

Research on the Method of Packaging Creative Design According to TRIZ Theories System

Lijun Xu

Packaging Engineering Department Nanjing Institute of Technology Nanjing, China
E-mail: Shuishui524@163.com

Abstract:

The packaging innovation is mainly decided by a concept design. The core of innovation is creating new and competitive work principle. Creative thinking ability is the core of innovation. It is a kind of deluxe appearance of mankind's thinking, and it is a successful implement thinking system for conceiving new ideas, which are related a certain problem. It is useful for finding and solving problems to use the innovation method based on TRIZ in practical packaging design. The procedure can be repeated, and the result can be forecasted easily. It is more scientific. Therefore it can help a designer to find more opportunities for invention and promoting packaging. We design the complete packaging solution to the feature and influence of fruits in Xinjiang Wujiaqu area.

Keywords: packaging design; innovation thinking; TRIZ theory; fruits package

1. TRIZ doctrine

1.1. TRIZ theory definition

English meaning of TRIZ: Theory of Inventive Problem Solving, also called TIPS. It can be a theory apprehensible for inventing a problem to resolve. It was summarized by the former Soviet Union inventor such as Genrich. S. Altshuller, through the analytical researching the invention of the patent to 2,500,000 near high levels in the world. And it was summed up 40 principles and rules which are the process mankind carry on invent a creation to resolve a technique problem follow of. Building up a constitution of comprehensive theory system called TRIZ, which is from resolving a technique problem, carrying out various methods, calculating ways of creative development.

Dr. Savransky, the famous international expert of TRIZ gives TRIZ definition as follows: TRIZ is according to the knowledge, facing to a system method of mankind invention problem resolving.^[4]

1.2. An overview and content of TRIZ theory

The concrete elucidation is as follows:

1. TRIZ is according to the method of knowledge

1)TRIZ is the knowledge which invents a problem to resolve an inspire type of a method.

2)TRIZ is a great deal of adoption natural science and the effect knowledge in the engineering.

3)TRIZ exploits the appearance knowledge of the problem realm.

2. TRIZ is the method which faces to a person

The inspire type method in TRIZ faces to designers, not faces to machines. TRIZ theory is according to resolve the system as sub- system, distinguishing the ful-

fillment of beneficial and harmful function. These decompositions are decided by problems and environment, and they themselves have the randomness. They can be quickly and easily used in the design work by designers.

3. TRIZ is a systematical method

1)In the TRIZ, problem of analytical adopted universal usage and detailed model, and problem's systematizing knowledge is important in that model.

2)Problem-solving process is one is a process, which is the already convenience application knowledge systematical of ability.

4. TRIZ is the theory to invent a problem to resolve

1)To obtain an innovation solution, it needs to solve to the confliction in design, but the steps of resolving some conflict doesn't be known.

2) The circumstance of unknown needs usually can be replaced by the purely imaginative comprehension.

3)Usually the ideal solution can acquire through the resources of environment or system.

4)Usually the ideal solution can be concluded from the already known of the system evolution trend predict.

2. The innovation thinking and method of design

2.1. The meaning and sense of innovation thinking

The creative thinking ability is the core of creative ability. The current of our country is in the aspects of industrializing, and there is still bigger margin in knowledge and the technique creative aspect and flourishing nations. Therefore, the margin which removes a Chinese and flourishing nation wants to depend innovation, and developing a Chinese nation demand to develop people the crowd's creative ability also. The Chinese nation is the

race of full of frontier spirit. We the ancient times, modern ages has to creation, creative quest, and our country the party and Beijing leadership values creation and innovation very much. Therefore, we are the youth student's generations to even want a development and train creative power, and creative ability.

2.2. Creative skill

Creative skill is some principles, techniques and methods summarized by the creation learners according to the development regulation of creative thinking. In the practice of creation, these creative skills can improve people's creation, creative thinking ability, and promote the carried out rate of the creative result.

The category of creative skills I—which is classified by someone such as Huitian Zhao according to a basis nature formation, as follows form:

Table1. The innovation designs (Feb, 2002)

Intellectual inspiring method	Brains storm method, MBS method, write from memory type BS method, card type BS method etc.
Associated method	Free association of thought method, associate a method and come in and go out a method, focus method compulsory
Characteristic method	The characteristic enumerates a method, weakness to enumerate a method and become to enumerate a method
Establish to ask method	The 5 W1 H method, John James Osborne's examination method
Combination method	Oneself combination method, assist to match a combination method, appearance analysis a method
Card method	KJ method, NM method

The category of creative skills II—which is classified by Qiaocheng Gao who is a famous Japanese creation learner from the thinking type, as follows form:

Table2. The innovation designs (Feb, 2002)

Proliferation discovery skill	Free association of thought method, freely allied viewpoint, compulsory association of thought a method, the type compares allied viewpoint, special associate a method, discuss personally a skill and collect an intelligence report skill
Synthesize concentration skill	The generally comprehensive skill, card type synthesizes a skill, technique development a skill, sell a skill, Predict skill and plan skill
Development of creative consciousness skill	The spirit skill, the consultation skill, mental play skill, thinking changes a method

The brains storm method is to apply at the earliest stage with the most in common use in many creation skills. It is the first creation skill in the world from the American by John James Osborne, and it's also called

the intellectual inspiring method, which is a kind of skill with creative community. This skill is extensively spread in an international community, getting through development and innovation by all countries learners, further with abundant and perfect. In the front period of the project design in the plan design, using your heading storm method can produce various design projects, and it will also discover an existent problem in the discussion and conceive the process. It is a part likeness discussed with the article later on TRIZ invention design method, which is to invent the problem and to resolve the problem.

3. Cases of design Application using TRIZ theory

3.1. Cases proposed on design

Xinjiang Uygur autonomous region, for short Xin, which is in the northwest border area of China. She has 166 millions square kilometers, which is one-sixth of total territory of China, and is the area of special provincial administrative region. Xinjiang has been a number of ethnic neighborhoods, and all nation's culture and customs and amorous feelings which have rich ethnic feature of tourist culture landscape. She's loved by the Chinese and foreign tourists. She located in the hinterland of Eurasia continent, and with advantaged resource of soil, water and sunshine. It is very favorable to the crops growing because the more hours of light, more accumulated temperature, much temperature differences between day and night, and longer frost-free. She's years solar radiation is second to Tibet, which is useful for the growth of the crops. Xinjiang is named of "home of fruits", which has thousands of special trees and fruits. She is going out of the Tianshan into the country with an abundant variety of characteristic fruits, and is slowly building into international markets and is very popular with excellent quality in more than 50 countries and Hong Kong, Macao and Taiwan regions. At present, the developed countries made many achievements because of developing the techniques for fresh fruits. Many new product of packing of fruits are welcome by the food manufacturers.

3.2. CPS description

Complete Packaging Solution is based on the packing of products, from the package design, test, manufacture, supply, store- transportation, to the packing operation, waste recovery and in a series of products and services. For the fruit, the foremost is from the distribution of the environment and its own characteristics, and integration of the logistics process. It can offer effective guarantee product quality, to save the cost, in accordance with the

relevant standards and environmental requirements of the Complete Packaging Solution.

We should focus on the leading brands development in Xinjiang areas, and implementation of the brand of packaging. We should consider fully on the characteristics of the fruit, market and consumer psychological factors in choosing the packaging materials and design, in order to elaborated packaging, brand packaging and good fruit tastes. It's formed production-sales chain of the "Famous fruits—fine packaging —wholesale markets (trade enterprises)". And we should also develop the new situation of industrialization, speed up the main sections of the industry development.

3.3. Applying TRIZ analysis problems in theory

As a kind of methodology, TRIZ provided process model, tool and method towards new design, improving design, again concept designing stage for designers.

According to the content and methods of TRIZ theory, we research on the packaging of product itself. Hami melon, grape, watermelon is a famous special traditional in Xinjiang, and enjoyed high reputation and popularity in the domestic market, and has a strong regional production. But there are several problems in fruit market:

1. Packing form a single, low grade

Overall, especially the packaging of medium and high grade fruit in the fruit sales is still low, and the packaging carton size, printing specifications and quality is variety. "First-class product, second-rate packaging, third-rate price" remains widespread. The high quality fruit production of main producing areas has not fully reflect their superiority, and the fruits have a very big choice of packaging.

2. Producers select the lack of autonomy of the package

Currently, the main producing areas of fruit sales are still the main business buyout. Most fruit operation households are only on behalf of fruit vendors to resume foreign fruit, and the fruit companies often have the final say when choosing the fruit packaging. Many fruit vendors use own box, and most dealers have no choice of the fruit packaging, and they can not form their own brands and independent reunification of packaging.

3. Packaging and labeling is not prominent, branding ineffective

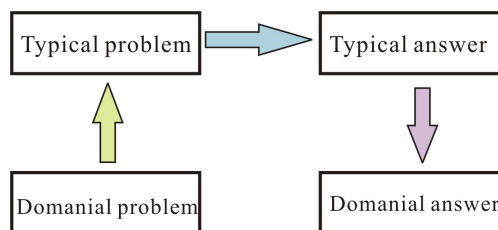
The main producing areas of fruit has long been constrained by various factors, and did not been aroused enough attention in the fruit packaging. Therefore, there is no unified brand and logo to the basic packaging of fruits, and can not be highlight the origin and characteristics of the name. There is not conducive to expand outreach and improve the visibility of fruit just general using of some non-registration, no credit and no brand clutter regional culture.

Existing problems for fruit packaging, the program

planning is around the fruit brand building of Xinjiang region. It is implemented to the implementation of brand packaging, packaging material selection and packaging design, fully taken into account the characteristics, market characteristics, consumer sentiment and other factors of the fruit. It can attractive fruits' packaging, branding and quality complement each other, and form a "Brand fruit—beautiful packaging—wholesale (trade enterprises)" of the production and marketing chain. It also can develop a new situation of the fruit industry, and speed up the pace of the fruit industry in the main producing areas.

3.4. Applying TRIZ solved problems in theory

TRIZ adopts the mode of thinking of science, and a series of tools. It becomes the particular problem from abstracting first standard or general problem, then adopts a standard method to resolve, gets a particular solution finally. As follows the diagram shows:



The problem solving process of TRIZ
Figure1. Process of TRIZ

For watermelon, melon, grapes and other fruits in Xinjiang, combined with the transit environment of the flow-field in Xinjiang and physiological characteristics of these fruits, we illustrate the Complete Packaging Solution by using TRIZ problem-solving theory, as follows:

Step1: In order to analyze the physical characteristics of fruits, we test the temperature and humidity with optimal storage and transportation of the fruits, control atmosphere, chemical preservation, cold storage and other related tests. Through analysis the environmental conditions of storage and transportation of areas, we initially determine mode of transport, transport, vibration, shock intensity and so on. To the Xinjiang watermelon, melon, grapes, the transportation is "from north to south", and temperature and humidity changes more severely, we generally choose the train transport.

Step2: Picking fruits of watermelon, melon, grapes, depending on the size, color grading.

Step3: We conduct pre-cooling treatment, drug treatment, and strengthening the capacity of storage.

Step4: Watermelon and cantaloupe can be selected all kinds of plastic wrap, and grape is placed in clusters into the storage bag or wrap.

Step5: Watermelon and cantaloupe can be used

foaming sets of PE, EPE, and then placed into the corrugated board. Add fresh grapes into bags or plastic wrap after the interval can be placed in corrugated board or a pit molded tray.

Step6: Put into the healthy processed hay and paper between fruit and cushion.

Step7: There are corrugated boxes, foam boxes, plastic boxes, wooden, bamboo basket, etc. can be selected. If it is difficult to recycle boxes, we can use all kinds of fresh, moisture and standard corrugated boxes; if the box with high recovery rate, you can use plastic packaging.

Step8: According to the need of transport and sale, we improve on the box, such as the design of transportation tank and the structure of easy to show.

Step9: We set into the number of fruit by the selected standard of boxes, and initially select the appropriate length and width according to the relevant information.

Step10: According to the formula related Kellicutt, we can obtain compressive strength, combined with the weight of each box, and the measured appropriate stack layer.

Step11: Selecting the criteria transfer tray. There exciting transit tray are plastic tray, corrugated pallets, wooden pallets, molded pulp trays, and all kinds of bamboo, cotton, wood pallets have been gradually developed applications. In Xinjiang region, there are a large number of abandoned cotton stalks, cotton stalks could be considered abandoned as the substrate, through appropriate processing, and can be made of cotton, fruit packing trays used to transit.

Step12: We design elated transportation package to strengthen the brand identity, characteristics, effects, and better guide the transport packaging in the handling and storage.

Step13: Determine the method of binding, packing and the recycling programs of the sold-packaging.

Step14: We should analysis the number of experimental design of packaging solutions, and feedback unreasonable design. Finally we can be optimized packaging solutions.

3.5. Innovation and conclusions of program design

Innovation is the main subject of the use of TRIZ theory. The whole set of Complete Packaging Solution of their production design against the influence and characteristics of fruits and vegetables in China's Xinjiang region

of Wujiangqu. Brand, logo and marketing strategy, security technology and its implementation, supply program of packaging material is a project of this subject innovation, and is the different from other similar signs of the packaging. It can be optimized Complete Packaging Solution through the product dropping method of crisp value, the cushioning material curve of coefficient of static buffer, the buffer material legal determination of vibration transmission, such tests integrated transport package design packaging solutions on a number of experimental analysis and feedback unreasonable design.

4. Conclusion

The thinking of creation ability is the core of creative ability, and the core stage of product creation is the design conception of product. The core of the design conception is to create the new and competitive ability of work principle. Through the analysis and comparison of the international designing theories, TRIZ theory was put forward originating thorough the research and analysis of the whole world patents. It's not only practical, but also strong maneuverability. The theories workers should speed up the TRIZ study and control a step, and make expansion application as soon as possible in our country enterprises, let it produces result of the product technique innovation in our country enterprise.

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