

Method of “Why, why” analysis

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Quality Management Dept.

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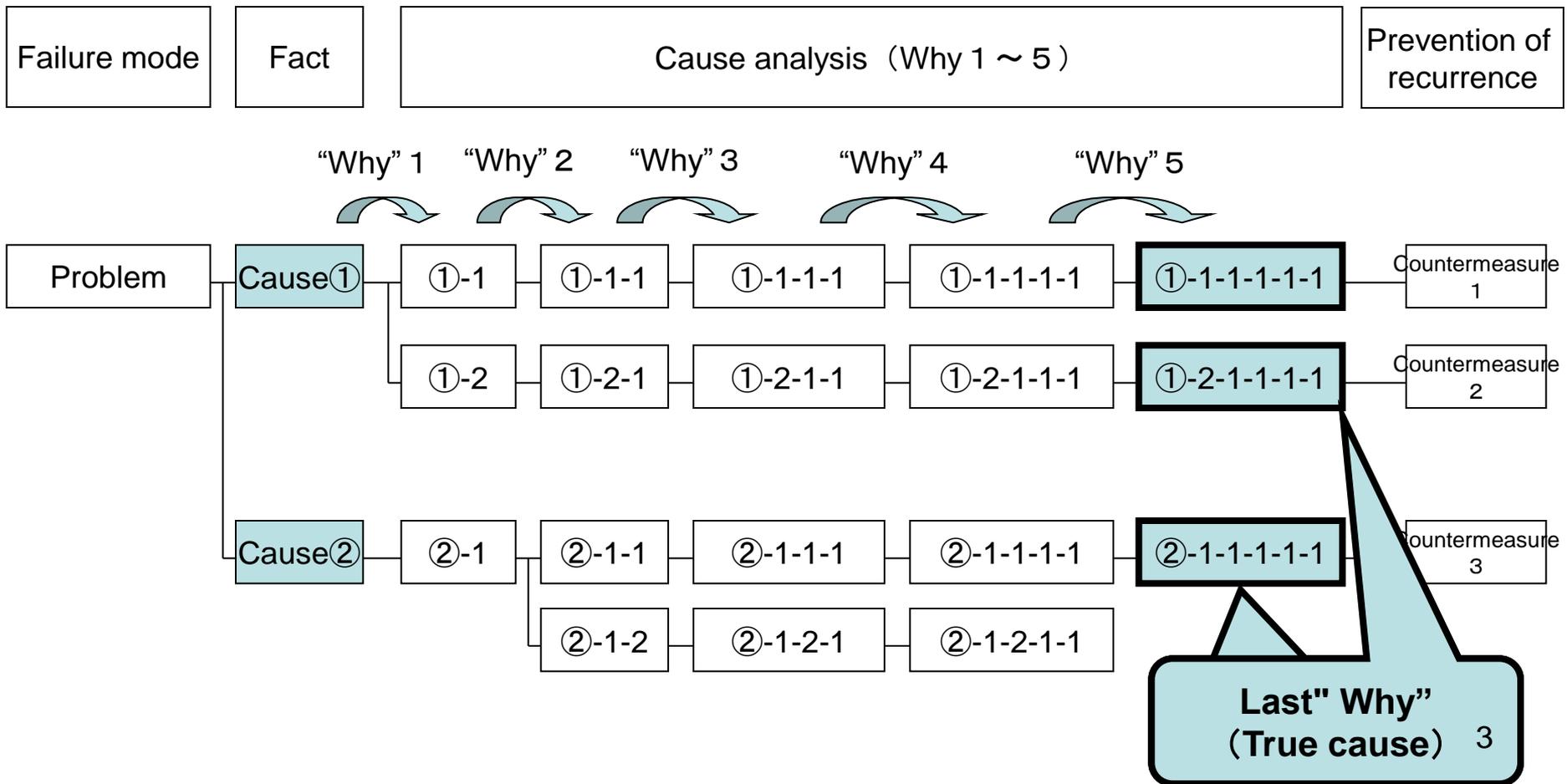
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I. What is “Why, why” analysis?

“Why, why” analysis is **technique to investigate the true cause that is hidden in the root of the problem** by repeating a question “why” for a cause (fact) to prevent recurrence of the problem.

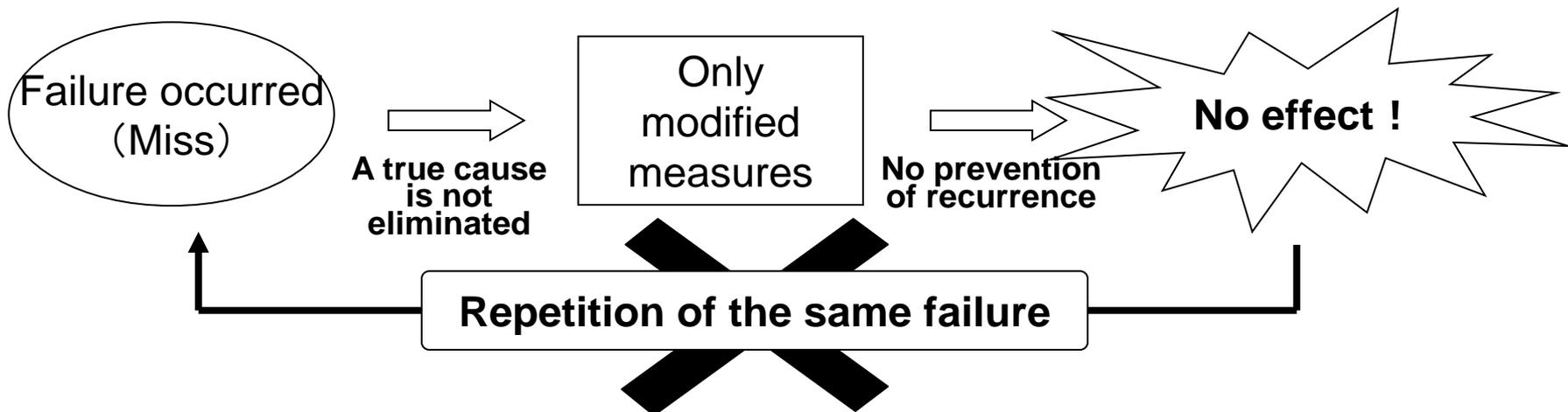


II. Why is “Why, why” analysis necessary?

If we take measures without eliminating the true cause of the problem, can we prevent recurrence of the same failure?

Unfortunately we often see repeat failure similar to the failure that occurred in the past. To achieve zero quality problem, we need to deeply understand the problem and promote no recurrence.

To do so, it is necessary to cultivate a habit to think "why, why" and identify the true cause, and carry out countermeasures.



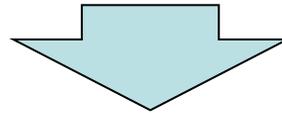
Let's cultivate a “habit” to think “why, why”!

Ⅲ. Preparation of “Why, why” analysis

Ⅲ-1 Step of preparation

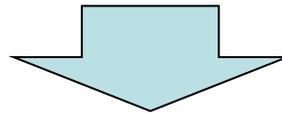
(1) Identification of problem

Most important is “Understanding problems precisely”



(2) Identification of problem process

Trace back from the problem process to a previous process and observe the product.



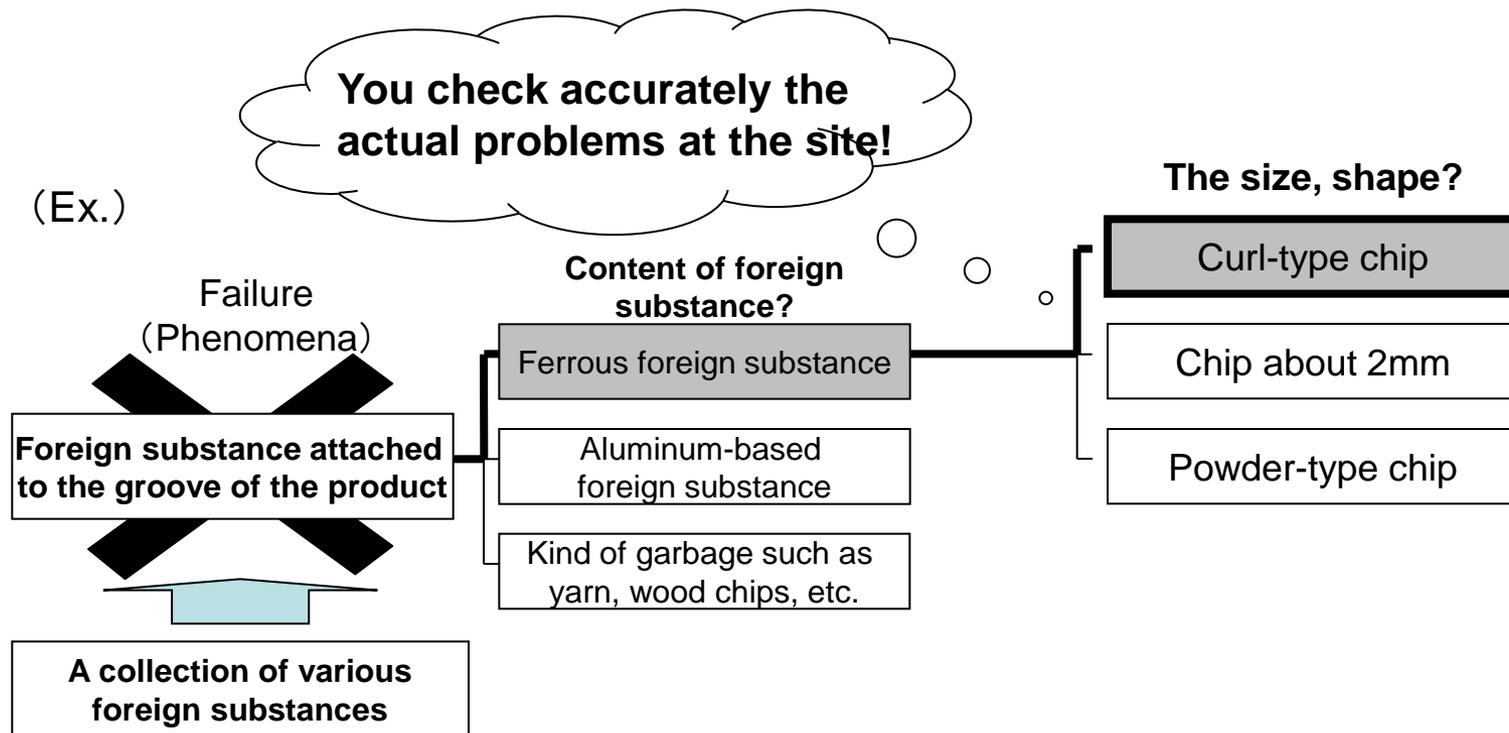
(3) Ascertain the problem occurrence condition

Using the statistical method, and grasping the problem occurrence situation.

(1) Identification of problem

When you start "Why, why", if you cannot accurately capture the phenomena, you need to change the route of the problem identification. The most important step in "Why, why" analysis is "understanding problems precisely". If you don't understand the problems precisely, you can not determine true cause even after you have analyzed the problem. Also, you will expend a huge effort.

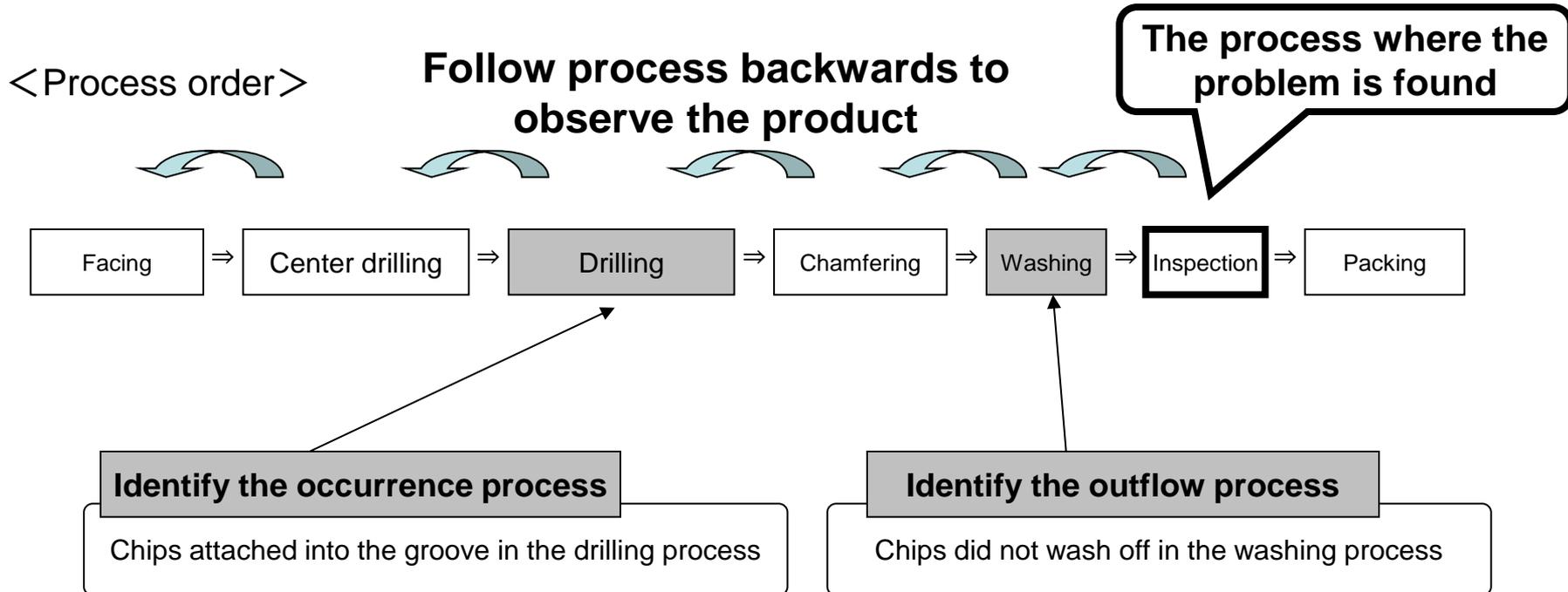
For all members to understand the problem, we need to grasp all conditions correctly and show detail circumstances clearly so others can grasp easily.



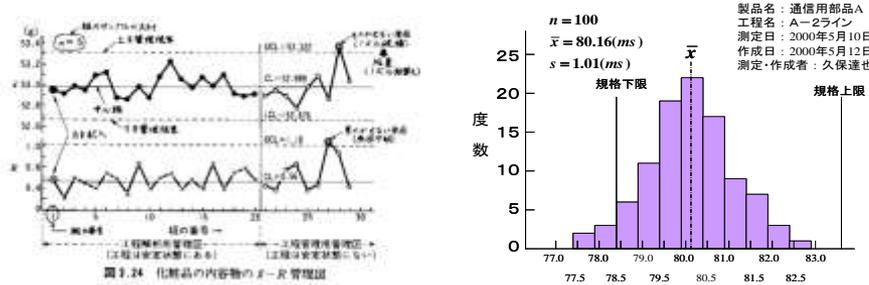
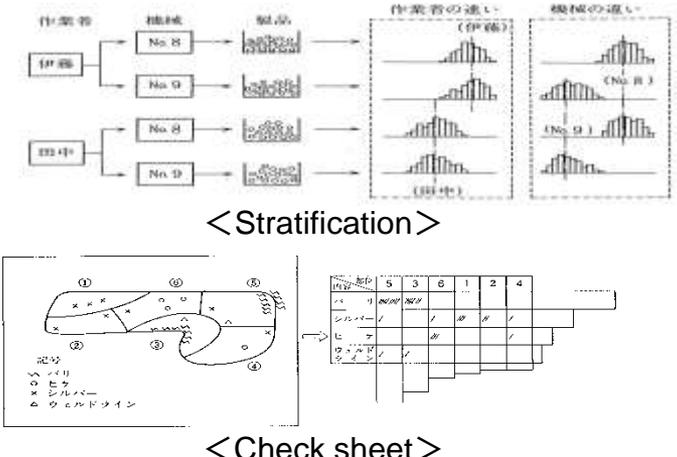
(2) Identification of problem process

For “Understanding problems precisely,” you have to, **follow the process backwards, step by step, until you find the problem with actual article at the site, and observe the product**, to pursue the cause. Identify the occurrence process and outflow process.

<EX : Curl-type ferrous foreign substance attached>



(3) Ascertain the problem occurrence condition

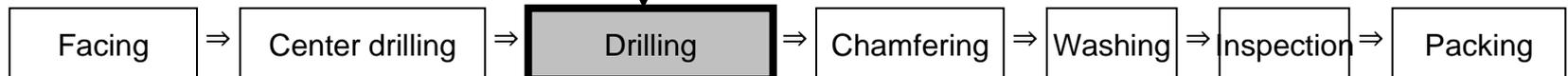
<p>Study the actual process to find the problem</p>	<p>Analyzed by statistical method (QC method)</p>
<p>① Became worse suddenly? Or what went wrong before?</p> <p>If became worse suddenly, the true cause can be found by looking for the changing point.</p>	 <p>The control chart shows data points over time with a mean line and control limits. The histogram shows the distribution of action times with a mean of 80.16 ms and a standard deviation of 1.01 ms. The specification limits are also indicated.</p>
<p>② Is it a sporadic? continuous? Is it periodic or not?</p> <p>If it is a periodic, to find the true cause, you need to understand what changes periodically.</p>	<p><Graph · Control chart></p> <p><Histogram></p>  <p>The stratification diagram shows data points grouped by operator (No. 8, No. 9, No. 10, No. 11) and machine (No. 8, No. 9). The check sheet is a grid used for recording occurrences.</p>
<p>③ What data are concentrated and where? Concentrated or widely dispersed?</p>	

EX : Curl-type ferrous foreign substance attached

Result of ascertainment of the occurrence situation

Occurrence was sporadic, it could not be found by sampling inspection.

<Process order>

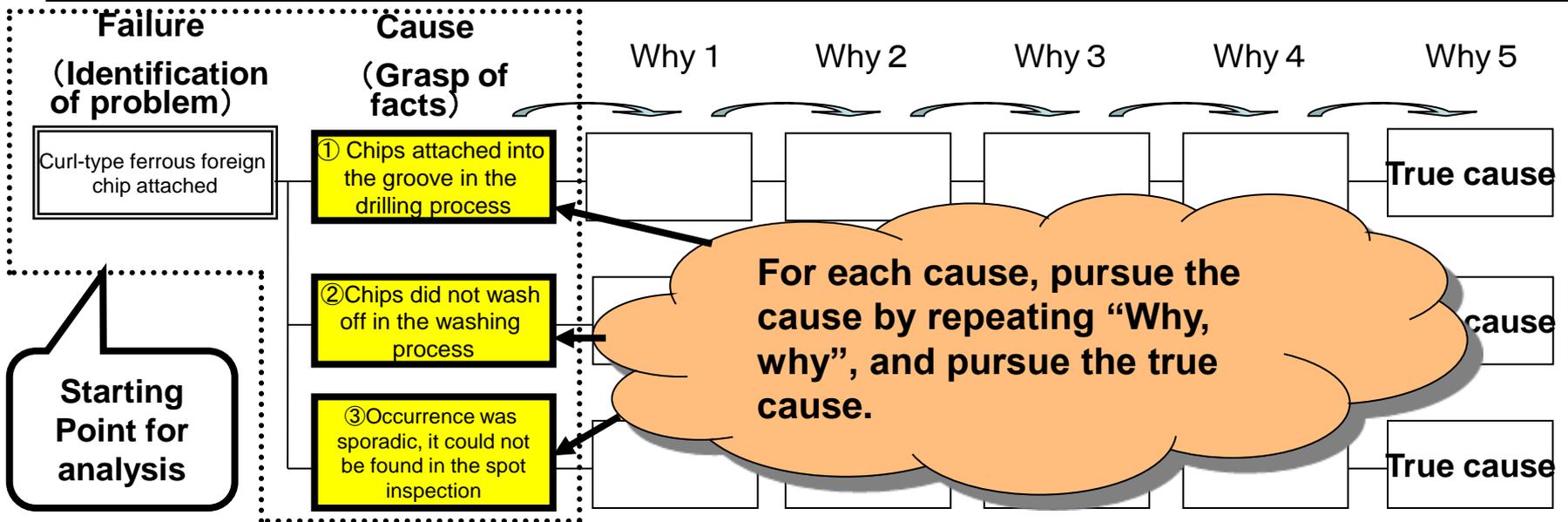


III - 2 Decide a starting point for analysis

Use the previous example “foreign object attached product”, and try to organize,

- (1) Identification of problem ⇒ Curl-type ferrous foreign substance
- (2) Identification of problem process
⇒ Occurrence : **① Chips attached into the groove in the drilling process**
Outflow : **② Chips did not wash off in the washing process**
- (3) Ascertainment of problem occurrence situation
⇒ **③ Occurrence was sporadic, it could not be found in the spot inspection.**

Now you can clearly grasp the phenomena.



As above, by determining the starting point for analysis, we can develop the subsequent “Why, why” analysis.

IV. Operation of “Why, why” analysis

Once the cause of the problem is clear, find the actual rootcause by using the following steps.

Step 1

- Write the first “Why”. Why the phenomenon has occurred?

Step 2

- To the answer of the first “Why”, write the cause of “Why” it happens. Repeat this until you reach the true cause.

Step 3

- If you reach the last “why”, trace back to the phenomenon and verify the theoretical correctness.

Step 4

- Check whether it's sufficient in the mentioned cause.

Step 5

- Take a measure against the true cause.

Step 6

- Confirm the measure effect. When it's ineffective, execute “Why, why” analysis again.

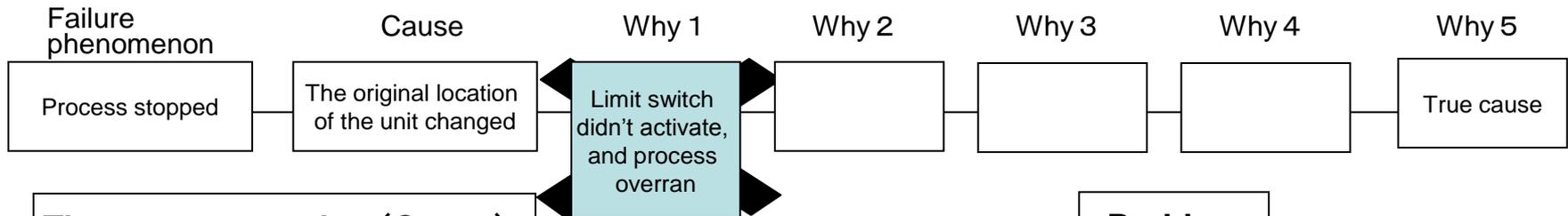
Step 1 : Write the first “Why”. Why the phenomenon has occurred?

<Point>

“What is the cause it was like that?”, give a concisely short style like “○○ was □□” (not put 2 verbs)

Use the past tense which shows fact. “~ was ~” , “~ **ed ~” etc.

(A bad example - often seen)



There are two verbs (Cause)

Facility overran

<The verb which shows a result>

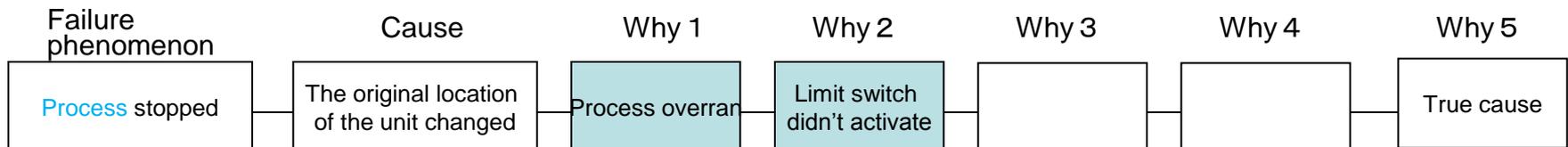
Limit switch didn't run

<The verb which shows a factor>

Problem

Hesitate to write next “Why” to either cause

(A good example)



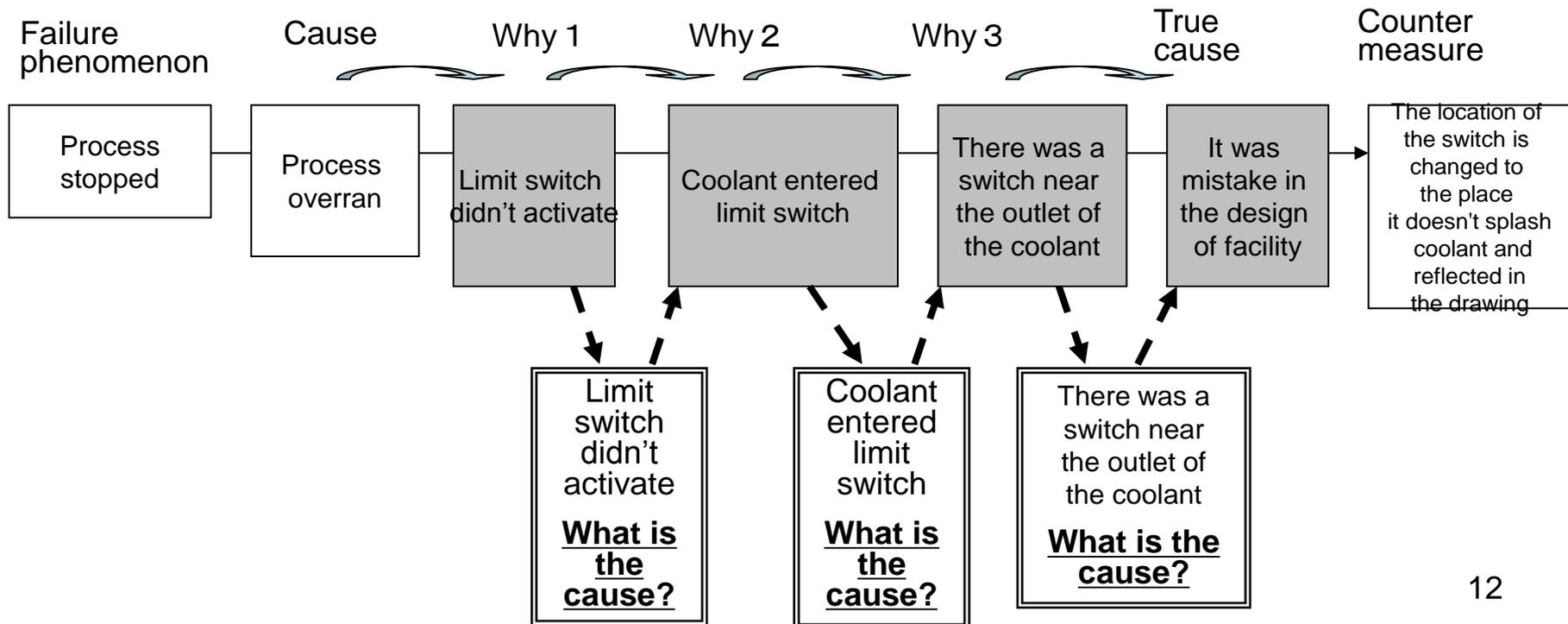
It will be one verb, and easy to connect the next “Why”.

Step 2 : To the answer of the first “Why”, and write the cause that “Why” it happens. Repeat this until you reach the true cause.

<Point 1 >

To the answer of the first “Why”, as “What is the cause – It was so?” The cause is . . . , and the cause is . . . ” , it’s repeated persistently “Why” “Why” from every angle until a recurrence preventive measure is prepared concretely.

(Example)



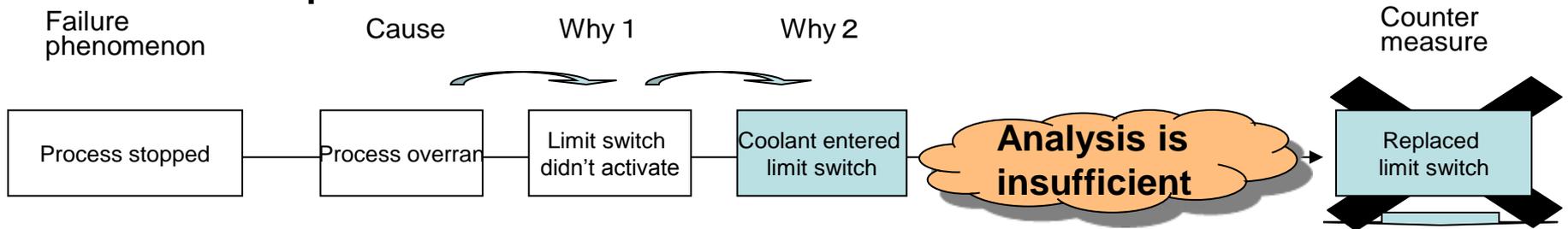
<Point 2 >

Confirm the fact of the actual problem at the site, and exhaust the causes until nothing is left. When an analysis is insufficient, attention is also necessary not to be a measure and to become response (corrective action).

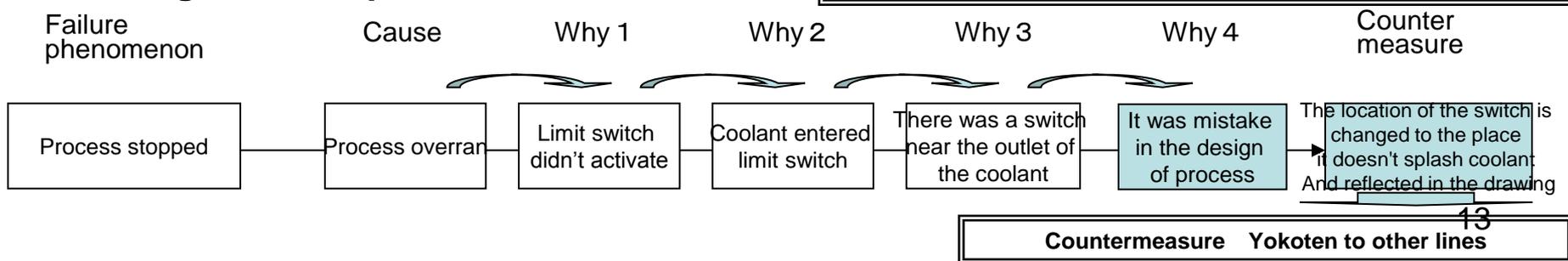
It is natural instinct to conclude countermeasure based on past experience and fill out the “why, why” analysis to justify the countermeasure. This should be avoided.

The ultimate goal is to eliminate and to prevent reoccurrence of the problems.

(The bad example often seen)



(The good example)



<Point 3 >

“OO was bad, or ΔΔ is bad” such as, an expression by the ambiguous word is useless.

To avoid having different interpretations, it's necessary to advance an analysis using a clear and concrete word. And it's necessary to write an analysis by concise sentences.

Such as, “OO was × ×” !

In the sentences, don't use the word “bad”.

<Bad example >



“Washing is bad”

OOO?

OOO?

OOO?

<Good example >



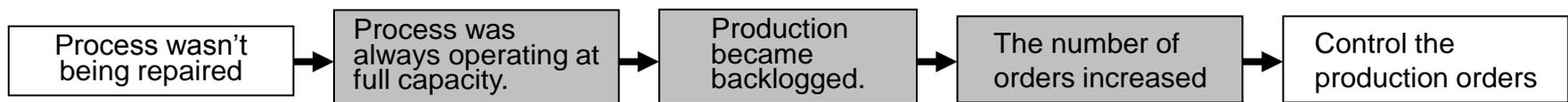
- Nozzle direction was
- Volume of cleaning solution was low.
- Cleaning solution was dirty.

There is no clarity - it is not clear what is wrong.

<Point 4 >

“Why, why” is a failure analysis, so an excuse should not be presented as a cause. You will reach a strange countermeasure as below.

Excuse is not reflection, so it's removed from the cause.



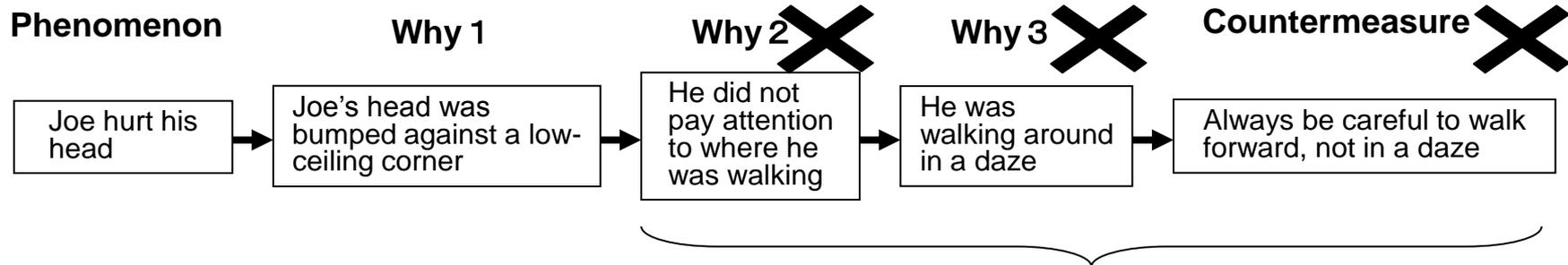
This is just excuse!

<Point 5 >

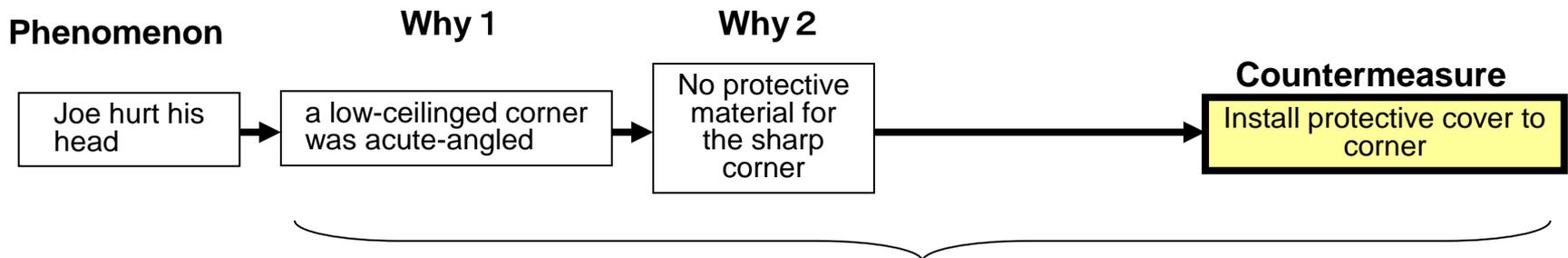
Cause according to human behavior must be avoided. Because that is “person’s behavior is affected by health and the situation”.

- For a true cause, like the below case “protective material is stuck on a corner”, it pursues the cause to a hardware side and mechanism of management.

<Bad example >



<Good example >



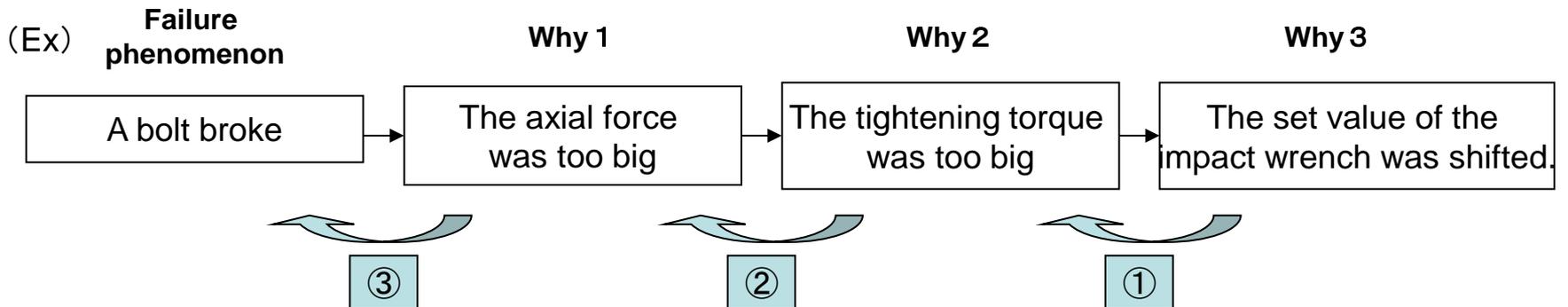
The cause is pursued to a hardware side and mechanism of management!

Step 3 : When you reach the last "why", trace back to the phenomenon and verify the theoretical correctness.

<Point>

After completing the "Why, why" analysis, always confirm if it makes sense by tracing back to "Phenomenon" from the last "Why" part. Using conjunctions such as [~, therefore ~], and re-read back from the conclusion, a cause with incorrect logic can be identified fairly quick.

<Trace back to "Phenomenon" from "Why">

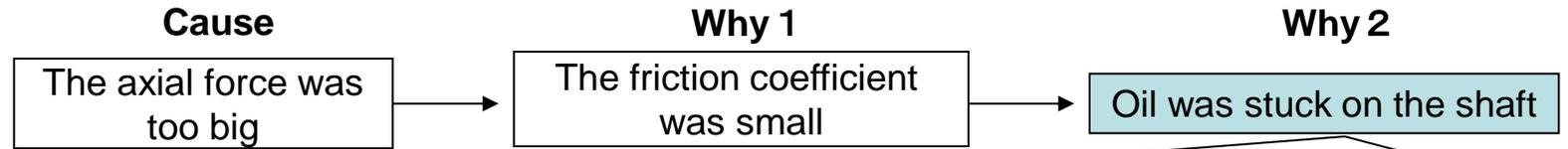


①	The set value of the impact wrench was shifted therefore	The tightening torque was too big
②	The tightening torque was too big therefore	The axial force was too big
③	The axial force was too big therefore	A bolt broke

Step 4 : Check for missing cause – Have we gone far enough?

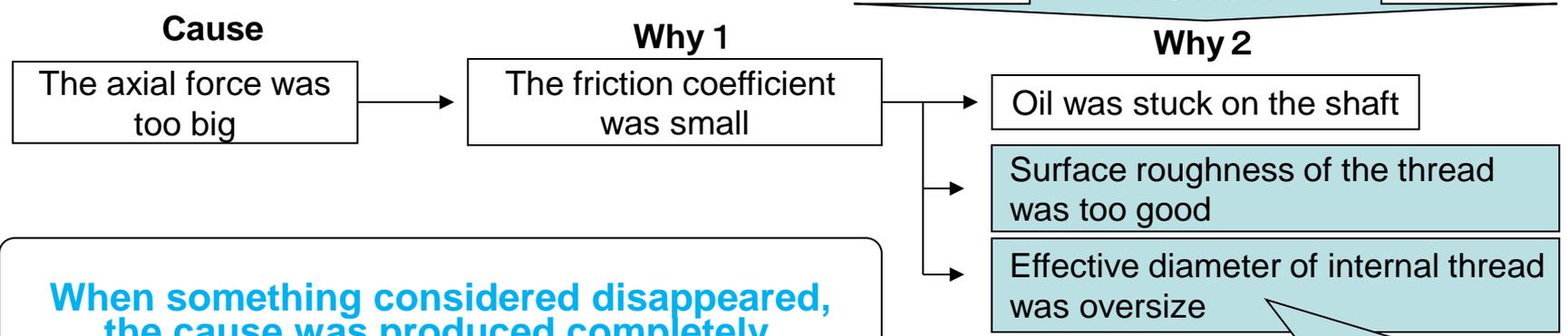
<Point>
Did all causes get mentioned? – check by going in reverse.
• Check **“if this cause did not happen, could the previous phenomenon not occur?”**

<Bad example>



Consider “if oil was not on the shaft, would the friction coefficient not be small?” . . .

<Good example>



When something considered disappeared, the cause was produced completely.

The new cause comes out 17

Step 5 : Take a countermeasure against the true cause.

<Point 1 >

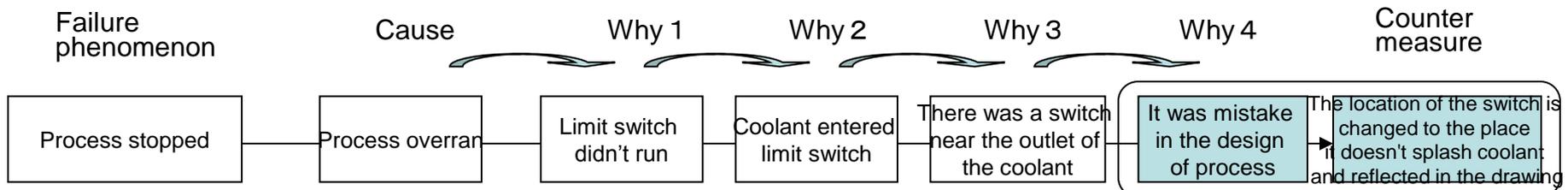
Even if it isn't repeated 5 times "Why", we can get a true cause. Do we need to do 5 times?

A goal is "To find a true cause.", and "5 TIMES" IS AN ONLY TARGET.

But, if executed only 2 or 3 times, it may give the illusion you've reached the true cause. It is important to check whether recurrence can actually be stopped when taking a measure against the cause.

So, if you found the cause leading to the prevention of recurrence, you can end with "Why 4". On the other hand, when the cause which leads to prevention of recurrence is not found even if it's repeated 5 times, "Why" must be followed until the cause comes out.

(Ex)



For the cause "It was mistake in the design of facility", check to see if recurrence can be stopped when doing "the location of the switch is changed to a place where it doesn't splash coolant and reflected in the drawing"

V. Summary

1. What is “Why, why” analysis?

It is technique to investigate the true cause which lies in the root of the malfunction, not the superficial, by repeating “Why” for the occurred problems.

2. Preparation of “Why, why” analysis

Evaluate the fact by the 3 factors, and organize.

3. Operation of “Why, why” analysis

Confirm the facts of the actual part at the actual site, and exhaust all possible causes.

4. Points of “Why, why” analysis

- (1) Express “Phenomenon” and “Why” by short and concise representation.
- (2) Repeat “Why” until the cause that connects to recurrence prevention comes out.
- (3) Confirm whether causality is also formed from the reverse.
- (4) Whether the cause is mentioned all, check with considering the reverse.
- (5) For recurrence prevention, analyze the background cause from the direct cause.
- (6) If there is no effect, try “Why, why” analysis again.