

Change of Sump Cleaning Process

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0 Introduction

Shanjiaoshu Coal Mine of Guizhou Panjiang Refined Coal Co., Ltd. was founded in 1965, which was approved by southwest coal mine construction headquarters of china and officially incorporated into national mine construction project. Mine construction was started in the south mining area in Mar. 1969, and put into production on Sep. 25, 1974, with the designed capacity of 300 thousand tons per year. Mine construction was started in the north mining area in Jun. 1970, and put into production on Jul. 1, 1973, with the designed capacity of 150 thousand tons per year, and designed production capacity of the mine of 450 thousand tons per year. With the implementation of technical transformation in 1990, the production capacity of the mine was verified as 900 thousand tons per year in 1997, 1 million tons per year in 2004, 1.3 million tons per year in 2005, and it was verified as 1.8 million tons per year in 2011 after the implementation of capacity expanding and rebuilding in 2008.

Two-stage drainage has been adopted for the mine water in the south mining area and part of the water gushing (field measurement, normal water gushing is 120 m³/h and the max. water gushing is 190 m³/h) shall flow automatically or be pumped to 215 transformed sump in the south mining area, from which it shall be discharged to 1370 main

haulage roadway ditch, and then flow automatically to 1370 central water pump house sump,

which shall be drained to the ground. Part of the water gushing (field measurement, normal water gushing is 35 m³/h and the max. water gushing is 50 m³/h) shall flow horizontally and automatically from 1400 to 1370 main haulage roadway ditch and then flow automatically to 1370 central water pump house sump.

Based on field measurement, hydrological and geological analysis, water flow in Shanjiaoshu Coal Mine is: normal: 245 m³/h, maximum: 420 m³/h.

1 . To determine the rationality of the calculation, control and adjustment

The cleaning process of Shanjiaoshu Coal Mine is to load by tramcars, dredge by manual work, and then transport to the ground along the track and then lift to the waster rock hill by tramcars for discharge. The process is primitive and with low efficiency. The volume of center sump is 4,500 m³, the sump cleaning is performed between Jan. and May of each year in general by two shifts with 12 personnel in each shift, and even in this circumstance, the task is often difficult to complete. After the cleaned part is lifted, it needs to be turned over independently, and all the lines are piled up with sludge, which makes civilized production more difficult and wastes a lot of manpower to

Abstract: This article first introduces the general situation of the mine and water gushing status, describes the original sump cleaning process and emphatically introduces the flow and effect of the current sump cleaning process.

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remove. In general, more than 1,800 workers are involved in the cleaning each year, combining those involved in the link from rollover on the ground to the waste rock hill and those involved in cleaning the sludge, it shall be more than 2,000 workers in total. The lifting safety shall be influenced and, at the same time, sludge discharge shall also increase difficulties for environmental gover-nance.

Aimed at the above-mentioned problems, Shanjiaoshu Coal Mine has improved the original cleaning process and the current cleaning process of central sump is as follows: pump the water and sludge to a vibrating screen by sinking pumps and through the pipeline for dehydration, then the screened finer sludge and

water shall flow to another sump, the articles left on the screen shall be delivered to the raw coal belt conveyor after dehydration to enter raw coal processing system. The screened articles whose sizes are much smaller (smaller than 3 mm) can be discharged to the purifying station on the ground for treatment through discharge pump before forming sediment, and the articles left on the screen can be recycled during processing since they contain many coal particles, which achieves good effects; at

the same time, it has greatly reduced the work such as discharging waste rock manually, civilized production of cleaning and manual cleaning, etc.

2. Effect after the Change of the Process

At present, cleaning work only requires 5 to 6 persons and takes 700 man-hours to finish the cleaning of two sumps, with the efficiency improved by 3 times, and labor charges saved by RMB 216 thousand ((2000 -

700) ÷ 30 × 5000 = 21.6), at the same time, with many steps regarding environmental governance and waste rock discharging being omitted, more than RMB 50 thousand can be saved indirectly (turning over 150 m³ waste rock each day may require 10 persons to work for a month). The transformation has created a lot of economic and social benefits, with great improvement in environmental governance.