Kepner Tregoe

Problem Analysis

Describe Problem

State the problem (one object, one deviation)

What object (or group of objects) has the deviation? *What deviation does it have?*

What do we see, hear, feel, taste, smell, or measure that tells us there is a deviation? *What data tells us it exists?*

Specify the problem

	IS	IS NOT
WHAT		
What object?		
What deviation?		
WHERE		
Where geographically?		
Where on the object?		
WHEN		
When first?		
When since?		
What pattern?		
When in the life cycle?		
EXTENT		
How many objects?		
What is the trend?		
What is the size?		
What is the trend?		
How many deviations?		
What is the trend?		

Identify Possible Causes

Use knowledge and experience OR...

What pairs in the Problem Specification are surprising?
What else could have caused this deviation?

Record possible causes ⇨

What causes do they suggest?
What would experts say? *What was our initial hunch?*

...Use distinctions and changes

Record possible causes ⇨

Look for Distinctions
What is different, odd, unusual, special, unique, or peculiar about each IS compared to its IS NOT?

What else is different...?
** New information*
** Based on facts*
** True only of the IS*

Look for Changes
What changed in, on, around, or about each distinction?
When did the change occur?
Record date and time

What else has changed…?

If no change, use NKC - No Known Change

How could this…
Change
Change plus distinction
Change plus change
Distinction
...cause this deviation?

Distinctions	Changes	Date

Evaluate Possible Causes

Test possible causes

For each IS/IS NOT pair, answer the following question:

If (Possible Cause) is the cause of (Problem Statement), then how does it explain both the IS and IS NOT information?

(Y) YES, explains because…
(N) NO, does not explain because...
Record supporting data
(A) Explains ONLY IF (assumption)...
List all assumptions

☐ MPC Y, N, A	Possible Cause

Evaluate Possible Causes

Test possible causes

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If (Possible Cause) is the cause of (Problem Statement), then how does it explain both the IS and IS NOT information?

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Record supporting data
(A) Explains ONLY IF (assumption)...
List all assumptions

☐ MPC Y, N, A	Possible Cause

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Record supporting data *List all assumptions*

☐ MPC / Y, N, A	Possible Cause

Evaluate Possible Causes

Test possible causes

For each IS/IS NOT pair, answer the following question:

If (Possible Cause) is the cause of (Problem Statement), then how does it explain both the IS and IS NOT information?

(Y) YES, explains because…
(N) NO, does not explain because... *(A) Explains ONLY IF (assumption)...*
Record supporting data *List all assumptions*

☐ MPC / Y, N, A	Possible Cause

Evaluate Possible Causes

Determine most probable cause

Which of these possible causes makes the most sense?
Most probable cause (MPC) has:
Assumptions that make the most sense in this situation
Most reasonable assumptions
Overall simplest assumptions
Fewest assumptions

Confirm True Cause

Verify assumptions, observe, experiment, or try a fix and monitor

What can be done to verify any assumptions made?
How can this cause be observed at work?
How can we demonstrate the cause-and-effect relationship?
When corrective action is taken, what results will indicate that we have identified the true cause?
Use the safest, easiest, quickest, cheapest, surest way

Confirmation

√	Use:	Actions to Confirm	Responsibility/Timing
	Verify Assumptions		
	Observe (list below)		
	Experiment		
	Try a Fix and Monitor		

Think Beyond the Fix

Extend the cause

What other damage could this cause create?

....
....
....
....

Where else could the cause create problems?

....
....
....
....

What caused the cause?

....
....
....

Extend the fix

Record proposed fix ⇨

What identical things need the same fix?

....
....
....

What problems could this fix cause?

....
....
....
....

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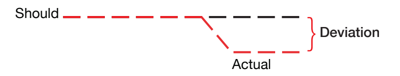
Problem Analysis

1 Describe Problem

When to use Problem Analysis?

Do we have a deviation?



Is cause unknown?
Do we need to know cause to take effective action?
Yes to all 3 = use Problem Analysis

State the problem

What object (or group of objects) has the deviation?
What deviation does it have?
What do we see, hear, feel, taste, smell, or measure that tells us there is a deviation?
What data tells us that a deviation exists?
Write a short statement with one object and one deviation
Be specific; separate if needed

Specify the problem

Ask IS/IS NOT questions in four areas:
WHAT - Identity
WHERE - Location
WHEN - Timing
EXTENT - Size

For each IS, ask questions to find IS NOTs that are:
- *similar to the IS*
- *closely related to the IS*
- *specific*
- *factual*

"…could be, but is not."
If you "need more data" (NMD), determine who will obtain it, how and by when

Problem specification

	IS *Describe the problem in detail*	**IS NOT** *Tighten the IS data. Help eliminate false possible causes*
WHAT	• *What specific object(s) has the deviation?* • *What is the specific deviation?*	• *What similar object(s) could have the deviation, but does not?* • *What other deviations could be observed, but are not?*
WHERE	• *Where is the object when the deviation is observed (geographically)?* • *Where is the deviation on the object?*	• *Where else could the object be when the deviation is observed, but is not?* • *Where else could the deviation be located on the object, but is not?*
WHEN	• *When was the deviation observed first (in clock and calendar time)?* • *When since that time has the deviation been observed? What pattern?* • *When, in the object's history or life cycle, was the deviation observed first?*	• *When else could the deviation have been observed first, but was not?* • *When since that time could the deviation have been observed, but was not? What could be the pattern?* • *When else, in the object's history or life cycle, could the deviation have been observed first, but was not?*
EXTENT	• *How many objects have the deviation?* • *What is the trend in the number of objects with the deviation?*	• *How many objects could, but do not?* • *What could be the trend, but is not?*
	• *What is the size of a single deviation?* • *What is the trend in the size?*	• *What could be the size, but is not?* • *What could be the trend, but is not?*
	• *How many instances of the deviation are on each object?* • *What is the trend in the number of instances?*	• *How many instances could be on each object, but are not?* • *What could be the trend in the number of instances, but is not?*

2 Identify Possible Causes

Use knowledge and experience OR Use distinctions and changes

Use knowledge and experience

Refer to the Problem Specification to generate possible causes

What pairs in the Problem Specification are surprising?

What causes do they suggest?

What else could have caused this deviation?

What would experts say?

What was our initial hunch?

Explain how the cause creates the deviation

Use distinctions and changes

Look for Distinctions *What is different, odd, unusual, special, unique, or peculiar about each IS compared to its IS NOT?*
What else is different...?
**Based on facts*
**New information about that IS/IS NOT pair*
**True only of the IS*

Look for Changes *What changed in, on, around, or about each distinction?*
When did the change occur? Record date and time
What else has changed…?

How could this…
Change
Change plus distinction
Change plus change
Distinction
…cause this deviation?

List without debate

Explain how the cause creates the deviation

3 Evaluate Possible Causes

Test possible causes

If (Possible Cause) is the cause of (Problem Statement), then how does it explain both the IS and IS NOT information? ⇨ *The answer will be:*
YES, explains because…, or
NO, it does not explain because…, or
Yes, explains ONLY IF (assumption)…

Record supporting data
List all assumptions
Eliminate any cause that fails
Complete testing one possible cause at a time

Determine most probable cause

Which of these causes makes the most sense?
Most probable cause (MPC) has:
Assumptions that make the most sense in this situation
Most reasonable assumptions
Overall simplest assumptions
Fewest assumptions

4 Confirm True Cause

Verify assumptions, observe, experiment, or try a fix and monitor

What can be done to verify any assumptions made?
How can this cause be observed at work?
How can we demonstrate the cause-and-effect relationship?
When corrective action is taken, what results will indicate that we have identified the true cause?
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