

Mining Engineering Vacation Work Experience 2021-2022 Glencore Coal Assets Australia Hunter Valley Operations



Source: Glencore Australia – Hunter Valley Operations

URL: <https://www.glencore.com.au/operations-and-projects/coal/current-operations/hunter-valley-operations>

Introduction:

To begin this report, I would like to express my gratitude towards the Australasian Institute of Mining & Metallurgy for offering the Third Year Mining Award in 2023. I am currently studying in my third year of a Mining Engineering and Petroleum Engineering double degree at the University of New South Wales (UNSW). Albeit thoroughly enjoying my time at university, my passion and interest in the Australian resources industry has made me incredibly eager to graduate and begin my exciting career in the sector.

Over the course of the 2021-2022 Christmas Break, I was fortunate enough to have obtained the opportunity to take on work experience at Hunter Valley Operations (HVO) under the Glencore Coal Assets Australia's (GCAA) Summer Vacation Program. During this time, I was an intern in the drill and blast engineering department, within the site's technical services office. As discussed further in this report, this internship experience was one of my most valuable experiences, enabling me to develop my technical skillsets and professional profile as a well-rounded Mining Engineer.

Technical Skillset Development:

As a first year Mining Engineering student, I was entering the GCAA summer vacation program with an incredibly limited amount of knowledge on the mining industry, let alone the technical skillset required of a mining engineer. This made me apprehensive, upon commencing vacation work, due to concerns of not being able to meaningfully contribute to the drill & blast engineering team. In saying this, I was also incredibly excited to commence vacation work and develop a plethora of new technical skills, enabling me to begin an exciting pathway towards my eventual goal of becoming a mining engineer.

The first two weeks of the internship consisted of my familiarisation with the operation of particular mining engineering software such as Vulcan, Blast-Logic and Shotplus, as well as the CAT Minestar system. From here, I began to perform a wide range of designs for different production, pre-split, and parting shots all throughout the South and West Pits of HVO. Designs included drill hole patterns, timing patterns and load designs. These designs incorporated burden & spacing based powder factor calculations, in order to determine the optimal amount of rock fragmentation during each blast. Other tasks included the composition and publication of blast exclusion maps to be distributed across the site for the appropriate placement of blast sentries and execution of nearby road closures where necessary.

In addition to my week-to-week drill & blast engineering work, I also had a series of projects which I undertook throughout the course of the vacation program. The first of which consisted of the monitoring and analysis of ground vibrations from blasts and their effect on a nearby set of power lines. This project involved working with the drill & blast consultancy company, Terrock, to assemble a series of blast monitoring apparatus including strain gauges, geophones, and modems to communicate the data back to the drill & blast department, as well as the Terrock office in Victoria. From here, the stresses acting on the power poles, as well as the ground vibrations caused by the blasts were able to be monitored, ensuring that our operations did not impose any damaging effects on neighbouring pieces of infrastructure.

Throughout my vacation work, I also had the opportunity to work in different departments and areas around HVO. This included working with the shotfirers in the manual loading of blast holes and the tying-up of detonator-cord. I also had the chance to log core with the exploration geologists and conduct surveys of rehabilitation areas with the environmental scientists. All in all, these experiences provided me with fantastic exposure to the technical skillsets required by professionals across various different aspects of a mining operation. It emphasised the importance of collaboration between each profession in ensuring the smooth operation of a mine project.

As a result of the above experiences, my summer vacation experience at HVO enabled me to develop many different technical skills in drill & blast and also in other areas of mining operations.

Exposure to the Mining Industry:

As a first year Mining Engineering student, my vacation work experience at HVO was my first ever opportunity to step foot on a mine site. As a result, my experience at HVO was truly eye opening, where I was able to get a true snapshot into how the mining industry works, from the day-to-day site operations to the broader company culture, and how the industry engages with the community.

The first key learning about the mining sector, which I discovered at HVO was that of the industry's serious commitment to safety. The mining industry is known to have a significant history of accidents and fatalities around the world. As a result, it was incredibly impressive to see the industry's zero tolerance approach to dangerous work practices and strong safety messages which were communicated to all employees on a daily basis. To this day, the Australian mining industry is the safest in the world, with some of the lowest rates of fatalities and lost time from injuries. This impressive milestone is a true testament to the way in which safety is perceived and acted upon in the Australian Mining Industry. From my vacation work experience at HVO, it was clear to see that the approach towards workplace safety is applied in every single aspect of the operation, from the safe handling of explosives on the blast bench, to the daily commute home from work each day. I have never felt safer as a worker as I was in the mining industry, particularly when working at HVO.

The other important key learning about the mining industry, which I discovered at HVO was the importance of collaboration between each aspect of the operation to ensure the overall smooth running of the mine site. Each stage of a mine's operation is heavily dependent on every other aspect. Some of these dependencies may be obvious, whilst others are incredibly subtle, although just as important. My broad exposure in different aspects of the operation enabled me to discover this. My time in with the Geologists and the Environmental Scientists enabled me to discover the importance of both these professions to design a safe and effective blast, let alone plan for the short term and long-term development of a mine.

A prominent example of this key learning occurred when I was designing a particular drillhole pattern, with the holes being drilled to the roof of a coal seam, based off the current geological model. It became noticeable very quickly on the CAT Minestar system that the actual depths of the holes being drilled were distinctly different from the design depths. This was due to a dip in the coal seam which had not been discovered, due to the exploration program running behind schedule. As such, the exploration department was yet to drill and log the subsurface of the region being blasted. This error resulted in the need to redesign the entire blast, to accommodate for the revised depths of the coal seam being drilled to. As a mining engineer, I believe it is very easy for your work environment to become insular, whereby you can perform your duties without the appropriate consultation and discussion with fellow colleagues in different departments working on the site. The lack of communication between the different departments within technical services and operations can be the cause of major technical issues and potentially safety incidents at a mine site.

Future Career Aspirations:

As a Mining Engineering student, I am incredibly excited to enter an industry which is rapidly changing and evolving to accommodate for the economies of the future. As the global population continues to grow, the worldwide demand for minerals and energy resources will continue to grow, thus increasing the need for mining all types of commodities in the future. I can see the opportunity for an incredible amount of growth in the industry as we continue to improve the efficiency and safety standards of mining operations around the world.

As an aspiring mining engineer, I believe it will be our responsibility as the next generation entering the industry to find practical solutions to improve the efficiency and viability of commodity extraction around the world. I hope to eventually be able to utilise my knowledge and experience from working in the Australian mining industry, to help improve the efficiency of other mining operations around the world.

In addition to the need to extract commodities more efficiently, I also believe it will be the responsibility of the next generation of mining engineers to improve the safety standards as well as reducing the environmental footprint of mining operations around the world. The resources sector has been placed under an increasing amount of pressure, in order to comply with the high expectations of modern society. This means that it is more important than ever before that the extraction of commodities can be performed in the safest and most environmentally friendly way possible. A mining company's social license to operate is becoming more difficult to obtain and keep each year, as the general public expects more from mining companies than ever before. As a result, it is more important than ever for the next generation of mining engineers to ensure that a mine site's impact on the neighbouring environment and communities is kept to an absolute minimum.

Personal Learnings Whilst on The Job:

My time at HVO enabled me to obtain some of my most valuable personal learnings as a mining engineering student. I was fortunate enough to have worked with a wide range of people from many different walks of life, all of whom had incredibly valuable advice to give, as well as fantastic stories to tell.

The most important personal learning which I obtained from my time at HVO was to remain humble and respectful to others. It is very easy to become arrogant as a student entering the mining industry, due to the abundance of high paying jobs and the fantastic opportunities to take your career across Australia and all around the world. Students are always informed that "the world is their oyster," and that they will become incredibly valuable employees upon graduation. Whilst some of this may be true, it is very important to consider that we are still students, with very little experience in the industry.

During my time at HVO, I had the opportunity to work with people who had been working at the same site, in the same job, since before I was born. Some of these people had been working in the mining industry since the time that my parents were born. These individuals provided a breadth of knowledge and experience that only decades of working in the mining industry could provide. As a result, I found it incredibly important to respect my fellow colleagues at HVO, absorbing as much of their knowledge and learnings from experience as possible. I am certain that learning off the most experienced and knowledgeable workers, will help me develop, both as a professional in the mining industry, but also as an individual throughout the course of life.

Another important personal learning, which I obtained from my time at HVO, was the importance of working as a team. Upon commencing my vacation program at HVO, I began to appreciate the level of comradery that was shared between employees across the mine site. It takes a very large team to successfully operate a mine site, whereby each and every team member makes an important contribution towards the sites' overall performance. Not only was this team based working approach beneficial for the efficiency of mining operations, but it also boosted the general morale around the site, making HVO an enjoyable place to work. I highly valued the comradery which I experienced during my vacation work, and I have attempted to implement the positive attitude of the workers at HVO into all aspects of my daily life. This includes my studies at university as well as other jobs which I have undertaken, since leaving site.

Contributions to My Employer:

I thoroughly enjoyed my time as a drill and blast engineering vacation student due to the sense of accomplishment associated with the contributions I made to my employer and the drill and blast engineering team. Albeit a first-year mining engineering student at the time, the team made sure not to pigeon-hole me onto a singular vacation student project. This ensured that the drill and blast team could get just as much value out of me as an intern, as I got out of the vacation program.

Throughout the program I was performing the day-to-day duties of a drill and blast engineer. I was designing the drill hole patterns, load packs and timing patterns for multiple different blasts that would fire each week. Some of the decisions I made were worth hundreds of thousands of dollars, and ended up making the company millions of dollars. In saying this, making the incorrect decision could have ended up costing the company millions of dollars. It was this level of responsibility and being "thrown into the deep end" which I was incredibly appreciative to have experienced throughout my summer vacation program.

Overall, it was definitely the day-to-day tasks as a drill and blast engineer which were the most valuable experiences I obtained. Completing this type of work made my internship more meaningful as I was contributing to the work of my employer and the drill and blast team. This meant that I was contributing to the operating efficiency of the mine site and thus the overall success of the company. The contribution I could make to my employer as an intern is a true testament to the GCAA summer vacation program, and I often wish that other intern programs were as beneficial as Glencore's one.

Conclusion:

Collectively, my time at Hunter Valley Operations under the Glencore Coal Assets Australia Summer Vacation Program, provided me with some of the most valuable experiences for my professional and personal development. Throughout the twelve weeks, I was privileged enough to have been able to explore different aspects of a mining operation, in order to truly appreciate how each component is incorporated within the larger business. As a result of this, I was able to develop a more well-rounded perspective of the mining industry as a whole. This has given me the scope to consider a broader range of technical and non-technical factors, when making decisions as a mining engineer, a trait that is becoming increasingly difficult to develop and find within employees.

My internship provided me with a fantastic introduction on the day-to-day responsibilities of a mining engineer and I thoroughly look forward to completing more site-based vacation work in the coming years, prior to my graduation.

To conclude, I would like to express my appreciation and gratitude to the Hunter Valley Operations Drill and Blast Team for making my experience as valuable and meaningful as it was:

- Guido Groehlich & Ernest Martin: Senior Drill & Blast Engineers
- Joshua Carey & Jack Neal: Drill & Blast Engineers
- Tori Skillen: Drill & Blast Admin



Setting off my first ever Nonel shot using the stomper!