DOCUMENT RESUME

ED 112 142 CE 004 932

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TITLE A Resource Guide for the Maryland Plan's Group Project and Line Production.
INSTITUTION Maryland Univ., College Park. Dept. of Industrial Education.
PUB DATE 75
NOTE 72p.

EDRS PRICE MF-$0.76 HC-$3.32 Plus Postage
DESCRIPTORS Charts; *Educational Programs; Group Instruction; Industrial Arts; *Industrial Education; *Industrial Structure; Industrial Training; *Junior High Schools; Occupational Information; State Programs; Vertical Organization
IDENTIFIERS Maryland; Organization Charts

ABSTRACT

This guide was developed for teachers who are using the Maryland Plan's group processes--the group project and line production methods. The guide is divided into four sections. The first section is an overview of the entire Maryland Plan. It describes the program which provides high school industrial arts students, from seventh grade through ninth grade, with a theoretical and practical understanding of the role of industry and technology. The second section contains information and examples of industrial personnel organization charts. It discusses organizational and content structure according to types of authority, project organization and management, and examples of organization charts. The third and largest section includes job descriptions and related information to define the various positions in a company's organization covering: the purpose of the job, responsibilities, and other typical titles for that position. This information is included because role playing is one of the primary learning experiences in the group processes. Information about industrial forms and materials are included in the last section. Form design, form control, form design checklist, and form references are given for the maximum promotion of manufacturing objectives. A bibliography is included. (Author/EC)

A Resource Guide for the Maryland Plan's GROUP PROJECT and LINE PRODUCTION

by GERALD F. DAY

A RESOURCE GUIDE FOR THE MARYLAND PLAN'S GROUP PROJECT AND LINE PRODUCTION

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1975

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ACKNOWLEDGMENTS

This resource guide was made possible through the assistance of many individuals and industries.

The author is particularly grateful to Dr. Donald Maley, originator of the Maryland Plan, for his guidance, assistance, and encouragement throughout the writing of this guide and the author's tenure at the University of Maryland.

Special acknowledgment is extended to Mr. George Haney, industrial arts department chairman at Earle B. Wood Junior High School, whose job descriptions were used as the basis for the descriptions included in this guide.

Appreciation is also expressed to the numerous students, teachers, supervisors, and administrators who aided in this effort. A special thanks to Dr. Karl Gettle, Dr. James Hastings, Paul Skellchock, W. Harley Smith, and Kendall Starkweather.

Finally, gratitude goes to the many companies which sent information, especially Bethlehem Steel, Black and Decker, Ford, IBM, Purolator, Kodak, and Sperry Univac.

USE OF GUIDE

This guide was developed in order to facilitate teachers who are using the Maryland Plan's group processes, the group project and line production methods. The need for this guide has been expressed by those using the Maryland Plan, and it is hoped that this resource will be of valuable assistance.

The guide is divided into four sections. The first section is an overview of the entire Maryland Plan. The second section contains information and examples of industrial organization charts. Job descriptions and related information are contained in the next section. Information about industrial forms and materials are included in the last section.

This guide is intended to be used by the teacher, but may be made available to students at the teacher's discretion. Students should be encouraged to use their own resourcefulness and ingenuity.

The teacher may want to encourage students to develop a similar resource guide or maintain a resource file for their own classroom use. Examples of organizational charts, job descriptions, and industrial forms, including the ones developed by the class, could be kept in a loose-leaf binder or filing cabinet. Each class could add to and refine the file's materials. When students interview their industrial counterpart, they could obtain industrial forms, manuals, and materials.

The teacher should continuously evaluate, update, and improve his or her skills as a facilitator of education. The primary use of this guide is to aid the teacher in evaluating and understanding how industrial management techniques can be used by the students in an educational setting. In order to guide and facilitate students, the instructor must understand how industrial organizations function to produce goods and services for society. This guide contains only a sampling of information, and the teacher is encouraged to expand upon and modify it to meet local conditions.

This guide should be used to supplement Donald Maley's book, The Maryland Plan: The Study of Industry and Technology in the Junior High School.

THE MARYLAND PLAN

The Maryland Plan is a junior high school industrial arts program which provides students with a theoretical and practical understanding of the role of industry and technology in our society. Starting at the seventh grade and continuing through the ninth, the program provides students with an opportunity to study technology - its evolution, utilization and significance; industry - its organization, materials, occupations, processes, and products; and the social and economic problems and benefits resulting from the technological and industrial nature of society. Figure 1 graphically conveys the organizational and content structure of the program.

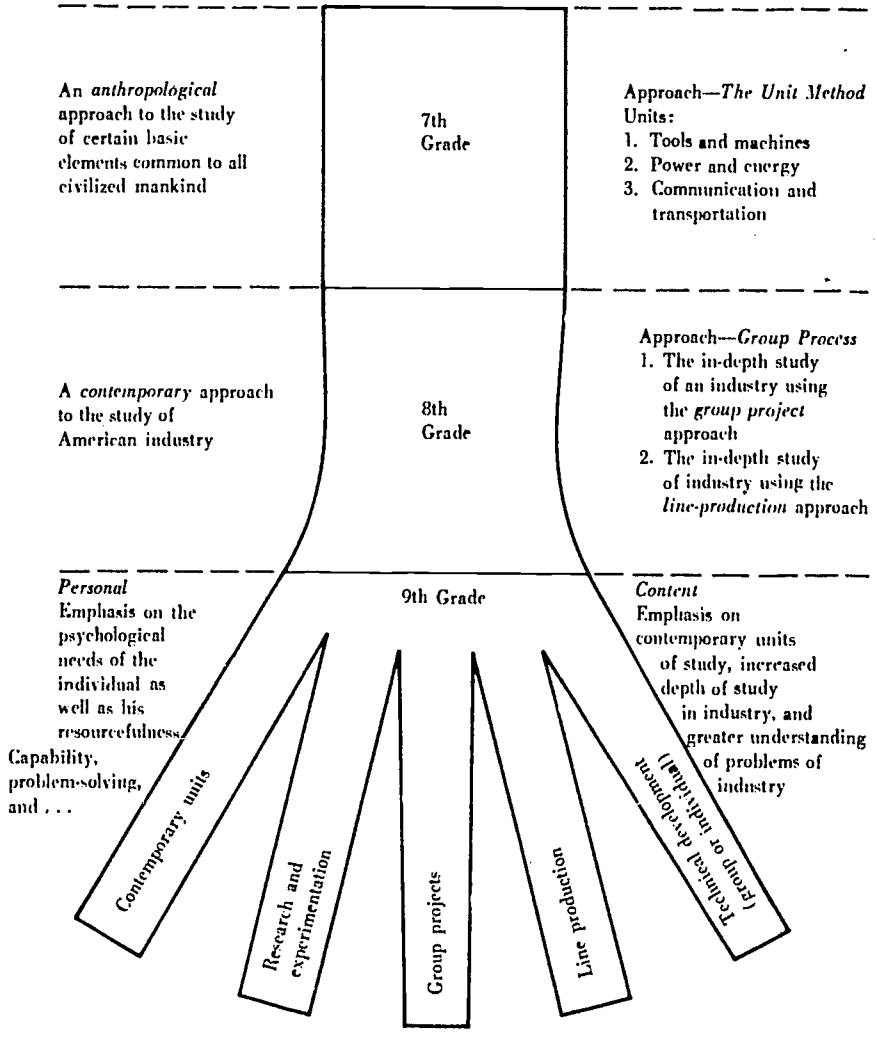


Figure 1. A Schematic of The Maryland Plan. (From Maley, 1973)

Seventh Grade Program

The seventh grade program is based on an anthropological study of one of three broad and comprehensive units which contain basic elements common to mankind's technological development. The development of and contribution to the growth of civilization of tools and machines, power and energy, or communication and transportation can be selected by the class for study.

After the unit is decided upon, each student selects an area or subtopic of which to research, investigate, plan and construct a project. For example, the Model T Ford would be a subtopic under the unit dealing with communication and transportation. In researching a subtopic, the student utilizes community resources such as libraries, museums, historical societies, governmental agencies, antique dealers, model makers, industries, and commercial firms. Data collected from this investigation is used to construct a model of the individual's subtopic and is also reported to the class in a seminar setting.

Eighth Grade Program

The eight grade program focuses on a contemporary approach to the study of American industry through two group processes, the group project and line production.

Group project. The group project method interprets the industries which produce on a project basis. Such low-volume industries would include space projects, ships, aircraft, buildings, and custom-built objects. The class selects a major raw material processing industry to study in-depth, such as steel, paper, cement, glass, or plastics. The students select, plan, organize, and construct a model or panel display which represents or depicts the production operations of the chosen industry. The model or panel display should utilize mechanization, programmed systems, and communication systems to convey the industry to the viewer.

The class establishes a company and each student selects a position to role play. In addition, all students are workers in the production department and each contributes his or her skills in the construction of the project. Staff meetings, special meetings, and presentations play important parts in this group process. Each student in a management position shares information and plans presentations to facilitate in the management, planning, operation, and production of the project. Films, field trips, guest speakers, demonstrations, and reports are integral elements in this educational activity.

Line production. The line production activity deals with high-volume industrial techniques. This method conveys industries which mass produce such items as automobiles, furniture, televisions, clothing, and appliances using such concepts as interchangeable parts, assembly lines, automation, jigs and fixtures, and other line production techniques.

The class selects a product which can be manufactured using the line production method and organizes a company with a management structure based on high-volume production industries. Each student selects a management role to play, different from the one he or she had in the group project. The class effort is directed towards designing the product, raising capital through the issuance of stock, production line planning, designing and fabricating jigs and fixtures, training of personnel, marketing, and other industrial activities. Staff meetings, special meetings, and presentations are again significant parts of this activity.

In both the group project and line production, the role playing activity enlarges the realm of student participation in keeping with his or her interests, aspirations, and capabilities. Through these group experiences, the organization of industry, productivity, occupational opportunities, automation, cybernetics, labor-management relations, financial structure, problems, and other concepts can be experienced by the students.

Ninth Grade Program

The ninth grade program provides opportunities to increase the students' understanding of industry and technology through a multi-pronged plan which takes into account the students' needs, resourcefulness, capabilities, aspirations, and interests. The teacher and students may select one of five instructional programs: contemporary units; research and experimentation; group project; line production; and technical development.

The contemporary units of study focus on either modern industry or technology. The group project can be used to study a specific modern industry or area of technology. The line production activity should provide for an increased depth of learning and greater sophistication than the eighth grade experience.

The research and experimentation program allows the student to select a problem for investigation, research, testing, experimentation, and solving. The problem may deal with consumer products, industrial processes and materials, or other areas of concern. After defining the problem, the student must investigate and gather existing information.

Appropriate and valid tests, which may involve the construction of testing apparatus, are run. Throughout this process, each student informs the class of his or her progress in a seminar setting. The exchange of ideas, sharing of information, development of analytic abilities, communication skills, and problem-solving techniques are important elements in the R&E program.

The technical development activity allows a student to choose a technical area in which he or she would like to develop knowledge and skills. In areas such as photography, metallurgy, graphics, and electronics, the student has the freedom to experiment, construct, research, and test different techniques, materials, and processes. This activity can be carried on as independent study or conducted as a group experience if there are other students with similar interests.

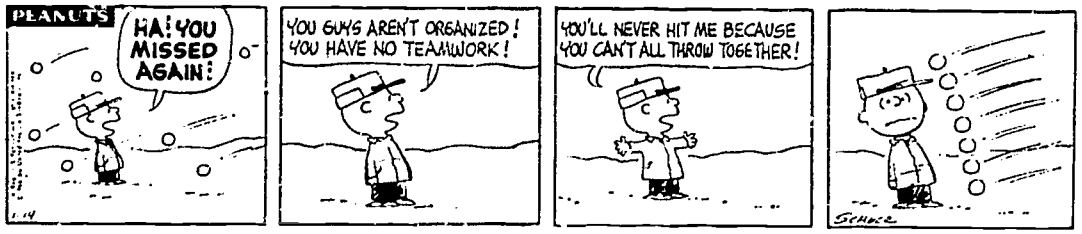
Summary

As can be observed, the Maryland Plan is student-orientated. It is designed around the developmental tasks, aspirations, and interests of youth. It is concerned with providing students with broad, varied experiences which will encourage self-initiative, self-exploration, self-reliance, and self-fulfillment. The student learns to learn for himself/herself. The development of the individual, not the construction of projects, is the most important aspect of the program.

The teacher is a manager and facilitator of educational activities rather than the source of all information. The teacher no longer lectures and demonstrates how to make projects,but rather facilitates, stimulates, reinforces, guides, and evaluates the development of students.

ORGANIZATION CHARTS

One of the first steps in both the group project and line production is that of devising a personnel organization chart. An organization chart represents, in graphic form, the major functions and the lines of authority of an organization as of a given point in time. The chart presents a picture of how the dynamic activities of an industry are coordinated into a working unit, and helps avoid confusion and conflict which might result from an overlapping or haphazard arrangement of duties. The importance of organizational structure is reflected in the following Peanuts cartoon.



The following section contains information about organization charts, with examples of different spans of control and reporting relationships for manufacturing industries.

Types of Charts

Organization charts range in complexity from a simple listing of titles to those utilizing color and photographs for key position personnel. There are basically three types of charts: vertical, horizontal, and concentric or circular. The mechanics of constructing a chart are not difficult, but the placement of positions is critical.

The most common type of organizational charting is the vertical chart, which shows the hierarchy of divisions, departments, and executives ranked from top to bottom. The chief executive at the top level is located at the top of the chart, with succeeding levels of authority moving toward the bottom. Figure 2 is an example of a vertical organizational chart.

Another variation of charting is the horizontal chart, which is read from left to right, putting the top echelon at the left and each successive, subordinate echelon extending toward the right. Figure 3 shows two types of horizontal charts.

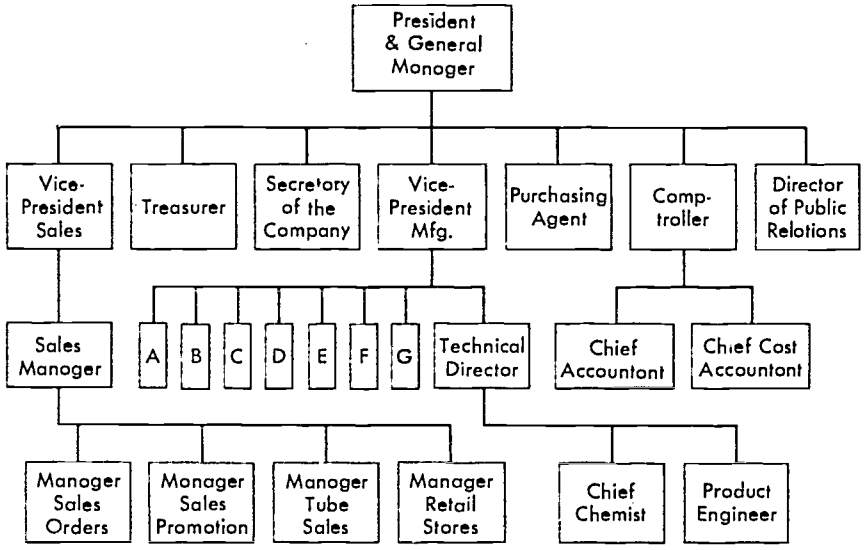


Figure 2. Traditional Type of Organization Chart. (From McFarland, 1970)

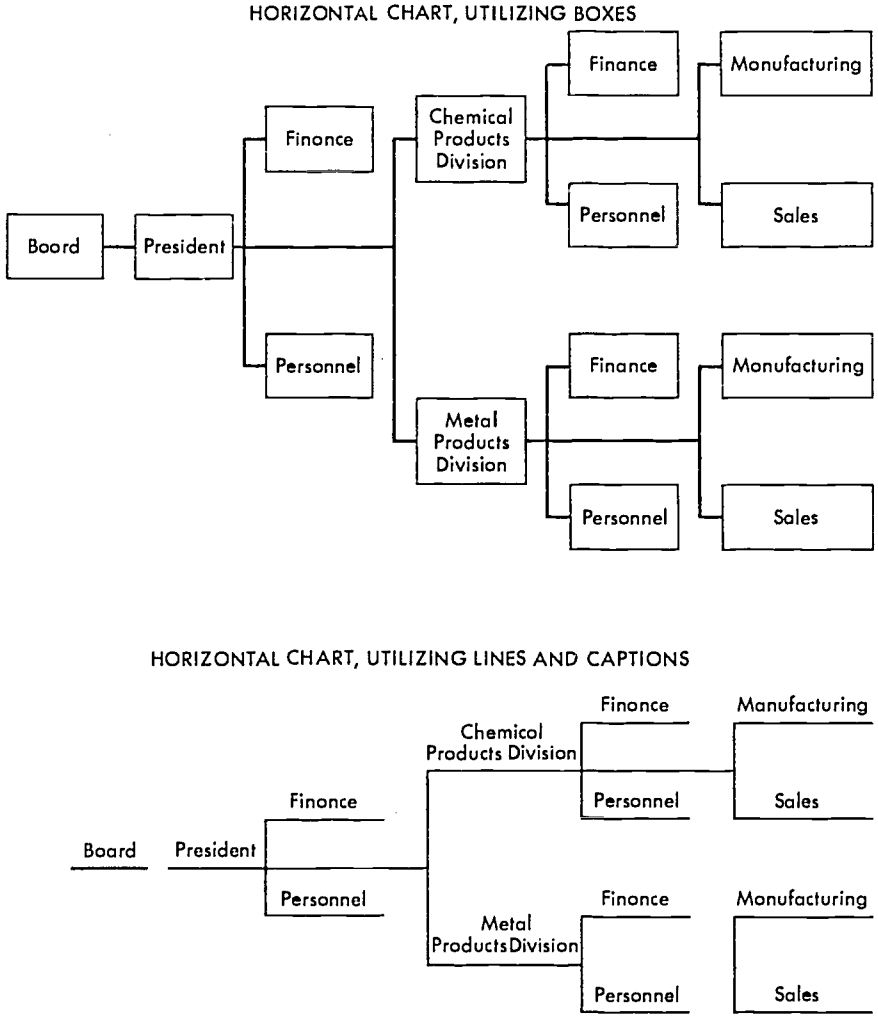


Figure 3. Horizontal Charts. (From McFarland, 1970)

Concentric or circular charts represent still another type of charting. The top executive is shown in the center of a series of concentric circles, with each successive echelon extending in all directions outward. This type of charting supposedly eliminates the status implicated in the vertical and horizontal charts and portrays the outward flow of authority. Figure 4 shows a concentric-circle chart of the same organization represented in Figure 2.

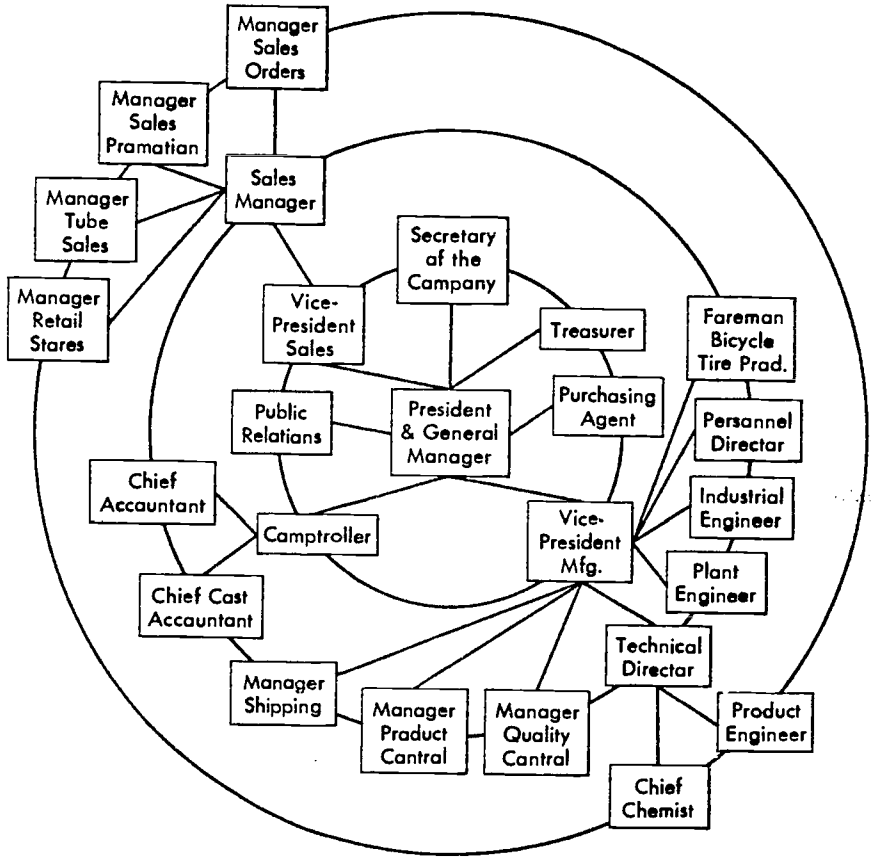


Figure 4. Concentric Organization Chart. (Note: Circles indicate echelon level; black connecting lines indicate flow of authority.) (From McFarland, 1970)

Types of Authority

The formal structure of an organization depends on the size of the company, the nature of its activities, the type of products or services, and many other variables. There are basically two types of authority or organizational functions

that can be modified and adapted to the variables of most organizations, the line and the staff.

Line and staff authority. Line refers to those positions in the organization that have responsibility and authority and are accountable for accomplishment of the primary organizational objectives. Line authority entitles a superior to direct the work of a subordinate, which is a command relationship. Figure 5 illustrates a simple line organization.

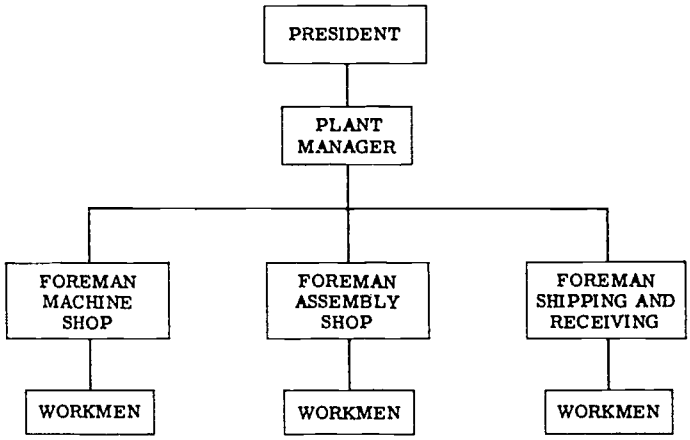


Figure 5. A Simple Line Organization. (From George, 1970)

Staff authority is advisory or service-oriented. A person or department possessing staff authority has the right to advise, plan, recommend, or assist those with line authority. A staff function is one that has been separated from a primary chain of command for purposes of specialization to produce economy and effectiveness of operation. Figures 6 and 7 show charts of line and staff organizations.

The key to distinguishing between line and staff is not the function itself, but rather the degree to which the function contributes directly to the accomplishment of organizational objectives for a specific company. For example, in most manufacturing firms, production or manufacturing, sales or marketing, and finance are regarded as line functions, while personnel, research and development, and other functions are usually classified as staff.

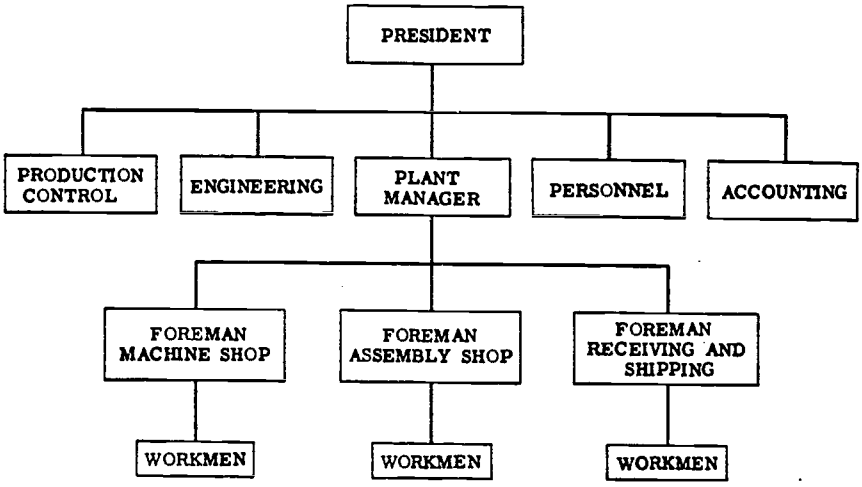


Figure 6. A Simple Line and Staff Organization. (From George, 1970)

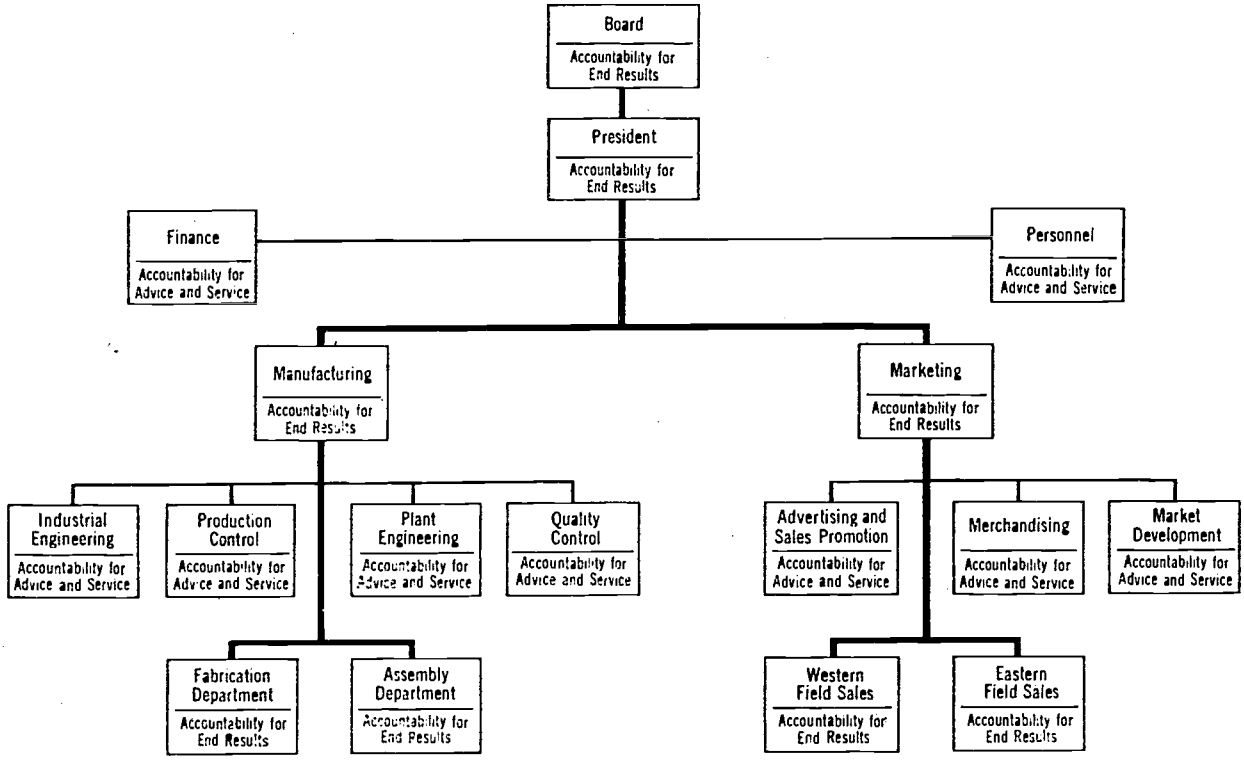


Figure 7. A Line and Staff Chart. (The heavy line indicates line authority.) (From Carzo and Yanouzas, 1968)

It should be noted that the same person or position may have both line and staff authority. For example, the personnel director has line authority over the employees in the personnel department and exercises staff authority when furnishing advice to other departments.

In addition, the same function may either be line or staff, depending on the type of business. In a manufacturing firm, production and marketing are line functions, while in a retailing organization, buying and selling are considered line functions. In a private personnel placement agency, the personnel function is a line function.

In conclusion, if a function is directly related to the customer of the organization or is related to the main objectives of the industry, it is usually regarded as a line function.

A greater use of staff authority in industry and the business world has led to a growth in conflicts between line and staff executives. No area of management has caused more friction and loss of time and effectiveness. Many times, the line-staff relationship is a reflection of the personal strengths and weaknesses of the people involved.

In summarizing the characteristics of the line-staff relationship, the following can be said:

1. Line functions are accountable for accomplishing the basic objectives on the enterprise and must be delegated authority for final decisions in the attainment of end results.

2. Staff functions are created for the purpose of providing advice and service to the line and other staff units in performing specialized work. Both line and staff are delegated authority to carry out their responsibilities and make decisions. However, the authority and decisions differ as to the kind and degree. Staff authority is advisory and service-oriented.

3. Staff should offer its advice and services when and where it believes it is needed. It is not necessary for staff to wait for action. It should keep itself informed about the problems confronting the organization, make plans, and help the line solve difficult operating problems.

4. Line should give serious consideration to the advice and services offered by staff functions. Staff should be used when it possesses more information than is available to line. When there is doubt, the sole criterion for acceptance of advice should be whether it is in the company's best interest to do so.

5. Line managers have the authority to accept, reject, or modify the advice or services offered by staff. The only exception is in those cases where management, as a company policy, has decided that specified staff advice or services will be used by all company units.

Functional authority. Another type of authority which is mentioned in the literature is functional authority. Functional authority gives a manager power over specified processes, practices, or matters relating to activities undertaken by personnel within or outside his or her department. A line manager may be given limited authority and a manager in another department may be delegated specialized or functional authority to carry out certain activities.

Thus, functional authority is similar to staff authority but it gives the right to command in matters pertaining to its function. This type of authority is not restricted to managers of a particular type of department. Functional authority may be exercised by line or staff managers, although the latter are delegated it more due to their specialized responsibilities.

Departments can also have functional authority. For example, if a product research department is given functional authority, then other departments would be required to follow its orders with respect to meeting consumer product preferences.

Project Organization and Management

The two group processes in the Maryland Plan are the group project and line production. Whereas the line production deals with mass production, the group project is concerned with industrial projects or one-time manufacturing activities.

In recent years, much attention has been given to project management. In large firms which undertake large, long-range, one-time projects, such as prototypes of aircrafts, building construction, or areas of new product development, project managers are designated to see the projects to completion. The project management type of organization needs quicker response and a more unified approach to achieving the project's objectives than the conventional organization. In the conventional organization structure, the successful completion of the manufacturing objectives is fragmented throughout the company's general management, manufacturing, engineering, and other functional areas. Within the project management concept, the responsibility and accountability of successful project completion rest primarily with the project manager.

Usually, the project manager and his staff are selected from the functional departments within the company's organization. After successful completion of the project, the members are reassigned to their departments or continue as a new product group.

Figure 8 shows one type of project management where a central group provides a source of staff assistance, control, and overall coordination. Project managers have full authority over their project's functional activities, such as design, manufacturing, and personnel.

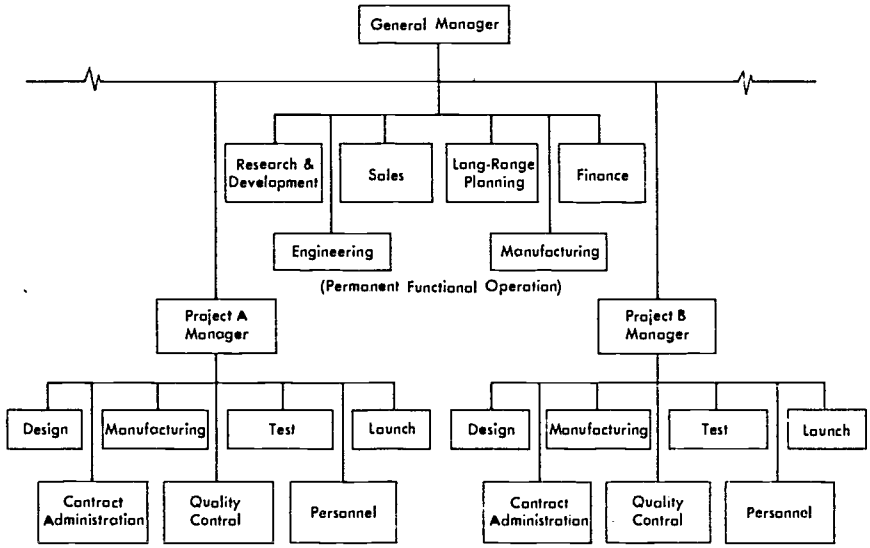


Figure 8. Pure Project Management, Showing Full Authority of Project Manager. (From Steiner and Ryan, 1968)

A matrix type of organization, shown in Figure 9, can be used with projects. The functional activities are departmentalized with the functional managers retaining their line authority over their people who are assigned to the project.

The last type of project organizational design is called the "influence" organization, illustrated in Figure 10. The project manager acts as a staff person to the general manager who supervises the functional group. The project manager monitors the activities of the project, exerting control through persuasion and influence.

Although these types of organizational structures may not work in a classroom situation due to the number of students in class and other variables, it would be valuable for the teacher to communicate the concepts to the class.

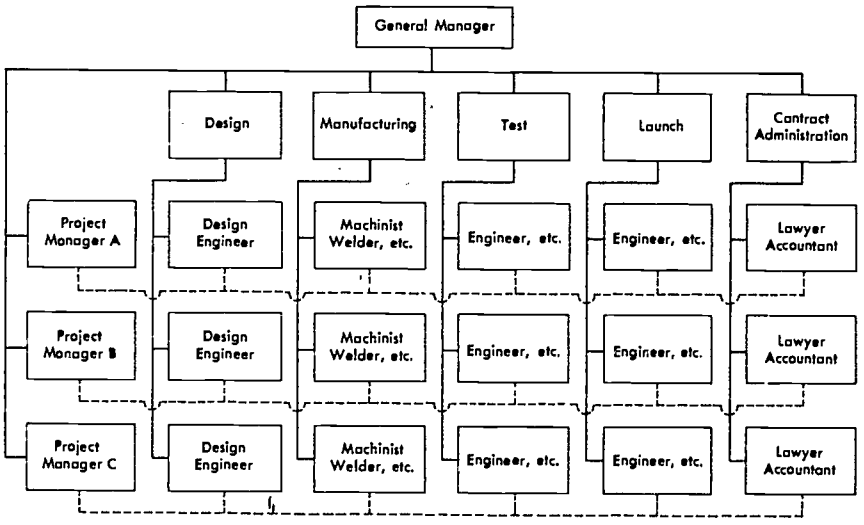


Figure 9. Matrix Organization in Project Management, Showing Shared Authority. (From Steiner and Ryan, 1968)

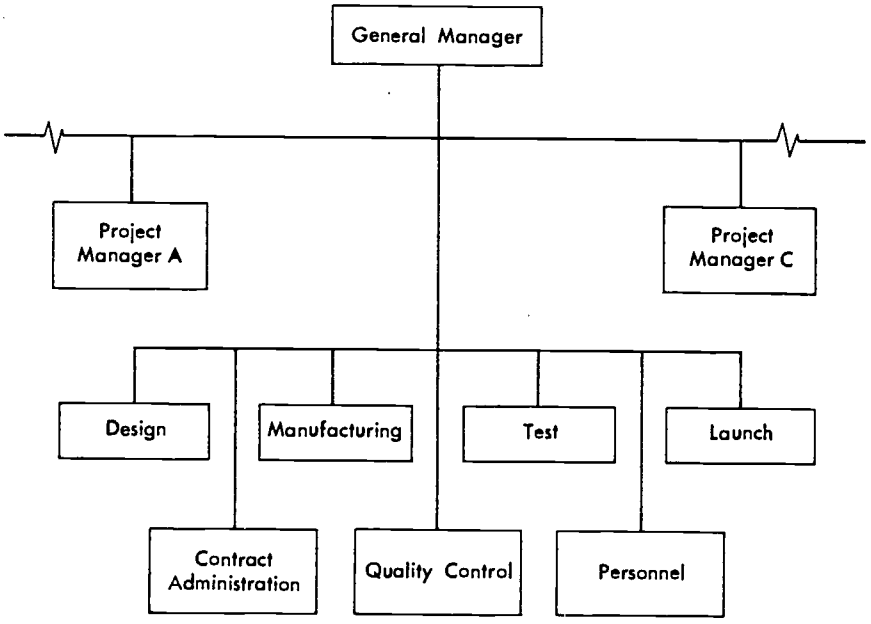


Figure 10. Influence Organization in Project Management, Showing Monitoring Authority. (From Steiner and Ryan, 1968)

Constructing Organization Charts

There are a variety of techniques available in constructing an organization chart. Since in large industrial organizations there is usually a rapid change in organizational structure and personnel, photographic layouts, flannel boards, removable position blocks, and other flexible methods are widely used. However, paper is still the most widely used media.

In constructing a chart, after the decisions have been made as to the structure, it must be determined what information is to appear on the chart. Drawing variations and practices vary considerably as to the nature and amount of information to be included. The following suggestions have been proposed for constructing a vertical organization chart:

1. Identify the chart fully by stating the name of the company, the date of preparation, and the title and name of the person or department responsible for preparation. If the chart is for one unit or department, include such information as part of the title. An approval signature may be necessary from a chief executive.

2. Use rectangular boxes to show either an organizational unit, division or a person. Committees and plural executives should occupy one box.

3. The vertical placement of the boxes shows relative positions in the organizational hierarchy. Due to space limitations, line units may be located below staff units.

4. Any given horizontal row of boxes should be of the same size and include only those positions having the same organizational rank.

5. Vertical and horizontal solid lines are used to show the flow of line authority.

6. Dotted or broken lines may be used to show functional or staff authority. (Some proponents advocate the avoidance of dotted lines because they make the chart more difficult to interpret.)

7. Lines of authority enter at the top center of a box and leave at the bottom center; they do not run through the box.

8. The position's title should be placed in each box. The title should be descriptive and show function.

9. Include the name of the person currently holding the

position unless personnel turnover is so great that rapid revisions would be necessary. Many companies include the name of only the top executives since there is less of a turnover in these positions.

10. When preparing a separate unit or department chart, include the superior to whom the unit reports.

11. Include a legend to explain special characteristics.

12. Keep the chart as simple as possible.

Examples of Organization Charts

The remainder of this section is devoted to different company organization charts which can be used as reference in constructing your class's organization chart.

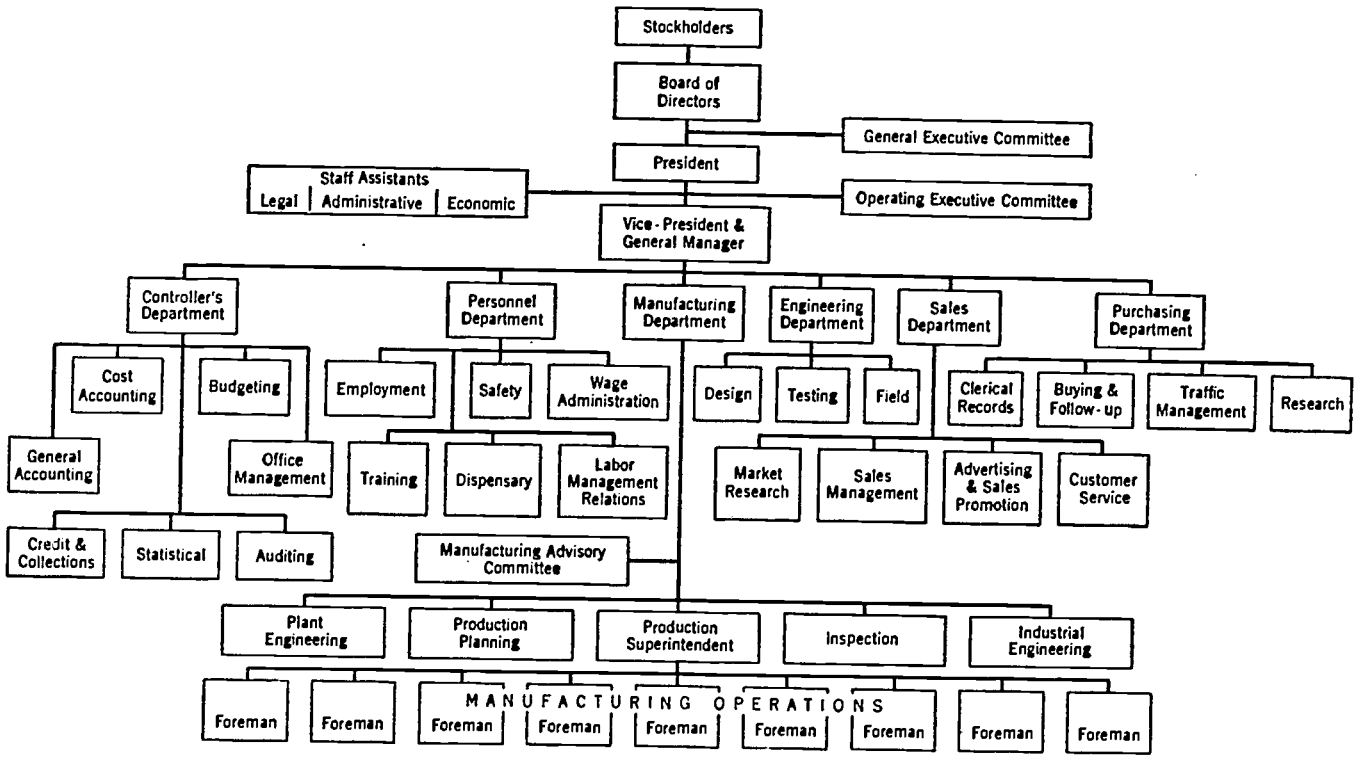


Figure 11. Organization Chart of a Manufacturing Firm. (From Anderson, 1960)

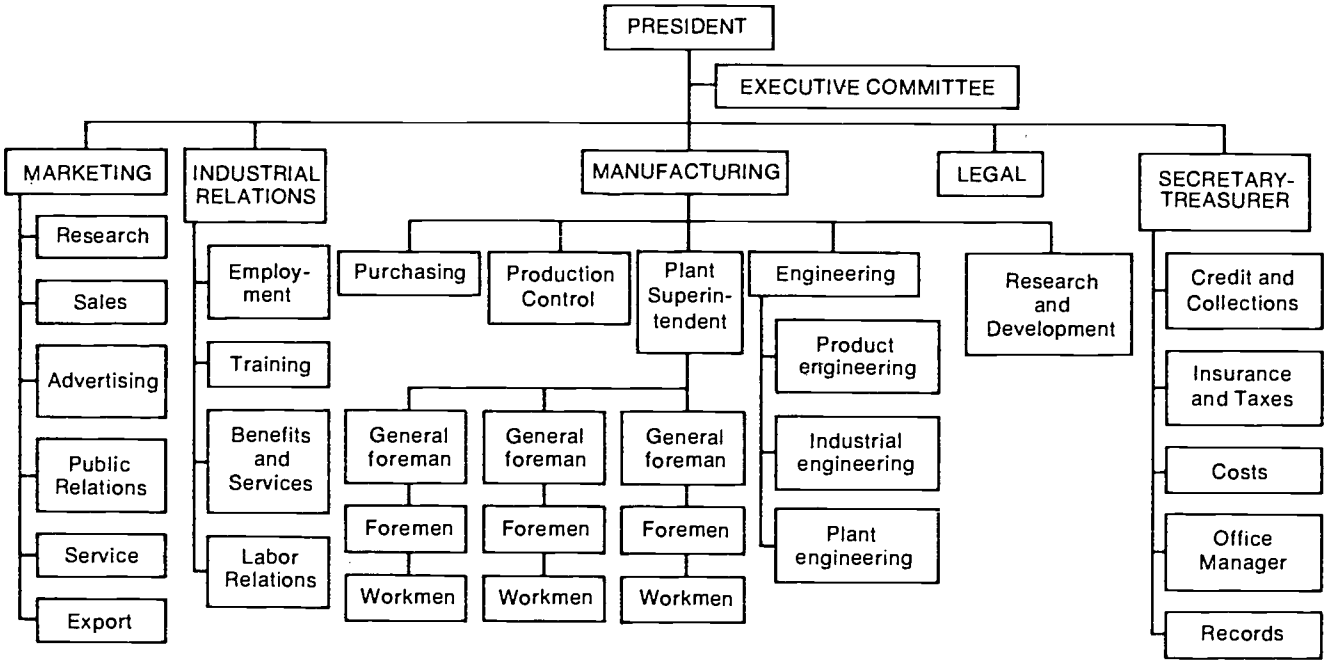


Figure 12. Typical Organization Chart of a Medium-size Manufacturing Company. (From Amrine, Ritchey, and Hulley, 1966)

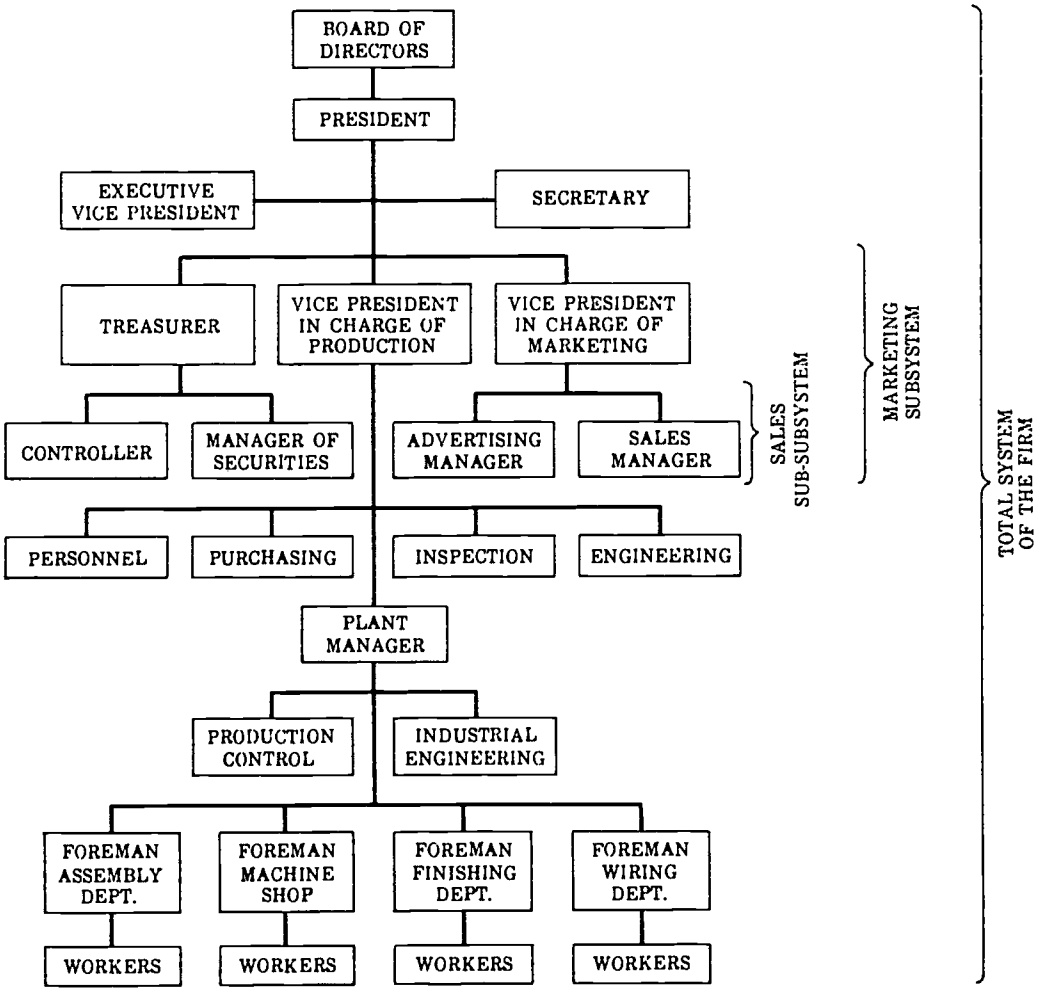


Figure 13. Organization Chart showing Typical Line and Staff Relationships. (From George, 1970)

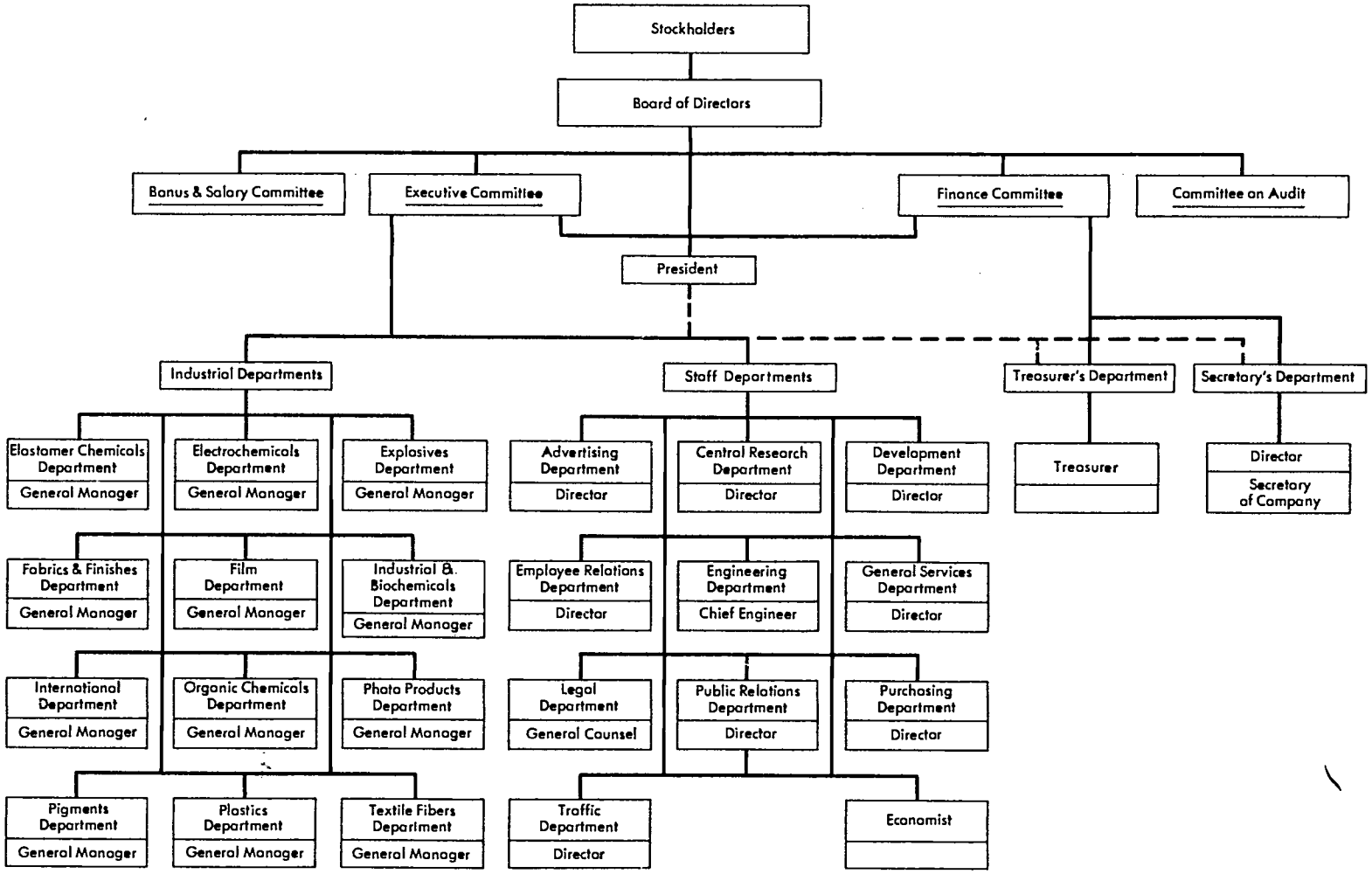


Figure 14. Committee Structure of E. I. du Pont de Nemours & Company. (From White, 1963)

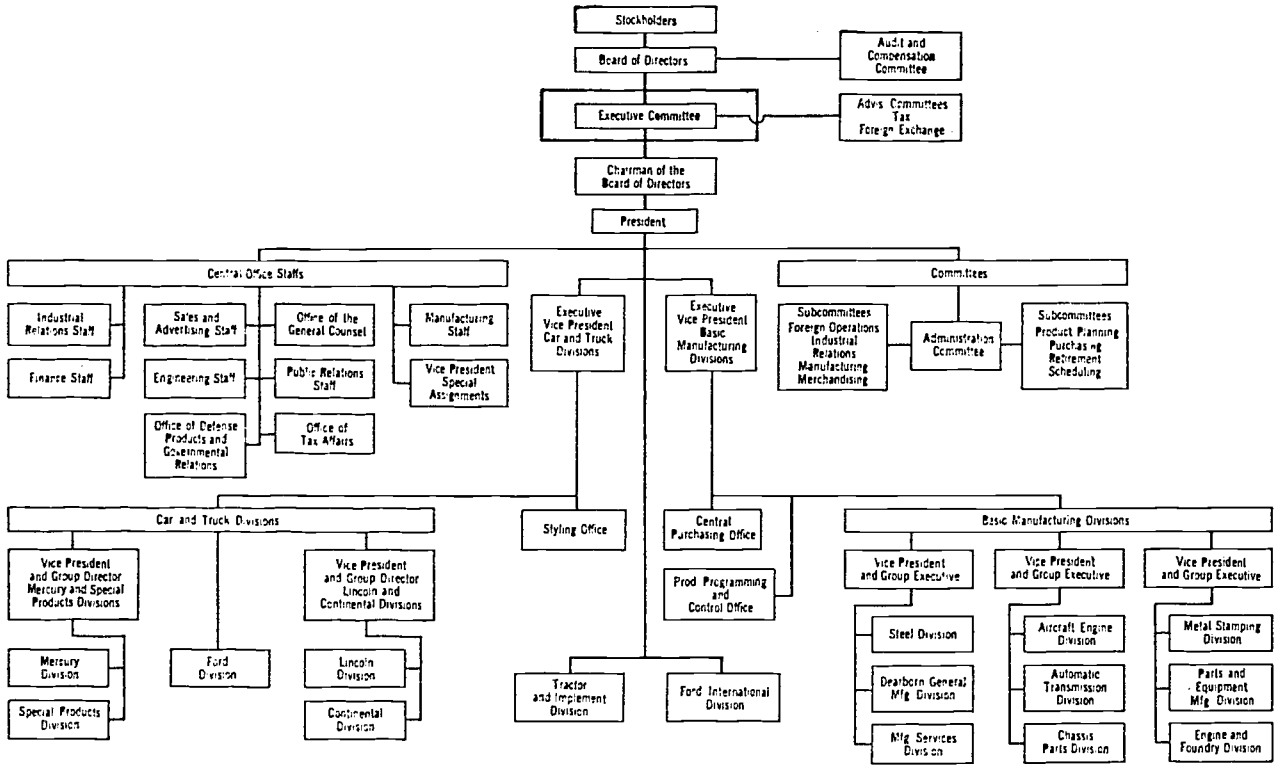


Figure 15. Ford Motor Company. (Courtesy of Ford)

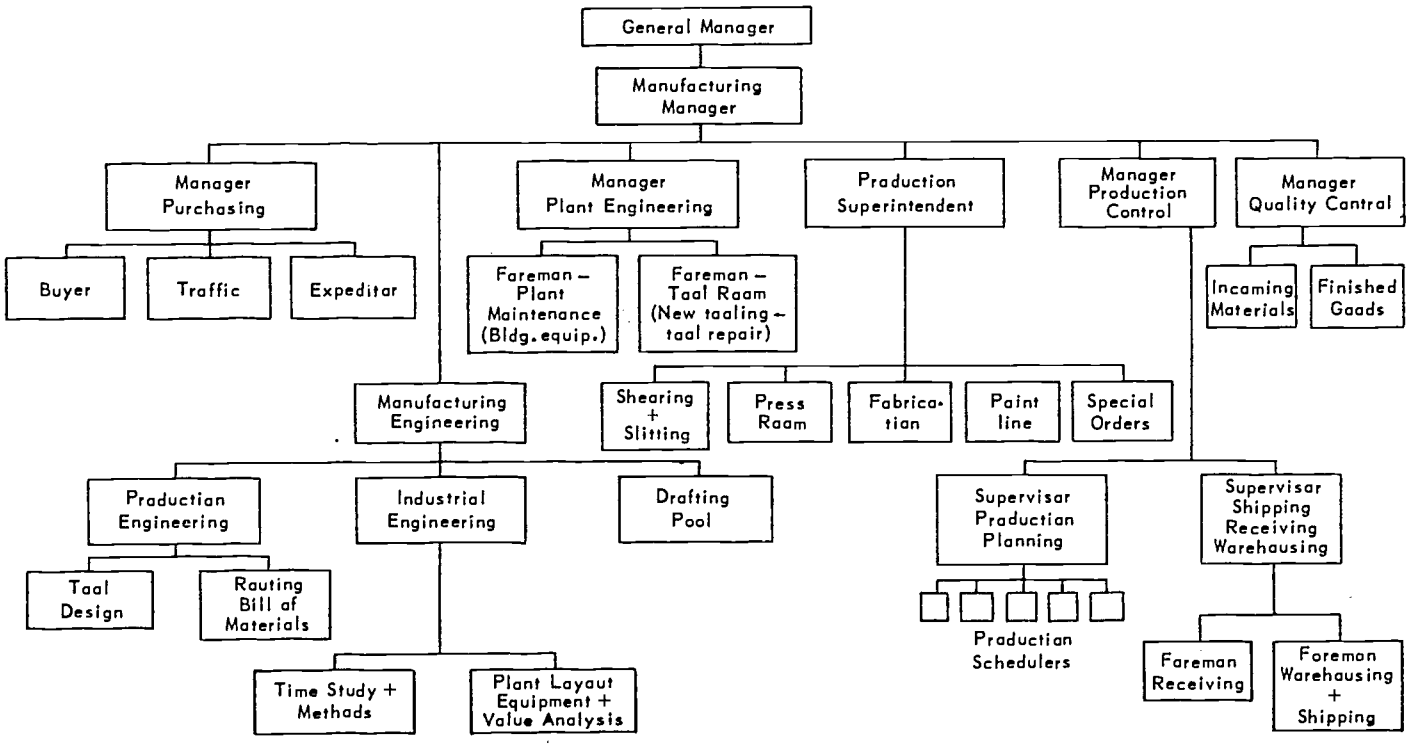


Figure 16. Manufacturing Organization Chart. (From Moore, 1970)

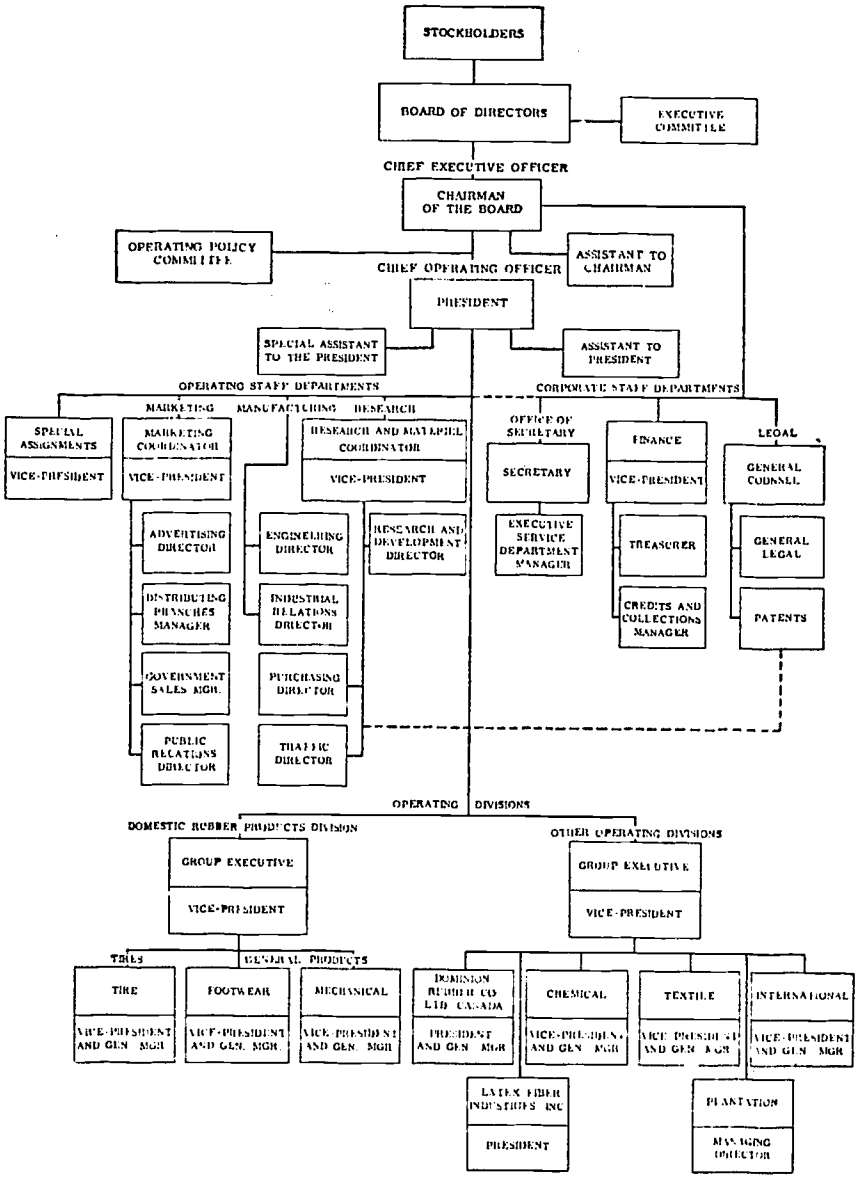
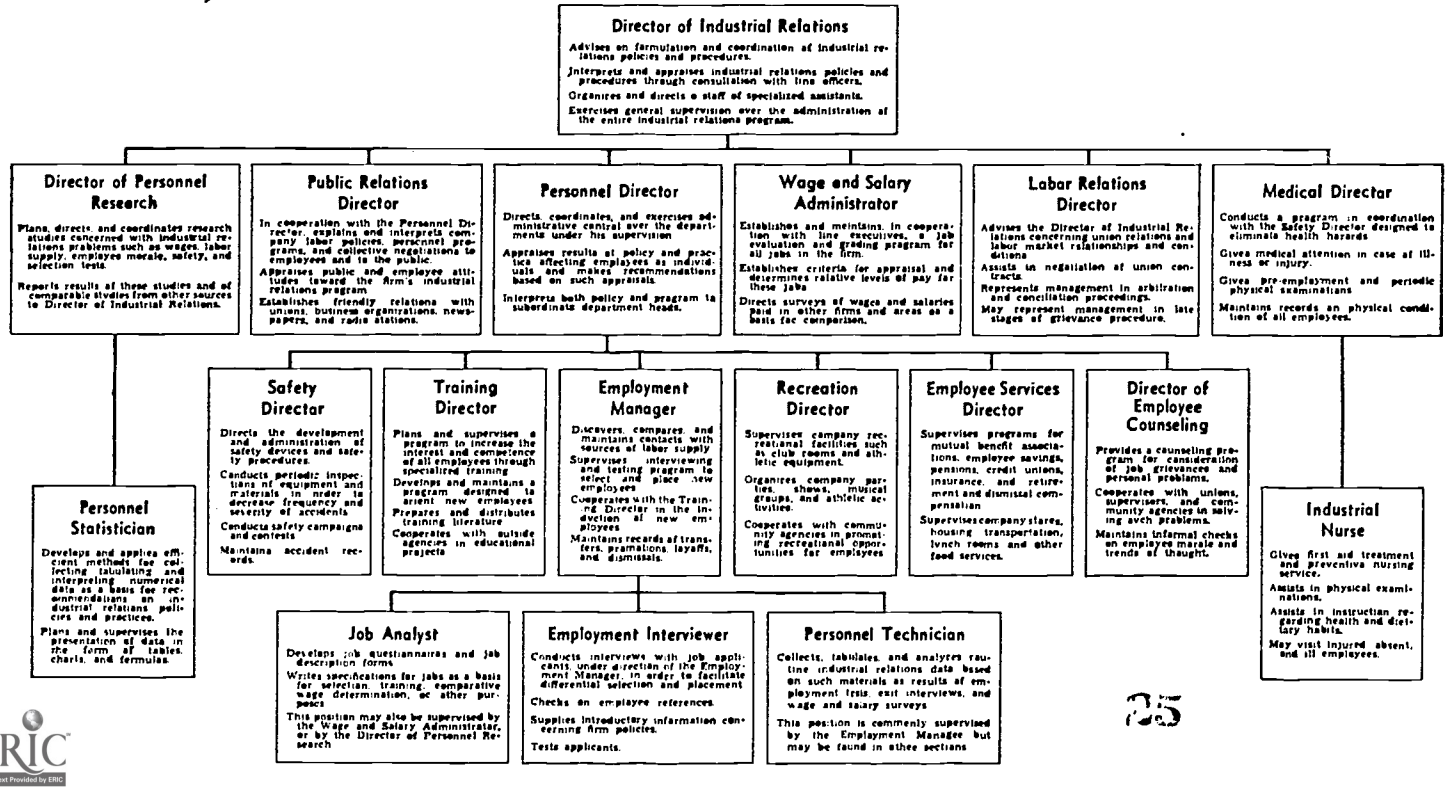


Figure 17. (right) Organization Chart of the U.S. Rubber Company. (From U.S. Rubber Co., 1968)

Figure 18. (below) Industrial Relations Organization Chart. (From Amrine, Ritchey, and Hulley, 1966)



JOB DESCRIPTIONS

In addition to the organization chart, job descriptions are needed to define the various positions in a company. A job description is a written statement of a position's purpose, duties, responsibilities, and working conditions.

Job descriptions are important in the Maryland Plan because role playing is one of the primary learning experiences in the group processes. In addition to being a worker in the production department, each student carries out the responsibilities and functions of a position in the organization and communicates that position's aspects to the rest of the class. The resourcefulness and ingenuity of each student is reflected in this activity.

The following section contains background information and examples of job descriptions.

Job Description Format

Job descriptions vary from company to company, but there are basically five parts to a description. First is the job title which should be descriptive of the position. It should reflect the job's duties and responsibilities accurately. The second element is a short description which explains the purpose and scope of the job. Third, the responsibilities and tasks are stated. The kind of work and how it is done, where the position fits into the organization, and the degree of freedom should be indicated. The fourth element is the nature and degree of relationships between the position with others within the organization and those outside the organization which the employee will deal with. This section would include the position's immediate supervisor. The final part is a quantitative overview, including such things as the number and type of employees supervised, what production volume is involved, how many plants are affected, and so on. Other facets such as working conditions, date of preparation and revisions of the description, and approval signatures are usually part of a description.

There is a distinction between a job description and a job specification. While a job description is a document of the duties, responsibilities, and working conditions of a job, a job specification pertains to the worker trait requirements and personal qualifications, such as education, experience, skills, and other criteria needed for successful job performance. These two documents are usually combined into one, but may be separate depending on company policy.

Whether a job description goes into minute detail or merely sketches the major duties of the job depends upon the uses to which it will be put. If the purpose is to define the major positions in an organization and show their relationship, the description may be relatively brief. If the purpose is for training, the description may be very detailed.

Job descriptions can be used for several reasons: (1) to assist in the establishment of organizational relationships; (2) to orient and educate new employees; (3) as standards for control; and (4) for personnel activities such as screening, training, merit pay, and job evaluation. If the job description is used for evaluative purposes, it may have to be approved by a management-union committee as to what duties and responsibilities constitute a particular job.

Below is a job description format form, followed by a sample job description.

JOB DESCRIPTION

Department	Standard Code .....
Subdivision	Standard Title .....
Branch of Plant	Plant Title .....
Date	Plant Code .....

Summary of Duties

Detailed Statement of Work Performed

Source of Supervision

Tools and Equipment

Materials

Responsibility (For safety of others, company funds or property, for performance of work without supervision, etc.)

Qualifications Required:

Special Knowledge:

Previous Experience:

Physical:

Working Conditions:

Surroundings:

Hazards:

Relation to Other Jobs

Promotion from:

Promotion to:

BLACK & DECKER MANUFACTURING COMPANY

BENCH-MARK JOB

POSITION TITLE: Director of Product Development

POSITION NUMBER: 20

OTHER TYPICAL TITLES: Chief Engineer

PRIMARY PURPOSE OF JOB (Why the Company has this job):

To manage the engineering design and development of new and revised products and product lines which will meet or exceed established divisional growth goals. Such products are to be within performance, quality, cost and time specifications which the Director of Product Development helps to determine. In addition, provide for engineering maintenance redesign and cost reduction for the division's product lines to equal or better the product offerings of current or potential competitors.

RESPONSIBILITIES (Major responsibilities for which incumbent is held accountable):

1. Participate in formulation of corporate and divisional policies. Takes a leading role in formulating policy as related to product content and to engineering department activities. Interprets policy and procedures for subordinates and associates to help them determine proper courses of action.
2. Establishes and maintains an effective and economical organizational structure to accomplish the overall engineering task of his division.
3. Staffs, trains, and motivates a mix of technically talented people to fill the requirements of his organization plan. Within corporate guidelines, administers wage and salary plans, work planning and review plans, personnel training and development plans.
4. In cooperation with Marketing and Manufacturing personnel, establishes cost, schedule and technical goals for product development projects. Approves plans for reaching project goals and reviews progress to insure plans are met.
5. Approves expense and capital equipment budgets and performance for his area of responsibility, within limits established by corporate direction.
6. Establishes and maintains effective relationships with functional heads of Marketing, Manufacturing, Finance, Personnel, etc., for planning and providing a dominant competitive posture regarding the products of his division.
7. Provides an engineering organization which excels in current technologies affecting the division's products. Monitors technical investigations within industry which have potential significance for the Company, and brings new technology to use at the proper time.

REPORTS TO: Vice President - Operations

DIRECTS WORK OF (Representative positions directly supervised):

Product Development Managers, Senior Project Engineers, and Plant Resident Engineers

POSITION TITLE: Director of Product Development

POSITION NUMBER: 20

KNOWLEDGE AND SKILLS REQUIRED (What the incumbent must know to function in his job: education, specialized technical knowledge and skills, managerial skills, skills of negotiation and persuasion):

Education: BS in Engineering (minimum). Formal or informal training in business management and industrial psychology.

Experience: Ten years varied experience in design and manufacture of related products. At least five years in management of complex engineering programs involving multiple projects.

Skills: Ability to relate technical planning and progress with the requirements for running a competitive business. Ability to interpret and contribute to the advance of a highly inter-related marketing, manufacturing, engineering complex. Ability to motivate a large staff of technical people to achieve demanding goals.

USE OF KNOWLEDGE AND SKILLS (Decision making – extent to which individual can commit Company OR problem solving – creative thinking, decision influencing, etc., which focus on difficulty of mental application):

Decision making: Can commit entire division to a given technical direction. Decisions affect entire product line over many years of production. Instrumental in establishing and maintaining product line function and costs, and hence, corporate profitability over a very long time period.

Problem solving: Must analyze and reach decisions within a complex technical administrative situation. Must make trade-offs between conflicting top-level objectives so as to arrive at best overall solution for Company.

SCOPE AND IMPACT OF THE POSITION (Consider number and level of people supervised, annual budgets, sales volume, markets-business development, control of financial resources, goods purchased, etc.):

Human resources: Directs, develops, and evaluates 3 to 5 engineering managers. Indirectly supervises 30 to 60 engineers, designers, and draftsmen.

Budget: Directly controls expenditures of up to $1,000,000. Work output influences $60 to $100 million in sales.

Overall impact: Directly influences corporate success in meeting overall growth objectives through provision of superior products and cost positions.

Maryland Plan Job Descriptions

The role playing activities that the students carry on in the Maryland Plan are similar to those in an industrial manufacturing firm. The following job descriptions, which were taken from ones already developed by the staff at the Earle B. Wood Junior High School, are presented to help facilitate the teacher.

These descriptions can be used in several ways by the teacher, depending on the type of students, size of the class, time allocation of the course, and other variables. First of all, the teacher can used them as a guide and evaluative aid. For below-average students or when time is a factor, the descriptions may be made available to students as reference. Most students, however, should be able to use their resourcefulness to find their position's responsibilities, functions, and activities in other ways.

The teacher may even require each student to write-up his or her position's job description which then could be placed in the Personnel Director's file or booklet. Another method is to have the Personnel Director write job descriptions of the major management positions.

Although the group project and line production have slightly different organizational structures, only one set of job descriptions are presented in this resource guide. With a few modifications, the descriptions can be used for both group processes.

The teacher is encouraged to add to and modify these job descriptions to meet the local needs and situation. The teacher should be cognizant of the fact that different companies use different job titles for the same job functions and responsibilities. For example, in one company the person in charge of plant maintenance may be called the Plant Engineer, whereas in another company, the same responsibilities may be done by the Plant Maintenance Director.

Another point of information is that different companies use different title ranking systems. For example, the 3M Company uses the following system: vice president, executive director, director, manager, and supervisor. The teacher should advise the class of this and the class should devise a system based on their company's structure.

The following job descriptions can be easily combined (Design Engineer and Research and Development Director) or expanded (Marketing Director into a Sales Director and Advertising Director), depending on the class size and company's structure.

TITLE: PLANT MANAGER

PRIMARY PURPOSE OF JOB: The Plant Manager is responsible for scheduling, supervising, and coordinating all company activities, including those of manufacturing, packaging, plant facilities and equipment operation, engineering, maintenance, plant and process design, technical service, warehousing, and marketing.

RESPONSIBILITIES:

1. Formulate, or receive and recommend for approval, proposals for policies on manufacturing, packaging, plant facilities, engineering, maintenance, and all other company activities. Administer such policies when approved by the Board of Directors.

2. Develop a master schedule or calendar of events, including such activities as:

   A. Full staff meetings related to the progress and/or problems of production.
   B. Selected department meetings related to the progress and/or problems of production.
   C. Special programs and educational presentations.
   D. Construction activities of the product.
   E. Pilot and final production runs.

3. Determine projected deadlines for various stages of the production cycle, including such aspects as:

   A. Product Design
   B. Prototype Model
   C. Purchasing of all Materials
   D. Sale of Stock
   E. Production Steps
   F. Market Research
   G. Jigs and Fixture Design
   H. Plant Layout
   I. Production Flow
   J. Pilot Production Run
   K. Final Production Run
   L. Advertising
   M. Product Sales

4. Supervise and coordinate all departments. Keep informed about the progress and problems in each department. Progress report forms and written progress reports from each department may be necessary.

5. Schedule and preside over staff meetings.

6. Develop methods and procedures for evaluating each department's performance.

7. Interpret and explain the purposes and plans of the Board of Directors to managers and employees of the company, and the public at large, as appropriate.

8. Ensure that operating units of the company receive adequate advice and service from the staff units, and promote cooperative effort between line and staff at all levels.

9. Report the progress of the company to the Board of Directors, as required.

10. Represent the company and promote good relations with customers, employees, stockholders, governmental agencies, suppliers, and the general public.

11. Sign, execute, and deliver in the name of the corporation such bonds, mortgages, deeds, contracts, and other instruments authorized by the bylaws of the company.

12. Develop forms and records that will be useful in carrying out the responsibilities of the Plant Manager.

OTHER TYPICAL TITLES:

President (in small companies)
General Manager
Project Director (for the group project)

TITLE: PERSONNEL DIRECTOR

PRIMARY PURPOSE OF JOB: The Personnel Director is responsible for organizing and coordinating internal employee relations policies, including: recruiting, hiring, and placing workers; labor relations; wage and salary administration; safety and health; benefits; and employee services.

RESPONSIBILITIES:

1. Develop a list of the management positions identified in class and write the names of each class member next to their position. Duplicate this list, distribute it to each class member, and post a copy on the company bulletin board.

2. Develop a personnel organization chart to show line and staff responsibilities.
   A. Develop a chart on 8 1/2 x 11 paper, duplicate it and distribute it to each class member.
   B. Construct a large chart for display in the room.

3. Record class attendance each day and shift appropriate personnel as needed to cover important areas or jobs.

4. Develop a list of needed production jobs from the production operations identified by the production engineering department.

5. Develop procedures for the hiring and placement of all workers needed on the production line.

6. Develop a system for recording the hours worked by employees. Consider the following:
   A. Time card
   B. Time card collecting box
   C. Time card rack
   D. Time card punch-in / punch-out device

7. Develop a program that will promote good relations between management and labor (workers).
   A. Employee suggestion system (suggestion box)
   B. Employee awards
   C. Company newspapers (consult with Public Relations Director)
   D. Others

8. Maintain employee records and reports.

9. Represent management on labor-management committee and grievance procedures.

10. Investigate employment complaints.

11. Write job description for each company position.

12. Distribute identification (badges, cards) to employees.

13. Organize recreational/social programs.

14. Work with Education and Training Director in developing the overall education program.

15. Exercise general supervision over all company benefits, programs and services.

16. Responsible for company health and safety programs.

17. Develop other forms and records that will be useful in carrying out the responsibilities of Personnel Director.

18. Oversee the departments under the personnel department on the personnel organization chart. Keep informed of the activities and progress of these departments.

19. Direct and maintain various activities designed to promote and maintain a high level of employee morale.

20. Formulate, recommend for approval, and administer wage and salary administration objectives, policy and procedures; evaluate and report results.

OTHER TYPICAL TITLES:

Employment Manager
Industrial Relations Director
Labor Relations Director

TITLE: EDUCATION AND TRAINING DIRECTOR

PRIMARY PURPOSE OF JOB: The Education and Training Director is responsible for developing and organizing a comprehensive program of education and in-plant training; for scheduling, conducting, and presiding over educational seminars and training sessions; and for establishing an effective evaluation system of all reports and presentations.

RESPONSIBILITIES:

1. Develop an educational program, along with the teacher and the Plant Manager, so that the class may learn about industry. List some interesting topics which would deal with the following concepts:
   A. Mass Production
   B. Automation and Cybernetics
   C. Labor-Management Relations
   D. Finance
   E. Industry-Government Relations
   F. The Market Economy
   G. Production Planning and Control
   H. Marketing
   I. Accounting

   Assign the topics to various members of the class to report on as part of the educational program. Other reports that should be assigned are the reports about the various occupations in the company organization.

2. Develop an educational seminar program or calendar with the head of the company.

3. Serve as the chairman of the educational program seminars.

4. Locate and preview possible educational films. Order and schedule these films for showing at various periods throughout the program. The Education and Training Director may wish to consult with other members and use their assistance in presenting films where topics relate to their departmental functions. Topics to consider include:
   A. History of Manufacturing
   B. Industrial Revolution
   C. Mass Production
   D. Automation
   E. Labor Unions
   F. Labor-Management Relations
   G. Advertising and Marketing
   H. Accounting and Finance

I. Stocks and Bonds
J. Product Design
K. Research and Development
L. Production Planning
M. Quality Control
N. Industrial Packaging
O. Others

5. Arrange for field trips to relevant industries or businesses.

6. Arrange for guest speakers from industry to make a presentation relating to their job in industry. The speaker could be the father of a student employee who would be able to speak to the class.

7. Help the members of the class who may ask for assistance in finding information about their report topics.

8. Research the most efficient and effective training technologies and equipment to attain learning objectives of a training program.

9. Develop and carry out a training program for the company workers on the various machines and jigs and fixtures. The Personnel Director should be consulted to insure all workers are adequately trained.

10. Develop an appropriate system for effectively evaluating the following kinds of educational activities:
    A. Written reports
    B. Class presentations
    C. Jigs and fixtures seminar critique
    D. Training programs

11. Work with the Safety Director to establish any educational needs in that area.

12. Develop the necessary forms and records that will be useful in carrying out the responsibilities of the Education and Training Director.

OTHER TYPICAL TITLES:

Education Officer
Manpower Development and Training Manager
Training Director

TITLE: PUBLIC RELATIONS DIRECTOR

PRIMARY PURPOSE OF JOB: The Public Relations Director is in charge of communicating effectively with all of the company's publics: class, student body, faculty, stockholders, parents, and community. This person should develop the company's image as: (1) a responsible industry leader and good corporate citizen; (2) a manufacturer of reliable best-value products; (3) a sound stock investment; and (4) any other characteristics favorable to the company's prestige and growth.

RESPONSIBILITIES

1. Determine a company name, logo, and slogan.
   A. The entire class should be requested to offer suggestions.
   B. Suggestions should relate to the selected product.
   C. Name, slogan, and logo must be selected immediately following company formation and product selection.
   D. Company name should be placed on all company memos, directives, letters, drawings, posters, charts, bulletin boards, and other company property. Make rubber stamps, tags, and/or labels that are printed, stenciled, and/or lettered.

2. Develop a public relations bulletin board.
   A. Bulletin board should contain company name.
   B. Bulletin board should be divided into appropriate divisions to include memos and directives from various departments: personnel, design, safety, production engineering, advertising, education and training, etc.

3. Develop a well-organized vertical file of all materials (department directives, letters, plans, production flow charts, union cards, procurement forms, etc.) that are duplicated for distribution.

4. Develop one or more of the following written publications describing the company function, company personnel, product to be manufactured, and other related activities of the class.
   A. Write an article or press release for the company newspaper, school newspaper, and/or other local newspapers.
   B. Design and develop an attractive brochure or company booklet.

C. Publish company newsletters to be issued periodically describing company operations and employee activities. (Consult with Personnel Director.)
D. Assist the Finance Director in preparing stock reports and concluding financial statements (annual report) for distribution to stockholders.

5. Act as host to all guests visiting the company.
A. Invite the principal, assistant principals, counselors, librarians, teachers, school secretaries, parents, etc. to view class activities.
B. Introduce yourself to all guests that may visit the industrial arts department and explain the company activities of the class.
C. Distribute to all guests copies of such public relations materials as brochures, company newsletters, newspaper articles, buttons, company cards, etc.

6. Consider the following public relations activities:
A. Construct signs and posters publicizing the company.
B. Make buttons or identification cards for company employees to wear.
C. Make personalized company cards that entitle employees to certain privileges.
D. Take photographs of various company activities to be placed on bulletin boards and to be used for other publicity.
E. Assist Marketing Director with developing displays and exhibits of company activities (product model, etc.) to be placed in the library and/or school showcases.
F. Make book markers, note pads, or other devices containing company name, logo, and/or slogan to be distributed in such places as the library, central office, other classes, etc. for publicity purposes.
G. Plan a company "open house" (during the final production run) and invite different administrators, counselors, teachers, librarians, librarian aids, parents, etc. to view the class activity.
H. Write a company newsletter.
I. Make film to convey the company's image.

OTHER TYPICAL TITLES:

Communications Director
Public Affairs Director

TITLE: SAFETY DIRECTOR

PRIMARY PURPOSE OF JOB: The Safety Director is responsible for inspecting protective qualities of plant equipment and employee clothing; for appraising potential health hazards and accident problems; for communicating information on accident prevention and safety standards; and for promoting attitudes of safety performance within all areas of the company.

RESPONSIBILITIES:

1. Administer accident prevention programs and assist in the control of occupational and health hazards.

2. Establish and maintain safety standards, correlating various accident prevention programs with national standards, including Workmen's Compensation Laws and the Occupational Safety and Health Act (OSHA).

3. Conduct regular safety inspections, investigate accidents and initiate corrective steps where needed.

4. Advise and assist all supervisory levels on safety techniques directly and through safety committee activities.

5. Assure use of specified protective equipment and devices.

6. Develop safety instructions and regulations regarding employee use of tools, machines, and equipment in the company plant. Consider developing:
   A. Safety instruction sheets to be distributed and explained to all employees (safety handbook, etc.)
   B. Charts and posters to be displayed in appropriate areas of the room.
   C. Safety slogans.

7. Design and develop a suitable company accident reporting form.

8. Keep an accurate record in the safety department's file of all employee accidents.

9. Develop a company policy that provides benefits to employees for accidents occuring during company time.

10. Create a safety award for those with the best accident-free record in the company and present these awards periodically.

A. Safety award certificate.
B. Other types of prizes, etc.

11. Construct a safety chart that records the number of accident-free work days.

12. Conduct educational programs and assist in accident prevention training programs. Collect various types of safety equipment and protective clothing - goggles, hard hats, gloves, shoes, etc. - and make an educational display of these items in the classroom.

13. Design and develop necessary forms and records that will be useful in carrying out the responsibilities of the Safety Director.

OTHER TYPICAL TITLES:

Health and Safety Engineer

TITLE: FINANCE DIRECTOR

PRIMARY PURPOSE OF JOB: The Finance Director is responsible for coordinating and supervising all company finance; for making complete and accurate records of all financial transactions; and for preparing and issuing financial statements. This person administers approved policies and procedures pertaining to accounting, auditing, budgets, inventory and stock control, payroll, and tax activities.

RESPONSIBILITIES:

1. Develop a certification of incorporation for the company.

2. Write and present to the class a report on the topic of stocks and bonds.

3. Design a stock and/or bond certificate.

4. Develop procedures for issuing and redeeming stocks and/or bonds.
   - A. Submit to the Marketing Director information about the location, date, and price of the stock so that appropriate advertising can be developed.
   - B. Form a committee to conduct the selling of stock. Consult the Personnel Director.
   - C. Record all stock transactions.

5. Establish and administer a method of accounting and cost control throughout the company.

6. Obtain from appropriate departments tentative budget requests for various direct costs such as materials and labor, and indirect costs such as plant overhead, marketing, and maintenance.

7. Prepare a budget forecast. This information will assist in determining the total production cost and the amount of capital needed to cover anticipated expenses.

8. Maintain records on accounts receivable or credits (money taken in or collected from each department) and accounts payable or debits (money paid out).

9. Prepare, analyze, and interpret financial data for management.

10. Develop a bank checking account and deposit system.

11. Audit and tally weekly time cards for correctness in hours, vacation time, absences, sickness, and other information.

12. Distribute payroll to all personnel, and check and answer all inquiries received from personnel concerning payroll.

13. Supervise maintenance of procedures relating to customer claims and adjustments.

14. Provide for systematic collection and follow-up of all delinquent accounts.

15. Conduct all tax activities of the company.

16. Work closely with the Procurement Director and Inventory Control Director in maintaining inventory and stock control records.

17. Along with management, determine the cost of the product and the profit to be returned to the stockholders.

18. Prepare and issue a concluding financial statement or annual report.

19. Direct the liquidation of all company assets and profits after the line production has been completed.

20. Develop all forms and records that will be useful in carrying out the responsibilities of the Finance Director.

OTHER TYPICAL TITLES:

Accounting Supervisor
Comptroller
Controller
Credits and Collections Manager
General Credit Manager
Treasurer

TITLE: PROCUREMENT DIRECTOR

PRIMARY PURPOSE OF JOB: The Procurement Director is responsible for obtaining all necessary materials, tools, and equipment requested by all departments.

RESPONSIBILITIES:

1. Direct purchasing activities for all materials and supplies required by the company.

2. Maintain company's integrity and reputation by method of negotiating with suppliers and by seeing that there is clear understanding with suppliers concerning:
   A. Terms and conditions of all purchase contracts.
   B. Ownership of special equipment.

3. Assist plant manufacturing departments in obtaining proper specifications, quotations, delivery terms and costs, and provide information regarding material availability to affected departments.

4. Assure the timely delivery of purchased materials (materials delivered to the plant through purchasing; delivered to operating departments through inventory control).

5. Develop necessary forms that can be used for procuring the materials, tools, and equipment needed for the company.

6. Obtain and issue all materials, tools, and equipment that are requested by other department personnel. These items should be obtained in the most economical and fastest way. Consider the following procedures:
   A. Use the telephone to determine availability and lowest cost.
   B. Write letters to determine availability and lowest cost.
   C. Visit local stores and other retail/wholesale outlets.
   D. Request assistance from parents or other adults.

7. Keep the records and accounting department informed of the quantity and cost of all materials used.

8. Submit to the Inventory Control Director all items not immediately issued. (The Inventory Control Director should label and appropriately store all such items in the company warehouse until issued.)

9. Develop a ledger to record neatly and accurately all requisition and purchase transactions. This ledger should contain:
   A. The name of the department submitting the requisition.
   B. The quantity, description, and cost of the purchased items.
   C. A copy of every purchase requisition submitted by the requesting department.
   D. Sales receipts showing cost of purchased items.

10. Work with Quality Control Director to insure quality of purchased materials and equipment.

11. Develop the necessary forms and records that will be useful in carrying out the responsibilities of the Procurement Director.

12. Work closely with the Finance Director and Inventory Control Director in maintaining inventory and stock control records.

OTHER TYPICAL TITLES:

Contracts Manager
Purchasing Manager or Director

TITLE: INVENTORY CONTROL DIRECTOR

PRIMARY PURPOSE OF JOB: The Inventory Control Director is responsible for controlling all materials, supplies, and equipment, including finished products. Duties include arranging the leasing of warehousing facilities and maintaining optimum inventory levels.

RESPONSIBILITIES:

1. Draw up a contract to lease a locked warehouse area (storage cabinet or bench locker) in the industrial arts laboratory and label this area with the company name.

2. Develop an inventory control system which will decouple the various production processes, from raw materials to the finished product.

3. Develop an inventory identification tag to include:
   A. Department or individual requesting storage.
   B. Type or name of item being stored.
   C. Quantities of items being stored.

4. Develop a form for keeping an accurate inventory of all company supplies and equipment housed in the company warehouse.

5. House all company supplies, raw materials, pre-cut parts, tools, equipment, etc. for each department in the warehouse area. All items should be fastened or grouped together when necessary.

6. Receive and tag all items obtained by the Procurement Director.

7. Work with other responsible departments in determining optimum inventory level as reflected by projected consumer demand and production level.

8. Coordinate and control in-stock and projected purchases of raw materials. Work closely with Procurement Director and Finance Director.

9. Keep a running account of all materials and products associated with the company.

10. Make regular inventory status reports to the company.

11. Establish procedures for rapidly issuing and collecting all needed on-line supplies and equipment during the time the production line runs are in operation.

A. Prior to each daily production line run prepare for rapid distribution all necessary production line supplies and equipment before employees report to work.
B. Following each daily production line run, collect, count, group, tag, and place in appropriate containers all production line supplies and equipment (including product parts or finished products) for storage in the company warehouse.

12. Work with other responsible departments in the efficient deployment of labor and machines in an attempt to limit waste of inventories.

13. Design and develop other necessary forms and records that will be useful in carrying out the responsibilities of the Inventory Control Director.

OTHER TYPICAL TITLES:

Materials Control Manager
Warehousing Director

TITLE: PRODUCTION MANAGER

PRIMARY PURPOSE OF JOB: The Production Manager is responsible for the overall management, direction and coordination of manufacturing operations in carrying out company objectives at the lowest cost, consistent with quality requirements. This person delegates authority to key supervisors in production, production control, package development, plant engineering, purchasing and other related operations.

RESPONSIBILITIES:

1. Oversee all manufacturing activities.

2. Assist the Design Engineer with the construction of preliminary product prototypes from the various preliminary design sketches.

3. Assist the Research and Development Director with research study of examining, experimenting, and testing the product prototypes.

4. Assist the Design Engineer with the construction of of a final prototype of the product selected for manufacture.

5. Analyze the final product prototype and develop (with assistance from the Design Engineer, Research and Development Director, and Quality Control Director) a flow chart, a schematic diagram, or PERT chart showing:
   A. All pieces and parts of the product.
   B. All production steps or operations necessary to fabricate, assemble, finish, and market the product.
   C. All tools, machines, and other types of special equipment required to fabricate, assemble, finish, and market the product.

6. Work with the Line Foreman and Public Relations Director to construct additional pieces of each product part. These product parts are to be mounted and labeled on a suitable display board showing the completed sequence or flow of manufacture from raw materials to completed product.

7. Complete and submit to the Procurement Director requisitions for the ordering of all materials and equipment for manufacturing product.

8. Assist Plant Engineer in developing a plant layout of machines and work stations.

9. Direct the solution of production problems as they arise, working closely with appropriate personnel.

10. Design and develop necessary forms and records that will be useful in carrying out the responsibilities of the Production Manager.

11. Authorize all changes in scheduling or manufacturing procedures when original plans cannot be carried out.

12. Keep management informed of progress and problems of manufacturing.

OTHER TYPICAL TITLES:

Manufacturing Director
Production Control Manager
Production Engineer
Production Planning Supervisor

TITLE: RESEARCH AND DEVELOPMENT DIRECTOR

PRIMARY PURPOSE OF JOB: The Research and Development Director is responsible for developing, conducting, and supervising all necessary tests and experiments on product prototypes, jigs, fixtures, or other production devices; and for providing advice to various management departments concerning all test findings and conclusions.

RESPONSIBILITIES:

1. Assist the Design Engineer with the construction of preliminary product prototypes from the design sketches.

2. Conduct a careful research study on the preliminary product prototypes to determine which one should be selected for production.
   - A. Approve the purchase of materials to construct the prototypes.
   - B. Collect and record all data, carefully examining, experimenting, and testing the product prototypes in terms of:
     - (1). The most appealing design - aesthetic quality. Consult the Marketing Director.
     - (2). The best production design - manufacturing feasibility.
     - (3). The most functional design - performance or operational quality.
   - C. Consult the Design Engineer, Production Manager, Quality Control Director, and Marketing Director for their input.
   - D. The Research and Development Director and Design Engineer are responsible for making the final decision on the product design and should submit a written report to management showing all data collected to support that decision.

3. Assist the Design Engineer with the construction of a final prototype of the product selected for manufacture.

4. Assist the Production Manager in developing a list of necessary production steps or operations, a sequence or flow of these production operations, and a plant production layout design.

5. Conduct laboratory experiments and tests to determine solutions to production problems.

6. Check and test the performance and operation of all production jigs and fixtures.

7. Consult with the Marketing Director to determine the total number of products that should be manufactured for a realistic sales program.

8. Design and develop necessary forms and records that will be useful in carrying out the responsibilities of the Research and Development Director.

9. Working with the Quality Control Director, test all materials and finished products for possible improvements.

OTHER TYPICAL TITLES:

Chief Research Engineer
Product Development Director
Research and Engineering Supervisor

TITLE: DESIGN ENGINEER

PRIMARY PURPOSE OF JOB: The Design Engineer is responsible for preparing preliminary product design sketches, developing final working drawings, and constructing the final prototype.

RESPONSIBILITIES:

1. Prepare preliminary sketches showing various designs of the proposed product idea.

2. Construct accurate prototypes of the various preliminary product sketches. Use assistance from the Research and Development Director, Quality Control Director, Production Manager , and Marketing Director.

3. Assist the Research and Development Director and Marketing Director in examining and testing the preliminary product prototypes to determine:
   A. Will the product sell as designed?
   B. Can the product be manufactured as designed?
   C. Will the product function and operate as designed?

4. Develop a set of final working drawings of the selected product design, including:
   A. Pictorial drawing.
   B. Multi-view orthographic working drawing noting product size (dimensions), type of material to be used, and kind of finish to be applied.

5. Construct an accurate and final prototype of the product. Consult the Research and Development Director, Quality Control Director , Production Manager, and Marketing Director.

6. Duplicate and distribute working sketches to each member of the class. Post one set of working drawings on the company bulletin board.

7. Assist the Production Manager in developing a list of necessary production steps or operations, a sequence or flow of these production operations, and a plant production layout design.

8. Design and develop necessary forms and records that will be useful in carrying out the responsibilities of the Design Engineer.

9. Assist the Line Foreman in constructing all jigs and fixtures. (This activity may be assigned to individual workers by the Personnel Director, or to a Tool Design Engineer if the company is large.)

10. With assistance from the Marketing Director, design the packaging for the product, including the material, cost, style, and artwork. The package must be attractive, durable, and protective.

OTHER TYPICAL TITLES:

Chief Design Draftsman
Research and Design Engineer

TITLE: PLANT ENGINEER

PRIMARY PURPOSE OF JOB: The Plant Engineer is responsible for ordering all necessary equipment, tools, and machinery and determining the most effective plant layout of the physical facilities and manpower for the manufacture of the product.

RESPONSIBILITIES:

1. Analyze all factors and data that affect plant operation, including:
   - A. External transportation facilities
   - B. Receiving operations (unloading, inspection, etc.)
   - C. Production activities
   - D. Service operations
   - E. Quality control
   - F. Manpower
   - G. Packaging operations
   - H. Storage operations
   - I. Shipping operations

2. Determine the best combination of men, materials, machines, and money.
   - A. Minimize materials handling.
   - B. Maintain flexibility of arrangement.
   - C. Hold down investment in equipment.
   - D. Make economical use of floor space.
   - E. Promote effective utilization of manpower.
   - F. Provide for employee convenience, safety, and comfort.

3. Determine the general flow pattern for the materials in process.

4. Design the individual work stations or production centers.

5. Design methods of handling materials, including conveyor systems, pulleys, etc.

6. Draw a floor plan and/or make a model of the plant layout. Indicate:
   - A. Arrangement of tools, machines, and other production equipment.
   - B. Location of all electrical outlets.
   - C. Flow of materials and supplies in the production line.
   - D. Quality control stations.
   - E. Work stations and operations performed.
   - F. Other required information.

7. Work with the Safety Director, Quality Control Director, and Plant Maintenance Director to insure coordination for a safe and efficient plant layout.

8. Submit a budget to the Finance Director of all costs related to the plant operation.

9. Develop necessary forms and records that will be helpful in carrying out the responsibilities of the position.

10. Make arrangements to use facilities (other labs) with the teacher in charge of lab.

OTHER TYPICAL TITLES:

Production Engineer

TITLE: PLANT MAINTENANCE DIRECTOR

PRIMARY PURPOSE OF JOB: The Plant Maintenance Director supervises and coordinates a plant maintenance program of all equipment, tools, machines, and facilities at the lowest cost and the highest productivity.

RESPONSIBILITIES:

1. Identify all items to be maintained.
2. Establish a maintenance work crew.
3. Develop procedures for cleaning up the lab at the end of the period. Assign clean-up responsibilities to each worker and supervise all clean-up activities necessary to ensure a clean and well organized plant.
4. Inspect and supervise work done by the worker or the maintenance crew.
5. Develop a work order form to request the repair and/or replacement of defective tools, machines, or equipment that can not be maintained.
6. Schedule all maintanance work.
7. Maintain records of all maintenance work completed.
8. Inspect and lubricate machines on a regular basis. Sharpen tool bits, replace broken blades, etc.
9. Determine materials and labor budget for maintenance work and submit to the Finance Director.
10. Develop maintenance checklists for use by inspectors or workers.
11. Work closely with the Safety Director and Plant Engineer in maintaining the plant's tools and equipment.
12. Post pertinent items on the company bulletin board.
13. Provide plant security if needed.
14. Request necessary tools, equipment and supplies for maintenance.
15. Supervise and direct the installation of production equipment and apparatus in the plant. The Plant Engineer will assist with this activity.

16. Develop a program of preventive maintenance for equipment and tools.

17. Develop forms and records that will be useful in carrying out the responsibilities of the Plant Maintenance Director.

OTHER TYPICAL TITLES:

Plant Engineer
Physical Plant Manager
Plant Operations and Maintenance Director

TITLE: QUALITY CONTROL DIRECTOR

PRIMARY PURPOSE OF JOB: The Quality Control Director is responsible for developing and maintaining performance, reliability, and safety standards to: measure and inspect the quality of the fabricated parts; measure and inspect the quality of the assembled parts; and measure and inspect the quality of the finished product.

RESPONSIBILITIES:

1. Working with the Procurement Director, inspect and test all incoming materials.

2. Initiate a quality work incentive program to remind and encourage workers to perform quality work in manufacturing the company product.
   A. Develop slogans and post them in the lab area to remind workers of building quality into the product.
   B. Design quality control badges or buttons to be worn by workers during production.
   C. Develop awards for those workers producing the least number of rejected parts or finished products, and issue these awards at the end of the production run.

3. Assist the Design Engineer with the construction of preliminary product prototypes from various preliminary design sketches.

4. Assist the Research and Development Director with examining, experimenting, and testing the product prototypes.

5. Assist the Design Engineer with the construction of a final prototype of the product selected for manufacture. Determine final acceptable tolerances.

6. Assist the Production Manager in developing a list of necessary production steps or operations and a sequence or flow of these production operations.

7. Develop various gages to measure the accuracy of fabricated parts at critical operations on the production line. These critical operations include those production line stages where fabricated parts must fit together (interchangeability of parts).

8. Identify on the production flow chart stations at various points on the production line for inspecting the quality of parts fabrication, parts assembly, and finished product.

Consult the Line Foreman and neatly mark (color code) these inspections stations on the production line flow chart.

9. Check the quality of all jigs and fixtures. All jigs and fixtures should meet the following standards:
   A. Construction durability - Is the jig or fixture solidly constructed with appropriate materials to withstand the repeated use during a production run?
   B. Safety features - Does the jig or fixture contain appropriate guards, plastic shields, and other safety devices to protect the operator during the production run? (Consult with the Safety Director.)

10. Design and develop product inspection and guarantee forms. Consider developing the following:
   A. An inspection slip or tag to be included in the packaged product.
   B. A reject slip or tag identifying the return of a defective part or product to a particular station for additional work or repair.
   C. A product guarantee to be packaged with the product.

11. Coordinate and communicate activities relative to the development and implementation of product safety standards, codes and common consumer law.

12. Coordinate product accident investigations and accumulate, analyze and follow-up all reported accidents and product liability cases, communicating findings and initiating corrective action and recommendations.

13. Maintain a complaint control system to assure good customer relations and to identify corrective action follow-up.

14. Develop and maintain a customer attitude survey system. Work with the Marketing Director on this.

15. Develop forms and records that will be useful in carrying out the responsibilities of the Quality Control Director.

OTHER TYPICAL TITLES:

Director of Product Reliability and Quality Assurance
Inspection Director

TITLE: LINE FOREMAN

PRIMARY PURPOSE OF JOB: The Line Foreman is responsible for supervising all assigned workers during jigs and fixtures construction, pilot production runs, and final production runs; and for assisting personnel in the departments of design, research and development, quality control, and production engineering.

RESPONSIBILITIES:

1. Assist the Production Manager in developing a list of necessary production steps or operations, a sequence or flow of these production operations, and a plant production layout design.

2. Develop a list of jigs and fixtures necessary for the complete production of the company product. Consult the Production Manager and Design Engineer.
   A. Identify only those jigs and/or fixtures necessary for the production run - parts fabrication, parts sub-assembly, final assembly, and finishing.
   B. Specify the quantity of jigs and/or fixtures for each operation.
   C. Name and/or code each jig and fixture.
   D. Submit jigs and fixtures list to the Personnel Director so that assignments can be made.

3. Establish and enforce a due date for the completion and testing of all jigs and fixtures. Consult with the Plant Manager and have these due dates posted on the company's master calendar.

4. Supervise the construction of all jigs and fixtures and lend technical assistance where needed.

5. During the production run, request materials, tools, manpower and maintenance as they are needed in your assigned area.

6. Work with the Safety Director, the Quality Control Director, and the Education and Training Director when they request your help.

7. Supervise all activities during the pilot run and final production runs - from parts fabrication to packaged product. (During this period, the Line Foreman is responsible for all labor or production worker functions.)

8. Assist the Education and Training Director in training the workers in the production line.

9. With assistance from the Personnel Director and Production Manager, develop a system for evaluating worker performance.

OTHER TYPICAL TITLES:

General Foreman
Production Foreman
Shop Foreman

TITLE: UNION STEWARD

PRIMARY PURPOSE OF JOB: The Union Steward is responsible for organizing and developing a union in the company; developing and enforcing a union or work contract; and for handling and helping to settle all worker grievances.

RESPONSIBILITIES:

1. Investigate the topic of labor unions - their history, function, and present-day purpose in industry.
   A. Prepare a written report on what unions are, how they developed, and what purposes they serve in industry today.
   B. Make a presentation to the class using the above information. (Consult with the Education and Training Director regarding presentation schedule.)

2. Persuade the class of the need to organize and form a labor union.

3. Develop a work or union contract which establishes wages and hours; sick leave benefits; other working conditions and fringe benefits; and grievance procedures. Have it approved and amended by union members. Negotiate the work contract with company management (Plant Manager and his representatives). Return it to membership for final ratification.

4. Design and develop a union membership card to be carried by all union members of the company.

5. Prepare other membership identification for union members.

6. Hold union meetings when necessary.

7. Prepare union news bulletins to be issued periodically.
   A. Include news about local union members.
   B. Include news about national union workers - contract settlements, contract disputes, strikes, etc.

8. Post on the company union bulletin board:
   A. Notices of union meetings.
   B. Other union-related information.
   C. National union events and developments.

9. Contact the AFL-CIO and/or labor union organizations to arrange for a guest speaker.

10. Negotiate with the company management in order to improve working conditions.

11. Develop a form for handling grievances, and negotiate all grievances submitted by the workers with management.

12. In the event that a strike should occur, prepare picket signs and strike placards to be used by union members.

13. Design and develop other necessary forms and records that will be useful in carrying out the responsibilities of the Union Stewart.

OTHER TYPICAL TITLES:

Shop Steward

TITLE: MARKETING DIRECTOR

PRIMARY PURPOSE OF JOB: The Marketing Director develops and adminsters the marketing objectives, programs, and policies of the company, insuring maximum sales volume at minimum cost. This person plans, directs, and coordinates the advertising and sales personnel toward the accomplishment of the company's objectives.

RESPONSIBILITIES:

1. Conduct a market research study to determine what product the company should produce, and identify potential markets.

2. Advise the Design Engineer on the construction of the preliminary and final product prototypes.

3. Develop advertising announcing the sale of company stock. Consult with the Finance Director to obtain information regarding when, where, how much, and the type of stock to be sold. Use posters, flyers, public address announcements, homeroom announcements, newspaper ads, and any other media to convey the information to potential markets.

4. Conduct a market research study to determine the most appealing design for the company product.

5. Insure that sales forecasts are prepared, and recommend short and long-term sales goals. Make every effort to see that assigned sales volume and profit goals are achieved.

6. Prepare a budget (advertising, sales, etc.) based on an understanding of the product and sales promotion objectives.

7. Direct sales planning. Analyze competitive products and selling techniques, consumer research, marketing legislation, sales budgets, quotas, and other relevant information.

8. Decide pricing policies, including quantities, terms and conditions of sales, etc. Approve delegation of pricing authority and individual pricing questions which have policy implications.

9. Develop an advertising and publicity campaign to stimulate a demand for the product. Direct the

administration of all advertising, sales promotion, and market research activities, and approve the selection of advertising agencies and services.

10. Consult with the appropriate directors to determine the total number of products that should be manufactured for the most effective and efficient sales program.

11. Develop a sales order form that could be used (with an appropriate display of the product) at different locations.

12. Design and develop a sales receipt booklet to be used during product sales.

13. Coordinate a sales team to be made up from members of the class, and develop an incentive system to promote product sales. Consider developing the following:
    A. Charts showing sales progress made by each salesman and/or the company that could be posted on the company bulletin board.
    B. Salesman awards and prizes to the person(s) with the best sales record.

14. Help the Design Engineer determine the packaging for the product, including the material, cost, style, and artwork. Insure an attractive, durable, and protective package.

15. Maintain a record of all sale transactions and deposit all cash from sales in the company bank. (Use cash deposit slips developed by the Finance Director.)

16. Submit to the Finance Director a record of all sales transactions.

17. Design and develop other forms and records that will be useful in carrying out the responsibilities of the Marketing Director.

OTHER TYPICAL TITLES:

Advertising and Sales Promotion Director

FORMS

Practically all of the communications, reporting, analysis, and coordination of information within an industry utilizes forms. The liaison between departments, within departments, with customers, vendors, and outside agencies must be accomplished through forms. The forms used in industry can significantly increase or seriously hamper production.

In designing forms, the fundamental consideration is the maximum promotion of the manufacturing objectives. Good form design and procedures can: reduce the amount of clerical labor required for filing; increase management efficiency by providing required information and eliminating nonessential data; and reduce printing and paper costs.

The following section deals with form design and control. No attempt was made to include examples of different forms since they are too numerous. However, a form design checklist and two references are recommended.

Form Design

Maximum efficiency at the lowest cost, interpretation, and application are important principles in designing forms. The system technician or specialist who designs forms must know the data that will be presented on a new form and the flow of the form through the organization. The specialist must cooperate with the future users of the form, which is usually a difficult and time-consuming task. If differences in opinion arise, the head of the systems function and the executives of the users' departments may have to be consulted for final determination.

A well-designed form presents all the required information and is easy to use. Many design techniques have been introduced, especially by form manufacturers. Color schemes, kind and weight of paper stock, carbons for copies, omitting or emphasizing certain data, and reproduction techniques available are all considerations that must be weighted for maximum efficiency.

The checklist contained at the end of this section may be used to analyze form design.

The design and control of forms have become such complex functions that many industries have created a systems function department or other specialized unit which can devote full attention to forms. However, forms concern all parts of an organization, and thus, there is need for close cooperation

between the staff responsible for the forms and the users.

Suggestions for new or revised forms usually come from the users or from procedural changes from management. Before designing a new form, it should be determined whether it would be possible to use an existing form.

Form Control

Since the cost and utilization of forms are a significant part of the overhead and operating expenses of a company, management must closely control forms. Effective control should provide for the following:

1. Control of form procurement and inventories. An efficient system for ordering, stocking, and issuing the correct quantities to authorized users.

2. Systematic elimination of useless and conflicting forms, and creation of new well-designed forms as required.

3. Ease of identification of forms.

4. A means of enforcing and following-up action requested by forms.

5. A central source containing every form in use in the company arranged in a logical fashion and cross-indexed.

6. Search for low-cost form materials and printing.

7. Emphasis on form simplicity and utilization.

Each form designed should have a separate folder with its complete history. This folder should be kept up-to-date and can be analyzed to determine whether the form should be continued or revised. The goal is always towards reduction in the number of forms. By keeping a folder, similar forms used by different departments can be merged into one.

Form flow charts should be constructed to describe how each form carries information within and/or outside the organization. The charts indicate the particular tasks that must be performed and possibly the time required to complete the tasks.

It is also advisable for those in main functional positions to write brief procedural manuals which should include detailed instructions specifying how to perform involve, repetitive operations using forms to communicate with different members

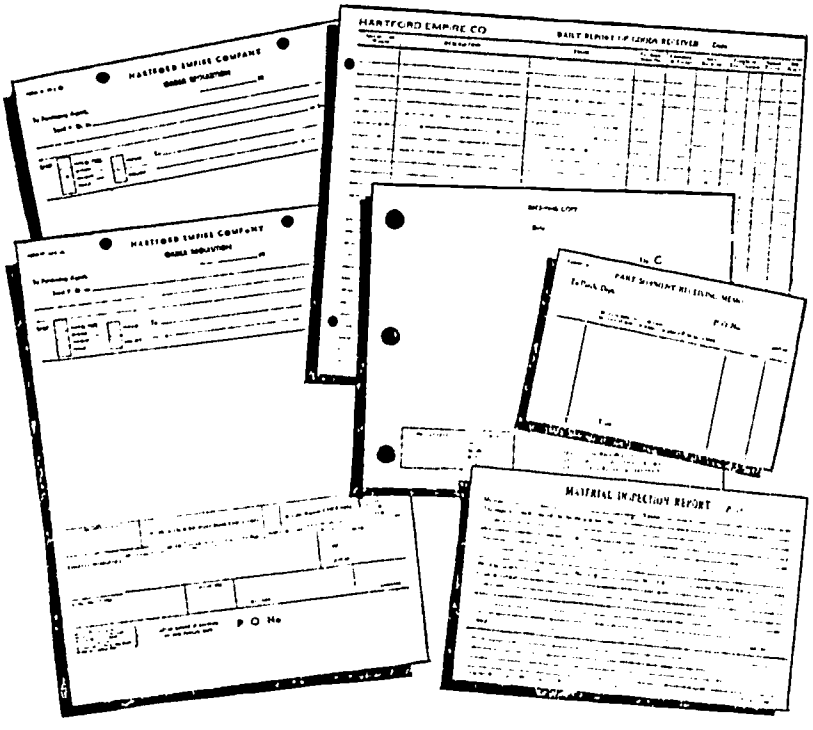
of an organization. These manuals establish order, and participation by different departments and individuals follow a proper sequence.

Form References

There are many references available to the students dealing with the design and control of forms. Forms collected from industry and those developed by former classes could be kept in a vertical file.

The American Management Association has published two excellent books on forms. The AMA Book of Employment Forms edited by Elizabeth Marting contains some 700 pages of several hundred examples of personnel forms. It costs $23 for AMA members and $30 for nonmembers. Forms Design and Control by Julius Kaiser contains information on forms design, manufacturing, routing, and contains many examples of forms. The cost is $12.50 to AMA members and $16.50 to nonmembers.

Both books can be ordered from the AMA, 135 West 50th Street, New York, New York 10020.



Form Design Checklist

I. General Use

____1. Are the purposes of the form necessary?
____2. Does the form completely accomplish its purposes?
____3. Can some other form be used for this purpose?
____4. Can this form be combined with some other form?
____5. Should the form be divided into separate forms?
____6. Are all necessary copies included?
____7. Are all copies necessary?
____8. Does the title indicate the use of the form?
____9. Is the title distinctive and descriptive?

II. Content

____10. Has the form-control number been included?
____11. Are all recurring data printed?
____12. Have spaces been left for required dates?
____13. For forms to be transmitted, should spaces be provided for "to" and "from" information?
____14. Has required space for signatures and approvals been included?
____15. Should simple routing or handling instructions be printed on the form?
____16. Is serial numbering desirable?
____17. Are all included items necessary?

III. Arrangement

____18. Have adequate spacing and margin standards been used?
____19. Has it been tested for proper spacing?
____20. Are the most important data in the most prominent locations?
____21. Should both sides of form be used?
____22. Are data required for filing and sorting prominently located?
____23. Is spacing sequence logical (minimum hand travel and easiest motions)?
____24. Is sequence of items same as on forms from which information is transcribed?
____25. Is sequence of items the same as used on similar forms?
____26. If it is to be mailed outside, should form be designed for window envelope?

IV. Sources of Information

____27. Have all users and potential users been consulted for suggestions?

____28. Have the persons responsible for the system been consulted for suggestions and approvals (supervisors, system men, etc.)?

V. Paper and Printing

____29. Is the size standard?
____30. Are the grades and weights standard and correct for usage, expected life, filing, and handling?
____31. Has colored paper been considered?
____32. Have all other required items been accurately specified on printing request (e.g., size of order, method of printing, ink, holes for binders and special machines, collating requirements, carbon requirements, etc.)?

(From Barish, 1951)

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