

# The Principle Research of Ammunition Weapon Scrap Destruction

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**Abstract.** Many varieties of ammunition can not adapt the tactical requirements and are eliminated. The processing of scrap ammunition is a long-term task. Foreign ammunition destruction situation and the principle of ammunition weapon scrapping destruction are expounded detail in this paper. Destruction of ammunition should adhere to safety first, strict destruction management, pay attention to the pollution prevention and recycling. The contents of this paper have important guiding significance for the destruction of ammunition weapon.

## The introduction

Ammunition became scrap ammunition finally because of the constant change of the quality condition[1-3].

With the continuous development of technology, many varieties of ammunition can not adapt the tactical requirements and are eliminated[4-7]. Therefore, the processing of scrap ammunition is a long-term task. The existence of a large number of scrap ammunition will not only consume large amounts of people, material resources, but also produce bad influence for ammunition storage, allocation, transportation, use etc. Part of the scrap ammunition has poor safety, exist safety hazard. The major accidents can be caused because of a bit careless. The normal ammunition technical support is affected. The accidents can also cause significant loss of life and property. The processing of scrap ammunition needs to rely on the necessary facilities[8-9]. The inflammable and explosive ammunition is eliminated the danger after processing by a series of technical methods. And valuable materials are recycled. The scrap ammunition processing activities have great security risks because of ammunition internal flammable and explosive characteristics. It is a strong technical and high security requirements professional activity. Scrap ammunition disposal is an important research topic around the world. At present, there are many kinds of method to deal with waste ammunition[10-17].

Buried deep, blow up, decomposition method and burning method are traditional destroy method. With the constant improvement of scrap ammunition processing requirements, modern ammunition disposal technology has also made great technological progress. Melting, shaped cutting, water cutting, high pressure liquid nitrogen cryogenic cutting and the laser destroy methods have sprung up constantly[18]. The work environment of ammunition destruction has become more safe and stable. The environmental pollution is reduced greatly.

Whether an ammunition weapon should be destroyed or not, its life should be test first, so bellow a kind of pearson general test method is introduced first.

## The Pearson $\chi^2$ General Test Method

The pearson  $\chi^2$  test method is widely used by engineers. It can be used for both the situation that the mother individual is discrete random variable and the situation that the mother individual is continuous random variable. And whether the parent distribution parameters is known or unknown , this method is always effective. It can also be used for the complete sample, censored

sample or packet date. Generally speaking, seven to twenty groups will be divided and there are no less than 5 individuals for each group.

Input requirements of Pearson test are as follows:

The input data with the format as :

- (1) The original hypothesis distribution function is  $F_0(x)$  ;
- (2) The amount of test sample is  $n$ ;
- (3) Segments of the life range interval is  $(a_0, a_1], (a_1, a_2], \dots, (a_{k-1}, a_k)$ ;
- (4) the real frequency of  $n$  samples falling into the interval is  $n_i$ .

## The Foreign Ammunition Destruction Situation

The history of foreign waste ammunition destruction is long. Waste mine is buried first, development to today's modernization process. The United States, Germany, Sweden and other European and American developed countries have very advanced destruction technology and equipment[19-22]. The mature equipments and corresponding technology are obtained for destroying ammunition and recycling resources. In the 1970s, the United States published many processing scrap ammunition technology patents. After the 1980s, many achievements have been obtained in the field of the ammunition metal material and comprehensive utilization of the explosive fire. Germany introduced foreign ammunition disposal equipment actively. Their own professional waste institutions were set up. The scrap ammunition processing work has been accelerated. In the early 1990s, the world famous Swedish Bofors AB implements merger and acquisition for FFV company[23-25]. It is responsible for the development and production of ammunition destruction equipment, undertakes other countries' ammunition destruction, provides technology and equipment of ammunition destroy for foreign, becomes a great influence company in the world's ammunition destruction industry field. Scrap ammunition brings hazards to the environment and human health. The United States and Germany put forward the new technology and new methods of scrap ammunition processing. The modernize of scrap ammunition processing is realized. Open-air burning and blow up batch scrap ammunition are banned. At present, scrap ammunition processing technology method around the world includes decomposition disassembled, cut down and burned with control etc[25-32]. The technology of recycling waste explosives has become mature. Equipment isolation operations, personnel protective security and automation level become higher and higher. Ammunition processing has developed towards automation control technology direction.

## The Principles Of Scrap Ammunition Destruction

**Adhere To Safety First.** The combustion or explosion of ammunition must be in accordance with the scheduled way. It is the reliability requirement of ammunition. It is also the risk of scrap ammunition processing work. Ammunition destruction is the period that is easy to occur combustion and explosion accidents in ammunition life cycle. Fire, explosion, shock, temperature and humidity in the process of ammunition destruction are likely to cause accidents. The operator must pay attention to some processes in the process of destruction ammunition, such as tools of decomposition link、equipment、personnel、space、environment、channel、transceiver、transportation、storage、preservation、temperature、pressure、pollution of projectile empty link and other related parameters. The change of ammunition in the destruction must be always pay attention. The destruction of ammunition must stay in the preventable and controllable state all the time. The careful operation is kept. The harm of ammunition accidental explosion accidents is often serious. The chain of severe damage is easily caused. The accident explosion accidents need to be prevented in the process of ammunition destruction. The safety hidden trouble can be eliminated by organization science ammunition destruction、technology and methods correct、management solid effective. The related content mainly includes: ① The unsafe behavior of human should be

eliminated. Wrong operation、 concentration and physical fatigue may cause damage. The accidents can be caused by theft and sabotage. ② The safety conditions of destruction is ensured, such as safe distance, protective barrier, job site, the structure of workshops, warehouse layout, transportation routes and the evacuation passageway. ③ The unsafe condition is eliminated, such as time monitoring facilities、 static electricity and fire protection of equipment、 the unsafe condition of electric explosion-proof、 vehicles、 heating and ventilation、 workshops[33].

**The Destruction Of Strict Management.** The ultimate goal of ammunition destruction is to eliminate the original technical functions of ammunition. Scrap ammunition resources can be recycled. No pollutants are discharged in the process of destruction. The environment does not be polluted. The destruction should be in strict accordance with the process steps[34]. The decomposition depth should conform to the requirements of process rules. The decomposition depth can't be changed random. The risk components of recovery value lower does not be allowed to decompose generally. The route process can not be allowed to change. Excessive breakdown phenomenon is caused. The ammunition components are destroyed. Ammunition destruction should be well organized. The way of abandon is forbidden to process scrap ammunition. Ammunition must be strict checked before destruction.

**Pay Attention To The Prevention And Control Of Pollution.** Along with the enhancement of people environmental protection consciousness, scrap ammunition processing is constrained by national and military environmental protection laws and regulations[35]. The destroy methods such as burned and blow up that do not meet the requirements of environmental protection laws and regulations will be abolished. The way of burying is not allowed to adopt to process overdue scrap ammunition. The pollution destruction treatment technology will be restricted. Advanced technology method should be adopted to separate ammunition. Burning and blow up processing scrap ammunition directly are avoided in the open environment. The control destroy mode should be adopted for burned and blow up. At present, ammunition disposal engineering and institutions without ammunition are difficult to achieve because of lack of technology. Investment should be increased in the future. The destruction process in accordance with the requirements of the environmental protection laws and regulations should be formed as soon as possible. The pollution hazard should be eliminated thoroughly.

**Recycling.** Most materials of ammunition can be recycled, such as steel, powder, wood, plastic, etc. The recycling of ammunition material should be limited. Recycled material is carried out in strict accordance with the requirements of technical regulations. The recycling material beyond the scope does not be allowed[36]. The decomposition ammunition components beyond the scope does not be allowed. The depth of decomposition ammunition is results based on the risk of material recycling and material recycling value.

## Conclusion

The processing of scrap ammunition has reached a higher level in our country after decades of practice and development. The destruction principles of scrap ammunition should adhere to safety first. The process of destruction should be managed strictly. The destruction treatment technology with pollution should be restricted to use. The destruction process in accordance with the requirements of the environmental protection laws and regulations should be formed as soon as possible. The pollution hazard should be eliminated thoroughly. Most materials of ammunition can be recycled. The content of this article has important guiding significance for the destruction of ammunition weapon.

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