PROBLEM SOLVING TRAINING

FOR

MANAGEMENT AND SUPERVISORY PERSONNEL

ENGINEERS BUILDING
CLEVELAND, OHIO

PROBLEM SOLVING TRAINING MANUAL

SESSIONS OUTLINE

and

REFERENCE MATERIALS

By
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For the Personal Use of

Problem Solving Trainer

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1955

TRAINING WITHIN INDUSTRY, INC.
Cleveland, Ohio

=CODE=

EXTENDED CAPITALS..... Section heads

CAPITALS ..... Subheads

Horizontal line across page..... Encloses section for timing

Plain type ..... Trainer says in own words

* Star in front of line ..... Trainer says verbatim

Material between lines ..... Board work

Bracket ..... Instructions to trainer

INTRODUCTION OF TRAINER

INTRODUCTION OF TRAINER

BY MANAGEMENT REPRESENTATIVE

The Directors of this Company want all of the Management personnel to be as well trained as possible in the duties and responsibilities of their work.

We realize that many day to day problems arise in your work that need wise and careful decisions before action can be taken.

This is one of your most important responsibilities.

The training program you are starting today will provide an opportunity to learn a simple and practical pattern to use in solving production problems.

The use of the skills learned in this program will be of the greatest value to you in developing a smooth running department.

We expect you to start using the skills learned here as soon as possible.

There will be eight two-hour sessions and we expect you to attend every one and give your best attention and participation.

Let me present Mr._____who will conduct these sessions.

PROBLEM SOLVING - SESSION I

Time Table.

BEFORE THE SESSION STARTS.

Give Management representative copy of outline for introduction before the meeting.

Be in conference room 15 minutes before the session starts.

Be sure you have:

5 x 8 cards for names.

Hand out materials:

"Duties and Responsibilities of a Supervisor"

"An Outline for Solving Problems. Practice sheet #1"

"An Outline for Solving Problems. Practice sheet #2"

"Isolate the Problem. Practice sheet #3"

"Step I"

Arrange chairs around table, or in U-shape if there is no table. Don't let members' first impression be that of a classroom.

Arrange to have facilities for hanging the charts.

Remember:

Have the right equipment, materials, and supplies.
Have the work place properly arranged.
Survey the blackboard. Plan how you will space the board work.

MANAGEMENT INTRODUCTION

Follow outline.

PROBLEM SOLVING - SESSION I

Time Table

OPENING THE SESSION

12 min. Establish informal atmosphere and put the group at EASE

GET ACQUAINTED

Identify yourself. Explain your business and experience.

Have each member tell the group something about his job, his company, and his responsibilities.

To help members get started to talk, ask such questions as:

What are your responsibilities?
How many people do you supervise?
Are these people skilled or unskilled?
Are they productive or non-productive workers?

Use folded cards for displaying names and titles.

* For the remainer of the program each member will assume the position and responsibility of the title on his name card.

THE SUPERVISOR, A MEMBER OF MANAGEMENT

* In these meetings we will use the term "SUPERVISOR" a great deal because our duties and responsibilities are those of a Supervisor and we will be working with the problems of a Supervisor.

* Who are Supervisors?

* For the purpose of our discussions, when we refer to a Supervisor, we mean anyone in charge of people, or who directs the work of others.

(a) Includes: Foremen, Supervisors, Executives, Administrators.

(b) Includes: Group leaders.

(c) Includes: Some staff people, often referred to as functional Supervisors who have limited supervisory duties and responsibilities.

12 min. to here

Time Table

DUTIES AND RESPONSIBILITIES

6 min.

* What are the Duties and Responsibilities of a Supervisor?

[Hand out "DUTIES AND RESPONSIBILITIES OF A SUPERVISOR."

Discuss briefly.]

* What are some of the things that make your job unnecessarily difficult and keep you from getting out:

		PRODUCTION
of good	-	QUALITY
on	-	SCHEDULE
at	-	LOWER COST
with	-	SAFETY

[Develop answers from the group and place on the board.]

Summarize:

* Many Supervisors have never analyzed the causes of their problems.

* Some are uncertain what if anything can be done about them.

* Others feel strongly that someone else ought to solve them.

* WHAT IS THIS ALL ABOUT?

* I am not here to tell you how to run your business, but to present a program which deals with the everyday production problems of a Supervisor, and a simple pattern to follow for their solution.

* Correct solving of production problems is one of the most important duties and responsibilities of a Supervisor.

18 min. to here

Time Table

PROBLEMS.

5 min.

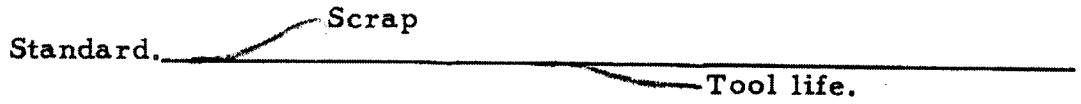
WHEN DOES A SUPERVISOR HAVE A PROBLEM?

* A Supervisor has a problem when the work assigned fails to produce the expected results.

The elements of a job assignment:

Materials	Tools Equipment Machines	Standard operating procedures. Know-How	Performance.

Materials	-Must be available.
Tools etc.	-Must be proper and in place.
Standard Practice	-The best Know-How must be provided.
Performance	-Must be satisfactory and complete. It is not proper when something is "Out of Standard".



WHEN PROBLEM SOLVING IS IMPORTANT.

* If the production problems are to be handled successfully, the Supervisor must understand the fact that:-

(a) Their problems are seriously interfering with their ability to get out production.

(b) Their problems have a direct effect upon Cost and Quality.

(c) Their problems are not necessarily inevitable.

(d) Their problems can be solved easily by following a definite pattern.

SUMMARY.

Some production problems are small and fairly simple, and the Supervisor can solve them quickly by his experience and judgment.

Most production problems, however, are much more involved and important and cannot be solved quickly because the facts must be collected and analyzed before a decision can be reached.

23 min. to here

Time Table

PROBLEM SOLVING

20 min. * In this program we learn by doing therefore we will practice on real production problems.

* Let me tell you about a production problem that a certain Supervisor had to solve.

[Pass out, "Problem Practice Sheet #1" and explain its use here.]

* Tell the problem. (Slowly and naturally)

"Smith, Supervisor of Department 'A', was walking through his department recently when he noticed three pans of angle plates on the floor in the main aisle. Smith called to a materials handler and reminded him that we must not leave material in the aisles and besides Department 'B' was short of the plates.

Department 'B' Supervisor reported not over an hour ago that they would soon have to stop production if they didn't get the plates.

Smith asked his Assistant why the plates were in Department 'A' and had not been moved out.

He replied that the Inspector said that some of them had oversize holes drilled in them.

Immediately Smith called the operator to his desk and reprimanded him for carelessness in his work. The operator complained that he had a sore finger which he cut on the pans while moving them."

[Members fill out the form. (Leader pass around group to give help where needed)

Sketch a similar form on the board.

Develop the problem, using one of the member's sheets. Work with member individually.

If time permits repeat the practice with another member's sheet.]

* Summarize.

Thank members for their participation.

This practice, though brief, seems to demonstrate that there is a need for further training in the techniques of production problem solving.

43 min. to here

Time Table

25 min. * Now we will go one step further in our practice of solving production problems.

Hand out (3) sheets of "Problem Practice Sheet #2" to each member.

Explain the sheet, its purpose and how to use it.

In using this form:

(a) Place an "X" in the small squares or circles to indicate the choice of your answer.
(b) Use simple short statements, not necessarily sentences, in filling in the large blocks.

Ask each member to think of a production problem and then to quickly fill in the form.

Have one member come to the head of the group with his problem sheet.

Have the member give his problem; Leader put same on board.

* Ask, "Does the group have any questions about this problem?"

Leader to make brief comment on the problem and thank member.

Repeat same procedure with two other member's problems if time permits.

Summarize:

* We are now aware of the fact that there is considerably more to solving production problems that was at first believed.

* We seem to have difficulty in:-

(a) Determining exactly what the problem is.

(b) Clearly giving proof of the problem.

(c) Stating the real cause, confusing it with evidence of the problem.

(d) Deciding what to do about it.

* Thousands of Supervisors may at this moment be having difficulty in solving their production problems.

1 hr. 8 min. to here * One is seldom born with this skill or technique but it can be easily acquired.

Time Table

STEP I - ISOLATE THE PROBLEM

32 min. * We will now take a look at a simple 4-step method which can be used by Supervisors to solve their problems at the Departmental level,

* It is an easy, practical, and workable method.

[Develop titles of the four steps from the group and place on board.

Present the four steps, titles only, on the board or by chart.]

* In this program we will take up each step separately, starting with Step I. "ISOLATE THE PROBLEM"

[Hand out sheet on Step I and explain in detail.]

1. State the Problem.

   The problem is either MECHANICAL or PEOPLE or BOTH. All problems involve people directly or indirectly.

   PEOPLE who: Don't know - Uninstructed or uninformed.
   Can't do - Unable physically or mentally.
   Don't care - Lacking in interest or initiative.
   Won't do - Insubordination."Problem worker"

2. Give Proof or Evidence of the Problem.

   Statistical data to prove there is a problem, about:--

   MECHANICAL part of the job:- Quality, Equipment, Tools, Safety, etc.
   PEOPLE involved in the job: - Their habits, skills, attitudes, productivity, etc.

3. Explore the Cause.

   When the cause is determined it is easier to make correction. The cause may be:-MECHANICAL - Methods, Layout, Machines, Tools, etc.
   -PEOPLE with - Wrong assignment, Faulty instruction, Personal problem or human relations, Insufficient skill or experience.

[To show relationship between #2 and #3 above it is helpful to ask such questions as: Why did this happen?,Where?, When?, Who is responsible?]

4. Draw conclusions.

   From the above facts we now know exactly what the problem is, and its cause or causes. We are now ready to prepare for its solution. Before presenting the details on how to prepare for solution we will now take necessary time to gain skill in the use of Step I "Isolate the Problem" through actual practice.

1 hr. 40 min. to here

PROBLEM SOLVING - SESSION I

Time Table

STEP 1 - PRACTICE.

15 min.

Hand out "Problem Practice Sheet #3" (3 or 4 to each member).

Explain the sheet in detail.

Take each step and item separately.

Use examples for fuller explanation. Use board for emphasis.

Show relationship between "Proof or Evidence" and "Cause".

1 hr. 55 min. to here

ASSIGNMENTS FOR THE NEXT SESSION.

5 min.

Each member to bring in a production problem with Step I "Isolate the Problem" analyzed completely on Problem Practice Sheet #3, and be ready to explain the details of it to the group.

In order to assure variety in problems and to have practice in problems of different types, divide the group so as to cover the following types of production problems:-

Quality problems	- Scrap, rework, tool breakage, etc.
Quantity problems	- Schedule trouble, "bottlenecks".
Safety problems	- Increase of accidents.
Cost problems	- Labor or material cost up.
People problems	- Productivity low, work habits bad.

* Does everybody understand their assignments?

Briefly review what has been covered in this session.

Duties and responsibilities of a Supervisor.

Problems of a Supervisor.

Problem solving of production problems.

4-step method.

Step I "Isolate the Problem"

Assignments.

Thank members for their cooperation and interest.

2 hrs. to here

BEFORE THE SESSION STARTS

Be in the conference room 15 minutes before the session starts.

Have everything ready. This Includes:

Tables and chairs properly arranged.
Blackboard clean and ready for use with chalk and eraser.
Supply of "Problem Practice Sheets #3" on hand.
Chart: Step I and Step II.

OPENING THE SESSION

Make appropriate remarks. Welcome the group.

Review the first session briefly.

"Problem Solving", an important responsibility of Supervisors.

Discuss some common production problems.

List the four steps (Titles only) on board or by chart.

Review Step I "Isolate the Problem"

10 min. to here.

Select three problems from group to use in this session.

30 min.

DEMONSTRATION OF STEP I.

* For the next hour and a half we will get practice in the use of Step I "Isolate the Problem". There will be three demonstrations.

* We will now start with the first demonstration.

Pass out "Problem Practice Sheets #3" to members. (3 or 4 each)

Ask member with 1st problem to come to the head of the table, bringing his problem sheet with him.

* Please tell your problem to the group.

After he has finished, ask the group: --

* Is this a production problem? (Get agreement)

* Is this a "Mechanical" problem? (Get agreement)

Place an outline on the board similar to that of the "Problem Practice Sheet #3."

PROBLEM SOLVING - SESSION II

Time Table

[Fill in form on board exactly as the "Supervisor" gives it.]

* Please fill in your form as it is on the board.

Ask the "Supervisor":

* What does this problem concern?

* Exactly what is your problem?

* What proof or evidence do you have of this problem ?

* What have you checked under, "Explore the Cause"?

* Which circle did you check under, "Conclusion"?

* Is this form on the board filled in the same as your sheet?

[Review the problem briefly.]

* Let's now give the members a chance to ask questions.

[(Refer to the "Supervisor" for all answers, he is the expert.)]

* If this were your problem how would you have filled in the spaces?

* Do you think this form is filled in complete?

* Do you think that the problems as stated is really correct?

Conclude:

* Before we can proceed to solve this or any production problem we must be sure that we know exactly what the problem is.

* "Isolating the Problem" as done in this demonstration was better than is found in most industries today.

* It did however bring out the important point that the time and study necessary to "Isolate the Problem" must be done before proceeding to the solution of the problem.

* Are there any questions?

[Thank the member and have him return to his seat.]

40 min. to here

Time Table
30 min.

SECOND DEMONSTRATION OF STEP I.

* We will now have the second practice demonstration of Step I.

[Have member come to the head of the table with his problem sheet.]

Please tell your problem to the group.

[Draw form on the board similar to that of "Problem Practice Sheet #3."

Fill in the form as follows exactly as the "Supervisor" gives it.

Do not check the top circles now.

In the proper space fill in "Exactly what the problem is".

In the proper space fill in "Proof or Evidence of the problem".

Instruct group members to fill in their sheets as follows (allow 3 min.)

Check the proper circle at the top.

Check the squares under "Explore the Cause".

Have the "Supervisor" continue as follows: (Check same on board)]

Tell which circle he checked at the top.

Tell what squares he checked under "Explore the Cause"

Tell what circle he checked under "Conclusion".

Let's again give the members a chance for questions and comment.

[Ask the following types of questions: (refer answers to "Supervisor")

What type of problem was this?

Did you have your sheet marked differently? What differences?

Do you believe that we have the problem completely isolated?]

Conclude:

Again we can see how necessary it is to determine exactly what the problem is. Without this we should not proceed.

[Thank the "Supervisor" and have him return to his seat.]

1 hr.
10 min.
to here.

Time Table

THIRD DEMONSTRATION OF STEP I.

30 min.
*

We will now have the third practice demonstration of Step I.

[Have a member come to the head of the table with his problem sheet.

Draw form on the board similar to that of "Problem Practice Sheet #3".]

Please tell your problem to the group.

[After he has finished, fill in the following exactly as he has it: -

"Proof or evidence of the Problem". (Only this space at this time)]

Please fill in your form for this problem as you think it should be. (Allow 5 minutes)

Check circles at top of the form.

Check squares under "Explore the Cause".

Write in your own words, "Exactly what the problem is" in proper space.

[Compare answers of the members of the group. Check these with the "Supervisor"; he is the "expert". Ask members the following questions:]

What circle did you check at the top of the sheet? Why?

What squares did you check under, "Explore the Cause"? Why?

What did you have in the space, "Exactly what is the Problem"? Why do you believe this is correct?

Did we have any other answers in this space? Why?

[Again turn to the "Supervisor" for his answers from his sheet:]

Please tell what you have in the vacant spaces as I write them on the board.

[Thank the member and have him return to his seat.]

Conclude:

We can see how difficult it is to be certain of the problem.

We often think we know when we really don't.

We may know the circumstances so well that we don't plan on any exact method of solving it.

Experience shows that more time and consideration should be given to the details before considering how to prepare for the solution.

1 hr.
40 min.
to here.

PROBLEM SOLVING - SESSION II

Time Table

DEVELOP STEP II HEADING.

10 min.

* We now have had practice on the skill of "Isolating the Problem" and are ready to go on to Step II.

[Place Step I "Isolate the Problem" on the board.]

* How many remember the title of Step II? (Develop from group)

[Place Step II, "Prepare for Solution" on the board under Step I.]

* This step is now divided into two general types of problems.

* What do you think they are? (Place ansers on board)

1 hr. 50 min. to here.

[Place the exact heading on the board, or use chart.]

---

10 min.

ASSIGNMENTS FOR SESSION III

* So that we may learn by doing we now will make two assignments for Session III.

[Assign to two members:]

* Bring in problems of a "MECHANICAL" nature. The problems dealing with Methods, Layout, Equipment, Tools, Materials, Machines.

[Explain exactly what is wanted.

Step I filled in completely.]

* Be prepared to go futther into details carrying the problem into the production line itself. Make it a real production problem.

[Review what we have done in the sessions to date.]

* We are now ready to learn how to prepare for the solution of production problems. The details will be brought out in the next session.

Thank the group for attention and interest.

2 hrs. to here.

BEFORE THE SESSION STARTS

Be in the conference room 15 minutes before the session starts.

See that chairs and tables are properly arranged.

Have everything ready.

Have the following "hand-out" material ready in sufficient quantity so that each member may have the following amount: -

Step II Complete, outline	1 per member
Step II Mechanical Problem Solving Outline	1 per member
Flow chart sample	1 per member
Flow chart blanks	5 per member
Flow diagram sample	1 per member
Flow diagram blanks	5 per member
Methods breakdown sheet sample	1 per member
Methods breakdown sheet blanks	5 per member
Definition of symbols	1 per member
"Parachute"	1 per member
The three parts of a Job	1 per member

Following charts (if to be used): -

Step II
Make a Flow Chart
Symbols
Question the Job as a Whole
The Flow Diagram
Make a Methods Breakdown
All Jobs are Divided into Three Parts
Types of questions

Time Table

OPENING OF SESSION III

5 Min.

Greet members cordially.

Make appropriate remarks.

Review Session II. Display Session II chart.

Discuss the problem practice sheet #3 briefly.

Importance of isolating the problem before continuing.

Check on assignments; select problems to be used in this session.

5 Min. to here

Time Table

8 Min.

STEP II - PREPARE FOR SOLUTION

* We are now ready to learn how to "Prepare for Solution" of production problems.

* For the ease of understanding and handling, we divide all production problems into two general types:

MECHANICAL:- such as those involving. . . .

Methods

Layout

Tools

Equipment

Materials

Machines.

PEOPLE:- who. . . .

Don't know

Can't do

Don't care

Won't do.

[Hand out "Step II Prepare for Solution".

Display chart of same. Explain headings.]

* The remainder of this session will be devoted to detailed study of those problems that commonly can be called "MECHANICAL". The other parts of this Step will be presented in Session III.

Conclude:

* We know that all production problems involve PEOPLE either directly or indirectly, however in our everyday production work we seem to have many problems that are apparently "MECHANICAL" in nature such as:-

Quality	-	Scrap, Rework, Spoilage, etc.
Quantity	-	Schedule bottlenecks etc.
Safety	-	Unsafe conditions and situations etc.
Cost	-	These all increase cost.

13 Min. to here

Time Table

7 Min.

OUTLINE: SOLVING MECHANICAL PROBLEMS.

* We now present an outline of the solving of MECHANICAL problems.

[Hand out "Mechanical Problem Solving outline" sheets.

Display chart of same and explain the points listed below:-]

* When the problem is MECHANICAL.

involving:. . .	
METHODS	ANALYZE THE OVERALL JOB OR SITUATION
	Make a Flow Chart.
	List routing or travel of a part, material, or paper.
LAYOUT	Show relationship to prior and subsequent operations or situations.
	Question the job or situation as a whole.
	Make a Flow Diagram.
TOOLS	Show layout and locations of work stations, equipment, aisles etc.
	Study for better production efficiency and for possible causes of problems.
MACHINES	ANALYZE SPECIFIC JOB OR SITUATION.
	Make a breakdown of the method of doing the job or of the situation.
	List all details including:
EQUIPMENT	Materials handling
	Machine work
	Hand work.
	Question all details to help locate problem sources.
MATERIALS	Use: WHY, WHAT, WHERE, WHEN, WHO, HOW.

20 Min. to here

Time Table
20 Min.

MAKE A FLOW CHART

* Experience shows that a Flow Chart can be usec advantageously when studying a situation where a change is contemplated or problem exists.

* It shows the routing of the subject and its relationship to prior and subsequent operations, inspections, handlings, delays, and storages.

* The subject may be a part, assembly, material, paperform etc, but usually it is a part as most problems occur to mechanical things.

* One of the important sections of a Flow Chart is the "Symbols" section. They are used to graphically show what is happening to the subject.

* Extra emphasis is obtained by drawing a connecting line from symbol to symbol thus highlighting costly items like handlings, delays, storages, etc. Colored lines or symbols can be used for further emphasis if wanted. Definitions of the meaning of symbols used is found on the next page.

* Here is a quick easy way to make a Flow Chart:--

1. Fill in headings.
2. Fill in "Subject charted".
3. List what happens to the subject charted.
4. Give "Oper.No." where it applies.
5. List "Dept." in which it occurs,
6. "Distance" in feet for transportations.
7. "Time" for all delays.
8. Apply symbols and connect dots.

FLOW CHART.

Subject charted.

Part: _____
Material: _____
Person: _____
Paper form: _____

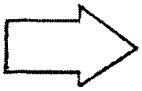
Date: _____
Department: _____
Charted by: _____

	What and How. Present method. Proposed method.	Oper No.	Dept.	Distance.	Time.	Symbols
1.	Storeroom					
2.	Moved to Dept. X.			100 ft.		
3.	Drill hole.	10	X			
4.	Inspect.					
5.	Department storage area.			240 ft.	2 hrs.	
6.						

Time Table

STANDARD DEFINITIONS OF SYMBOLS

Hand out "Definitions of Symbols" and explain. (Use chart).

	Classification	Symbol and definition.
*	Operation 	An operation occurs when: (a) An object is intentionally changed in any of its physical or chemical characteristics. (b) It is assembled or dissembled from another object. (c) It is arranged or prepared for another operation, transportation, inspection, storage. An operation also occurs when: (a) Information is given or received. (b) When planning or calculating takes place.
*	Transportation 	A transportation occurs when an object is moved from one place to another, except when such movements are a part of the operation or are caused by the operator at work station during an operation or an inspection.
*	Inspection 	An inspection occurs when an object is examined for identification or is verified for quality or quantity in any of its characteristics.
*	Delay 	A delay occurs to an object when conditions except those which intentionally change the physical or chemical characteristics of the object, do not permit or require immediate performance of the next planned action.
*	Storage 	A storage occurs when an object is kept and protected against unauthorized removal.
*	Combined activity 	Operation-Inspection. Storage-Inspection. When it is desired to show activities performed either concurrently or by the same operator at the same work station, the symbols for these activities are combined.

40 Min. to here.

Time Table

5 Min.

QUESTION THE JOB AS A WHOLE

* We question the job or situation as a whole from the Flow Chart which is usually the starting point in the process of making any improvement or when solving production problems.
It will highlight such costly and troublesome items as Transportation, Inspections, Delays, Materials Handling, Safety Hazards, Etc.

* Let's consider the prerequisites for proper questioning.

* 1. Have an open mind.

The mind is like a parachute; it functions only when open.

Cultivating an open mind is difficult but it is absolutely necessary if you expect to find openings for improvements and for solving production problems.

* 2. Develop and maintain a questioning attitude.

Your success in preparing for the solution of production problems depends on the ability to develop a questioning attitude.

Question everything. Never accept any job as being perfect.

The answers you get will give the information you need. The more thorough the questioning, the better the facts.

Beware of mental road blocks.
The greatest obstacle to probing for causes of problems is not created by technical difficulties but rather it is set up by mental attitudes of persons who feel that they already are using the least troublesome methods.

It has often been said that tradition destroys progress.
Just because a job is done in a certain way is no proof it is the best way.
Just because a job is done at all is no proof that it is necessary.
The fact that the method of doing the job has been in effect for years is no proof that it is the best way.

* The best results are obtained by asking:-
WHY is it necessary? WHAT is its purpose? Can it be eliminated? Can it be Combined in whole or in part with another operation? Can it be Rearranged in routing or sequence? This would save: Handlings, Back-tracking, Delays; also improve working conditions.

* If this questioning process reveals the answer to the problem then record it on:-
Flow Chart for the corrected or proposed method.

45 Min. to here

Time Table

10 Min.

THE FLOW DIAGRAM

* We will now discuss the Flow Diagram and its use in solving production problems.

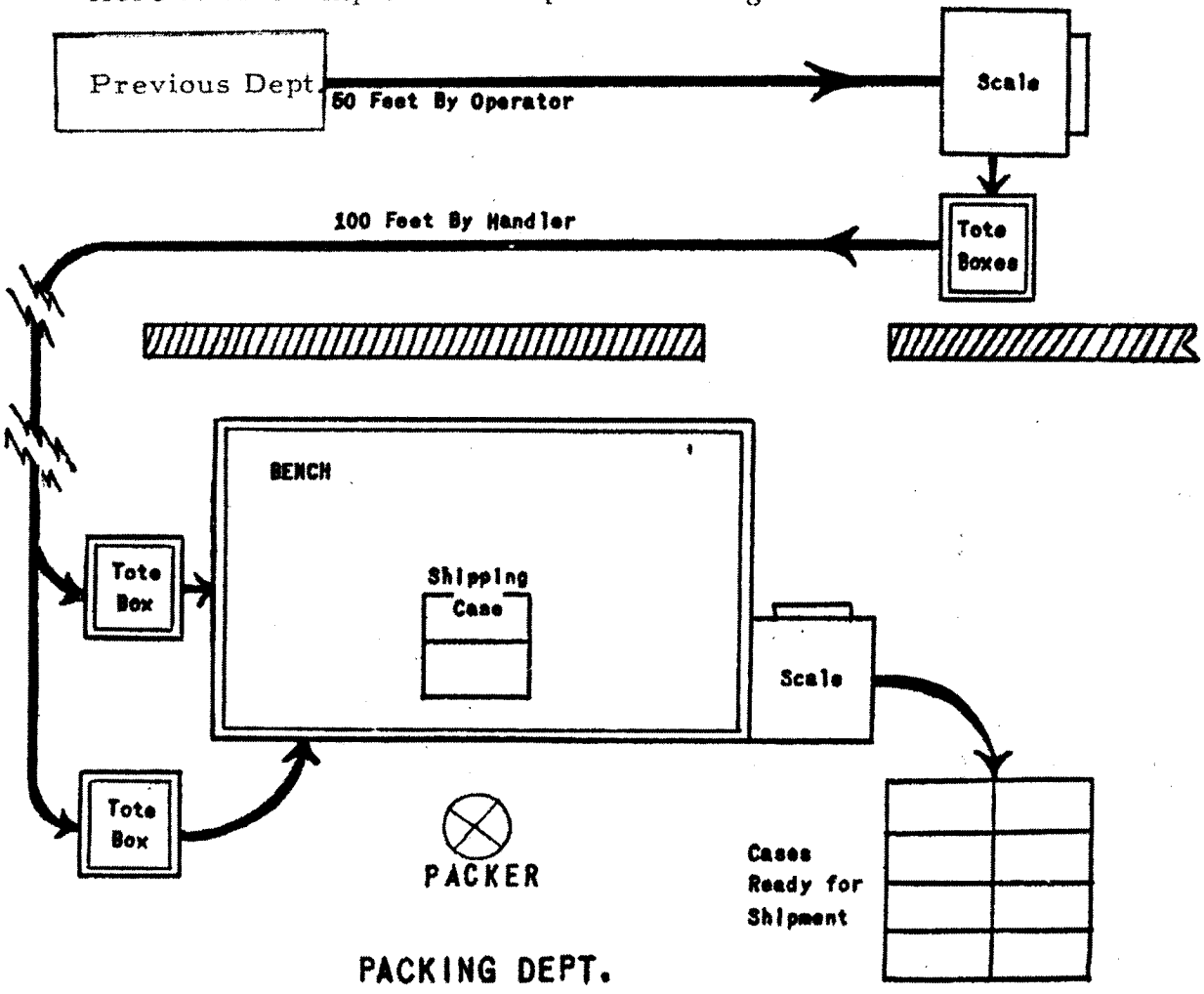
* The Flow Diagram is a simple graphic picture of an area on which is shown the movement of an item.

Actually follow the item or subject, keeping to area involved.

Detail or indicate every: Operation, Transportation, Inspection, Delay, Storage.

Flow Diagrams are helpful in visualizing the situation when studying and planning for efficient manufacturing and in solving production problems.

Here is an example of a simple Flow Diagram.



50 Min. to here.

[Pass out sample Flow Diagram and explain.]

Time Table
2.0 Min.

BREAK DOWN THE SPECIFIC JOB

Refer to "Outline for Solving Mechanical Problems" (Chart)

* We have analyzed the overall job or situation in search of the answer to our production problems.

* In this analysis we may have found the answer, but more often we learn that it is a "Specific Job or Situation" in which the trouble is located.

* We will now practice analyzing the specific job or situation, this is done by:-

1. Break down the job
2. Question every detail

BREAK DOWN THE JOB.

* Breaking down the job into steps or details gives us facts.

* The breakdown sheet is a complete and accurate record of the operation or job. This should be made on the job as it is actually done just as you see it, not as you remember it.

* We often place this breakdown form on the opposite side of the Flow Chart form for convenience.

* Here is a quick easy way to make a breakdown for Job Improvement and for Solving Production Problems.

1. Fill in the headings completely on the breakdown sheet.
2. Go to the job and observe or do the operation.
3. List every detail as it is actually done and in its regular order of occurrence. Write these briefly in the left hand column on the sheet as shown below.
4. Question each detail and make notes in the middle column.

JOB METHODS BREAKDOWN

From: _____ Department: _____ Date: _____

Part number: _____ Part name: _____

Operation number: _____ Operation name: _____

No.	Details of Present Method.	Notes and Ideas. Write them down.	Details of Proposed Method.
			This part of the sheet is used in STEP III.

1 Hour 15 Min. to here

Time Table
5 Min.

THREE PARTS OF A JOB

* From our analyses we belive the trouble or problem lies in a specific job or location.

To locate or discover it we must use the questioning process.

Experience shows that the source of many production problems lies in the handling or movement of parts of materials.

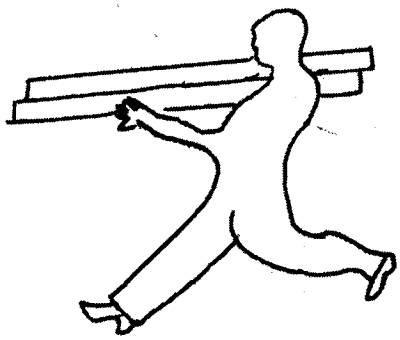
Movement of material without definite work accomplishment is either:

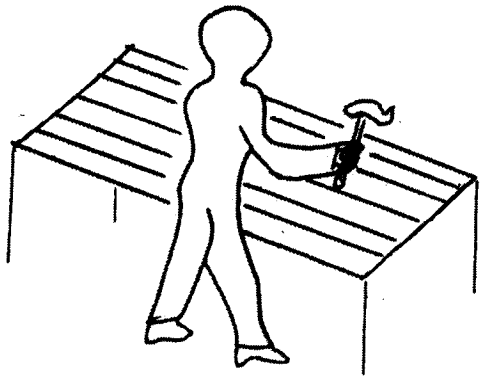
(Chart)

MAKE READY
PUT AWAY
WASTE

MAKE READY

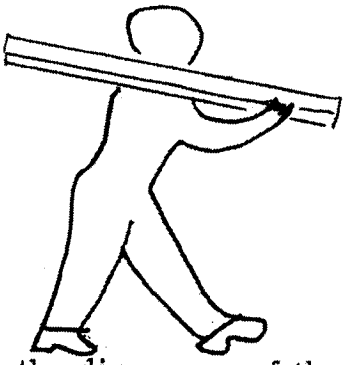
This is the time and effort spent in getting things ready such as: Materials, Tools, Equipment, Gages. Also the placing of the material or part in the nearby work area, from trucks, pans, racks, etc.





DO

This is the work that actually does accomplish the desired main actual objective and does add to the value of it. eg. Drill a hole, Plane a board, etc.



* PUT AWAY

This includes all details necessary to complete the job after the "DO" operation. It includes setting the part aside and/or placing on trucks, in pans, on racks, on conveyors, etc.

* The greatest opportunity for improvement, or the discovery of the source of a problem is in the "MAKE READY" and "PUT AWAY".

* They add to the time and cost but not to the value of the end product. Less than 50% of the total time is usually consumed by the "DO" part of the job.

1 Hour
20 Min.
to here.

Time Table 10 Min.

QUESTION EVERY DETAIL

The "DO" details are questioned first because if they are unnecessary, or if the naswer to the problem is here, then there is no need to question the rest of the operation, otherwise continue the questioning in the regular manner.

The "MAKE READY" and "PUT AWAY" details afford the greatest opportunity for improvements and discovery of problem causes.

Types of questions to be asked: (Chart)

WHY IS IT NECESSARY?

We ask this question of each detail to distinguish necessary details from those that are unnecessary, doubtful, or troublesome.
This is the most important question and the hardest to get answered.

WHAT IS ITS PURPOSE?

This is the check question to WHY is it necessary. We want to learn if the detail has a useful purpose or adds to quality. If it does not, we will reconsider its necessity.

If the detail is found to be necessary, then continue with other question, as follows:

WHERE SHOULD IT BE DONE?

Where is the best place or location to do the detail?
Why is it done there? Where else could it be done?
Could it be combined with another?
Could this be the location of the problem?

WHEN SHOULD IT BE DONE?

We ask this question to find the best time to do each detail.
What details must it follow, and what detail must it preceed?
Why is it done at this time? Are the details in proper sequence? Can it be done simultaneously with another?
Could the timing be the cause of the problem?

WHO IS BEST QUALIFIED TO DO IT?

We ask this question to learn who is best qualified from the standpoint of skill, experience or physical strength.
Is the source of the problem here?

HOW IS THE BEST WAY TO DO IT?

We ask this question only after asking WHERE?, WHEN?, and WHO? Can it be done easier and safer? Can the layout of the work-station be improved? Are proper tools and equipment used? Can this be the source of the problem?

1 Hour 30 Min. to here.

List your IDEAS and THOUGHTS arising from these questions, on the breakdown sheet in the column marked "NOTES and IDEAS". It is from these that the new method or correction is developed.

Time Table
25 Min.

PRACTICE DEMONSTRATION

* We have presented the outline for solving MECHANICAL Problems.

* What is necessary to do this?

[Place quickly on board - have brief comment]

Make a Flow Chart of Overall Job
Make a Flow Diagram of area if needed
Make a Job Breakdown of Specific Job
Question details to find facts upon which we can make correction.

* These are the facts with which you can proceed to make the correction. This will be presented in SESSION V.

[Draw a sample blank Flow Chart on the board]

* Now let's do a practice problem.

[Pass out blank Flow Charts to group.]

* Please copy on your form what I put on the board.

* I will now tell the problem (same one used in SESSION I)

* I have the problem worked out on the Step I form.

It shows the problem to be MECHANICAL.

[Fill in the Flow Chart form on the board from the sample Flow Chart.
Review briefly - Ask if there are any questions.]

* What do we do next?

[Question the overall Job.
Ask members for types of questions.
List or note their answers.
Brief comment.]

Conclude:-

We have done the first thing but we do not seem to have found the specific facts upon which we can make a correction of the problem. We do have a step here which should be analyzed further.

* Which one is it? (Brief discussion)

* Do you think we should make Flow Diagram in this case? Why? (Brief discussion)

* What should we do next in gathering facts so we can make a correction?

[Draw out from group - Brief discussion
Answer - Breakdown Specific Job.]

* Let's make a Job Breakdown of the Specific Job.

[Pass out blank breakdown sheets.]

* Copy on these sheets as I place the breakdown on board.

[Draw a Job Methods Breakdown Sheet Form on board.]

[Copy the breakdown from the sample sheet of the Job.]

* Which is the "DO" detail? (brief discussion)

* Which are the "GET READY" details? (brief discussion)

* Which are the "PUT AWAY" details? (brief discussion)

* Which detail do we question first? (Answer - a "DO" detail)

[Have a member question - (coach him)
Ask for group comment.]

* Do we find facts here that can be used in making the correction?

* What details do we question next? (Answer is "GET READY")

[Have a member question these details (coach him)
Ask for group comment.]

* Do we find facts here that can be used in making the correction?

[Discuss - "bring out facts" - List on board.]

* What details do we question next? (answer is "PUT AWAY")

[Have a member question these details (coach him)
Ask for group comment.]

* Do we find facts here that can be used in making the correction?

[Bring out the fact that the drill was dull and it was running at too high speed.]

Conclude:-

This brief problem points out the general use of this easy simple procedure to help prepare for the solving of MECHANICAL problems.

Time Table
5 Min.

MAKE ASSIGNMENTS

[Make Assignments]

* We have covered the MECHANICAL problem solving part of Step II but you may remember that the problem may not always be Mechanical.

* What other types of problems may there be?

[Refer to Chart - Discuss briefly.]

* We will present this angle in the next session.

* We will need some problem to practice upon.

* Who will bring in a problem where the trouble is due to faulty instruction? Bring in this problem with Step I form filled in.

* Who will bring in a problem where the trouble is due to a personal situation or human relation situation?
Bring in Step I form filled in.

Thank group for interest and participation.

2 Hour
to here

PROBLEM SOLVING - SESSION IV

BEFORE THE SESSION STARTS

Be at meeting room 15 minutes before Session starts.
Have everything ready:-

Chairs and tables properly arranged
Blackboard ready -
Hand-outs ready -
Sample Job Instruction Sheets - 1 per member
Blank " " " - 2 " "
Sample Relations Problem - 1 " "

Chart - Step I
Chart - Step II
Chart - Get Ready to Instruct
Charts - Job Instruction Sheet Presentation
Charts - Time table Presentation
Charts - Job Relations Presentation

Time Table 5 Min.

OPENING AND REVIEW

Greet members:

Review: Step I - Use chart - brief discussion

Step II - Use chart - brief discussion

MECHANICAL PROBLEMS

(a) Overall Job
Flow Chart
Flow Diagram
Question Overall Job

(b) Specific Job
Breakdown Job into details
3 parts of a Job
Question the details

* Now we will take up the "PEOPLE PROBLEM" part of this step.

* Remember, not all problems are MECHANICAL in nature, but most of them are PEOPLE problems.

due to:

Faulty Instruction
Wrong Assignment
Personality Situation

Or in other words - People who: -

Don't Know
Can't Do
Don't Care
Won't Do

5 Min. to here

Time Table 30 Min.

PROBLEMS DUE TO FAULTY INSTRUCTION

* First we will devote our time to "PEOPLE PROBLEMS" due to "Faulty Instruction".

* What is "Faulty Instruction"? [Place answers on board]

Insufficient Instruction
Incorrect Instruction
Inefficient Instruction
No Instruction

* What can be the cause of "Faulty Instruction"?

Little or no preparation of:

Work Place
Instructor
Learner

* To prepare for the solution of production problems resulting from Faulty Instruction we must:

GET READY TO INSTRUCT

Time Table

Present "Get Ready to Instruct"

Use board or chart - Discuss briefly.

Get Ready to Instruct

(1) Prepare the Workplace
Have everything ready
Have the workplace properly arranged.

(2) Prepare yourself
Make a Job Instruction Analysis
List important steps
List Key points
Plan the Instruction
Make a Time Table
Who will do What, When, How soon?

(3) Prepare the Learner
Put him at ease
Find out what he knows about the job
Interest him in learning the job
Position him correctly for instruction

* We will now take up each part separately

(1) Prepare the Workplace -

(a) Have everything ready -

MATERIALS EQUIPMENT
TOOLS SUPPLIES

Ask questions - get brief discussion

* What should be ready in your department?

* What problems might arise if everything is not ready?

* Who is responsible for this in your department?

Conclude: -

* We can see that many serious production problems can arise by not having everything ready for instruction.

Time Table

(b) Have the Workplace properly arranged.

[Ask questions. Get brief discussion.]

* Why should it be properly arranged?

* What effect may this have on Safety?

* In your plant is this a part of standard procedure?

* If this is poorly done, what problems may arise?

(2) Prepare Yourself.

* When this is not done or done ineffectively the situation can lead to serious production problems.

* What are some of the ways you can prepare yourself for job instruction?

[Put answers on board. Brief discussion.]

Questions:

* Why should you prepare yourself for job instruction?

* Is this standard procedure in your plant?

* Name a few problems that can arise if you do not prepare yourself?

* The most important preparation step is to break down the job for instruction purposes, separating the job into important steps together with the key points in each step.

* Another preparation step is to decide in what order you will instruct the job, and should it be broekn up into smaller instructional units for ease and effectiveness.

Questions:

* Why is "order of instruction" important?

* Could this lead to a production problem?

* When should this decision be made ?

* Acquant yourself with the hazards of the job as well as strange terms and trade names.

* How could this lead to a production problem?

* The lack of clearly organizing the job in one's mind is the principal reason for poor or faulty instruction resulting in the following:

Scrap, Rework, Accidents, Delays, Mistakes, Broken Tools, Damaged equipment, Spoiled materials, Low productivity, Discouraged workers, etc

Time Table

JOB INSTRUCTION SHEET

* We will now present the Job Instruction Sheet and how to make one.

Hand out sample job instruction sheets. Use chart for discussion.

* **BREAK DOWN THE JOB**

- *Why is it necessary?*
  To clearly organize the job in one's mind.
- *What is its purpose?*
  To know what you are going to put over; how much; and in what order.
- *Where should it be done?*
  Right on the job.
- *When should it be done?*
  Every time you have any instructing to do. (Once completed, file for future use.)
- *Who should do it?*
  The person who is to do the instructing. - Supervisor - Foreman - lead person, etc.
- *How is the best way to make a job breakdown?*
  Here is a quick, simple way to do it:

* 1. The first thing you do is to fill in the headings →

* 2. Next you list the → IMPORTANT STEPS IN THE OPERATION

Start doing the job until there is →

A Step is —

→ A logical segment of the operation when something happens to ADVANCE the work.

JOB BREAKDOWN SHEET FOR TRAINING MAN ON NEW JOB

OPERATION: SET UP TO DRILL # 1 HOLE PART: DRILL PRESS # 55

	IMPORTANT STEPS IN THE OPERATION	KEY POINTS Key Point: Anything in a step that might: Make or break the job; Injure the worker (Safety is always a Key Point); Make the work easier to do, i.e., "knack", "trick", special timing, bit of special information.
1	GET SPECIFICATION SHEET AND TOOLS FOR THE JOB.	FROM TOOL CRIB. CHECK TOOLS WITH SPECS.
2	SET MACHINE SPEED.	ADJUST BELTS AND PULLEYS.
3	SET UP MACHINE.	INSERT PROPER DRILL AND TIGHTEN. ADJUST TO HEIGHT AND SET STOPS.
4	INSTRUCT THE OPERATOR.	FOLLOW JOB INSTRUCTION SHEET. USE JOB INSTRUCTION TECHNIQUES.
5	GAGE FIRST FEW PIECES.	USE PLUG GAGE # 3654.

Then write it in this space as Step → 1

Continue the job, listing the important steps in the consecutive spaces.

* 3. Start doing the job again. Do the first step. Pick out the Key Points.

List them briefly opposite Step 1. in the proper space. Continue with the job, doing each step, picking out the key points.

* Breakdowns are not micro-motion studies, job descriptions, nor instruction sheets for workers. They are just simple, common-sense outlines that you make of the job, so you will not overlook or miss anything when you instruct another on that job.

Time Table

* Often while preparing a Job Instruction sheet one may come upon the answer to his production problems.

* To break down a job for instruction it is important that we understand the two principal parts involved: (chart)

IMPORTANT STEPS

KEY POINTS

* Important Step: (What is done?)

As the job is done, observe closely for the parts of the operation when something is done to advance the job. Question what is being done.

These steps should include inspections and automatic machine operations in their proper sequence.
A step is not every conceivable action or motion.

* Key Point: (How it is done)

Nearly every important step has a certain exact and definite way in which it must be done. These are the keys to the way the job must be performed, and so are called KEY POINTS.

If the step is done as the Key Points state, then it will be performed correctly and little or no trouble should be experienced.

If the Key Points are omitted or not explained fully in the instruction then expect to have the following troubles:

Poor quality and quantity of work.
Accidents.
Low productivity.
Discouraged workers.
Wasted materials and supplies.
Broken tools and equipment.
Etc.

* Many Key Points are more or less obvious, but if in doubt, then: -

Probe for the Key Points. Ask questions as the job is done.....
"What would happen if.....?"
"What difference does it make if.....?"
"Why did you.....?"

Prove the Key Points. Question the answers to the above with....
Does it make or break the job?
Will it injure the worker? (Safety is always a key point)
Will it make the job easier to do?

(3) Prepare the Learner

* Questions: (Discuss briefly)

Why should we prepare the learner?

Is this a standard procedure in your plant?

How should we parepare the learner?

Present: (Board or Chart)

Put at ease
Find out what he knows about the job
Interest him in learning the job
Position him correctly for instruction

Point out that:

Preparing the learner for instruction, correctly and fully is a good way to prevent many production problems.

35 Min.
to here.

Time Table 25 Min.

PROBLEMS IN PERSONALITY SITUATION.

* When the problem is PEOPLE who: Don't care

Won't do.

then we have a personality situation which involves Attitude and Behavior.

* What are some problems resulting from personality situations?

Put answers on board. Brief Discussion.

Questions:

* Are these types of problems common in your plant?

* Tell me about your experience with such problems.

* In preparing for solution of such problems, what would you do?

Present this part of Step II. (board or by chart)

Get the Facts ---- Weigh the Facts - Make the Discussion

* Which of these is the most important? Why?

* What do you understand by the term "Fact"?

* How do you get Facts? Brief Discussion.

Present, "Get the Facts." (board or chart)

Review the records.
What rules and plant customs apply.
Talk with individuals concerned.
Get opinions and feelings.

* Questions:

What records would you review?

What are you searching after?

Where will you find such records?

Why are records considered good facts?

Why should rules and plant customs be considered?

Where will you learn of these in your search for facts?

"Talk with individuals concerned."

Questions: (Get brief discussion on each.)

* Who will you talk with?

* Where will you find these individuals?

* What will you talk about?

You are attempting to "Get their Opinions and Feelings".

* Should opinions and feelings be considered as facts?

* How do you get opinions and feelings?

Present:
Don't argue
Encourage him to talk about what seems important to him.
Don't interrupt.
Don't jump at conclusions.
Don't do all the talking yourself.
Listen.

* Conclude:
Before any problem can be solved you must get the facts, for upon them is based the answer or correction. Be sure you have the whole story.

* In preparing to correct PEOPLE problems dealing with personality situations getting the facts is most important.

Present, "Weigh the Facts"

* After the facts are gathered they must be considered from these points:

Do they fit together?
Are there any gaps, omissions or contradictions?
Consider their bearing upon each other.
Check against company policies and practices.

Present, "Make the Decision"

* We are now ready to make a decision in the preparing for solution of the PEOPLE problem:

Make final analysis of the facts.
What possible action can be taken?
Weigh the consequences.
Question the psychological effect.
Leave a way open for him to "save face"
Consider the effect upon the individual, group and compan
Decide on the final action. Don't jump at conclusions.

1 Hour
to here

Time Table 50 Min.

PRACTICE DEMONSTRATIONS

* We will now have some practice demonstrations in PEOPLE Problems.

The first one will be a case where the person "Didn't know" or "Couldn't do" resulting in faulty instruction.

Have the member come to the head of the table.
Explain what he is to do.

* Please tell your problem.

* How do you know you have a problem?

Have him explain his Step I, "Isolate the Problem" to the group. (Brief discussion - get agreement).

Have him tell how he would - Get Ready to Instruct.

* How would you prepare the work place?

(Get brief discussion and agreement).

If appropriate use the board to sketch work place.

* How would you prepare yourself?

Have him explain his Job Instruction Sheet
Fill in breakdown on large breakdown sheet.
(get brief discussion and agreement.)

* How would you prepare the learner?

(Get brief discussion and agreement)

Demonstrate this point with another group member.

Thank the member and have him return to his seat

* We will now apply the things WE have learned in considering "People Problems" which concern ATTITUDE and BEHAVIOR.

* I will tell a Problem and together we will apply Step II, using work sheet.

[Pass out copy of problem, - - "Outline for Handling Problem"
Draw FACTS from the group.
Question according to the pattern placed on the board earlier in this Session.
For practice in WEIGH the FACTS use the questions on the board as above.
The details outlined under MAKE THE DECISION on a previous Manual page to be used as a guide.]

The second practice demonstration will be a case where the person "Didn't Care" or "Wouldn't do" resulting in an Attitude or Behavior Problem.

[Have member come to head of table.]

* Please tell your problem

* How do you know you have a problem?

[Have him explain his Step I "Isolate the Problem" to the group.
(Brief discussion - get agreement)]

[To group:]

* How do we prepare to solve this problem?

* Tell us the facts as you know them (place on board)

* Should we let the group ask questions?

Add only those facts to which the "Supervisor" agrees.

* What do we do next? (answer - Weigh the Facts)

[Have group participate in weighing the facts]

* Are we now ready to make a decision?

* How do we do this? Why?

* What do we consider? Why?

(get brief discussion - and agreement)

* [Have we prepared this problem for solution?]

Thank member and have him return to his seat.

1 Hour 50 Min. to here

Time Table 5 Min.

CONCLUSION OF STEP II.

In this step we have presented the technique of "Preparing for Solution".

This is preparatory to the next step and covers the whole problem possibilities in industry.

Review:

When the problem is MECHANICAL involving such things as:

Methods, Tools, Layout, Machines, Equipment, Materials, Etc.

We learned that a Flow Chart is useful to look at the whole problem.

The Flow Diagram is often used when layout seems to be the problem

When we discovered that the problem was in a specific place or job we learned that we should break it down into details and question every detail. Here is where we are most likely to find the trouble.

When the problem is PEOPLE who "Don't know" or "Can't do," then we learned that it is due to fauly instruction and so we must prepare for job instruction if we are to correct such situations.

We learned that we first must "Get Ready", having the proper tools etc., and having them properly arranged.

Next we learned that the most important tool for "Getting Yourself Ready to Instruct" is to break down the operation for instructional purposes. Here we list the Important Steps in the operation and list the Key Points of each step. These are the keys to the job.

Then in PEOPLE problems who "Don't care" or "Won't do" we have a personality situation dealing with attitude and behavior. It is here that most human relation problems are found. We learn how to prepare for thier solution by:

Getting all the facts.
Weighing these facts.
Making the decision.

1 Hour 55 Min. to here

5 Min.

ASSIGNMENTS FOR SESSION V

We will want practice problems at the next session in MECHANICAL and PEOPLE problems.

We will use the same problems that were used in Sessions III and IV as we will want to carry them on to correction in Session V. Have Step I fully completed on these problems.

2 Hours to here.

BEFORE THE SESSION STARTS

Be there 15 minutes before the session starts.
Have everything ready: -
Chairs, tables, blackboard, etc.
Hand-outs for Step III and Step IV. (1 per member)
Charts for Step I, Step II, Step III, Step IV.

Time Table
3 Min.

OPEN SESSION V

Greet members cordially.

Review:
Step I - ISOLATE THE PROBLEM (chart)
Stress its importance. (brief discussion)

Step II - PREPARE FOR SOLUTION (chart)
Stress the three parts of the step.
Tell of the importance of Step II.

* Let me again state that this program is designed to help Supervisors solve their day to day production problems.

* It is developed primarily for use at the department or the division level.

* We know that all Supervisors have problems.
It is these problems that interfere with his ability to get out production of good quality, on time, with safety.

* We have learned how to Isolate these problems, and how to Prepare for their Solution and now we are ready to continue further with the problem solving pattern.

3 Min.
to here

5 Min.

STEP III HEADINGS

* We will now present Step III.

Develop step III headings from group - place on board.

* We are now ready to "CORRECT THE PROBLEM" Step III. (board or char

Present Step III. Hand out Step III. (board or chart)

* In this step we carry on the two parts as we did in Step II.

MECHANICAL PROBLEMS
PEOPLE PROBLEMS

8 Min.
to here.

Explain briefly. Get discussion and agreement.

Time Table 15 Min.

DEVELOP THE NEW METHOD

* For simplicity in learning the problem solving pattern we will again take up the MECHANICAL problems first. Problems involving Methods, Layout, Tools, Equipment, Machines, Materials, Etc.

Present: "Develop the New Method" (board or chart)

Explain: -
This step is actually a reasoning process.
We use the answers to the questions asked in Step II together with the ideas and notes we jotted down on the breakdown sheet to finally arrive at an improvement or correction of the problem.

We can make improvements or correct "mechanical" problems when details are: -

ELIMINATED
COMBINED
REARRANGED
SIMPLIFIED.

Show relationship between the questions asked in Step II and developing a new method in Step III. (Chart)

Eliminate Unnecessary Details:

We eliminate details to solve the problems when it is due to: -
Unnecessary use of manpower - machines - tools - materials - time.

* Questions: -
How can you tell if a detail is unnecessary?

Who is best qualified to answer the question in your department?

Point out that:
Many production problems arise here.

Combine Details in Whole or in Part Where Practical.

* We combine details when the problem is: -
Transportations - Inspections - Delays - Storages.

* When the problem involves the place - time - person, we consider combining details where practical.

* Questions: -
When would this be impracticaL.

Who determines the best place - time - person to do a job in your company?

Point out that:
Many production problems start here.

Time Table

Rearrange Details for Better Sequence Where Practical.

* We rearrange details when the problem is one of location or excessive handlings - backtracking - delays - accident hazards - maintenance possibilities - working conditions.

* Questions: -
  Why would this be impractical at times?

  How would such problems be discovered?

  How would you proceed to have details rearranged in sequence in your department?

Point out that: -
Many production problems can be corrected in this way.

Simplify all Necessary Details.

* We simplify all necessary details when the problem is to: -

  Reduce non-productive work motions.

  Make the work easier and safer to do.

* This is done only after we have tried to correct the problem by:

  Eliminating unnecessary details.

  Combining or Rearranging details where practical.

* In simplifying jobs when solving production problems we often find that the answer is in: -

  Pre-positioning of Material, Tools, Gages, etc., in the best place in the proper work area.

  Using gravity feed hoppers if practical.

  Using drop delivery chutes if practical.

  Letting both hands to useful work.

23 Min. to here.

Using jigs and fixtures instead of hands to hold work.

---

7 Min.

RECORD PROPOSED CORRECTION

* We are now ready to complete the breakdown sheet by recording the proposed correction in the right hand column.

Work with same group member whose problem was used in Session III. Complete the breakdown.

30 Min. to here.

Point out that:
There are usually less details in the proposed correction.
(Get brief discussion and agreement)

Time Table
3 Min.

PUT THE CORRECTION INTO EFFECT

* We are now ready to make the correction

* We will follow the proposed correction on the breakdown sheet.

* Get approval of all concerned: -

  How soon will you do this?

  Who do you need to help you on this?

  Who will you contact to secure approval?

  Why is it necessary to consult others?

33 Min. to here — Who actually will put the correction into effect?

---

15 Min.

PRACTICE STEP III -- MECHANICAL PROBLEMS

* We will now practice the Step III of the MECHANICAL problem soliving pattern.

  [Have member come to the head of the table with his breakdown.

  Have him place the "Present Method" on the board. Members copy same on blank breakdown sheet.]

* Now please show the group how you have arrived at the correction of your problem.

  [Have him go through the questioning process, making notes and listing ideas.

  Have him develop the new or corrected method and place on the board in right hand column of breakdown sheet.]

* Now can we let the group ask questions? (Get permission of member)

  Get brief discussion from members.

  Conclude: -

  This practice, though brief, shows us how to correct MECHANICAL production problems.

  We will have more practice later.

  [Thank member for his interest and cooperation and have him return to his seat.]

48 Min. to here

Time Table

20 Min.

INSTRUCT THE LEARNER.

* We have presented the pattern to use in correcting production problems when the cause is MECHANICAL such as:- Methods, Layout, Tools, Equipment, Machines, Material, Etc.

* Now we will consider the production problems which predominantly involve PEOPLE.

All production problems involve people either directly or indirectly. We have divided the PEOPLE problems section into two categories.

1. **Problems due to faulty instruction**
2. **Problems due to personality situation and job assignment.**

* **Let us first present the correction of production problems due to faulty instruction and its preparation.**

* **We learned in Step II how to Get Ready to Instruct, which briefly is:-**

Prepare the Workplace (use board or chart)
Prepare Yourself
Prepare the Learner

* Now we will continue with the problem solving pattern for problems involving PEOPLE who, "Don't know" or "Can't do".

* These problems account for a high per cent of all production problems, which result in:- Scrap, Rework, Delays, Accidents, Damaged Tools and Equipment, Spoilage of Materials, Low productivity, Etc.

* In Step II we prepared the learner for instruction. Now to correct faulty instruction problems we will use this pattern:-

Place on board or use chart.

INSTRUCT
TRY-OUT
PUT ON HIS OWN

* Experience has shown that the following method of instructing a worker is best and its consistent use will prevent many of the common day to day production problems that a Supervisor has.

* Questions:

Who has had problems due to faulty instruction?

Whose responsibility is it to instruct in your plant?

What problems can result from faulty instruction?

Time Table

* We are now ready to present the three steps of instructing:- (chart)

* INSTRUCT:

TELL what you are SHOWING. (Use illustrations when necessary)
One Important Step at a time, following the job instruction sheet.
Stress the KEY POINTS in each step giving their importance.
Repeat as often as necessary, testing him with "W" questions.

* TRY-OUT THE LEARNER'S PERFORMANCE

Have him do the job. Correct his errors at once.
Have him repeat TELLING what he is SHOWING,
stressing the KEY POINTS giving their importance.
Test him with "WHY" questions.

* PUT HIM ON HIS OWN

Stress quality and safety.
Encourage questions about the job.
Tell him who to ask for help.
Leave him on his own.

* A great many production problems can be corrected by the use of this simple instruction technique. It is easy to use and very effective.

Questions:

How would correct instruction methods prevent production problems?

Why follow the job instruction sheet while instructing?

What is the purpose of using "W" questions while instructing?

Who is responsible for instructing workers in your plant?

1 Hour
8 Min.
to here.

15 Min.

PRACTICE DEMONSTRATION

Use the problem for which the job instruction sheet was made in Step III.

Place large Job Instruction sheet on wall or copy on board.
Leader do the instruction or have a group member do it.
Select a group member for a "learner".
Review the "Get Ready to Instruct Points".
Teach the job using the above standardized pattern.
Do a perfect job of instructing as a pattern for following demonstrations.
Thank member for his cooperation.

* This demonstration of instruction as a method of correction of production problems due to faulty instruction was brief but we will have more practice later.

1 Hour
23 Min.
to here.

Time Table

TAKE ACTION

10 Min.

* A great many of the Supervisor's day to day problems are personality situations type or cases where PEOPLE "Don't care" or "Won't do".

* There are always problems in attitudes and behavior and they require quick and careful solution.

* In Session IV, Step II, we learned that we must "Get the Facts", then weigh them to see if we had the whole story, then arrive at a decision.

* We are now ready in Step III "Correct the Problem" to TAKE ACTION.

* There are some important things to remember before taking your action:-

  Consider the best time and place to do it.
  Explain the action to the person; Why it is best for him.
  Give advantages and benefits to him. Get acceptance.
  Are you going to handle this yourself?

* Put the action or decision into effect.
  Consider feelings and attitudes.

* Secure understanding.

* Notify all concerned.

* Questions:

  Why should you consider time and place before taking action?

  Why do you think it well to explain the action fully and get his acceptance?

  Who "takes action" in such cases in your plant?

1 Hour 33 Min. to here.

PRACTICE DEMONSTRATION

10 Min.

* We will now have a demonstration of a problem where a personality situation exists.
  We will continue with the same problem that was prepared for solution in Session IV, Step II.

  Have the member come to the head of the table.

* State the problem again to refresh our memory.
  Review just what was done in Step II on this problem.

  Place "action" on the board. Members copy same on their forms. (brief discussion)

* This demonstration was brief but we will have more practice later.
  Thank the member and have him return to his seat.

1 Hour 43 Min. to here.

Time Table

12 Min.

CHECK AND EVALUATE THE RESULTS.

* We have learned how to:-

ISOLATE THE PROBLEM	STEP I	(chart)
PREPARE FOR SOLUTION	STEP II	(chart)
MAKE THE CORRECTION	STEP III	(chart)

* Now that the correction of the problem has been made we must:-

CHECK AND EVALUATE THE RESULTS STEP IV. (chart or board)

Pass out Step IV sheet.

The checking and evaluating of results of correcting a production problem may be done in various ways depending upon the conditions present in the company together with their practices and policies.

Here is how to Check and Evaluate the Results of the correction:-

1. Check as soon as possible or practicable to learn if the correction has been made.

2. Keep alert of the Human Angle because where changes have been made people often build up a Resistance or a Resentment to it. Such feelings will present itself in various:

   Attitudes - Behavior - Relationship situations.

3. Keep a close check on the situation to detect any signs of a new problem being created by this correction.
   People often react to changes as threats to their basic job wants such as:-

   Recognition - Security - Job Satisfaction.

4. Evaluate the results by consulting records where available:-

   Production records.
   Quality records.
   Accident records.
   Productivity records.
   Attendance records.
   Grievance records.
   Cost records.

   Note the results of these records and inform all concerned of progress and results.

5. Look for ways to prevent a recurrence of the problem.

* "Did your action help production?"

1 Hour 55 Min. to here.

Time Table

PROBLEM SOLVING PRACTICE ASSIGNMENTS

5 Min.

* We have completed the 4-step problem solving pattern and are now ready for practice in its use to increase our proficiency in solving the day to day production problems we meet in business and industry.

Pass out the "Master sheet" of the program.
Display the chart of the complete program.
Briefly review and discuss the overall pattern pointing out the relationship of the three basic programs of Supervision and their use in solving problems.

* This 4-step pattern is rather extensive but complete. It is designed for help in solving any production problem at the department or division level in a practical way. It is also applicable to most any level of Supervision and to other forms of business.

* Many of the daily problems in industry will not need the application of the entire pattern. Only those parts that apply should be used.

* Assignments:-

Each one is to bring in a production problem completely solved with all necessary details and facts pertaining to it, ready for presentation to the group.

All forms necessary for its proper solution must also be presented:-

Step I "Isolate the Problem" form.
Flow chart.
Flow diagram.
Methods breakdown.
Job instruction sheet.

Where the problem is due to faulty instruction, bring in the sample problem. Where the problem is an attitude or behavior situation, be prepared with all facts and information about the problem for proper presentation.

So that we may have a variety of problems for practice, each member will be assigned a certain type of problem. All members of the group will have an opportunity to participate in the discussions.

* I will visit the various plants with you to help select the problems.

Session VI.	Mechanical problem. Faulty instruction problem Attitude or behavior problem.
Session VII.	Mechanical problem Faulty instruction problem Attitude or behavior problem.
Session VIII.	Mechanical problem Faulty instruction problem Attitude or behavior problem Mixed problem.

2 Hours to here.

Time Table

5 Min.

REVIEW THE 4 STEPS.

Stress the importance of using the 4-step problem solving plan for correcting production problems.

Review the 4 steps. (Refer to the Master pattern sheet, or chart)

* Why is it important to isolate the problem?
* How do you isolate a problem? (Use Step I sheet, or chart)
* Why are Steps II and III separated into three sections? (Use chart)
* Tell the value of Step IV.

5 Min. to here.

40 Min.

PRACTICE DEMONSTRATION.

Value of Demonstrations.

Gain confidence by doing what we have learned.
We see practical application of these principles to our own jobs.
Everyone of us has the same opportunity to show his ability in the use of the problem solving plan.

We will have three demonstrations in this session.

1st - The Mechanical problem	40 Min.
2nd - The Faulty instruction problem.	35 Min.
3rd - The Attitude and Behavior problem.	35 Min.

Have member come to head of the table bringing his material.

Pass out blank forms of Step I and Step II to members.

Demonstration procedure for presenting the Mechanical problem.

1. Describe the problem. (Tell in a natural narrative manner)
   - What is the problem?
   - Who is affected?
   - What are the effects of the problem?
   - When and where did it start?
2. Explain how the problem was isolated.

   Use large chart or board. Members to copy data on their sheets.
3. Explain how Step II was used to analyze the overall situation.

   Use large Flow chart or board showing present method. Members copy.

   Use Flow diagram if needed to show overall layout. (Copy on board)

Time Table

4. Explain how Step II was used to analyze the specific situation.

   Use large Job Methods Breakdown chart, or board showing present method. Members copy.

   Use the questioning method to demonstrate how facts were discovered which enable you to develop a new method thus correcting the problem. (Members do not participate at this time)

5. Explain how Step III was used in developing a new method or making a correction to the problem.

   If Flow chart or Flow diagram furnished sufficient facts to make the correction, then:-

   Use large Flow chart showing the proposed situation. Members copy.

   Use the Flow diagram (board) showing the proposed layout.

   If analysis of the specific situation was needed to make the correction then:-

   Complete the Methods breakdown using chart or board showing the proposed or corrected method. Members copy.

6. Explain how Step IV will be used in this problem.

   When and where will the correction be made?

   Who will be notified of the correction?

   What facts and data will be collected to prove the problem is solved.

   Could this problem have been prevented? How?

* We will now have questions about how the problem solving pattern was used in this demonstration.

Have members ask questions. All answers are referred to the "Supervisor" who made the presentation. "It is his problem"
If further improvements or corrections can be made it demonstrates that problems need all of the facts before a final answer can be given, or that corrections may be made in more than one manner.

Use remaining time, if any, to review how the problem was isolated, and how it was prepared for solution, and finally how it was corrected.

Thank member and have him return to his seat.

45 Min. to here.

Time Table 3'

PRACTICE DEMONSTRATION.

* We will now have a demonstration of how to correct a problem due to faulty instruction (Members refer to Master Chart).

Have Member come to head of table with his Material.
Solicit another Member to be the "learner".
Pass out blank Job Instruction sheets.

Procedure for Presenting "Faulty Instruction" Problem.

Get Ready to Instruct.

1. Explain how the work place was prepared.
   State the job setting. Tools - Machines, Materials, etc.
   Sketch the job layout (Simple sketch on board)

2. Explain how to prepare yourself.
   Draw outline of Job Instruction sheet on board (large Chart optional)
   Fill in Important Steps and Key Points in their proper spaces. (Members copy)

3. Explain the order of instruction to be used.

4. Demonstrate how the learner is prepared.

   Have learner approach the work place.

   Put the learner at ease.
   State the Job. Learn his experience.
   Interest him in learning the job.
   State the use and case of tools, equipment, gages, safeguards, etc.
   Place him in correct position for learning.

Instruct the Learner

5. Demonstrate the regular step by step method of instruction.
   Instruct
   Try out his performance
   Put him on his own

* We will now have questions about how the Problem Solving pattern was used in this demonstration.

Have Members ask questions and comment on demonstration.
All answer as referred to the "Supervisor" who made the demonstration.
"It is his problem".

Use remaining time, if any, to review how the problem was solved by correct instruction.

Thank Members and have them return to their seats.

1 Hour 20 Min. to here.

Time Table
~~40~~ 35 Min.

PRACTICE DEMONSTRATION

* We will now conclude the practice demonstrations for this session by observing how one of our members handled a problem involving Attitude and Behavior.

Have member come to head of table with his notes and material.
Pass out Step I work sheets.
Pass out Job Relations work sheets.
Ask members to fill out work sheet from the information of the demonstration.

Procedure for presenting an Attitude and Behavior Problem.

1. Tell the incident or situation that caused you to realize that you had a problem.

2. Tell which one of the following ways from which this problem arose.

   (a) Did you sense a change in your department?

   (b) Did you anticipate a change in your department?

   (c) Did this problem come to you?

   (d) Did you run into this problem?

   The purpose of bringing out how problems arise is to make you realize how preventive work may be done particularly as regards (a) and (b) above.

3. Explain how the problem was isolated. Step I.

   Use large chart or board. Members copy same on their sheets.

   Go through each sub-head of Step I and tell how it was used and how it applies to this problem.

4. Explain how you prepared for the solution of this problem. Step II.

   Go through each sub-head of Step II and tell how it was used in preparing for the solution of this problem.

   Get the Facts.

   Write the facts of this case on the board. Members copy.

   Tell what records were reviewed.
   Tell what rules and regulations were consulted.
   Tell which persons were consulted for opinions and feelings.

   Weigh the Facts.

   Tell how the facts fit together. Show their relationship.
   Show that there are no contradictions or gaps that calls for additional facts.
   Show how you considered their bearing upon each other.

Time Table

Make a Decision.

List the possible actions that could be reasonably made. (members copy.)

Tell how you considered the effect of this decision upon the individual, the group, and on production. (members copy.)

Tell what the final decision is and give reasons for its selection.

5. Explain how Step III will be used.

Go through each sub-head, explain how used. Refer to chart.

Take Action.

Tell how you considered time and place for the action and why you selected these.

Tell what was used to explain the benefits and advantages of this action to the individual.

Explain exactly how the action will be put into effect.

Tell how you will get understanding and acceptance of the decision.

6. Explain how Step IV will be used. Follow master outline for problem solving sheet or chart.

When and where will the correction or action be made?

Who will be notified?

What records will be consulted to evaluate the results of this corrective action?

* Could this problem have been prevented? (Have group discussion)

* In considering the Human Angle, what changes in Attitude and Behavior would you look for?

Thank member and have him return to his seat.

1 Hour 55 Min. to here.

5 Min. Review of Session Vi.

Make assignments for next session.

Close session.

2 Hours to here.

Time Table
5 Min.

PRACTICE DEMONSTRATIONS

* In the last session we had practice in solving production problems dealing with MECHANICAL situations and with PEOPLE situations.

Review the 4-step master pattern. (Refer to hand-out and chart)

5 Min. to here

1 Hour 55 Min.

* We will continue with practice demonstrations to increase our skill in the use of the 4-step pattern for solving production problems which we experience daily at the department level in industry.

1st demonstration - Mechanical problem. 40 Min.

2nd demonstration - Faulty instruction problem. 40 Min.

3rd demonstration - Attitude and Behavior problem. 35 Min.

Follow the same procedure for the demonstrations as we used in Session VI.

* In our next and last session we will continue with practice demonstrations.

* The assignments will be somewhat different and will include what we call "Mixed situations" problems such as: -

(a) A Mechanical problem combined with a Faulty instruction problem.

(b) A Faulty instruction problem combined with a problem involving Attitude and Behavior.

2 Hours to here.

Time Table
1 Hour 50 Min.

PRACTICE DEMONSTRATIONS

* This is the final session in the program and we will continue to practice so as to improve our skill in solving production problems.

1st demonstration - "Mechanical" problem. 35 Min.

2nd demonstration - "Mechanical" and a "Faulty instruction" combined problem. 40 Min.

3rd demonstration - "Faulty instruction" and an "Attitude and Behavior" combined problem. 35 Min.

Follow the same procedure as before for each of the three demonstrations.

1 Hour 50 Min. to here.

Time Table
10 Min.

APPLYING THE PROBLEM SOLVING PATTERN

* We have arrived at the end of this program for solving production problems.
At the opening of the program we discussed the Duties and Responsibilities of the Supervisor. (Refer to the "hand-out")

* You have learned the entire pattern for solving day to day problems and have had practice in using it. Now you will soon be able to practice the skill which you received here in your own industry, in your own department. (Write the 4-steps on board, or use chart.)

Restate the urgent need for: --

Full	PRODUCTION.
of good	QUALITY
on	SCHEDULE
at	LOW COST
with	SAFETY

* Although we can foresee many problems at their inception and can prevent them from arising, yet it is quite improbably that all problems can be forseen nor prevented.

* It has been said that one of the principal Duties and Responsibilities of a Supervisor is to keep a smooth running department. This is what all Supervisors strive for but never quite attain.

* So long as we are dealing with PEOPLE we will have problems.

* These problems can be solved by fully and conscientiously applying this 4-step pattern. It will work if used properly and regularly.

Emphasize that the only sure way that a Supervisor can get a smooth running depa rtment is to follow this 4-step pattern of problem solving, otherwise he is only a "trouble shooter" dealing with one emergency after another and never quite getting them solved.

* Many Supervisors will say that they don't have time tu use such a pattern for solving problems, but experience shows that they will use much more time "shooting trouble" and never get the problem solved.

* Just what are you going to do about this?

Point out:

Use the 4-step pattern for solving all of your problems.
Make it a habit.
Use it fully.
Have the various forms which were used in the program, prepared especially to fit your own plant and department.
Solving problems is your responsibility as a Supervisor.

* Thank you for your attention, interest and cooperation in this program.

* I wish you success.

Adjourn the session.

2 Hours
to here.

DUTIES AND RESPONSIBILITIES OF A SUPERVISORY PERSON.

To coordinate with the remainder of the Organization.

To operate in accordance with company policies.
To operate according to schedule and specifications.
To cooperate with staff and other departments.
To keep management informed at all times.

To make effective use of Manpower.

To place the right man on the right job.
To start the new employee.
To train the employee for jobs which are new to him.
To improve job performance of each person.
To gain cooperation and develop smooth working relationships.
To interpret company policies.
To control labor costs.
To protect potential abilities of each person.
To create and maintain high department morale.

To make effective use of Materials and Equipment.

To plan for efficient handling and storing of equipment.
To control material costs.
To control machinery and equipment costs.
To maintain safe operating conditions.

SOLVING PROBLEMS.

Does this problem involve: THINGS? ☐ PLACES? ☐ PEOPLE? ☐ .

Exactly what is the problem?

Does this problem concern: QUALITY? ◯ QUANTITY? ◯ SAFETY? ◯ COST? ◯

What is the proof or evidence of the problem?

What caused the problem?

What would you do about this?

Date: _____ Dept: _____ Name: _____

An outline for

SOLVING PROBLEMS

What is the problem?

List possible causes	List possible corrections

Exactly what should be done about it?	When?	Who do you need to help?

STEP I .. ISOLATE THE PROBLEM .

1. State the Problem.

Is it MECHANICAL pertaining to Things and Places?

Is it PEOPLE who Don't know - Can't do - Don't care - Won't do ?

2. Give proof or Evidence of the Problem.

MECHANICAL	PEOPLE. who.	
	Don't know Can't do	Don't care Won't do
Schedules	Productivity	Attitude
Rework and Scrap	Work habits	Interest
Tool wear and breakage	Skill	Job satisfaction.
Equipment breakdowns	Ability	Personality
Accidents	Safety	Physical condition.
Records and paper work.	Responsibilities	Health.

3. Explore the Cause.

Method	Job assignment
Tools	Faulty instruction.
Equipment	Personality situation.
Material	Insufficient skill
Layout	Human relations.
Design	Unsafe acts.
Standards	
Unsafe conditions.	

(Use questions: Why did this happen?, Where?, When? , Who is responsible?.)

4. Draw Conclusions.

Weigh causes.

Is the difficulty MECHANICAL? PEOPLE? or BOTH?

Decide on plan of solution.

ISOLATE THE PROBLEM

This problem concerns QUALITY ◯, QUANTITY ◯, SAFETY ◯, COST ◯, PEOPLE ◯

Exactly what is the problem?

PROOF or EVIDENCE of the PROBLEM.

When it is MECHANICAL Involving: Things and Places.		When it is PEOPLE Who: Don't know–Can't do–Don't care–Won't do.
Behind schedule by	per	Productivity is
Rework is up by	per	Work habits are
Scrap is up by	per	Job interest is
Tool breakage is up by	per	General attitude is
Machine down time is	per	Workmanship is
Accident rate is up by	per	Complaints are
Set–up time is	per	Attendance is
Paper work is increased by		Job satisfaction is

EXPLORE the CAUSE

The above problems are caused by.... →		The above problems are caused by... →	
Job method	☐	Incorrect job assignment	☐
Layout	☐	Faulty instruction and follow–up	☐
Tools, fixtures, dies, gages etc.	☐	Insufficient skill and experience.	☐
Machines and equipment	☐	Poor human relations	☐
Materials and parts	☐	Personality situation	☐
Product design	☐	Basic wants threatened.	☐
Housekeeping and working conditions	☐	Health and physical fitness	☐
Unsafe conditions	☐	Unsafe acts.	☐

CONCLUSION

This problem is MECHANICAL.. ◯, or it involves PEOPLE.. ◯, or BOTH... ◯.

STEP- 2

PREPARE for SOLUTION

If its MECHANICAL	If its PEOPLE	Who
Methods. Layout. Tools. Materials. Equipment.	Don't Know Can't Do	Don't Care Won't do
Improve - Method for better way	Improve - Knowledge - Skill - Productivity	Improve - Attitude - Behavior
<u>Analyze</u> (1) Overall Situation Flow Chart Flow Diagram Question overall job (2) Specific Situation Method Breakdown Layout Diagram <u>Question each detail</u> Why is it necessary? What is its purpose? Where is it to be done? When is it to be done? Who is best qualified? How is the best way?	<u>Get Ready to Instruct</u> 1. Prepare the Workplace Have everything ready Have workplace set up properly. 2. Prepare Yourself Break down job for instruction List important steps List key points Plan the Instruction. 3.Prepare the Learner Put him at ease. Name job. Show finished part. Learn what he knows about the job. Interest him in learning the job. Explain use and care of: tools, gages, equipment, safeguards. Position him for learning.	<u>Get the Facts</u> Review the records What rules and plant customs apply. Talk with individuals concerned. Get opinions and feelings. <u>Weigh the Facts</u>. Fit facts together. Any gaps, omissions or contradictions. Consider their bearing upon each other. Check against Company Practices and Policie <u>Make the Decision</u> Consider effect upon individual, group, production

THE "SMITH" PROBLEM

Brown, the drill press operator in Dept. "A" was working at his job, drilling the #1 hole in angle plates.

He had cut his finger while moving tote pans of material to the work area.

The standard specifications of the job called for gaging one piece in twenty for size. Brown did this and although the pain from his finger was diverting his attention all that he gaged seemed good.

He therefore had no indication that the drill was dull nor that the machine wasn't running at the correct speed. It was just as the set-up man had left it. By mid-morning he had completed five tote pans for a total of 100 pieces.

Smith the Supervisor suddenly called Brown to his desk and reprimanded him for carelessness in his work.

Brown was angry and felt discouraged. He told the Supervisor he was going home at noon.

Smith the Supervisor was worried because Dept. "B" needed the work now or they would have to stop production. The Inspector had told him that a great many of the angle plates were off specifications.

JUST WHAT AM I TRYING TO ACCOMPLISH

ALL THE FACTS IN THIS PROBLEM

POSSIBLE ACTIONS

	CHECKS AGAINST POSSIBLE ACTIONS				
	PRACTICES & POLICIES?	ACCOMPLISH OBJECTIVE?	EFFECT UPON INDIVIDUAL?	EFFECT UPON GROUP?	EFFECT UPON PRODUCTION?

FINAL ACTION TAKEN

STEP - 3

CORRECT the PROBLEM.

MECHANICAL	PEOPLE	
Develop new method	1: Instruct the Learner	Take Action
Eliminate unnecessary details		Consider time and place
Combine details where practical	2. Try out performance	Explain Action
Rearrange details for better sequence		Benefits to him
Simplify all of the necessary details.	3. Put him on his own.	Put into effect
Record proposed correction.		Notify all concerned.
Put it into effect.		

STEP IV CHECK and EVALUATE RESULTS.

Follow up to see that the change or correction has been made.
What improvements do the records show in Quality, Quantity, Safety, Cost?
Consider the Human Angle. Note changes in attitudes and relationships.
Inform all those concerned of progress and results of the action or correction.
Look for ways to prevent a recurrence of this problem.

DID YOUR ACTION HELP PRODUCTION?

SIMPLIFY or IMPROVE the JOB.

STEP III DEVELOP THE NEW METHOD.

This step is actually a reasoning process. Here you use the answers to the questions asked in Step #2 together with the IDEAS which you jotted down on the breakdown sheet to finally arrive at a possible improvement. If possible you should tryout the new method

We can make improv >nly when details are Eliminated,Combined, Rearranged,and Simplified.
As the new method is developed,write the details step by step in the "Proposed Method" column of the breakdown sheet.

ELIMINATE UNNECESSARY DETAILS.

We eliminate details to avoid unnecessary use of manpower,machines,tools, materials and time.

The answers to "WHY" and "WHAT" lead us to eliminating unnecessary details. The answer to "WHY" must justify the existence of the detail.

COMBINE DETAILS in whole or in part, where practical.

Possibilities for combining details are often discovered by finding the best place,best time,and the best person to do them.

Combining details often reduces the total time as the new combination may be done in less time than was formerly needed to do the two.

All transportations,delays,inspections,and storages are eliminated between two or more details the moment they are combined.

The answers to "WHERE" ,"WHEN", and "WHO" are leads for combining.

REARRANGE DETAILS for better sequence where practical.

Here the details are moved from one to another location in the sequence.

We rearrange details to reduce handlings,back-trackings,delays,accident: hazards,and to improve maintenance possibilities or working conditions.

The answers to "WHERE","WHEN",and "WHO" also give leads for rearranging.

SIMPLIFY all necessary details.

After we have made every possible Elimination,Combination,and change of Sequence,the development of "HOW" is the best way to do the job"is now considered. It is the last phase of a development and should be applied after all other steps are completed.
The answer to "HOW is the best way to do it" leads to simplifying.

Avoid unnecessary non-productive motions. Make the work easier and safer. Preposition materials,tools,and equipment at the best places in the proper work area. Use gravity feed hoppers and drop delivery chutes.
Let both hands do u seful work.
Use jigs and fixtures instead of hands to hold work.

To reduce the time necessary to acquire skill,the fundamental principles of motion economy should be studied and used.

STEP II
QUESTION DETAILS

WHY
is it necessary?
WHAT
is its purpose?

WHERE
should it be done?

WHEN
should it be done?

WHO
is best qualified to do it?

HOW
is the best way to do it?

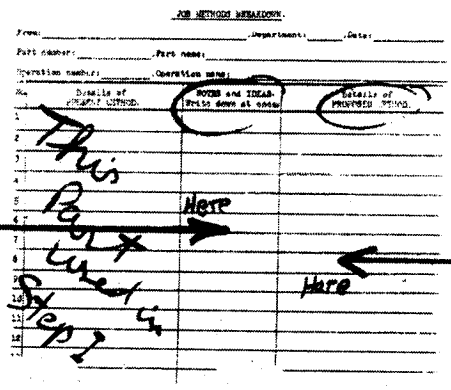
STEP III
DEVELOP A NEW METHOD

ELIMINATE
unnecessary
jobs; steps; details

COMBINE
to reduce
⇨ □ D ▽

REARRANGE
for better sequence
to reduce
handlings-backtracking

SIMPLIFY
Motions
Layouts
Tools
Materials-handling



Write down the IDEAS you get from questioning →

← List details of the proposed method

JOB METHODS BREAKDOWN WORK SHEET

PRODUCT Radio Shields NO. DATE CHARTED BY Bill Brown

OPERATION Inspect, Assemble, Rivet, Stamp and Pack NO. DEPT. Rivet & Pack Sheet of

No.	Details of Proposed Method	TIME IN MIN	DISTANCE IN FEET	Notes	WHY	WHERE	WHEN	WHO	HOW	IDEAS Write them down—Don't trust your memory	Eliminate	Combine	Rearrange	Simplify
1.	Put pile of copper sheets in right jig.			Boxes placed on table by Handler.										
2.	Put pile of brass sheets in left jig.													
3.	Pick up 1 copper sheet in right hand and 1 brass sheet in left hand													
4.	Inspect both sheets.			Scratches and dents. Drop scrap through slots.										
5.	Assemble sheets and place in fixture.			Fixture lines up sheets and locates rivet holes.										
6.	Rivet the 2 bottom corners													
7.	Remove, reverse, and place sheets													
8.	Rivet the 2 top corners													
9.	Place Shield in front of fixture. Repeat No. 3 to No. 9 inc. -19 times													
10.	Put 20 Shields in shipping case - 200/case			Cases placed by Handler										
11.	Carry full cases to Packing Dept.			By Handler with hand truck										
12.	Close, stencil cases			Check inspection by Packer										
13.	Write weight on delivery slip			200 shields in case uniform weight										
14.	Set cases aside for shipment													

HUMAN PROBLEMS in METHODS IMPROVEMENTS.

Many difficulties are encountered in dealing with people when attempting to present or install any new IDEA or METHOD, but two human failings have been responsible for stopping more improvements from being put to work than any others, namely:-

(A) RESISTANCE to new ideas or changes.
(B) RESENTMENT of criticism.

RESISTANCE to new ideas or changes.

Every time a method is changed, people are involved, and serious consideration must be given to the effect of this change upon them. Occasionally the savings involved in the new improvement is not worth the upset in human relations caused.

The basis of this resistance has little to do with reasoning.
It is an emotional reaction. It is FEAR.

They fear: Upset of routines.
Change of work habits.
Effect upon their production.
Change in working conditions.
Their ability to learn the new method.

There is a tendency to build "empires".
We defend past practices, customs, traditions, work methods, and habits.
We often hear, "Why change this?" "We have been doing this for years" etc.

This resistance to change may happen anytime such as when:-
1. Processing the proposals.
2. Putting them into effect.
Supervisors may be skeptical.
Employees fear the effects.

How can this resistance be overcome?

Tell people in advance about changes that will affect them.
Tell them WHY: Present the idea or change in a clear, simple, concise manner.
Make a trial run of the new method demonstrating advantages.
Present facts to prove the benefits expected such as:
Figures of savings.
Charts, Diagrams, Breakdown sheets, Sketches, etc.
Clarify the effect upon persons involved. Give assurance that:
The job will be simpler, safer, easier, and more comfortable.
Possibilities of accomplishment are undisturbed.
When operations or jobs are eliminated, other important work will be found.

RESENTMENT of criticism.

Often someone may interpret your search for a better method as personal criticism. All concerned should understand that the proposed change is not a criticism of past methods, or of those persons who originally proposed or installed the present method, but that it is a constructive search for a better way to get out quality production in sufficient quantity and on time, at a more satisfactory cost.

Remember, that people do not like to be told that they are wrong, so in discussing any new method or change, refrain from inferring personal criticism.

Other factors to be overcome when making methods improvements:

Reluctance to assume the initiative.
Tendency to overrate the importance of the job.
Reluctance to admit that what we do is unnecessary or nonessential.

Subject charted. FLOW CHART.

Part: _____ Date: _____

Material: _____ Department: _____

Person: _____

Paper form: _____ Charted by: _____

	What and How Present method. Proposed method.	Oper. No.	Dept	Distance	Time	Symbols
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JOB METHODS BREAKDOWN.

From: _____ .Department: _____ .Date: _____

Part number: _____ .Part name: _____

Operation number: _____ .Operation name: _____

No.	Details of PRESENT METHOD.	NOTES and IDEAS. Write down at once.	Details of PROPOSED METHOD.
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Flow chart other side.

HOW TO SOLVE PRODUCTION PROBLEMS.

STEP I. ISOLATE THE PROBLEM.

1. State the Problem: Is it Mechanical, pertaining to things and places?
   Is it People who:-Don't know, -Can't do, -Don't care, -Won't do?
2. Prove the Problem: Statistical data of trouble in production, performance, attitude.
3. Explore the Cause: Is it Methods, Layout, Tools, Equipment, Materials, Design, Hazards?
   Is it Wrong assignment? Faulty instruction? Personality situation?
4. Draw Conclusions: Is it MECHANICAL? PEOPLE? or BOTH?

STEP II. PREPARE FOR SOLUTION

Is it.. MECHANICAL ?	Is it.. PEOPLE ? who..	
Methods, Layout, Materials, Tools, Equipment, Design.	Don't know? Can't do?	Don't care? Won't do?
then improve.. Method for Better Way	then improve.. Knowledge—Productivity—Skill.	then improve.. Attitude and Behavior.
ANALYZE: (1) Overall situation. (1) Flow chart. (2) Flow diagram. Question overall job. (2) Specific situation. (1) Method. (2) Method breakdown. (3) Layout. (4) Work station set-up. QUESTION EACH DETAIL. Using questions starting with. WHY?, WHAT?, WHERE?, WHEN?, WHO?, HOW?.	GET READY TO INSTRUCT. (1) Prepare the Workplace. Get specified tools, material. Arrange for best efficiency. (2) Prepare Yourself. Break down job for instruction. List the Important Steps. List Key Points in each step. Plan the instruction. (3) Prepare the Learner. Put him at ease. State job. Learn his experience. Interest him in learning. Explain use and care of tools, equipment, safeguards, etc. Position him for learning.	GET THE FACTS. Review the records. What rules and plant customs apply? Talk with individuals, get opinions and feelings. WEIGH THE FACTS Fit facts together. Check for gaps, omisions, contradictions. Consider their bearing upon each other. Check against company practices and policies. MAKE THE DECISION Consider effect upon individual, group, production.

STEP III. CORRECT THE PROBLEM.

DEVELOP THE IMPROVED WAY Eliminate unnecessary details. Combine where practical. Rearrange for better sequence. Simplify necessary details. RECORD PROPOSED CORRECTION. Make a Flow Chart of new method Make a Breakdown of new method PUT IT INTO EFFECT. Get final approval of all concerned on:— Safety, Quality, Quantity, Cost.	INSTRUCT THE LEARNER Instruct. Tell, Show, Illustrate one step at a time, stressing Key points. Test with "W" questions. Try out learner's performance. Have him do the job. Have him repeat, Telling what he is Showing, stressing Key points. Test him with "WHY" questions. Put him on his own. Stress quality and safety. Encourage questions about job. Tell him who to ask for help.	TAKE ACTION Consider time and place. Explain the action. Why it is best for him. Advantages and benefits. Secure understanding and acceptance. Put into effect. Consider feelings and attitudes. Notify all concerned.

STEP IV. CHECK AND EVALUATE RESULTS.

Follow up to see that the change or correction has been made.
What improvements do the records show in Quality, Quantity, Safety, Cost?
Consider the Human Angle. Note changes in attitudes and relationships.
Inform all those concerned of progress and results of the action or correction.
Look for ways to prevent a recurrence of this problem.

TRAINING WITHIN INDUSTRY
INCORPORATED
725 ENGINEERS BLDG.
CLEVELAND 14 OHIO

PRACTICE DEMONSTRATION.

Procedure for Presenting a Mechanical Problem.

---

1. Describe the problem. (Tell in a natural narrative manner)
   What is the problem?
   Who is affected?
   What are the effects of the problem?
   When and where did it start?

2. Explain how the problem was isolated.

   Use large chart or board. Members to copy data on their sheets.

3. Explain how Step II was used to analyze the overall situation.

   Use large Flow Chart or board showing present method. Members copy.

   Use Flow diagram if needed to show overall layout. (Copy on board)

4. Explain how Step II was used to analyze the specific situation.

   Use large Job Methods Breakdown Chart or board showing present method. Members copy.

   Use the questioning method to demonstrate how facts were discovered which enable you to develop a new method, thus correcting the problem. (Members do not participate at this time.)

5. Explain how Step III was used in developing a new method or making a correction to the problem.

   If Flow Chart or Flow Diagram furnished sufficient facts to make the correction, then:-

   Use large Flow Chart showing the proposed situation. Members copy.

   Use the Flow Diagram (board) showing the proposed layout.

   If analysis of the specific situation was needed to make the correction then:-

   Complete the Methods Breakdown using chart or board showing the proposed or corrected method. Members copy.

6. Explain how Step IV will be used in this problem.

   When and where will the correction be made?

   Who will be notified of the correction?

   What facts and data will be collected to prove the problem is solved?

   Could this problem have been prevented? How?

OUTLINE FOR SOLVING MECHANICAL PROBLEMS.

When it Involves	ACTION
METHODS	ANALYZE THE OVERALL JOB OR SITUATION
	Make a Flow Chart.
	List routing or travel of a part, material or paper.
LAYOUT	Show relationship to prior and subsequent operations or situations.
	Question the job or situation as a whole.
	Make a Flow Diagram.
TOOLS	Show layout and locations of work stations, equipment, aisles, etc.
	Study for better production efficiency and for possible causes of problems.
MACHINES	ANALYZE SPECIFIC JOB OR SITUATION.
	Make a breakdown of the method of doing the job or of the situation.
	List all details including:
EQUIPMENT	Materials handling
	Machine work
	Hand work.
MATERIALS	QUESTION ALL DETAILS TO LOCATE PROBLEM SOURCES.
	WHY is it necessary? WHAT is its purpose?
	WHERE should it be done? WHEN should it be done?
	WHO is best qualified to do it?
	HOW is the best way to do it?

MAKE A FLOW CHART.

Experience has shown that a Flow Chart can be used to a great advantage when studying a situation where a change is contemplated.

It shows the present routing of the subject and its relationship to prior and subsequent operations, transportations, inspections, delays, and storages.

The subject may be a part, an assembly, a material, a person, or a paper form. Most cases involve the study of a part or an assembly.

One of the important sections of a Flow Chart is the "Symbols section". These symbols are used to graphically show what is happening to the subject being studied.

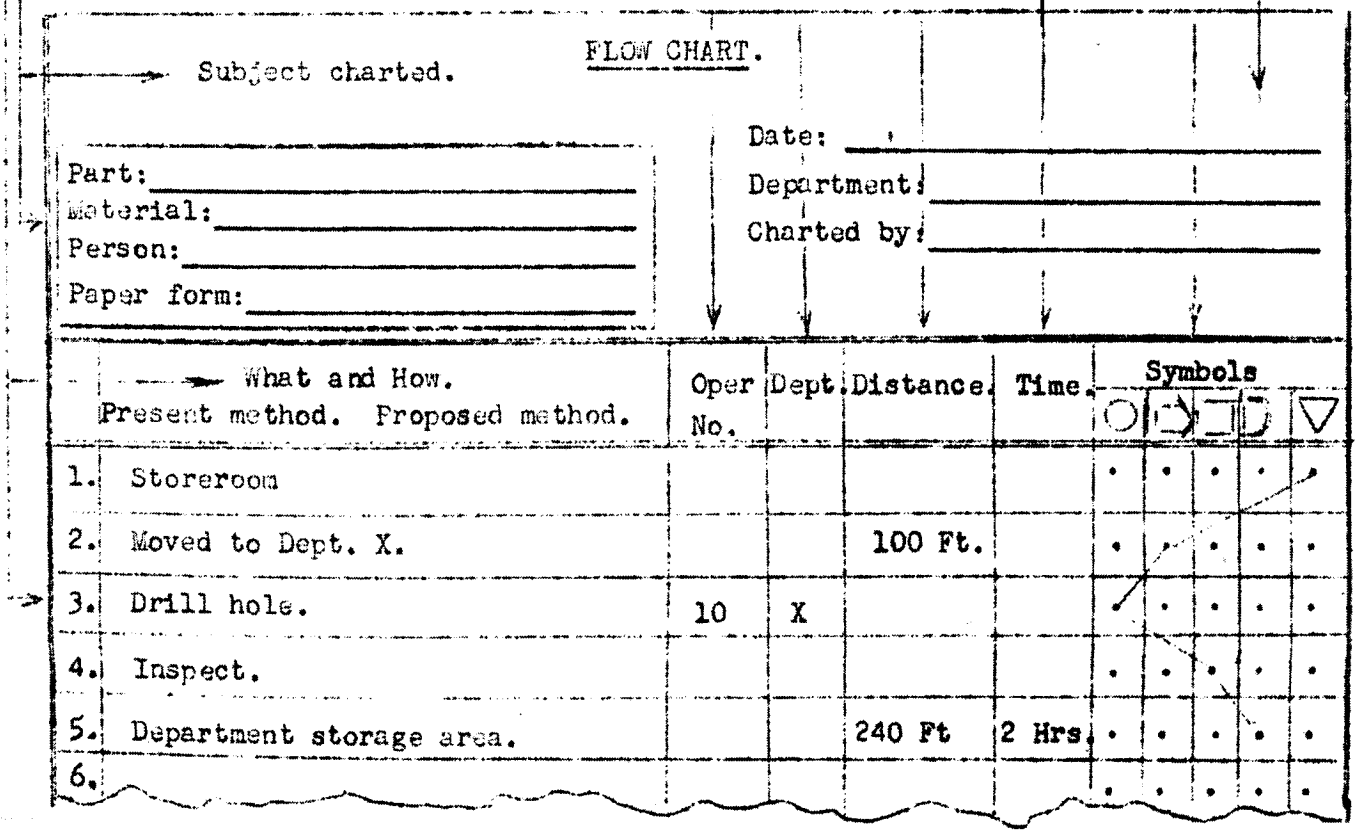
Extra emphasis can be obtained by drawing a connecting line from symbol to symbol thus highlighting such costly items as excessive transportations, delays, and storages.

Extra attention may be drawn to these high cost items by using a color effect such as drawing different color lines or by filling in the symbol blocks in color.

Definitions covering the meaning of the symbols used is found on the next page.

Here is a quick easy way to make a Flow Chart:-

1. Fill in headings.
2. Fill in "Subject charted".
3. List what happens to the subject charted.
4. Give "Oper.No" where it applys.
5. List "Dept." in which it occurs.
6. Enter "Distance" in feet for all transportations.
7. Enter "Time" for all delays.
8. Apply symbols and draw connecting line.



Subject charted. FLOW CHART.

Part: _____ Date: _____

Material: _____ Department: _____

Person: _____ Charted by: _____

Paper form: _____

	What and How Present method. Proposed method.	Oper. No.	Dept	Distance	Time	Symbols ○ ⇨ □ D ▽
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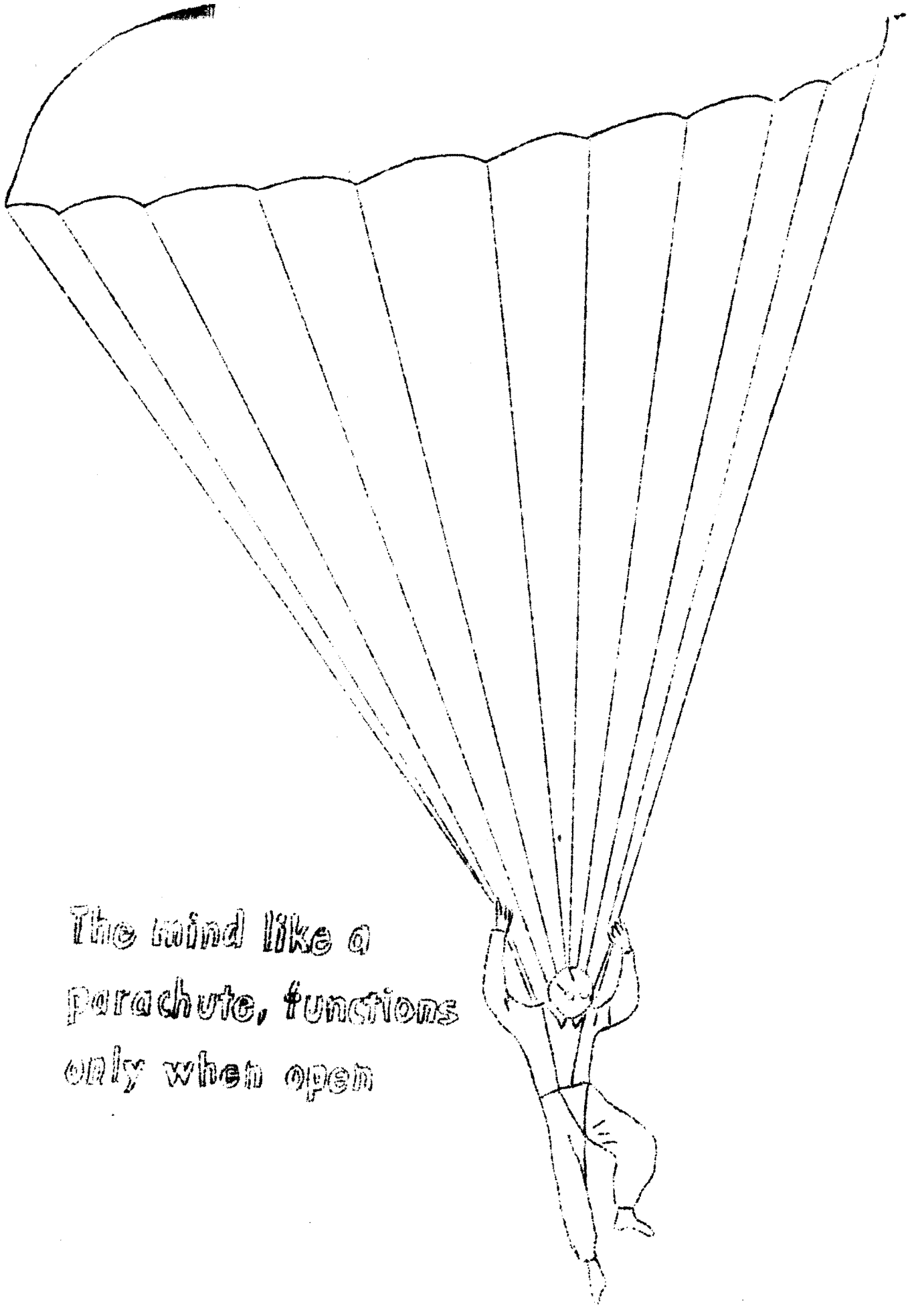
STANDARD DEFINITIONS OF SYMBOLS.

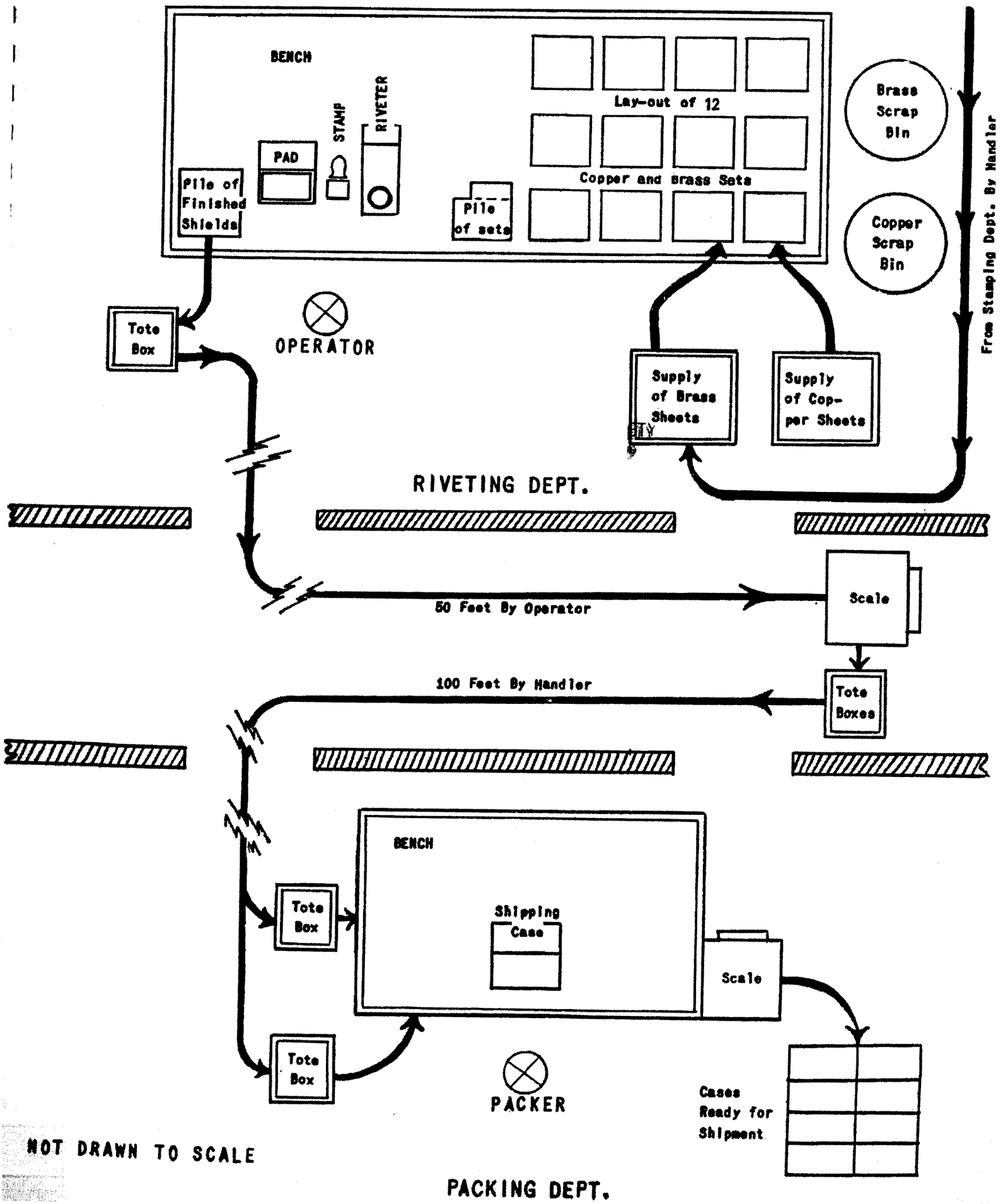
We have adopted the standardized A.S.M.E. symbols. They are as follows:

Classification	Predominant results	Symbol and definition.
Operation	Produces	 An operation occurs when: (a) An object is intentionally changed in any of its physical or chemical characteristics (b) It is assembled or dissembled from another object. (c) It is arranged or prepared for another operation, transportation, inspection, storage. An operation also occurs when: (a) Information is given or received. (b) When planning or calculating takes place.
Transportation.	Moves.	 A transportation occurs when an object is moved from one place to another, except when such movements are a part of the operation or are caused by the operator at work station during an operation or an inspection.
Inspection.	Verifies.	 An inspection occurs when an object is examined for identification or is verified for quality or quantity in any of its characteristics.
Delay.	Interference.	 A delay occurs to an object when conditions except those which intentionally change the physical or chemical characteristics of the object, do not permit or require immediate performance of the next planned action.
Storage.	Keeps.	 A storage occurs when an object is kept and protected against unauthorized removal.
Combined activity.		Operation-Inspection.  Storage-Inspection.  When it is desired to show activities performed either concurrently or by the same operator at the same work station, the symbols for these activities are combined.



The mind like a parachute, functions only when open

PRESENT METHOD LAYOUT



JOB METHODS BREAKDOWN.

From: _____ Department: _____ Date: _____

Part number: _____ .Part name: _____

Operation number: _____ .Operation name: _____

No.	Details of PRESENT METHOD.	NOTES and IDEAS. Write down at once.	Details of PROPOSED METHOD.
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Flow chart other side.

ALL JOBS CONSIST OF THREE PARTS.

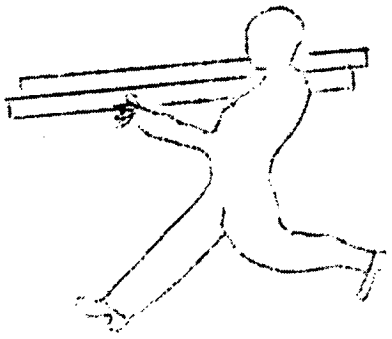
Movement of material without definite work accomplishment is either:-

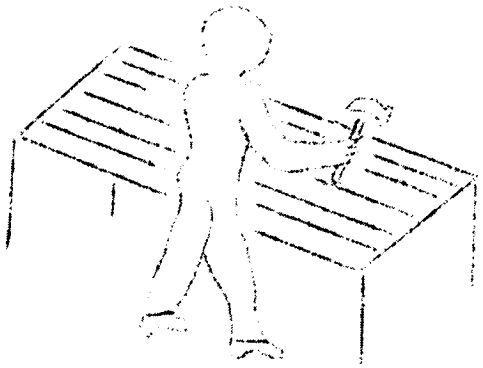
Make ready
Put away
Waste.

Eliminate every step that does not contribute to the end result.

MAKE READY.

This is the time and effort spent in getting things ready such as: Materials, Tools, Equipment, Gages. Also the placing of the material or part in the nearby work area, from trucks, pans, racks etc.



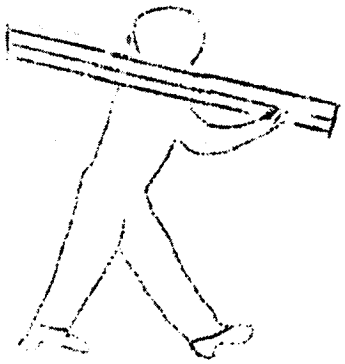


DO.

This is the work that actually does accomplish the desired main actual objective and does add to the value of it. eg. Drill a hole, Plane a board etc.

PUT AWAY.

This includes all details necessary to complete the job after the DO operation. It includes setting the part aside and/or placing on trucks, in pans, on racks etc.



The greatest opportunity for improvement is in the "MAKE-READY" AND "PUT AWAY". They add to the time and cost but not to the value of the product.

Less than 50% of the total time is consumed by the "DO" part of the job. The "MAKE-READY" and "PUT-AWAY" should be cleaned up after first attempting to improve the "DO" details.

SIMPLIFY or IMPROVE the JOB.

STEP II. QUESTION EVERY DETAIL.

We question the "DO" detail or details first because if they are unnecessary then there is no use to question the rest of the operation. If this is necessary, then continue the questioning in the regular manner.

2. "MAKE READY" and "PUT AWAY" details.

The greatest opportunity for improvements lies in these details. These details consist of the time and effort used in getting the job ready and after it has been done to clear it away. It is getting the necessary materials and supplies, and placing them, and putting the finished product aside after the operation. It also includes getting the trucks, racks, pans, boxes, skids etc.

The movement of material without definite work accomplishment is either:

MAKE READY PUT AWAY OR WASTE.

These very definitely should be questioned with improvements in mind.

Types of questions to be asked.

1. WHY IS IT NECESSARY?
   We ask this question of each detail to distinguish necessary details from those that are unnecessary or doubtful.
   This is the most important question and yet the hardest to get answered.

2. WHAT IS ITS PURPOSE?
   This is the check question to WHY is it necessary. We want to learn if the detail has a useful purpose or adds to quality. If it does not, we will reconsider its necessity.

If the detail is found to be necessary, then continue with other questions.

3. WHERE SHOULD IT BE DONE?
   Where is the best place or location to do the detail? Why is it done there? Where else could it be done? Could it be combined with another?

4. WHEN SHOULD IT BE DONE?
   We ask this question to find the best time to do each detail. What details must it follow, and what detail must it preceed? Why is it done then? At what other time could it be done? Are the details in proper sequence? Can it be done simultaneously with another?

5. WHO IS BEST QUALIFIED TO DO IT?
   We ask this question to learn who is best qualified from the standpoint of skill, experience, or physical strength. Can women be used here? Can "old timers" be used instead of young men?

6. HOW IS THE BEST WAY TO DO IT?
   We ask this question only after asking WHERE?, WHEN?, and WHO?.
   We want to learn if there is a better way to do the detail. Can it be done easier and safer? Can the layout of the work station be improved? Are proper tools and equipment used?

List your IDEAS and THOUGHTS arising from these questions, on the breakdown sheet in the column marked "NOTES and IDEAS". It is from these that the new method is developed.

JOB BREAK-DOWN SHEET FOR TRAINING MAN ON NEW JOB

PART ANGLE PLATE #35 OPERATION DRILL #1 HOLE

IMPORTANT STEPS IN THE OPERATION Step: A logical segment of the operation when something happens to ADVANCE the work	KEY POINTS Key point: Anything in a step that might Make or break the job Injure the worker Make the work easier to do, i. e., "knack," "trick," special timing, bit of special information
Place Piece in fixture and lock	Face down Angle to left Clamp securely
Slide fixture under drill	To back stop
Drill to stop	Use gentle pressure Release drill .
Withdraw fixture	Pull towards you
Remove piece and dump chips	Unclamp Turn fixture over to remove piece and chips
Place finished piece aside	In pan Angle to left
Gage with Go - No-go Gage	One per pan of 20