

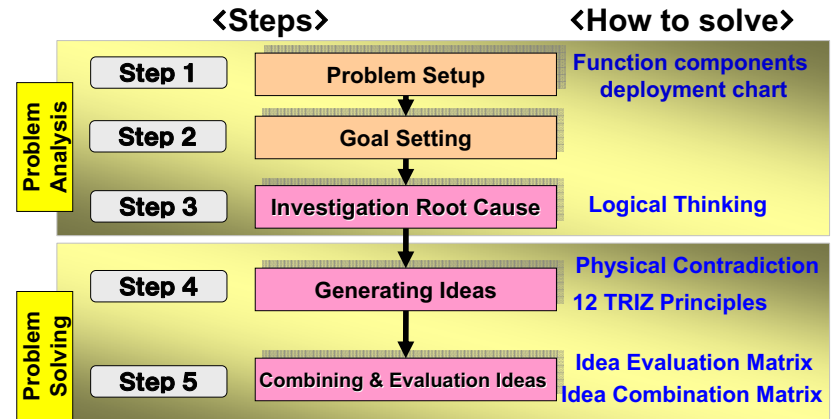
# Creative Problem Solving Process Where We Use Only 12 TRIZ Principles: Generating Ideas and Combining Ideas

Creativity Study Group

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# Problem Solving Process

This process consists of 2 parts, Problem Analysis and Problem Solving. These parts include 5 Steps.



## Step for Identification of Underlying Causes

### Executing Brain Storming

- To share the knowledge about problem by function component deployment chart
- To identify underlying causes by Brain Storming

### Got hurt by being caught between pivoted door and wall

- Due to narrow space between door and wall
- Due to wide door
- Due to hard door
- Due to rotating door
- Due to heavy door
- Due to high rotation speed
- Due to small radius of door
- Due to hard external wall
- Due to fixed wall
- Due to larger hand
- Due to larger foot
- Due to inertia force of door

### Extraction from Problem

#### Got hurt by being caught between pivoted door and wall

- Due to narrow spacing between door and wall
  - Due to small diameter of external wall
  - Due to wide door
  - Due to fixed door against the rotating axis
  - Due to hard wall
- Due to inertia force of pivoted door, quick stop is difficult.
  - Due to wide door (Problem added to Method)
  - Due to thick door (Problem added to Method)
- Due to high pressure for shutting in
  - Due to large rotation torque for pivoted door
  - Due to hard pivoted door
    - Due to thick door (Problem added to Material)
    - Due to hard door
- Due to hard external wall
  - Due to thick external wall (Problem added to Material)
- Due to heavy door
  - Due to thick door (Problem added to Material)
- Due to no detection by sensor

### Extraction from Wish

How can we change? Switch from demark to merk.

Minimizing the force while caught between door and wall. (Merk)

Consider some components save door and external wall

- If door axis can absorb the strong force of door, ...
  - If the axis is slim, ...
  - If the axis softens, ...
- If ceiling can absorb the strong force of door, ...
- If floor can absorb the strong force of door, ...
- If bearing can absorb the strong force of door, ...
  - If inner diameter of bearing is large, ...
  - If bearing softens, ...

### Selected Underlying Causes

|                         |  |
|-------------------------|--|
| Extraction from Problem | Due to small diameter of external wall<br>Due to wide door<br>Due to hard door |
| Extraction from Wish    | If door axis softens, ...<br>If inner diameter of bearing is large, ...        |

## Combining & Evaluation Ideas Step

### Generated Ideas

|   | Segmentation | Local quality | Asymmetry | Nested doll |
|---|--------------|---------------|-----------|-------------|
| 1 |              |               |           |             |
| 2 |              |               |           |             |
| 3 |              |               |           |             |

### Combining Ideas

|    | Best Idea | Better Idea | Third Idea |
|----|-----------|-------------|------------|
| 1  |           |             |            |
| 2  |           |             |            |
| 8  |           |             |            |
| 10 |           |             |            |

### Evaluation Ideas

|   | Idea | Quality1 | Quality2 | Cost | Delivery |
|---|------|----------|----------|------|----------|
| 1 |      | +        | S        | S    | +        |
| 2 |      | +        | S        | S    | S        |