8 Step Problem Solving Method

- Deepen your awareness of the importance of the 8 step process to effective problem solving
- Apply the process to your own work situation during class discussion
- Experience how the A-3 tool communicates the process thinking
- Apply in the work environment that will work both in the field and in the on-campus lab

Learning Goals

8 Step Problem Solving Process

- Step 1: Define the problem
- Step 2: Gather data
- Step 3: Analyze the data
- Step 4: Identify root causes
- Step 5: Develop solutions
- Step 6: Implement solutions
- Step 7: Monitor results
- Step 8: Standardize improvements
Be adaptable to the work process needs—take action quickly
If necessary, use TEMPORARY measures
-when a problem occurs, take action quickly
Keep at it until TRUE countermeasures are in place
- that which if implemented prevents problem from returning

**Speedy Action in a Timely Manner**

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**Temporary Measure Example**

**Difference between “Temporary Measure” and “Countermeasures”**

- Machine over travels
  - Why?
  - Limit switch not activated (Fact)
  - Temporary measure: Replace the limit switch
  - Prevents the recurrence

- Limit switch Arm is Frozen (Fact)
- Limit switch is in Coolant air flow
- Root Cause
- (Countermeasure) Shield limit switch from coolant

---

**Temporary Measure**

Action to stop or contain the problem--can add necessary extra work to the process.
(+ $ / + ‡ / + ød)

- When a problem occurs, take action quickly
- Purpose is to contain the problem, not solve it.
Select the optimal containment action on the following criteria:

- Simplicity
- Minimal modification to current process
- Time to implement

<table>
<thead>
<tr>
<th>Option</th>
<th>Simplicity</th>
<th>Minimal Modification</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

Rate each option relative to each other for each criteria. Sum the scores and select the option with the highest score.

**Short-Term Containment**

**Temporary Measure Implementation Plan**

**A problem is ...**
The current situation gap to the standard = PROBLEM
- Fact based
- Discovery driven

**What Defines a problem in the 8 Step method?**
**Non Value Added Work = Waste**

- Waste is any factor which does not contribute to the process by adding value.

- The goal of Lean is to eliminate any factors which raise cost without adding value to the product.

---

**The 7 Wastes!**

1. Overproduction
2. Inventory
3. Transportation
4. Motion
5. Quality Defects
6. Waiting
7. Over Processing

---

Would you like to work in this place?
What Defines a Problem in the 8 Step Method?

8 Step Process for Problem Solving

• See handout

Example of Problem A-3 Report
Step 1 - Clarify the Problem

1. Clarify the “Ultimate Goal” of your responsibilities & work
2. Clarify the “Standard” of your work
3. Clarify the “Current Situation” of your work
4. Visualize the gap between the “Current Situation” and the “Standard”

Visualize the gap between the “Current Situation” and the “Standard”

Process 1. Clarify the “Ultimate Goal” of your responsibilities & work

Ultimate Goal
To provide customers with highly functional and high-quality cars at reasonable prices in a timely manner

My job’s purpose
To meet customer demand

My work & Responsibilities
To meet Production Plans
1. Clarify the Problem

Ultimate Goal: Assure TMMK cars meet customer requirement for quality
Standard: Zero audit defects from sealer area
Current Situation: 7 water leaks on 7/28

Example: Step 1

1. Clarify the Problem

Ultimate Goal: TMs are compensated for work completed and paid timely and fairly
Standard: 100% (3300) of TM's paychecks are deposited error free
Current Situation: 80% (2640) of TM's paychecks are deposited error free

GAP
20% (600) paychecks
Need a manual check
To correct errors

Example: Step 1

8 Steps

Step 1. Clarify the problem
Step 2. Break down the problem

Proceedings

(1) Break down the problem
(2) Identify the prioritized problem
(3) Specify the point of occurrence by checking the process through GENCHI GENBUTSU

Step 2 - Break Down the Problem
Step 2 - Break Down the Problem

- Formulating a clear, concise statement from your Gap
- The statement describes the difference between the standard and current situation
- During this step, break the large problem into smaller, more specific problems
- If you can’t describe it, you can’t solve it!

Step 2: Break Down the Problem

Narrow the problem sufficiently
Classify and quantify

1 Water leaks
7 on Avalon
6 on Camry

Vehicle Type

1 in Mohican
5 Tail light
1 side

Process

Many water leaks in the tail light
Priority decision: tackle the biggest impact problem FIRST

Step 2 - Break Down the Problem
Step 2 - Break Down the Problem

Classify Then Quantify

3% increase in SCRATCHES found on vehicle at Final Inspection

Left Door= 95%
Right Door= 5%
Hood= 0%
Trunk= 0%
Roof= 0%
80% Window Frame
15% Door Handle
5% Side Pnl

Prioritized Problem

Left=95%
Right=5%
Roof=0%
Hood=0%
Trunk=0%

The point of occurrence (POO) is the actual work element at the physical location where the problem is first seen.

For example, walk the line back. Check each work station, until you arrive at the station where the problem is no longer seen.

8 Step Problem Solving
(Locate Point of Occurrence)

Locate Point of Occurrence (POO)
**Step 2 - Break Down the Problem**

*Why is Point of Occurrence important?*

For efficient use of time & effort

Where is Point of Occurrence?

**Prioritized Problem at the Point of Occurrence**

---

Go and See Investigation for Point of Occurrence

1. Floor Brush—Finish lower seam in end panel
2. Engine Room Finish—Finish the area just above and below the tail light

---

**Example: Step 2**

20% (660/3300) manual checks being issued

- Group Leader Error 35% (231/660)
- Other 23% (151/660)
- Salary Continuation 42% (277/660)

---

**Example: Step 2**

Problem: FMLA paperwork is not received from TMR by the payroll deadline.
**Step 3 - Set a Target**

- Make a commitment
- Set measurable, concrete and challenging targets

---

**Example: Step 3**

Target: Eliminate 5 tail light area water leaks on Camry by 7/29
Example: Step 3

3. Target Setting

Target: Eliminate 100% late submissions of FMLA forms to meet payroll deadline by arch 2009. (193 of 660 total gap)

Example through Steps 1, 2, & 3

1. Clarify the Problem
2. Break Down the Problem
3. Target Setting

Ultimate Goal:

No water leaks in TMMK produced cars

Ideal Situation (Standard):

Zero audit defects from Sealer area

Current Situation:

7 water leaks on 7/28

Go and See Investigation for Point of Occurrence

1) Floor Brush -- Finish lower seam on end panel
2) Engine Room Finish -- Finish the area just above and below the tail light

Target:

Eliminate 5 tail light area water leaks on Camry by 7/29

1. Clarify the Problem

3. Target Setting

2. Break Down the Problem

Engine Room
Floor Brush
Trunk Brush
2nd Application

Engine Room Finish
1st Application

Finish Rear Hood
Mirror Plate
Finish Upper End Panel
Finish Side Tail Light
Finish below tail light
Finish Hood Corner

7 Water Leaks
Actual
Prioritized Problem

Many water leaks in the tail light Process

1 on Avalon
6 on Camry
Vehicle Type

7 Water Leaks
Actual
Prioritized Problem

2640 Manual checks being issued
100% (3300) of TM’s paychecks are deposited error free

20% (660/3300) manual checks being issued
80% (2640) of TM’s paychecks are deposited error free

Group Leader Error
35% (231/660)

Other
23% (151/660)

Salary Continuation
42% (277/660)

STD Not Paid
30% (83/277)

FMLA PTO Not Paid
70% (193/277)

Time Execution
61% (142/231)

Other
39% (90/231)

Current Situation:

100% (3300) of TM’s paychecks are deposited error free

Target:

Eliminate 100% late submissions of FMLA forms to meet payroll deadline by March 2009. (193 of 660 total gap)
Example through Steps 1, 2, & 3

8 Steps

Step 1: Clarify the problem
Step 2: Break down the problem
Step 3: Set a target
Step 4: Analyze the Root Cause

1) Examine the Point of Occurrence and think of possible causes without prejudice
2) Gather facts through GENCHI GENBUTSU and keep asking “Why?”
3) Specify the root cause

Step 4) Analyze the Root Cause

Prioritized Problem at the Point of Occurrence
Time for WHY

Think of all meaningful possible causes
Go and See to confirm
Repeat
Step 4 - Analyze the Root Cause

(Example) Bad polishing of painted parts

Man (Human):
Standard work being followed?

Machine:
RPMs correct?

Material:
Correct compound?

Method:
Polishing standard correct?

Environment:
Work place temperature correct?

Step 4 - Analyze the Root Cause

Example: Welding robot stops in the middle of its operation.

Why? A fuse in the robot has blown.
Why? Circuit overloaded.
Why? The bearings have damaged one another and locked up.
Why? There was insufficient lubrication on the bearings.
Why? Oil pump on robot is not circulating sufficient
Why? Pump intake is clogged with metal shavings.
Why? No filter on pump intake (as designed)

Step 4 - Analyze the Root Cause

*Apply the “therefore” test to check thinking

Example through Step 4

Step 4 - Analyze the Root Cause
**4. Root Cause Analysis**

FMLA paperwork is not received from TMR by the payroll deadline

- Form doesn’t pass review
- Form was submitted incorrectly
  - Part “D” not complete
  - T/M thought HR was to complete
  - Instructions not clear in Part “D”

*Apply the “therefore” test to check thinking

**Example through Step 4**

**Step 4 - Analyze the Root Cause**

1. Examine the point of occurrence and think of possible causes without prejudice
2. Gather facts through GENCHI GENBUTSU and keep asking “Why?”
3. Specify the root cause

**Step 5**

1. Develop as many potential countermeasures as possible
2. Select the highest value added countermeasures
3. Build consensus with others
4. Develop a clear and detailed action-plan

**Example Step 4**

**Step 4: ID Root Cause**

“WHY” is this POC happening... (Problem Tree)

- Prioritize Problem at the POC: Why is it happening?
- Therefore
- WHY
- Therefore
- WHY
- Therefore
- Root Cause

**8 Steps**

<table>
<thead>
<tr>
<th>Step 1. Clarify the problem</th>
<th>1. Clarify the “ultimate” of your work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2. Break down the problem</td>
<td>2. Clarify the “current situation” of your work</td>
</tr>
<tr>
<td>Step 3. Set a target</td>
<td>3. Visualize the gap between the “current situation” and the “standard”</td>
</tr>
<tr>
<td>Step 6. Analyze the root cause</td>
<td>4. Make a commitment</td>
</tr>
</tbody>
</table>

**Step 5) Develop Countermeasures**

- Develop as many potential countermeasures as possible
- Select the highest value added countermeasures
- Build consensus with others
- Develop a clear and detailed action-plan
Procedure for developing countermeasures

Step 5 - Develop Countermeasures

<table>
<thead>
<tr>
<th>Countermeasure with the highest value-added</th>
<th>Is it effective?</th>
</tr>
</thead>
</table>

Step 5 - Develop Countermeasures

Select the highest value added Countermeasures

Evaluate all potential Countermeasures

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Truly eliminates the Root Cause</th>
<th>Move the Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost/Manpower</td>
<td>The cost and time</td>
<td>Number of people required to implement/to sustain</td>
</tr>
<tr>
<td>Risk</td>
<td>The risks when implementing</td>
<td>Safety? Quality? Workability?</td>
</tr>
<tr>
<td></td>
<td>Impact on other previous or following processes</td>
<td></td>
</tr>
</tbody>
</table>

Step 5 - Develop Countermeasures

Build consensus with others

Present to management for approval to go forward—A-3 format is a standardized and efficient tool

• Explain and discuss plans with all relevant parties
• Set up a cross functional committee
• Organize the meeting to present the analysis and countermeasure ideas/plans
• Hold update meetings to share latest info/progress

Note: thru Process step 5, planning phase is completed

Step 5 - Develop Countermeasures
Step 5 - Develop Countermeasures

Make an evaluation matrix: Countermeasure for assembling mismatched parts

- **Factors**
  - Change parts color
  - Change parts shape
  - Change sequence of operation

<table>
<thead>
<tr>
<th>Options</th>
<th>Risk</th>
<th>Technical difficulty</th>
<th>Quality problem</th>
<th>Safety problem</th>
<th>Workability</th>
<th>Problems to other processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change parts color</td>
<td>△ △ △ ○ ○</td>
<td>△</td>
<td>△</td>
<td>△</td>
<td>△</td>
<td>△</td>
</tr>
<tr>
<td>Change parts shape</td>
<td>△ △ △ △ △</td>
<td>△</td>
<td>△</td>
<td>△</td>
<td>△</td>
<td>△</td>
</tr>
<tr>
<td>Change sequence of operation</td>
<td>○ △ △ △ △</td>
<td>△</td>
<td>△</td>
<td>△</td>
<td>△</td>
<td>△</td>
</tr>
</tbody>
</table>

Confirm the facts by interviewing related people and departments.

**Step 5 - Develop Countermeasures**

Develop a clear and detailed action-plan

When creating the action-plan, be sure to clearly identify the four W's of the countermeasures:

- **Who**
- **What**
- **Where**
- **When**

**Example: Action Plan**

- Determine the best color for parts per model
- Prepare trial parts
- Discuss color
- Discuss and decide in a team meeting
- Request to prepare
- Confirm test results
- Report to managers
- Test by using trial parts

Clarify the roles and responsibilities of people and departments involved:

Keep updates (points to be checked) through reporting, informing, and consulting.

Clarify the schedule and order of actions to implement:

When creating the action-plan, be sure to clearly identify the four W's of the countermeasures:

- **Who**
- **What**
- **Where**
- **When**
Example: Step 5

<table>
<thead>
<tr>
<th>Options</th>
<th>Effectiveness</th>
<th>Budget</th>
<th>Speed</th>
<th>Quality</th>
<th>Overall Assessment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

Step 5. Countermeasure Options & Evaluation

Effectiveness

- X: Very effective
- O: Effective

Budget

- O: Low
- O: Moderate
- O: High
- O: Very high

Speed

- O: Fast
- O: Moderate
- O: Slow
- O: Very slow

Quality

- O: Excellent
- O: Good
- O: Average
- O: Poor

Overall Assessment

- X: Excellent
- O: Good
- O: Average
- O: Poor

Comments

- Create awareness of enhancement
- Help T/Ms who review board
- Not helpful at home
- Would document enhancement as new standard
- Dependent on T/M reading it
- Verbally communicate the enhancement
- Cannot ensure that T/M will remember the instructions if not written down
- Would document enhancement as new standard while confirming the instructions

Step 6 - See Countermeasures Through

8 Steps

1. Clarify the problem
2. Break down the problem
3. Set a target
4. Analyze the root cause
5. Develop countermeasures

Proceedings

1. With all members united, implement countermeasures with speed and persistence
2. Share information with others by informing, reporting and consulting
3. Never give up, and proceed to the next step quickly
1. Concentrate efforts
2. Check progress regularly
   “On-the-floor” standup at the progress boards—relate to “jishuken” room

**Step 6) See Countermeasures Through**

<table>
<thead>
<tr>
<th>What</th>
<th>Who</th>
<th>When</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rewrite Standard Work</td>
<td>TL</td>
<td>7/28</td>
<td>100%</td>
</tr>
<tr>
<td>Develop SWES with Key Points</td>
<td>TL</td>
<td>7/29</td>
<td>100%</td>
</tr>
<tr>
<td>Train TMs</td>
<td>TL</td>
<td>7/28/21</td>
<td>100%</td>
</tr>
<tr>
<td>Check for 3 SHs</td>
<td>TL</td>
<td>8/3</td>
<td>100%</td>
</tr>
<tr>
<td>Remove Temp Action</td>
<td>TL</td>
<td>7/30</td>
<td>100%</td>
</tr>
</tbody>
</table>

Example: Step 6

**Action Plan**

<table>
<thead>
<tr>
<th>Item (What)</th>
<th>When</th>
<th>Resp</th>
<th>Who</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Feb</td>
<td>W1</td>
<td>W1</td>
</tr>
<tr>
<td></td>
<td>Mar</td>
<td>W2</td>
<td>W2</td>
</tr>
<tr>
<td></td>
<td>W3</td>
<td>W3</td>
<td>W3</td>
</tr>
<tr>
<td></td>
<td>W4</td>
<td>W4</td>
<td>W4</td>
</tr>
</tbody>
</table>

Draft form with clearer instructions
Sample T/M response; revise as needed
Consensus/Approval throughout
Coordinate communication method with TMR and roll out

Example: Step 6
Step 7 - Evaluate Both Results and Processes

8 Steps Proceedings

Step 1. Clarify the problem
1) Identify the "Ultimate Goal" of your responsibilities & work
2) Clarify the "Standard" of your work
3) Clarify the "Current Situation" of your work
4) Visualize the gap between the "Current Situation" and the "Standard"

Step 2. Break down the problem
1) Break down the problem
2) Identify the prioritized problem
3) Specify the point of occurrence by checking the process through GENCHI GENBUTSU

Step 3. Set a target
1) Make a commitment
2) Set measurable, concrete and challenging targets
3) Clarify the "Ultimate Goal" of your responsibilities & work
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6) Visualize the gap between the "Current Situation" and the "Standard"

Step 5. Develop countermeasures
1) Develop as many potential countermeasures as possible
2) Narrow down the countermeasures to the most practical and effective
3) Build consensus with others
4) Develop a clear and detailed action-plan

Step 6. See Countermeasures Through
1) With all members united, implement countermeasures with speed and persistence
2) Share information with others by informing, reporting and consulting
3) Never give up, and proceed to the next step quickly

Step 7. Evaluate Both Results and Processes
1) Evaluate the results and the processes, and share it with members involved
2) Evaluate from three key perspectives: Customer's, 8 Step's, and Your Own
3) Understand the reasons of success and failure

Example through Steps 5 & 6

8 Steps Proceedings

Step 1. Clarify the problem
1) Identify the "Ultimate Goal" of your responsibilities & work
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Step 7. Evaluate Both Results and Processes
1) Evaluate the results and the processes, and share it with members involved
2) Evaluate from three key perspectives: Customer's, 8 Step's, and Your Own
3) Understand the reasons of success and failure
Evaluate results and process, and share it with stakeholders

Evaluate the process for achieving the results

Did we analyze the true root cause?

What really made the difference in the results?

Did we follow the 8 problem-solving steps completely?

Step 7 - Evaluate Both Results and Processes

Step 7 - Evaluate Both Results and Processes

Step 7 Execution

Develop a tracking chart or graph (make the standard/target easy to see)

• Where do we get the data?
• What data is needed?
• What is the required time period?
• Who will collect and summarize data?
7. Monitor Both Results and Processes

Example: Step 7

<table>
<thead>
<tr>
<th>Date</th>
<th># of Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/30</td>
<td>0 defects</td>
</tr>
<tr>
<td>7/31</td>
<td>0 defects</td>
</tr>
<tr>
<td>8/1</td>
<td>0 defects</td>
</tr>
<tr>
<td>8/2</td>
<td>0 defects</td>
</tr>
</tbody>
</table>

Tail light Waterleaks Tracking

Monitor Both Results and Processes

Example: Step 7

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of FMLA forms from TMR not meeting payroll deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1</td>
<td>193</td>
</tr>
<tr>
<td>5/1</td>
<td>100</td>
</tr>
<tr>
<td>6/1</td>
<td>98</td>
</tr>
<tr>
<td>7/1</td>
<td>20</td>
</tr>
<tr>
<td>8/1</td>
<td>19</td>
</tr>
<tr>
<td>9/1</td>
<td>6</td>
</tr>
<tr>
<td>10/1</td>
<td>0</td>
</tr>
<tr>
<td>11/1</td>
<td>0</td>
</tr>
</tbody>
</table>

Tail Light Waterleaks

8 Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Proceedings</th>
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<td>Develop countermeasures</td>
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Step 8 - Standardize Successful Processes

<table>
<thead>
<tr>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 8 - Standardize Successful Processes</td>
</tr>
</tbody>
</table>

8 Steps

- Clarify the “Ultimate Goal” of your responsibilities & work
- Examine the “Current Situation” of your work
- Clarify the “Current Situation” of your work
- Make a commitment
- Set measurable, concrete and challenging targets
- Break down the problem
- Identify the root causes of a problem
- Specify the “Ultimate Goal” of the countermeasures
- Analyze the root causes of a problem
- Specify the “Current Situation” of the countermeasures
- Identify the root causes of a problem
- Specify the “Current Situation” of the countermeasures
Step 8 - Standardize Successful Processes

Procedure for Standardizing successful processes

1. Successful processes as new standard
2. Share the new standard (YOKOTEN)
3. Start the next round of KAIZEN

Start the next round of KAIZEN

Kaizen

Standardize

Solve one problem

Repetition of problem solving process
8. Standardize Successful Processes

**Yokoten:** Contact other NAMC's to confirm no problem

**Follow-up:** Have Pilot add special check for finish angle in Standardized work development

**Example: Step 8**

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8. Standardize Successful Performance

Document reason for adding additional instructions to form

Standardize electronic form in database with revision date

**Yokoten:** Share the new form with other NAMC's by June 30

**Example: Step 8**

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**Example: Steps 1-8**
Example: Steps 1-8