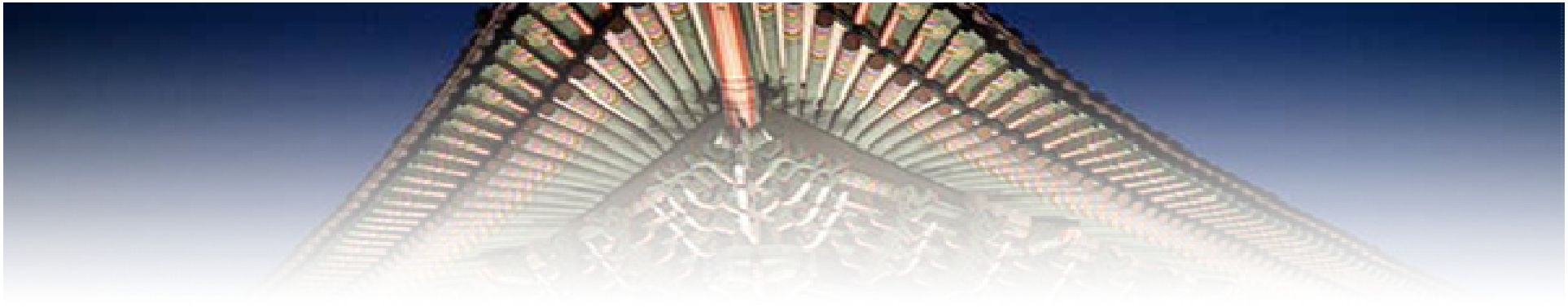

TRIZ Process
Based on experience in the field

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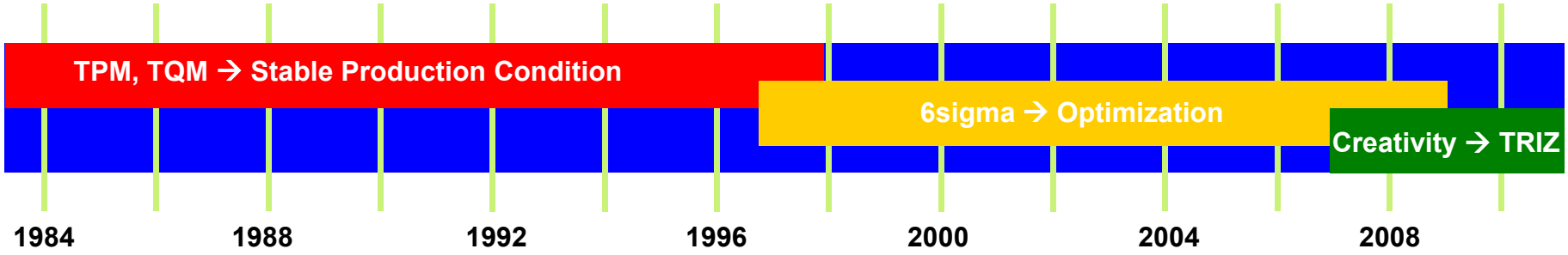
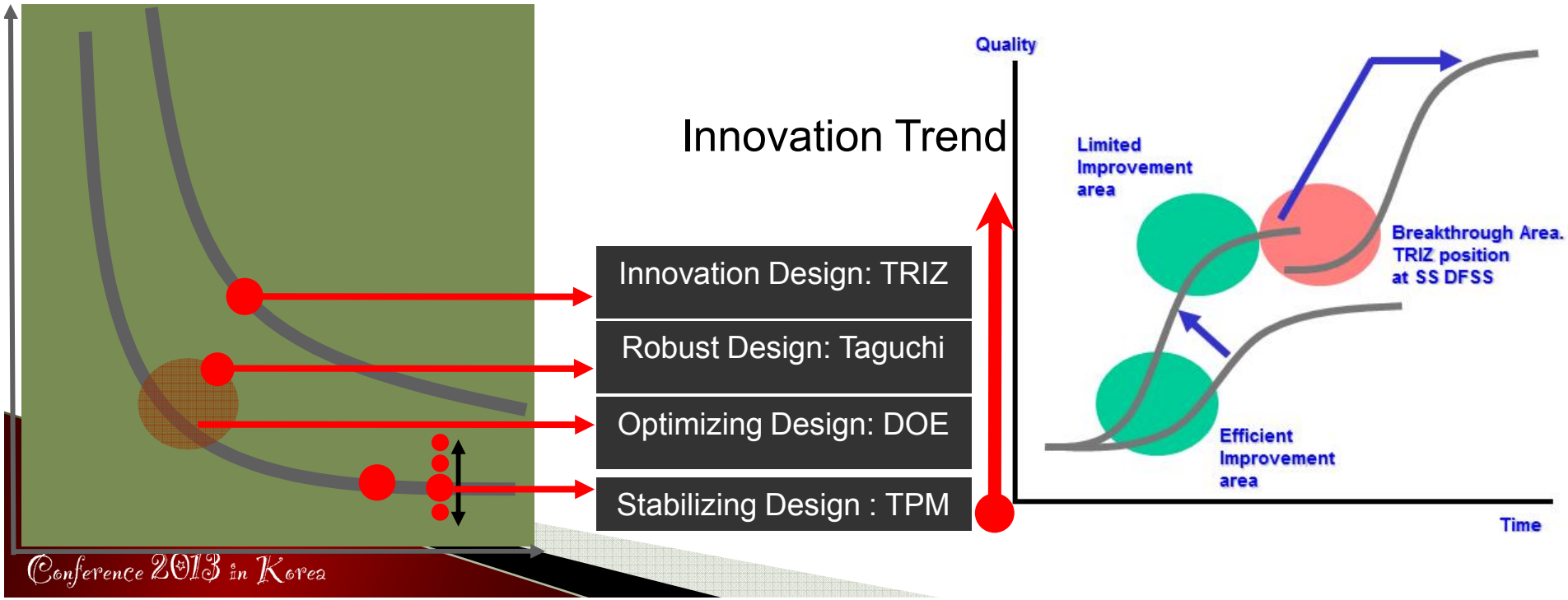
TRIZ is …

- 6sigma is optimization, but TRIZ dispatch (remove) optimization
- The typical approach is optimization, but it does not lead to invention
- An invention must overcome the contradiction



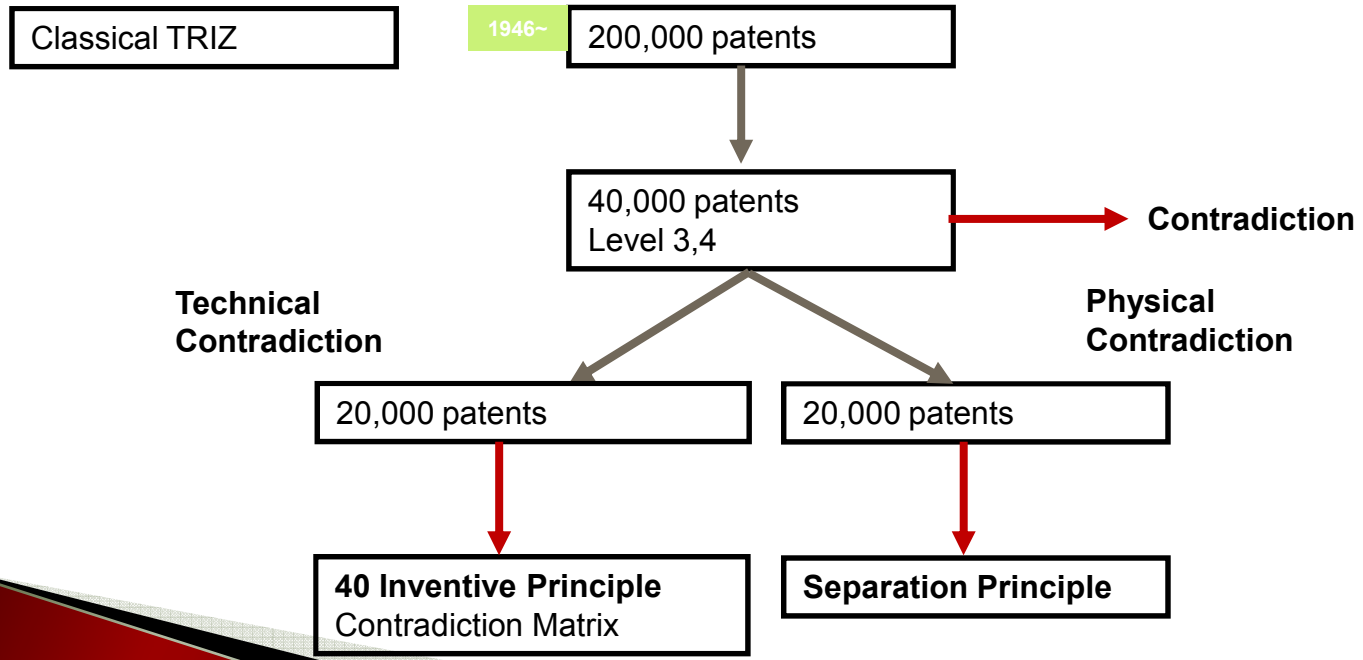


TRIZ Process Level 1

□ An Invention overcomes the Contradiction. How?

– Technical Contradiction(TC) → 40 Inventive Principles, Contradiction Matrix
ex) If the power of engine is improved, then the fuel efficiency can be decreased

– Physical Contradiction(PC) → Separation Principles
ex) The wheel of airplane must exist and must not exist



The Treasure of Classical TRIZ

- Separation in Time
- Separation in Space
- Separation in Scale

01. Segmentation	쪼개어보다	21. Hurrying	안 좋은 것은 후딱
02. Extraction	필요한 것만 뽑아내다	22. Convert Harmful to Useful	안 좋은 것은 좋은 것으로
03. Local Quality	전부 똑같이 할 필요 없다	23. Feedback	피드백이 되게
04. Asymmetry	대칭이면 비대칭으로	24. Intermediate	중간매개물을 활용
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09. Preliminary Counter Action	미리 반대로 조치하다	29. Pneumatics and Hydraulics	공기나 유압을 사용
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19. Periodic Action	주기적으로 동작	39. Inert Atmosphere	불활성환경
20. Continuity of Useful Action	유용한 작용을 연속으로	40. Composite Material	복합재료

TRIZ Process Level 2

□ "Contradiction → Tool → Idea → Result", in contest at company. Practically, is it honest?

One of the typical logic at TRIZ Best Practice contest in company

① The problem is …

② I could find TC

③ So, I derived 2 factor from 39 standard parameters

④ Using matrix, #24 and #14 principles were recommended

⑤ Applying #14, I could solve TC and apply for a patent ……

TRIZ Process Level 2

□ Normal Circumstances, this is usually called “paper work”!

– Many great results after using TRIZ in global company appear as follow…

① The problem is …

② I could not find Contradiction. Too many TC, invisible PC!

→ at this time, many person give up TRIZ,
and say “TRIZ is attractive but difficult to use, it’s just theory)

③ It’s so annoying, the contradiction! I hate contradiction.
I will just apply 40 principles and separation principles. Then Good Results appear

④ Company order me to do presentation at TRIZ contest.
So I must prepare 10 slides for TRIZ result

⑤ So I think “why do #14 principle solve problem?”
“Yes, there is TC between A and B!”

⑥ After assurance about contradiction, I could extract another good solution more

⑦ Finally I could make report “contradiction → matrix → principles → idea → result”

TRIZ Process Level 2

□ Almost real work in the world is paper work. Work and document is typically different

– Core process in Lateral thinking of Edward De Bono

① Typical Brain Storming → 40 principles and Separation principles

② Grouping → paper work, reverse engineering “yes this is contradiction”

③ Concept (called Fixed Point) → “yes this is contradiction”

④ Alternative → after finding contradiction, he could extract another various solutions

– This is TRIZ Process Level 2 : this is true situation, practical way.

– Some kinds of another Creative thinking way based on Lateral Thinking of De Bono
→ TRIZ Process Level 2 (Real situation in Global Company using TRIZ)

TRIZ Process Level 2

☐ Contradiction → Tool → Idea → Result, in contest at company. Practically, is it honest?

– One of the typical logic in TRIZ Best Practice contest at company

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④ Company order to do presentation at TRIZ contest. So he must prepare 10 slides for TRIZ result
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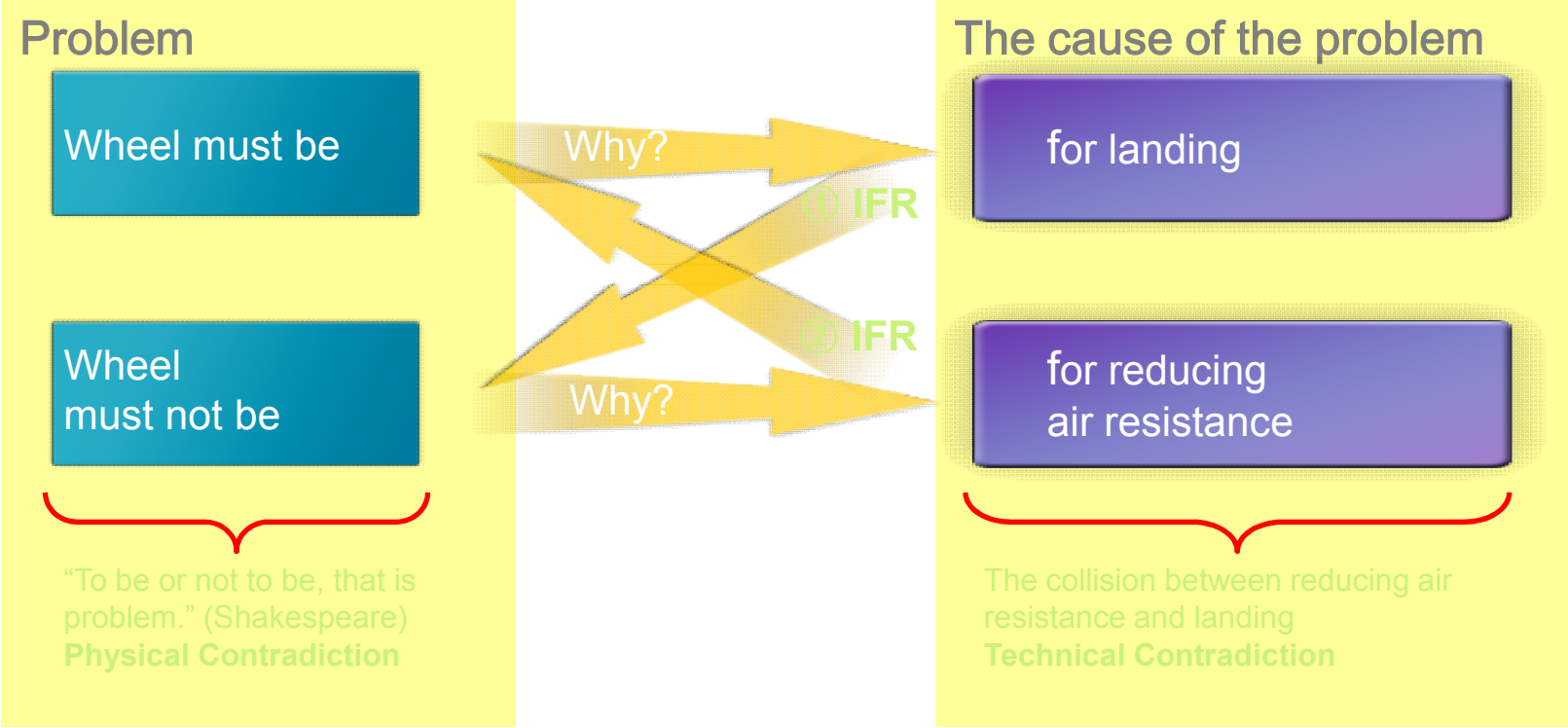
Some kinds of Creative thinking way based on Lateral Thinking of De Bono

TRIZ Process Level 3

- Problem contains Physical Contradiction and Technical Contradiction at the same time
- The cause of the problem can be Technical Contradiction
- The problem itself can be Physical Contradiction



- If you could analyze the structure of problem, you can consider 2 general directions
  - Best use of resources is very important (this is some way of "How to use resource")
  - The Core of ARIZ itself !!!

RCA is not enough. How do we can improve? CECA enough?

- Root Cause Analysis (RCA) is called also 5 Why
- It looks reasonable to remove Root Cause for solving problem
- **But, in reality, it's difficult for expert to remove Root Cause**

1st Why?

2nd Why?

3rd Why?

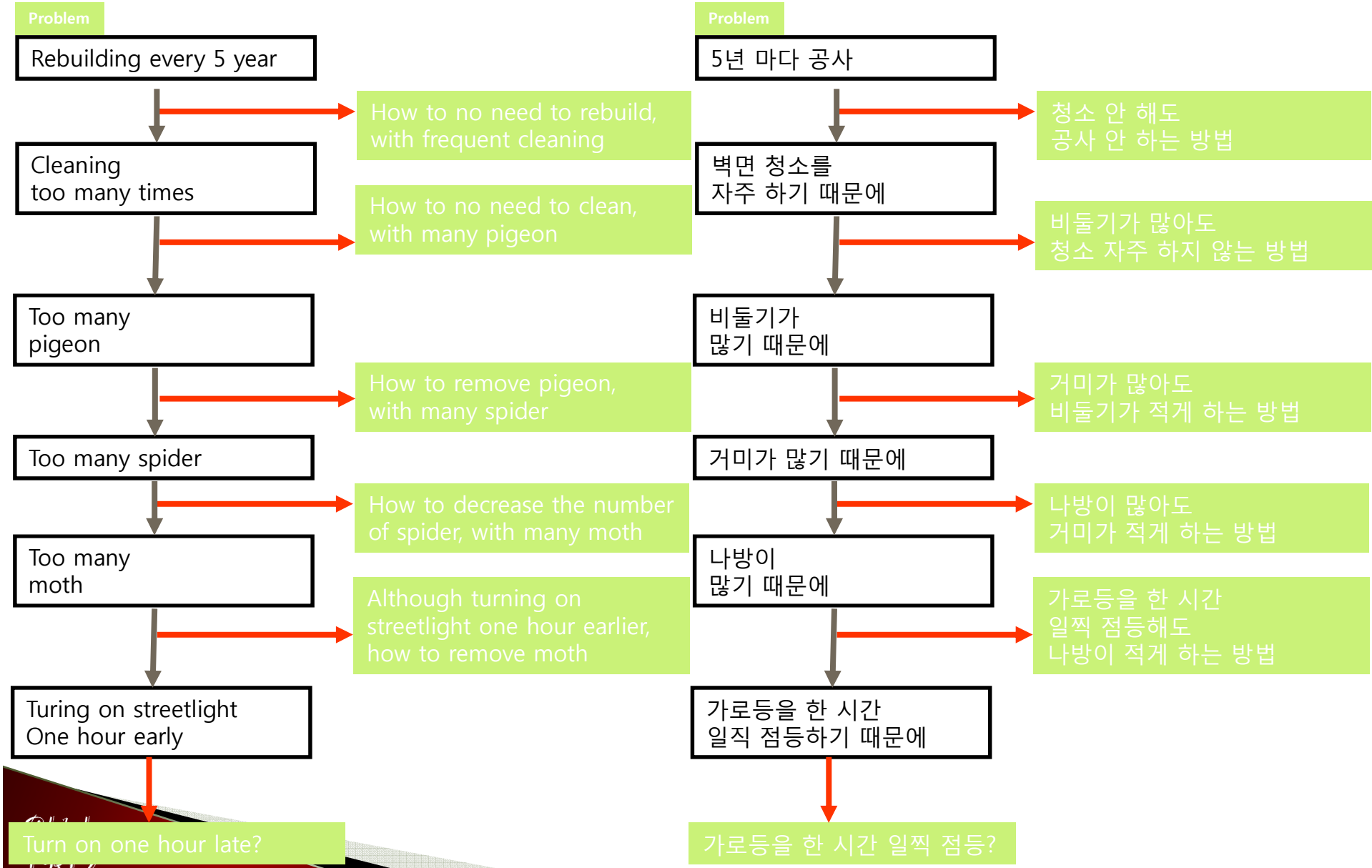
4th Why?

5th Why?

But, in reality, there is the reason why the Root Cause is difficult to remove.

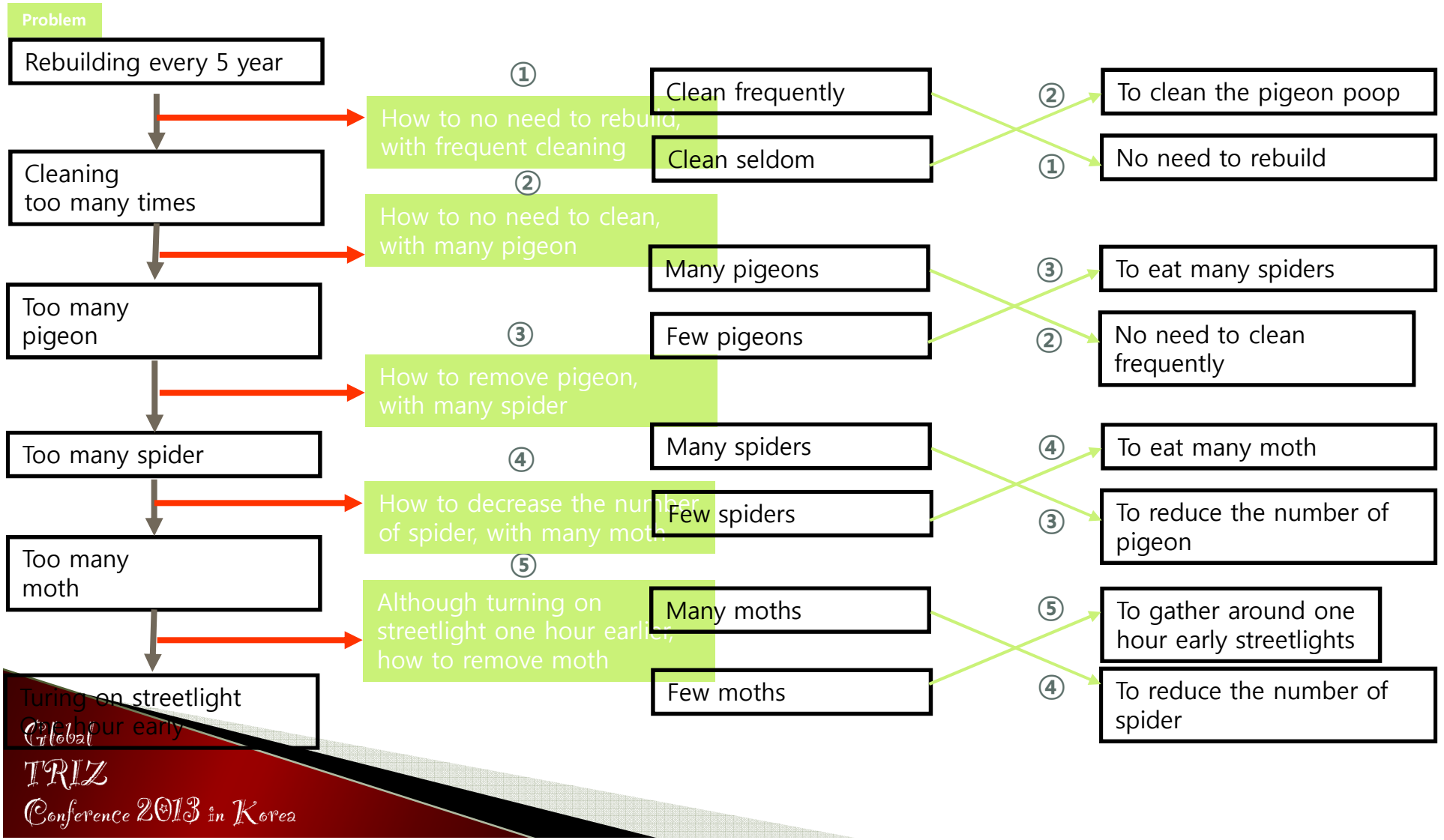
Here some person extract contradiction, Cause Effect Chain Analysis.
But, Harmful Function is just IFR.

TRIZ Process Level 4 : Problem Chain Analysis

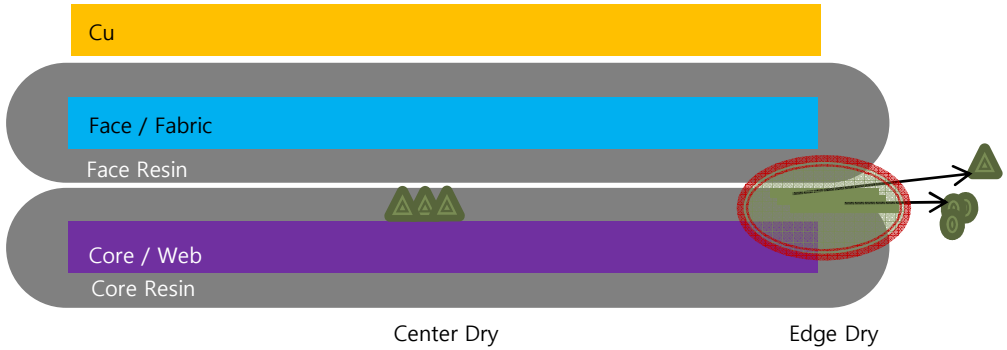


How to extract every contradiction systematically? → Level 4

- Problem Chain Analysis (PCA) provide every possible solutions
- The extracted solution introduce the Physical and Technical Contradictions, PTC modeling

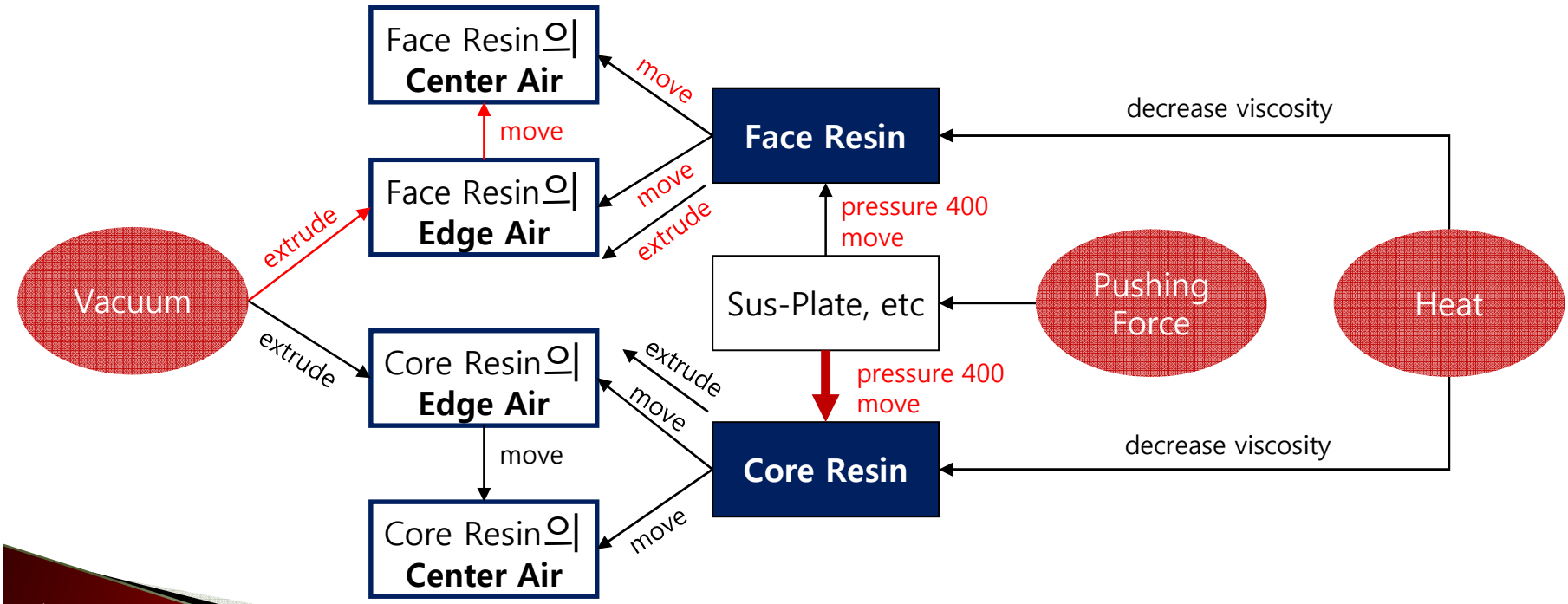


1. System Diagramming

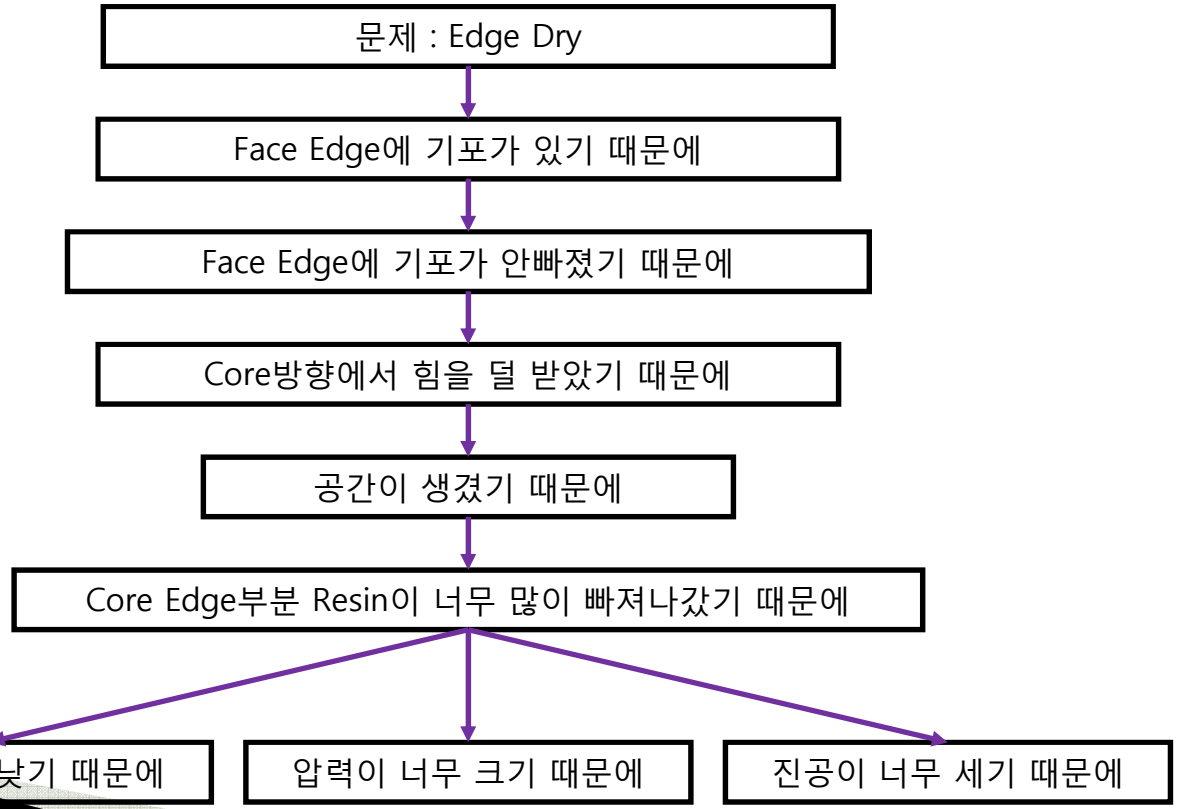


130도 근처에서 Face Resin도 압력을 받는 상태에서 점도가 낮아지지만
Resin이 외부로 삐져나올 정도로 점도가 낮지는 않음.
→ 압력과 점도간의 관계가 중요 변수인데, Core Resin에는 최적화가 이루어지지 않았다고 판단

2. Function Analysis



3. Problem Chain Analysis (improved Cause Effect Chain Analysis)



4. Contradiction Finding

Drill Bit 마모

Filler가 Drill Bit 가는 길에 있음

Filler는 Resin에 Random 분포

Drill Bit가 Filler와의 마찰

X / O → Filler가 Drill Bit 가는 길에 있지만 Drill Bit가 마모되지 않는다

X / O → Filler가 Random하게 분포하지만 Drill Bit 가는 길에 없다

X / O → Filler가 Drill bit 가는 길에 있지만 drill bit와 filler와 마찰하지 않는다

Drill Bit 와 filler 가 마찰하지만 Drill Bit가 마모하지 않는다

5. Separation & 40 Principles

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