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Work Safety Standardization Grade Evaluation Model and System Development of Bauxite Mines

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Abstract

In order to reasonably evaluate safety standardization grade of bauxite mines, after core requirements of "Basic Norms for Work Safety Standardization of Enterprises" (AQ/T9006-2010), this paper uses 13 first level indexes and 40 second level indexes to estimate safety standardization degree and applies fuzzy comprehensive evaluation theory and analytical hierarchy process to establish safe standardization grade evaluation model of bauxite mines. The actual application showed that the evaluation model was scientific and practical. The paper has developed the evaluation software with complete function and easy operation, which has improved efficiency and normalization of the evaluation.

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Keywords: bauxite mines; safe standardization; analytic hierarchy process (AHP); fuzzy comprehensive evaluation; standardization grade evaluation software

1. Introduction

Work Safety is an important policy in China, which is related to the safety of people's lives, property, the whole situation of reform and social stability. In order to further implement the enterprise main responsibilities of safe production and comprehensively promote the standardization of safe production, the State Administration of Work Safety issued the "Basic Norms for Work Safety Standardization of

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Enterprises" (AQ/T9006-2010) ^[1] in April 2010. After summarizing the coal mines, dangerous chemicals, metal and nonmetal mines, fireworks and crackers, metallurgical and machinery industry, we clearly define "work safety standard" for the first time and unify basic requirements and metrics of the standardization. Work safety standardization of enterprises has entered a new stage of development ^[2]. The State Council issued the "Circular on Further Strengthening work safety" (Guo Fa [2010] No. 23) in July 2010, which clearly put forward to deeply carry out construction of work safety standardization by making the enterprise standard. The State Security Committee issued the "depth enterprise security product on standardization of guidance" in May 2011, which also clearly pointed out that non-coal mining enterprises should achieve work safety standardization by the end of 2013.

Bauxite Mines are high-risk industries and have many risk factors, its work safety related to the sustainable development of China's aluminum industry ^[3], the work safety standardization of bauxite mountains can help non-coal mining enterprises to implement the responsibility of work safety, to improve the economic efficiency and management level of enterprises, to achieve scientific management and ultimately improve the level of intrinsic safety.

2. Establishment and application of evaluation model

2.1. Determination of factor set and evaluation set

After considering a variety of evaluation methods, we choose fuzzy comprehensive evaluation method to assess work safety standardization grade of bauxite mines and construct the evaluation model based on fuzzy math theory and AHP ^[4].

According to the principles of indexes system ^[5] and combining with the core requirements of "Basic Norms for Work Safety Standardization of Enterprises", we establish evaluation indexes system of work safety standardization grade, including 13 first level evaluation indicators and 40 second level evaluation indicators. 13 first level evaluation indexes are shown in Figure 1.

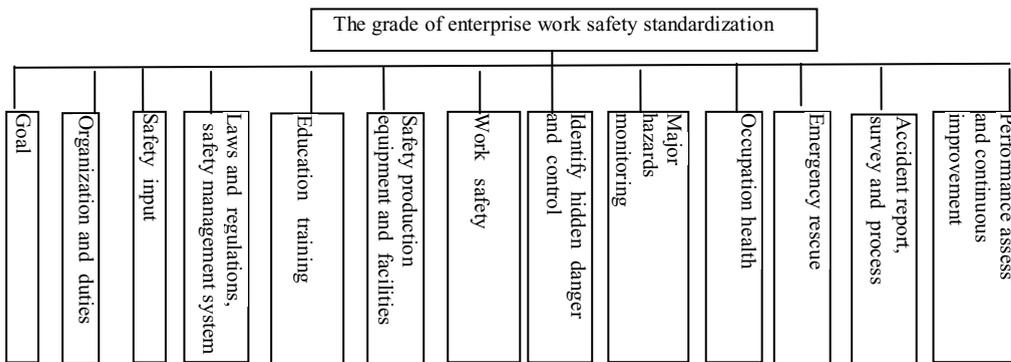


Fig.1 First level indexes of Work Safety Standardization grade evaluation of Enterprises

Considering the situation of safety standardization grade which have been released by many enterprises, work safety standardization grade of bauxite mines is divided into five levels = (first, second, third, fourth, fifth), as shown in Table 1.

Table1. Evaluation grade of work safety standardization of bauxite mines

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