TRIZ Innovation

SIGDOC
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http://www.triz-journal.com
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Why are we here?

- DESIGN PATTERNS: Were probably difficult to understand and learn

- HISTORY:
  1. JV + EG + RH
  2. Enter RJ with the concept of Alexander's Patterns
  3. 48 pages became 250+ pages, the #1 best seller in CS

- WHAT DID THEY DO?
  - Created a framework in which to express solutions to common problems
  - Found a better way to COMMUNICATE the idea
  - The 1995 version: Somewhat Primitive

TRIZ = Theory of Inventive Problem Solving

Теория Решения Изобретательских Задач

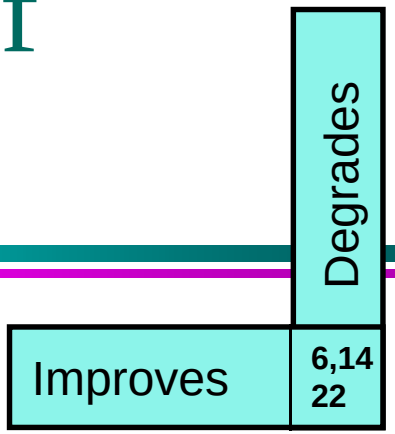
- TRIZ is a Russian acronym
  - 1946-85. Originated in work of G. Altshuller and others in the USSR
  - Global expansion of use and research since the mid-80's
  - Incorporated into Six Sigma and other quality disciplines -- late 90's.
- TRIZ is pronounced like "trees"
- http://www.triz-journal.com for history and research

Two Culturally-Shocking, Underlying TRIZ Concepts

1. **Somebody, someplace has already solved your problem**, or one very similar. Creativity is finding that solution and modifying it to fit your circumstances

2. **Don't accept compromises.** Remove the source of the problem.

There Are 2 Kinds of Contradictions



- Technical Contradictions
  - "Trade-offs" are BAD. Something gets better, something else gets worse
  - Remove the contradiction using the matrix and 40 principles
- Physical "Inherent" Contradictions
  - One object has contradictory (opposite) requirements.
  - Remove the contradiction using separation principles

Hot/cold
Soft/hard
Time consuming/instant
Present/absent

Use the Matrix

For Trade-offs
(Technical Contradictions)

	Worsening Feature → / Improving Feature ↓	1 Weight of moving object	2 Weight of stationary object	3 Length of moving object
11	Stress or pressure	10, 36, 37, 40	13, 29, 10, 18	35, 10, 36
12	Shape	8, 10, 29, 40	15, 10, 26, 3	29, 34, 5, 4
13	Stability of the object's composition	21, 35, 2, 39	26, 39, 1, 40	13, 15, 1, 28
14	Strength	1, 8, 40 15	40, 26, 27, 1	1, 15, 8, 35
15	Duration of action of moving object	19, 5, 34, 31	-	2, 19, 9
16	Duration of action by stationary object	-	6, 27, 19, 16	-
17	Temperature	36,22, 6, 38	22, 35, 32	15, 19, 9

40,26, 27, 1

Then go to the 40 Principles for solution concepts

Resolve Physical Contradictions 4 Ways

1. Separation in time
2. Separation in space
3. Coexistence of the contradictory properties, in different sub-systems or different regions of phase space
4. Solve the problem in the super-system or a sub-system, not in the system as presented

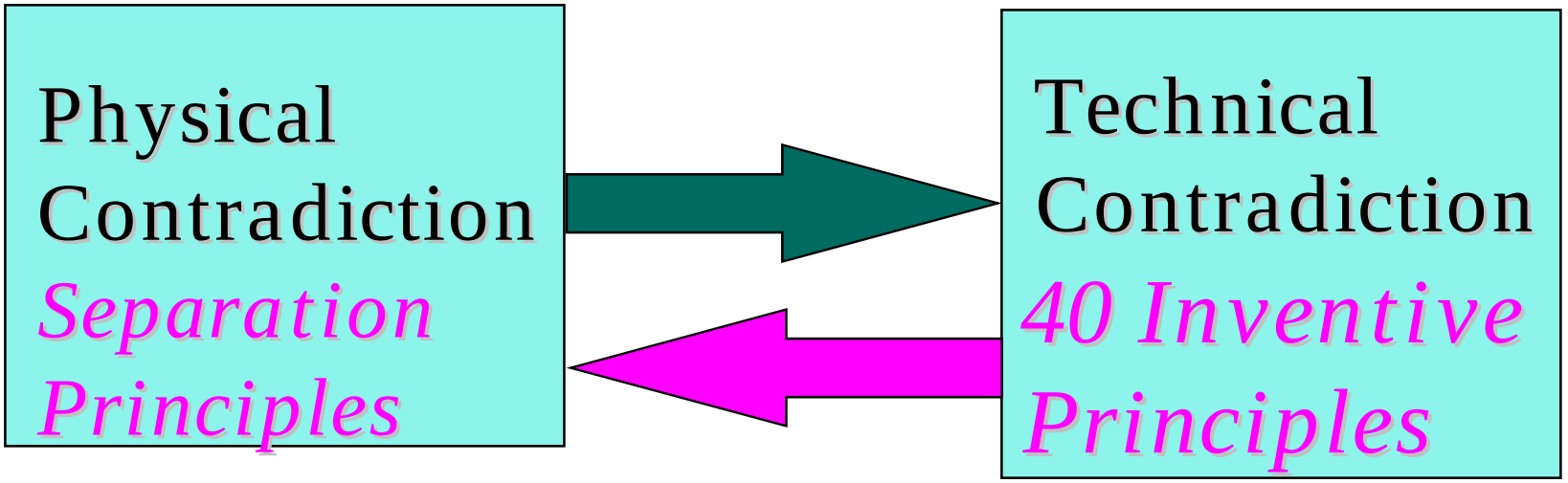
Removing Physical Contradictions

- Try the 4 ways
- If you still have a physical contradiction, convert to a technical contradiction and use the contradiction matrix
  - Ask “why?” Example:

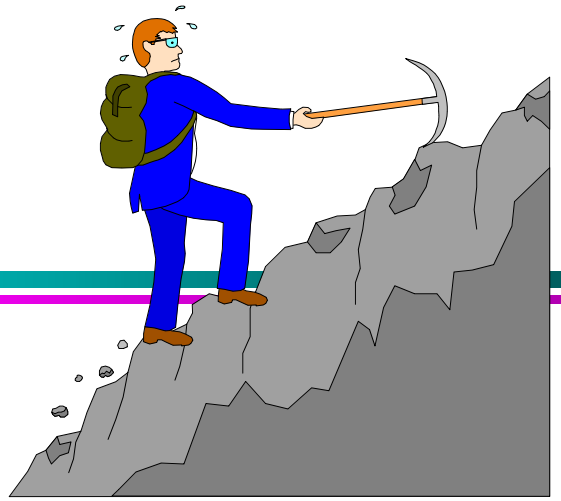
The candy needs to be cold. Why? So the chocolate won’t melt.

The candy needs to be hot. Why? So the liquid will move faster and production will be faster.

Try Both Ways



Next Steps



- Apply TRIZ to ***any*** innovative situation.
- Integrate TRIZ with all your communication and system development needs
- Read and contribute to
  The TRIZ Journal

  http://www.triz-journal.com

Example of Contradictions

- Example 1: STRENGTH gets better while WEIGHT gets worse
- Example 2: Bandwidth gets better while power requirements get worse
- Example 3: Information gets better while retrieval time gets worse
- Example 4: Capability of a program increases while usability (even, the ability to communicate what the thing does) decreases - i.e., the End User Experience gets worse

Structural Design Patterns

- 1. Adapter Pattern (make an interface into what an object expects) = Mediator Pattern (negotiate a temporary link)
- 2. Bridge Pattern (relate an abstract class with a concrete class: TV Remote) = Principle of Extraction (separate parts of a system)
- 3. Composite and Iterator Pattern (one interface to negotiate list traversal) = Universality Principle (promote uniformity of a feature)

Structural Design Patterns

- 4. Decorator Pattern = Principle of Nesting (Russian dolls) and/or Flexible Membranes (restating the obvious!)
- 5. Façade Pattern (deal with one user interface) = Principle of Consolidation (bring functions together - such as a player that will play all formats available on a CD-ROM)
- 6. Proxy Pattern (access control of an object, such as preloading an image) = Principle of Parameter Change and/or Phase Transition

Questions and Comments

- Thoughts?
- Ideas?
- How can this help you?