

# **“Sustainable Productivity” – Committed in every facet of the company, every corner of the globe.**

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Atlas Copco in collaboration with the AusIMM award a travelling scholarship each year to a student ambitious to pursue a career in the minerals industry, providing the winner with a once in a lifetime opportunity to observe mining on a global scale, liaise with the people and learn of the strategies which contribute to Atlas Copco’s on-going successes. This paper aims to illustrate to undergraduate students and young professionals the opportunities that the minerals industry holds and encourage students to apply for this scholarship by giving insights into the professional development and experiences I encountered throughout my travels.

The Atlas Copco group of companies is an organisation working across many industries with a strong presence in the mining industry internationally. This scholarship provided me with the opportunity to observe Atlas Copco’s commitment to quality products and sustainability across four continents and build a rapport with a company which I have no doubt will continue to drive success in the industry I am committed to see develop and thrive. Through the scholarship and resulting network I was able to visit Atlas Copco operations in Perth, various manufacturing centres and sites utilising Atlas Copco equipment in Sweden as well as incorporate personal travel with site visits in Mexico and Peru. The scholarship provided technical insights into the historical development and future of mining, an increased awareness of working across different countries and cultures, and finally memories and stories that will continue to mentor me throughout my professional career.

## **INTRODUCTION**

Atlas Copco is a world leading provider of industrial solutions, heavily involved in the construction and mining sectors. The Swedish based company has a long history within the mining industry and is currently operating in over 170 different countries.

In 2012 I was given the opportunity of a lifetime, to vastly expand my experience in the industry, travel the world and build a strong rapport with a company that I will maintain throughout my working life. As a 23 year old at the start of my professional career I could never have imagined how a program from one company could enrich

my passion for the mining industry as this scholarship has done. Atlas Copco has played major roles in many global projects such as Ground Zero in New York and the intake tunnel for Sydney’s desalination plant and since this travelling scholarship I have come to appreciate the company’s wide presence through their familiar yellow branding.

## **MINING AND ROCK EXCAVATION, PERTH**

In October 2012 I embarked on my first Atlas Copco experience, as I spent a week in Perth with their Mining and Rock Excavation Team. During my time in Perth I was able to meet with many people who

took time out of their day to show me the best and most interesting of what they know and do, and why they choose to continue to work for Atlas Copco. I was able to visit the workshop and have a look at numerous machines and customisations completed onsite and the larger redesigns that have been filtered back to manufacturing in Texas to increase the efficiency of the product for the global market.

I was also fortunate enough to have a training session in one of the amazing simulator facilities at the site used for training operators on the controls and software interface. Furthermore I was able to attend meetings and sit on the supplier side of the table, seeing how employees not only sold equipment but maintained their commitment to quality service, as one person told me, *“sales sells the first rig, service sells the next 10”*, timely advice for someone like myself just starting in the industry.



Figure 1. Standing in front of a Pit Viper undergoing final checks before transport to the Pilbara

### **UNDERGROUND ROCK EXCAVATION, ÖREBRO**

The first stop on my Swedish experience was in Örebro where I was given an overview of the company and was able to quickly gain an appreciation for the size of the operations run out of this amazing city. I was greeted by an extremely happy and welcoming group of employees at the URE office and a proud Aussie flag, alongside a Mexican flag which was being flown as

several Mexican customers were on site completing a multimillion dollar contract, at this instant I knew this would be an experience I would never forget.

In the URE division I was able to visit the most pristine and efficiently run workshops, constructing rigs to order by highly skilled operators with minimal inventory. In the workshop I was able to build on my experiences in Perth as numerous design components were pointed out to me as an innovation resulting from operations all around the world. This commitment to constant product improvement through liaison with customers is in my opinion a key to Atlas Copco's continual success.



Figure 2. Drill rigs ready to be shipped off in the yard

Following a “Fika”, the Swedish institution that is regular coffee breaks, I was able to visit the yard where over a hundred rigs, trucks and loaders were ready for shipping, destined for every corner of the globe in both mining and civil works. During the tour I was run through the Quality Assurance procedure, where the rock drills are tested on the hardest granite found in Sweden and each rig undergoes a 6 hour testing operation to check its performance. I was also informed that many prototypes are actually shipped to Australia for more lengthy trials, the reason for is our ability to truly test the limits of equipment. I was told by a worker that the global rule in

mining is “If you want something stuffed, send it to Aus”.



Figure 3. Hanging in the bucket of a 14 tonne Scooptram ready for shipment

### **SURFACE DRILLING EQUIPMENT AND RAISEBORING, ÖREBRO**

SDE was the next stop on my journey through Atlas Copco, where I was shown many of the surface rigs and discussed the process of taking the new innovations from operations I mentioned above and having design engineers make them into real components improving productivity, safety and sustainability. I was also able to see how innovations on the SmartRoc rig including a fully automated drill cycle and a Hole Navigation System improve accuracy and productivity.

I also met with the Research Department to discuss some major projects currently being worked on including the mammoth 85 tonne underground truck and the current Rio Tinto research venture into the Modular Mining Machine expected to more than double development rates in underground block caving operations.

I was then given a chance to catch a glance at the Pulse room, essentially the Pentagon of Atlas Copco’s Roctec research where major new projects and designs are discussed and planned. The walls of the room were filled the top 10 projects being worked on, a sea of sticky notes,

competitor’s patents and future plans. It was incredible to see a company giving a student the rare opportunity to see the core of Atlas Copco’s research. I will never forget the experience even though I’m sure it would take a lifetime of experience in mining to fully appreciate what I was seeing.

Following my day in Orebro I was off to Karlskoga, to see the Alfred Nobel Museum, the famous inventor of dynamite which revolutionised mining the world over. It was an excellent opportunity to see a little more of Sweden and the best museum I have ever visited, I strongly recommend it for any travellers in the area.



Figure 4. Standing next to one of the FlexiRoc rigs at SDE

### **LUNDIN MINING ZINKGRUVAN, ZINKGRUVAN**

After experiencing a large portion of the product range in Orebro I was off to Zinkgruvan, literally translated Zinc mine, which has been operating a Zinc, Copper and Lead deposit utilising sublevel benching and panel stoping for longer than Australia has been a country. Atlas Copco has an excellent relationship with the mine but only takes their most important visitors to the site, making me feel very lucky and

truly demonstrating Atlas Copco's commitment to making this experience the most it could be.

While underground I was able to see several Atlas Copco products and even a Raiseborer in operation. I was also able to discuss with a mine worker and my Atlas Copco guide the Scaletec product used for scaling, an ongoing issue I had learnt about in Perth whereby Australian mines are using Boomers for scaling causing damage to machines as this task is out of their design function.



Figure 5. Standing outside on a chilly morning with the Zinkgruvan headframe in the background

### GIA, GRÄNGESBERG

My next stop was Grängesberg, a small iron ore mining town near Kopparberg many would know for their famous Swedish cider. In Grängesberg I met with several people from Atlas Copco GIA, a recent acquisition aimed at expanding the Atlas Copco range to include ventilation and an electrical range of mining equipment. I was able to take a tour of the work site and discuss the long term plans to move away from diesel equipment due to its environmental and OH&S issues.

My guide here was extremely proud of the work the company had achieved, with Atlas Copco now being the only company to provide the whole ventilation range, with their fan and ducting configurations

being able to run up to 11km without a booster. He was also extremely excited about the future developments into electric mining equipment and explained that the main customer of the ventilation projects was China who is investing a great deal of resources into developing underground storage facilities.



Figure 6. Standing inside one of the enormous ventilation silencers in the workshop

### SECOROC, FAGERSTA

Secoroc is the rock drilling tools arm of Atlas Copco which has over 100 years of experience in manufacturing drilling tools which are at the centre of many Atlas Copco products. The employees were all very proud to say Atlas Copco is the number one supplier of DTH, Raiseboring and Tophammer equipment and number two in Rotary Drilling, this was quickly followed by "so there is still room for improvement".

I was introduced to the Atlas Copco patented COPROD technology which is a combination of DTH and Tophammer techniques and has a promising future in the industry with significantly lower operating costs quickly offsetting initially higher capital expenditure. Following this I undertook a workshop tour where I was shown the specialised treatment techniques used to achieve the strongest steel, the hand operated machines which provide the straightest drill steels and patented chemical compounds

impregnated into drill tips to ensure longevity of the product.



Figure 7. Having a “bit” of fun outside AC Secoroc with the Aussie Flag.

After lunch at another restaurant overlooking a medieval castle I was off the Distribution Centre, a huge logistical success that manages over 500t of product turnover weekly. I was also able to meet with an employee who had worked for Atlas Copco most of his life and discuss his career progression and gain an insight into what my future may hold; working and maybe raising a family overseas, learning new languages and changing roles. During this chat I heard about his many travels with work and after him naming a few countries I commented “So you’ve seen a lot of the world”, to which he replied “Oh, I’ve seen it a few times”.



Figure 8. Standing amongst the 16km of storage shelves for the world supply of AC drill steels.

## LKAB, KIRUNA

In the morning I was flown to Kiruna, another small mining and tourist town in the Arctic Circle. Here I was able to go on a mine tour of the LKAB underground iron ore operations, truly the most impressive mine I have been to or could imagine. LKAB is a conglomerate company working with iron ore and steel making, their underground Kiruna mine is currently working with many Swedish and internationally based companies to champion underground automation.

Currently LKAB have automated their LHDs, Primary crushing, secondary crushing, production drilling conveyors and winders. The mine itself has become a symbol of Swedish ingenuity and innovation. The mine employs 2300 people which means almost everyone in the town is either directly or indirectly employed by LKAB. The mine boasts over 400km of roadways and uses over 7% of Sweden’s entire cement requirements in the process of ensuring the annual production of 27Mt of high grade magnetite.



Figure 9. Automated drilling with an Atlas Copco Simba, with an empty cab as it is being remotely operated.

After dining at one of the mines two restaurants at 720m level with full mobile reception, all very strange experiences for someone with coal mining experience, I was off to see more of the automation implemented on site. Atlas Copco has

worked closely with LKAB to develop this automation technology with one operator currently controlling 3 Simba drill rigs from a remote office location with the aim to increase this to six over the coming years. During my tour I was able to visit the control room where around 50 massive computer screens and 20 people controlled the vast majority of operations underground.

In addition to this incredible mining experience I was able to experience some of the true Swedish traditions, dog sledding with 12 huskies in the Arctic circle, visiting the world's only hotel constructed solely of ice and packed snow and eating surströmming, a fermented fish dish that is completely repulsive.

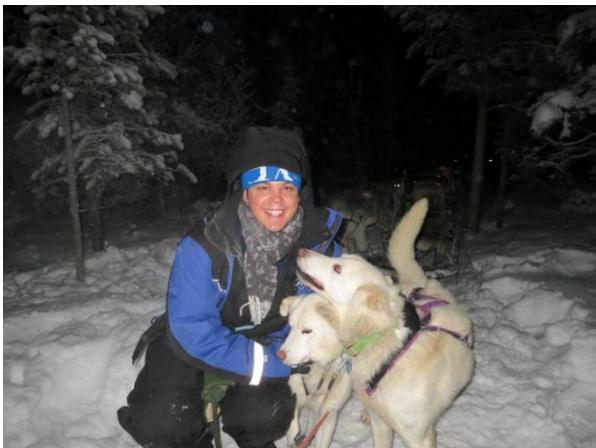


Figure 10. Husky sledding in the Arctic circle in search of the elusive Northern Lights

### **CRAELIUS, MÄRSTA**

Next on my adventure was Craelius, the Geotechnical Drilling and Excavation division of Atlas Copco. Here I was given presentations of the various products in the range including In the Hole, Christensen, Diamec and Explorac. Following this I visited the workshop where I was able to see many of the machines ready for shipment and innovative features such as the cyclone which sorts the cuttings to enable easier analysis of the geology.

While at Craelius I was also taught an interesting life lesson, which was referred to in the Swedish world as the “Saab-Volvo factor” easily appropriated as the Ford- Holden factor. Many businesses and operators prefer what they know and I heard many stories of products and designs which did not take off due to operator resistance. I was told that this push to trial and reap the benefits of new technologies must come from the new generations in management, our generation, something that has resonated with me.

### **ATLAS COPCO GROUP CENTRE, NACKA**

My trip was sadly coming to a close and I was back in Stockholm to experience the sites and meet with people at Nacka, the Atlas Copco headquarters, and like everything on this trip it was no ordinary HQ. I met with people from the HR division to discuss what it takes to find motivated, skilled and passionate people in the industry, attract them to work for a business in a competitive industry and most importantly ensure worker satisfaction to retain these workers through tough times. It is incredible how much effort is put in behind the scenes to ensure the correct people are resourced and available to make projects a success.

I also met with staff from Financing who discussed the various roles they play in ensuring the company maintains returns for stakeholders and sufficient capital for their vast array of R&D projects. I was then able to meet with workers from Communications and Branding who have the massive task of keeping the world up to date on the work AC does around the world. The Achieve magazine released by Atlas Copco details their work around the world with a focus on the projects that are having long lasting positive impacts on the society and environment in the area.

Following these inspiring meetings I was taken to the Nacka underground test mine which has been operating since 1938. This is most the most unusual mine and probably the most urban of any mine in the world located under Atlas Copco Head Office, a shopping centre and 10 minutes from Stockholm CBD, all at only 40m below ground level – now that’s confidence. It is also likely the only mine you will see several Audi’s driving around in. Here numerous products are tested and shown to prospective clients in operation. I was able to go see a charged face ready for blasting and see air leg drills in operation, destined for India and the African market. It was an eye opening experience to see this taking place in such an urban setting and also interesting to see the focus on the equipment with no interest in the mined product.



Figure 11. Probably the most metropolitan charged face in the world.

The next day I had a full tour of Stockholm with a tour guide and chauffeur. I was able to see the Vasa Museum, the old town, experience the first Stockholm snow while I ice skated in Kungsträdgården and then tried the local beers and schnapps – at pretty much Perth prices!



Figure 12. Shovelling the first fall of snow at the house of a Swedish couple that I met on my flight.

### ZACATECAS, MEXICO

After my inspiring experience with Atlas Copco I returned to Australia to graduate university and then take off to Central/South America, a graduation present to myself. During my time in Sweden I was able to network with many people and I was extremely fortunate to build a few links to see some more of Atlas Copco around the world. While in Mexico I made a stop through Zacatecas one of the world’s most famous silver deposits, and I was able to visit Federero I Minervo Mine, an interesting board and pillar metaliferous mine unlike anything I have encountered before with extremely irregular ore bodies.

I was taken to the site by an Atlas Copco representative, undertook a full induction and mine tour in Spanish - my Spanish got a great deal better or I understood a lot less than I thought I did. The following day a few of my travel friends and myself were picked up by another Atlas Copco representative, a Mexican national who was on holidays from her job in Sweden. Despite it being her holidays she picked up some stray Aussies and gave us a tour of the local attractions and showing us the best food in town!



Figure 13. Having a photo next to one of nine religious shrines underground, a very a-typical mining experience

### LIMA, PERU

Later in my travels I was able to visit Atlas Copco Peruana in Lima, here I was able to meet with several product specialists who highlighted key competitive advantages and safety features on AC Scooptrams, afterwards I was able to visit the workshop to see these features in operation. The following day I visited CIA Minas Condestable mine, utilising selective extraction and thin pillars for recovery of their steeply dipping copper vein deposits. Atlas Copco boomers have achieved high productivity which has made low grade ore bodies economically feasible, something its competitors could not achieve.

Following this I was taken to Asia, a resort beach town outside of Lima for a delicious meal and a further conversation (mostly in Spanish) with Atlas Copco representatives. From both of these additional visits I was able to see how a company works across varying different countries with different regulations and cultures but still maintain commitment to a quality product and exceeding what is prescribed by regulations for social and environmental benefit. A direct example being that Tier 4 engines are required by Europe regulations but are now being fitted to all Atlas Copco

rigs due to their positive environmental impacts.



Figure 14. Hanging with some of the technicians at the Atlas Copco underground workshop.

### CONCLUSION

The Atlas Copco Travelling Scholarship was undoubtedly the best experience in my life, combining travel and cultural experiences within a mining context and has in my mind set a high benchmark for the future of mining equipment. The willingness of Atlas Copco to show and explain prototypes being developed as well as showing me behind the scenes in workshops to enhance my experience demonstrates their commitment to ensuring I was able to have the most fulfilling experience.

Another thing I will take away from this experience was one morning while I was sitting in a waiting room four different languages were being spoken. Throughout the whole trip English was usually present, but not always, and most people were able to speak at least two languages. As I was told in Sweden, *“Australians are notorious for only speaking one language, but having another will never do you a disservice especially in business”*.

In the same international vein I have now been able to see Atlas Copco operations across four continents and their commitment to safety, productivity and sustainability was consistent, making it clear they are actively trying to drive



changes to make mining better the world over.

The longevity of Atlas Copco in the industry combined with the passionate and experienced workers that make it successful means myself and many others working in this industry will have a great deal to do with Atlas Copco throughout our careers and I am confident your experience of the people and company will be as positive as mine.

In this report I am unable reflect on every amazing piece of advice, every insight into the industry or machinery or retell every incredible experience, but each and every person I met gave me new insights and holistically has left me a much better prepared and focused individual entering the industry passionate to drive success and bring about changes necessary to help achieve this.

#### **ACKNOWLEDGEMENTS**

I cannot possibly express my gratitude to all who have contributed to this experience (I met with over 60 people formally or informally). Those who offered advice and

career guidance, shared a wealth of knowledge so willingly that only comes from years of passionate work in the industry and gave up free time of their own to show a 'newbie' to the industry the potential that can be achieved. Every person I met welcomed me warmly and I cannot speak highly enough of this experience and the people who made it so fulfilling. I would also like to thank everyone behind the scenes Theresa Gustafsson, Anja Pettersson, Hector Garcia and Maria Patricia Tuccio who organised everything and made sure my trip was a success and hassle free.

I am looking forward to my next experience with Atlas Copco in the future and the potential of catching up with many people I met through this scholarship later in my career.

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