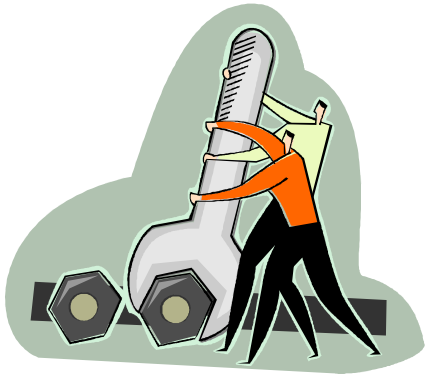


Problem Solving

Key to Continuous Improvement

Workshop

Six Steps Problem Solving Process

1. Identify concerns
2. Analyze the problem (facts)
3. Evaluate Alternatives
4. Propose and Implement Solution
5. Analyze the Outcome
6. Improve the Process

The Six Step Problem Solving Process Model

1. Identify Concerns and problem
2. Analyze the Problem
3. Evaluate the Alternatives
4. Propose and Implement the Solution
5. Analyze the Outcome
6. Improve the Process

Six Steps Problem Solving Process

Step 1. Identify Concerns

(How urgent or important is this?)

- **Identifying the gap**
- **Smoke out the issues to the team or organization**
  - Use analysis reports such as **check sheets, Pareto charts**
  - Use questions to probe for understanding of real issues which require further investigation
- **List areas of concern and the consequences of not taking action eg. Defects, tardiness, attitude**
- **Proceed to identify concerns**
  - Keep asking to surface the real issues
  - Team to get agreement on area of mutual concern

Six Steps Problem Solving Process

Step 1. Identify Concerns

(How urgent or important is this?)

- **Identifying the gap**
  - Something is wrong and needs to be corrected
  - Something is threatening and needs to be prevented
  - Something is missing and needs to be provided
- **Smoke out the issues to the team or organization**
  - Use analysis reports such as check sheets, Pareto charts
  - Use questions to probe for understanding of real issues which require further investigation
- **How your team proceeds**
  - List Areas of Concern eg. STT, Defects, UMH
  - **Questions to ask:**
    1. Why is a solution necessary? Consequences if nothing is done?
    2. What is (or is not) the problem? Keep asking to surface the real issues
    3. What is/should be happening? Determine the appropriate gap
- **Proceed to identify concerns**
    1. Use formats to help get team agreement on area of mutual concern

Six Steps Problem Solving Process

Step 2. Analyze the Problem

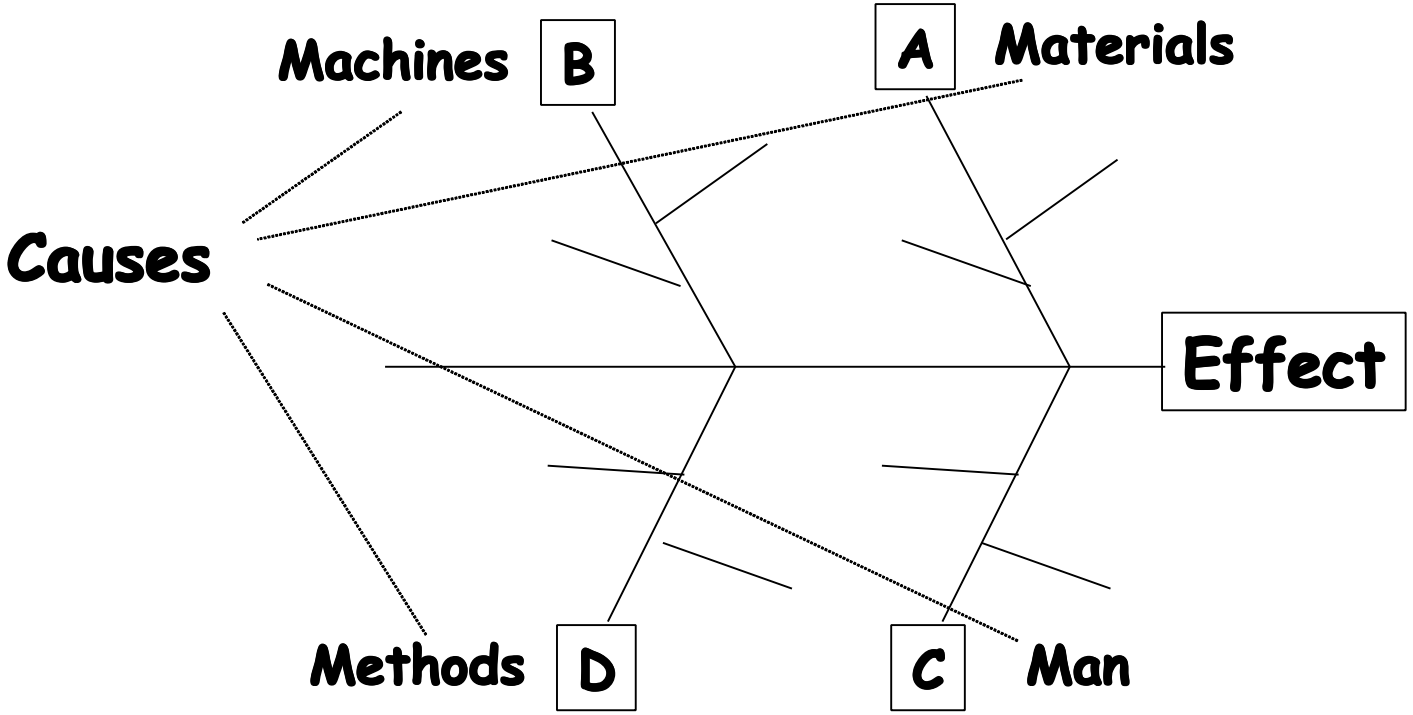
- **Investigate in Detail (gather and evaluate the facts)**
  - Write a statement that identifies the root problem
- **Use appropriate tools and techniques**
  - Checksheets, reports, observations
  - Brainstorming (Alex F. Osborne, Applied Imagination, 1957)
  - Force Field Analysis (Kurt Lewin, Field Theory in Social Research, 1955)
  - Cause and Effect Diagram or Fish Bone Diagram
- **Ensure active participation**
  - Build consensus
- **Proceed to analyze the problem**
  - Team agreement that area of mutual concern has been sufficiently analyzed
  - Allow for constructive criticism and concerns to be shared

Six Steps Problem Solving Process

Step 2. Analyze the Problem

- **Investigate in Detail (evaluate the facts)**
  - Obtain valid information about "what is"
  - Write a statement that identifies the root problem
- **Use appropriate tools and techniques**
  - Checksheets, reports, observations
  - Brainstorming (Alex F. Osborne, Applied Imagination, 1957)
  - Force Field Analysis (Kurt Lewin, Field Theory in Social Research, 1955)
  - Cause and Effect Diagram or Fish Bone Diagram
- **How your team proceeds**
  - Everyone participates actively
  - Build consensus
- **Proceed to analyze the problem**
  - Use formats to help get team agreement that area of mutual concern has been sufficiently analyzed

Cause and Effect Diagram



The Effect (results which is influenced by the main factors or Causes) are placed in a fish bone diagram. Using this diagram will help to identify the real causes

<u>Uses</u> :

- **To grasp the causal relationship between cause and effect**
- **To stratify**
- **To analyze the possible causes**

The Force Field Analysis Tool

List ***Driving forces*** – that driving you towards a needed change	List ***Restraining forces*** –those that are causing you not to change

Steps One and Two
Analysis Summary

Key things that the team should have:

- **Looked for patterns or trends during the analysis.**
  - Recurring themes point toward a definition
- **Define barriers, as necessary.**
  - A clear definition of these barriers is necessary when preparing an action plan
- **Used brainstorming techniques to open up discussion**
  - All ideas are acceptable
  - Get as many as possible
  - Involvement leads to ownership and commitment

Six Steps Problem Solving Process

Step 3. Evaluate alternatives (most critical step)

- **Test your problem analysis**
  - Establish **priorities** and
  - Set **criteria** in an effort to establish a goal (refer next slide)
  - Enables a **wider perspective** of possible solutions which tend to be more mutually acceptable by team. This in turn leads to **higher commitment** by the group

Six Steps Problem Solving Process

3. Evaluate alternatives (continued)

- **Alternative testing procedure**
  - Takes into account 3 fact finding and judgment procedures
    1. Establish team priorities (assign point values)
       1. List Absolute Requirements eg. Goal to be met in 6 weeks equals 10 points
       2. List Desirable Objectives eg. Minimum Improvement of 8% equals to 10 points
    2. Evaluate alternatives eg.
       1. Replace with new unit
       2. Return cash to customer
       3. Repair and return later
    3. Set your criteria
       1. What do you want to achieve by any solution you make?
       2. What do you want to preserve by any solution you make?
       3. What do you want to avoid by any solution you make?

Step Three – Evaluate Alternatives Tool

1. Establish priorities

List absolute requirements (points value)

Pts	Reqmt M	N	O
10	<6 wks	<$300	
8	>6-7	>$300 - $400	
6	>7-8	>$400-$500	
4	>8-9	>$500 - $600	
2	>9	>$600	

List Desirable Objectives (points value)

Pts	Reqmt x	y	z
10	>0.50		
8	>0.40		
6	>0.30		
4	>0.20		
2	>0.10		

For Alternative 1,

Example of Requirements
M = timeframe to complete
N = cost of implementation

Example of Requirements
x = UMH

Step Three – Evaluate Alternatives Tool

2. Establish Priorities - Evaluate Alternatives

	Alternative 1: **24 pts**			**Alternative 2:** **18 pts**			**Alternative 3:**		
Absolute Requirements									
Pt value	8	6		6	6				
Reqmt	M	N	**Pt. Total 14**	M	N	**Pt. Total 12**			**Pt. Total**
Desirable Objectives									
Pt value	10			6					
Objective	x		**Pt. Total 10**	x		**Pt. Total 6**			**Pt. Total**

Step Three – Evaluate Alternatives Tool

3. Criteria of this Alternative

- Set your criteria

1. Does this alternative express your desired achievement?

_____
_____
_____

2. Does this alternative express what you need to preserve?

_____
_____
_____

3. Does this alternative express what you need to avoid?

_____
_____
_____

Six Step Problem Solving Process

Step 4. Propose and Implement the Solution

- **Develop a plan of action**
  1. Specify **steps** to be completed
  2. Determine **resources needed** to implement plan
  3. Group member **responsibilities** to be agreed upon
  4. Determine **timeline** of events
  5. Provide for **emergencies and/or contingencies**
  6. Determine **expected impact and actual impact**
  7. Plan for **assessment** of your proposed plan

Step Four – Solution Creation Tool

Suggested Solutions	Does it meet Need for change? How/why?	Is it workable? How?	Any disadvantages?

Decided upon solution:

Step Four – Action Planning Tool

Steps to be completed Chronological order	Needed Resources	Whose responsibility?	Begin date and completion date	Expected Impact	Actual Impact	Possible emergencies

Plan to assess Action Plan results : (list tools used eg Pareto charts, trend charts etc)

Six Step Problem Solving Process

Step 5. Analyze the Outcome

- **Follow through is critical**
  1. Analysis follow through
     1. Validate the entire process
     2. Dissemination and analysis of improvement results
  2. Determination of **new problems that surfaced**
  3. Revisit the process as necessary
  4. Problem **Recurrence Prevention** intervention
  5. **Institutionalization**

Step Five – Analyze the Outcome Tool

Detail level of improvement (or non-improvement)
Can improvement process be institutionalized or action planning stage to be revisited? List observations.
Do reports reveal any possibility of problem reappearing? Detail action plan to see this does not happen.

Six Step Problem Solving Process

Step 6. Improve the Process

- **Continue the improvement**
  - Link to Step 1 – Identify Concern (initiates the process again)
  - Step 6 also verifies your commitment to continuous improvement
    - Evaluate what you do on a daily basis
    - Rethink and change the way you do things
    - Eliminate non-value added activities
    - Accept responsibility and ownership for problems for which you are part of the solution

Problem Solving is an ongoing process

Six Steps Problem Solving Process

Important Considerations

Project selection

- Project clearly defined
- Customer oriented
- Business Impact

Analysis technique

- Thorough and appropriate analysis techniques used
- Benchmarking of best practices

Remedies

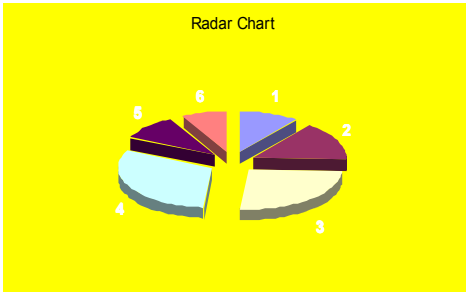
- Use the simplest tools
- Alternative solutions seriously explored
- Remedies consistent with analysis
- Implementation plans thorough and well defined

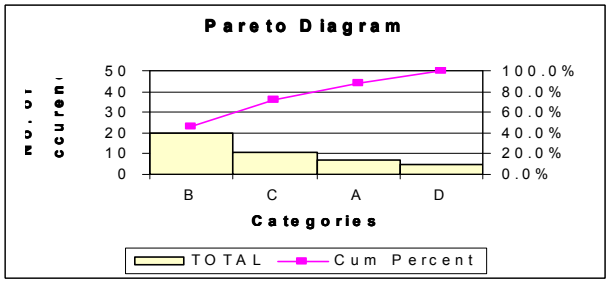
Results

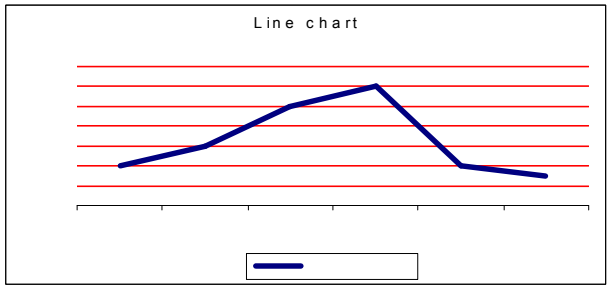
- Verified improvements measured
- Customer satisfaction results evident

Institutionalization

- Improvements sustainable and permanent







The Problem Solving Analysis Tools

Tool 1 – Tally Sheet

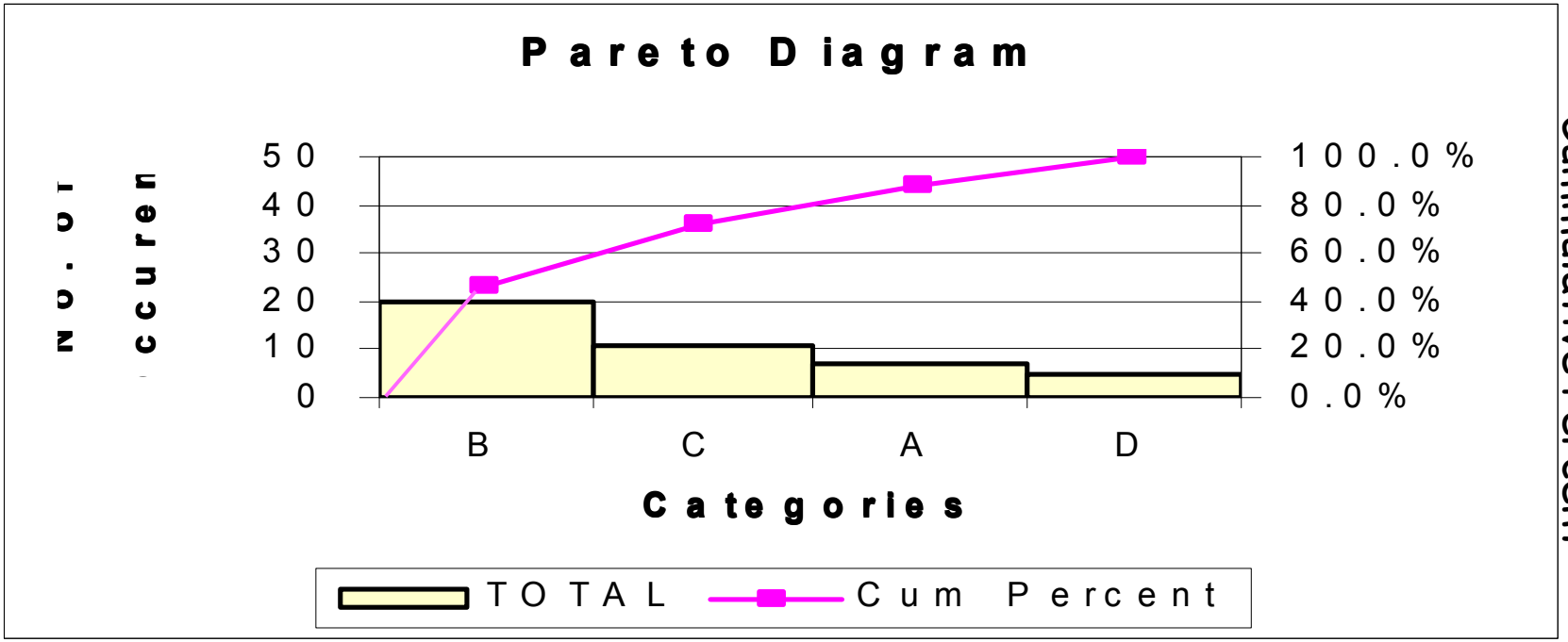
	A	B	C	D	TOTAL
1			////		4
2		///// /////			10
3					
4					
5	//	///// //			9
6			///		3
7				/////	5
8	/////		////		9
TOTAL	7	17	11	5	40

To analyze the situation and look at important questions.

<u>Uses</u> :

- **To grasp the past and present situation**
- **To stratify**
- **To grasp the changes through time**
- **To confirm the standard**

Tool 2 - Pareto Diagram

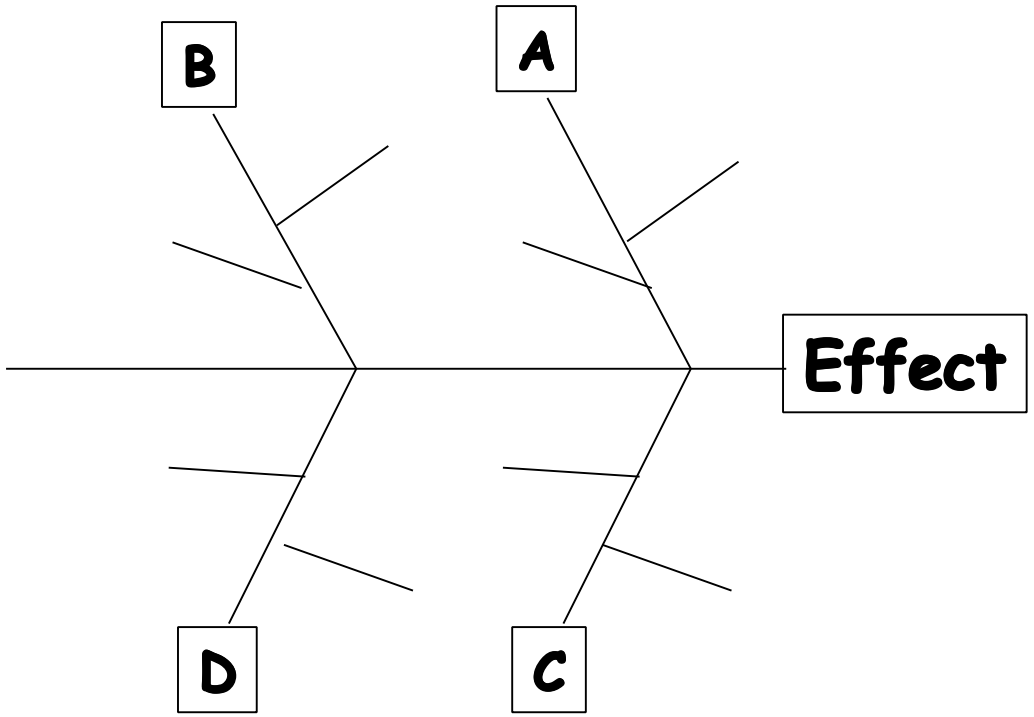


From the tally sheets, identify the few main problems to tackle.

<u>Uses</u> :

- **To grasp the problem better**
- **To grasp the past and present situation of the problem**
- **To stratify**
- **To confirm the improvement results**

Tool 3 - Cause and Effect Diagram

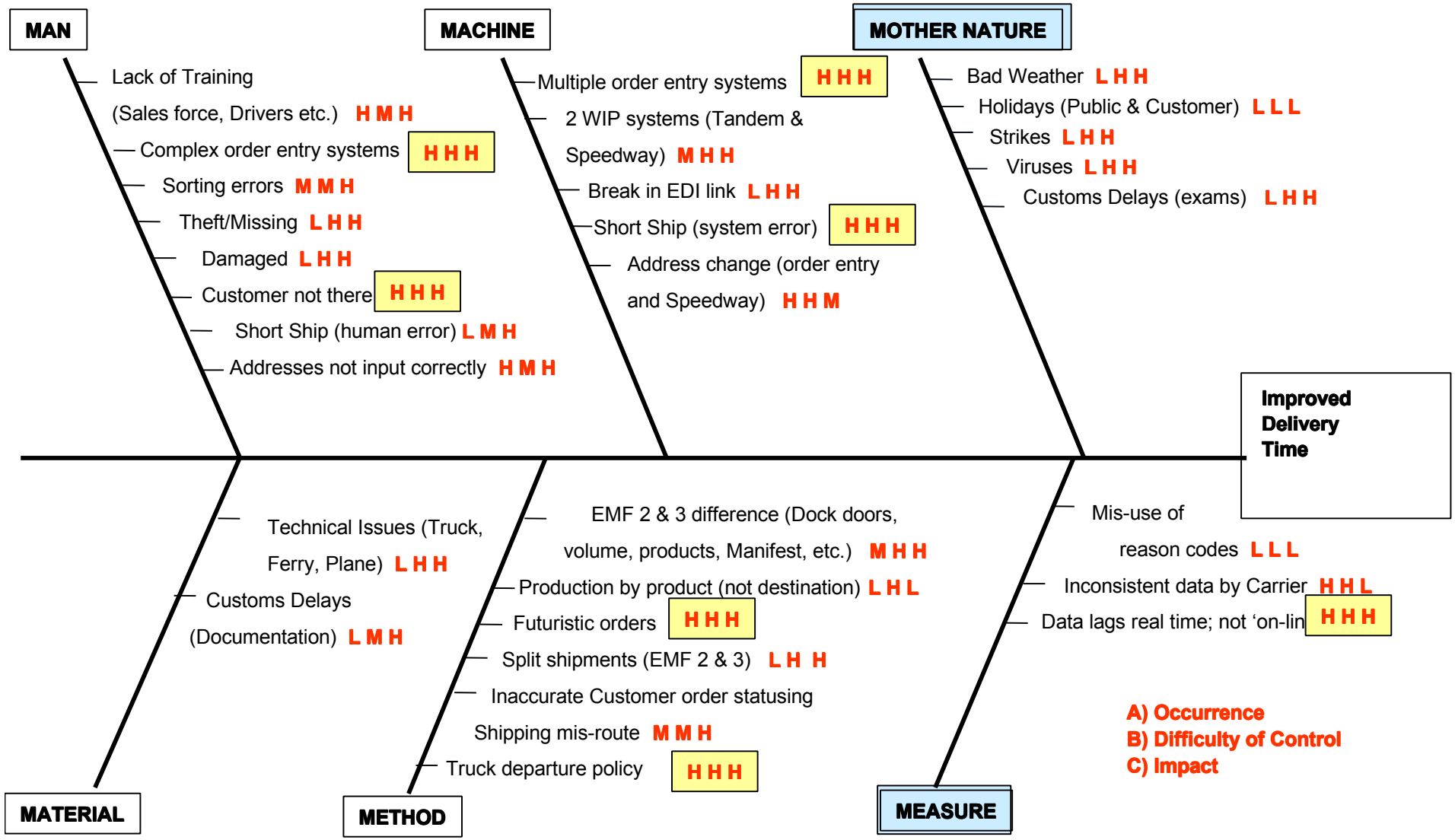


The Effect (results which is influenced by the main factors or Causes) are placed in a fish bone diagram. Using this diagram will help to identify the real causes

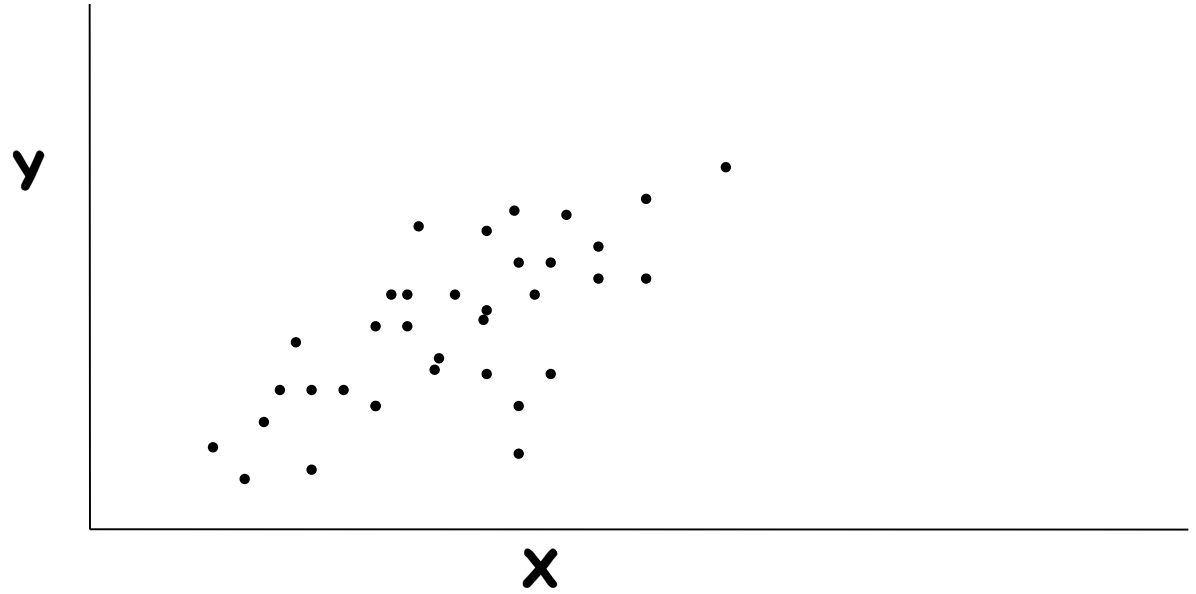
<u>Uses</u> :

- **To grasp the causal relationship between cause and effect**
- **To stratify**
- **To analyze the possible causes**

BPI Project Example
Analyze: Root Cause and Proposed Solutions



Tool 4 - Scatter Diagram



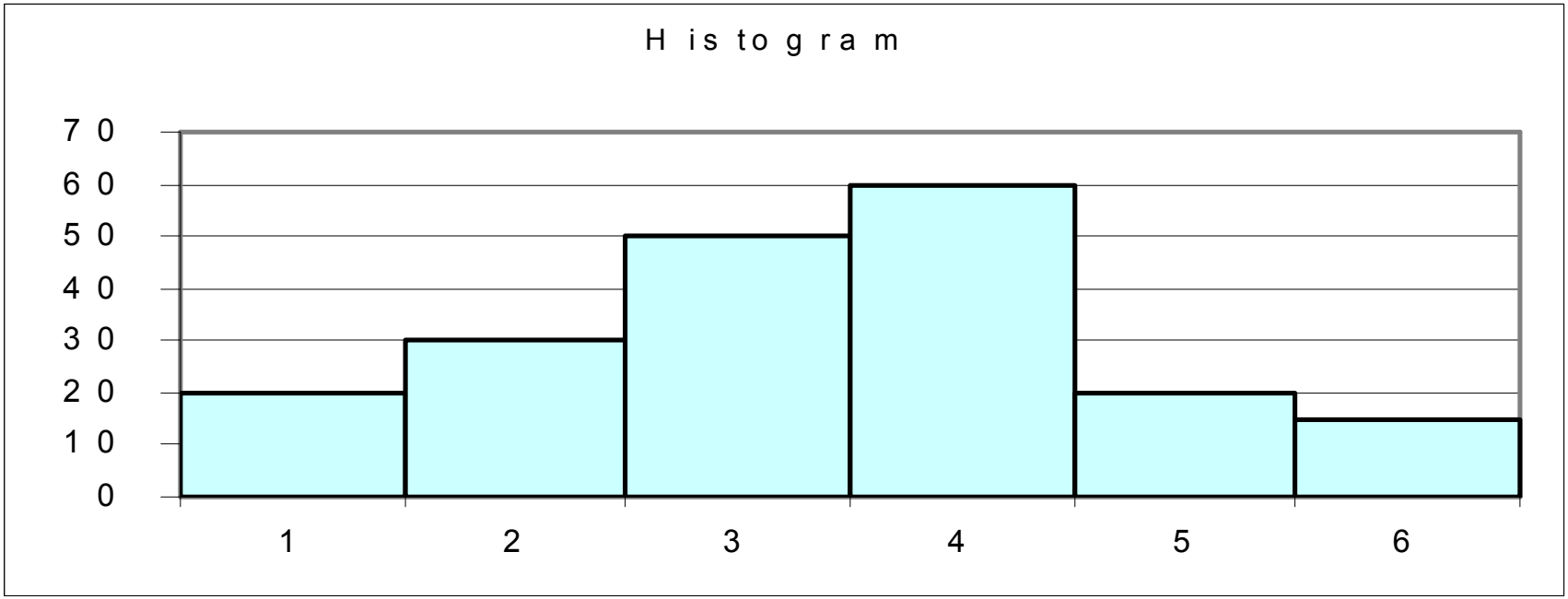
To study the correlation between X and Y

Utilizing two sets of data to plot them onto the vertical axis and horizontal axis. From the analysis of the situation, we can see the congenial relationship of the data

<u>Uses</u> :

- **To grasp the past and present situation**
- **To grasp the correlation**

Tool 5 – Histogram

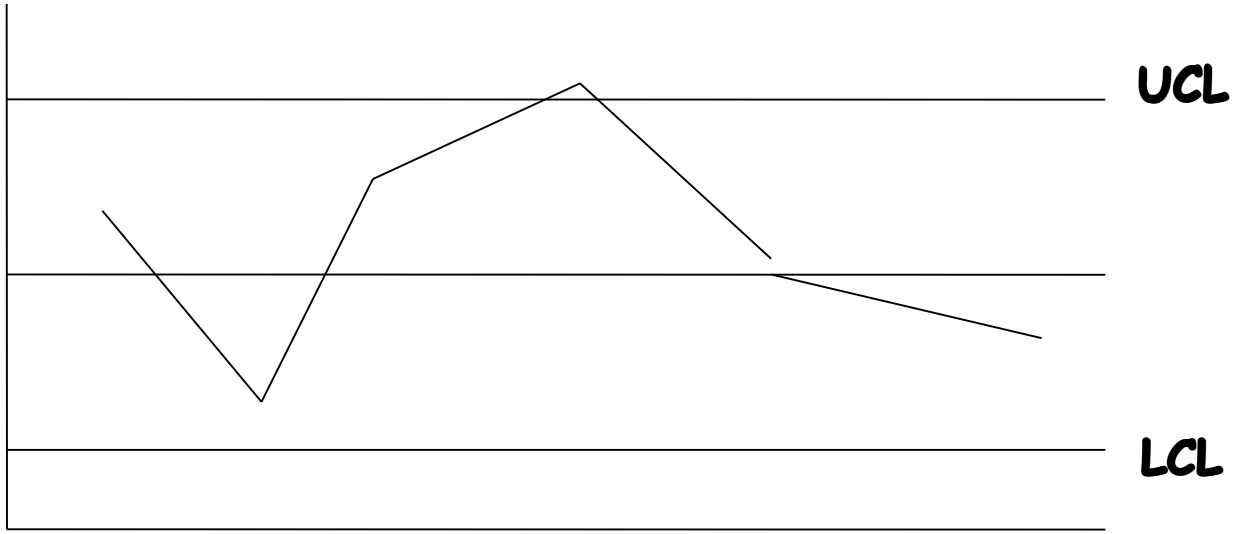


Data has a tendency to be centered upon a maximum of large numerical value, and from there it spreads out, gradually decreasing. The analysis of the situation is placed in columnar form

<u>Uses</u> :

- **To grasp the past and present situation**
- **To stratify**
- **To identify the extent of the problem**
- **To confirm the improvement results**

Tool 6 - Control Charts

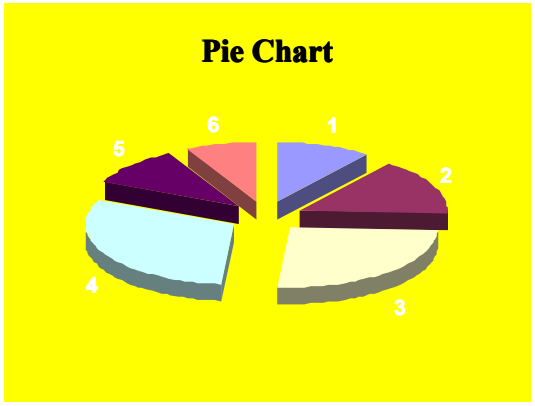


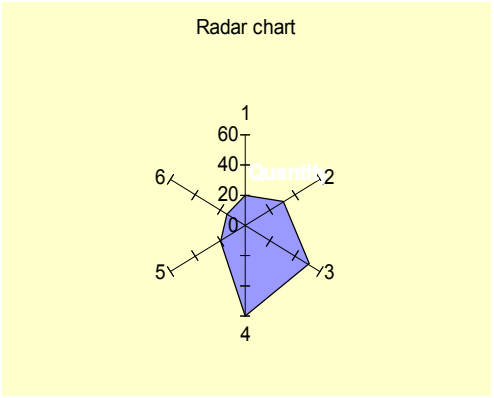
A line graph used to grasp the variation in the data which is entered through planning the control limit lines of a centre line, an upper control limit and a lower control limit.

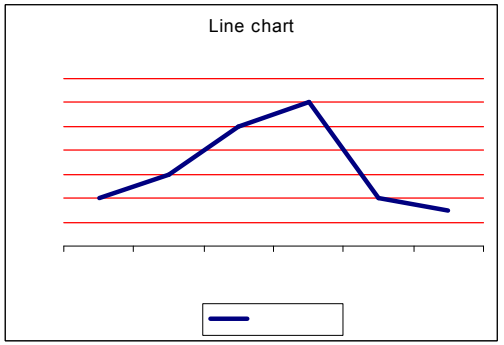
<u>Uses</u> :

- **To discover the variables**
- **To grasp the control situation**

Tool 7 – Graph





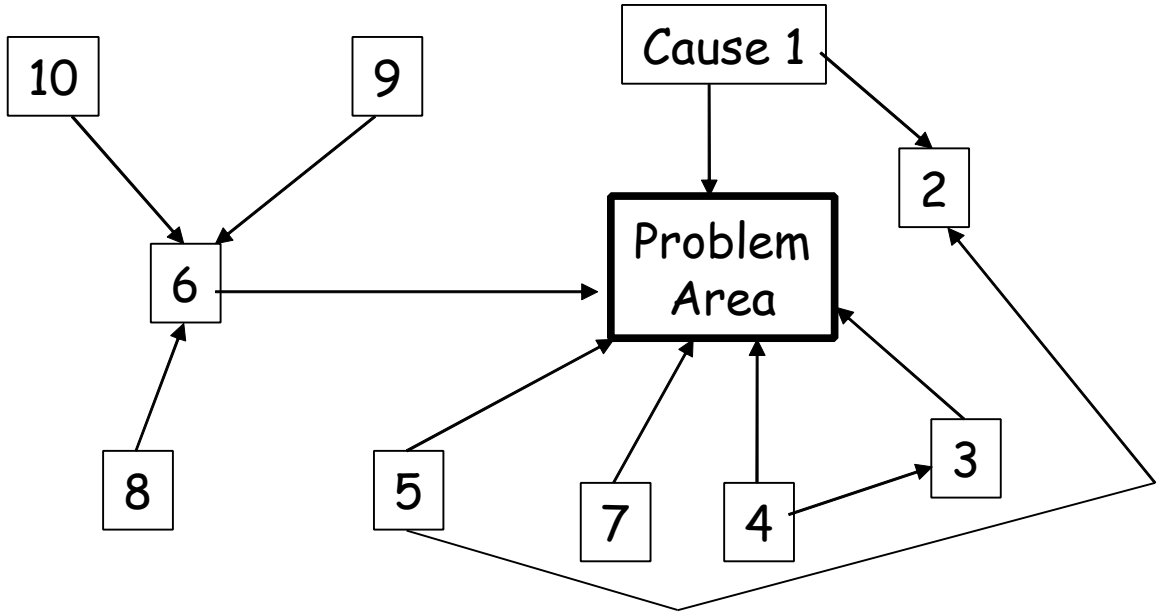


Useful information about control and improvement is plotted onto diagrams which are visual and easily comprehensible. Column graphs, line graphs, pie charts, belt charts, radar charts and others.

<u>Uses</u> :

- **To analyze the cause**
- **To record the time and contents**
- **To record the time and schedule control**
- **To grasp the large and small numbers and time changes**
- **To track trend**

Tool 8 - Relations Diagram



To solve problem by rationally seeing the relationship between "Cause – Results", and "Objective – Measures", where complicated circumstances are interwoven into the problem

<u>Uses</u> :

- **To grasp the causal relationship between cause and effect**
- **To grasp the relationship between objectives and measures**
- **To grasp the problem areas**

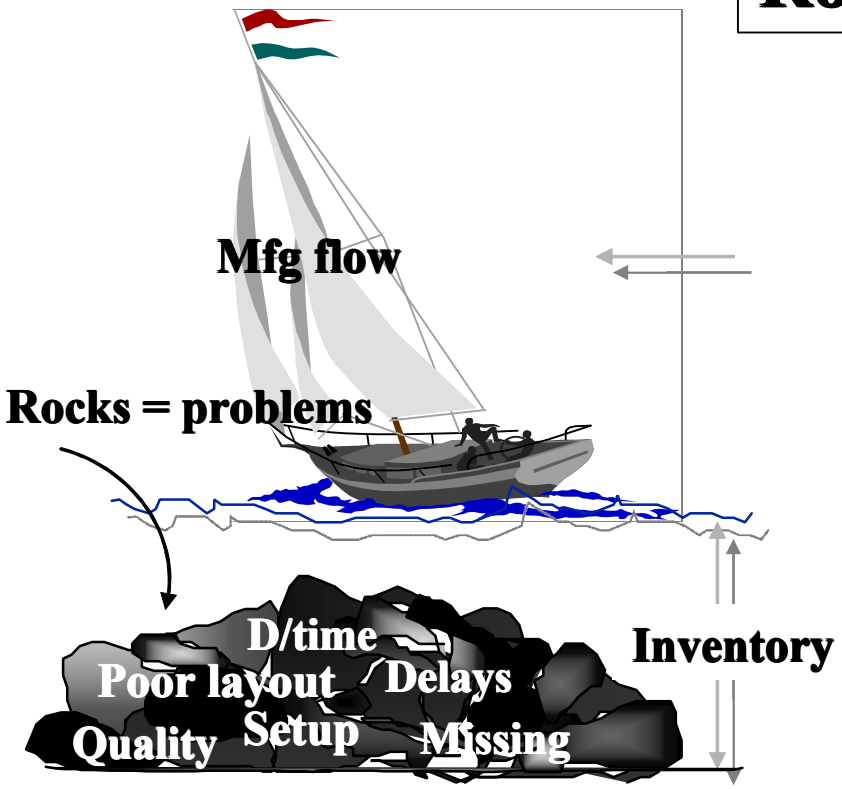
The Problem Solving Technique
Enforced Problem Solving

Enforced Problem Solving

Concept

"Purposely seek and expose the problems so that they get attention to fix them"

Rocks in the River



Two Choices

to keep the sailboat afloat and keep moving forward :-

A. Increase water level

or

B. Lower the water level to uncover the rocks and break them up

Enforced Problem Solving

6 Ws and 2 Hs

Look at current processes, systems, methods and ask questions!

6 W

- Why
- What
- Where
- When
- Who
- Which

2 H

- How
- How many

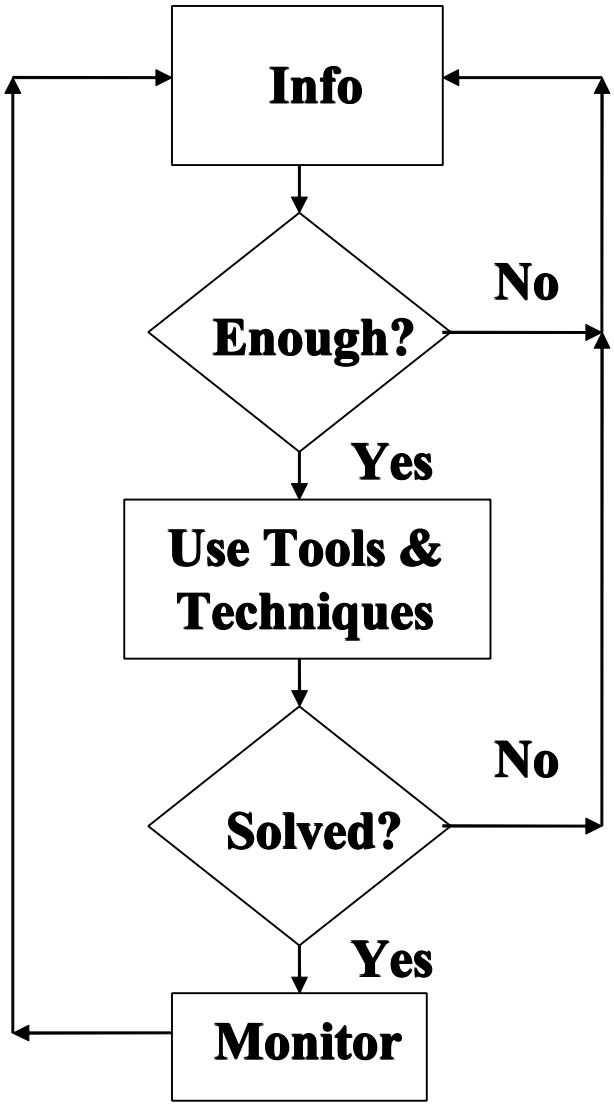
Problem Solving Process
Key Components

Thinking Process

Questioning & Listening - key skills

Tools/techniques

Problem Solving Process



It's about information processing.
It is about getting the right information!!

Thinking and Action Process

Input → **Process** → **Action** → **Results**

- **Input**: Information, Experience, Judgment, Knowledge
- ***Thinking***: Gather, Sort, Organize, Analyze, Confirm
- **Action**: Creativity, Decision Making, Speed of Execution
- **Results**: Concern Resolved

Questioning & Listening Skills

Making decision and taking action are critical to learning and understanding the problem resolution

The Human Side of Problem Solving

Team Member Interaction Styles

The Power of Group Diversity

Contributors

People who concentrate on individual, task-oriented effort

- Synthesize ideas
- Assess risks
- Summarize process status
- Provide expertise

Collaborators

People who see the big picture, the ultimate goal of the team

- Set standards/rules
- Generate ideas
- Test ideas
- Negotiate solutions

Communicators

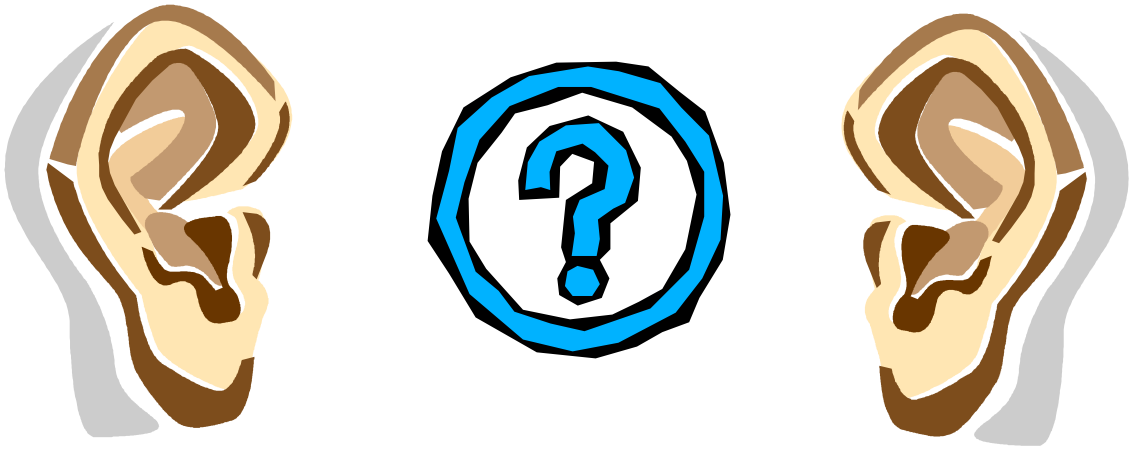
People who ensure everyone's views are expressed and keeps everyone talking

- Encourage participation
- Provide compromise
- Reflect feelings
- Support others

Challengers

People who question the leaders and members to keep the team on track

- Provide ideas
- Criticize answers
- Defend ideas



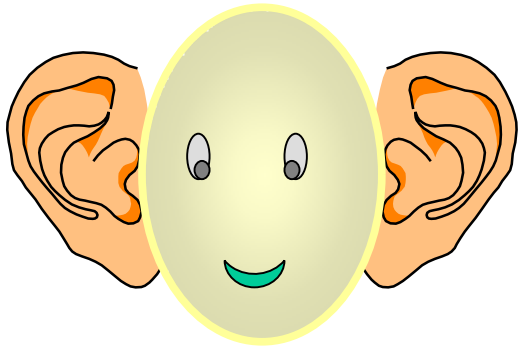
The Human Side of Problem Solving

Communications

Communication Skills

Questioning

Unraveling the unknown



Listening

Building trust and respect

Learning from others

Questioning

Unraveling the unknown

Problem Solving Skills
Questioning

Questioning Is a Key Skill

Success in process depends on using a systematic approach and asking questions effectively

Effective questions understand :

- **Intent behind their questions**
- **The assumptions they have made**
- **The importance of choosing words carefully**
- **Where they are likely to get the answers**

Characteristics of an effective question

- **Clear**
  - **for easy communication**
- **Relevant**
  - **to the time and topic in discussion**
- **Specific**
  - **to the point in discussion**

Types of Questions and Uses

- **Open –** ***to explore, understand further, solicit information***
  - **Begin with What, When, How, Which, Where, Why, Who**
  - **Require explanation/description in the answer**
- **Closed –** ***to confirm agreement, to move on to next topic***
  - **Lead to a yes or no answer**
  - **Elicit only the answer to that specific question**
- **Reverse –** ***to clarify, evaluate ideas,/views, seek ideas/opinions***
  - **Asking back the question and getting associates to think for themselves**
- **Leading –** ***direct flow to desired direction***
  - **Indicates the desired/expected response**

Other Types of Questions and Uses

- **Reflecting/Restatement**
  - **Encourages expansion of the point**
- **Request**
  - **Specifies what expansion you need**
- **Probing**
  - **To further understand the issue or situation**

Probing Questions

- **5Ws + 1H**
- **Why 5X**

The Problem Solving Techniques and Tools

Brainstorming Technique

Brainstorming – getting maximum group participation

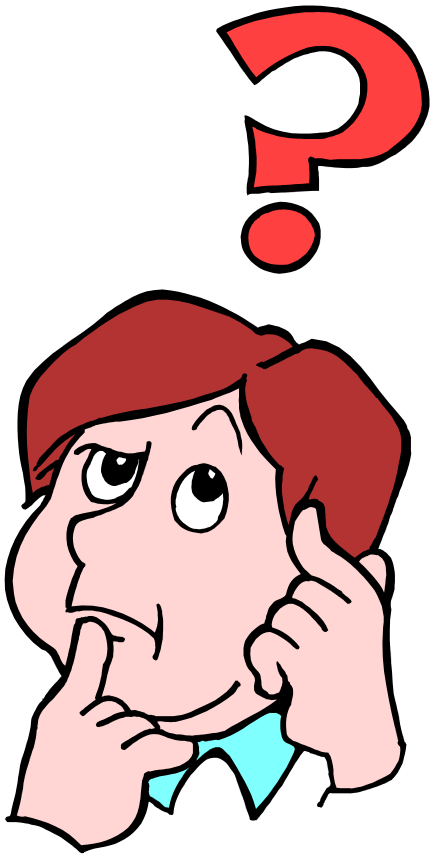
"The best way to get a good idea is to get a lot of good ideas" – Linus Pauling

- **Use for generating alternative solutions to a problem**
- **Leader describes the problem**
- **Everyone takes a few minutes to think**
- **Capture ideas visibly**
- **Group or categorize ideas (eg. use fish bone daigram)**
- **Lastly, evaluates the best ideas**

Rules :

- **Go for quantity**
- **Allow for the absurd. Fantasy etc**
- **Do not criticize, challenge, question or pre-judge idea yet**
- **Piggy back on each idea**
- **Use open-ended questions to stimulate more ideas**
- **Go round fast when seeking ideas**
- **Encourage full participation – round robin technique**
- **Write ideas visibly (on flip chart)**

Problem Solving & Decision Making Process



Brainstorming Technique

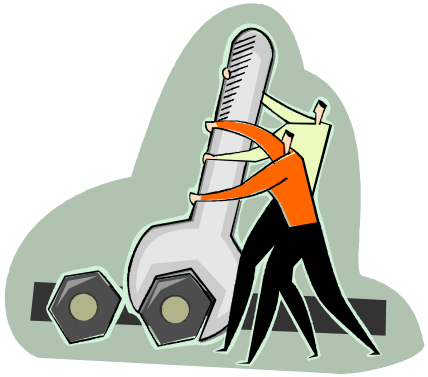
Case 1

How to make Dell a better workplace?

Case 2

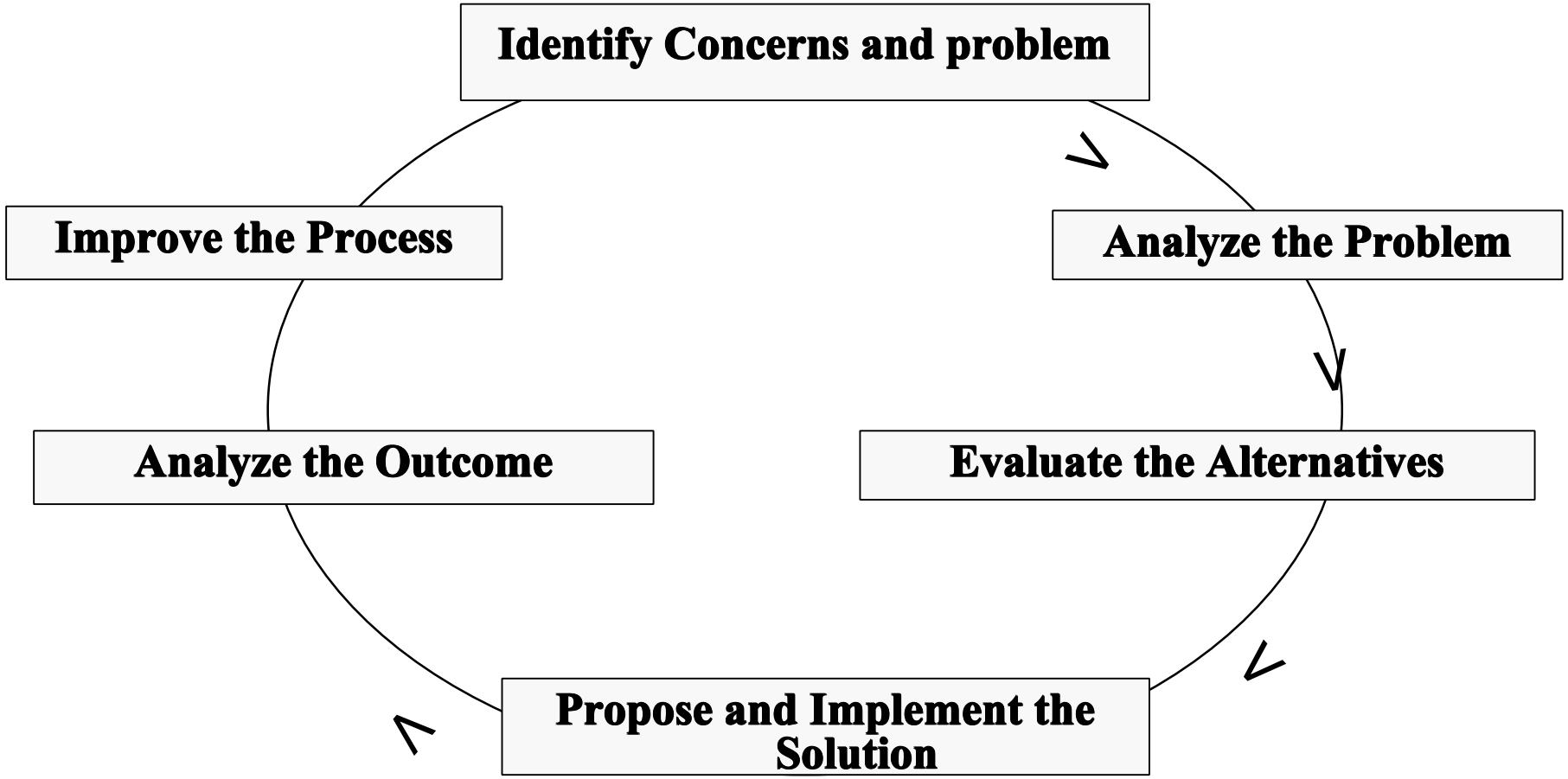
How to make myself enjoy the work I am doing and the time I spent in Dell.

Time : 15 min

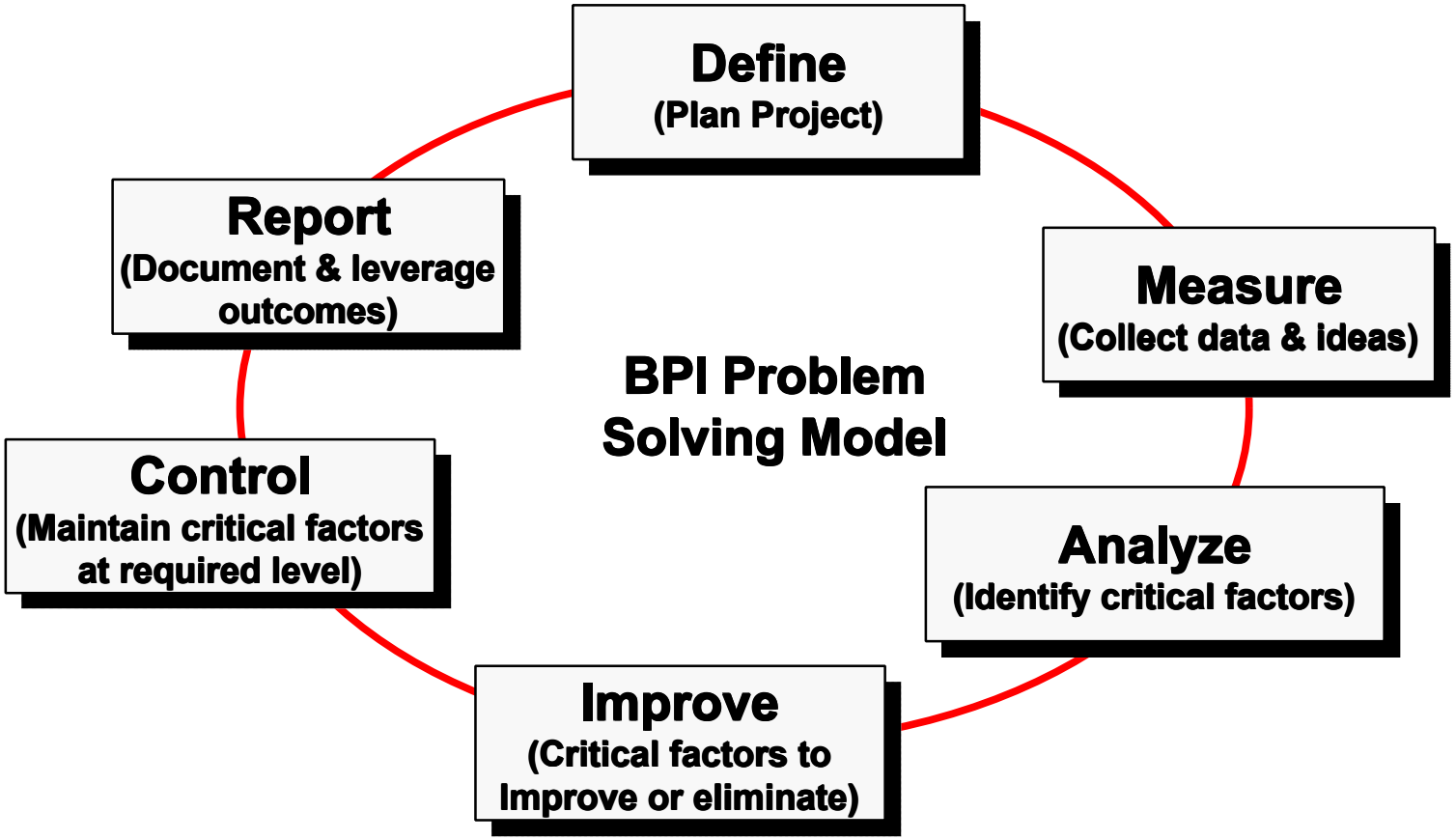


The Various Problem Solving Methodologies

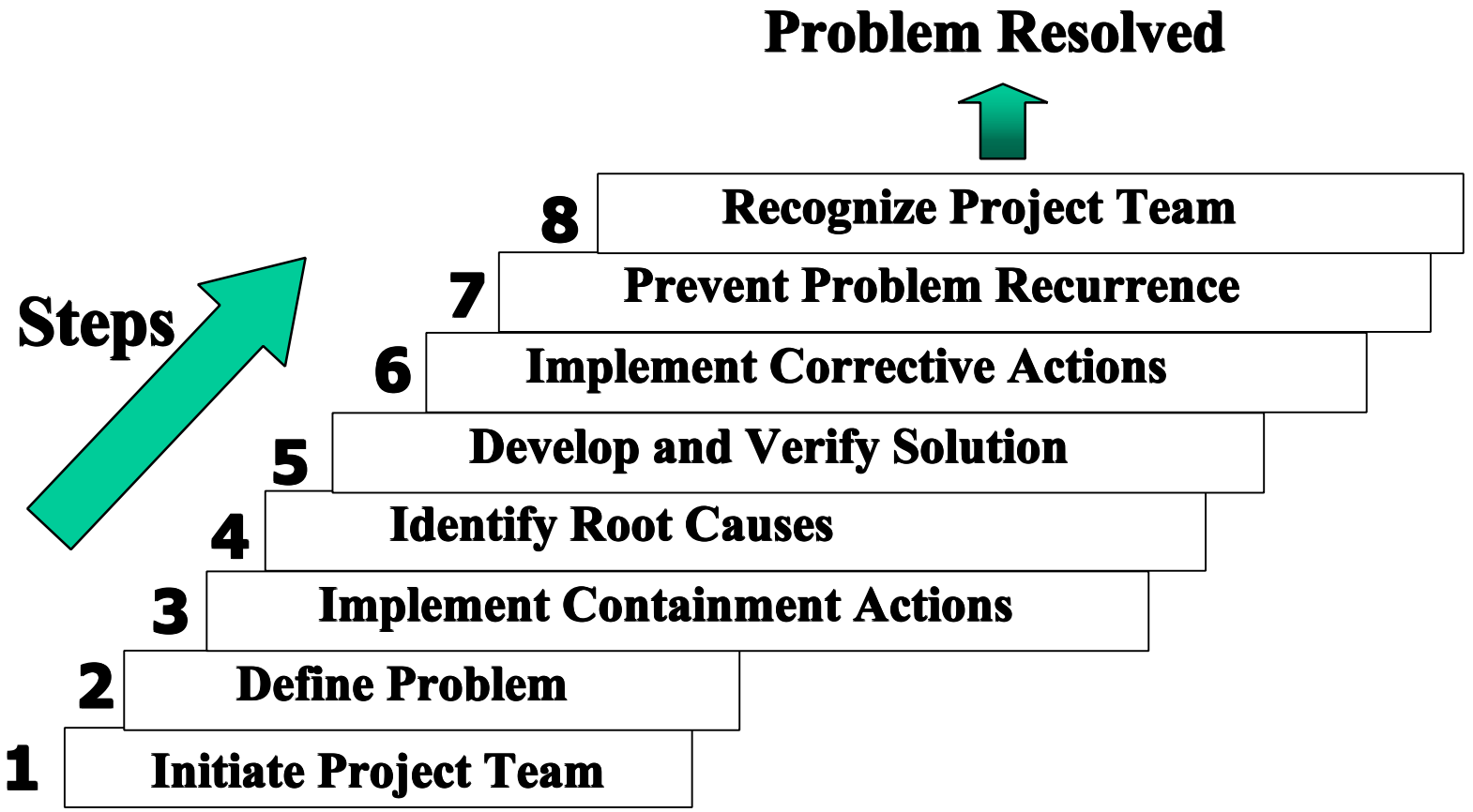
The Six Step Problem Solving Model



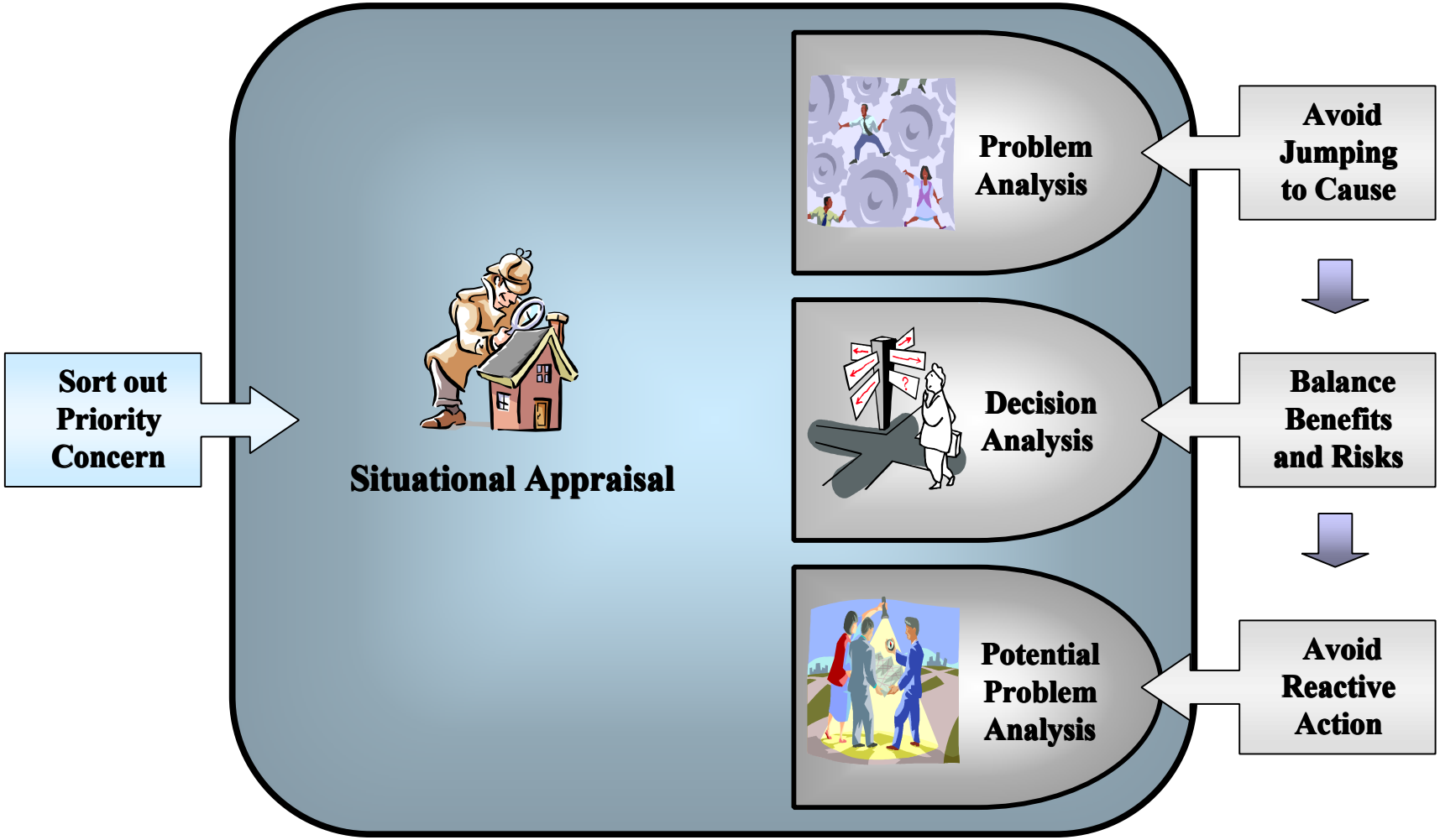
The BPI Problem Solving Process



Ford 8 D Problem Solving



Kepner-Tregoe Problem Solving and Decision Making Process



Problem Solving & Decision Making Model

Situation Appraisal

1. Identify concerns or issue

Problem Analysis

2. Analyze the problems

Decision Analysis

3. Generate and evaluate alternative solutions
4. Propose and Implement Solution

Potential Problem Analysis

5. Analyze the outcome
6. Improve the process

Tools At Each Step

1. Identify Concerns and problem

Check Sheet, Yield Log Sheet
Pareto Diagram
Questioning Techniques

2. Analyze the Problem

Stratification, C&E diagram, Histogram
Relationship diagram, Force Field Analysis
Questioning, Brainstorming Techniques

3. Evaluate the Alternatives

Evaluate alternatives tool, Prioritization tool,
Criteria (requirements, objectives) evaluation tool,
Experiment or simulation, Questioning Techniques

4. Propose and Implement the Solution

Solution Creation Tool
Action Planning Tool
Gantt Chart

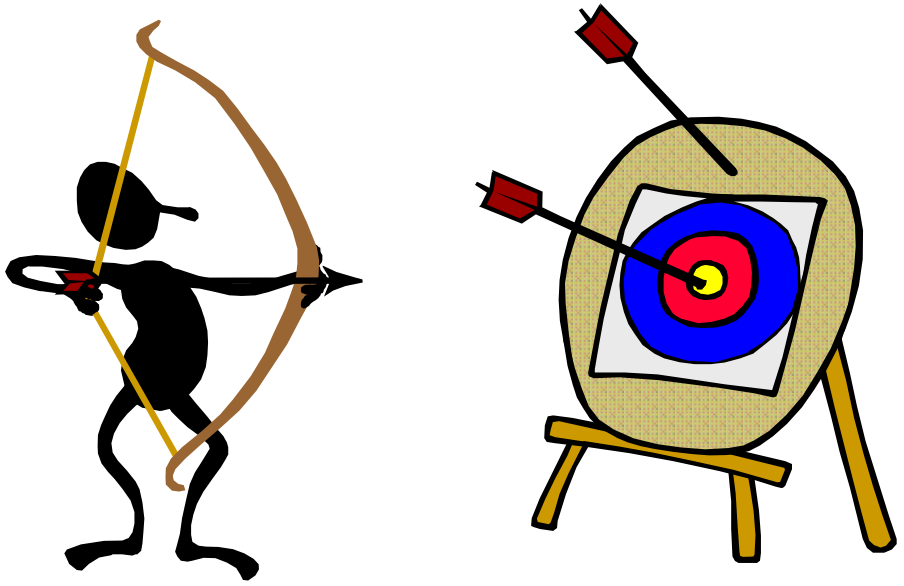
5. Analyze the Outcome

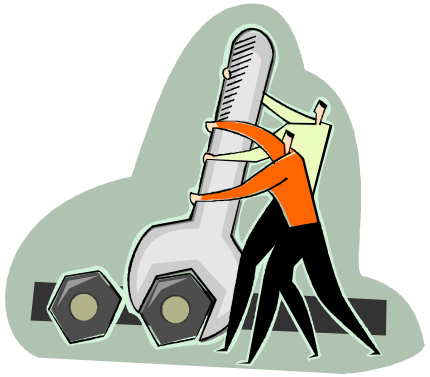
Trend chart, Control Chart,
Paired Pareto diagram, Paired Histogram,
Radar Chart, Graphs, Scatter Diagram
Improvement Analysis tool

6. Improve the Process

Trend chart, Control chart

The power is not the tool
but
the power is in the tool





Problem Solving

Key to Continuous Improvement

Thank You