

Is the Automated Mine A Threat to Recruitment?

Thanks to remote control technology and robotic operating systems, automated mining is becoming a reality. Although, while some suppliers have been working in this area for a number of years its only more recently that more of mining's operators are taking steps to implement these technologies.

With this growing trend for automated mines and 3D virtual training platforms for heavy machinery operators finally making their mark on the industry, WRS consider the impact that more automation and less human operation will have on future recruitment for the worldwide mining community.

Lucy Donald, who is Director of the Mining division for WRS, a leading recruiter for the global Mining industry, comments, "This new era does seem to carry some huge benefits related to time, money and enhanced health and safety solutions – all of which seem to be a no brainer for Mining companies. For example, the weight of a human operator can have a big impact on the wear and tear of machinery over time, whereas a computer operated machine will have no operator weight to factor in so will use less fuel and rubber."

She goes on to explain, "Certainly with underground mining, automation can save significant time as it eradicates the time required for an operator to travel from the surface to underground. You imagine how often each operator must be making that journey on a daily basis? Autonomous mining is a significant advancement in keeping people out of danger zones and, in some cases, out of the mining environment altogether."

With the advent of this remote controlled mining revolution, led by companies such as CAT and Atlas Copco, the days of safety concerns over underground mining operations may soon be over, as operators can work from a safe location while operating the heavy machinery and equipment. A great example of this is the Atlas Copco Scooptram ST14, which is almost fully automated. A skilled operator is needed to load it from the control station, but then this machine can automatically haul the rock through tunnels, dump it and return to the loading site on its own, with no need for human intervention at all. In direct competition is the CAT MINEGEM system, which integrates with underground loaders allowing remote control of the vehicle, as well as fully automated transport and dumping through the use of on-board computers, cameras and lasers.

The fundamental question is will this eventually render certain mining techniques, skills and ultimately, professions obsolete? One of the disciplines that companies usually hire in their dozens on a new green field mine are operators, so will automation see the high volume requirement for this key skill become a thing of the past? Lucy says, "I do not think this will necessarily be the case, I just think operators will have to move with the times and companies will have to invest more in training on various high tech simulation programmes such as CyberMINE."

On the subject of training, virtual training for heavy machinery operators is making its way to the mining community thanks to companies like ThoroughTec Simulation, who specialises in virtual reality software for mining. Their creation, CyberMINE, is a 3D platform that trains machine operators on how to use various types of mining machinery from the safety of a control room. Unlike the Scooptram and CAT's MINEGEM systems, the machines controlled by CyberMINE are 100 percent virtual. As mining machinery and equipment is expensive, and training inexperienced workers to use the massive, dangerous equipment in operations may leave some site managers ill at ease, this virtual reality training definitely has huge benefits. Canada's Yukon Mine Training Association has already implemented the CyberMINE system into its training module. Immersive Technologies also develops training simulator technology and has created virtual reality training platforms for Caterpillar, Liebherr, Komatsu, Hitachi Construction Machinery and P&H MinePro, offering both virtual surface and underground mining training.

So we've reviewed the training developments, now let's look at the key Pro's and Con's of the Automated Mine?

The Pro's

Improved Safety: Autonomy in mining can eliminate the need for skilled machine operators, so improving safety, equipment availability and overall productivity on mine sites, which is particularly important for geographically remote sites where attracting and retaining skilled staff is a challenge. The safety implications would be even more critical in dangerous and difficult locations of new deposits.

Increased Performance: The significant advancements in automated equipment have provided a great opportunity for mining companies to achieve high performance. Companies can improve productivity and access environments that might not be possible when equipment is under human operation. With less direct operator control over trucks, dozers and other equipment, operator induced variations in speed, load and travel as well as downtime, could be dramatically reduced. As a result, equipment could operate more frequently at 'textbook' parameters, such as making loads more consistent and reducing idle times, stockpiles, wear, and bottlenecks throughout the production value chain, while still allowing an element of flexibility when conditions change. This performance improvement could directly improve mine productivity and yields.

Reduction in Costs: In both developed and emerging mining locations the continued supply-demand imbalance has raised the cost of available skills and over the past decade salaries have risen in response to this shortage. While in remote locations, employee infrastructure costs have risen too, increasing the case for moving to an automated mining operation.

In addition to reducing direct employees costs, more precise and consistent equipment operation can reduce other operating costs. These cost reductions will be from less wear and tear and without human operation, equipment availability and utilization rates should rise, with no downtime needed for shift changes, operator considerations or unplanned maintenance. Energy costs could be lower too as automated equipment should operate closer to technical design. Lastly, repair costs could also be reduced as improper equipment operation, damage from collisions plus excessive wear and tear should decline with the introduction of autonomous equipment.

The Con's

Increased Costs: Annual maintenance, scheduled repair and upkeep costs could rise due to the use of more technically complex equipment. Likewise, additional costs would come from higher-salaried maintenance employees, given the different skills required to maintain this more sophisticated equipment.

Lucy summarises, "I certainly do not think the automated mine will become mainstream overnight and one saving grace is that there will always be a need for human intervention when it comes to maintenance of such equipment. However, the dynamics of deposits and demographics are definitely increasing the potential for automated mining. And I expect to see more companies deploy this autonomous equipment within the next decade but it will be those with a high risk tolerance and ample financial resources that lead the way."

She goes on to say, "To truly embrace this technology, companies will need to change the way they integrate their technologies, design their operations and, most importantly, recruit and train the skills and experience they require to support this automation."

It goes back to our earlier article about Asteroid mining and the new skills opening up for professionals with robotic and electronic engineering within the mining sector. I saw my first Robotic Engineer CV only this week and I will be sure to be developing my network of such professionals as I anticipate this as a niche skillset in the very near future."