

## What is TOP-TRIZ?

TOP-TRIZ is a step by step list of inventive guidelines focused on problem identification and solving. TRIZ improves upon traditional trial and error methods or brainstorming in speed and quality of problem solutions. Traditional problem solving strategies frequently fail to fully take into account the source of the problem to solve, so people attempt to generate ideas randomly stuck in inertia of preconceived notions. TOP-TRIZ improves upon traditional problem solving by giving users a guide through problem solving and innovation to produce breakthrough solutions that solve problems fast without deterioration of other functions.

TRIZ was invented by Dr. Genrich S. Altshuller in the former Soviet Union. It is a Russian acronym that means “The Theory of Inventive Problem Solving.” Classical TRIZ was developed through analyzing 200,000 patents. Dr. Altschuller identified that there were 173 typical changes inventors used to solve problems, and most of these were done through tradeoffs. However, he saw that truly breakthrough solutions eliminated the tradeoff entirely. Dr. Altschuller recognized engineering evolution trends to help predict technological progression, and called these principles the Laws of Engineering System Evolution. These 173 changes were revised down to 76 standard solutions and out of that 40 inventive principles.

TOP-TRIZ is a modification of Classical TRIZ by Mr. Royzen with a focus on “Tool-Object-Product” focus. This modification simplifies Dr. Altschuller’s method by eliminating the need for an additional special method, as well as streamlining the entire TRIZ process and making it more visual.

The process starts with formulating the problem. This requires the innovator state the purpose of the system, the objective, current problems, and why known existing known solutions are insufficient. Next the user analyzes the situation. This involves analyzing the basic function of the system, the structure, constraints and alternatives. Properly analyzing the problem allows the innovator to work to solve the root cause of the problem and why it exists.

The next step is to classify the problems. Each problem classification has its own problem solving steps with TOP-TRIZ. If the root cause needs to be uncovered, the user can follow steps to reveal the cause. If the user needs to detect or measure something in a complicated situation, there are steps for that too. The problem solving steps also cover the conflict solving algorithm and harmful action elimination as well as fixing an insufficient action or even searching for a new useful function not yet uncovered.

The core of TOP-TRIZ focuses around the Function Model. The useful function is modeled with a Tool, which is the source of the useful function, the Field which the Tool creates to act upon the Object which turns the Object into a Useful Product. Through the TOP-TRIZ process, users identify and justify the usefulness and source of the tool and the field it creates. If these are unknown, candidates can be found from the field that is needed to turn the object into a useful product.

The benefits of using TOP-TRIZ are well proven with many patents credited to it. For instance, a problem with a power connector shorting in air planes had gone unsolved for 10 years, but a solution was found in 2 hours with TOP-TRIZ. Boeing had a problem with space limitations of the engines of a new 767 fuel tanker. A problem unsolved for 3 years had a solution developed in just 4 hours of introducing TOP-TRIZ.

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If the company has a failure in a system that they can't find the cause to, a unique feature of TOP-TRIZ is to find the cause of the failure. The first step of problem formulation simply changes to problem *reformulation* where the engineer uses TOP-TRIZ as if the failure was the desired end product.

TOP-TRIZ is guided innovation. It helps users develop solutions faster, and be more effective with their creativity by prompting and channeling it into critical innovation criteria. Using TRIZ can eliminate the need for any tradeoffs by developing more elegant breakthrough solutions.