study.

Chapter 1 serves as a foundation for the entire report. It presents the meaning of organization as it will be used in this research study.

Chapter 2 presents the formal organization of each of the ten manufacturing plant locations' packaging departments of groups. This presentation might be thought of as snapshot of their organization, since it depicts detailed facts for only a given moment in time. Today as you read this study or perhaps next month, it may be entirely different. However, this is where they were at the end of 1964.

The following chapter graphically shows the results of the opinion survey along with appropriate and necessary discussion of the results. The survey and the results are divided into three areas:

1) The opinions of personnel about the objectives of packaging, both within their departments and the packaging objectives of the Corporation.

2) Opinions that pertain to their organization and distribution of work within the department.

3) Opinions that pertain to the organizational relationships of the packaging department: to other members within their department, to departments or divisions within their plant, to other plant locations and to Corporate Headquarters.

The last chapter, Chapter 4, includes the conclusions that can be drawn from both the personal interviews and the opinion survey and recommendations for improvement.

CHAPTER I

THE MEANING OF ORGANIZATION

The word "organization" undoubtedly has a different meaning to each individual. To some it may bring to mind William H. Whyte, Jr.'s book, The Organization Man, in which his thesis was that employees and managers in the large corporations were losing their sense of independence and daring. Others may think in terms of organizational behavior and the conflicts that arise between the human personality and the formal organization as presented in Personality and Organization by Chris Argyris. Still others may think in terms of "big business" and government organizations and relate these to modern bureaucracy. All these, plus many more, are concepts of organization that have been studied since the "management movement" began at the end of the last century.

The study of organization in this research paper deals mainly with the formal organization of ten packaging departments within IBM.

The formal organization as is used in this study is based on the definition given by Allen: "a system of well-defined jobs, each bearing a definite measure

of authority, responsibility and accountability; the whole consciously designed to enable the people of the enterprise to work effectively together in accomplishing their objectives."[1]

Although I have examined the formal organization, this does not mean that I have ignored or would want management to ignore the humanistic side of administration. The term "administration" was purposely used here and should not be confused with organization. The technique of administration can be described as the art of directing and inspiring people, which must be based on a deep and enlightened human understanding. The technique of organization may be described as that of relating specific duties or functions in a coordinated whole. The statement of the difference of the two shows that the technique of organizing is prior, in logical order, to that of administering. A sound organizer may be a poor leader or administrator because his tempermental qualities may not fit him for the latter task. On the other hand, it is inconceivable that a poor organizer can ever make a good leader if he has any real organizing work to do.[2]

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[1]Louis A. Allen, Management and Organization (New York: McGraw-Hill Book Co., Inc., 1958) p. 60

[2]J. D. Mooney, The Principles of Organization (New York: Harper & Brothers Publishers, 1947) p. 3

Organization is then developed for people. To assume otherwise would be as fallacious as to assume that an automobile can be designed apart from the people who drive it. However, just as it would be unwise to design an automobile exactly to fit the dimensions, personality and tastes of one individual, because it would then be unl[illegible] fit the needs of anyone else; in the same way, the organization should not be tailored to fit individual personalities.[3]

The point of the discussion so far is that the mechanistic organization and the humanistic administration are not irreconcilable. In order for people to work effectively together, the two must be integrated. However, because I felt it would not be feasible in the scope of this research study to look at the personalities and behavior of individuals in depth, I have chosen only to study the formal organization. Its importance can partly be explained by a statement of Lounsbury Fisk:

> "Organization is more than a chart - it is the mechanism through which management directs, coordinates and controls the business. It is, indeed, the foundation of management. If the organization plan is ill-designed, if it is merely a make-shift arrangement, then management is rendered difficult and ineffective. If, on the other hand, it is logical, clear-cut and streamlined to meet present-day requirements,

---

[3]Louis A. Allen, Management and Organization (New York: McGraw-Hill Book Co., Inc., 1958) p. 58

then the first requisite of sound management has been achieved."[4]

Peter Drucker also comments on the necessity of a sound organization structure:

> "A good organization structure is not a panacea. It is not, as some organization theorists seem to think, the only thing that matters in managing management. Anatomy, after all, is not the whole of biology either. But the right organization structure is the necessary foundation; without it the best performance in all other areas of management will be ineffectual and frustrated."[5]

Universals in Organization

There are three universals that take place whenever organization takes place. They are:

1) Division of Labor. When a group pools its efforts effectively, there must be a division of the total effort so that all do necessary, purposeful work which contributes to the attainment of the objectives and so that the work of one member of the group does not duplicate or overlap the work being done by others.

2) Source of Authority. There must be some means of securing compliance of individual members of the group in contributing their efforts to the common goal.

3) Relationships. It is necessary to set up certain rules for teamwork to enable group members to work harmoniously together.[6]

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[4]Lounsbury Fish, Organization Planning (American Management Association, General Management Series No. 142; New York, 1944) p. 15

[5]Peter F. Drucker, The Practice of Management (New York: Harper & Brothers Publishers, 1954) p. 223

[6]Louis A. Allen, Management and Organization (New York: McGraw-Hill Book Co., Inc., 1958) p. 53

These universals were used as a basis for questions asked in both the personal interviews with packaging managers and the questionnaire administered to all packaging personnel. The three principles of organization will not be expanded upon any further at this point, but will be discussed at various points throughout the text of this study.

CHAPTER II

PACKAGING ORGANIZATION WITHIN IBM

This chapter presents a synopsis of how IBM's packaging activities are organized from first, a corporate standpoint and second, from an individual plant location standpoint. Although the formal structure of each department is presented, I have attempted to incorporate more in the analysis of the packaging activity than is shown by reading a particular plant's organization chart. A chart will only show clearly the formal positions, their titles and the formal links among them. It will not show the actual lines of person-to-person contact in the process of getting the job done. Many routine contacts grow up outside formal channels simply because people find that they help to get the job done. In order to determine these relationships, the following series of questions was incorporated into the survey taken by all the personnel involved in packaging. This is included in the last part of each plant's organizational structure.

1) How often do you work with other activities within your department to get your job done?

2) List in order of frequency the departments from which you receive your job requests.

3) List in order of frequency the departments that you contact the most in order to get your job done.

4) List in order of frequency those departments that slow down or hinder your work progress the most. (Try not to think of individuals, but rather work conflicts.)

5) Check the frequency with which you contact other plants each month in getting your job done.

The "list in order of frequency" questions were given factors or weights of 4, 3, 2, 1 in order to determine the overall frequency for each particular department or group.

Although the formal and some informal relationships mentioned earlier are included in each plant analysis, there were several significant questions asked of packaging managers that took into account the principles of organization. Since the objectives of a particular group are, or should be, the starting point of organization, questions about the long-range or broad objectives were asked in the management personal interviews. Thus, the objectives of each of the packaging departments are presented immediately following a few general notes on each one of the plant's operations.

The completeness and rigor with which the long-range objectives were given varies a great deal from department to department. A note of caution should be injected here on the problem of communications. In IBM, each manager formulates the short-range (one year

or less) objectives of his department. These are specific and very tangible goals that the department expects to meet in that period of time. I was not looking for these, but rather the broader or long-range ones that I felt were important in relation to how each packaging activity was organized. In some instances, I drew the "pat" answers which very well might be the objectives of any packaging organization. This does not necessarily mean that those departments didn't have more specific, longer-range goals formulated, but this is what was presented to me.

Each department's packaging group was analyzed in relation to the three elements of organization that were presented in the introduction of this study: Division of Labor, Source of Authority and Relationships. Montaigne's statement, "It is a pity that men of understanding so love brevity; their reputation is better for it, but ours is the worse.", is appropriate in connection with my presentation of job responsibilities of each department as is writtenin these descriptions. Although it may have been more meaningful to go into much greater depth when examining what each group is working on, time and space would not permit it.

When studying organization, there is practically an endless task of defining nomenclature: departments, titles, etc. There are a few terms that will be used repeatedly in the following material that might cause

confusion to the reader if they weren't defined. These definitions concern terminology used by the packaging departments in referring to the types of packaging in which they are involved.

> Product Packaging involves the packaging of a completed product, such as a typewriter, an individual piece of data processing equipment, a computer system or even a box of carbon paper. It is then a packaged product that requires no further manufacturing or assembly and may be used by a customer.
>
> Parts Packaging includes the packaging of component parts or assemblies that may be shipped to a customer's location or another plant for assembly into a piece of data processing equipment or a higher level of assembly. Example - this may include spare parts or parts necessary to bring a machine to the latest Engineering Change level.
>
> In-Plant Packaging involves a system for efficiently handling and packaging parts and assemblies within the machining and assembly areas of each plant. This may include the assignment of a container to the manufacturing routing for all in-process parts.
>
> Vendor Packaging (includes sub-sontractor packaging) involves assisting a vendor or supplier in packaging his parts or assemblies in order that they arrive at an IBM plant location in an acceptable condition and can be safely handled by the receivor's personnel.

I would like to add two final notes on the analysis of the individual plant's packaging departments. The plant location names are not mentioned but rather referred to as Plant A, B, C, etc. since I did not feel it would enhance the purpose of this study from an academic standpoint. Also, in the section of notes on

the plant locations I have included some of the products manufactured by that plant as stated in available reports. Since the introduction of System/360, many new products have been introduced adding to or changing the product lines of the various plants. However, from a packaging standpoint, the products listed should be representative of the types shipped from that location.

Organization: From a Corporate Standpoint

In the spring of 1964, Corporate Industrial Engineering originated a project with the title of Corporate Packaging Program. Its purpose was to insure corporate excellence in packaging activities consistant with the needs of IBM. Prior to this project, the various IBM plants had operated their parts and product packaging activities on an essentially independent basis. They had tried, however, to implement a common packaging program, but needed continuity through active corporate participation.

The Corporate Packaging Program, then, was to fill this need with a twofold plan. First, it was to establish short and long-range corporate packaging objectives and policies. Second, it was to develop a plan of action to:

1) Obtain Corporate Manufacturing Services' approval of all objectives and policies and solicit participation by interested

areas, such as the Reliability and Traffic Departments.

2) Obtain approval of specific objectives that affect other operational areas, such as Product Development and Customer Engineering and solicit their participation.

3) Generate specific project assignments and activities necessary to support the objectives.

4) Utilize all the professional services (which would include the Traffic staffs, plant packaging personnel, outside consultants and the Packaging Sub-Committee) available to meet the planned objectives.[7]

Several months after the Corporate Packaging Program was originated, the Corporate Packaging Committee was chartered by the Interdivisional Industrial Engineering Council. Its organization included a chairman, who was to monitor and coordinate assignment activities of the participating operating divisions. One member was appointed from each domestic location and that member was to be empowered to make decisions for his location at committee meetings. Also, members of other Councils or functions of the business were to be invited to attend meetings for liason purposes. The scope of the committee's work covers:

1) Parameters for proper conditions of packaging for shipment.

2) Design of efficient packaging hardware and methods.

3) Improvements in intercommunication in packaging areas.

---

[7]Project Description, Corporate Industrial Engineering, May, 1964

4) Development of technical details for establishment of standards and procedures as will be needed for the efficient handling of the packaging function.

5) Monitoring for compliance with established Standards documents in this field.[c]

Although packaging has only recently received formal sanction from Corporate Headquarters, it should be noted that the packaging personnel of the individual plants have met several times since the Fall of 1962 in an attempt to establish corporate-approved package testing standards. In the course of discussing testing standards, there were other areas covered by the personnel that they felt needed continuity among the plants. Many of these areas of standardization are now being formulated, but to date have not been finalized.

Organization: From an Individual Plant Standpoint

Plant A

Notes on the Plant Operation: This plant started operations in the early 1900's. It handles SMS production, central processors and print units for data processing systems, all printed circuit cards, sorters, data transmission systems and Character Recognition system.

Objectives: The long-range packaging objectives are:

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[c] Charter of the Packaging (for Shipment) Subcommittee of the Interdivisional Industrial Engineering Council, IBM

1) Have package testing done by Product Test as part of development cycle.

2) Test for high frequency vibrations (5-55 CPS).

3) More extreme environmental testing (From 150° at 30% R.H. to -40° at 30% R.H.).

4) More parts testing and sub-assembly testing.

5) Have the corporate director see to it that various plants conform to package test standards.

6) Have packaging groups report indirectly to Corporate Headquarters Packaging and directly to the Manufacturing Engineering function.

The mission of the packaging group is to try to design a perfect product so it won't require any packaging. If the design could go into the equipment at early stages, a lot of problems in the field could be forestalled. Package engineering should, in time, be part of the product test cycle.

Formal Name: Manufacturing Engineering Package Technology

Chain of Command: 1) Manufacturing Engineering Manager

2) Assistant General Manager

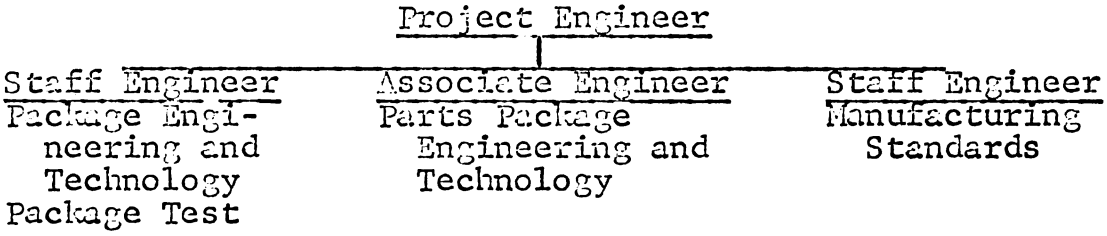
3) General Manager

Job Coverage of Department: Packaging is divided into two parts, product packaging and parts packaging. The department also has a part in manufacturing standards for this plant. These are the tooling standards and the test equipment standards.

Personnel in Packaging: Twelve, or 63% of the total in the department.

Job Coverage in Packaging: The department designs packages for all types of shipments. This includes rail, truck, air and export. The products are tested with the package in their testing lab. This testing can be thought of as continuing from product conception to its finished design. Package design for equipment transfers from plant to plant are now covered by the packaging activity as requested by management. Their activities also include designing, specifying and testing parts packages, vendor packaging on a limited basis and the design of the containers and the assignment system for in-process parts.

Organization: The formal organization within the department can be explained by the chart below:



The staff engineer is the group leader. His responsibilities include determining when new machines are coming out of the development laboratory and making assignments to the various engineers, the follow-up of these assignments, making certain they are meeting their weekly check points and offering technical suggestions

on the assignments. He has technical responsibility.

This department relies on packaging technicians for individual machine responsibility as opposed to systems responsibility for the engineer. The technician will also test the machine, but it is the engineer who sets up the instrumentation on the testing and establishes the test schedule and the test levels.

The department uses a formalized method of budgeting the workload of the packaging activities and actually can project the man hours and dollars by machine.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 18 on the Questionnaire) In answer to the question, "How often do you work with other activities within the department?", one said "often", two said "occasionally" and one said "seldom".

Job Requests:	1) Manufacturing Engineering 2) Shipping 3) Development Engineering 4) Product Engineering
Contacts:	1) Shipping 2) Product Engineering 3) Manufacturing Engineering 4) Product Development
Hindrances:	1) Product Development 2) Product Test 3) Purchasing 4) Product Engineering
Plants Contacted:	1) Plant E 2) Plant H 3) Plant G 4) Plant C See Table No. 1

Plant B

Notes on the Plant and Packaging Operations: This plant's original facility was completed in the early 1950's. It manufactures components: transistors, diodes, magnetic cores, thin film memories, resistors and capacitors. Within the past month, there was an organization change that affected the seven-member Material Handling and Packaging group. In order to provide in-line responsibility for standards and methods, the group was divided, with three men going into three different Operations Engineering groups. The remaining material handling and packaging personnel had then divisional responsibility; i.e., to coordinate the activities of all the packaging and material handling people no matter where they might be.

Objectives: Because packaging in this department is in a state of organization change, the direction in which the department was headed rather than specific objectives was given. The manager envisioned packaging to be more restricted to the end of the manufacturing line and attempting to build packaging into the product. Packaging will be more relegated to the distribution and shipment system. Right now they are satisfying their people, acting more as industrial engineers than packaging engineers. It was believed that this direction will be reversed and they will become more customer-oriented.

Formal Name: Material Handling and Package Engineering

Chain of Command: 1) Industrial Engineering Operations Manager

2) Industrial Engineering Manager

3) Product Operation Planning Manager

4) Product Operations Manager

5) General Manager

Job Coverage of Department: Material Handling, Packaging and Operations Engineering.

Personnel in Packaging: Four, or 27% of the total in the department. Of the four, two could be thought of as devoting most of their time to packaging and two to materials handling, with some packaging involvement.

Job Coverage in Packaging: The packaging in the plant location is closely tied in with materials handling in that the four men act as coordinators for all the activities of the packaging and materials handling personnel in the three Operations Engineering groups. They initiate many projects that are not specifically tied to a particular product. They provide support to the warehousing function and the distribution function and much of the shipping function. The job coverage in packaging would include support to product, parts and in-process packaging.

Organization: The packaging activity uses the group leader concept within the department. Although there is one group leader, the work of the four personnel is

divided between materials handling and packaging, with two principally in materials handling and two (group leader included) mainly in packaging. The group leader's responsibility encompasses being the primary contact with the materials handling and packaging people in the other operational engineering groups, maintaining lines of contact with both corporate and other plant locations and defining and balancing the work-load of the people within the department.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 18 on the Questionnaire) In answer to the question, "How often do you work with other activities within the department?", three said "often".

Job Requests:	1)Manufacturing 2)Manufacturing Engineering 3)Shipping 4)Materials Distribution
Contacts:	1)Purchasing 2)Manufacturing Engineering 3)Manufacturing 4)Facilities Planning
Hindrances:	1)Manufacturing Engineering 2)Purchasing 3)Quality Control 4)Facilities Engineering
Plants Contacted:	1)Plant F 2)Plant E 3)Plant C See Table No. 1

Plant C

Notes on the Plant Operation: This plant was completed in the mid-1950's. It manufactures new power supply

units, STRETCH* computing system, IBM 7040 and IBM 7044 of the solid state computer series.

Objectives: The long-range objectives as stated by management are: "To see that our products are getting to the customers safely and free of damage, and that the operation doesn't involve undue amounts of money. And also to leave a good impression with the customer." In speaking of the packaging activity on a corporate level, it was stated that alot could be done in the education of the people at each of the plants - "the local strengthening of the type of people we have doing a job."

A more specific long-range objective of this plant's management includes the upgrading of packaging personnel in their knowledge and experience in materials, terminology, technology and distribution. Through education and professional development, the packaging engineer can share with the product designer, development engineer and production engineer in providing the customer with a quality product.

Formal Name: Manufacturing Layouts and Materials Handling

Chain of Command:
1) Space and Manpower Planning Manager
2) Industrial Engineering Manager
3) Assistant General Manager
4) General Manager

Job Coverage of Department: Manufacturing Plant and Warehousing Layout and Materials Handling. Included in the

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materials handling function is the packaging activity, which encompasses shipment of the product.

Personnel in Packaging: Four, or 36% of the total personnel in the department.

Job Coverage in Packaging: Packaging at this plant location falls into four areas: Vendor packaging on a limited basis in problem areas; packaging for in-process parts; product packaging, including shock and vibration studies and systems packaging; and parts packaging.

Organization: Of the four men, three of these are assigned projects by type of product. Their responsibility covers supporting their product lines in the areas of in-process parts handling, vendor packaging and product packaging. The other person has a more specialized assignment in shipping of large units and is more concerned with the shipping characteristics of the product, shock and vibration testing and installation of the product at the customer's location. There was a packaging group leader in the department prior to a recent organizational change. Now he is the manager.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 18 on the Questionnaire) In answer to the question, "How often do you work with other activities within the department?", one said "often", three said "occasionally".

Job Requests:
1) Manufacturing Engineering
2) Manufacturing
3) Development Engineering
4) Shipping
5) Quality Control

Contacts:	1) Plant Engineering (Maintenance) 2) Purchasing 3) Production Control 4) Shipping 5) Manufacturing
Hindrances:	1) Shipping 2) Quality Control 3) Purchasing
Plants Contacted:	1) Plant F 2) Plant A 3) Plant H 4) Plant G See Table No. 1

Plant D

Notes on Plant and Packaging Operations: This plant was completed in the late 1950's. It is the manufacturing facility of the Office Products Division. All electric typewriter manufacturing activities are located here; also, the manufacture of accounting and dictating equipment.

The Packaging Engineering Department has existed in its current organization for about two years. Prior to this, there wasn't a packaging department but rather just a group that was under Production Engineering. This was when there was Production Engineering on typewriters only. Because of growth - more products - this plant was organized on product lines with each product line having its own Production Control, Purchasing, Assembly, etc. divisions. Packaging Engineering is organizationally under one of those product lines, Production Engineering which is

concerned with IBM SELECTRIC* printers.

The Packaging Engineering group is different from those in other plants in that it uses Product Test to package-test all its products, and it is the only department that has only the activity of packaging in it.

Objectives: The long-range objectives revolve around getting the manpower to give adequate support in each of the five product lines from the standpoint of cost reduction, quality control and one person to provide coverage within the product group for new products only.

Formal Name: Packaging Engineering Department

Chain of Command:
1) Production Engineering Manager
2) Manufacturing Engineering Manager
3) SELECTRIC Production Engineering Manager

Personnel in Packaging: Four.

Job Coverage in Packaging: One engineer provides support to in-plant containers, assembly trays, skids, pallets, vendor packaging and sub-contract packaging. The other three work on all machines and supplies packaging and assist on a very limited basis in field parts packaging. The work load is the heaviest in machine and supply packaging, and about five percent of one man's time is devoted to vendor packaging. The department sends a considerable amount of their drafting out to other departments or subcontractors, and also uses Product Test as their testing laboratory.

Organization: The division of work within the department is on a product line basis. The manager supports one of the five lines, and three men support the other four; with the fifth person working on in-plant containers for all products. Within the product lines the personnel are responsible for a particular package from the request for assistance from the Product Manager to the completion and follow-through of the project.

Interaction Patterns: (taken from Questions 14, 15, 16 and 18 on the Questionnaire)

Job Requests:	1) Production Engineering 2) Product Engineering 3) Manufacturing Engineering 4) Manufacturing 5) Product Test
Contacts:	1) Purchasing 2) Production Control 3) Production Engineering 4) Manufacturing 5) Product Test
Hindrances:	1) Product Test 2) Quality Control 3) Production Control 4) Product Engineering
Plants Contacted:	1) Plant A 2) Plant G 3) Plant F See Table No. 1

Plant E

Notes on Plant and Packaging Operations: This plant was completed in the late 1950's. It, as the manufacturing facility of the Federal Systems Division, concentrates on advanced information handling and control systems for the

United States Government Space and Development Agencies. They are not solely involved with military products, however. They also manufacture the whole family of sorters and total relays.

In this manufacturing organization there are fewer people than there are in the Development Engineering Laboratory located here. This facility, from a corporation point of view, has the most complete environmental testing facility that is available in IBM, in order to support the space products manufactured here. Because of this fact, the packaging department manager stated that it was unnecessary to keep the degree of capability within the confines of his department with the professional personnel available in the testing facility.

Objectives: Since this plant's products are growing more in the direction of commercial products, they feel there will and should be more effort placed on expanding their use of the vacuum forming machine for in-plant containers for finished parts and assemblies.

Formal Name: Industrial Engineering

Chain of Command:
1) Industrial and Plant Engineering Manager
2) Plant Administration Manager
3) Administration and Planning Manager
4) General Manager

Job Coverage of Department: Materials Handling, Packaging, Facilities Planning, Warehousing Layout and the responsi-

bility of the plant's capital surplus list.

Personnel in Packaging: One man (or 9% of the total department personnel) who has additional responsibility in the area of materials handling. He should not be considered as giving full-time support to packaging.

Job Coverage in Packaging: Design and specify in-plant containers and to a great degree, since purchasing a vacuum forming machine, build their own containers. Assist in vendor packaging to a very limited degree. Although Development Engineering is responsible for the shipment of the final machines in all military products, they provide coverage in parts and product packaging.

Organization: Because of the diversity of the department, the manager uses and feels that a group leader in materials handling (packaging) is an absolute necessity. His responsibility includes coordinating the efforts of two men involved in general materials handling.

Interaction Patterns: One of the areas from which there are many job requests is Tool Engineering. They frequently make requests for the design of in-plant containers. The Manufacturing organization also makes numerous requests in the area of expendable packages for inter-plant shipping.

Plant F

Notes on Plant Operation: This plant was completed in the late 1950's. It manufactures random access desk files, image storage systems, process control systems and

calculators. It is also involved with desk and read-write head production.

Objectives: The long- and short-range packaging objectives are:

1) Establishment of Corporate-approved packaging document manual which would contain standardized documents such as:

   a) packaging instructions
   b) package test report format
   c) packaging glossary of terms
   d) packaging specification materials
   e) packaging graphics - labeling
   f) packaging cost evaluation format
   g) packaging filing system index
   h) copies of Corporate package test standards

2) Establishment of a Corporate-approved packaging policy manual which would contain information on IBM packaging policies such as:

   a) overall packaging objectives of the company
   b) packaging engineers responsibilities
   c) relationship of packaging versus product development cycle
   d) methods of controlling and filing packaging documents

3) Establishment of local plant program for cost reduction of both packaging materials and/or packing procedures.

4) Establishment of local plant program for developing illustrated packaging instructions.

5) Establishment of local plant program for packaging research activity in the areas of package testing. Example - shock and vibration, packaging materials and carrier handling methods.

6) Establishment of local plant program for periodic random inspection of packaging on out-going field transferred or returned products.

7) Establishment of local plant program for maintaining close liason with the program administrators and the engineering design groups during initial phases of new product development.

Formal Name: Industrial Engineering

Chain of Command: 1) Industrial Engineering Systems Manager

2) Assistant General Manager

3) General Manager

Job Coverage of Department: Plant Layout, Materials Handling and Packaging. Also included is scheduling the cafeteria, clean-room and environmental studies, operations analysis and building simulation models to determine in-process inventory, space planning and special management studies.

Personnel in Packaging: Three and one-half or 23% of the total personnel in the department.

Job Coverage in Packaging: Primarily product packaging with one and one-half men providing support to parts packaging, vendor and sub-contractor packaging. The support in product packaging covers determining what packaging is needed, designing and specifying it, and then testing the packaged product in the testing laboratory.

Organization: A group leader, a senior associate industrial engineer, is used in the department to coordinate the efforts of others. He is also one of the two men providing job coverage to the completed products. One man is assigned to vendor packaging, while the other one-half man is called

in on special assignments. The work in the department is not broken down on a functional basis, such as drafting, designing or testing. Each individual completes his entire assignments from receipt of a request to testing and the follow-through. The department has a formalized method for scheduling and budgeting the work of the packaging activity in conjunction with the Program Administrator. They get reports as to where machines are in the development stage. The Program Administrator schedules a machine for them to package test. The packaging instructions and the package test are completed before the machines are run through their last product test. The Product Test Department will not accept a machine for their last test unless this schedule is followed.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 18 on the Questionnaire) In answer to the question, "How often do you work with other activities within the department?", three said "occasionally".

Job Requests:	1) Shipping 2) Manufacturing Engineering 3) Industrial Engineering 4) Traffic
Contacts:	1) Shipping 2) Purchasing 3) Traffic 4) Quality Control
Hindrances:	1) Manufacturing Engineering
Plants Contacted:	1) Plant A 2) Plant F 3) Plant G

4) Plant C
See Table No. 1

Plant G

Notes on Plant Operation: This plant is part of the Supplies Division. It provides punched cards, magnetic tapes, ribbons and other supplies for use with data processing machines. It has recently become responsible for desk viewers and copiers. This plant designs and specifies the packaging for six manufacturing facilities throughout the country.

Objectives: The objectives as seen by the manager of this department were prefaced by the comment that a packaging group has to concern itself with the best way to handle and merchandise a product. Therefore, there should be more emphasis on what the customer really wants and needs, how the product is handled and, along with these, a packaging cost reduction program. To aid in meeting these objectives, it has been advocated that an outside packaging consultant be contracted to do some work on this division's products.

Formal Name: New Products Industrial Engineering and Packaging Engineering

Chain of Command: 1) Industrial Engineering Manager
2) Manufacturing Engineering Manager
3) Manufacturing Manager
4) General Manager

Job Coverage of Department: Evaluate and implement the

manufacture of new products in the Supplies Division and product packaging.

Personnel in Packaging: Three, with a cutback to two beginning in 1965, or 20% of the total personnel in the department.

Job Coverage in Packaging: There are three areas of support as stated by the manager of this department: new products packaging, packaging support for existing products and packaging for cost reduction. However, the effort in 1965 will be mostly in terms of packaging for new products that will be introduced into the division.

Organization: Within the Department there is a packaging engineer who acts as the group leader. He receives requests, conceives the idea for a particular package, discusses the concept with one of the two draftsmen who makes a model of the package. The group leader then tests it prior to the package going into production.

The method used in scheduling the projected workload of the packaging activity is a regular bar chart. The jobs scheduled are those that can be assigned an approximate number of man hours or days it will take to complete the assignment.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 13 on the Questionnaire) In answer to the question, "How often do you work with other activities within the department?", both personnel said "often".

Job Requests:	1) New Products 2) Industrial Engineering Direct Operations 3) Supplies Division Plants
Contacts:	1) New Products Industrial Engineering 2) Product Development 3) Purchasing 4) Marketing
Hindrances:	1) Product Development 2) Marketing 3) Purchasing
Plants Contacted:	1) Plant F 2) Plant A See Table No. 1

Plant H

Notes on the Plant Location: This plant was completed in the early 1940's. It manufactures IBM data systems, key-punch and several computers in the IBM solid state series.

Objectives: The long-range objectives of this department are:

1) Promote machine reliability and service-ability through continuing study of causes and effects of shock and vibration in handling.

2) Expand practice of minimum or no packaging wherever practical.

3) Conduct research in new packaging materials and practices.

4) Improve vendor packaging as required.

5) Develop a broad concept of the packaging needs of our industry and strive for increased efficiency.

Formal Name: Space Control and Materials Handling

Chain of Command: 1) Project Manager in Industrial Engineering

2) Division Head of Industrial Engineering

3) Assistant Plant General Manager

4) General Manager

Job Coverage of Department: Space planning, plant and warehousing layout, materials handling; and included in materials handling, packaging.

Personnel in Packaging: Three, or 30% of the total department personnel. Although there are five men in the materials handling section, three would be considered packaging personnel.

Job Coverage in Packaging: Write specifications, develop and test packaging for final machines and systems. Develop packaging for parts. Initiate standard containers for in-process parts, although they do not call out containers on routings. There is no effort placed in vendor packaging except in special problem areas.

Organization: Since this plant produces mainly three types of products: data systems, general products and System/360 products, the workload is divided on a product line basis with one man covering each area. Although they are not organized on a "group leader" concept, there is what management refers to as a "lead" man who has no managerial responsibility. Each member does his own designing, specification writing and testing of packaged products.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 18 on the Questionnaire) In answer to the question,

"How often do you work with other activities within the department?", one said "always" and two said "occasionally".

Job Requests:	1) Machine Shipping 2) Product Engineering 3) Purchasing 4) Customer Engineering
Contacts:	1) Product Engineering 2) Purchasing 3) Machine Shipping 4) Manufacturing
Hindrances:	1) Product Engineering 2) Quality Control 3) Production Control 4) Purchasing
Plants Contacted:	1) Plant C 2) Plant A 3) Plant H 4) Plant G See Table No. 1

Plant I

Notes on Plant Operation: The main plant here was occupied in the late 1950's. It manufactures collators, reproducers, bank proof machines, proof inscribers, card read punches, interpreters, test scoring machines, medical systems and terminals for banking and medical industries.

Objectives: The department manager stated two general areas as being part of their long-range objectives. First, there is a need to give packaging direction at earlier stages of development to Development Engineering personnel as to what things should be done to a machine to make it shippable. Also, along this same line, there is a need to be more conscious of acting on the basis of the customer in

packaging the products. Second, there should be some further study of the effectiveness of the in-plant container system.

Formal Name: Plant Layout and Materials Handling

Chain of Command: 1) Plant Engineering Manager
2) General Manager

Job Coverage of Department: Plant Layout, Materials Handling and Packaging.

Personnel in Packaging: Five, or 38% of the total personnel in the department.

Job Coverage in Packaging: Product packaging, parts packaging, vendor packaging and assignment of containers to in-process parts. The depth of the support given to these four areas varies. Two men are assigned to designing, writing specifications and testing the completed products; one man to writing container specifications for in-process parts; one person has the job of vendor packaging coordination; and one is assigned to designing and specifying packages for problem parts and assemblies shipped to the field and other plants.

Organization: The continuing assignments within the department are divided on the basis of the areas supported; such as, product packaging, parts packaging, etc. In final machine packaging, the work is divided by product type. Management stated there was a group leader who gave technical direction, organized and coordinated the workload of the group.

There is no formalized method for assigning projects.

Interaction Patterns: (taken from Questions 9, 14, 15, 16 and 18 on the Questionnaire) In answer to the question, "How often do you work with other activities within the department?", one said "often", three said "seldom".

Job Requests:
1) Production Control
2) Manufacturing Engineering
3) Shipping
4) Quality Control

Contacts:
1) Product Engineering
2) Purchasing
3) Manufacturing Engineering
4) Production Control

Hindrances:
1) Purchasing
2) Product Engineering
3) Production Control
4) Manufacturing Engineering

Plants Contacted:
1) Plant A
2) Plant C
3) Plant F
4) Plant H
See Table No. 1

Plant J

Notes on the Plant and Packaging Operations: This plant started operations in the late 1950's. It manufactures core planes, wire contact relays, reed relays and switches, data transmission systems and is involved with SMS card manufacture and SLT production.

The current organization has existed about two months. Since [illegible] of the products that are going to be manufactured here have been in production at another

plant for two or three years, most of their packaging and materials handling work has been well-engineered by an engineering department there.

Objectives: The manager of this department stated one broad and a more specific objective. First, there is a need to provide protective packaging for all products so they will arrive at the customer's or other plant locations in a safe condition and at the least cost. Second, there will be effort expended in assisting the vendor in packaging his product. In this area of vendor packaging, there is also a need to more clearly define where the plant's responsibility starts and ends.

Formal Name: Plant Layout, Materials Handling and Packaging Department

Chain of Command: 1) Plant Services Manager
2) Planning and Services Manager
3) Plant Manager

Job Coverage of Department: Plant layout, materials handling and packaging will be the three major areas of support. The department will also have the responsibility of furniture and office equipment.

Personnel in Packaging: There will be no one who will specialize in just packaging. However, there is one man who will act as the mainstay or contact in packaging, and he will be responsible for reviewing existing packaging, since they have not had packaging talent at this plant before.

Job Coverage in Packaging: Review existing packaging since this plant is a second-source plant. It is not intended that packages will actually be designed here because there is too much talent in this area from vendors. The ideas, supervision and approval would originate from the packaging personnel, however.

Organization: As was noted in the first section of this plant's operation, it is in a high degree of organizational change. However, the manager's philosophy should be mentioned in order to present the direction in which the internal organization of the department will go. The people in the department should not only have had industrial engineering experience; that is, materials handling, layout and packaging experience, but also plant engineering experience so they know what happens to their drawings after they leave the department.

Interaction Patterns: Most of the job requests for future manufacturing facilities will originate from Manufacturing Engineering.

CHAPTER III

QUESTIONNAIRE RESULTS

Summary of Classification Data

Within IBM's domestic manufacturing operations, there are ten plants with packaging activities. The number of packaging personnel at these various plant locations totaled thirty-seven, with a range of one to twelve men at any one plant. Their job coverage, again depending on the location, included support to product packaging, parts packaging, packaging for in-process parts and vendor packaging.

A breakdown of the education of the personnel was: six with Industrial Engineering degrees, three with Mechanical Engineering degrees, two with Packaging Technology degrees and five with degrees in other fields. The average (mean) education of the total reporting was 2.3 years of college; and the average (mean) years of experience in the field of packaging was 6. Twenty-four men had job titles of either Industrial Engineer or Packaging Engineer, with those remaining classified as Technicians.

The analysis of the data collected in the opinion survey was divided into three categories:

1) Questions that pertain to the objectives of packaging both within the plant packaging departments (or groups) and the packaging objectives of the corporation as a whole.

2) Questions about division of work within the departments. (As a part of this category, there were questions about the assignment of projects and their effectiveness in attaining a good distribution of projects.)

3) Questions about the relationships of the packaging group members to:

   a) other members within their department
   b) departments or divisions within plant locations
   c) other plant locations
   d) Corporate Headquarters

At the end of each set of questions, I have briefly summarized the results and added a few pertinent comments, and in many cases, conclusions on the data. The task of cross-classifying and correlating answers to questions can be endless. I have attempted to do this in those areas where it would be the most meaningful.

The results of the questionnaire are graphically presented in percentages. Not all results add up to 100%, since there were isolated cases where answers were omitted.

OBJECTIVES

"How would you rate your knowledge of goals of the packaging group?"

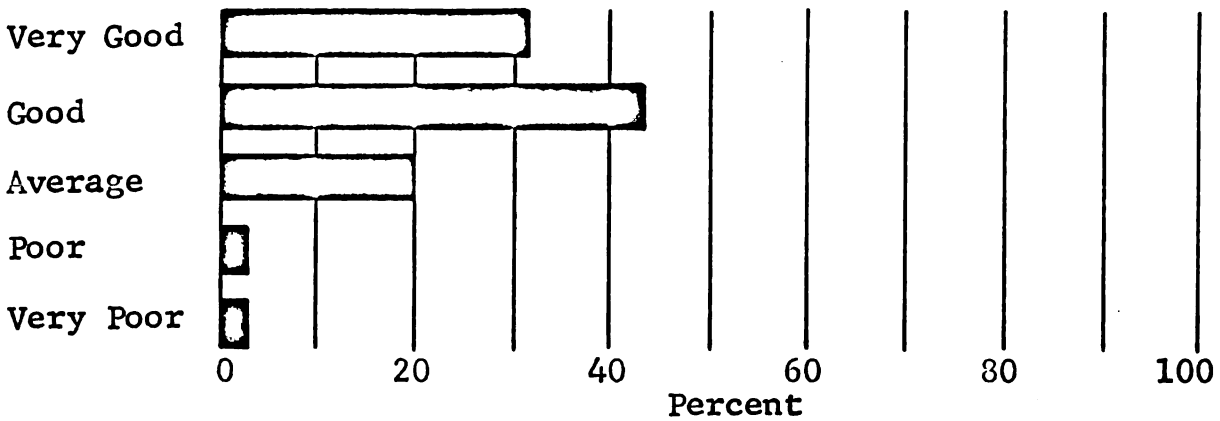

Fig. 1

"How well would you say your job has been related to the objectives of the packaging group?"

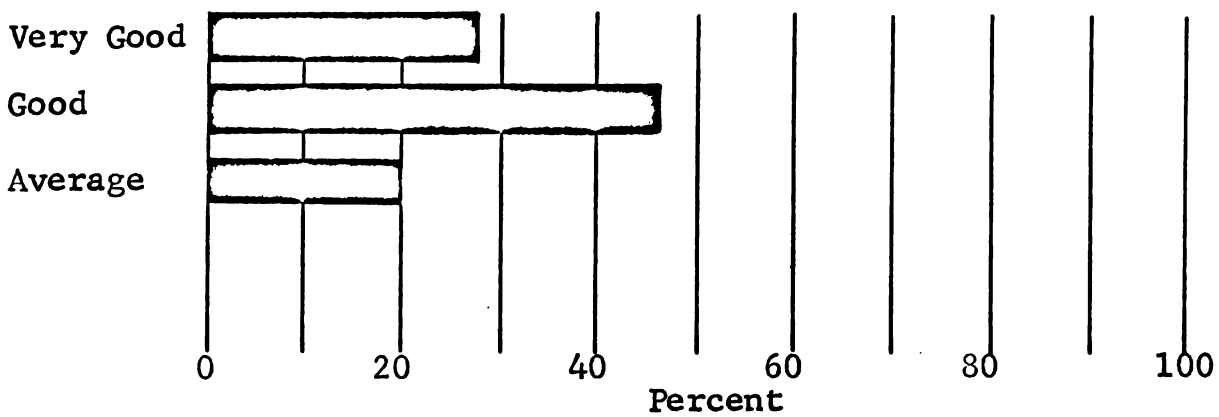

Fig. 2

The answers to both of the previous questions (see Figures 1 and 2) were favorable. It should be noted, however, that the personnel answering both questions "average" were from the same three plant locations, which may indicate the absence or vagueness of their goals. Again, those individuals reporting "poor" or "very poor" to the first question were from one of the just-mentioned plants.

"How would you rate the knowledge of the packaging group's objectives by the level of management that your department reports to?"

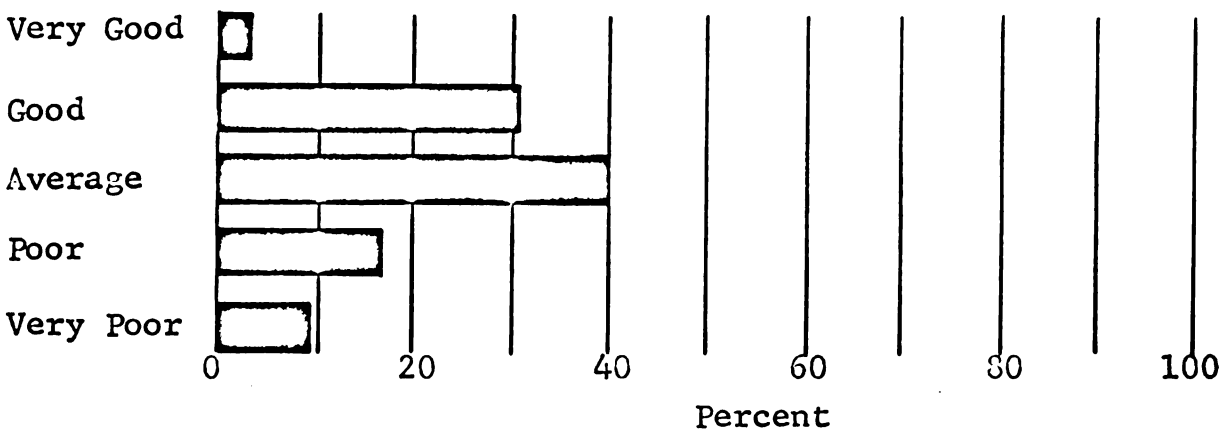

Fig. 3

Although the bar graph of Figure 3 is skewed in favor of the next level of management's knowledge of packaging objectives, 26% of the answers were either "poor" or "very poor" and 40% "average" leading to these possible conclusions:

1) The packaging departments have not clearly communicated what they are attempting to accomplish to the next level of management; or,

2) Packaging in that department is not considered as the primary activity.

The latter conclusion may be substantiated by a fact given in the personal interviews with managers. The question was asked, "How much of your time, excluding personnel matters, is devoted to the packaging activity in your department?" The average (mean) time given as a percentage was 31%, with a range of from 5 to 90%. Therefore, if packaging managers spend less than one-third of their time with packaging, it can be correctly assumed that a small

part of that percentage concerns packaging problems with the next level of management.

"How important do you feel it is that the next level of management know these objectives?"

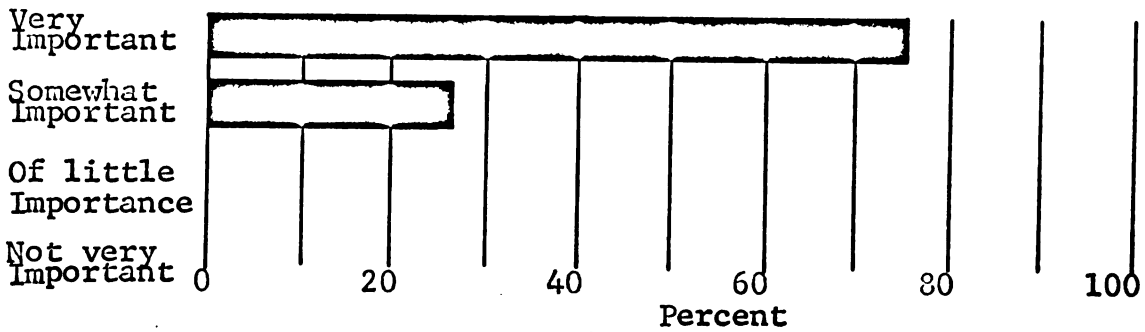

Fig. 4

In the previous question (see Figure 4), I believe it can be said that the packaging personnel feel a basic need to be recognized by the next level of management and that management be cognizant of their work. There should be more emphasis on upward communications of the objectives of packaging by the department managers.

"Are you aware of the goals of the Corporate Packaging Committee?"

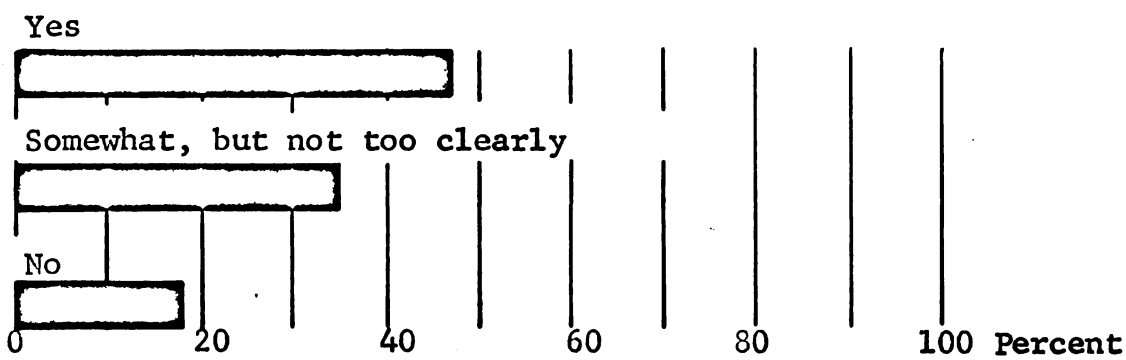

Fig. 5

Although almost one-half of the personnel stated they knew what the Corporate Packaging Committee's goals were (see Figure 5), there were a substantial number that either were not completely sure or had no idea of what they were. In analyzing the data, it was found that if the packaging personnel were divided into those involved in product packaging and those in the other packaging areas; such as, in-plant, vendor and parts packaging, the results looked quite different.

	Product Packaging	Other Areas of Packaging
Yes	52%	23%
Somewhat	33%	54%
No	14%	23%

These results are understandable if you were to refer back to the goals of the Corporate Packaging Program. Most of these goals are aligned with product packaging.

"If your answer to the last question was "Yes" or "Somewhat", rate how well staffed you think the various plant's packaging groups are in relation to attaining the Committee's goals? (The word "staffed" as used here means the technical competence and overall knowledge of packaging rather than just the number of men.)

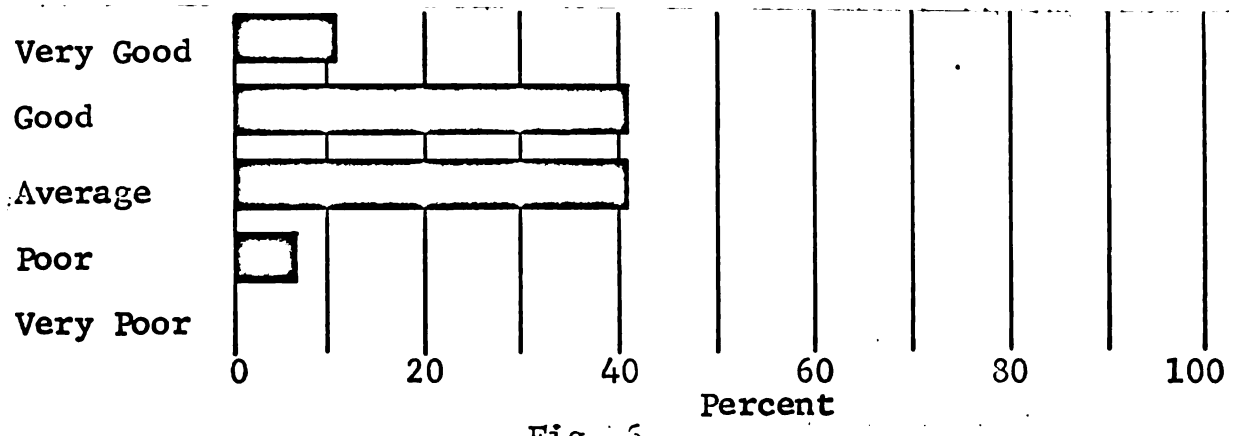

Fig. 5

In the results of this question (see Figure 6), 52% rated the packaging groups as being staffed "very good" or "good". Of the remaining 48%, 22% of the "average" or "poor" ratings came from what would be considered the most well-staffed packaging department.

PROJECT ASSIGNMENTS

AND DISTRIBUTION OF WORKLOAD

"Who assigns your projects in the packaging activity?"

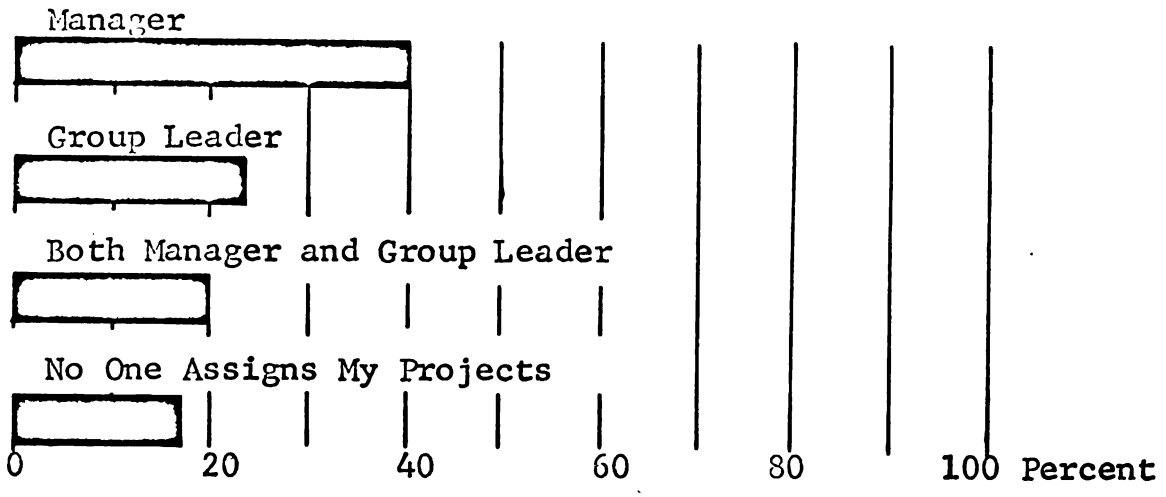

Fig. 7

In most plants the manager assigns projects (see Figure 7) and 23% of the projects are assigned by a group leader. Twenty percent out of 23% of the answers pertaining to the group leader concept came from one plant. Of the 17% answering "No one assigns my projects", only one was a group leader himself; and 11% of this answer came from the two plants that have packaging managers who stated they devote 5 to 10% of their time to packaging.

Without a deeper understanding of the definitions of individual jobs, it is difficult to say whether the persons answering "No one assigns my projects" are working as effectively as they should be. However, it does not seem possible that individuals can work at any length

without a source of authority and a coordinating force and still work at maximum effectiveness.

"About what percentage of the work that you are now doing has been assigned to you?"

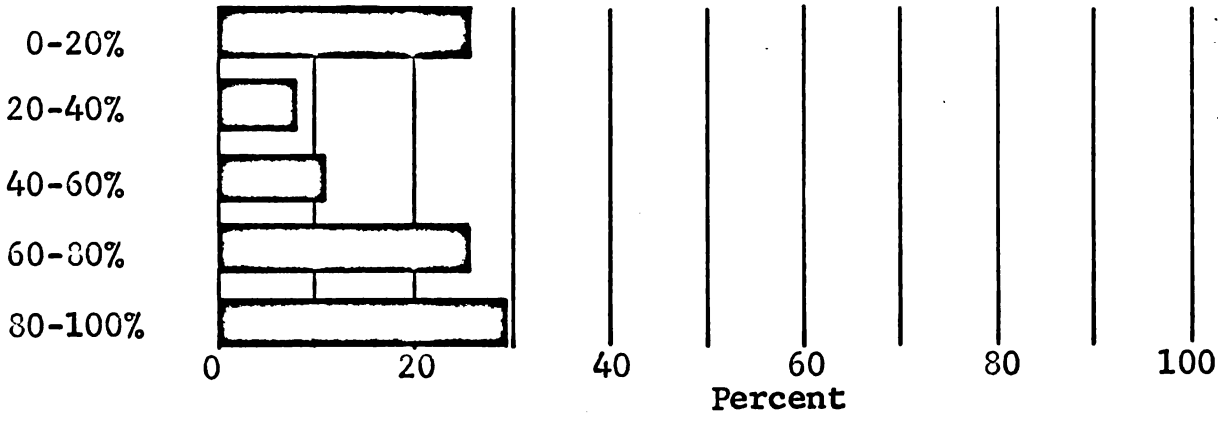

Fig. 8

In the previous question (see Figure 8), 55% of the answers fall at either extreme of "0 to 20%" or "80 to 100%". Half of those answering "80 to 100%" came from one plant location. There was one plant in which all personnel answered in the "0 to 20%" range. Two-fifths of those assigned "80 to 100%" of their projects were titled "technicians", the rest were engineers.

"Does the packaging group have a formalized method for assigning and controlling projects?"

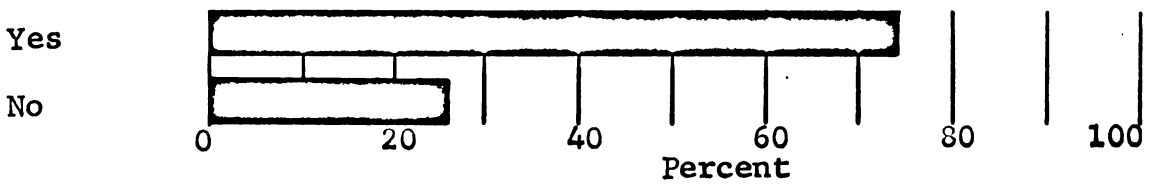

Fig. 9

"If the answer was "yes", how effective do you think the method is?"

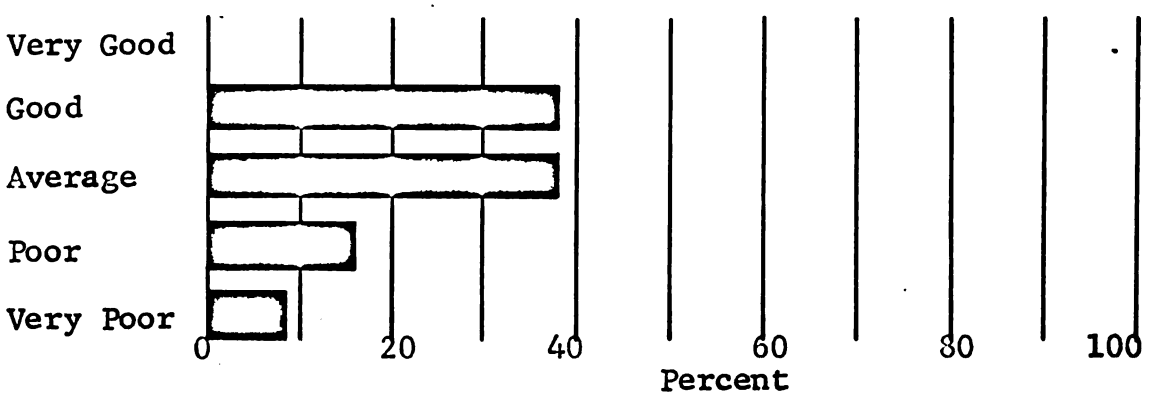

Fig. 10

Although most of the plants have a formalized method for assigning and controlling projects (see Figure 9), the rating of the effectiveness of the methods (see Figure 10) is skewed downward. The 24% in the "poor" and "very poor" categories came from two plant locations. It may be that those personnel felt that the system was not only ineffective but was too rigid or uncompromising. A 38% rating in the "average" category should also prompt a review of the plants' assignment system.

"If the answer is "No", do you feel you would work more effectively if there was a formalized method?"

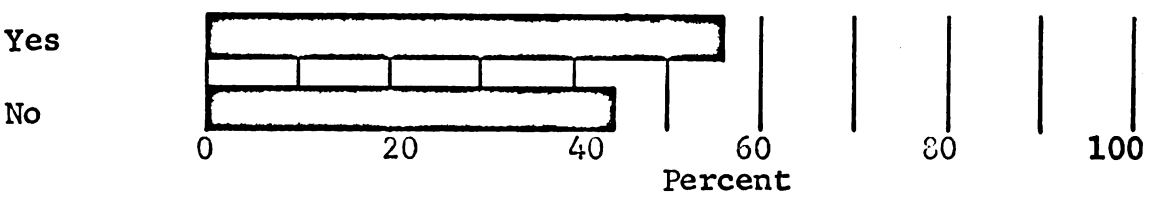

Fig. 11

"Again, if the answer is "No", do you think the packaging group as a whole would accomplish more if there was a method?"

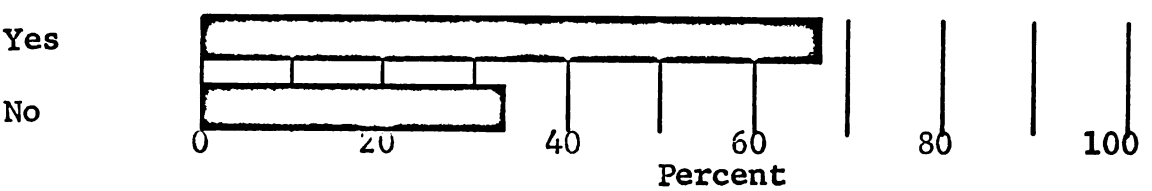

Fig. 12

Of those plants that had no system (see Figure 11 and Figure 12), the majority of the personnel felt that their packaging groups would benefit from one. Although there was some correlation between those that answered "yes" to this question and the lower ratings on the following one (see Figure 13), it was not significant enough to draw any conclusions.

"Do you think the workload of the packaging activity is well distributed in keeping with the objectives of the packaging group?"

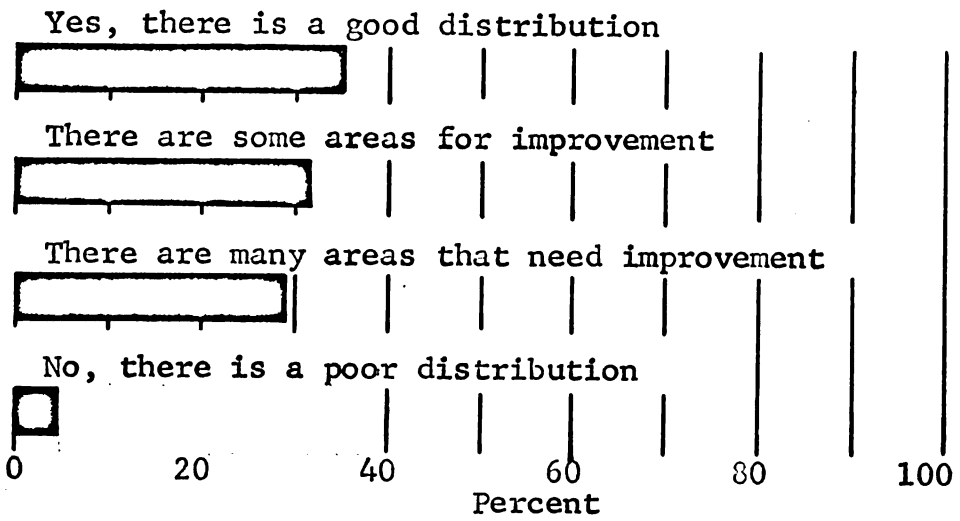

Fig. 13

Two-thirds of the answers to the question concerning the workload of the packaging activity in relation to the objectives of the packaging group (see Figure 13) were of an affirmative nature in relation to the distribution of the workload. Twenty-six percent out of the 33% that answered negatively were from three plant locations. However, two of these three plants did have a formalized method of assigning projects. A majority of the members of the six remaining plants gave ratings in the first two categories.

"About what percentage of your time is set aside for applied research; i.e., new ideas or innovations about packaging problems in general?"

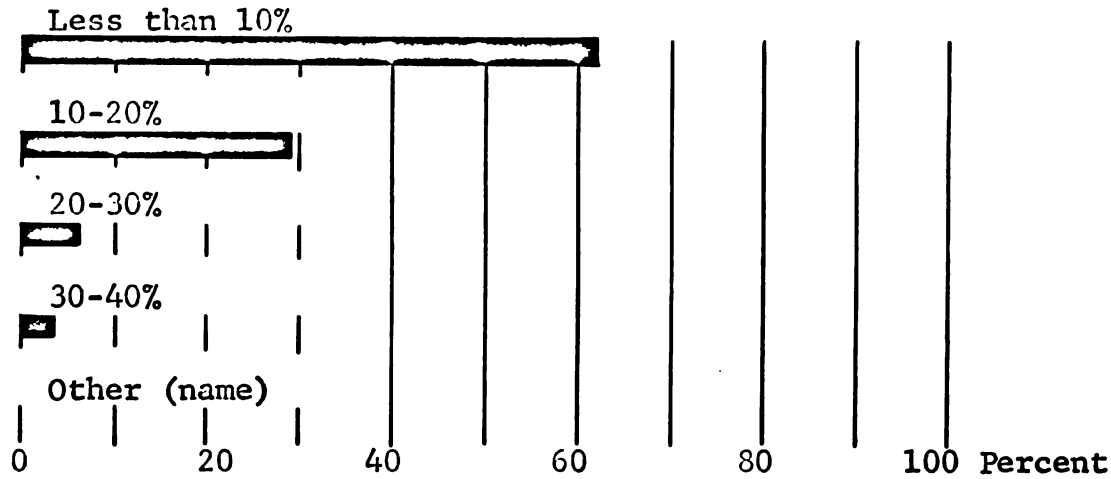

Fig. 14

There is a limitation in the question shown in Figure 14 that should be pointed out. The breakdown of percentages should have been in smaller increments, since the 62% reporting "0 to 10%" may be spending zero percent or 9% of their time on research. The latter may be termed completely adequate by some managers for certain job classifications. In all but two plants the majority of the personnel reporting said they spend less than 10% of their time on applied research. Of the 9% reporting "20 to 40%", two were technicians and one was a senior industrial engineer.

"In answering the last question, do you feel this is:"

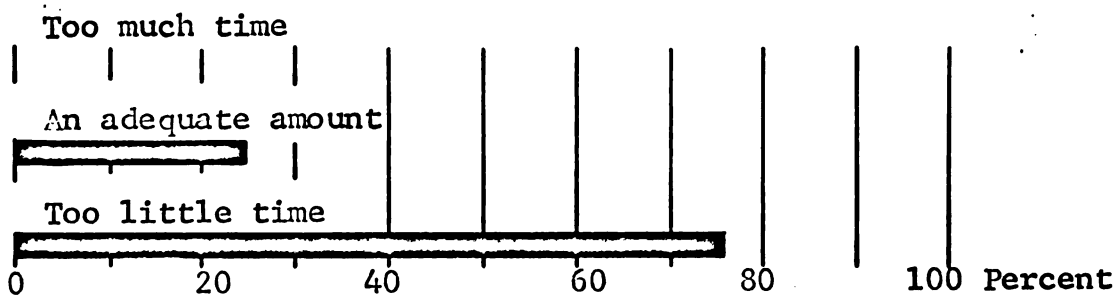

Fig. 15

"How would you rate your packaging group in this area of applied research?"

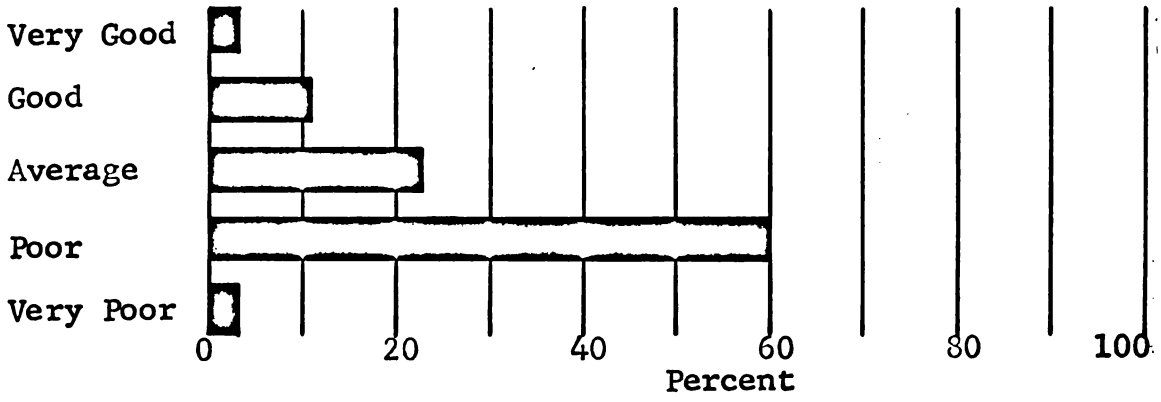

Fig. 16

Over three-fourths of the personnel answered "too little time" (see Figure 15) and then almost the same number correspondingly rated their packaging group as "poor" or "very poor" in the area of applied research (see Figure 16). It appears as though the problems and the workload of packaging personnel are very pressing and immediate with very little time remaining for applied research. This does not mean, however, that the personnel cannot or do not innovate in their day-to-day work.

RELATIONSHIPS

"How would you rate the cohesiveness of all the members of the packaging activity?"

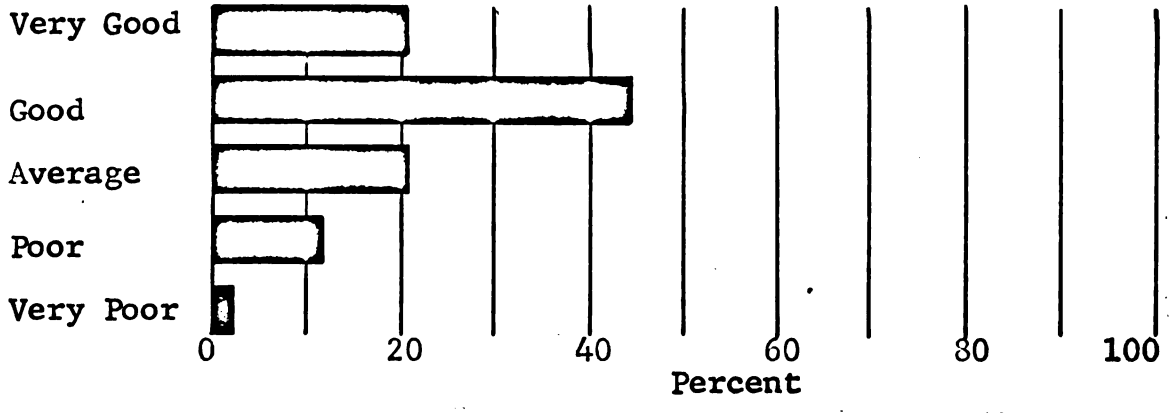

Fig. 17

See Table No. 1

"In general, how would you rate the cooperation between those plants you contact and yourself?"

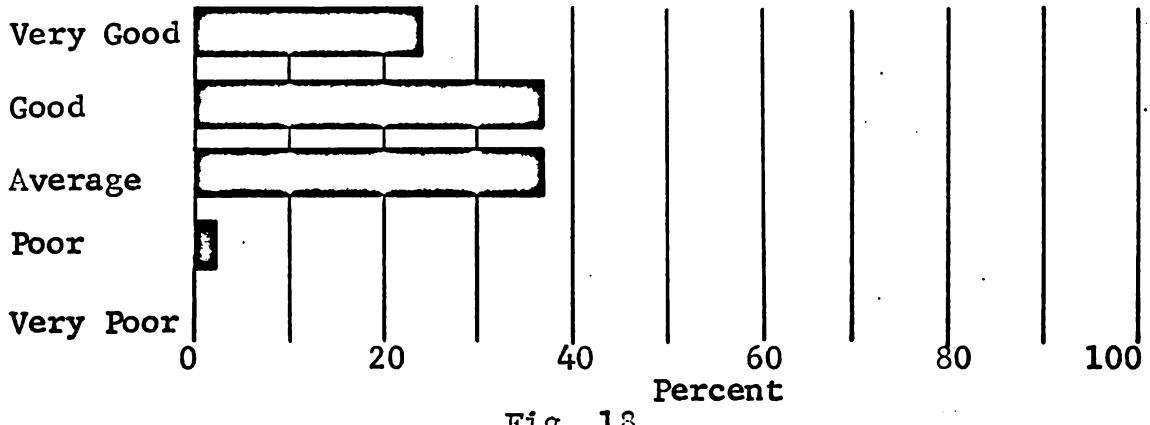

Fig. 18

Since the packaging departments and, in some cases, the packaging groups of several plants, must work as a

team in attaining common objectives, it is very necessary that their personnel work effectively together. Both of the graphs (see Figures 17 and 18) are skewed in the "very good" direction, especially the 61% in Figure 18 that rated the cooperation between plants as "good" or "very good".

In the first question there were two plant locations where one-half of the packaging personnel gave ratings of "average" or lower, leading to the possible conclusion that there may be internal conflicts which could reduce the group's effectiveness.

"How would you rate the awareness of what the packaging group is doing (or trying to accomplish) by the following: (leave blank if it does not apply)"

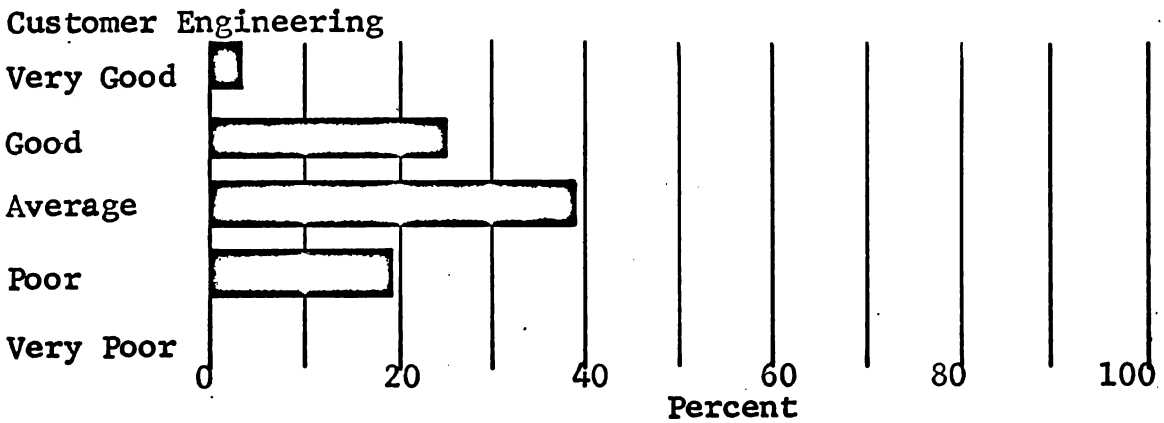

Fig. 19a

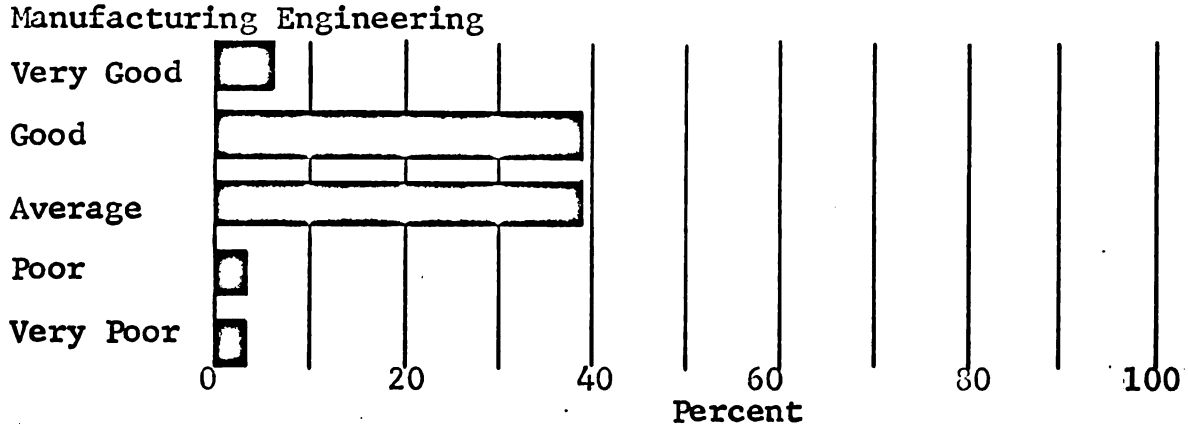

Fig. 19b

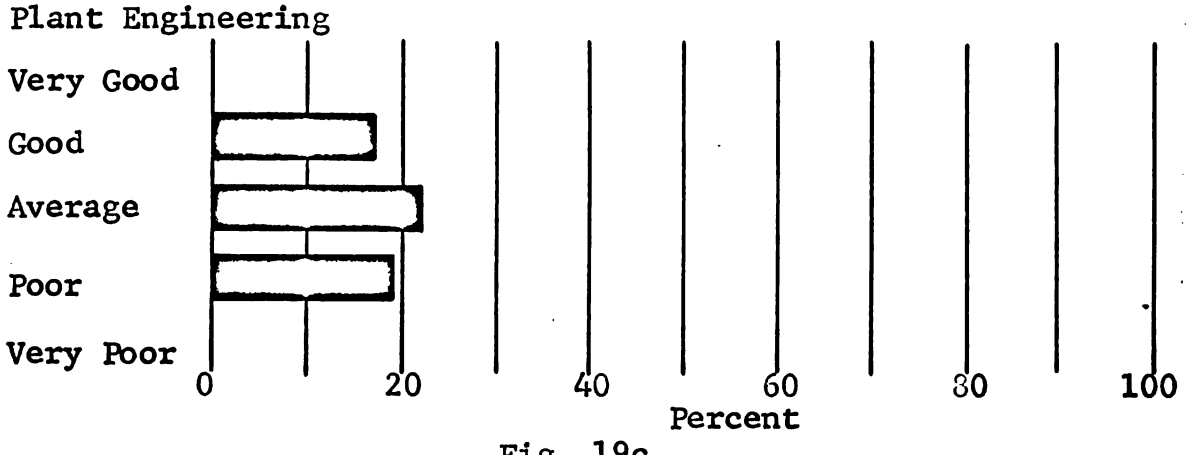

Fig. 19c

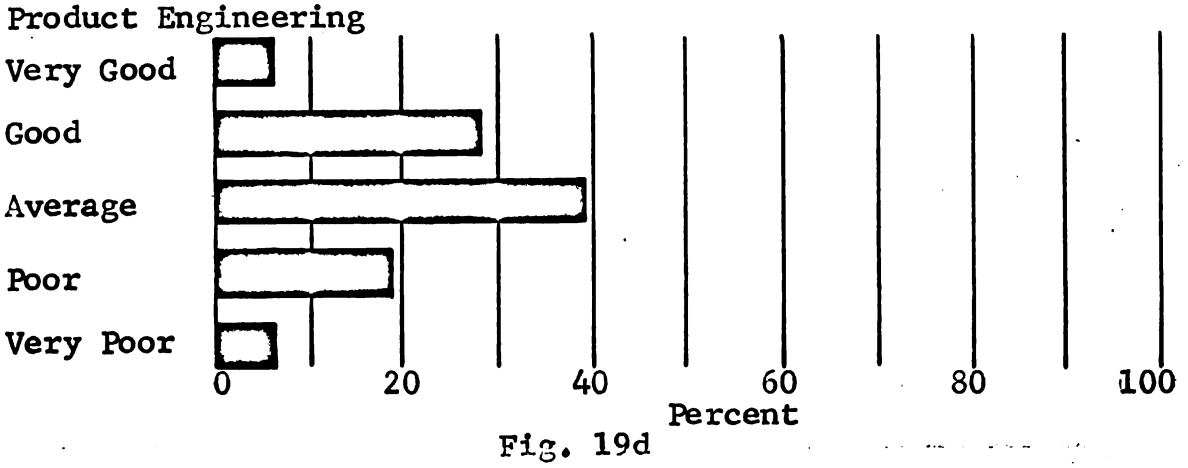

Fig. 19d

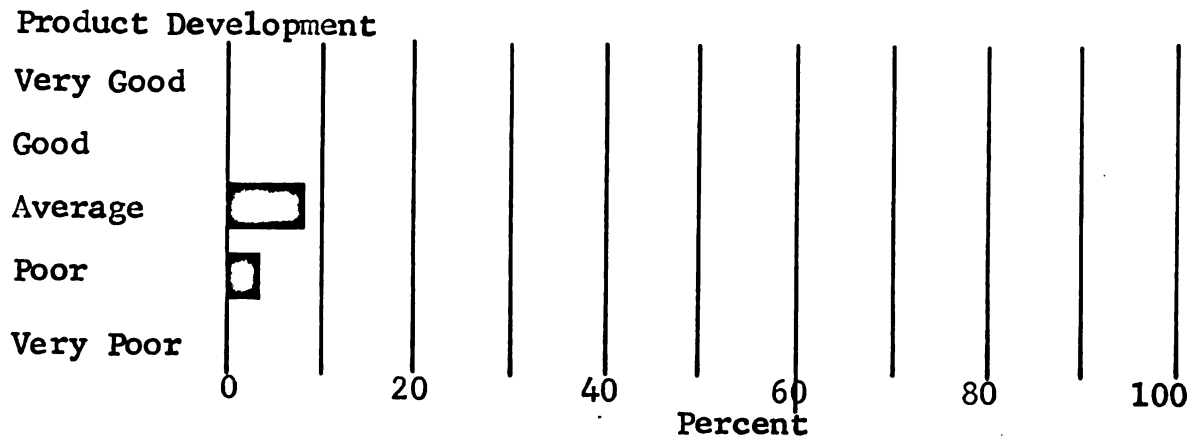

Fig. 19e

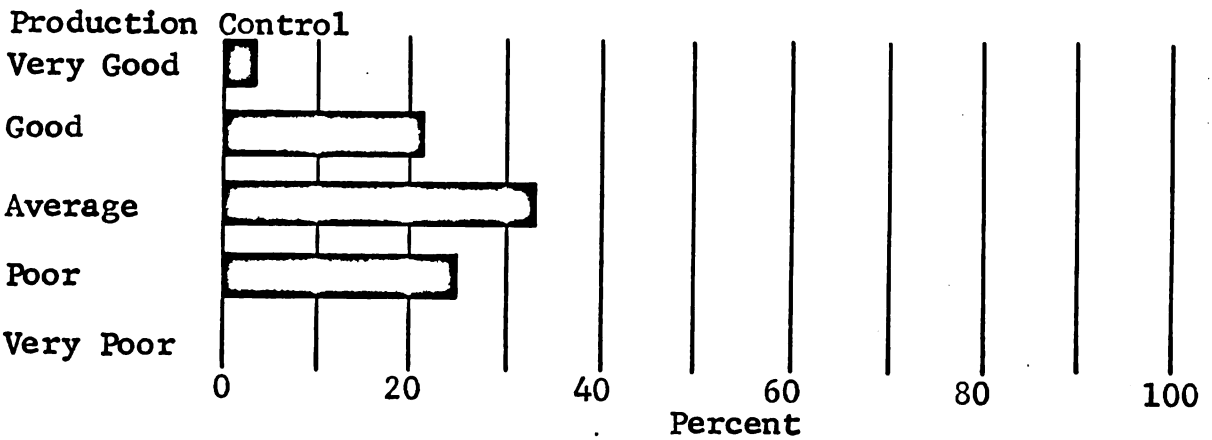

Fig. 19f

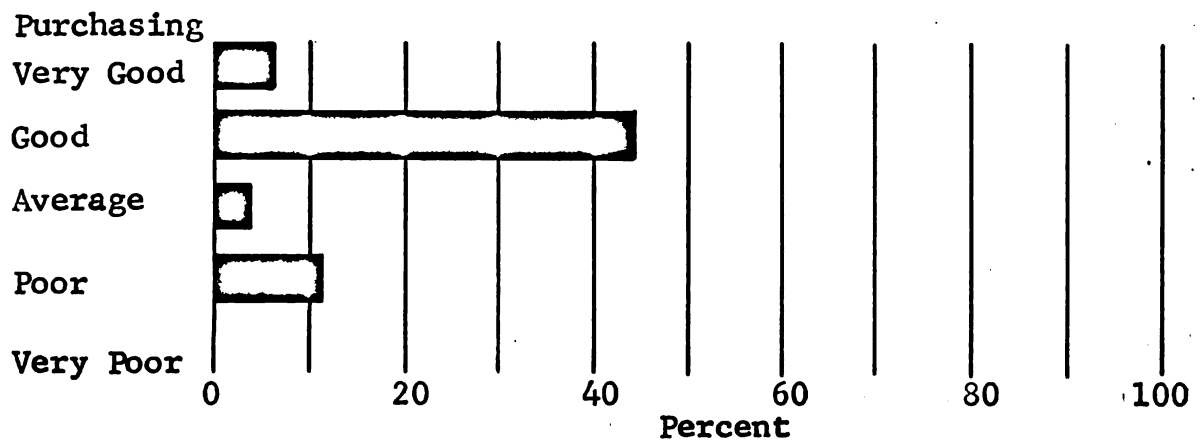

Fig. 19g

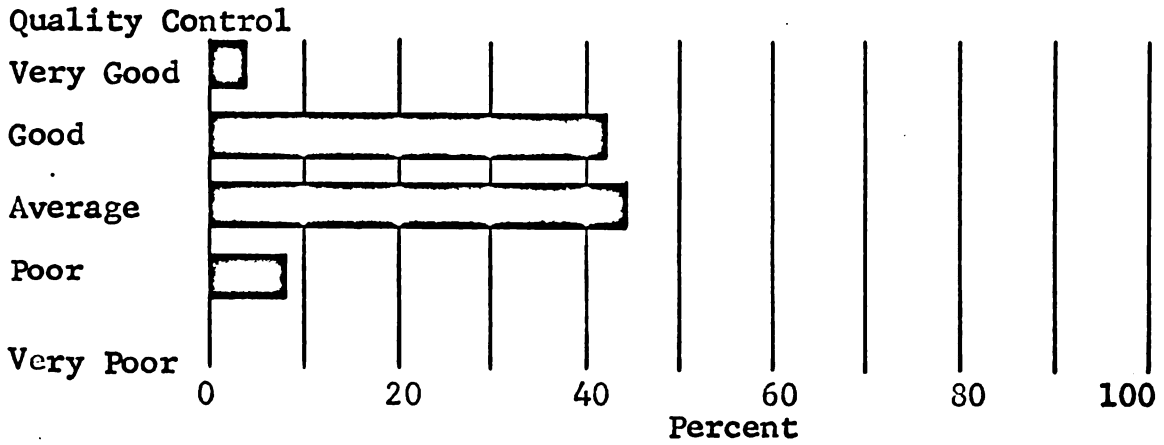

Fig. 19h

The discrete plants' packaging groups rated the listed functions (see Figures 19a through 19h) quite differently. However, these charts give a general indication of these functions' awareness of the goals of packaging as rated by the packaging personnel. In some packaging jobs, it may be very necessary that Manufacturing Engineering or Production Control have a good knowledge of what they're trying to accomplish. In other areas, in particular Product Packaging, I feel it is very important that Customer Engineering, Product Engineering, Product Development and Quality Control have an adequate understanding of packaging objectives. Overall, there were too many in the "average" and "poor" categories for these four functions.

Each plant's packaging manager, depending on that plant's objectives, should strive for closer relationships with those functions necessary in accomplishing packaging's work.

It should be noted that the writer made an omission in the listing of functions (or departments). The Traffic Department and the Product Test Department were not included and should have been, since they are, or should be, both involved with the packaging groups' work, especially in product packaging. There were two "write-in's" in these areas. The results were: Product Test - "average" and Traffic - "poor".

"Do you think you could do a more effective job if you had a better knowledge of what the packaging personnel (with similar job assignments) at other plant locations were working on?"

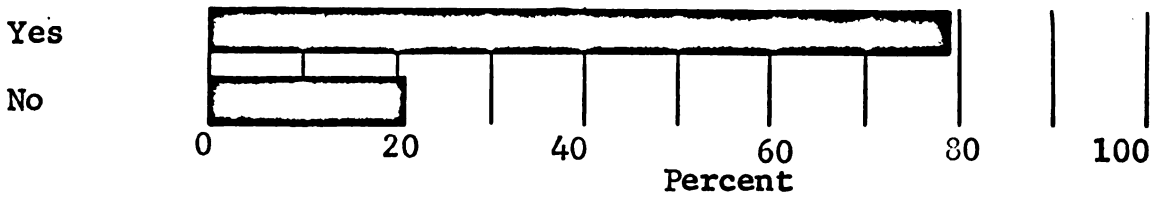

Fig. 20

Almost 80% of the personnel felt that they could do a more effective job if they knew what other plants were doing (see Figure 20). This fact was substantiated by the personal interviews with managers also. In the course of these interviews, one-half of the managers stated that there should be a greater flow of information among plants on new materials, packaging methods, etc.

"If your answer to the last question is "Yes", then what means do you feel would be best used to get this information?"

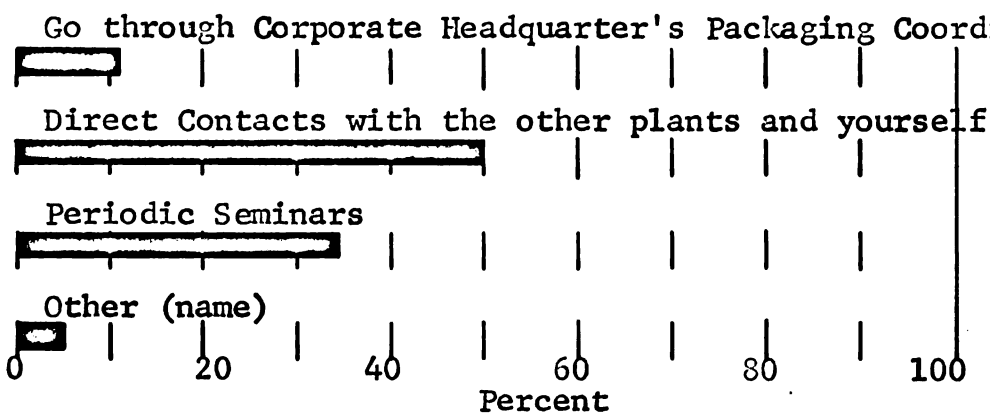

Fig. 21

In the previous question (see Figure 21) most of the personnel felt that this could be accomplished through direct contacts or seminars.

Because of the relative newness of the Corporate Packaging Committee and their current work, I felt it would be meaningful to ask the following question in the survey:

> "Could you name those areas in packaging where you feel there should be more continuity or standardization among plants."

Again, a word of caution is needed. In an open-end type question such as this, there were a wide variety of statements that required interpretation. It is hoped that none of these were misconstrued or omitted.

The most often mentioned areas in order of frequency were:

1) Package test standards.

2) Engineering Change Procedures and Release for packaging part numbers.

3) Writing of packaging specifications.

4) Illustration and documentation of packaging and unpackaging instructions.

5) Graphic design, including standardization of labeling.

6) Shock and vibration analysis, environmental test specifications and fragility factor studies.

7) Measurement of manpower requirements and areas of responsibility for packaging personnel.

8) Basic research activity.

9) Packaging document manual.

10) Interplant packages and containers.

CHAPTER IV

CONCLUSIONS

Up to this point, I have attempted to view IBM's packaging activities from an organizational standpoint as objectively as possible. After spending a considerable amount of time going over the data collected from the plants, certain organizational patterns became apparent. I will attempt to generalize on these patterns at this point and then get more specific toward the latter part of my conclusions.

In the analysis of each plant's operations, the approximate date the plant was established was given. Of the ten plants, eight have started operating within the past nine years. During the start-up time there was a great deal of effort and emphasis placed in originating materials handling systems, container systems and layouts for the new plant by the Industrial Engineering Department or a department with similar industrial engineering functions. This staff group had very immediate and real problems to contend with in just "getting things off the ground."

One of the last things to concern the plants at this stage was a sophisticated and well-thought-out product

packaging program. After the plant layout, materials handling and warehousing problems settled down (and in some plants there has been very little relief to date) then packaging for the customer began receiving a greater degree of attention from a packaging technology standpoint.

Although some plants may have begun investigating the shipping characteristics of their products prior to 1960, they were few. I believe I can correctly assume that the depth of packaging consisted of enclosing the product in a crate and making sure it could be handled within the plant. However, in the past two or three years there has been greater emphasis placed on working closer to Development and Product Engineering and designing into the product as much "packaging" as is economically possible.

One point should be made at this time about most of IBM's products. The machines are not only prepared for shipment at the manufacturing plants but must be packaged for transferring and retransferring from one customer to another out in the field. Therefore, adequate product packaging cannot always be depended upon in the field, so any packaging designed into the machines will provide some of the necessary protection.

Organizationally, what does all this discussion lead to? Packaging at the "start-up" of a plant is

primarily concerned with providing parts protection and establishing packaging systems within its plant location. Therefore, it necessarily is closely aligned with materials handling, warehousing and plant layout. These areas, of course, should still be given support as new products are introduced. Warehousing and handling systems should be updated and layouts changed. However, as long as these functions are being performed by the same personnel within a department, packaging for customer products will not be given the effort it should. Although devoting effort to customer products is possible, there is a basic conflict which must be overcome. This conflict appears between the packaging personnel meeting the internal demands of the manufacturing plant and going outside of the function, which includes the packaging activity, and uncovering the potential of product packaging. In case this last remark is not completely clear to the reader, let me expand on this point.

Chapter II included the long-range objectives of packaging from a corporate level and also from an individual plant level. In all but two instances, the objectives were aligned with the shipment of the product and concern for the customer. However, although there are twenty-one persons out of the total of thirty-seven either partly or wholly involved in product packaging, 43% of these twenty-one personnel are from one plant. If the stated packaging

objectives are to culminate, then there must be greater emphasis placed on working more closely with the groups of Product Development, Product Engineering, Quality Control and Customer Engineering that are presently (according to the survey) least aware of what Packaging is attempting to accomplish.

It would be incorrect to state that the packaging activity cannot operate in the organizational structure it is currently in, but rather its greatest potential will not be realized until it is primarily customer-oriented. One packaging manager was much more dogmatic in a statement about the organization structure of the packaging activity. He said, "I cannot see packaging being divorced as it is from the functions of shipping and traffic, as well as product design. We have a big responsibility to the customer engineering people in the field. I don't think we are oriented right . . . their (other plants) orientations are inward instead of outward."

The conclusion of this discussion is: although the objectives of the packaging activities are and have been changing over the past several years with greater emphasis placed on product packaging (i.e., shipment of products to our customers), the organization of packaging is, in most plants, still inwardly directed.

What then are some of the organizational alternatives to move packaging in the direction of their objectives and

to be more customer-oriented? First, just stating that the packaging activity should be more outwardly oriented isn't going to bring Customer Engineering, Product Development and Product Engineering to Packaging's doorstep with valuable advice. They also have immediate problems of their own, so the packaging departments must earn their reputation through being knowledgeable about the potential of product packaging. Packaging personnel must know just what is happening to their products in transit. They must get accurate feedback from the field about what shipping damage is costing. They must know exactly how machines are being handled at the customer's locations and what problems a packaged product is causing a customer. Overall, they must take a professional approach to packaging technology.

In order to do all this, a considerable amount of research time, coordinating effort and support from packaging management and the Corporate Headquarters Coordinator is necessary.

Referring back to the data collected in both the personal interviews and the survey, there were several indications that the packaging activities had all they could do just to stay abreast of new product packaging. Very little was being done in the area of applied research and, consequently, 63% of the personnel rated their departments "poor" or "very poor" in applied research.

Therefore, if product packaging is to attain its goals, there must be specific well-formulated projects with research time allotted for selected personnel to carry out the assignments.

Throughout this research study considerable emphasis has been placed on objectives. I believe that the philosophy of management by objectives, the effect of which is to develop the potential of the individual and make him a willing partner in the organization, is well accepted. The first implication of this philosophy is that management starts with policies and objectives that are widely and cooperatively conceived. Involvement and participation in an objective setting by the packaging personnel are the sources of motivation.

However, not even a dynamic program runs itself, no matter how democratic the sense of participation may be. Therefore, the greater the degree of delegation and cooperation, the more coordination must be emphasized.

It is this area of coordination, both within the various plants' packaging groups and on a corporate level, that must be examined if the packaging organization as a whole is to operate at maximum effectiveness.

TABLE 1

INTERACTION PATTERNS BETWEEN PLANTS

Contactor

	Plant J	Plant A	Plant B	Plant C	Plant D	Plant E	Plant F	Plant G	Plant H	Plant I
Plant A	9.5		2.5	10.0	5.0	15.0	9.5	10.5	12.5	5.0
Plant B	.5	.5		3.0	.5	3.0	9.5	.5	.5	.5
Plant C	1.5	7.0	.5		.5	1.0	10.0	3.0	3.5	.5
Plant D	.5	2.5					.5	1.0		
Plant E	.5	3.0	1.5	1.5	.5		1.5	.5	.5	.5
Plant F	1.5	10.5	3.5	10.5	3.5	1.0		4.5	5.5	1.0
Plant G		.5		10.5			3.0			
Plant H	2.0	5.0	1.0	1.5	1.0	1.0	4.5	4.0		.5
Plant I	.5	4.0					1.5		1.0	
Plant J	NOT APPLICABLE									

Factor: .5 Less Than Once; 1.5 1 to 2; 2.5 2 to 3; 3.5 3 to 4; 4.5 4 to 5

No. 18: Check the frequency with which you contact other plants each month in getting your job done.

APPENDIX A

OPINION SURVEY

To All Packaging Personnel

This is a survey of the ideas and opinions of all the personnel involved in packaging at IBM's domestic plant locations. Through this questionnaire, we hope to learn what patterns of organizational policies are the most effective in attaining packaging objectives.

What you say in this questionnaire will remain completely anonymous. Do not sign your name. The answers on individual questionnaires will be combined with those of the packaging personnel at other plant locations so it will be impossible to identify any individual in the organization. The classification data will not be used in such a way as to single out any one individual.

Whether the results of this study give a true picture of the packaging organization depends on whether you answer the way you really feel.

INSTRUCTIONS

1. For most questions no writing is needed. Just mark the answer that fits your case best with a ✓.
2. Please answer the questions in order. Do not skip around.
3. Be sure to answer all questions
4. REMEMBER. This is not a test. Your opinion is the only right answer.

CLASSIFICATION DATA

Job Title _____

Last completed year of formal education (circle one).

High School 1 2 3 4

College 1 2 3 4 What degree? _____

Total number of years experience in packaging. _____

A description of your present job coverage. Include in your answer the areas you support such as in-plant containers, final machine or systems packaging, etc and also the depth of your coverage.

_____

_____

_____

_____

_____

_____

_____

_____

THE FOLLOWING QUESTIONS PERTAIN TO THE ORGANIZATION OF YOUR PACKAGING DEPARTMENT (OR GROUP)

1. How would you rate your knowledge of the objectives or goals of the packaging group?

Very Good	Good	Average	Poor	Very Good
( )	( )	( )	( )	( )

2. How well would you say your job has been related to the objectives of the packaging group?

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

3. Questions 3 to 6c pertain to specific job assignments in the packaging group. When you answer these questions think of the day to day, week to week, and month to month assignments you receive and not the very broad assignments such as "provide support to final machine packaging".

Who assigns your projects in the packaging activity?

_____ (1) Manager
_____ (2) Group Leader
_____ (3) Both manager and group leader
_____ (4) No one assigns my projects

4. About what percentage of the work that you are now doing has been assigned to you?

_____ (1) 0 - 20%
_____ (2) 20 - 40%
_____ (3) 40 - 60%
_____ (4) 60 - 80%
_____ (5) 80 -100%

5. Does the packaging group have a formalized method for assigning and controlling projects?

_____ (1) Yes
_____ (2) No

6a. If the answer to No 5 is "Yes", how effective do you think the method is?

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

b. If the answer to No 5 is "No", do you feel you would work more effectively if there was a formalized method?

_____ (1) Yes
_____ (2) No

c. Again, if the answer to No 5 is "No", do you think the packaging group as a whole would accomplish more if there was a method of assignment and control?

_____ (1) Yes
_____ (2) No

7. About what percentage of your time is set aside for applied research, ie, new ideas or innovations about packaging problems in general?

_____ (1) Less than 10%
_____ (2) 10 - 20%
_____ (3) 20 - 30%
_____ (4) 30 - 40%
_____ (5) Other (Name) _____

8a. In answering No 7, do you feel this is:

_____ (1) Too much time
_____ (2) An adequate amount
_____ (3) Too little time

b. How would you rate your packaging group in this area of applied research?

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

9. Answer this question only if your department has other activities in it such as Materials Handling, Plant Layout, Planning, etc. How often do you work with the other activities within your department to get your job done?

_____ (1) Always
_____ (2) Often
_____ (3) Occasionally
_____ (4) Seldom
_____ (5) Never

10. Do you think the workload of the packaging activity is well distributed in keeping with the objectives of the packaging group?

_____ (1) Yes, there is a good distribution
_____ (2) There are some areas for improvement
_____ (3) There are many areas that need improvement
_____ (4) No, there is a poor distribution

11. How would you rate the cohesiveness of all the members of the packaging activity? How well do they work together?

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

THE FOLLOWING QUESTIONS ARE ABOUT THE ORGANIZATION OF YOUR PACKAGING DEPARTMENT (OR GROUP) IN RELATION TO OTHER DEPARTMENTS IN YOUR PLANT LOCATION

12. How would you rate the awareness of what the packaging group is doing (or trying to accomplish) by the following: (leave blank if it does not apply)

	Very Good (1)	Good (2)	Average (3)	Poor (4)	Very Poor (5)
Product Engineering	( )	( )	( )	( )	( )
Customer Engineering	( )	( )	( )	( )	( )
Manufacturing Engineering	( )	( )	( )	( )	( )
Production Control	( )	( )	( )	( )	( )
Quality Control	( )	( )	( )	( )	( )
Purchasing	( )	( )	( )	( )	( )
Plant Engineering	( )	( )	( )	( )	( )
Other (Name)	( )	( )	( )	( )	( )

13a. How would you rate the knowledge of the packaging group's objectives by the level of management that your department reports to?

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

b. How important do you feel it is that the next level of management know these objectives?

_____ (1) Very important
_____ (2) Somewhat important
_____ (3) Of little importance
_____ (4) Not very important

14. List in order of frequency the departments from which you receive your job requests. (Name the department and division. Example: Tool Engineering -- Manufacturing Engineering Division).

(1) _____

(2) _____

(3) _____

(4) _____

15. List in order of frequency the departments (and division) that you contact the most in order to get your job done.

(1) _____

(2) _____

(3) _____

(4) _____

16. List in order of frequency those departments (and division) that slow down or hinder your work progress the most. (Try not to think of individual personalities, but rather work conflicts.)

(1) _____

(2) _____

(3) _____

(4) _____

17. In order to get your particular packaging assignments done, in what department or division do you feel you could work most effectively?

(1) (name) _____

_____

(2) In right place now. _____

THE FOLLOWING QUESTIONS PERTAIN TO THE RELATIONSHIPS OF THE VARIOUS DOMESTIC IBM PLANTS' PACKAGING GROUPS TO ONE ANOTHER AND ALSO THEIR RELATIONSHIP TO CORPORATE HEADQUARTERS

18. Check the frequency with which you contact other plants each month in getting your job done. (Contacts may include such things as information requests, packaging changes, damage reports, etc) Leave blank if no contacts are made.

	Less Than Once	1 to 2	2 to 3	3 to 4	4 to 5
Burlington	( )	( )	( )	( )	( )
Endicott	( )	( )	( )	( )	( )
Fishkill	( )	( )	( )	( )	( )
Kingston	( )	( )	( )	( )	( )
Lexington	( )	( )	( )	( )	( )
Owego	( )	( )	( )	( )	( )
Poughkeepsie	( )	( )	( )	( )	( )
Rochester	( )	( )	( )	( )	( )
San Jose	( )	( )	( )	( )	( )
Vestal	( )	( )	( )	( )	( )

19. In general, how would you rate the cooperation between those plants you contact and yourself?

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

20. Do you think you could do a more effective job if you had a better knowledge of what the packaging personnel (with similar job assignments) at other plant locations were working on?

_____ (1) Yes
_____ (2) No

21. If your answer to No. 20 is "Yes", then what means do you feel would be best used to get this information?

_____(1) Go through Corporate Headquater's packaging coordinator
_____(2) Direct contacts with the other plants and yourself
_____(3) Periodic seminars
_____(4) Other (name) _____

22a. Are you aware of the goals of the Corporate Packaging Committee?

_____(1) Yes
_____(2) Somewhat, but not too clearly
_____(3) No

b. If your answer to No. 22 was "Yes" or "Somewhat", rate how well staffed you think the various plants' packaging groups are in attaining the Committee's goals. (The word "staffed" as used here means the technical competence and overall knowledge of packaging rather than just the number of men.)

Very Good	Good	Average	Poor	Very Poor
( )	( )	( )	( )	( )

23. Could you name those areas in packaging where you feel there should be more continuity or standardization among plants.

(1) _____

(2) _____ _____

(3) _____

(4) _____

(5) _____

PLEASE PLACE THE QUESTIONNAIRE IN THE ATTACHED ENVELOPE AND SEAL IT. THEN RETURN IT TO YOUR MANAGER IMMEDIATELY.

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