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Current Situation Analysis and Benefit Analysis of Construction Waste Reuse

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Abstract

With the acceleration of industrialization and urbanization, the construction industry is also rapid development at the same time, the company and the construction waste is increasing, poses a serious threat to the global ecological environment and the test. This paper introduces the construction waste of four big hazard, and the comprehensive utilization at home and abroad were analyzed, from the perspective of sustainable development, put forward control source, completes the classification, the views on Suggestions to perfect the mechanism, improve the present situation of construction waste reuse, provide efficiency.

Keywords

Construction waste; Recycling.

1. Status of domestic construction waste

Since the reform and opening up, with the acceleration of industrialization and urbanization, the construction industry has been developing rapidly, and the amount of construction waste generated in succession is increasing day by day. The amount of construction waste in China has accounted for more than one third of the total urban waste. According to statistics, every year at least $3 \times 10^7 \sim 4 \times 10^7$ m^2 old buildings are demolished in China, generating hundreds of millions of tons of construction waste, among which more than 40 million tons of construction waste residue are generated in the construction process alone, accounting for 30% ~ 40% of the weight of solid waste [1,2]. By 2020, China will produce 2.6 billion tons of construction waste. From the perspective of resource utilization, the overall recycling rate of China's construction waste is less than 10%, far lower than the European and American countries of 90% and Japan and South Korea of 95%. The disposal method is still in the stage of extensive landfill and stacking.

For these construction wastes, most of them are transported to the suburbs or the countryside without any treatment, and are disposed by means of open-air stacking or landfill, which not only damages the ecology and occupies a large amount of land, but also brings water pollution, air pollution, soil pollution and other problems, seriously affecting the living environment of urban and rural residents. The prevention and control of solid waste pollution is closely related to the prevention and control of air, water and soil pollution.

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2. The necessity of reusing construction waste

2.1 Construction waste encroachment on land

At present, our country the main means for the processing of construction waste is to be directly shipped to the outskirts or deposited in the open air to landfill, at present, the construction industry in 10000 tons of construction waste will need at least 1 acres to pile up, with the increase of urban construction garbage, garbage dumps are also on the increase, this means that a large amount of land needed to heap construction waste. However, China has a large population, a small amount of land per capita, and a high demand for land. Therefore, a large amount of land is piled up with construction waste, which is in contradiction with our basic national conditions. Therefore, it is necessary to carry out resource management on construction waste to reduce the waste of land resources.

2.2 Construction waste causes soil pollution

Process of the waste and landfill deposited in the open air, because the long time experience weathered, ferment, scour, soak harmful substances (including urban construction waste in the paint, coating and asphalt release of polycyclic aromatic hydrocarbons, such as structure material) through garbage leachate seeping into the soil, so as to produce a series of physical, chemical and biological reaction, soil pollution, thus affecting the soil quality.

In addition, under the action of various external forces, small gravel blocks of urban construction waste piled in the open air will enter the nearby soil, change the material composition of the soil, damage the structure of the soil, and reduce the productivity of the soil. In addition, the content of heavy metals in urban construction waste is relatively high. Under the action of various factors, chemical reactions occur to increase the content of heavy metals in soil, which will increase the content of heavy metals in crops. Contaminated soils generally do not have a natural self-purification capacity, and it is difficult to reduce the degree of pollution through dilution and diffusion.

2.3 Construction waste causes water pollution

Construction waste in the process of pile and landfill, as a result of the fermentation and rainwater leaching, scouring, as well as the surface water and groundwater soak and infiltration wastewater, landfill leachate or drench filtrate, around will cause serious pollution of surface water and groundwater.

The main ways to pollute the surface water are as follows: garbage is scattered in the reservoirs and ditches near the dumping site during the process of handling; The leached filtrate in the waste storage site diffuses on the surface and flows into the surface water body. The leached filtrate in the landfill will seep into the nearby surface water in the soil layer. The main influence of garbage dump on groundwater is that garbage pollution seeps into the aquifer with leached filtrate, and then deep pollution is caused by the infiltration of rivers, lakes and ponds contaminated by garbage into the recharge aquifer. Landfill leachate contains not only a large number of organic pollutants, but also a large number of metal and non-metallic pollutants, the water quality composition is very complex. Drinking this polluted water will do great harm to human health.

2.4 Construction waste causes air pollution

Construction waste pollutes the atmosphere. In the process of dismantling and transporting construction waste, solid particles such as dust will be produced, which will cause the emergence of industrial dust phenomenon when serious, and these dust will seriously affect the air quality. In addition, the poisonous gas such as formaldehyde, sulfur dioxide still exists in some coating, paint, can escape gradually from the building rubbish in the air, pollute atmosphere.

3. Reuse of construction waste at home and abroad

3.1 Reuse level of construction waste in foreign countries

As early as 1980, the superfund law enacted by the us government urged enterprises to actively seek ways to reuse construction waste, which limited the production of construction waste at the source.

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Meanwhile, the government provided technical support and set up special funds to provide economic support. Now, a multi-level garbage management mode has been formed with "controlling garbage source first, recycling second and landfill second". In recent years, the construction waste recycling in the United States accounted for about 70%, every year 100 million t waste concrete is processed into aggregate used in project construction, and 68% of recycled aggregate is used for road infrastructure, 6% is used for mixing concrete, 9% is used for mixing of asphalt concrete, 3% is used for slope protection, 7% is used for backfilling foundation pit, 7% to be used in other places, use accounted for 5% of total construction aggregate using recycled aggregates [3].

Due to its small land area and relative lack of resources, Japan's structural raw materials are higher than those in Europe. Therefore, the Japanese regard construction waste as a "by-product of construction", and attach great importance to reusing it as a renewable resource. In 1977, the Japanese government formulated the "code for the use of recycled aggregate and recycled concrete", and successively set up recycling processing plants around the country mainly dealing with concrete waste to produce recycled cement and recycled aggregate. In 1991, the Japanese government enacted the law on the promotion of resource reuse, stipulating that construction wastes such as muck, concrete blocks, asphalt concrete blocks, wood and metal that are generated in the process of construction must be sent to the "recycling facility" for treatment. Japan's leading policy on construction waste is: do not discharge construction waste from the construction site; Construction waste should be reused as much as possible; Those with difficulties in reuse should be dealt with appropriately [4].

Germany is the first country in the world to introduce legislation on circular economy. It enacted the waste treatment law in 1978 and the law on circular economy and waste clearance in 1994, which has gained wide influence in the world. The immediate reuse level of the whole building is in a leading position in Europe. In Germany, the largest amount of construction waste is excavation soil, accounting for more than 60% of the construction waste, followed by construction waste, accounting for about 25%. Among the recycled materials, 65% are used for road construction, 25% for geoengineering and 5% for recycled aggregate of concrete. Every region in Germany has a large amount of construction waste in processing and the recycling rate of construction waste has exceeded 87%.

3.2 Current situation and successful experience of reusing construction waste in China

With the increasingly serious problem of construction waste and the in-depth study on the recycling of construction waste abroad, China put forward the problem of construction waste for the first time in 1995 and introduced the municipal solid waste treatment regulations. The promulgation and implementation of the regulations on urban construction waste management issued by the ministry of construction has played a positive role in promoting the management of urban construction waste and maintaining a good city appearance and environment. From the introduction of foreign equipment to the present independent research and development of construction waste recycling equipment, we are gradually moving towards a powerful country in the utilization of construction waste resources.

In 2002, a company in nanjing cooperated with colleges and universities to successfully develop the technology of "using waste concrete to process ash stone as basic material for municipal roads and roads". Shenzhen city adopts the form of "1 yuan land lease" to give economic support to construction waste recycling enterprises, so as to attract more enterprises to participate; Handan municipal government adopted the strategy of "government building platform and enterprises performing drama", organized personnel to investigate and study, compiled opinions on construction waste brick making project, formulated relevant development policies, implemented tax reduction and preferential treatment, and continuously promoted the operation and development of construction waste brick making project. In the construction of the northern ring road expressway, xi 'an city used more than 6 million tons of recycled construction waste materials, recovered about 3,000 mu of land occupied by construction waste, reduced the area of land excavated by 1,500 mu, and reduced carbon dioxide emissions by 40 million cubic meters, with direct and indirect economic benefits exceeding 1 billion yuan.

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4. Suggestions on reuse of construction waste

4.1 Control the source and reduce emissions

For the management of construction waste, we can use the following inverted pyramid to summarize. Firstly, the source of construction waste should be controlled to reduce emissions to avoid the generation of construction waste. If can't avoid completely, also want to do as far as possible to reduce the generation of construction waste; In view of the inevitable construction waste that has been generated, it is considered to recycle it by means of technology or management. After these control stages, the non-recyclable construction waste is compressed to reduce its volume and facilitate the final disposal of construction waste [5]。

4.2 Classification and reasonable disposal

Effective strategies should be established on the basis of effective classification, so it is crucial to do a good job in the construction waste site classification, to reduce the cost of recycling construction waste and improve the utilization efficiency. According to the classification of construction waste sources, it can be divided into five categories: land excavation, road excavation, construction material production garbage, construction and demolition of old buildings. Among them, the construction waste soil generated by land excavation and road excavation is muck and gravel. Building materials produce waste soil such as waste concrete; The construction waste soil produced by construction is broken brick (broken block), concrete block, mortar, packaging material, metal material, wood block, etc. The old building demolition produced by the construction waste soil if concrete, stone, gravel, soil, brick, sand and so on. Categorize the resulting construction waste and put the same construction waste together for the next step.

4.3 Improve tact and optimize management

The relevant departments of the state should conduct a large-scale quantitative and qualitative comprehensive survey and statistics in the construction enterprises in the country, according to which the relevant standards for the allowable amount of construction waste and the amount of discharge shall be formulated, and the standards shall be regarded as an important assessment index to measure the management level and technical level of the construction enterprises. Only in this way can people pay enough attention to the comprehensive utilization of construction waste, and the source of a large amount of construction waste can be effectively controlled. At the same time, a sound management institution should be established to mobilize social forces to participate in the management and supervision of construction waste, and dynamic monitoring and tracking analysis of all aspects of construction waste to provide decision-making basis for relevant planning and policy making. In the process of construction, raw materials are used reasonably, efficiently and sustainably to the maximum extent, and their impact on the natural environment is reduced to the minimum extent, so as to form a new construction model with high utilization and low emission, which not only protects the environment but also gains greater economic benefits.

5. Evaluation of social benefits

Recycling of construction waste is beneficial to social development. Recycling is a renewable industry with remarkable social benefits.

(1) The development of resource-based reuse of construction waste can greatly improve the environmental pollution caused by traditional construction waste treatment, and at the same time, through its professional management, it can also reduce the environmental damage in the process of demolition and transportation.

(2) The development of construction waste recycling conforms to the relevant policy requirements of China. At present, as the economy continues to the efficient growth and environmental pressure of unceasing aggravating circumstances, clearly put forward to build "a resource-conserving and

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environment-friendly society", and set it as the national economy and social development planning a long-term strategic task, and the resource recycling of construction wastes and the strategic task.

(3) The recycling of construction waste can also solve the employment problem. The us environmental protection agency found that the incineration of 10,000 tons of construction waste could provide one job, the landfill of 10,000 tons of construction waste could provide six jobs, and the recycling of 10,000 tons of construction waste could provide 36 jobs. The process is simple, the threshold is relatively low, and the staff training is relatively simple.

6. Conclusion

There is no pure garbage in the world, only misplaced resources! Over the years of construction, hundreds of millions of construction wastes have been generated. It is of great practical significance to apply the usable part of construction wastes to the usable part, explore the way of recycling solid waste, and relieve the siege of garbage and turn waste into treasure.

At present, many countries and regions are actively exploring and developing renewable resources, and the products have been quite diversified. We should give full play to the advantages of scientific and technological talents, organize colleges, universities and research institutions to carry out research and promotion of advanced and practical technology and equipment, and further develop construction waste recycling products. Through the cooperation between government, industry, universities and research institutes, we will foster and strengthen the construction waste recycling treatment industry and standardized and large-scale construction waste treatment enterprises. The large-scale application of recycled construction waste materials and the broadening of new methods and approaches for engineering construction under the requirements of energy conservation and environmental protection is an innovative exploration, thus achieving a win-win situation of economic benefits, environmental benefits and social benefits.

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