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Evolution of Bord and Pillar Mining System Cm Technology in Coal Mines

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ABSTRACT –

In Indian underground mines by conventional mining the loss of coal is more and the safety also less so the many underground mines planning to introduction of the use of the Continuous miner in bord and pillar mining method. The Continuous miner technology helps in achieving high production and faster rate of extraction with safety. The continuous miners use the shuttle car to transfer the coal from face to feeder breaker, quadbolter for bolting operations by using these automobiles and remote controlled continuous miner hence the man power is less and productivity will increase and safety is more. The present study has been aimed for optimizing continuous miner operations and optimizing the continuous miner utilization under different conditions.

INTRODUCTION

In underground mining, first and foremost in the modernization process are the machines that extract coal primarily the continuous and long wall miners. First introduced in the late 1940's, continuous miners provided a quantum leap in the speed and efficiency of extracting coal. Modern versions operate on basically the same principal as their predecessors using a large rotating steel drum in 1967 manufactured by Jeffrey manufacturing company. The drum is equipped with tungsten carbide steel 'teeth' or cutting bits to cut the coal. Continuous mining currently accounts for about 49% of total U.S. underground coal production each year. Standard continuous miners can extract coal at a rate of up to 38 tons a minute depending upon the seam thickness. New, more powerful continuous miners are highly productive and are remotely controlled being designed for a variety of seams and mining conditions. These make possible even fuller recovery of the available coal, while removing the machine operator further from the working area

LITERATURE REVIEW

Introduction To achieve the mass production in bord and pillar mining the implementation of continuous miner is necessary. The continuous miner used to cut the coal and transferred to the shuttle car to unload. Bord and pillar mining The following methods are commonly used in bord and pillar method for development and depillaring using continuous miner: Development 1. Bord and pillar method Depillaring 1. Split and Fender system 2. Nevid method of mining

Continuous

miner A continuous miner is a large steel drum equipped with a tungsten carbide teeth that scraps the coal from the face. It is used along with the quadbolter, shuttle car and LHD's. The

continuous miner accounts about 45% of underground production, and also utilize conveyors to transport the removed coal from the seam. The remote controlled continuous miners are used to work in a variety of difficult seams and conditions and robotic versions controlled by computers are becoming increasingly common

Tramming routes: A direct relationship between the tramming route distances and the average away times has already been established. It is therefore important to keep the tramming as short as practically possible. Not only the distances be kept minimal the following factors should be considered when designing or determining tramming routes. Floor condition: Bad floor conditions can be as a result of an uneven floor (attributed to geological conditions or floor that are not awept), poor water drainage, and steep gradient. These conditions may significantly reduce the life of the cars' components and consequently cause premature failure, or the cost per ton of the operation may increase due to losses in efficiency and productivity. Belt extension: To maintain overall short tramming distances, it is important to schedule a belt extension effectively. As the working moves no of pillars splits or belt extension should be done to reduce the tramming distance and time. The maximum average away time that should be obtained at any particular time to reach the set production is 75 seconds. Cable management: The cable management system is very important in any mine because of the heavy machinery. And the spare cables are not available in the mine.The idle handling of cable of CM should be well protected when the CM is in tramming to return because damage of cables may effect the working time and production. 5. Field observations As mentioned in the above in above chapter to ensure optimum utilization on CM operations the sub objectives are very important and investigated. The reason was breakdown, shortages and uptime of machinery is very essential for optimum utilization. The old workings breakdown data and uptime data is available. The old workings breakdown data and uptime data is available. Maintenance planning and optimal replacement As mentioned above the two replacement models are important to avoid breakdowns and to reduce the cost. As in model one the preventive replacement model objective is to objective is to avoid breakdowns of CM and to determine the optimal time interval between sub replacements of CM. A preventive replacement eliminates the cost of the sub replacements cost when breakdown is occurred.The model two optimal replacement model by Tsang and jardine takes age the age in to the account. And it is used to replacement time of the parts of CM.

ANALYSIS

and evaluation of results for maintenance planning and optimal replacement Tsang A and Jardine A designed two replacement models that were able to calculate the optimal time intervals to perform preventive replacements. Model one used a fixed interval approach. The model derived fixed intervals that specify when to perform preventive replacements. Their second model used a unit age base approach to determine the optimal time to perform preventive replacements.

CONCLUSIONS

The two models were studied and both models yield sub replacement schedules. In that two models the second model by Tsang and Jardine was found to be the better suitable models for the maintenance in VK-7 mine. The optimal preventive replacement for subs of the CM can now be planned according to the new replacement schedule. The replacement schedule is determined by average breakdowns. The improvement in bolting operation is can be done by

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eliminating breakdowns by total productive maintenance (TPM) strategy and keeping the required materials when breakdown is occurred. Tramming speed of the CM and Shuttle car are studied in the above chapters. The tramming routes should be prepare by considering the unload distance of shuttle car from face to feeder breaker. And the newly prepared tramming routes should be well maintained.

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