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Automating the Mine

Anyone who has spent even a short period of time in a working mine experienced the hazardous conditions that can be there. Often hostile climate combined with dust, heat and mist caused by the process of digging, drilling into the Earth’s surface is not a good place to make important decisions because of the limited possibilities of obtaining necessary information. Recklessness caused by these conditions put people at a high risk of being buried alive deep underground. So there’s a natural desire to reduce this risk, to remove human operators from hazardous environments while increasing the efficiency of mining operations. The best way to achieve these goals is to use remote and automated control of the mine operations.

With constantly developing modern technologies 3D virtual environment of the mine can be created using scanning infrared lasers. It is possible to install all kinds of sensors on the mining machines in order to provide the operator with remote control of mining operations. Mines that have been automated typically have an offsite control center where the operations can be monitored by a number of human employees. Since these control centers are offsite, advances in communication technologies were also instrumental in the advent of automated mining. Each aspect of a mining operation can be watched from these control centers, and adjustments can typically be made as needed to increase efficiency.

There are a lot of benefits of mine automation especially as mines are going deeper now. It is beneficial not just to save lives by removing humans from hazardous areas but also in terms of economic development. Central to this automation is the development of a new, advanced teleoperated control system that has a great potential for saving costs and increasing productivity as humans could operate machines remotely and enable mining equipment to move faster and for longer distances.

The first project concerns development of remotely controlled vehicle that provides real time visual surveillance and atmospheric analysis of underground coal mines in situations where it is too hazardous for manual exploration. The second project area involves the teleoperation of mining equipment extracting coal using the highwall mining method. Here a continuous mining machine is driven under remote control into the coal seam exposed by previous open-cut mining operations. Because the tunnels formed have no roof support, human entry is prohibited, so the mining method is completely reliant on teleoperation.

Thus, operators would be able to switch their role from one machine to another when required which promotes creating a more flexible and productive workforce.