6 Step Problem Solving Using the A3 as a Guide

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• Overview of the 6 Step Guide to Problem Solving using the A3 (with Example)
• Practical example using the 6 Step Problem Solving process
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“BEFORE I STATE THE PROBLEM, ARE THERE ANY SOLUTIONS?”
6 Step Problem Solving Process

What is a Problem Solving Process?

Grasp the Situation/ CHECK/ ACT

Observe Problem

Observe Problem

Explain the Problem

Analyze Potential Causes

Find Root Cause

Root Cause (s)

PLAN/ DO

COUNTERMEASURE

CHECK/ ACT

FOLLOW UP

1. Identify the Problem

2. Set a Target

3. Analyze the Causes

4. Propose and Implement Countermeasures

5. Check/Evaluate

6. Act and/or Standardize
6 Step Problem Solving Process

Why Use PDCA?


pointb.
6 Step Problem Solving Process

- It is every team member’s responsibility to improve processes.
- We want to eliminate waste. Wastes, in all forms, are problems. To eliminate wastes we need to uncover the problems.
We use this approach because:

- It efficiently explains our approach to people whose agreement or approval we need.
- It documents what we did and why we did it for future problem-solvers.
- Those who understand the format can follow the logic of our reasoning, even if they are not experts in this area.
- It forces us to become better problem-solvers because we have a structured process to follow.
Where Does A3 Fit In?

- It’s not just a “Tool” – it’s a visual manifestation of our thinking to share our wisdom with others.
- The A3 is only as good as the “dialogue” that creates it. (?)’s asked at gemba).
- The A3 is 5S of information- not everything I did in between.
- Understanding the importance of the “people side” of the A3 is more important than the actual tool itself. (Don’t just fill in the boxes) Engage, Coach, Involve and Challenge your people at every level.
6 Step Problem Solving Process – The “Thinking” Behind the A3

### Problem Solving (A3) Report

#### 1. Identify the Problem

**Ask:**
- What is the standard
- Does it reflect the customer’s point of view
- Is understood by those doing the job
- Are we meeting the standard
- What is the GAP
- Gather facts as known from Gemba – Who, What, When, Where
- How important is it to solve this problem
- What did you do to contain the problem

**Show:**
A clear statement of the problem using sketches, graphs, and charts

**Tools:**
Line graph, prioritization Matrix, 4Ws. Tree diagram, pareto diagram

#### 2. Set The Target

**Ask:**
- What are your intermediate targets (milestones) and when do you expect to achieve them

**Show:**
A statement or graph indicating targets

#### 3. Analyze The Causes

**Ask:**
- Why does this problem occur
- Do potential causes map to the know facts
- What are some reasonable assumptions to make about potential causes (where should we look first)
- Can we gather more facts to help determine Root Cause
- Can we explain the cause and effect relationship plausibly

**Show:**
How we arrived at the Root Cause

**Tools:**
Fishbone diagram, pareto chart, tree diagram

#### 4. Propose and Implement Countermeasures

**Ask:**
- What countermeasures are most likely to eliminate the Root Cause
- Which countermeasures are most feasible and effective; likely to cause the least impact; what is the cost, difficulty
- Can I select the countermeasures that will achieve my targets

**Show:**
Countermeasures and why they were selected

**Tools:**
Countermeasures Matrix

#### 5. Check/Evaluate

**Ask:**
- Did the countermeasures work
- Was the target achieved
- Can I verify that the Root Cause was eliminated (can I turn it off & on)
- If the Countermeasure was not effective, why didn’t it work

**Show:**
The results; describe the reliability of the new process

**Tools:**
Line graph, pareto

#### 6. Act and/or Standardize

**Ask:**
- How will we ensure the process continues to work (stays solved)
- What have we learned
- Where else can we apply this learning

**Show:**
New or changed procedures, plans to apply learning in other areas

**Tools:**
Standard Operating Procedures
1. Identify the Problem

Many complaints regarding the reimbursement process: the reimbursement process takes too long.

34 of 44 check reimbursements that were investigated took longer than the standard of 6 days.

2. Set a Target

Shorten the reimbursement process turnaround time to be consistently performed in 6 working days or less by 17 October 2008.

3. Analyze Causes

Flowchart of Expense Reimbursement Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive Expense Form</td>
</tr>
<tr>
<td>2</td>
<td>Inspect Expense Form</td>
</tr>
<tr>
<td>3</td>
<td>Generate Reimbursement Check</td>
</tr>
<tr>
<td>4</td>
<td>Send Expense Check</td>
</tr>
</tbody>
</table>

4. Propose Countermeasures

<table>
<thead>
<tr>
<th>Cause</th>
<th>Countermeasure(s)</th>
<th>Who</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Member did not know that a receipt was necessary</td>
<td>1. Review/revise guidelines and policies for expense reports.</td>
<td>MA</td>
<td>Week 1</td>
</tr>
<tr>
<td>Team Member did not give instructions</td>
<td>2. Conduct informational sessions to communicate guidelines.</td>
<td>RB</td>
<td>Week 2</td>
</tr>
</tbody>
</table>

5. Check/Evaluate

- 1. Review/revise guidelines and policies for expense reports.
- 2. Conduct informational sessions to communicate guidelines.
- 4. Add to new hire orientation.

6. Act/Standardize

Standardization
In the Lean Operating System, we achieve *operational excellence* by:

- Defining our standards
- Continuously compare our operations against those standards
- Engaging in aggressive and rigorous problem-solving when there is any deviation from the standard.
6 Step Problem Solving Process

Step 1: Identify the Problem
Step 2: Set the Target
Step 3: Analyze the Causes
Step 4: Implement Countermeasures
Step 5: Check & Evaluate
Step 6: Act and/or Standardize
Step 1: Identify the Problem

What Is a Problem?

Any deviation from the standard.
Step 1: Identify the Problem

What Is the Standard?

- A standard, or a standard condition, is a specific, explicit, and known expectation.
- A standard is either met or not met.
- What is actually observed (what really happened) is the current condition.
- This is the first question you must ask when you encounter a problem. You cannot begin problem-solving until you have asked this question.
- You cannot define a problem or improve a process without this critical baseline.
Step 1: Identify the Problem

Grasp the actual situation based on facts and “go and see”.

- Step 1: Identify the Problem
- Step 2: Set the Target
- Step 3: Analyze the Causes
- Step 4: Propose/Implement countermeasure
- Step 5: Check & Evaluate
- Step 6: Act and/or Standardize
Step 1: Identify the Problem

What is the Gap?

Current Situation: 13th Place out of 30 Master Females at Cascade Edge Sprint Triathlon

Ideal Situation: Top 10 of the Master Females in a Sprint Triathlon Race

Trisha's Finish Time vs Top 10 Triathlon

![Bar chart showing Trisha's finish time of 91.15 minutes compared to the ideal top 10 finish time of 80.30 minutes.](chart.png)
Step 1: Identify the Problem

Dig a little deeper!

Stratification by Leg of Race

<table>
<thead>
<tr>
<th></th>
<th>Swim</th>
<th>T1</th>
<th>Bike</th>
<th>T2</th>
<th>Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trisha</td>
<td>17.63</td>
<td>4.42</td>
<td>40.70</td>
<td>3.10</td>
<td>25.30</td>
</tr>
<tr>
<td>Top 10</td>
<td>16.80</td>
<td>3.30</td>
<td>37.70</td>
<td>2.20</td>
<td>20.30</td>
</tr>
<tr>
<td>Gap</td>
<td>5%</td>
<td>26%</td>
<td>8%</td>
<td>31%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Step 2: Set the Target

Step 3: Analyze the Causes

Step 4: Propose/Implement countermeasure

Step 5: Check & Evaluate

Step 6: Act and/or Standardize

Minutes

Percent of Gap
Step 1: Identify the Problem

Largest area for improvement: Still deeper!

% Improvement Needed:

- T2: 31%
- T1: 26%
- Run: 19%
- Bike: 8%
- Swim: 5%

Leg of Race:

- T2: Dismount & run to transition spot
- T1: Rack Bike
- Run: Remove Helmet
- Bike: Remove Cycling Shoes
- Swim: Put On Running Shoes
- Grab Hat & Race Belt w/Number
- Don Hat & Belt while Exiting T2

Trisha's Leg 4 Times:

- 0:46: Dismount & run to transition spot
- 0:03: Rack Bike
- 0:02: Remove Helmet
- 0:45: Remove Cycling Shoes
- 0:45: Put On Running Shoes
- 0:02: Grab Hat & Race Belt w/Number
- 0:45: Don Hat & Belt while Exiting T2
Step 2: Set the Target

Triathlon Target

Reduce Cycling to Running Shoe changeover time:

From: **90** Seconds (0:45+0:45)

To: **32** Seconds

Net Improvement: 58 seconds

(By the Seafair Triathlon on **7/15/07**).
Step 3: Analyze the Causes

Triathlon Cause and Effect Diagram

- Environment
  - Rain
  - Muddy
  - Soggy & Wet
- Methods
  - Socks or No Socks
  - Adjustments, Rework from T1
- Physical Condition in T2
- Mental Condition in T2
- Inadequate Practice
- Man power
- Long Finger Nails
- Motivation / Effort
- Shoe lace Design
- Lack of time display
- Running Shoe Design
- Cycling Shoe Design
- Machines / Equipment

Excessive Time to Change over from Cycling to Running Shoes

Root Cause
### Triathlon Evaluate & Prioritize

<table>
<thead>
<tr>
<th>Possible Countermeasures</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Overall Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>Ranking</td>
<td>Change over</td>
<td>Race Time</td>
</tr>
<tr>
<td>Enter more triathlon races</td>
<td>$55 - $70</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Supervised Swim/Bike/Run workouts</td>
<td>$15 - $45</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Supervised Bike/Run (Brick) workouts</td>
<td>15 - $25</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Quick Laces</td>
<td>$6</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>Stage Shoes in Leg 4</td>
<td>$0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
### Step 4: Propose & Implement Countermeasures

**Triathlon Implementation Plan**

<table>
<thead>
<tr>
<th>WHAT</th>
<th>BY WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire Quick-Laces</td>
<td></td>
</tr>
<tr>
<td>Order Quick-Laces</td>
<td>1-June</td>
</tr>
<tr>
<td>Install in shoes</td>
<td>4-June</td>
</tr>
<tr>
<td>Supervised Mini Practice Tri Race</td>
<td></td>
</tr>
<tr>
<td>Raise-The-Bar Workout</td>
<td>27-Jun</td>
</tr>
<tr>
<td>Luna Chix Workout</td>
<td>3-Jul</td>
</tr>
<tr>
<td>Danskin Team Workout</td>
<td>11-Jul</td>
</tr>
<tr>
<td>On Own - Bike/Run Workout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-Jul</td>
</tr>
<tr>
<td></td>
<td>6-June</td>
</tr>
<tr>
<td></td>
<td>12-June</td>
</tr>
<tr>
<td>On Own - T2 Transition Practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7-June</td>
</tr>
<tr>
<td></td>
<td>13-June</td>
</tr>
<tr>
<td></td>
<td>14-June</td>
</tr>
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</table>
Step 5: Check & Evaluate

Triathlon Check

Five Mile Lake
Woman's Sprint Triathlon
30-Jun-07

New Leg 4 Times

Dismount & run to transition spot
Rack Bike
Remove Helmet
Remove Cycling Shoes
Put On Running Shoes
Grab Hat & Race Belt w/Number
Don Hat & Belt while Exiting T2

0:46 0:03 0:02 0:11 0:23 0:02 0:45

% Improvement Needed

% Gap

35
30
25
20
15
10
5
0

6 26 19 8 5

T2 T1 Run Bike Swim

Leg of Race
### Are we “On Track?”

<table>
<thead>
<tr>
<th>WHAT</th>
<th>BY WHEN</th>
<th>STATUS</th>
</tr>
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<tbody>
<tr>
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<td></td>
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</tr>
<tr>
<td></td>
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<td>Complete</td>
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<td></td>
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<td>Complete</td>
</tr>
<tr>
<td></td>
<td>14-June</td>
<td>Complete</td>
</tr>
</tbody>
</table>
Step 6: Act and/or Standardize

Implement the Standard and follow it.

- Revise or develop Standard Work
- Make sure the “right way” is the “easy way”
- Explain the reasons for Standard Work and gain approval
- Train Team Members who will be using the new standard
- If possible include Poke-Yoke in the standard
Step 6: Act and/or Standardize

Triathlon Standardization

1. Video T2 of race to use in development of standard work.

2. Write Standard Work to share with other team mates.

3. Start analysis on T1 of race, 2nd largest area of improvement needed.
Follow-Up on your results

- Ensure stability in the process with the new countermeasure
- Act on any remaining or unforeseen issues that may come up
- Communicate the process and results to appropriate

A departure from your new process is a problem!
Questions?
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