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Problems and Countermeasures in Reclamation and Ecological Restoration of Industrial and Mining Wasteland

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Abstract

Based on the important role of reclamation and ecological restoration of industrial and mining wasteland in improving the ecological environment quality, expanding the land use space and improving and ensuring people's livelihood in China, this paper analyzes the current situation of reclamation of industrial and mining wasteland in China according to the current standards of reclamation and ecological restoration of industrial and mining wasteland in China, and summarizes the problems in the current reclamation and ecological restoration of industrial and mining wasteland in China, The corresponding countermeasures are put forward for the reference of relevant personnel.

Keywords

Industrial and Mining Wasteland; Land Reclamation; Ecological Restoration.

1. Introduction

Since entering the 21st century, with the rapid development of China's social economy, the demand for mineral resources has also become higher and higher, which has led to many places having to increase the development of mineral resources, leading to the depletion of natural mineral resources, and also causing damage to the surrounding natural ecological environment, which not only affects the sustainable development of local economy, but also affects the development of future generations. Based on this, relevant personnel must, in accordance with the green development concept of sustainable development, reclaim the industrial and mining wasteland, and carry out ecological restoration at the same time, so as to promote the harmonious coexistence of human and nature, promote the healthy development of the local economy in the mining area, and achieve the great goal of "green water and green mountains are golden mountains and silver mountains".

2. Introduction to Reclamation and Ecological Restoration of Industrial and Mining Wasteland

2.1. Reclamation Concept of Industrial and Mining Wasteland

Reclamation refers to the restoration of the landform of the damaged area to the same form as before the destruction. This restoration includes not only the landform, but also the plant and

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animal communities in the area. The reclamation of abandoned industrial and mining land, also known as land reclamation, is a process and activity in which the mining right owner, in accordance with the requirements of the relevant laws and regulations on mineral resources and land management in the country where the mining right is located, carries out survey and planning, filling and leveling treatment on the damaged and abandoned land in the mining area caused by the mining of mineral resources in the process of mine construction and production, so that it can be restored to the state that people can continue to use. In real life, mining operations of mineral resources in mining areas often lead to the destruction of the land in mining areas, which is also a common serious problem in the world.

2.2. Relationship between Reclamation of Industrial and Mining Wasteland and Ecological Restoration

According to the concept of industrial and mining wasteland reclamation, land reclamation is not only related to land issues, but also related to environmental issues. Its core and ultimate goal are the reconstruction of the ecological environment. Therefore, reclamation of industrial and mining wasteland and ecological restoration are interdependent, and ecological reclamation of industrial and mining wasteland is the ultimate goal of land reclamation.

2.3. Standards for Reclamation and Ecological Restoration of Industrial and Mining Wasteland

When mining in industrial and mining areas, when the resources are exhausted and abandoned, the organic matter of some land will be restored to a certain extent after a period of natural repair, which will enable the land to be reclaimed. Moreover, China has a large population and a small per capita land area, especially less per capita arable land. According to statistics, China's arable land area only accounts for 7% of the world's arable land area, while the population accounts for 22% of the world's total population. Therefore, the core of the current reclamation of industrial and mining wasteland in China is to carry out around the protection of cultivated land, reclaim these industrial and mining wasteland into cultivated land, improve the quality and production efficiency of land, which is also the primary goal of industrial and mining wasteland reclamation and ecological restoration. In addition, the reclaimed industrial and mining wasteland should also actively establish vegetation to provide necessary vegetation support for the normal use of the land in the region, ensure the protection of the ecological environment in the region, and avoid water and soil loss.

3. Status Quo of Reclamation and Ecological Restoration of Industrial and Mining Wasteland

Since the establishment of the Land Reclamation Research Institute of the China Land Society in 1987, China has paid more and more attention to land reclamation. The work has been carried out for decades, and has made great breakthroughs. Especially in recent years, the application of various new processes and technologies has accelerated the progress of reclamation of industrial and mining wastelands. Many industrial and mining wastelands have been ecologically restored, and land reclamation has been realized. However, there are still many difficulties, as follows.

3.1. The Land Structure has been Seriously Damaged

Because most of the minerals are buried deep underground, and most of them are in remote areas, so in the process of mining resources in the mining area, the mined mineral resources cannot be transported out at the first time, and can only be stacked near the ore outlet, which will occupy a large amount of land surface. In addition, in the process of mining, because the mining technology is not advanced enough and the management is not perfect enough, the

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mines in some areas have collapsed, which will seriously damage the original topography of the mining area, thus damaging the land structure of the area. Over time, the land in the mining area will not only suffer from serious nutrient loss, resulting in land desertification, but also cause ground subsidence and land loosening. In case of storm weather, geological disasters such as debris flow or flood will occur, resulting in casualties and irreparable losses.

3.2. The Ground Vegetation is Seriously Damaged

Because most of China's mineral resources are located in areas with rich vegetation and steep terrain, the native plants in these areas are very lush. However, mining mineral resources will not only cause serious damage to the geological structure of the region, but also cause serious damage to the original vegetation of the region. The native vegetation on the ground can prevent the desertification of the land in the region and prevent the occurrence of natural disasters such as debris flow and flood. Therefore, once the native vegetation on the ground is destroyed, the probability of various natural disasters will be increased. In addition, in the process of mining mineral resources, most of the mined mineral resources are first stacked in the mining area and nearby areas, which will occupy more land, resulting in the destruction of vegetation in the mineral resources stacking area. According to the statistics of relevant departments, the area of vegetation damage caused by the mining of mineral resources in China has reached 10600 km2, which leads to major problems in the reclamation and ecological restoration of industrial and mining wasteland.

4. Reasons for Problems in Reclamation and Ecological Restoration of Industrial and Mining Wasteland in China

4.1. The Reclamation and Ecological Restoration System of Industrial and Mining Waste Land is not Perfect

Since 2011, China has successively issued the Regulations on Land Reclamation, the Measures for the Implementation of the Regulations on Land Reclamation and the National Land Reclamation Plan (2010-2015), clarifying the objectives and tasks of land reclamation from the level of laws, regulations and planning. However, policies and measures related to fund raising, technical specifications, inspection and acceptance, and incentive measures have not been formulated, which has seriously affected the smooth and comprehensive development of reclamation and ecological restoration of industrial and mining waste land.

4.2. The Reclamation and Ecological Restoration Technology of Industrial and Mining Waste Land is not Advanced Enough

At present, China's annual mining of mineral resources will lead to the destruction of millions of acres of land, and because the types and origins of mineral resources are different, the reclamation and ecological restoration of industrial and mining waste land must be carried out scientifically according to the different types and origins of minerals, in order to promote the reconstruction of soil, landform, vegetation, landscape and biodiversity protection. But at present, China's technology in this area is not advanced enough, which has affected the reclamation and ecological restoration of industrial and mining waste land.

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5. Corresponding Strategies for Problems in Reclamation and Ecological Restoration of Industrial and Mining Wasteland on China

5.1. Formulate a Complete System for Reclamation and Ecological Restoration of Industrial and Mining Waste Land

In view of the problem that China's industrial and mining wasteland reclamation and ecological restoration system is not perfect, relevant personnel should learn from the experience of western developed countries in this regard, introduce their advanced systems into the localization transformation, and gradually develop a perfect system. For example, the United States, Canada, Australia and other countries have developed relatively complete land reclamation systems, with a land reclamation rate of more than 50%, and have made remarkable achievements. China can also use the experience and lessons of these countries to actively introduce the relevant systems of these countries, and then combine them with the characteristics of mining areas in various parts of China to gradually develop a perfect system to promote the smooth development of reclamation and ecological restoration of industrial and mining waste land in China.

5.2. Strengthen the Research and Development of Reclamation and Ecological Restoration Technology of Industrial and Mining Waste Land

In order to promote the reclamation and ecological restoration of industrial and mining wasteland in China, we must strengthen the research and development of technology. In practice, first of all, according to the type of abandoned land in the mining area, appropriate chemical technology should be used to strengthen the improvement of the soil in the abandoned land in the mining area. For example, for acidic soil, it can be neutralized with the help of alkaline industrial substances such as coal ash and lime, so as to harmonize the acidity of the land and make the land in this area reach the standard of normal farming; For alkaline soil, coal humic acid can be used to neutralize and improve it; For the soil with insufficient soil fertility, inorganic or organic fertilizers such as nitrogen, phosphorus and potassium fertilizers can be used to improve it and effectively increase the soil fertility. Secondly, forest and grass plants have good effects on ecological restoration of industrial and mining wasteland. The ecological restoration of industrial and mining wasteland can be achieved through the planting of forest and grass, so that it can achieve the effect of reclamation. Therefore, in the process of ecological restoration of industrial and mining wasteland to enable it to be reclaimed, the relevant departments can scientifically and reasonably select the types of forest and grass plants according to the degree of destruction of industrial and mining wasteland in the region and in combination with local natural conditions, such as trees and grass species with good cold and drought resistance, fast growth speed and soil improvement effect, and plant them in the characteristic areas, So as to effectively realize the reclamation and ecological restoration of industrial and mining wasteland. Finally, relevant personnel can also use modern science and technology. Such as RS technology, GPS technology and GIS technology, these three technologies are different and have their own application scope. In the specific operation, relevant personnel can use RS technology to investigate the land cover of the mining area; Use GPS technology to monitor the subsidence and deformation of the mining area land; Use GIS technology to process the surveyed images, and extract and analyze the corresponding data. With the support of these three technologies, the reclamation and ecological restoration of industrial and mining wasteland can be promoted, and the industrial and mining wasteland can be turned into "green waters and green mountains", and then into "golden mountains and silver mountains".

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