

## "Matrix 2003" Questions and Comments

Dec. 29, 2004 by Toru Nakagawa

This is a document of errata, questions, and suggestions from the translator in Japan to the Authors, especially Darrell Mann, with the hope of response by the Authors in near future.

### 0.1 Publication style, etc.

The Japanese Edition will be published in the following style:

Translator: Toru Nakagawa

Book design: Kazuo Gotoh (Ricoh Co., Ltd.)

Publisher: Sozo Kaihatsu Initiative, Ltd., Tokyo (headed by Masatoshi Hotta)

Book size: B5, soft cover, about 90 pages in total.

### 0.2 Book Title in Japanese:

In Japan we are going to publish this book as the second volume of SKI's series of "TRIZ Practices and Benefits". Thus the book title, being translated back from Japanese, will be:

"TRIZ Practices and Benefits. Volume 2.

New Edition of TRIZ Contradiction Matrix. Matrix 2003 (for Technology in General)"

### 0.3 Preface for the Japanese Edition by Toru Nakagawa

This preface was written (on Sept. 19, 2004) and inserted after the Authors' Preface.

It will be shown to you in English translation in due course. **[See the separate page.]**

### 0.4 Table of Contents

The table of contents has been extended a little, as shown in the separate page of this document. The sections and subsections (whose headings are sometimes built newly) are numbered in a hierarchical way. Several lists are inserted for convenience of readers (see below in this document).

## Section 1. Introduction and Background

Following revisions are made in this section and afterwards:

**Subsection headings** are built wherever thought appropriate, and numbered hierarchically.

For example: **1.1 Historical background and the intention of this book**

**1.2 Structure of this book**

**1.3 Structural Change from Classical Matrix to the New Matrix**

**1.4 Structural Change (1) Expanded List of Parameters**

**1.5 Structural Change (2) Parameter Sequence Alterations**

....

When appropriate, some words are added for clarification/explanation in Japanese and are shown in [ ].

When appropriate, some **translation notes** are inserted with the marks<sup>[translation note]</sup> .

Translation notes are shown in this document.

Some important keywords are shown in **bold face**.

## Section 2. Data Acquisition Methods

Figure 2 (flow chart) is revised to show the process logic more clearly.

## Section 3. Physical Contradiction Resolution Strategies

[**Translation Note:** Concerning to the concept of Physical Contradictions, strategies for resolving them, and examples of their applications, see Ref. 9, Chapter 11. In the present textbook, the strategy "4) Separation between the parts and the whole" and the three Inventive Principles relevant to the strategy are added to the table in Ref. 9. ]

## Section 4. Contradiction Matrix 2003 Edition: Details of Information

This section title is inserted as shown above.

And the following **two subsections** are inserted before the body of data.

### 4.1 Description of the items

In the original edition, each of the 48 parameters is described in 2 pages. But in the Japanese Edition, we have decided to show each parameter in one page for reducing the number of pages. For this purpose the headings of items are somewhat simplified, as described in this subsection.

**Title:** Parameter we want to improve: Parameter Number, Parameter Name

**A. Definition:** 'Meaning' of the parameter defined in short sentences.

**B. Relevant keywords:** In the original text this is written as 'Synonyms, Antonyms and Equivalent Meaning'. Though the keywords appearing in the parameter name and in the definition sentences are omitted here in the original text, we have decided to show them here under the consideration that people often scan this part in order to search for an appropriate parameter for representing their problem. We have shown them in [ ], together with some more keywords we think relevant. It should be noted that these Parameters specify the relevant aspects of the problem/system, and hence not only synonyms but also antonyms fall in the same parameter. For instance, the size parameter includes smallness as well as largeness, and the speed parameter contains slowness.

**C. Inventive Parameters that should always be considered:** The original text writes as 'Inventive Parameters that should always be considered for problems where we wish to improve

this parameter'. One to five Inventive Parameters are written in the order of their numbering.  
**D. Inventive Principles that should be considered (in the decreasing order of frequency):** The original text writes as 'Averaged list of other Principles that should be considered where we wish to improve this parameter (decreasing order of frequency)'. 5 to 10 Inventive Principles are described. It should be noticed that in this list the Principles listed in Item C above are not always included, and sometimes listed only in the low degree of frequency.

**\*\*\* Question (important):** The difference between the items in C and D should be explained better. How were the items in C obtained? How should we guide the readers to use C and D? \*\*\*

**E. Combination/Special Principles to be considered:** The original text writes as 'Most likely Combined/Special Principles that should be considered where we wish to improve this parameter'. Refer to Section 6.2 for these principles.

**F. Table of relevant Inventive Principles to be used when we have identified a worsening parameter (Detail):** This is the detailed description of the information of one row of the new Contradiction Matrix shown in the separate sheet.

**G. Note:** Note in the original text.

#### Section 4.2 List of the Parameters and the Inventive Principles to be considered

In the Japanese Edition we have inserted a three-page table of the Parameters used in the new Contradiction Matrix. The Inventive Principles to be considered when we wish to improve each Parameter are also summarized here. They are described on the basis of Item D (Principles in the decreasing order of frequency) and the information in Item C is complemented by showing their Principle Numbers in bold face. (Principles listed in C but not in D are shown at the end of the list with Principle Numbers enclosed in ( ).)

Parameter (Number, Name)	Inventive Principles to be considered for improving the Parameter (in the decreasing order of frequency)
Physical 1. <b>Weight of moving object</b>	35. Parameter changes, 2. Taking out, 28. Mechanics substitution, 10. Preliminary action, 3. Local quality, 1. Segmentation, 5. Merging, 25. Self-service, 24. Intermediary, 30. Flexible shells and thin films, <b>40. Composite materials, 31. Porous materials</b>
2. <b>Weight of stationary object</b>	3. Local quality, 35. Parameter changes, 13. 'The other way around', 17. Another dimension, <b>31. Porous materials, 4. Asymmetry, 40. Composite materials, 2. Taking out, 14. Curvature, 19. Periodic action, 28. Mechanics substitution, 30. Flexible shells and thin films</b>
...	...

#### Section 4.3 Detailed information of the new Contradiction Matrix

Some examples of B. Relevant keywords are shown:

1. Weight of moving object

B. Relevant keywords: [weight, heaviness], burden, [mass], bulk, load, lightness

10. Amount of substance

B. Relevant keywords: [amount of substance, amount of materials, parts number, number of objects], flesh, body, matter, stuff, density, particle-count

21. Stability (of the object's composition)

B. Relevant keywords: [stability of the composition relationship in the system, stability of the composition materials], inertness, deformation, droop, tipping (over), [decomposition], distortion, [chemical decomposition, dissociation], oxidation, rusting, [erosion, change in chemical quality], homogeneity, consistency, delamination

Question (Page 42, 15. Force/Torque, B. Synonyms, etc. )

Original text: ... change of momentum, intensity, lift, drag, ...

Should be: ... change of momentum, intensify, lift, drag, ...

## Section 5. Combination Effects and Resolution Strategies

[Translation Note (page 111): 'Strength of an invention' means that the invention is highly effective and exceeds other alternative means in its functionality, performance, etc. Among possible solutions to a problem, the invention defeats (or wins) others in practical application.]

[Translation Note (page 115): Concerning to the ideas of applying multiple/combined Inventive Principles to solve Physical Contradictions, see Sections 11.3 and 11.4 of "Hands-On Systematic Innovation". As for the ideas of 'Chain of contradictions', see Section 10.4 of the same book. ]

## Section 6. Inventive Principles (Extended List)

[Translation Note (page 117): In the Japanese Edition, the \* marks are attached to the new or revised descriptions of Inventive Principles, in comparison with the texts in "Hands-On Systematic Innovation". ]

[Translation Note (page 118): The explanation here in the original text apparently talks about a specific case and may not be suitable as the explanation to Principle 12. Usually it is explained as: "If an object is requested to lift or lower, redesign the object's environment and eliminate the necessity of lifting/lowering the object." With some extension, this Principle means that in case of requests of lifting/lowering an object, movement, increasing/decreasing temperature, and various other treatment, try to redesign the system and its environment so as to reduce wasteful operations and to perform operations smoothly without wasting energy. Same comment was made in the Japanese Edition of "Hands-On Systematic Innovation". ]

Errata: Page 118, in Principle 10:

Original text: ... (either fully or partially before it is needed.

Should be: ... (either fully or partially) before it is needed.

Errata: Page 119, in Principle 22A:

Original text: ... so that the deliver a positive effect.

Should be: ... so that **they** deliver a positive effect.

### **List of Inventive Principles (Extended version)**

A list of 40 Inventive Principles and 37 additional ones is inserted at the end of Section 6.

Section 7. If A Solution Has Not Been Found ...

### **Section 8. Into The Future**

Errata (Page 131, line 3):

Original text: ... simply that without **working** having worked out ...

Should be: ... simply that without having worked out ...

### **References**

### **Index**

In the Japanese Edition we are going to omit the Index, since we have already made a lot of tables for effective use of this data book.

### **Authors' Profiles:**

We would like to publish here the profiles and pictures of the four authors.