Analysis of Development of Hazardous Waste Disposal Technology in China

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Abstract. With the rapid development of science and technology and economy, the rapid increase of hazardous waste has become the common environmental problems facing the whole world. China is the world's manufacturing power, with the accelerating process of urbanization, the resulting number of hazardous waste more and more. However, hazardous materials such as toxic, corrosive, flammable, reactive and infectious, and other dangerous characteristics if not properly handled, will cause serious harm to the environment, ecology and human health. Therefore, hazardous waste disposal research has extremely important practical significance. In this paper, the basic summary of hazardous waste, while the status of hazardous waste disposal in China to make an analysis of hazardous waste disposal in China to provide value for reference.

1. Introduction

In recent years, with the rapid development of science and technology and the continuous improvement of living standards, the problem of hazardous waste is more and more serious, and its production more and more complex composition. As early as the middle of last century, due to a large number of hazardous waste generation and improper disposal, causing a series of environmental pollution incidents. The love canal in the United States in the middle of the twentieth century as a waste dump, due to wanton and large accumulation of hazardous waste, causing groundwater pollution and soil pollution, the local ecological environment and the health of the residents seriously affected, direct economic losses of 30 Billion dollars\cite{1}. Severe mercury pollution in the Gulf of Japan, resulting in thousands of people poisoning and more than 100 deaths in the disaster. The 1970s, the United States Missouri mixed with 2,3,7,8-TCDD sludge sludge asphalt pavement, resulting in serious soil pollution and a large number of livestock deaths, the ecological environment and the health of the residents affected. At the same time, there have been many hazardous waste pollution incidents in China, such as thousands of people caused by tin emissions in Yunnan sub-acute poisoning; The end of the last century, Jinzhou, Liaoning Jinzhou ferroalloy plant chromium residue caused by serious groundwater pollution incident and Guangxi Longjiang River upstream of the Cd leaching residue and pressure residue and other hazardous waste filtrate caused by river and underground drinking water pollution incidents\cite{2}. Undoubtedly these hazardous waste pollution incidents on the ecological environment and human health posed a huge threat. Through the above analysis, the disposal of hazardous waste disposal should be sufficient attention to countries. At present, with the continuous improvement of China's comprehensive strength, China has become the world's largest manufacturing country, as the world's "factory", hazardous waste production can not be ignored, while a large number...
of hazardous wastes occupy a lot of land resources, and the harmful substances may also cause soil and water pollution and endanger human health. Therefore, how to effectively deal with hazardous waste disposal has become a new topic.

2. Brief Description of Hazardous Wastes

2.1. Classification of Hazardous Wastes
Hazardous Wastes are defined as hazardous wastes that are chemical, toxic, explosive or hazardous to humans, animals, plants and the environment, in addition to radioactive waste[2]. The United Nations Environment Program (UNEP) defines hazardous wastes as hazardous wastes. The United States, "Resource Conservation and Regeneration Law" will be defined as hazardous waste disposal due to improper handling of human health and ecological environment will cause actual or potential hazards of waste or waste compounds. Japan's "Waste Disposal and Sweep Act" Definition: After the government decides that the explosive, toxic, infectious and the ecological environment and personal health hazards of substances [3]. China in the "Solid Waste Pollution Prevention Law of the People's Republic of China" provides that hazardous waste is included in the national list of hazardous wastes or hazardous waste in accordance with national standards and methods of identification of hazardous characteristics of the waste. Hazardous waste can therefore be: ① The threat to human health and ecological waste; ② Hazardous characteristics of the two criteria for waste to determine. Hazardous wastes are categorized according to their characteristics, sources and composition, and they are classified into leaching toxicity, acute toxicity and corrosivity according to the hazardous degree of hazardous wastes [4].

2.2. Hazardous Waste Sources and Hazards

2.2.1. Sources
Hazardous wastes are widely used, of which industrial production is the main source of hazardous waste in China, accounting for 40% of the total amount of hazardous wastes, such as chemical waste, mining, metal smelting, machinery manufacturing and other hazardous waste accumulation and emissions. Followed by the medical process of hazardous waste generated, such as blood, drugs and colonies and other emissions will cause serious pollution of the ecological environment and a threat to human health. Finally, the agricultural production process and human life will also bring hazardous waste.

2.2.2. Hazards
Hazardous waste has a variety of hazardous characteristics of the ecological environment pollution and human health hazards are very serious, but did not cause enough attention, often in the cause of environmental pollution accidents or disasters were found, at this point, the consequences have reached the point where it is difficult to restore and restore. According to the potential and long-term characteristics of hazardous waste pollution, the main hazards are summarized as follows: ① Hazardous wastes are washed away by rainwater into rivers, lakes, and seas, causing surface water pollution or infiltration of filtrate into the soil, causing soil and groundwater pollution. ② Hazardous waste itself evaporation, sublimation and decomposition of organic release of harmful gases caused by air pollution. ③ Hazardous waste dust, particles cause soil and air pollution. Therefore, the disposal of hazardous waste should be properly, try to avoid or reduce the hazardous waste in the nature of the continuous bioaccumulation, reduce its human and environmental threats.

3. Analysis on Present Situation of Hazardous Waste Disposal at Home and Abroad

3.1. The Status of Hazardous Waste Disposal Abroad
Some developed countries of foreign countries attach great importance to the management of hazardous wastes, after nearly half a century of development, the formation of the whole process of hazardous waste management philosophy, at the same time to establish a more comprehensive system of laws and regulations, developed an effective and effective management system, effectively curbing
the hazardous waste pollution. The United States as one of the first countries to carry out hazardous waste management, as early as the 20th century, 70 years there is a hazardous waste related legal control. And the effective control of hazardous waste as a basic goal and one of the most important environmental protection work. Japan in order to solve the problem of environmental pollution of hazardous waste, has more than ten laws and regulations in the development of hazardous waste-related legal provisions, and put forward the hazardous waste management "3C" principle[5]. Accordingly, the Japanese hazardous waste pollution control has achieved remarkable results. In Germany, only the control of solid waste by the promulgation of laws and regulations there are more than ten. In Canada, the development of more detailed hazardous waste management laws and regulations and related management regulations, covering the disposal, transfer, technology, etc. In short, the developed countries, the main concept of hazardous waste management can be summarized as: "reduction, reuse, recycling," the 3R governance, the whole process and the classification of governance, economic stimulus, near the nearest governance, national and social co-governance, public participation and other principles[6-7].

The main management system is as follows: ①The smallest quantitative system. Reduce the source of hazardous waste emissions, to maximize the waste recycling. ②Standardized management system. Enterprises in the process of hazardous waste management, such as the occurrence of transfer of ownership, hazardous waste disposal and storage storage, need to go through the appropriate approval process and apply for proof. ③Industrial disposal system. Through the high-end science and technology and the sincere cooperation between countries to achieve the industrialization of hazardous waste disposal, improve the recycling of hazardous waste, and bring economic benefits. ④Information management system. The establishment of hazardous waste treatment and disposal of the whole process of information monitoring platform to improve the efficiency of hazardous waste disposal. At present, the world's environmental protection strategy has changed, has been transferred from the solid waste management to toxic chemicals and hazardous waste on the safe disposal and effective control. After continuous exploration, developed countries have established a relatively complete system of hazardous waste treatment and disposal.

The status of domestic hazardous waste disposal
Hazardous waste management in China started late, until the last century, 80 years before the establishment of specialized departments responsible for hazardous waste management. However, with the improvement of comprehensive strength in China, in the hazardous waste management work has made rapid progress. As one of the earliest parties to the Basel Convention[5]. Has always attached great importance to the management of hazardous wastes, and promulgated a series of laws and regulations and the introduction of the relevant standards and technical policies to form a set of practical standards in line with our hazardous waste management system. At the same time, China's construction of hazardous waste management institutions have also strengthened the degree of attention, has established in various provinces and cities nationwide hazardous waste management center, and hazardous waste comprehensive utilization, treatment and disposal technology research, publicity and education, technical training, International cooperation and so has made great progress. In addition, with the increasing emphasis on environmental issues in China, increasing investment in the state, the gradual improvement of laws and regulations, China's hazardous waste treatment capacity has been greatly improved. According to statistics, in 2010 the country's hazardous waste disposal capacity of about 23.25 million tons / year, the actual disposal of about 8.4 million tons, compared to 2006 increased capacity by 226%. However, as the world's largest developing country, due to extensive economic development in China, the level of technology constraints, there are still some problems in hazardous waste management. In recent years, although China's rapid economic development, people's living standards improved significantly, but the types and quantities of hazardous waste also increased, resulting in a very serious environmental problems. Figure 1 shows the distribution of hazardous wastes in China, it can be seen only Shandong, Xinjiang and Qinghai, hazardous waste production accounted for more than half of the national total, and relatively concentrated. In addition, China's hazardous waste management-related laws and regulations and pollution control standards policy system is not perfect, the lack of appropriate technical and economic
policy support. Therefore, in order to effectively control the generation of hazardous wastes and their non-standard treatment and disposal, the economic and technical policies for the market operation and management of hazardous waste collection and disposal should be formulated, and the construction of centralized disposal facilities for hazardous wastes should be vigorously promoted and strict standardization of hazardous waste management system, to minimize its harm to the environment and human health.

![China's hazardous waste production distribution map](image)

**Figure 1.** China's hazardous waste production distribution map

### 4. Analysis and Suggestion on Hazardous Waste Disposal in China

In recent years, although the hazardous waste management in China has made more positive results, but the annual production of hazardous waste is still large, and at present our country for the effective management of hazardous waste, there are still many problems. Technical immaturity and lack of economic policy support, hazardous waste disposal efficiency is low, there are environmental risks.

#### 4.1. China's Hazardous Waste Disposal Problems

4.1.1 Hazardous Waste Generation Is Large. China as a manufacturing country, the rapid development of industry, energy and chemical industry, non-ferrous metal mining and mining, oil processing, equipment manufacturing and other industries generate hazardous waste is very large. A large number of hazardous waste can not be effectively used to deal with human health and the surrounding environment harm. With the rapid development of China's economy, the production of hazardous waste will continue to show an increasing trend. However, with the adjustment of industrial structure, the improvement of environmental management capacity, technological progress, capital investment, etc., the rise of hazardous waste production will tend to slow.

4.1.2 Hazardous waste supervision is not in place. The problem of hazardous waste pollution has not been adequately addressed for a long time, and the concept of hazardous waste in the industry is relatively vague, and the reality of hazardous waste can not be accurately and comprehensively grasped. Resulting in the chaotic state of its governance process. The medical waste management is even more chaotic, and the existence of medical waste and garbage stacked at random phenomenon, resulting in cross-infection, endangering the health of the masses. These issues require long-term cooperation in various departments, cooperate with each other and actively communicate, from the hazardous waste disposal of all aspects of collaborative governance, to achieve its "whole process of governance".

4.1.3 Electronic product waste improperly. With the rapid development of science and technology, electronic products in our lives everywhere. At the same time, the extensive use of electronic products discarded, bringing a variety of environmental problems. First of all, a large number of e-waste will seriously pollute the soil, rivers, groundwater, the atmosphere, endangering human health; Secondly, a large number of electronic products produced by the exploitation of mineral resources mining, geological disasters continue to occur, but also undermine the ecological environment, resulting in shortages and even depletion of resources and a series of problems. A large number of hoarding of electronic waste has caused a serious waste of resources, because e-waste contains a large number of precious metals and organic materials with high recycling value. With the electrical and electronic
products in science and technology, society, all aspects of life penetration, the number of discarded electrical and electronic products increased year by year, but a large number of waste electrical and electronic products have not been a reasonable recycling and utilization of China's electronic waste management status, should get enough attention to the relevant departments. With the rapid economic and social development and the continuous progress of science and technology, the upgrading of electrical and electronic products is very frequent, waste electrical and electronic products will greatly increase the amount of production. Due to the lack of effective governance and supervision, as well as the industry does not have strict access system, making practitioners of the scale of operation and professional level of uneven, more chaotic market order. Therefore, China's waste electrical and electronic need for effective regulation and regulation.

4.1.4 the legal system is not perfect. Our country is still lacking of the policy of hazardous waste management, which leads to the disposal of hazardous waste can not be an effective solution to the problem. In China, hazardous waste disposal is in the initial stage, the lack of practical experience, so that the relevant legal policy is not perfect, hazardous waste management does not enter the regularization track. China's existing laws and regulations system is not perfect, the lack of hazardous waste science and flexible management and disposal, there is a standard between the fault phenomenon.

4.1.5 Hazardous waste environmental assessment is not in place. Environmental impact assessment is an important means to control environmental pollution, but some environmental assessment units are not concerned about the content of hazardous waste, the types and quantity of hazardous waste investigation is not careful enough, and the enterprise self-built hazardous waste disposal facilities treatment capacity and effectiveness of the assessment did not make an accurate assessment of the feasibility of hazardous waste pollution treatment measures at the same time vague. So that environmental protection departments to the environmental regulation difficult, but also to environmental safety and health risks.

4.1.6 Lack of advocacy. In recent years, the publicity of water pollution and air pollution has aroused the attention of the society, but the promotion of hazardous waste is not much, appears stretched, lack of propaganda. It is precisely because the propaganda is not enough and the people vigilance is not high, so most people do not know what kind of waste is dangerous, but also do not understand the hazardous waste on the environment and the human body will be what kind of impact. When the pollution accident occurs, people can not take the correct treatment and disposal methods, and even take the wrong disposal of the disposal of serious consequences.

4.1.7 Hazardous waste disposal technology is backward. At present, most of the hazardous waste disposal facilities in our country are relatively backward, and the disposal waste is single and the utilization level is low. First of all, business owners are mostly self-employed just to maximize the interests of the pursuit of investment equipment, many of which are out of technology to deal with hazardous waste for simple disposal, there is a huge second hidden environmental pollution. Secondly, a large number of non-classified e-waste and household waste into the sanitary landfill, the hazardous waste disposal delay, hazardous waste disposal program is not reported to the environmental protection department for direct landfill, resulting in secondary pollution. This shows that the lack of hazardous waste disposal facilities and technology behind the hazardous waste management to face more severe challenges.

4.2. Recommendations

4.2.1. Strengthen the supervision and management capacity of hazardous wastes. Strengthen the supervision of hazardous waste capacity should start from the following points:
①Increase the degree of government attention, strengthen management philosophy. To establish a sound regulatory body of hazardous waste and thus ensure that grass-roots environmental protection
department staffing, increase the strength of law enforcement to ensure that law enforcement requirements for professional governance.

Establish and improve the supervision mechanism, the implementation of accountability. Give full play to the NPC and CPPCC oversight mechanism, severely punished due to the neglect of waste management seriously ignored the serious consequences of the government, the main responsible person and hazardous waste management objectives to complete the responsibility of the poor people accountability, while opening up a wide range of monitoring Responsibility channels, to expand the scope of supervision, to draw a wide range of views.

Give full play to the role of departments, the establishment of inter-departmental collaboration mechanism. Therefore, it is necessary to give full play to the functions of the relevant functional departments, establish inter-departmental linkage mechanisms such as commerce, industry and land, and integrate industry supervision with environmental management in an effective manner.

Accelerate the process of local laws and regulations, detailed legal constraints.

4.2.2. Improve the whole process of hazardous waste management system. First, strengthen the source of hazardous waste supervision. In the course of the project, the demonstration of clean production should be done, the approval process of environmental impact assessment should be strictly controlled, and the environmental risk assessment should be done to reduce the project environmental risk. At the same time, the establishment of hazardous waste project information transfer system, to control the production process supervision, the establishment of production reporting system to ensure the smooth development of supervision and management. Secondly, increase the intensity of law enforcement and establish a long-term environmental monitoring and monitoring mechanism. Furthermore, the listing of the illegal system. Make full use of environmental pollution deadline management system, environmental violations listing system to strengthen the supervision and management of hazardous waste, the existence of major environmental issues issued deadline for corporate governance tasks, and accountability of the relevant responsible persons. Finally, to carry out industry and regional special management of hazardous waste pollution. In order to improve the understanding of pollution prevention and control of sewage sludge, strengthen the whole process of hazardous waste management system, and strengthen the hazardous waste management of the whole process of bad environment while vigorously improve the level of control of hazardous waste control.

4.2.3. To improve pollution prevention and control measures of hazardous waste. Promote cleaner production and recycling economy. Through political and economic measures to encourage enterprises to promote cleaner production processes, to minimize and prevent the generation of dangerous goods.

Hazardous waste to achieve hierarchical management. The establishment of hazardous waste classification system, hazardous waste classification system through the hazardous waste is divided into known as the very limited and hazardous waste to facilitate the disposal of hazardous waste disposal, hazardous waste management more refined and more scientific and improve management efficiency and effectiveness. The establishment of hazardous waste exemption / priority system, to achieve the reduction of hazardous waste, resource, sound, to achieve environmental and economic benefits of the harmonization.

To strengthen the solid waste prevention and control of waste management technical support basis. Smooth collection and disposal of hazardous waste approach. Introduction and development of new technologies. And actively learn from foreign advanced technology, and constantly improve the processing technology, and actively promote the disposal of industrial, to avoid the occurrence of secondary pollution.

4.2.4. To do a good job of social supervision and publicity. With the development of the Internet, information channels more smooth, more and more obvious role of social supervision, we should give full play to the role of media supervision of public opinion to strengthen supervision and management of hazardous waste publicity. The use of media publicity and supervision of public opinion to carry out the environmental protection of hazardous waste warning education, and guide the masses to carry
out social supervision, and promote management integrity and effectiveness of construction. ② Promoting environmental education from the basic point We shall set up environmental education courses in kindergartens, primary schools, secondary schools, universities, graduate schools, and various training and Education, and promote environmental awareness education to all levels of education. ③Strengthen training, improve quality.

5. Conclusions
Hazardous waste disposal in China is still in the initial stage, therefore, in China has potential for development. At the same time the effective disposal of hazardous waste, in line with national development needs, to protect the ecological environment and human health. At the same time, in the process of hazardous waste disposal still need to learn from the technology of developed countries and related measures to form a line with China's national conditions relative to improve the hazardous waste management system to improve the efficiency of hazardous waste disposal, bringing greater economic and social value.

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Acknowledgements
This research is sponsored by the Opening Foundation of Tianjin University State Key Laboratory of Hydraulic Engineering Simulation and Safety (Grant No.HESS-1701); the Project of Tianjin Science and Technology Plan (Grant No. 16ZXFWGX00090); Tianjin science and technology major projects (Grant No. 16YFXTSF00270). This research is also sponsored by the Tianjin second batch of talent development special support plan (Safety disposal and resource recycling of hazardous waste innovative team)