PROCESS CHARTING
Its use in procedural analysis

Management Bulletin

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BUREAU OF THE BUDGET
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FOREWORD

Much has been written about process charting. This bulletin collects in one place what seems to be most significant on the subject, and at the same time summarizes actual experience from private industry and Government. It aims to put process charting into action as a practical working device in attacking management problems.

The material was originally planned for use in a series of administrative planning conferences to be conducted by the Bureau of the Budget. The widespread interest in process charting shown by Federal agencies has led to prior publication, however, as one of the series of Bureau of the Budget Management Bulletins.

The multi-column process chart described here is particularly useful in analyzing procedures involving more than one unit or section of an agency organization. It will be of special interest to methods analysts. For a description of a simpler form of process charting, useful in analyzing less complex procedures such as those within a single unit, we refer you to the Bureau of the Budget's Work Simplification pamphlet, Supervisor's Guide to the Process Chart.

Thousands of procedures in Government agencies are waiting for improvement. This bulletin is intended to send the reader into action on them. The template attached to the back cover will help you make the process charts that will bring these targets into focus. Sighting these targets leads to savings in time, money, and man-hours and to increased efficiency.
PROCESS CHARTING

Any method which has proved effective in simplifying administrative procedure should be a part of the working kit of the methods analyst. Process charting is such a method. Dollar savings and man-hour savings have conclusively proved its usefulness in getting work done better, faster, more efficiently.

Process charting is not new. It is a tested method to help in spotting bottlenecks, duplication, backtracking, and other procedural troubles. But the usefulness of process charts need not be confined to spotlighting procedural troubles. They can be used to point up problems in relationships, distribution of functions, assignment of authority and responsibility, and other major administrative problems.

Specific examples will best show what we mean:

1. Men applying for jobs in a field office complained of the long delays in handling their papers. A process chart was used to trace every step taken by applications as they flowed through the office. Examination of the chart revealed that four separate sections (Qualifications, Investigations, Certification, Employment) were regularly checking the citizenship of the applicant. A further study of the responsibilities of each of these sections indicated that this work should be done by the Investigations Section. Here process charting furnished a clue to improper organization, delayed processing, and wasted effort. Before and After Charts of this procedure are shown on pages 16 and 17.

2. During a survey of the procedures in a Personnel Office, a process chart was made of the steps taken in transferring an employee from one office to another. The chart showed that the employee's new office prepared 8 copies of a notice, one of which was sent to his former office. When his former office received its copy, it made out 8 more copies of the notice. The chart also showed that 6 of those copies went to the same places that originally received copies. With these facts made clear, it was possible to give notice to everyone concerned by making 10 copies in the first place, eliminating the time (and 6 of the copies) involved in the second writing.

3. When an employee transfers from one agency to another, he often has a balance to his credit for the purchase of war bonds. If this balance is not sufficient for the purchase of an entire bond, the normal procedure is to refund it to the employee. In one Federal agency it was proposed that rather than make a refund to the employee, the balance should be transferred to the employee's credit in the new agency. A process chart was made of the present procedure and of the
proposed procedure. These charts showed that the present procedure involved fewer steps and less time than the proposed procedure — that on the ground of efficiency the proposal should be rejected.

These typical uses of process charts show that they get into problems whose solution is important to effective administration. Process charting helps spot unrecognized trouble because it is based on a complete, orderly, and detailed organization of facts. A finished chart compresses a wide range of operations within a relatively small space. At the same time it spotlights every detail.

WHEN TO PROCESS CHART

Process charting presents many opportunities for saving time and money, for justifying existing procedures and personnel utilization, and for improving agency management. Times when process charting will be useful in spotting procedural troubles are:

1. When a major change is taking place. No agency is long without major changes in procedure, large personnel turnover, an increase or decrease in volume of work. Knowing in detail the steps of a procedure and the relation of that procedure to the agency as a whole makes adjustments easier.

2. When a procedural problem arises. Here process charting presents well-recognized assistance. Bottlenecks, dragging work flow, and other symptoms demand detailed investigation. The multi-column process chart shows the whole procedure graphically in a relatively compact space.

3. When making an administrative analysis. Once a year at least, an agency should check to see if its house is in working order. More frequent check-ups are even better since conditions and requirements of agency management are subject to constant change. The procedure that is best today may not be best next month. Process charting shows up unsuspected faults since it shows the whole procedure in detail.

4. When setting up a new office. Consult process charts of similar procedures for valuable help. Process charts of the proposed procedure will show which way is most efficient, and will prevent procedural troubles before they become entrenched.
<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>CHART TO USE</th>
<th>ILLUSTRATION OF CHART</th>
</tr>
</thead>
<tbody>
<tr>
<td>To study the sequence of major operating steps in an activity and the organization units performing them.</td>
<td>WORK FLOW CHARTS give a general description of the steps in one column; other columns represent organization units. The connecting lines show the flow of work.</td>
<td>A B C D DESCRIPTION</td>
</tr>
<tr>
<td></td>
<td>Application prepared for examination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Examined, verified and approved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>License prepared, validated and issued</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distributed and recorded</td>
<td></td>
</tr>
<tr>
<td>To analyze the detailed steps in a flow of work that is quite complex or involves several organization units.</td>
<td>MULTI-COLUMN PROCESS CHARTS show steps in greater detail than on a work flow chart -- symbols are used to describe steps.</td>
<td>MAIL CLERK</td>
</tr>
<tr>
<td></td>
<td>CLERK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TYPIST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ANALYST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHIEF</td>
<td>1 Case on Desk</td>
</tr>
<tr>
<td></td>
<td>2 Enter in register</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Out basket</td>
<td>4 To file clerk</td>
</tr>
<tr>
<td>To study the detailed steps in a relatively simple procedure such as one within a single organization unit.</td>
<td>SINGLE-COLUMN PROCESS CHARTS are often drawn on printed forms; work flow is shown by connecting the appropriate symbols.</td>
<td>FORM DISTRIBUTION CHARTS show the number of copies in the first column. The flow of each copy of the form is traced from unit to unit.</td>
</tr>
<tr>
<td></td>
<td>Application form 1096</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2 2 2 1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3 3 3</td>
</tr>
<tr>
<td>To study the flow of copies of a multi-copy form.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To improve the layout of the office so that unnecessary steps can be avoided.</td>
<td>LAYOUT FLOW CHARTS involve a diagram of the office made to scale -- the flow from desk to desk is shown by arrows.</td>
<td>LEF THand</td>
</tr>
<tr>
<td></td>
<td>OPERATION CHARTS are of several types; the one shown in the next column is commonly used to study the motions of each hand.</td>
<td>1. Move to drawer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Pick up clip</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Move clip to paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Attach clip to paper</td>
</tr>
</tbody>
</table>
SELECTING THE RIGHT CHART

In any problem concerning the flow of work, charting the flow helps point out administrative failures. There are several types of charts that are used to analyze sequence of work steps. To avoid confusion as to which chart to use, see the Chart Selector on the opposite page. It will help you to identify your problem and to select the chart which best applies to its solution.

Before selecting the multi-column process chart -- the chart discussed most fully in this bulletin -- make certain that you can answer "yes" to these questions:

1. Is the flow of work complex, or does it involve more than one unit?

2. Do I need a detailed picture to arrive at the solution of the problem?

An affirmative answer tells you that the multi-column process chart is the chart to use.

The multi-column chart, however, need not be the only tool to use in solving a procedural problem. Special phases of your problem will lead to the use of other types of charts to supplement the process chart. For example, the procedure may involve the use of a multi-copy form, which can be best studied on a Form Distribution Chart; an acute bottleneck at a key point may indicate the need for more detailed analysis with an Operation Chart; where study of the physical layout is necessary, a Layout Flow Chart will be helpful.

Experience has shown that a multi-column process chart is successfully applied where a procedure involves a series of repetitive steps, a large volume of paper work, or several employees doing identical work. It is equally valuable in analyzing relationships between positions and between units, and in pointing up trouble spots in the distribution of functions, delegation of authority, and other major administrative problems.

How the chart pictures procedures is shown on pages 10 and 11. Notice that the use of several columns makes it possible to show graphically not only the sequence of the steps performed, but the places where they are performed. The use of symbols and notes clarifies the details of the work flow.
USING THE MULTI-COLUMN PROCESS CHART

The multi-column chart as a complete, orderly, and detailed organization of facts, can be put to many uses:

1. To improve procedures. The procedures involved in actually carrying out the job to be done must be sound if an organization is to operate efficiently. The multi-column process chart is applicable to all types of jobs; in fact, some of the best results have been achieved in high level or professional jobs. It is quite common to find detailed steps performed by professional men that could be handled adequately by clerks. Unnecessary checks and reviews are often uncovered at high levels in an organization.

2. To standardize procedures. Where field offices are performing similar operations, comparison of process charts is a starting point for developing best or standard procedures. Similarly a composite of the best methods in use within offices performing the same or similar work can be set up as standard. Process charts are also useful in standardizing procedures when setting up new offices.

3. To train personnel. A chart of a procedure as it is, and as it will be revised and improved, affords the personnel concerned with it a clear explanation of the change. One Federal agency has increased output in its offices by using process charts to train clerical employees to do jobs that heretofore have been done only by technical people. The charts set forth for each employee precisely what steps are to be taken. They serve as graphic standard operating procedures.

4. Personnel orientation. Process charts are extremely useful in giving an employee a better understanding of his job in its relation to the organization. In this way they show where his job fits into the sequence of agency operations. He better realizes the importance of the steps he performs, and of his individual responsibility in the agency.

5. Classification and Recruitment. The details of jobs shown on process charts are helpful to the position classification man in evaluating the level of specific jobs and to the recruitment officer in defining qualifications for a given position.
GETTING THE FACTS

Let's take a situation involving a flow of work to which the process chart is applicable. In order to spotlight the organizational relationships involved, a multi-column chart, as on pages 10 and 11, will be used. To get the facts to put on the chart -- and they must be facts -- certain preliminaries are essential.

Laying the Groundwork

As in any other study, it is first necessary to make certain that the way is clear -- that the head of the organization understands and approves of the study, and that it has been explained carefully to all supervisors and employees who will be affected. Without the full cooperation of the operating people -- those who know the most about the job -- it is impossible to get all the facts. Further than that, to get improvements installed, it is essential to have the sympathetic interest of those who will have to put them into effect.

Gaining the cooperation of the supervisors and employees is largely a matter of the attitude of the person making the study. This attitude should be friendly and casual. The purpose is to be helpful rather than critical; primary interest is in the procedures rather than in the performance or salary level of individual employees; the charts and notes are working papers, not mysterious, confidential reports. These factors should be made apparent from the outset.

Tracing the Procedure

Process charting aims to find out the way in which things are actually being done -- not the way the supervisor TELLS employees to do things, nor the way the supervisor THINKS they are done, nor the way a manual SAYS they should be done. To uncover facts, it is essential to trace the steps one by one during the operation. Doing this involves starting at the point in the office where the procedure begins and walking from work place to work place in succession, talking with each individual employee separately, finding out exactly what he does by watching him do it.

Fact-gathering must not be a purely mechanical process. The best fact-gatherers do not get facts blindly -- they do so purposefully. Preconceptions are out of place when securing information, but a great deal of call-back time can be saved by thinking analytically as the fact-gathering progresses.
HINTS IN GATHERING PROCESS CHART DATA

1. Explain to each person you interview what information you want and what you are going to do with it.

2. Be friendly and considerate -- show the employee you have a genuine interest in his job.

3. Avoid conversational detours. A controlled interview will get you more facts, faster.

4. Use simple language, trying as much as possible to pick up terms or phrases that have special meaning to the employee.

5. Don't criticize or make hasty suggestions.

6. Be sure to follow the procedure through its successive steps.

7. Take notes as you go along -- it is impossible to remember all the steps in a procedure and in the correct order.

MAKING THE CHART

It has become common practice to construct process charts so that they must be read from the top of the page to the bottom. There are some obvious inconveniences to this method. Vertical charting goes against natural reading habits because we are accustomed to read from left to right across a page. Therefore a chart with the flow from left to right, rather than from top to bottom, is easier to understand. It is also easier to use. A horizontal chart can be unrolled from left to right before you, a considerable advantage over vertical process charts, which often get trampled underfoot if they are charts of long procedures. Vertical charts are, however, used in single column process charts because of the convenience of reading from left to right the material written in the explanation column.

The principles presented in this bulletin apply to both vertical and horizontal multi-column process charts. Any procedure can be pictured by a chart of either type. In the interests of readability, however, the conventional vertical construction has been disregarded, and all charts are presented in the more effective horizontal form.
Use of Symbols

Symbols are a distinguishing mark of process charts as differentiated from other types of charts picturing the flow of work. In both the single column and the multi-column process charts four symbols are commonly used to express the basic steps that are involved in a procedure.

OPERATION -
When something is being changed or created or added to.

TRANSPORTATION -
When something is moved from one place to another.

STORAGE -
When something remains in one place awaiting action, or is filed.

INSPECTION -
When something is checked or verified.

In the early days of process charting, industrial engineers used a wide variety of symbols to express different types of operations. Today the tendency in both private enterprise and government is to standardize on four symbols. Variations are sometimes added to these symbols. They are useful, for instance, when a step in a given procedure has an unusual aspect which is frequently repeated. A symbol can then be devised to illustrate this step, thus eliminating the repetition of work descriptions. The variations should be described in the legend on the chart so that those interested in the result of the survey can understand what they are looking at.

Since a process chart is a picture of a procedure, its meaning should be clear at a glance. Standardized symbols add to this clear understanding. You will notice that to chart the procedures used in this bulletin no more than four standard symbols were used.
MAKING A MULTI-COLUMN PROCESS CHART

1. **HEADING** identifies procedure, organization unit, and date.

2. **COLUMNS** designate individuals, units, sections, divisions or files, rooms, floors or buildings. Arrange in sequence corresponding to work flow.

3. **NOTES** explain symbols and lines; specify what is done, where and why articles are stored, what is carried and by whom. Indicate time and distance where significant. Multiple copies of forms can be shown: "1/3 FORM 1301," (original and 3 copies).

4. **DIVIDED FLOW** is used for alternative treatment of work.

5. **LEGEND** explains symbols and form numbers used in notes.

6. **SYMBOLS** designate the kind of step. Refer to page 9.

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**3. NOTE ON NUMBER OF COPIES**

**4. DIVIDED FLOW OF WORK**
SIGHTING TARGETS FOR IMPROVEMENT

IN LOOKING AT THE WHOLE CHART WATCH FOR TROUBLE AREAS LIKE THESE:

IS BACKTRACKING NECESSARY?
This segment of the chart shows that each case in a procedure comes to Clerk B's desk four times. Could the flow be simplified?

IS WORK DISTRIBUTED EVENLY?
Does B have too much to do in this procedure? Why is it necessary for A, C, and D to each perform only one operation in the process?

IS THERE DUPLICATION? Could the sequence or cycle of steps performed by B, C, and D be performed once only? To answer all questions like these further study is needed.
USING THE CHART TO SPOT TROUBLE

Though analytical thinking comes into the fact-gathering process incident to process charting, the first chart you produce -- the chart of the existing procedure -- shows none of this analysis. It is the procedure as it is -- a picture of facts to be read.

If there are areas of trouble, the chart will show them -- but you must look at it with persistent questioning and an open mind. You will already have knowledge of the procedure gained from interviews and from reviewing pertinent documents. The chart gives you a systematic course to follow. It will help you pick your targets because facts are organized in sequence and in detail.

Looking at the Whole Chart

Start your analysis by looking at the chart as a whole. If symptoms of administrative defects exist, they can be easily picked out. Are there backtracking lines? These may point to a poor sequence of steps or improper distribution of functions. A repeated cycle of steps suggests possible overlapping or duplication. Columns with an unusual (few or many) number of steps may show an uneven distribution of work. Typical examples are shown opposite.

Looking at Groups of Steps

Now select groups of steps that should logically be considered together. A sorting activity, for example, could include several transportation, storage, and inspection steps. What is their relation to the complete process? The entire group may be failing to accomplish its purpose; or that purpose may not serve the objective of the agency as a whole. By looking at groups of steps, entire groups may be eliminated, or drastically modified.

Looking at Individual Steps

This is the bedrock examination. Probing each step will turn up all the trouble encountered in a procedure. Be alert for chances to eliminate, combine, rearrange and simplify.

To avoid haphazard conclusions, the whole chart -- groups of steps -- and individual steps must be examined in turn. Pages 14 and 15 show HOW.
MAIL CLERK

FILE CLERK

ADDRESS CLERK

CORRESPONDENCE CLERK

STENO POOL SUPERVISOR

STENOGRAPHER

TYPIST

CASE EDITOR

ANALYST

SECTION CHIEF

LEGEND

- Indicates flow of documents
- Operation
- Transportation
- Storage
- Inspection

\{ \} Step 30-46 omitted
ANALYZING THE CHART

This chart shows how each of the following questions led to an improvement. After checking to see if you have all the steps, apply each question to every detail.

**WHY** is this step done? Can it be omitted?
**WHERE** could this step be done better?
**HOW** could this step be made easier?
**WHEN** should this step be done to simplify the procedure?
**WHO** is the best person to perform it?
PRESENT EMPLOYMENT PROCEDURE
PERSONNEL DIVISION
JULY 1945

PROVING THE POINT. To present improvement effectivelv, a BEFORE Chart, showing the former or present procedure and an AFTER Chart, showing the proposed or new procedure can be used together. They not only make an easy comparison of the two methods, but give a graphic expression of the simplicity of the proposal.

This BEFORE Chart shows that the citizenship of the applicant was being checked in four separate sections — Steps 6, 16, 17, and 25. Analysis of the chart showed that this activity properly belonged in the Investigations Section, and pointed to the "back-tracking" involved in Steps 25, 26, and 27.

BEFORE

"Before"
RECOMMENDED EMPLOYMENT PROCEDURE
PERSONNEL DIVISION
JULY 1945

"After"

The improvements are pictured in this AFTER Chart. Citizenship is now checked only in the Investigations Section (Step 12) eliminating the check in the other three sections. Assigning the requisition number is done earlier in the process (Step 6) making "backtracking" unnecessary.

BEFORE and AFTER Charts are excellent devices not only for telling the improvement to management, but for training the personnel who will be affected by it. Visual presentation points up the relationship of the new procedure to the old --helps the employee understand why the change was made.
USE OF PICTORIAL SYMBOLS

Pictures replace symbols on this chart. They help sell improvements because they present them more graphically. Their use is described more fully on Page 20. Compare this chart with that on Pages 10 and 11, since both show the same procedure. Note that all storages have been omitted in the interests of simplicity in presenting the general picture.
EFFECTIVE PRESENTATION

Although the primary use of process charts is to analyze procedures and work out improvements, they can also be used to advantage to explain or demonstrate proposed improvements. Some of the ways which promote effective presentation are mentioned below.

Before and After Charts

These charts are particularly efficient in showing graphically the superiority of one procedure over another. A typical use of Before and After charts is shown on pages 16 and 17.

Distinctive Colors

Colors can be used to emphasize steps that are to be combined, rearranged, eliminated, or simplified. On the chart on pages 14 and 15 the steps to be improved are marked in red. The chart on page 17 illustrates the use of distinctive red arrows to point up key spots on the chart.

Pictorial Symbols

The chart on pages 18 and 19 substitutes pictures for the usual symbols. This method is valuable where the purpose is to give a general understanding of a procedure without going into details. Such a chart is not only used to present the improvement so effectively that it will tend to be accepted but also to put the revised procedure into operation. A variety of pictorial symbols are made for each of the common types of operations likely to be encountered, such as typing, time-stamping, or posting; or they may represent common office objects such as file cabinets, desks and tables. Such symbols have been especially prepared and reproduced for use in pictorial process charting. Those on the preceding chart are used by an industrial company. The pictorial symbols are pasted on at appropriate points and a photostat is made of the completed chart. When pictures replace symbols in representing the steps, those who are unfamiliar with the procedure can better understand what actually happens.

In using the multi-column process chart, therefore, it is essential to remember: First, it leads to the discovery of improved methods in agency management. Second, when effectively presented, it sells those improvements. Third, it helps you to install the improvements. Gains in time, money, and man-hours saved are the practical result.
REFERENCES

Process Charts


Other Charts


METRIC W 2 0

Directions: For using ruler to draw parallel lines, draw a line, cover this line with a parallel line on the ruler and draw the next line. Margins, oblongs, squares, staffs for music made neatly, and quickly.