

FILE NAME: National Safety Council (NSC)

DATE: 1917 Sept

DOC#: NSC048

DOCUMENT DESCRIPTION: Proceedings of the NSC 6th Annual Safety Congress -
Article - Eliminating Injurious Dust

PROCEEDINGS
of the
National Safety Council

*SIXTH ANNUAL
SAFETY CONGRESS*

Held at the
HOTEL ASTOR
New York City
September 10, 11, 12, 13 and 14, 1917

PLAINTIFF'S
EXHIBIT
MSC-46

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about the same conclusion arrived at after many thousand examinations of miners on the Rand. In other large hard rock camps in this country it would appear that the percentage is also large. But suppose we put it as low as 5 per cent; an industry showing 5 per cent of the workers afflicted with an occupational disease reveals conditions that should not be allowed to prevail indefinitely. But it would appear that the situation is not materially improving, especially where mines are getting larger and deeper.

ELIMINATING INJURIOUS DUST.

The elimination of injurious dust, then, is of prime importance in mine sanitation. It can be secured, first, by doing away with dry drilling. Two methods may be resorted to—the use of drills which feed water through a core in the steel, or the application of water to the holes while drilling by water lines, sprays affixed to the drills or squirt guns. The first is the best method, as it insures constant application of water and puts less reliance upon the coöperation of the miner, consequently it is less likely to fail.

Until 1914 only reciprocating or piston drills were used in the Southwest Missouri district. A number of sprinkling devices had been tried in an effort to lay the dust, but without success. Since that date hammer drills, which feed water through a core in the steel, have been installed in the majority of the hard-rock or sheet-ground mines. These machines wash the cuttings from the hole and produce very little dust. Where piston or stopping machines are used, and two men are employed in the working face, independent water lines can be installed and water sprayed through a nozzle on the collar of the drill hole, which will help lay the dust, but this method is not as effective as the water drills. The installation of the water drill has not only improved the sanitary conditions for the machine men and other underground employees, but it has also enabled them to increase their efficiency, as the drilling speed of the drills where water is applied is much greater than dry drilling.

Spray attachments fixed to the drill are efficacious when working, but are apt to be messy and much of a nuisance, and it is the history of most places where tried that the men soon stop using them. Squirt guns loaded from buckets of water that have to be carried to the working place are apt to be a failure, especially if the men have to carry water up to a stope or raise. However, local conditions will usually determine which system is indicated. While water hammer drills and water drills of the jackhammer type have

proved successful, there does not seem to be a wholly satisfactory water stopper for drilling overhead holes, though the evolution of such a drill is largely a question of demand. The reason why water stoppers have not been as successful as other water drills is probably due mostly to the attitude of the men; miners usually object strongly to using water overhead where it may fall back on them. Proper laws, proper discipline and a little educational work would overcome this objection in time. It should be recognized that it is not sufficient to have a law compelling an operator to furnish dust laying drills or appliances; the law should go further and make their use obligatory on the miner and provide penalties for failure to do so.

The system of chambering or squibbing holes, popping boulders, loading ore out of chutes, or shoveling broken ore, also produces dust, and to eliminate this some mines have employed men whose duty it is to sprinkle the broken dirt in the mine daily and also to see that all holes drilled during the day are washed out. In order that no squibbing may be done during working hours, laws have been passed in Missouri making it a misdemeanor for a miner to squib a dry hole during work hours. Shooting of large boulders also causes much dust and this should be prohibited during the shift, as all of this can be done when the shift goes off duty. Also the blasting of the ground should be done when the shift goes off, and in the event there is more than one shift working the last shift off should blast all dirt.

VENTILATION.

The matter of proper mine ventilation is of much importance. In the coal mining districts this is regulated by state laws; however, this is not the case in the majority of the metal mining districts, and various systems of mechanical ventilators are used. In practically all states more than one shaft or opening is required; when several openings are available, the installation of a large suction or blower fan can be made, which will give proper ventilation. In mines where there are not sufficient openings, ten-inch drill holes have been put down and small ventilating fans installed. These give good results.

We include under this heading high temperatures with excessive humidity, and gases and powder smoke, as the lack of proper ventilation usually carries one or more of the others in its train. The complex problems of ventilation in metal mines, especially large metal