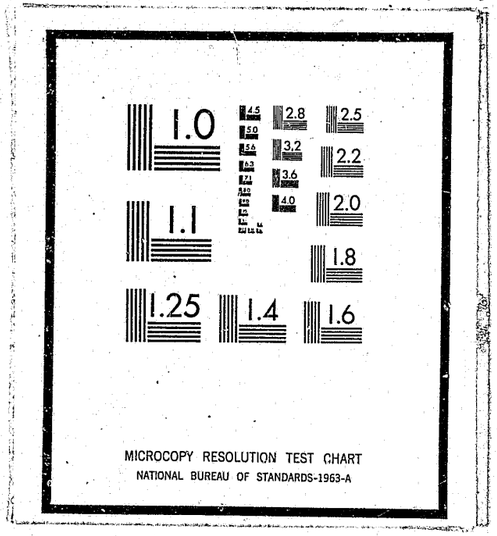


~~A SEMINAR ON~~

THE ELEMENTS OF MANAGEMENT ANALYSIS

A Seminar

FOR USE WITHIN

THE

LAW ENFORCEMENT ASSISTANCE ADMINISTRATION

TABLE OF CONTENTS

AN INTRODUCTION TO

THE

DESIGN AND CONTENT OF

THE SEMINAR

MATERIAL FOR INTRODUCTORY SESSION

Seminar Objectives and Methodology

1. Introduction of seminar leader and group members - educational and work experiences; seminar procedure, etc.

2. Seminar Objectives

   a. An introduction to the use of specific analytic techniques - the procedure flow chart, the work distribution chart, and the PERT chart. (technical aspects)

   b. A description or explanation of the ends to be sought - and hopefully realized - through the use of these analytic techniques. These ends should go far beyond the simple reduction of paperwork. (application)

   c. An explanation of the managerial attitude or philosophy which is best suited to the use of these techniques - and why the potential of the techniques has not been realized in the past. (perspective)

3. Organizational needs and problems which give rise to the application of the analytic techniques.

   Pertinent Definitions:

   Organization - a series of interrelated functions designed to achieve a specific goal or series thereof.

   Leadership - the setting of an organizational direction or purpose; motivating people to want to go in that direction or to achieve that purpose; and to coordinate people's activities toward that end. Part of managements' leadership problem is to meet organizational goals and in the process satisfy, or at least not unduly frustrate, individual needs.

   a. The initial need to establish an organizational goal or goals.

   b. The continuing need for planning, control, and evaluation.

   c. The problems associated with organizational specialization or division of labor.

      1. the danger of physical and psychological isolation.
      2. the need for coordination.
      3. the need for communication.

   d. The need for personal growth and development of the individual employee.

      1. Theory X view of personal attitudes and needs.
      2. Theory Y view of personal attitudes and needs.

         a. physiological and safety needs.
         b. social needs.
         c. egoistic needs.
         d. self-fulfillment, creative needs.

4. Potential contributions of the analytic techniques to organizational needs - personal and technical.

   a. provide a variety of tools for systematic approach to planning and control.

   b. can simplify work procedures and reduce the amount of paperwork necessary in those procedures.

   c. provide an opportunity to increase the employee's overall perspective and knowledge of his agency's operations by exposing him to functional areas which interrelate with his own. (increased technical understanding, increased communication).

   d. promote the breaking down of inter-office or inter-divisional psychological barriers (isolation and conflict) which may exist (increased human understanding, increased communication).

   e. promote morale by giving the individual the feeling that his ideas are worth considering and that he may participate in effecting change, rather than being a passive agent constantly subject to change imposed from the outside - or no change at all.

   f. promote an attitude of openness and of constructive discontent and to increase the employee's sensitivity to procedural inefficiencies. One must begin with the assumption that the tasks and procedures currently in being are less efficient and effective than they could be.

   g. promotes increased comprehension on the part of new personnel, either through viewing existing charts and diagrams, or through participation in a management analysis seminar.

The accomplishment of the above objectives essentially involves (1) a knowledge of the techniques; (2) a willingness to use them; and (3) an opportunity to apply them regularly through cooperative team efforts.

Theory X - Theory Y

Douglas McGregor

The Traditional View - Theory X

1. The average human being has an inherent dislike of work and will avoid it if he can.

2. Because of this human characteristic of dislike of work, most people must be coerced, controlled, directed, threatened with punishment to get them to put forth adequate effort toward the achievement of organizational objectives.

3. The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, wants security above all.

4. But some individuals are self-directed and motivated.

Douglas McGregor's Theory Y

1. The expenditure of physical and mental effort in work is as natural as play or rest.

2. External control and the threat of punishment are not the only means for bringing about effort toward organizational objectives. Man will exercise self-direction and self-control in the service of objectives to which he is committed.

3. Commitment to objectives is a function of the rewards associated with their achievement.

4. The average human being learns, under proper conditions, not only to accept but to seek responsibility.

5. The capacity to exercise a relatively high degree of imagination, ingenuity, and creativity in the solution of organization problems is widely, not narrowly, distributed in the population.

6. Under the conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilized.

Source: The Human Side of Enterprise
Douglas McGregor
McGraw Hill, Pages 33, 48

GENERAL INTRODUCTION

Seminar Title: Elements of Management Analysis

Designed For: Those persons in the GS 7-14 range who have had little or no educational background or current working experience in the area of general management analysis.

Purpose and Content: To introduce these individuals to the rationale and practical application of such analytic devices as the:

1) Flow Process Chart
2) Flow Diagram
3) Flow Procedure Chart
4) Work Distribution Chart
5) PERT Chart

Experience in government and industry indicates that the intelligent and imaginative use of these managerial tools in planning, evaluation, and control activities can ease the burden of management, and can provide substantial benefits in terms of time and money savings. Additional valuable benefits relating to the training of new employees, agency communication, and employee morale, may also be realized through the correct utilization of the tools and the managerial philosophy which underlies them.* In any case, a working familiarity with the techniques would seem essential if agency personnel are to perform their managerial tasks with maximum effectiveness.

*Note: A full discussion of these indirect benefits will take place during the seminar.

This abbreviated introduction will not, of course, ensure the immediate, totally effective, use of these devices. The primary intention here is simply to provide selected agency members with an appreciation of the usefulness of the analytic techniques, and at least a moderate level of expertise in their application.

Seminar Methodology

The individuals for whom the seminar is designed may by the nature of their responsibilities have little time to devote to training courses. For that reason the seminar is so constructed that a minimum of formal "in-class" participation is required. The general approach resembles that of "programmed instruction," wherein the participants individually study the prepared material - under guidance of a seminar leader - and then proceed to reinforce their learning through an immediate practical application. It is strongly suggested that this applied aspect of the seminar be approached as a coordinated team endeavor, rather than as an effort of separate individuals. This coordinated approach to the area of project application is more consistent with the philosophy underlying the use of the management techniques, and, in addition, is capable of being applied to larger, more complex projects than would otherwise be the case. A given seminar should, accordingly, be limited in size to between three and ten persons. The time involved in completing a team project should not be discounted as time lost to the agency as the project will be designed to improve that agency's procedures.

The seminar schedule is arranged in the following activity sequence:

1) Introduction by seminar leader - 1 hour
2) Reading of seminar materials - 4 "
3) Formal session with leader - 3 "
4) Completion of project #1 - 2 hours
5) Review and evaluation - 2 "
6) Completion of project #2 - not calculated
7) Final review and evaluation - 2 hours

Total "in-class" hours - 8 "
Total reading hours - 4 "
Project #1 hours - 2 "
Total seminar hours (excluding project #2) - 14 "

Upon completing the seminar, participating agency members should be capable of assuming the role of seminar leader, and of conducting further seminars as desired within their particular divisions.

Reading Material

The course material is divided into four major parts or sections:

Part One: Philosophy and Approach
Part Two: The Tools of Analysis
Part Three: Practical Application
Part Four: Network Analysis (PERT)

Each of the four sections is preceded by an introduction briefly describing the content, purpose, and approach of that section. It is recommended that seminar members read all of these introductions preliminary to pursuing the detailed material in any particular section. This procedure will give the reader an overview of the course material which will be of some value as he approaches a detailed reading of each section.

THE GROWING PROBLEM OF PAPER WORK

By Ben S. Graham

More than 8 million people are engaged full time in doing paper work. And analysis shows that they are probably about 50 per cent productive. We paid $75 billion for their work last year. Want to try for more? Paper work is something the executive should investigate. It can bring real savings to the company that takes the right approach to the problem. Here's one of the country's leading experts, suggesting the executive approach to the whole problem

The Growing Problem of Paper Work

By Ben S. Graham

PAPER work problems present a tremendous challenge to management today. This challenge will grow tomorrow and become even more important. The problems today are many. The volume of paper work is continually growing. The cost of doing that paper work has been rising rapidly. The time required for the preparation of the paper work, which, when delays are involved, makes the paper work increasingly less valuable, is becoming an ever more important factor. Errors and inaccuracies, of course, detract from the value of the finished product. All of these problems will continue, and may grow rapidly tomorrow, unless we mend our ways insofar as our approach to improving them is concerned.

New machines, incredibly fast, which have been developed in recent years won't solve the problems, might even aggravate them. Systems, made more foolproof and comprehensive, are not the answer. Tighter controls are likely to add to the burden rather than alleviate it.

We are all prone to look for an easy short cut—a sure cure. As new techniques are developed, we embrace them enthusiastically—look for marvels in results, continually hope for a magic cure-all.

We've all heard of systems analysis, forms control, records retention, work measurement, incentives (particularly wage incentives), mechanization, integrated data processing, statistical sampling, automation, operations research, empathy, humanics, human engineering, and others. Each of these has frequently been represented by some of its practitioners as a cure-all for our problems.

There is no short cut, no magic solution.

What Is the Key?

There is, however, I believe, a key which is capable of opening the door to the solution. That key is "understanding." But understanding what?

First we must get back to fundamentals and have a clear *understanding* of what we mean by paper work. I have asked many men to define it for me in terms of what we do, what we are working with, and why we do it. In those terms, we usually arrive at something like this. Paper work is the recording, storing, analysis, and reporting or transmitting of information (sometimes facts) for only one reason: To help somebody do his job better.

Whether it is to let the janitor know when to clean the room and what equipment or materials to use, or whether it is to have information available for the board of directors five years from now to enable them to make a decision as to whether to expand facilities, extend territory, or change products—the only real reason is: To help someone do a better job.

We must also get back to a basic *understanding* of our objective in business. That objective should be: To produce a product or service which our customers want, of a quality suitable to their needs, at a price they can afford, and which will provide a profit. We should also understand that profit is the key to the success of our economy.

I can remember a time not along ago when some companies apologized for making profits. In our economy, profit is the foundation of security. We must also appreciate that profit is dependent upon productivity. Only as individuals accept the responsibility to produce in order to make a profit can they assure security.

What Is Paper Work For?

We must *understand* that only as paper work helps assure our objectives is the paper work justified. Perfection in records, systems, or control is not the objective, but unfortunately it seems to be in some situations. Whether our recording of information is done by pencil, pen, a machine such as a typewriter or bookkeeping machine, by punching holes in tape, or recording magnetic impulses to operate electronic computers makes little difference. Only as any of these methods of processing information further our objective are they of value.

We must *understand* each of the techniques—systems analysis, forms control, records retention, work measurement, mechanization, integrated data processing, automation, operations research, human relations, and the many others. We must particularly appreciate that while each of these is important, we only achieve the full benefit of their application when we integrate all of them in proper relationship to a co-ordinated business way of life.

When we apply any one of them to our paper work problems, we may make dollar savings in what seem to be substantial amounts. Actually, the dollar savings from any one of the techniques is only a small part of the total savings available. But, unfortunately, the dollar savings frequently lull us into a sense of security, and we may neglect to apply the other possible techniques.

We should *understand* what paper work is costing our economy nationally and develop a conservative estimate as to what the cost is in our own organization. Over 8 million of our working people are clerical workers devoting 100 per cent of their time to paper work. When we add to that the part-time activities of production people; production supervision; staff people such as industrial engineers, production control people, engineering department, auditing, and the other staff functions; over 25 per cent of our manhours are devoted to paper work activities.

Last year we paid $75 billion in wages for this work. Analysis of productivity of people engaged in paper work activity indicates that they are not much more than 50 per cent productive. In a proper atmosphere, they could undoubtedly produce half again as much as they do now. This means that a third of the $75 billion is waste.

In addition to that, a critical examination of the paper work now being done in most organizations in terms of whether or not it helps anyone do his job better will disclose that somewhere between 30 and 50 per cent of the paper work being done does not measure up. This would add to our waste another $15 billion, making it a total of $40 billion of waste in paper work annually. If I'm not mistaken, this is almost twice the total corporate profits for last year.

Does Right Approach Mean Savings?

In recent years a number of companies have demonstrated that with a properly integrated approach to improving paper work, they can eliminate waste which had been costing the equivalent of the profit on a 10 per cent increase in business the first year. During the second year they have demonstrated that the accumulated savings can be more than doubled.

If we are going to solve our problems, we must set adequate goals for the elimination of waste in paper work. From experience it would seem that savings equal to 10 per cent of the profits should not be out of line the first year. An ultimate saving should approach between 50 and 100 per cent of the annual profit of the organization.

Our *understanding* of the new equipment which is being developed is essential. Marvelous advances have been made. But we have only added new tools to aid in the elimination of waste. In order to use the fantastic speed, flexibility, and accuracy of some of the new equipment effectively, we must first get our house in order. We must eliminate the "water" from our present systems before we mechanize. For many of us, if we mechanize what we are doing now, we will make it faster, perhaps cheaper and more accurate to obtain the end results which we are now obtaining, but we will mechanize much that should be eliminated. That will only compound a felony and perpetuate waste.

The sound approach of paper work simplification is still prerequisite to mechanization, integrated data processing through new equipment, or the use of electronic methods and computers.

The better *understanding* of the purpose of controls and control reports can open the way to tremendous savings in paper work. Controls should indicate a trend in the wrong direction so that corrective action can be taken before the damage is done. In too many cases, controls are not controls at all, but rather a historical record of how bad the damage has been after it's too late to do much about it.

In production cost reports, for example, we accumulate vast quantities of data regarding direct labor, direct material, indirect labor and material, and burden. This accumulation has been completed perhaps by the end of the first week of the following month to show what happened in the previous month. More often it is not ready until the middle of the following month. Literally, it is locking the barn door after the horse has been stolen.

How To Plan in Advance

In most organizations we plan what we will do in advance. We plan production and estimate costs. We should look for some simple indicator such as manhours related to the volume of finished product which can be followed on an up-to-the-minute basis. When a trend begins which indicates that we may be going to get out of bounds on cost, that should be the signal that would set off all the bells and whistles we can devise. Action should be taken then to prevent loss.

In many companies, quality is controlled on this basis. An intelligent approach to our other control requirements can develop similar methods for preventing loss to replace the archaic approaches of determining how much *has* been lost. At the same time, the accumulation of fantastic amounts of data and tremendous volumes of paper work can be eliminated.

Another area in which a similar approach can be made is in that of inventory. Many companies have lost expensive items in the past. As a result, they set up comprehensive, foolproof systems to control inventory. But they apply the system not only to the expensive items, but to paper clips, pencils, cotter pins, washers, nuts, bolts, and other cheap items. Analysis of inventories indicates that about 10 per cent of the items carried in inventory represent 90 per cent or more of the total value of the inventory. Thus 50, 60, even 70 per cent of the items are of such low value that the system cost exceeds the possible loss that might be suffered if no system at all were maintained.

An *understanding* that controls should prevent loss, should be dynamic, and signal significant deviations from normal before damage is done, so that preventive action can be taken, is most important.

Empathy has received a lot of attention recently. Briefly, it means understanding the other fellow. This is fine. However, it seems to me there is a prerequisite. We must *understand* ourselves first if we are to be effective. My mother had a favorite quote I learned as a youngster which has stood me in good stead. "To thine own self be true, And it must follow, as the night the day, Thou canst not then be false to any man." By understanding yourself truly, you have made tremendous strides in understanding the other fellow.

We must *understand* the need of our worker to "feel important, feel needed, feel that he belongs." We must not make the mistake of assuming that because we pay him well we have purchased his interest, loyalty, and support. Those things, and enthusiastic work, cannot be bought. They must be earned by the management.

Following the 1954 elections, *U. S. News* analyzed the trends behind the election. There were, of course, many factors behind the trends. The most significant to me, however, was represented by an interview of a mass-production worker in Detroit. The worker was asked how he voted and why. His reply was, "Well, all of the bosses around here vote Republican, so naturally we guys vote Democratic." This is a sad commentary on American business leadership, or the lack of it.

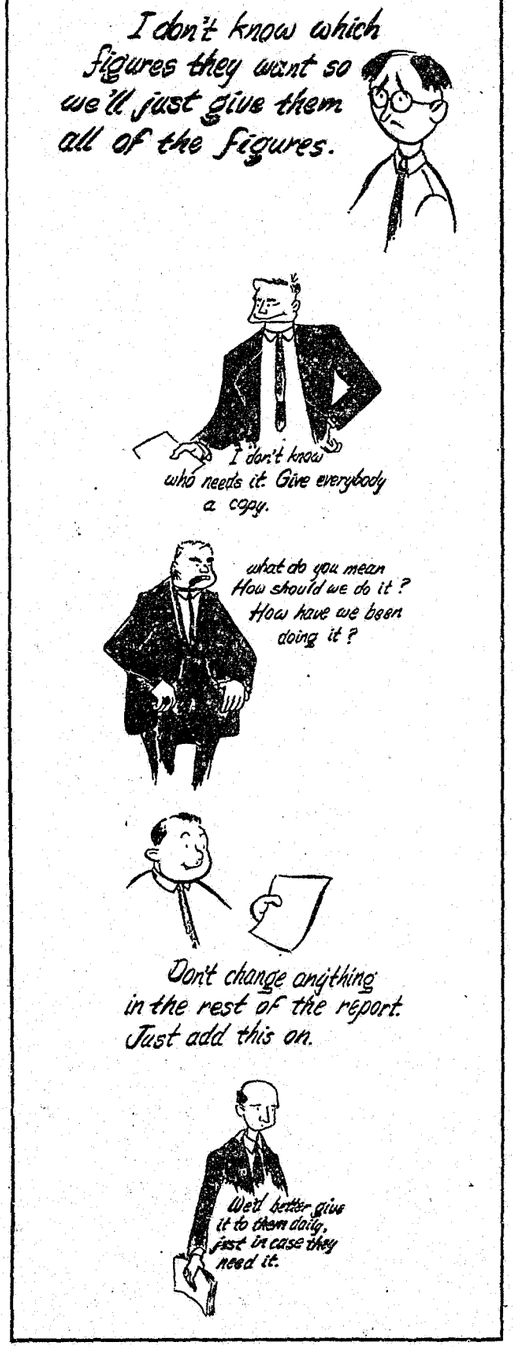
We must *understand* that our economy has been built on the basis of a team—a prosperous team—not push-button activity. If the irresponsible comments about push-button office and push-button factory were able to be carried through to what would seem to be the logical conclusion, to eliminate workers, we would simultaneously destroy our economy by eliminating our customers as well. This, of course, is ridiculous. Instead of eliminating workers, the new marvels place on management an added responsibility to help in upgrading those workers so that they can handle the more responsible jobs involving the new equipment.

The development of an effective production team, improvement, and the elimination of waste require close co-operation and enthusiasm on the part of every member of the team. This is a selling job of the highest type, selling ideas, intangibles. There is one rule for good selling which applies across the board. That is the Golden Rule. The best sales manual ever written, far superior to any of the current hot-shot sales books, was written almost 2,000 years ago in the New Testament.

PAPERWORK

WE CAN ALWAYS ADD ON

By Ben S. Graham, Jr.



"Man can make system great, it isn't system that makes man great." —Confusius.

PAPERWORK

A problem is isolated and solved. This is the way man progresses.

Somewhere amid the maze of humanity an individual or a group of individuals applies ingenuity and imagination to another puzzle and works it out. Finely trained minds, questioning minds, uncover more and more needed solutions.

But we are not solving all of our problems. Some seem too uninteresting or too inconsequential to merit our attention. Some seem too difficult to solve.

There is one major area of our economy in which we are not making much headway. This is in clerical operations. Let's not be fooled by the occasional furor which accompanies the introduction of new panaceas in this field. Of course some good work has been done, but to get the facts on how well we are doing with our clerical operations we can take a look at the ever-mounting size of the clerical portion of our labor force. It is not just growing at the same rate as the total labor force, — it is growing much faster. In fact, during the last twenty years the clerical portion of our labor force has grown faster than any other part.

This is not a sudden thing. It has been building for decades and it is still building. We are not suddenly becoming buried in paperwork, but it is growing steadily and we don't seem to be able to do anything about it.

Uninteresting— There are lots of reasons. One is that we don't seem to be interested in the problem. It is made up of dull, unromantic filing systems, distribution lists, accounting, reports, forms, — just a lot of dry detail for some clerical staffer to work out, — nothing for people with ability to waste their valuable time on. With this sort of attitude we begrudge every moment we spend in this area and anxiously accept the first expedient that comes along, well aware that it is a poor compromise. But we tell ourselves that it will get the job done and not cost us much.

We are accepting the compromises a nickel and a dime at a time to the extent that today we are spending approximately $125,000,000,000. a year for clerical detail work in the United States. That's one dollar out of every four paid for labor, and it amounts to the sum total of about 500,000,000,000 two-bit decisions. "I can't be bothered with these details. Just work it out any way you like, — just get it done," And another $6,000 is built permanently into the payroll!

Complexity— Another reason for this mounting wall of paperwork is the growing complexity of our operations. As our organizations grow larger and larger, with more people, more departments, more different types of technology, our problems of understanding and communications become greater and greater.

We find ourselves faced with enormous organizations in which the people in one department have little idea of what the people in the other departments are

WE CAN ALWAYS ADD ON

By BEN S. GRAHAM, JR.

BEN S. GRAHAM, Jr., paperwork simplification authority, holds BA and BFA degrees from Ohio Wesleyan University and a MBA from UCLA. His career is marked by outstanding work in Industrial Engineering, Production Control, and Systems Management. He served on the faculty of UCLA prior to industrial activity for West Coast firms. As an Air Force Intelligence Officer he was in supervisory development of work measurement. Since 1960 he has directed the Ben S. Graham Paperwork Simplification Conferences for a number of the nation's most substantial industries.

doing. One reason for this is that we have so many people in these organizations that it becomes extremely difficult to keep track of one another.

There is a second reason. People trained and working in specialities get to know a great deal more about what they are doing than they can easily communicate to others. Also, we don't always want to let others know what we are doing. A little privacy may create security, help to build an empire or defend us from scrutiny.

These organizations are formal arrangements of people. They may appear orderly and logical. The paperwork systems on the other hand, are not the least bit orderly and they are frequently illogical. They lace through the entire organization, ignoring departmental boundries, trying to deliver information to the people throughout the organization who need it.

Now, if there is some truth in these words, then here we have the root of a very real reason why we are not solving our paperwork problems. The individuals who know their jobs well enough to know how the paperwork is being processed and the value that is being derived from it, seldom know enough about the total paperwork systems, as they affect other departments, to be able to suggest realistic improvements. When they try to improve their own systems they invariably run into difficulties with other departments.

The few people in the organization who may have a fairly broad view of the total paperwork systems rarely have sufficient knowledge of the details of these operations to be able to make anything like realistic improvements. They can observe the mounting piles of paperwork and try to do something about them but their efforts will almost certainly result in little more than confusion, reaction, a reshuffling of the organization, and eventually settling back to another system. In order to get the job done the clerks and supervisors throughout the organization will soon patch up this system and, before long, it will look about like the system which preceeded it.

What this means is that no one individual can improve our systems. The people close to the work are locked in by virtue of the fact that they understand only parts of the systems. The corporate leaders usually lack the knowledge of the details necessary to permit realistic changes. When they do impose changes they are often in a position about like a doctor who, not knowing what is wrong with a patient, decides to take him apart and put him back together. Our corporate leaders may then be disappointed because their changes don't seem to work out as well as they had hoped. They should be thankful that the patient survived, and the chances are that the survival is due to those people close to the work who patched up the executive's brainstorm.

If neither the individuals close to the job nor the people in charge of it can understand it well enough to improve it, then it won't be improved. But our needs do change. If we don't adapt our present systems to these changing needs then all we will do is build more systems and add on. We can always add on. **We don't have to know what we are doing to add on.**

So we have a problem which is dull, uninteresting and complex, and growing fast. We can ignore it. We can try to wish it away. We might even try to do something about it.

Experts—One thing we can do is to call in a specialist to try to solve our problem. This specialist may try to solve the problem himself or he may help us to work out our own problem. If he takes the first course he puts himself in the position of trying to tell us what information we need most on our jobs and what information we should be providing for others. It is not surprising that we so frequently bring in a specialist and then refuse to accept his recommendation. We get him in and then we suddenly realize that this fellow doesn't know nearly as much about our jobs as we do.

Mechanization— One delightful way to withdraw from the problem completely and, at the same time, identify ourselves with all the new, modern, scientific advances is to embark on a program of mechanization with the end objective of solving all of our paperwork difficulties. But mechanization simply is not a solution to our paperwork problems. We may mechanize very effectively after we have achieved a good solution to these problems, but to mechanize sloppy and wasteful systems is only to make our problem that much more complex by adding the additional difficulty of machine language with the result that we may be building permanent electronic monuments to bad paperwork systems.

Out With The Old and In With The New — Or we may advocate solving our paperwork problems by ignoring what we have and concentrating on what we ought to have. There are however two gigantic fallacies in this approach. First, it is not possible for us through some metaphysical process to devine what we really need. Second, if we could, why haven't we been doing this all these years? We have not suddenly bred a more brilliant race of men who can visualize their problems more clearly than previous races.

Study— There is, however, a sound, logical, orderly solution to this problem. The root of it lies in the word

(over)

PAPERWORK (Con't from page 27)

'study'. We study what we have been doing through the years, taking advantage of the cumulative knowledge of years of experience, working with our paperwork systems, not because we enjoy looking at, or laughing at, redundant and inefficient systems, but because our study of these systems can be the key which leads us to a real knowledge of what our information needs are.

There is a logical way to go about this study. That is, to bring into a study the people whose experience and knowledge of the job are greatest, namely the people closest to the job. As individuals they cannot do much to solve their problems but working as project teams their joint efforts can be astonishing. Each can contribute his intimate knowledge of his work. With training and coaching they can turn this knowledge into fresh, clean and realistic systems. You may say that these people will not be able to see the forest for the trees but my answer is that these forests will never be cleaned out unless we do it tree by tree.

We have an enormous problem. To meet it we need an enormous force. That force may be found in the collective knowledge and abilities of the many, many people who make up our economy. The democratic process at work can rekindle the curiosity, imagination and ingenuity of these people and can erase problems which individuals can't touch.

Man, with his new improved technology, is in a better position than ever to make finer systems. But if man sits back and depends on the systems or the machines or any form of the technology itself to solve his problems, he will wait in vain and eventually suffocate under stacks of useless paper. ■

PART I: PHILOSOPHY AND APPROACH TO PAPERWORK FLOW ANALYSIS

The Basic Questions of Management

Basic Principles

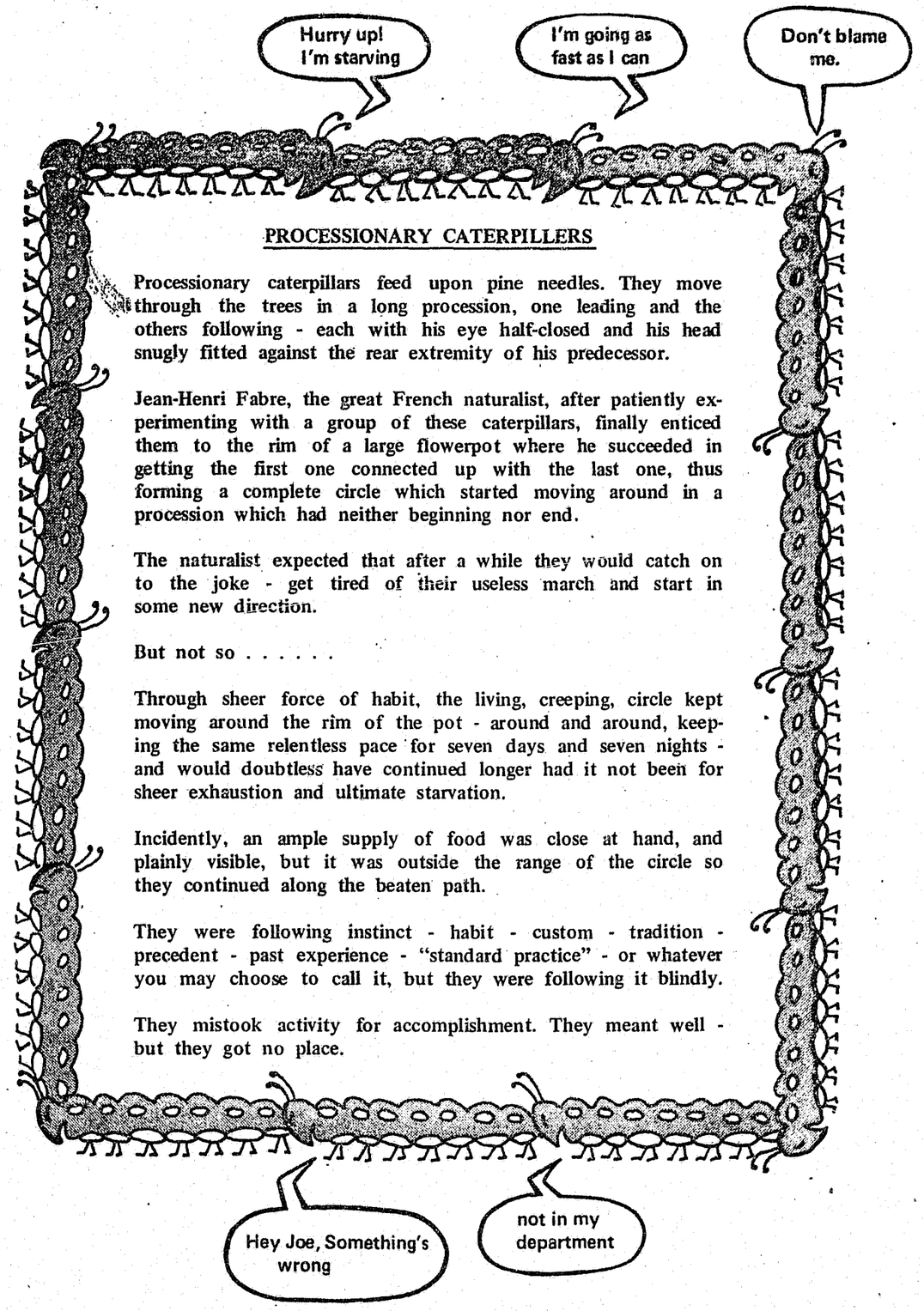
Participation

GUIDE TO PART ONE

Because there have been innumerable misunderstandings concerning the nature, scope, and application of basic work simplification techniques, it is well to begin an analysis of that subject with a brief look at the general principles - human and organizational - which underlie the correct use of those techniques. Part One of the text is, therefore, limited to a review of certain management fundamentals, beginning with a discussion of the basic questions - the why, how, what, when, and where queries - which need to be continuously addressed by management in its search for organizational improvement.

Heavy emphasis is given in the section to the point of view that work simplification techniques are not simply management tools to be mechanically and unilaterally applied by the "efficiency" expert. Participation of personnel at all organizational levels and grades in the use of these tools is stressed as desirable, not only because the success of subsequent innovations will depend, ultimately, upon the degree of acceptance of those changes by these employees, but also because they will usually have something positive to offer in work simplification studies.

Much of the material in Part One is drawn from experience in the private business sector. Human behavior and organizational design in government are not so vastly different from their private counterparts, however, that principles applicable in the latter area are of no benefit in government. If an agency's objectives are clearly drawn, and if there is a serious desire to evaluate the success of those objectives, the fact that a pursuit of monetary profit is absent will be of little consequence in the application of work simplification techniques.



Whatever else they may be, hospitals today are the fifth largest business in this country. Like industrial leaders, hospital administrators too are faced with problems to be solved, adjustments to be made. Their challenge is a mandate once again to seek and ask . . .

The Basic Questions Of Management

by LILLIAN GILBRETH, Ph.D.

MANAGEMENT isn't fundamentally different now than it was in pioneer days. The big job is still a matter of questions rather than answers. Working on answers to problems, of course, is essential. But it must be recognized at the same time that those problems solved to date represent only *some* of the problems facing management. In no case should the solving of problems mean stopping at a given point, halting all further investigations. Indeed, much has happened in recent years which makes a continuing evaluation of management necessary, in order to judge what is worth keeping or adopting and what must be done to meet new challenges. This is particularly true in terms of the long look ahead and the application for hospitals of current issues and probable trends in management.

Pioneers in management recognized the essential value of the questioning approach and so were able to contribute ideas and techniques of long-term value. Their writings reflect the scientific method, complemented by a realization of individual differences and universal likenesses. They recognized that one has not only the responsibility but the opportunity to question everything that goes on. Their questioning was not a Socratic method aimed at proving the limitations of knowledge nor the legal method of emphasizing one aspect of a question while avoiding exploration of its opposite. Rather, the approach of these pioneers was that of a curious child who asks questions and is unbiased (and intelligent) enough to *listen* to the answers.

What is the most important question for management? Many feel it is *how?* They regard method and "how-to" as of prime importance in the management concept; after all, American "know-how" has become justly famous throughout the world.

But the most important question is *why?* For, while the questioning approach pursues the *how, what, when, where* and *who*, it must also stop frequently and ask *why?* It must ask, "Is this really necessary?" For this is the key question which, by throwing light on deep and underlying reasons for action, will often decide whether a method is to be accepted or rejected. And it is a question which involves those human values—individual differences and in workers and, because they do not want to do the job, they feel they cannot. Then, too, a person may be hired who does not have the experience but does have the capacity. At least there is potential here, whereas another who is able to do the job easily may lose all sense of job satisfaction and efficiency because his job has become routine and he is capable of so much more. Certainly a capable worker will feel frustrated if current performance does not hold some hope of future transfer or promotion upward in the management level. Quite simply, if the *why* and *what* of a job is thoroughly defined, it will contribute a great deal to the *who* of the person who is to do the job.

As far as the question of *where* is concerned, there has been much talk these days about centralization versus de-centralization. For example, there is the question as to whether more time should be put into small industry rather than the large organization and whether the relationship between the two might not be studied further. Before meeting any new changes, however, it is necessary to look backward occasionally to discover how this situation arose as well as forward to see where it is apt to lead.

Hospitals face a similar problem of *where.* Because of new developments in medical care, many former demands no longer are being made. Scientific advances are rendering some traditional patterns obsolete. Hospital stays, for example, are becoming shorter, thereby placing new demands on the home. One large city hospital decided to send all its long-term and chronic patients home. Hospital teams could visit and treat the patients in their homes, thereby freeing needed beds and reducing the strain on other hospital facilities. The hospital discovered, however, that the homes of the community were not built for and totally unready to receive these patients. In short, there was neither sufficient training or preparation to undertake changing the *where.*

Are Those Interruptions Necessary?

As regards the question of *when*, the problem of timing looms larger every day. In industry—and, I feel, in hospitals as well—this problem is that we know we are limited today and in all probability cannot get our houses in order by next week. But *next year* seems much farther away than it actually is. We say, "By next year, there won't be any difficulty in getting this thing done." And then next year comes and it is just as crowded as was this year. We look ahead and think, "This can be done in such-and-such a time." We are sure that we can, even though we have never timed ourselves. We fail to calculate the types and lengths of interruptions that will occur and what we are going to do about them. Or, perhaps, in dodging an interruption, we neglect something that is more impotrant than the job being done. A physical breakdown of facilities is obviously an important interruption which demands that time be spent in repairs, but who can say that some employe or associate in a dilemma does not need time to interrupt for advice or help? If these interruptions are dodged, management may be branded as "too busy" or "unresponsive." As a result, the work itself may actually suffer to such an extent that only a true understanding of the depth of the problem will help rectify matters.

In planning the *when* of a job, management must first find out how long it takes to do such a job, how near to completion a given person can bring it and what interruptions might occur and whether or not these can be avoided. Then, we can ask, "When must this thing be finished?" By setting partial completion goals based on the actual finsh date, the progress of the job can be studied. If the worker keeps up, fine! If he falls behind schedule, then we must ask if it is the schedule's fault or his. And, if he gets ahead of schedule, we must ask if the schedule is wrong or if the worker is so intelligent or eager that he is completing the work ahead of time. Perhaps, in this last case, we should appreciate as well as study what the worker is doing.

When one has achieved at least a theoretical grasp of the administrative set-up, including answers to the questions *why, what, who, when* and *where,* then it is time to decide the *how.*

I know of no case where some time and energy cannot be saved by putting in work simplification. But what is to be done with this saving? Who is to profit by it? Will it put some people out of work?

The Goal is Mankind Itself

All of these questions lead to the great challenge now confronting our age—automation. There are new and great opportunities presented by these wonderful machines, but the fact that we are facing something like an industrial revolution raises definite dangers. Management has a responsibility to face. We must ask the people who give us these machines, "What do you think you are doing?" If they answer "Eliminating drudgery," then we must make sure that it is real drudgery—heavy physical and mental work of no real value to people—of which they are speaking. These same people will tell us that we will need more skilled people, but where will we get them? Conversely, we will need fewer unskilled people, but what are we to do with those unskilled workers currently in our employ? Will we be patient enough to take people of low capacity and try to raise them to a level of satisfactory service in this new age, to give them the feeling of independence and adequacy which is the need of every person?

There is talk of a possible four-hour work day. Actually, in some industries and other organizations, that is about all the real work that is being accomplished in the present eight-hour day. There are idiotically long coffee breaks and a host of unnecessary and fruitless interruptions and evasions of work.

There will be more leisure time in the future, but are people ready for it? Can they enjoy it and use it free from economic and emotional worry? Are they creative enough to profit by time spent in leisure?

These are but some of the questions which management in business and industry must continually face. Hospitals, in addition to their own unique problems, must face these questions too. Industry feels the answers lie in education—a lifetime education. It feels it should take the long look ahead and project its operations each year at least 10 years into the future. And then educate to meet objectives.

For industry, this continuing study, revision and improvement of management is directed toward growth, increase in output and survival in competition. For hospitals, the goal of management is nothing less than mankind itself. ★

FOUR BASIC PRINCIPLES

The pioneers combined fundamentals of motion study and a philosophy—to eliminate waste.

PAPERWORK has been in the spotlight since the early days of World War II. Following the war and a return to competitive markets, the emphasis on cost has led to many varied attempts to reduce Paperwork and office non-productive costs. Too often the emphasis has been on the non-productive costs rather than on the elimination of waste. This misplaced emphasis can frequently lead to apparent cost reductions which result in expensive wastes in other areas.

Measurement of Paperwork in terms of the objective—"does it help someone do his job better?"—can help in the elimination of much of the major "office" waste. It is also important to measure the values derived from the product of the Paperwork, against the cost of that product. When this is done, systems important to the control of production, product quality, or cost will not be the unfortunate victims of an economy drive.

Elimination of waste is our objective in Paperwork Simplification. This includes the waste due to entire procedures that do not measure up, the waste found in duplication of systems, poorly designed systems, inaccurate and low production in the various phases of a system. More important, it includes the waste which occurs in the productive functions of a business due to inaccurate or inadequate Paperwork. Most important of all, Paperwork Simplification and Work Simplification take into account the waste of personal interest, initiative and enthusiasm, it never overlooks the importance of acceptance of the improved method by the people who will use it.

Work Simplification Defined

Paperwork Simplification is the adaptation of Work Simplification to the problems of Paperwork. Work Simplification is defined in simple terms as, "The organized application of common sense to find better and easier ways of doing a job" or, as I prefer, "The organized application of common sense by everyone to eliminate waste of any kind—waste time, energy, space, material, equipment, etc." *Eliminate waste* implies getting results, not just talking about it. Results come from better methods only when they are enthusiastically used by the people concerned. For years, the "enthusiastic use by the people concerned" was the reef on which many "better methods" foundered.

In the middle Thirties several of the leaders in the field of scientific management, Allan Mogensen, Professor Erwin H. Schell of Massachusetts Institute of Technology, Dr. Lillian Gilbreth and Professor David B. Porter of New York University, recognizing the importance of enthusiastic cooperation, combined the simple fundamentals of the technique of motion study with a way of thinking or philosophy of management and called it Work Simplification. Having repeatedly developed and installed better methods only to return a few months later and find that people on the job had reverted to their old methods, these pioneers recognized the problem involved in developing *acceptance* of the better methods. The problem involved the most difficult and highest type of selling, the selling of an idea or an intangible. People buy what they want rather than what is good for them or what they need.

The first and most important problem then is to convince the individual worker that he has a direct personal stake in eliminating every possible element of waste. Then get the individual "into the act" in the elimination of waste and he will "buy" his own ideas for improvement enthusiastically and make them work. Too often the expert mistakenly calls his activity "Work Simplification." In many cases anticipated results are not achieved because of the seeming lack of appreciation of the importance of enthusiastic cooperation on the part of every individual.

Today in Work Simplification and particularly Paperwork Simplification, it is extremely important that we integrate all the management and improvement techniques in their proper relationship for effective business operation. Techniques include scientific organization, delegation of responsibility, personnel selection, job evaluation, conference leadership, training, accounting, cost accounting, motion study, work measurement, mechanization, automation, integrated data processing, operations research, the various psychological, sociological and other techniques as they may apply in a given organization or situation. But they must be coordinated. Overemphasis of one destroys the balance and distorts results. Even more important they must be reduced to simple terms understandable by management and others not technically trained if they are to be accepted and used effectively by business.

1. Productive Activity

The simple principles of Work Simplification provide a basic guide in the integration of these techniques, emphasize the importance of the individual, recognize the need for enthusiastic cooperation and provide simple, usable measurement of the effectiveness of methods.

The first principle is: *Activities should be Productive.* By "activity" we mean anything that goes on in business, including delays and storages, as well as the various operations and moves in a procedure. Since Paperwork is entirely a non-productive function of business, it is necessary to stretch the meaning of the word "productive" when we apply these principles to Paperwork. However, many products of Paperwork are essential to the best conduct of the business. If we define productivity as directly accomplishing the end results, we can apply the term to Paperwork.

The typing of a 3-part letter, an original and two copies, will illustrate the point. Assembling three sheets of paper and two sheets of carbon, jogging them into alignment, inserting them in the machine, positioning them in the machine, removing and separating them after the typing operation, are all non-productive. The only productive part of the operation is the actual typing when the information is put on the paper. Long moves from desk to desk and delays on the desk are non-productive elements in Paperwork procedure. The first objective then is to reduce the non-productive elements in our Paperwork to an absolute minimum.

2. Smooth Flow

The second principle is: *Activity should be arranged to provide smooth flow from operation to operation in a process or a balanced motion pattern for an operator at a work place.* Everybody knows how discouraging an unduly heavy work load can be to the average worker. Worrying about getting the work out distracts attention from the job at hand and slows up the actual production tremendously.

On the other hand, the average person is much happier when busy than when looking for work. This was illustrated very forcefully by an experience in the invoicing department in a large corporation. Application of Work Simplification, particularly the first principle, had cut the work load in half in the Typing Department. The typists who should have been released by this reduction in work, were badly needed in another department. However, the supervisor, accustomed to being measured by an all too common standard of how many people he supervised, could only see his empire being cut in half. The typists, afraid that some of their group would be worked out of a job, stretched out the work to appear busy. Quality fell off, discord crept in, till the department was thoroughly disorganized. When, finally, half the girls were transferred to other work, production more than doubled, quality rose to its highest level, and all the girls, honestly busy, were happier in their work. Smooth flow or balance is important especially in Paperwork.

3. Simplicity

Our third principle is: *Activity should be as simple as possible.* In examining countless Paperwork systems in business and industry, I have been reminded of Rube Goldberg's cartoons illustrating extremely complex and involved ways of accomplishing very simple results.

The study of a receiving system in an industrial plant illustrates how the simplifying of Paperwork activity can also facilitate elimination of many elements of waste in productive functions. The objective of the system was to provide facts regarding thousands of items received, to aid in control of the quantity and quality of materials received, facilitate the storage and prompt availability of the materials to the proper production department, relieve procurement of further responsibility, enable Accounts Receivable to pay for the materials and to help the Cost and other departments carry out their functions. The old system, which had grown up over the years to meet varying requirements, included three separate forms which had to be written for each shipment (involving seven copies all together) and a 10-copy summary of all shipments received which was used to advise the interested parties. Because the information had to be written four times, there were many errors in transcription and long delays before the summary could be completed. The laboratory, which was supposed to control the quality of many of the items received, frequently did not receive its copy of the summary report until the items were already being used.

In many cases, department heads had to search through 30 or 40 items on the summary sheet to find whether or not the one item in which they were interested had been received. In the various accounting departments, the use of the summary report added substantially to their work and severely handicapped their functioning.

A simple eight-part form completed immediately after the receipt of the shipment eliminated rewriting the information three times, with the three opportunities for transcription errors; advised all interested parties promptly as to the receipt of each shipment; enabled the laboratory to test required items for quality before they had been used; and saved many hours of unnecessary work in purchasing, production and accounting departments.

As in this case, it is almost invariably true that simplification through elimination of waste improves not only production but quality as well.

These three principles covering the technique of Work Simplification are simple enough to be understood and used by the average person to measure the effectiveness of almost any work activity. These principles, and the technique are, as can be seen, a simplified version of Motion Study. Contrary to many mistaken concepts, Motion Study as conceived by the Gilbreths, is not limited to the activity of an individual at a work place. One of the most important tools of Motion Study, developed by Frank Gilbreth, is the Flow-Process chart, a simple device for visualizing and measuring, chronologically, every detail in an over-all process or procedure. It is, in reality, the "steam shovel" approach to the elimination of waste as compared with the "hand-shovel" or "teaspoon" approach used in examining the individual operation. Each of the so-called laws, or methods, of making Motion Study effective, may be classified under one of the three principles.

As usual, we have three principles for the mechanics and only one left to cover the important part of Work Simplification—the human side. The emphasis must be in the opposite ratio. The human relation aspect is at least 75% of the job in Work Simplification.

4. Personal Interest

The fourth and, by far, most important principle is: *Participation with "know how," built on understanding, stimulates interest, initiative, imagination and results in enthusiastic cooperation.* The more the question is studied, the more apparent is the fact that the individual produces most effectively in terms of quantity, quality and cost when personal satisfaction is derived from the job. Participation provides personal satisfaction when it is "built on understanding."

Understanding and confidence must permeate the organization from top to bottom. When this situation exists, participation in the elimination of waste will be carried on enthusiastically and will provide the opportunity for self-expression, accomplishment and recognition, provide job interest and develop enthusiastic cooperation. The individual, equipped with the technique and tools to eliminate waste and make improvements, has a tremendous satisfaction in initiating changes and developing better methods.

The change in attitude, the effective teamwork resulting from participation, is well expressed as, "The difference between enthusiastic cooperation and dignified acquiescence."

DEVELOPING PARTICIPATION IN PAPERWORK SIMPLIFICATION

ONE WHO IS INITIATING Work Simplification—the leader himself and the coordinating committee which may have been appointed—will appreciate the primary importance of generating interest and enthusiasm from top to bottom. The value of "participation with know-how" in accomplishing the objectives cannot be emphasized too often.

Work Simplification—as the organized application of common sense by everyone to eliminate waste—is a continuing activity and should be part of everyone's job. It is a philosophy of cooperative activity to achieve a common objective in the most effective manner. Properly developed, it is an on-the-job climate or atmosphere of teamwork. If job evaluation or merit rating is used at any or all levels, effective participation in eliminating waste should be recognized as a factor in it.

Company-wide participation should be the ultimate goal. But there are initially three approaches open to us. One is through top management on a company-wise basis. The second is a departmental approach. And the third is through on-the-job training by the staff specialists. Let's review them.

A. *Starting at the Top*

A company-wide approach must be predicated on a sound organizational set-up—a proper delegation of responsibilities all the way down the line. It entails initial activity by top management to eliminate waste. Above all, it requires an appreciation by top management of the importance of people, the possibility for improvement through those people, and their need for the intangible satisfactions associated with their jobs.

What do we mean by top management waste-elimination? Recently one company found that for requisitions of $100 or more, sixteen executive approvals were required on a five-part set. Since the set was not prefabricated with interleaved carbons, in many cases each executive signed five times, making a total of 80 signatures required. Obviously, this involved tremendous elements of waste and probably cost almost as much as the purchase of $100 worth of material. As long as such a situation existed at top level it would be extremely difficult to generate much interest at lower levels in eliminating relatively smaller elements of waste. It is important that top management people do more than give lip service to participation. They must act and let the results of their actions be known in order to arouse interest in the possibility of participation.

Spreading Interest

After top management has gotten into the act and produced results, the next step is to interest the next levels of management. An analysis of the problems facing the organization should provide the necessary material to arouse interest at each level. Problems such as increased competition, increased costs cutting into profit margins, and the need for continual improvement in product and cost to keep the company growing, all affect every member of an organization. However, these problems must be presented to the individuals in terms of their personal interests. Any one or all may be a threat to the job security of every individual in the company. This should not be used as a threat to generate participation but should rather be related to the activities of each individual and his opportunity to help in developing greater security for himself through eliminating waste of any kind.

Results of action at the top and at other levels as participation expands can be used to indicate to all employees the importance attached to the program. The sincerity of management will be evident and will stimulate the thinking of people down the line throughout the organization. To avoid killing interest, however, we want to be sure that no executive thoughtlessly commits a wasteful act. If it should happen it must be acknowledged and not repeated.

With such interest aroused, the next step is to present the objectives in terms of company needs and problems. We can be specific as to goals, if not actual improvement projects. Better quality and service or lower cost to the customer can mean new plant, equipment, development of new products, etc., which contribute to the growth, stability and profit of the company. But most important of all, the accomplishment of such objectives must be related to the individual in terms of better jobs, greater opportunity, pay, security and recognition. This step may be taken in the first of a series of meetings designed to impart the "know-how" for eliminating waste or solving problems, or it may be accomplished in special meetings of larger groups. In the latter instance, those most interested will make up small groups for the subsequent training sessions.

B. *Departmental Alternative*

In some situations it may be difficult or even impossible to interest top management immediately in an over-all program of participation with know-how. On the other hand, there may be a division or a major department led by people who are interested in such a program within their part of the organization. Working with that division or department, we can follow much the same procedure outlined for an over-all company program. If the departmental program is handled properly, the success within the department will attract the attention of other departments or divisions. As the benefits accumulate, other departments will recognize the desirability of the program and want to get into the act, too. This is the first alternative to an over-all company approach, with the same ultimate goal in view.

C. *Staff-To-Worker Contact*

In other situations it might not be practical or possible to sell either top management or divisional or departmental management on the idea of general participation with know-how. A staff organization may be charged with the responsibility for developing improvements. Or a department such as accounting or office management may have grown up with a general supervisory responsibility for paperwork procedures and methods. In such a situation, it is far more effective and easier to accomplish results if the staff people will explain to the line people on the job the objectives of their specific studies, how they plan to work and the techniques to be used. The staff person should admit frankly the need of the job know-how of the line people and enlist their cooperation. Developing satisfactory improvements and obtaining enthusiastic use of them will be much easier than if the staff person assumes the attitude of an expert and attempts to work out answers by himself.

This is the second alternative to the company-wide approach. Fundamentally all three are the same. The difference is in the degree to which we attempt to develop initial participation with training and know-how. With any one of the three approaches, the opening group meeting to generate interest and enthusiasm will pave the way for better results.

Training Follows

When either the company-wide or the departmental approach is used, we must be prepared to follow the initial interest-generating meetings with training. With executives this will be more developing an appreciation of the know-how than actual training. At various levels of supervision and with the workers, the training will be detailed and specific techniques will be introduced to fit the needs of the particular groups. It will be carried on with small groups and with every group it should wind up with the complete working out of a project for the solution of a problem.

The fundamental know-how for eliminating waste and developing more effective systems, procedures and methods is the same whether we are tackling production problems or paperwork problems. When a billing or other paperwork job, for instance, grows beyond the capacity of one person and requires several, knowledge about the various machines or equipment available to handle such a job pays off materially in developing improvements. It is comparable to a knowledge of automatic screw machines and other equipment that would be suitable for handling a lathe job that has similarly grown in volume. The fundamental approach is the same in either case. Only the detailed techniques and equipment will vary with the specific areas or activities studied.

A general understanding of Paperwork objectives, problems and techniques for improving jobs is desirable as a part of the training for several reasons. It is impossible to divorce paperwork from the line activities. In production it is frequently impossible to set up competent controls or paperwork systems without modifying production activities and layout. Very often people seem to like tackling jobs other than their own. Production people like to get into paperwork, which too often has been imposed upon them by others. In imparting know-how we will, therefore, cover the fundamental approach to improvement, together with the techniques used most generally. Supplementing that, there should be an appreciation of the specialized techniques and the services which are available through technicians when required. These specialized techniques include the detailed analysis of operations involving complicated relationships, such as, right-and-left-hand or that of the operator to one or more machines; and the use of statistical methods in quality control, work sampling or in other control accounting. Certainly an appreciation of systems analysis, procedure flow charting, methods for improving the writing process and the significance of form design, are a must.

Follow-Through to Projects

Many companies have generated the all-important initial interest in participation to eliminate waste—and then systematically trained everyone in the organization in techniques. Two mistakes are frequently made with this approach. First, you don't generate enthusiasm by directive. People go through the motions while the heat is on but conveniently forget when the "drive" is over. Second, the training should be only the opening of the door. The group trained should follow through by picking a project and as a group working it through to a conclusion. Groups should be set up on a voluntary basis. They should be small, not exceeding six or eight people. The individuals in a group should be of a comparable level within the organization and should be from jobs sufficiently related so that the members will have a common interest in projects or problems.

The first groups particularly should be selected because the individuals have demonstrated interest. If these groups select projects which affect people or functions not covered by the group, that go beyond the scope of the activities covered by the group, representatives of those activities must be included in the group before the study is begun. When these added members have assisted in solving the problem, in most cases, they will ask to be included in the next training group. The participation will expand beyond departmental or divisional areas. And if it grows because people want to "get in," it will be healthy and lasting as contrasted with most "programs." We will achieve a work climate or atmosphere of mutual understanding and confidence. The result will be better relationships, improved production, and profit and more security for everyone.

A WORD OF CAUTION

"Work Simplification is the organized application of common sense by everyone to eliminate waste—waste of time, energy, materials, space, equipment—waste of any kind."

SO MANY misunderstandings have developed regarding the meaning of Work Simplification that it seems desirable to stop at this point and discuss some of them in order to develop a proper understanding and approach. The term "Work Simplification" itself has been widely misunderstood. To the uninitiated, it is considered as synonymous with simplifying work. Since it is a generic term, this is not entirely unexpected. Many people then misinterpret simplifying work to be synonymous with breaking the jobs down into little jobs and deskilling them. This, of course, is a poor substitute for eliminating waste. Too often the added handling between the small operations creates waste far in excess of any possibility for savings.

Breaking down and deskilling the job may in some instances make the selection and training of the workers easier. More often than not, it is a poor substitute for proper selection and training, and results in more expensive methods. Work Simplification has been confused with job methods training which was developed during the war to meet a specific purpose. Actually, job methods training was an over simplification of a small part of Work Simplification—the pattern or approach to problem solving. It was designed specifically to break down jobs so that untrained people could readily be trained to produce something. With the stimulus of the war, many did come into production work and perform uninteresting, monotonous jobs effectively. When the war stimulus was over, the motivation was gone and the effort fell flat. Job enlargement, or putting jobs back together to eliminate waste handling and develop more interest, is, of course, an integral part of a properly conceived work simplification program for eliminating waste.

Aim Can be too Low

Many people who have had only a superficial contact with Work Simplification, consider it a program of training to encourage low level supervision and the people on the job to help in improving their own jobs, as a means of developing more interest in their work. The objective is to produce more with less effort. In such a situation, the pattern followed in improving jobs is designed specifically for this purpose. It is not suitable for middle or top management because of the phraseology. Too often it is a gimmick or a device prescribed by management for the worker. It is not something which management feels it can use itself. In these situations it tends to become an exploitation of low level supervision and the workers, to get more for less, instead of a true program of participation. Participation is not something designed for a group within a group, but rather for an entire group. To be effective, the foundation must be broad and useable by all.

To many others, Work Simplification means short cuts, gadgets or perhaps mechanization.

Such approaches are not sincere efforts to develop participation, and they tend to emphasize improving a job or operation at a work place before finding out if that job or operation is a necessary part of the process or procedure. Even when these programs develop interest, the workers soon improve their own jobs and run out of "worlds to conquer."

Narrowness of Purpose

A program conceived by the Bureau of the Budget was published in 1949 as Publication # 91 by the Public Administration Service. This program, designed to meet a specific, limited need, was well thought out by the people in the Bureau of the Budget. It is based on a limited application of the Flow Process Chart, the Work Distribution Chart and a Work Count. However, too many people have adopted the program without understanding the need for which it was designed. This need is stated in a paragraph on the second page of the Bulletin. "A word may be said about the reason for selecting these three techniques. First, they have been tested on a large scale by the Army Quartermaster Corps and paid big dividends. Second, they are best adapted to meet the needs of the customer for whom the program was designed, the first-line supervisors. Third, they are most relevant to the problem of the Federal Service today. It should be noted that these are techniques for dealing with the procedural problems of a single operating unit. Since the first-line supervisor was the customer, obviously techniques for improving practices cutting across organization lines were not appropriate subject matter."

With such a low level program, results can be achieved of course, but much of the work will be devoted to improving operations or even whole departments, which, if they had been examined in relation to the over-all procedure or process, would have been found unnecessary. This, of course, only tends to add to the waste and perpetuate it. Even though thousands of dollars may be saved, this approach skirts around the fringe of the real problem and misses the big opportunities for savings many times greater than those actually achieved.

Misconception of "Office"

"Office Work Simplification" as a concept is another factor which has tended to limit the effectiveness of Work Simplification, particularly as applied to record keeping, communications and controls which I describe as paperwork. Very little paperwork or record keeping starts in the office and is confined to the office. (By office, I mean primarily the clerical and accounting functions which handle the paperwork. I do not mean the administrative and management phases of business.) Most of our paperwork starts with a customer's order. In industry, production creates the major volume of paperwork. Purchasing, which is usually a production function, has to buy the materials, frequently warehousing them, to have them available to the actual production activities. Then we have the material control, production control, inspection or quality control, stores, routing, work ordering, finished goods inventory, shipping and other production functions which add to the paperwork, providing most of the source data which then is fed into the office for processing for many purposes. The office frequently duplicates inventory function and in addition, maintains cost records from the source data received from the factory, does the billing and maintains the general books, including accounts receivable, capital accounts, personnel and payroll records, etc. When we approach the paperwork or record keeping function from the standpoint of only that part which the office handles, we miss terrific opportunities for real savings by not taking into account the record keeping functions in production, sales, engineering, etc.

Work Measurement Fallacy

Work Measurement is a phrase which has received a great deal of emphasis recently and has been misunderstood in connection with Work Simplification. Some form of Work Measurement is, or should be, a part of every study of a process or a job. Without a suitable form of measurement, we do not have the facts involved. However, that does not mean that we must measure the work in terms of hundredths or thousandths of a minute. The measurement may vary anywhere from weeks to minutes to fractions of a minute. In testing the durability of paint under weather conditions for example, we might expose the paint to weather for several years. On the other hand, in the testing laboratory, we can simulate many of these conditions and make the measurement in minutes or at most, hours. In studying a paperwork system, we do not need to know how long the billing operator takes for each key stroke. We should know how many operators produce how many invoices in a given period of time which will represent the fair average of their production. When they improve an operation, the people on the job want to know how effective their improvement has been. If they don't know what they had been accomplishing before the improvement was made, they have no basis for comparison. Of course, at times, when we are breaking down or studying a highly repetitive operation, it may be essential to have a detailed, accurate form of measurement in order to determine the best method as of now.

Making Measurement Practical

To plan and schedule work, it is desirable to know the capacity of workers and machines in terms of units of work which they can produce. We can then provide people and machines which will be able to handle the work load anticipated. Proper planning and scheduling is just as essential in connection with record keeping as in production. However, it is foolish to attempt to apply detailed work measurement for the purpose of standards or for planning and scheduling what we are doing now until we find out whether or not it is necessary. When we have eliminated the unnecessary activities, improved the necessary, using that degree of measurement suitable to the study, we can then plan and schedule the necessary work.

Work Measurement must, of course, always be practical. That is, the results achieved must be sufficient to justify the cost of the measurement. In connection with record keeping or paperwork, this frequently is a determining factor as to the method of work measurement which can be used profitably.

Statistical methods and statistical sampling, used for generations in some forms of business, have become popular in industry in recent years. Quality Control was one of the first applications. The statistical approach is now being used for other control purposes and has been used in the work measurement field in ratio delay and work sampling, in an effort to make the measurement of nonproductive activities more economical. Again this is a technique developed to help eliminate some of the waste involved in the more comprehensive approach, as well as to improve the quality. It is another technique which fits into the work simplification pattern in its proper place.

Integrating New Machines

In recent years, due largely to the impetus of the war, tremendous mechanical and electronic developments have been made. The adaptation of these developments to business has resulted in much progress. The proper use of these facilities makes it possible to go even further in the elimination of waste. The biggest value is in mechanizing uninteresting, monotonous routines, and providing an opportunity for the upgrading of people into better, more productive jobs. It also incurs a responsibility that the temporarily displaced people shall be provided with the opportunity to upgrade themselves. Intriguing names have been applied to some of these developments such as Integrated Data Processing, Automation, and the Push Button Factory and Office. While these names have been useful in achieving publicity for the new opportunities for mechanization, there have been some unfortunate repercussions connected with their use, particularly the term "push button office or factory". Some have interpreted this to mean that machines will replace people. If this were true, and were carried to extreme, it would also mean that we would, by getting rid of people, get rid of our customers too. This is a highly fallacious assumption. Actually, we have a terrific opportunity to promote the idea that we will eliminate the uninteresting, monotonous, distasteful jobs and upgrade our people so that they can in the over-all produce more, earn more and enjoy life more. Great opportunities to reduce effort, increase production and improve quality are available. Again, the proper use of these facilities at the proper level in an organization is all part of a well integrated management program.

Techniques are not Program

Many techniques have been developed in other fields. The personnel field alone has techniques which aid in the better selection of people, defining and evaluation of jobs, improved training, supervision and management-worker relationships. Unfortunately, too many of the technicians in this, as well as other fields, over-emphasize their techniques. They feel they have the cure-all to the problems of the business. The technique becomes the objective instead of the means to produce the results. In one large company, for example, which has embraced every personnel and industrial relations technique developed, the techniques and the people administering them have not been integrated into a cohesive working group. There is little understanding by the line organization or the people on the job of the techniques. There is little or no understanding between the technicians of their interrelationships. The result has been that while they go through the motions, there have been extremely poor human relation situations throughout that organization.

If we are going to develop an effective team to eliminate waste, all of these and many other techniques and approaches should be a part of a well organized management pattern and philosophy. Too often they are instituted as "programs"—get a lot of stimulus for a short while—then fade out. They are all basic to "Work Simplification" as an organized effort to improve operation and lessen waste, through people.

PART II: THE TOOLS OF ANALYSIS

The Scientific Method

The Flow Process Chart

The Flow Diagram

The Outline of Objectives
(System Study)

The Procedure Study Sheet
(Procedure Data Chart)

The Procedure Flow Chart

The Work Distribution Chart

GUIDE TO PART TWO

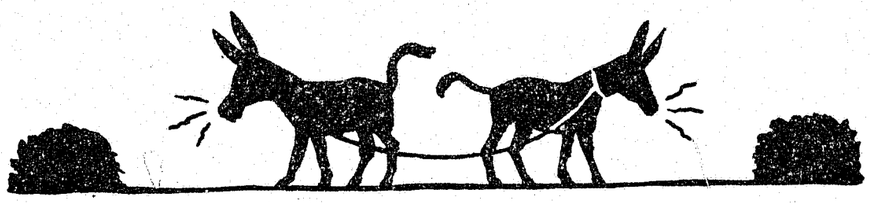
In Part One we reviewed briefly the philosophy and principles underlying the use of work simplification techniques. In Part Two some of the working instruments, or tools of analysis - charts and diagrams - are presented and discussed in detail.

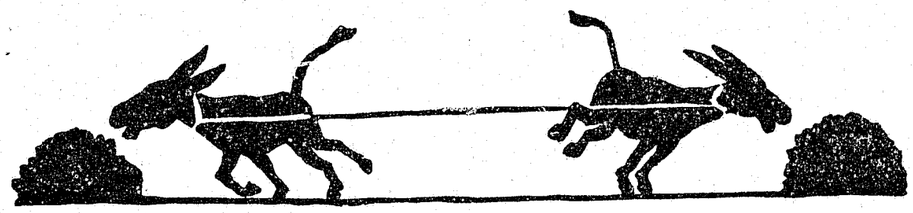
We have noted that work simplification is defined as "the organized application of common sense." Stated in another way, it is simply the application of the scientific method to the analysis of organizational procedures. The scientific method provides the framework by which one can systematically approach the study of those procedures and the problems connected therewith. Without such an orderly approach the instruments, tools, or techniques of detailed analysis would be of far less utility, and in some cases a waste of time altogether.

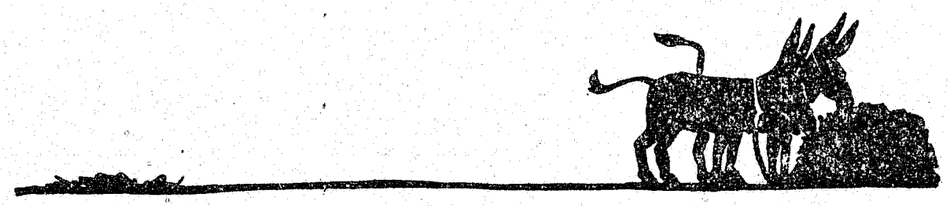
The instruments of analysis which are examined in the following pages are the Flow Process Chart, the Outline of Objectives Form (System Study Form), the Procedure Study Sheet (Procedure Data Chart), the Procedure Flow Chart, and the Work Distribution Chart. In each case a copy or sample form will be appended to the article discussing a particular instrument. Please note that a form or chart may be referred to by more than one title, as indicated above.

Depending upon the nature of a given work simplification project, all of the listed techniques may be utilized, or only a few. Generally, the functions of the charts are interrelated and designed to complement one another. Their application will, however, depend largely upon the judgement of the individuals involved, and upon the type of study envisioned.

The ARS Guide to Work Simplification booklet is appended at the end of Part Two even though its content is largely a duplication of the other articles in the section. The simplified, pictorial presentation of the booklet material may well help the reader to grasp key ideas faster, or may act simply to reinforce his understanding. In either case use of the booklet will be of some benefit.







THE SCIENTIFIC METHOD

It's the organized application of common sense in solving a specific problem.

THE PRACTICAL techniques of Work Simplification are important elements in accomplishing desired results. But common misconceptions of Work Simplification emphasize techniques, tools and even experting—and ignore the fundamental first objective. The problem of *creating the proper atmosphere for participation* warrants a few words by way of reminder here.

In the days when most of our production came from small craft shops, that atmosphere was a definite asset. Each craftsman knew the boss, the boss's objectives, and his own responsibilities. As a matter of fact, he and the boss usually worked together, lived in the same community, and had many common interests.

Problems of communication within the organization didn't exist. There were no problems of complicated organization, indefiniteness of responsibility or confusion of line and staff. Job evaluations, standards, wage incentives, personnel selection, training programs, definition of responsibility and qualifications of leadership, depth interviews, opinion surveys and the many other techniques of scientific management had not been formalized.

Understanding First

Some shops were good places to work. There the things were being done which made for equitable, sound business, for mutual confidence, and for profitable and satisfying relationships. Many of today's scientific management techniques are the result of efforts to analyze and organize the practices and attitudes of the old-time successful leaders. Other techniques are attempts to develop satisfactory substitutes for the close personal relationship and mutual confidence which then existed.

Unfortunately, the various techniques have too often become highly technical. Like a smoke screen they fog the atmosphere for many, and at times they seem to blow back to confuse some of the "experts."

The results have been lack of understanding and fear of the unknown.

Understanding and mutual confidence provide the proper atmosphere for effective participation. When applied with this objective, each of the scientific management techniques—from setting up the business organization and defining and delegating responsibility, to planning the smallest detail of layout or work flow—increases understanding and confidence.

The Know-how Needed

Confidence in one's self as well as in others leads to a willingness to examine and question critically the present methods and to seek a better way. Active participation by people at all levels in the solution of problems within the scope of their responsibility, at their particular level, provides a challenge and interest to even routine jobs. Through this participation we can include in the job, which occupies a large part of our waking hours, elements of the individual *freedoms* that are as important in "our way of life" as material or social benefits.

But the challenge to help solve a problem can be frustrating instead of stimulating without "know how." The tools or "know how" of Work Simplification must be simple, readily understood and usable.

The first and basic "tool" of Work Simplification is a logical, orderly approach to the solution of a problem—"the organized application of common sense," frequently referred to as the *scientific method.* As used in Work Simplification, this includes the following five steps:

1. Select a Situation for study.
2. Get all the facts.
3. Analyze the facts.
4. Develop the improvement.
5. Apply the improvement.

Phraseology may vary, but the meaning is the same. The number of steps used in the "scientific method" will vary widely as used in different techniques or even as expressed by different authors for the same technique. More steps usually mean that one or more of the five basic steps have been subdivided. The five step pattern has been generally accepted in Work Simplification.

What the Steps Mean—1

Select a Situation, the first step in our pattern, has also been expressed as "Pick a job" or "Select the job." Usually, an effort to improve work is justified because of apparent problems involved in the work. Cost may be unduly high. Manpower requirements may be out of proportion. The job may be a bottleneck. The value of the end result may be questioned. Overall time of a process or procedure may be out of proportion to actual working time.

Whatever the problem, it must be accurately defined. Definition of the problem must, of course, include a thorough examination of the product of the work in question. What is the end result?—its value? Is it necessary? If the necessity cannot be established, an opportunity for a real steam shovel elimination of waste may be indicated—*elimination of the entire process or procedure.* Particularly in paperwork, the end result of a procedure can be examined in terms of the definition of paperwork—"does it help someone do his job better?" If the product of the paperwork doesn't measure up, use the steam shovel. Apply the first principle of Work Simplification—"Activities should be productive"—and eliminate the entire procedure. In this manner, not only is the existing waste eliminated, but the waste involved in a detailed study of a non-productive process is avoided.

After the problem has been defined, and the product or end result of the work has been evaluated and found necessary, set up the *objectives* to be accomplished through Work Simplification.

Example: Selecting a Situation

Perhaps an invoicing problem (common to many organizations and one that will become increasingly acute as volume increases and available manpower decreases under our preparedness economy) will illustrate the use of our pattern. This type of problem may be found in many medium-to-large retail establishments, particularly if they have a substantial volume of mail or telephone sales. It will be found in wholesale establishments and in many industrial plants which ship from stock or manufacture to the customers' orders.

In many cases, when a priced copy of the sales order and the shipping copy are received in the Billing Department, the invoicing procedure starts. The amount of the invoice is figured—quantity shipped times unit price, perhaps with discount calculations, then totaled. Papers go to the billing operator who types a three-part invoice. The original goes to the customer, one copy accompanies other papers to Customers' file, and the other goes to the Accounts Receivable or Collection Department. Three girls have been handling the filing, assembly of shipping copy, extension of amount and typing of 20,000 invoices annually. The girls rotate on the various parts of the job to relieve monotony.

An Essential Job

In recent months the number of sales and invoices has been increasing. Under pressure the girls handled the situation until the volume had increased about 25%. Today, inability to ship complete orders has further aggravated the situation. With back orders the clerical work has increased and the number of invoices is at the rate of 30,000 per year, a 50% increase, and still growing. The backlog of work is getting bigger and bigger. Efforts to hire additional help have failed. Typewriters and calculating machines can't be had for months.

The problem—How can we attain and maintain a current billing position?

Questioning the end result doesn't help in this case. *It is necessary* to: 1. bill our customer; 2. maintain an Accounts Receivable file; 3. maintain a customer order file. We cannot eliminate the job.

Objectives—Find a way to reduce the work involved, so that 50% to 100% more invoices than in the past few years can be handled without an increase in staff.

Briefly, the first step in our "scientific method," *Select a Situation,* may be summarized as follows:

a. Define the apparent problem.

b. Determine the product or end result of the work, process or procedure.

c. Determine objectives to be accomplished (if problem cannot be eliminated).

All the Facts—Step 2

Get ALL *the facts* is our second step. The terms "Break the job down," and (where the activity is limited) "Make a Process Chart" have also been used to describe this step.

ALL the FACTS are essential to a competent analysis of any problem.

The "What," "Where," "When," "Who," and "How" of every operation in a process or procedure and every element in an operation are important facts.

The "What" of our invoicing typing operation goes far beyond the mere fact that the "invoices are typed." Measurement must be used also. How many invoices per operator hour, day or month—or what proportion of the three girls' time is spent typing 30,000 per year? What information is typed? What are the maximum, minimum and average number of items? What percentage of orders must be back-ordered? Are certain items or certain customers involved in most back-orders? Are some orders back-ordered more than once? How often?

The "How" of the typing operation also involves much more than "typed on an electric billing typewriter." How are the forms positioned in the typewriter? Are cut forms and carbons assembled and inserted? Does the typing sequence follow the same sequence as the source record? Exactly what information is typed and how? Measurement is important here, too, but the measurement such as explained in the previous paragraph is not satisfactory. In a detailed study of an operation, measurement must be sufficiently fine to cover at least the major elements.

While the "What," "Where," "When," "Who," and "How" facts are essential, the answers to "Why" in relation to each of these are fully as important. Answers to "Why" reveal the reasoning behind the present procedure and include the opinions, likes, dislikes and prejudices of the people concerned with the work directly and indirectly. Without the "Why" of a problem the analysis cannot be complete, is frequently doomed to failure.

With these answers we have isolated the causes back of the situation and can now accurately define our problem.

Aids for Fact Finding

In gathering facts, various types of charts have been developed to aid in obtaining all the facts and in organizing them in an orderly, logical manner for analysis. The most widely used—the Flow Process Chart developed by Frank Gilbreth—is most effective when one is studying an overall process or procedure, and is a steam shovel tool of Work Simplification. The Flow Diagram is frequently used to supplement the Flow Process Chart. This shows the flow of the work on a scale diagram.

The Multi-Column or Multiple Activity Chart is a modification of the Flow Process Chart. It is designed to show the flow of several subjects in relation to each other.

The Procedure Flow Chart, developed by The Standard Register Company, is a modification of the Multi-Column Chart especially designed to show the related flow of forms in a multiple-copy record system.

The Operation, Right and Left Hand, Man and Machine, and Simultaneous Motion charts are used in the study of operations and provide varying degrees of detailed breakdown.

These and other charts will be discussed in detail after we have completed a review of the five-step method. Each chart has its use as an aid in getting all the facts in an organized manner for ready analysis.

The Flow Process Chart and Flow Diagram are the principal tools used by all participants in Work Simplification. The other charts require special skills or training. However, in an effective pro-

gram, participants should have an appreciation of the charts and should have technicians available to assist when their use is desirable.

Analyze the Facts—Step 3

This step has been variously described as "Challenge each detail," "Challenge the job and each detail," or "Question the job and each detail." In discussing the first step we suggested that after the problem had been defined and the end result or product of the process or procedure under study had been determined, we question the necessity of that end result. Obviously if that end result is not essential and the entire procedure could be eliminated without a detailed study, we would accomplish a truly steam shovel job.

In the third step we again look at the over-all process or procedure, but this time with the benefit of *all the facts* covering the various activities in the process or procedure. We can now examine and weigh the end results of our process or procedure much more critically. We can examine them from the standpoint of the *cost of obtaining those results* as measured against the values derived. In many situations, particularly in paperwork, we will find that records and reports measured in terms of cost versus value, do not measure up and can be eliminated in their entirety.

Having survived the second and more detailed over-all evaluation, the facts regarding our problem are now subject to an extremely detailed examination and evaluation.

Our "six honest serving men" of Kipling (what, where, when, who, how and why) and the first three basic principles of work simplification are extremely helpful in a logical, detailed, critical examination of the facts. For this purpose we find that a rearrangement of our six questions adds materially to their value. We have determined what is done, where, when, by whom and how. Now we are questioning *why* it is done at all, why there, why then, why by that person and why in that way. The intelligent use of why is the expression of the "open mind" and the "questioning attitude" so essential to successful participation in work simplification.

In analyzing the facts we apply each of the double questions to every activity in a process or procedure or every element of an operation. We can then measure the answers to our questions in terms of our principles. When the answers to our questions do not measure up, we make notes regarding these unsatisfactory answers in the margin of our work sheet or chart.

Is Activity Productive?

The question "What is done?" is designed to bring out not only a statement of the activity but all the facts regarding it, including the time required per unit of work or the number of units of work per unit of time; total number of units completed, number of operators required and the cost. In now questioning "Why is it done?" we are of course considering "Is it necessary?" Here we can apply the first of our *principles*—"Activities should be productive." But let us clarify this first. The participant will soon recognize that activities in a process or procedure fall into four general classifications. These are usually described as *(1) operations; (2) moves* or *transportation; (3) inspections; and (4) delays or storages.* Generally speaking, when measured in terms of our first principle, the only activity which can be productive is an *operation*—performed on material in manufacturing or on forms in a paperwork procedure. The movement of material in manufacturing or of forms in paperwork; the inspection of the result of operations performed on material or on a form; and delays or storage of either —these activities are all nonproductive although they may be *necessary* in the process or procedure.

But not all *operations* are productive. From the standpoint of our analysis it is helpful to distinguish between the productive and the nonproductive. Examples of nonproductive *operations* would be cleaning a machining coolant or rust preventative from parts in process; or, in paperwork, separating the parts of a set of forms, after writing, for distribution to various departments.

In the more detailed breakdown, it will be recognized that an operation itself is usually made up of elements which may be classified as *make-ready, do* and *clean up* or *put away*. Only the "do" elements are productive. For example, the actual machining of a piece of metal or the actual typing of information on a piece of paper is productive. The detailed breakdown of the machining operation will reveal elements of positioning the metal preparatory to machining, removal and disposal as nonproductive elements. Similarly the positioning of forms in a typewriter, removal and disposal are unproductive elements of a writing operation.

Other Principles Apply

Our objective in questioning "what is done" and "why is it done" is to measure the operation or more finely, the element, in terms, first, of whether or not it is productive. Nonproductive activities or elements should be reduced to a minimum. When an operation or element has been determined as essential, it can then be questioned in terms of cost versus value. If the value does not exceed the cost obviously the operation or element must be questioned, even though it may further the end results or seem to be essential within the process.

Now to proceed, under *Analyze the Facts,* we take the answers to the next two double questions—*where* is it done —why is it done there; and *when* is it done—why is it done then—for each operation or element. We measure them against our second principle: *activities should be arranged to provide smooth flow in a process or a balanced motion pattern in an operation.* Again questionable answers are noted.

Next, *who* performs the operation—why does this person perform the operation, is asked of each operation in relation to our first two principles. Utilization of the highest skills of people is an element of *productivity.* The skills and abilities as well as the physical location of people may determine whether or not various operations may be combined or the sequence be changed to smooth the *flow* within a procedure.

Finally, the question of how is it done —why it is done in that way, is applied to the various operations and elements. Measured in terms of our third principle, that activities should be as simple as possible, the unsatisfactory answers are again recorded.

The Improvement—Step 4

We are now ready, in Step 4, to *Develop the Improvement.* We consider the respective possibilities for action—that is, *eliminate, combine, change sequence* or *simplify*—in logical order and in direct relation to the answers that have been developed in Steps 2 and 3, concerning each activity in a process or procedure.

First, the what-why answers—the activity or element of work plus the reason for it—are placed against the possibility of *eliminating.* Re-examination is applied first to *operations* or to *do* elements of an operation that are *productive* (measured by our first principle). With respect to each of these we now determine whether the value derived from the operation exceeds the cost. Here we must avoid the common error of accepting present "do" operations as essential. Major progress is made through basic changes.

The answers to where-why, when-why and who-why questions—for the "do" operation, still—measured against our first and second principles of *productive* and smooth *flow*—are examined to see whether or not any of the "do" operations may be *combined* or *changed in sequence.*

Finally the answers to how and why for the "do" operations are examined under our third principle of simple-as-possible to see whether or not the method by which the operation or element is performed may be improved.

(If improvement in an operation is indicated as the result of this examination and if the operation is of sufficient importance, it may indicate the application of the entire five-step work simplification pattern to that operation itself—with the proper detailed study chart to facilitate getting all the facts and analyzing them.)

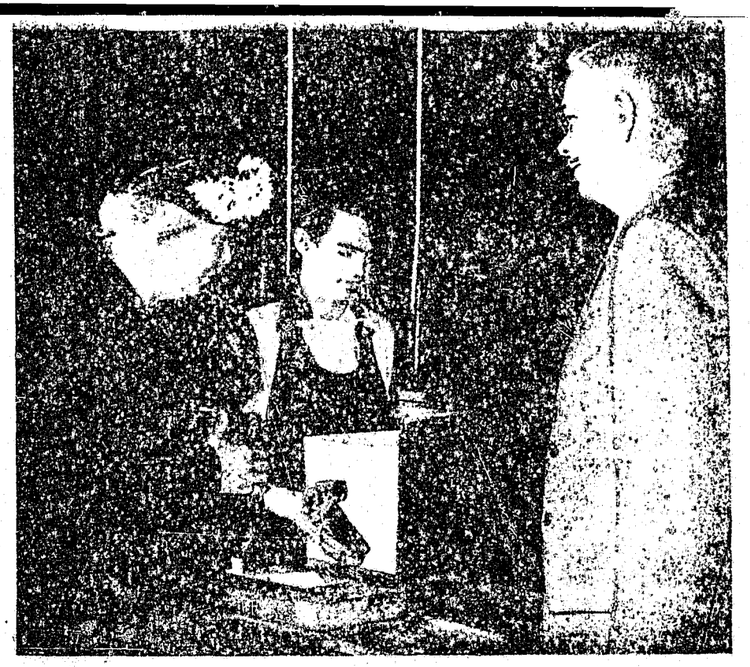
When all the "do" operations have been covered as above, we then proceed in the same way with other activities in a process — inspections; moves; delays and storages.

The sequence outlined above is logical and practical. Obviously if we question the "do" operations first and find that we can eliminate any of them we will automatically eliminate any of the nonproductive activities incident to that "do" operation. There is little use trying to improve an operation until we first find out whether it can be eliminated or combined with another operation. Also, there is little use in examining the nonproductive activities which are all incidental to and dependent upon the productive activities until we have completed our examination of the productive or "do" activities.

Short Cut May Be Risky

Having examined each operation or element and indicated the actions to be taken, we now organize those operations which remain, in a new chart of the improved operation.

The preceding description of Steps 3 and 4 may seem to those experienced in improving methods to be more detailed than necessary and, in some cases, repetitive or superfluous. The experienced man, for example, may question what and why in relation to "do" operations and take action without ever questioning many of the collateral operations. However, this can only be done safely by a



Observations by Dr. Gilbreth

I AM IMPRESSED by the way *participation* in Work Simplification penetrates to the worker level throughout the Standard Register plant." Dr. Lillian M. Gilbreth, industrial management consultant, "mother" of motion study, associate of Mogensen, Schell and Porter in founding the Lake Placid Work Simplification Conferences, is shown above with Standard's Clinton Thacker and Ben S. Graham as she made that remark. The boxing line (where she is watching the mechanical jogging of carbon-interleaved forms into tight-smooth-edged packs) is a good case in point; the workers themselves developed the layout and were even then improving it again.

"An individual who is given the technique of Work Simplification doesn't feel isolated in a job," Dr. Gilbreth commented. "It is group work. In a larger sense, one possessed of this technique can spread and extend scientific management to any area—not only industry, but to home and family life, social welfare, public affairs.

"Your employees are fortunate," interjected the 72-year old pioneer of scientific management, noting the precision that marks the manufacturing of Kant-Slip marginally punched continuous forms and mechanisms for their feeding and handling. "I would be most unhappy if I had to work where high standards of quality are not important."

Turning to Standard Register's conception of selling as the extension of Work Simplification to paperwork problems, Dr. Gilbreth saw it fitting in with the basic principle of participation. "Your salesman is the *resource* on whom those developing the improvements can draw for special knowledge, suggestions and assistance. He applies wide experience with many such problems in many organizations."

Dr. Gilbreth came to Dayton to address the local chapter of the Society for Advancement of Management. Last winter she attended the International Management Congress in Sao Paulo and traveled around the world.

person who is thoroughly competent, through extensive experience, to appraise results of this approach adequately. Since our objective is to get "everybody into the act" we must work in terms suitable to the neophyte rather than the expert. Ultimately, of course, every participant in a work simplification program will acquire some of this ability. However, if we expect to acquire this ability ourselves or transmit it to others, we must go through the painful detail in order to get adequate experience. Following the detail precludes many of the possibilities of omission or superficial examination.

Apply Improvement—Step 5

Finally, all of our efforts will be of no avail unless we take the fifth step; apply the approved method. This step usually involves, first, obtaining approval from authority up the line; second, installation of the improved method; then measurement of the improvement as compared with the estimated improvement; and finally a continual follow-up to see whether further improvements may be effected.

In some cases, particularly those involving expensive changes or equipment, it may be wise to precede actual installation by a pilot or test installation to work out weaknesses and validate assumed savings.

An evaluation of a new method, the potential saving and the cost of the improvement are desirable and in most cases essential in order to obtain approval from the line authority for installation of the new method. A brief statement of the problem, the objectives to be achieved through the study, and the results in terms of dollars, material, man hours, equipment, space or other savings, accompanied by charts of the present and proposed methods and the detailed evaluation figures, are the bare essentials of a proposal to be presented to the authority.

If our study has been conducted properly and our fourth principle of work simplification—participation—properly followed, line supervisor, co-workers and others possibly affected by the improvement will have been involved in the development of the improved method. This will facilitate acceptance of the method when it is installed, as well as the acceptance of the improvement higher up.

Once approval by the line organization has been given, the installation must be made. Obviously again, if participation has been developed among those who will be affected by the installation there will be little if any problem in training.

Eventually the actual benefit derived from improvement should, of course, be measured and compared with the cost of the old method and with the estimate of savings at the time it was proposed. Since many improvements can only be the best way *as of today*, in the light of existing conditions, equipment and circumstances, we should always keep in mind the re-examination of any improvement to look for further developments that may permit an even better answer.

STEP 4: DEVELOP THE IMPROVEMENT.

QUESTION	PRINCIPLE	ACTION
What—Why	Productive (1)	Eliminate.
Where—Why When—Why Who—Why	Smooth Flow (2) & Productive	Combine. Change— —Place —Time —Person.
How—Why	Simple (3)	Improve.

THE FLOW PROCESS CHART AS AN AID

The development of a most useful instrument in applying the scientific method.

EVERYONE who is successful in solving any kind of a problem uses, consciously or unconsciously, the five-step pattern of activity (the "scientific method") which we have discussed in previous articles as the basic tool of Work Simplification. (The steps: 1. Select a situation; 2. Get all the facts; 3. Analyze the facts; 4. Develop the improvement; 5. Apply the improvement.

In application of the pattern, many techniques and devices have been developed to assist in the process. Their purpose is to aid one in getting all the facts and organizing those facts so that a problem may be visualized in the overall as well as in detail; analyzing the facts; developing the improvement; and where necessary dramatizing the improvement to obtain management approval. The aids include many types of charts. Each chart has its place when properly used in the right situation.

At times the making of a chart has been over-emphasized. Unless it serves a definite purpose and makes the solution of the problem easier, or unless it can be used to help sell the solution to the authority who must approve any change, the making of a chart is itself waste that should be eliminated.

Problems as widely divergent as those of the baseball catcher helping his pitcher get the next man out and the president of a manufacturing company determining whether or not to build an extension to the plant are solved through the use of the five-step pattern.

An alert and analytical catcher knows that some batters are suckers for a change of pace, others for a low inside pitch or a high outside one. He knows whether a particular batter is likely to hit to right or left field and, if there is a man on first, which type of pitch the batter is likely to hit ahead of the runner. The outstanding catcher has the facts accumulated over the years, at his fingertips. As each situation arises he analyzes the pertinent facts and plays the percentages; if his pitcher ably follows instructions, we may see another perfect game—unless the batter, in the solution of his side of the problem, happens to be correctly anticipating the next pitch.

Obviously, however, no chart would apply in the situation.

A typical post-war experience illustrates the other sort of problem. We had been asked to aid in simplifying a manufacturer's back order paperwork. Business on certain products had grown so tremendously in the months following World War II that there was no possibility of keeping up with the orders and serious consideration was being given to the expansion of manufacturing facilities.

A detailed examination of a sampling of the orders showed that many of their competitors' regular dealers were placing large orders with this concern. This, together with the size of orders, indicated that many dealers were placing orders at every possible source of supply, for quantities far in excess of their needs, with the hope that partial shipments from any of the suppliers would take care of their current needs. The decision on the plant extension was delayed. In a few months as production improved and as moderate deliveries were made to the various retailers, wholesale cancellations of back orders confirmed management's judgment. While the five-step pattern was used, particularly the detailed analysis of all the facts, no Work Simplification chart was called for.

On the other hand, the situations in which some form of chart does apply are many and familiar.

Gilbreth's Contribution

The chart most commonly used is the Flow Process Chart. It was created by Frank Gilbreth as a part of his development of motion study and was one of the most important of his many contributions to scientific management. In scientific management the flow process chart compares to certain other charts used for breaking down and analyzing individual operations in detail, as the steam shovel compares to a hand shovel in digging a foundation.

In the beginning the flow process chart (also called the process flow chart) was a relatively simple two-column affair. In the first column were shown the various activities as they were performed in sequence in a process, connected by a flow line. In the second column was a brief explanation of each activity. As the value of this type of analysis became evident, elements of measurement were added. Quantity, time and distance all added to the value of the chart. Approximately 30 different types of symbols were devised by Gilbreth to designate the different types of activity.

Over the years many people have developed variations of the chart, each designed to solve the problems best for those who made the changes. Symbols were gradually narrowed down to express the basic type of activities and today either four or five are used. Probably the most commonly used today are the four Gilbreth symbols as follows: Large circle for an operation; small circle for transportation; inverted equilateral triangle for storage or delay; square for inspection.

It is also common to distinguish between a "do" or productive operation on the one hand and make-ready, put away or nonproductive operation on the other. This distinction is frequently made by coloring the large circle for the "do" or productive operation.

Refinement of Symbols

In paperwork we have felt that there were two major "do" operations, which were worthy of distinction. The first is

the origin or creation of a record; this we designate by a small circle inside the large circle or by coloring the entire large circle. The second "do" operation is one in which some information is added to the record. This is indicated by shading or cross-hatching the circle.

The above four symbols for expressing the major classifications of activities, with the variation of the operation symbol to indicate the "do" operation, have achieved wide-spread acceptance.

In the last few years a joint committee of the American Society of Mechanical Engineers and the Society for the Advancement of Management, chairmanned originally by Professor Ralph Barnes of UCLA and more recently by Professor David Porter of NYU, have developed a new set of symbols which they feel more adequately meet the needs of the chart. These symbols are the large circle for operation; square for inspection; an arrow for transportation; large D for delay; and the inverted equilateral triangle for storage. The arrow better indicates motion and direction. The large "D" was added to indicate delay as avoidable and distinct from an intentional storage. Neither a delay nor a storage when followed by other activity is essential or adds anything to the value of the product—except perhaps in cases such as the storage of the Kentucky nectar in charred oak barrels for a period of four years. And this would not be expressed as a delay or storage but rather as an operation: highly productive, or aging.

The symbols are significant. They help remind us that the only activity which can add to the value of the product is the "do" operation—and even some of these might not be essential when critically examined. The more of the other activities which can be eliminated the better for the overall process.

Essentials of the Chart

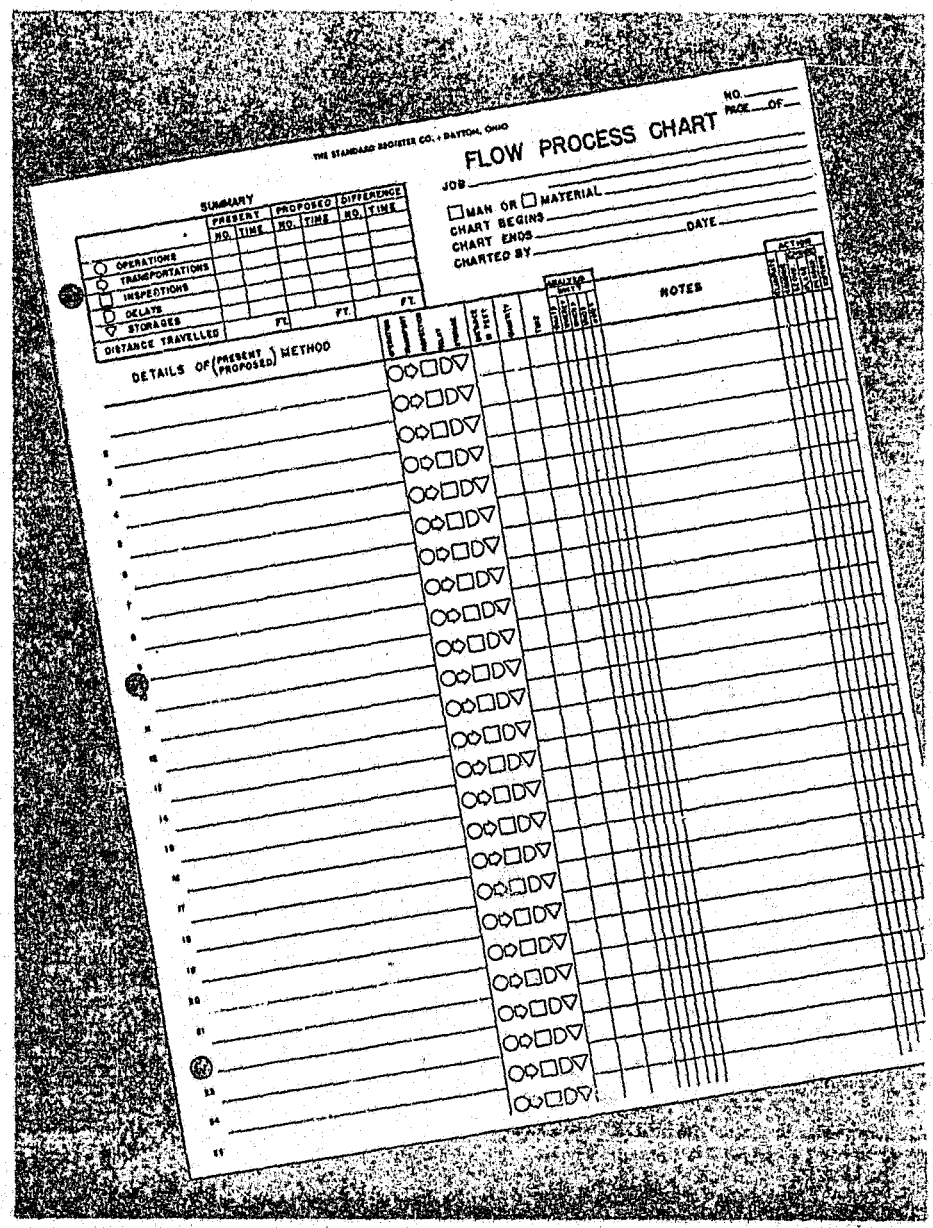
The flow process chart as used today is usually a printed form, frequently 8½" x 11" for convenience in handling, and although it may vary considerably in appearance and layout, it almost invariably contains certain essential elements.

There are two major sections, the heading and the body. In the heading, we should always assign the chart a number, and since charts frequently run more than one page, a page number. It is convenient to show also the number of pages included in the chart. The job is identified by a brief description. The subject to be charted must be noted and in the making of the chart, every step must be recorded in the terms of that subject. The subject is usually either man or material. The scope of the study has already been defined and the chart heading usually includes the beginning and ending point for the chart. The person making the chart is identified and the chart study dated. Frequently you find a record of the authority by which the chart or the study is being made.

The heading also includes a summary of the activities by operations, transportations, inspections, delays or storages. The number of each of the activities and the time required for them is a valuable part of the summary, as is the distance traveled for the transportation. The summary is usually in tabular form with columns for the summary of the present procedure, the proposed procedure and for the difference between the present and the proposed.

Details In the Body

The body of the flow process chart varies from a relatively simple page of columns, properly headed and with horizontal rules, to charts designed to show both the before and after methods. The



latter chart does not provide for as much detail as the single chart, but does give a direct comparison between old and new. Generally speaking, the flexibility provided by the double chart is not worth the sacrifice of detail.

The body of the simplest form of the flow process chart will contain columns for (1) step number; (2) the appropriate symbol to designate the type of activity for each step; (3) a brief description of the activity; (4) distance traveled and (5) notes explaining details of the step. Since a chart can rarely be recorded on one page, continuation sheets printed with the body matter only are usually provided, and may be pasted at the bottom to extend the chart as far as necessary.

Current developments in the form of the flow process chart have added a number of columns to the printed body, and from a superficial examination they might appear to make the chart more complicated. The purpose has been the exact opposite. Because so many workers are learning to use the process chart to help solve problems, columns have been added to emphasize the questioning pattern used in the analysis (the what? where? when? who? and how?—dominated by WHY?) and the action taken in relation to each of the steps on the chart (the familiar eliminate, combine, change or simplify).

The more recent charts also place more emphasis on the measurements as a part of the flow process chart study. Columns are almost invariably provided for recording the distance of a move; the quantity of materials processed in an operation or handled in any activity as a unit; and the time required for operations, inspections or any other activity.

While measurements as a part of the flow process chart study is not in terms of hundredths or thousandths of a minute, it is extremely important, particularly in evaluating the old and new methods. Facts derived from an analysis of the activity over a sufficiently long period to be accurate and fair, are the basis of this measurement. If for example an office department is staffed to handle maximum volume, but keeps busy full time when the load is at 50% (a situation which occurs all too frequently) the facts should be known and recorded.

Question of Emphasis

In these modern charts the five symbols are preprinted at each numbered step on the chart. All that is necessary for flow charting is to join the appropriate symbol at each activity to that of the next activity in sequence, by a line.

Some charts separate the operation and inspection symbols from the transportation, delay and storage symbols by a vertical rule and emphasize that the transportation, delay and storage do not add any value to the product. In this type of chart there would be a tendency to concentrate on eliminating the three types of activity so emphasized. But what about the other two?

Personally I do not believe that the inspection adds any value to the product, and certainly operations of the make-ready and put-away sort add no value either. It is only the "do" operations which can add value and even these do not always prove to be necessary after critical examination. If we can eliminate the "do" operations, we usually eliminate many collateral operations dependent upon that "do." I feel we should examine every activity critically to improve it rather than emphasizing one more than the other. If special emphasis should be given at all, it should be toward eliminating the "do" operations, if possible.

Major Purposes Served

It has been suggested before in this series of articles that the worst stumbling block to the elimination of waste and the increasing of productivity, has been the problem of selling the improved methods. In Work Simplification it is recognized that at least 75% and perhaps as high as 90% of the problem is selling the improved method. Further it is recognized that people will buy their own ideas. If they can develop the new, improved methods, they will use them enthusiastically. In the current developments of the flow process chart, the objective has been to provide a form which can be used effectively by as many people as possible, while at the same time emphasizing the importance of the elements of measurement, the questioning pattern as a method of analysis and the action pattern. The flow process chart herewith illustrated is one development in this field made by the Work Simplification Conference, directed by Allan H. Mogensen.

The flow process chart has been designed to help you, me and everyone interested in improving work, do a better job. It should help us to be sure that we got every detail in relation to every other detail in logical sequence, together with adequate measurements in the study of a process or procedure. It should also help us logically to analyze the activities in relation to each other and to take appropriate action. The comparison of the before and after charts should help us to present the facts and contrast them visually to convince our superiors that our ideas are good.

To make a chart simply for the sake of making a chart is pure waste. If the chart does not serve its purpose, *don't make it.* Use it *always* when the situation calls for it.

PAPERWORK SIMPLIFICATION CONFERENCE

FLOW PROCESS OR OPERATION CHART

Chart No.

Process or Operation ____________________ Flow Diagram or Layout No. ________

Subject ____________________ Man / Material

Chart starts ____________________ Ends ____________________

Prepared by ____________________ Date ________

System Study or Flow Process Chart No.	Operation No. Page of	Annual Savings: Labor, Material, Equipment, etc.	Installation Cost	Net Savings

ANALYSIS		IS IT NECESSARY ?	ACTION		
WHAT is done? WHY?			Not necessary	Eliminate	
WHERE is it done? WHY?			Better Place	Change	
WHEN is it done? WHY?			Better Time	Change	Combine
WHO does it? WHY?			Better Person	Change	
HOW is it done? WHY?			Better Way	Analize to improve	

SUMMARY	Present No.	Present Time	Proposed No.	Proposed Time	Difference No.	Difference Time
Origin of record						
Add to operation						
Handling operation						
Move						
Inspection						
Store, delay, dispose						
Distance traveled						

PRESENT METHOD Description	Effect	Subject Charted	Distance	Quantity	Time	What	Where	When	Who	How	NOTES	Action	PROPOSED METHOD Description	Effect	Subject Charted	Distance	Quantity	Time
1		○ o □ ▽													○ o □ ▽			
2		○ o □ ▽													○ o □ ▽			
3		○ o □ ▽													○ o □ ▽			
4		○ o □ ▽													○ o □ ▽			
5		○ o □ ▽													○ o □ ▽			
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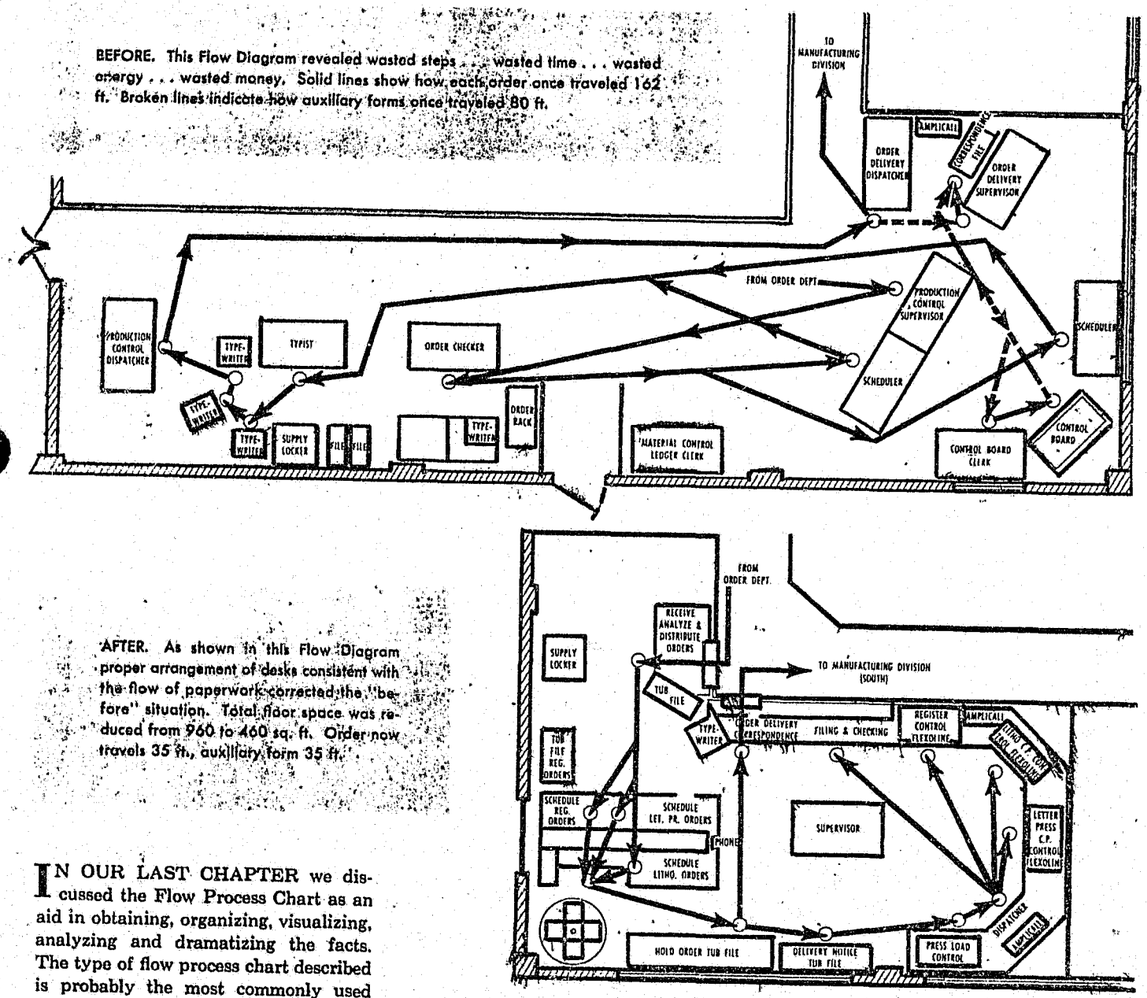
Process or Operation

THE FLOW DIAGRAM IS A ROAD MAP

In analyzing the facts of travel, "a picture is worth 10,000 words."



BEFORE. This Flow Diagram revealed wasted steps . . . wasted time . . . wasted energy . . . wasted money. Solid lines show how each order once traveled 162 ft. Broken lines indicate how auxiliary forms once traveled 80 ft.

AFTER. As shown in this Flow Diagram proper arrangement of desks consistent with the flow of paperwork corrected the "before" situation. Total floor space was reduced from 960 to 460 sq. ft. Order now travels 35 ft., auxiliary form 35 ft.

IN OUR LAST CHAPTER we discussed the Flow Process Chart as an aid in obtaining, organizing, visualizing, analyzing and dramatizing the facts. The type of flow process chart described is probably the most commonly used device for this purpose. It is particularly applicable in the analysis of a manufacturing process or a paperwork procedure which involves the flow of a material and related activities. It has, however, a major shortcoming in that it does not provide for visualizing the various operations or movements in perspective. When distances are long, when the flow is complicated or back tracking is involved, it is frequently necessary to visualize this *flow* in order to properly appreciate and analyze it.

The Flow Diagram developed for this purpose is a layout of the work area with a flow line drawn on this layout to indicate the path of movement. (The Flow Diagram has been variously termed as layout, flow layout and process layout. The use of this terminology is apt to be confusing, particularly when "layout" is the one selected. Layout has long been used as the name for the detailed scale drawing of a work area. However, no movement or action is usually associated with the layout.)

The Flow Diagram in its simplest form is used as a supplement to a *Flow Process* Chart study and may consist only of a rough free-hand drawing of the work area with the flow of the material indicated by the flow line. In this form the flow diagram can be used to supplement the flow process chart in the analysis only of the most elementary type of problem.

In any but the most elementary problems a scale layout of the work area is first made. Work stations and equipment are drawn in the work area to scale. The flow of work is then indicated by the flow line. To make the picture more clear, symbols may be used to indicate the type of activity at the various work stations. Arrow heads indicate the direction of the flow on the flow line. The operation, delay, storage or inspection symbols, as described in discussion of the Flow Process Chart, may be used at the various work or activity stations.

In the more complicated problems there is frequently a great deal of back-tracking or confused line patterns in the flow diagram. This is particularly true in the study of paperwork systems involving several copies of various forms. Colors or line patterns may be used to simplify the reading of the flow diagram and differentiate the various flow lines. Line patterns might be varied by using light and heavy lines, dots, broken lines or variations of these patterns.

In its most complicated form the Flow Diagram may assume the proportions of the three dimensional scale layout, involving scale models of equipment and work areas and colored tapes or cords to indicate flow. However, this is a tool used only by the specialists. Except in extreme cases, the two-dimensional flow diagram will serve the purpose.

The flow diagram records primarily the flow of materials or movement of people. The only measurement involved is distance. In some simple problems involving only movement it may be the only device used to simplify the gathering, organizing, visualizing and dramatizing of the facts for analysis. However, these occasions are the exception rather than the rule.

Many attempts have been made to combine some or all of the advantages of the flow diagram with other forms of charts. This is particularly true in early attempts at the charting of paperwork systems. One of our early experiments involved the designation of areas to indicate departments, with different colored flow lines indicating the flow of the various pieces of paper from the point of origin through the various departments to their final destination. We soon found, however, that this was much too complicated to give one either the values derived from the Flow Diagram or from the Flow Process Chart. This practice was soon dropped in favor of using two charts to serve the purpose. The one indicated the activities in relation to each other while the flow diagram indicated the actual, physical flow.

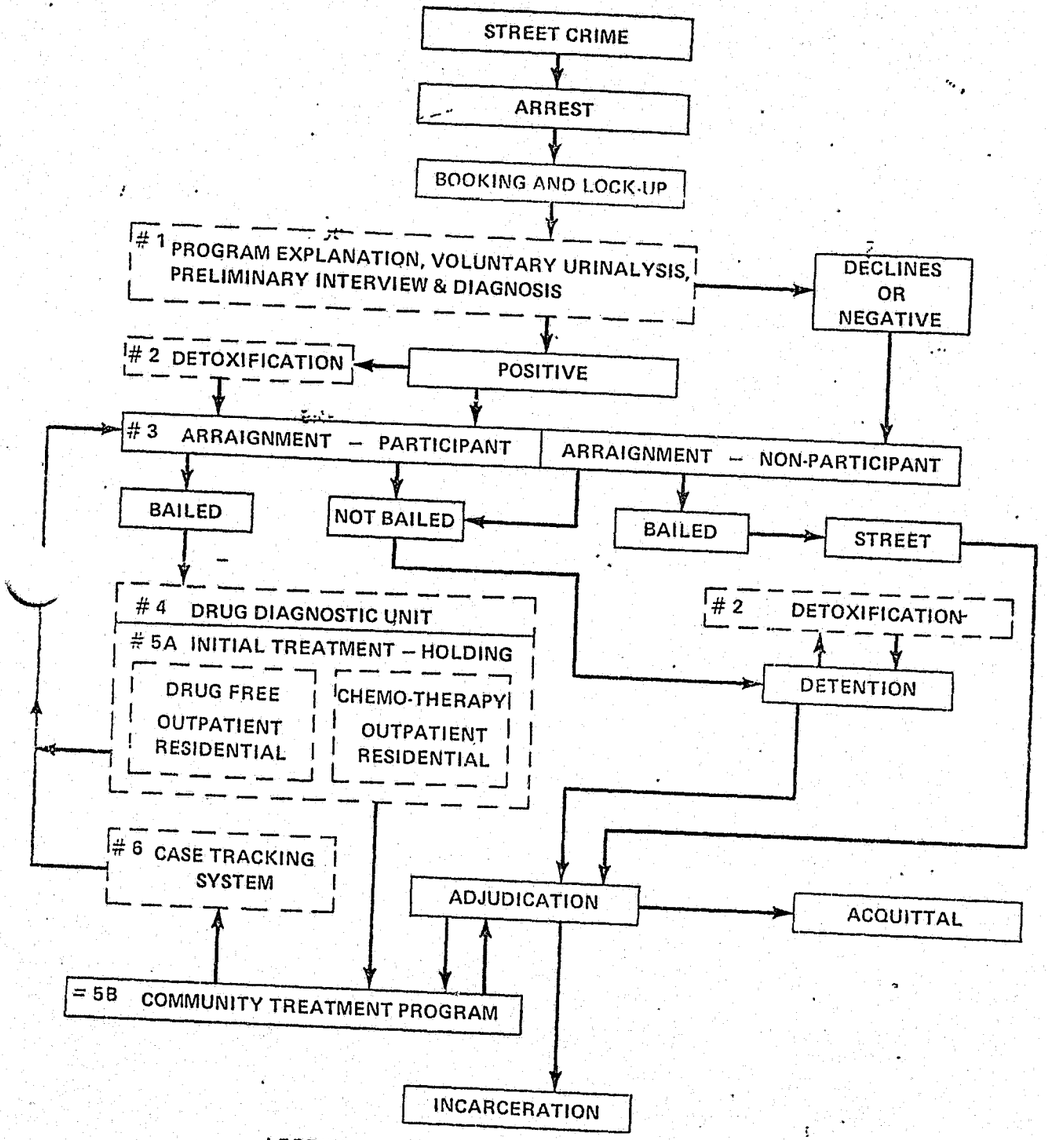
Other attempts have included dividing the chart vertically into areas assigned to various departments. Each sheet of paper was then shown originating in a given area and flowing from department to department. However, when a system involving several pieces of paper and a complicated procedure was charted in this manner, the back-tracking and the inter-relationships of the various pieces of paper resulted in a highly complicated and confusing chart.

The before and after flow diagrams illustrated here provide an excellent example of what can be accomplished when the actual flow is visualized. The results illustrated in the new arrangement of the work area and the flow of the papers—both in reduced travel and in halving the space required—are eloquent testimony to the value of the flow diagram.

When the Flow Diagram is used to supplement a flow process or other chart it should, of course, be properly identified as related to that study. In those cases where the flow diagram is used as the only device in the study, it should be identified with substantially the same information as is used in the heading of the Flow Process Chart previously described. Since the flow diagram must be drawn to fit the specific work area under study, there is no standard form for use.

The Flow Diagram is an excellent device when used as an aid in solving problems through the "Scientific Method" (five-step pattern) of Work Simplification. It accurately pictures flow or movement in relation to work stations in a work area and distances involved in the movement; and it helps each person studying the problem to see the relationship of each work station to every other and picture the entire procedure.

CASE FLOW CHART



DISCUSSING THREE SPECIAL TOOLS

For the study of paperwork procedure

FIVE SPECIAL devices and charts to aid in the comprehensive study of complicated systems and procedures were mentioned in our previous article: the *Outline of Objectives, Procedure Study Sheet, Procedure Flow Chart, ~~Form Design Data Sheet~~* and the *~~Typewriting Analysis Form~~*. Actually the first three have to do with study of the procedure, the last two with the study of details within the procedure. The overall study of a system is most important and should be undertaken before detail is improved. Waste has been compounded too many times by the initial study and improvement of detail which was later found to be entirely unnecessary when the overall system was studied.

Outline of Objectives

The first step after the system to be studied has been selected, is to gather preliminary data regarding it and outline the objectives to be accomplished so far as possible. The Outline of Objectives (S.R. Form 929) has been designed for this purpose. Such a study should be initiated and usually participated in by fairly high level management people from the various departments involved in the system. A technician is required to gather and organize the essential information from the various people in order that those participating may see the overall picture. Then it is frequently worthwhile to have the interested people examine the reports and records involved in the procedure. At this point these documents can be evaluated from the standpoint of whether or not they are essential. Sometimes a steamshovel job can be done by eliminating some of the reports, or in the exceptional case eliminating the entire system. This, of course, is the most profitable type of work simplification. It can only be accomplished if those involved approach the problem with a completely open mind.

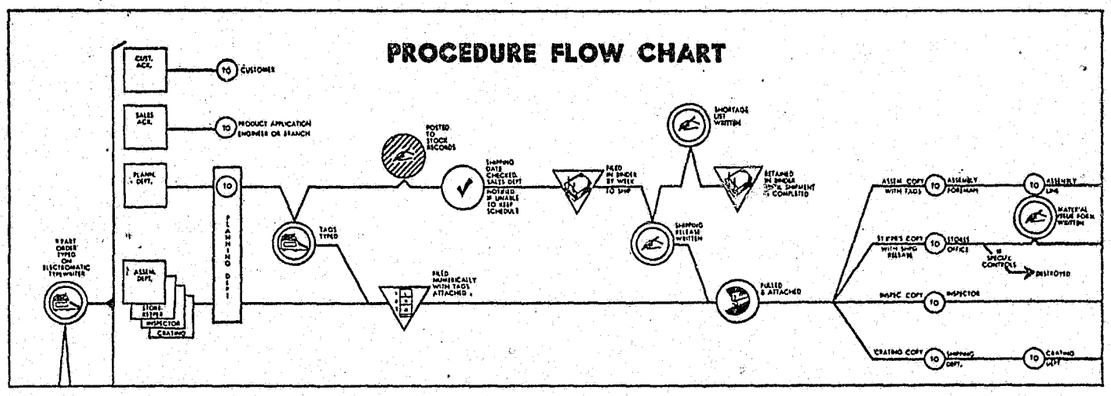
Procedure Study Sheet

When the objectives have been outlined and the study decided upon as worthwhile, the next step is to gather all *detailed* facts and organize them. The *Procedure Study Sheet,* a modification of the Flow Process Chart also mentioned in the last article, is the form devised for this purpose. (S.R. Form 90).

Its heading provides primarily for identification of the specific line of flow covered by the Sheet, in relation to the system being studied. A separate *Procedure Study Sheet* is made up for each line of flow. Usually a line of flow indicates a single piece of paper. The exception might be found when a set of forms is written and follows a number of different operations as a complete set before being separated. In such case a single study sheet may be used to record the flow of the entire set as a unit, until separation of the parts. The heading (see cut) also includes as reminders the symbols; the double questions so important in any improvement development and the action which may result from challenging each step.

One additional symbol might well have been illustrated. In this case, it would be a "V" on its side, with the point to the right. Frequently, in paperwork, one piece of paper causes something to happen to one or more other pieces of paper or action to be taken. This has been classified as an effect. In order to record the inter-relationship of various pieces of papers in a system, it is necessary that these effects be charted with other activities.

For example, when a receiving report comes into the Purchasing Department to indicate that the material covered by a purchase order has all been received, it may cause the purchase order to be pulled from file, attached and forwarded to the Accounts Payable Department. Receipt of these papers in Accounts Payable will then cause the invoice to be pulled from file, approved for payment and the check to be written. These are activities *caused by* the receiving report, rather than *happening* to the receiving report and are indicated by the effect symbol.



When such an effect occurs, the symbol "V" is placed in the symbol column. The activity effecting the other form is shown in the notes column by the proper symbol and brief explanation.

The *Procedure Study Sheet* in the body provides for recording the step number, the symbol, and a brief description. The next three columns provide for measurement of each activity, using a yardstick suitable to the job being studied. In studying an overall system, in order to have all the facts, we must know, for example, the number of operators typing invoices and the number of invoices typed per unit of time (hour, day, or week). If later we intend to evaluate the improved method, we should also have a general idea as to the dollar cost per hour of that class of operator. In the case of filing, sorting, posting and other operations, we should have similar measurement. Without this data, we certainly do not have all the facts.

In the study of overall systems the number of lines provided on the *Procedure Study Sheet* are frequently inadequate to record the activity connected with each piece of paper. Extension sheets which may be pasted to the heading sheet are provided.

When the technician has gathered all of the information regarding the flow and activity of each piece of paper involved in a system, it is usually desirable to review this information with the people interested in the study to be sure the detail is correct. The next step is to bring all this detail together in a single picture so that it may be readily visualized by all parties as a complete system. This also permits each detail to be seen in relation to all others. After a great deal of experimenting with many types of charts, the *Procedure Flow Chart* was developed for this purpose.

The Procedure Flow Chart

Systems involving several multi-copy forms frequently are made up of literally hundreds of activities. None of the conventional types of vertical charts are adequate to express these activities in relation to each other. Such charts are frequently 20, 30 or even 50 or 60 feet long, which makes it impossible to display them vertically. For that reason we have devised what we call the horizontal flow. With it, even the most complex system can be displayed on the walls of a room, although at times it has become

System _____ Procedure Study Sheet

Date _____

Prepared For (Company Location, Sponsor) | Job Assignment No

Form | Form No | Title of Copy | Copy No.

Origin of Record · Adding To Record · Handling Operation · Move · Inspection · Hold, Delay, File Or Storage

Question Each Step: What is done? WHY? · Where is it done? WHY? · When is it done? WHY? · Who does it? WHY? · How is it done? WHY?

Indicate Type of Improvements For Each: Can it be eliminated? If so, indicate by ___E · Can it be combined or changed in sequence for better operation? If combine, mark ___C; If change in sequence, mark ___CS · Can it be simplified? If so, mark ___S

Step	Symbol	Description	No of Oper.	Wage Bkt.	Output or Dist. Moved	Notes - - - Questions - - - Improvement

difficult to find a room large enough. In this type of flow chart we have horizontal levels or lines. The number of levels is determined by the number of lines of flow which occur simultaneously. On these lines of flow, we have positions. In any vertical column of positions, the activities occurring on each line of flow will have a time relationship.

Situations or activities not covered by the basic charting symbols, frequently occur when we put these separate lines of flow together. Several of these are illustrated in the section of a *Procedure Flow Chart* reproduced.

Charting Conventions

When a multi-copy form is originated, the various parts are indicated by the square (same as the inspection symbol) with the title or number of the part written inside the square. These are bracketed as shown in the illustration to indicate that the origin of all occured in the single writing.

When several parts flow together, usually attached, they may be indicated as shown by the four grouped at the point of origin. A single Flow line then indicates that they travel as a unit until such time as they are separated.

When the same activities affect two or more parts simultaneously, it is shown by a vertical rectangle, crossing the flow lines, with the symbol indicating the activity placed within the rectangle.

The charting of "effects" by means of a V either in normal position or inverted, is illustrated in the flow of the Planning Department copy in the example. Other documents may join the line of flow as in the case of the "tags typed" or the "shipping release written" and attached to the four parts for the Assembly Department. When the parts are separated this is indicated as shown at the extreme right of the example.

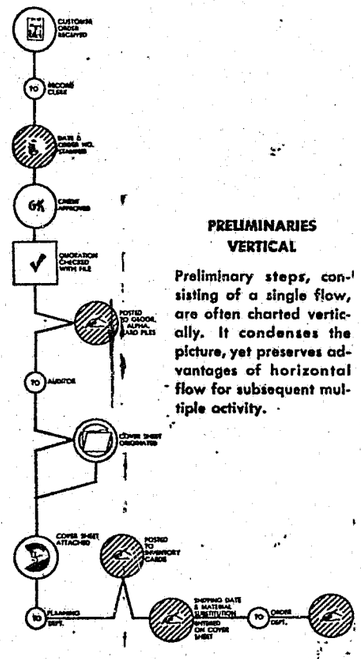
Another charting convention, the "by-pass," is illustrated on the section of a chart opposite; see caption.

The advantages of the horizontal charting technique have been cited. But to chart horizontally a relatively long series of operations preceding origin of a multiple-copy form adds nothing to clarity. Hence no suggestion here.

Now let's consider briefly the "iffiness" we encounter. Business, production, life, even paperwork systems don't always rigidly adhere to a standard pattern. Contingencies must be met in systems. In the Procedure Flow Chart we have met the situation by providing conventions for alternatives.

When manufactured parts reach inspection, for instance, the *basic flow* will show what happens in most cases. But rejected parts may be reoperated or they may be scrapped with as much materials salvaged as possible. Failure to provide definite alternate procedures for reworkable and for scrap parts has often resulted in material losses running into tens of thousands of dollars. Lack of proper controls has resulted in reworking with piece work rates credited and paid several times for the same operation.

The system from which our charting illustration is taken covered order, shipping, invoicing, sales and inventory activities. If an order is shipped incomplete, the star (see chart section) indicates an alternative, extensive procedure.



PRELIMINARIES VERTICAL

Preliminary steps, consisting of a single flow, are often charted vertically. It condenses the picture, yet preserves advantages of horizontal flow for subsequent multiple activity.

to be followed before entering the steps following it. This is one method.

A simple alternative is shown at points (3). If after the extensive procedure mentioned has been followed, shipment is still incomplete, parts (E) and (F) will go to file as indicated. If shipment is complete, re-filing of these parts is skipped.

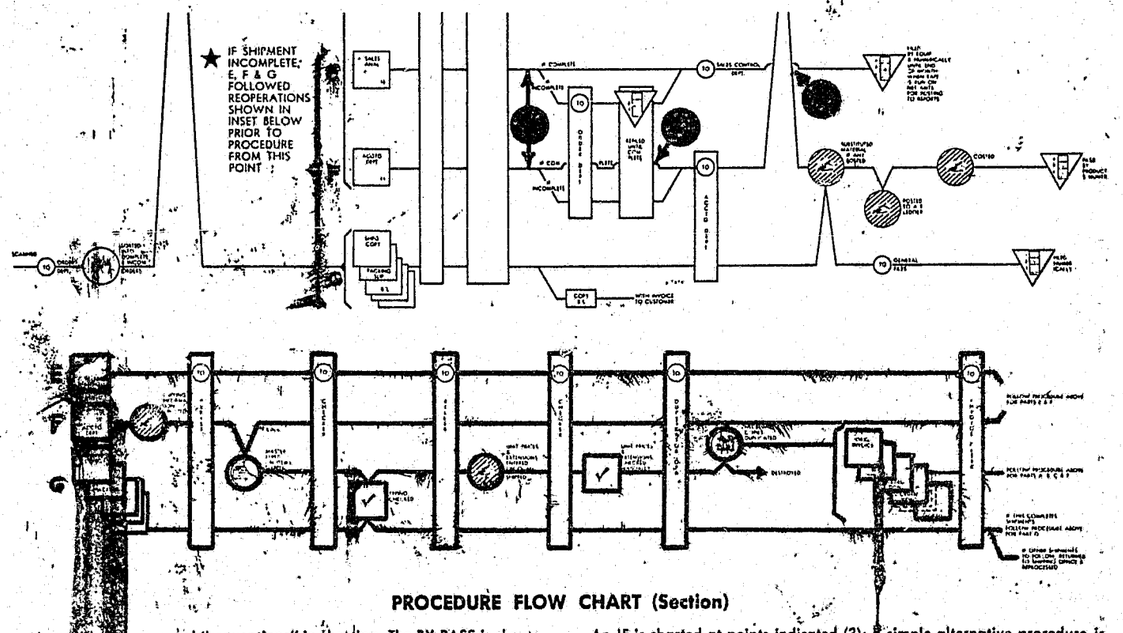
Some cases require extremely elaborate alternatives. The one shown by star is in reality an added procedure. It does not replace any part of the normal system for complete shipments. When such procedures are sufficiently involved, the easiest way to show them is to make an overlay, hinged at the top of the chart. With several overlays these can be used like a "flip" chart to expose any one of the procedures.

Just Enough Detail

Usually the Procedure Flow Chart does not present all the facts. These should be available on the source charts, the Procedure Study Sheets. If adding the number of times an operation is performed per unit of time will make the chart more effective, this can be done readily in the explanation. For example, when the operation "invoice written" is indicated we can add "20 per hour per operator" or "120,000 per year, 3 operators full time." At a storage or delay point, the time may be shown if significant. Distance moved may also be indicated. But—we want to avoid adding so much detail that we detract from the broad picture.

One common practice in Paperwork can be confusing. Papers are grouped in batches. Orders move through a procedure in batches. Invoices, accounts payable, payroll records and many others are handled in the same manner. Yet in charting we follow the flow of one piece of paper, one order, invoice, accounts payable voucher or payroll record. For clarity in charting, the movement from operation to operation may carry the added explanation "50 per batch" or "100 per batch."

Handling of papers in batches at times causes confusion in charting. Consistency in the Procedure Flow Chart is important particularly if we are to get a general picture of the system. Breaking an operation down in detail at one point and not at another tends to distort the importance of detailed operation.



PROCEDURE FLOW CHART (Section)

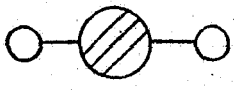
Above illustrates several "conventions" in charting. The BY-PASS is shown at (1) and (2). indicates that flow line is going around the rectangle (simultaneous ...) in the one case and around the inverted V (effect) in the other and that neither is involved in the progress of form parts indicated.

An IF is charted at points indicated (3); a simple alternative procedure is followed here. If the shipment is not then a complete one. But preceding this, a star-marked "If" directs one to the more elaborate alternative procedure for papers E, F, and G that is charted in color below.

Ordinarily an operation is shown to indicate what happens at a work place. Exceptions may be made when two or more definitely independent operations are performed by the same person. One indication that they should be separate is that they would be performed at separate work places if the volume were large enough. An example may serve to clarify some of the more common misunderstandings.

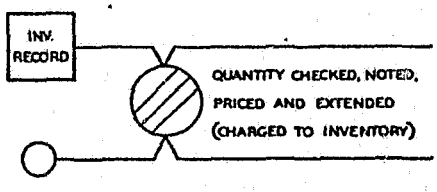
Let us assume that an order procedure is being charted. The order goes from the mail room in a batch of 50 orders to the desk where customer credit is checked and discount rate is applied. When the batch is finished, it moves to the next work place. Since the average order is in the middle of the batch, it will sit on the desk a while before and after the actual operation on that specific order. This is frequently charted in this manner.

The delays, before and after the operation, are not necessary. If the description of the move shows "credit desk in batch of 50" the charting . . .

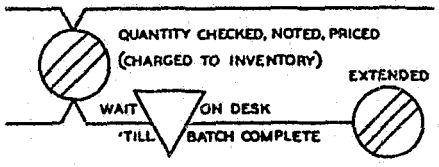


. . . is adequate and more consistent. It is obvious that all invoices in the batch cannot be handled at once, but the batch is being worked on.

However, at the next work place, inventory is checked, availability noted on the order, quantity charged out on the inventory, prices from the inventory card posted and extended on the order. Two records are involved with several postings. If the operator completes one order at a time, this would be the simple way to show it:



If the batch is completed before any extensions are made, it could be charted in the following way. Obviously the operator is performing two separate operations.

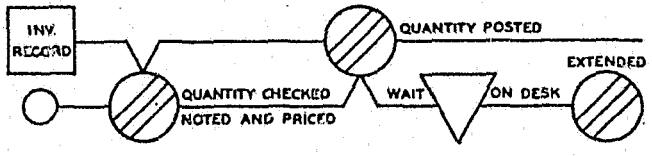


If more detail is required and shown throughout the chart, this activity could be shown as indicated below.

But generally the latter method shows too much detail, particularly since the order is the subject of the chart, the inventory record incidental.

While batching is common practice in production, it is frequently overlooked in Paperwork. Proper batching can save much bitching, if I may be permitted to resort to common parlance.

The Procedure Flow Chart, as well as several of the charts used to make a detailed analysis of specific operations, is not made by the individual participants in a Work Simplification program. They involve technical training and time out of proportion to their use. Each participant should be familiar with the various charts, understand when they will be helpful. Facilities should be available to the participants when needed. The technician can make the detailed studies and prepare the charts, but participate in the analysis and improving only as a technical resource when requested. If the technician attempts to take over and run the show, he is liable to destroy the major values of Work Simplification. In many cases, clients have found Standard Register representatives are the best source of special technical help in complicated Paperwork procedures.



PAPERWORK SIMPLIFICATION CONFERENCE

SYSTEM STUDY

NO.

Requested by | Prepared by | Date

SYSTEM

Study begins with Dep't., Operation, Form

Study ends

Departments involved

FORMS, REPORTS, OTHER RECORDS INVOLVED

Name	No. of Parts	No. Operations	No. Locations	Type of Form	Annual Usage	Quantity on Hand	Writing method	Samples Blank	Samples Min fill	Samples Max fill

OBJECTIVES — Indicate weaknesses or deficiencies to be corrected. - Lack of control, adequate information or flexibility. Obsolete forms or methods. Unnecessary delays, duplications, bottlenecks. Personnel problems. Manufacturing difficulties.

RESULTS

	Savings Old	Savings New	Savings Net
Labor			
Material			
Equipment			
Total			

Date to start	Est. man hrs required	Analyst assigned - Name, date	Employees advised	Analyst introduced	Est. finish date

SUMMARY	No.	Time
Origin of record		
Add to operation		
Handling operation		
Move		
Inspection		
Store, delay, dispose		
Total		

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number

Chart No.

Page of

Date

System

Form name | No. | Copy name | No.

Prepared by

Effect	Subject Charted		Description — Notes - Questions	Distance	Quantity	Time
	○ o □ ▽	1				
	○ o □ ▽	2				
	○ o □ ▽	3				
	○ o □ ▽	4				
	○ o □ ▽	5				
	○ o □ ▽	6				
	○ o □ ▽	7				
	○ o □ ▽	8				
	○ o □ ▽	9				
	○ o □ ▽	10				
	○ o □ ▽	11				
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	○ o □ ▽	24				
	○ o □ ▽	25				

PROCEDURE CHARTING

This description is intended to provide the basics of procedure charting. It is not intended to answer every question that could come up in procedure charting but it should help a careful reader to be able to figure out, for himself or herself, satisfactory answers to most charting questions.

HORIZONTAL - We chart horizontally because it is easier to work on the charts and to display them if they are horizontal rather than vertical.

SYMBOLS - (See figure 1.) The value of the symbols is that they help us to concentrate on different functions of work, one at a time, - transportation, inspection, storage, etc. For instance, a glance at a procedure chart can quickly reveal the records retention situation for the procedure charted by concentrating on the storage symbols.

There is nothing sacred about these symbols. They were considered useful by the men who originated them (Frank Gilbreth and Ben Graham, Sr.). If you are interested in studying the functions of work which these symbols represent, use them. If not, change them. As long as you provide a key on each chart you should have little difficulty.

ASSIGNING THE HORIZONTAL LINES - The first rule of procedure charting is that each document to be charted is assigned a horizontal line and all of the symbols for that document appear on that line. Exceptions to this rule are explained under the headings, "ALTERNATIVES", "CORRECTIONS", "ATTACHED", "TOGETHER" AND "MULTIPART DOCUMENTS".

When all of the steps involving a particular document have been charted a period is placed on the line just to the right of the last symbol (or effect). This indicates that the remainder of this line, further to the right, is free to be used for charting other documents. (See figure 2.)

LABELS - Each document line is labeled to the left of the first symbol (or effect) on that line. The label is a rectangle in which the identification of the document is written. (This is the only case where information is written inside of a symbol.) (See figure 2.)

FIGURE 1
PROCEDURE CHARTING SYMBOLS

ORIGINATION - This symbol is used to indicate the first time information is added to a document

ADD TO - This symbol is used to indicate all subsequent entries of information on a document.

(Together the origination and the add to symbols show the flow of information in a procedure.)

HANDLING - This symbol is used to indicate all of the times a document is handled (i.e. sorted, stapled, put in file, removed from file, separated, etc.).

TRANSPORTATION - This symbol is used to indicate all of the times a document moves from one work station to another. In normal usage, movement at a single work place is ignored. Sometimes this symbol is used in place of the small circle.

INSPECTION - This symbol is used to indicate activities which exist primarily for the purpose of checking for proper quality or quantity.

STORAGE - This symbol is used to indicate periods of time when a document is stored. Sometimes short delays are distinquished from long term storage by using the symbol to indicate delay.

DESCRIPTIONS - By themselves, the symbols do not provide enough meaning to adequately describe the steps of a procedure. Therefore the symbols are supplemented with written descriptions located next to but not within the symbols. Normally the description is placed below the symbol and amounts to only four or five words. (See figure 2.) Occasionally, however, a description may require several paragraphs and may even include an illustration or a copy of a form.

EFFECT - An effect occurs whenever two or more documents are used in such a way that one or more of them contributes to an effect on another (or others). Some examples are: (See figure 3.)

1. Information is copied from one document to another. The one document contributes information. The affected document has information added to it.
2. One document is used to check another. The one document contributes valid data. The affected document is either verified or found to be in error.
3. Several documents are used to originate another. Several documents contribute data. The affected document is originated.
4. One document is used to locate and pull another from file. The one document contributes identifying information and the affected document is removed from file.

The effect is charted with a "V" or an inverted "V" which points in the direction of the affected document.

ALTERNATIVES - When a document may be treated in more than one way the line is branched and the different treatments are charted on different lines. A black circle is used to call attention to the branching, at the point where the line divides. A description is written near each of the lines to indicate the conditions which call for each of the treatments. Often but not always the branches will rejoin later. (See figure 4.)

CORRECTIONS - Whenever an inspection occurs in a procedure it will be followed by some sort of error routine to show the action which is taken in those cases where the inspection turns up something wrong. Simple corrections are usually handled in the description next to the inspection symbol but when a correction requires several steps it should be charted. Corrections are charted in the same manner as alternatives with two differences. The treatment which the document receives when there is no error is charted on the same line that was being used to chart the document. The correction is shown on a different line and is shown with a dotted line. A dotted line always indicates an error routine. (See figure 5.)

2.

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FIGURE 2

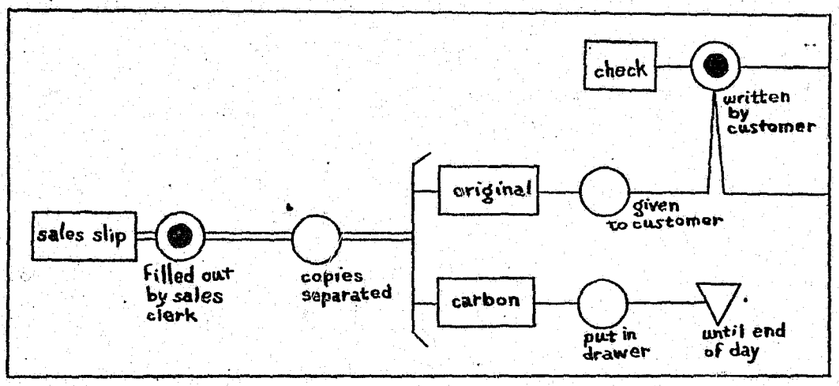
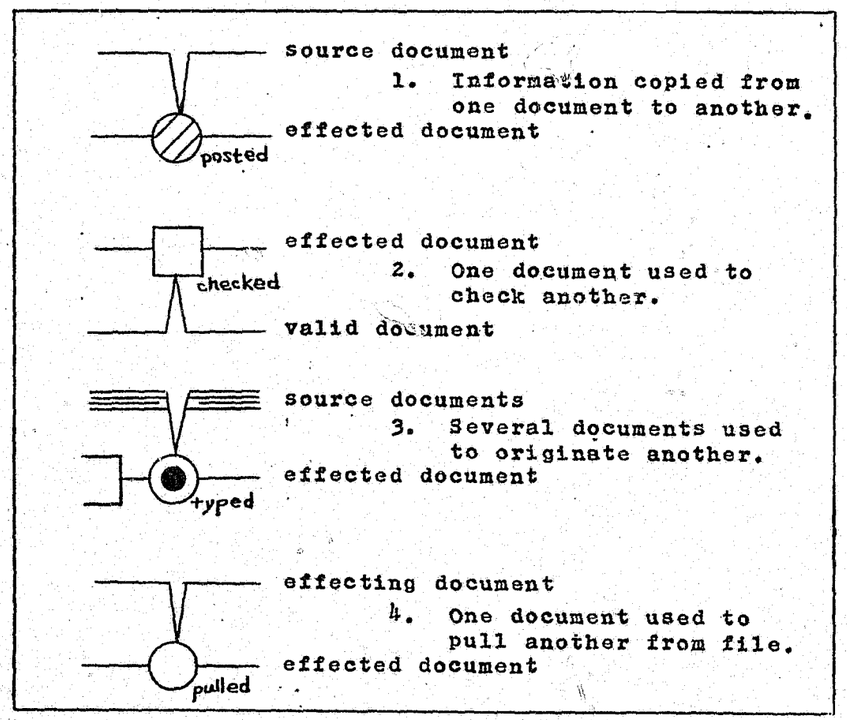


FIGURE 3



ATTACHED - When two documents are attached to one another their two lines are brought together. This is usually done by bringing the line of the subsidiary document to that of the more significant document. It is helpful to continue both of the lines to signify that more than one document is being shown. (See figure 6.)

TOGETHER - When two documents are dealt with together but they are not physically attached they may be charted in two ways. One is identical to the charting of attached documents except that there is not a handling operation showing the physical work of attaching. The other involves not bringing the lines of the two documents together but indicating that a symbol applies to both by placing it in a rectangle which, in effect, places the symbol on both lines. (See figure 7.)

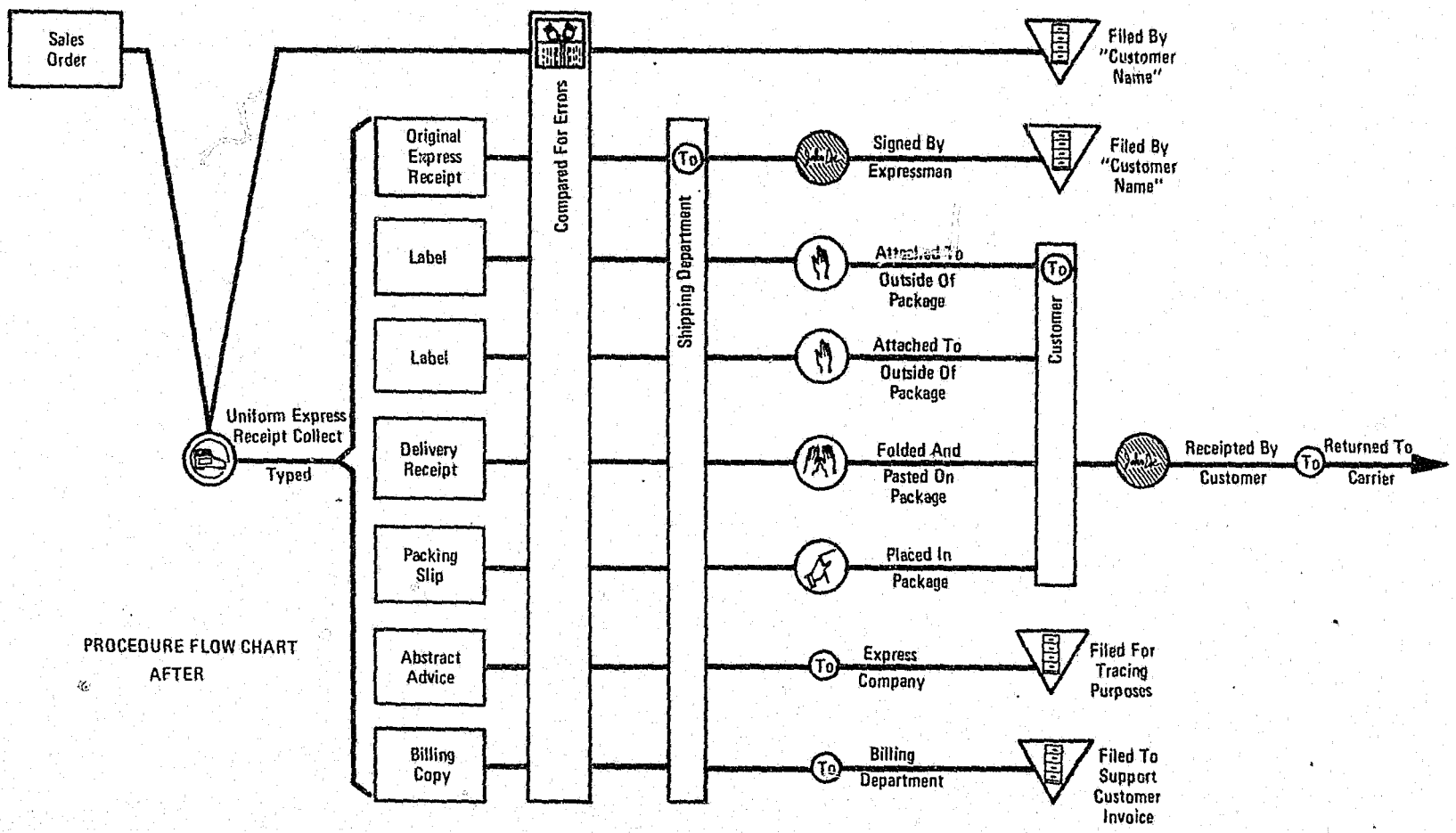
MULTIPART DOCUMENTS - Multipart documents usually begin as one and are later separated. The charting of this is the opposite of documents being attached with the exception that something must be done to label the different copies at the time they are separated. This is handled by interrupting the lines of the multipart document with a vertical bracket of sufficient height to span the lines which will be used for the parts of the document. Immediately following the bracket rectangles are placed to label the various copies. (See figure 2.)

BY-PASS - Occasionally it is necessary for flow lines to cross. When this occurs, one of the lines is broken and curved lines are drawn (See figure 8.) to suggest going around.

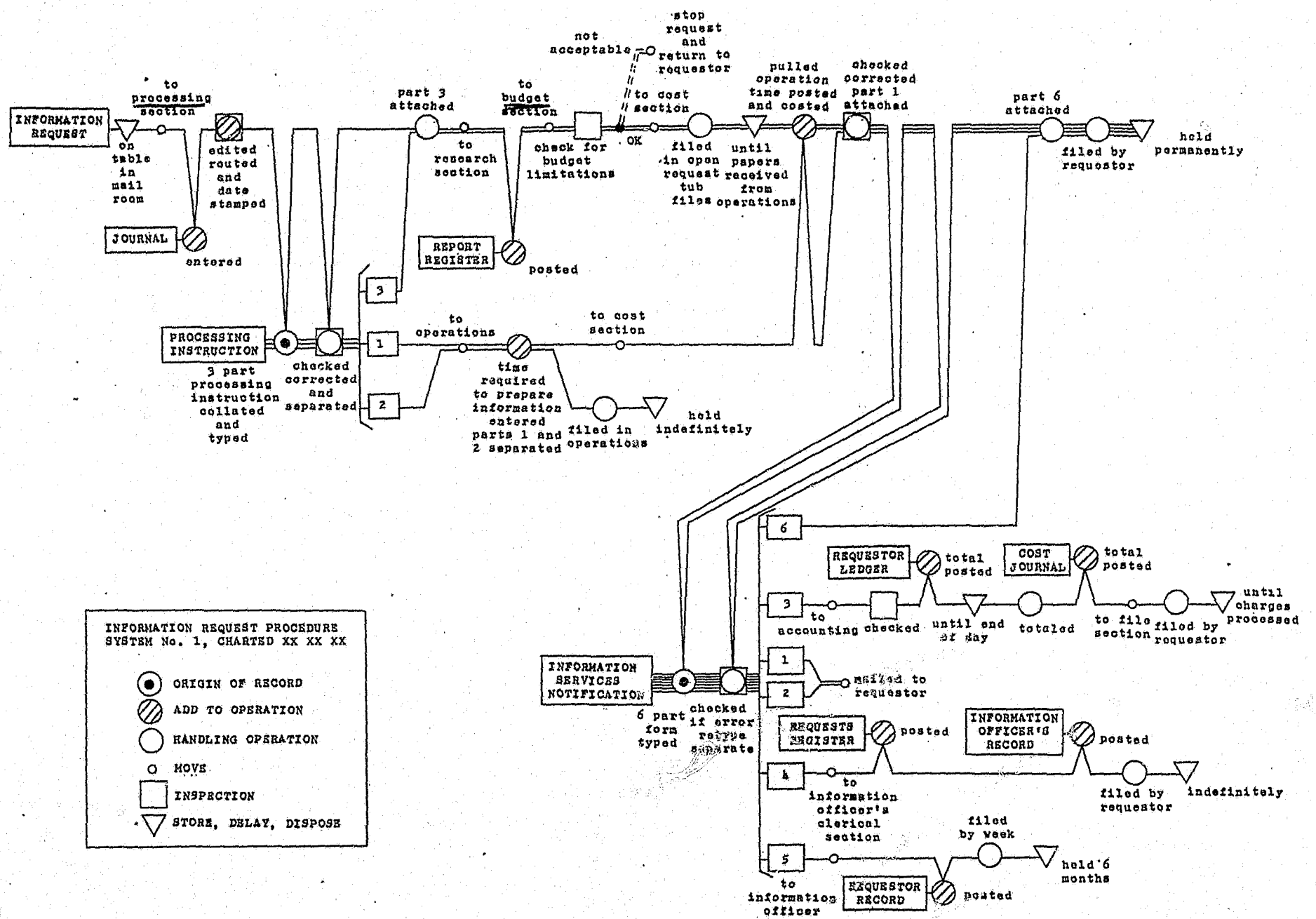
GETTING STARTED ON A CHART - It is extremely helpful to rough in a chart first on scratch paper ahead of time. When the rough chart is completed it can be used to help lay out the final chart. Numbering the lines used on the rough, from top to bottom makes it easy to assign lines to the documents on the final chart.

Spacing need not be maintained rigorously but consistent spacing produces a more readable chart. Spacing must be sufficient to allow sufficient room for legible printing of descriptions.

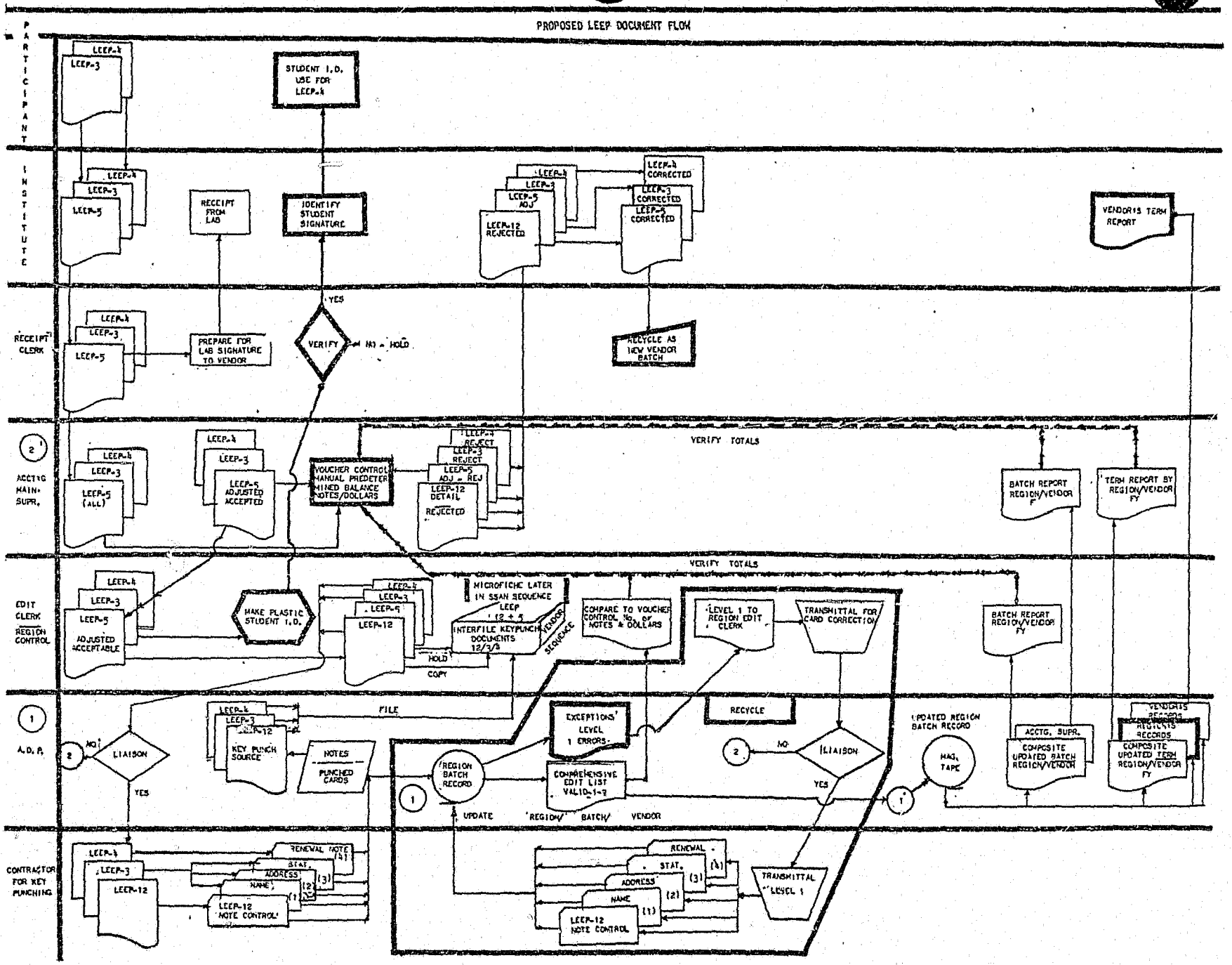
BY ALL MEANS, USE PENCIL.



PROCEDURE FLOW CHART
AFTER



PROCEDURE FLOW CHART

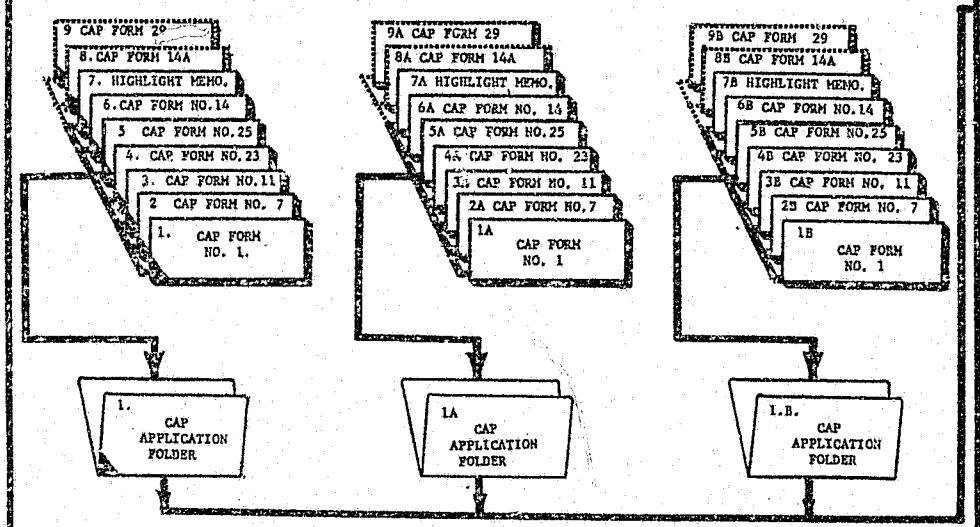

PROPOSED LEEP DOCUMENT FLOW
PARTICIPANT
INSTITUTE
RECEIPT CLERK
ACCTG MAIN. SUPR.
EDIT CLERK REGION CONTROL
A.D.P.
CONTRACTOR FOR KEY PUNCHING
LEEP-4
LEEP-3
LEEP-5
LEEP-12
STUDENT I.D. USE FOR LEEP-4
RECEIPT FROM LAB
IDENTIFY STUDENT SIGNATURE
LEEP-4 CORRECTED
LEEP-3 CORRECTED
LEEP-5 ADJ
LEEP-12 REJECTED
VENDOR'S TERM REPORT
PREPARE FOR LAB SIGNATURE TO VENDOR
VERIFY
YES
NO - HOLD
RECYCLE AS NEW VENDOR BATCH
VERIFY TOTALS
LEEP-5 (ALL)
LEEP-5 ADJUSTED ACCEPTED
VOUCHER CONTROL MANUAL PREDETER MINED BALANCE NOTES/DOLLARS
LEEP-4 REJECT
LEEP-3 REJECT
LEEP-5 ADJ - REJ
LEEP-12 DETAIL REJECTED
BATCH REPORT REGION/VENDOR FY
TERM REPORT BY REGION/VENDOR FY
LEEP-5 ADJUSTED ACCEPTABLE
MAKE PLASTIC STUDENT I.D.
MICROFICHE LATER IN SSAN SEQUENCE
LEEP 12 + 4
INTERFILE KEYPUNCH DOCUMENTS 12/3/3
VENDOR SEQUENCE
HOLD COPY
COMPARE TO VOUCHER CONTROL NO. OF NOTES & DOLLARS
LEVEL 1 TO REGION EDIT CLERK
TRANSMITTAL FOR CARD CORRECTION
BATCH REPORT REGION/VENDOR FY
FILE
KEY PUNCH SOURCE
NOTES PUNCHED CARDS
LIAISON
NO
YES
REGION BATCH RECORD
EXCEPTIONS LEVEL 1 ERRORS
COMPREHENSIVE EDIT LIST VAL10-1-2
UPDATE REGION/BATCH/VENDOR
RECYCLE
UPDATED REGION BATCH RECORD
MAG. TAPE
ACCTG. SUPR. COMPOSITE UPDATED BATCH REGION/VENDOR
VENDOR'S RECORDS REGION'S RECORDS COMPOSITE UPDATED TERM REGION/VENDOR FY
RENEWAL NOTE (4)
STAT. (3)
ADDRESS (2)
NAME (1)
LEEP-12 NOTE CONTROL
TRANSMITTAL "LEVEL 1

PROPOSED REGIONAL PROCESSING FLOW OF CAP APPLICATIONS

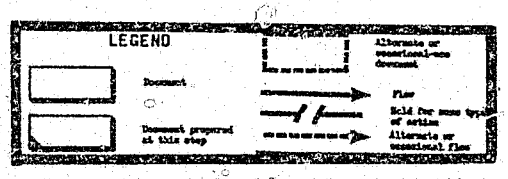
EXHIBIT 2
CHART 1

-1-

APPLICANT AGENCY

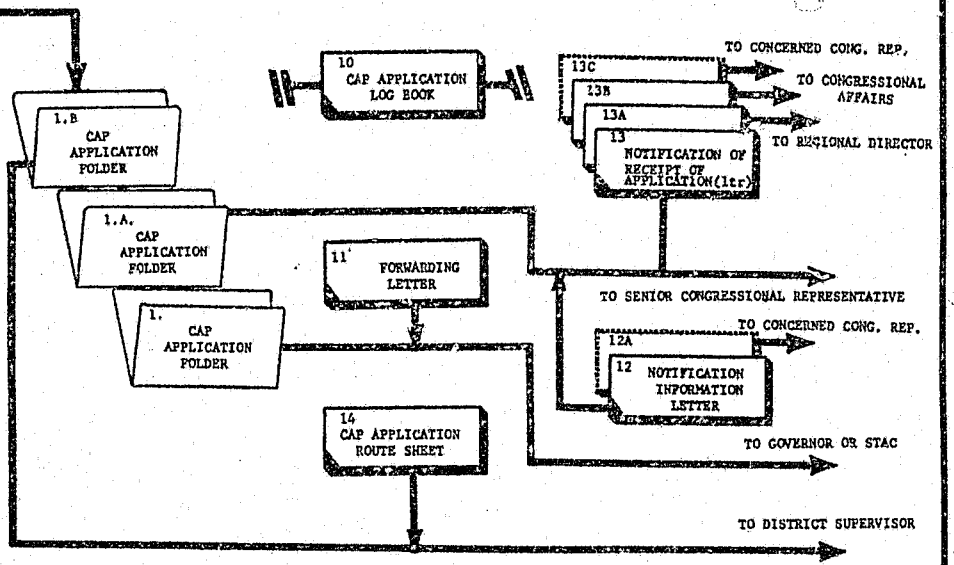


1 PREPARE ,ASSEMBLE, AND SUBMIT THREE COMPLETE AND APPROVED CAP APPLICATION FOLDERS TO THE OEO - REGIONAL OFFICE. NOTE: THIS IS THE CRITICAL PHASE OF THE CAP APPLICATION FLOW. IT REQUIRES COORDINATION BY THE CAA BOARD AND STAFF AND THE ASSIGNED OEO FIELD REPRESENTATIVE. QUESTIONS OR ISSUES EMERGING DURING THE PREPARATION OF THE CAP APPLICATION THAT REQUIRE ACTION BY POLICY AND ADVISORY GROUPS SHOULD BE RESOLVED PRIOR TO SUBMITTING THE CAP APPLICATION TO THE OEO REGIONAL OFFICE. ADHERENCE TO THIS PROPOSED PROCEDURE WILL MINIMIZE DELAYS OR LENGTHY DISCUSSIONS BETWEEN CAA REPRESENTATIVES AND THE OEO FIELD REPRESENTATIVE DURING THE FORMAL OEO REVIEW AND APPROVAL OF THE FUNDING REQUEST.



-2-

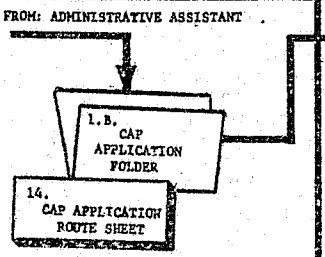
OEO-ADMINISTRATIVE ASSISTANT (DISTRICT SUPERVISOR)



1. RECEIVE (3) COPIES OF CAP APPLICATION FROM APPLICANT AGENCY.
2. REVIEW APPLICATION TO ASSURE THAT ALL REQUIRED DOCUMENTS ARE INCLUDED AND COMPLETED.
3. ASSIGN APPROPRIATE GRANT AND COMPONENT NUMBERS TO CAP APPLICATION.
4. LOG DATE OF RECEIPT AND TYPE OF CAP APPLICATION (VERSATILE, SUMMER HEAD START, SUMMER CRASH, FULL YEAR HEAD START) IN CAP APPLICATION LOG BOOK.
5. ASSIGN GRANT ACTION NUMBER TO CAP FORM NO. 14
6. TRANSCRIBE PERTINENT BACKGROUND INFORMATION FROM CAP FORM NO. 14 TO CAP APPLICATION LOG BOOK.
7. NOTIFY STATE GOVERNOR OR STATE TECHNICAL ASSISTANCE COORDINATOR OF RECEIPT OF CAP APPLICATION. LOG DATE OF NOTIFICATION IN CAP APPLICATION LOG BOOK. ATTACH FORWARDING LETTER TO COPY OF CAP APPLICATION AND PLACE IN OUTGOING MAIL.
8. NOTIFY, BY LETTER, CONCERNED CONGRESSIONAL REPRESENTATIVE(S) OF RECEIPT OF APPLICATION. LOG IN CAP APPLICATION LOG BOOK DATE OF NOTIFICATION. ATTACH LETTERS TO A COPY OF CAP APPLICATION AND MAIL TO THE SENIOR CONGRESSIONAL REPRESENTATIVE.
9. ATTACH CAP APPLICATION ROUTE SHEET TO COPY OF CAP APPLICATION, AND HAND CARRY TO DISTRICT SUPERVISOR.

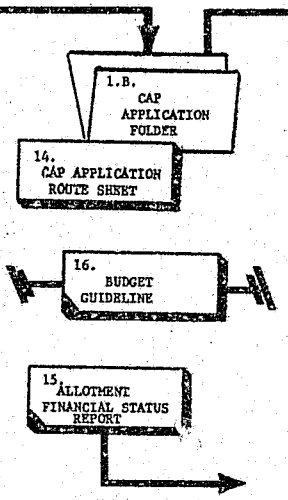
EXHIBIT 2
CHART 2

-3- DISTRICT SUPERVISOR



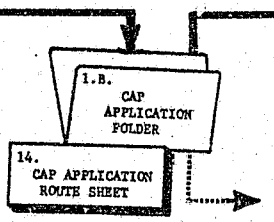
1. REVIEW CAP APPLICATION FOR PURPOSES OF DETERMINING THE TYPE, SCOPE, AND MERIT OF THE APPLICATION.
2. REVIEW ANY IMPOSED SPECIAL CONDITIONS.
3. RECOMMEND APPROVAL OR DISAPPROVAL.
4. INITIAL AND DATE CAP APPLICATION ROUTE SHEET.
5. ROUTE APPLICATION TO CAP FISCAL.

-4- CAP FISCAL



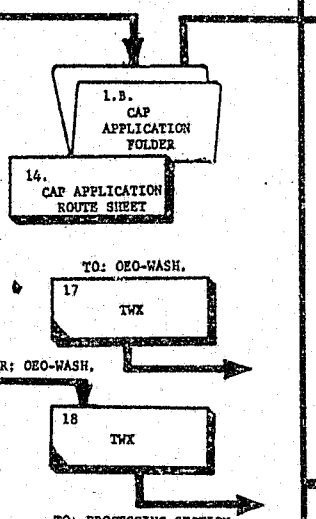
1. REVIEW COST COLUMNS ON CAP FORM NO. 25 TO ASSURE THAT COLUMNS TOTAL TO THE TOTAL AMOUNT SHOWN ON CAP FORM NO. 14.
2. REVIEW CAP FORM NO. 14 TO ASSURE THAT ALL REQUIRED INFORMATION HAS BEEN SUBMITTED.
3. COMPARE THE TOTAL COST OF THE CAP APPLICATION SHOWN ON CAP FORM NO. 14 WITH THE APPROPRIATE BUDGET GUIDELINE; CONFER WITH REGIONAL ACCOUNTING OFFICE, AS NECESSARY. CERTIFY THE AVAILABILITY OF FUNDS TO COVER CAP APPLICATION GRANT.
4. PREPARE ON AN "AS NEEDED BASIS" A FINANCIAL STATUS REPORT SHOWING THE STATUS OF ACCOUNTS WITH THE OVERALL ALLOTMENT. DELIVER REPORT TO THE REGIONAL ACCOUNTING OFFICE.
5. INITIAL AND DATE CAP APPLICATION ROUTE SHEET.
6. ROUTE CAP APPLICATION TO CAP ADMINISTRATOR.

-5- CAP ADMINISTRATOR



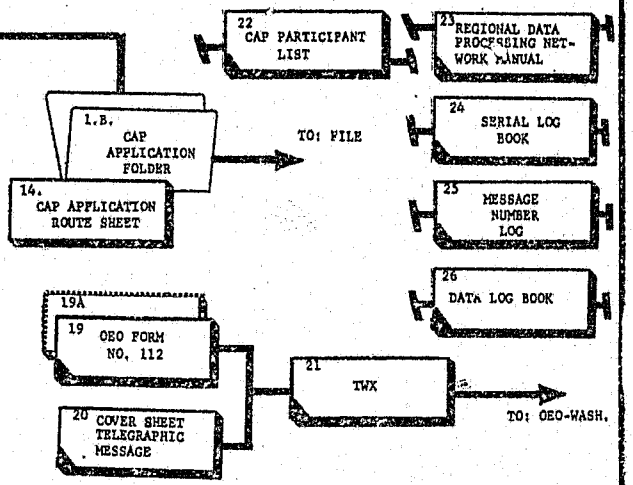
1. REVIEW CAP APPLICATION AND PROPOSED ACTION; CONFER WITH DISTRICT SUPERVISOR, CIVIL RIGHTS COORDINATOR, GENERAL COUNSEL, AS NECESSARY.
2. APPROVE OR DISAPPROVE CAP APPLICATION. RETURN DISAPPROVED APPLICATION TO APPLICANT AGENCY.
3. INITIAL AND DATE CAP APPLICATION ROUTE SHEET.
4. ROUTE CAP APPLICATION TO CONGRESSIONAL AFFAIRS.

-6- CONGRESSIONAL AFFAIRS



1. REVIEW CAP APPLICATION AND PROVIDE, BY TWX, THE CONGRESSIONAL RELATIONS OFFICE AT OEO-WASHINGTON A NARRATIVE OF THE CAP APPLICATION. NOTE: NARRATIVE IS USED TO NOTIFY CONCERNED MEMBERS OF CONGRESS OF THE APPROVED CAP APPLICATION.
2. INITIAL AND DATE CAP APPLICATION ROUTE SHEET - ROUTE TO CAP FISCAL (PROCESSING SECTION).
3. RECEIVE TWX FROM OEO-WASHINGTON OFFICE APPROVING CAP APPLICATION - REVIEW AND ROUTE TO PROCESSING SECTION.

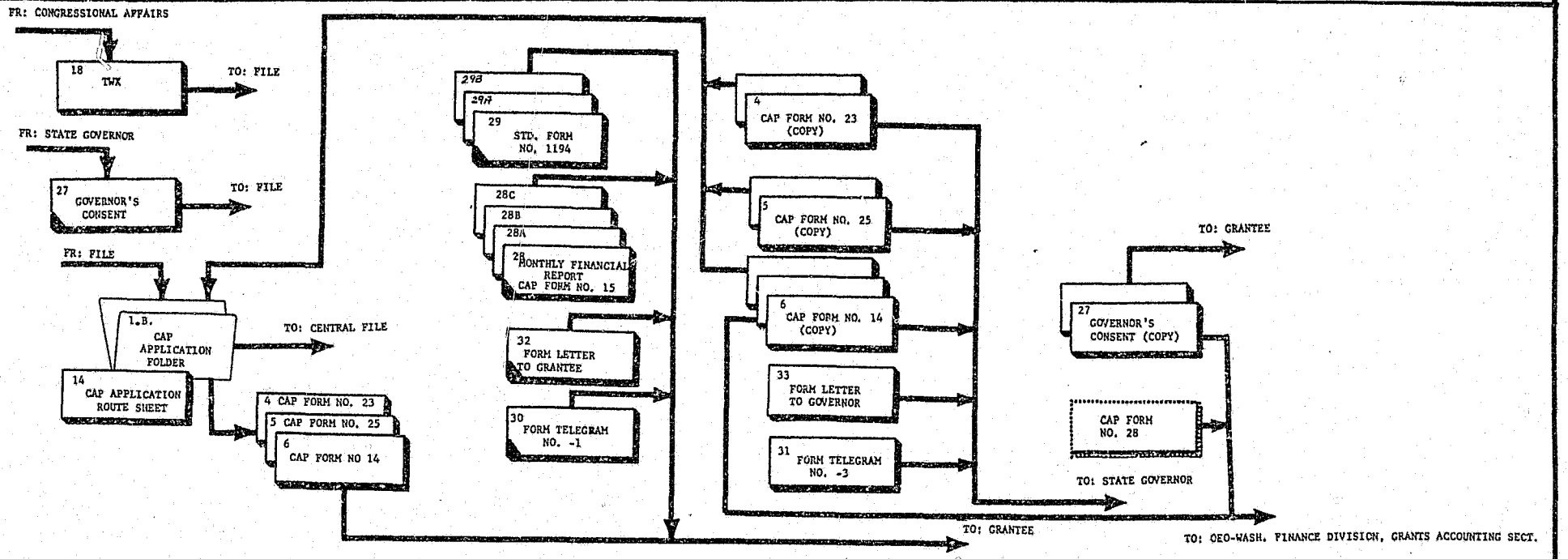
-7- CAP FISCAL PROCESSING SECTION



1. RECEIVE CAP APPLICATION FROM CONGRESSIONAL AFFAIRS.
2. PREPARE OEO FORM NO. 112. PREPARATION INCLUDES:
   - FOR APPLICATION
     - TRANSCRIBE GRANT NO. FROM CAP FORM NO. 14 TO OEO FORM NO. 112.
     - TRANSCRIBE PACKAGE NO. FROM SERIAL LOG BOOK TO OEO FORM NO. 112.
     - TRANSCRIBE COMPONENT NO., PROGRAM ACTION NO. AND TRANSACTION TYPE FROM CAP PARTICIPANT LIST TO OEO FORM NO. 112.
     - TRANSCRIBE CAA NO. AND DA NO. FROM CAP PARTICIPANT LIST TO OEO NO. 112.
     - TRANSCRIBE PROGRAM CODE FROM RDPN MANUAL TO OEO FORM NO. 112.
     - ENTER SECTION OF ACT.
     - TRANSCRIBE GEOGRAPHIC SCOPE, STATE CODE, COUNTY CODE, AND CONGRESSIONAL DISTRICTS FROM RDPN MANUAL TO OEO FORM NO. 112.
     - TRANSCRIBE BOTH FEDERAL AND NON-FEDERAL REQUESTED AMOUNT FROM CAP FORMS 14 & 25 TO OEO FORM NO. 112.
     - ENTER DATE RECEIVED AND DATE OF APPLICATION ON OEO FORM NO. 112.
     - COUNT TOTAL FIELDS USED ON OEO FORM NO. 112. INDICATE NUMBER IN FIELD COUNT ON OEO FORM NO. 112.
   - FOR APPROVAL
     - ENTER IDENTICAL KEY INFORMATION AS USED FOR APPLICATION, CHANGING ONLY THE TRANSACTION TYPE.
     - ENTER FISCAL YEAR ON OEO FORM NO. 112.
     - ENTER SECTION OF ACT.
     - TRANSCRIBE COST BREAKDOWN FOR EACH COMPONENT FROM CAP FORM NO. 25 TO OEO FORM NO. 112.
     - TRANSCRIBE NEW FEDERAL AND NON-FEDERAL FUNDS APPROVED, AND CARRY-OVER IF USED, FROM CAP FORM NO. 14 TO OEO FORM NO. 112.

CONTINUED ON NEXT PAGE ►

CAP FISCAL PROCESSING SECTION



CONTINUED FROM CHART 2.

- TRANSCRIBE CAP ADMINISTRATOR'S APPROVAL DATE, NUMBER OF PARTICIPANTS, AND NUMBER OF PERSONNEL, FROM CAP FORM NO. 14 TO OEO FORM NO. 112.
- TRANSCRIBE END OF PROGRAM YEAR AND ACTION NO. FROM CAP FORM NO. 14 TO OEO FORM NO. 112.
- ENTER DURATION OF PROGRAM.
- COUNT TOTAL FIELDS USED ON OEO 112 AND INDICATE NUMBER IN FIELD COUNT ON OEO FORM NO. 112.
- REPEAT THE ABOVE ACTIONS FOR APPLICATION AND FOR APPROVAL FOR EACH COMPONENT IN THE GRANT APPLICATION.

3. PREPARE SUMMARY SHEET - TRANSCRIBE PERTINENT DATA FROM CAP FORM 14 TO OEO FORM NO. 112.
4. ASSEMBLE DAILY FORM 112's INTO A SINGLE PACKAGE AND PERFORM THE FOLLOWING: (1) SHOW ON THE COVER SHEET HOW MANY FORMS ARE TO BE DONE, (2) ASSIGN A MESSAGE NO. FROM MESSAGE LOG BOOK, (3) ENTER ON 1st FORM 112 THE REGION NO., DATE, AND MESSAGE NO., (4) ENTER ON LAST FORM 112 THE TOTAL FIELD COUNT OF ALL 112's IN PACKAGE.
5. ENTER IN DAILY LOG BOOK ALL GRANTS SENT UNDER A MESSAGE NO., TYPE OF PROGRAM, AMOUNT OF FUNDS, AND DATE OF CAP ADMINISTRATOR's SIGNATURE.
6. DELIVER (HANDCARRY) PACKAGE OF FORM 112's TO TWX OPERATOR FOR TRANSMISSION TO OEO-WASHINGTON.
7. DATE AND INITIAL CAP APPLICATION ROUTE SHEET. FILE APPLICATION FOLDER IN FILE - AWAITING CONGRESSIONAL RELEASE FROM OEO-WASHINGTON.
8. RECEIVE TWX FROM CONGRESSIONAL AFFAIRS. PULL APPLICATION FOLDERS FROM FILE AND MATCH TO THOSE LISTED ON THE INCOMING TWX.
9. ENTER ACTION NUMBER ON LETTERS, TELEGRAMS, FOLDERS, CAP FORM 14, ETC., AND DATE LETTERS AND TELEGRAMS.
10. REPRODUCE TWO COPIES EACH OF THE FOLLOWING: (1) CAP FORM NO. 23, (2) CAP FORM NO. 25, (3) GOVERNOR's CONSENT; REPRODUCE THREE COPIES OF CAP FORM NO. 14.
11. TRANSCRIBE RELEASE DATA AND CR. LIST NUMBER FROM TWX TO CAP APPLICATION ROUTE SHEET.
12. SORT AND DISTRIBUTE COPIES AS ILLUSTRATED IN THE ABOVE CHART.

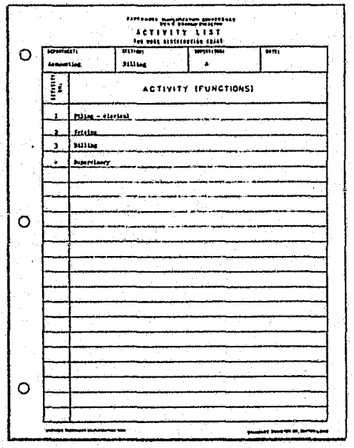
THE WORK DISTRIBUTION CHART

A supervisory tool to aid in organizing a department and in improving detail previously found necessary. This should follow the use of the Procedure Flow Chart described in Chapters IX and X or similar broad study.

ANY MANAGEMENT TECHNIQUE, any system, is of value only as it contributes to the real objective of more effective production of the product or service our customer buys. Too often the technique, the system, controls, etc., become the objective at the expense of production and profit. One technique that has frequently been misused, but which is a worth-while tool of Work Simplification, is the Work Distribution chart.

In its earliest form, this Chart consisted of a listing of jobs in a department vertically, and a listing of the people available to do those jobs, horizontally across the top of the page. Each job that a person performed was indicated below his name on the line with that job title. By another designation, those people trained to perform a job, though not doing it currently, were also indicated. In this form, the chart was an aid in maintaining flexibility within a department, and in providing for training and replacements and capacity for peak loads. As originally used, it was assumed the jobs were necessary and that people were performing adequately on the various jobs.

During the war, the Bureau of the Budget developed a program for work improvement in government services. It was shaped to meet their market—that of a supervisor working with his people. The program was not designed to cross departmental lines. The Bureau recommended the Flow Process Chart, the Work Distribution Chart and the Work Count. Work Count was used as a gross type of measurement in an effort to plan and schedule work and determine manpower needs.

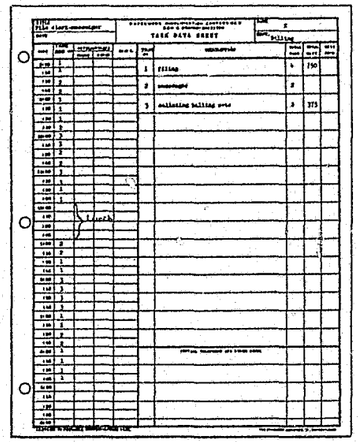


An Opening Wedge

Many business concerns adopted the Bureau of the Budget program as an *over-all* approach to work improvement. They were able to make definite, and in the case of a large organization, substantial, savings. Unfortunately, the goals were small compared to the potential. Much detail was improved which would have been eliminated through a comprehensive approach.

Today the Work Distribution Chart has been improved substantially and has its place in a well rounded program as an aid in improving detail. The latest design combines hours worked on a task by the person with number of units of work completed. This gives a gross evaluation of the relative efficiency of the people doing the same job.

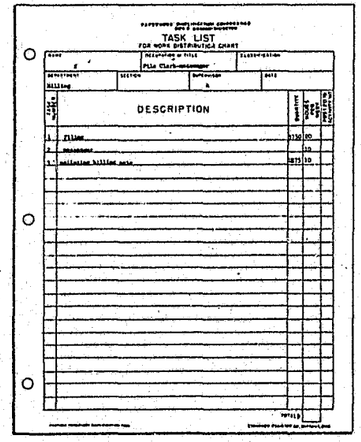
It will highlight those jobs which require the greatest number of hours. Although this is a very elementary approach, it can be used to aid the supervisor in providing for replacements and in determining in a gross manner, his manpower needs. It is not a substitute for a proper work measurement approach to planning and scheduling. It will serve to point up jobs to study, and if the results developed are sufficient, and if supervisors and management don't become complacent and satisfied with mediocre results, it may be the wedge which will open the door to a broad program.



Preparation of Chart

The first step in preparing a Work Distribution Chart is for the supervisor to list the major activities in his unit. In preparing such an *Activity List* for a Billing Unit, for example, one activity could be "Filing-Clerical," another "Pricing," etc. At the start it is wise to discuss the entire project, covering the purpose of the Work Distribution Chart and its value to the department and individuals, and then explain how to prepare the several forms.

The *Task Data Sheet* is prepared by the workers. For this purpose a "task" is an operation or component duty of an "activity." In our example the Filing-Clerical activity is handled by a File Clerk-Messenger who has three tasks—filing, messenger work, collating billing sets. Each worker lists the tasks he performs in the description column, and they are given arbitrary numbers for convenience in keeping records. When the tasks have been properly defined, the worker then records the task number performed for each quarter-hour period in the left-hand column. In the Quantity Column, the number of separate times any one task is performed can be entered. Any significant interruptions can be noted in the description column, assigned a number and recorded in relation to the time period in which they occurred. One *Task Data Sheet* covers one day's work. Sheets should be kept for a normal period long enough to provide a representative picture of the work performed. Usually a week is sufficient.



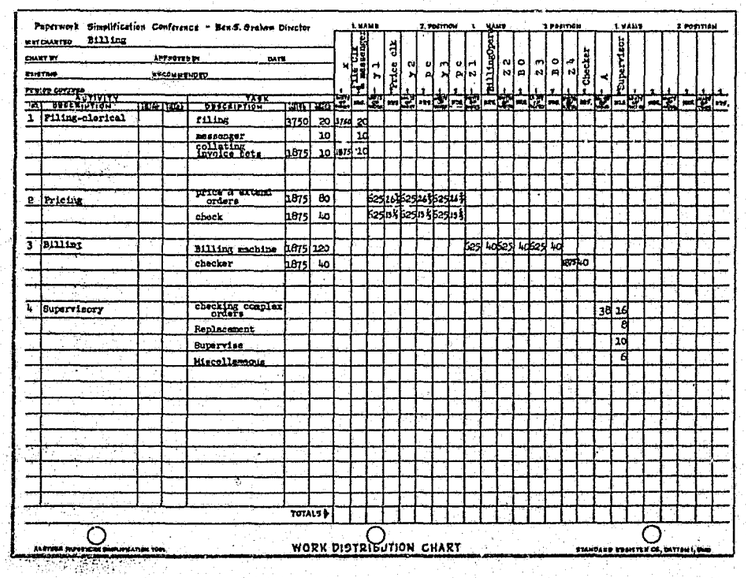
After the data has been accumulated for the week, each employee summarizes the Task Data Sheets on a *Task List*, totalling the time and the units of work produced, e.g., collating 1875 billing sets in 10 hours.

The supervisor will then combine the Task Lists on the *Work Distribution Chart*, after completing the heading. The first activity (Filing-Clerical in the illustration) is recorded on the first line of the body of the form. The tasks involved in that activity are then listed vertically in the description column. The same procedure is followed with other activities, leaving a line or two blank between each group. Names of department members and their job titles are then entered at the top of the sheet in boxes indicated by (1) for name, (2) for job title. Units of work performed and hours are then entered from the Task Lists in the respective workers' columns. These are then totalled for each task. Where significant, they may be totalled by activity.

Values of the Technique

When the Work Distribution Chart has been completed, the supervisor with his people, can analyze the results. The order of analysis would be to question the over-all activity first, then the task and finally, the worker columns vertically. The objective is to eliminate, combine or improve activities or tasks; redistribute the work to use workers at their highest skills; highlight jobs that need analysis as to methods, and evaluate and improve the skills and increase the interest of the workers. Additional values can come from better planning as to manpower needs, preparation for the handling of peak loads and rescheduling of work to avoid the peaks.

The Work Distribution Chart has possibilities as a top level "steam-shovel" tool. In some situations, top management people have been sold on the desirability of keeping a reasonably accurate record of their own activities. Usually the most that can be expected is that they will keep the record for a period of time, and then examine it for their own benefit. However, if top management can be persuaded to keep such a record, and then summarize it on a Work Distribution Chart, the benefits are even more far reaching. Duplication of activity and overlapping of responsibility are almost always apparent. The importance of delegating the tasks or activities requiring less skill than found at the top level is also emphasized.



ACTIVITY/TASK LIST

TYPE OF LIST:	ORGANIZATION:	SUPERVISOR:	DATE:
[X] ACTIVITY	Administrative Section	M. R. Smith	5-15
[ ] TASK	NAME: (Use for Task List Only)	WORKING TITLE:(Use for Task List Only)	GRADE/RANK: (Use for Task List Only)

No.	DESCRIPTION	HOURS PER	WORK COUNT	ACT. NO.
1	Preparation of correspondence			
2	Reception and arrangements			
3	Recording of conferences			
4	Make reports			
5	Maintain regulations library			
6	Maintain file			
7	Make travel arrangements			
8	Administration and supervision			
9	Miscellaneous activities			

Obtained from AFM 50-20,
June 1955, Page 45

AMXOM FORM 16 (REV OCT 63)

ENTER TOTALS AFTER LAST ENTRY

ACTIVITY/TASK LIST

TYPE OF LIST:	ORGANIZATION:	SUPERVISOR:	DATE:
[ ] ACTIVITY	Administrative Section		5-14
[X] TASK	NAME: (Use for Task List Only) POWERS, Gertrude	WORKING TITLE:(Use for Task List Only) Clerk-Typist	GRADE/RANK: (Use for Task List Only) GS-3

No.	DESCRIPTION	HOURS PER Week	WORK COUNT	ACT. NO.
9	Attend office meetings	2		
2	Answer telephone	5		
1	Type teletypes (from rough draft)	2-40	4	
2	Make appointments (for Col and Major)	5		
6	File branch correspondence	5-40		
4	Prepare activity & historical reports (for branch)	5-30		
4	Prepare and type special reports	7-40		
6	File teletypes for branch	2-30		
2	Arrange for branch conferences (notify participants of conferences)	2		
9	Miscellaneous	2		
		40		

Obtained from AFM 50-20,
June 1955, Page 38

AMXOM FORM 16 (REV OCT 63)

ENTER TOTALS AFTER LAST ENTRY

WORKSHEET # 4e Part II

WORK DISTRIBUTION CHART

Distribution	X Present / Proposed
Charted by	H. R. Smith
Function charted	ADMINISTRATIVE SECTION
Approved	
Date	5/15

Opr./Process No.	Operation/Process	Work Count	Hours per Week	H. R. Smith, Supervisor, GS-5: Task	Work Count	Hours per Week	G. Powers, Clerk-Typist, GS-3: Task	Work Count	Hours per Week	L. Grady, Clerk-Typist, GS-3: Task	Work Count	Hours per Week	R. Blair, Clerk-Typist, GS-3: Task	Work Count	Hours per Week	S. Brown, Clerk, GS-2: Task	Work Count	Hours per Week	Name / Position / Grade: Task	Work Count	Hours per Week
1	Preparation of correspondence		33-30'	Take dictation & type letters	5	2	Type teletypes	4	2-40'	Type teletypes	4	2-40'	Miscellaneous typing		1-30'						
				Prepare Corres. (Oral)	5	2-30'				Take dictation & type letters	5	2	Type Correspondence	7	3-30'						
										Screen "In" Corres.	50	1									
										Screen "Out" Corres.	40	4	Type dittos	10	5-40'						
2	Reception and arrangements		23-30'	Answer telephone		2-30'	Answer telephone		5	Answer telephone		4									
							Make appointments		5	Make appointments		5									
							Arrange for conferences		2												
3	Recording of conference		4-40'	Take dictation & prepare reports		4-40'															
4	Make reports		13-10'				Prepare activity & history reports		5-30'												
							Prepare and type special reports		7-40'												
5	Maintain regulations library		39										Maintain base regulations		5-30'	Maintain base regulations		9			
													Maintain AF and Command Regs.		7-20'	Maintain AF and Command Regs.		11-30'			
													Research regulations		1	Research regulations		4-40'			
6	Maintain files		47-50'				File Correspondence		5-40'	Maintain corres. suspense		7-20'	File teletypes		1	File teletypes		5-30'			
							File teletypes		2-30'	File Correspondence		7	File Correspondence		4-30'	File Correspondence		5-20'			
										File teletypes		3									
7	Make travel arrangements		1	Making travel arrangements		1															
8	Administration and Supervision		21-50'	Work planning		4-30'															
				Plan and conduct meetings		4															
				Work review		6-20'															
				Assign work		7															
9	Miscellaneous Activities		21-30'	Coordinate office work		3-30'	Office meetings		2	Office meetings		2	Office meetings		2	Office meetings		2			
				Miscellaneous		2	Miscellaneous		2	Miscellaneous		2	Miscellaneous		2	Miscellaneous		2			
	TOTAL (Man-hours)		200			40			40			40			40			40			

Annotations: MOST TIME! STUDY FURTHER · SPREAD TOO THIN? · UNRELATED TASKS? ASSIGN HERE · COMBINE! (RELATED) · NOTE! WHO MAINTAINS OFFICE SUPPLIES? · SKILLS PROPERLY USED · MOST TIME! STUDY FURTHER · SPREAD TOO THIN · TOO MUCH TIME! · MISDIRECTED EFFORT

[1] Work count data is optional.

ANALYSIS: WHAT TAKES THE MOST TIME? ... IS THERE MISDIRECTED EFFORT? ... ARE SKILLS USED PROPERLY? ... ARE THERE TOO MANY UNRELATED TASKS? ... ARE TASKS SPREAD TOO THINLY? ... IS WORK DISTRIBUTED EVENLY?

NOTE—If additional columns are required, cut all required number from another blank form and attach by pasting on this edge.

AF Form 1003

Obtained from AFM 50-20, June 1955, Page 51

RESPONSIBILITY CHART Sheet 1 Of 1 Chart # 1

Subject Charted

Systems Function

Director xx-xx-xx

Approved By Date

M.M.

Prepared By

	Director	Asst. Dir. Research	Asst. Dir. Operations	Asst. Dir. Personnel	Asst. Dir. Accounting	Chief Information Officer	Supervisor of Systems	Systems Analyst	Project Team				Remarks
Recommend Syst. Sec. & Budget													
Approve Syst. Sec. & Budget													
Fill Syst. Supervisor Position													
Fill Syst. Analyst Position													
Recommend Syst. Projects													
Approve project priorities													
Select project teams													
Train project teams													
Plan project													
Conduct project													
Submit recommendations													
approve recommendations													
Install improvements													
Check out installations													

▩	☒	▨	⧄	◪	▤	▥	▣	S	P
Work is done	General Super-vision	Direct Super-vision	Coord-inate	Decide Special Points	Consult	Notify	May Ex-change views	Spe-cific Person	Part Of The Ac-tivity

RESPONSIBILITY CHART SHEET_____ OF _____ CHART # _____

Subject Charted

Approved By Date

Prepared By

													Remarks

▩	☒	▨	⧄	◪	▤	▥	▣	S	P
Work is done	General Super-vision	Direct Super-vision	Coord-inate	Decide Special Points	Consult	Notify	May Ex-change views	Spe-cific Person	Part Of The Ac-tivity

PART III: PRACTICAL APPLICATION

Information Request Project

Special LEAA Project

HOW TO BE EFFICIENT, WITH FEWER VIOLINS

The following is the report of a Work Study Engineer - a specialist in Methods Engineering - after a visit to a symphony concert at the Royal Festival Hall in London:

For considerable periods the four oboe players had nothing to do. The number should be reduced and the work spread more evenly over the whole of the concert, thus eliminating peaks of activity.

All the twelve violins were playing identical notes; this seems unnecessary duplication. The staff of this section should be drastically cut. If a larger volume of sound is required, it could be obtained by electronic apparatus.

Much effort was absorbed in the playing of demi-semi-quavers; this seems to be an unnecessary refinement. It is recommended that all notes should be rounded up to the nearest semi-quaver. If this is done it would be possible to use trainees and lower-grade operatives more extensively.

There seems to be too much repetition of some musical passages. Scores should be drastically pruned. No useful purpose is served by repeating on the horns a passage which has already been handled by the strings. It is estimated that if all redundant passages were eliminated the whole concert time of two hours could be reduced to twenty minutes and there would be no need for an intermission.

The conductor agrees generally with these recommendations, but expressed the opinion that there might be some falling off in box-office receipts. In that unlikely event it should be possible to close sections of the auditorium entirely, with a consequential saving of overhead expenses, lighting, attendance, etc. If the worst came to the worst, the whole thing could be abandoned and the public could go to the Albert Hall instead.

--Anonymous memorandum circulating in London, 1955

GUIDE TO PART THREE

The purpose of this section is to provide each participant with an opportunity to apply the work simplification techniques explained in Part One and Part Two to a practical work situation. Two projects are included: the first, a hypothetical case study involving a private business firm; the second, a project to be selected by the seminar participants themselves, but related to their particular work environment in LEAA. If at all possible, the LEAA project should involve the seminar members in a team effort. Discussion of project #2 will take place at the time of the first meeting.

Project #1: Information Requests Procedure Study

A. This project involves a private business firm which has as its primary purpose the filling of individual requests for information on a variety of technical subjects. Information requests are received through the regular mails. Once received, a request is processed and sent to the firm's operational center within which the subject-matter material is compiled by various technical specialists, the reports assembled, and the information sent to the requestor for a nominal fee.

The Chief Information Officer of the firm has become increasingly concerned that the company will not be able to continue meeting its stated policy of filling any information request within a two-day period, due to the increasing number of requests being received. Accordingly, he has asked that a detailed study be made of the paperwork flow involved in the filling of requests. The object of the study is to ensure a continued adherence to company policy - i.e., a two-day turn-around period. A system study instruction (see sample #1) has been prepared and a project team appointed to conduct the study.

The initial step - selecting a situation for study - has thus been satisfied, and an objective has been set. The steps still to be completed by the team are:

2. Get all the facts
3. Analyze the facts
4. Develop the improvement
5. Apply the improvement

B. Getting the Facts

1. As the first order of business the project team decides that an analysis of the internal mail pickup and delivery system might be of some benefit. Accordingly, the mail operation is broken down into its component parts (see sample sheet #2). The various mail pickup and delivery functions are then charted on a flow process chart (see sample sheet #3). A flow diagram is also prepared to show the physical layout of the various offices (see sample sheet #4).
2. A procedure data chart (see sample sheet #5) is then made up. This chart traces three interrelated forms - the original information request, the processing instruction, and the information services notification - as they each wend their way through the organizational maze from beginning to end.

The project team now has a fair picture of the paperwork flow as it relates to the information requests procedure. That picture could be further refined, however, by transposing the detailed information incorporated in the procedure data chart, to a procedure flow chart.

3. Assignment - Each participant is asked to prepare a procedure flow chart from the information listed on the procedure data chart. The assignment will probably take about two hours for those who are unfamiliar with charting of this type. Please do not do the assignment, however, until after the introductory session with the seminar leader.

C. Analyzing the Facts

1. Assignment - Upon completing the procedure flow chart each participant is asked to review the various charts and diagrams compiled, and then to list all the possible improvements in the paperwork flow process which may be of help in meeting the company's objective.

NOTE: In this particular study we have not utilized the work distribution chart. If the above effort did not result in sufficient saving of time to satisfy the firm's objective, an analysis of the work loads of individuals involved in the request procedure might be of some value.

D. Developing the Improvement

E. Applying the Improvement

A Final Note: The paperwork system presented in project #1 is not totally unlike some of those presently in use within LEAA. Although the LEEP and the Discretionary Grant Systems, as examples, are more complex than the Information Request procedure, the same type of analysis can be applied to them, and the same benefits in terms of time, simplicity, and cost may well be realized.

SAMPLE NUMBER 1

PAPERWORK SIMPLIFICATION CONFERENCE

SYSTEM STUDY

NO. 1

Requested by Chief Information Officer Prepared by N.N. Date XX-XX-XX

SYSTEM Information Requests Procedure

Study begins with Dep't., Operation, Form
Information Request in mail room, sorted for delivery to the processing section

Study ends
Information has been sent out and notification of charges followed to destination

Departments involved
Mail room, processing section, operations, research section, budget section, cost section, accounting, I.O. clerical section

FORMS, REPORTS, OTHER RECORDS INVOLVED

Name	No. of Parts	No. Operators	No. Locations	Type of Form	Annual Usage	Quantity on Hand	Writing method	Samples Blank	Min fill	Max fill
Processing Instruction	3	3	1	cut	85m	25m	Typed	✓	✓	✓
Information Services Notification	6	3	1	cut	105m	30m	Typed	✓	✓	✓

OBJECTIVES Indicated weaknesses or deficiences to be corrected. - Lack of control, adequate information or flexibility. Obsolete forms or methods. Unnecessary delays, duplications, bottlenecks. Personnel problems. Manufacturing difficulties.

Fill information requests with less delay. (We are meeting increasing difficulties in meeting our Bureau requirement, to fill all requests within 2 days.)
Also cut down on clerical work and rewriting of information.

RESULTS

	Savings Old	New	Net
Labor			
Material			
Equipment			
Total			

Date to start	Est. man hrs required	Analyst assigned - Name, date	Employees advised	Analyst introduced	Est. finish date

SAMPLE NUMBER 2

Prepare a Flow Process Chart of "Mail Delivery."

Chart messenger. Four trips daily: 9 a.m., 11 a.m., 1:30 p.m. and 3:30 p.m.

The mail is carried by a pretty young girl. She carries it in a shoulder bag with compartments for each section and one for mail picked up en route. Mail is sorted in the mail room. The 9 a.m. and 1:30 p.m. trips include the mail from the post office. The "Delivery" starts when the messenger picks up the filled bag and it ends when she completes sorting the mail picked up on the trip.

Picks up filled bag and hangs on shoulder

Walks to Director's office

Delivers and picks up mail

Waits while Secretary checks for more mail

Walks to Processing Section

Delivers and picks up mail

Walks to Research Section

Delivers and picks up mail

Walks to Budget Section

Delivers and picks up mail

Walks to Systems Section

Delivers and picks up mail

Walks to Accounting

Delivers and picks up mail

Walks to Cost Section

Delivers and picks up mail

Walks to Information Officer's Clerical Section

Delivers and picks up mail

Waits while Secretary checks for other mail

Walks to Operations

Delivers and picks up mail

Walks to Personnel

Delivers and picks up mail

Walks to Library

Delivers and picks up mail

Walks to Reproduction

Delivers and picks up mail

Walks to Mail Room

Sorts mail picked up on route

SAMPLE NUMBER 3

PAPERWORK SIMPLIFICATION CONFERENCE

FLOW PROCESS or OPERATION CHART

Chart No. 1

Process or Operation: Mail delivery - 4 trips/day — Flow Diagram or Layout No. 1

Subject: Messenger — Man / Material

Chart starts: Pick up bag in mail room — Ends: Sort mail in mail room

Prepared by: [illegible] — Date: XX-XX-XX

Process or Operation: Mail Delivery

System Study or Flow Process Chart	Operation No.	Annual Savings: Labor / Material, Equipment, etc. / Investment Cost / Net Savings
No. 1	Page 1 of 1	

ANALYSIS

WHAT is done? WHY?
WHERE is it done? WHY?
WHEN is it done? WHY?
WHO does it? WHY?
HOW is it done? WHY?

IS IT NECESSARY ?

ACTION

Not necessary	Eliminate
Better Place	Change
Better Time	Change / Combine
Better Person	Change
Better Way	Analize to Improve

SUMMARY

	Present No.	Present Time	Proposed No.	Proposed Time	Difference No.	Difference Time
Origin of record						
Add to operation						
Handling operation	14	16.1				
Move	13	8.6				
Inspection						
Store, delay, dispose	2	7.5				
Distance traveled	1935					

PRESENT METHOD

	Description	Effect	Subject Charted	Distance	Quantity	Time
1	Picks up filled mail bag & hangs on shoulder					
2	Walks to director's office			75'		.3
3	Delivers and picks up mail					.5
4	Waits while secretary checks for more mail					4.0
5	Walks To processing section			65'		.3
6	Delivers and picks up mail					1.0
7	Walks To research section			35'		.2
8	Delivers and picks up mail					.5
9	Walks To budget section			30'		.2
10	Delivers and picks up mail					.5
11	Walks To systems section			55'		.3
12	Delivers and picks up mail					.5
13	Walks To accounting			80'		.4
14	Delivers and picks up mail					.5
15	Walks To cost section			45'		.3
16	Delivers and picks up mail					.3
17	Walks to information officer's section			230'		.9
18	Delivers and picks up mail					.5
19	Waits while secretary checks for other mail					3.5
20	Walks to operations			685'		2.7
21	Delivers and picks up mail					.3
22	Walks To personnel			45'		.3
23	Delivers and picks up mail					.5
24	Walks To library			160'		.6
25	Delivers and picks up mail					.6
26	Walks to reproduction			50'		.3
27	Delivers and picks up mail					.4
28	Walks to mail room			380'		1.8
29	Sorts mail picked up on route					10.0

What	Where	When	Who	How	NOTES	Action
					Shoulder mail bag with sections for each section and a separate slot for pick ups.	

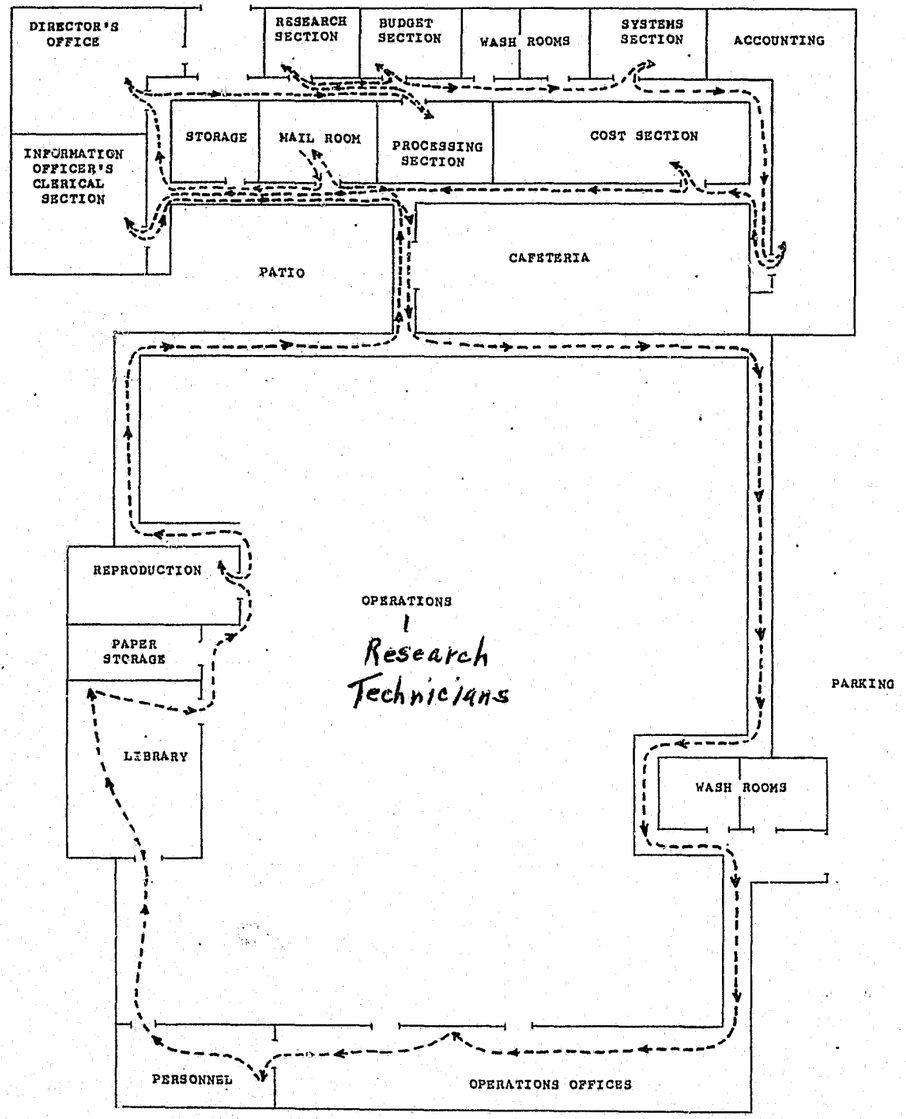
PROPOSED METHOD

Description	Effect	Subject Charted	Distance	Quantity	Time

SAMPLE NUMBER 4

FLOW DIAGRAM

mail delivery
subject charted - messengor
starts in mail room
ends in mail room
Charted by mm date XX-XX-XX



SAMPLE NUMBER 5

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number 1
Chart No. 1
Page 1 of 1
Date XX-XX-XX

SUMMARY	No.	Time
Origin of record		
Add to operation	4	38 hrs.
Handling operation	6	6½ hrs
Move	5	
Inspection	3	27 hrs.
Store, delay, dispose	3	
Total	21	

System: Information Request Procedure
Form name: Information Request — No.
Copy name — No.
Prepared by: J.J.

	Effect	Subject Charted	Description	Notes - Questions	Distance	Quantity	Time
1		○○□▽	On table in mail room			300	Per day
2		○○□▽	To processing section		140'		
3		○○□▽	Entered in Journal			300	6 hrs.
4		○○□▽	Edited routed and date stamped			300	8 hrs.
5		○○□▽	3 part processing instruction collated and typed	see chart 2 line 1			
6		○○□▽	Checked, corrected if necessary and separated	see chart 2 line 2			
7		○○□▽	Part 3 of processing instruction attached				1 hr.
8		○○□▽	To research section		25'		
9		○○□▽	Posted to report register			300	8 hrs.
10		○○□▽	To budget section		45'		
11		○○□▽	Checked for budget limitations			300	6 hrs.
12		○○□▽	If not acceptable	Stop request & return to requestor			
13		○○□▽	If OK - to cost section		200'		
14		○○□▽	Filed in open request tub files			375	1½ hrs.
15		○○□▽	Held until papers received from operations				1 day
16		○○□▽	Pulled on receipt of papers from operations, operation time	pulled		375	1½ hrs.
17		○○□▽	posted and costed	posted & costed		375	16 hrs.
18		○○□▽	Checked, errors corrected, part 1 of processing instr attached			375	8 hrs.
19		○○□▽	6 part Information Services Notification typed	see chart 3 line 1			
20		○○□▽	Checked, if error retype, separate	see chart 3 line 2			
21		○○□▽	Part 6 of Notification attached	see chart 3 line 6			1 hr.
22		○○□▽	Filed by requestor name				1½ hr.
23		○○□▽	Held permanently				
24		○○□▽					
25		○○□▽					

SUMMARY	No.	Time
Origin of record	1	16 hrs.
Add to operation	1	5 hrs.
Handling operation	2	
Move	2	
Inspection	1	8 hrs.
Store, delay, dispose	1	
Total	8	

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number 1
Chart No. 2
Page 1 of 1
Date XX-XX-XX

System: Information Request Procedure
Form name: 3 part Processing Instruction — No.
Copy name — No.
Prepared by: KK

Effect	Subject Charted	Description — Notes - Questions	Distance	Quantity	Time
	○●□▽	1 3 part processing instruction collated & typed		300	16 hrs.
	○○■▽	2 Checked, corrected if necessary & separated - ○ part 3 attached to Inf. request - see chart 1 step 7		300	8 hrs.
	○○□▽	3 Parts 1 & 2 to operations	1185'		
	○○□▽	4 Preparation time entered, Parts 1 & 2 separated ○ - part 2 filed in operations ▽ - held indefinitely			5 hrs.
	○○□▽	5 Part 1 to cost section	1050'		
	○○□▽	6 Inf. Request pulled, operation time posted, costed - see chart 1 line 16			
■	○○□▽	7 Checked (Inf. request), errors corrected; Part 1 of processing Instr. attached to Inf. Request - see chart 1 line 18			
	○○□▽	8			
	○○□▽	9			
	○○□▽	10			
	○○□▽	11			
	○○□▽	12			
	○○□▽	13			
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	○○□▽	16			
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	○○□▽	21			
	○○□▽	22			
	○○□▽	23			
	○○□▽	24			
	○○□▽	25			

CONTINUED

1 OF 2

SUMMARY	No.	Time
Origin of record	1	24 hrs.
Add to operation		
Handling operation	1	
Move	1	
Inspection	1	8 hrs.
Store, delay, dispose		
Total	4	

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number 1
Chart No. 3
Page 1 of 4
Date XX-XX-XX

System: Information Request Procedure
Form name: Information Services Notification — No.
Copy name — No.
Prepared by: LL

Effect	Subject Charted	Description — Notes - Questions	Distance	Quantity	Time
	◉ ○ □ ▽	1 6 part Information Services Notification typed - see chart 1 line 19		375	24 hrs.
	○ ○ □ ▽	2 Checked, if error retype, separated - see chart 1 line 20		375	8 hrs.
	○ ○ □ ▽	3 Parts 1 & 2 mailed to requestor ○ - Part 3 to accounting see chart 3, page 2, line 1			
	○ ○ □ ▽	4 ○ - part 4 To information officer's clerical section, chart 3, page 3 line 1			
	○ ○ □ ▽	5 ○ - part 5 to information officer see chart 3, page 4, line 1			
	○ ○ □ ▽	6 ○ - part 6 attached To Inf. Request see chart 1, line 21			
	○ ○ □ ▽	7			
	○ ○ □ ▽	8			
	○ ○ □ ▽	9			
	○ ○ □ ▽	10			
	○ ○ □ ▽	11			
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	○ ○ □ ▽	24			
	○ ○ □ ▽	25			

SUMMARY	No.	Time
Origin of record		
Add to operation	2	10.1 hrs.
Handling operation	2	2 hrs.
Move	2	
Inspection	1	8 hrs.
Store, delay, dispose	2	
Total	9	

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number 1
Chart No. 3
Page 2 of 4
Date XX-XX-XX

System: Information Request Procedure
Form name: Information Services Notification — No.
Copy name: Accounting — No. 3
Prepared by: WM

Effect	Subject Charted	Description — Notes - Questions	Distance	Quantity	Time
	○ ○ □ ▽	1 To accounting see chart 3 page 1, line 3	1905'		
	○ ○ □ ▽	2 Checked		375	8 hrs
	○ ○ □ ▽	3 Total posted to requestor ledger		375	10 hrs.
	○ ○ □ ▽	4 Held until end of day			
	○ ○ □ ▽	5 Totaled			1/2 hr.
	○ ○ □ ▽	6 Posted to cost journal (day's total)			1/10 hr.
	○ ○ □ ▽	7 to file section	30'		
	○ ○ □ ▽	8 Filed by requestor ~~name~~		375	1½ hrs.
	○ ○ □ ▽	9 Until charges processed			
	○ ○ □ ▽	10			
	○ ○ □ ▽	11			
	○ ○ □ ▽	12			
	○ ○ □ ▽	13			
	○ ○ □ ▽	14			
	○ ○ □ ▽	15			
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	○ ○ □ ▽	18			
	○ ○ □ ▽	19			
	○ ○ □ ▽	20			
	○ ○ □ ▽	21			
	○ ○ □ ▽	22			
	○ ○ □ ▽	23			
	○ ○ □ ▽	24			
	○ ○ □ ▽	25			

SUMMARY	No.	Time
Origin of record		
Add to operation	2	1½ hrs.
Handling operation	1	1½ hrs.
Move	1	
Inspection		
Store, delay, dispose	1	
Total	5	

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number 1
Chart No. 3
Page 3 of 4
Date XX-XX-XX

System: Information Request Procedure
Form name: Information Services Notification — No.
Copy name: I.O. Clerical — No. 4
Prepared by: MM

Effect	Subject Charted	Description — Notes - Questions	Distance	Quantity	Time
	○ □ ▽	1 to information officers clerical section	230'		
	○ □ ▽	2 Posted to Requests Register		375	6 hrs.
	○ □ ▽	3 Posted to Information Officers Record		375	6 hrs.
	○ □ ▽	4 Filed by requestor		375	1½ hrs.
	○ □ ▽	5 Held indefinitely			
	○ □ ▽	6			
	○ □ ▽	7			
	○ □ ▽	8			
	○ □ ▽	9			
	○ □ ▽	10			
	○ □ ▽	11			
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	○ □ ▽	23			
	○ □ ▽	24			
	○ □ ▽	25			

SUMMARY	No.	Time
Origin of record		
Add to operation	1	½ hr.
Handling operation	1	1/10 hr.
Move	1	
Inspection		
Store, delay, dispose	1	
Total	4	

PAPERWORK SIMPLIFICATION CONFERENCE

PROCEDURE DATA CHART

System Number 1
Chart No. 3
Page 4 of 4
Date XX-XX-XX

System: Information Request Procedure
Form name: Information Services Nonification — No.
Copy name: Information Officer's Copy 5 — No.
Prepared by: OO

Effect	Subject Charted	Description — Notes - Questions	Distance	Quantity	Time
	○ □ ▽	1 Mailed to information officer			
	○ □ ▽	2 Posted to Requestor Record		16	½ hr.
	○ □ ▽	3 Filed by week		16	1/10 hr.
	○ □ ▽	4 Held 6 months			
	○ □ ▽	5			
	○ □ ▽	6			
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	○ □ ▽	23			
	○ □ ▽	24			
	○ □ ▽	25			

CHECK LIST FOR PROCEDURE CHART

1. Is the procedure really necessary?

2. Is each major action in the procedure necessary? Is it in the best sequence?

3. Does each organizational element in the procedure have to be involved? Is the involvement in keeping with its assigned functional responsibility?

4. Is the information input to the procedure satisfactory as to format, cycle and quality?

5. Is each form involved in the procedure necessary? Is each copy prepared, necessary? Is it prepared at the best time? Is the method of completion appropriate in view of person completing, volume and subsequent use? Could a rubber stamp be used instead of the form?

6. Is each record (file, register, log, etc.) required? Is it maintained at the best point in the procedure? Is it maintained by the proper organizational element and person?

7. Is each operation and inspection necessary? Is it performed at the best point in the procedure? Could it be combined with other similar or duplicate actions? Is it performed by the most appropriate skill?

8. Could excessive movement be reduced by changes in layout? Are all handcarries really necessary and appropriate?

9. Could delays be eliminated or cut down?

10. Could steps be subdivided to reduce skill requirements?

11. Where volume permits could machines be used? Could volume be pooled to justify mechanization?

12. What consideration has been given to EAM and ADP application?

PART IV: ORGANIZATIONAL DIRECTION AND CONTROL

Planning, Controlling, Evaluating

Network Scheduling (PERT)

GUIDE TO PART FOUR

It is our intent in Part Four to acquaint the seminar participant with the general principles underlying sound program planning, control, and evaluation; to apply these principles, at least in a tentative fashion, to an agency such as the LEAA; and, finally, to introduce a specific management tool - the Program Evaluation Review Technique (PERT) - highly useful in the performance of the planning, control, and evaluation functions.

The basic concepts underlying the use of PERT are defined and illustrated in summary fashion. If the participants find the PERT material of value as it relates to their own management planning, and/or control and evaluation activities, they are encouraged to review the following two volumes describing in more detail the practical uses of PERT:

(1) PERT FOR CAA PLANNING

(2) PERT FOR CAA OPERATIONS

The two volumes are designed for self-instruction, and each one can be completed in about three hours. The volumes are excellently arranged and illustrated, and are highly recommended to anyone interested in this particular management technique. Each volume will be made available to participants in the workshop.

PLANNING, CONTROLLING, EVALUATING: IN THEORY AND PRACTICE

Part I - Theory

Introduction

It is the purpose of this paper to present a brief analysis of the basic principles and processes underlying the planning, evaluation, and control of organizational programs. The steps by which each of these activities are effected are described separately and in general terms; no effort is made to present the complex interaction of the principles or to apply them in more than a superficial manner to a particular program activity. It is left to the reader to make this more detailed application in terms of his own particular administrative experience. Nevertheless, it is hoped that through a reading and discussion of the material contained herein, new insights into the subject-matter may be formed, and older ones refined.

The First Principle: A Clearly Defined Objective

"Managers must always keep in mind the principle that the kind of organization they should have depends on the kind of results they want to achieve." [1]

To affirm that organizational structure and managerial technique must be adapted to the requirements of varying goals, is to deny neither the existence nor the utility of generally accepted organizational and managerial principles. Such affirmation is an assertion that these approaches and principles, divorced from particular standards or goals, do not order or define themselves; that the principles are not true universals, equally applicable in a precise, standardized, and objective manner to all organizational situations. As one must be aware of the rationale for the creation and operation of a particular type of aircraft, i.e., whether its prime purpose is speed, range, carrying capacity, or some complex combination of each, before specifying the exact aircraft design, so one must understand the prime purpose of any proposed organization before specifying definite structural and managerial arrangements.

It is for this reason that classical organization theorists [2] clearly assigned the highest priority to the definition of organizational objectives. Briefly, their approach to organizational design proceeded in the following manner:

1) Definition or description of organizational objectives.

2) Division of the main objective or objectives into a set of subgoals.

3) Planning of general tasks or approaches designed to achieve those subgoals.

4) Division of these tasks into particular jobs or positions.

5) Grouping of these positions into homogeneous administrative units.

Out of their analysis emerged the description of generalized organization principles, including unity of command, span of control, division of labor, line and staff, and the hierarchy of authority; and such managerial functions as planning, staffing, directing, coordinating, controlling, etc. But the application of these principles is hardly an automatic, self-evident process, as those theorists would readily admit. That application depends upon such variables as the nature of organizational objectives, the immediate external environment of the organization, i.e., its relationships with other groups, and the personal expertise and philosophies of its individual members. Educational institutions, governmental agencies, private corporations, and churches obviously vary in these particulars, and it follows that the application of the managerial and organizational principles will vary accordingly, whether we are speaking of the manner in which authority is exercised, policies are established, coordination is effected, or evaluation of accomplishments measured. If the point is an elementary one, it is distinguished by the ease with which it is overlooked.

Planning, Evaluating, and Controlling

Although there is no distinct line to be drawn between the processes of planning, evaluation, and control, for analytical purposes we will treat these processes separately in the following pages.

1) Planning for Implementation

Once a reasonably clear definition of organizational purpose is achieved, whether that purpose involves the education of the young, the reduction of crime, or simply the realization of a profit - and whether the organization is one long established or newly formed - plans for the attainment of that ideal must be formulated in detail.

In its broadest meaning planning has to do with "deciding in advance what is to be done." Formal, detailed planning "involves the explicit evaluation of alternative courses of action, selection of one of the alternatives for execution, and formal communication of the decision to interested persons throughout the organization."[3] The immediate purpose of a plan or program is to bring about behavior that leads to desired outcomes. To do this it must (1) describe actions and outcomes, and (2) serve as a formal guide to coordination.[4]

The initial stage of program planning requires the answers to certain questions relative to the proposed program objectives:

1. Are the program (plan) objectives consistent with the basic organizational mission?
2. What is the essential nature of the objective? Is it to change behavior, knowledge, attitudes?
3. Who is the target of the program? What are the characteristics of the target groups that may adversely affect the desired objectives? Positively affect them?
4. When is the desired effect to take place? Is it to be immediate or gradual and long range?
5. Are the objectives unitary or multiple? Is the program aimed at a single effect or a series thereof?
6. How is the objective to be attained? What are the specific needs in terms of staffing, administrative structure, equipment, space, expertise, authority, etc.?
7. What external environmental factors are relevant? Are there legal, political, and/or economic limitations? Are there competing organizations with similar or opposing program objectives?

While these questions are hardly exhaustive of the investigatory process, they will give the reader some insight into the general nature of the inquiry. As one reflects on the nature of the answers to these questions, and the bewildering diversity of possible program objectives, however, the fact that quantitatively exact information is often lacking becomes apparent. Thus, the initial implementation of program objectives, rather than being scientifically precise, may partially reflect a subjectively informed judgment. At this point "scientific management" gives way at least temporarily to the "art" thereof.

2) Program Evaluation

If the initial formulation and implementation of program objectives is experimental and a matter of subjective judgment, program evaluation should be less so, especially as program experience accumulates. Whereas the purpose of program planning is, as we have indicated, to define the problem and to spell out the activities and procedures for accomplishing stated objectives, evaluation endeavors to provide an objective (quantitative, factual) assessment of the extent to which the program has achieved the desired results. Some of the specific points of exploration in any evaluative study will include:

- determination of the reasons for specific successes and failures.
- uncovering the principles underlying a successful program.
- laying the basis for further research on the reasons for the relative success of alternative techniques.
- redefining the means to be used for attaining objectives, and even to redefine goals and subgoals in the light of research findings.

The steps necessary to the actual conduct of an evaluation would be of the following order:

1. Identification of the goals to be evaluated.
2. Analysis of the problems with which the program activity must cope.
3. Description and standardization of the activity.
4. Measurement of the degree of change that takes place.
5. Determination of whether the observed change is due to the activity or to some other cause.
6. Some indication of the stability and durability of the change.

Ideally, this evaluative component should be built into the program at the very first stages of the planning effort.

A final caveat: A program cannot be effectively evaluated where there are no clearly defined objectives or criteria of success or failure. In some instances, unfortunately, the nature of the organizational mission may place its direct measurement beyond the realm of possibility. To use a rather extreme example: If the stated goal of a church is "to save souls," church administrators will of necessity be satisfied with measuring that objective indirectly. Church membership, communions, money collected, etc. may be utilized as substitutes, assuming that the particular substitute has some meaningful relationship to the ultimate organizational purpose. In some governmental programs this same necessity of substitution for a direct measurement may be present.

3) Program Control

If the planning of a program and its subsequent evaluation are to have any real value, it is essential that agency administrators have some realistic means at their disposal to control the implementation of that program. A perfectly designed plan for effectuating a given program, and a highly sophisticated evaluative technique will be less than successful if top administrators are foreclosed, for whatever reason, from effective control of operating subordinates. If one is dealing with a typical superior-subordinate relationship, wherein operational personnel are dependent upon supervisors in terms of salary, promotions, etc., the basic control cycle may be stated as follows:

1. An official issues a set of orders.
2. He allows his subordinates time to put each order into effect.
3. He selects certain orders for the evaluation of his subordinates' performance.
4. He seeks to discover what has actually been done at lower levels as a result of the orders he is evaluating.
5. He compares the actual effects of his order with his original intentions.
6. He decides whether these results are effective enough to require no more attention; ineffective but unlikely to be improved because of obstacles encountered; or partially effective and capable of being improved by further orders. [5]
7. In the last case, he issues further orders, starting the cycle again.

Control and evaluation, thus, proceed hand in hand.

The effectiveness of the control cycle will depend upon the manner in which officials issue orders, and upon the way they collect their evaluative information (the authority to issue orders and to obtain pertinent information is assumed here). For example, if effective control begins with issuing orders, then the less ambiguous and general these orders are, the less discretion is delegated to subordinates, and the less need for extensive review efforts. At the same time, this may produce a dangerous rigidity detrimental in itself. In any given case a balance between the need for organizational flexibility and organizational control will have to be found. Clear-cut organization will, of course, aid in locating the individual or individuals primarily responsible for meeting a specific objective or standard. If duties have been clearly defined, it should be a relatively easy matter to identify the people who are concerned with the activity that is to be controlled.

Secondly, officials will have to develop objective measures of performance, and specific standards stated in terms of those measures. Performance budgets, quality control standards, profit levels, sales quotas, and time control standards are examples of such measures.

Thirdly, the preparation of standardized reports by subordinates will not only furnish information to superiors on a regular basis, but will also serve to remind each subordinate that he must meet certain standards of performance.

In practice, top officials cannot review everything done by subordinates in response to their orders. It follows that they ought to review only the most important responses or those most likely to be executed badly (management by exception). Some alternative ways of selecting specific behavior for review are:

- reviewing only those matters that create strong feedbacks from external agents.

- reviewing only significant deviations from standard or preplanned performance targets (management by exception).

- reviewing only those decisions about which subordinates cannot agree.

- reviewing only those matters above a certain quantitative level of significance.

- reviewing a certain number of matters selected at random.

Finally, the use of independent monitoring staffs, divorced from the burden of line operation responsibilities, may be used by administrators to enhance their evaluation and control of line activities. Examples of monitoring agencies are the Army's Inspectorate General, the General Accounting Office, and the numerous other audit groups prevalent at the federal, state, and local governmental levels.

Summation

The principles and procedures touched upon above are not easily or automatically applied. A great deal depends upon the environment in which an organization finds itself, the program expertise of its members, and the accumulated managerial experience of its top officials. Given organizations differ substantially in these respects, and it must be left to the judgment of officials in any particular organization to make the most beneficial application of these principles to their own situation.

In the following section an effort will be made to sketch a general outline of the planning, evaluation, and control processes as they might apply to an agency such as the LEAA. This is not an attempt to provide definitive answers to particular organizational problems; those answers will have to be worked out over a period of time at the operational level. The material which follows merely tries to provide an initial insight into the nature of those problems, and to raise some of the questions pertinent to their analysis and resolution.

Part II - Application

Declaration of Purpose (Title I)

It is the declared policy of the Congress to assist State and local governments in strengthening and improving law enforcement at every level by national assistance. It is the purpose of this title to (1) encourage States and units of general local government to prepare and adopt comprehensive plans based upon their evaluation of State and local problems of law enforcement; (2) authorize grants to States and units of local government in order to improve and strengthen law enforcement; and (3) encourage research and development directed toward the improvement of law enforcement and the development of new methods for the prevention and reduction of crime and the detection and apprehension of criminals.

Part A - Section 101(a). There is hereby established within the Department of Justice, under the general authority of the Attorney General, a Law Enforcement Assistance Administration.

Program Planning and Implementation

A. General Observations

(1) For purposes of simplification let us assume that we may define the overall program objective as "reduction of crime and delinquency."

(2) Meaningful statistical measurement of the number and types of crimes committed during a given period is possible if standard reporting systems are established. Over a stated period of time, such measurement will provide an insight into the actual impact of the agency's efforts toward the objective stated above in #1.

(3) Three levels of government - federal, state, and local - are to be engaged in the planning and implementation of the program.

(4) The planning-implementation role of each participant must be defined in some detail, keeping in mind the "semi-sovereign" nature of the state and local units - a point which has important ramifications for the federal control function.

a. "The Omnibus Control and Safe Streets Act of 1968 specifically recognizes that "crime is essentially a local problem that must be dealt with by state and local governments if it is to be controlled effectively." The funding package for that Act, especially the block grant concept, clearly places major responsibility on the states and logically then defines the central federal role largely in terms of support and assistance..." (LEAA Task Force Report, p. 17).

(5) For our purposes, then, let us assume that the partnership can be defined in general terms as one in which the federal agency plays an enabling or staff (support and control) role, and in which state and local units act as the primary planning-operational units.

(6) Some decision must be made as to the degree of decentralization of the federal activities. Given current LEAA policy this would mean thorough-going decentralization. (See Redelegation of Authority to Regions).

B. Program Planning

(1) If "reduction of crime and delinquency" is the overall goal to be achieved, definite planning as to how this is to be accomplished must be forthcoming. If there is any uncertainty here experimentation will be necessary. Decentralization of operational activities among the states will be an advantage because of the potential variety of approaches to the problem.

(2) This decentralization of operational activity, and the resulting variety of approaches will be meaningful, however, only to the extent that activities of the operational units are given systematic guidance. This direction must come from a well-drawn, detailed state plan of action (state comprehensive plan). It is at this point that federal review and support of operational activities would logically begin.

(3) While the states are primarily responsible for creation of the comprehensive plan, it remains the responsibility of the federal partner to ensure that each plan has some direct relationship to the problem of crime, and that it is a detailed plan of action designed to meet those problems (this assumes that control and evaluation functions are in fact assigned to the federal partner).

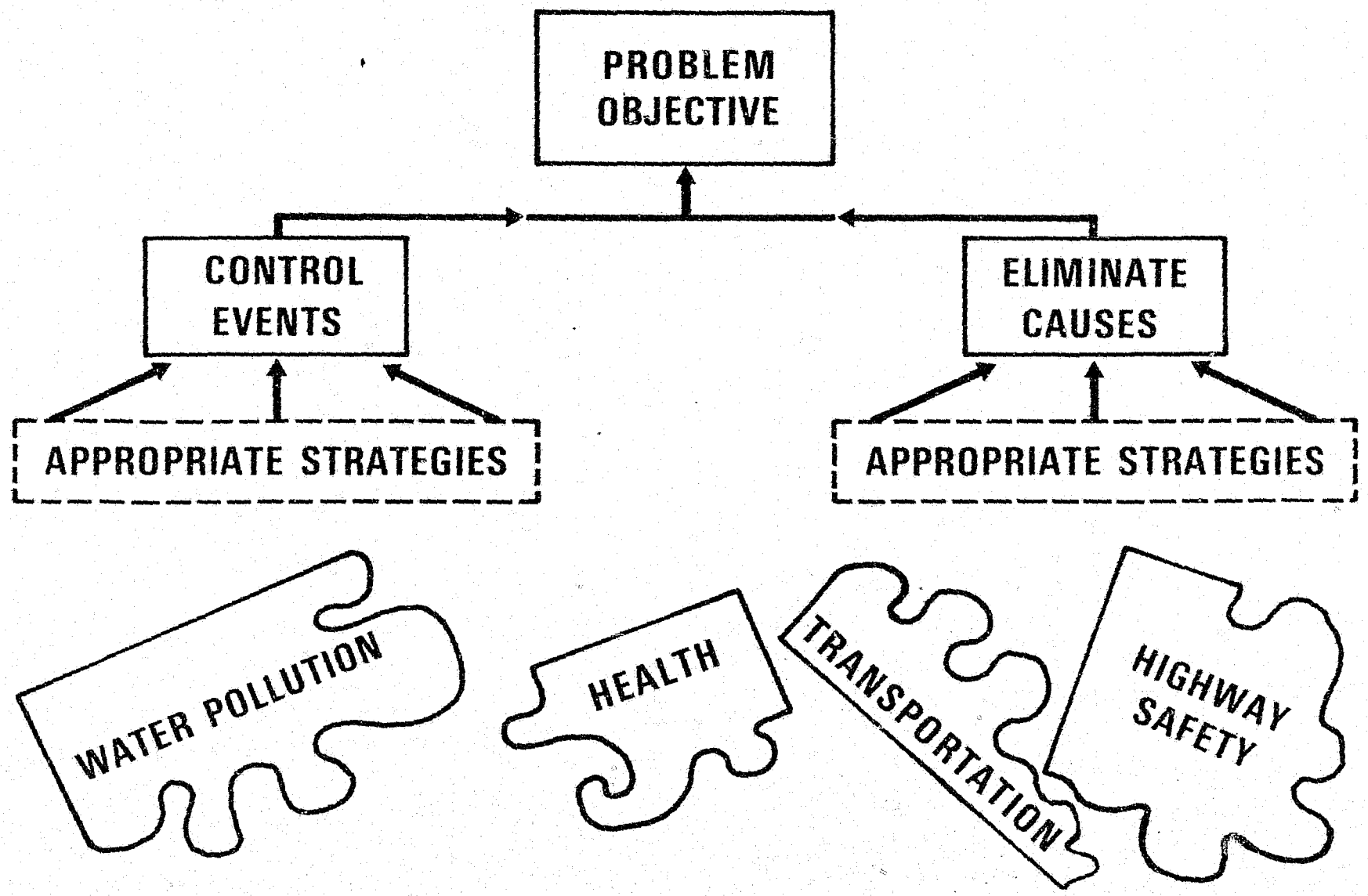
(4) While the ultimate goal, again, is the reduction of crime, subgoals leading to the realization of the larger objective will have to be formulated. Those subgoals, whether they relate to the improvement of police action through better training, improved court administration, correctional reform, or whatever, will (a) have to be reasonably related to the overall goal, and (b) be measurable in terms of their impact on that goal. If these points are neglected in the initial planning process, meaningful control over implementation is unlikely - whether that control is exercised by federal or state officials.

C. Program Control and Support

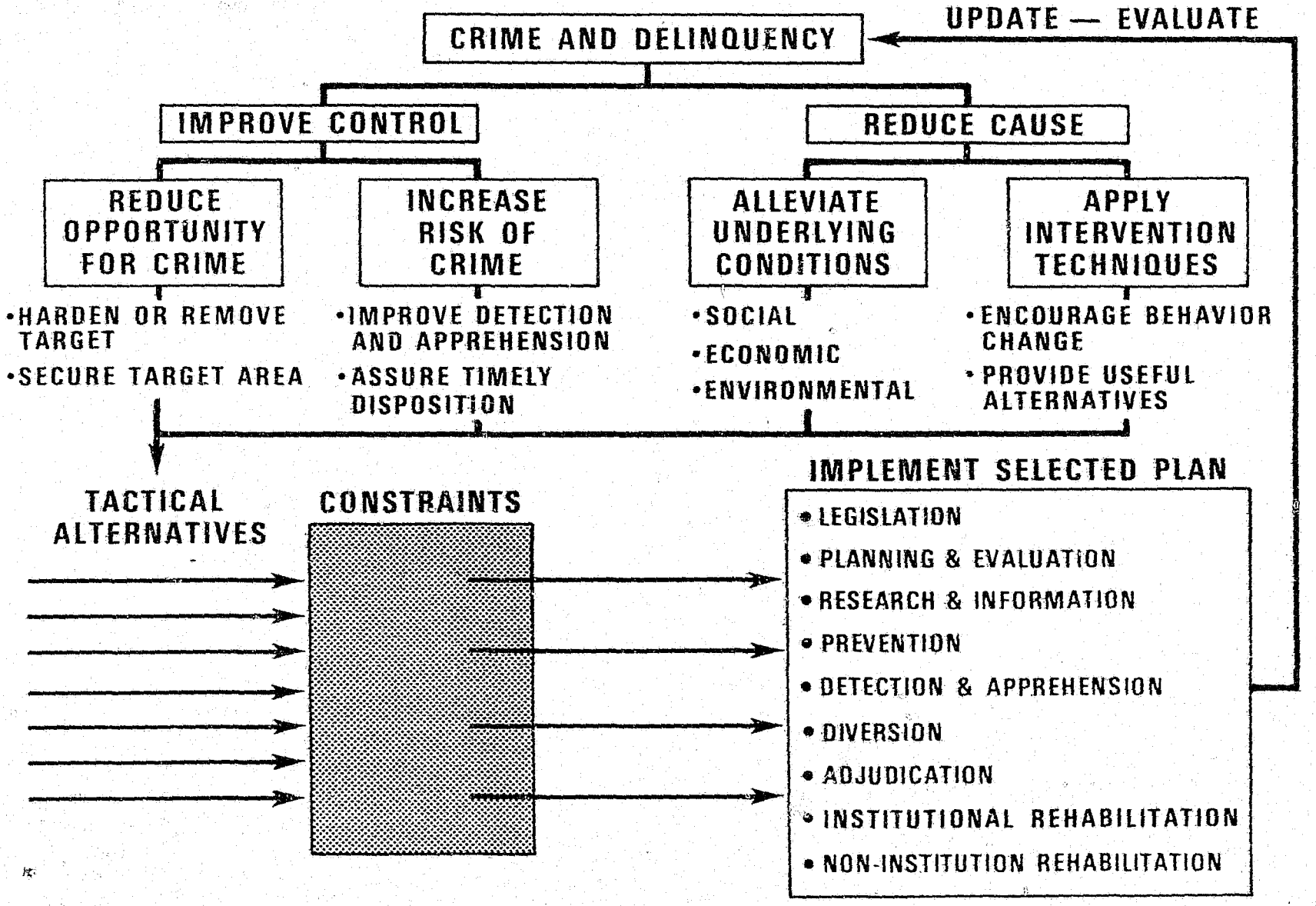
(1) As has been indicated, federal or state control over plan implementation begins with a clearly drawn comprehensive plan.

(2) Overall control involves a continuing review of state and local implementation procedures in terms of their compliance with (1) statutory law and administrative regulations, and (2) in terms of the consistency of individual action grants awarded, to the particular subgoals posited in the comprehensive plan.

ATTACK THE PROBLEM



CRIME ANALYSIS AND PROGRAM DEVELOPMENT



Thus, the purpose and procedures under each action grant should be clarified as they relate to a specific subgoal. If this is not done evaluation becomes largely subjective, and control is reduced to seeing that statutory and administrative regulations are complied with.

(3) A variety of periodic standardized operating reports from the state and local units might be required on the status of current grant activity, problems encountered, crime statistics, etc. Periodic financial audits would also be required.

(4) Operations support on the part of LEAA regions would involve such activities as:

a. consultation with the states in the development of the state comprehensive plans.

b. financial, management, and budgeting technical assistance to the state and local units as requested.

c. technical assistance in specialized program areas as police, courts, and corrections as requested.

(5) A continuing problem for the federal partner in the areas of control and support is the relative legal and political independence of the state and local partners. Ultimately, the degree of control and support of operational activities possible will depend upon the readiness of state and local units to comply with and, indeed, to actively seek the technical assistance of the federal partner.

The nature of federal-state-local contacts, thus, becomes a pivotal question; one which may be basic to regional office organization and administration. Should selected regional personnel, for example, be stationed within the individual states in order to work with state and local officials on a day-to-day basis? Should task forces made up of technical assistance personnel visit the respective states periodically to observe practices, and to provide needed expertise? Should regional personnel remain largely in the regional offices, responding only to specific state and local requests for assistance? Answers to the above questions may have important consequences for the quality of support and control functions exercised by the regional offices and should be given serious consideration in any analysis of regional office administrative structure.

(6) The 1971 LEAA Task Force Report, and the Staff Study on regional offices conducted by the Management Planning and Review Division in April, 1971, each made specific recommendations concerning the organizational structure of the regional offices. No further effort in that direction shall be made here, except to say that regional office administrative structure should reflect the actual working role of those offices. Until that role, as it relates to the state and local units, is precisely defined a degree of ambiguity will probably exist in regional office administrative practices.

FOOTNOTES

1. Merrill, H.F. Classics in Management, p. 132.

2. See "Notes on the Theory of Organization," Papers on the Science of Administration," T. Gulick and T. Urwick, eds. (1937).

3. Emery, J.C. Organizational Planning and Control Systems, p. 108.

4. Ibid., p. 109.

5. Downs, Anthony. Inside Bureaucracy, p. 144.

NETWORK SCHEDULING (PERT)

The Uses of PERT

The process of management may be defined in three steps: Establishment of objectives; direction and attainment of objectives; and measurement of results. Once the objectives are established and plans laid to accomplish the objectives, the manager will organize, communicate, motivate, direct, and guide or counsel. As operations start, controls are established and results are measured and evaluated. These become part of the information gathering step which starts the cycle again.

PERT application to a system program directly affects the planning effort, and provides a tool for measuring, evaluating, and controlling the system. More specifically, PERT can be:

(1) A visual method of showing, in sequential order, the activities necessary for the fulfillment of stated goals.

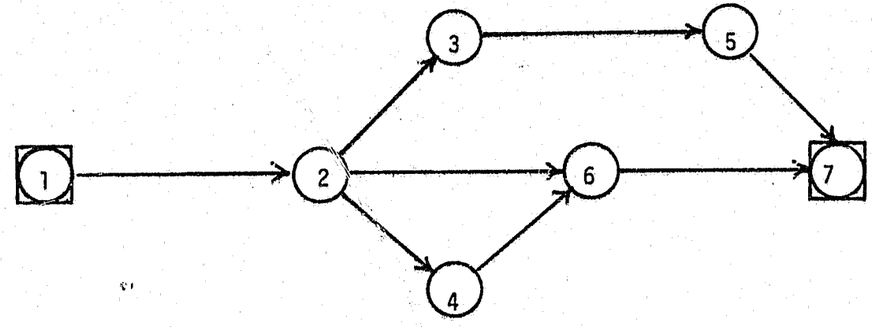
(2) A method of structuring and coordinating activities so that their interrelationships become clearly evident.

(3) A method of estimating the completion date of an entire project or any segment of the project.

(4) A method which will indicate possible areas of improvement in resource allocation so that the completion date of the project may be advanced.

Activities and Events

Simply stated, a PERT chart is a diagram which shows the relationships among the activities and events of a project - as in the following illustration:



Activities are things being done, characterized by people using facilities over some period of time to accomplish a stated objective. Examples would be: preparing, researching, building, negotiating, deciding, testing, etc. Activities are the "flow" of a network, and it is this flow of human effort, materials, use of facilities, investment, expenses, and progress towards an objective, which can be controlled by the manager.

Events are points in time which indicate the beginning of or the completion of one or more activities. Events do not take time in themselves to complete. Events are meaningful, specific accomplishments, either physical or intellectual that do not consume time or resources. Each event, such as "report prepared" is shown on a PERT chart by a numbered circle. For example, (3) represents event number 3.

An activity such as "prepare a report" is represented by an arrow (⟶). Arrows are never used alone, however, because each activity starts with a leader event and ends with a follower event. For instance, in (3)⟶(4) event 3 is the leader event and event 4 is the follower event. The arrow represents the activity necessary to advance the project from event 3 to event 4, and is called "activity 3-4." Activity 3-4 cannot start unless event 3 has occurred. Similarly, event 4 cannot occur until activity 3-4 is completed.

Backward-Chaining

Analysts who study work operations have learned to help the expert workman, who often works by habit, to remember each step necessary to do his job by asking him to first describe the last step he does in completing the job. They then ask, "What is the next to last step you do?" This "backward-chaining" type of questioning is carried through each step of the operation until finally the first step in the process is described. Because remembering "backwards" is difficult, our minds think slowly and carefully. When we are thinking backwards, we cannot "jump ahead" by forgetting in-between steps, and we usually remember every step in its proper reverse order.

Backward-chaining is one of the most important concepts of PERT. First we state our goal; that is, where we want to be when we have completed the last step. Then we work backward step by step to where we are now. In PERT, each step is known as an activity and every project consists of a chain of activities.

Summary

Some the the vocabulary and symbols used in PERT have now been presented. Here is a short review to help you remember them.

	ACTIVITY	EVENT	MILESTONE
DEFINITION	Work needed to advance the operation from one event to the next.	The start or completion of an activity.	Any outstanding event.
REQUIRES	Time, labor, material, resources.		
REQUIRES NO		Time, labor, material, resources.	Same as event.

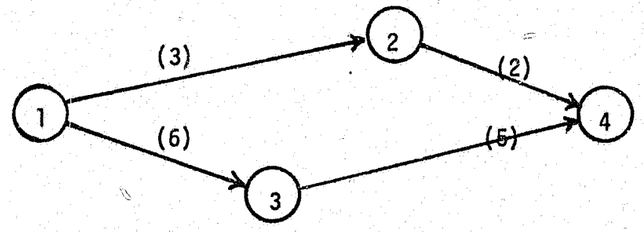
	ACTIVITY	EVENT	MILESTONE
VERB FORM USED TO DESCRIBE	Active form ending in "ing" or command form.	Past tense; usually ends in "-ed."	Same as event.
IDENTIFIED BY	Number of leader event, hyphen, number of follower event; such as "activity 1-2."	Number within a circle.	Number within a circle enclosed by a square.
SYMBOL			

PERT Activity Time Estimate (t_e)

The most direct way of estimating the time required for an activity (its t_e) is to use common sense coupled with a knowledge of the job to be done. In making your time estimate (t_e) for each activity you must have a thorough knowledge of the amount of resources available for the activity and the quality of those resources.

Once the t_e (estimated time) for an activity has been derived, you should state it in terms of whatever measure is appropriate for the project. Most important programs or projects require several weeks, at least, to complete, so that the activity t_e's can be stated in terms of work days. Regardless of how you decide to measure the t_e's for activities (months, weeks, days, or hours) you should strive for accuracy. Whenever better estimates are available, use them.

The project charted below contains parallel activities. The figures within parenthesis represent estimates in work-days (t_e) for the accomplishment of each activity between the event circles. Note that the length of an arrow has nothing to do with the time required for the activity it represents.

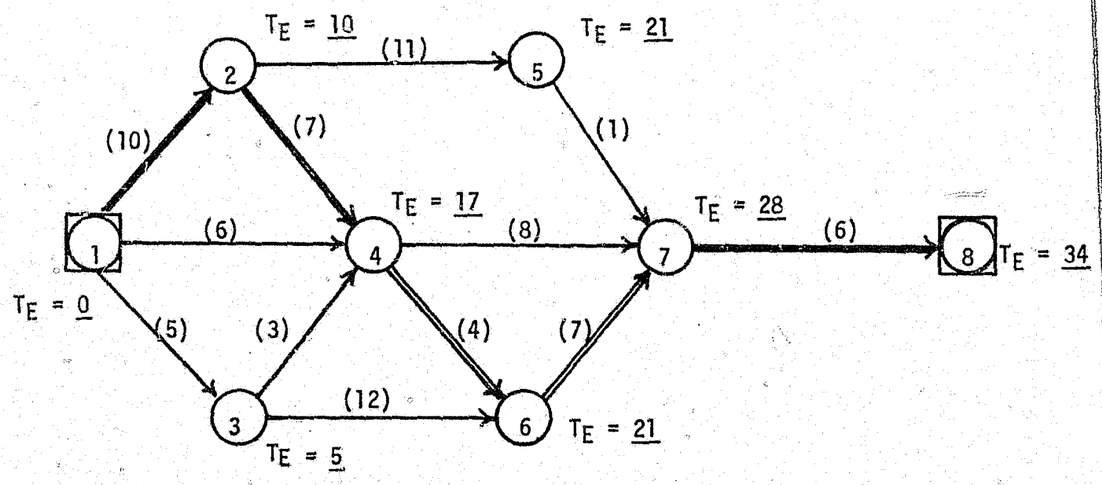


In the above chart there are two activity paths. Path 1-2-4 will take 5 days to complete, while path 1-3-4 will take 11 days. Activity 3-4 will not be accomplished until the 11th day of the project. The shorter activity path can easily be accomplished within that time. As a rule, remember that the shortest time that an event - in this case event 4 - can occur after event 1, is determined by the longest activity path leading to that event. That longest path is known as the critical path. It is called critical because if any of the activities along this path should require more time than was originally estimated, the whole project will be delayed. Remember that the time necessary to complete the critical path is identical with the time required to accomplish that particular plan of action. Management's attention should, therefore, be initially focused on the critical path.

PERT Event Time Estimate (T_E)

The estimated time that an event will occur after event 1 is known as the T_E for an event. The T_E of an event is always found by working backwards from that event to the first event, along the path which requires the most time.

Using a slightly more complex chart, the t_e's are listed, and T_E's are calculated as shown:

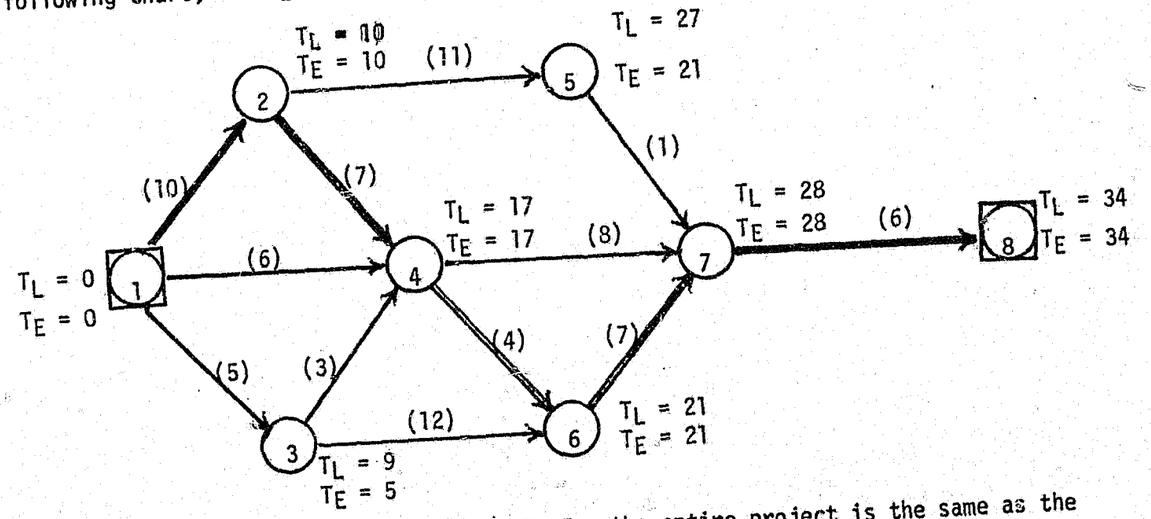


The critical path of the above subject is 1-2-4-6-7-8, and the total T_E is 34 workdays.

Latest Allowable Time (T_L)

The estimated earliest time for the completion of an event is usually abbreviated as T_E. In addition, however, we are interested in knowing the latest allowable time for the completion of an event, abbreviated as T_L. The T_L for any event is defined as the latest allowable time that the event can occur without delaying the project beyond the number of days indicated by the critical path.

To determine the T_L for a specific event, take the T_L for the entire project and subtract from it the number of workdays required to advance from the specific event to the end of the project. Where more than one path leads back to the event, the T_L will be determined by the longest path leading back to that event. In the following chart, the T_E's and T_L's are both calculated:



We have assumed in this case, that the T_L for the entire project is the same as the T_E for that project. This may not be true in every case, however.

Event Slack Calculation

Event slack time (S) is the amount of time we may delay an event without delaying the completion of the project. It is computed as follows:

$$T_L - T_E = S$$

If we assume that "project T_L" = "project T_E" then the slack time is zero for any event on the critical path because $T_L = T_E$ for every event on that path (see above chart). In such a case, the delay of any event on the critical path will obviously delay completion of the project. This will not necessarily be the case with events which are not part of the critical path, however. Using the sample network above, notice that event 2 has zero slack. In other words, no delay of activity 1-2 can take place without delaying the entire project unless some other activity along the critical path is reduced in time. Event 5, however, has a slack time of 6 days. This means that activity 2-5 may be delayed by six days without increasing total project time. This allows management 6 days of slack before starting activity 2-5, and the idle resources may possibly be used elsewhere during that period, even to shorten the time of the critical path itself.

Activity Slack Calculation

So far we have discussed the effect on a project should the occurrence of certain events be delayed. An event, however, will be delayed only if the t_e of one of its leader activities is increased. That is, if any particular activity requires more time than was originally estimated, and if its leader event cannot be advanced, then its follower event will be delayed. Strictly speaking, slack time can only apply to activities because activities, not events, require time and resources.

The calculation of slack for an activity is only slightly more complicated than that for event slack. Read these instructions carefully and you should have no trouble.

1. Calculate the T_E's and T_L's for all events.
2. Locate the activity whose slack you wish to calculate.
3. Write the T_L of the follower event of that activity.
4. Starting from this follower event find the longest chain of activities back to the first event of which the activity forms a part.
5. Add all the t_e's along this chain.
6. Subtract the sum of these t_e's from the T_L of the follower event of the activity whose slack you are trying to find.
7. Your answer is the slack for that activity.

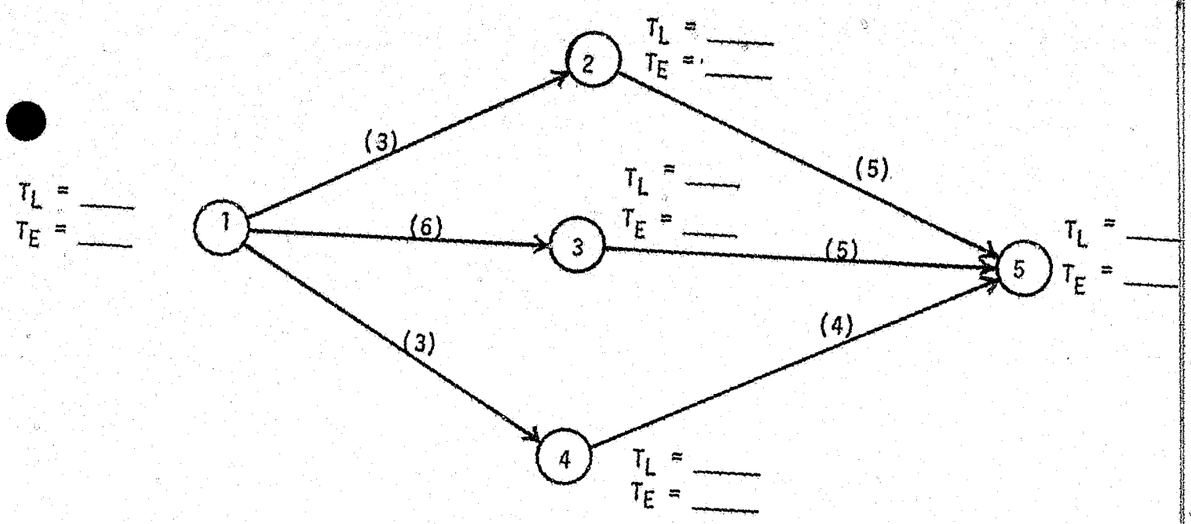
The activity slack time in the above network is as follows:

Activity:	1-2	1-3	1-4	2-4	2-5	3-4	3-6	4-6	4-7
Slack:	0	4	11	0	6	9	4	0	3

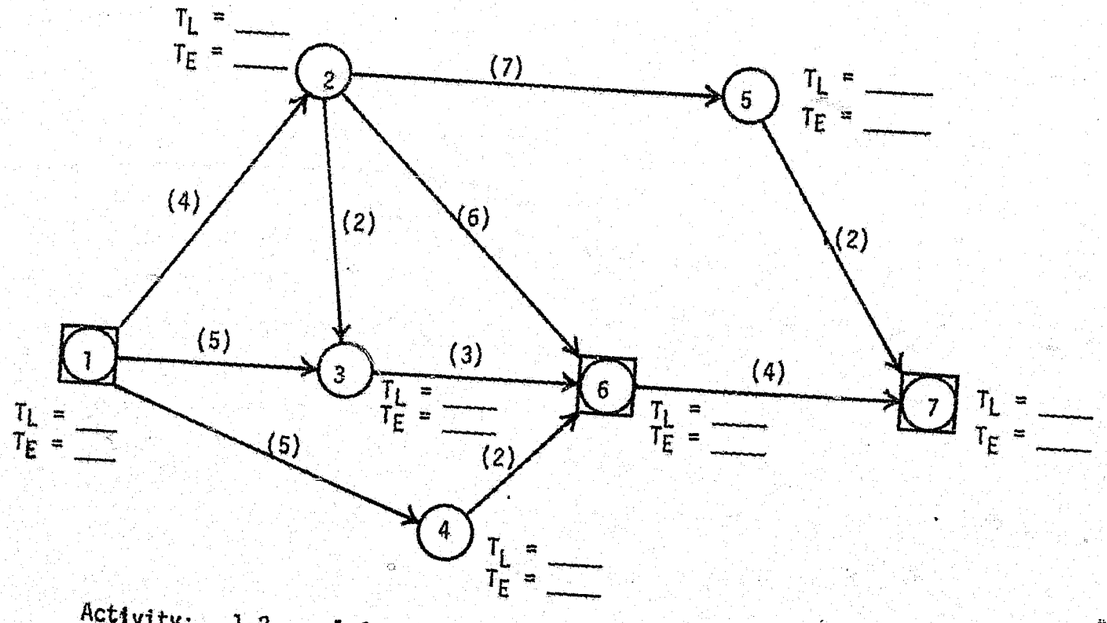
Activity:	5-7	6-7	7-8
Slack:	6	0	0

Exercise

Write the critical path and calculate the T_E's, T_L's, and the activity slack time in the two PERT charts below.



Activity:	1-2	1-3	1-4	2-5	3-5	4-5
Slack:	___	___	___	___	___	___



Activity:	1-2	1-3	1-4	2-3	2-5	2-6	3-6	4-6	5-7	6-7
Slack:	___	___	___	___	___	___	___	___	___	___

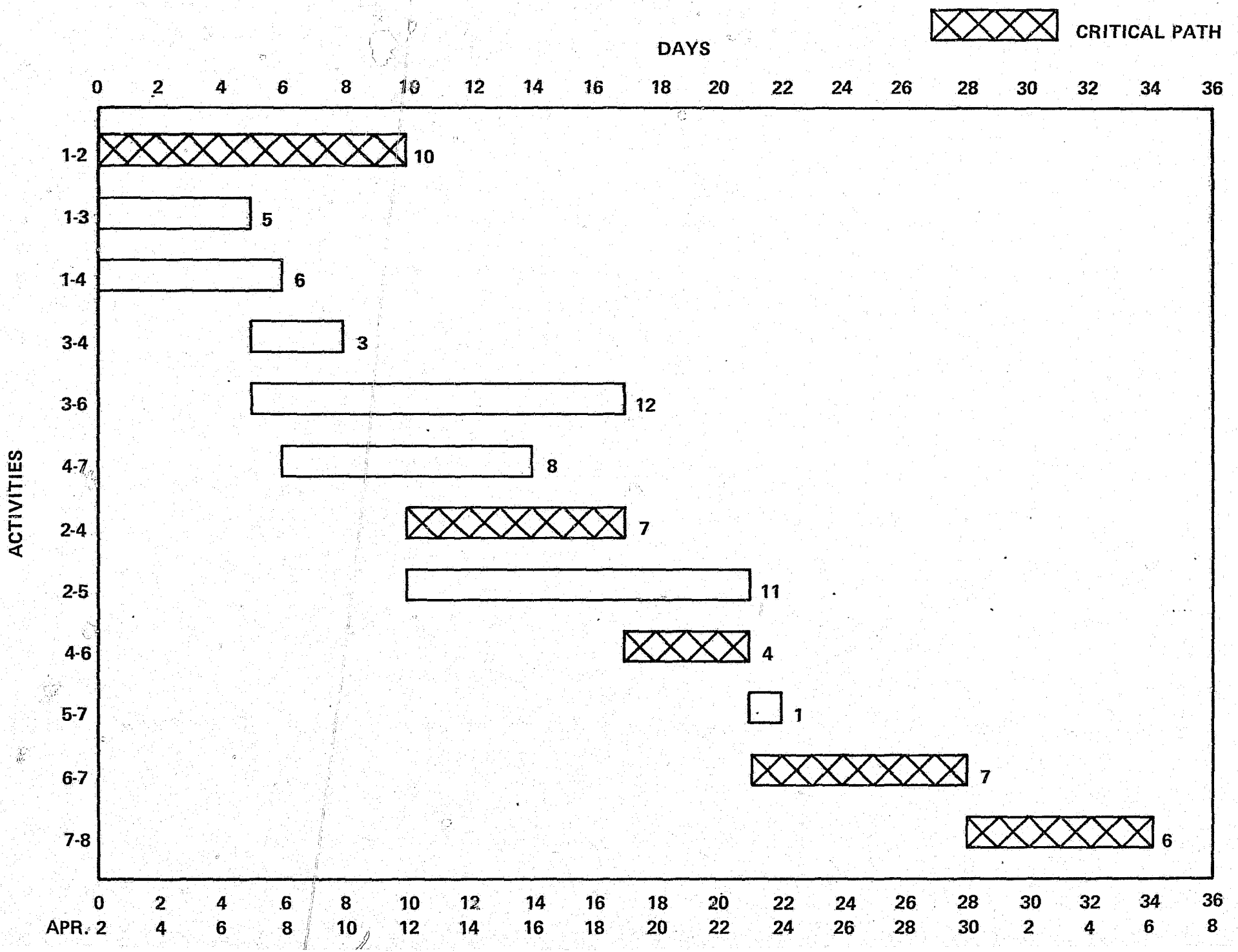
Summary

The essentials of PERT analysis may be stated in the following terms:

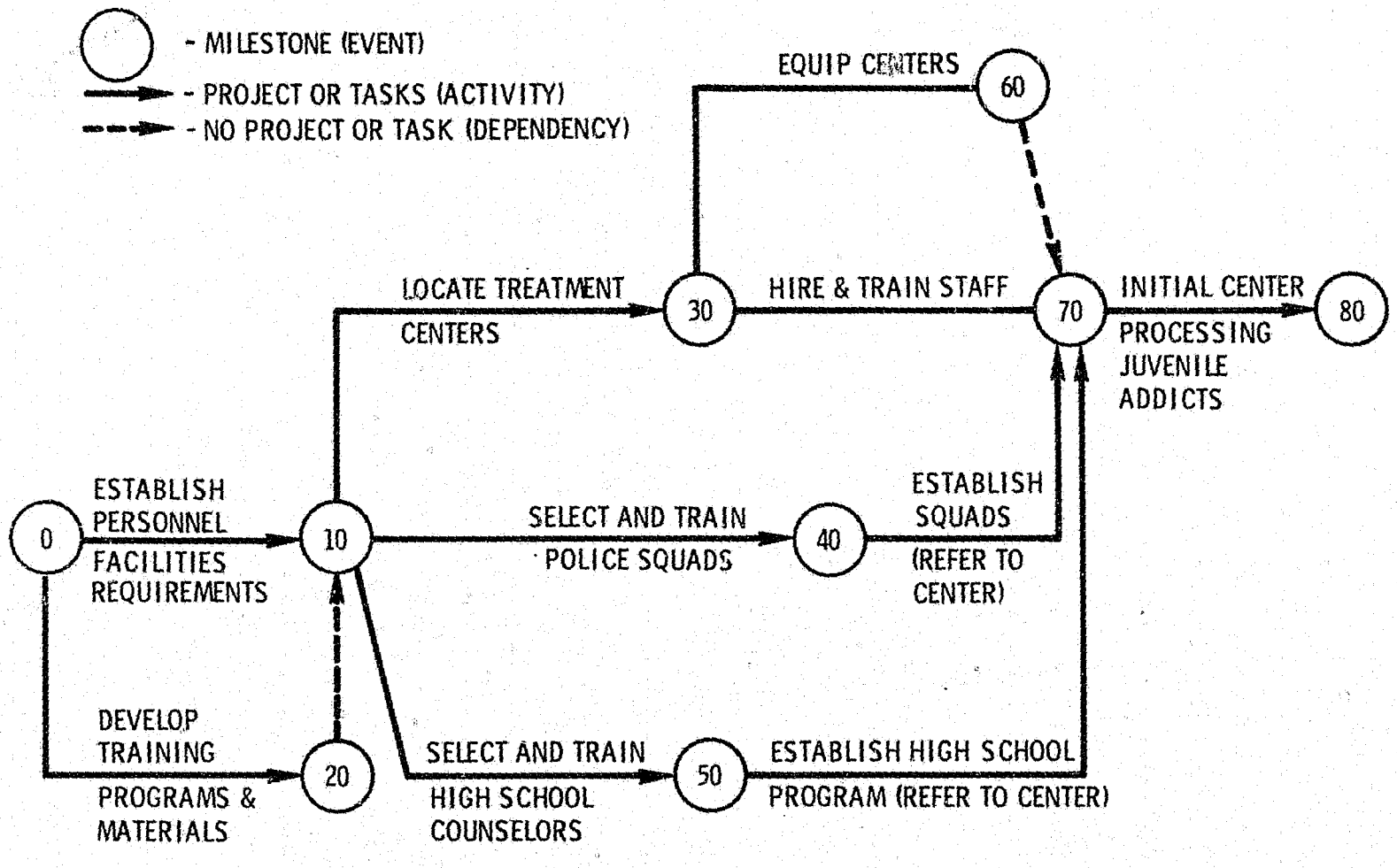
1. State your intended goal.
2. Working backwards from the goal, list all the activities necessary to attain it.
3. Construct a PERT chart (may be done simultaneously with step 2), working backwards from the last event of the project which represents the goal.
4. Estimate t_e's for all activities.
5. Determine T_E's and T_L's for all events.
6. Find the critical path.
7. Calculate the slack for all activities.
8. If a scheduled completion date (T_S) for an event has been set, put it in terms of days after event 1 and use it as the T_L for that event.
9. Incorporate new, better, estimates for activity times as they become available.
10. Allocate resources from non-critical to critical activities to shorten the time required for the project.

Now return to the first page of this section and re-read the statements describing the purpose and use of PERT charting.

GANTT CHART #1



EXAMPLE OF NETWORK DIAGRAM FOR REDUCTION IN JUVENILE NARCOTICS PROBLEM



SAMPLE CHART

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