

## I. INTRODUCTION

TRIZ theory is the solution to the problem in creative design, the theory of product evolution and the principle of conflict resolution. On the one hand, creative thinking method of TRIZ theory can effectively break the thinking set and expand the creative thinking ability, and on the other hand, the creative thinking method provides scientific problem analysis method and guarantees seeking creative solution<sup>[1]</sup> of problem according to reasonable approach. In the face of the status quo of serious imbalance between the present firefighting emergency rescue equipment and the rapid development of high buildings in China, and the global firefighting problem short of effective technical means but with the increasingly high building fire, the society needs some practical fire escape creative ideas and effective high building fire rescue methods to be implemented early so as to bring broad business opportunities for the domestic building fire prevention facilities and equipment market and also protect our peaceful and harmonious society. Applying TRIZ to analyze the innovation highlights of high building fire escape facilities and solve the troubles of previous inadequate firefighting devices, inadequate technical support and inadequate management measures.

## II. STATUS QUO

Since the 19<sup>th</sup> century, the high buildings emerged, and in the 20<sup>th</sup> century, high buildings have spread all over the world, and ultra high-rise skyscrapers were higher and higher. In the 1980s in China, with the reform and opening up policy implementing as well as the rapid development of economic construction, high buildings began to spring up like mushrooms from the ground. Moreover, high buildings have been regarded as the mark

<sup>[2]</sup> of civilization level, technical development and comprehensive strength of a city, a region and even a country. However, from the trend of the increasingly high building fire, we should be fully aware of the seriousness of potential high building fire hazards, the ruthlessness of the consequences arising from fire, and the limitation of technical equipment as well as the urgency of avoiding and reducing the fire hazard to the maximum extent.

China's high buildings started late but developed rapidly. The problems in fire prevention are worrying and mainly reflected in the following aspects: inadequate firefighting devices, inadequate technical support and inadequate management measures. At present, high buildings generally have congenital fire hazards such as "Short in Weight" of firefighting facilities, bad quality performance, incomplete functions, illegal use of equipment, etc. The creation of high buildings, from design to construction, has high requirements and lots of links. Because of the restrictions by various subjective and objective reasons, it is common that high buildings have congenital fire hazards in the fire compartment, segmentation measures, concealed works and material use.

## III. IMPORTANCE OF TRIZ

The core of TRIZ is the technology system evolution theory, conflict resolution is the evolution impetus, and to minimize problem complies with ideal technology system<sup>[3]</sup>. Resource is one of the core vocabularies of TRIZ theory, and the thought always penetrates through TRIZ theory<sup>[4]</sup>. The key to utilize resource reasonably is to directly use or reintegrate the existing system resources which can be used for solving problems so as to implement functions, and finally, the design product will be near to its ideal state.

In China, there are more and more high buildings. The skyscrapers with the height of 100m or more also continuously "Take Root" in China. In case of any fire, the aerial ladder truck is not as high as the skyscraper. At present, the highest aerial ladder truck is only 62m in the world. Therefore, once the stair fire happens, the aerial ladder truck is totally useless. Aiming at the problems and defects in high building firefighting facilities at the present stage and taking TRIZ innovative design theory as the guidance, it puts forward the necessity of the innovation in preventing high building fire<sup>[5]</sup>. Besides, with the design examples as the basis, in combination with the ideal solution of innovation theory and technical